An Analytical Approach for Large Scale Business Oriented Software Architecture

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Abstract - Information Technology has made itself essential for the day to day life of today's society. Almost all including individuals, Private sector organizations have been smart enough to get hold of the benefits of information technology.

In comparison to private sectors the government sector has however lagged behind to update all activities by using Information technology as the government infrastructure is very complex. Heterogeneous platforms, huge proprietary legacy applications and databases, varying rules and policies at National, State and Regional levels of government, changing political scenarios, non-uniform hierarchical organizational structures and responsibilities, localization problems are the reasons behind it. People are unable to get services, benefits as required in time due to manual procedures and inefficient communication systems. Redundancy and inconsistency of data also exists due to duplication of database records of citizens on standalone databases of various departments."Electronic –Governance i.e. e-governance can be defined as application the use of Information and Communication Technology to improve transparency, quality and efficiency of delivering services to the public. One of the aims of the e-government program is to use information and communication technology to provide government services to citizen in such a way that the citizen access it without being bothered about the structure of the government. He or she should be able to access the service from a single point of access despite the fact that fulfillment of the service may require inputs from more than one departments of the government. Attaining such a state requires interoperability of the government information systems with a strong coordination of all the organizations involved. The fulfillment of the e-Government visions of such an 'One stop' government service would dependent on increased vertical and horizontal integration of government operations and services [1].

Keywords - e-governance, Heterogeneous platforms, transparency, hierarchical.

I. INTRODUCTION

Interoperable e-Government would result in significant benefits, including: reduced costs of information collection and management through streamlined collection, processing and storage, improved decision making for policy and business processes, resulting in more integrated planning and enhanced government service delivery. improved timeliness, consistency and quality of government responses information will be easily accessible, relevant, accurate, and complete; improved accountability and transparency for citizens; reduced costs and added value for government through reusing existing information, sharing infrastructure and designing integrated, collaborative methods of delivering services, improved fraud detection and national security. The real constraint here is to entertain people by providing concrete information at a common place where varieties of information, communication policies, heterogeneous platforms are tied together what ultimately results with a problem called Interoperability.

Interoperability is" the ability of system units to provide services to and accept services from other heterogeneous systems and use the services to enable them to operate together. Even it is viewed by different researchers in different angles like; the ability of two or more systems or elements to exchange information and to use the information that has been exchanged, the capability for units of equipment to work together to do useful functions. the capability, promoted but not guaranteed by joint conformance with a given set of standards, that enables heterogeneous equipment, generally built by various vendors, to work together in a network environment. the ability of two or more systems or components to exchange information in a heterogeneous network and use that information. Interoperability means 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 [5], [6].

Some researchers and standard organizations attempted to define Interoperability more precisely that really clears up the in depth view of it by providing distinct definition for these three terms: Integration: E-Government Integration is the forming of a larger unit of government entities, temporary or permanent, for the purpose of merging processes and/or sharing information. E-government integration refers to the mainly non technical constraints in which technical interoperation occur. Interoperation: Interoperation in E-Government occurs whenever independent or heterogeneous information systems or their components controlled by different jurisdictions/administrations or by external partners smoothly and effectively work together in a predefined and agreed upon fashion. Interoperability–e-Government interoperability is the technical capability for e-Government interoperation.

II. RELATED WORK

The interoperability problem has not been addressed comprehensively in the software applications of public sectors. Suggested interoperability frameworks are full of policies and management statements, without analysis of potential heterogeneities, which might be crucial for approaching the interoperability problem. With reference to past analysis on what interoperability is and what its concerns are a good methodology for the development of an interoperability framework must be defined taking into account: (1) the different components identified in the enterprise application (processes, data/information, communication and resources), (2) the three interoperability domains (Enterprise Modeling, Architectures & Platforms, and Ontologies), and (3) enterprise business levels (strategic, tactical and operative).

In this paper we introduce a methodological approach that will be the first step in the definition of a methodology for the development of an integrated Interoperability Framework [23].Bases of the Proposal : Taking into account all the interoperability concerns and their classification as described in Section 2 an Interoperability Framework should include:- Procedures where the partners, current and future ones, can easily and what to do to interoperate considering the EM domain.- Policies and regulations about the use of the data and the information shared. Ontologies, where terminology can be clarified for all the stakeholders.- Utilities to easily establish collaborations that do not mean extra or high investments.- A repository of specific tools and methods that can easily support the interoperability project.- Exchange utilities and tools to communicate IT structures and platforms. The main goal of the proposal is to define a process guide that supports enterprises to develop this framework that will promote and sustain other enterprises to interoperate with them. The proposal is structured in five processes. For each one a brief description, goals activities, and results are defined. In order to implement the framework the idea is to develop a web portal where potential partners would query about the procedures to be applied, the methods and tools that can be used to establish the interoperability and the ontology to support the achievement of full interoperability. Processes of the Methodology: The processes defined range from an initial process, where the conceptual aspects and strategic requirements are identified, through design and implementation, to, finally, the use and the maintenance process that covers the needs that any engineering project will generate [24].

Process 1: Definition of Conceptual Aspects. The first process is focused on the identification of the main goals that an enterprise sets up to achieve by developing a framework that eases establishing interoperability with other enterprises.

Process 2: Identification and Classification of Current and Future Interoperability Situations. The identification of current and potential partners must be based on the goals defined in the previous process. New aspects can be added in the previous results, when specific partners are analysed.

Process 3: Design of Procedures and Platform. This process will include the design of user procedures, business processes, data bases, and specific platforms for each of the situations identified in Process 2, taking into account the three domains and the three enterprise levels.

Process 4: Implementation of the Interoperability Framework. Taking into account the design results from the previous process, the platform to support the interoperability framework must be implemented. In this process technologies available must be evaluated and the viability study must be considered.

Process 5: Use & Maintenance. The use of the platform will provide feedback in order to improve and to enlarge the interoperability situations and requirements. New conceptual aspects may appear, new ontological concepts must be added or reviewed and new techniques, tools will be proposed to improve the framework.

The main objectives of this study are to verify the importance of interoperability in large scale business software architecture that helps in efficient e-governance activities and to propose an integrated interoperable frame to support it.

III. SYSTEM MODEL

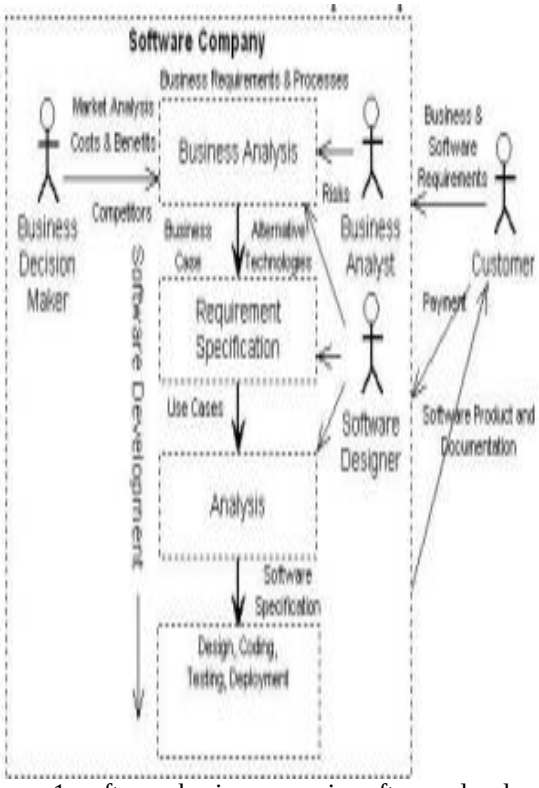

Figure 1: software business case in software development process

Phase 1: A business analysis is the first step in establishment of requirements. A business analyst collects all relevant business requirements, software requirements, and possible descriptions of customer's business processes

into a business case document. A business decision maker, for example, a production manager supplements the business case document with e.g. a market analysis, a cost & benefit analysis and information about direct and indirect competitors. A software designer can provide a business case with his/her view on alternative technology choices.

Phase 2: A business analyst and a software designer translate business requirements into software requirements using use cases of UML [11]. Later in software projects UML use cases are useful in identifying reusable functional modules for a new system, and deriving and organizing test cases. The business case should be an open document for all software project members and it should remind workers during the project of the things that create value for a customer.

Phase 3: In the analysis phase, use cases are analyzed in more detail including preconditions, post-conditions; basic, alternative and exceptional flows.

Phase 4: The development process continues with design, coding and testing. Finally, the software and documents are deployed to the customer including in most cases installation and training services. The customer checks whether the product or a project has met all required business requirements.

IV. TECHNICAL PRELIMINARIES

The architectural development plan that the application integration architecture describes need to be applied to define a coarse-grained system architecture design that addresses the following issues: system boundaries that separate the system focus from its supporting environment, interfaces that clearly identify structural and behavioural dependencies between services, higher-level assemblies of services through a component mechanism. The application integration architecture defines a development plan that guides the development of a coarse-grained architecture, whose purpose it is to provide an abstract, logical integration layer and its link to a supporting platform. We propose an integration architecture development method in three steps:

1. Architecture identification and service types,
2. Service-based integration,
3. Logical architecture identification.

The first step refines the initial service classification from the application integration discussed in section 3 and adds necessary software architecture and system-related information. Essentially, the business-centric notions of process and activity have to be reinterpreted as software system-specific concepts, i.e. this is a change of focus from computation-independent to platform-independent architecture modelling and further on to platform-specific implementation

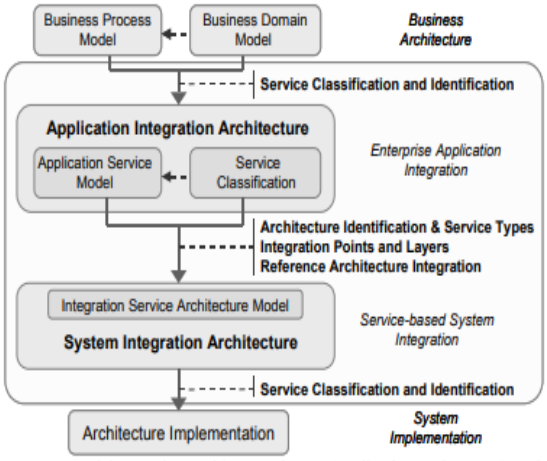

Figure 2: Architecture activities with transformation stages.

I.

V. CONCLUSION

Analysis of interoperability properties such as Data Interoperability, organizational Interoperability, platform Interoperability, networks Interoperability with the Designing of interoperable frame work for one- stop application. Implementation of the framework in an integrated form in both open source and eclipse based framework. Evaluation of utility. Some of the highlighted methods are taken into account like sector level and cross sector level interoperability for effective frameworks.

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