



Global Justice Information Sharing Initiative: Exploring Service-Oriented Architecture Services for Justice Information Sharing



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- ▶ Learn about the U.S. Department of Justice's Global Justice Information Sharing Initiative (Global) and its pursuit of a Justice Reference Architecture
- ▶ Explore the concept of Service-Oriented Architecture (SOA) and why it is important to the future of justice information sharing
- ▶ Delve deeper into *services*—a chief component of Global's envisioned Justice Reference Architecture



GLOBAL SERVICE-ORIENTED ARCHITECTURE: TOWARD A BRAVE NEW WORLD OF JUSTICE INFORMATION SHARING

Information sharing is a long-standing practice among justice agencies. As society becomes more mobile, the importance of effectively and efficiently sharing data to secure our nation and improve day-to-day public safety grows exponentially. Technological advancements have been critical to the increased ability to share information. As we have moved from paper, telegraphs, telephone, and teletype machines to computers and wireless communications, the working partnerships and the types of data exchanged have been transformed. The arrival of the World Wide Web and its supporting technologies has spawned a brave new world of information sharing. This new world goes beyond exchanges among specific partners to embrace the whole of the justice community—including law enforcement, prosecutors, defense counsel, courts, probation, corrections—and a host of nontraditional justice partners, such as homeland security, fire, emergency services, health, education, transportation, and motor vehicle licensing. In particular, the availability of Service-

Oriented Architecture (SOA) points the way to not only developing an effective, efficient means to share information in a seamless and timely fashion but also to significantly increasing our data exchange capabilities while vigorously considering privacy and security concerns. Furthermore, the incremental nature of SOA takes the prohibitive “all or nothing” sting out of the proposition for justice and public safety decision makers. Public policymakers and justice system managers are critical to the success of the SOA—they cannot stand back and “leave it to the experts” but, instead, must become active participants in the design, development, and implementation of information systems. The U.S. Department of Justice's Global Justice Information Sharing Initiative is committed to providing decision makers with educational resources (such as this booklet), so they can intelligently add their voice to this exciting information sharing dialogue in pursuit of a Justice Reference Architecture.

PREFACE

Harnessing the promise of new technologies for the good of the collective justice community is no easy task. While the challenge is formidable, with the leadership and support of the Bureau of Justice Assistance (BJA) and Office of Justice Programs, U.S. Department of Justice (DOJ), significant inroads have been made. A large portion of these successes are due to the dedication of volunteer members of DOJ's Global Justice Information Sharing Initiative (Global) Advisory Committee (GAC).¹ Since 1998, practitioners from local, state, tribal, and federal justice entities have participated in this federal advisory committee to collaboratively address issues that have historically impeded effective justice information sharing.

Global's initiatives and activities, especially the development of information exchange standards, are derived from actual user requirements and have been driven from the "bottom up," based upon the business process problems of all justice disciplines. The development of information exchange standards through Extensible Markup Language (XML) began with the Global Justice



XML Data Model (Global JXDM)² being adopted across the nation at all levels of government as a key justice standard.

Building on the momentum of the Global JXDM, in September 2004, the GAC unanimously recommended the report of the Global Infrastructure/Standards Working Group (GISWG), titled *A Framework for Justice Information Sharing: Service-Oriented Architecture (SOA)*³, for delivery to the U.S. Attorney General and BJA for appropriate action. By doing so, the GAC recognized SOA as the recommended framework for development of justice information sharing systems, adopted the report's action agenda for its activities to further the utility of SOA for the justice community, and urged the members of the justice community to take corollary steps in the development of their own systems.

The adoption of the SOA report reflected the belief of Global that an SOA approach was most likely to achieve its mission:

Any member of the justice community can access the information they need to do their job, at the time they need it, in a form that is useful, regardless of the location of the data.

Several things about this statement are important. First, the emphasis is upon access to

¹ The GAC is a "group of groups," representing many independent organizations spanning the entire justice spectrum. Global's members are justice agency executives and policymakers; justice system planners and managers; justice information practitioners; and, most importantly, end users. This last group is vital since it distinguishes Global as an entity whose members are actively dedicated to the issue of information sharing, precisely because they continue to be producers, consumers, and administrators of critical justice and public safety information. More information is available at www.it.ojp.gov/global.

² See Global Justice XML Data Model (Global JXDM) at www.it.ojp.gov.

³ Located at http://it.ojp.gov/documents/20041209_SOA_Report.pdf.

information, not the origin of the data. Second, the focus is on the services that the user receives. Third, it expects that information sharing will cross agency, discipline, and government boundaries. Fourth, it recognizes that privacy and security are major considerations. This is an ambitious vision that requires an equally ambitious action agenda. It is also a vision that demands that justice managers and policymakers educate themselves on issues related to SOA.

Recognizing the potential and challenges of this architecture, Global is working to peel back the complexity of SOA for the justice world, much like they have been doing for several years with XML through the Global JXDM. The ambitious goal of Global is to create a Justice Reference Architecture. At a very high level, the Justice Reference Architecture consists of four pieces: standards (such as the Global JXDM for content), services, policies, and registries. This paper provides an executive briefing on **services**.

SOA

The concept of large-scale justice information sharing (sometimes referred to as “integrated justice”⁴) has become a holy grail of sorts in the justice and public safety communities. While the laudable increase of information sharing relationships has brought us closer to the promise of enterprise-wide data exchange, in most cases, we continue to build information technology (IT) connections in the same old way: drop lines from Point A to Point B, execute interagency agreements or memorandums of understanding (MOU), and then contract all around. And, as long as there is a direct

⁴ The concept represented by the phrase “integrated justice” is more appropriately represented by the term “information sharing,” stressing the act of data exchange as opposed to physical interlinking of systems. As such, this report uses “information sharing.”

system-to-system connection and parties are willing to enter into an agreement, data access is granted. But this model is time- and resource-intensive; limited in scope, application, and efficiency; and approaching obsolescence in the face of increasing (and increasingly complex) information needs.

Fortunately, the advent of Web technology provides the means to achieve the elusive goal of enterprise-wide justice information sharing. In particular, the availability of SOA points the way to not only developing an effective, efficient means to share information in a seamless and timely fashion but also to significantly increasing our data exchange capabilities while vigorously considering privacy and security concerns. Furthermore, the incremental nature of SOA takes the prohibitive “all or nothing”

sting out of the proposition for justice and public safety decision makers.

Conceptually, SOA is a distributed software model in which small pieces of application functionality are published, consumed, and combined with



other applications over a network on demand. The difference from past integration efforts is that the business processes and information sources remain functionally autonomous—the “owner” of the data retains control of the information. SOA is the ideal framework for developing effective justice information sharing systems because it is uniquely suited

to accommodate the distributed, heterogeneous nature of the American justice information sharing landscape. SOA tolerates diversity and allows for the dynamic “many-to-many” information exchanges that justice, public safety, and homeland security agencies require. It shifts the focus to providing and gaining access to “services” to get the *right information* to the *right person* in the *right place* at the *right time*.

The concept of a *service* is also useful for describing which business processes need to be integrated. The key is what the receiving organization does *after receipt* of the message. For example, a prosecutor may send out a message with a charging document. Upon receipt of that message, 1) a court may initiate a case, 2) a law enforcement agency may change the status of a case, and 3) a criminal history repository may alter a record. The *same information* is exchanged in all three cases, but the “business” usage is different. In this example, it may literally be the same “service” sending the data, but different “services” receiving. On the other hand, the originating agency may have different business requirements for the different receivers of the data. Even though the information *content* of the message may be the same, the services from the originating agency should be considered different.



SERVICES

At the heart of *A Framework for Justice Information Sharing: Service-Oriented Architecture (SOA)* is the assumption that software services will be shared across the justice domain. This requires not only standard policies (business rules) and a means for locating and accessing the relevant components (registry) but standards for content and delivery mechanisms.

SERVICES BASICS

At its simplest, a service involves a producer and a consumer using an agreed-upon technical architecture and business rules to exchange information in support of a business process.

In this case, the producers and consumers are actually computer systems instead of people. In today’s world, the technical architecture typically consists of open or nonproprietary Internet protocols and standards.

The data standards describing the content of the information being exchanged are a mix of standards developed by industries or business domains that “own” the data. For example, justice data standards are being governed by the Global JXDM process. Within that general process, individual justice domains, such as courts, corrections, or law enforcement, are responsible for developing the data standards for exchanges they originate.

As mentioned above, these services differ from traditional dedicated point-to-point exchanges in several important ways. The use of open

Internet standards frees both the consumer and producer from the need to understand the other agency's technical architecture or keep up with related changes. The on-demand nature of services frees both the producer and consumer from needing to tightly coordinate their business processes beforehand.

Currently, a major services "sticking point" is agreement on key business rules. There are technical standards and methods for specifying and complying with a number of security, reliability, and privacy provisions. Yet, the technology is still too new for many agencies to be comfortable with anything short of a formal written contract, agreement, or MOU before exchanging data.

Reuse is a major business advantage of SOA. All parts of the architecture can potentially be reused—from policies, business rules, and requirements to delivery mechanisms and data modules. One reuse strategy is for the same kinds of agencies to reuse the standards for one kind of exchange, such as a driver or criminal history. Another kind of reuse is for the same agency to reuse data modules across multiple data exchanges. Typical examples include person, address, or vehicle information.

COORDINATION OF SERVICES

The potential for significantly reduced costs is exponential if multiple agencies in multiple jurisdictions agree on a common set of exchange standards. Vendors are then able to build support for these standards into their products and offer them to justice agencies at low cost. On the other hand, lack of coordination could lead to each agency developing its own set of standards and services, resulting in a massive

"Tower of Babel" even worse than today's fragmented network of exchanges.

Current technologies allow systems to be distributed throughout the world, yet appear to the user as a single system in a single location. This provides essential redundancy and reliability, especially in the case of mission-critical applications where system failure could mean the difference between life and death.

This has far-reaching implications for the application and management of a Justice Reference Architecture. If different agencies and justice associations agree on a set of architectural standards, they can incrementally build up what looks and acts like a single system, literally, without anyone being in charge. This is basically how the Internet itself has evolved.

A strategy of distributed services always presents the danger of potentially inconsistent services to be deployed across the federated system. Although this problem can be mitigated by extensive documentation of policies and standards, it remains a significant operational problem because we are currently far from agreement on the full range of standards required to consistently specify a service architecture. Nevertheless, most likely, a federated approach to justice services will prevail in the near term because of the decentralized governance structures that exist.

INDUSTRY PRODUCT MATURITY

Even though most implementations of SOA services are only in the pilot stage, industry support and product availability are growing. Vendor support for open Internet standards implementing many parts of a Justice Reference

Architecture is already fairly widespread. Many of these products are in their first release, so caution must be demonstrated in implementation planning. The surest way to success is to have clearly defined requirements, before any product is examined, and a clearly defined test suite to ensure that a selected product actually meets those requirements.

Risks

While a Justice Reference Architecture based on services offers many potential business benefits, it also brings its own risks. The most threatening pitfalls are not technical. A Justice Reference Architecture exposes services that deliver justice information in new and unique ways. By making such information available to new customers via nontraditional conduits, Justice Reference Architecture forces justice organizations that provide the information to rethink their business rules for security, privacy, and governance in fundamental ways.

Aside from some very critical technical issues related to safeguarding the sharing of XML data with external justice partners, the way in which consumers of justice data services are identified, approved, and served will radically change in a Justice Reference Architecture. Existing business rules must be respected and supported, where appropriate. New business rules must be created and agreed upon with a number of justice partners.

There are parallel privacy concerns: the ways in which a Justice Reference Architecture enables information sharing and the types of organizations that might be able to consume such information may concern citizens and justice agencies unless appropriate business

rules for safeguarding privacy are agreed upon and implemented along with the Justice Reference Architecture itself.

Security and privacy concerns are illustrative of the need to have a clear, pragmatic, and widely accepted governance strategy for identifying, implementing, and managing a Justice Reference Architecture. Even within a single organization, SOA governance problems can become critical if not actively managed. The Management and Policy Committee of the Global Infrastructure/Standards Working Group will be addressing these governance issues in the near future and recommending strategies for facilitating consistent approaches to the business policies supporting a Justice Reference Architecture.

AN NLETS SOA EXAMPLE

Nlets – The International Justice and Public Safety Information Sharing Network ran a traditional point-to-point network for criminal history transactions using a legacy architecture that was necessitated of all users. It enforced security centrally by mandating a set of physical security and training requirements.

Now, Nlets has reengineered their network to support services for their core transactions that will allow law enforcement agencies who are creating their own SOAs to reuse the Nlets services as if they were consuming them directly. Once this capability is combined with national standards for the transactions and agreements on services business rules, many of the existing barriers related to these kinds of transactions will disappear.

Note that many participating state agencies did not have to rearchitect their legacy systems.

They merely translated their old transactions into the format used by the services approach. Now they no longer need to consider the hardware, software, or messaging methods used by the agencies with which they are transacting. It has also proven relatively easy to add new services, like the Amber Alert.

The Nlets pilot is a good example of the impacts a services approach will have on traditional security methods. Systems accessing the National Crime Information Center and Nlets have historically relied on physical terminal security and the auditing of transactions at the terminal level. The new security model will rely more on electronic credentials, digital signatures for persons, and layered network security, such as encryption and firewalls. The security requirements are the same, but the means will be more standardized and flexible.

WHY TRY SOA SERVICES NOW?

The risks of trying an SOA approach *now* should not deter us from supporting work on a Justice Reference Architecture. Any endeavor of significance requires us to grapple with similar types of risks. The obvious moral is that we must perform due diligence to ensure that adequate governance and appropriate business rules drive the formation of the Justice Reference Architecture. Doing so is just as important as resolving the various technical concerns surrounding information sharing.

Implementation of SOA services is not a silver bullet that will instantly solve information sharing issues among the justice and public safety communities. Current implementation plans for SOAs anticipate 12 to 18 months for the pilot phase and 5 additional years for full

SOA implementation.⁵ Because of the required cultural changes and funding cycles, it may take even longer for full implementation across the justice and public safety enterprises.

Of course, a Justice Reference Architecture is only as useful as the services registered. It also requires start-up investments. So, services inevitably start out being limited in scope. The initial registration of services will need to be encouraged (perhaps through ties to grant funding). Patience will be required to see the benefits. More importantly, if services are implemented without a structured plan, an inadequate system will be the likely result.

Therefore, the question becomes, “Why try SOA services now?” SOAs require concentrated effort, long-term vision, and planning, and the return on investment may not be immediately apparent. True; however, the long-term payoff will be a significantly more flexible and robust Justice Reference Architecture that will better meet the needs of the justice and public safety professionals—and all the people they serve.

⁵ See www.ebxml.org/case_studies/NHS-ebMSG-casestudy-041206.pdf.

ABOUT GLOBAL

The efforts of DOJ's Global Justice Information Sharing Initiative have direct impact on the work of more than 1.2 million justice professionals. The importance of the Initiative's mission, however, positions Global to impact citizens of the United States, Canada, and beyond. Global's mission—the efficient sharing of data among justice entities—is at the very heart of modern public safety and law enforcement.

Global is a “group of groups,” representing more than 30 independent organizations, spanning the spectrum of law enforcement and judicial, correctional, and related bodies. Member organizations participate in Global out of shared responsibility and shared belief that, together, they can bring about positive change in interorganizational communication and data sharing.

The Global Advisory Committee (GAC) advises the nation's highest-ranking law enforcement officer, the U.S. Attorney General. Global aids its member organizations and the people they serve through a series of important initiatives. These include the facilitation of the Global working groups; development of technology standards, such as the Global JXDM; creation of documents on data sharing issues, such as the *National Criminal Intelligence Sharing Plan* and *Privacy Policy Development Guide*; and the dissemination of information via the Global Web site.

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