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## ESTABLISHING INTEROPERABILITY FOR E-SERVICES USING SOA

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### ABSTRACT

Interoperability means the ability of making the systems work together. Interoperability between e-services is important because the services provide benefits like easy access and also the coordination between the services at lower cost. Many meaningful services are provided to the citizen. Using service oriented architecture interoperability between different e-services is established so that it will be easy for the user to access different services through a single point though they are provided by different organizations.

**Keywords:** *Interoperability, Service Oriented Architecture*

### 1. INTRODUCTION

The concept of Electronic service (eservice) represents one important application of utilizing the use of Information and communication technologies in several areas. E-services are explained as:...deeds, efforts or performances whose delivery is transmitted by information technology. Benefits of E-services:

1)accessing a greater customer base 2)broadening market reach 3)lowering of entry barrier to new markets and cost

4)alternative communication channel to customers 5)increasing services to customers 6)enhancing perceived company image 7)gaining competitive advantages 8)potential for increasing customer knowledge . This definition reflects three main components-

service receiver, service provider and the channels of service delivery [7]. Example for service provider are public e-service, public agencies and for service receiver are citizens as well as businesses. The channel of service delivery is the third requirement of e-service. The main channel for e-service delivery is Internet while other classic channels like telephone, mobile phone, television, call center are also considered. Such an e-service is a public service mediated electronically through a user interface that is generally available. Example for e-service: EDD which offers the ability to manage payrolls tax account for the

employers online. Through third party access, the client's account of payroll agents can be accessed, which allows the payroll agent to maintain their client's accounts. The advantages of this service are that it is easy and secure way to manage payroll taxes and this service is available 24 hours a day. The features of this service are: firstly the employer has to register to the payroll tax for an account number and then the request for payroll taxes for certain time period can be made, payments can be done online, we can view our payments done, we can also update the information regarding our address or mobile numbers and so, and we can also inactivate the account when not required. The concept e-service is used for many services. This should probably mean that there is some common service component in such services [8].

Interoperability is the ability of a collection of communicating entities to (a) share specified information and (b) operate on that information according to an agreed operational semantics. In order to ensure interoperability across the public sector, the E-Government Interoperability Framework (e-GIF) has laid down the Technical Policies covering four key areas:

- Interconnection
- Data Integration

• Content Management Metadata □ e-Services Access. The ultimate test of interoperability is the coherent exchange of information and services between systems [10]. This means that it should be possible to replace any component or product used within an interface with another of a similar specification while maintaining the functionality of the system. To be e-Government Interoperability Framework compliant, a system must satisfy both requirements. India has been harnessing the benefits provided by the Information & communication Technologies (ICT) to provide homogeneous governance, interact with citizens more faster, and give them a efficient services and citizen empowerment through access the information.

There are different types of interoperability.

1. Syntactic interoperability – Syntactic interoperability is exhibited when two or more systems are capable of communicating and exchanging data.
2. Semantic interoperability – Beyond the ability of two or more systems to exchange information with shared meaning, semantic interoperability is used to interpret the information exchanged meaningfully and accurately in order to produce useful results as defined by the end users of both systems.
3. Cross-domain interoperability – Multiple entities i.e., social, organizational, political, working together for a common interest and/or information exchange.

A number of issues, some old and some new have arisen in e-governance Application, for example: The project implementation is generally vendor driven. Lacks of standardization like, same type of projects are carried out by different state agencies using incompatible file formats and application standards. Reverse compatibility of application with legacy systems are missing in several projects. The IT infrastructures are procured before building the application or digitizing the data. Physical security is spotlighted, whereas the application security and Logical is left to salesperson in many cases. Lack of understanding by the sectors, for the constituent of e-governance applications, which can be outsourced or can

be carried out in-house [5]. Despite the success of the project, the e-governance enterprise several hindrances like delay in project implementation, overall cost, financial practicality and financial sustainability along with technical bottlenecks and Integration with Government sectors and states. To conclude, the current e-government practice in India is project specific and implementation and integration differs from state to state and is not nation-wide.

### I. Existing System

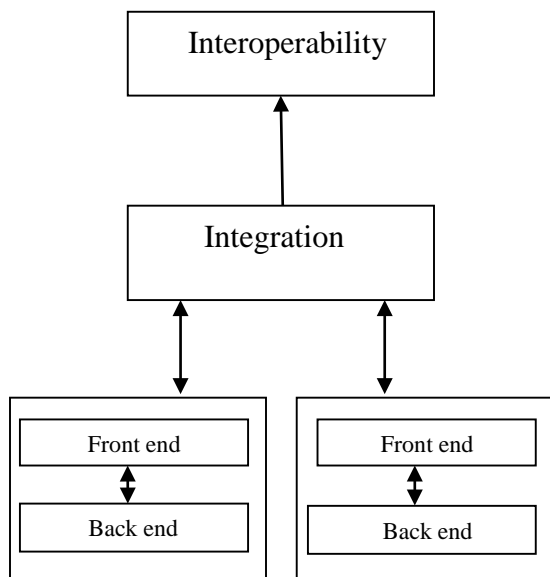
The below mentioned list will give the details about some e-governance projects that are presently working.

#### Existing E-Government systems:

Name	State Where Implemented
E - Seva (Electronic Seva)	Andhra Pradesh
CARD	Andhra Pradesh
Gyandoot	Madhya Pradesh
LOK MITRA	Rajasthan
Bhoomi	Karnataka

E-Seva project has been based on single location for the citizens by allowing them to make payments for using Governmental beneficial services. Through this service common citizens can now avail these services by walking into one of the centre across the cities or using the Internet from their home. Online payments have been enabled by means of payment gateways for which the state government has already tied up with several banks. It is being used for the payment of water, electricity, telephones bills, municipal taxes, and issuing of certificates for birth and death registration, passport applications and providing the transport department services. CARD (ComputerAided Administration of Registration Department) project included the complete computerization of the land registration process in the state. It is being used to record the sale and purchase of properties, power of attorney etc [3].

The Gyandoot project has been initiated in January 2000 by a committed group of civil servants in consultation with various gram panchayats in the Dhar district of Madhya Pradesh. Gyandoot is a low cost, community-owned rural online system. These are managed by rural youth selected and trained from amongst the unemployed educated youth of the villages [2].



There have been initiatives carried out by e-government agencies in the interoperability arena, which have produced the corresponding interoperability frameworks in different parts of the world. Though this concept of semantic interoperability for e-government is new but it's emerging very fast.

## II. Problem definition

Interoperability between e-government web services is an important issue. Its importance is not only to link up backend information systems but also to provide meaningful services to citizens. But heterogeneities at data, hardware and operating system level should be resolved so that a single access point to government services via web can be provided without having to modify the existing functionalities of information systems.

Consider one web service available at with 54 attributes that returns an address for a listed telephone number. Another service available at with 67 attributes that uses an address to provide demographic and logistical information. The collective data from these services can be to make some strategic marketing decisions. Problem is that output of these two services are not compatible and requires data conflicts at various levels (schematic, syntax and intention) can be resolved. Also user may want to customize the web services in various ways [4].

Interoperability is much more than the capability for exchanging data between systems. Also required is a shared understanding of that information and how to act upon it.

Interoperability is the ability of a collection of communicating entities to (a) share specified information and (b) operate on that information according to an agreed operational semantics [9].

The ability to exchange information is syntactic interoperability and the ability to operate on that information according to agreed-upon semantics is semantic interoperability; both are needed to solve the interoperability problem.

## III. Proposed System

SOA based on the web service technologies is a software architecture that particularly focuses on the issues of interoperability. It is an approach for designing new systems and wrapping existing systems in such a way that these systems can work together.

The most common form of serviceoriented architecture is that of web services, in which all of the following apply: [6]:

- 1) Service interfaces are described using Web Services Description Language (WSDL),
- 2) Payload is communicated using Simple Object Access Protocol (SOAP) over Hypertext Transfer Protocol (HTTP),
- 3) Universal Description, Discovery and Integration (UDDI) is used as the directory service.

Other than the above, the following three are required for work flow coordination,

- Web service transactions for destroyed results
- Web service security for finding related issues
- Web service reliable messaging

## IV. SYSTEM IMPLEMENTATION

To develop the CARD system various technologies are used. They are as follows:

### Service oriented architecture:

A service-oriented architecture is an architecture where independent systems communicate by using services. The communication can involve either simple data passing or it could involve two or more services coordinating some activity. Some means of connecting services to each other is needed.

For a service-oriented architecture to be effective, we should have a clear understanding of the term service. A service is a function that is self-contained and which may be composed of many other services.

Service-orientation is a way of thinking in terms of services and service-based development and the outcomes of services.

The components of service oriented architecture are:[5]

- Service Provider
- Service Requester
- Service Registry

#### Service Provider:

Service provider creates a web service or defines a service description for the web service and publishes it to a service registry also known as UDDI registry.

#### Service Requester:

The service requester using a find operation retrieves the service description locally or from the service registry and uses the service description (WSDL) to bind with the service provider and invoke or interact with web service implementation.

#### Service Registry:

This is a centralized registry which contains the list of available web services. Client uses this UDDI register to find whether the required web service is available or not. The service Provider can publish new Web services into the Registry. A contract can be established between service provider and consumer and UDDI registry acts as centralized medium to achieve it.

#### WSDL:

WSDL is a document written in XML. The document describes a web service. WSDL specifies the location of the web services. Usually a WSDL contains information about the service location, interface of the service and implementation details for the interface which are hidden from the user.

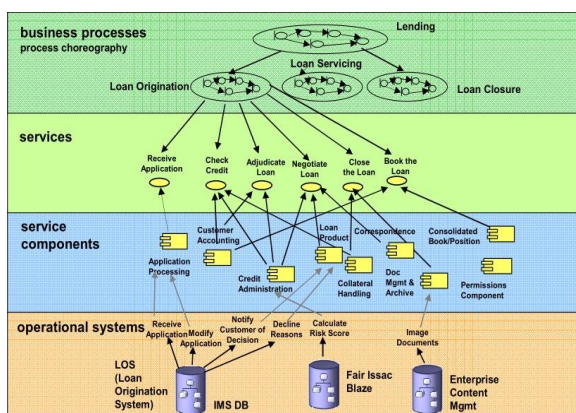
As a matter of fact, whether to go for SOA or to decide not to go for SOA is no more a question anymore. It is finally 'when to go for SOA?'. By the rapidly matured SOA implementations and awareness of the involved challenges and advantages, there is a rampant use of SOA in the path of the developing business enterprises. The department of information technology carries out their work with ease because of the SOA. It cleared the path for a shift from an application point of view to a process view. In the modern times the IT world enjoys a full length freedom where they can merge services of business from various applications in order to convey a genuine uninterrupted support to business processes. As the integration method of SOA generally the Web Services enable a loosely coupled components, the departments of IT can go for changing their applications without disturbing other applications. It has been observed that nearby in attendance is a rich shortage of hard testing and composite methodologies designed specially and particularly for SOA applications, though it has been progressively implemented as together top down and sometimes bottom up. It is better to validate and verify the applications that depend on concepts of SOA, and it is necessary to adopt new approaches and methodologies.

#### Web Services:

Web services can implement a service-oriented architecture. Web service is a software system designed to support interoperable machine to machine communication over a network. A web service is a software that makes itself available over the internet and uses a standardized XML messaging system.

The encountered problems with development of Web Services are:

- Its ontology building in itself is time consuming.
- The dynamic nature of the field. The exponential rise in the number of bioinformatics Web services over the past year required a further two months effort to maintain and extend the ontology.
- Lack of guidelines on how to build the domain specific ontology, or indeed how to relate it to upper level ontologies.
- Differing interpretation of the myriad of standards – SOAP, WSDL, UDDI, XML Schema etc.; and how they relate [1].



**Fig: Service Oriented Architecture Importance of SOA:**



## V. Conclusion

Service oriented architecture has emerged as the computing paradigm for developing large scale, distributed application by integrating existing pieces of software revealed as services. Most e-governance services employ a variety of disparate applications that store and exchange data in dissimilar ways and therefore cannot 'talk' to one another productively. Given this situation, in this project work, interoperability is provided as a cost – effective solution for uniting information distributed between different web services with heterogeneous databases. Furthermore, this project can support the convergence and reusability of the three categories of e-services (Web, P2P, Grid) by providing appropriate models and platforms.

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