

A Review: Mobile Cloud Computing: Its Challenges and Security

Yogita G. Patil¹ and Pooja S. Deshmukh²

Department of Computer Science and IT, BASPONC College, Bhusawal, India

²Department of Computer Science and IT, BASPONC College, Bhusawal, India

Abstract- Mobile Cloud Computing (MCC) has revolutionized the way in which mobile subscribers across the globe power services on the go. The mobile devices have evolved from mere devices that enabled voice calls only a few years back to smart devices that enable the user to access value added services anytime, anywhere. MCC integrates cloud computing into the mobile environment and overcomes obstacles related to performance (e.g. battery life, storage, and bandwidth), environment (e.g. heterogeneity, scalability, availability) and security (e.g. reliability and privacy)

Keywords Mobile Cloud Computing, Challenges, Security

I. INTRODUCTION

Mobile devices (e.g., smartphone, tablet pcs, fabled etc.) are increasingly becoming an essential part of human life as the most effective and convenient communication tools not bounded by time and place. Mobile users accumulate rich experience of various services from mobile applications (e.g., iPhone apps, Google apps, etc), which run on the devices and/or on remote servers via wireless networks. The rapid progress of mobile computing (MC) becomes a powerful trend in the development of IT technology as well as commerce and industry fields. However, the mobile devices are facing many challenges in their resources (e.g., battery life, storage, and bandwidth) and communications (e.g., mobility and security). The limited resources significantly impede the improvement of service qualities. Cloud computing (CC) has been widely recognized as the next generation's computing infrastructure. CC offers some advantages by allowing users to use infrastructure (e.g., servers, networks, and storages), platforms (e.g., middleware services and operating systems), and software (e.g., application programs)

II. Mobile Cloud Computing

The mobile cloud computing is a development of mobile computing and an extension to cloud computing. In mobile cloud computing, the previous mobile device-based concentrated computing, data storage and frame information processing have been transported to 'cloud' and thus the requirements of mobile devices in computing capability and resources have been reduced, so the developing, running, deploying and using mode of mobile applications have been completely changed. On the other hand, the terminals which

people used to access and obtain cloud services are suitable for mobile devices like smartphone, PDA, Tablet, and I Pad but not limited to fixed devices (such as PC), which reproduces the advantages and original intention of cloud computing. Therefore, from both facets of mobile computing and cloud computing, the mobile cloud computing is a combination of the two technologies, a development of distributed, network and central algorithms, and have broad prospects for application

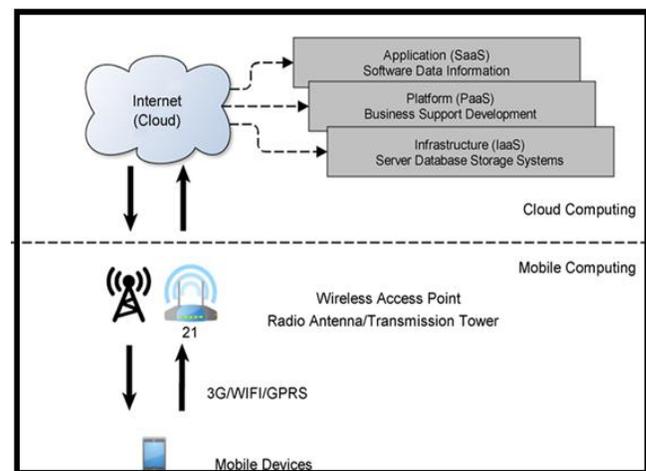


Fig 1: Architecture of Mobile Cloud Computing

As shown in Fig 1, mobile cloud computing can be divided into cloud computing and mobile computing. Those mobile devices can be laptops, PDA, smartphones, and so on, which connects with a hotspot or base position by 3G, WIFI, or GPRS. As the computing and major data processing stages have been travelled to 'cloud', the capability requirement of mobile devices is limited, some low-cost mobile devices or even non-smartphones can also

complete mobile cloud computing by using a cross-platform mid-ware. Although the client in mobile cloud computing is changed from PCs or fixed machines to mobile devices, the main concept is still cloud computing. Mobile users send service requirements to the cloud through a web browser or desktop application, then the organisation component of cloud allocates resources to the request to start connection, while the monitoring and manipulative functions of mobile cloud computing will be implemented to confirm the QoS until the connection is completed

III. The cloud computing service models

Software as a service (SaaS)- end user software applications are transported as a service. Structure and platform are abstracted, and can manage and arrange with less effort. In this model users can obtaining the ability to access and use the service or application that is introduced in the cloud.

Platform as a service (PaaS)- the application platform refers to where uses services and applications can be organised. Users can obtaining the access to the platforms and allow them to arrange the required software on the cloud. The network access and operating systems are not managed by the users.

Infrastructure as a service (IaaS)- physical substructure is abstracted to provide storage, computing and networking as a service to avoid the extra needs and incidentals for dedicated systems. User manages and controls the systems in terms of the storage, applications, operating systems and network connectivity, but they do not manage and control cloud substructure .

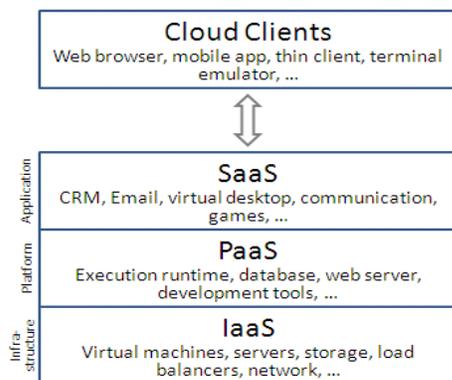


Fig2: Service Models in Cloud Computing

IV. Challenges Related To Mobile Applications

The main goal of mobile cloud computing is to provide users a expedient and quick way to access the data from the cloud on the go by using their mobile devices. While attractive the

user’s convenience, a lot of problems still continue in the understanding of mobile cloud computing.

Limitations of the hand-held devices: While talking about mobile devices using cloud computing, the first thing that has to be looked upon is the resource constraints. While mobile plans have better in all aspects- storage, size of the screen, capability of CPU, wireless communication, operating systems, there are serious limitations in computing capability and energy resource to set up complex applications. As linked to PCs and laptops, the modern mobile devices like the iPhone5 or the Android or Window mobile phones, reduce the processing capability by 3 times, memory by 5-6 times and bandwidth by around 10 times. While these intelligent phones are improving consistently, the vast differences still pose a limitation to mobile cloud computing.

Limitations of the loss of the battery and network flow: If an application needs a lot of battery and network flow, it will become difficult to organize that application on the mobile device. To overcome this problem, there will need to be a decrease in the data exchange rate and the amount of data replaced between the mobile device and the cloud end, by improving the cloud end.

Problem of individualization of mobile devices: At present, there are several handheld operating systems and to develop an application based on the handheld device, we must make the client end of the application software simple. Simple client end means that a big amount of data computing can be put in the cloud end and the client side be made standard so that it can run on any mobile device, without creation much modification.

Quality of service: The data transmission rate in mobile cloud computing environment is ever-changing and the connection is cracked since the Internet service provider is normally far away from the mobile device users. The inactivity delay period in a wireless network may be 200 milliseconds compared to 50 milliseconds in wired network. Some other issues such as dynamic alteration of application throughput, mobility of users and even weather will lead to variations in bandwidth and network overlap. Therefore, the handover delay in mobile network is higher than in wired network.

V. Mobile Cloud Computing Security

The one of the key issues that most cloud providers are given consideration is securing mobile cloud computing is user’s privacy and integrity of data or applications. Subsequently mobile cloud computing is a grouping of mobile networks and cloud computing, the security related issues are classified into two categories:

- Mobile network user's security
- Cloud security

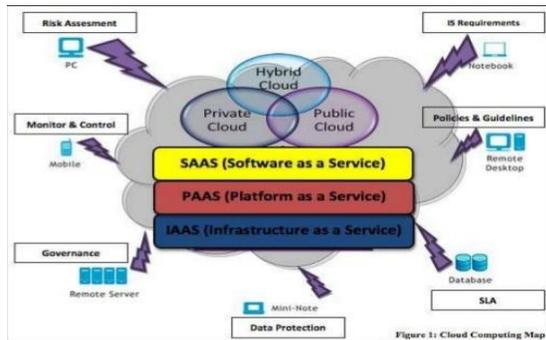


Fig3:Mobile Cloud Computing Security

Mobile network security

Different mobile devices have numbers of security threats such as malicious codes.

Some applications to these can cause privacy issues for mobile users .There are two main issues concerning the mobile user security

Mobile Application Security

The easiest ways to check security problems is done by installing and running security software and antivirus on mobile devices. But since mobile devices are having limitation with processing and power, caring them from these threats could be more difficult linked to regular computers. Several techniques have been introduced for transporting threat finding and security mechanisms to the

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cloud. Before mobile users could use an application, it should go through some level of threat evaluation. All file activities that are done on mobile devices will be verified if it is malicious or not. Instead of running anti-virus software or threat detection programs locally, mobile devices only performs lightweight activities such as execution traces transmitted to cloud security servers.

Privacy

Revealing your private information such as giving geo location and user's important Information like date of birth, Credit card information etc. creates situations for privacy issues. For example, use of GPS on mobile devices. Intimidations for revealing private information could be reduced through selecting and analysing the enterprise needs and require only specified services to be acquired and moved to the cloud .

VI. Conclusion

Mobile cloud computing as a advance and extension of mobile computing and cloud computing has inherited mobility and scalability. Due to the large-scale response, it has become the hot topic of research in recent years. Within a year, it is expected to observe a fierce competition among PaaS players to become the market leader in mobile cloud computing. In the next 2-3 years, customers in technologically and progressive republics will be sensing a major change in mobile application technology. 2014-16 is estimated to be the year when mobile cloud computing will really start to control the industry.