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MOBILE SOCIAL CLOUD COMPUTING: OPEN CHALLENGES

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ABSTRACT

Mobile Social Cloud Computing (MSCC) integrates the Cloud Computing and Social networking into the wireless mobile communication environment. We have seen an exceptional boost in the usage and deployment of smart phone platforms and social networking applications worldwide. At the same time, mobile devices are progressively becoming essential part of one's life as these are most convenient and effective communication tools these days and not bounded by time and place.In the recent years, we have seen that CCframeworks, such as AWS (Amazon Web Services), Microsoft Azure and Google AppEngine become progressively more popular among IT developers and organizational clients. In social computing, users share media and other files among each other with less or no authentication because users are eager to provide their data to other SN members even through mobile devices. The paper presents representative effects of the MSCC paradigm. The inherent major technical challenges (problems), like frequent disconnections that are associated with mobility,that arise in MSCC and the opportunities that can be realized to overcome thechallenges are presented. We conclude the paper by highlighting future insights in the domain.

Keywords: Cloud Computing, Content Addressable Network (CAN), Fault tolerance, Mobile Social Cloud Computing (MSCC), Quality of Service (QoS), Scheduling, Social Networking, Privacy, Virtualization.

I. INTRODUCTION

The rapid progress of mobile computing (MC) [1] becomes a powerful trend in the development of IT technology as well as commerce and industry fields. Cloud computing (CC) has been extensively accepted as the next generation computing framework. CC offers use of infrastructure, platforms and software provided by cloud providers (e.g., Amazon, Salesforce and Google) at low cost. In addition, CC enables users to access on-demand, pay-as-you-use and elastically utilizable resources. As a result, mobile applications can be quickly provisioned and released with just effortless management by service provider.With the explosion of social networking applications and the support of CC for a variety of services for mobile users, Mobile Social Cloud computing (MSCC) is introduced as an integration of Social Networking and CC into the mobile environment.

II. MOBILE SOCIAL CLOUD COMPUTING - MSCC

Indeed,'mobility' is one of the characteristics of a pervasive computingenvironment where the user is able to continue his/her workseamlessly regardless of his/her movement. The Paradigm is evolved keeping mobility in mind known as the Mobile Social Cloud.Social Computing is blend of social communication and computational systems.In recent years, developers build abundant mobile applications in various domains such as entertainment, sports, social networking, business, news and travel.Thepopularity of these is evident by looking through mobile appdownload centres such as Google Play Store and Apple's resources. The convergence of mobile computing, social networking and CC gave birth to a new and powerful paradigm for achieving great interaction. Mobile devices in MSCC create SNs,which is basedon basic authentication, to share cloud services

Figure 1 shows the global view of MSCC computing environment and communication. MSCC is using CAN which is type of P2P network.
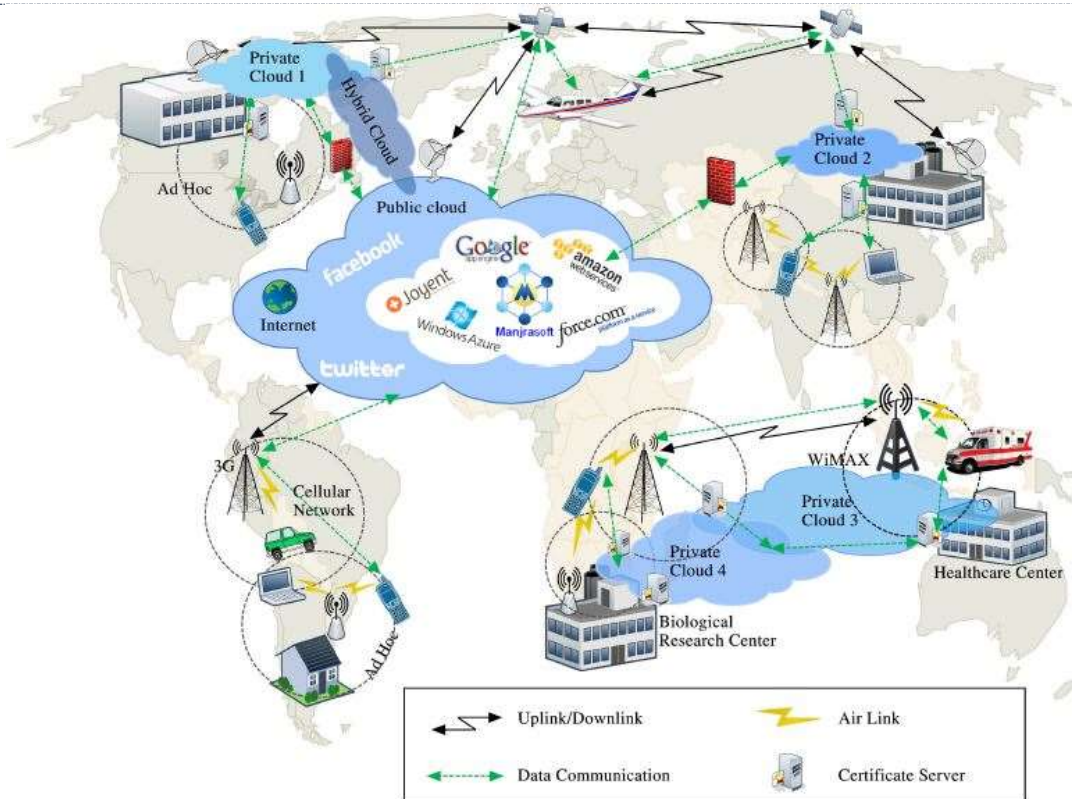
Figure 1:Global View of MSCC Environment

To establish the need and importance for mobile CC, the work [2] discussed unique advantages of applications based on mobile computing. Thus work is focused on (MSCC), which put together mobile devices, CC, and social networking. The combination of Mobile devices, SNs and CC is a novel paradigm generating representative effects due to following reasons [1].

- The increasing use of mobile computing: Mobile delivery of critical applications including calendar, enterprise email has become a basic requirement.
- The growth of SNs for business: Team and Social collaboration on wikis, blogs etc. for sharing files, creates great likelihood for productivity.
- The continued augmentation of CC: The real beauty of the cloud is that users can seamlessly deliver services to multiple end-points such as tablets and PCs.
- Mobile users can join and become a member of a SN to share the data or cloud service without further authentication. Now, in addition to servers the mobile devices can also provide cloud services to other users of the SN, so mobile devices act as resources.

III.   LITERATURE REVIEW

There are several issues inherent in MSCC and each category of issues like Security, Service Level Agreements etc. demands separate research in the domain. The works [3], [4] addressed major challenges and faults (problems frequent disconnections due to resource scarcity and mobility) by executing mobile applications on providers external to the mobile device. Authors [4] also focused on several other issues including: Privacy, Security, trust, data management and Operational and End user level issues. Authors [5] illustrated the applicability of MCC in various domains including Social Networking, learning, health/wellness and commerce. This paper [6] presents a survey of MSCC that includes overview of the definition of MCC, architecture, and applications. MSCC issues, existing solutions, and approaches are presented. In addition, the future research directions of MCC are discussed. Sook Kyong Choi et al. [7] proposed fault tolerance and QoS (Quality of Services) scheduling using CAN (Content Addressable Network) in Mobile Social Cloud Computing (MSCC). Elio Goettelmann et al. [8] proposed an approach for deploying business processes on the cloud supporting security constraints; thereby ensuring sensitive data exchange.

IV.   MAJOR TECHNICAL CHALLENGES IN MSCC AND OPPORTUNITIES

This section outlines major technical challenges (problems) in MSCC and the opportunities that can be realized to overcome the challenges.

MSCC has some distinctiveness that differentiates it from usual Grid computing. Though, there are few more issues in MSCC due to the nature of mobile devices that must be handled.

1.   Faults:

The inherent problem referred to as Faults. Faults may occur due to following reasons:

-   **Network disconnection resulting from user mobility:** MSCC supports user mobility. Therefore, users can freely move in a network, which may cause network disconnection from the AP or communication disconnection from the cloud server. These hinder user access to cloud services.
-   **User Freedom to Operate**: Some of Inherent problem of mobile device includes intentional turn off intentionally by the owner as device is independently operated.
-   **Power run down:** It is another reason. Besides, there are some circumstances in which users could not use cloud services because of faults, including physical defects, or software faults of mobile devices.
-   **Malicious Behavior:** In view of these faults, even after receiving a service request, a device may not grant cloud service to other mobile devices. Such users are termed as malicious users. Therefore it is vital to deal with these faults. Most of the schemes are proposed against random faulty clouds and works well, but these do not protect from malicious nodes present in clouds. So, efficient Fault Tolerant methods/models are still required to deal with malicious users.

2.   Quality of Service (QoS):

MSCC essentially includes another user requirement i.e. QoS. QoS is necessary metric to evaluate the quality of MSCC. Depending on the research areas, different researchers defined QoS in different ways. Authors [9] defined basic and extended QoS for evaluating scheduling algorithms. Time and Cost are considered in basic QoS while reliability, availability, security/privacy, and reputation covered in extended QoS.

The chief goal of research in MSCC is to deal with challenges affecting QoS and to improve certain QoS parameters.

V.   CONCLUSION AND FUTURE SCOPE

The performance of mobile devices including smart phones and laptops is steadily rising as prices dive sharply. So, mobile devices are changing from being a mere interface for requesting services to becoming computing resources for providing and sharing services due to immeasurably improved performance. With the increasing number of mobile device users, the utilization rate of SNS (Social Networking Service) is also soaring. Applying SNS to the existing computing environment enables members of social network to share computing services without further authentication. To use mobile device as a computing resource, temporary network disconnection caused by user mobility and various HW/SW faults causing service disruption should be considered. Also these issues must be resolved to support mobile users and to provide user and extended QoS. QoS is defined in different ways depending on the research area. In future, more QoS provisioning methods can be studied to meet diverse user needs for services.

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