

WEB 2.0 AND HOMELAND SECURITY: ENDING THE FRAGMENTATION OF THE PRACTITIONER COMMUNITY

Statement of Purpose

One of the most significant problems facing the public safety and emergency response community (hereinafter referred to as the “practitioner community”) cited in countless after action reports, is the inability to seamlessly communicate and share information when needed. This is due to the fact that there are approximately 55,000 police, fire, and emergency response agencies, each of whom has its own proprietary information and communications systems, and the overwhelming majority of which, were not developed to work with one another. That can change rapidly by employing the technologies and business models that exist today under the broad rubric of Web 2.0.

Introduction: The Fragmentation Problem

One of the dilemmas the nation faces in our effort to improve homeland security and the public safety in general arises from our system of government. Homeland security, like many of the public safety issues facing us today, is national – if not international – in scope. However, the “boots on the ground,” that we have employed to tackle these issues, exist largely at the state and local level. They comprise nearly 55,000 state and local agencies in the practitioner community spread throughout the nation.

The majority of these agencies are small or volunteer agencies. Approximately eighty to eighty-five percent of the 18,000 law enforcement agencies have twenty-four or fewer sworn officers and fifty percent have twelve or fewer. Some eighty percent of the more than 30,000 fire departments are volunteer agencies. Yet it is these agencies comprising more than three million practitioners that are the front line of our homeland security.

In the past, these state and local agencies mainly focused on jurisdictional issues, while federal agencies such as the Central Intelligence Agency (CIA), the Federal Bureau of Investigation (FBI), the Drug Enforcement Administration (DEA), and the Bureau of Alcohol, Tobacco, and Firearms (ATF) concentrated on national and transnational concerns.

The luxury of that simple division of labor no longer exists because of events such as the Oklahoma City Bombing, the 1993 World Trade Center bombing, September 11, 2001, and Hurricanes Katrina and Rita, to name a few. Today’s response framework is vastly different for the practitioner community. In addition to the day-to-day local issues, they have to give equal priority to regional and national problems as practitioners respond to organized crime, drugs, gang violence, terrorism, and manmade and natural disasters. For the most part small, local agencies do not have the resources to acquire the capabilities necessary to meet the new demands.

While collaboration, coordination and communications interoperability have become increasingly more important, the practitioner community’s fragmentation and size have made this a challenge. For example:

1. Communications interoperability on a local, state, regional, and national basis has been consistently identified as one of the most critical needs facing the practitioner community. Yet historically agencies have invested in communications systems that address only their immediate local needs. As a result, billions of dollars have been invested in legacy systems that, more often than not, cannot “talk” to one another.
2. Information and intelligence sharing have been cited by the 9/11 Commission as a top priority to enhance homeland security. While this issue has gained a high profile since September 11, 2001, it has been recognized as a critical need by law enforcement agencies for some time. Crime does not recognize jurisdictional boundaries and consequently, law enforcement has long understood the need to share information – from intelligence to informing other jurisdictions of an open warrant. Unfortunately, similar to the problem with communications systems, state and local agencies have invested hundreds of millions of dollars in information systems that addressed only their needs, creating stovepiped systems across the country. A critical element of the problem is that these systems are often proprietary, making it hard to integrate existing systems to be able to talk to one another.
3. Responding effectively to a catastrophic event, whether man-made or natural, requires a high degree of coordination among all response agencies. In a large scale event not only do local agencies - police, fire, emergency management, and emergency medical - need to coordinate among themselves, they need to coordinate on a statewide and regional basis. Doing this successfully requires that multiple agencies can communicate with one another and share a common operating picture and information. An effective response is difficult because incident management systems have “grown up” as fragmented and proprietary systems similar to communications and information systems.
4. State and local agencies are increasingly required to implement national level programs that they are often ill-equipped to execute. Programs such as the National Incident Management System (NIMS) and the National Response Framework (NRF), developed by the Department of Homeland Security, require a level of capabilities and training that often does not exist at the local level. The same is true of issues such as critical infrastructure protection and cybersecurity.
5. Most state and local agencies do not have the resources to conduct due diligence on new products and technologies. Conversely, it is equally difficult for vendors to get their products into the public safety and emergency response market in a cost effective fashion. For this reason, smaller agencies frequently do not get timely information on new products or processes. If they do, they often have to rely on the vendor for the information, which is an inherent conflict of interest. Finally, even if they can get the information they need, the agencies’ small budgets often preclude them from procuring a new product. An example is software based products where high license fees prevent agencies from taking advantage of a new technology.

6. While state and local practitioners are the “boots on the ground,” they often have little or no say on the policies and procedures that are established to deal with various issues. At best, a limited number of state and local practitioners are consulted for their input using temporary working groups, committees, and advisory groups. While it is easy to blame the federal government, the reality is that the fragmented nature of the practitioner community makes it very costly and time consuming to reach out to the larger community. Regardless, the impact is the same – the lack of input leads to a lack of effectiveness, due mostly to the absence of involvement and buy-in from the practitioner community.

Web 2.0: Closing the Gap

The emergence of the suite of technologies that has become known as Web 2.0 provides a means for solving many of these issues. The adoption and employment of Web 2.0 technologies and new business processes can enable interoperability and collaboration in ways that weren't practical in the past.

Web 2.0 changes the model associated with software and the Internet. In the old model, the software provider focused on locking in competitive advantage through featuring proprietary, closed systems. In the new model, the system comprises platforms without owners per se and which uses open standards and protocols that enable the platforms to link together seamlessly. Web 2.0 is a standards-based, open architecture system in which the source code is available to users for little or no cost. There is little licensing and sale of software, just use of the software – or software as a service. The user puts more focus on obtaining, managing, and figuring out how to best use the data in the system rather than figuring out how to make systems talk to one another. As a result, information that was previously stored in various stovepiped systems will become more readily available for people to act on – whether in the form of providing or accessing services or collaborating on the development of policies and procedures.

The net effect of this is to create a “participatory web” that better enables seamless information sharing and communications, social networking, and mass collaboration. One point should be noted at the outset. While Web 2.0 can enable a dramatic and positive change for practitioners, there are critical issues that have to be addressed for that to occur. A great strength of Web 2.0 is the degree to which it permits large scale use and transparency. The practitioner community, by contrast, has legitimate and crucial concerns about security, privacy and limiting access when appropriate. This issue will become even more critical with access to unprecedented amounts of data from many different avenues. Towards that end, there will have to be a great deal of work put into addressing the issues of security, policy, and procedures in order to maximize the effectiveness of Web 2.0.

Putting the Power in the Hands of the User

It is also important to recognize that Web 2.0 puts the tools directly in the hands of the users. Previously, users had to depend upon consultants to develop and disseminate the tools and applications they needed to improve the performance of their systems. Now Web 2.0 enables them to do it themselves!

The practitioner community has long been at the mercy of vendors who, while they may be committed to providing assistance, none-the-less focus on their bottom line. Thus the impact of applying the technology and business model associated with Web 2.0 is truly revolutionary. This is particularly notable as the community gets increasingly adjusted to the world of the Internet. The impact, as we shall see below, has created the potential to make rapid leaps forward in the ability of practitioners to solve the problems identified above and dramatically improve their capacity to guard the safety and security of the nation.

Making it Mobile

Finally, Web 2.0 tools are not only available at the desktop or on a laptop; they are also available in a mobile environment. As the Apple iPhone, Google GPhone, and Blackberry Storm demonstrate, many of these tools can be utilized in hand held devices that serve as mobile platforms, enabling practitioners to obtain information that they previously could have only received at their computer. This is of tremendous value to a practitioner community which performs the majority of its jobs in the field, where toting around a laptop is inconvenient.

How Web 2.0 Can Benefit the Practitioner Community

To understand the value that Web 2.0 brings to the practitioner community, it is critical to first understand that homeland security depends on making information actionable. At the end of the day, a large part of homeland security and other response activities depend on acquiring, managing, analyzing (including visualizing), sharing, and protecting information to make it useable. As identified above, that has proven to be a very difficult task for the practitioner community. The application of Web 2.0 tools provides a means to overcome these problems.

1. The use of standards-based, open source/open architecture systems will empower agencies to begin to break down the stovepipes created by the proprietary systems that have been imposed on them in the past.
2. Web 2.0 interfaces, such as those provided by Google, will enable agencies to integrate diverse sets of data from various sources into a browser and visualization system. While this is not a complete integration of systems, it will allow the use of information that would otherwise be excluded from use to be actionable in near real time.
3. One of the biggest impediments to the use of advanced software tools by state and local practitioners is the high license fee that is typically charged for these

tools. The Web 2.0 open source/open architecture approach will enable state and local agencies to utilize these tools with minimal or no cost for a license. The agencies will continue to pay for the operation and maintenance of these systems, but this can be accommodated through their regular service providers or using their own internal information technology (IT) organizations.

4. The fact that Web 2.0 enables practitioners to develop their own applications can result in the development and proliferation of cheaper and better tools. These tools will be more precisely tailored to their needs and will be available for sharing with anyone who needs them.

5. Collaboration tools that are readily available will enable practitioners to more effectively provide input on important policy issues, obtain critical information, and share best practices and lessons learned. In effect, Web 2.0 has the potential to end the disenfranchisement currently plaguing relations between the federal government and state and local government agencies.

6. The mobility of these platforms will enable practitioners to obtain all the information they need whenever and wherever they need it. This would be a world where the practitioners receive alerts, technical assistance, and critical information through means as simple as a cell phone. In the end, communication with their partners will become faster, easier, and real time.

A Real World Example: Virtual Alabama

Virtual Alabama was created by the Alabama Department of Homeland Security following the devastation of Hurricane Katrina. What began as a situational awareness project designed to enable the Governor of Alabama to visualize the damage, has rapidly evolved into a model of how Web 2.0 tools can dramatically transform the way in which the practitioner community conducts operations and does business.

When Alabama Homeland Security Director, Jim Walker, was given the task of obtaining and organizing all of the State's geospatial data in a useable format, he turned to the two people of his staff uniquely qualified to solve that problem. According to Director Walker, Norven Goddard, Deputy Director of Research and Development, Alabama Department of Homeland Security is "a true rocket scientist," as he is on loan from the U.S. Army's Space and Missile Command. He has spent years addressing issues similar to geospatial data for the U.S. Department of Defense. Chris Johnson, the Program Manager of what became the Virtual Alabama project, on loan from the State Space and Rocket Center, is an expert in geospatial data and has worked in the area for over fifteen years.

Before even looking at a technical solution, Goddard and Johnson developed a unique set of criteria for their ultimate solution and were determined to break the usual practice of focusing on proprietary solutions. Instead, they decided that the solution would have to:

- Be able to integrate disparate geographic information systems (GIS) and other data sets into one platform
- Be intuitive to use such that it can be used with little training

- Be cost effective and sustainable
- Be scaleable so that it can be used by large numbers of people
- Be able to be “owned” by all kinds of government agencies

After looking at all available technologies, they settled on Google Earth Enterprise as their platform. Not only did Google Earth Enterprise meet all their criteria, but the cost was only \$150,000 for an enterprise level license in perpetuity. This gave Director Walker the ability to provide a license to any dot gov or dot edu in the state and, in fact, across the country. Given what state and local agencies have experienced in the past, this alone was a revolutionary change. But the best was yet to come. By enacting Virtual Alabama, the Alabama DHS team achieved what Art Kalinski called “the holy grail of geospatial systems” in *Geospatial Solutions: Government and Military* on February 11, 2008. For the first time, one platform was able to seamlessly integrate GIS data from numerous GIS systems in such a way as to create a common operating picture across the State. And that was just the beginning.

As the team spread out across the sixty-seven counties in Alabama to convince county and city officials to provide their data for the system, they began to see the fundamental transformation that they were enabling across their state. They convinced those officials by first providing them with their own free licenses, and then, demonstrating the concrete benefits of Virtual Alabama.

For example, they showed county sheriffs that by overlaying publicly available information on sex offenders across their countywide maps and employing some simple mapping tools, it would help them determine whether the offenders lived or worked within 2,000 feet of a school, a violation of Alabama law. They showed firefighters that by using the three-dimensional (3-D) modeling tools that came with the software to model the interiors of key buildings and overlay data on hazardous and combustible materials, they could better prepare firefighters in the event they have to enter those buildings. They showed emergency management officials how the tools in Virtual Alabama could be used to plan for disasters and enable cross jurisdictional coordination if one should strike. The possibilities were endless.

There was still more. Overlaying GIS information with data showing the locations of utilities, such as power lines and creating 3-D models, Virtual Alabama became a tool to map and assess the vulnerability of the State’s critical infrastructure. Overlaying other information, such as the location of critical assets (hospitals, for example), demonstrated the ability to use the tool to plan for disasters. Other tools, such as plume modeling and traffic information, demonstrated response capabilities, including the ability to improve evacuation procedures, triage, etc. Finally, the Virtual Alabama team has integrated a social networking-collaborative work space tool into the system, enabling virtual, real time collaboration that can be used to plan, share best practices, or communicate during an incident.

Creating a Regionally Based National Operations Center

Thinking more broadly by integrating communications into the system, the Virtual Alabama platform could create a common operating platform not only for the State but across multiple states! “Imagine,” Director Walker has stated, “if we had a tool like this

during Katrina. Anyone involved in the response and recovery could have shared the same operational picture of the situation which would have vastly improved our efforts. And we could have used it virtually for staging, evacuations and everything else we had to do.” In other words, Director Walker is describing the ability to create a virtual national emergency operations platform that can be shared among and across state and local agencies as well as with the federal government.

Where Are They Now?

Just two years after launch, they are now implementing Virtual Alabama 3.0. Far beyond simply a common operating picture, they are now using it as a common operating platform for day-to-day and emergency use. They have successfully implemented it in all sixty-seven counties across Alabama and are now working with every state agency to use it as well. Currently they have the capability to:

- Integrate thousands of data sets across the State
- Track moving objects in real time
- Get real time video feeds
- Overlay information dynamically, as it develops
- Overlay numerous tools, such as plume modeling
- Monitor sensor feeds
- Do 3-D modeling
- Conduct GPS based asset tracking and management
- Created a social network and collaborative work space to enable users to share best practices

This is not just a nice toy. After the tornados in the spring of 2008, Virtual Alabama enabled the State’s emergency managers to rapidly determine the damage done and file their relief request with FEMA in record time – just a few days after the tornados ended. Moreover, they helped tornado ravaged Greenburgh, Kansas do the same.

Where is this going? According to Virtual Alabama Program Manager, Chris Johnson, they haven’t even realized 10% of the full capability of the system. Given their understanding of the value that this tool can provide the country, Director Walker and his team have been hitting the stump to preach the virtues of this Web 2.0 technology to anyone who will listen. In the spirit of Web 2.0, they are not doing it for any other reason than it is good public policy. They have talked to over half the states in the country and are now working with the U.S. Department of Homeland Security on three pilot projects to demonstrate the importance of this capability, including how the platform will link to various federal systems to allow for a truly national common operating platform.

Virtual Alabama as a Web 2.0 Success Story

By all measures, Virtual Alabama is a great Web 2.0 success story. Not surprisingly, as of this writing, Virtual Alabama has won five national awards in the innovative application of technology. That being said, it is important to understand that the key to

success was Director Walker and his team's realization and insistence to engage all the local stakeholders. It is their use of this tool on a day-to-day basis that is ultimately responsible for the success of the program. After all, it is their data and their collective imaginations of how to make that data actionable, in a way that is meaningful to them, that has created the program called Virtual Alabama.

Walker's team also understood that in order to engage the stakeholders, they had to be given ownership of the system. Another important aspect of the program's success is that the thousands of users of Virtual Alabama (representing over 1,000 agencies at the time of this writing, including federal agencies) feel that this is their system. Virtual Alabama took the opposite approach of most government programs, and it has clearly paid off.

In this case, the Virtual Alabama team took to the road to give the tool, free of charge, to over 3,000 individual users to use as they saw fit. The only thing they asked was that the data be sent for inclusion into the Virtual Alabama platform. Even then, they allowed the users (owners) to determine the policies by which the State and other users could see the information they sent. In other words, the stakeholders had true ownership of the system. Not only could they use it, but they could develop and disseminate tools on their own. It was after they saw the utility of the system for themselves, including the value of providing the information to the State, that the true value of Virtual Alabama emerged - complete with thousands of data sets and hundreds of tools.

What is important to note here is that it wasn't only the technology that made or was the sole enabler of Virtual Alabama's success. It was also the process and business model inherent in the Web 2.0 approach taken by Google. If Google took the typical approach of providing a proprietary system that was licensed to the State of Alabama at a high cost - as is usually the case - none of this would have happened. Instead, it was the fact that the technology was based on an open source standard (Keyhole Markup Language) and provided an enterprise level license in perpetuity at such a low cost that Alabama was able to give ownership of the system to all the stakeholders for free.

Providing a Policy Voice for Public Safety

In 2006, at a time when the New Zealand National Police were under a great deal of scrutiny, the New Zealand Parliament directed the Minister of Police to rewrite the fifty year old Police Act. The task fell to New Zealand Police Superintendent, Hamish McArdle, who immediately created a task force and asked members for their suggestions as to how to accomplish the task.

Due to the spotlight it was under, the task force decided that the traditional methods of consultancy, which usually involved using a set of consultants who would write a document and then, perhaps, post it in the public library, would not suffice. Instead, the Superintendent asked his team, "How can we connect with people about what kind of policy they want to govern their police in the 21st century?" To answer that, the Superintendent and his team determined that their efforts would be driven by two criteria - transparency and engaging as many people as possible in the process.

They felt that an open and transparent process would go a long way towards removing the suspicion and cynicism that the New Zealand public felt towards its police. In order to further build trust, they felt that they had to go beyond the usual experts and reach deep into the people they serve - including youth and minorities - to get another level of input and opinions.

After a great deal of discussion and some false starts, they decided on a two year, phased approach using multiple methods to obtain the input they wanted and needed. In addition to traditional means of obtaining input, they decided to turn to the Web, especially the tools available through Web 2.0, as the key part of their strategy. After some experimentation, they succeeded in finding the right balance of tools to get the input they needed. In fact, it was in their final phase, during which they posted a wiki to help them write the Act itself, that they began to see the true value of the Web 2.0 tools. The power of Web 2.0 became especially clear when, during the final days of their effort, they received as many as 10,000 inputs a day. And while not all of the inputs had the same level of value, Superintendent McArdle believed that using Web 2.0 in the way they did was critical to the success of their initiative.

“One of the key outcomes,” stated Superintendent McArdle, “was to help the parliamentarians know that our product was well consulted – that it had community buy-in.” Another surprising result was the amount of new ideas that they received. “If this was a good process (the one and a half years consulting effort) you would think we’d have heard all the ideas there could be. But the wiki brought in fresh ideas. While most of the ideas haven’t been accepted this time around they’ve introduced new ideas, ones we wouldn’t have thought of and brought a creative tension to the debate.”

In other words, the collaborative approach accomplished precisely what they wanted it to accomplish – and more. It wasn’t easy, however. As Superintendent McArdle is the first to admit, there were a lot of failures along the way; it wasn’t a case of build it and they will come. But at the end of the day, the utilization of Web 2.0 tools for policy deliberation and development proved to be a major success and a model for what we might look forward to in the future.

What Next? Developing a Seamless National Capability

While Virtual Alabama and the New Zealand Police wiki were both unqualified successes, they are only the beginning. Given their respective lessons learned, there really is no reason we can’t extend what both projects have created to establish, a Virtual National Operations Platform that will enable seamless information sharing among all of the local, state, tribal, and federal agencies in the country. Imagine the tremendous value if the Gulf Coast states would have been able to share the capabilities that are available in Virtual Alabama in a seamless fashion during Katrina or similar events of the last few years. Imagine if Louisiana, Mississippi, Alabama, and Texas would have been able to look at the same picture and share the same information as they planned their rescue and recovery efforts.

There is absolutely no reason this can't be done today. The technology makes it possible. In fact, as a result of programs like Virtual Alabama, the technology itself is becoming ubiquitous as other companies scramble to replicate what Google has done. For example, ESRI, one of the premier graphic information systems and mapping companies, has now created a platform similar in form and function to Google Earth Enterprise. While the integration of such systems has yet to be tested, it is not going to be the integration of the technology that presents the challenge to establishing such as platform. As is usually the case in establishing interoperability, the challenge will be in the development of the governance structure and policies and procedures that determine when an agency can get access to information and under what circumstances. That being said, the availability of the technology will serve as a catalyst to address these issues.

While the common operating platform will dramatically improve the ability to obtain, manage, visualize, and share information, the integration of collaboration tools into these platforms will dramatically improve the ability to make that information actionable. Practitioners will now be able to not only see the same data, they will be able to use it and act on it. Imagine a scene where practitioners from the same Gulf Coast states are all working from an identical platform and using the information presented there to collaborate on line and in real time. Using collaborative works spaces, threaded discussions, chat rooms, and wikis, they can work together to analyze what they are seeing, develop plans and policies, and write documents from directives to press statements.

Now imagine putting that same power in the hands of every practitioner through an iPhone or GPhone-style device which will serve as a mobile platform, enabling every practitioner to have the power of the national platform at his fingertips!

The Tip of the Iceberg

The above success stories, while perhaps the most comprehensive examples of the use of Web 2.0 to address these problems, are just the tip of the iceberg. There are numerous other examples where Web 2.0 has been used in a more ad hoc fashion to solve immediate issues.

In the aftermath of Hurricane Katrina, Katrina Help, a wiki-based social network that provided information to victims and volunteers on a number of different topics, sprung up. Information included missing persons, housing and shelters, health and safety issues, donations, and other resources.

During the October 2007 California wildfires and again during the August 2008 earthquakes in Los Angeles, local residents were eager for timely reports regarding their communities. The traditional news outlets were overwhelmed and did not provide the kind of up to date information residents desired. Twitter, a free social networking and micro-blogging service, was used to disseminate firsthand knowledge via cell phones. The Twitter messages that were sent during the wildfires were useful for information about evacuation orders, structural damages, road closures, injuries, and even the status of fire containment.

We are truly in the infancy of what is certain to become a revolution in how the practitioner community does its job. Implementation will not necessarily be easy. The adoption of Web 2.0 technologies and practices goes against many ingrained ways of doing business. It threatens to upend most of the existing stovepiped ways the business of public safety and emergency response is conducted today. Moreover, as noted above, there will have to be a great deal of effort in addressing security, privacy, policy, and procedures. Nonetheless, as evidenced in the successes of implementing Web 2.0, it is clearly worth doing. Where it goes next is anyone's guess, but wherever it goes, it will result in dramatically improving the safety and security of the nation.

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