

ARCHITECTURE OF MOBILE CLOUD COMPUTING

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ABSTRACT

Nowadays the requirement of anytime anything from anywhere, the accessibility of data is increased, with the help of the “cloud computing”. Cloud computing allowed to the mobile users to access the remote resources through internet on pay-as-usability basis. The importance of cloud computing is that “the user only paying for what they really use and only utilize what they required”. Cloud computing is used to serve services to a local-client via the internet on on-demand basis. The mobile devices have only less amount of storage volume and less processing power so requirement of cloud computing in mobile devices is increased. The Mobile Cloud Computing (MCC) is the mixture of cloud computing and mobile computing. The movable devices need not to have high configuration because all computations process are performed inside of the cloud. In this paper we are talk about the Architecture of Mobile Cloud Computing (MCC), which includes introduction to MCC, architecture of MCC, advantages of MCC and applications of MCC. And it also covers what are the problems in MCC.

Index Terms—Mobile computing (MC), Cloud Computing (CC), and Mobile Cloud Computing (MCC).

I. INTRODUCTION

Mobile communication is the process of performing computations on a portable device and transmission of data to single or many more devices [1]. It is the method of connected and making use of centrally located information and application software with the deployment of little, movable wireless communication and computing devices [1–3]. In this modernistic world, all are depending on technology. The amount of mobile users is increased day to day; so we have to provide enhanced quality of service at very low cost and power.

Cloud computing is a development in the field of computer technology and computer science. Nowadays computer user’s access net services through portable devices. Cloud is an example of distributed computing. It is a group of interconnected and virtualized computers and it offers computing resources on a pay-per-use basis [4]. Cloud computing resources can be utilizing by the user as pay-per-use basis from the cloud computing when the user needs [5-6].

II. MOBILE CLOUD COMPUTING

In the past days, computing process is performed by the computers. According to the recent surveys, people are using the portable devices such as Smartphones, laptops, tablets, PDAs, i-Pads etc. rather than the desktop computers. Today, the needs of mobile phones are growing at a very speed because computing process is performed by the mobile phones [7]. The mobile phone provides the facility to move and access the data at anywhere and anytime. There are some restrictions in mobile devices compare to the desktop these are, low processing speed, less amount of storage, small battery life, bandwidth etc. Fig. 2 shown Mobile Cloud Computing provides an infra-structure that data processing and storage can be execute outside the mobile device. Mobile device need not to have huge storage capacity and powerful CPU speed. The data processing is completed outside the mobile devices on a centralized computing platform located in clouds. In the year 2011 the no. of mobile handlers in the world is 5.6 billion [8]. Mobile users can use platform, infrastructure, and software provided by cloud providers on

on-demand basis due to this, in the year 2014 the no. of mobile users accessing ‘mobile cloud’ is 1 billion.



Fig 1: Mobile cloud computing

The company users need not to spend a huge amount on software and hardware; they can share it on the cloud. There are many advantages at the some problems in using MCC for example access schemes, bandwidth, security etc.

This paper is organized in many sections. Section II of this paper talk about the architecture of MCC. Section III explains advantages of MCC. Section IV explains some applications of MCC.

III. ARCHITECTURE OF MOBILE CLOUD COMPUTING

MCC involves of the following components [9]:

- Mobile network
- Internet service
- Cloud service

A. Mobile network:

A mobile network is combination of mobile devices and network operators. Mobile devices are Smartphones, laptops, tablets, PDAs, i-Pads etc. The mobile devices and network operators are connected to the network operator via the BTSs, satellites or access points. BTSs launch the connection and control the connection between the functional interface between network operators and mobile devices. The architecture of MCC is shown in Fig. 2 it shows the connection between cloud providers and mobile devices.

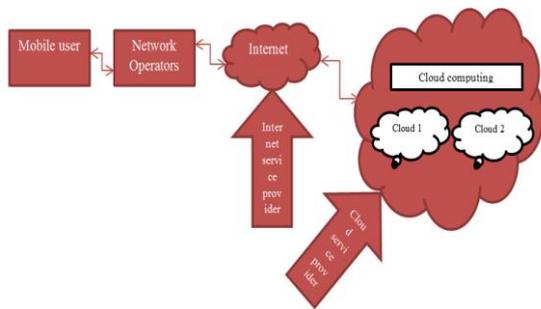


Fig. 2: Architecture of mobile cloud computing

B. *Internet service*: It links the cloud and mobile network. The user requests send to the cloud through a high-speed Internet service. The user can communicate with the cloud using Wireless connection such as 3G, 4G, 5G, etc. or wired static connection.

C. *Cloud service*: Users send request to cloud controller, it processes the requests and provides service to the user which is they required. Service providing layers of cloud are below:

- Data center layer: Data center offers the infrastructure and hardware facilities for the cloud. Data center is combination of many servers and connected with ultra-speed networks and high power supply. Mostly, data center are launched in less populated areas.
- Platform as a service: PaaS offers a combined environment or platform for users to construct, install some applications, and test.
- Infrastructure as a service: IaaS placed on the top of the data center layer. It offers, servers, storages, hardware and networking components to its users on a “pay as you use” rule.
- Software as a service: SaaS is a software delivery model offers by ASPs. Software and the related data are centrally hosted on the cloud. SaaS can offer many types of software solutions such as ERP, CRM, HRM, MIS, etc., on demand without installing the application on client device.

IV. ADVANTAGES OF MOBILE CLOUD COMPUTING: Using MCC the user can get lot of benefits. Using MCC the cost, time and energy consumption is minimizing [10].

- Extending storage capacity: Mobile device have only limited amount of storage volume. But MCC provides a vast amount of storage.
- Extending battery lifetime: In MCC, data processing and data storage is performed outside the device and in the cloud. So automatically decrease the battery usage lifetime of the device is increased. Using offloading technique the battery life of mobile devices can be extended.
- High reliability: In MCC, data loss is less because data and applications are stored in multiple computers. More over cloud provides more security services such as malicious code detection, authentication, and virus scanning.
- Extending processing power: Many applications such as broadcasting multimedia service, playing

games, transcoding, and so on, need high-processing power. The user can offload tasks into the cloud.

- On-demand service: In MCC, the user gets, on demand, all-in-one service from the cloud. Users need not install software or hardware in their device. User can get it from the cloud.

V. APPLICATIONS OF MOBILE CLOUD COMPUTING

Mobile devices use cloud computing can achieve the requirements of mobile users during moving position. MCC can be used in performing mobile payment, mobile accounting, or mobile healthcare. MCC also offer listening music anywhere at any time. Some MCC application given below,

- Cloud email: Mobile users are using Gmail on their mobile devices. This is a good example of MCC, all mails are store on a server and all processing is performed on the cloud.
- Mobile commerce: Mobile commerce applications can be mobile shopping, finance, accounting, advertising, etc. [12] All these require mobility like mobile transactions, payments, mobile ticketing etc. Using M-commerce on mobile devices has to face a many of challenges but CC to mobile reduces these challenges.
- Cloud music: MCC offers “Music Anywhere” to user on their mobile device.
- Mobile learning: M-Learning offers the facility to learn anything from anywhere at any time [11]. M-Learning is mixed of E-Learning and Mobility. MCC offers services at low cost, at high processing speed.
- Mobile gaming: Mobile gaming needs huge computing resources. MCC helps to the users that all computations processes are performed on clouds. So mobile devices need not to have high computing resources.

VI. CONCLUSION

Mobile cloud computing is combination of mobile computing and cloud computing. In other terms the advantages of mobile computing and cloud computing are collected and the mobile cloud computing concept is invented. Mobile devices are have limited storage and less computing power as well as less power supply. Cloud computing offers that user can user cloud on-demand services. These benefits are combined in MCC. The mobile user can access the cloud using their mobile devices. In this paper we are discussed about the architecture of Mobile Cloud Computing (MCC), which includes introduction to MCC, architecture of MCC, advantages of MCC and applications of MCC.

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