Chapter 34
An Ontological Business Process Modeling Approach for Public Administration:
The Case of Human Resource Management

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ABSTRACT

In this chapter, an electronic model of Public Administration's operation using an ontology as a means to a formalized representation of knowledge is presented. According to the proposed model, every public administration procedure is viewed as a service offered to some external entity and is represented as a (Semantic) Web service, semantically annotating its functional parameters, profile, and workflow. The modeling of public administration services/procedures involved the commonly used IOPE (Inputs – Outputs – Preconditions – Effects) model of OWL-S for Semantic Web Service description. This chapter also presents a specific use case about the Human Resource Management department of the Region of Central Macedonia. In order to do so, certain extensions/adaptations of the general methodology were needed. In this chapter the authors fully present and justify these adaptations that were deployed in order to turn the general methodology into a really flexible and re-usable tool to model any public administration procedure. Furthermore, the authors describe the full knowledge engineering cycle for developing the ontology of this department's business processes.

INTRODUCTION

The main objective of e-Government is the development of user-friendly and efficient services for citizens and businesses. Semantic interoperability between public administration (PA) procedures of different governmental agencies, as well as between public administration's procedures and citizens' and businesses' understanding of them, is a vital issue to solve within this domain. Public organizations produce daily a great volume of administrative documents, in order to fulfill their mission, which is to serve citizens and businesses adhering to constitution and laws. This requires the use of certain procedures incumbent on law provisions and executives' experience. Web powered semantics could help the e-Gov by engineering inter-operable PA procedures, facilitating the performance of daily routine procedures and helping inexperienced civil servants with new tasks, leading "knowledge based government, in a knowledge based economy and society". Knowledge is now a major driving force for organizational change and wealth creation, and effective knowledge management is an increasingly important source of competitive advantage and a key to the success of modern organizations.

In order to capture knowledge that is inherent in PA's operation and procedures, a formal representation framework, such as ontologies, is needed. Ontologies (Staab and Studer, 2009) have been proposed as the main means to capture semantics and organize information in the (semantic) web (Berners-Lee et al., 2001), since they provide a formal description of concepts, terms, and relationships within a given knowledge domain. An ontology provides a shared vocabulary, which can be used to model a domain - that is, the type of objects and/or concepts that exist, and their properties and relations. In addition to describing a domain, an ontology is also used to reason about the entities within that domain.

Business Intelligence (BI) refers to technologies, applications and practices for the selection, integration, analysis and presentation of operational information. The future trend is the expansion of BI applications to more users inside and outside of an organization and a shift to a further automation of the decision making processes. Business Intelligence covers a broad area of practices that can be used in order to improve efficiency and effectiveness of many internal procedures in an enterprise. In the end BI will aim to the big mass of the end users of the enterprise applications which today are not available to them. Intelligent automation of procedures is called Intelligent Process Automation (IPA) (IDC, 2006). IPA is the merger of BI and of the technologies of operational procedure management. It is an automation of the repetitive operational decisions (not the strategic ones). Formal process modeling is needed in order to efficiently address the problem of representing, analyzing and managing knowledge about an organization and its processes (Koubarakis and Plexousakis, 2000).

In this chapter we describe our proposal which envisions an electronic model of PA's operation in a certain field with a possibility of reuse in lots of applications. Ontologies can be a means to the representation in a formalized manner of knowledge fields as they can capture knowledge and provide a commonly accepted conceptualization which can be reused in a variety of applications and by a variety of people. They can provide a common vocabulary of a field and define with different levels of formality of the terminology and the relationship between different entities. Thus knowledge can become a shared property.

The vision of web services is the description of services using semantics understandable by computers. Semantic annotation is a critical point in order to automate retrieval, composition and execution of services. Ontologies are used to help web service technology to be realized worldwide. OWL-S is a representation language of the different characteristics of semantic web services (Martin et al., 2007). OWL (Web Ontology Lan-

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