Mapping Service Oriented Architecture and E-Governance

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ABSTRACT

The worldwide revolution in internet is changing our life in terms of the way of work, learn and work together with others. These changes should reflect the way government functions in terms of the organization of the government, its connection with its citizens, institutions and industries and cooperation with other governments. Also, the increasing simplification of technology access by citizen and organizations brings expectations and demands on government. Service Oriented Architecture (SOA) provides a strong orientation of User Centered Design (UCD) for efficient conceptualization, design and expansion of information systems (IS) for sustainable use. This paper attempts to find an approach to get better the internal relationship between the government and the citizens' electronic freedom by using SOA approach.

Keywords

Service Oriented Architecture, Web service, e-governance, service provider, service consumer

1. Introduction

E-governance requirements may be driven by economic, political, technological and cultural reasons [2]. E-governance is the use of current information and communication technologies such as internet, wide area network, mobiles, etc., by government to develop effectiveness, , and service delivery to citizens and offer transparency. By implementing an e-governance initiative government departments will streamline their processes, join all the stakeholders, and improve the delivery of their services. Information technology for e-governance system could yield great benefits and modernization of the different government sectors. The knowledge of e-governance system in a number of developed and developing countries has shown that information technology can provide greater service delivery with great quality [4]. Implementing e-governance projects aims at achieving several objectives and goals that adhere to the following principles:

- Upgrading and improve delivery of government services.

- Empowerment of citizens through improved access to government information and ability to interact and participate

- Transparency success and higher accountability of the government

- Improvement of internal connection between the government and the citizens' electronic delivery

The goal of E-governance is to enable citizens and private/public sectors to access government services in effective and efficient integrated services delivery to the customers anywhere, any time in a form convenient to the service recipients through the use of internet and other channels like mobile phones, etc. It also enables citizen to take part in the government's policies framing and decision making.

Preliminary analyses indicate the need to redesign the basic processes and to use the Service Oriented Architecture (SOA) and the web services for optimizing the performance of e-governance applications. This can be achieved by enhancing the liveliness and flexibility of the technologies used in e-governance applications. Using the appropriate technology to automate Public Services can reduce the expenditure of the Government in a significant way and the citizens can have smooth access to different public services. Retrieval of Government information has to pass through many complex procedures and may need to collect from various departments. Though different citizen centric applications are accessible in various government departments, but it is a big challenge for Government to integrate these applications. Lack of interoperability reduces the efficiency of Governance. Service Oriented Architecture (SOA) acting a vital role in integrating different departments their services and service rules.

SOA principles describe strength from the benefits of well practiced architectures in software engineering discipline like client-server, distributed architecture. SOA principles work closely with applications and enterprise with 'service-orientation', and 'service-oriented solution logics' (Erl, 2008). E-governance services are mostly regarded as 'enterprise' level services since it includes various 'stakeholders' in the process. Major stakeholders are 'citizens', 'government agencies', and 'service provisioning agencies'. SOA based models help revolutionize enterprise environment by leveraging web services technologies. IT enabled service-orientation' provides the right force for a good architecture which can be possible through the SOA. Web-services driven SOA is speedy gaining its status against conventional 'distributed architecture' environment. SOA builds on the strengths of 'application architecture' and 'enterprise architecture' has potential to manage e-governance projects. Application architectures have evolved in Indian states in separation and there are a number of mission mode projects developing for scale up. This scale up exercise entails federate the application architectures and their 'reuse'. Enterprise based solutions are part of the mission mode projects which aim at having 'national reach' and providing distributed environment for the services to reach the citizens. Indian citizens have varied demands with tough rural-urban disparities and yet having a enormous

potential to have converged and unified services across the nation. This leads to an 'environment' conducive for encouraging individual 'service orientation' while providing 'standardized services' nationally. Indian villages cover up the larger population to ignore and demands of this population vary depending on limited, household and individual priorities, marketplace conditions and national policies. SOA is projected to provide 'universal service identifier' in the system so that desired service can be identified 'on demand' with least transaction time, transaction cost and autonomous of spatial conditions. Universal service identifier is expected to manage with service broker with service descriptions so as to mine the desired service from the warehouse. A typical architecture of SOA is presented in Figure 1.
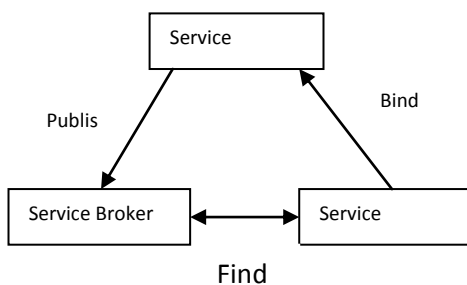

Figure 1

The concept behind SOA describes the service orientation and relationship of different stakeholders who work together, arrange and offer services as desired. But an enterprise level SOA needs a detailed treatment for collating all possible services with best practices, communication among components and relationships.

The main aim of e-governance is to agree to the public sector to provide citizens with information based on their need, hence increasing their efficiency, and quality of service. An SOA approach to e-governance align IT with service delivery goals and enables different government departments to reuse developed resources The goal is to provide a flexible SOA solution for governing, integrating, deploying, securing, and running service, irrespective of the platforms on which they were created.

E-governance Portal allows the citizens to access government information easily and to enjoy one stop government services. It enhances the customer focused service delivery channel. E-Governance Portal allows a department to present information, applications and services in a single consolidated browser view. It provides a secure and individualized view of multiple online resources and interactive service. It offers a only access point to critical information and the primary applications necessary for an individual to gain the services. In a simple way E-Governance Portal act like an interface between government and the citizens.

2. Service Oriented E-Governance
The Service Oriented Architecture (SOA) which has proven successful in building large, dispersed heterogeneous systems has the potential to provide architectural support to build up e-governance solutions by integrating independent services developed and controlled by individual owners with their varied goals and parameters[3]. E-governance

Portal is built based on Service Oriented Architecture. SOA may be defined as groups of services that communicate each other through data passing or two or more services coordinating some activity. SOA builds applications out of web services. Services comprise an associated unit of functionality that have no calls to each other embedded in them. They typically implement functionality the majority citizens would make out as a service, such as filling out an online application for a driver's license, viewing online electronic form, or submitting a query. The departments that are to be combined with the E-governance Portal require to interact with the portal and to each other for unspoiled of delivery of services to citizens. The connections between these departments are proposed to be done using the industry's widely acknowledged and adopted Service Oriented Architecture framework. Using SOA framework, the services of the E - governance Portal would be exposed using the web services, and some can be consumed by various departments.

3. Proposed Architecture
The proposed architecture is divided into seven layers to improve the competence of a government organization. The figure 2 shows the relationship between the various services in a government level groups and Service Oriented Architecture.

3.1 Communication Layer
The communication Layer refers to the assistance, defined in terms of services produced by government. The aim of this layer is to assure customers and resolve their problems, usually through the composition of complementary standalone services from one or various government organization. The communication layer is mainly composed of the Web browser, which acts as cross-platform. Client set-up data in accordance with the network can understand the program, manage data decryption and encryption. In addition, to that it also expresses layer protocol decoding and encoding image and file format information [3]. Communication layer is realized through JSP/Applet/Java GUI/Html [5].

3.2 Channel delivery Layer
Presents the access interface for end users with e-Government services

- Visible element of the e-Government and all access to e- Government services can be achieved via interaction with this layer.

- Includes application such as e-Government portal, ministry websites as well as ministry applications

3.3 Service Layer
- Provides front end layer service for services that usually needed by e-Services.

- Example of Services: Validation and e-Payment services. Provides access to legislative information via web services. E.g., citizen information profile.

3.4 Component Layer
   At this layer business component are defined that can be consumed across multiple application interface and this layer defines software components and orchestrations that allow the business services to link to and call enterprise-level shared assets as needed. It is a placeholder for connection technology implementations ranging from

JDBC to JNI (Java Naming Interface) to Java connectors. All the infrastructure code that is needed to access extended enterprise systems such as ERP systems and a content repository fits into this layer.

3.5 Data Layer

The data layer illustrates applications, packages and databases that might be called upon by the different components and it includes all of the substantial resources for computing, storage, and network connectivity distributed over the Internet. The data layer swap messages via a peer-to-peer network [8]. This layer understands and maintains the underlying data to location, structure, format, synchronous mode and cross-reference relationship. It uses this information as a basis to provide data integration services, and consistent data to read and update, improve productivity and reduce the business service costs and complexity of creation and preservation, in order to achieve SOA [6]. The functions of the data layer are realized through Entity Bean/JDO/ Hibernate/JDBC.

3.6 Integration Layer

This layer enables the integration of services through the introduction of reliable and smart routing, protocol mediation, and other transformation mechanisms, often described as the enterprise service bus. An Enterprise Service Bus (ESB) is a standard-based integration platform that combines messaging, web services, data transformation, and intelligent routing in a highly distributed, Service Oriented Architecture (SOA). An ESB provides a messaging infrastructure along with basic transformations and routing. It combines message queuing and protocols such as Simple Object Access Protocol (SOAP), Web Services standards, Web Services routing, and provides for extensions. An ESB mainly uses open standards like Web Services to allow applications to communicate. Therefore an ESB acts as an SOA backbone for the organization [7].

3.7 Management Layer

This layer introduces special challenges in security and between heterogeneous platforms or operating systems [7] and it interacts with multiple layers providing ancillary services. The components consist of directories and security and monitoring services. The monitoring service support management tasks at all levels of the architecture stack. In addition, multi-layer monitoring allows system components to react to changing environmental conditions. Various technologies such as the Globus Grid Security Infrastructure (GSI) and access control lists are used as appropriate to allow a secure distributed computing environment [7]. It ensures quality of service through sense-and responds mechanisms and tools that monitor the health of SOA applications, including the all important principles implementations of WS-Management.
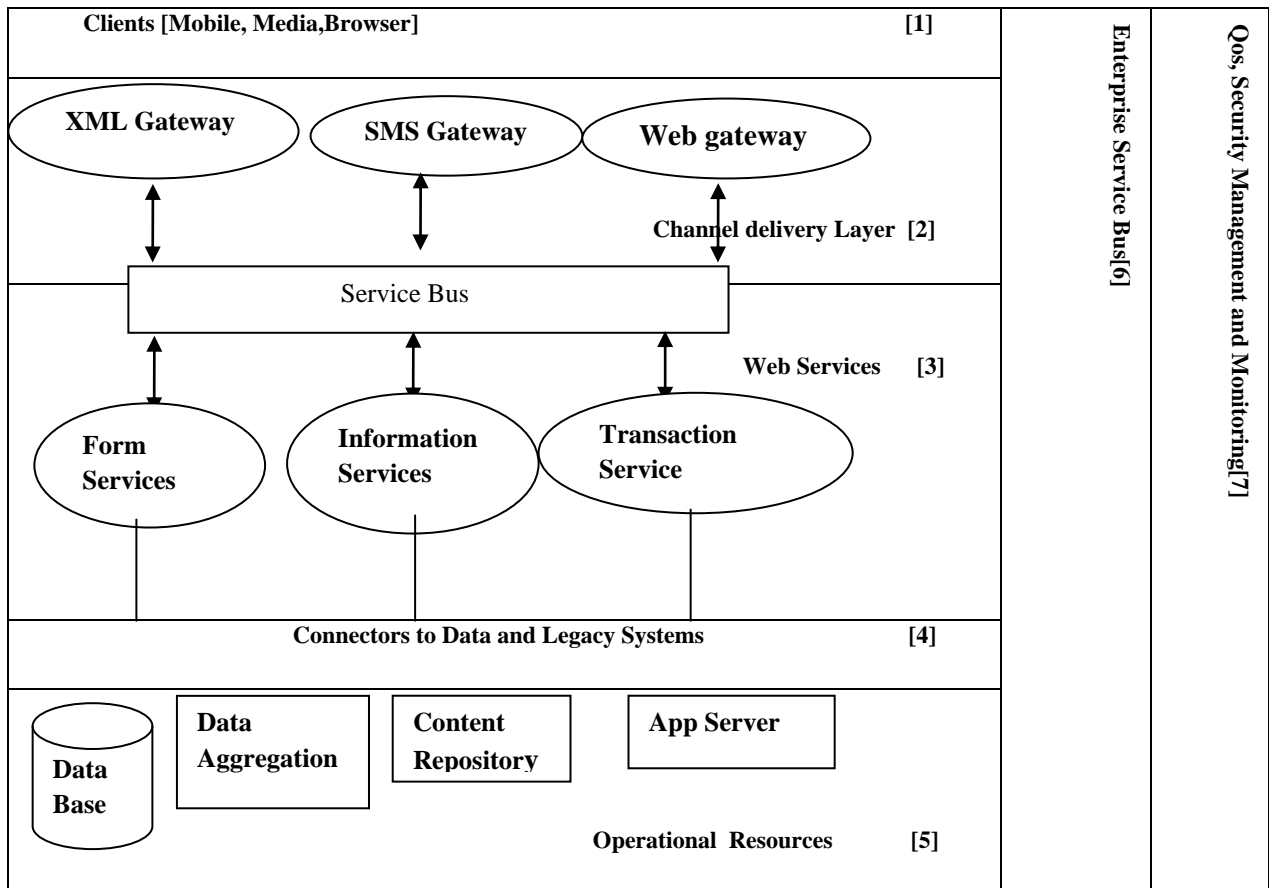
Figure 2

4. CONCLUSION

Service Oriented Architecture for e-governance provides the transparent governance to citizens by IT enabling various government organizations. Usage of SOA and web services optimizes the performance of government applications. The Service Oriented E-Governance based result transforms the existing applications and content into web services without reengineering the applications. We have offered the design of an architecture that can powerfully couple the envisioned Internet of Things infrastructure with government services. This approach is event-based and its interaction with external entities as well as inner communication is based on web services.

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