Information Sharing: A Strategic Approach

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ABSTRACT

The purpose of this paper is to provide and recommend a strategic approach for implementation of information sharing initiatives. While such an approach offers a number of benefits, as a primary benefit, it provides a way to measure and monitor the performance of such initiatives, irrespective of their scope, whether they are regional, state, or federal efforts.

The first section of the paper presents a framework for alignment among information sharing initiatives; the second section builds on this framework and outlines a roadmap for an assessment methodology for such initiatives.

Keywords

Information Sharing, emergency response, emergency management, standards, interoperability, Information Exchange

INTRODUCTION

Sharing information during emergencies is a critical part of emergency response as it enables streamlined and efficient prevention of, response to and recovery from all-hazards. It requires collaboration among multiple stakeholders and consists of an inclusive and expansive list of emergency support functions, including traditional first responder agencies, public health, hospitals, transportation, emergency management, federal, state and local government agencies, private sector organizations, media, and others. (Note: This paper uses emergency management ands response as an example to present the concepts, but the process and approach applies to, and can be easily extended to other areas or sectors)

In this complex landscape, a *system of systems* approach enables communications interoperability and is described as an *Enterprise Services Framework* that aligns three key components: people, process and technology. (Dwarkanath and Daconta, 2006) This need for alignment is recognized in the Department of Homeland Security's *Interoperability Continuum* which identifies what is required to enable interoperability – governance (people), standard operating procedures, training and exercises, and usage (process) and technology (SAFECOM). While people and processes are the foundation of interoperability, technology is a critical enabler of interoperable communications. This paper focuses on technology, and in particular, the role of information sharing and the need to align information sharing efforts in the emergency response community.

Open standards alleviate some of the technical barriers and play a vital role when information needs to be shared among multiple stakeholders. They ease the complexity of integration, offer flexibility to end users, and can potentially lower the total cost of ownership. The Internet serves as a good example of the power of open standards when coupled with open networks. (Gaynor et al, 2008) However a number of challenges exist - the lack of a common definition and understanding of standards, their use, and the requirements that led to the development of standards. There is a need for a shared understanding among the various stakeholders and these ontological challenges can hinder the successful development, adoption and use of standards. In some cases, each community or domain attributes a different meaning to terminologies – a few examples: while some communities use 'incident', others use 'event' or 'crisis', in public alerting, 'alert', 'warning', and 'notification' are used interchangeably, different communities classify incidents and their sub categories in a different manner, and many others. These issues are further compounded when applied in a global setting, in addition to other factors such as multiple languages, difference in processes in emergency response, differences in the concept of emergency functions etc.

While standards itself do not lead to seamless interoperability, they are critical building blocks for information

Reviewing Statement: This paper represents a work in progress and identifies best practices and case studies for discussion; it has been reviewed for clarity, relevance and significance.

sharing and as a result there is an increasing demand to develop standards or information exchanges allowing members of the emergency response community to share information seamlessly. However this development should be based on an underlying framework and methodology since such an approach offers many advantages:

- *Provides prioritization and focus*: Given the extensive timeframe for development of standards and information sharing initiatives, it provides an opportunity to focus on developing standards that address the most critical business processes as a starting point.
- *Avoids duplication and redundancy of efforts*: There are a number of standards development bodies and initiatives that have developed standards, but they are frequently not known to other entities. Using a common framework helps to share information and make it visible to the community; as result, helps to reduce duplication of efforts and resources.
- *Provides for alignment in the community or domain*: Related to the above section, a common framework provides *context* for information sharing in the community. As community members validate the common framework, it provides broader alignment and creates a shared understanding among members.

The following section presents an approach to develop a framework for information sharing which can serve as a collaboration point to align information sharing initiatives.

METHODOLOGY FOR A GAP ANALYSIS

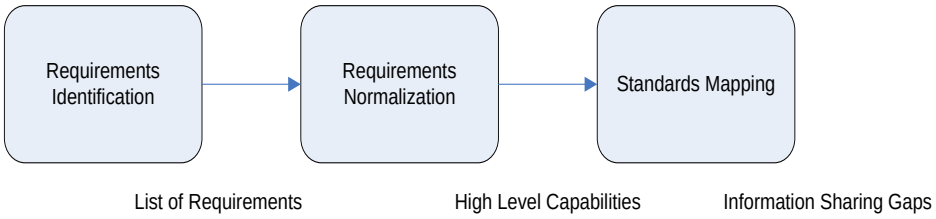

Figure 1: Gap Analysis Process Overview

Requirements Identification

As a first step, it is necessary to analyze various information sharing scenarios to obtain a comprehensive view of the business processes in the community; here it is important to ensure that the scenarios are inclusive. As an example, for emergency response, the scenarios need to account for day-to-day emergencies and mass casualty events. In addition, they need to include all the relevant stakeholders - emergency support functions, emergency service providers/businesses, and the public.

Requirements Normalization

A scenario analysis provides various requirements and these requirements are often at a detailed level and can be grouped into high level categories. Aggregation and normalization of these requirements across the various scenarios leads to developing *capabilities* which represents a high level functional view. This is illustrated in the below example: detailed requirements related to resource management such as resource ordering, tracking etc are grouped into high level categories, which then are mapped to a *Resource Management* capability. (See Figure 2)

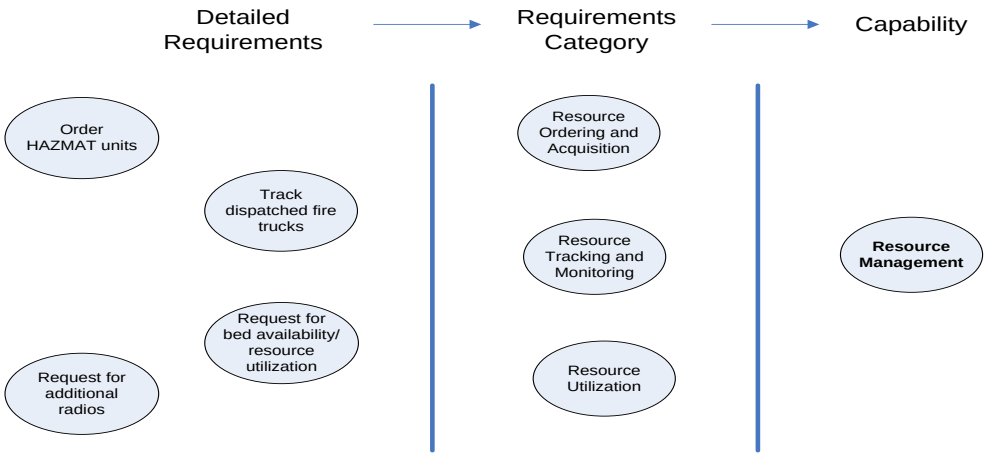

Figure 2: Development of Information Sharing Capabilities

Standards Mapping

A mapping of the standards to the capabilities identifies the *gaps* - areas where standards do not exist or are under development. It sets the stage for collaboration among the various standards development entities and enables each standards program or initiative to prioritize their development activities.

An example of this methodology is described in the case study below, a project conducted by The Office for Interoperability and Compatibility (OIC) within the Department of Homeland Security Command, Control and Interoperability (CCI) Division

Case Study

The Department of Homeland Security's Office for Interoperability and Compatibility (OIC), in the Science and Technology Directorate, has focused on developing standards for emergency response as part of its Emergency Data Exchange Language (EDXL) initiative. Recently, OIC conducted a *Gap Analysis* to develop a framework for information sharing using a *capability* approach and to identify the various standards that apply to the various capabilities.

The purpose of the *Gap Analysis* was to identify a list of gaps between the information sharing business requirements of the emergency response community and existing messaging standards. Doing this helped to identify requirements that were not being addressed so that OIC could prioritize the development of future data messaging standards to support emergency response.

The results from the analysis are described below; it lists the various high level capabilities for sharing information during emergencies.

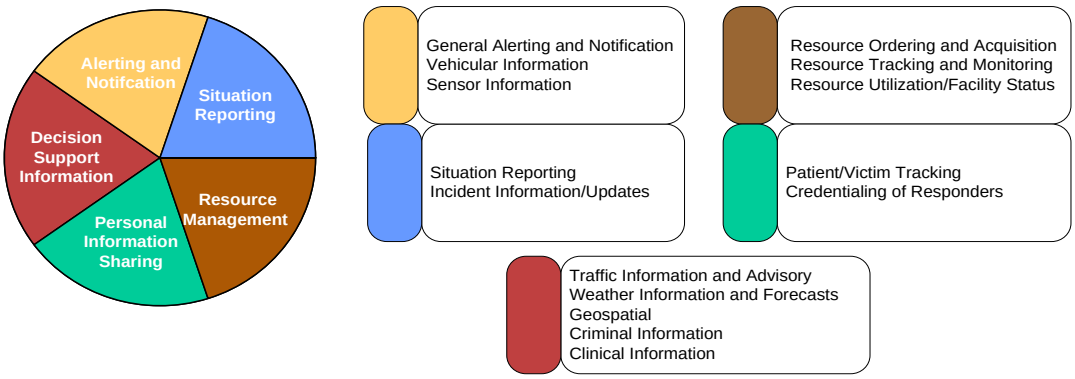

Figure 3: Requirements Categories and High Level Capabilities

Once the analysis was completed, the different information exchanges were reviewed along the various dimensions of Government to Government, Government to Citizen, Business to Government, and then mapped to existing standards or standards in development. A high level view of the mapped standards is shown below and as part of next steps the program intends to validate the results with key stakeholders in the community of interest – both practitioners, industry members and standards development organizations.

Alerting and Notification	General Alerting and Notification	
	Vehicular Emergency Alerting	
	Sensor Information Notification	
Resource Management	Resource Ordering and Acquisition	
	Resource Tracking and Monitoring	
	Facility Status/Resource Utilization	
Decision Support Information	Traffic Information and Advisory	
	Weather Information and Forecasts	
	Facility and Site Assessment Information	
	Suspicious Activity Reporting	
	Vehicular Information	
Situational Awareness and Reporting	Situation Reporting and Awareness	
	Incident Information/Incident Status	
Personal Information	Patient/Victim Information and Tracking	
	Responder Credentials	
	Citizen Information	

LEGEND

POTENTIAL GAP	STANDARD IN DEVELOPEMNT	DRAFT STANDARD	APPROVED STANDARD	VOLUNATRY STANDARD

Table 1: Gap Analysis of Information Sharing Standards

THE GAP ANALYSIS AND ITS IMPLEMENTATION

A gap analysis helps to assess the current state and plan for the future state. Among other benefits, it enables increased collaboration, promotes reuse, and prevents redundancy and duplication of efforts. It allows an organization to strategically orient its initiatives, providing for optimal resource utilization and return on investment (Anderson et al, 1994).

		Fire	9-1-1/PSAP	Emergency Management	Law Enforcement	Public Health and Medical	Transportation	Public Woks and Utilities	Mass Care & Human Services	NGOs
Local										
	County A									
	County B									
State										
Federal										

Table 2: Information Sharing Technology Assessment Framework (Template)

A multi-region information sharing initiative can develop a customized assessment framework (a sample is shown in Table 2) to categorize its information sharing initiatives/exchange partners and assess the state of interoperability in the region. This assessment can be conducted by identifying systems along the various dimensions and stakeholders. As an example, consider the capability of alerting and notification, the region can identify its gaps by a detailed analysis: is the local emergency management agency in *County A* able to share information seamlessly with other agencies in *County A*? Is it able to share information with *County B*'s emergency management agency? If needed, is it able to share information with the adjoining the *State* and *Federal* agencies etc?

The above example highlights the process to assess the technology part of interoperability, and as mentioned in previous sections, a holistic approach to information sharing requires consideration of the other important areas of process and people (political and organizational). (Dawes 1996). A comprehensive assessment framework should include all the three dimensions as illustrated in the aggregated framework, shown in Figure 4.

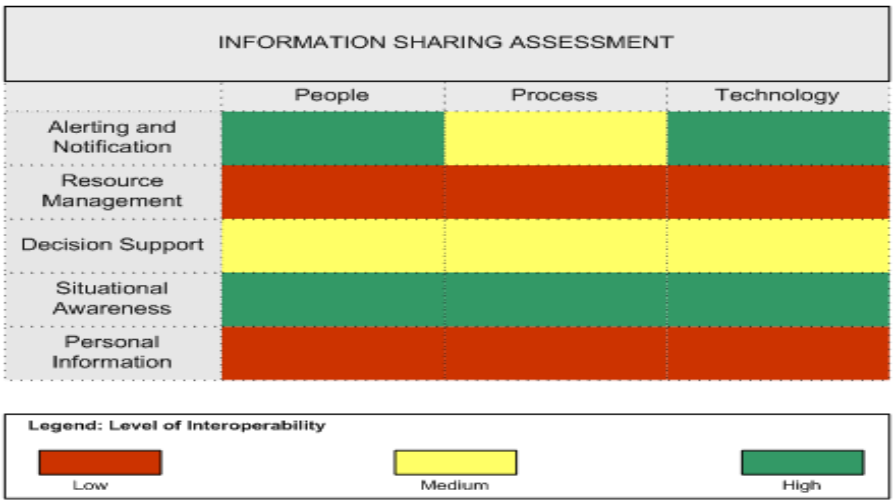

Figure 4: Information Sharing Assessment Framework

Such a comprehensive assessment framework allows information sharing initiatives to help assess the current state of interoperability, identify the gaps and provides a means to plan and prioritize efforts to achieve a future state.

CONCLUSION

This paper argues in favor of adopting a strategic approach to information sharing - such an approach offers a number of benefits and can help alleviate some of the problems in information sharing. It helps to prioritize efforts, avoid duplication, and serves to align the community. More importantly, it helps to measure and assess the current state, and plan and prioritize its objectives to achieve a desired future state.

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