Review: Interoperability Application in eGovernment

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Abstract: In recent years, interoperability implementation has become larger, mainly in eGovernment. Interoperability is the means by which the interlinking of systems, information and ways of working, whether within or between administrations, nationally or across Europe, with the enterprise sector. Interoperability has more roles in complex eGovernment applications, so that a survey of 109 European eGovernment applications suggests that practitioners are struggling to overcome all aspects of interoperability. Interoperability is implemented in eGovernment own more shapes.

Keywords: Interoperability, eGovernment, Semantic

1. Introduction

Interoperability is very important for eGovernment. Interoperability is essential for achieving the aim of electronic government (eGovernment) for integrated service provision to match the customers’ needs and ultimately for realizing one-stop government and joined-up government. Therefore, interoperability is an essential requirement in the design and implementation of a large number of eGovernment applications particularly in cases where service provision involves more than one Public Authority (PA) agency or heterogeneous technical infrastructure in eGovernment application.

Today, most governments need high level of specialization and clearly defined roles and responsibilities. While this type of organization may be well compatible to help accountability and equal treatment, it is less obvious that it will assist in leveraging services and increased efficiency.

In the dawn of 21st century, where system complexity, multiplicity and diversity in the public sector is posing extreme challenges to common interoperability standards, eGovernment Interoperability Frameworks (eGIF’s) pose as a cornerstone for the provision of one-stop, fully electronic services to businesses and citizens. Such interoperability frameworks aim at outlining the essential prerequisites for joined-up and web-enabled PanEuropean e-Government Services (PEGS), covering their definition and deployment over thousands of frontoffice and back-office systems in an ever extending set of public administration organizations.

In other hand, The Analogy eGovernment Interoperable Ecosystem (AD-eGIE), is a model that utilises sectorial data to drive the eGovernment operational services. Its AD-eGIE systems architecture is constructed on the mechanism of the spoke and hub configuration. At the central part is the hub composed of the data clearing house, directory service, publishing services, subscription services and web services.

These components are surrounded by a message bus which is enclosed by a security layer that protects the whole system. However the edge of this message bus is connected with the four major domain consisting of sectorial data. These domains are: the executive, judiciary, legislative and others. Each domain encompasses one or more administrative sectors with their associated sets of primary and secondary data.

The AD-eGIE establishes interoperability between systems which is a key issue in unlocking data that is required to enable eGovernment solutions. In fact, in this era, the need for interoperability is becoming increasingly more important for Governments that are focussing on implementing their eGovernment initiatives and in particular their service portals.

2. Role of Interoperability in eGovernment

Based on European Commission interoperability is the ability of information and communication technology (ICT) systems and of the business processes they support to exchange data and to enable sharing of information and knowledge”. In the EIF three aspects of interoperability are identified include:

- Organizational interoperability deals with cases where the organizations that have to cooperate have differences in their structure and in their business processes.
- Semantic interoperability deals with cases where the information exchanged between organizations is interpreted differently by each side.
- Technical interoperability deals with the technical issues of linking computer systems and services. Other important issues like open interfaces, interconnection services, data integration and middleware, data presentation and exchange, accessibility and security services are also included here [1].

Based on ttimios et al, interoperability model consist of more model. Following figures will describe the the model of interoperability:
Figure 1: The Bilateral Model

The bilateral model. This model is the most straightforward approach towards achieving interoperability. The basic idea in this model is that a direct connection is established from each PA agency to all other PA.

Second, a model called the clearinghouse model. This model suggests the use of a central unit that will be responsible for enabling and facilitating the communication between the PA agencies. Thus, all the information exchange and coordination takes place through the common clearinghouse.

Figure 2: The clearinghouse model

Third model of interoperability is called the central unit model. This model is based on the use of a central unit, which defines the protocols and procedures for communication between many local units.

Figure 2: The central unit model.

These findings indicate that direct bilateral or multilateral communication between PA agencies is preferred when implementing eGovernment applications. This is probably because this is the easiest way to address interoperability challenges.

Though, this might turn to be a quite shortsighted approach considering the serious scalability problems that the bilateral model faces. It is interesting to see that the adoption of bilateral models for collaboration can also explain the fact that current eGovernment applications do not deal with semantic interoperability issues. Indeed, in the case of bilateral agreements resolving semantic interoperability issues is a relatively easy task.

However, as the number of partners that need to collaborate grows, the limitations of the bilateral model will become evident. In these cases, the use of the clearing house and central unit models is expected to increase and consequently the need to resolve semantic interoperability challenges will become more evident.

But, this model which is described in the research examined a limited only number of interoperability patterns and implementation models. More importantly, eGovernment information systems are sociotechnical and not purely technical systems, therefore interoperability challenges related to legal, management, cultural, ethical and other social issues should be more deeply investigated.

3. Shape of Interoperability

Result of analysis strategy and analytical model were guided by the research design of a recent review mapping the eParticipation field. Here, a grounded analysis of a sample of the eParticipation literature resulted in a conceptual model of the field.

The eParticipation model consists of actors, activities, contextual factors, effects, and evaluation approaches, providing an excellent outline of an emerging field.

This research adopt the conceptual model to provide an initial overview of the interoperability literature according to categories from the eParticipation model.

Interoperability in terms of a set of key concepts; actors, activities, contextual factors, effects and evaluation approaches based on a grounded analysis of our literature sample.

While each concept has the potential to include a wide variety of sub-concepts, our focus has been on identifying concepts that are special to the interoperability area, or seem to have a different significance related to mainstream eGovernment research.

The result of this research is that interoperability model differs substantially from the eParticipation model. This does not mean that there is no overlap whatsoever, but perhaps rather that the models have been developed with the intent of emphasizing distinguishing features of each field. Therefore, dominating features have been selected to suggest defining characteristics. But the result still use narrow of quality journal, so that the shape of interoperability don’t have strong reason.
4. Interoperability Registries in eGovernment

The architecture that implements the Interoperability Registry comprises three layers: (a) the Web-based and UDDI (Universal Description, Discovery and Integration) interfaces for various groups of users, (b) the tools layer including ontology management, process and data modeling and (c) the information repository for interconnected data elements, process models, XML schemas and Web Services descriptions. These three layers, as shown in Figure 4.

But the registry model cannot be implemented because this model don’t propose an interoperability Registry includes both organisational and technical tasks, since the proper maintenance and usage of the registry is now the crucial issue.

5. Interoperability Technology in eGovernment

In Latin America research, a framework was proposed. The proposed model called Iberoamerican Interoperability Framework (Marco Iberoamericano de Interoperabilidad – MII), promoted by the Latin American Centre of Administration for Development (Centro Latinoamericano de Administración para el Desarrollo – CLAD). In particular, the article presents several data related to technological issues and, therefore, to the technical and semantic dimensions of interoperability. It looks deeply into important themes such as data and information, semantics, open software, regulation, or security. Finally, it presents the authors’ reflections on how to enhance technical interoperability in the region.

6. Analogy of Data in eGovernment

Another research about analogy of data in interoperability based on ecosystem. This model of analogy called The Analogy eGovernment Interoperable Ecosystem (AD-eGIE). (AD-eGIE) is a model that utilises sectorial data to drive the eGovernment operational services. [5]

Its AD-eGIE system architecture is constructed on the mechanism of the spoke and hub configuration. At the central part is the hub composed of the data clearing house, directory service, publishing services, subscription services and web services. These components are surrounded by a message bus which is enclosed by a security layer that protects the whole system.

However the edge of this message bus is connected with the four major domains consisting of sectorial data. These domains are: the executive, judiciary, legislative and others. Each domain encompasses one or more administrative sectors with their associated sets of primary and secondary data.

The Government sectorial data are divided into four domains: the Executive, with sectors covering all line-ministries. The second domain is the Judiciary, focusing on the courts and justice sector. The implementation of the AD-eGIE system illustrated with figure 5.

Figure 4: Platform Architecture

Based on Yannis et al [3] The front-end platform components are the following:

- The Registry Web Site found within the Greek eGIF Web Site which publishes the various documents of the eGovernment Framework but also gives access to citizens and businesses for publicly available data.

- The Registry Intranet, accessible to pre-selected public administrations and portal builders that gives access to the Registry Tools (processes, ontology, XML).

- The Registry UDDI interface, where administrations publish their Web Services or find existing, available Web services to use through their information systems, constructing truly interoperable, one-stop services.

Figure 5: Government Domains Sectorial Data Silo

While the AD-eGIE system architecture illustrated in Figure 6 is organised along the mechanism of the spoke and hub configuration. As introduced earlier on, from the outer part, this architecture has ten (10) components and these are: the Government Sectorial Data, Security Layer, Message...
The AD-eGIE establishes interoperability between systems which is a key issue in unlocking data that is required to enable eGovernment solutions. This work deals particularly with sectorial data which is classified into primary and secondary Government domains. To achieve the workable eGovernment operational services, the ideal situation would be to substitute the secondary sectorial data with that of primary sectorial data.

But this model don’t discuss about result of Locking system that many implemented in eGovernment system. Besides, communication about unlocking and locking system is very important in interoperability application.

7. Summary

In recent years, interoperability implementation became larger, mainly in eGovernment. Interoperability is the means by which the interlinking of systems, information and ways of working, whether within or between administrations, nationally or across Europe, with the enterprise sector. Interoperability has more roles in complex eGovernment applications.

Based on European Commission interoperability is the ability of information and communication technology (ICT) systems and of the business processes they support to exchange data and to enable sharing of information and knowledge.”

One model of interoperability called The eParticipation. This model consists of actors, activities, contextual factors, effects, and evaluation approaches, providing an excellent outline of an emerging field.

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