Article 6

Students Activities Notification System

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Abstract
Student portal is an official website of UiTM. The function of student portal is to spread the new information or activities for the current semester. The examples of information are date of course registration, date of validation, date of result final exam, faculty or club activities. From my survey, I found that it is hard to get new information. They have to log in into student portal to enable them to get the latest news. To solve this problem, an Android Mobile for Students Activities Notification System was being created using Android platform. This project was developed using hardware and software. The hardware is using mobile phone with Android operating system and personal computer for the server. Android SDK (System Development Kit) was used to develop the Android Mobile for Students Activities Notification System that compatible for Android operating system. These projects were conduct usability test and transmission of update information from server to client. As long as student is connected to the Internet, they can get the notification of new information that is being update. This project involve with server client communication. This project is important because it helps student to get or receive new update information without have to log in into student portal.

Keywords: GCM, UiTM, JXTA, JDK, SDK.

Introduction
In Mobile Application Architecture for Android Mobile for Student Notification System involve several steps to get the notification of the new information. The first step is student mobile phone must connect to the Internet to get connected to the web server. After that, admin were updating the new information on the web server and the information were stored in the data storage on the web server. After the new information was being updated, the web servers were use notification service to send the information to the mobile phone students. In the mobile phone students, their mobile were notified when they receive the new updated information.

Methodology
In methodology, there were three (3) process invloves in developing the system. First is the process of developing the Android mobile for students activities notification system which discuss the hardware and software used, followed by explanation on Android mobile application flow architecture. Lastly, is the design of Android mobile application to make sure the design meets user friendly interface.

1. Development of Android Mobile for Students Activities Notification System

Developing Android Mobile for Students Activities Notification System is using Eclipse. The languages that were used to develop this mobile application are Java and XML language. In this project, the connection is between servers to client connection. The web server is using php. The server is using 23.94.32.114 ip address. The server operating system is Centos 5.9. Servers were connected to the internet to get connected to mobile phone users. The mobile phone user is using Android 2.3 and above. Mobile phone users also were connected to the internet to get any updated information that being updated in web server. Figure 1shows the network topologies that were used in this project.
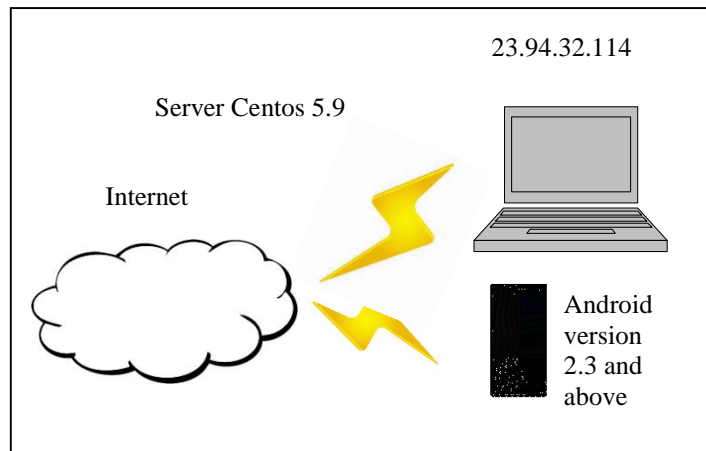
Figure 1: Network Diagram of Android Mobile for Students Activities Notification System

2. Android Mobile Application Flow Architecture

This phase explains the processes involved in designing and development the mobile application flow architecture. The computers were act as a server while mobile phone acts as a client as shown in Figure 2. The web servers were using PHP language. When the new information is being updated, the servers were connected to mobile application. At the client side, firstly the clients were connecting to the Internet. After that they download that mobile application on the mobile phone store. After finish download, the application were being installed on the mobile phone client. To use that mobile application, the client must login first. After login, to enable them receive the new updated information, they must register their mobile phone with GCM service.

The applications connected to the server to get any update information on the server. The connections were used wireless connection. The application only can get the new information went it connect to the internet. Figure 2 shows the mobile application flow architecture of this project.
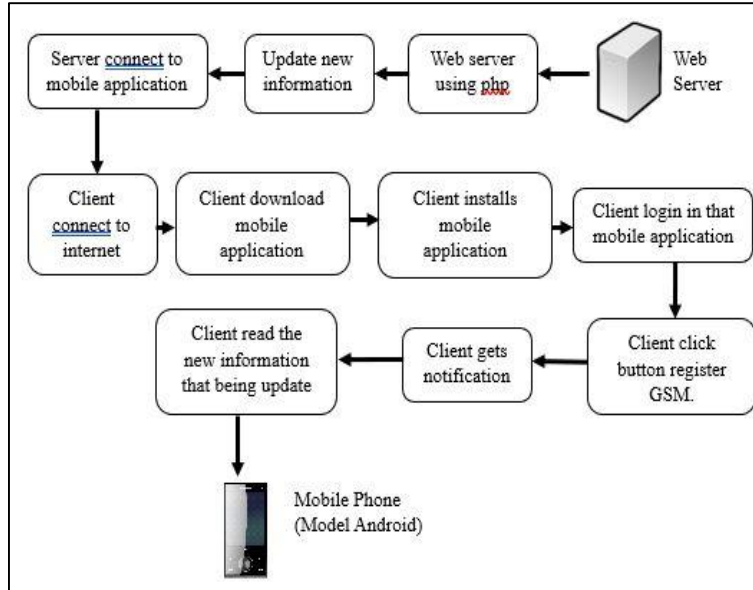
Figure 2: Mobile Application Flow Architecture

3.   Design of Mobile Application Interface

Android Mobile for Students Activities Notification System has five interfaces which are introduction, login, GCM register, home and about us interface.

a)   Introduction Interface

The first interface is introduction interface. The logo UiTM and welcome text were used to start the mobile application as a trademark of this mobile application. Figure 3 shows the introduction interface.

Figure 3: Introduction Interface

b)   Login Interface

The second interface is the login interface; two edit box and one login button were used for the user to login first before using this mobile application. The first edit box is student id. Student must enter their student id that is being given by the UiTM. The second edit box is student password. After student complete enter their student id and student password, enter the login button enable them to read the information that being updated. Figure 4 shows the login interface.
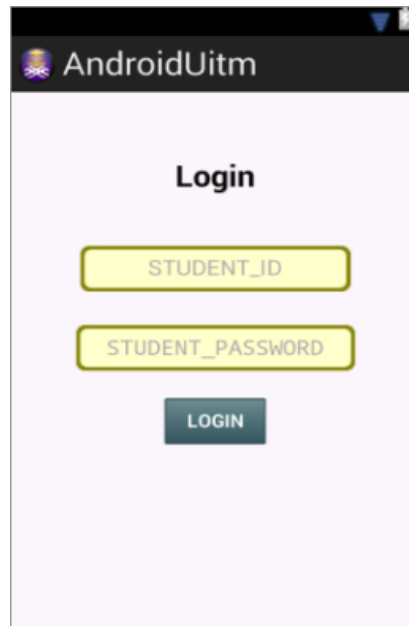

Figure 4: Login Interface

c) GCM Register Interface

The third interface is GCM register interface. The GCM register interface have three button which are home button, register gcm and unregister gcm and the status to show whether the mobile phone user is already register or not. The home button is link to home page interface. The register GCM button is to register the user device or mobile phone to enable them to receive notification when the new updated information was updated. The last button is the "unregister" button. This button is to stop the device from receive the notification. Figure 5 shows the GCM register interface.
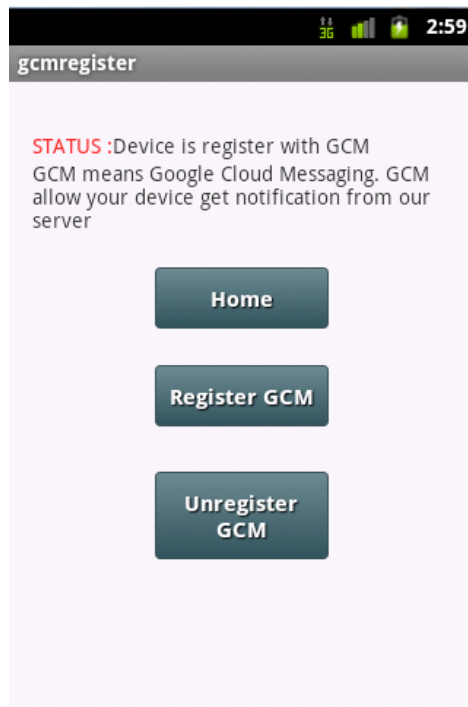
Figure 5: GCM Register Interface

Experimentation

There are 2 scenarios experiments were conducted, which are Experiment 1 for the effect of response time to Android Mobile for Students Activities Notification System with multiple users (Table 2) and Experiment 2 for effect of response time to Android Mobile for Students Activities Notification System with different size of data (Table 2).

Table 1: Step of Experiment 1: The Effect of Response Time to Android Mobile for Students Activities Notification System with Multiple Users

NO.	DESCRIBTION
1.	Install Android Mobile for Students Activities Notification System to mobile phone 1, 2, 3, 4, 5.
2.	Start the experiment with mobile phone 1.
3.	The new information was being updated in the web server.
4.	Time taken was being recorded when the mobile phone user receive the new information.
5.	Repeat step three and four for mobile phone 2, 3, 4, 5.

Table 2: Step of Experiment 2: The Effect of Response Time to Android Mobile for Students Activities Notification System with Different Sizes of Data

NO.	DESCRIBTION
1.	One mobile phone that was installed with Android Mobile for Students Activities Notification System was being connected to the web server.
2.	The new information was being updated in the web server with 215 Byte sizes of data.

3. Time taken was being recorded when the mobile phone user receive the new information.
4. Repeat step two and three using different sizes of data which are 802, 1299, 2953 and 3393 bytes.

Discussions
Experiment 1: The Effect of Response Time to Android Mobile for Students Activities Notification System with Multiple Users

In first testing, we use different size of data in Byte and send the data with one user only. The time taken is taken three times. As we can see, in Table 3 shows the result of the average time message receives to mobile phone users. From the data collected, it shows that the bigger the size, the longer the time. In this testing we not only depend on size of data but the time of message receive also depend on the speed of the Internet. Figure 6 show the graph of average time message receive against size of data.

Table 3: Average time against size of data

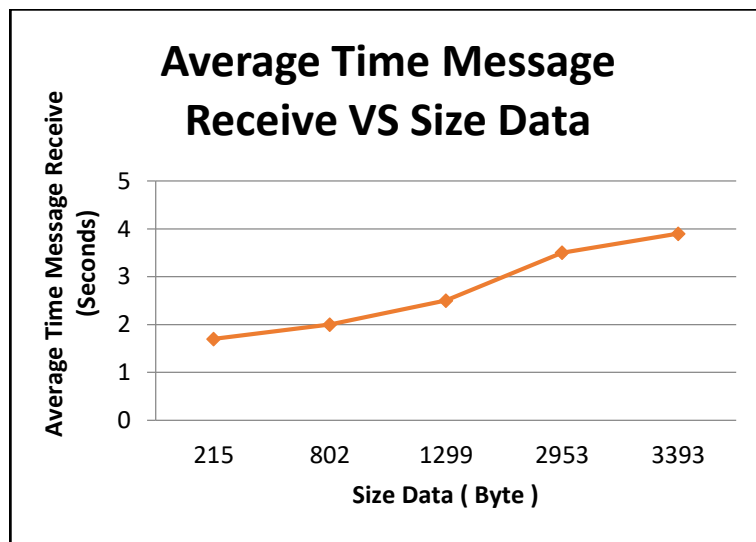| Size Data(byte)	Time Message Receive(seconds)			Average Time Message Receive (seconds)
	First taken	Second taken	Third taken	
215	1.3	1.9	1.5	1.7
802	2.0	1.9	2.2	2.0
1299	2.5	2.2	2.9	2.5
2953	3.1	3.9	3.7	3.5
3393	3.5	4.1	4.0	3.9

Figure 6: Graph of Average Time Message Receive against Size Data

Experiment 2: The Effect of Response Time to Android Mobile for Students Activities
Notification System with Different Sizes of Data

For the second testing,which was tested in different number of users, this testing is using the same
size of data which is 474 bytes. Table 4 shows the data collected in this testing. From the result of
the testing, it can be conclude that when the number of users is increase, the time of message
receive to mobile phone users are also increasing. In this testing also depend on speed of the
Internet connection. The average time from five numbers of users is acceptable because it only
take three to four seconds that the users to receive the message. Figure 7 shows the picture of time
taken during both testing phase.

Table 4: Average Time against No. of Users

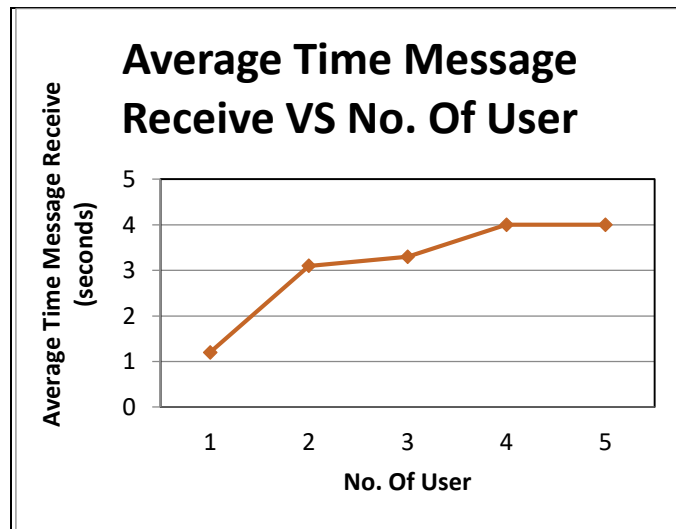| No. Of Users	Time Message Receive					Average Time Message Receive (seconds)
	First user	Second user	Third user	Fourth user	Fifth user	
1	1.2					1.2
2	3.84	2.3				3.1
3	4.6	2.8	2.5			3.3
4	4.1	4.3	3.5	4.2		4.0
5	4.2	3.6	3.0	4.9	4.4	4.0

Figure 7: Graph of Average Time Message Receive against No. of Users

Figure 8: Time taken during testing phase

Findings

The Android Mobile for Students Activities Notification System help the students in UiTM Perlis to get alert on important information that being update by UiTM admin in UiTM Student Portal. This mobile application also helps UiTM to spread their new information to student and their staff. Furthermore, by using this mobile application, it can reduce the probability of student miss some important information and it also wore make students to take immediate action to new information that they receive. The students directly received the information that being update in UiTM Student Portal in their mobile phone. This project also helps other developers of mobile application to make improvement or new application as a guideline to improve the education system.

Conclusion

From the observation on the experiment and feedback from students, the Android Mobile for Students Activities Notification System should be implemented in the UiTM Perlis to manage the information spreading. This is because it was made easier for the UiTM to spread their important information to students and staffs. It also can reduce the probability of student not receive or read the information and they can immediately take an action. In addition, it also can improve the education system to become more interesting. By improving the education system, students were getting motivated to study and easier to get new update about the important information. Besides that, by using this mobile application, spreading information was becoming more practical in conducting the information. Thus, it shows that this mobile application is the best way to spread the important information to UiTM Perlis students and staffs. It should be implemented in UiTM Perlis or others UiTM branch.

References

Ahmed M. G. (2013). How To Develop Smart Android Notifications using Google Cloud Messaging Service. Senior R&D Engineer-SECC.

Ben F. (2010). Mobile Application Development "The search for common ground in a divided market".

Chris A. (Red Hat), Shawn P. (Google) (2011). Understanding and UsingGit at Eclipse. Retrieved from http://eclipse.org/egithttp://www.eclipse.org/legal/cpl cpl-v10.html

Chris D. (2012). Type of Mobile Application. Retrieve from http://cdixon.org/2012/05/21/four-use-cases-for-mobile-apps/

Debajit G. (2010). Building Push Applications for Android.

Daniel S. (2010). Android Application Development. Senior Software Engineer, Google Inc.