Removing the Barriers to a Secure Future

A PRACTICAL GUIDE TO SHARING VITAL INTELLIGENCE

Preface

In the aftermath of September 11, 2001, public safety organizations across the nation have taken a fresh look at security—the security of the public they are charged to protect and the security of their own workforce. Likewise, even those utility and communications providers who weren't directly impacted by that disaster can relate to the issue of preparedness. Every service provider has been or soon may be overwhelmed by a manmade or natural disaster of epic proportions. Public safety organizations, like the general public and the business community, depend on functioning infrastructure more than ever before.

Today, all public service providers have a mandate to revamp their procedures and information systems to avert or respond more quickly to disasters. A crucial component of that is creating newfound intelligence by effectively merging a variety of internal and external data sources. Barriers that exist between public and private organizations, and at the city, county, state, and national levels must fall in the interest of public safety. Information that is readily available from a variety of sources must be integrated to produce a *whole new breed of intelligence*. The payback can be measured in terms of lives saved and in the bottom-line dollars associated with business continuity. And the side stream benefits experienced in *normal* operations may even stand on their own merits in justifying the investment!

Most organizations are committed in spirit to this mandate for improvement, but no one can trivialize the effort involved in achieving that goal. Still, it is one that is quite achievable. The purpose of this guide is to provide practical pointers on approaching this challenge and to identify some of the benefits that this kind of approach can produce.

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The Inevitable Erosion of Information Boundaries

The necessity to erode old information boundaries is paramount today for any organization that serves the public. No longer do public safety organizations, communication providers, and utilities have the luxury of running their operations by relying simply on internal information sources. Heightened threats to homeland security, industry deregulation, the need to share advanced infrastructure, availability of new electronic information sources, and growing public dependencies and expectations—all are forces compelling every service provider, both public and private, to take a fresh look at information resources. Sharing and integrating the information necessary to deliver real operational intelligence needs to be viewed as *mission critical*.

Internal Obstacles

Even within an organization, it is still common to find many barriers to organizational efficiency. Critical information is stored on paper or on an isolated computer where it cannot be readily accessed. Such is often the case with applications involving location analysis, including crime analysis. Regular statistical reports are frequently produced, but the information is not being directly applied to real-time operating procedures. An opportunity to reduce crime is being passed up, perhaps while officers' lives are unknowingly being put at risk. Similarly, communication providers and utilities may have information on in-house applications that is sometimes important to share with field personnel. And yet field personnel have no way to directly access that information. The result is impacted response time for both routine and emergency operations.

> Homeland security and the need for organizations to share information are making headlines. However, it is short sighted to overlook the opportunity to use existing internal information more effectively.

And then there are the redundancies that happen all the time. Information is being recorded in two different systems that are not synchronized—with *neither* system being able to provide an accurate accounting of historical information or assets. In the end there are any number of information integrity issues that can greatly reduce an organization's internal effectiveness. That might entail an imminent danger that results from failure to synchronize an E911 system and a computer-aided dispatch (CAD) system.

Organizational Obstacles

And then there's the paramount issue of safety during natural disasters and threats to national security—times when information sharing is in everyone's best interest at the local, state, and even federal level. Otherwise, the potential for miscommunication is huge. Too many people using different and potentially conflicting frames of reference is hazardous even on a normal workday. But terrorists and Mother Nature certainly don't recognize artificial territorial boundaries that have long provided the framework for public safety and service providers and their information systems. Public safety supervisors and field personnel are forced to make real-time decisions without the intelligence that could

have been derived from assembling all *available* facts. That can mean the difference between saving lives, or between a business losing millions, as opposed to thousands, as a result of a utility outage.

Jurisdictional issues are only the tip of the iceberg in integrating external information sources.

Everyone knows that eliminating organizational barriers is easier said than done. For instance, cities and counties want access to infrastructure data from local utility providers. However, obtaining the necessary agreements to share information is just the tip of the iceberg. More often than not, the data being requested exists in different formats and in different types of databases. And there are also issues of network access and network security to address.

The questions and answers that follow will provide guidance on how an organization can begin to use a wide variety of information sources to produce newfound intelligence.

How can we make better use of the information that's available?

First, simply recognize that there is more information that can be tapped into today than ever before. Secondly, realize that it is the *synthesis* of information—performed instantly without relying on human cognition—that can spur tremendous organizational improvements. Which brings us to the third and most important point in getting started—the clear identification of organizational goals. Those goals should serve as the basis for investigating the types of information available both internally and externally.

Effective situation management can span many law enforcement jurisdictions, so you must consider regional, state, and national data sources. Whether it's for analyzing information about a regional serial killer or for the pursuit of a criminal on a multi-state shooting spree, efficient information sharing will put the culprit behind bars sooner. Coordinated efforts also ensure that local, state, and federal authorities don't unwittingly injure or kill each other during heated criminal pursuit. Similarly, nearly every type of private service provider can benefit from integration. Without current and accurate information from other providers, one provider can easily disrupt another's underground infrastructure.

A few types of external information sources your organization may want to consider include—

Local, state, and federal resources – An accurate view of manpower resources across agencies at all levels is becoming an imperative in the development of homeland security plans.

Infrastructure – Maps and other details for power, gas, water, sewer, street lights, hospitals, schools, phone and fiber networks, and fire hydrants are useful for both public safety and private service providers.

Demographic information – This information is particularly useful in determining how to bring relief to the largest percentage of the population as quickly as possible.

Aerial photos – These are often a missing complement to infrastructure detail. They are superior to street maps because they show buildings, openings, and physical obstructions. Aerial photos can be used to produce superb base maps for creating visual overlays of many other types of information.

Crime statistics – Patrol officers and supervisors can operate with knowledge of the types and timing of crime in various areas, allocate heavier patrol in high-crime areas, and ensure that backups are readily available.

What is the best approach for organizing all these information sources?

Location, location, location! It's a key factor in nearly every operation and every decision. What better framework could there be for organizing your information?

Public safety organizations, utilities, and communications providers all have one attribute in common – geography. The success of their operations is dependent on effectively managing both physical and human resources in a *specific geographic area*. For that very reason, the most effective way to organize diverse information sources is based upon data's geospatial attributes. By aligning information using that common component, organizations can gain a completely integrated and meaningful way to interpret and understand shared information. And geographically aligned information lends itself to both powerful visual as well as traditional database analytic possibilities.

How do you gain access to the data you need both inside and outside your organization?[1]

You've identified the sources of information that need to be integrated to accomplish the organization's goals and objectives. The next step involves three primary issues—jurisdictional issues, data types, and technical infrastructure. An in-depth feasibility study involving experienced technical professionals is usually in order at this point. The factors that follow should be investigated during that study.

Jurisdictional Issues

While it may have been difficult to obtain information from other organizations in the past, public and private enterprises are realizing that sharing such information is now vital to homeland security, and even day-to-day operations. Naturally, high-security federal agencies aren't going to grant direct access to their real-time databases. But they are

[1] All trademarks, trade names, and product names mentioned in this white paper are the property of their respective owners.

becoming more lenient with sharing relatively recent information with local authorities. Even if your organization has been denied information access before, it's worth exploring this issue again in light of recent changes in attitude.

Jurisdictional issues need to first be broached by the heads of the affected agencies and organizations to find agreement in principle for sharing information. There are sometimes valid reasons for declining real-time data access. But by approaching the issue with the attitude that there must be *some* interval (daily, weekly, monthly, quarterly) that the other organization finds acceptable for providing "information snapshots", agreement is often achievable. After that agreement in principle is made, it's time for analysts to work out the details of how the information actually can and will be shared.

Jurisdictional issues are ones that you can start tackling on your own. To investigate data types, consult a systems integrator qualified to explore geospatial attributes as well as disparate data types. Otherwise, you could waste money and time needlessly recreating existing data.

Data Types

Only in very rare cases will all data types be similar. Information that needs to be integrated typically includes at least some paper maps and reports; electronic reports; spreadsheets; databases of various types (Oracle, SQL, DB2, Microsoft Access, and so forth); network-accessible data as well as some stored on individual personal computers; CAD drawings; digital images (photo-like raster data as well as more "intelligent" vector images); various forms of geographic data (MapInfo, ArcView, Intergraph, and so forth); and web-based information.

The challenge associated with varying data types, of course, is bringing them all together to provide that unified view that will support better decision-making and reduce cognitive burden for personnel. A qualified systems integrator can—

- Combine disparate data sources
- Devise ways to make existing data entry tasks more efficient and reliable
- Help you improve data integrity by eliminating redundancy whenever feasible
- Ensure that the database is scalable—designed to support users and functional objectives, both now and in the future

Differences in data types are complex enough. But then there are variations in networks and operating systems that must also be evaluated.

Technical Infrastructure

After or during the data-type assessment, technical professionals accustomed to dealing with disparate data types, networks, and information security will need to perform an analysis to determine more mechanics of the information sharing. It is common to discover that organizations wanting to share information are at varying degrees of

technical maturity. For instance, one may only have network access via modem while the other may have T3 connectivity. While sharing information over a T3 connection is quick, most systems of that scale also involve complex security systems and firewalls that must be accommodated. Other issues to be investigated include server operating system disparities (UNIX, Solaris, Microsoft Windows/NT or Windows/XP, and so forth), as well as the capacity of those machines to support information sharing. It is often possible to obtain needed information even from a heavily loaded system or over a slow network, simply by obtaining "information snapshots" at off-peak hours.

Are there any other important considerations for putting it all together?

First and foremost, it is in the best interest of your organization to assimilate all the needed information into one geospatially enabled database. Sometimes the single database is not a physical one, but a "logical" one—comprised of information that physically resides and is maintained as multiple databases. Having everything in one database eliminates wasted staff time associated with independently maintaining the same information in two or more information systems. This fact alone can also help improve the integrity (accuracy) of the information your organization relies on for decision-making.

Combining all information in a single database can result in substantially improved return on investment, both now and in the future. So, too, can conformance to standards.

Secondly, for information that is periodically provided by other organizations, it is best to automate the entire procedure for obtaining that information. Otherwise, the task may inadvertently drop to the bottom of the priority list, leaving your organization exposed in time of crisis.

Lastly, but very important, is conforming to standards whenever possible. For instance, the Institute of Electrical and Electronics Engineers (IEEE) provides a wide variety of standards, governing everything from standard ways of transmitting data over networks, to wireless device interfaces, and more. Adherence to such standards will make future extensions easier, because the whole purpose of these standards is to enable different types of technology to work together. Where international and industry standards do not exist, it is beneficial to establish your own internal data standards. Managers can create and impose standards for the way your mission critical data is created so that integration of that data can be performed quickly and consistently. Creating one centralized database provides easy access, maintenance, and scalability for all future applications/endeavors.

How do we reap the benefits of all this data?

The possibilities from spatially enabling the information in your database are virtually endless. In fact, the data—once assembled in this manner—is transformed into an incredibly powerful application that can take on many forms. For instance, the same

central application that helps a dispatcher locate and assign resources efficiently can also provide maps to an officer in a vehicle and details about building exits to an officer on foot patrol with a mobile device. Just imagine a few other capabilities that are possible in a law enforcement agency. With proper integration, it's hard to define where one function ends and the next one begins.

- The **computer-aided dispatch (CAD) system** dispatches the appropriate responder based on resource availability and proximity to the incident.
- A countywide **Enhanced 911** system is integrated with the police department's CAD system saving valuable dispatcher time. Knowing the caller's location and identification enables critical information to be passed to the dispatcher seamlessly and assists in the CAD process. It also provides useful information about cellular phone users and their location—an important advantage with the increased popularity of wireless devices.

The possibilities for a spatially enabled application are endless. That's why it's especially important to prioritize your information integration efforts using your organization's goals and objectives.

- An **automated vehicle locator (AVL) system** assists supervisors in routing officers within their respective precincts based on their real-time location. Backups are called in based not only on proximity, but also resource availability.
- The **in-car mapping system** (ICM) in every vehicle directs officers to unfamiliar locations, saving precious minutes in responding to emergencies, as well as assisting with overall operating efficiency. Also, in certain emergency situations when an officer is unable to provide his or her location, the ICM will. This could be instrumental in saving an officer's life.
- A **crime analysis system** provides for detection of patterns of crime that were previously going undetected, resulting in an ongoing reduction in crime rate without an increase in personnel. This enables public safety organizations to be proactive as opposed to reactive in their responses.
- Imagine this…A system for **inter-agency information sharing** helps coordinate city, county, and state resources when a suspect is being chased across jurisdictions. Dispatchers in all three agencies can switch on access to others' AVL information to quickly devise a seamless plan for swift apprehension of a suspect.
- A particularly effective **homeland security system** is almost inherent with integration of all types of information from the public and private sectors. Because natural disasters or acts of terrorism are never predictable, it is difficult to assess beforehand what precise combination of information needs to be instantly and intelligently combined. That's why an application based on spatially enabled location data can be more effective than other types of applications. Footprints of school systems can be correlated with the footprint of utility outages, so that children receive swift attention or so that nearby facilities can be assigned as temporary shelters. Transportation hubs

can be identified and secured as needed by emergency responders in close proximity. Dispatching systems can be used to redirect an *expanded* team of emergency responders in an efficient manner.

Additional faces that an application might wear for utilities and communications providers, as well as the public sector, include—

- A system for **infrastructure asset tracking**, and the regular interchange of that information with other providers who share the infrastructure or have other infrastructure in close physical proximity
- **Emergency response enablement** and **disaster recovery**, based perhaps on an existing AVL system used to address routine service calls
- A **business continuity** system, which specifically helps the provider ensure that attention is quickly directed not only to medical facilities but to the disruptions that result in violation of service agreements with major businesses in the area

Tailoring the "faces" of an application according to users' roles further minimizes cognitive burden and increases productivity. The type of computer being used is another factor to be considered in designing a user interface.

One central powerful application wears many different faces, each adapted to both the person's role in the organization and the physical environment in which they serve. Accessibility to the central application can be achieved via a mobile or wireless device, the Internet, the organization's intranet, or other internal network. An experienced systems integrator can ensure that the user interface is appropriately adapted to the computer of choice—a desktop PC, a notebook, a pocket PC, or other wireless device.

How do you get started with the whole process?

Today, a number of companies provide products that assist with geocoding and spatially enabling your information assets. Some organizations lacking experience in that process have made substantial product investments without substantial return on investment. Often that's because it wasn't as easy as anticipated to get those products to produce the anticipated results. Most IT departments will find it necessary to enlist the assistance of an experienced systems integrator with a track record of choosing and integrating the appropriate set of geospatial products, as well as the needed data sources, into a solution that is consistent with the organization's goals.

Tapping into proven expertise can be a make or break factor in your information integration effort.

A qualified systems integrator knows what products and capabilities are within the budgetary reach of a smaller organization, as well as how to ensure that the system being developed for a large organization can scale up to support more people and long-range goals and objectives. In selecting your systems integrator, experience does matter!

About TSI

Known for its progressive solution development for organizations in both the public and private sectors, TSI brings more than 15 years of experience satisfying customer needs for mapping and spatial analysis technology. TSI was founded to help early adopters of geographic information systems (GIS) products practically apply and integrate these mapping technologies into their existing IT environments. The company's rich base of experience and expertise ensures that every solution, whether for public safety or private enterprise, is both pragmatic and insightful in achieving the maximum return on investment in these systems.

TSI's mission is to incorporate location based mapping and spatial analysis technology in ways that truly revolutionize the way its customers—and especially those engaged in public safety—do business. Enabling its customers to tap into, grow, and analyze the vast wealth of spatial information that is available, TSI also helps to promote the selective sharing of critical information across organizational boundaries. In the area of public safety, for instance, that information sharing can be mission critical and result in very tangible preservation of human life and corporate profitability during times of natural disaster and threats to homeland security.

Headquartered in New London, Connecticut, with offices in New York City, TSI has served customers whose vision and needs went beyond the basic use of off-the-shelf mapping technology since 1987. Initially, that meant helping customers understand, install, and extend GIS products to satisfy critical business objectives. During the past decade, TSI has expanded its scope to embrace more advanced solutions and services, including sophisticated spatial analysis, application development, and back-end database connectivity. Today, public safety organizations large and small, as well as large telecommunication and utilities providers have seen the benefit of the comprehensive and thoughtfully integrated solutions and services provided by TSI.

To obtain more information about TSI or to make inquiries about a solution for your organization—

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