INVESTIGATING SOAP AND XML TECHNOLOGIES IN WEB SERVICE

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ABSTRACT

In this paper, Investigating SOAP and XML technologies in web service is studied. The reason for using XML technology to transmit data and also the need for application of existing communicative structure in SOAP technology in web pages with WSDL technology are investigated uniquely. And also the need for searchable address giving for web service which is available in UDDI technology and the advantages of using it are explained for programmers.

KEYWORDS

XML, SOAP, WSDL, UDDI, OOP, Reliability

1. INTRODUCTION

People who are familiar with IT have heard the name web server for sure. For example, over 66% of people who have participated in the poll conducted by InfoWorld journal believed that the next commercial models of internet are web services. Besides, Gartner group has predicted that web services increase efficiency of IT projects to 30%. But, what is a web service and how it will change the form of business in internet?

In order to simplify commercial processing, non-concentrated programs (enterprises) shall connect to each other and use common data of each other. Before, this was done by invention of private standards and format of data in the special form required by each program. But the web world and XML increased free technology to transmit data and the information between systems. Web services are the software using XML to transmit data between other software via prevalent internet protocols. In a simple way, a web service does some actions by web and the functions or subroutines send the results to other programs. This means that the program that is launched in a computer sends data to other computer and asks for respond. The program in second computer does the requested actions and returns results based on internet structures for the first program [1,2].

2. WEB SERVICES

Web services can use numerous protocols in internet. However they use HTTP, which is the most important one, the most. Web services can do anything. For example, in a program, they can take the last news titles from web service of Associated Press or for instance, a financial program can

take the last news and stock data via a web service. What a web service does can be as simple as multiplying two figures or as complicated as performing all subscription affairs of a company.
Web service has properties making it different from other technologies and computer models. Paul Flessner, vice-president of Microsoft has mentioned several characteristics for a web service in dot NET Enterprise Server. First is that web services are programmable. A web service keeps secret what it does. When a program gave data to it, web service would process it and would return that data for the main program as respond. Second, web services are made base on XML and the XMLs based on SOAP or Simple Object Access Protocol are technologies provide web services with the possibility to connect to other programs even if those programs are written in different languages and are launched in different computers [3].

Also, web services are self-describing. It means that they explain what they do and their usage method. These explanations are generally Web Services Description Language (WSDL). WSDL is a standard based on XML. Besides, web services are detectable. It means that program writer can search for desired web service in directories such as Universal Description, Discovery and Integration (UDDI). UDDI is another standard for web service.

3. WEB SERVICE TECHNOLOGIES

As it was explained before, one of the reasons for separating web service from other existing technologies is use of XML and some other technical standards such as SOAP, WSDL and UDDI. These technologies provide the filed for connection between programs in a way independent from program writing language, operating system and hardware. SOAP creates a communicative mechanism between software and web service. WSDL is a unique method for describing web service and UDDI makes a searchable directory for web service. When they get together in a place, these technologies provide program writer with the possibility to prepare the programs as service and launch them on internet [3].

3.1. XML

Extensible Markup Language (XML) is a technology vastly supported. This technology is open and it means that it doesn't belong to a special company. First time in WWW consortium or W3C in 1996, it was created for simplifying data transmission. By expansion of using web in 90s, little by little the limitations f HTML revealed. Weakness of HTML in extensibility (ability to add and subtract properties) and its weakness in describing data keeping inside it disappointed the program writers. Also, vagueness of its definitions stopped it from development. In respond to these problems, W3C added a series of facilities on it along developing HTML that provided the possibility to change structure of texts in HTML. This is called Cascade Style Sheet (CSS). This development was just a temporary solution. A standard, extensible method with strong structure should have been created. As a result, W3C made XML. XML has power and extensibility of Standard Generalized Markup Language (SGML) and the simplicity that web requires [4].

Independence of data or separation of content from appearance is assumed as a characteristic for XML. XML texts just describe a data and the program familiar to XML can make any change to the data inside XML file regardless of language and operating system. XML texts are consistent of data without a special form, thus the program that is going to use them should know how to display them. Therefore, display form of a XML file can be different in a PC, PDA and Cell Phone.

When a program confronts a XML text, it will ensure that it contains its subjective data. This assurance is gained by programs such as XML Parser. The analyzers investigate the orders of

XML text. Also, they help program to interpret XML texts. Each XML text can voluntarily refer to another text containing structure of the main XML file. The second XML text is called Document Type Definition (DTD).

When XML file refers to DTD, the analyzer program investigates the main file with DTD to find out whether it is formed by the same structure described in DTD or not. If a XML analyzer can correctly process a text, the XML text is also formatted appropriately. When most software increases their web facilities, it seems that XML will be chosen as a global technology to transmit data between programs. All programs using XML will be able understand the XML of each other. This high level of adjustment between programs makes XML to be an appropriate technology for web services, because without the need for the same operating system and hardware, data can be transmitted [5].

3.2. SOAP

Simple Object Access Protocol (SOAP) is one of the most prevalent standards used in web services. According to evident, first time it was made by Developer Mentor, User Land Company and Microsoft in 1998 and its first version was presented in 1999. The version 1.2 is indicative of hard work and high eagerness of IT to use SOAP and web service.

The main objective of SOAP is to create a method to send data between systems distributed on net. When a program starts to communicate with web service, SOAP messages are used for connection and data transmission between them. SOAP message is sent to web service and a function or subroutine in launches it. This means that this message has requested web service to do something. Web service uses SOAP message to start its operation. At the end, sends the results for the main program with a SOAP message [6].

SOAP protocol as a XML-based protocol is composed of a series of XML schemas. These schemas specify the shape of XML messages which are transmitted on the net, like as the data and information that facilitate text's interpretation for the third party. In fact, SOAP is designed for transmission of data on internet via HTTP protocol; however it can also be used in other models such as LAN. When web services use HTTP, they can easily pass through Firewall.
A message is consistent of three important parts: Envelope, Header and Body. Envelope is used for wrapping the message. This part describes the content of message and specifies its receiver. The next part of SOAP messages is its Header, which is an optional part and explains issues such as security and routing. Body is a part of SOAP message in which subjective data are placed. Data is based on XML and they follow a specific model that explains schemas. These schemas help the receiver to correctly interpret the text. SOAP messages are taken by SOAP servers and they are interpreted so that as a result of that web servers become active and so their function [7,8].

In order not to use web services in SOAP, a large number of protocols shall be used. For example, XML-RPC is an old technology which was providing the same facility. Anyway, most of great software producers prefer SOAP than other technologies. There are a lot of reasons for choosing SOAP that most of them are about its protocol which is beyond this text. Three major priority of SOAP compared to other technologies are included of extensibility, simplicity and internal functionality.

SOAP messages are normally do not have many codes and for sending and receiving them there is no need for complicated software. SOAP provides the program writer for this possibility to change it according to its need. At the end, because SOAP uses XML can transmit data by HTTP regardless of the program writing language, operating system and hardware [9,10].

A web service in a simple meaning is a kind of component under web. This component provides the applications using it with the possibility to be able to use methods of this web service. It's better to explain web service with an example. Assume that you want to have the climate situation in your web application, in order to implement it you have two choices:

    I.   You can gather the climate situation from different sites yourself and use them in your web application.

    II.   You can use a web service which provides the climate of different geographic regions.

In fact, this web service is not working itself, but it has functions that are called by different web applications that for instance here the web service returns the climate situation. However web services have more efficient and important usages too, such as working with databases … that here an example was provided for clarifying the issue.

4. CONCLUSIONS

Not the need for repeated coding. Maybe many individuals who have worked with Object Oriented programming (OOP) say that this is also possible by class training. Yes, it is possible, but:

    I.   In program writing at class you have to add your class in each project, but in web service you just need to use methods.

    II.   In working with classes, you may work in different applications with different classes. It means that each time your work is different and this reduces eligibility and makes extensibility difficult. However, in using web service each time you work with a special web service and you work base on those specific web service methods no matter where and in which application you are.

    III.   When you work with service, there is a series of standards for usage that all applications shall follow and this increases reusability.

Therefore, simply one can conclude that using the mentioned techniques in this paper would lead to increase in efficiency.

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