Improving Access to Government through Better Use of the Web

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Please refer to the errata and glossary for this document.

Abstract

Current Web technology allows governments to share with the public a variety of information in unlimited quantities on demand. Technology is also available to allow citizens to bring issues of concern to the attention of local, regional and national governments. However, exploiting these capabilities within government systems is a challenge that encompasses environmental, policy, legal, and cultural issues. Establishing effective eGovernment requires openness, transparency, collaboration and skill in taking advantage of the capabilities of the World Wide Web. The rich potential for two-way dialogue between citizens and government creates a need for global leadership. The W3C has an opportunity to provide guidance in support of eGovernment objectives by promoting existing open Web standards and noting the challenges external to the Web and

technology. There is also role for the W3C to facilitate the development and vetting of new open Web standards needed by governments in context.

This document is an attempt to describe, but not yet solve, the variety of issues and challenges faced by governments in their efforts to apply 21st century capabilities to eGovernment initiatives. Detail and useful examples of existing, applicable open Web standards are provided. Where government needs in the development of eGovernment services are not currently met by existing standards, those gaps are noted.

Status of this document

This section describes the status of this document at the time of its publication. Other documents may supersede this document. A list of current W3C publications and the latest revision of this technical report can be found in the W3C technical reports index at http://www.w3.org/TR/.

This is a public Interest Group Note produced by the eGovernment Interest Group, which is part of the eGovernment Activity. This publication as an Interest Group Note represents the culmination of the first year of group work. The contents of this document may be subject to further iteration and development. It incorporates comments received since the publication of a draft of this document released on 10 March 2009. Please send further comments to public-egov-ig@w3.org (with public archive).

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The disclosure obligations of the Participants of this group are described in the charter.

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1. Introduction

Governments have been striving since the late 1990's to find better ways to connect with their constituents via the Web. By putting government information online, and making it easily findable, readily available, accessible, understandable, and usable, people can now interact with their government in ways never before imagined.

This concept is dubbed "electronic government", or eGovernment. The promise of eGovernment allows citizens to access government information and services on their terms. Sharing government data and information with the public provides openness and transparency with citizens, and can improve operations within and between governments.

Unfortunately, effective eGovernment has not been easy to accomplish, given the unique challenges that governments face in collecting, managing, and making information and services available electronically. These challenges include outdated policies, budgetary and personnel constraints, and a slow-moving, bureaucratic culture. Web 2.0 and social media have only added to these challenges, and governments have been slow to adjust to these new paradigms of openness, interaction, and influence. A further challenge is the proliferation of mobile devices, where and when they are an access point to government services and also where and when they are the only access point available to constituents given the lack of adequate physical infrastructure. Lastly, the issue of accessibility, where data and Web pages and services are available or not to those with disabilities further compounds the challenges of eGovernment.

We are facing many questions now, such as how can governments leverage Web 2.0 tools without violating existing laws, regulations, and policies? How can governments ensure the authenticity of their information when it is opened for public use? What is the best way to include electronic communications into the "official record"? How can new technologies be integrated into legacy systems? How do we effectively reach all citizens, including those who access the Web via mobile devices, those with disabilities, or those without any access to the Web?

These questions are not easy to answer. The W3C eGovernment Interest Group (eGov IG) offers this Note to help governments formulate their eGovernment vision. This paper describes, but does not yet solve, many of the issues and challenges faced by governments. The use cases and explanations focus on current technical standards, and provide context for the challenges and issues we must overcome.

Background

Governments have strived for over a decade to provide more information and services to their constituents including the public, businesses, and other governments. Through their efforts there have been struggles given policy, resources, technology, capability, and other issues which have provided significant challenges and roadblocks to conceptualizing or achieving the desired goals and results. The explosion and development of the Web, related technologies, and practices have offered governments perhaps the best opportunity to realize their goals in providing information and services while meeting the demand for increasingly more contribution and interaction.

The idea of government use of the Web and related technologies was born in the late 1990's and culminated in early 2000 as an extension of everything "e". At the time, the Web was in its infancy and still very much acting and facilitating a wild-wild west frontier. eCommerce, eKnowledge, B2B, B2C, eService and many other terms floated around and sought to be defined to enable and leverage the promise of the Web. Terms were publicized and communicated in the hopes of creating interest and ultimately business via this new and exciting medium. During this period, governments realized there were also opportunities internal to their organization and activities seeking the same efficiencies and approaches used by others to improve and make electronically available information and services. This concept and opportunity was dubbed "electronic government" or eGovernment, eGov for short.

The promise of eGovernment then and continuing now offers governments the opportunity to open their doors to citizens, helping expose the secrecy of government, opening doors to the inner workings while aiding understanding and explanation, informing and making available large quantities and types of information for use, interest, and comprehension, delivering services where and when and at times citizens and constituents need them, and creating internal and external operating efficiencies that improve the operations and interchanges within and between governments.

The promise, progress, and efforts have been stymied given the many unique needs, requirements, and challenges that governments face in collecting, managing, and making available information and services. The unique issues include policies which control, at times in specific and procedural detail, how information must be handled, who has access, and if or not it can be distributed, and if it can, when. Other issues relate to budgetary and personnel resources that prohibit innovation, ability and execution of electronic government related activities. Governments are challenged to always do more with less being mindful of spending tax income. Governments are challenged in recruiting and retaining the qualified and skilled resources needed to develop innovative applications and approaches. Governments are challenged with being able to adeptly and quickly maneuver and adjust policies and procedures to facilitate a forward direction in electronic government.

Another challenge comes from the government and its role and contribution to society. Governments have looked to, used, and implemented technologies well after technologies and related approaches have been tested and proven in private industry. Governments, who are the champions of innovation and at times the financial resource for the private sector, cannot readily adapt to being an innovator which places them far behind what is viewed as the norm and current technological environment.

The host of issues cited and many more create challenges for governments considering or moving forward with electronic government.

The new ideas, applications, and promises of the so called Web 2.0 have only furthered and made more complex the issues and challenges that governments face in achieving the promises of electronic government. Web 2.0 and particularly social media, social networking, and the new paradigms of openness, interaction, and influence have confounded governments as to how they can take advantage of Web 2.0 and meet the demands of their constituencies. Many questions have been brought forth and with only partial answers to some. How can policies, practices, and laws be amended to allow for electronic participation? How can operations be altered to operate on and in real time to leverage the interest and desired level of participation? How can governments ensure the authority and primary nature of the information is maintained? What can and is a part of the official record of government and its activity? Can electronically derived and received comments be considered part of the official record? How are they responded to or addressed? How can governments use and incorporate new technologies within their older systems and infrastructure? Are there way to expose data from the older systems and infrastructures via the Web?

Additional issues and challenges come forth on who and what percentage of their constituencies have access to the Web, electronic tools and applications which would allow for the provision of information and service, the interaction, and the contribution. How and what must governments do to ensure the majority have access to the information and services now available from the fruits of their labor? The issue of access confounds and challenges both developed and developing countries and regions of the World. The wide adoption of mobile devices has furthered even greater complexity to the access issue. The citizens of some countries and regions (Japan, India, Latin America) have adopted mobile devices as their primary interface to the Web and are demanding more and more mobile access to government information, service, and interaction. For many in developing countries, mobile delivery and retrieval are their only opportunity and method for access given the lack of adequate telecommunications and networking infrastructures needed to connect and communicate by other means.

The further challenge and complexity of the access issue comes from cost. Computers and connection points are still economically out of range for a majority of people around the world. Cost and the lack of infrastructure limit the opportunities for many and their related governments in achieving and benefiting from the promise of electronic government.

One last challenge to document, although not in any way seeking to be conclusive of all the issues and hurdles that exist, is the understanding and definition of what the openness and transparency movement and demand is. How do or should different governments define or consider openness and transparency? How does each address the structure of government and cultural norms? Many of these questions will take considerable time to find their answers and explanations. Consensus of and on the answers are not yet clear nor do governments yet fully understand the impact and opportunity and how to operationally incorporate and accommodate.

Once the questions are answered, policies evaluated, and challenges are met, technical standards and particularly standards related to open source, data, and Web standards can aid governments and others with achieving and realizing the promise and benefits of electronic government.

Standards work across many groups, governments, and organizations continues to aid governments. Many have committed time and resources to develop XML, Authentication, and other data standards to promote and aid information to be free flowing and available. Others have sought to address and understand how to aid in developing standards for interoperability and interchange of data while others have sought to create or identify Web presentation layer, application, and browser based standards to aid governments in their efforts.

The W3C eGovernment Interest Group (eGov IG) seeks and aspires to become a critical link in assisting governments with the promise of electronic government. The Interest Group realizes that one group, government, nor organization needs to own or create everything needed to assist governments. Innovations, new opportunities, and work are occurring worldwide creating example applications, creating and vetting new standards, manipulating or customizing existing standards, and experimenting with and addressing the policy and procedural challenges seeking solutions to these and many of the other existing challenges and issues.

The eGov IG, therefore, acts as the validation and aggregation point of the representative use cases, standards, approaches, and opportunities while being the connector and enabler in the electronic government space. The IG efforts and products will be freely available and adoptable by governments worldwide.

Charter and Activities

The eGov IG focuses its efforts to fill a distinct gap in the Web and technology standards space focusing on the unique and diverse needs and issues that governments throughout the developed and developing World face in enabling electronic service and information delivery and providing opportunities for discovery, interaction and participation.

The eGov IG is in its first year of existence and is through this Note, an issues paper, and future work attempting to meet and execute its charter [EGOVIG] and mission for the W3C and specifically for serving its purpose and intent to assist governments throughout the World in realizing the promise of electronic government.

The IG is designed as a forum to support researchers, developers, solution providers, and users of government services that use the Web as the delivery channel. The Interest Group uses email discussions, scheduled IRC topic chats and other collaborative tools as a forum to enable broader collaboration across eGov practitioners.

The following activities are in the scope of the eGov IG and three interest areas have been formed to achieve the Group's mission:

Usage of Web Standards

Gather information about the areas where best practice guidelines are needed: best practices will be drawn from the successes (and failures) of efforts at opening, sharing, and re-using knowledge about the use of standards and specifications by government applications that could be collected into a set of best practices with the intent of identifying productive technical paths toward better public services.

Provide input to help governments comply with standards: for example, standards bodies could provide training and outreach materials on best practices and tools, and improve the packaging and promotion of existing material. The work of W3C's Web Accessibility Initiative (WAI) [WAI] is an example of a successful education and outreach program that helps governments achieve compliance goals.

Transparency and Participation

Identify ways to improve government transparency and openness: identify any gaps to be filled in creating a complete suite of standards to enable open government information and ease the goal of linkable Public Sector Information.

Identify ways to increase citizenship participation: recognize new channels, ways to get the information to the citizens where the citizens are looking for it, and make better use of tools as means to increase citizenry awareness and participation while supporting champions, i.e. acknowledge and help active citizens and public servants.

Identify ways to increase citizens and businesses use of eGovernment services: get information on benefits of Web use for government services, identify main factors that are important for people and businesses to use eGovernment services such as time and money savings, simplicity, and identify ways to improve them.

Seamless Integration of Data

Identify how to advance the state-of-the-art in data integration strategies: identify ways for governments and computer science researchers to continue working together to advance the state-of-the-art in data integration and build useful, deployable proof-of-concept demos that use actual government information and demonstrate real benefit from linked data integration. These proof-of-concept tools ought to be targeted to applications that will show real improvement in areas that elected officials, government officers and citizens actually need. This area would include addressing the needs of business cases through the use of XML, SOA, and Semantic Web technologies.

Relationships and Collaborations

The eGov IG is currently working with, forming relationships, or collaborating with governments and other organizations (The World Bank, EC, OECD, OAS, ICA, CEN and OASIS). Activities throughout the World on the issues, challenges, and work required to aid governments in achieving the eGovernment vision is consistently recognized by the eGov IG and its partners.

2. Definitions

Description terms are used to highlight and describe the various types of interaction points and relationships that governments have to their various constituencies. A few of the major and known terms are below:

- *G2C: Government to Citizen*: Governments providing Web based information and services to their public constituencies.
- *G2B: Government to Business*: Governments providing Web based information and services to companies and others in the private sector (Financial, Retail, as examples)
- *G2G: Government to Government*: Connections and communications between, state, local, regional, territories, Federal depending on Country and political structure.
- C2G: Citizen to Government: A new term resulting from the demand for more opportunities of participation and interaction
- *B2G: Business-to-Government:* Companies and other organizations supply information requested or required by government agencies for regulatory or other purposes.

3. Trends and Modalities of the Web and the Information Consumer

The Web working groups are currently processing and addressing several trends and activities requiring evolution of tools, thoughts, and strategies. Five key trend areas must be accounted for and noted in strategies being discussed, developed, and implemented:

- **Global**: Issues related to content, information, and services that are tailored to the individual's needs and consumption to include multilingual formats and take into account cultural sensitivities [I18N].
- **Connected**: User and community connectivity resulting in content/information available via APIs and desktops (without browsers) and content/information that centers on online communities and is distributed across many sites, platforms, and repositories. Content and information should be able to be shared, manipulated, and packaged as the user or groups of users see fit honoring all rights and restrictions and where they interact and spend their time.
- **On the Go**: Content/information availability via mobile devices [MWI] that takes into account a variety of delivery methods and accepted practices, industry standards and applications.
- **Accessible:** Content that conforms to W3C accessibility guidelines [WAI-GUIDES] so that all people, including people with disabilities and senior citizens, can find the same information and perform the same functions as other users. Information architectures and navigation are relevant to and usable by a diverse worldwide audience.
- **Readily available:** Content and information that are available and discoverable; searchable via quick and simple applications; complete and relevant to promote an experiential gain of knowledge and growth; and is presented to allow programmatic combinations (mash-ups) for a hyper-personalized experience.

Globalization is now a major factor throughout the World. Localization is still critically important, however, all content and interaction crosses continents and oceans despite the original intent. With the advent of globalization, one can no longer say that an organization can focus only on a particular geographic area. All organizations must recognize that the content, actions, and communications are available, reviewed, watched, and potentially used by other information consumers around the globe. This global reach has furthered the concept of communities where people from a variety of geographic regions can meet, interact, share, and consume information and services. People want to be connected in ways that are tailored and customized to how and where they want to meet, interact, share, and consume. This "on demand and customized" desire for information, services, and interaction, requires the recognition that all or most participants must be available via mobile devices and applications. In today's hyper busy world with "on demand" expectations, the concept of "on the go" becomes a necessary part of daily work life. The activity, connectivity, and growth of information and services on the Web has caused exponential growth of information in volumes requiring more complex and faster ways to access, mine, categorize, and deliver.

These new demands and requirements are currently pushing technological limits and are resulting in very complex systems comprised of many different parts and interactions both on a consumer and systems level. Therefore, the strategies must be able to account for the dynamism that is

occurring today and ensure that tomorrow's demands, requirements, and trends can be easily met in a global audience construct.

These five key trends with the recognition that the Web space is both local and global must result in governments thinking and defining their role in the context of modalities.

Within the key trends there are three modalities that exist for governments' use of the Web by governments:

- to deliver public services, to citizens,businesses, and other governments and levels of government (providing information or transactional services)
- to engage with citizens through the use of social media on government Web sites or through engagement with online communities elsewhere on the Web.
- as infrastructure, to enable others to retrieve and manipulate government provided data.

These modalities can be loosely characterized as **provide**, **engage** and **enable**. The extent to which a government chooses to fulfill any or all of these roles on the Web is a socio-political question, tightly connected to levels of public funding and the more general development of public services.

A number of general observations can be made when characterizing governments' current use of the Web. While increasingly cognizant of the opportunities afforded by social media, typically governments are still operating a broadcasting paradigm. Web sites are a vehicle for mass communication and for the delivery of transactional services. In this environment statistics showing the scale of usage are celebrated as indicators of success in themselves. The structure of a government Web estate is often organizationally driven. This is problematic as the structures of government continually change, resulting in significant disruption to the presentation of government on the Web. Government departments can be surprisingly transient entities. Transposed to namespaces and URIs this is quick sand on which to build an essential information infrastructure using the Web.

To give an example of the consequences of this churn, governments have difficulty maintaining persistent URIs even to documents. Increasing volumes of official reports and documents are published on the Web alone making the long term availability of those resources an important issue. In this context 'link rot' is not just an inconvenience of the information consumer, it undermines public accountability as documents cease to be available. Inability to persist resources and manage URLs inhibits willingness to link between government agencies. This is a loss for information consumers who want a seamless government Web site experience and do not care which government agency hosts the information they seek. Government departments need to deep link more and with minimal risk consideration.

Firmly in the provide mode many governments have devised a channels strategy for their Web estate. This has been developed primarily from a communications perspective. What is more generally absent is a data strategy from a Web engineering perspective. It is rare in government to think about Web site development as the engineering of basic information infrastructure.

Underlying these issues is one of particular interest to the W3C as a technology standards organization, not just about adoption and usage of its standards, but about the understanding of them. As a supplier and provenance source of information on the Web, governments have an important role to play. There is potential for significant social and commercial innovation using public sector information made available using the Web.

The reality is that not many officials responsible for commissioning or managing government Web sites are familiar with the basic principles of the Web, for example Architecture of the World Wide Web [WEBARCH]. Unfortunately, lacking a government context and being aimed at a more expert audience, the W3C guidelines and specifications are almost impenetrable to many Web decision makers in government.

4. eGovernment Issues

A number of eGovernment issues and challenges need to be managed by any government working towards openness, participation, and collaboration. The technical community who are creating, developing, and making available tools and technologies that can assist governments also have challenges to overcome. The eGov IG recognizes the need to document and publish the complexities of the environment, the myriad of issues, ideas for solutions, and opportunities to assist governments.

The eGov IG believes the following topics are the most pressing for governments in the context of the current constituency demands and the trends related to Web 2.0. transparency, and participation. Potential future work of the eGov IG will begin to structure, prioritize, and address many of the other issues impacting eGovernment while continuing to mature those found below.

Participation and Engagement

What Is Participation and Engagement?

In an increasing number of developed countries the level of domestic broadband access has reached and surpassed critical mass. The Web is the first port of call for information and advice - from breaking news to fact finding about an illness. Increasingly human relationships are being created and sustained on the Web through social networking sites. Large numbers of people are using social media tools to keep in touch with their friends and colleagues. These are important trends that are opening new opportunities for governments and citizens to interact. Increasingly the default means for government to communicate its message and to provide public services is using the Web.

Participation

The Web provides a transformative platform for the public sphere, the process of social communication where opinions are expressed, synthesized and coalesced. There are many types of public spheres operating across many different platforms, including the traditional mass media of television, radio and newspapers. The Web is transformative simply because it allows anyone to be a publisher. This changes the power relationships in the public sphere in profound ways. It affords political leaders new routes to power, crowd sourcing both finance and campaign teams. It affords citizens new ways to have their say. Either marginalized or extreme voices can now be heard making the public sphere increasingly rich and diverse. In turn this changes the nature of politics, news and journalism and how they contribute to the public sphere. What is clear is that people's use of the Web is shifting the relationship between the citizen and the state. The nature of these changes varies by culture and system of government but the impact is being felt everywhere.

The growth of political blog [BLOG] illustrates the Web's use for conversations about the direction of public policy. Outside of traditional political processes, campaign Web sites provide the means for people to group together to press for political change. This may be through lobbying or by seeking elected office or from new forms of campaign such as crowd sourcing a flash mob. And communications to elected representatives, whether as part of a petition or an individual message, the amount of correspondence has increased in many places due to the access to the Internet. This is about using the Web for participation, to shape, direct or change public policy.

Both politicians and political parties are increasingly using social networking tools as part of their political campaigning with the most striking example being the Obama campaign in the United States. Supporters who have grown up with a candidate engaging in a two-way dialogue during the campaign feel they have a strong stake in what that candidate does once they have been elected. For example, there is evidence with the Obama administration that supporters are insisting on

maintaining the dialogue from the campaign into office, "Holding Obama-Biden Administration Accountable" [US-OBACCO]. This is the introduction of a new type of check and balance into the political system, what some, such as William Dutton, call the fifth estate [FIFTH-ESTATE]. We see the phenomenon elsewhere where online communities seek to enforce a degree of accountability. Social network Facebook's response to pressure over changes to the service's terms and conditions, which led to a return to the original [FB-TOS] is an example of such community power.

Others are using the disintermediation of traditional media to push forwards transparency and democratic accountability. On the premise that in order to participate effectively in the political process you need access to information about what is happening, organizations like MySociety [UK-MYSOCIETY] in the UK and the Sunlight Foundation [US-SUN] in the United States have developed innovative services that open up information from legislative and governmental decision making processes.

David Weinberger, one of the co-authors of The Cluetrain Manifesto [CLUETRAIN], observes that, “there is an inverse relationship between control and trust”. If true that has profound implications for government. Governments may seek to trade a loss of control through greater transparency and openness in return for an anticipated increase in public trust. The Obama administration's memo on Transparency and Open Government [US-OBMEMO] could be seen in that light.

Engagement

A government is a complex entity, consisting of many institutions that grow and develop over time. People engage in conversations. Sometimes they do so representing an institution. For government, the use of the Web for online engagement means individual public servants engaging in online conversations, in an official capacity.

Just as the Web enables anyone to be a publisher, it raises the possibility of anyone as public servant to become a communicator and a representative of government. Increasing numbers of public servants are blogging about their work or discussing work related issues using micro-blogging [MBLOG] tools. These activities are directed at engagement rather than effecting political change.

The use of the Web for engagement is significant in that it opens up new ways to talk to government but these conversations are complex because the boundaries between participation and engagement are sometimes blurred. Some contributors to a topic in an online discussion forum may be participating, putting political points into the public sphere, while public servants may simultaneously be engaging - openly gathering and presenting evidence or discussing policy options. It is the role of the contributor that determines whether they are participating or engaging, when such discussions take place.

There are a number of different types of Web enabled engagement:

- **Policy related government to citizen interaction**, public employees using the Web to directly engage in dialogue with citizens about issues of public policy, on behalf of a political administration. Typically the government does this by allowing comments on proposals, in a similar way to that in operation on many blogs. Blogging platforms are often used to underpin these services.
- **Policy related engagement in citizen to citizen conversations**, policy makers directly engage in online dialogue between citizens about matters of public policy, on other Web sites. This may be to highlight evidence, explain aspects of public policy, correct misleading statements, or to engage in open discussion about policy options and priorities. Policy makers are beginning to come to online communities and say "we want to solve this problem, how should we go about doing that?".
- **Advice related government to citizen or business interaction**. This is about public employees using the Web to directly engage with citizens or businesses about particularly

problems or issues that they may have, in a public conversion.
- **Advice related citizen to citizen interaction**, people talking to each other about public policy issues ("where should I send my child to school?" "Is what I've been told by my doctor right?"). Government involvement in such forums may add huge value, delivering expert advice to groups who need it. Such engagement with citizens may be unwanted however - people don't want the government in every part of their lives. The tolerance for such engagement needs to be carefully ascertained. It will vary from community to community and area to area.

What Public Policy Outcomes Are Related to Participation and Engagement?

Governments generally operate in five spheres: social policy, economic policy, security policy, regulatory and legal policy and international relations. Some issues, such as the credit crunch or climate change cut across these boundaries, requiring economic, social and regulatory action in a coordinated multilateral way. People are using the Web to facilitate their participation in each of these policy areas - all are matters of public discourse and political debate.

In practice, the importance of the Web as a tool for engagement has come most to the fore in the social policy arena - not least because this covers the issues that most directly impinge on individuals' lives. There are wide variations between states in how social policy is delivered - in some countries the state is the direct provider of services such as health, in others such services are delivered almost entirely by the third and private sector. Attitudes and expectations from public services are changing in part because of the experience people have from using online services and governments have already started to evaluate the impact, benefits and challenges of these new ways of interaction [US-SOCMED].

There are three areas of public policy outcome where online engagement can play an important role.

Enabling Citizen Choice and Improving Public Services

Encouraging citizens to discuss their impressions and experience of the public services they use, potentially star rating those services, can facilitates citizen choice and introduces a new incentive mechanism for improving public services. For example, if parents are given a choice about which state school to send their child to, they can make their selection based on the views of parents with children already at that school.

In the UK, the government has launched an online service called "NHS Choices" [UK-NHSC], which supports citizens to make a healthcare provider choice from amongst various public healthcare providers. Those using the services are encouraged to rate and comment on their experiences using a particular provider. This is an example of government providing a forum for citizen to citizen interaction, with a view to supporting choice and raises quality of provision. A similar but independently service is provided by Patient Opinion [UK-PATIENTO].

Providing Advice and Support to Citizens to Achieve Public Policy Outcomes

Citizens are helping each other in discussion forums in ways that achieve public service outcomes. At the time of writing, many countries are in or about to enter a recession. This is the first global economic crisis to happen in an era of widespread availability of the internet and the use of social media tools. After prolonged periods of relatively high and stable levels of employment a significant number of people, many of them highly qualified and skilled, will find themselves out of work, perhaps for a prolonged period of time.

Governments are announcing various initiatives to help families cope with the change in the economic climate, for example promising protection against foreclosure. There is evidence that

people are confused and fearful. It is reasonable to anticipate that they will turn to online communities for help, advice and support. In these forums public servants can add value by giving advice and guidance about what support from the government is available or how the system is supposed to work. This advice is instantly available, not only to the intended recipient but also the wider community.

The incentive for government is to provide support that helps to achieve wider public policy objectives, particularly in areas of social policy. Other examples of relevant online communities for engagement by public servants include parents providing support to each other with raising their children, talking about childcare problems, illnesses or behavioral issues, through to college students discussing issues to do with their studies, financing their education or seeking work.

Changing Behaviors and Establishing New Social Norms

Many of the issues confronting governments today for example changing the pattern of energy consumption to combat climate change involve large numbers of people changing their behavior in some way. To achieve this, new social norms need to be fostered and established. It is insufficient simply to provide information about the impact of individual's choices. That information needs to be contextualized and humanized in the context of dialogues with people that encourage and support the development of new social norms.

What Are the Main Benefits to Using the Web for Participation and Engagement?

People trust those places and services that they themselves control or have the impression of controlling. Engaging with people where they are means interacting on their terms. Provided this is done authentically anecdotal evidence suggests that people welcome the involvement of public servants in many different online community environments. This presents a more human face to government institutions, which is more approachable, more credible and more likely to be listened to and valued.

Interestingly, those communities that governments would most like to engage with and support, because of their alignment with public policy objectives (such as parenting support groups) seem those most open to engagement by public servants and welcoming of the opportunity to directly engage. For example, members of NetMums [UK-NETMUMS] in the UK welcomed the chance to help shape aspects of government policy for children and families and have pressed for advisors on benefits and tax to interact in the discussion forums.

In the policy arena, engaging in discussion about policy options has resulted in some remarkably mature and considered input. Instead of going through a traditional consultation exercise, the Power of Information Task Force in the UK issued its report "in beta" [UK-POIT] and allowed people to comment on it on a paragraph by paragraph basis. Hundreds of comments were posted including points of clarification from public servants. Open public discussions took place on all key topics and some important new ideas were introduced and developed through those discussions. The collaborative development of policy through public conversations involving public servants and others around a shared evidence base should lead to better public policy.

Collaboratively developed policy is more likely to be consensual and less open to partisan attack or misrepresentation in the mass media.

How Can Participation and Engagement Be Achieved?

The explosion of site, services, and opportunities has created many challenges for governments specific to the internal operations, policies, procedures and most importantly culture and cultural norms and perceptions that should be identified, managed and resolved. The following seeks to offer some guidance to governments while raising questions and comments that should be thought through and considered in achieving the goals of public participation and engagement.

Access of Public Servants to Web Sites that Citizens Are Using

Public servants need to be given access to the Web sites that citizens are using in order for them to be able to engage. The “lock-down” culture that exists in many government IT departments often restricts access to the more interactive Web sites for security reasons. This badly hampers the effective engagement with online communities by public servants. Many governments are blocking employee access to Facebook, YouTube, MySpace, and others where conversations occur, interaction is embraced, individuals align around similar goals, issues, and interests, and participatory and engaged communities are formed. Security issues, employee rights and misdeeds, and lack of familiarity with the tools are impacts that governments must content with, however, in taking time to do so limits the amount of participation, feedback, and interaction from constituents.

Clear and Simple Rules for Public Servants

Governments need to set clear and simple rules for public servants to follow so they can be confident about engaging online without risking their career.

Training, Support and Cultural Change

There needs to be training and support for public servants in the use of appropriate tools and techniques to use the Web to engage, particularly for the development of public policy. Engaging with online communities over the development of public policy will involve significant culture change in government. To achieve it will require clear leadership at senior levels. As the use of the Web for engagement is so new in government there are few people with both the practical knowledge and the seniority and experience to provide this leadership.

Support Open Debates and Discussions

Many times citizens will self organize policy debates and discussions outside of government Web site. Governments should take a effort to recognize and point out forums that they are aware of on issues of concern. Governments should be mindful of these independent venues, both by openly showing interest in some of these external efforts.

Provide the Institutional Resources to Handle Incoming Correspondence

One of the aspects of electronic communication is the often sharp increase in electronic petitions and other electronic forms of correspondence. Governments should recognize the importance in fielding the resources to consider the messages. Also governments should use technology standards to help ease the burden of communicating on the part of citizens and on government civil servants. When possible, citizens should have access to a way to bundle their communications so that they can decrease the noise perceived with a deluge of the incoming messages.

Allow Comments on Policy Documents

Policy documents need to be presented in formats which allows for comment and discussion in a granular way. Fragments within such documents need to be directly addressable. In consultation documents for example, the relationship between the questions for discussion and the proposals to which those questions refer need to be made explicit. The RDFa [RDFA-PRIMER] based ArgotConsultation Consultation [UK-ARGOTC] which was developed for the UK government is an

example of the type of technology required for publishing consultation documents in ways that enable engagement.

Governments can also enable commenting on official documents by providing reliable electronic citations, for example as a URL that points to an official or authentic version of the document and make specific fragments of the document addressable.

Promote Use of Lightweight Standards for Metadata and Communication

Government can publish standards that it may already being used for internal systems of data storage and communication. Government can also create easy, cheap and quick methods of communication that make it possible for more people to be heard by their government. And the standards should include ways to classify or tag information correctly and in ways to allow tabulation and closer consideration of issues. Those same standards can also be used by everyone for their own system of publishing.

What Are the Main Issues with Using the Web for Participation and Engagement?

Representation Boundaries

The boundaries are shifting between public and private, personal and professional. This blurring of distinctions between individuals and their roles gives rise to particular set of problems for public servants because governments operate in a political environment. When an official posts a message to a W3C email list or a social media group are they doing so as an individual, or as a representative of the institution for which they work? Services such as micro-blogs (e.g. Twitter or Identi.ca) that mix personal and professional messages exacerbate this dilemma.

Do the participants of such communities expect to find public officials in their community? Is this the state as friend, or is it an overbearing intrusion into people's lives? How should public officials themselves engage - anonymously, with a pseudonym or authentically as themselves? How can others be sure the advice being given, for example about a tax matter, has come from a public servant? The provenance not just of the information, but also of people, starts to really matter.

Relationships

If a government department establishes a feed for new information using a micro-blog tool, and people chose to consume that information by following that channel, does the service provider "follow" in return? What does it mean to be followed by a user named "@legislation" or "@parliament"? Should the service provider only "follow" if they are willing to engage as well as broadcast? Neither citizen nor service provider are clear about what community norms should apply.

Ownership and Use of Third Party Services

While free for citizens to use, many of the social networking services have been created on a commercial basis. It may be that an inappropriate reliance on third party services develops. By participating in an online community is the government endorsing it in some way? Does the implied endorsement stretch to the availability of the service, data protection issues (which may be sensitive if the service may be provided from a different jurisdiction) or security?

Who owns the social networks and in whose interests are they being operated? If key public services are provided using social networking services (e.g. advice to parents, tax guidance), to what extent should government seek to control the services upon which it relies? The terms and conditions of the service are clearly vitally important.

Several governments, including the US Federal Government have been successful with negotiating agreements with a variety of third party services which protects government information, meet the legal and policy needs of government, while allowing government to be a participant in the communities and tools offered by the third party services.

Inclusive Access to Information

How are the interests and rights of people with disabilities and people who are not yet on the Internet protected? Many government, social networking and community Web sites are not accessible to people with disabilities and older people, even where required by policies or laws. While people with disabilities use the web in ever-increasing numbers, they often encounter barriers to full participation as both consumers and producers of information. And there are other populations who do not yet use the Web at all. As governments pursue strategies of engagement through the Web, they must be mindful of keeping alternative channels of communications open for these citizens.

Challenges exist for both developed and developing countries and regions of the World. The wide adoption of mobile devices has furthered even greater complexity to the access issue. The citizens of some countries and regions (Japan, India, and Latin America) have adopted mobile devices as their primary interface to the Web and are demanding more mobile access to government information, service, and interaction. For many constituents in developing countries, mobile delivery and retrieval are the only opportunity and method for access given the lack of needed telecommunications and networking infrastructures. The cost of access is also an issue since computers and connection points are still economically out of range for a majority of people around the world. Cost and the lack of infrastructure limit the opportunities for many constituents and their related governments to benefit from eGovernment opportunities.

The eGov IG includes members of [WAI] Working Groups to ensure inclusion of disability issues and with digital divide activists to include the needs of those with low literacy and/or lack of technology access.

Authoritative Sources

How does the government protect the authority of its information while allowing the conversations and communities to grow and flourish?

Interoperability and Data Portability

Generally it is in governments' interests to support interoperable systems based on open standards, yet many social networks have been designed to be "walled gardens", locking people in to their service as much as they possibly can. Should governments participate in Web sites that lock people in, not allowing information consumers to move their data to another provider? How would such a stance relate to competition policy? With walled gardens the citizen has the inconvenience of multiple user accounts and login details as does the public servant. Can this be overcome, for example by the wider use of other de facto standards such as OpenID [OPENID]? Certain initiatives are currently ongoing to create vocabularies that could be used to annotate and thus interlink data locked in different systems. Examples include [FOAF] which becomes a de facto standard for describing people and [SIOC] which is at the time of writing a W3C submission for annotating discussions on the Web. Improvement would most likely to happen if these were open standards development efforts happening . in transparent fora/consortia and/or standards organizations.

Archiving Challenges

If public policy is being developed in distributed collaborative ways, what are the public records and archival implications? How can the development of policy created through participative Web based tools be captured for posterity? The existing mechanisms for archiving “records of decisions” are poorly suited for the capture of distributed and fragmented information created on the Web.

Metrics

How can a government set clear measures and metrics to gage the success of fairly new and innovative practices and projects?

Accessibility

Web accessibility is essential for equal opportunity. The Web is an important medium for receiving information as well as providing information and interacting with society. Therefore it is essential that the Web be accessible in order to provide equal access and equal opportunity to citizens with disabilities and older citizens. An accessible Web can also help citizens more effectively interact with government.

Given that people with disabilities represent between ten and twenty percent of the population of most countries, ensuring accessibility of government Web sites is an important aspect of openness and transparency of government data. This need has been made more explicit by the 2008 passage of the United Nations Convention on the Rights of Persons with Disabilities [UN-ACC], which among other fundamental human rights includes the right of access to information.

The Web is an opportunity for unprecedented access to information for people with disabilities. That is, the accessibility barriers to print, audio, and visual media can be much more easily overcome through Web technologies. The Web is also an opportunity for unprecedented *interaction* for people with disabilities.

For example, the act of completing a government form once required going to a government office and completing the form on paper. That act presented significant barriers for many people with disabilities, including getting to the office, reading the form, and completing it in writing. When that same form is also available on the Web in an accessible format, it is significantly easier for many people to complete. Therefore, people with disabilities can have more effective and efficient access to government interaction through accessible Web sites - in some cases, where there was essentially no access to them before.

An accessible Web expands opportunities for communication, interaction, and employment for people with disabilities throughout governments.

Open Government Data

What is Open Government Data?

Public organizations produce, archive and distribute a wealth of information (e.g. legal, financial, bibliographic) in their daily operations. This Public Sector Information (PSI) is subject to certain laws and regulations (e.g. stating how/when it must be published or how it's licensed) that vary from country to country. Traditionally, PSI has been published in different ways and formats, from the early paper days to the early Web days in which information was being published online in whatever format was more convenient for the government organization in charge of publishing it and according to the normative at that time (e.g. the European Directive [EU-PSID]).

Unfortunately, much PSI was and is still being published using proprietary formats or in ways that create barriers of use for various interested parties. Examples include device incompatibilities for those using mobile devices or older hardware, the lack of information available to those using

computers without the required proprietary software, and accessibility barriers experienced by people with disabilities.

Flourishing of Web applications and services using other types of information on the Web that are provided in open raw formats, as well as adapters built by third parties to reuse existing PSI on the Web, show that there is demand and potential in publishing PSI offering unobstructed access to the raw information.

For the purposes of this Note, Government Data is the same as PSI, while Open Government Data (OGD) means the publication of PSI in open raw formats and ways that make it accessible and readily available to all and allow reuse, such as the creation of data mashups (mashups defined as merging data from two or more different applications or data sources and producing comparative views of the combined information).

Although there are several definitions of Open Government Data [OGD-DEFS], a set of open government data principles [OGD-PRINCIPLES] developed by a group of Open Government Data advocates includes: “Open [government] data promotes increased civil discourse, improved public welfare, and a more efficient use of public resources;” in order to publish Open Government Data, there are three fundamental steps that need to be taken from a high level perspective: “identify the data that one controls, represent that data in a way that people can use, and expose the data to the wider world.” [JEN-OGD]

What Data?

Whether is a health statistics, geospatial or legal information or some other kind of PSI, it's out of the scope of this Note to debate what datasets should be published, mainly because this is a policy issue, governed in several countries by laws such as the Freedom of Information Acts (FOIAs) that state what information should be published, when and how. The Report "Show Us the Data: Most Wanted Federal Documents" [US-FEDATA] offer examples in the United States while the PSI Navigator [EU-PSIN] and the Directory of PSI Re-use Products and Services [EU-PSIDIR] offer some European examples.

Nonetheless, some of the examples and use cases discuss about specific data sets that could be of interest with the intention of giving some hints on how the return on investment of those policies can be improved when publishing Open Government Data.

What Public Policy Outcomes are Related to Open Government Data?

- **Inclusion**: providing data in open standard and accessibility supported formats allows anyone to use numerous software tools to adapt it to personal needs. For example, an XML [XML] dataset or RSS [RSS] feed could be transformed and properly available to various devices, including assistive technologies used by people with disabilities.
- **Transparency**: open and unobtrusive PSI increases transparency; interested parties can use PSI in the most appropriate way to achieve their purpose, getting a better picture of the government's work and customize it for their particular needs.
- **Accountability**: the appropriate open datasets properly mashed up can provide several views on information about the performance of the government to achieve its public policy goals.

What Are the Main Benefits of Publishing Open Government Data?

The great majority of PSI on the Web is still mainly found in two shapes:

- *Proprietary formats*, requiring the potential consumer to have proprietary software or tools to access it.
- Open and standard *human readable formats*. While enabling access to people, mixing of

content, presentation and purpose limits its use by machines.

Taking this last scenario into account when designing a data publication strategy, some potential benefits of publishing Open Government Data are described below.

Multiple views, not just one

When government information is made available through portals, e.g. the so called one-stop shops, the government intends to build the consumer's view in order to provide the information in the most usable way. Even when the PSI is provided by means of an API, the methods to access it are often restricting the view that a given consumer can have or need of that information.

Providing Open Government Data allows the consumer to use the information in the most appropriate way to achieve the intended goal. Some authors argue that “it would be preferable for government to understand providing reusable data, rather than providing Web sites, as the core of its online publishing responsibility.” [GOV-INV].

Reuse

Open information boosts everyone’s ability to reuse the information, including:

- *Other public sector organizations*, which may use someone else’s information to provide added value by mixing and combining their own information with other sources using Web technologies, thus increasing data usability, visibility and value.
- *Other non-public organizations* (NGOs, private companies, social Web communities, etc.) that may create pure-Web, standards-based applications that combine different datasets (mashups). For instance, someone can create a layer on top of a Geospatial map showing data derived from several sources of information.

When the information is made available through the Web using the appropriate open standards it can be used again and again in new, unanticipated and imaginative ways that can greatly enhance the value of the data by its reuse and combination with increased automation and enhanced interoperability. As the Many Minds Principle [MANY-MINDS] reads: “the coolest thing to do with your data will be thought of by someone else.”

A few third sector organizations have already taken government information and provided views into joined data sources to meet public needs or other objectives which show the potential these mashups could have. Well known examples are FixMyStreet [UK-FIXMYSTREET], where UK residents can report problems in their neighborhood (like graffiti or potholes on the road), and the numerous mashups providing useful views and all sorts of data about the work of the representatives such as TheyWorkForYou [UK-TWFY] in the UK, its New Zealand counterpart [NZ-TWFY], OpenCongress [US-SUNCON] and GovTrack [US-GOVTRACK] in the USA and OpenAustralia [AU-OPEN].

The government is also starting to consider reuse seriously, and is has already organized competitions to find out what are the most demanded applications, such as Show Us a Better Way [UK-SHOWUS] in the UK, and the Apps for Democracy [US-APPDEM] contest sponsored by the Office of the Chief Technology Officer of the District of Columbia (USA), or the consultation on open access to public information [AU-OGD] by the Australian Government.

Improved Web Search

Some systems are still preventing the consumer to find the needed information, even when it's already publicly available, e.g. is not being indexed by search engines. There is a need to improve Web search. The use of tools such as the sitemap protocol [SITEMAP] (an XML open format, too),

show that governments are trying to improve the discoverability of information. The Library of Congress in 2006, partnered with Microsoft, Yahoo, and Google on the development, testing, and piloting of open sitemaps. The initiative focused on exposing and making discoverable hundreds of thousands of items in the American Memory [US-LOCMEM] repository resulting in successful indexing and exposure increasing Web traffic to the targeted materials by 25 percent. Making PSI available in open formats can even greater help consumers to find the information they need.

Data Integration

Governments provide information using open standards that empower other agencies and third parties to further mix, enhance and share this information, bringing vast improvement of data integration between disparate systems and flourishing of new services.

How Can Open Government Data Be Achieved?

It has always been possible to publish data on the web, just as it's possible to publish any type of file. A database dump or zipped packages for bulk data download is one approach for publishing government data, albeit a crude method. The focus here is on Web centric methods for open government data.

Publishing (X)HTML

Even when the data is found on the Web in hard-to-reuse formats, third parties are finding their way through it. One common practice is that of *screen scraping*, in which tools [TOOLS-SCRAP] are used to separate and extract the data from the HTML code. This data is then transformed into a more automatic reusable format, usually XML or RDF, and then mashed up with other sources. Coding and maintenance is costly, requires great work on the side of the consumer. Usefulness of the existing applications (some examples [GOV-MASH]) is high. This shows the potential that providing easier access to the information in a reusable open format has.

Ensuring Accessibility

Adherence to Web standards allows an array of various devices, including assistive technologies, to effectively access Web content. eGovernment initiatives must not only be required to conform to the Web Content Accessibility Guidelines (WCAG) 2.0 [WCAG20], from W3C's Web Accessibility Initiative (WAI) [WAI], but must validate conformance and maintain the standard over time. Only in that way can government maintained Web content and applications ensure access by all citizens. In addition, government bodies must be given the training and understanding to develop partnership and purchasing requirements that reflect the need for partners and vendors to conform as well. Harmonization with W3C's international standards for Web accessibility has emerged as an important issue, since fragmentation into divergent standards slows the development of supporting authoring and evaluation tools.

Providing APIs

There are already cases in which the government is providing access to information through APIs. In most of the cases, this means that the consumer has access to the data only in the way the producer thinks it should be accessed, e.g. through certain methods, but the consumer does not have access to the raw data or a holistic view of it. APIs are usually provided in Javascript or similar languages to integrate in Web pages and applications and in some cases provide access to an XML view of some parts or the whole dataset.

Some examples are the ones offered by the UK Government for the Show Us a Better Way

[UK-SHOWUS] competition, from health statistics and geospatial information to postal codes, but also those from the third sector, such as the ones provided by the Sunlight Foundation [US-SUNAPI], that offer from congress records and events to census data.

RSS/Atom information

Many pieces of information provided by governments are suitable for distribution as news feeds using RSS [RSS] or Atom [ATOM-SYND] that are supported by a great number of tools including built-in support in most modern Web browsers. In this scenario, people subscribe to a set of channels and get the information about e.g. government news, job openings, grants or acquisitions.

One of the core benefits for this approach is update notifications - when a piece of information is added or modified, subscribers can easily get to know this. Information consumers only need a news feeds reader, which they use to subscribe and read the information.

The number of feeds provided by governments is constantly increasing and thousands are already available [GOV-FEEDS].

REST interfaces

REST [REST] provides an architecture to create Web applications, using standards like HTTP and XML. Basically, a "*resource*" is associated to a URI that can be used to access or modify its information following certain design principles [REST-PRI]. Under this paradigm, a Web site can publish a set of URLs that provide a real programmer's API that 3rd parties can use to build applications that extend the site's capabilities - perhaps by mixing several different sites. This model is highly suitable for the development of mashup applications and can also provide data in open raw formats as the following example shows.

The Seniors Canada Online Web site currently provides such interfaces to perform searches on their databases - for instance, on leisure and sports information [CA-REST1] and also more sophisticated database-query-like services, such as all keywords starting with letter 'L' in french language [CA-REST2]. Other agencies could use this API to publish the information - perhaps mixing several sites and putting the data on a map on the Web. The World Bank API [TWB-API], allows to tap into indicators from data sources like World Development and Governance Indicators.

Semantic Web Technologies

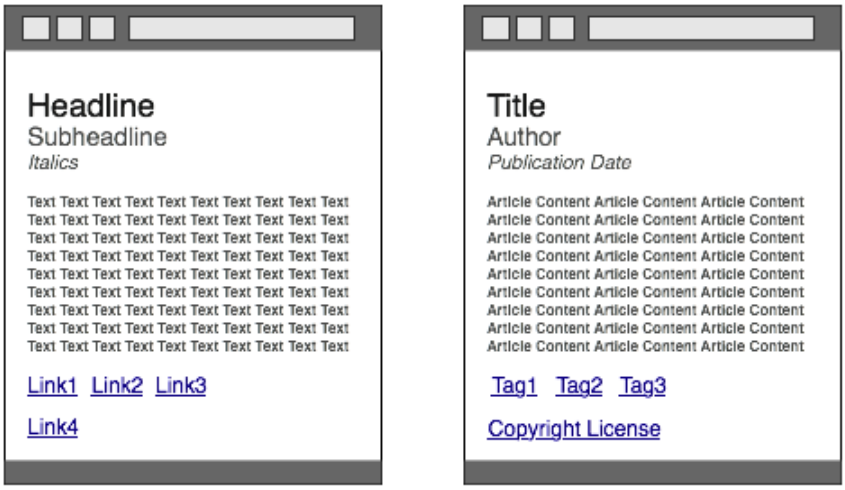
Semantic Web technologies can provide a huge development in the way the Internet is thought and used. Take for instance, the process of booking a flight with current technologies:

- access a search engine to locate a couple of online travel agencies
- access some of them using a Web browser, and using their HTML Web interfaces, gain access to the information
- compare the results
- book the flight

If all the information could be stored in a single relational database, the task could be automated with a series of SQL queries. However, given the distributed nature of the Internet, this kind of automatization is not directly possible with current technologies. Semantic Web technologies could provide a means of implementing such a solution in the Internet space.

The Semantic Web “provides a common framework that allows data to be shared and reused across application, enterprise, and community boundaries” [SW-ACT] and there are several technologies [SW-FAQ] that allow to describe, model and query these data.

RDFa in XHTML [RDFA-SYNTAX] is a first approach in bridging the Human and Data Webs. It allows to add some metadata described in RDF to XHTML that is easier for machines to understand. From the RDFa Primer [RDFA-PRIMER]:



On the left, what browsers see. On the right, what humans see. Can we bridge the gap so browsers see more of what we see?

An example is the London Gazette [UK-LONGAZ1], the UK Government's Official Journal and Newspaper of Record where proposals and decisions of public bodies, e.g. to establish a new tax or to give permission to a company to build a factory, have been published since 1665. SemWebbing the London Gazette [UK-LONGAZ2] shows how increasing semantics is challenging but can lead to important benefits.

The DBPedia project is an example of how a given Web site can be prepared for this kind of applications, using:

- Internet standards and XML technologies. HTTP, URIs, XML Schemas, etc.
- The Resource Description Framework (RDF) for representing extracted information. Query results would be represented as XML. In the example, available notices.
- A set of Web sites that provide information (datasets). In the former example, publishers of PSI would be datataset providers.
- A query language. A Semantic Web query language [SPARQL] would be used (instead of SQL).

DBPedia is one of the largest datasets in the Linked Open Data [LOD] community effort which shows how powerful mashups of datasets exposed using Semantic Web technologies can be.

Governments would need to publish the required interfaces so third parties could query their information in distributed Web applications. This could provide huge benefits:

- Publishing a static document on a portal provides a unique and challenging effort for automation, where Semantic Web constructs would indeed provide a high degree of automation easily.
- While current technologies (Web Services, REST, etc.) provide such automation, public administrations need to create some set of queries and offer them as an API. This provides value, but requires design - and the decision on which queries are supported (and which not). It is impossible to foresee all the scenarios of data usage, so usage is therefore limited.

Using a Semantic Web approach, public organizations would publish datasets annotated with domain specific vocabularies and/or metadata (e.g. using a common and generic service model to annotate public services) - and offer a query interfaces for applications to access public information in a non-predefined way. This would greatly boost the ability of third parties to use and reuse the information provided by governments, in ways and applications perhaps unforeseen (and unforeseeable) by them.

What Are the Main Issues with Publishing Open Government Data?

Mission and Strategy

In general, government agencies have not seriously considered mashups on a coordinated level yet. The agencies are challenged with exposing data from applications or creating applications to display data. Resourcing of personnel and funding have not allowed for a focus on providing Open Government Data. The government agencies are also challenged in finding other agencies or organizations where regulations or government policy (in addition to the lack of resources) will allow the sharing/exchange of information which would lead to a useful mashup.

For example, agencies have not rendered their mission, goal, and objective statements in readily shareable format. Thus, it is more difficult than necessary not only to create cross-agency mashups of the data contained in agency strategic plans themselves but also to identify related objectives that offer strategic opportunities for well-coordinated sharing of data supporting those objectives.

A typical application mashup requires the use of APIs with data available via XML, many agencies have not yet considered the consistent or holistic use of XML across applications or data repositories, not to mention other open formats like RDF. The age of systems varies significantly and, at times, the proprietary nature of the systems and applications offers further challenges with providing access to the data needed for a mashup when it is often not within the mission of an agency to provide sets of information from other agencies or different sources.

Provenance and Trust

Agencies are faced with having to ensure that the information and other data that they provide remains the authoritative source of the information. Providing access to data via XML or similar open formats to others for display in mashups releases control and management of the data outside of the responsible agency, which is a concern; the agency can no longer be sure that the data has maintained its original nature and the final consumer cannot be sure about where the data is coming from and if it's trustable or not.

Some issues may arise: on one hand the interpretations other could do of the provided information without the proper context, on the other how to ensure that the data carry its restrictions with it (e.g. original author, copyright, license, etc.). If agencies are to proceed in adopting mashups within their organizations and/or across the government and/or with third parties, best practices, policies, and procedures will be needed to ensure the information and data's authoritative nature is preserved when necessary.

Limitations of the Technology

Although some of the technologies and standards have been in use for many years already, such as HTML from the day the Web was invented or XML from 1998 here might be cases in which when using one of the existing standards some issues may arise or some ways in which the technology is intended to be used are not possible yet -- i.e. some gaps in the standards are found or some new features are required. W3C has an open process [W3C-PROCESS] that allows anybody to

comment and participate on improving the standards; one of the eGov IG's goals is to act as a mediator between governments and W3C, communicating to other W3C Groups those needs in order to be taken into consideration and fulfilled as necessary, and communicating to governments how to better use the existing standards for the benefit of both governments and W3C and the Web community at large.

Capabilities

Governments have been using the Web even before it became a very popular channel to publish public information. The Web is an ecosystem in constant evolution and as such there are always new capabilities that need to be acquired in order to use it to its full potential. Adequate resourcing and training of those involved in the development of applications and services is needed.

Interoperability

What is Interoperability?

Within the European Interoperability Framework [EC-EIFV1], Interoperability was defined as: “the ability of information and communication technology (ICT) systems and of the business processes they support to exchange data and to enable the sharing of information and knowledge.” In the draft document as basis for the EIF v2 [EC-EIFV2DRAFT] this definition has been reworked into a more comprehensive one “the ability of disparate and diverse organizations to interact towards mutually beneficial and agreed common objectives, involving the sharing of information and knowledge between the organizations via the business processes they support, by means of the exchange of data between their respective information and communication technology (ICT) systems.”

For the United Nations e-Government Survey 2008 From e-Government to Connected Governance [UN-SURVEY] means “the ability of government organizations to share and integrate information by using common standards.”

The delivery of eGovernment services typically involves the interaction between actors, citizens, business and administrations, in a scenario of large diversity, not only in terms of technology, but also in terms of how the relationships and the processes are organized and of how the necessary data and information are structured and handled. The following types of interaction cover most of eGovernment services:

- Direct interaction between citizens or business with Public Administrations.
- Interaction and exchange of data among Public Administrations (Local, Regional, Central, Supra-National or International) and other organizations (other public entities, public universities, etc...). It is common in governmental processes that two or more public organizations share data while delivering a given service.

Interoperability is a relevant requirement which has been scaling steps in the political agenda in recent years. In the European Union for instance several policy documents and acts refer to interoperability, like the Communication to the Council and European Parliament (2006) 45 final [EC-COM45].

The achievement of interoperability requires a global approach which should take into account issues like types of interactions, dimensions of interoperability (organizational, semantic, technical, in time), the interoperability chain, standards, common infrastructures and services and conditions for share, re-use and collaborate.

The Dimensions of Interoperability

- **Organizational Interoperability** refers to the collaboration between entities in the development, deployment and delivery of eGovernment services, and to the interaction between services, and supporting processes, including also agreements or similar formal instruments about service levels, the use of common services, security or other quality aspects.
- **Semantic Interoperability** enables organizations to process information from external or secondary sources in a meaningful manner. The achievement of semantic interoperability may require supporting instruments that serve for collaboration, sharing and re-use of information artifacts also called *semantic assets*, like SEMIC.EU - The Semantic Interoperability Centre Europe [EC-SEMIC].
- **Technical Interoperability** refers to the interaction of technological systems.
- **Interoperability in time** refers to the interaction among elements that correspond to various technological waves. It is particularly relevant in relation to the preservation and access to information on electronic media along the time.

The Interoperability Chain

Interoperability behaves like a chain when systems and services are deployed across boundaries of entities or governments; there is a succession of interconnected elements, in a rather dynamic way, through interfaces and with projection to the interoperability dimensions. Interoperability may break at the weakest point elements individually adequate are deficiently joined. The delivery of complex services requires interoperability between all the links of the chain, end to end, including back-office and front-office environments. The interoperability chain might include basic links like infrastructures and associated services; data models and data integration; systems and services integration; and secure integrated multi-channel access; together with some transversal aspects. An important aspect of interoperability is enabling citizens who are using assistive technologies, mobile devices, and older software and hardware.

The Role of Standards

Standards are applicable in the dimensions of interoperability, they are used in common infrastructures and services, and they are used in certain links of the interoperability chain. The use of open standards allows that the actors providing and receiving eGovernment services may take part using their preferred technological choices. Governments are taking into account open standards in their policies and interoperability frameworks and in some cases like The Netherlands [NL-OSOSS] are developing coherent strategies towards openness. In the United States, OMB Circular A-119 [US-OMB119] directs agencies to “use voluntary consensus standards in lieu of government-unique standards in their procurement and regulatory activities, except where inconsistent with law or otherwise impractical.”

Common Infrastructures and Services

Common infrastructures and services propagate interoperability producing economies of scale and using synergies that stem from cooperative work in similar areas of action and respecting the subsidiarity of the participating entities in the provision of complex services. They offer integrating solutions that ensure interoperability in the dominion of their implementation with the rest of information consumers, putting the focus on the corresponding interfaces. They facilitate the development of new services, as well as the interoperability of the existing ones.

Share, Re-Use and Collaborate

The voice *sharing* is present in the interoperability definition mentioned above; together with re-use,

both of them are important for interoperability. The terms *share* and *re-use* are connected, for instance, with the corresponding policy in the European Union shaped in the Action Plan on Electronic Administration i2010 [EC-i2010]. The openness approach benefits interoperability and it is a condition that favors sharing and reusing. Putting in practice the sharing approach may require the support of platforms like OSOR.eu - Open Source Observatory and Repository [EC-OSOR] and the application by governments of adequate licensing conditions, as in the case of the EUPL [EUPL].

What Public Policy Outcomes are related to interoperability.

Interoperability policies developed by governments generally address the following goals:

- Improve the cooperation of government services with the aim of delivering better integrated services in a quicker and more flexible way.
- Improve efficiency and effectiveness driving to the reduction of costs.
- Making life easier to the citizen by means of offering more choice and reducing the administrative burden.

These outcomes provide benefits which are described in the following paragraphs.

What Are the Main Benefits of Interoperability?

Interoperability offers many important benefits to governments, to business and industry and to citizens. Within [EC-EIFV2DRAFT] there is a whole section on this question which is helpful to identify in summary the main benefits:

- *Organizational coherence and integration.* Interoperability is a means towards more coherent and integrated operation for the overall public administration domain. The current stovepipe organization of public institutions prevents the horizontal movement of information and allows only vertical flows according to the bureaucratic paradigm (command-report). Cross-agency interoperability makes the horizontal flow of information feasible and allows better communication and coordination amongst separate agencies.
- *Coordination and cooperation.* It facilitates *better coordination and cooperation* of government services enabling the development, aggregation, deployment and delivery of complex services.
- *Technological choices. It facilitates* the creation of scenarios where actors participate in eGovernment services using their preferred *technological choices*.
- It contributes to the *reduction of administrative burden*.
- It contributes to the *reduction of ICT costs* enabling a more efficient use of citizen's taxes because interoperability facilitates the re-use of data, the speed-up of services and supporting services development and deployment, the integration of services and the flow of data.
- *It makes life easier for the citizen* since interoperability is the key for the delivery of citizen centric services delivered through a multi-channel approach: reduces the burden on the citizen to request and present documents from different administrative services, speeds up decisions by government services resulting in higher quality and added value from the citizen's perspective and helping those with disabilities or the elderly with transportation or communication constraints.
- *Increased multi-channel delivery*. It facilitates the deployment of multi-channel delivery of government services.

How Can Interoperability Be Achieved?

Interoperability is by its own nature a joint effort. Sharing information requires sharing a set of common principles among all participants. The best way to achieve interoperability is through standardization.

Open Standards

It is of paramount importance to use open standards where available as opposed to proprietary formats. According to the Berkman Center for Internet and Society at the Harvard Law School [OPEN-ICT], a standard is considered to be open if:

- cannot be controlled by any single person or entity with any vested interests;
- evolved and managed in a transparent process open to all interested parties;
- platform independent, vendor neutral and usable for multiple implementations;
- openly published (including availability of specifications and supporting material);
- available royalty free or at minimal cost, with other restrictions (such as field of use and defensive suspension) offered on reasonable and non-discriminatory terms; and
- approved through due process by rough consensus among participants.

The workload to select standards for eGovernment services may be considerable and in fact all the governments that maintain lists of standards for their interoperability frameworks are carrying out similar tasks. That's why the IDABC Programme of the European Union started on the proposal of Denmark the work to develop a Common Assessment Method of Standards and Specification [EC-CAMSS]. This method has been elaborated on the basis of commonalities of existing practices in some European countries in relation to the assessment of standards for interoperability frameworks with the aim to facilitate this task and share the results. CAMSS identifies several criteria such as the ad equation of the standard to the required function, its potential in terms of stability, scalability and others, the degree of openness and the market conditions.

Open Source

Open Source does not imply the use of Open Standards or vice versa. Open Source refers to licensing and development models. It is essential that governments consider open standards in relation to considering either Open Source or proprietary solutions.

Government Interoperability Frameworks

Though it is possible to start peer-to-peer data interchange programs, greater value usually lies in multi-lateral solutions. This principle sets the ground for the creation of a Government Interoperability Framework (GIF).

A GIF is an instrument shared by different Governmental Organizations that provides a global approach to interoperability and which enables them to interact with each other, share information and business processes and cooperate for the delivery of eGovernment services. A GIF usually deals with the following:

- Legal status, scope, policies, organization, concepts, vocabulary, guidelines, practices, recommendations, compliance and governance issues.
- Interoperability dimensions and associated principles and relevant elements such as standards, common infrastructures and services, conditions for re-use and sharing and other possible aspects.

There a wide number of initiatives in this area:

- *National Interoperability Frameworks*. Many countries worldwide are developing their Interoperability Frameworks such as Australia [AU-IF], Belgium [BE-IF], Denmark [DK-IF], Estonia [EE-IF], Germany [DE-IF], The Netherlands [NL-IF], New Zealand [NZ-IF], United Kingdom [UK-IF].

European Interoperability Framework. Pursues the interoperability of services and systems between public administrations and the public (citizens, businesses) at a pan-European level [EC-EIFV1], [EC-EIFV2DRAFT].

What Are the Main Issues to Achieve Interoperability?

Interoperability presents a series of issues that need to be taken into account.

Standards

Standards is a rather complex issue which might require a longer discussion outside the scope of this document.

There is a wide number of standardization bodies producing plenty of technical specifications and the way they can be normatively referenced and used by governments varies significantly. In Europe there is a distinction between *standards* and *technical specifications*, being the former the technical specifications approved by a recognized standardization body according to the Directive 98/34/EC [EC-STDS]. [EC-EIFV2DRAFT] states that "openness of standards or technical specifications is important for public administrations because of its relationship with interoperability, freedom and choice". In the United States, OMB Circular A-119 [US-OMB119] directs agencies to use *voluntary consensus standards*.

The selection of standards for eGovernment services and interoperability frameworks presents several issues as shown above while explaining the [CAMSS] method. How to structure standards for interoperability is also discussed in the Final Report of the CEN/ISSS eGovernment Focus Group on the eGovernment Standards Roadmap [CEN-REPORT].

Although there is no single definition of open standard W3C technical specifications, formally known as recommendations, are broadly known as open Web standards. "W3C primarily pursues its mission through the creation of Web standards and guidelines. In order for the Web to reach its full potential, the most fundamental Web technologies must be compatible with one another and allow any hardware and software used to access the Web to work together. W3C refers to this goal as *Web interoperability*. By publishing open (non-proprietary), royalty-free standards for Web languages and protocols, W3C seeks to avoid market fragmentation and thus Web fragmentation" [W3C-OVERVIEW].

Privacy

Legal frameworks usually establish privacy and data protection obligations for governments and institutions that are entrusted with the administration of public services and the exchange of information about citizen's and business. The exchange of this kind of information requires conformity with the applicable legal framework and security policies and requirements. Following [EC-EIFV2DRAFT] citizens and business require a sufficient level of guarantees regarding their privacy and that their fundamental rights are preserved. From the information consumers perspective, functions associated with security (identification, authentication, authorization, integrity, non -repudiation, confidentiality, etc.) should have a maximum level of transparency, involve a minimum of effort and provide the proper level of security.

Security

Security, in close relation with privacy, is also a transversal question. Being a quite difficult issue, it is important that required levels of security are in place in the different areas: data access, communications, etc. providing equivalent safeguards to non-interoperable scenarios.

Semantics

Semantic agreement in advance facilitates all exchanging parties to have a common understanding of the meaning of the data exchanged. At the international level, this can be a complex topic since some legal concepts may differ from one country to the other. The final goal is to be able to interpret data consistently across the different organizations and platforms involved in the data exchange. Toward that end, it would be beneficial to publish on the Web in readily sharable, referenceable format the names and definitions of elements currently being used, regardless of the scope of agreement that has been achieved.

Legal Aspects

Interoperability may require changes in current legislation, so this needs to be addressed as well.

Cultural/Political Aspects

In general and historically, public agencies have developed a culture that does not promote cross-agency sharing. In many cases, agencies are reluctant to change existing processes, open data and services to external parties, and re-negotiate their way of operation with external parties. Who owns and controls the data or sharing service is not visible in the new sharing environment until after the execution of an interoperability project linking together two or more agencies.

Multi-Channel Delivery

What is Multi-Channel Delivery?

Channels are different means used by service providers to interact with and deliver services to their information consumers. Multi-channel service delivery is the provision of services through different networks, terminal devices or platforms and interfaces, in an integrated and coordinated way, with comparable levels of usability.

Governments, like other sectors, also interact with citizens through different channels, from the traditional ones such as the counter or face-to-face and postal delivery to the electronic channels such as Internet Web sites, e-mail, SMS-messaging, fixed phone, mobile phone, interactive voice response systems, digital television, fax, self-service terminals (ATMs), etc. Governments also have challenges in relation to the elimination of barriers in the access to their services and in relation to the provision of choices about how to access their information and services.

Mobile devices, digital TV and others are opening new ways of interaction between citizens and governments, so that electronic services are no longer limited to the PC. This is possible thanks to the evolution of terminal devices with better features in terms of processing capacity, memory, power autonomy, screen size and quality, on one side and to the improvement of networks, protocols and markup languages on the other side.

Industry and citizens are getting used to these new electronic channels taking advantage of their possibilities and of new services and there is an expectation that governments may be able to do the same.

These new electronic channels require the adoption of new architectures and systems that are able to provide maximum functionalities.

The Web is a main channel to access government services and it should be possible to offer citizens these services through any device incorporating Internet access. This would allow a

significant increase in the usage of government services by means of any kind of widespread channels such as PDA, Smartphone, WAP, WebTV, or even Bluetooth and others; in this way the access to government services would really be anyhow, anywhere, anytime through mobile devices.

Governments should take into account distribution, access options and accessibility aspects to avoid creating new barriers which could limit the amount of information or services provided. Consideration to socially disadvantaged users [EC-MCEGOV], users without high bandwidth and high cost devices, as well as devices, platforms and Web sites with smaller audiences should be taken into account.

What Public Policy Outcomes are Related to Multi-Channel Delivery?

Multi-channel policies developed by governments generally address the following goals:

- **Facilitating e-Inclusion, avoiding digital divide and reaching the disadvantaged citizens**. For instance, the Lisbon Ministerial Declaration [EU-LISBON] refers to multi-channel delivery in relation to inclusive eGovernment. Also, the ICT PSP work programme 2009 [EC-CIP] focus the multi-channel service delivery to the socially disadvantaged and opens this entry explaining that one third of the European population is currently considered socially disadvantaged, most of it suffering from multiple difficulties leading to social exclusion (economic, physical, cultural, geographical factors etc.).
- **Making available eGovernment services and information to large part of the population**. This is especially interesting in countries with low computer penetration as explained in the case of the Multi-Channel Citizen Service Centers in Greece [GR-PAPA]. It has to be taken into account the worldwide expansion of mobile networks and the forecast that by the end of 2010 there may be four billion people in the world with access to a mobile phone.
- **Expanding citizen's choice, extending and providing citizen centric and personalized services**; also referred in [EC-CIP].
- **A closer government to the citizens, providing transparency and openness and expanding citizen participation** in public policy decision making. The Obama administration's memo on Transparency and Open Government [US-OBMEMO] emphasizes these questions. Also it is an issue in the Lisbon Ministerial Declaration.
- **Re-use of governments' information:** Governments produce, collect and share vast amounts of information with high commercial potential for re-use as the basis for new added value products and services, such as e.g. car navigation systems, weather forecasts, insurance and credit rating services and legal databases, as explained in the European PSI Initiative [EU-PSI]. Following the same source, a survey made in 2006 showed that the overall market size for public sector information only in the EU is estimated at € 27 billion. The EU adopted the PSI Directive in 2003 [EU-PSID] to overcome barriers that limit the re-use of government information; this Directive deals with how public sector bodies should make their information available for re-use, and with key issues like transparency of what is available and under which conditions, fair competition and non-discrimination between all potential re-users. The transposition of this Directive into national legislations in the EU includes the promotion of the re-use through multi-channel platforms as, for example, in the case of the national law of Spain.
- Multi-channel delivery of government services in support to the process of **combined service delivery across different administrations**, also referred in [EC-CIP].
- **Re-using data and applications independently from the channel**, reducing the costs of providing services, included in policies oriented to efficiency, effectiveness and transparency.

What are the Main Benefits of Multi-Channel Delivery?

Main benefits of multi-channel delivery may be both for the information consumer and for the service provider:

- An increase of **flexibility** in terms of anytime, anywhere, anyhow and access options for the

user.
- An increase of the **choice** according to the information consumer's preferences; access to the same information and services through different channels.
- **Wider usage and impact** of government services; a higher population or user community reached by government services.
- **Cost savings** along the delivery chain for the service provider.
- **Quicker deployment of services through new or additional channels** which may provide easy, accurate and personalized content delivery.
- **Integration of government services** in the front-office.

How Can Multi-Channel Delivery Be Achieved?

Developing a Multi-Channel Strategy

As a starting point, governments can develop strategies regarding access to their Web sites to be available through a range of digital platforms offering more choice to citizens. More global approaches design strategies which combine face to face offices, call centers and Web sites, as in the case of the multi-channel initiative consisting in a Web site, a network of offices (more than 1.600 in March 2009), and a telephone number in Spain [ES-060] and the Multi-Channel Citizen Service Centers in Greece [GR-PAPA], with equivalent experiences to this one in other countries. Transport Direct [UK-TRANSPORT] in the United Kingdom offers travel information beyond the PC platform including PDAs or mobile phones and digital TV which gets to a segment of the population who do not have ready access to the internet through a PC.

The study about "Multi-Channel Delivery of Government Services" [EC-MCD] developed by the Program IDA of the European Commission elaborates on how to develop a multi-channel strategy; this study includes a list of possible channels with their main features, proposes a channel selection framework and provides implementation guidelines of the multi-channel strategy. This implementation may require a number of steps such like the following:

- Identify candidate services for multi-channel delivery.
- Investigate whether the service can be divided into distinct steps. Given one service, sometimes one specific channel can satisfy the full transaction; in other cases the full transaction could take several steps which might involve different channels. For instance, in order to renew the citizen´s ID card in Spain an appointment can be made through a Web site, the citizen may receive a confirmation with an SMS message through the mobile and then the last step is made face to face in an office of the administration.
- Carry out research and segmentation of the target information consumer community.
- Analyze organizational changes including business processes, back end and front end applications, staffing.
- Analyze technical solutions.
- Determine the channels to be implemented.
- Quantification and evaluation. Statistics of access through the different channels enabled.
- Using standards, principles and best practices:
    - *W3C technical specifications*: URI, URL, XHTML, CSS, XML technologies, and others.
    - *Web Accessibility*. Using the guidelines developed by the Web Accessibility Initiative (WAI) [WAI-GUIDES] and considering the relationship between Web Content Accessibility and Mobile Web [WAI-MWI].
    - *Mobile Web*: using Device Description Repository Simple API, Device Description Repository Core Vocabulary; and the Mobile Web Best Practices 1.0 [MWI].
    - Web Content Accessibility and Mobile Web relationship: Web sites can more efficiently meet both goals when developers understand the significant overlap between making a Web site accessible for a mobile device and for people with disabilities.
    - *Device Independence principles* [DEVIND] set out some principles that can be used when evaluating current solutions or proposing new solutions, and can form the basis of

more detailed requirements and recommendations.

What are the Main Issues with Multi-Channel Delivery?

General Requirements of the Information Consumer and of the Provider

- **General requirements of the information consumer**, as pointed out in [EC-MCD]: flexibility, access options, accessibility, usability (easy to use), quality, security.
  Some of them are especially relevant like security providing trust, and simplicity so that the content may have a similar appearance from any device, providing transparency from the point of view of the information consumer.
  Many people uses the mobile phone only for phone calls and are not aware of the rest of possibilities of the device, because its operation may result difficult for them. This inhibiting factor decreases the usage of the offered services. For instance, trying to write an URL in a mobile may be a difficult task because certain characters ("@", "/", "?", " &", ":", …) are hard to find and the writing task is generally troublesome. The information consumer usually has to remember a crowd of short numbers, key words, URLs, while using impulsively a mobile device with low help capabilities and requiring a quick answer to solve an specific problem.
- **General requirements of the service provider**, as pointed out in [EC-MCD]: efficiency, effectiveness, security.

Limitation of Mobile Devices and Adaptation of Information and Services Provided

- **Limitations of mobile devices**, as listed in [MW-LIM]: Small screen size, Lack of windows, Navigation, Lack of Javascript and cookies, Types of pages accessible, Speed, Broken pages, Compressed pages, Size of messages, Cost - the access and bandwidth charges, Location of mobile user, Situation in which ad reaches user.
- **Adaptation to the access to the Web through mobile devices**, which may require, between others, the reduction of download traffic and the processing consume, because of the need to keep the battery, reduce the cost by traffic and the time response perceived by the information consumer when used intensively or when downloading contents.
  The ideal scenario is that introduction of new electronic channels would be as non-intrusive as possible; for instance without having to modify content managers used for the production of information for the Web.
  This may require the deployment of intermediate elements which adapt or format the content taken out from the Web appropriately according to the kind of device involved in the transaction.
- **Management of contents that cannot be showed in a mobile device**, have a large size very costly to download and memory consuming.

Coordination and Integration of Different Channels

- **Coordination and integration of different channels** is necessary to provide a focus on the user, a consistent approach to data and databases available or shared by all channels and consistent look and feel.
- **Interoperability**, discussed above in this *Note*.

Access to eGovernment Services and Information

In considering multi-channel access to eGovernment services and information, providers must take into account:

- **Web for everyone**: so that it may be available to all people, whatever their hardware, software, network infrastructure, native language, culture, geographical location, or disability. It has to be considered that services should be satisfactory according to the context where they are used.
- **Accessibility**: so that people with disabilities, as well as older people with accessibility needs due to ageing [WAI-OLDER], can perceive, understand, navigate, and interact with the Web, and that they can contribute to the Web.

To effectively deploy multi-channel service delivery, providers must have knowledge of the availability of different devices and bandwidth. Providers must also understand the social preferences of target populations, their habits of information consumption and accessibility requirements, including for people with disabilities.

Interesting information may be about the proportion between mobile phones to PCs or preferences of channel in relation to specific services. Depending on how simple or complex is the service, the information consumer may prefer making a phone call, browsing with the mobile, receiving or exchanging information by e-mail or using a Web site with a computer.

Governments use different strategies to get this kind of information; for instance, studying information consumer profiles, information consumer groups and heuristics of navigation.

For instance, Directgov [UK-DIRECTGOV] in the United Kingdom is available through its Web site, through any Internet enabled phone and through digital TV; they have found that users of the Directgov TV service are more likely to be older (63% over 35, 40% over 45, 17% over 55 respectively), the majority not working (67%) and half (48%) rarely or never use the internet.

Other strategies include facilitating free Internet enabled computers at libraries and kiosks or ATMs, widely available to citizens for free at public locations; targeting the lower cost devices and the lower cost access; providing some information in text form for mobile access; announcing multi-media information and making it searchable through text based services so that users who have limited access to multimedia enabled workstations can find out about resources they need and go to a kiosk or library with access available.

The MC-eGov Study on Multi-channel Delivery Strategies and Sustainable Business Models for Public Services addressing Socially Disadvantaged Groups [MC-GOV] includes a good number of good practice examples.

Conditions about the Reuse of Government Information

- **Conditions about the reuse of government information by the public**, as explained in [US-GSATRAN].
- **Multi-Channel Distribution Standards**
  Standards, principles and best practices are needed to facilitate the provision of multi-channel services and to satisfy requirements such as efficiency, effectiveness, integration, quick response to policies, priorities and social needs and the delivery of services that offer a sustainable value to society.
- **Fair distribution**
  Fair distribution refers to the issue if government distributed content through selected Web sites, platforms or devices creates an unfair advantage for a particular device, platform, distribution network, or Web site. This question has close connection with the re-use of government information discussed above in this document.
  It may be also interesting for governments and for the information consumers of their services and information to consider, for instance widely used instruments such as Web 2.0 services, as an additional channel for distribution of multimedia information. Also they could consider the use of social networks as a mean to increase interaction and citizen's participation taking

due care of privacy, reliability and accessibility barriers they may present.
In relation to these questions, governments are considering and putting in practice the idea of being present in main Web 2.0 services and similar instruments and thus reaching large communities, instead of just remaining outside and waiting for information consumers to come to their traditional Web sites.

- **Multi-media central feed**
Strategies in relation to the distribution of multi-media government content may include approaches to facilitate the access to content provided through social media channels, in a searchable way, in freely accessible, playable and downloadable formats, allowing tagging or preserving hyperlinks.
- **Digital divide**: as explained by Wikipedia [DIG-DIV], it “refers to the gap between people with effective access to digital and information technology and those with very limited or no access at all...It is the unequal access by some members of society to information and communications technology, and the unequal acquisition of related skills.” This gap or unequal access includes the imbalances in physical access to technology and disability, as well as the imbalances in resources and skills needed to effectively participate as a digital citizen. The digital divide may be classified based on gender, income, disability and race groups, and by locations.

Identification and Authentication

What is Identification and Authentication Technology?

Identification and authentication is the piece of any transaction that allows the parties to have confidence with which they are dealing with and the reliability in the preservation of the material and wording of the transaction. Identifying the parties of any transaction is necessary to ensure that the transaction is valid in the future. Usually legal liability is attached to people and organizations that are identified in a transaction. And having a method of authenticating the documentation of the transaction is also necessary for any future verification of the details of the transaction, especially for legal proceedings where authentication is required. Unlike other discussions of technology, identification and authentication technology issues relate directly to the legal arena.

The Transition of Identity from the Physical to the Virtual.

Governments and citizens communicate using online methods increasingly and for many purposes. And in the numerous types of these communications between government and citizens there are varying needs or requirements for both parties to identify themselves or authenticate the transaction which include: privacy of the identity of the citizen, the transaction and the information contained in the communication, the assurance to the citizen of the identity of the government agent or body, the legal requirements that may bind a citizen and government agency to the accuracy or agreement contained in a transaction, and the reliance on outside parties the tools and implementation of identity and authentication.

A major difficulty that must be overcome to advance online identification and authentication is the lack of coherent analogies to the forms and protocols that have endured for centuries in which face to face or physical representations were the main methods of assuring identity and authentication. Another Complicating the transition is the fear by both the government and the citizen of losing control of identity which can have more profound and wide ranging effects than were previously possible. On the other hand, the advantages, adoption and efficiencies of electronic communication are pushing societies to rapidly adapt to this new world.

The issue of how governments provide assurance of their own identity to the citizen is also very different from the physical world. Where postal addresses of government buildings are easily verifiable and how civil servants are clearly identified by badges, the location of their office and other accepted methods, on the Internet those identities are harder to prove and not easily

transformed from the physical manifestations. And in the age of Internet subterfuge and phishing, governments struggle to recreate and synthesize an Internet identity.

The Myth versus Reality of Physical Forms of Identity and Authentication

In creating online analogies to how identity and authentication worked, it helps to better understand the actual practices of authentication rather than the many myths and assumptions. For example, signatures were not always analogous to biometric forms of authentication and identity was more assumed than verified with certain exceptions. On the other hand, the physicality of identity and authentication made mass forgeries and identity theft less prevalent and less impactful on the persons whose identity was being stolen. And in the relative short time of the World Wide Web and mobile phones the nature and social forms of identity are being created anew in ways that are far beyond the understanding and capabilities of the world prior to 1991. And the ability to both verify and falsify the nature of reality creates complications in how to identify and authenticate in this new age. Imagine that a person standing on a street in view of public Web cams using a pre-paid cell phone with GPS, logging in remotely to a computer half way around the world to communicate with a government agency housed three blocks away.

What Public Policy Outcomes are Related to Electronic Identification and Authentication Technologies?

- **Efficiency:** By moving from paper to electronic transactions, both time and resources can be saved.
- **Availability**: By allowing government services that depend on identification and authentication, citizens will be able to search online for those services.
- **Security of transactions:** Technology offers many new methods of making transactions more secure, although there are many counter issues.
- **Legal and Financial Liability:** Depending on how laws related to identification and authentication are written and acted upon, there will be some shifts in the nature of liability. Also, some implementations of identity management will bring in mixed liability due to third party involvement of software, vouching organizations and network actors.

There are many types of online communication between citizen and government that used to depend on a signature placed on a piece of paper in the presence or not of witnesses. There were many less formal communications in which identity was hidden or not important, because the citizen was only one of many people expressing a viewpoint. And in others the physical presence of the citizen was required even if the transaction was anonymous, as in many forms of electoral procedures. In transforming those communications from physical to virtual, the purposes behind the need for identity and authentication should be of the highest consideration and the actual physical methods should not, except where social practices outweigh any of the advantages of technology.

And, except in a small percentage of transactions that might have dangerous or catastrophic implications at the point of the transaction, authentication and identity on the public side of a transaction should be enhanced by:

- providing privacy protection,
- avoiding burdensome requirements or costs,
- avoiding unnecessary levels of pre-authentication (where the transaction if the first of a series of communications and/or where other off-line forms of communications are used for authenticating),
- avoiding forcing identity to be divulged when unnecessary or counter to the purpose,
- and avoiding the reliance on outside parties to supply authenticating credentials as the sole means of authentication.

Personal identity verification is not the only aspect of identity in online transactions: other characteristics and types of status will be wanted including identification of jurisdiction (either in

terms of the location of the transaction or the residence), the status of residence or citizenship, certifications (e.g. medical license), employment status, etc. Also the relationship with certain organization may be conveyed, such as the chief financial officer of a corporation would be the sole identified individual to be allowed to sign certain documents.

What are the Main Benefits and Potential Drawbacks of Citizens and Governments Use of Identification and Authentication Technology?

Benefits include:

- Substantial improvement in government service delivery based on more efficient transactions and availability. With instantaneous transactions that can take place from any location at any time, citizens have more opportunities and flexibility in transacting business with their government.
- Saved resources as the cost of transactions can be much less for both the citizen and governments.
- Enhanced security for transactions when properly implemented.
- Enhanced privacy for citizens when properly implemented.

Potential Drawbacks:

- Cheaper and more likely for bad actors to try and interfere with transactions. Phishing attempts flourish as the value of transactions increase.
- Decreased privacy if poorly implemented.
- Increased liability for citizens depending on how laws are written concerning online transactions, especially as there are third parties involved in software or identity/authentication management that are made necessary for transactions.

Identity and authentication allow for many types of online activities and transactions. Identity is often used for gating and/or authorization, as in only certain identified persons can have access to specific information or software. Identity is also used as a social control method, for example to avoid anonymity where the anonymity might lead to inappropriate dialogue. Authentication is a primary means to ascertain the validity of a transaction and the identity of the parties to the transaction, as in a legal document that must be authenticated in case of a court case. And significantly, tracking the identity of the sender or recipient of electronic disbursement of money for auditing purposes.

The question of the role of third parties in the establishment of identity for governments and citizens is a potential hazard. Governments now use third parties to prove identity and authentication (the GPO of the US Government uses at the time of writing a commercial firm to both provide identity and authentication for some of its posted documents). Also, if individuals are pushed to use software and identity provided by non-governmental entities, without guaranteed protection for the individual against failure of the software or identity, systems may lose the trust of the citizens.

How Can the Use of Identification and Authentication Technology be Achieved?

Legal Dependencies

Governments may need to pass legislation that allows or provides the legal permission for authentication. In the United States, the Government Paperwork Elimination Act was enacted to provide the positive law to allow transactions that previously only been allowed with paper and pen, especially when identification and authentication were necessary for the transaction. Other government entities have created laws to allow for electronic authentication.

Technological Methods for Identification and Authentication

Depending on the laws in a jurisdiction, either government or private entities must create the technology that would adhere to the law. In some cases, restrictive laws might necessitate using third parties to provide assurance of identity and authenticity. Additionally, legal requirements might shape what technology software or hardware is allowed.

Providing Citizens Tools to Identify Themselves

Quite often citizens will have to obtain electronic identities before being able to complete electronic transactions. Government would need to help create an identity regime that would enable such transactions.

What are the Main Issues for Implementing Identity and Authentication Technology?

Identification of the Citizen

Authentication technologies rely on the combination of several methods of identification and authentication including:

- assertion,
- assumption,
- what you know,
- what you are,
- what you have,
- where you are,
- what time it is,
- who knows you,
- quality and/or quantity of attempts,
- and off-line response or vouching.

Often online identity is paired with membership or contractual relationships in addition to be tied to certain technologies.

Based on the work of the "Safe to Play" [SAFETOPLAY]:

- Fair Risk Allocation (essentially proved consumer protection so that citizens or government takes on an undue burden).
- Control. Don't assume that the government will own the methods of control. Likewise it is important for the government to play a role in identity based on a legal framework.
- Accountability, which involves depending on auditors and the legal teams to assign liability. Also involved is transparency of actors and transactions.

W3C eGov IG's Interest in Identity and Authentication

The group aspires to provide use cases where Web technology is used for online identification and authentication by government and the public. There are several standards already developed and in development by the W3C that are and will be important in the use by government agencies. Governments may want to use unique identifiers to include and use for storing and managing identity, and the use of XML [XML] compliant strings such as URI/URLs [ADDRESSING]. As an example, this group has used OpenID [OpenID] URL's as a unique identifier for identity for access to the group's wiki [EGOVIG-WIKI].

XML Schemas [XSD] allow for validating information that accompanies and helps to verify identity or jurisdiction such as postal addresses. The W3C has also established a standard for forms [FORMS]; forms are the most common means by which citizens can send information to

government agencies. And the W3C is working on methods to ensure the non-repudiation and authenticity of documents through its work in the XML Security Working Group [XML-SEC]. This group will endeavor to welcome participation in acknowledging various technologies, while seeking to help in finding methods to evaluate the quality and success.

5. Next Steps

The group aspires to keep this work going over the upcoming years. As is demonstrated throughout this work, there are significant and challenging questions and issues to address, technically and otherwise, along with representative answers and solutions that would aid governments in achieving the promise of eGovernment.

The world is changing rapidly as the Web continues to proliferate every aspect and activity in society and its members. This rapid rate of change and dynamism is further making the promise of electronic government more and more challenging for governments to achieve. Today's Web is pushing interaction and access boundaries, which have existed for a decade. Many governments were just beginning to address the promises of eGovernment and now must adjust course to address the new movement to openness, transparency, and interaction that is now permeating every level and activity of government.

The desire for an open and transparent government is more than open interaction and participation, appropriate data as products of the government must be shared, discoverable, accessible, and able to be manipulated by those desiring the data. The data as well must be linked via subject, relevance, semantics, context, and more. Linked Data [LOD] offers the information consumer ways and means to find relevant and pertinent information through search, queries, interfaces, or tools available today and for tomorrow. All appropriate data must be searchable, accessible, and discoverable, the size of the Web grows larger by the minute, hour, and day and it will grow more and more challenging to locate and mine relevant information unless plans are laid in place which follow appropriate standards and practices.

The needs of the Web and information consumers are being addressed today, but how do we content with the future generations and how they will mine historical and other government data? Governments must focus on long term data management (repositories, archives, URIs and many other subjects comprising the realm to ensure all needs of the information consumer are met, not just those of today.

While data and archives grow increasingly important as the backbone of the information Web, accessibility and availability must remain at the top of the priority list. Without accessible interfaces and tools, what is saved, discoverable, archived and managed wont be available for those that seek it.

In a Web environment, there is little or no connection to the original source of data and information. Often the same data and information can be discovered on a search but the results list a variety of sources. Not all sources provide the same data with the most current updates. Some data management functions are enabled by technology and standards, but technology and standards do not guarantee validity, accuracy, completeness, assurance, and authoritativeness of data. These characteristics of data and information quality build trust with information consumers but current information quality practices in many organizations are fragmented and assigned as auxiliary duties. Part of the data quality problem is in the constant re-architecting of data. Discovery and access to the original source of data may help alleviate this challenge. Finally, while technology and standards have evolved to facilitate search and discovery, search is not enough. The current search results do not provide context. Metadata standards can facilitate the understanding of the context of data and information discovered on a search to determine relevancy for information consumers. One additional point to note pertains to the preservation of data and records. Agencies across government do not have a uniform repeatable process or language for consistency. Part of authenticating data and sources is to understand how long data is retained, how often it is refreshed, and how robust are the security constraints. Standard metadata to identify date, steward,

steward contact information, uniform markings and controls such as laws, regulations, and policies may help address this challenge.

Noting the dynamism and myriad challenges and issues noted, the eGov IG, in up will try to continue to build and mature those subjects and resources found throughout this issues paper with the aim and goal of ensuring governments have the most recent information, tested and validated use cases, and continued identification, examples, and solutions to the many non-technical challenges confronting governments in achieving their electronic government goals.

As well the group will seek opportunities and venues to communicate and share the findings and results of this document. Throughout the efforts, the group will continue to identify partnerships and synergies, which will enable the group to leverage well what is already available, in process, or identified allowing the group to build on the work of the group and others ensuring the products, advisories, and documents are useful and appropriate for the intended audiences.

The group also aspires to keep participation open and transparent for all who are interested in learning and contributing to the goals and efforts of the group.

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