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ANDROID CLIENT FOR ACCESSING DATABASE WEB SERVICE

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Abstract

Web Services, is one of the important means to implement Service Oriented Architectures. Many organizations are moving to cloud computing for the proved benefits of cloud computing. Therefore it is need to develop good mobile based clients which can access server programs stored in cloud. Android is major platform in mobiles as well as in tabs. This paper demonstrates how to develop an Android client which can access web service. We present the performance results obtained in different networking environment.

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cloud computing applications and due to

benefits offered by cloud computing more organizations are attracted for cloud computing services. For example Google services, Amazon services, eBay, Paypal services [12, 17] are more popular in developers and good efficient client applications need to be developed for accessing these cloud based web applications. For convenience users want to access the application from their mobiles or tabs. This paper discusses and demonstrates a mobile client application development to access database web services. In section II use of kSOAP[9] library is discussed.

Invoking Web Services in Android: the KSOAP2 solution

Before delving into the KSOAP2 [9] solution adopted for accessing Web Services on Android [13, 15] it can be helpful taking a look at the conceptual model implemented by the original application as regards Web Services invocation that we decided to keep, only modifying its implementation.

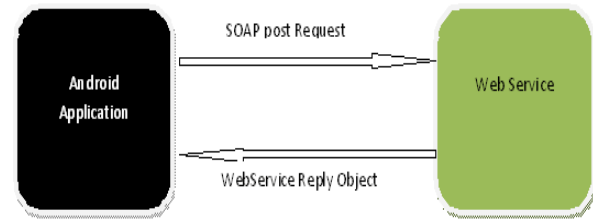


Fig. 1: Communication between client and server

KSOAP [9]: a SOAP open source client library for mobile Java-based devices, see fig. 2. KSOAP is an open source SOAP web service client library [2,7] for constrained Java environments such as Applets or J2ME applications [8]

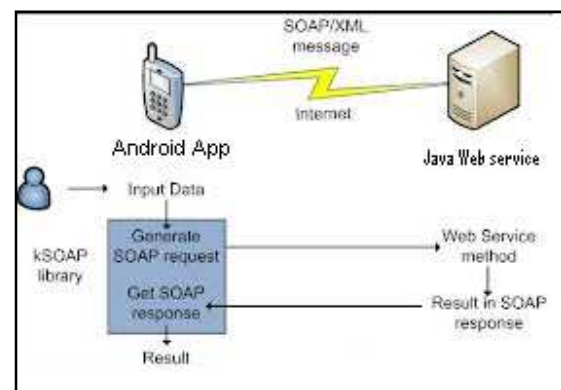


Fig 2: Use of kSOAP library

A. Model-View-Controller(MVC)

MVC is used for separating GUI from Business Logic and Data Access, Model-view-controller (MVC) [16] is used as shown in Fig. 3.

Experiment performed

A. Testbed

Our testbed consists of following computers and router as shown in Fig 4.

- D-Link DIR-300 Wireless G Router
- DELL INSPIRON with Intel Core2 Duo CPU T6400 @ 2 GHz and 4 GB RAM with Windows XP
- Karbonn A21 mobile with Android 4.0.4 OS

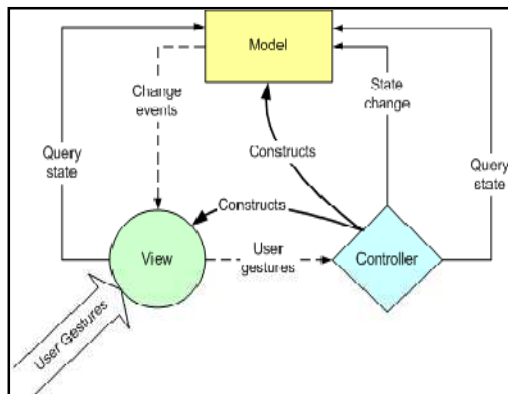


Fig. 3: MVC design pattern

Web services were developed in J2EE using Netbeans 7.1.2 and Glassfish Server 3.1.2 were used for deploying web service. Database used: Java DB (Derby). Android client application was developed using

Eclipse and Android ICeCream Sandwich [15] 4.0 OS. Device used was Karbonn A21 Mobile. Server and client are connected using Wi-Fi [1,11] network as well as tested using public ip address at server and 2G network service provided by Tata Docomo in Karbonn Mobile.



Fig. 4: Test bed for experiment

We performed similar experiments in 2 networks.

1. Using Wi-Fi connectivity
2. Using Bluetooth connectivity

B. Test Application

We developed a web service [14] for performing Select, Insert, Delete, Update

operations on a database. This web service was then published in Glassfish server. Android application uses this web service and using kSOAP library above 4 database operation are performed in mobile.

Web service testing is shown in Fig. 5. Database Web service's WSDL is shown in Fig. 6. Ooutput of different database operations are shown in Fig 7-11. Response time was measured using System.currentTimeMillis() method available in java.util package [13].

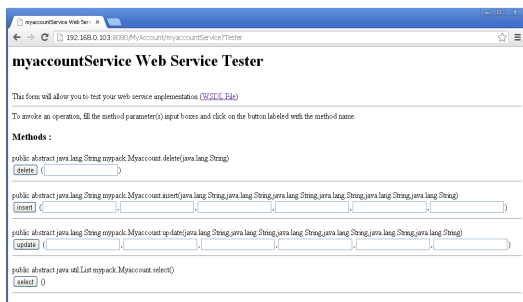


Fig. 5: Web service Testing

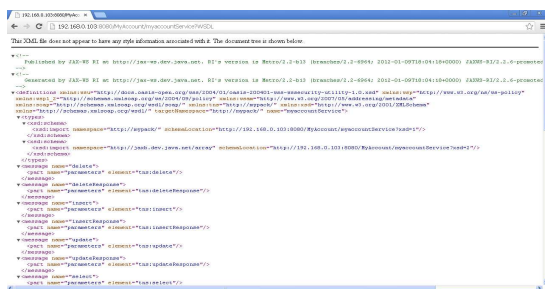


Fig. 6: A Web service's WSDL

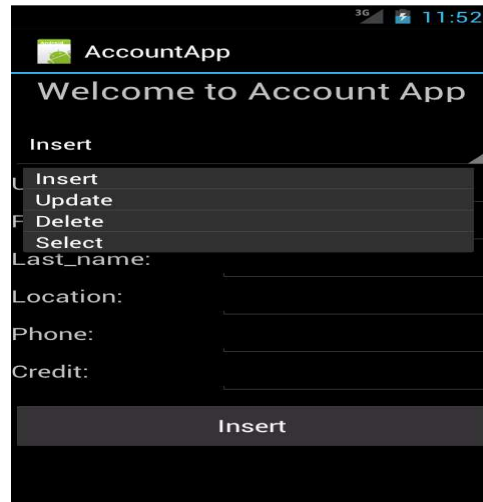


Fig. 7: Screen shot of Client app

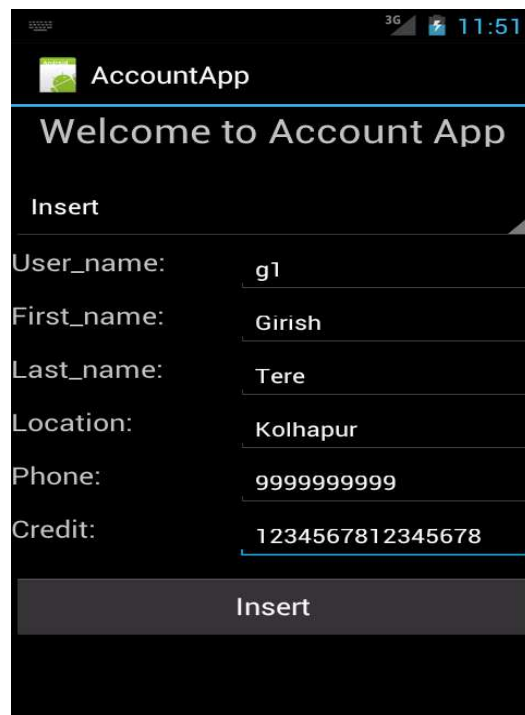


Fig. 8: Screen shot of Insert operation

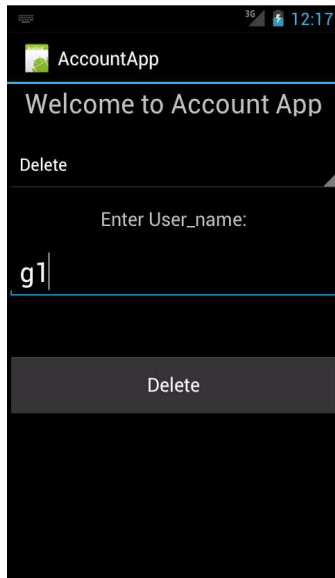


Fig 9: Screen shot of delete operation

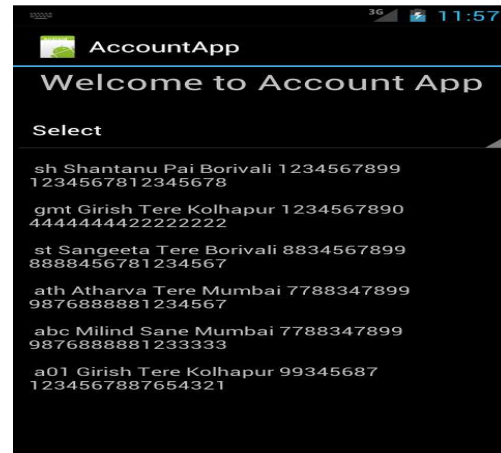


Fig. 11: Screen shot of Select operation

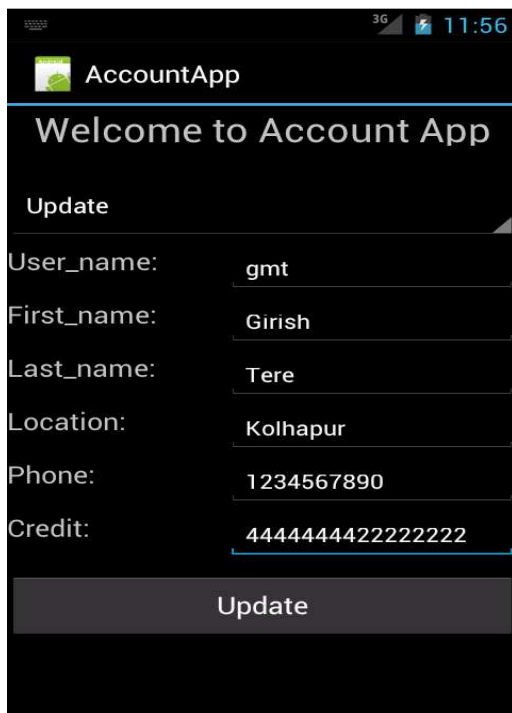


Fig. 10: Screen shot of Update operation

Table 1: Response time for various data operations in different networks.

Operation	Response Time (msec)	Response Time (msec)
	Wi-Fi	Bluetooth
Select (10 records)	546	786
Select (100 records)	2576	3980
Insert	330	459
Update	450	563

Delete	238	296
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It is observed that more response time is required if SOAP response message contains large data. (for e.g. 100 records) To reduce this time compression technique can be used.

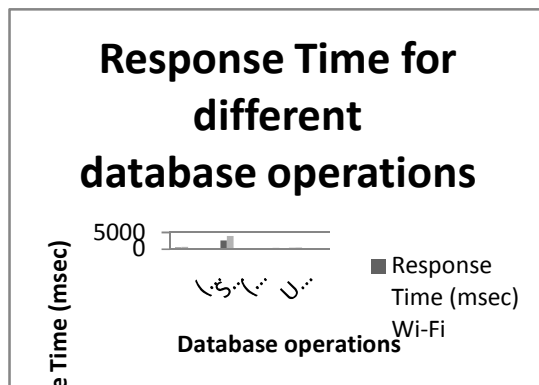


Fig 12: Response time for different database operations in different network

Conclusions

We developed Android client which access database web service developed in different platform and published in remote server. We need to install kSOAP library at client side for SOAP processing as the communication between client and server is via exchanging SOAP messages. Experiments were performed in different

networking environments and results are shown here, see Fig. 12. In order to reduce the response time required for select operation, SOAP message can be converted to binary and SOAP compression libraries can be used at both client and server.

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