


Comprehensive Approach to Implement E-Government Backend in Jordan Using Service-Oriented Architecture

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ABSTRACT

This paper proposes a comprehensive approach to implement and deploy a backend middleware for e-government in Jordan using service-oriented architecture (SOA) and enterprise service bus (ESB). The proposed approach takes into consideration a full overview of needed e-services as well as all stakeholders communicating within e-government environment. The paper describes the high-level architecture of the proposed approach and then goes deeper to describe the internal implementation of the middleware and its layers. Finally, the paper addresses some deployment issues and proposes a deployment architecture to overcome these issues.

KEYWORDS

E-Government, E-Services, Enterprise Service Bus, Service-Oriented Architecture, Smart-Government

INTRODUCTION

According to the World Bank, “E-Government” refers to the use of information technologies (such as Wide Area Networks, the Internet, and mobile computing) by government agencies that have the ability to transform relations with citizens and businesses. These technologies can serve a variety of different ends: better delivery of government services to citizens, improved interactions with businesses and industries, citizen’s empowerment through access to information, or more efficient government management. The resulting benefits can be less corruption, increased transparency, greater convenience, revenue growth, and/or cost reductions (“Topics”, 2020).

Jordan is moving toward e-government implementation in consistent steps and many achievements have been added during recent years, but there is still great potential for improvement and enhancement, including by adding new e-services as well as improving existing ones. Theoretically and technically, implementing government services and publishing them online (e-services) highly facilitates operations for both government and citizens as well as residents, visitors or business organizations, however e-government adoptions often fail due to a lack of appropriate technical facilitation and support or a lack of sensitivity to user needs. Nevertheless, the ultimate adoption of e-services in

DOI: 10.4018/IJSI.2021040107

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government is inevitable due to greatly increased ease of use, saving time and money, increasing government transparency and improving government efficiency and performance.

Implementation of a full e-government solution requires great skill and planning, involving a huge amount of integration between government ministries and agencies, business organizations, charities, banks, and other entities. E-government interacts with many stakeholders via three main channels: government to government (G2G), government to business organizations and investors (G2B), and government to citizens, residents and investors (G2C).

This paper proposes an approach to facilitate backend integrations for e-government in Jordan. Based on enterprise service bus (ESB) middleware, which acts as the heart of the e-government backend. This ESB sits in the middle of all transactions which take place inside the e-government, as it receives requests from e-government portal website or from other entities and routes them to the appropriate backend entity or component.

BACKGROUND

(Al-Omari, 2006) provided a comprehensive analysis of e-government in Jordan, explaining its architecture, main concepts, objectives, most common applications, famous worldwide experiences and status in Jordan. His study presented the experiences of countries like USA, the UK, Singapore, UAE and Egypt and proposed a simplified model for some Jordanian E-Government Portal Online Services (Al-Omari, 2006). (Mohammad et al., 2009) reviewed e-government concepts in information society, especially focusing on the e-government project in Jordan. They also viewed some of strategic and technical challenges and risk factors affecting the development of electronic government and gave some suggestions to overwhelm consequences of these difficulties (Mohammad et al., 2009).

(Shannak, 2013) studied the difficulties and possibilities of e-government in Jordan by exploring the realities of e-government as experienced in the country, examining the challenges and complexities of its implementation in the context of Jordanian society. (Al-Khanjari et al., 2014) proposed a low-level e-Government architecture based on service oriented architecture (SOA), which achieved seamless e-government interoperability. (El Benany et al., 2015) suggested an architectural framework for interoperability and data integration in Morocco based on SOA, in which they used enterprise paradigm to attract more citizens to use the platform.

(Al-Khanjari et al., 2014) proposed a Census Web Service, a web application that interacts with other web applications based on the SOA across various e-government applications to share citizens' data. It consists of three layers: web service provider, service broker and web service consumers. Table 1 summarizes work related to implementing e-government architectures, showing e-government service types, architectural styles, and quality attributes.

THE PROPOSED METHODOLOGY & IMPLEMENTATION

This section explains the methodology and implementation of the design in detail.

Proposed Methodology

The choices of implementation technologies and architecture are the most fundamental factors in the success of any IT project. There are plenty of both commercial and open source programming languages and frameworks that can be used to achieve the target, thus some skill and detailed consideration is required to consider the available options and make the most appropriate decisions in choosing a language or framework, including project framework complexity, size, nature, single or distributed components, security implementation, flexibility and scaling etc., considering a potential learning curve and the potential availability of specialized resources. For example, one could build a user interface using Angular, Asp.net, Oracle ADF, or Primefaces. However, one will find that ADF

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