iWay Software | Accelerating Business Integration

An Integrated Justice Solution From iWay Software

A White Paper

by Greg McGrath

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"Databases used for law enforcement, immigration, intelligence, and public health surveillance have not been connected in ways that allow us to recognize information gaps or redundancies…. It is crucial to link the vast amounts of knowledge resident within each agency at all levels of government."

National Strategy for Homeland Security
Office of Homeland Security
July 2002

Introduction

Government officials and the American public have intensely scrutinized information sharing within the criminal justice system during the past four years. While the ongoing threat of terrorist attacks has captured the public's attention, more mundane cases have exposed our difficulties most starkly – especially when justice officials have released known criminals because they didn't have enough information to keep them in custody.

Although Homeland Defense has brought additional urgency to the need to integrate the disparate systems and processes within federal, state, and local justice information systems, the problem is not new. States, counties, and municipalities have long recognized the high cost associated with stovepiped information systems. They frequently attempt to share information by printing it from one system and reentering it in another – with considerable error rates, and an alarming cost for taxpayers.

In 2003, the National Association of Chief Information Officers (NASCIO) issued a document called *Concept for Operations for Integrated Justice Information Sharing* (ConOps), which illustrated the problem using an incident from six years earlier:

> On September 25, 1997 Ilka Mondane was shot and killed outside her south Minneapolis home by her ex-husband, Douglas Welch. Welch was on the street in spite of his arrest and conviction a few weeks earlier as a felon in possession of a gun, an offense which carried a minimum prison sentence of 18 months. The judge, lacking critical information about Welch's recent involvement with the justice system (a month earlier he had been arrested for domestic assault against a girlfriend and a few years earlier another girlfriend had filed a court order for protection against him for threatening to shoot her), reduced Welch's bail pending sentencing from $15,000 to $5,000. Had he known these facts, the judge indicates he would certainly not have considered reducing the bail.

This case is a tragic example of the very human costs associated with the flaws, gaps, and imperfections of our justice information systems. It is an unfortunate reality that this case is not unique.

Framework for Meeting Integrated Justice Challenges

We at iWay Software have used NASCIO's ConOps as the architectural framework for delivering integrated justice solutions across local, state, and federal agency boundaries. That document clearly defines the universal attributes for information sharing that are inherent in contemporary visions of integrated justice.

This paper provides a conceptual structure for meeting integrated justice challenges. Part one identifies the elements of integrated justice solutions. Part two describes iWay Software's abilities to provide these elements. Additional background information, links, and proof points for iWay Software solutions appear in the appendices.

Elements of Integrated Justice Information Sharing

Defining Our Terms

The NASCIO ConOps document opens with a quote from David J. Roberts, Deputy Director of SEARCH's Research and Technology Division: "The concept of integrated justice information sharing refers to the ability to share critical information at key decision points throughout the justice enterprise."

To fully understand this definition, we must briefly answer a few key questions:

- What comprises the justice enterprise?
- What is considered critical information?
- What are the key decision points?

Justice enterprise – People involved in integrated justice projects have to balance information-sharing goals with security and privacy requirements. To balance those requirements, we should think in terms of diverse justice agencies working together to manage a justice enterprise. In this paper, anyone working on behalf of the justice enterprise can be considered a justice agent.

Information systems within each agency must provide a mechanism for communicating relevant content with other agencies. Relevant content can include any data worth sharing, and it should be noted that communicating includes both requesting information when necessary and providing information when appropriate.

At the local level, this information could come from police information systems or booking information systems. States must share information from their criminal history repositories, prosecutor information systems, or court information systems. At the federal level, information may reside in systems within the FBI, CIA, or the Office of Homeland Security.

Key Points

- The justice enterprise is composed of all agencies involved in justice activities (i.e., all justice agencies), each working independently but cooperating to the greatest extent possible.
- Technology for information sharing must be able to get information into and out of all types of information systems.
- Technology for information sharing must be compatible with a variety of technical standards and capable of adjusting to government mandates.

Critical information – Critical information can be public (name, address, and phone number) or it can be private (social security number). It can be informational (an expiration date) or it can be imperative (an order to detain a suspect). It can be unclassified or classified. Also, information that is critical for one organization may be prohibited for another, so information-sharing technology cannot react to all requests in the same way.

The fundamental questions of information sharing are based on the agency's charter. An agency must determine what information it should protect and what it should share before questions of technology can enter the picture. In other words, policy comes before technology. Although this is a good principle in general for information technology, it is especially true for information sharing.

Information is only critical if it is needed for the justice agent's current task. Too much information can be worse than too little. In general, fresh information is very important, while very old information clutters up displays and obscures relevant information. Also, some tasks require more reliable information than others. The current whereabouts of an escaped convict's wife, for example, must be very accurate, while an inaccurate prior address may be sufficient as long as it gets investigators into the right neighborhood.

Key Points

- Critical information can be any type of information that is necessary for an agency to perform its function. No prejudgments should be made regarding the criticality of any individual piece of information.
- Technology for information sharing must be able to handle a variety of different types of information at a variety of different security levels.
- Technology for information sharing must be able to distinguish among requestors and respond with only the appropriate information, where what is appropriate can vary by classification, criticality, timeliness, or other criteria.
- Technology for information sharing must be able to help agencies deliver information that is as timely, accurate, and complete as possible.

Key decision points – Decision points are events that occur whenever an agency identifies a data point or takes an action. Examples include an emergency call center receiving a 911 call, local law enforcement pulling over a speeding car, a judge issuing a search warrant, and a prison transferring a prisoner.

Decision points are critical because they cause justice agents to take an action and because they represent an opportunity to identify, apprehend, and/or interfere with the activities of criminals. Without appropriate knowledge at key decision points, the ability to make intelligent decisions decreases dramatically. Too much information, however, can result in information overload, which interferes with a justice agent's ability to make decisions.

Key Points

- Key decision points are related to events taken by or reported by justice personnel.
- Information is timely only if it reaches a justice official at a key decision point.

- Information sharing is only effective if the information reaching the justice official is appropriate to the task at hand and as accurate and timely as the task requires.

We can think of integrated justice as something that can be broken down along dimensions that relate to the elements that we have just defined.

Dimensions of the Integrated Justice Challenge

Any integrated justice project will need to identify the justice events that trigger an information flow, the information that needs to be passed, the agents who need to receive it, and the data exchange mechanisms by which agencies will communicate. These four characteristics are identified as the key dimensions involved in integrated justice systems research, design, development, and implementation.

Events – Justice events are actions taken by personnel acting as a justice agent. Examples of justice events include stopping a car, writing a ticket, making an arrest, booking a suspect, and issuing a warrant. Note that many events are also key decision points. When an event occurs, all pertinent information must be sent from the agent to other parts of the justice enterprise. If the event is also a key decision point, then it may require information to be pulled from elsewhere in the justice enterprise, or automatically pushed to the justice agent taking the action. (See the push and pull justice functions on the next page.) When discussing IT architecture, events are normally electronic documents – not necessarily human-readable documents – that contain information about the event.

Information – Justice events either generate or require critical information, much of which is ordinary data: name, age, sex, race, driver's license number, electronic image of an arrestee's fingerprints, and so on. Information must be encoded into a format that the receiving agency can interpret.

Exchange conditions – Exchange conditions include a variety of factors associated with the case; for example, whether the case is a felony or misdemeanor, whether the defendant is an adult or a juvenile, and whether the defendant is in custody or on release. Exchange conditions can vary widely, and can affect the flow of information within the justice enterprise.

Agencies – Justice agency interfacing involves the movement of information from one agency to another, according to the appropriate exchange conditions when an event is triggered within the justice enterprise. In the past, this data exchange most commonly occurred between local agencies or between states. The reaction to the events of 9/11 created a mandate that federal, and even international agencies, be in a position to easily exchange information in the event of a terrorist incident.

Any integrated justice project will entail significant effort to determine what technologies should be used to support these dimensions. For example, standards such as LegalXML, CourtXML, and JusticeXML help structure the data in ways that will make information interchange more accurate, automatic, and effective. These standards cross multiple dimensions by encoding information about specific events in ways that promote effective agency interfacing.

Justice Functional Requirements

Functional requirements for integrated justice information sharing emerge when we look at the different kinds of data exchanges that can occur between local, state, and federal agencies inside the justice enterprise. In these functions we can begin to see where the challenges of integrated justice deployments will be addressed through the implementation of technology. The justice functions are outlined in the NASCIO ConOps document, which refers to them as "Model Functions for Information Sharing." They include:

Query and response functions – The query and response functions enable an agency to receive a request from local, regional, state, and national databases. For example, a police officer might submit a query to a statewide warrant system during a traffic violation, or a customs officer might query a national visa system when someone enters the country.

Push function – The push function is used when an agency detects an event and wants to send operational information about it to another agency. For example, after an arrest event, all or portions of the arrest report may be pushed from the police information system to the sheriff's booking information system. (This is a push because the police information system sent it to the booking system automatically. If the booking information system must request the information, it executes a pull: see below.) Likewise, during the booking process, a sheriff's booking information system might glean information from the arrest report and booking document to generate a standard press release and push it to the department's Web page.

Pull function – This function enables an agency to request operational information from another agency. For example, if the police information system pushes only the arrest report number to the sheriff's booking system, the booking system can use that number to pull the complete report from the police information system if it needs additional details to complete the booking document.

Publish function – The publish function enables the publishing of information on key transactions and events regarding subjects, events, and cases in traditional (e.g., paper) and electronic (e.g., publicly accessible Web pages, secure servers) media. For example, when a defendant is free on his or her own recognizance and fails to appear for a court date, the judge

may issue and digitally sign an arrest warrant, which the court information system in turn (a) pushes to the original arresting agency for service, and (b) publishes to a statewide warrant system.

Subscription/notification functions – These functions enable agencies to register to be notified of key events regarding subjects, events, and cases. For example, a state criminal history records repository might notify justice (e.g., Department of Probation and Parole) and other governmental agencies (e.g., Department of Health and Human Services, Department of Welfare, Department of Education, Department of Motor Vehicles, etc.) when a criminal is about to be released. Likewise authorized non-governmental agencies (e.g., licensing boards, treatment service providers, etc.) who have subscribed to notification of relevant changes in legal status (e.g., the conviction for a disqualifying offense) will receive similar information.

The NASCIO ConOps document outlines 18 very detailed integrated scenarios that incorporate these justice functions, and strongly suggests that local, state, and federal agencies use these scenarios to test the viability of proposed integrated justice solutions. Some states, including the State of Kansas, have already validated against these scenarios.

Putting It Together: Architectural Principles

Integrated justice information sharing is a challenge because the justice functional requirements are not yet fully met by existing standards. Agencies don't have the option of standing still, but they need to be ready to handle (a) changing standards and (b) pragmatic non-standard integration in places where appropriate standards don't yet exist.

Service-Oriented Architecture Requirements

Integration specialists have defined a term – "service-oriented architecture," or "SOA" – that encapsulates best practices for achieving agility in the face of shifting functional requirements.

In Gartner's glossary of terms,* it's defined this way:

> An application topology in which the business logic of the application is organized in modules (services) with clear identity, purpose and programmatic-access interfaces. Services behave as "black boxes": Their internal design is independent of the nature and purpose of the requestor. In SOA, data and business logic are encapsulated in modular business components with documented interfaces. This clarifies design and facilitates incremental development and future extensions. An SOA application can also be integrated with heterogeneous, external legacy and purchased applications more easily than a monolithic, non-SOA application can.

*http://www.gartner.com/6_help/glossary/GlossaryS.jsp

Justice Functional Requirements	Technology Enablers	Justice Standards	Technical Standards
Push	Justice Data and Document Integration	Legal XML	XML
Pull	Justice Document Exchanges	Justice XML	XSL
Query	Justice Warehousing Services	Court XML	Web Services (SOAP, WSDL, UDDI)
Subscription/ Notification	Business Intelligence Tools	JCIT XML Standards	ebXML
Publish	Analysis Tools and OLAP	Legal Transcripts XML	EDIINT (AS1, AS2, AS3)
	Data-Driven Alerts	Etc.	BPEL
	Justice-Driven Geographical Information Systems		Etc.
	Justice Dashboards and Portals		

Organizations are attempting to standardize the technology and justice standards needed to support the justice functional requirements. Technology enablers map the justice functional requirements to the standards that support them.

Key elements of this definition include (a) the emphasis on modularity, and (b) the importance of interfaces. By focusing on modularity, SOA encourages reuse; by focusing on interfaces, it helps isolate one part of an organization from changes in other parts.

SOA generally involves Web services, which are standards that define how interfaces should be created using common technologies like HTTP and XML. Since these standards have become available on almost every platform because of their adoption on the Internet, their use makes it possible to call the service from anywhere. And since the interfaces hide the details about the implementation, the Web service provider can change anything about the service without causing problems among Web service consumers – as long as the interfaces stay the same.

Current Web services technology doesn't solve all problems, however. For example, current security standards might not be secure enough for sensitive information. Web services also don't provide guaranteed delivery yet. The Web Services Interoperability organization, or WS-I, is working on standards to solve these problems, but as of this writing they're still in

development; so an SOA might use EDIINT AS2 – a specialized secure, reliable form of HTTP – or other protocols alongside or instead of Web services standards.

The important thing is ensuring that the underlying services are available in consistent ways across any channel, whether Web services-based or not.

Unfortunately, many current processes are based on legacy systems that were never designed to interoperate. Government agencies struggle to open these systems up and make them reusable through standard interfaces. Often it requires a great deal of custom code, which minimizes flexibility and dramatically increases costs. Cost-effective SOA demands solutions for this problem.

Global JXDM Support

Since SOA demands flexibility in using standard interfaces, we must examine one of the major standards used in any integrated justice implementation: Global Justice XML Data Model, or GJXDM. It provides a standard vocabulary and set of semantics that can be implemented, reused, and extended across any number of integrated justice projects.

The 900-plus page GJXDM reference model details the objects, rules, and elements found in information exchanges that can take place in the justice enterprise. It provides the basis for exchanging justice and public safety information between trading partners within the criminal justice enterprise. While the model may be used as a means for designing a shared data warehouse, its primary function is to facilitate the exchange of information.

In the justice enterprise, information exchange occurs through documents. Reference Information Exchange Package Documentations (IEPDs), formerly called "Reference Exchange Documents," provide a baseline for defining the documents for information exchange within the Justice Enterprise. By providing a starting point for establishing GJXDM-conformant information exchange, they can significantly assist in the implementation of the Justice XML standard between trading partners.

IEPDs exist for an ever-growing number of document types, including incident reports, criminal history reports or rap sheets, traffic citations, court orders, and the nationwide Amber Alert, just to name a few. These packages include GJXDM objects, elements, metadata, and rules regarding the exchange of information between justice activities.

The model is the result of an on-going collaborative effort organized as the U.S. Department of Justice Global Justice Information Sharing Initiative, which consists of representatives of all levels of government: local, tribal, state, and federal. Input from the vendor community has been through an Industry Working Group. The GJXDM collaboration takes the earlier works of the OASIS LegalXML and extends it for the justice and public safety communities.

The reference model is not meant to be all encompassing, and the committees such as the Global XML Structure Task Force (XSTF) that developed the structure realize that each implementation must have the flexibility to meet its own needs. As such, the GJXDM specification identifies ways to augment or extend the model with new locally defined objects, attributes, and rules.

Free-Form Search

Most information systems require specific knowledge in order to retrieve information, e.g., which system the information resides in, what keys will appear in which parts of the metadata catalog, and how the information is formatted.

Complex integrated systems, in which different systems catalog information differently with different keys and metadata catalogs, cannot effectively respond to queries that are too structured. Fortunately, search engine technology has exhibited tremendous efficiencies in managing unstructured and semistructured information architectures such as the Internet, allowing users to find any information anywhere in the world simply by choosing reasonable keywords.

For example, only the first two of these steps would be possible with most integrated database and document management systems:

- The user determines the name and SSN of a suspect by entering the arrest incident number
- The user queries the court systems of other states by entering the name into their standard query interfaces, and receives no returns
- The user Googles the integrated justice system and determines that someone using that SSN with a different name was arrested for a similar crime in a different state
- The user queries the court systems of other states by entering the other name, and receives results showing that someone using that name and SSN has been arrested several times across several state lines

In short, a built-in search capability makes queries more flexible, more likely to return usable results, and much more comprehensive for certain types of queries than other methods are.

iWay Integrated Justice Suite

iWay Software, a provider of foundational SOA technologies for thousands of public-sector and private-sector organizations worldwide, has created a software suite that tackles some of the most intractable issues involved in implementing integrated justice solutions.

Implementing Service-Oriented Architecture

Turning Systems Into Services

The iWay Adaptive Framework provides the basis for an information-sharing architecture that is consistent but flexible, sophisticated but easy to use.

Its greatest distinguishing feature is the number of different types of *adapters* it provides. Adapters are software modules that enable developers to use an interface they understand (e.g., Web services or Java's JCA) to interact with a technology they don't understand fully (e.g., mainframe transactions, packaged applications, or B2B interactions).

This is especially critical for government organizations, who often have a tough time making SOA a reality because of the amount of hand-written code that they need to write. The more custom code they produce, the more brittle their infrastructure becomes. iWay adapters can eliminate the vast majority of that code, which is the first step to getting the SOA off the ground.

Benoit Lheureux of Gartner clearly highlights iWay Software as the leader for this type of technology, even saying that "iWay Software has strengthened its leadership in the adapter suite market."[1] Our leadership derives in part from the breadth of our adapter solution: "Although other adapter suite vendors offer useful solutions, they don't offer an adapter portfolio as complete as iWay Software's suite across the five adapter categories: application, database, industry protocol, legacy and technology."[2]

GJXDM: Adhering to Standards for SOA

iWay Software's support for GJXDM includes two-way manipulations of GJXDM documents:

- Incoming GJXDM documents are parsed, validated, and transformed into other file formats (if needed) before being handed off to other applications or data warehouses.
- Outgoing documents need not start off as GJXDM compliant; instead, any format of data can be picked up from a message queue or file system, converted into a GJXDM document, validated against the data model, and transmitted to any receiver.

[1]Gartner, E-22-4020, 6 April 2004, page 6.
[2]ibid, page 4.

In other words, instead of training developers on the 900-plus page GJXDM reference model and the dozens of IEPDs normally used to exchange information, you can let the iWay Adaptive Framework ensure the correct formatting of documents used in information sharing.

With the GJXDM adapter embedded in the iWay Adaptive Framework, any organization can use GJXDM documents as interfaces for information sharing with little-to-no custom programming. In addition, agencies can use the GJXDM as the basis for creating a data warehouse in which data automatically gets updated as GJXDM documents enter their environments.

Service Composition: Providing Isolation From Change

In addition, iWay Software's Adaptive Framework enables "service composition" – a powerful technique for isolating different parts of the organization from underlying change.

Consider an agency that maintains two different systems that provide information about people in the court systems. Suppose they both provide information based on Social Security Numbers. If the agency believed that SOA depended primarily on Web services, it might expose both systems through one Web service each. External agencies would call both Web services when they needed information.

There is a major problem here, however. If the agency needed to upgrade one of its systems, all of the external agencies that call into it would have to upgrade their Web service calls along with it, causing considerable downtime. Also, the amount of support needed to help other agencies get the information they needed out of one or the other system would be doubled: instead of one interface, each tech support person would need to help them connect to two.

A better solution for all concerned is to "compose" a single service: a single, stable interface that provides the needed information. The agency can then determine exactly how that interface is implemented, through whatever calls are needed to any underlying systems. In this scenario, when one of the underlying systems is changed or replaced, the agency merely reconfigures the service implementation to use the new system – and none of the calling agencies need to alter anything at all.

Google Search of an Indexed Justice Repository

iWay Software, in conjunction with Google, the world leader in Internet search, have teamed up to create a fully searchable integrated justice repository. The iWay Integrated Justice Suite automatically indexes every document that flows through it, so a built-in Google appliance can provide instant access to any information that contains the keywords, identification numbers, or document names you choose.

One interesting side benefit of the coupling of iWay and Google technologies is that users will also be able to see the queries that other people have run that turn up the same information. In other words, someone Googling "Tom Jones 123-45-6789" will get back his arrest report, as expected, but also the query for domestic abusers run by someone else in which his name was returned. Not only will users tap into the information flowing through the system, but also the collective intelligence of the agency's workers as they query information sources.

Naturally, this flexibility requires an additional security layer to ensure that users only see the documents that they're authorized to view. The iWay Adaptive Framework provides this security and makes it transparent to end users.

Summary of General iWay Software SOA Capabilities

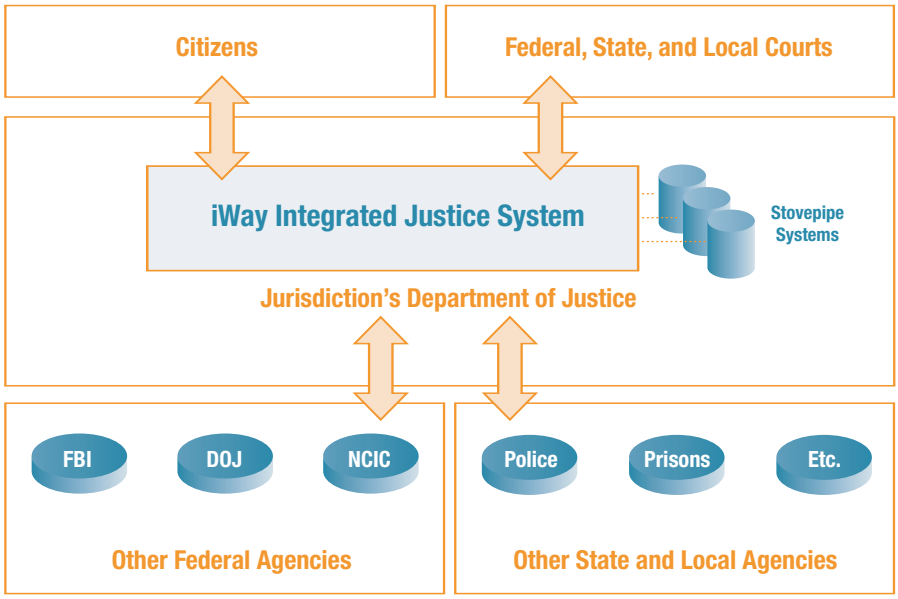
The iWay Integrated Justice Suite provides a set of technologies that provide the foundation for SOA, including:

- Web services publishing that enables a user to create Web services from any work done using iWay technologies
- Support for message standards for automatic parsing, validation, and generation of complex documents, such as Global JXDM formats, so that they can be used as integrated justice system interfaces
- Adapters for a wide variety of system types, including
  - Application adapters that expose packaged applications as sets of services, without writing complex integration code
  - Legacy data adapters that enable data administrators to expose complex nonrelational data as standard services
  - Transaction system adapters that expose CICS, IMS/TM, and BEA Tuxedo as services
- Service-composition capabilities that enable users to define high-level, easy-to-understand service interfaces, and then instantiate them using existing proprietary application-level transactions
- Google-based search capabilities of the entire integrated justice repository and all documents and queries that run through the iWay Integrated Justice Suite

Mapping Technology Enablers to Justice Functional Requirements

Once architectural principles have been established, the next phase in meeting the real integrated justice challenge involves finding technologies that give agencies the ability to enable the justice functions across all justice dimensions for any data, transactions, documents, and systems throughout the local, state, federal, and perhaps even international level of the justice enterprise.

iWay Software's Integrated Justice Suite facilitates the collection, transformation, integration, formatting, delivery, and analysis of justice information. It includes eight technology enablers that map to the justice functions outlined in the NASCIO ConOps document.



The iWay Integrated Justice Suite facilitates the interaction of information from external agencies, local constituents, and internal stovepipe systems that contain relevant data.

The combination of these features allows iWay Software to enable any of the NASCIO integrated justice scenarios.

Justice data and document integration – Justice data exists in a myriad of different applications, data sources, and structures. The only certain thing about them is that they will constantly be in flux over time as new technologies and standards are introduced. Information sharing requires the ability to incorporate the justice events (i.e., electronic documents that contain justice event information) into processes that include existing systems. This means finding a justice solution that contains appropriate adapters – software modules that put the information in justice events into any database or application, or vice versa. The iWay Integrated Justice Suite contains over 280 adapters to comprehensively address the data access requirement.

Justice data and document exchanges – Once a justice data source has been identified within the justice supply chain, agencies need to exchange data and documents coming from different formats and different systems, and leverage different data sources. The iWay Integrated Justice

Suite contains a document exchange and transformation engine that supports SQL, EDI, XML, LegalXML, CourtXML, JusticeXML (as part of the GJXDM), JDDI, and all of the emerging justice standards to facilitate any agency-to-agency data or document exchange.

Justice data and document exchange-driven alerts – Two-way communication between people and systems is a critical part of any successful integrated justice deployment. Information needs to be pushed to police officers, first responders, and other state and federal level justice personnel and to be pulled from disparate justice systems. The iWay Integrated Justice Suite enables justice agencies to provide cost-effective, reliable, and secure access to existing data sources through any handheld device – including BlackBerry, Palm, two-way pagers, pocket PCs, and cell phones – without having to build custom interfaces or change existing communication infrastructure.

Justice warehousing services – Justice systems require the easy archival of criminal events and criminal histories and then easy access to this information. The iWay Integrated Justice Suite offers a broad range of ETL and real-time data management options – providing direct access to data and documents at their source, as well as the ability to populate warehouses and data marts with information from any kind of justice document or data.

Justice-driven graphical information systems – Since justice planning, logistics, and intelligence activities often involve spatial relationships, integrated justice implementations must be able to manage and analyze information from geographical information systems (GIS). COMSTAT in New York City provides one example of a high-profile GIS implementation. The iWay Integrated Justice Suite, through a partnership with ESRI, delivers a comprehensive GIS capability for loading, displaying, and reporting on real-time and historical data from internal or external information systems.

Business intelligence and analysis tools – Comprehensive integrated justice systems require a rich set of reporting and analysis capabilities that provide unlimited numbers of users with instant access to critical information. Ease of access and scalability are paramount because of the user base, which includes everyone from highly trained analysts to district attorneys to police officers. Instead of providing traditional analytical tools that require training, emphasis should instead be placed on making intuitive, real-time reports available anywhere, in any format – HTML, Excel, PDF, and so on. The iWay Integrated Justice Suite contains the premier report writer in the business intelligence marketplace for delivering wide-scale deployments to hundreds of thousands of users.

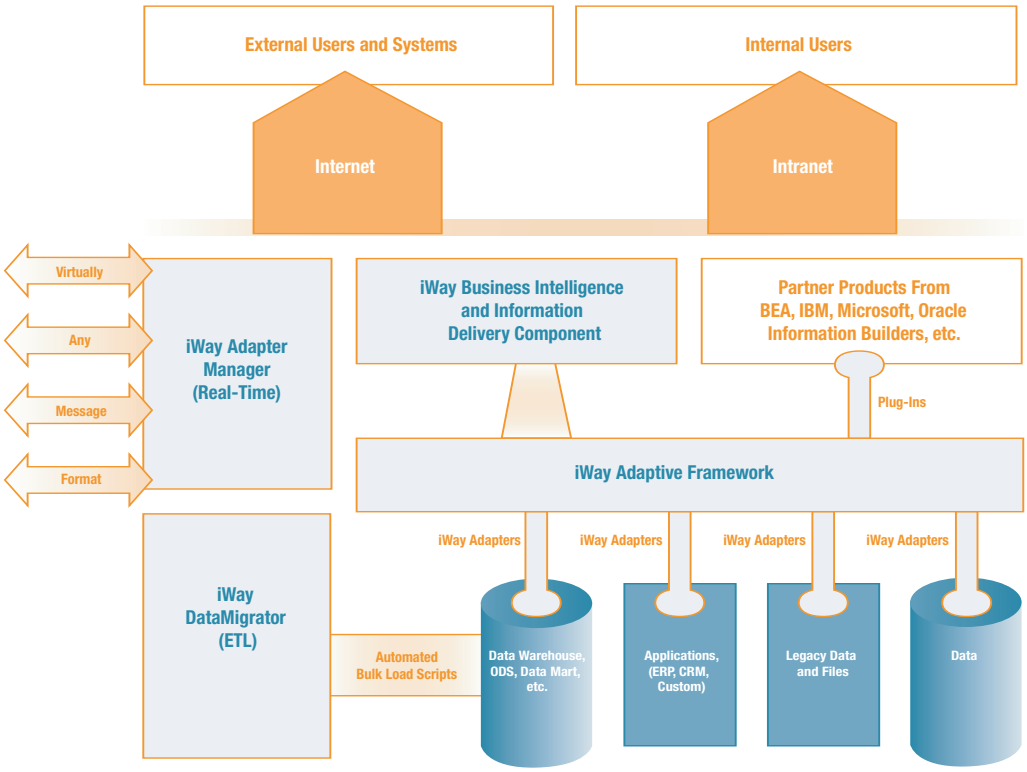
Online analytical processing (OLAP) – Justice agents must often visualize and analyze data from many points of view to discover relationships, compare information, and spot critical trends. For example, money-laundering investigations might require justice personnel to conduct in-depth OLAP analysis against any data source. The iWay Integrated Justice Suite contains comprehensive OLAP capabilities, including traditional OLAP tools for slice-and-dice analysis by sophisticated users, as well as so-called visual OLAP tools for intuitive visualization of complex data by novice users.

Justice dashboards and portals – Dashboards and portals can integrate justice data into one user-friendly interface, which enables justice agents to personalize their view of criminal information while simultaneously giving administrators control over the environment set up for a particular user, for example, police officer, district attorney, and public defender. The iWay Integrated Justice Suite provides a dashboard that can be tailored to the needs of any agency or set of users. It also snaps into all of the popular portal environments today, meaning that it can be used with any existing infrastructure and allows justice agents to personalize their own dashboards, or have them personalized (for added security, for example) by administrators.

iWay Technology Architecture, XML, and Justice Standards

The iWay Integrated Justice Suite was designed to:

- Support emerging justice standards to ensure easy interaction with other agencies in the justice enterprise
- Support technology standards to ensure easy integration with any needed enabling technologies
- Deploy to any hardware or software platform to ensure compatibility with existing environments
- Maintain compatibility with all end-user devices to ensure rapid delivery of critical information at the point of usage
- Provide end-to-end security and privacy protection for all data and interactions



The iWay Integrated Justice Suite Architecture. The iWay Adaptive Framework provides access to stovepipe systems. iWay Adapter Manager collects event documents in any form from internal or external sources and integrates them with other information systems in real time. iWay DataMigrator manages bulk data on a scheduled basis. The iWay business intelligence and information delivery component delivers HTML, PDF, Excel, and other human-readable formats to end users. All products can deliver information over the Internet or an intranet. Finally, note that all interactions use iWay Adaptive Framework to communicate with the relevant information systems.

Emerging justice standards – iWay's Integrated Justice Suite includes the iWay Adapter Manager specifically to handle emerging justice standards. Two of the most critical are JusticeXML/GJXDM, which is designed to facilitate the sharing of justice information among various local, state, and federal jurisdictions, and LegalXML, which is driven by the need to create an electronic data exchange medium between courts, prosecutors, public defenders, and litigants.

Technology standards – The iWay Integrated Justice Suite adapts to more standards than can be addressed in the scope of this paper. To take one example, however, in just a few mouse clicks users can create Web services from the industry's widest variety of packaged applications and data sources. A point-and-click interface allows users to browse an application – including

customized transactions and a variety of interface types – and select the transactions that they'd like to publish as Web services. Users can deliver the automatically generated WSDL to any UDDI directory or agency to immediately create standardized connections into their applications.

Deployment – The iWay Integrated Justice Suite runs on every major platform, including Windows, Linux, HP-UX, AIX, Solaris, iSeries, and z/OS USS. Virtually any hardware platform, including mainframe and midrange servers, are supported. It was developed in Java and runs standalone and on every major application server (including, but not limited to, BEA WebLogic Server, IBM WebSphere Application Server, JBoss Application Server, Oracle Application Server 10g, and Sun Java Enterprise System Application Server).

Compatibility with end-user devices – The reporting, business intelligence, and information delivery capabilities provided with the iWay Integrated Justice Suite provide greater flexibility for the end user than any other suite in the industry. Any device, whether based on an ordinary PC with an Internet browser or e-mail system, Palm device, RIM BlackBerry, cell phone, or other technology, can receive critical information over its standards channels from the iWay Integrated Justice Suite – and respond, drill down, query, and update data.

End-to-end security – The iWay Integrated Justice Suite is ideally suited to meet today's stringent demands for high security, helping to ensure continuity for all justice-related operations. Not only is it compliant with all your infrastructure's existing security procedures and protocols, it can also add additional layers of security.

- **Application access security.** Within the iWay Integrated Justice Suite, administrators can manage and define user access according to user groups, departments, or roles.
- **Data access security.** Access to information can be restricted down to the data-value level so users see only the information they need to see. This not only lets you protect sensitive information, but it can streamline the reporting environment and make reports easier and quicker to read.
- **External security.** The iWay Integrated Justice Suite supports external security systems and authentication schemes, including operating system and database management security, as well as extended security packages such as LDAP, ADS, nTrust, and VeriSign.

Conclusion

Integration encompasses a variety of functions designed to enable the timely and efficient sharing of information. Within agencies, the primary objective of integration is to eliminate duplicate data entry, provide access to information that is not otherwise available, and ensure the timely sharing of critical data. Duplicate data entry hinders agency operations, consumes precious resources, retards timely access, and undermines data quality.

Integration and sharing of relevant information throughout the justice enterprise is essential for public safety, homeland security, quality of justice, and the efficient expenditure of scarce public resources. Enforcing standard methods of collecting, storing, and sharing information reduces operational and administrative costs while boosting the efficiency of government workers. When properly constructed, inter-agency connectivity among justice agents and case management systems makes it easier to analyze crime patterns, single out offenders, and enforce justice decisions. This results in faster action in the event of an emergency, more effective deployment of resources, and better inter-agency cooperation.

Traditionally, developers connected information systems using point-to-point connections designed for specific applications and data elements. Today, as part of much larger integrated justice initiatives, they are creating service-oriented architectures that enable general connectivity among many different applications. iWay complements and extends both approaches. It uses service-oriented integration techniques to solve point-to-point integration problems while creating a standards-based architecture for maximum flexibility in the future. It encourages a pragmatic, problem-solving orientation in which high-priority integration projects can be placed into production quickly and more complex applications can be built over time by leveraging the results of earlier projects.

About iWay Software

iWay Software has 30 years of experience helping government agencies and businesses create secure data integration solutions. Our award-winning technologies helped define the term “middleware” in the early 1990s, and our experience with national intelligence agencies demonstrates our proficiency with security. We work with virtually any type of technology, from legacy applications to sophisticated multi-platform applications using distributed Web services.

The iWay Adaptive Framework provides a foundation for SOA, eliminating custom code and focusing on issues that other middleware vendors generally ignore. It creates Web services, but also supports additional service interactions such as EDI, plug-ins for development and integration tools, and even proprietary APIs. Most importantly, it emphasizes the reuse of

integration technology by focusing on service publishing, composition, and reuse rather than message brokering and other issues.

iWay Software provides seven adapter classes – data, application, transaction processor, terminal emulation, document, protocol, and "touchpoint" (packaged integration process) – to make integration as easy as possible.

Some of the world's most important technology companies, including BEA, Information Builders, Microsoft, Oracle, SAP, and Sun, make their technology more productive using the iWay Adaptive Framework. In addition, over 2,000 customers use the iWay Adaptive Framework as a key part of their integration strategies.

For government, law enforcement agencies, and departments attempting to quickly deliver complete integrated solutions, the iWay Integrated Justice Suite provides the tools that facilitate the rapid assembly of integration points with little to no programming. It includes everything needed for a complete end-to-end solution, including Information Builders WebFOCUS, a world-class business intelligence suite.

About Information Builders

Headquartered in New York City, Information Builders has been providing solutions to federal, state, and local governments since 1975. As the parent company of iWay Software, its mission is to deliver the right information to the right people at the right time. In times of national crisis, intelligent information delivery is especially critical. Using Information Builders technology and services, many government customers have deployed sophisticated, award-winning applications to assist in rapid decision-making. Information Builders' experience centers on implementing vital applications by leveraging existing databases and infrastructures.

WebFOCUS

Information Builders' flagship product is WebFOCUS, an enterprise business intelligence environment. Released in 1996, WebFOCUS was built from the ground up as a Web-based reporting tool that includes everything necessary to construct self-service, production reporting, and business analysis systems. WebFOCUS provides direct access to real-time information from any platform and any data source, supporting unlimited numbers of users at any skill level for visualization, analysis, and decision-making activities.

Appendix A: Integrated Justice Success Stories

State of Missouri – Highway Patrol

The Missouri State Highway Patrol's criminal justice information system is transforming law enforcement. As the state repository for all criminal history and traffic records in Missouri, the Highway Patrol makes information available to troopers, the general public, the Federal Highway Administration, state and local agencies in Missouri and elsewhere, and the Missouri state courts.

To make these records easier and more cost-effective to access, update, and maintain, the Highway Patrol implemented a fully automated system for gathering and disseminating information throughout its extensive network of users, including wireless communications with patrol cars.

Such a system requires coordination among federal, state, and local systems. That means it has to work with the diverse platforms and interfaces in legacy and partner systems – while still satisfying a wide range of end users and constantly changing government requirements. The Highway Patrol has built a flexible, scalable infrastructure for accessing and delivering information using Information Builders' solutions. Information Builders' consultants have been involved with numerous phases of the overall reporting and integration effort since May 2001.

To perform reporting across all its systems and turn data into information, the Highway Patrol is using Information Builders' business intelligence technology – WebFOCUS. They are also using technology from iWay Software to integrate and move data across platforms for cost-effective access. By using a common technology, the Highway Patrol can reengineer legacy applications with minimal coding. End users – from the public to troopers in the field – have timely access to critical information through a simple interface that isolates them from the complex back-end technologies.

United States Postal Service

The United States Postal Service's anti-money laundering solution uses WebFOCUS to track suspicious money orders and locate patterns that may indicate money-laundering activities. For example, the system has the ability to identify patterns within specific parameters. This allows officials to easily recognize the purchase of multiple money orders at the maximum legal amount, which could indicate possible fraudulent money-laundering activity. Since the implementation of this application, the United States Postal Service and its branches have saved immeasurable amounts in fines and lost funds.

State of Pennsylvania

Under then-Governor Tom Ridge, the state of Pennsylvania developed and implemented a Uniform Crime Reporting (UCR) system that provides instant access to state crime data. The solution provides for the collection and reporting of information from any location with Internet access, including police departments, municipal buildings, schools, libraries, and private homes.

The system gives everyone from law enforcement agencies to private citizens access to crime information – on demand. Built using WebFOCUS, Pennsylvania's Uniform Crime Reporting Website helps local police fight crime more effectively while giving citizens 24/7 access to crime statistics for towns, counties, regions, college campuses, and the state as a whole. It features real-time statistical analysis, queries that anyone can customize, and automated file transfer to the FBI national crime database. Information Builders' consultants have provided development and implementation services since the outset of the project.

Pennsylvania State Police

The Pennsylvania Uniform Crime Reporting System (PAUCRS), built with WebFOCUS technology, delivers crime statistics and information to the public and law enforcement personnel. It is designed to help local police fight crime more effectively while giving citizens easy and immediate access to crime statistics. Prior to the launch of the Web-based extranet and intranet system, this crime data remained tied up in a dense report that was published only once a year. The new site allows crime-fighters and the public to view and analyze fresh, month-by-month data.

United States Department of Justice

WebFOCUS is an integral component in the DoJ's Human Capital Project, designed to meet a presidential mandate for human capital management. The DoJ installed WebFOCUS to streamline access to human resource and payroll information, deliver real-time information to users, and minimize costs while maintaining a high level of security.

Los Angeles County Civil Court System

Although Los Angeles County's online systems represent huge improvements over their hard-copy predecessors, one major bottleneck remained: users had to physically be in the county court offices to gain access to and retrieve information from the systems. Los Angeles County wanted to give users access to court records via the Internet, eliminating the need to be

physically at the courthouse to search for information and reducing the amount of staff resources required to assist with searches. The new Web Court system, created with WebFOCUS, provides current information from any computer running a Web browser and allows users to access court records from outside the county court offices. WebFOCUS generates HTML reports, which can be read on any Web browser, allowing access by all users.

Hillsborough County, County Clerks Office

The Hillsborough County Clerks Office in Florida has used WebFOCUS as its enterprise reporting standard since September 2001. Its ACS Criminal Information System is the centralized hub for countywide agency reporting, including the sheriff's office, state attorney, public defender, and the 13th Judiciary Court. WebFOCUS provides reporting and data access to produce clerk reports, criminal reports, felony/misdemeanor reports, civil reports, and juvenile reports. The information is accessed on a real-time, scheduled, and historical basis. Information Builders is currently working with Hillsborough County to extend reporting functionality to other outside agencies.

Other Integrated Justice Applications

- Bad check reporting – Security Check
- Community correction information system – Wayne County, Michigan
- Criminal case history – County of Cuyahoga, Ohio
- Domestic violence and auto DD5– New York City Police Department
- Flood of paper ends – Federal Emergency Management Agency
- Global transportation network – United States Department of Defense
- License background checking – State of Iowa
- Online restaurant inspection – City of New York
- Pesticide regulation – State of South Carolina at Clemson University
- Public safety reporting – State of Louisiana
- Statewide automated child welfare information system – State of Oklahoma

Appendix B: Awards

Perhaps the best measure of technical stature and leadership is the recognition achieved by Information Builders and its customers for developing effective business intelligence and enterprise integration solutions.

Numerous customers have been recognized by the ComputerWorld Honors Awards for innovate use of technology and for placement into the permanent collection of the Smithsonian Institution, including:

- ArvinMeritor
- Federal Emergency Management Agency
- CSX Transportation
- Bank of Montreal
- United States Postal Service

Other awards include the following:

- KM World Best Practice Award: Administaff – 2002
- British Columbia Industry Association Award for Best Application of Web Technology: The City of Richmond – 2002
- CMP/Intelligent Enterprise Real Ware Award Winner – 2001
- Enterprise Systems 100 Most Electrifying Leaders – 2001
- DM Review 100 – 2001, 2000, 1999, 1998
- VAR Business 500 Best Solution Providers – 2002, 2001
- ComputerWorld ROI Award: City of Richmond – 2001
- The New York City Mayor's Award for Excellence – 2001
- Post Newsweek Agency Award for Excellence: USDA – 2001
- Government Technology Leadership Award: USDA – 2000
- Government Computer News Federal Award for Excellence: United States Postal Service – 2001
- eWeek eXcellence Award Finalist – 2001

The iWay Integrated Justice Suite and related solutions have also been recognized:

- The Pennsylvania State Police were honored with a Process Innovation Award in the Government Vertical category for its crime-fighting Web site application.
- The United States Postal Service received the prestigious GCN technology award for its anti-money laundering system.
- The NYC Department of Health and Mental Hygiene placed fourth in InfoWorld's Top 100 for the iWay Bioterrorism Response Suite

Appendix C: Achieving Standardization

The standards in place today to bring order to the chaotic world of differing database formats and multiple hardware platforms include:

- Functional standards of the Consortium for National Case Management Automation (National Center for State Courts, the Conference of Chief Justices, the Conference of State Court Administrators, and the State Justice Institute)
- National Crime Information Center (NCIC) NCIC2000 Codes
- X.400 Directory Specification (International Standards Organization)
- American National Standards Institute (ANSI) standard ANSI NIST-CSL 1-1993: "Data Format for the Interchange of Fingerprint Information" Addendum ANSI/NIST-ITL 1a-1997: "Data Format for the Interchange of Fingerprint, Facial AND SMT Information"
- Extensible Markup Language (XML)
- Extensible Stylesheet Language (XSL)
- Simple Object Access Protocol (SOAP)
- Universal Description, Discovery and Integration (UDDI)

Appendix D: Use of iWay Software and Information Builders Solutions

Federal, state, and local government agencies that leverage iWay and Information Builders solutions include:

Army Keystone
Boston Public Health Commission
California Department of Conservation
California Department of Social Services
California Health and Human Services
City of Akron
City of Birmingham
City of Cincinnati
City of Des Moines
City of Houston
City of Las Cruces
City of Long Beach
City of Los Angeles
City of New York – New York Police Department
City of New York – Department of Information Technology and Telecommunications
City of Richmond
City of Sacramento
Colorado Department of Revenue
County of Cuyahoga Data Center
County of Los Angeles
County of Wayne
County of San Diego
DECC Oklahoma City
Federal Deposit Insurance Company
Florida Department of Transportation
Florida Lottery
Fulton County
General Services Administration
Harris County
Hill Air Force Base
Los Angeles Department of Labor
Los Angeles Department of Social Services
Los Angeles Department of Management and Finance
Los Angeles Community College
Management Board Secretariat
Maryland Aviation Administration
Maryland Department of Transportation
Maryland Procurement Office
Maryland Public TV
Maryland Department of Agriculture
Maryland Department of the Environment
NASA
New Mexico General Services Department
New York City Public Schools
New York City Board of Education
New York City Department of Health
Oklahoma Gas and Electric
Sedgwick County
Social Security Administration
State of Colorado
State of Florida Banking and Finance
State of Florida Technology Office
State of Iowa
State of Louisiana
State of Maryland
State of Maryland Judiciary
State of Missouri
State of Tennessee
State of Wyoming
U.S. Department of Agriculture
U.S. Federal Emergency Management Agency
U.S. Department of Treasury
U.S. Postal Service
U.S. Total Army Personnel Command
Utah System of Higher Education

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