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RESEARCH ARTICLE

SERVER SCALABILITY ISSUES IN MOBILE PRESENCE SERVICES

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ABSTRACT: With the development of wireless telecommunication technologies, the customer services that are used in the computer-based Internet have also appeared in mobile phones. Mobile instant message (MIM) is a typical example. MIM enables consumers, whether sitting at the computer or on the road, to connect instant message (IM) with existing communities and social services. A mobile presence service is one of the essential components of a MIM and many social network applications as it maintains each mobile user's presence information, such as the current status whether online or offline, GPS location and network address, and updates the user's online friends with the information continually. This presence update occur frequently so enormous messages are distributed by presence server may lead to a scalability problem in a large scale mobile presence service.

This paper gives a survey of presence services of existing and proposed systems and their server scalability issues. Various Instant Messaging services (IM), VoIP services are discussed here.

Keywords:- Social networks, mobile presence services, Instant messaging

I. INTRODUCTION

Because of the ubiquity of Internet, many mobile devices and cloud computing environments can provide presence- enabled applications, i.e., social network applications / services worldwide. Presence is a powerful network capability that is useful for consumers as a rich communication tool, for enterprises to enhance productivity and for mobile operators to increase the value of the network. Presence complements new business models in open mobile eco-systems. Application developers for Android, iPhone or any Windows Mobile can be easily derived and use Presence to offer new social applications. Facebook, twitter, Mobile Instant Messaging (MIM), WhatsApp etc. are the popular social, presence-enabled applications. These applications engage with their

friends on the Internet, share live experiences instantly across far distances. For example, Facebook receives more than 25 billion shared items every month and Twitter receives more than 55 million tweets every day. In the future, mobile devices will become more powerful, sensing, and media capture devices. The key function of a mobile presence service is to maintain an up-to-date list of presence information of all mobile users. Presence is a foundational element of unified communications.

The presence information includes details about a mobile user's location, availability, activity, mood, device capability. The service must also bind the user's ID to his/her current presence information, as well as retrieve and subscribe to changes in the presence information of the user's buddies. In social network services, each mobile user has a friend list, called a buddy list contains the contact information of other users that he/she wants to communicate or interact with. The mobile user's status is broadcast automatically to each person on the buddy list whenever he/she transits from one status to the other. For example, whenever a mobile user logs into a social network application, such as an IM system, through his/her mobile device, the mobile presence service first searches for and notifies everyone on the user's buddy list. If want to maximize a mobile presence service search speed and to minimize the notification time, most presence services uses server cluster technology. Currently, more than one billion people use social network services on the Internet. Given the growth of social network applications and mobile network capacity, it is notified that the number of mobile presence service users will increase substantially in the future. Thus, a scalable mobile presence service is deemed essential for future Internet applications. In the last decade, so many Internet services have been deployed in distributed paradigms as well as cloud computing applications. For example, the services which developed by Google and Facebook are spread among as many distributed servers as possible to support the huge number of users worldwide. In this paper, we discuss the server architectures of existing and proposed presence services.

II. COMPARATIVE STUDY

Instant messaging (IM) is a type of online chat which offers real-time text transmission over the Internet. Most popular network IM system are discussed here. They are

1) AOLInstant Messenger,
2) Yahoo! Messenger (YMSG),
3) Microsoft Messenger (MSN).

Most IM systems use centralized clusters to provide presence services. Jennings et al presented taxonomy of different features and functions supported by these three IM systems. The authors also provided an overview of the system architectures and observed that the systems use client-server-based architectures all three commercial systems use server clusters for scalability. AIM and MSN choose the asymmetric approach.

1) AOL Instant Messenger:

AIM defines different types of servers. Some of them are login, BOS icon, chat roomsetup, user search and chat room hosting. AIM uses client-server architecture for normal operations but uses a peer-to-peer approach for voice-chat sessions.

2) Yahoo! Messenger (YMSG):

YMSG takes the symmetric approach. YMSG also uses client-server architecture for normal operations as well as voice-chat service. YMSG voice traffic is routed by a centralized voice-chat server. Clients need only one type of server and then route all kinds of activities though that particular server. While each has been designed and implemented separately, the total group exhibits same characteristics with respect to network and system architecture.

3) Microsoft Messenger (MSN):

MSN defines three types: dispatch, notification, and switch board. MSN alsouses a client-server architecture for normal operations and peer-to-peer for voice chat communication. Most IM systems have mechanisms for maintaining lists of friends. These are typically called buddy lists, allow lists, and block lists.

Many of the IM protocols allow authenticating with a central server and got engaged in private messages, and conversing in public chat rooms. In addition, some IM systems allow file transfers, Webcam usage, using privacy controls, maintaining buddy lists, voice chat sessions, and other options. Most IM systems, including the three use client-server architecture. IM providers host a set of servers that customers log in to and exchange messages with. In client-server architecture, since both control and data paths go through the central servers, they scale the service to millions of users is difficult. The scalability issue is difficult for voice chat sessions.

Recently, presence services are also integrated into mobile services. Some mobile devices also support mobile presence services. For example, the techniques like Instant Messaging and Presence Services was developed by the Wireless Village consortium and was united into Open Mobile Alliance (OMA)IMPS in 2005. Chen et al. proposed a weakly consistent scheme to reduce the number of updating messages in mobile presence services of IP Multimedia Subsystem (IMS). However, it also suffers scalability problem since it uses a centralSIP server to perform presence update of mobile users. Authors presented the server scalability and distributed management issues in IMS-based presence service. Recently, the IETF has embarked on an effort to standardize IM and chat protocols. Two standards are being developed: one based on SIMPLE and a second one based on XMPP.

SIMPLE:

SIMPLE is an extension to the Session Initiation Protocol (SIP) that adds instant messaging and presence. SIP defined as a text-based control-plane protocol for establishing multimedia sessions such as Voice over IP. The Message Session Relay Protocol(MSRP) is an instant message transport protocol defined by the SIMPLE working group. It is a session-based protocol. For example, 3GPPdefined the integration of presence service into its specification in UMTS. It is based totally on SIP protocol, and uses the technique SIMPLE to manage presence information.

XMPP:

XMPP, the Extensible Messaging and Presence Protocol, is an another alternative to SIMPLE. The basic syntax and semantics of XMPP were developed originally within the Jabber open-source community.
It is intended mainly for the purpose of building IM and presence applications. This IM protocol is also the protocol used in the commercial implementation of Google Talk and Facebook Chat. In the year October 2004, the XMPP working group at IETF published the documents. Those documents are RFC 3920, RFC 3921, RFC 3922 and RFC 3923,to standardize the core XMPP protocol. WhatsApp also uses a customized version of the XMPP. Upon installation, it creates a user account using one's phone number as the username (Jabber ID:[phone number] @s.whatsapp.net).

Global Index (GI) technology:

Skype, a popular voice over IP application, utilizes the Global Index (GI) technology to provide a presence service for users. GI is a multitier network architecture where each node maintains full knowledge of all available users.

All these IM services use central server architecture which leads to scalability problem at server side. So to address the problem, efficient and scalable server architecture, called Presence Cloud is proposed by Chi-Jen et al. Presence Cloud organizes presence servers into a quorum-based server-to-server architecture for efficient presence searching. It also uses directed search algorithm and a one-hop caching strategy to achieve small constant search latency. Overall, Presence Cloud is shown to be a scalable mobile presence service in large-scale social network services

III. CONCLUSION

This paper provides survey of different presence enabled services with their systemarchitectures. Popular IM services, VoIP, mobile presence services and chat communication using IETF standardized protocols such as SIMPLE and XMPP are discussed. Presence Cloud is a proposed scalable server is also discussed. Out of all the systems, Presence Cloud seems to more scalable and efficient server for mobile presence enabled services.

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