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The activities of the International Conference is in line and very appropriate with the vision and mission of the UBL to promote training and education as well as research in these areas.

On behave of the First International Conference of Engineering and Technology Development (ICETD 2012) organizing committee; we are very pleased with the very good responses especially from the keynote speakers and from the participants. It is noteworthy to point out that about 45 technical papers were received for this conference.

The participants of conference come from many well known universities, among others: Universitas Bandar Lampung, International Islamic University Malaysia, University Malaysia Trengganu, Nanyang Technological University, Curtin University of Technology Australia, University Putra Malaysia, Jamal Mohamed College India, ITB, Mercu Buana University, National University Malaysia, Surya Institute Jakarta, Diponogoro University, Unila, Universitas Malahayati, University Pelita Harapan, STIMIK Kristen Newmann, BPPT Lampung, Nurtanio University Bandung, STIMIK Tarakanita, University Sultan Ageng Tirtayasa, and Pelita Bangsa.

I would like to express my deepest gratitude to the International Advisory Board members, sponsors and also welcome all keynote speakers and all participants. I am also grateful to all organizing committee and all of the reviewers which contribute to the high standard of the conference. Also I would like to express my deepest gratitude to the Rector which give us endless support to these activities, such that the conference can be administrated on time.

Bandar Lampung, 20 Juni 2012

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UNIVERSITAS BANDAR LAMPUNG
Bandar Lampung, Indonesia
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Web-Based Service Optimization with JSON-RPC Platform in Java and PHP

WachyuHari Haji

Faculty of Computer Science, Mercu Buana University
Jl. Meruya Selatan No. 1 Jakarta Barat, Indonesia
wahyuhari@gmail.com

Abstract—Web based application has been used by many organizations to support their business activities within the organization. Sometimes, that application requires the availability of information from other parties outside the organization. Other than that, there is a need to exchange information between applications in a particular organization with applications in other organizations. The applications may be on the different systems and platforms. There is a technology that can be used, commonly known as a web service. JSON-RPC is an alternative to build a web service. This technology involves two applications that are connected via a data connection. During the connection, an application can executes a remote procedure from web service provider to do implementation web service using JSON-RPC technology, with PHP platform for client side application and java platform for server side application.

Keywords: Web service, JSON-RPC, PHP, java

I. INTRODUCTION

At present the need for web-based applications become a major requirement for many organizations to support all business activities in the organization. Sometimes an application requires the availability of information from other parties outside the organization, then the information is used as data for further processing. In addition, there is a need to exchange information between applications in a particular organization with applications in other organizations, which are likely to be on different systems with different platforms. That is why we need a technology that enables cross-platform communication via the web. One technology that can be used is a web-based service technology or commonly known as a web service. This technology allows for cross-platform communication. Web-based services are used as a service provider in the form of information to other applications, so that between different applications can interact and communicate through the functions provided by an application service provider. This technology facilitates multiple applications to interact with other applications within an organization and outside organization using standards that are not tied to any platform and are not tied to the issue of what programming language used by each application, so that applications can access a sub-routine in Other applications, such as the application is currently accessing the sub-routine in the local system.

RPC is a simple protocol that can be used to build a web-based services. RPC allows an application to call to the sub-routine provided by other applications residing on different systems. RPC uses a specific data exchange formats like XML or JSON as a communication liaison between systems. RPC protocol with JSON format as a data exchange format called JSON-RPC. This research will implement a web-based services with JSON-RPC for PHP platform using the Java platform client application and server application service provider.

II. WEB SERVICE

Web-based services is a technology that aims to facilitate communication between applications, which uses a standard platform that is not bound and not bound by the programming language used by each application. W3C definition (2011) "A software system designed to support interoperable machine-to-machine interaction over a network. It has an interface described in a machine-processable format (specifically WSDL). Other systems interact with the system through its interface by sending and receiving messages using HTTP typically with XML serialization in conjunction with other Web-related standards. ".

a. JSON

JSON is a data exchange format which has the characteristics of lightweight, easily understandable by humans, and has been translated easily by computer. JSON is based on part of the JavaScript programming language. JSON itself is a text that is independent of the programming language of any kind. This is because it is a style of language used by programmers for programming language family includes C, C++, C#, Java, JavaScript, Perl, Python, etc. These properties make JSON ideal for use as a data exchange format. JSON using the following form:

Object
Apair of name/value that is not Sorted. The objectof writing begins with the character"{" (open brace) and ends with the character"}" (curly braces). Each name is always followed by the character":" (colon), and each name / value pairs separated by the character"," (comma).

RPC protocol which uses JSON as a data exchange format called JSON-RPC

b. Array

Arrays is a collection of values Sorted. Array always begins with the characters"[" (open square brackets) and ends with the characters"]" (close brackets). Each value is separated by the character"," (comma).

c. RemoteProcedureCall

Remote Procedure Call (RPC) is a fairly simple protocol that is widely used today to build web-based services. According to Dave Marshall (1999), RPC is a powerful technique for constructing distributed, client-server based applications. It is based on extending the notion of conventional application server, local procedure calling, so that the called procedure need not exist in the same address space as the calling procedure.

Server and client may be on the same system, or they may be on different machines. To do this, an application server must provide a set of sub-routines which can be accessed by client applications. The approach is called a server socket, where the server will wait for a client that calls the sub-routine provided by the server.

RPC protocol uses a specific data format to exchange data, a datagram that many use XML technology, the XML protocol is usually named with XML-RPC. However, over the technology, found an easy-to-use and fundamental data exchange format, JSON, which has advantages over XML. JSON, among others, the nature of light, easy to readable, human beings, easily written by humans, as well as small size, so that the resulting byte will be smaller than XML. It is certainly useful for later data processing, which will be with the faster than XML.

The basic concept of JSON-RPC is very simple, which is often used in mechanisms consisting of two systems are connected via a data connection. During the connection, if there exists a system, a server can perform call asub-routine found in other systems.

Tomakelong distance callsto asub-routine, then the object of making an inquiry or notification will be send by the client to the server, then the server will give the child object the processing of the request object, unless it is sent to the server, the server will not give the object a reply in response to the client.

A call to a sub-routine in the server is similar to a call to a local sub-routine. When an RPC is done, the input parameter is mapped to a sub-routine in the service provider system, and client calls a sub-routine if the server is waiting for a reply object that is returned from the sub-routine in the call.

PHP (Hypertext Preprocessor) is an web-based programming language that can process data dynamically. PHP will be fully executed by the server, but in other cases, the web browser will return a result. In principle, the server will work if there is a request from the client. In this case, the client uses PHP code to send a request to the server. When using PHP as the scripting language of the application server, the server will do the following:

- Read request from client
- Search the site/page on the server
- Perform the instructions given by the PHP to make modifications to the page
- Send back the page to the client via the internet or intranet.
PHP has several advantages that can run on different platforms (Windows, Linux, Unix, etc.), but it's very easy to learn. PHP.

f. **JAVASCRIPT**

JavaScript is a scripting language based on the concept of prototype-based programming. This language is particularly well known for its use in websites (as client-side JavaScript), and also used to provide access to objects embedded in another application.
III. GLOBAL WEB DESIGN BASED SERVICES

Making web-based services with JSON-RPC involves two applications that are connected via a data connection. During the connection, if a sub-routine is contained in another application, the call to sub-routine in another system will be send by the client application to the server, then the server will provide the result of processing the object. If the notification from the client application, then the server will not send any reply to the client. Figure 4 below illustrates the flowchart for the process of communication that occurs between the client and server on the system web-based services with JSON-RPC technology globally.

![Flowchart Web-Based Service Systems With JSON-RPC](image)

The implementation for this component is a Javascript file that will be placed in the client application. At this Javascript file there is a class that is JSONRpcClient class, which has a sub-routine specification as follow:

**TABLE 1**

<table>
<thead>
<tr>
<th>No</th>
<th>Name of Sub-Routine</th>
<th>Layer</th>
<th>Uses</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.</td>
<td>JSONRpcClient (vurl,vuser,vpas)</td>
<td>Sub-routine</td>
<td>is usefully early initialization constructor and value of the parameter is the URL where the server be</td>
</tr>
<tr>
<td>2.</td>
<td>JSONRpcClient.prototype.doLogin = function()</td>
<td>Sub-routine</td>
<td>is useful for logging onto the application server web-based service provider</td>
</tr>
<tr>
<td>3.</td>
<td>JSONRpcClient.prototype.getDataFilm = function(id,namaBioskop)</td>
<td>Sub-routine</td>
<td>is useful for showing film that are being aired today at several theaters</td>
</tr>
<tr>
<td>4.</td>
<td>JSONRpcClient.prototype.getDataBioskop = function(id)</td>
<td>Sub-routine</td>
<td>is useful for displaying data existing cinema</td>
</tr>
<tr>
<td>5.</td>
<td>function GetXmlHttpObject()</td>
<td>Sub-routine</td>
<td>is useful for objects Getting XmlHttpObject, which will be used for access to web-based service provider's server via AJAX technology</td>
</tr>
<tr>
<td>6.</td>
<td>JSONRpcClient.prototype.getDataPooling = function(id)</td>
<td>Sub-routine</td>
<td>is useful for displaying data poll</td>
</tr>
<tr>
<td>7.</td>
<td>JSONRpcClient.prototype.setPooling = function(pilihan,id)</td>
<td>Sub-routine</td>
<td>is useful to set the selection of the most popular movie poll</td>
</tr>
<tr>
<td>8.</td>
<td>function randomString()</td>
<td>Sub-routine</td>
<td>is useful to get a random string to be used as an ID on the request object</td>
</tr>
</tbody>
</table>

### a. JSON-RPC SERVLET

Implementation of JSON-RPC Servlet component is in the form of a class named ServletJSONRPC which is a subclass of the Servlet class (javax.servlet.http.HttpServlet) in the java library. This class serves as a liaison between the client application to the application server. All sub-routines that exist in this class are the same as its parent class (javax.servlet.http.HttpServlet), with a new sub-routine reimplementation of the sub-routine "doGet" and "doPost". Details can be seen in the following example:
b. OBJECT HANDLER

Implementation of Object handler component is a Java class named TwoRequestHandler and NotificationHandler

<table>
<thead>
<tr>
<th>No</th>
<th>Name of Sub-Routine</th>
<th>Uses</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.</td>
<td>public String[] handledRequests()</td>
<td>Get names of all the sub-routine that handles all the request object</td>
</tr>
<tr>
<td>2.</td>
<td>public JSONRPC2Response process(JSONRPC2Request req)</td>
<td>Object to process incoming requests</td>
</tr>
</tbody>
</table>

IV. TEST RESULTS

The test result of the steps described above are as follows:

- Test result showed that the communication goes as expected, and the data is displayed in accordance with data obtained from the server.
- Test result showed that the objects given by the server response were appropriate, and also support the use of object return error.

The results of direct access to the application server through the browser can be seen in the following table:

<table>
<thead>
<tr>
<th>TABLE 5. TEST RESULTS THROUGH BROWSER APPLICATION SERVER</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
</tr>
<tr>
<td>----</td>
</tr>
<tr>
<td>1.</td>
</tr>
<tr>
<td>2.</td>
</tr>
<tr>
<td>3.</td>
</tr>
<tr>
<td>4.</td>
</tr>
</tbody>
</table>

V. CONCLUSIONS

Based on implementation of case studies have been conducted, it can be concluded as follows:

JSON-RPC can be used as an alternative solution to create cross-platform web-based service, which allows communication between two applications with different platforms, the process of communication between client and server applications with JSON-RPC is faster and lighter than the other web-based service technology that uses XML data exchange format, this is because it uses the JSON data interchange format and makes the transmitted data size smaller.

Application development process becomes faster and more efficiently because of the JSON-RPC technology weapons, the development of an application can be done separately for the application server and client applications.
REFERENCES


