Private Cloud To Device Push Messaging

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Abstract—The emergence of mobile cloud computing provides the opportunity to connect with a number of people simultaneously. Together with an exclusive growth of mobile application and emergence of cloud computing concepts, mobile cloud computing has been introduced to be a potential technology for mobile services.

In this paper we do a case study of the state of the art of push messaging for Android. We examine the technology of private cloud and we also examine its connection with the android application. The application is predominantly developed for addressing the problem of connecting with a large number of people simultaneously. Wherein the same message can be send to a number of people at the same time using private cloud. We create an application using private cloud and do initial performance test. In our project we also look at the performance of the private cloud, and its integration with the android application.

Keywords: Ubuntu Cloud Enterprise, Eclipse, Push Message, Eucalyptus, Controller.

I. INTRODUCTION

Mobile phones, and especially smartphones, are becoming increasingly popular. Gartner reported that in 2010 the smartphone sales to end-users increased by 72.1%, while mobile device sales as a whole increased by 31.8% to a total of 1.6 billion units sold [1]. Consequently, developers are able to reach a very large audience with new and innovative software. Another important development in mobile phone technology is the high-speed network available to the public. With EDGE, 3G and even 4G in some places, users are almost always connected. The feature-rich and powerful mobile devices combined with a high-speed network provide many new and exciting innovation possibilities. One of these is cloud computing, which has emerged as a promising technology direction in the last few years, especially when utilized in combination with new smartphones. The term cloud computing refers to the applications delivered over the Internet specifically and the hardware and systems software that is providing these services [2].

Cloud computing will in many cases offer the appropriate scalability, flexibility and cost-model for many different types of services. According to the Gartner [3] both cloud computing and mobile applications and media tablets are on the top 10 list of strategic technologies for 2011. This proves the importance of these technologies and how crucial it is to continue to push the boundary on what is possible to offer to the end users with the ever-improving hardware and network infrastructure available.

The work that we intend to do in this project is to tie two technologies together. In this project we tie cloud computing with the android application so we use push messaging for this purpose. Here push messaging is used to for communications using android application and cloud. For cloud, we intend to develop a private cloud for this purpose. The cloud is used to temporarily store the message (mostly text). For this purpose we study ubuntu cloud enterprise which can be used for the development and management of the private cloud. The Ubuntu Enterprise Cloud (UEC), powered by Eucalyptus, is highly configurable and customizable to a variety of environments.

An android application is built which can be used on a smartphone for sending and receiving of the messages. The application acts as an interface between the smartphone and private cloud. For the development of a android application we study Eclipse SDK. In computer programming, Eclipse is an integrated development environment (IDE). It contains a base workspace and an extensible plug-in system for customizing the environment. The Android SDK provides you the API libraries and developer tools necessary to build, test, and debug apps for Android.

A. Related Works

There exists a service that is provided by the google for the developers to make use of for development of android application using it. The service provided is called as Google Cloud Messaging (GCM). Google Cloud Messaging for Android (GCM) is a service that allows you to send data from your server to your users' Android-powered device, and also to receive messages from devices on the same connection. The GCM service handles all aspects of queueing of messages and delivery to the target Android application running on the target device. GCM is completely free no matter how big your messaging needs are, and there are no quotas. A GCM implementation includes a Google-provided connection server,
a 3rd-party app server that interacts with the connection server, and a GCM-enabled client app running on an Android device.

There is also a library called Cloud to Device Messaging (C2DM) using which it is possible to develop push notification application. A research related to which was done by Mr. Jarle Hansen, Mr. Tor-Morten Grønli and Gheorghita Ghinea. In their opinion the C2DM technology is particularly interesting because it integrates push technology on the Android platform with cloud computing. They did find room for improvement in the standard API offered by Google. They have tried to improve this in our own open source project called Simple-C2DM.

B. Literature Surveyed

Now there exists various papers on cloud computing. The various literature that exists describes the working of cloud and the way in which android application can be used for the same. One such paper that describes in depth the integration of cloud an android is “Cloud to Device Push Messaging on Android: a Case Study”, authored by Jarle Hansen, Tor-Morten Grønli and Gheorghita Ghinea. In this paper they do a case study of the state of the art of push messaging for Android. They examine a technology called C2DM (Cloud to Device Messaging) and how well it integrates with cloud computing. The abstract of the paper describes the purpose of the investigation undertaken by them. It also illustrates the reasons for the increase in the use push notifications as a means of communication.

II. EXISTING SYSTEM

Cloud computing is internet-based computing in which large groups of remote servers are networked to allow the centralized data storage, and online access to computer services or resources. Google Cloud Messaging (GCM) is a service that enables developers to send data from servers to both Android applications or Chrome apps and extensions. The service provides a simple, lightweight mechanism that servers can use to tell mobile applications to contact the server directly, to fetch updated application or user data. The service handles all aspects of queuing of messages and delivery to the target application running on the target device. The free service has the ability to send a lightweight message informing the Android application of new data to be fetched from the server. Larger messages can be sent with up to 4 KB of payload data. Each notification message size is limited to 1024 bytes, and Google limits the number of messages a sender sends in aggregate, and the number of messages a sender sends to a specific device. Applications on an Android device don’t need to be running to receive messages. The system will wake up the application via a mechanism called Intent Broadcast when the message arrives, as long as the application is set up with the proper broadcast receiver and permissions. GCM does not provide any built-in user interface or other handling for message data. Instead, it simply passes raw message data received straight to the application, which has full control of how to handle it. For example, the application might post a notification, display a custom user interface, or silently sync data.

III. PROPOSED SYSTEM

In this project we tie cloud computing with the android application so we use push messaging for this purpose. Here push messaging is used for communications using android application and cloud. For cloud, we intend to develop a private cloud for this purpose. The cloud is used to temporarily store the message (mostly text). For this purpose we study Ubuntu Cloud Enterprise which can be used for the development and management of the private cloud. The Ubuntu Enterprise Cloud (UCE), powered by Eucalyptus, is highly configurable and customizable to a variety of environments. An android application is built which can be used on a smartphone for sending and receiving of the messages. The application acts as an interface between the smartphone and private cloud. For the development of an Android application we study Eclipse SDK. In this system, a user can log onto the system using his own login ID and password after which the user can send a message to all the people in its contact. The user can type its message and send which will then sent to the private cloud for temporary storage. After which it push down the messages to all the contacts of the user.

A. Working

The android application is developed in the Java programming language using the Android Software Development Kit(SDK). Private cloud will be implemented in Ubuntu Cloud Enterprise(UCE) , a product of Ubuntu. PHP programming language is used in the cloud for the connectivity between the application and cloud storage. The IP address generated is used as a intermediate for private cloud and android application.

The first phase initiates with the registration of admin and client of the android application to the private cloud. The data of admin and client are stored separately to distinguish for latter operations. For each client, an random token is generated which is unique to identify or assign them into groups. The prime operations like sending messages, receiving messages, registration and cloud response takes place using the IP address of the private cloud.
The admin can send message only if it is registered to the cloud and the else cases will be discarded for security purposes. When the admin clicks the send message in the application, an file is created in which the contents is the data to be sent. This file is uploaded and sent to the cloud using the IP address which will be then stored into MySQL database. This data will be then fetched later for push messaging.

The third step is to push message to all the clients that have been registered to the cloud. The data will be fetched from the database and then using the sms gateway, the messages will be sent. All the clients will receive the message in the notification bar of the android application. On receiving messages from cloud, the client will send an acknowledgment back for successful delivery. If there is an error occurred during this process, for all those clients whose acknowledgement is not received will be resend further.

The client has got an privilege to retrieve all the messages that is stored in the database at any interval. For every retrieve event triggered by the client, there will be flow of messages between client and cloud. This operation is essential because for any client that is registered recently can check all the events that has happened before. If the database is empty or does not contain any data, it will send an message indicating that no events exists.

Push notifications have become popularized by the mobile industry to achieve desired user experiences by compensating for connectivity deficiencies. Push got its start in wireless email but as of late has been generalized for usage in several different forms. The application has immense potential in various businesses and organizations were important information is to be shared among a number of people in a short period of time. The applications can also be used in times of disaster to send SOS messages. The application can be developed to send distress messages incase of mobile networks being down. There also exists scope for using the application for various recreational activities such as sending of audio, videos etc among people in the future.

The use of the push notifications increases the level of communication among the people in an organization. There are various future uses such as sending of SOS messages. The application has a very user friendly GUI which makes it easier for understanding of the user. The application makes use of private cloud using which additional security features can be provided for the users, this makes mass communication more secure. The application makes use of two technologies of cloud computing and android applications. The paper concludes that it is possible for seamless integration between two technologies.

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REFERENCES


