Effective Strategies in Justice Information Integration:

A Brief Current Practices Review

J. Ramón Gil-García
Carrie A. Schneider
Theresa A. Pardo

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Center for Technology in Government
University at Albany, SUNY
187 Wolf Road, Suite 301
Albany, NY 12205
Phone: 518/442-3892
Fax: 518/442-3886
Email: info@ctg.albany.edu
www.ctg.albany.edu

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Executive Summary

Information integration is considered one of the most significant ways to change the structure and function of organizations. It has the potential to support the transformation of organizational structures and communication channels between and among multiple agencies working in different locations. Traditional governmental structures have organized the capture, use, and management of information along agency lines. Overcoming these deeply entrenched program and information "silos" is the particular challenge agencies face as they pursue the benefits of integrating information. This current practices study contributes to a community-wide knowledge building effort by examining the factors that influenced the success of selected justice information integration initiatives.

Not all integration initiatives are the same. Some focus on a specific problem, others focus on building systemic capacity. The benefits realized from information integration differ from organization to organization as well, and according to the characteristics of specific projects. However, there are certain types of benefits that can be expected in almost any information integration or information sharing initiative. Dawes (1996) classifies these benefits into three categories: technical, organizational, and political.

Despite tremendous benefits, information integration, like many other IT-related initiatives, presents organizations with tremendous challenges. A review of the academic and practitioner literature identified four key categories of barriers to information integration: (1) turf and resistance to change, (2) IT and data incompatibility, (3) organizational diversity and multiple goals, and (4) environmental and institutional complexity.

The cases included in this study illustrate the following strategies used to mitigate the impact of each barrier as well as the cumulative effect of multiple barriers.

- Retain autonomy of the involved agencies
- Establish and exercise a governance structure
- Secure strategic partnerships
- Build on long-range and comprehensive planning
- Build understanding of the business process
- Secure adequate financial resources
- Obtain and nurture executive leadership and legislative support

Exploring Information Integration

Information integration is considered one of the most significant ways to change the structure and function of organizations. In its most simple conceptualization, information integration allows managers to work at the same time, with the same information drawn from multiple disparate sources. It has the potential to support the transformation of organizational structures and communication channels between and among multiple agencies working in different locations. The question remains, not whether we should invest in integration initiatives, but which initiatives should be pursued and what barriers must be overcome in order to be successful?

Information sharing and integration is a relatively new challenge for public agencies. Traditional governmental structures have organized the capture, use, and management of information along agency lines. Overcoming these deeply entrenched program and information "silos" is the particular challenge agencies face as they pursue the benefits of integrated information. Justice agencies, in particular, need to share information in a timely and effective way in order to secure public safety. As a result, a number of efforts[1] within the justice community are seeking to build knowledge and understanding about information integration. This current practices study contributes to this community-wide knowledge building effort by examining the factors that influenced the success of selected criminal justice integration initiatives.

This study[2] was conducted to help practitioners respond to questions about which initiatives to pursue, what barriers they will encounter, and what are some effective strategies for overcoming those barriers. A snapshot of current research on barriers to information integration is presented first followed by strategies, drawn from the six cases, found to be effective in overcoming the barriers to information integration. Each case is then presented in terms of five elements: 1) goals of the project, 2) brief description, 3) key players, 4) critical success factors, and 5) challenges and future plans.

It is important to emphasize that there is no "one size fits all" solution. Solution strategies are context specific. The reader is urged to consider the barriers in each case and the strategies employed for overcoming barriers in terms of their own environment and the specifics of their initiatives. Specific information is provided about each integration initiative so the reader may be aware of the context within which these strategies were effective.

Understanding the objectives and the benefits of any particular integration initiative is necessary to the identification of barriers and the development of strategies for overcoming those barriers. The following sections presents two frameworks for

[1] Some examples of these efforts are projects funded by the US Department of Justice such as (1) Consequences of Inadequately Integrated Justice Information Systems, developed by the Center for Society, Law, and Justice, University of New Orleans, (2) And Justice for All: Designing Your Business Case for Integrating Justice Information, developed by the Center for Technology in Government, University at Albany, (3) Applying Security Practices to Justice Information Sharing developed by the Security Working Group of the Global Justice Information Sharing Initiative, (4) Integration in the Context of Justice Information Systems: A Common Understanding, developed by SEARCH, The National Consortium for Justice Information and Statistics, and (5) Increasing Information Sharing Effectiveness: A Capability Assessment Model for the Justice Enterprise, developed by the Center for Technology in Government, University at Albany.

[2] The results are based on a review of relevant research and of case studies and other materials related to information integration in the criminal justice enterprise. Additional information was gathered through interviews with participants from selected initiatives.

expressing the objectives of an integration initiative and a set of categories to support the identification of benefits.

Integration Objectives

Not all integration initiatives are the same. Some focus on a specific problem, others on building systemic capacity. Table 1 shows one way to classify integration initiatives in terms of their focus and the associated level of organizational involvement. Analysis of the cases supports the observation that there is a logical, yet highly simplified, progression of complexity. Specific characteristics of the initiatives such as the number of participants or the institutional framework will influence the final result. However, in general terms, moving from an initiative of type A to one of type F introduces a wide range of new issues.

Table 1. Types of Information integration initiative

Organizational Level	Focus on meeting a specific need or problem	Focus on building a systemic capacity
Inter-Governmental	E	F
Inter-Organizational	C	D
Intra-Organizational	A	B

These two dimensions help to illuminate the challenges being faced. For example, inter-governmental initiatives that focus on building systemic capacity can be generally understood as more complex than intra-organizational initiatives that focus on a specific need or problem. Most of the cases selected for this report can be identified as being in cells D, E, or F. Therefore, they are considered initiatives that involve high complexity and the way they overcome different challenges provides valuable lessons for other similar or less complex information integration initiatives.

Initiatives can also be classified based on the objectives of their integration; comprehensive, incremental, and selective. These groups are not mutually exclusive. Initiatives categorized as comprehensive can have some characteristics of selective or incremental strategies. In fact, many counties and states have complex initiatives with a mix of comprehensive, selective, and incremental components. In addition, some initiatives start as selective or comprehensive and become incremental due to the changing nature of the technology and the needs of the justice community.

Comprehensive integration initiatives attempt to integrate information from many different organizations and levels of government in a relatively short period of time. They are the most likely to be both inter-organizational and inter-governmental in nature and typically involve building systemic capacity rather than solving a specific problem. Colorado Integrated Criminal Justice Information System, initially developed over a four-year period, is an example of such a strategy.

Selective integration initiatives integrate information only in certain areas or types of organizations (e.g.: courts, law enforcement, etc.). Normally, these projects attempt to gather information about one function from different levels of government. However, sometimes the projects focus on different functions in the same level of government. The Oklahoma Offender Data Information System (ODIS) which is focused on managing the state's law enforcement agencies' data, is an example of a selective integration initiative.

Incremental integration initiatives take an incremental approach to developing information integration in a limited number of organizations and levels of government, typically pursuing a more comprehensive information integration project in the long-run. An example is Harris County's Texas Justice Information Management System. This system has been in place for over 20 years and the plans for system enhancement extend well beyond basic law enforcement and court procedures to include open warrants, address records, pawnshop data, gangs and gang members, and vehicle registrations.

Integration Benefits

As Dawes (1996) points out, information integration, as well as information sharing, offers organizations a greater capacity to share information across organizational boundaries, to discover patterns and interactions, and to make better informed decisions based on more complete data. Bellamy (2000) adds that information integration in the justice enterprise can lead to improved safety and more coordinated justice services. Decentralization, improved decision making, high quality services, empowerment, and greater productivity have been mentioned as potential gains from information integration projects. Increased productivity, improved decision-making, reduced costs, increased revenues, and integrated services (Kuan and Chau, 2001; Roldán and Leal, 2003) have been identified as positive results as well.

Understanding the type of information sharing being pursued and the challenges associated with achieving the stated objectives is important to understanding the benefits that organizations can expect to realize. The benefits realized from information integration differ from organization to organization and according to characteristics of specific projects. However, there are certain types of benefits that can be expected in almost any information integration or information sharing initiative. Dawes (1996) classifies these benefits into three categories: technical, organizational, and political.

Technical benefits are those related to data processing and information management. Caffrey (1998) notes that information integration reduces duplicate data collection, processing, and storage and therefore reduces data processing costs that attend every public program. Furthermore, as Dawes (1996) suggests, an information sharing initiative can also promote better standards and shared technical resources. Some of these technical benefits are identified in information systems literature as system-related benefits. System reliability and accessibility are two well-known examples.

Organizational benefits**,** known also as business or firm benefits, are benefits related to the solution of agency-wide problems or the enhancement of organizational capabilities. Improving the decision making process, broadening professional networks, improving coordination, increasing the quality of services, and reducing costs are some examples of organizational benefits (Walton, 1989; Andersen and Dawes, 1991; Roldán and Leal, 2003). In the information science literature organizational benefits are treated separately but are considered complementary to technological and environmental benefits.

Political benefits might include better appreciation for government-wide policy goals, more public accountability, more comprehensive public information, integrated planning, and improved service delivery (Andersen and Dawes, 1991). According to Jane Fountain (2001), political benefits can also be considered as individual benefits for public officials as a result of the use of specific technology characteristics or applications.

Despite the tremendous benefits, information integration, like many other IT-related initiatives, presents organizations with tremendous challenges. Those challenges result, in large part, from the reality that integrating criminal justice information involves, ultimately, large parts of, if not the whole criminal justice enterprise. This is made even more challenging by that fact that these enterprises differ so greatly among states and localities. Those involved in justice integration initiatives must be aware of the differences, and the implications of those differences, as they look to their colleagues for guidance and best practices. This study provides insight into some integration objectives, strategies, barriers, and current practices. It presents, along with those insights, case information so that the insights shared can be considered in their original context and then explored, by potential adopters, in terms of their own environments.

Barriers to Achieving Integration

A review of the academic and practitioner literature identified four key categories of barriers to information integration. Experience and research shows that any single initiative is faced with a myriad of highly interdependent barriers, and as a result integration teams must employ multiple strategies to overcome these barriers. The cases illustrate a number of examples where integration teams adopted strategies to mitigate the impact of each barrier as well as the cumulative effect of multiple barriers. The following section presents the four integration barrier categories followed by a set of strategies found in the case studies used to overcome these barriers.

Table 2. Integration barrier categories

- Turf and resistance to change
- IT and data incompatibility
- Organizational Diversity and Multiple Goals
- Environmental and institutional complexity

Turf and resistance to change

Among the barriers to information sharing at the organizational level are turf as a form of resistance to change, integration experience, and technology acceptance (Best, 1997; Kolekofski and Heminger, 2002). Most of these barriers are recognizable at the

organizational level and in many cases represent either decision-makers interests or characteristics of the organizational culture and structure.

As a form of resistance, turf seems to be a strong barrier to information integration initiatives. According to Cresswell and Connelly (1999), the concept of *turf* seems to include at least three major reasons organizations act defensively: (1) to avoid the costs of change, (2) to reduce or control risk, and (3) to preserve autonomy or protect the organization's position in a competitive or adversarial environment. Turf can be conceived as a personal or organizational problem, and it refers to the defense of status, power, or other resources that may be at stake for individuals in any particular integration initiative.

IT and data incompatibility

Known as technical, technological, or information-system barriers, these barriers are mainly related to incompatibility or specific complexity of hardware, software, and telecommunications systems (Caffrey, 1998; Chengalur-Smith and Duchessi, 1999; Dawes and Pardo, 2002). Other sources of problems in information integration initiatives are mismatched data structures and incompatible database designs (Ambite et al., 2002). Information technology and data incompatibility are challenges that can diminish the potential positive effects of information integration. Minimal uniformity and consensus on data, infrastructure, and procedures, as well as shared decision making, are necessary to achieve most integration objectives (Cresswell and Connelly, 1999). However, as Dawes (1996) suggests, even when the organizations involved use of the same kind of data, sharing often remains problematic due to conflicting data definitions. Reliability and compatibility of the data are necessary to foster an environment in which organizations are willing and able to integrate.

Organizational diversity and multiple goals

Organizational diversity and multiple goals can be considered primary organizational barriers. Dawes (1996) establishes that "given the diverse costs of information sharing, it is probably unreasonable to expect an organization to share its information resources without an expectation that it will gain internal benefits, improve its public image, or expand its influence over others" (380). Conflicting organizational goals and priorities are also significant barriers for any collaborative IT project (Dawes and Pardo, 2002). Meyer and Gardner (1992), as well as Chengalur-Smith and Duchessi (1999) have identified other organizational characteristics as important factors of success such as: centralization, organizational culture, strategy, and size.

Building trust and collaboration across agencies with very diverse and, in some cases, competing goals, is a challenge many integration initiatives face. On one hand, the Justice community is formed by not only multiple agencies, but also by multiple levels of government, and by complex interactions between the different branches of government. This particular situation increases the difficulty of integration projects. On the other hand, professionals from different organizations might see the same problem in different ways. If these different perspectives are sought after, they can be used to inform integration decision making. Organizational culture shapes the way people deal with problems and how they make certain decisions. In general, each of the states and counties has developed its own strategy to overcome organizational diversity and differences among the organizations participating in the integration initiative.

Environmental and institutional complexity

These barriers relate to the political complexities of every governmental system. Some examples of these barriers are given by Dawes (1996): (1) external influences over the decision-making process, such as legislative committees, interest groups, civil servants, and other governmental jurisdictions like local governments; (2) the power of agency discretion, which refers to the capacity of high level bureaucrats to influence the programs and policies; and (3) the primacy of programs, which reinforces vertical connections and serves as a disincentive collaboration among agencies.

These barriers result from the structure of the American political system. Our government is based on independent branches of government with shared powers. Organizational and regulatory frameworks are established for supervision and control between branches and not for cooperation among them (Derthick, 1990; Fountain, 2001). Thus, the criminal justice system involves organizations from at least two government branches (executive and judicial). Successful projects must find ways to avoid institutional impediments and work collaboratively towards a common or shared objective.

Effective Strategies for Information Integration

The following core set of strategies are being employed in the initiatives examined in this study to deal with and overcome key barriers to information integration in the justice enterprise.

Retain autonomy of the involved agencies

A strategy regularly adopted in the cases studied is the recognition and retention of the autonomy of different agencies involved in the integration initiative. As a group, members of each initiative made decisions together, but the members were respectful of individual agency decisions concerning each agency's information and infrastructure. An example of this is the Colorado Integrated Criminal Justice Information System (CICJIS). Each agency participating in the initiative maintained its own legacy system and made most of the decisions pertaining to the information contained within it.

This kind of integration strategy was employed in the cases studied, and was seen as a first step to more comprehensive and integrated projects requiring process or infrastructure integration.

Establish and exercise a governance structure

A well-organized governance structure was considered a success factor in each integration initiative studied. Each case benefited from a well-organized governance structure charged with providing leadership, defining goals and objectives of the project, and enabling efficient analysis of policy environments and technical solutions. A

governance body was considered an important coordination and control mechanism for the agencies involved in an initiative. Each case recognized and acted on the need to have policy-level members in the governance structure. Through the various governance structures members were provided the capacity to make decisions and build agreements with their partners. The governance bodies provided a venue for cross-boundary integration teams to explore the diversity of their organizational goals and to focus on establishing a shared goal for the integration initiative. The governance bodies also provided a venue for the necessary debate that surrounds the development of system and data standards necessary to support interoperability.

The Commonwealth of Pennsylvania Justice Network (JNET) executive council is comprised of ten governing agencies. The executive council is responsible for establishing the policy and strategic vision of the integration initiative.

Table 3. Useful integration strategies

Integration strategy	Integration barriers addressed
Retain autonomy of the involved agencies	♦ Turf and resistance to change ♦ Environmental and institutional complexity
Establish and exercise a governance structure	♦ Organizational diversity and multiple goals ♦ IT and data incompatibility
Secure strategic partnerships	♦ Environmental and institutional complexity ♦ IT and data incompatibility
Build on long-range and comprehensive planning	♦ IT and data incompatibility ♦ Environmental and institutional complexity ♦ Turf and Resistance to Change
Build understanding of the business process	♦ Organizational diversity and multiple goals ♦ Environmental and institutional complexity
Secure adequate financial resources	♦ IT and data incompatibility ♦ Turf and resistance to change
Obtain and nurture executive leadership and legislative support	♦ Turf and resistance to change ♦ Environmental and institutional complexity

Secure strategic partnerships

Participants in successful integration initiatives have formed strategic partnerships within the justice community, beyond the justice community and with the private sector. In the integration initiatives studied, participants consider success to be more dependent on forming strong relationships and building trust than on using any particular technology. Using strategic partnerships was found to be effective in helping teams deal with the complexity of the environment. Some projects found that partnerships with end users

were critical to their success. These partnerships resulted in access to multiple perspectives on justice business processes and the use of integrated information. In addition, technical assistance provided by vendors appears in several initiatives as a success factor. A positive effect of the partnership with private vendors was the impact on IT and data incompatibility issues. In one case, public-private partnerships resulted in an improvement of technical expertise concerning a specific piece of hardware or software.

The Commonwealth of Pennsylvania had success in using technical knowledge from the private sector in developing its integration initiative. It has also had success with outsourcing its technological support to outside companies. In Minnesota, the executive director of Minnesota Business Partnership was able to successfully explain to the State Legislature how applying corporate "best practices" could help the State with its criminal justice information integration initiative.

Build on long-range and comprehensive planning

Most organizations involved in the cases studied engaged in comprehensive planning before starting with the development and implementation of their integration initiative. This prior planning allowed integration efforts to exist within a broad strategic view of integrated justice. Indeed, according to Cresswell and Connelly (1999), initiatives based on comprehensive planning and a long-range perspective achieve a wider, more systematic range of objectives. Prior and ongoing planning efforts in the cases allowed for the identification of environmental complexity and resulted in the adoption of short and long-term strategies to address this complexity. Planning also informed change management strategies and specific technical development efforts. Early integration planning highlighted the need for an interoperable technical infrastructure to support integration. A number of the cases invested early on in cross-boundary standards efforts to support interoperability.

Harris County designed its integration initiative with future needs in mind. Likely needs for support and growth were considered in the development of the County's Justice Information Management System (JIMS). Similarly, Delaware developed an incremental approach that included long-range planning and periodic enhancements.

Build understanding of the business process

According to Cresswell and Connelly (1999), the design of information architectures and applications requires clear and highly-detailed knowledge of specific procedures that generate or use criminal justice information. Successful organizations have this highly detailed knowledge about their business processes and a solid understanding of the reasons why they are engaging in integration projects. Each of the initiatives demonstrated a good understanding of their own processes as well as the processes of their partners. They used the work of building this understanding to identify and highlight organizational similarities and differences. For example, they were able to identify how a single data element was viewed and used differently by different agencies, and even by different units within a single agency. Process analysis efforts allowed integration teams to reduce complexity by making the processes of each agency explicit.

Delaware staff talked to every user of the system to understand their needs and have a clear picture of the processes of the different agencies involved in the initiatives. These efforts also resulted in the shared understanding for how each process supports or does

not support the shared goal of the integration effort and the specific and appropriate goals of each individual agency.

Secure adequate financial resources

Adequate financial resources were identified as necessary to take advantage of the promises of information integration projects. Support from state and federal grants was considered a persistent success factor. How resources were used also seemed to influence success. Using resources in an enterprise-wide manner, in particular, was found to be a factor in achieving success. Financial support was often seen as an incentive to reduce resistance to participation. In addition, the cases indicate that the availability of financial support resulted in more agencies being willing to move forward on the changes necessary to support technology and data compatibility. Adequate financial resources allowed those agencies that were resistant based on a lack of their own resources to consider the opportunities of integration independent of the impact on local, already constrained budgets.

Many of the initiatives reviewed in this study received funding from state or Federal sources. However, governments have found other ways to fund integration initiatives. For example, in Marin County, the Criminal Justice Information System began when key officials from four neighboring counties in California pooled money to begin its development.

Obtain and nurture executive leadership and legislative support

Successful projects have either a strong executive champion, the support of the legislature, or both. Obtaining the support and buy-in from an executive leader or a legislative body necessary for an information integration project to move forward is critical. Integration efforts require organizations and individuals to change. In a number of the cases, leadership support was critical to efforts to secure necessary change. Securing the necessary change in the cases studied required an open and collaborative process, and clear and consistent leadership support.

At the state level, legislative support is considered essential for the success of broadly based integration initiatives. The complexity of the environment and the sometimes unclear lines of authority were found to be less of a barrier in those cases where the legislature provided leadership and support to the initiative. In most of the cases studied, the legislature was closely involved in the design, implementation, and evaluation of the initiative.

In Colorado, a Statutory Commission of the Legislature was a key player in establishing the state's comprehensive integration initiative. In Delaware, the State Legislature played a major role in the development of the Delaware Justice Information System (DELJIS).

Current Practices in Information Integration

There is growing attention on integration as a critical strategy for increasing the effectiveness of multi-jurisdictional, multi-governmental enterprises such as the justice enterprise. As a result, the integration of information across traditional boundaries is growing in importance to the agendas of local, state, and Federal agencies. The emergence of enterprise architecture at the Federal and more and more at the state level is an example of the investments being made in infrastructures to support cross-boundary information sharing.

The justice community in particular is investing in the development of standards, as a form of infrastructure, to support data sharing. For example, an XML Technology Working Group, as part of the Justice Integration Information Technology Initiative of the US Department of Justice, Office of Justice Programs, is currently working to coordinate the efforts of federal and state agencies in the design of interoperable standards for criminal history and public safety records.

Selected examples of integrated justice are described in detail below. These examples build understanding of integration efforts by presenting the problems experienced, successful strategies employed, and the benefits obtained. This section describes three county-level and three state-level examples. The case presentations are organized by the following five elements:

1. Goals of the project
2. Brief description
3. Key players
4. Critical success factors (CSFs)
5. Challenges and future plans

Information integration at the county level

This section presents three cases of information integration at the County level. These cases provide exemplary strategies for achieving successful information integration in the criminal justice enterprise at the county level.

Harris County, Texas

Goals of the Project: The primary goal for establishing the Justice Information Management System (JIMS) was to establish a permanent operation with ongoing support, growth, and development. JIMS was not designed to be a single project with a limited development period, but instead was designed with future needs in mind.

Brief Description: Overall, JIMS is a large operation. It began in 1977 and currently has a staff of 43 and an annual budget of over $3 million of County funds. The system contains over 180 million criminal justice records and over 85 million civil justice records. The user community consists of over 18,000 individuals from 144 county agencies, 111 other local agencies and governments, 11 state agencies, 15 Federal agencies, and over 800 subscribers. The system has grown to include civil justice information in addition to criminal justice information. JIMS includes jury management and payroll processing as

well as an extensive civil justice component. JIMS also includes a GIS system adaptable to various agency needs.

Key Players: The Harris County Commissioner's Court and the District Clerks' Office were key champions to the establishment of JIMS.

CSFs and Results: Several factors converged to provide an opportunity for the creation of JIMS. A class action suit on jail overcrowding revealed a weakness in the county's information systems. The County had three information systems that were unable to interact with each other. Political and organizational factors opened the window of opportunity the County needed in order to act. The County's courts and law enforcement agencies, along with the data processing operations organization, completed an exhaustive analysis of information used by the criminal justice enterprise. It then produced recommendations for a data processing center that would replace the three disparate systems. The County ultimately chose to take an incremental approach to solving its information integration issues by developing components in smaller steps. The development decisions were based upon an understanding of information flows, business rules, and user needs.

Challenges and Future Plans: JIMS has been in place for over twenty years. Given its length of existence, the system faced problems of obsolescence. Harris County decided to stay with its grand-design architecture by migrating its legacy database to a more current technology. There are plans to enhance the system to include open warrants, address records, pawnshop data, gang information, and vehicle registration.

Hennepin County, Minnesota

Goals of the Project: The goal of the Criminal Justice System Information Integration Project (CJIISP) is to create an information network that allows agencies real time access to the information of other criminal justice agencies. The scope of this integration effort encompasses all law enforcement agencies within Hennepin County, city and county prosecutors, the courts, probation and parole, the local jail, and the local post-sentence incarceration facility. Similar integration efforts using the compatible integration middleware are being pursued in other counties within Minnesota. A statewide office called CriMNet is responsible for orchestrating these county-level efforts and for providing integration services to allow access to information between counties and from counties to state criminal justice agencies.

Brief Description: Hennepin's County Criminal Justice Coordinating Committee (CJCC) oversees the county's integration effort. CJCC was formally established in 1998, but had been in place informally for twelve years prior. CJIISP was a natural fit for this multi-agency committee. Currently CJCC is working under a memorandum of understanding. CJIISP began in 1999.

Key Players: Each of the local criminal justice agencies cited above are represented on the CJCC and provide high-level guidance for this information integration effort. In addition, representatives from Hennepin County serve in an advisory capacity on various state-level boards created to guide the CriMNet initiative. Funding for these integration initiatives comes from the U.S. Department of Justice, and the Minnesota State Legislature. Private industry in Minnesota has also played a major role in the initial success of the endeavor.

CSFs and Results: CJIISP was initially a county effort, but eventually grew into a statewide project. The executive director of Minnesota Business Partnership was able to explain to the State Legislature the complex process of integrating information systems and how applying corporate "best practices" could help the state to integrate its criminal justice information. The State Legislature was very supportive of the idea of establishing a statewide criminal justice information system. Within Hennepin County, real-time data exchanges have been implemented between arrest events (law enforcement) and pre-sentence detention (the Sheriff and pretrial evaluations performed by Community Corrections) and prosecution (County Attorney). Real-time data exchanges between prosecution and the courts have also been implemented.

Challenges: With a population of over 1.1 million, Hennepin County is the largest county in Minnesota. It is the most complex county in the State. At one time the system was too slow to keep up with the demands placed upon it. The CJIISP also lacked standard purchase order numbers across the systems.

Future Plans: CJIISP plans to conduct an analysis of city prosecution business functions to streamline their activities by leveraging information already captured by law enforcement. There are also plans to develop event-driven application adapters for the systems of records used by Adult and Juvenile Probation. CJIISP is also working on integration analysis and development for the introduction of a new statewide court system.

Marin County, California

Goals of the Project: The current goal of the Criminal Justice Information System (CJIS) is to incorporate new technology and new features into the system.

Brief Description: CJIS began in 1984 and was built over a seven-year period. Over time it grew into a five county effort. The consortium began when key justice officials from Kern, Marin, and San Joaquin counties pooled financial resources to develop a new information system. This cooperative approach has worked very well for the counties involved. Each member of the consortium was responsible for developing and working on the components that were most important to it. As a group, the counties agreed upon which standards to use. A contractor was then hired to develop the initial code. The District Attorney Case Management (DARWIN) phase 1 has been implemented and is considered successful. The system interfaces with the CJIS database and provides technology enhancements including MS Office, imaging, and Web interface.

Key Players: The Marin County Information Systems and Technology (IST) Department played a major role in the development of the Criminal Justice Information System.

CSFs and Results: CJIS has become a national model for cooperation in criminal justice information integration. It is an example of interorganizational cooperation and resource sharing.

Challenges: The Marin County justice community is being served by an increasing number of discrete systems. The system currently only provides access to adult criminal, civil, and juvenile justice information. Probation case management was added to the system in 2002.

Future Plans: Marin County and the other members of the consortium are in the process of developing a new integrated justice system – E-JUS. E-JUS will provide greater

connectivity and enhance the ability to share and view data amongst the systems. The consortium has plans to add a system in 2003 – Law Enforcement Information (ALEIS). There are plans to add a new Statewide Information System for the Courts in 2004.

Table 4. County Overview

County	Integration Approach	Start Date	Levels of Government	Governance Structure	Funding
Harris County, Texas	Incremental / Systemic Capacity	1977	County	Yes	Funded by Harris County
Hennepin County, Minnesota	Comprehensive / Systemic Capacity	1999	Grew into Statewide Project	Yes	Funded through the State Legislature
Marin County, California	Incremental / Systemic Capacity	1984	Multi-County	Yes	Funded through resources provided by member counties

Information integration at the state level

In this section, three state level information integration initiatives are presented. The three cases are exemplary examples of integration in the criminal justice enterprise at the state level. This section briefly describes each of these three initiatives.

Colorado

Goals of the Program: The Colorado Integrated Criminal Justice Information System (CICJIS) is a program that helps criminal justice agencies share information. The goal of criminal justice information sharing in Colorado is getting the right information to the right people at the right time and place. To that end, CICJIS has at least four related sub-goals: to improve public safety by making more timely, accurate, and complete information available statewide to all criminal justice decision makers; to improve productivity of staff (reducing redundant data entry, collection, and storage efforts, as well as related paper processing); to enhance access to and quality of information; and to provide statistically reliable information.

Brief Description: CICJIS is a seamless criminal justice information sharing program that incorporates several agencies as primary participants and federal and local government through the primary participants. CICJIS maximizes standardization of data and communications technology among law enforcement agencies, district attorneys, the courts, and state-funded corrections for adult and youth offenders. The initial program scope included all felony and juvenile cases, as well as all case types for warrants and restraining orders. The information integration initiative valued the existing autonomy and platforms of involved agencies; therefore each participant maintained its own legacy system and ownership of its information. CICJIS facilitates information sharing by electronically moving data from one agency to the next and by providing query access on other systems. The annual CICJIS budget line is approximately $1 million and another $200-400,000 comes from grants.

Key Players: A Statutory Commission of the Legislature appears to be the most important player in the initial successful development of CICJIS. Before expiring in 1994, the commission arranged for all agencies involved to testify before the legislature as to why integration still did not exist. This was the catalyst to start this comprehensive integration initiative. There were three additional relevant players involved in the initial development of CICJIS: the Information Management Committee, the Executive Policy Board, and the CICJIS Task Force. Now that the program has been in production for five years and is a success, expansion opportunities are being considered. New key players are the Program Director/CIO, Task Force, Executive Policy Board, and the Business and Technical Teams.

CSFs and Results: CICJIS was developed in less than four years (from 1995 to 1998). Several performance measures were established by the Legislature. One of the initial success factors for Colorado was the state legislature's support and oversight. The primary success factor continues to be the State's disposition match rate that started at a mere 8-12% but is now 89% statewide. Ongoing success requires maintenance and support of the system and projects to further enhance information sharing opportunities. The initial CICJIS design was comprehensive but may no longer meet the scalability and reliability requirements of the program. While maintaining the business rules and

standards, CICJIS is converting its solution to a Web services environment utilizing Justice XML.

Challenges and Future Plans: Future plans include enhancing existing queries, value add to query results, registering sex offenders earlier in the criminal justice process (at conviction), and expansion opportunities both inside and outside of the criminal justice enterprise. The CICJIS program is developing enhancement requirements to meet homeland security information sharing needs, while integrating additional agencies for both criminal justice and homeland security goals. The State is looking at using the CICJIS program information-sharing model as a statewide standard. Challenges include lack of funding and current system solution scalability and relative high maintenance costs. Previous data integrity challenges have been significantly reduced with a database design change and a complete rewrite of the data and referential integrity rules.

Delaware

Goals of the Project: The main goal of the Delaware Justice Information System (DELJIS) is to create an integrated information environment that will expand services to agencies and individual criminal justice professionals and workers by providing accurate and timely information that can be shared across participants.

Brief Description: In 1984, the Information Systems Plan of the Criminal Justice System of the State of Delaware was released for dissemination. The formal launching of DELJIS was dated in 1990, when the courts' Disposition Reporting System merged with the Computerized Criminal History. Currently, users are able to instantly determine the status of a case, thus enhancing the ability to process criminal cases in a more efficient way. Through the system, users can share criminal history, warrant, and case information. The system also considers extensive use of videophones for many purposes, and as a result users have gained some organizational efficiencies. DELJIS has had financial support from federal and state agencies. Creating and improving the system cost approximately $10 million since 1982. Currently, the Delaware Criminal Justice Information System contains comprehensive information from law enforcement to courts and corrections.

Key Players: The State Legislature was the most important player in the development of DELJIS, the agency that oversees the criminal justice information system. In addition, the board of managers of DELJIS continues to offer suggestions for improvement and next steps for the system.

CSFs and Results: DELJIS can be described as using a well-planned incremental approach. One of the most important factors that helped Delaware to be successful in information integration was user involvement. Identification of users' needs was a difficult and time-consuming task for the DELJIS staff, but the results were very good. User involvement in the design phase of the system, followed by adequate user training seemed to be a successful strategy in this case. In addition, the relatively small geographic size and limited number of local agencies were also organizational characteristics that facilitated the integration effort. Another factor to take into consideration was the partnership with Troop Two of the Delaware State Police. Their support was essential in getting other law enforcement agencies to accept the Automated Warrant System. Currently, the board of managers conducts annual evaluations of the plan. Its initial firmly outlined scope and strategic vision helped to achieve results and continue selling the integration idea to more and more agencies.

Challenges: There are several challenges that the system has to overcome. Information quality is still a problem for DELJIS. Second, probably as a result of their incremental approach, not all important agencies are participating in the system. As a consequence, important information is not shared among the justice community. The composition of the board of managers is not homogeneous. Some of the members are technical staff that cannot fully represent the strategic view of their respective agencies. In addition, it is still necessary to create common standards and to enhance searching capabilities.

Future Plans: Delaware is converting several mainframe applications into client/server applications. They are also investing in applications to support credit card payments through the Internet (ticket fines). They are working with the Delaware State Police to electronically record accident reports, and to merge data from that report directly into an electronic ticket which will be uploaded from the police vehicle to the appropriate court.

Pennsylvania

Goals of the Project: The Commonwealth of Pennsylvania Justice Network (JNET) has the goal of enhancing public safety by providing a common on-line environment whereby authorized state, county, and local officials can access offender records and other criminal justice information from participating agencies. A related objective is to increase staff productivity by promoting cost-effectiveness, and to reduce redundancy and errors.

Brief Description: In 1995, the Pennsylvania Improved Management Performance and Cost Control Task Force reported over 400 different ways to reduce costs, increase accountability, and improve service. One year later the IT Strategic Planning Initiative was announced. JNET started as a collective project between several state agencies, but it has since added counties, municipalities and local police departments. Currently, JNET is a statewide effort in which about 32 commonwealth agencies, 36 counties, and 250 municipal police departments are participating. In addition, 9 Federal agencies are also accessing Pennsylvania justice information. The JNET system uses a Web-browser interface that allows agencies to share different types of information. In using the system each agency has control of its own data, and it can decide its level of information sharing. JNET has received funding from sources such as the Governor's Administration Office and the U.S. Department of Justice. The estimated total budget for 2002 was $12.5 million.

Key Players: The Governor's Office and each contributing agency have played a significant role in the development and improvements of the system. The JNET Executive Council is also an important player. It has members from each of the governing agencies and can be considered the governance structure of the state's information integration initiative.

CSFs and Results: In 2002, JNET won a national award from the Federation of Government Information Processing Councils. Ensuring agency independence was a key factor in enhancing cooperation among involved organizations. Another important factor was the use of private sector technical knowledge in the development of the integration initiative. Outsourcing technological support to companies such as BearingPoint (formerly KPMG Consulting) and Diverse Technologies Corporation helped avoid some technology-related problems. In addition, the JNET governance structure includes people from several agencies. The IT Strategic Planning Initiative was also a factor in the successful development of the endeavor.

Challenges: The main challenge to JNET's efforts is budget constraints. In addition, the JNET Executive Council has not finalized a structure for the necessary decision-making processes.

Future Plans: JNET is planned to be deployed statewide by 2004.

Table 4. State Overview

State	Integration Approach	Start Date	Levels of Government	Governance Structure	Funding
Colorado	Comprehensive / Systemic Capacity	1995	Statewide	Yes	Funded by State Legislature
Delaware	Incremental / Systemic Capacity	1990	Statewide	Yes	Received funding from federal and state agencies
Pennsylvania	Comprehensive / Systemic Capacity	1996	Not yet statewide, Counties, municipalities, and Federal agencies are participating	Yes	Received funding from the Governor's Office and the U.S. Department of Justice

Selected Bibliography

Ambite, J. L. et al. (2002). Data integration and access. In William J. McIver & Ahmed K. Elmagarmid. *Advances in digital government technology, human factors, and policy*. Boston, MA: Kluwer Academic Publishers.

Andersen, D. F. and Dawes, S. S. (1991). *Government information management. A primer and casebook*. Englewood Cliffs, NJ: Prentice Hall.

Bellamy, C. (2000). The politics of public information systems. In David Garson (ed.). *Handbook of public information systems*. New York: Marcel Dekker.

Best, J. D. (1997). *The digital organization*. New York: John Wiley and Sons.

Caffrey, L. (1998). *Information sharing between & within governments.* A study group report of the Commonwealth Secretariat. London: The International Council for Technology in Government Administration.

Chabrow, E. (2002, February 25). IT innovation drives homeland-security efforts. *Information Week.* Retrieved June 2, 2004, http://www.informationweek.com/showArticle.jhtml?articleID=6500919

Chengalur-Smith, I. and Duchessi, P. (1999). The initiation and adoption of client-server technology in organizations. *Information & Management, 35*, 77–88.

Colorado Integrated Criminal Justice Information System, *Strategic plan*, Version 1.5. Last retrieved June 2, 2004, http://www.state.co.us/gov_dir/cicjis/StrategicPlans/CICJIS_Strategic-Plan-03-04-v1-5.html

Common Wealth of Pennsylvania Justice Network. Last retrieved June 2, 2004, http://www.pajnet.state.pa.us/pajnet/site/default.asp

Commonwealth of Pennsylvania Governor's Office. (2003, July 1). *Executive order: Pennsylvania Justice Network Governance Structure number 1999-4*. Last retrieved June 2, 2004, http://www.pajnet.state.pa.us/pajnet/lib/pajnet/public_info/execorder.pdf

Cresswell, A. M. and Connelly D. (1999). *Reconnaissance study. Developing a business case for the integration of criminal justice information*. Albany, NY: Center for Technology in Government.

Dawes, S. (1996). Interagency Information Sharing: Expected Benefits, Manageable Risks. *Journal of Policy Analysis and Management*, *15,* 377–394.

Dawes, S. and Pardo, T. (2002). Building collaborative digital government systems. In William J. McIver & Ahmed K. Elmagarmid. *Advances in digital government: Technology, human factors, and policy*. Boston, MA: Kluwer Academic Publishers.

Derthick, M. (1990). *Agency under stress : The social security administration in American government*. Washington, D.C. : Brookings Institution.

Fountain, J. E. (2001). *Building the virtual state: Information technology and institutional change*. Washington, D.C.: Brookings Institution Press.

Harris County Justice Information Management System. Last retrieved June 2, 2004, http://www.jims.hctx.net/jimshome

Hayes, H. (1999, June 11). High-tech highway cops get the full scoop on criminals. Last retrieved June 2, 2004, from http://www.cnn.com/TECH/computing/9906/11/crime.idg/#2

Hennepin County Criminal Justice System Information Integration Project. Last retrieved June 2, 2004, http://www.co.hennepin.mn.us/vgn/portal/internet/hcdetailmaster/0,2300,1273_82696_100377481,00.html

Holmes, A. (Fall 1999/Winter 2000) Delaware Criminal Justice Information System: The evolution of integration. *Case study series. A report of the National Task Force on Court Automation and Integration*. Last retrieved June 2, 2004, http://www.search.org/courts/pdf_files/DE%20case%20study.pdf

Holmes, A. and E. Johnson. (Fall 1999/Winter 2000) Marin County, California: Criminal Justice Information System. *Case study series. A report of the National Task Force on Court Automation and Integration*. Last retrieved June 2, 2004, http://www.search.org/courts/pdf_files/Marincasestudy.pdf

Holmes, A., D. Usery, and R, Roper. (Fall 2000/Winter 2001) Colorado Integrated Criminal Justice Information System: Project overview and Rrcommendations. *Case study series. A report of the National Task Force on Court Automation and Integration*. Last retrieved June 2, 2004, http://www.search.org/publications/pdffiles/Colorado%20case%20study.pdf

Kolekofski, K. E. Jr., and Heminger, A. R. (2002). Beliefs and attitudes affecting intentions to share information in an organizational setting. *Information & Management, 2012*: 1–12.

Kuan, K. K. Y., and Chau, P. Y. K. (2001). A perception-based model for EDI adoption in small businesses using a technology-organization-environment framework. *Information & Management*, *38,* 507–521.

Luo, Z; Rengaswamy, M; Woolfenden, D. (2002). Architectural Governance & Oversight. *JNET Web Services White Paper*. Last retrieved June 2, 2004, http://www.pajnet.state.pa.us/pajnet/lib/pajnet/media/jnetwebservicesposition.pdf

Marin County, Information Services. E-JUS Integrated Justice Project. Last retrieved June 2, 2004, http://www.co.marin.ca.us/depts/IS/main/ejus/index.cfm?print=yes&

Meyer, D. N. and Gardner, D. P. (1992). Political planning for innovation: Information strategy. *The Executive's Journal*, *(Fall),* 5–10.

Miller, J. (2002, February 4). Pennsylvania, FBI Shares Crime Data. *Government Computing News, 21*, No. 3. Last retrieved June 3, 2004, http://www.gcn.com/21_3/statelocal/17867-1.html

Pennsylvania's justice network recognized. (2002, June 12). *Government Technology*. Last retrieved June 2, 2004, http://www.govtech.net/news/news.php?id=14004

Roldán, J. L. and Leal, A. (2003). A validation test of an adaptation of the DeLone and McLean's Model in the Spanish EIS field. In Jeimy J. Cano (ed.). *Critical Reflections on Information Systems: A Systemic Approach*. Hershey, PA: Idea Group Publishing.

U.S. Department of Justice, Office of Justice Programs, Bureau of Justice Assistance. 2002. *Mission possible: Strong governance for the integration of justice information systems.* Washington, D.C.: U.S. Government Printing Office.

Walsh, T. (2001, July). Data sharing tightens net for the law. *Government Computing News*, 7, No. 7. Last retrieved June 3, 2004, http://www.gcn.com/state/vol7_no7/news/1093-1.html

Walton, R. E. (1989). *Up and running: Integrating information technology and the organization*. Boston, MA: Harvard Business School Press.

Wells, M. (2002, May). A model system. *Government Technology*. Last retrieved June 2, 2004, http://www.govtech.net/magazine/story.php?id=10427