Chapter 15

Semantic Search Engine and Object Database Guidelines for Service Oriented Architecture Models

Omar Shehab  
Staffordshire University, Malaysia

Ali Hussein Saleh Zoliat  
University of Bahrain, Bahrain

ABSTRACT

In this paper, the authors propose a Semantic Search Engine, which retrieves software components precisely and uses techniques to store these components in a database, such as ontology technology. The engine uses semantic query language to retrieve these components semantically. The authors use an exploratory study where the proposed method is mapped between object-oriented concepts and web ontology language. A qualitative survey and interview techniques were used to collect data. The findings after implementing this research are a set of guidelines, a model, and a prototype to describe the semantic search engine system. The guidelines provided help software developers and companies reduce the cost, time, and risks of software development.

1. INTRODUCTION

1.1. Project Background

Integration technologies are improved by using the Simple Object Access Protocol (SOAP) which is considered lightweight and is based on XML. This protocol is used for the exchange of information in a distributed systems environment. In addition, the Component Object Model (COM) which is from the Microsoft Windows family, is employed by the developers to re-use software components, and the Remote Method Invocation (Java RMI) enables the programmer to distribute the java technology – base to java technology...
based applications by invoking java objects from other java virtual machines.

In using the Enterprise Application Integration (EAI), which links the applications within a single organization, this process suffered from a lack of structure by using a point – to – point approach to link the processes. Creating architecture to reuse and integrate the classes will accelerate the development operation and reduce the cost. The guidelines work as a reference point for any companies to increase their productivity. The developers need to find the required object oriented models and integrate them to build the system easily and at a low cost. Creating a database structure which is considered one component of the system and connecting it with the search engine to facilitate the gathering of components will be a complete framework for service oriented architecture. Also, this structure is scalable to enable the developer to integrate the components from other organizations. The service oriented architecture will be used to build new systems by investing the service oriented business model and dividing the system into many partitions. Each partition is called a service. The structure enables the developers to combine one or more services to build their system. Sharing these services enables the software development companies to increase their productivity and build a large system in a short time at low cost. Finally, the information retrieval dilemma is that there are huge numbers of classes developed and to reuse these classes it is necessary to reorganize and restructure the retrieval operations to simplify access to these components. For the developers, it is a challenge to find a class which was built before hiring date and this problem also recurs with the massive amount of components especially when the documentation is very poor. Converting the system development inside the industry media into services is a big shift and it creates new perspectives for reusing these components as a business process model. There are two problems this research tries to solve. The first problem is how to create a search engine which should be semantic/ intelligent in order to retrieve the software components stored in the database. The second problem is how to store these software components in the database to facilitate the access operations which will lead to using the search engine to find the required software component.

2. LITERATURE REVIEW

The retrieval and integration of existing application components need to deal with connectivity and data exchange to and from those applications. The most contemporary approaches to connecting to a legacy system are Java Connector Architecture and Web Services. And one of the most crucial requirements to offer the services as expected from the applications is by modelling the data exchanges with a Model Business Data such as XML. XML works with object oriented languages to provide “portable information”. Even though the applications written in different languages such as Java, VB, or C#, are able to interact with XML, to accomplish the goal of connecting systems the XML specification describes what information is required to complete a transaction and stores this information in its database. Then an XML document is created based on the agreed upon standards. The XML document which uses the agreed upon XML standard is sent to the other side as part of information transition processes. The parser is used to convert the data into the native format of the application side. Juric et al. said “XML is the language that links new tools to legacy applications.”

2.1. The Semantic Search Engine Architecture

There are several steps in the Semantic Search engine architecture:

2. Identifying Web Ontology Language(OWL) and mapping operation.