

The complexity government agencies face in creating interoperability appears to increase proportionally with the number of boundaries crossed, the number and type of information resources to be shared, and as the number of technical and organizational processes to be changed or integrated increases. These difficulties result from the reality that sharing information involves large parts, if not the whole, of an enterprise or policy domain.

“While we can't predict future challenges, we know they will be there. We know they will be difficult, surprising in complexity, and growing in frequency and severity.” *A U.S. Local Government Public Health Official*

The **Information Sharing Complexity Matrix(5)** (see Figure 2) provides a mechanism for characterizing a cross-boundary interoperability initiative and identifying the level of complexity to be expected in creating the interoperability and information sharing capability necessary for transformation. The first dimension refers to the focus of the initiative, which can be meeting a specific need or problem or building systemic capacity. The second dimension takes into consideration the associated level of organizational involvement with three categories of involvement: intra-organizational, inter-organizational, and inter-governmental.

### Figure 2. Information Sharing Complexity Matrix

With respect to improving interoperability, the ability to understand the level and nature of the complexity early on and before investments are made is important. The Information Sharing Complexity Matrix provides a simple but clear conceptual model to help government managers identify the types of “boundaries” that will be crossed and some of the associated barriers and challenges that they might face within a specific interoperability initiative. Of course, acknowledging the complexity of these “future challenges” is only a beginning. Government leaders need to move from understanding to action. The following section explains the specific role of government leaders as they enhance the capability for interoperable governments.

## Four recommendations for government leaders

Many government leaders understand the need for interoperability; however, they have not yet consistently recognized the unique role they must play in creating the conditions necessary for building interoperable systems. As a result, while agency leaders and program managers seek to organize and work differently—to get people to do **different things in new ways**—they continue to be constrained by the traditional bureaucratic models that favor and reinforce the **old ways of doing things**.

### Four recommendations for government leaders

1. Build network leadership skills.
2. Create effective cross-boundary governance structures.
3. Create enterprise resource allocation models.
4. Reduce barriers to non-crisis capacity building.

Leaders must use their political will to create the conditions for interoperability, in particular for establishing appropriate policy frameworks and creating the governance mechanisms necessary for governments to organize and work effectively along new lines; networks of organizations working collaboratively on common interests and shared priorities.

A more interoperable government can change the nature of democracy, and citizen participation, and provide

systems for services improvement, efficient and effective operations of government, and the development of stable and vital economies. Four recommendations for realizing these changes are presented as a roadmap for government leaders. Collectively, the recommendations guide the transition to the policy environment for creating the interoperability necessary to realize government transformation. The recommendations focus on changes that must be made to create a government that is capable of effectively managing itself and its resources to provide the day-to-day services necessary to its citizens while at the same time being prepared to work with others to respond to crises as they emerge; in a sense creating a government worth having.

### Recommendation # 1: Build network leadership skills

The delivery and management of public services, historically provided through traditional bureaucratic organizations, today relies on networks of interdependent organizations. Effective and efficient delivery of programs and services through these networks requires interoperable systems. Leading a group of interdependent organizations to create this interoperability requires a different set of skills than those required in traditional bureaucratic organizations and traditional program and service delivery models. Crosby and Bryson describe this setting as “no-one-in-charge, shared-power world,”<sup>(6)</sup> where a great number of organizations and groups have only partial responsibility to act on a public problem and share the power required to solve it.

Leaders in this context must understand the challenges of working in networks; they must recognize the complexities inherent in working with many agencies and levels of government to coordinate programs and services. Two fundamental assumptions of traditional leadership literature<sup>(7)</sup> do not apply to collaborative settings. First, a leader cannot exert formal authority based on hierarchical rank because the individuals involved are from different organizations. Second, it is very difficult to agree upon a common goal because participating organizations, by design, have different missions, priorities, and, therefore, conflicting goals. Network leaders require boundary spanning skills. They must be skilled at creating the conditions for collaboration across the boundaries of these organizations. They must be able to identify shared opportunities for joint effort, to build energy and interest in working in new ways, and to navigate the complexity of network-based initiatives. They must be capable of drawing together key stakeholders to establish joint agreements about technologies, processes, policies, and practices.

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Creating interoperable systems across a government enterprise requires leadership that is knowledgeable about the challenges of working in networks and able to navigate the inherent complexities of this environment. Since IT permeates all business functions of an organization, IS leadership requires a holistic cross-functional view of the organization, which poses unique challenges for many chief information officers (CIOs) (Karahanna & Watson, 2006). It is imperative that government leaders recognize the importance of this type of network leadership style and put their support behind those individuals that demonstrate such skills and those programs and policies that support the development of these skills throughout the government workforce.

### Recommendation # 2: Create effective cross-boundary governance structures

Effective cross-boundary governance processes are critical to creating and sustaining interoperable systems. These governance processes must exist outside each participating organization's traditional bureaucratic structures and be designed to provide a similar kind of decision making capability to these “no-one-in-charge, shared-power world” environments. To be effective in this horizontally oriented setting, cross-boundary governance processes must be acknowledged by and supported by government leaders.

Interoperability requires, to varying degrees, changes in organizational resources beyond information technology such as personnel, equipment, and funding. It most often necessitates changes to current policies and procedures and the creation of new structures of authority to support decision making processes that must involve multiple organizations. Sometimes these organizations have similar goals and work models, sometimes their goals are quite divergent or even competing. Developing clarity about roles and responsibilities of each participating organization has been found to be an important factor in the success of information sharing and interoperability initiatives. Cross-boundary governance bodies are critical in creating this clarity.

Often the capabilities necessary to create network oriented governance structures is lacking. In part, this is due to the inherent conflict between traditional hierarchical processes versus the kind of cross-boundary processes

required to create interoperability. The kinds of decisions necessary to build enterprise interoperability often come in conflict with existing governance processes. For many governments and the specific organizations involved, creating enterprise interoperability is uncharted water. In these environments there is often a lack of agreed upon decision making processes as well as a lack of knowledge of each of the participating organizations and clarity about roles and responsibilities, and the fear of losing autonomy. Enterprise interoperability initiatives require cross-boundary governance structures that have their own clear lines of authority and decision making processes.

New governance structures must recognize the realities of the political environment in which they seek to create interoperability. They must be designed to complement traditional mechanisms with transparent, realistic, and flexible cross-boundary governance structures. These structures should not arbitrarily replace existing lines of authority with cross-boundary governance structures that disregard how decision making flows through agencies and branches of government.

Government leaders often hold the exclusive authority to empower cross-boundary governance structures to make decisions on behalf of a group of organizations; decisions that, while not in the best interests of or supported equally by each individual agency or partner, may reflect the overall enterprise priority. It is a focus on the enterprise priority that will guide interoperability efforts; decision making must be removed from individual agencies and shared across those agencies involved.

### Recommendation # 3: Create enterprise resource allocation models

Most existing resource allocation models do not allow for the movement of money or people across agency or government lines; at least without great pain inflicted to all involved. Even when organizations recognize the value of interoperability and are willing to commit resources to an enterprise priority, they are typically limited by law or regulation in their ability to allocate dollars across organizational boundaries. Small, short-term problem solving projects can often find innovative ways to share resources across boundaries and make it work. Complex and long term projects designed to create new capability in government are stymied by the inevitable limitations of traditional resource allocation models organized to fund agencies to work on agency-specific projects. Even in situations where interoperability initiatives are sanctioned by government leaders, participation and commitment are severely limited by these traditional funding and spending models. New legislation is needed to lay the foundation for resource allocation models that recognize and support this new way of working.

**Existing funding models constrain interoperability strategies** Resource allocation was a consistent source of interagency conflict in one government's justice information sharing project. Given existing funding models, some agency directors wanted to know how an integrated justice solution would affect their agency before the group could even begin discussing possible courses of action. Concerns that their agency would end up having to carry the burden of additional system administration and training costs without additional funding while other agencies simply benefited from the resulting information integration handicapped collaboration. Existing funding models provided no way for funds to be jointly appropriate and used.

New enterprise resource allocation models are necessary also to accommodate the use of scalable systems strategies and to acknowledge the need for sustainable systems. Developing scalable systems allows organizations to start small and to learn through more modest implementations and to "scale-up" as considered feasible and advisable to do so; a start small, and scale up strategy. Many resource allocation models require an all or none approach.

Increasing emphasis on sustainability also requires the unique attention of government leaders. Investing in systems to solve today's problems but are not sustainable over time is a common scenario for government agencies. Leaders alone have the ability to create new resource allocation models as well as require scalable and sustainable strategies. Government leaders are necessary actors in changing how money can be requested and spent.

### Recommendation # 4: Reduce barriers to non-crisis capacity building

Governments in general, react well in a crisis. They loosen the institutional and organizational constraints on working together across organizational boundaries, between public and private organizations, and across levels of government; network leaders emerge, priorities become clear and common, and decision making is streamlined. Sharing information and other resources becomes easier. Interoperability is more readily created within the context of a crisis to share information about victims of the crisis, about the equipment needed to respond and recover, and about the spread of a disease within the context of that crisis. Creating interoperability

ahead of time and building capacity to share information in normal times is often viewed as unnecessary and expensive; but in the long run, it may not be.

Immediately following a crisis governments tend to see the value of interoperability and will commit resources to build overall capability. Those involved in the 9/11 and the Tsunami responses saw this need very clearly; those planning for the next pandemic also see it clearly. Unfortunately, diverting resources, scarce resources, from other priority programs to create interoperability becomes politically unpopular as soon as memories of the most recent crisis begin to fade.

**Lessons from the World Trade Center Responses - Advance planning during normal times**> Some unexpected needs, such as the need to fly over Ground Zero to capture remote sensing and visual data, were so unusual that no existing legal procedures or routine relationships could be immediately invoked. The process of securing permission and resources to carry out this effort was invented as it unfolded, with frustrating gaps in understanding and overlaps of authority among people and organizations that had never met or worked together before. Because the fly overs involved civilian, military, local, state, and federal authorities, delays and misunderstandings added to the confusion. One person recalled that it took days to get the effort up and running. "I think everyone now recognizes that we'd like to set up contracts in advance, and specs, and have a company ready to go, so that when something happens, [you] lift up the phone, fly, no questions, everyone knows [what's happening], and they're up in the air and we're getting that intelligence back to us." *Information, Technology, and Coordination: Lessons from the World Trade Center Response*, Center for Technology in Government, 2004 [http://www.ctg.albany.edu/publications/reports/wtc\\_lessons](http://www.ctg.albany.edu/publications/reports/wtc_lessons)

Government leaders alone have the ability to keep a focus on the need for interoperability. They alone can ensure transformation by sustaining investments in the necessary capabilities. They can create an environment that helps cultivate enterprise interoperability for both day-to-day government operations and interactions with citizens as well as emergency management and crisis responses. The benefits are twofold: first, governments end up being more proactive rather than reactive when it comes to crisis response; and second, investing in capabilities that serve both day-to-day and crisis needs demonstrates a more efficient use of scarce resources and produces a more resilient government.

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(5) Gil-Garcia, et. al, 2005.

(6) See John M. Bryson and Barbara C. Crosby. 1992. **Leadership for the Common Good: Tackling Public Problems in a Shared-Power World**. Jossey Bass Public Administration Series.

(7) Chris Huxham and Siv Evy Vangen. 2000. "Leadership in the shaping and implementation of collaborative agendas: how things happen in a (not quite) joined-up world." **Academy of Management Journal**, Vol. 43 No.6, pp. 1159-75.