OntoMetaWorkflow: An Ontology for Representing Data and Users in Workflows – Extended Abstract[1]

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Abstract. Administrative processes are a type of business process commonly used in public institutions and large companies. These processes are frequently reused because there are often similar processes within the organizations. The use of ontologies for modeling the workflows of administrative processes can provide significant improvements in this reuse process. In this paper, we describe OntoMetaWorkflow, a generic ontology to represent canonical workflow terms in the domain of administrative processes.

Keywords: business process, administrative process, workflows, ontologies, WEAPON.

1 Introduction

Administrative processes are generally used in administrative or legal ambits. They are characterized by being initiated by a user and which must be attended to or evaluated by other different users following a perfectly defined protocol for data, times and agents involved. These processes are often defined generically in the level of management of the organizations but must be reused in the lower levels in order to be applied in them. Examples could be the management of public contest bids, loan application procedures or a simple holiday application.

They can be managed by simple Workflow Management Systems (hereinafter referred to as WfMS) with features that facilitate to share and reuse this type of process. The use of ontologies as a basis for this type of WfMS could be very useful due to their characteristics of complete and precise representation of terms.

An appropriate case of application to reuse processes is the WfMS model based on ontologies was proposed in [1]. This model provided a generic ontology described in [1] as the basis of workflow representation. We have restructured the ontology and the WfMS model to improve the reuse process.

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This paper is structured as follows: section 2 enumerates works that use ontologies in WfMS, section 3 presents a brief description of the redefinition of the WfMS [1], now called WEAPON (Workflow Engine for Administrative Processes based on ontologies), and, section 4 describes the new ontology, called OntoMetaWorkflow.

2 Use of Ontologies in WfMS

The application of ontologies to WfMS have been used previously in several approaches as [2,3,4,5] and a recent survey is available in [6].

Unlike the previous approaches, this paper presents an ontology for representing administrative processes together with their activities, domain data and users involved. Although several models and languages of workflow representation exist [7,8], the application of ontologies can provide the following advantages:

- The users, following methodologies for building ontologies, can obtain complete, precise and shared definitions of administrative process workflows.
- The data and the users of a process can be changed without modifying the definition of the data managed by activities or the definition of the workflow.
- Workflows represented in ontologies, are more easily reusable although the reuse process may involve some effort in the search, selection and, in some cases, adaptation to the new system.

3 WEAPON: Workflow Engine for Administrative Processes based on Ontologies

WEAPON is a WfMS that proposes how a workflow designer must define, on one hand, the taxonomy of relevant data of the domain and the taxonomy of users which can participate in the workflow and, on the other hand, the activities that the process contains together with the identification of which type of user defined can perform them and the data managed by every activity. WEAPON uses ideas of ontology field together with ideas of traditional WfMS and the Case Handling approach [9].

The architecture of WEAPON presents a series of interrelated components (a graphical representation is available in [2]). These components are:

1. OntoMetaWorkflow[3], contains the terms that form the workflows of administrative processes and their relationships. This ontology, represented in OWL Language, is built adapting the definitions of workflow elements provided by the WfMC [10] to the specific characteristics of administrative processes. It has been developed following the METHONTOLOGY methodology [11].
2. OntoDD, an ontology of the domain data and workflow participants built following the specifications of OntoMetaWorkflow. It imports the concepts defined in

[2] http://quercusseg.unex.es/weapon/

[3] http://quercusseg.unex.es/weapon/?download=OntoMetaWorkflow.owl

OntoMetaWorkflow and must contain, firstly, the taxonomy of data which will be used in the corresponding domain and, secondly, the taxonomy of the possible workflow participants. As example, the OntoDD ontology for a loan application domain is available in [4].

3. OntoWF represents the workflow of the administrative process that will be managed by the WfMS. It contains the concrete workflow of the administrative process, including its properties, the activities that it contains the order of execution of said activities, the relevant data of OntoDD that will be shown or modified in an activity and the participants which can perform every activity. As example, the OntoWF ontology for a loan application process is available in [5].
4. WEAPON Designer, is the tool that allows users to combine WF-Net [12] representation with OntoMetaWorkflow and the OntoDD of a domain in order to design the OntoWF Ontology for a specific administrative process.
5. WEAPON Manager, is the web application that reads OntoDD and OntoWF ontologies and generates the web forms and the database that manage the workflow of the administrative process.

4 OntoMetaWorkflow

The different definition elements of OntoMetaWorkflow are classified into two types (a graphical representation of OntoMetaWorkflow is available in [6]):

1. Definition elements of OntoDD: are used to define the classes and properties that represent the common data and the potential users of all similar processes within a domain. These elements are the *Domain Data, Workflow Participant* and *Root* classes. *Domain Data* stores common data of all instances of an administrative process and has the *External Document* and *Location* attributes. The *Workflow Participant* class stores the users involved in the process and has Id, Password, Name, Surname and Email attributes. The *Root* subclass is a special class that can administer the WEAPON Manager WfMS.
2. Definition elements of OntoWF: are used to define the classes and properties that represent a particular process, that is, the sequential flow of activities and their relationships with the elements of the domain defined in OntoDD. These elements are the *Administrative Process* and *Activity* classes. *Administrative Process* class is used for representing the process managed by the WfMS and has defined the *Generated By* relationship. The *Activity* class represents a logical unit of work and has defined the *Is Performed By* and *Before* relationships and the *Before Control Flow Pattern, Select Class Of Domain Data, Show Class of Domain Data,Select Instance Of Domain Data, Show Instance of Domain Data*, *Fill In Instance Attributes of Process, Show Instances Attribute, Days Time Frame, Day Notice* and *Activity Description* attributes.

[4] http://quercusseg.unex.es/weapon/?download=OntoDD_LoanApplication.owl
[5] http://quercusseg.unex.es/weapon/?download=OntoWF_LoanApplication.owl
[6] http://quercusseg.unex.es/weapon/?OntoMetaWorfklow

5 Conclusions

We have presented OntoMetaWorkflow ontology and WEAPON. OntoMetaWorkflow is an ontology which specifies the elements and rules that define workflows according to the standards and recommendations of the WfMC. OntoMetaWorkflow and the methods of WEAPON have been tested in several domains, mainly in administrative processes of University of Extremadura. They work properly with administrative processes that are fully oriented to humans and, specially, in those processes that involve submitting some type of application to be considered at different stages, where different participants need to handle current information of a dossier in order to provide new data in the corresponding activity.

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