Creating web services and implementation through service-oriented architecture (SOA)-A Generic review

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Abstract

Now a days, software has become an integral part of all critical departments and every part of our life; where the components of the so-called software are termed as web services. A web service can always be treated as an internet-based software component that can hold all different types of resources under one roof of protocol stack. It helps us in raising the abstraction levels. A service can be understood as a unit of work. Purely, a web service can be treated as an independent component that usually having the idea of serving different needs; and it is not confined to a single application. The main focus of the web services is to convert an application into web application. A web service has an interface which is normally defined and described in a machine understandable format which is called as WSDL. We know pretty well that these services can be discovered by using UDDI. The platform elements are SOAP, UDDI and WSDL. By using these web services the problems of interoperability, complexity and traversal of firewall can be solved. These application components can communicate with open protocols.

Keywords: WebService,SOAP,UDDI,WSDL, HTTP, interoperability.

1. Introduction - HOW TO CREATE A WEB SERVICE

The aroma of web services is a vital part and identified as an internet component. They are independent of platform and loosely coupled. The main aim of this paper is to explain how web services are created by using an IDE. When it comes to the creation of web service, it can be created by using an application. For example, take Java EE IDE – Eclipse; Go to File, Other Java project. Next Create a java project. And here type your new project name. This can be done manually. After entering the project name just Click FINISH. The navigation of creating a web service is shown in Figure 1. You can right-Click on SRC in the navigation space and enter package and class names. Then you will see a screen for coding. Now, create a new java project and enter a name – Calculator. And this is created in the workspace. As shown in the Figure 2, the execution environment JRE is JavaSE-1.6. The project specific jre is jre6. While configuration, in the project layout separate folders for sources and class files are created. Create a new java package where the source folder is Calculator/src; Calculator is the name of the project and src is the source then enter the name of the package which is Calculator. And click Finish. This concept is shown in Figure 3.
Figure 1: Creating Web Service by creating a new java project
Creating web services and implementation through service-oriented architecture (SOA)-A

Figure 2: Giving project name
Creating web services and implementation through service-oriented architecture (SOA)
Next, you have to create the web service: the process is shown in Figure 4. There are so many wizards available in the application; you have to select Web Service in Web Services hierarchy. Then click Finish.

Figure 4: Creating a Web Service
The Figure 5 shows the implementation of the service by selecting the created resource and type of the web service. They are com.prasanth.utilities.Calculator and Bottom up Java bean Web Service. You can also ensure that server has started otherwise it can be started later and finally you can publish the Web service.
2. Demonstration with an example

Creation of Web services are demonstrated here by taking an example of Calculator which performs all arithmetic operations.

The following are the operations performed by Calculator.java program:

1. additionOperation(String, String)
2. divisionOperation(String, String)
3. multiplicationOperation(String, String)
4. subtractionOperation(String, String)

The resource created here is com.prasanth.utilities which came from the source as a web service. Under this you can
define both the .java and .wsdl. Always you can see this .wsdl in the web content.

Figure 7: Calculator.java program

The Figure 7 shows that all the operations are performed by creating them as Static and response will be returned, and the name of the class is Calculator which is declared as public. Services are usually understood as web services and will be undertaken by SOA as a host by defining a WSDL which is a contract. From the WSDL you can create a project comprising bindings. The binding allows us to communicate with the host system. These further categorized as operations which can be bundled as test suite and these operations are derived as test cases, from these you can write the test steps.

The SOAP messages which are mentioned in a particular .wsdl file uses a SOAP/HTTP platform which will be sent to a host system. From here, it will extract the messages from SOAP envelope and serialize the messages as POJO (Plain Old Java Object). The following is the example of a
SOAP message which talks about performing different operations and getting the result.

Example:

```xml
<AddRequest>
<op1>----</op1>
<op2>----</op2>
</AddRequest>
```

TestProxy P=newTestProxy(  );
AddRequest ar=newAddRequest(  );
ar.setop1 (“10”);
ar.setop1 (“10”);
AddResponse ar=P.add(ar);
s.o.p(ar.getResult(  ));

When we are generating WSDL you need to remember into how many can WSDL can be generated. Sometimes, generation of wsdl is based on the type of input data given or kind of data types used. You can further use this WSDL for generating test data. Services are always understood as web services and will be guided by SOA as a host by defining a WSDL which is a contract between service consumer and provider.

3. Related Work

This part of the section focuses on how web services are created. Web services can be either manually or automatically tested based on the service requirements. Our paper deals with creation of web service and automatic wsdl generation. We have created web services which when we give a wsdl as input it generates test requests and run them to completion. The input is in the form of a SOAP message which is a request and the result is also a SOAP message which is response. A test case is considered to be good if it has the high possibility of finding an undiscovered error. The Figure 8 shown here is the WSDL of Calculator which contains imports, bindings, types, services, port type and messages. Sometimes web services testing involve several categories like testing only one operation of web service, testing whether all operations are executed in sequence or not etc. Most of the users use only black box testing because the specifications of WSDL may be available but implementation and design details are not available.

The testing of web services is very expensive because it requires lot of resources where we have to send a SOAP message for each and every test data in order to invoke a web service which is under test. In future, research may be done in the way to reduce or to minimize the test data by using different approaches like AETG. Finally, the minimization of invocation of services is monitored by using the data.

Research is going on different techniques in order to include fault tolerance, load balancing into a web service framework. There are several architectures designed for various applications of web services and also frameworks to integrate them. Today the web is designed so as to communicate with the users. Sharing the information is the highest priority. It so happened because it construction is on standards like HTML and HTTP. While platforms are computed you have to guess very less assumptions.

Research work goes on how the interface of the service and its related impact on the performance. The performance may vary from time to time and may sometimes depend on the situation and parameters of web services. Currently, the research takes place on different variations of web services and the researchers concentrate on service investigation.
The idea of web services is to construct a platform of type distributed computing for the web environment. Interoperability and fastness are the main goals. They are completely based on standards and concentrate much on messages and related documents.

The wsdl that is generated concentrates on automatic test case generation, where we are calling as code based framework. But similar types of frameworks are also designed by several researchers but this is different. For example, Marcel Karam et al; proposed a workflow-based framework for testing composed web services is...
a type of framework which concentrate on capturing a composed web service under test.

Moreover testing web services has so many challenges, methodologies, tools and techniques where they are applicable only to the formal and conventional applications. Finally it is very clear to understand that web services can be published by service provider; binded by broker; and finding by requester.

In the case of adopting a web service, ensuring quality of service is the main problem. In order to generate test cases automatically and efficiently test suite should be designed very effectively and resourcefully. So, based on this, abstract test suite and executable test suite analysis of WSDL based web service are derived.

4. Conclusion

This paper presents the current research going on web services and how to create web services. Web services creation plays a vital role in the present market scenario where these services can be published and demonstrated by using an IDE like eclipse. This creation helps the user to understand the properties, standards, attributes and protocols so as to make the web service testing easier.

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