



## **A PROPOSED FRAMEWORK FOR THE INTEGRATION OF E-GOVERNMENT DATA AND SERVICES**

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**Abstract** – According to the Population, overcrowded, and required governmental services growth, require an improvement of system and data services, because of the spatial information increase, sharing, issuing and dissecting plays a more essential part. One-stop open administrations and single window frameworks are essential objectives of numerous e-government activities. Instructions to encourage the specialized and information interoperability among the frameworks in diverse government organizations is a key of meeting these objectives. While numerous product principles, there are many techniques used to integrate government for Web Services like XML, OWL, UBL, CCTS, RDF and Jason have been used to address the integration and interoperability between diverse government, the information interoperability and integration issue stays to be a major test. The data integration and interoperability concern how distinctive gatherings concur on what data to trade, and the definition and representation of such data. To address this issue, XML (eXtensible Markup Language) Schema Design and Management Guide has been discharged and additionally the Registry of Data Standards under its e-Government Interoperability Framework activity. The aim of this work is to improve accessibility and connectivity of governmental services for citizens and by means of creating integrated scenarios and providing guidance to users while following this scenario.

**Keywords:** Service Integration, Data Integration, e-government, interoperability

### **1. Introduction**

The overflowing of the web and trade data have created to expand the requirement for a typical information design. Today, many different organizations are going to be integrated and enable data exchange between them. Data exchange is principle concept to complete the service execution, interpolation and portability. Such operations have many different challenges that were addressed in many researches before. Challenges include different data management systems, schema structures, data types, constrains, semantics and much more. In case, data are not integrated perfectly, the world will have extreme big data with enough noise like duplications, missing values, inconsistent, and structure and semantics conflicts rather much more. These reasons offered ascend to the requirement for a profoundly institutionalized normal information position for information trade and incorporating between heterogeneous applications and frameworks [1], are the upsides of interoperability, exemplified

by the web [2]. XML is one such inventive use of relational database incited by expanding the utilization of associations database applications and its related need of overseeing incessant stockpiling and recovery of not-exceptionally organized information in archive position [3]. XML is intended to represent information utilizing labels (components), permits communicating data in ways that match better for business. XML permits us to model data frameworks in characteristic and natural way. It conveys various intense capacities to data displaying, for example, heterogeneity, extensibility, and adaptability. Thus, XML turns into a standard information arrange generally utilized as a part of associations and a typical dialect for information transmission over the Internet. This prompts a developing requirement for trading and incorporating the heterogenous XML information sources and patterns between diverse application frameworks and associations. In this way, information trade between heterogeneous databases turns out to be exceptionally intriguing subject as of late. Various of dialects, for example, Document Type Definition (DTD) is likewise utilized for rebuilding the XML archives [4].

XML representation might wasteful contrasted with storage the information in a relational database, since XML component (tag) names are rehashed all through the archive. Be that as it may, XML representation has noteworthy points of interest when use it to trade the information between the associations, and for putting away complex organized data in records. XML makes the message self-presenting so as to archive of the components, a mapping does not require master to comprehend the importance of the content. The configuration of XML archive is not unbending; effectively can add extra data utilizing the components. What's more, can disregard any data or component. As it were, the capacity to perceive and disregard startling components permits the arrangement of the information to develop after some time, without discrediting existing applications. Likewise, the capacity to have various events of the same component makes it simple to speak to multivalued qualities. In like manner, XML permits settled structures, and a wide assortment of instruments are accessible to help with XML preparing, including programming dialect to make and to peruse XML information, program programming, and database apparatuses [5, 6, 7].

## **2. Related Work**

In [8], European use information and communication technologies (ICTs) to improve public services and increase democratic participation of E-government. and designed to improve efficiency by reducing the costs of electronic information management, improve management of government agencies and reduce routine for citizens trying to e-government in the European Union in achieving smart economy, sustainable, inclusive and by making Governments use ICT to reduce expenses related to paper collection, filing, processing, storage and retrieval of information; to reduce the costs of printing and distribution of the information.

In [9], a strategy for integration the heterogeneous XML (eXtensible Markup Language) patterns is proposed. The returned intervened construction contains all ideas and relations of the sources without duplication. In detail technique partitions into three stages; First, remove all subschemas from the sources by break down the construction sources to predecessor, root and leaf. Second, the procedure coordinates and looks at the subschemas and return the related competitor subschemas. At last, make the sedate composition by integration the hopeful subschemas, and after that get the negligible and complete unified schema.

In [10], a service oriented structural for information interoperability have designed (named DISASTER: Data Interoperability Solution AtStakeholders Emergency Reaction) giving an adaptable extensible

answer for settle the intercession issues. Web administrations have been embraced as particular innovation to actualize this worldview that has the most critical scholastic and mechanical perceivability and fascination. Commitments of this work have been accepted through the configuration and advancement of a cross-fringe practical model situation, effectively including both crisis chiefs and crisis specialists on call: the Netherlands–Germany outskirts fire.

In [11], they develop a framework to gather information parts that give semantics comprehended by all, and rules for creating them as required into information trade details. This exertion is known as the C2 Core. Conceivably the first real client of the C2 Core is the Tactical Edge Data Solutions (TEDS) Joint Capability Technology Demonstration (JCTD). The TEDS JCTD was started to work with the Services to overcome reported crevices in information sharing and make a Joint way to deal with conveying information for use in a pioneer driven, net empowered future.

In [12], the United Kingdom, the e-Government Interoperability System and its important specifications as issued by the e-Government Unit. The GovTalk XML Pattern Library contains roughly 78 XML Diagrams (coming up to 102 with all adaptations considered). In any case, the larger part of those Blueprints is fringe, don't allude to "center" administrative reports, similar to the Automated Registration of Title to Land (ARTL) Case Administration Interface Mapping and Diagram for CON29 Land Looks, or guide to basic segments such as location and individual.

In [13], propose system exploits UBL's (Universal Business Language) evident offerings and skill and advances an inventive opportunity that offers adaptability and extensibility, without being restricted to UBL's degree and customization constraints. The proposed approach yields significant lee-route in usage endeavors and regards every nation's and open power's self-sufficiency in characterizing the precise information traded yet keeping in mind the end goal to address the developing heterogeneity in existing information models, it receives a clear approach in light of setting nonpartisan calculated information models for displaying of legislative information.

In [14], propose an intervention-based methodology for integrating data from two sorts of data sources, viz. spatial data frameworks, for example, GIS and searchable databases of geo-referenced symbolism. The proposed system empowers clients to issue a solitary inquiry keeping in mind the end goal to seek various data sources and, consequently, get a joined result fusing information from over these sources.

In [15], propose a lightweight framework to conquer the issue of interoperability among XML information source that gets its motivation from the late semantic web activity. The methodology does not require either source-to-source or source-to-worldwide mappings. Rather, it depends on advancing nearby sources with semantic statements in order to empower interoperability. These assertions uncover the semantics of the data substance of sources by mapping the ideas display in that to a typical (application specific) vocabulary, in the soul of RDF. Not with standing this foundation.

In [16], Greece, the e-Government Interoperability System has conveyed the Certification Structure for Open Portals and Sites, the Interoperability and Administrations System and the Computerized Verification Structure and a Registry of Procedure Models, reusable Center Parts, XML Diagrams and Web Administrations.

In [17], dish European level, the European Interoperability System, which is at present being amended by IDABC and the Building design Rules for Trans-European Telematics Systems for Organizations (Ver. 7.1) are met. Similarly, as the Semantic Interoperability angle is concerned, an EU-Venture SEMIC.EU (Semantic Interoperability Center Europe) has likewise been set up with a specific end goal to bolster the information trade for dish European e-Government administrations yet has not discharged to date any interoperability resources.

In [18], Denmark, the most recent adaptation of the Interoperability Framework has been released. Information Structure Base, the Danish joint effort device advancing interoperability, incorporates a global guidelines vault containing business process portrayals, information model depictions, interface depictions, complex XML outlines and pattern pieces (data object) from open and private associations and a UDDI (Universal Description, Discovery and Integration) storehouse containing data on web administrations. The Info Structure Base has propelled an agreement WSDL (Web Service Definition Language) device that empowers the client to make solid Web Service definitions in light of new and existing Schema definitions found in the Info Structure Base store, without dealing with the numerous complexities of utilizing XML Schemas as a part of WSDL documents. In this connection, the UBL antiquities (i.e. Business Information Entities and Documents) have been received as they are.

In [19] have been proposed an Ontology that is a Logical extension of Ontology Web Language for Services OWL-S for implementation of Eservice integration modeling framework.

In [20] Hong Kong, the Information Technology Services Department (ITSD) (The Government of the Hong Kong Special Administrative Region (HKSAR)) has built up the HKSARG Interoperability Framework (Version 5.1). The XML Co-ordination Group has built up a XML Schema Design and Management Guide while Common Schemas are distributed on the XML registry. Such patterns are in accordance with the Core Components Technical Specification (CCTS) however slant more towards being portrayed as code lists and center parts and don't introduce any genuine legislative reports. Next table compare between some of the previous research discussed in this section.

Table 1: comparison of related work.

Studies	Technique	Application
IN [8] 2015	ICT	Service-government
IN [9] 2015	XML	Data-business
IN [10] 2015	JSON	Service-emergency
IN[11] 2010	Xml	Data-military
IN [19] 2009	OWLS	Eservice government
In [13] 2008	UBL-CCTS	Data-government
IN [12] 2007	XML	Service-government
IN [20] 2007	XML-CCTs	Service-government
IN [18] 2006	XML	Data-government

### 3. Problem Statement

Light is focused on handling data exchange and interoperability between different government offices under approved administrative umbrella. Integration and Interoperability is performed to handle different database management system, and heterogeneous schemas.

#### 4. Proposed Framework

Now according to the previous work, the field of interoperability is still not achieved with the good requirement. All research work either on data or service exchange without caring of interoperability. Exchanging data or service without caring of interoperability may make the system susceptible to data duplication. More of the previous work is used either for data exchange or service. Data interoperability is a very important these days because the massive data and increased number of people every day that need more data. Like these systems are very important to reduce the burden on the government and organizational Institutions. It makes a value to propose a system trying to combine the good characteristics and overcome the drawback of these systems. The proposed system that developed here tries to interoperate and exchange data and also authorize the user or clients to ask for the services they need. Figure 1 illustrates the proposed frame work component and the data exchange between the different process.

The proposed system consists of three roles including administrator region, operator region and security context. **The administrator** who able to control the overall process of certifications. In addition, the administrator the only one is responsible for creating these certifications and assign the role between provider and consumer. In the **operator roles**, the system has two major nodes, service provider and service consumer. The service provider is a complete standalone system for organization X while the consumer is another standalone system for organization Y. Both X and Y asked the administrator to create a certificate to be updated, filled and agreed by the provider and the consumer respectively. For complete scenario for data interoperability between X and Y under supervision of administrator. The expiration date of the certificate is assigning by the administrator. These certifications are encrypted in **security role** to keep them from unauthorized people. In the other hand the proposed system sends a notification to all governmental organization if one of them make any edition in the data to male all organization of government up to data. These features are automatically and dynamically happening during any alteration on database, see the following framework.

In the proposed framework:

1. Administrator create XML certificate for every service with *new state* which would be used to describe:
  - a. **The service provider**; who will be notified to accept the certificate first after administrator finishing the certificate creation.
  - b. **The service consumer**; who will be notified as soon as provider accept the certificate.
  - c. **Effective start date**; which will be used as FROM date for XML certificate to be active.
  - d. **Expiration date**; which will be used as TO date for XML certificate to be inactive.
  - e. Assign a certificate conventional name and fill in other extra data.
2. Administrators send the XML certificate to the service provider changing it to be created state.
3. The service provider completes the service details including specification for:
  - a. Service URL; web URL will be used to access the service online.
  - b. Service Method Name; unique identifier for every method provided by the system
  - c. Method Input List; will be used during the service outside call via consumer
    - i. Name: Field's identifier is retrieved automatically from the database schema.
    - ii. Type: data types are detected automatically as soon as fields is selected.
  - d. Method Output Value; either specify the type of the return value ranging from primitive to user defined and structured types or void.
4. The service provider can do one or more of the step no. 2 to gain max possible interoperability and provide all functionality under conditions of the certificate.

5. The service provider accepts the certificate and sends the responsibility to the partner; consumer.
6. The service consumer is notified by the certificate and start to complete the following details for every method provided by the provider:
  - a. Map Input list; specify which from his site will be used for what being passed for consumer site.
  - b. Map Output value; specify where the return will be hold
7. The consumer sends the certificate to the administrator to be approved finally as active state.
8. The system automatically secures the certificate by encryption XML file using predefined secure key.
9. The system enrolls the certificate to be available for data interoperability between the provider and consumer FROM/TO duration as active certificate and usable.
10. When Y consumes a method that is provided by X, Y selects the potential suitable active certificate to be access the method otherwise the access is refused.

The proposed system has been done here to make an improvement on the previous work as we discussed before. They have some limitation because all of them didn't develop system for interoperability of data and service exchange. Here the proposed system has made the data interoperability and exchange in addition it also provides service for clients. The proposed system overcome the problem of data duplication it also can display the data according the perspective of client with policy schema. It also provides all of client from Interference of data or service which can make a track of his required service. Any service has a stat which known by all organization worker and client to save effort and time.

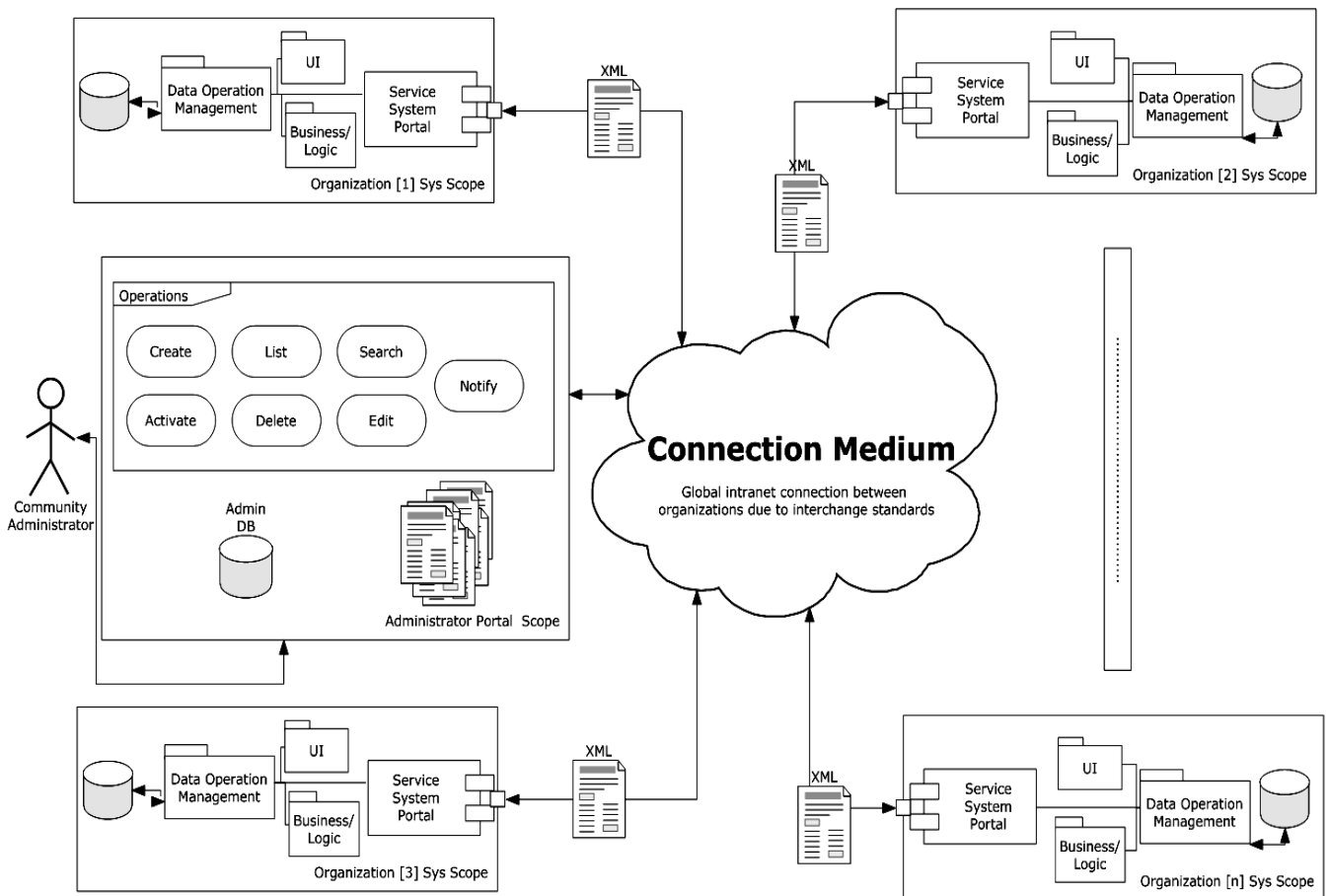


Figure 1 The proposed Framework

**5. Evaluation and Discussion**

There are many issues face any interoperability and exchange framework. The proposed frameworks have handled many challenges of data interoperability which can be summarized in table 1. The proposed system here aims to improve government efficiency through the reduced cost of electronic information management and communications, the reorganization of government agencies and the reduction of administrative silos of information. Even more importantly, it can reduce administrative burdens on citizens and businesses by making their interactions with public authorities faster, more convenient and less costly, thereby spurring competitiveness and economic growth. More recently, open data and collaboration with third parties has offered governments new insights into issues and possible new services.

Table 2. Proposed Framework challenges

<b>Challenge</b>	<b>State</b>	<b>Comment</b>
<b>DBMS verities</b>	<b>Yes</b>	The proposed system capable to handle different DBMS using their Connectivity driver
<b>Different Schema</b>	<b>Yes</b>	Dynamic handle schema details at runtime free constrains
<b>Different Table definition</b>	<b>Yes</b>	Handle every details of table definition using its metadata
<b>Privacy</b>	<b>Yes</b>	Every partner holds his responsibilities only
<b>Data Duplication</b>	<b>Yes</b>	Save time and space to re-save data locally as using it life
<b>Universality</b>	<b>Yes</b>	The proposed depends on XML which is standard
<b>Security</b>	<b>Yes</b>	The proposed secure the certificate using encryption.

Here the integration and interoperability between different governmental organizations with different database systems solved with their driver’s connection in the proposed system. Each government can be asked for its data and these data can be allocated in the perspective of the consumer even if there different of data types. It is also providing different policy mechanism for different usage between governmental organizations and normal users or consumer. According to this feature each schema has its own responsibility that can be done with the assigned user. Each schema may be assigned to different consumer and consumer has its own privacy. Web service can handle different database Schema by changing and altering it during the usage time which make it very accurate, helpful, simple and timeless. Two different policy or mechanism can display the gathering data from the same table according to its metadata without caring of the source field name. Each schema can display the data according the require user perspective. The proposed framework prevents from data duplication to save memory and time during life using. The proposed system sends a notification to all governmental organization in case of any data alteration or updating to prevent from data duplication or miss. XML is simply to understand it is also known for all users which make it standers for all users and partner. The proposed system encrypts the policy between different parties to be secure with controlling and monitoring.

The next table is to indicate the modifications that have been done in the proposed model here over others. From table 1 and table 2, the proposed model gives the provider the ability to change the schema or certification during working time which mean there is a dynamically process in every time to change the certificate. In the other side every government organization has its own database with different definition of tables. Consumer can ask for the data and display it in his own perspective as he need even if there is different in data types which enforce it to the large value. Universality is an important factor with application like that to be a standard for all. XML have this feature over other technique like RDF. Most of governmental integration application work either for data integration or service integration.

Table 3 Comparison among challenges.

Studies	Technique	Different Schema	Different Table definition	Universality	Governmental	Service Integration	Data Integration
IN [6]	ICT	No	No	No	Yes	Yes	No
IN [11]	XML	No	No	No	No	No	Yes
IN [19]	JSON	No	Yes	Yes	No	Yes	No
IN [20]	OWLS	No	No	No	Yes	Yes	No
Proposed system	XML	Yes	Yes	Yes	Yes	Yes	Yes

## 6. Conclusion

The vision behind our proposed model is to create a lightweight scalable infrastructure for interoperating and integration over governmental organization for data sources and services. The XML Schema Design and Management Guide provide a comprehensive design methodology and the necessary schema management infrastructure to facilitate e-government data and service standardization. Moreover, the XML Schema Design Guide is a generic integrated methodology, which covers all necessary steps in e-government modeling, from requirement analysis, to service process and information modeling. Therefore, different governmental organizations can easily adapt it to establish their own data interoperability infrastructures which help user to quickly gain his services. Mobile e-government is an important direction of the development of e-government, which wasn't studied comprehensively before. In the future, we will study about mobile e-Government services channels.

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