Supporting Effective Operation of E-Governmental Services Through Workflow and Knowledge Management

Dong Yang, Lixin Tong, Yan Ye, and Hongwei Wu

Department of Industrial Engineering, Shanghai Jiao Tong University, 200030 Shanghai, China
{dongyang, culizn, yeyan, hom}@sjtu.edu.cn

Abstract. The improvement in efficiency of governmental administrative processes is a key to successful application of e-government. Workflow technology offers such a mean to realize automation of business processes. However, it is inappropriate to employ workflow technology alone for automating governmental processes that are typically of knowledge-intensive characteristics. In this paper, we study an approach of automating or semi-automating e-governmental processes by combining workflow technology and knowledge management, especially semantic web technology such as OWL, SWRL. The proposed approach can be classified into several parts: (1) The government processes are modeled using UML activity diagram with extended UML profiles. (2) The Problem-Solving-Method (PSM) tasks are represented with OWL-S. (3) The application ontology for applying for social security cards is developed in OWL. 4) Based on the proposed approach, the architecture of knowledge-driven e-governmental processes management system is presented and a prototype system is implemented using workflow engines, Jena and JESS.

Keywords: Knowledge-intensive business processes, e-government.

1 Introduction

Electronic government aims to enhance the efficiency of governmental administrative processes, improve qualities of government services and reduce operational costs through application of ICT (Information and Communication Technology) technology. With the prosperity of ICT, especially the Internet, recent years almost all government agencies around the world have set up their own websites or portals to promote communication between citizens and them, trying to serve best for their customers. It is estimated that until July, 2005 the number of websites built by government agencies at all levels in China amounts to 16000, increasing at the rate of 14.6 percent a year [1]. These websites or portals in China mainly present static information such as information publishing and guidelines for specific services to citizens. Additionally, interaction channels such as message boards and online feedbacks are offered to collect from citizens and enterprises feedbacks and advices on operation of services. Furthermore, some information integration means such as
central databases are adopted to eliminate the information islands existing among applications within government agencies. For example, Shanghai, the largest commercial city in China, has established a central database called CIS (Shanghai Citizen Information System) to realize the consistency of citizen data among government agencies.

However, several weaknesses exist that hinder the development of e-government in China. Firstly, most government agencies fail to provide a mechanism for citizens or enterprises to track the progress of the cases or services for which they apply, such as granting full old-age pension. Second, the internal processes within government agencies are not streamlined. An obvious example is that much time was wasted passing documents or information manually between the tasks of the fragmented processes. Thus, up to now the automation of e-government processes has not been indeed achieved. The current strategy to implement e-government in Shanghai by the construction of a central database is not enough to exploit the potentials of electronic government.

To better serve citizens and automate government processes, a perspective of citizen-oriented, processes-center integration is needed. Workflow technology has been proven to be effective in integrating or automating business processes and production processes (such as ERP) [2,3]. Nevertheless, automation of governmental processes by employing workflow technology alone is inappropriate. The reason for this is that e-government processes differ essentially from business processes in that they are knowledge-intensive processes [4,5]. The knowledge-intensive processes are characterized by frequent dependencies on knowledge such as regulation and rules to fulfill tasks, and they can be identified by high complexity of processes and high intensity of knowledge [5]. The typical knowledge-intensive processes are order configuration, new product development, market sales, etc. In the context of e-government, government administrative processes often involve a kind of knowledge-intensive tasks that are identified in the CommonKADS [6] as PSM (Problem-Solving-Method) tasks. The example PSM tasks include assessment, configuration, diagnosis, etc [6]. A variety of PSM tasks exist in the context of electronic government processes, such as assessment of full old-aged pension, the classification of legal cases. However, the means for automating these tasks and thus improving processing efficiencies of these tasks still lack. Although Workflow technology offers a way of automating or semi-automating business processes, only normal, well-structured tasks are supported. To effectively automate or manage overall e-government processes involving both normal and knowledge-intensive tasks, the combination of workflow technology with knowledge management is indispensable to achieve this goal. In this paper, we discuss the undertaken project, KD-GPMS (Knowledge-Driven e-Government Processes Management System), aiming to develop a novel approach to the automation of e-government processes by leveraging workflow technology to manage the overall processes and semantic web technologies to realize automatic reasoning of PSM tasks.

This paper is organized as follows. Related work is summarized in next section. The motivation of this paper is described in section 3. In section 4, we present the approach of modeling e-government processes in UML activity diagram with extended UML profiles to support the modeling of the knowledge-intensive tasks. The construction of e-government application ontology using OWL and the