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The National Consortium for Justice Information and Statistics

A Service-Oriented Architecture Primer for Executives: Why You Should Care

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If you are a justice or public safety business leader today, chances are good that you have heard about service-oriented architecture (SOA). For example, do you know the opportunities and risks it presents to your organization or your information sharing partnerships? Do you know what problems SOA resolves? What should a business executive know about SOA? The answers to these questions are important for you to know as your agency seeks to integrate justice information.

The purpose of this technical brief is to outline the business case for SOA. This brief, and subsequent conversations with your technical staff, will better prepare you to make key decisions and help facilitate a successful integration strategy.

Background

In 2004, the [Global Justice Information Sharing Initiative](#) (Global) adopted SOA as the recommended national baseline approach to design justice information sharing systems. In the five years since, Global's [Infrastructure/Standards Working Group](#) developed a toolkit called the [Justice Reference Architecture](#) (JRA) to make SOA easier for state, local, and tribal jurisdictions to implement. Given its prominence in technology literature and the emphasis major technology vendors place on it, it is very likely that your jurisdiction's technology leaders, and probably your own information technology (IT) staff, have explored SOA.

The number one reason why SOA implementations fail? Failing to explain SOA's *business value*.

—[CIO Magazine Online](#),
July 18, 2008

SOA Improves Business Agility

In a 2006 survey of business executives, *CIO Magazine* learned that only 11 percent of CEOs said that their organizations were able to keep up with business demand in areas where technology had a significant involvement in service or product delivery. Reversing that statistic means that almost nine-tenths of executives feel that technology is holding their organizations back, because it cannot change fast enough. Business leaders and operational managers come up with good ideas for process improvement or opportunities to expand service offerings. These ideas are often shelved or scaled back because the technology cannot adapt quickly or efficiently enough to support them. Most executives experienced price “sticker shock” or the disappointment when technology projects exceed budget and timelines.

Information sharing is the lifeblood of the justice system. The very premise for how law enforcement, prosecutors, the judiciary, corrections, and other agencies work together is their ability to share information. In the past several years, state, local, and tribal jurisdictions invested considerable resources in automating these information flows to increase productivity throughout the justice system.

Many of these jurisdictions have learned that without employing SOA principles, linking information systems together across organizational boundaries can result in unwanted dependencies. These dependencies occur at two levels:

- **Technology Dependencies.** If a single vendor, technology platform, database product, or solution is adopted by all participating organizations, then individual agencies generally have to change their internal systems to fit. Not only is this financially costly, but it also reduces your ability to manage internal operations without impact to the other partners. Changes to partner operations may also affect your system.
- **Business Process Dependencies.** Also called “building a one-off.” An automation project that focuses only on the immediate process will result in future project delays. Without considering the potential for reuse in the future, development efforts will take longer, cost more, and create significant operational overhead. If the *semantics* of an automated information exchange—the definition of the data and how it is structured—are driven by one agency’s internal data model or business process to the exclusion of the others’, the participating agencies have more work to do to “translate” the information into a form meaningful to them.

In both cases, and after several tactically successful projects to implement information exchanges, the inter-system connection points in a jurisdiction can wind up looking like a rat's nest, as shown in Figure 1.

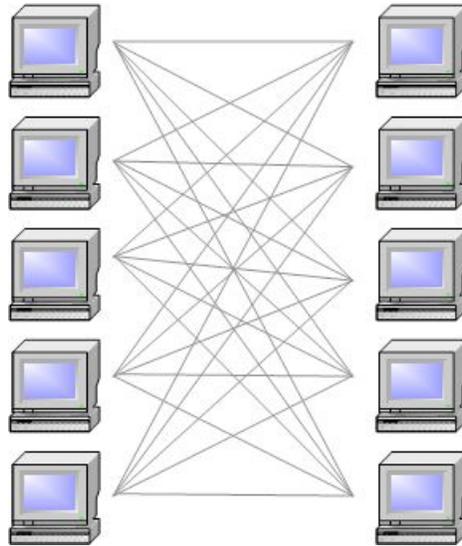


Figure 1

Given the autonomy with which justice and public safety organizations traditionally operate, these unwanted (and unnecessary) dependencies pose serious challenges for a jurisdiction's information sharing approach. Unlike most private sector organizations, state or local government agencies have considerable control and latitude over their internal business processes and technology choices. This autonomy allows each agency to optimize processes and technology to suit its unique stakeholder base, legal requirements, and traditional roles. However, agency autonomy coupled with the one-off approach can exacerbate the negative impact of unnecessary business process and technology dependencies. These dependencies can infringe on the ability of agencies to maintain their own processes and technologies and create operational challenges for multiple applications.

SOA provides a set of methodologies, techniques, and technical standards that avoid these pitfalls. The details of these SOA elements are beyond the scope of this technical brief, and are really the domain of your technology staff. However, it is important for the business executive to know that brittleness and fragility are potential outcomes of automated information sharing initiatives that do not adopt an SOA approach.

Sharing of Infrastructure

In today's climate, in which state, local, and tribal governments face severe fiscal constraints, the customary need to economize on resources takes on even greater significance. It is simply not financially feasible for every agency or project to procure, deploy, and maintain its own tools and technologies for automating information flow.

However, for shared infrastructure to work, the infrastructure must be based on open industry standards. This avoids the need for every justice and public safety agency to choose the same technology vendors, platforms, tools, and so on. These standards describe the ways in which tools from different vendors will interact. The standards are referred to as *open industry standards* because they are developed by cooperative efforts among leading technology vendors. Buying information sharing infrastructure that conforms to open industry standards is an important component to ensure that your information exchanges will interoperate with future systems and meet future needs with a minimum of adaptation and change. Open industry standards also provide a neutral playing field that avoids favoring one vendor over another. This, in turn, supports fair technology procurements and enhances partners' autonomy to make optimal choices for their internal technology needs while simultaneously supporting common goals.

SOA encompasses a broad set of open industry standards to guide the acquisition and implementation of information sharing infrastructure. It includes best practices that your technology staff do not have to discover for themselves. SOA can accelerate establishing infrastructure, and encourage agencies to share it once it is in place because it provides a clear roadmap for infrastructure tools and technologies, describes how they fit together, and what they need to do. Ultimately, these reduce long-term costs, increase system flexibility, and preserve your agency's autonomy.

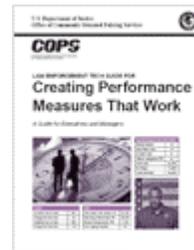
An SOA Action Plan

So if the justice business leader finds agility and increased sharing of technology compelling, what are the steps he or she should follow in moving down the SOA path? The following action items should be among the priorities for any organization seeking to adopt SOA.

- **Understand that SOA is primarily about setting technology standards.** Adopting SOA is not about buying technology—servers, tools, gadgets, or software. It is about setting standards for how the organization's technologists will build solutions that link systems together. The justice business leader should challenge any message coming from IT staff or vendors that purchasing an "SOA suite" or "enterprise service bus" will propel the organization toward the SOA promised land. Adopting SOA is about consciously choosing behaviors for the IT practitioners (and their industry partners) that have proven effective at producing increased agility and improved sharing of infrastructure assets. The standards included within an SOA will include basic technical standards such as web services and the [National Information Exchange Model](#) (NIEM), but also much more, such as:

- Methodologies for identifying services that explicitly address strategic business goals
 - Standards for the design and specification of services to maximize reuse
 - Governance processes that clarify the many roles and responsibilities necessary for proper sharing and reuse of services and infrastructure
 - Required infrastructure capabilities.
- **Engage a qualified architect.** The body of technology standards that constitute an SOA will collectively form the organization’s architecture for information sharing. Developing an architecture requires skill and experience, as well as a balance between technology savvy and the ability to promote SOA, build consensus, communicate effectively, and manage the architecture development project. In the right hands, development of an SOA can take as little as several weeks.
 - **Acquire infrastructure products after establishing the architecture.** Once an organization establishes an architecture, it will likely become apparent that some investments in technology will be necessary to enable the partners to conform to the standards. These purchasing decisions should be based on requirements explicitly identified in the architecture. In fact, architecture conformance should be a principal requirement in the request for proposals (RFP) or other procurement documents for infrastructure tools. The business leader should expect to find a robust market for SOA support tools, including viable open source tools that involve no up-front licensing cost. While an organization’s IT department may have established preferred vendors for core technologies, such as databases and application servers, it is important to recognize that *any* SOA support product will be new to the organization and will require some degree of integration with these other tools. Organizations should strongly consider a “best of breed” approach that includes open source when acquiring SOA infrastructure.
 - **Leverage the Global JRA to accelerate adoption.** The Global JRA provides several benefits to the justice organization seeking to adopt SOA. It provides baseline documents for all the necessary standards, which the organization can tailor to meet specific local requirements. These baseline documents have resulted from bringing best practices and lessons learned from state and local practitioners who have pioneered SOA adoption in a justice environment. In addition, the JRA documents provide off-the-shelf alignment with national justice standards, such as NIEM and the [Global Federated Identity and Privilege Management](#) (GFIPM) initiative. As a result, leveraging the JRA can save a state or local jurisdiction significant time and effort in adopting SOA, while ensuring alignment with national strategies.

- **Support the SOA effort by engaging other leaders.** For many justice agencies and partnerships, SOA will represent a significant change in behavior, especially for the IT sections of each partner agency. In the short term, SOA will almost certainly require additional effort, time, and resources—in short, a sacrifice. This is where an executive’s leadership abilities are crucial. Effective communication of the ultimate vision and fostering agreement on the outcomes are very important jobs for a leader to take on.
- **Establish an SOA Center of Excellence.** Gartner, Forrester, and other technology research firms have long recognized that an SOA Center of Excellence (COE) is a key enabler of SOA success. SOA is basically an integration strategy grounded in technology standards. As such, it tends to involve different justice partners at different times, depending on tactical project needs. It is generally inefficient for each agency, even in a large state government environment, to maintain the expertise needed to support an SOA. Additionally, since the success of SOA requires all partners to agree to follow certain standards, it is important to establish a centralized group to work with project teams, vendors, and other technologists in the partner agencies to ensure conformance with the standards and maximum reuse of infrastructure. Initially, this central group can consist solely of the SOA architect, but as the architecture expands and governs more information exchanges, the COE will likely need to grow with it.
- **Demand to see results, but give it time.** The justice business leader should insist on measurement of how the SOA is making the organization more agile and cost-effective. The difficulty with measuring the agility impact of SOA is that it is often not felt for some time, so initially the focus should be on adoption across the justice enterprise. Over time, *output* measures can transition to *outcome* measures—cost savings and reduced time to accommodate policy changes—once the opportunity to observe these outcomes arises.



Need to learn how to measure SOA improvements? See [Law Enforcement Tech Guide for Creating Performance Measures that Work](#)

Conclusion

This brief suggests that SOA provides two key business benefits—business agility and sharing of infrastructure—that should be important elements of any justice and public safety information sharing effort. While the executive leader’s job is not to develop or implement SOA, it is the leader’s job to understand and approve the business rationale for any significant technology investment.

The fundamental business purpose of SOA is to minimize unnecessary dependencies (technical and business process) and enable common infrastructure, thereby transforming the rat's nest of information exchanges into a more manageable, sustainable approach, as shown in Figure 2.

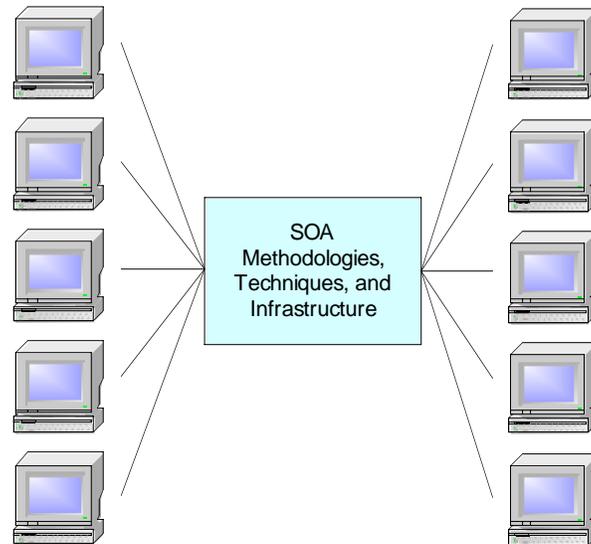


Figure 2

To request technical assistance with SOA implementation in your jurisdiction, visit <http://www.search.org/products/ta/>.

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