A Multiagent Service-Oriented Modeling of E-Government Initiatives

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Abstract

The recent technological developments have led to the emergence of a wide range of operational scenarios and significantly affected the formulation and implementation of e-government initiatives. While the failure of many e-government initiatives is attributed to many factors (organizational, institutional, technological and structural), the lack of consistent e-government modeling frameworks and universal architectures threatens the capacity of such initiatives to meet their objectives. Because of the complexities experienced in addressing e-government implementation issues, the use of multiple techniques can improve the likelihood of developing and implementing successful e-government initiatives. This article builds on previous work to advocate a “coupled” multiagent service oriented model for the implementation of the e-government initiative in Sudan. The use of service oriented measures and concepts of agency are considered to be necessary for improving overall consistency, integration, promptness and information sharing. Despite its potential benefits, the capacity of the proposed “coupled model” is contingent, among others, upon technological maturity and institutional flexibility.

Keywords: e-government; model coupling; multiagent systems; service oriented architecture

Introduction

The use of the Internet and other related communication technologies has led to the emergence of multiple business models and dictated new axioms for information acquisition, sharing, and utilization. The increasing use of technological platforms is directly related to the emerging organizational transformations, and the growing importance of deploying universally enacted applications to improve the efficiency, effectiveness, and data quality in public and private organizations. Such applications range from electronic document interchange, through e-learning, e-business, e-commerce, e-banking to corporate models of e-government.

The last couple of years have witnessed an expanding deployment of e-government initiatives and applications at different scales. The emphasis, at the abstract level of analysis, continued to be on the use of information and communication technologies in public administrations (following customer-centered perspectives) to strategically enhance accessibility and delivery of government information, public services, and democratic processes to citizens, businesses, government employees,
and other agencies (Hernon, Reylea, Dugan, & Cheverie, 2002; Andersen, 2004; Seifert, 2002; European Community, 2003; Hangen & Kubicek, 2002). The use of such a pool of technologies also reflects the existence of a wide range of institutional, structural, technological, and personnel-related factors.

The majority of e-government initiatives are aimed at improving government processes by cutting process costs, managing process performance, making strategic connections in government, and creating empowerment within the government architecture. Accordingly, connection between governments and citizens (and other stakeholders) can be improved (Hussein, 2006; Richard, 2001). In addition, the interactions associated with the use of such a rich pool of organizational and technological platforms in e-governance, creates a “task-oriented” forum of engagement between governments and other stakeholders (Davies, 2002; Paul & Thompson, 2004; Kim & Henriksen, 2006; Traunmüller & Lenk, 2002).

However, the increasing deployment of e-government applications neither means that governments and citizens will gain the “promised” benefits, nor that the level and magnitude of “downside” risks can be assessed. Estimates about the performance of existing applications in different countries show that almost 85% of the e-government systems are been regarded as totally or partially operational failures irrespective of their technological buildup. Such failure has been attributed to the lack of leadership and strategic thinking, technological infrastructures that facilitate accessibility, connectivity and network readiness, institutional infrastructures that secure an e-business climate, population e-aware, human capital, and legal infrastructure that maintains trust, information security, and privacy.

Successful implementation of e-government initiatives depends not only on the availability of resources, but most importantly on the adoption of appropriate implementation-oriented paradigms that describe the growth and evolution of e-governments. To avoid failures, such modeling paradigms must be practical enough to guide the implementation, monitoring, and maintenance of the entire e-government initiative. In addition to the growing percentage of failure of many e-government applications, the importance of focusing on the development of practical models and architectures originates also from the importance of managing the complexity associated with electronic interactions.

The main objective of this article is to address the context of e-government modeling by investigating architectural issues, taking the e-government initiative in Sudan as a case study. The chapter emphasizes the need for an integrated architectural approach for the management of distributed e-government services by coupling service-oriented architectures with multiagent technologies. While the second section of this article presents relevant literature in e-government development architectures, the third section discusses service-oriented concepts. The fourth section reflects on the e-government initiative in Sudan, with more focus in the fifth section on the process of coupling multiagent technologies with service-oriented architecture to be used for the development of the “coupled model” described in the sixth section. The seventh section addresses the advantages of the coupled model for the case study, potential limitations, and modifications with some conclusions provided in the eighth section.

E-GOVERNMENT DEVELOPMENT ARCHITECTURES: RELATED WORK

The importance of developing appropriate architectures is dictated by their importance for process identification, stakeholders and partners, attitudes and preferential matrix, connection management, resource utilization and monitoring. However, easy access to the Web has created the possibility for new business models and resulted in growth and evolution of multiple computing architectures, programming languages, and development approaches (Craw-
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