웹 서비스 분석기의 디자인과 구현

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Design and Implementation of Public Web Services Analyzer

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요 약

Web services (WS) present a new promising software technology, which provides application-to-application interaction. They are built on the top of existing web protocols and based on open XML standards. Web services are described using WSDL, and the UDDI is a integration directory provide a registry of Web Services descriptions. WSDL provides information of Web Services but it is getting more and more important to know more than those provided by WSDL. From WSDL we can not get the information like usage of WS, performance of WS, complexity of WS, usability of WS with other web service. In this paper, we proposed a new method for Web Services so called Public Web Services Analyzer (PWSA). This technique is based on analyzing various public UDDI registries in order to get various kinds of statistics of web services. Those statistics will be used by both web services developers and consumers for finding them suitable services for their needs. PWSA guarantees that it can provide enough information to find right web services for both Web Services Consumers and Web Service Developers.

1. Introduction

Web services (WS) standards and technologies are expected to contribute in suppressing the cost and complexity of application integration within an enterprise and across enterprise boundaries. As the deployment of Web services increases in complex business application integration and collaborative business process scenarios, the analysis of Web Services is essential for the successful deployment of Web services. Currently, web services developers or consumers do not have pertinent means to access the information on the status or the quality of web services. Many proposals have been made to analyze and test the usage status of web services. However, most proposals are based on the analysis of WSDL files describing web services. Current WSDL does not contain sufficient information for a web services developer or web services consumer. For Instance, from standard WSDL description file for a web service, we can only know the inputs, outputs, the types of the inputs and outputs, the order of the inputs and outputs, and how the web service should be invoked [2]. More advanced information such as web services characteristics can not be obtained from just using WSDL file. Web Services characteristics include availability of WS, response time of WS, location of WS, complexity of WS, message size of WS, popularity of WS and usage of WS [1]. Another problem is that today there is no means to compare services of different web services. Comparing web services is important in two aspects. First, comparing services is a pre step to find best service among multiple candidate services. Second, more importantly, comparing different web services is useful when service developers are needed to find a web service that is useable with other web services. Suppose that we are given web services like car rental, ticket servicing and hotel reservation web services. Then developers can understand whether they can be one universal web service so called composite web services. To address above problems, we propose a new tool named Public Web Services

Analyzer (PWSA). This tool provides information by analyzing public UDDI registries. Various kinds of statistics of web services are gathered. The statistics will be used both by web service developers and consumers, in finding suitable services to their needs. Information of web service engines used in particular web services, web services descriptions are the examples. PWSA consists of several components such as, Dynamic web service invocation, Web service methods analyzer, Web Services Finder, Web Services Tester. PWSA helps WS developers to choose right technique and right service and it can help WS consumers to select best Web Services.

2. Related Work

2.1 WSDL based analyzer

So far, most researches done on analyzing web services generally based on analyzing web services by using WSDL files. First one is Strike Iron web service analyzer for java [5]. This has several positive implications, primarily enabling WSDL analyzer, method invocation and testing Web Services. However, it can provide only information that is from WSDL file. W.T.Tsai*, Ray Paul [2] is addressed the problem of dependence information of WSDL. They extended WSDL by a new complex type in the WSDL schema. Still it has problems. First, there is no standard specification. Second, it can not test web service whether it can be composed to other one.

2.2 Testing Web Services

Current Web Services Testing mechanisms are also based on WSDL analyzer. Siblini, R.Monsour [3] applied mutation operators to the WSDL document in order to generate Web Services interfaces that will be used to test Web Service. Gerardo Canfora [4] is focused on perspective of users using web services. However there is no real implementation. R.Hackel, M.Lohman [8] proposed to visualize contracts by graph transformation rules which blend well with a UML-based notion of data models and signatures. The concept is to test operations provided and requested to make sure matching data types, service accessibility and operation signatures. There is no testing or comparing performance of web services.

2.3 Web Services Manager

IBM' s Tivoli is a good example for web services manager [6]. It has many functionality for using and managing particular kind of web services. It is a component of Tivoli Web services solutions of IBM. Another work done is xmethods.com [7]. This site provides various kind of web services information like information of web service engines used in particular web services, web services descriptions. Information provided by xmethods.com is very limited.

3. Public Web Services Analyzer(PWSA)

3.1 Features and Design goals

Ultimate goal of PWSA is to provide both Web services developers and web services consumers with enough information of existing consumable web services and their various kinds of statistics. PWSA has several unique features and design goals. First,

PWSA is a tool that can consume any web service with any method, so that users can easily get information of existing web services. For that PWSA provides facilities that users can insert URL of desired WSDL file of any web services for calling particular method of web services. Users don' t have to write application to test the result of particular kind of Web Services.

Second, when we use WSDL analyzers there will be lack of information. PWSA has two vital features to solve this problem. First, PWSA is basically constructing information of existing web services from various UDDI registries. Second, PWSA provides searching mechanism of web services from various UDDI registries.

Search is based on keyword search (Users can search using specific keywords), topic search (users can search by sentences or group of keywords like we do when using google.com), Grouping (Users can group web services by type of web services, technologies used in web services, location, usage, ...etc).Third, PWSA provides facilities to make various kinds of statistics out of existing web services information.

In this context there are two kinds of statistics. First, it is about technologies used in web services. It makes easy for developers to get information of best technologies. Second, it is about web services usage statistics. As an example, there are several online book purchasing web services if users are needed to use one of them they can view the technologies and performance of candidate web services and choose best of them. Finally, PWSA is equipped with functions that can provide various statistics of web services and functions to compare the facilities of different web services in order to find whether they can form a composite web services.

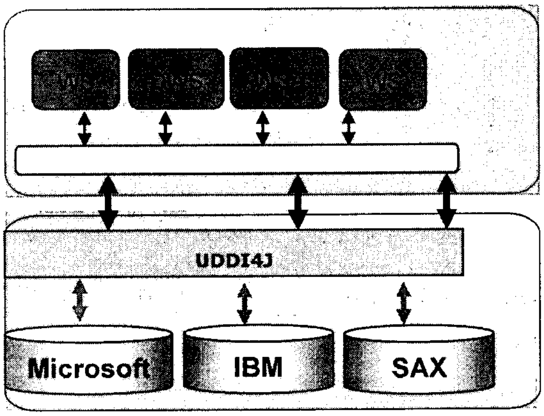

Figure 1

3.2 Implementation

Main architecture of PWSA is shown in Figure 1. Traditionally in web services there are three main parts like UDDI Registry, Client (Service Requestor) and Service (Service Provider).They have relationship with one another. In PWSA there are two main components. First part is for accessing various public UDDI Registries. Lower part of PWSA is set of public UDDI registries. (Figure 1) IBM, Microsoft, SAX provide public UDDI registries. UDDI4J is used to access public web services. Second part is PWSA' s four modules. First, WSF (Web Services Finder) is to search any web services with keyword based search or sentences based search [7]. DWSI (Dynamic Web Services Invocation) is a technique to call any existing web services with any method and any parameter by entering input from user. WSA (Web Services Analyzer) is facility to make statistical data out of existing web services by using various analyzing techniques. WST (Web Services Tester) is another important facility to test web services factors like response time, QoS.

4. Future works and Conclusions

In this project, we presented a new tool PWSA and its design. PWSA is a new approach for making statistical analysis of various critiques of existing Web Services. PWSA has many advantages and facilities, two outstanding features are: First, it can provide much information than traditionally provided by WSDL analyzers. Second, it can check whether two or more web services can be a composite web service. To show the usefulness of our method, we have introduced various challenges of Web Services including need for web services analyzer and we also examined related researches. We introduced pros and cons of existing web services analyzers. We introduced PWSA model as divided into four sub modules. We described each sub modules role in detail. This paper also states that PWSA is useful for both Web Services developers and consumers. As a future work, test and analysis of long lived transactional works like B2B will be added. Composite Web Services Tester is also important factor for testing and analyzing. We will consider discovery of Web Services not based on key words but sentences. As deployment of Web Services is getting increase PWSA will be more important.

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