2012 International Conference on Information and Knowledge Management (ICIKM 2012)
IPCSIT vol.45 (2012) © (2012) IACSIT Press, Singapore

Creating dynamic environment by merging semantic web and knowledge management

SeyedjamalZolhavarieh ,and MoloodBarati

Faculty of Creative Multimedia (FCM), Multimedia University, Cyberjaya Campus, Malaysia

Abstract. The main idea of Semantic Web is to encode semantic repositories in computer language form due to exploiting or sharing knowledge anytime and anywhere. The content of the Semantic Web is structured in a semantic way so that it is meaningful to computers as well as to humans. Connectivity and responsibility of knowledge management systems is the main factor to the next generation of web services.The challenge of semantic web is the preparation of distributed valid information with well-defined meaning which could be useful for different parties.Providing semantic Web services based on the Web service modeling ontology which has ability to dynamically discover and invoke is Conventional issue in Semantic Web technology.The main purpose of this paper is to present the relevance challenge of Semantic Web Service (SWS) technologies to Knowledge Management System (KMS) by creating dynamic environment. Furthermore we discuss about how to combine Knowledge management methods to SWS to design dynamic architecture.

Keywords: Collaborative environment, semantic gap, knowledge based, Semantic Web Service (SWS),ontology modeling

1. Introduction

Information retrieval (IR) has emerged several of techniques to facilitate human search in large repositories. The domain of this study concerned with searching for metadata about documents, studying structured storage andcreating optimized relation between databases[9]. On the other hand Semantic Web prepares collaborative environment that extends common formats for data on the World Wide Web [10]. The Semantic Web tendsto convert unstructured documents on the web into a "web of data" that is built on the Resource Description Framework (RDF)[8]. Packaging information in the form of objectattributevalue statements called triplets. These triplets can be semantically processed, analyzed and classified by machine agents.Furthermore, the agent can use this information with other machine agents making the vision of the Semantic Web more real[11].

Latent semantic analysis (LSA) the first semantic classifier is a technical strategy in language processing and analyzing relationships between a category of knowledge related toinformation and terms. LSA structure follows thisassumption that words that are close in meaning will occur close together in text[16]. A matrix including word counts per paragraph (rows represent unique words and columns represent each paragraph) is constructed from a large piece of text and a mathematical technique called singular value decomposition (SVD). SDVdecreases the number of columns with similar structure among rows. Words are then compared by taking the cosine of the angle between the two vectors formed by any two rows. Values close to 1 express very similar words while values close to 0 represent very dissimilar words in context [5].

In semantic web technology a knowledge base is a specific type of database for knowledge management. A knowledge base is a main part of each semantic web repository to collect, classified, shared and search information and terms. Machine-readable knowledge bases are a term about storing knowledge in a computer readable form that should be in a logical consistent structure. Some machine readable knowledge bases are exploited from artificial intelligence, for example as part of an expert system[3].

Corporate Semantic Web (CSW) illustrates the application of Semantic Web technology and Knowledge Management methodology in order to corporateenvironments. The initial vision of a Semantic Web faces to many problems such as scalability, extensive adoption of shared ontologies, and lack of stimulus to annotate documents[4]. Furthermorethe quality of privacy and trust issues are the other necessity of a complete Semantic Web Service (SWS)[1]. CSW considers to semantic improvement of information which is delivered to users as well as semantic applications. CSW is directing to promoting the integration of information in heterogeneous repositories, enhancing information retrieval through diminish information overload, supplying decision making support, dissolving ambiguities in terminology corporation, and recognizing relevant information[15].

CSW has three fundamental areas: ontology engineering, semantic applications, and collaboration. Ontology engineering regards toefficiency and effectivenessof ontology development to the costs of ontology evolvementand maintenance. Semantic application analyzes applications to evaluate what extent could gainprofit from semantic technology. Collaboration concentrates on the human centered aspects of knowledge management in corporate concepts. Extracting explicit knowledge from the interaction of amateur users in developing collaborative ontology could be one of the examples of collaboration area[15].

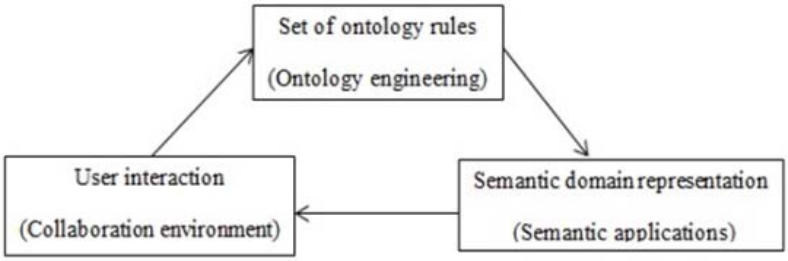

Figure1: Corporate Semantic Web life cycle

Designing a dynamic distributed semantic web that has the ability to support difference possibilities has raised many arguments in computer science world. In this paper we present how to combine new knowledge management method into SWS to create dynamic environment.

2. Semantic web and knowledge management systems

For being successful in KM we need to be equipped to several technologies which are related to KM such as Groupware, expert systems, decision support systems and various forms of collaborative systems, Because this field is combined of difference professional sciences. The efficient and effective management of knowledge resources require to dynamic communication between departments and members due to quick respond to change. Capturing, sharing, supplying and managing are the factors of effective knowledge-based organization [13].

Data accuracy and up-to-date information are undeniable factors in each organization with dynamic communication. Combining KM with SWS would provide dynamic environment to support emergency situation. According to studies the semantic web is a web of data that is directly or indirectly processed by agent systems. HTML technology creates static environment in World Wide Web, but by interfering Semantic Web technology we will be able to overcome this constrain. SWS are constructed on the environment with software agent to support quick decision making. SW technologies use ontologies and taxonomies to process web content. With SW tools such as Protégé and knowledge representation models, the progression has grown sharply. SW is lied on distributed and collaborative environment that ontologies will involve. Evolution of shared inter-organizational ontology is a new area in this field that tries to create comprehensive collaborative environment [13].

3. SWSand Dynamic environment

The concept of Semantic web Service in Dynamic Environments refers to dynamically discovering, discussing, arranging, executing and managing to realize progression steps of workflow is a dynamic research issue. Methods which are submitted in this area involve in many different concepts and frameworks that are isolated necessary aspects. What is needed is one comprehensive and complete framework that has the ability to manage the processing of Virtual Organizations workflow, altersorganization workflow to a collection of service-oriented tasks, and converts these tasks from accessible services, handle new knowledge and execute new service[2].

3.1.Framework of Knowledge-basesin Dynamic Semantic Web Services

Knowledge-based Dynamic Semantic Web Services (KDSWS) Framework directs in an integrated end-to-end mode, the life-cycle of activities involved in providing, creating, requesting, discovering, selecting, altering, and delivering Semantic Web Services. Figure2 expresses the life cycle of KDSWS framework[7].

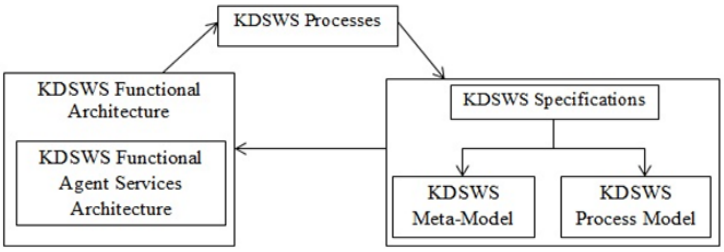

Figure2: The life cycle of KDSWS framework

The KDSWS Processes presents the steps to deliver functionality through web services and threads as global layer of functionality. KDSWS Specifications are constructed on two models the KDSWS Meta-Model, and the KDSWS Process Model which are based on the Knowledge/Data Model. Features Specification to enhancing the semantic web services is the responsibility of this section. The KDSWS Functional Architecture expresses the executioncomponents to support the Framework. A central component of the KDSWS Functional Architecture is the KDSWS Functional Agent Services Architecture to organize services into specialized responsibilities[7].

3.2.The importance of dynamic semantic web

The most general necessities to creating a system for dynamic semantic web services are:

- Minimizing manual configuration to automatic registry discovery on LANs and WANs, to find best is important[7].
- Discover the best matched services for given tasks, selection of the best services among many othersbased on semantic descriptions[7].
- In wireless environments, minimizing resource such as bandwidth to prevent receiving too many responses to queries.For solving this problem we can have a completely decentralized topology that means the ability to immediate update without need to republish and propagate any new services metadata[7].

Need to create Content Management System (CMS) to assessing the dynamic data in dynamic environment is a new challengeable issue to reduce the current problem.The procedures of CMS could be manually or computer based. A CMS allows creating, editing, and changing content as site maintenance from a central page. It supplies a set of procedures used to handle work flow in a collaborative architecture. Although CMS considers to resource management, transaction control, evolution of the Virtual Organization, and workflow management[6].

4. Using CMS for KMS in order to create dynamic environment

Knowledge management system is the collection of information technologies used to facilitate the collection, organization, transfer and distribution of knowledge between users and individuals. An information management system massages data to produce information. A knowledge management system is an information management system with all the tools required to help you turn information into knowledge[12].

One of the main problem in some of the knowledge bases in knowledge management system is stay on up to date situation and having a dynamic data, because now a days knowledge base systems are based on the static knowledge bases and they should check for updating version of knowledge bases time by time. If the knowledge management system prepares one collaborative environment for data and knowledge in order to share data dynamically, some of the problems in up to dating data solve. It means when sharing knowledge dynamically between knowledge bases in knowledge management system exists, knowledge bases can have collaboration by together so we can say the environment which creates with this collaboration is collaborative environment. For solving up to date information and dynamic knowledge bases we propose to apply CMS[13].

A CMS is a computer application used to create, edit, manage, and, publish content in a website. CMSs are frequently used for publishing industry-specific documentation such as news articles, operators' manuals, blogs, technical manuals, sales guides, and marketing brochures. The content managed may include computer files, image media, audio files, video files, electronic documents, and Web content[14].

As it is determined in figure 3, there are different files in CMS for managing and embedding for knowledge bases. In this figure, variety of sections can be structured, un-structured and semi-structured in whole of the system. For accessing to this system and managing files in dynamic environment we need to implement interface and create Application Programming Interface (API) in order to help users to extract new knowledge. CMS supports versioning and provides up-to-date knowledge and information and also it gets the ability to its users in order to utilize new knowledge anywhere and anytime. Furthermore, extra new knowledge can be added to this dynamic architecture.

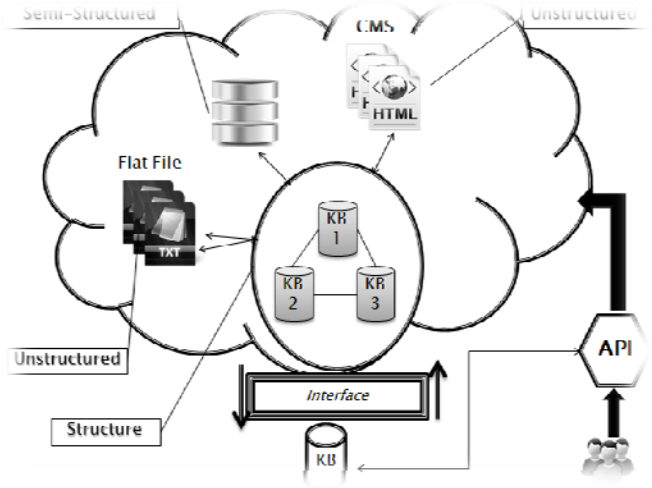

Figure 3: CMS for KMS

5. Conclusion

The exponential increase in web sizes and rapid change in its application has been appeared in different layers of web. In complicated and dynamic web environment, SWS of information becomes critical in order to search and manage knowledge, and also automatically communicate between software agents, web services and human. The semantic weband automatic processing of semantic information, has introduced

controversial issue. In this paper we mention to CMS the new technology as a way to improve dynamic semantic web technology.

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