Facet of Modeling Web Information Systems from a Document-Centric View

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ABSTRACT

The modeling of Information Systems in general, and Web Information Systems (WIS) especially, is a permanent issue so that there have been already several attempts and proposals for representing various facets of WIS. In our proposed approach, we focus on the organizational and business activity modeling and we concentrate on documents that represent the information of enterprises in the form of unstructured and semi-structured documents. The compilation of documents mirrors implicitly or explicitly the structure of enterprises, the interrelationship of business processes, and activities and tasks within processes. The documents represent, at the same time, the system roles along with tasks and activities. Our modeling approach concentrates on the co-existence and co-operation of documents and activities of business. The Story Algebra, or more generally the process algebra approach provides a formal framework that promises a formal describing method for modeling precisely the event triggered processes coupled with data in document format within an Enterprise Architecture Framework.

Keywords: Document-Centric, Process Algebra, Process and Data Modeling, Story Algebra, Web Information Systems (WIS)

1. INTRODUCTION

As the information technology for Enterprise Resource Planning systems and generally Information Systems moves toward Web Services, Cloud Computing environment and SOA, the documents that—at the same time—incorporate the end-user interfaces and significant content of the information exchange plays outstanding role within the information processing procedure. The user interface is populated by various document types as structured, semi-structured and unstructured.

The Web Information System (WIS) within an enterprise or organization has an architecture that can be mapped to one of the enterprise architecture paradigms. A document-centric approach attempts to depict both the life cycle...
and life history of Information System – i.e. the changes during design and operational time – from a viewpoint that puts the changes in structure and content of documents in the focus. Moreover, the documents assist to grasp both the dynamic and static facet of IS behavior.

A WIS contains beside conventional elements documents described by XML that can be handled as semi-structured documents. Within WIS XML documents draw on active hyperlinks and on other characteristic that can be exploited by Web services.

In this article a proposal will be shown that outlines a modeling approach that takes into account the inherent document-centric operation style of modern enterprise IS, the enterprise architecture approach and most recent software architecture approaches.

We will present the proposed approach and the relationship to the previous and similar methods that can be used in phases of analysis, design, implementation and operation.

We will outline the issues that were created by the most recent software architecture and technological development as SOA, Cloud Computing and their combination. The topics that should be investigated and requires some response from modeling methods: (1) the focus point of information exchange between end-user and IS moved slowly from structured documents towards semi-structured and unstructured document; (2) the dynamic side of man-machine communication is manifested in services, Web services that processes the input data.

There is a strong coupling among the data, document and the service of IS at information architecture level. To understand the proper behavior an adequate approach is needed.

There are attempt in the literature that try to describe these phenomenon by various method as e.g. Business Artifact (Cohn, 2009), adaptive documents (ADoc) (Kumaran, 2003), adaptive business objects (ABO) (Mandi, 2005), and lately business entities (Kumaran, 2008).

In Section 2, we present the previous researches reported in the literature, in Section 3 we outline our method making use of the previous approaches in a document centric approach, and Section 4 provides a summary and conclusions.

2. LITERATURE REVIEW

The use of semi-structured and active documents described in the form of XML and a methodical design approach to construct web-based applications are discussed in Köppen (1999).

Another article (Atzeni, 2001) shows a design methodology for a disciplined design process to structure and sustain large amounts of data in a Web site. For large-scale WIS design, Ref. (Rossi, 1999) encompasses a method.

To assists the understanding the complex behavior of WIS the enterprise architecture approaches provide a helping hand. Zachman ontology and TOGAF was developed for information systems (Zachman, 1987; Bent, 2008; MacKenzie, 2006). The two frameworks could help to structure both the behavior of WIS considering static, dynamic and operational side.

The service orientation is emerged as new software architecture paradigm and SOA is a kind of reference architecture or architecture style that independent from technology. The SOA helps to arrange and to make use of business services in the form of business capabilities and resources that may belong to various business functions (MacKenzie, 2006). SOA as a reference architecture can assist to organize the utilization of software technology within a given enterprise, or consortium of organizations that should take part in information exchange to communicate with each other. In this sense SOA can be regarded as set of principles to guide the design of software architecture that has, as a focus point, the concept of “service” or “Web service”:

A Web service is a software system designed to support interoperable machine-to-machine interaction over a network. It has an interface described in a machine-processable format (specifically WSDL). Other systems interact
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