

# **A Survey of Automatic Wi-Fi based Push Notification in College Campus using Cloud**

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## **ABSTRACT**

Today's a very important aspect of communications is messaging. In universities, colleges and hospitals it is efficient to display messages on notice board regarding meeting times, exam dates, special events, class cancellations or any pertinent. But sticking various notices day-to-day is a difficult process which requires a separate person to manage these notices to be displayed. To overcome the limitations of old techniques, the push notification came into existence. The purpose of this new form of cloud-based push-styled mobile notifications that uses push services as a means for sending notifications to the user and displaying notifications on users mobile device.

## **Keywords**

Android, GCM, PUSH NOTIFICATIONS, Server, Token, Wi-Fi.

## **1. INTRODUCTION**

The project is going to manage notices in different organisation like colleges, companies, public places etc. that will minimize the effort of lengthy job for managing the notices in large scale organisation. Wi-Fi is one of the latest technology for communication which using for transmit the data or notice information directly on the user mobile. So the person in the organization will always be updated about the circular or events. A new form of cloud-based push-styled[1] mobile application that exploits today's push notification services as a means of command dissemination. That creates an android application which registers itself on GCM (Google Cloud Messaging)[3] using Google API Console[5] which provides the platform to the push notification in web server (which in PHP) [4]. In the server the app stores the registration id of android application and information notices in server database which has been send to user. Whenever the server gets request it is verified by GCM and if a new update is available, it pushes the notification to the Android device [3]. By using this push style notification technique [1] with cloud, the server can keep track of the user's mobile which means that if the mobile device is on or off at that particular movement is not an issue. Every time it connects with the Wi-Fi [2] or any type of Internet plan the user can get update or notification. The aim of the project is the organization provided Wi-Fi or Internet to get the notifications from the cloud server. The User will get notifications through the internet and it is cheaper if the organization provides a Wi-Fi service to the students to reduce cost further.

## **2. LITERATURE REVIEW**

There are a number of studies in the literature on Push Notifications. Push Notification can be defined as a short message that is pushed to a certain application or individual's smart phone. This message informs the end user that there is an update or an event available that is related to the application. For example, an individual can be notified about certain events like placement details about a certain job availability.

The cloud platform can be used to make sure that notifications are pushed to the mobile device. While selecting a cloud service it is selected from the available services which are provided by cloud viz. Software as a service, Infrastructure as a service and Platform as a service. The googles cloud messaging app uses Platform as a service to implement C2DM (Cloud to device messaging) and is very-well integrated with Google's services. The Platform as a Service is a preconfigured service provided by Google and provides higher level of abstraction than other cloud services [8].

The push messaging will also include libraries like XMPP and C2DM with some particular ones like Urban Airship, Xtify and MQTT but the focus will mainly be on C2DM and XMPP. The XMPP protocol is used for real-time messaging and used for instant messaging by Google. The implementation of XMPP in cloud messaging is done by modifying it to suit the needs of cloud messaging by integrating it with the cloud services [8].

A Push Notification is mainly designed to work on a Smartphone or tablets. It is a way that allows an application that is not running on the device to let the user know that it has updates or information. Push notification can display alert message or play an alert sound to notify users with new updates. With the advance in the mobile technology it is not difficult to provide this service to each and every individual and thus proving to be a more reliable way to send information in form of a notifications at will to the user at that particular instance. Many different types of technologies associated with the Google's cloud based messaging service have been used for multiple applications for applications like push-pull server applications and chatting apps also use similar features like the GCM service to get notifications in real time. The technologies like 3G and wireless have also proven to be of assistance to improve the scope of this technology and is proving to be more useful by the day.

Google's cloud technology is used to provide different types of services. Google Cloud Messenger is a service that enables developers to send data from servers to both Android

applications or Chrome apps and extensions. Google Cloud Messenger is a free service that allows developers to send data from third party server to their application running on android devices. It handles queuing of message and delivery to the target application running on target device. It is a completely free service whatever maybe the messaging need. Other studies show that the cloud technology has helped in implementing peer-to-peer messaging and many other researches have been in favor of the PUSH NOTIFICATIONS via GCM. The Push notifications service is completely reliable service and will be advanced further to make it more robust.

### **3. NEED AND SCOPE OF THE PROJECT**

#### **3.1 Existing Technique:**

In the corporate world, managers are always faced with a lot of decisions to make based on data generated at their various offices. The decision making process is very vital for company. At times, information about company is so huge that the decision making process takes larger time than required. So therefore in existing technique, the manager are provided with summarizes data so that they can make quick decision [1].

At times the information they get can be so voluminous that plotting strategies and analyzing various trends from the received data becomes very tedious and thus the decision making process takes longer time than required [1]. Thus it's divided into following process:

1. The concept and model used that would be used to retrieve information from the central database.
2. Motivation for developing an android application for use by corporate executives.
3. Literature review of android applications that have been developed for corporate use.
4. The design and methodology used in development of an android application.

The application mentioned above is only for single user & small scale business, because large scale business cannot afford these techniques on so much company data. The managers cannot view the whole report, events and data catalogs on an android phone with the screen of merely 4 inches high. Even the managers have to make correct quick decisions to remain competitive, thus, profitable decision making is vital as any wrong decisions made could have serious consequences on the organization.

#### **3.2 Proposed Technique**

For viewing different tabs for every section & events in college a user has to visit a notice board or a website regularly to check if there is some new content available. Sometimes the user may miss out on an important notice. To sort this problem the solution is to provide the user with a digital medium like displaying those notices on his handheld device like a mobile phone, then PUSH NOTIFICATION [1] is what the need is. If that website provides updates, all the user needs is to do is install the application on his android device. The user then can use the application which then checks for updated content frequently and displays it on the device.

In the present system there is no portable and quick notification system. Even the notice boards or website student sections are not updated from time to time. In the "old days"

of the web to keep track of updates on a website people had to "bookmark" websites in the browser and manually return to them on a regular basis to see what had been added. The use of traditional notice boards in schools/colleges leads to following problems:

- Missing Notices or important memos created for students.
- Waste of time and energy to go looking for the notice boards.
- Human Error in pinning any related updates.
- Students tend to forget important updates by just going through the notice boards.

All these problems can be solved in this development project i.e. through PUSH NOTIFICATION [1] with the help of the googles C2DM and GCM architecture. In this project the aim is to provide the users with the feature of real-time and accurate data reception in less time. As soon as the website is updated the users should dynamically receive the important updates in real time.

The exchange of information that PUSH NOTIFICATION [1] facilitates can also take place from students to faculty or among the students in various courses within a department. Faculty can use Push Notification to help themselves efficiently and use the Internet to exchange disciplinary information and increase awareness of important developments.

The first thing that is needed to be done is install the app into the individual's android device. It's work a little like email but without an account. It can be chosen as update criteria to only receive certain types of information.

### **4. OVERVIEW AND ARCHITECTURE**

Google Cloud Messaging for Android (GCM) is a service that allows you to send data from your server to the users' Android-powered device. This could be a lightweight message telling your app there is new data to be fetched from the server like new version of apps or something like that [9].

The GCM service handles all aspects of storing, queuing and delivery of messages to the target Android application running on the target device. It is a completely free service whatever you're messaging needs [3].

#### **4.1 GCM Architecture**

1. Android device would send the sender's ID and the application ID to GCM server for registration.
2. On successful registration, the GCM server issues a registration ID to android device.
3. After receiving registration ID, device will send it to the local server.
4. The local server will store the registration ID in the database for later use.
  - a. Whenever a notification is provided through the website, the server sends the message to the GCM server along with the registered ID.
  - b. GCM server will deliver that message to respective device using that registration ID.

The Google's Cloud messaging platform as shown in the figure will act as the primary platform. The user will first be registering onto the GCM platform and will receive a token ID which will be stored on the server which identifies the user's

phone based on that ID. The server is where the organization will be having a PHP based web client which is going to send the notifications to individuals with respect to their registration ID or in bulk however intended [9].

Fig 1. Shows how the process of registration and sending a notification takes place. The user registers on the GCM in step 1 the GCM provides the registration ID in step 2. In step 3 & 4 the mobile stores the ID on the server and the step a. & b. are the phases where the server is sending the notification to the phone via the GCM architecture.

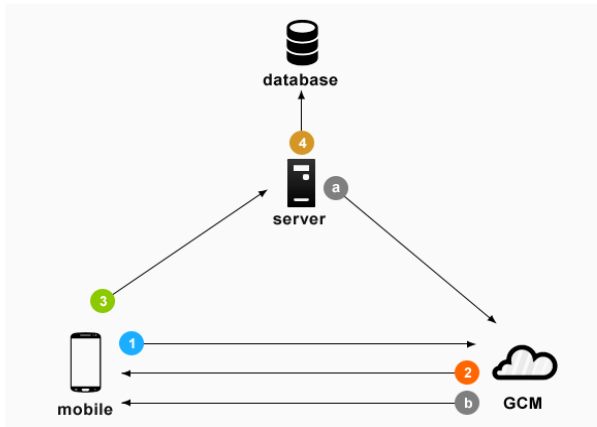


Fig 1: Architecture and workflow

GCM is used as it is a client server architecture which is the most commonly and widely used architecture and is easy to implement. GCM has a feature of collapsible messages; collapsible messages are a better choice from a performance point of view, because they put less of a burden on the device battery.

Scalability implies the ability for the architecture to grow and accommodate increasing numbers of users, applications, and systems. Scalability and Extensibility refer to an application's ability to inherently support changes to the hardware and software on which it depends. Using GCM we can send messages to a single or a group of android devices simultaneously in a single transmission.

## 4.2 Android Device

The Android application is the main interface via which the user is going to use to receive the push notifications. The important requirements for developing the application are listed below:

- Android Application [5]: This application is developed using android development studio in conjunction with SDK tools.
- SDK tools [5]: The *Android SDK tools* compile the code along with any data and resource files. The Android SDK provides the tools and APIs necessary to begin developing applications on the Android platform using the Java programming language.
- .apk [5]: All the code in a single *.apk* file is considered to be one application and is the file that Android-powered devices use to install the application.

- Android OS [5]: Android is a Linux-based operating system designed primarily for touch screen mobile devices such as smart phones and tablet computers. It enables replace and reuse of components.

## 4.3 Server and Database

The server and database are an essential part of the push notifications and the main activity of the server and database is to provide the admin the facility to send the message to the client and receive an acknowledgement from the client that the message has been received. The components which are required to setup a server are listed below:

- PHP [3]-[4]: PHP Hypertext Pre-processor", is an open-source, reflective programming language used mainly for developing server-side applications and dynamic web content. XAMPP is a free open source cross platform web server package consisting of Apache Http server, MySQL database and interpreters for scripts written in PHP and Perl programming language.
- MySQL [6]: MySQL is the most popular database system used with PHP. MySQL is open source RDBMS which manages the data contained within the databases. We have used the version MySQL 5.0.

## 5. EXTENSION TO OTHER PLATFORMS

The application can be used on multiple platforms other than Android to provide push notification services as well. There are ways to extend GCM service to other platforms and to push notifications in other platforms are almost similar to GCM in the architectural design.

When an application launches in a mobile device, it needs to register to the push service to get a unique ID (it may have different names in different platforms, e.g., *device token* in iOS and *push URI* in Windows), and then sends it to the application server.

When the application server wants to send a push notification to an application, it sends the ID together with the payload to a push server, which then forwards the payload to the application.

After comparing these different push notification services including Google's GCM, Apple's Push Notification Service, Microsoft's Push Notification Service, Blackberry's Push Service (BPS) and Nokia's Notification API. The developer can make the application based on these individual platforms. The application can be developed for these individual platform.

## 6. CONCLUSION

GCM push notifications save time and helps to get the information you want quickly after it was published. It provides users to stay updated with information consistently with the help of synchronization process via cloud. Using the services provided by the Cloud, the technology can be applied to solve many obstacles faced by the institutions and organizations while giving out any updates by creating an efficient and reliable application on any mobile platform so that the end user remains updated on the latest news regarding their respective organizations. This application is a need of the hour as it allows users to stay updated in real time.

The future scope of this idea enables the user to get updates in real time and completely makes the traditional way to become obsolete as the technology progresses. The organizations may

not require to display anything on the boards since all the users would receive the updates on their mobile devices. The push notifications is relatively a new prospect and needs to be studied more hence more further modifications and changes will make it grow even more adaptive and powerful thus making it very useful in the future.

The project will be scalable across multiple platforms and will provide more reliability due to its efficiency and robustness.

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