Chapter 1 E-Government Systems Development Methodologies, Tools and Platforms

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ABSTRACT

The analysis of e-government initiatives of various countries shows that the development and deployment of e-government systems for effective online service delivery to citizens remain a key priority in e-government development. On the other hand, given the complex nature of the public administration system with several departments and agencies, thousands of legislations and operating procedures, added to the high number of technologies needed for developing e-government systems, there is a need to learn about the software development practices in e-government. This chapter provides an overview of the methodologies, tools and platforms for software development processes of e-government systems. Firstly, the state-of-the-art software development practices in e-government are reviewed. Secondly, the methodological approaches employed for developing e-government systems including stage of growth models, agile software engineering and Semantic Web techniques are presented and illustrated with real world case studies for their application in e-government projects. Thirdly, the tools and platforms used for the analysis, design, implementation and deployment of e-government systems including traditional software engineering tools and platforms, Semantic Web ontology languages and platforms, database management systems and semantic query languages are analysed and discussed in detail. Finally, the state-of-the-art of e-government systems integration techniques are reviewed and discussed.

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INTRODUCTION

An analysis of e-government initiatives of countries with successful e-government implementation such as Australia (Teicher & Dow, 2002), Singapore (Devadoss et al., 2003), Taiwan (Sang et al., 2005) and the United Kingdom (Beynon-Davies, 2005), shows that the development and deployment of e-government systems for effective online service delivery to citizens remain a key priority in e-government development. On the other hand, given the complex nature of the public administration system with several departments and agencies, thousands of legislations and operating procedures, added to the high number of technologies needed for developing e-government systems, there is a need to learn about the software development practices in e-government.

The current trends in e-government software systems development is geared towards the building of a single government web portal also called one-stop e-government portal (Wimmer, 2002). One-stop portals enable seamless citizens' access to relevant government services, without visiting each autonomous website of government departments and agencies to access these services. In other words, the building of a one-stop portal requires e-government services across all government departments and agencies to be reengineered and integrated at a single access point. Then, when citizens request a service at the access point, all the required information is automatically gathered from various government entities integrated through the access point, to accomplish the requested service. This is transparent to the user (citizen) as he/she is not aware of the back-office operations such as services composition, merging, etc. that are performed to satisfy his/her request. Several one-stop e-government solutions have been proposed in the literature (Chatzidimitriou & Koumpis, 2008; Gouscos et al., 2002; Feldkamp et al., 2008). Chatzidimitriou and Koumpis (2008) present a one-stop e-government solution based

on life-events or citizen's needs. The architecture for one-stop e-government services delivery is presented in Gouscos et al. (2002), whereas, the Switzerland one-stop e-government model is described by Feldkamp et al. (2008). The main challenge in building an efficient and interactive one-stop portal is the ability to integrate and interoperate various heterogeneous systems from different government departments and agencies. From the software development perspective, Web service standards and semantic technologies (Muthaiyah & Kerschberg, 2008) are currently employed to address these issues. At present, a number of countries have one-stop e-government portals.

E-government development broadly requires: (1) a legal framework that regulates the process, (2) the infrastructure and technologies for developing and deploying real world e-government applications for online service delivery to citizens, businesses and organizations, and (3) the readiness of citizens to embark into e-government. Thus presented, e-government development in a given country is a huge and complex task. To address this complexity, over the years, many companies and organizations (Deloitte & Touche, 2001; United Nations, 2003) have developed maturity or stage of growth models which provide a stepwise manner for adopting e-government through iterative stages. Meanwhile, traditional software engineering methodologies including structured analysis and design, object oriented and agile methods have been applied to develop e-government systems worldwide. And more recently semantic web technologies have emerged as useful tools for developing e-government software systems (Muthaiyah & Kerschberg, 2008). The following sections provide details on how the abovementioned methodologies and technologies have been used in e-government, the tools and platforms employed, as well as, sample case studies of their applications in different countries around the world.

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