Chapter 1
Service-Oriented Architecture for Developing Web-Based Applications for Connected Government

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ABSTRACT

Connected Government suggests provisioning of a government's services to its citizens using the Web and communications technologies employing the latest software development paradigms and related methodologies. This also requires appropriate integration of, and interaction between, software applications and e-services developed by various government departments as well as the other influencing sectors of the society such as commerce. This is especially so as the connected government (c-government) applications require open, flexible, interoperable, collaborative, and integrated architecture to provide services for the emerging technologies such as mobile, cloud, and big data. This, in turn, suggests a robust and standard mechanism to develop such applications and services. In this context, Service-Oriented Architecture (SOA) is an attractive approach to adopt. SOA has already been proven successful in providing such a framework for delivering software applications as services with flexibility and multi-platform and multi-channel integration that are necessarily required for c-government application offerings. This chapter provides a discussion of the SOA paradigm and the associated citizen and administrative requirements. The chapter also presents a service-oriented architectural framework based on a set of evaluated application characteristics that support newer technologies. A number of service-component models have also been proposed that provide required customisation, reuse, flexibility, and extensibility. In the context of the proposed overall service-oriented architecture, a large-scale sub-system that the authors term "e-Taxservice" has been used as a case study. The study has a service design that has been validated against a set of key service quality attributes.

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INTRODUCTION

Electronic Government or e-Government aims at a citizen centred vision of a government that provides effective governance, increased transparency, improved management, effective processes and efficient services through the use of the Internet and ICT (Information and Communication Technologies). It is about harnessing the information revolution to improve the lives of citizens and businesses and to improve the efficiency of government policies and implementations (Borras, 2004). In this context, e-Government is an enabler for better governance, where technology is used as a strategic tool to modernise structures, processes, regulatory frameworks, human resources and the culture of public administrations to increase public value (Centeno et al., 2004). Ultimately, the goal is to enhance interaction between three important components of a society: citizens (i.e. general public), government (including other agencies and employees) and the business sector.

Connected Government or c-Government takes a step further and attempts to ensure a much better interaction between the government and the governed through the use of newer computing technologies such as Web 2.0, social media and various mobile technologies and devices. This is sometimes also referred to as Government 2.0.

Interaction between the government departments and the citizens is carried out through the provision of electronic services (e-services) over the Internet that are then consumed by the general public, other government agencies and various other sectors of the society. These services implement the required functionality for the users to make use of e.g. a citizen can use these services to file income tax return electronically or purchase an item online or cast his/her vote using mobile telephone, etc.

These services are software applications developed by governmental agencies as well as the other sectors of the society e.g. financial sector, health organisations etc. Often, there is a need to integrate such applications e.g. certain border agency services to be linked to the police enforcement applications. In this case, it is important that the integration is seamless and interface such that the output from one application is easily and correctly read by another application without further human intervention. It then becomes imperative that the design of such software applications conforms to certain set standards that all agencies, especially the federal and local governments, adhere to. Service Oriented Architecture (SOA) is one design approach that can be effectively used. Component based design is another and there are many variations of these. The core benefit of such architectural styles is that the basic programming unit is a *service* or a *component* that is fully cohesive but functionally independent and self-contained. These units can be built with interactions with latest technologies and devices that can be easily constructed and modified as required; besides, these units can be orchestrated and linked relatively easily.

In this chapter, we first present the concept of SOA and then discuss an SOA based framework for Web applications development. The chapter also proposes a number of service component models that provide required customisation, reuse, flexibility and extensibility. To illustrate the effectiveness of the suggested technologies, a large scale sub-system that we term as e-Tax service has been used as a case study for services design which has been validated against a set of key service quality attributes. In the chapter, e-government and c-government terms are sometimes used interchangeably.

SERVICE ORIENTED ARCHITECTURE (SOA)

Service Oriented Architecture (SOA) is an architectural style for developing and integrating large applications. It is an organisational and technical framework to enable an organisation to