

An Assessment of Mobile Cloud Computing

S. Thamizharasan ^{1#1}, S. Balaji ^{2#2}

1 Final Year M. Tech (CSE), Christ college of Engineering and Technology, Puducherry-605010.

2 Final Year M. Tech (CSE), Christ college of Engineering and Technology, Puducherry-605010.

ABSTRACT

Cloud computing, plays a major role in towards world, so it has been analyzed to summarized the concept and the core ideas of Mobile cloud computing, Described the basic model, workflow and architecture of Mobile cloud computing, Pointed out many problems about Mobile cloud computing, gave the solving methods; Summarized the development of Mobile cloud computing. Cloud is a group of computers- personal computers or servers- which are interconnected together. Cloud is the network that provides resources to the clients. Cloud computing concentrates all the computing resources together, manage them with software systems, therefore, people do not have to take part in it while clients can surf the internet and apply any service they want by fixed network equipments anywhere at any time.

Key words: Component, Mobile computing, Cloud computing 3+, Mobile cloud computing.

1. INTRODUCTION

Cloud Computing is proposed as a new network application mode. Cloud computing brings along a new cycle of development of Internet. On the basis, cloud computing eliminate many limitations. With cloud computing, people will not be constrained and confused by physical resources any more, on the contrary, they can use the Internet anywhere and at any time. Mobile cloud computing will be a main branch of the development of cloud computing in the future. The clients of mobile cloud computing can also enjoy the interest of new Internet without the limitation of fixed equipments.

2. CLOUD COMPUTING AND MOBILE CLOUD COMPUTING

A. The history and concept of cloud computing

Cloud computing is a kind of distributed computing. The main idea of distributed computing is to disperse data, process distributed. By doing this, we can solve a Huge computing problem by making it into many small parts and distributes the small parts to many computers so that they can deal with the problems. Finally, we can integrate the results together and get the final result. Distributed computing can work as effectively as super computer, while cloud computing is also the development of distributed computing. The main part of cloud computing is the so called "cloud".

B. Mobile cloud computing

Mobile cloud computing are 3+ combination, that is the combination of mobile computing, mobile internet and cloud computing. Mobile computing technology [5] is to share resources and transport data of computers or other intelligent terminal equipments such as cell phones. The essence of mobile cloud computing is to provide valuable, precise and real time information to any clients at any time, at any place.

Mobile Internet technology is the combination of mobile communication and internet, the essence of which is to let clients obtain real time network resources and network services. Mobile cloud computing means that any intelligent terminal equipments such as cell phones and personal computers can obtain services in wireless environment, which is also called mobile cloud computing. Mobile cloud computing integrates the advantages of mobile computing, mobile internet and cloud computing. Therefore, mobile cloud computing can also be called the cloud computing in mobile internet. Handheld equipments are often individualized from outlook to operating system, which is limited to the requirement off volume and convenience, the processing ability of CPU, storing space, keyboard and screen, battery and bandwidth compared with PC, especially for storage and computing ability. A main advantage of cloud computing is to provide large storage and computing ability by "cloud end", which means a group of servers on the Internet. Even though the ability of handheld equipments is not good enough, as long as the input and output data of cloud in the far end can exchange, unimaginable results will come out. From this perspective, the character of cloud computing can be seen more clearly in mobile internet, that is to transport applicable computing and storage from terminal to cloud end of the server, so as to weaken the processing requirement of mobile terminal equipment.

C. Character of Mobile cloud computing

- **Hardware of handheld equipment and independence of the system:** All the computation are carried on in the cloud-far end servers, therefore, mobile cloud computing does not have requirement for handheld equipment, even unintelligent cell phones can realize mobile cloud computing.
- **Effectiveness of task processing:** This advantage is obvious thanks to the processing ability of cloud end. If the interface of input and output is good enough, we can see the result of tasks directly by cell phones.
- **Convenience of sharing data:** A large amount of data is stored in the cloud end of servers, enabling sharing data conveniently. If the bandwidth is wide enough, it will work as fluently as locally, which is easy to realize for cell phones. Compared with the data transportation among former clients, the cloud storage method will enhance the convenience of sharing data.
- **Elimination of regionality:** Mobile cloud computing eliminates the limitation of regionality, enabling people to obtain what they want at any time and any place from the internet.

3. THE BASIC IDEA MODEL AND SYSTEM ARCHITECTURE OF MOBILE CLOUD COMPUTING

A. The basic idea model of mobile cloud computing

The client end of mobile cloud computing is relatively changed, but the main idea is still cloud computing. The cloud end server provides large amount of storage and service while the wireless clients obtain service according to their need, which is shown in fig1.

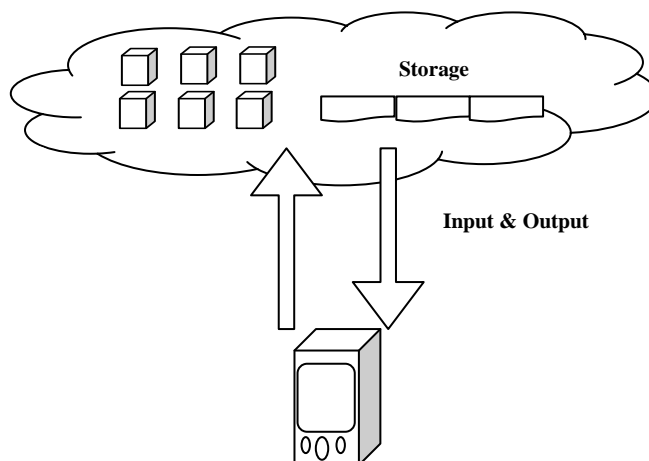


Fig1: The basic idea model of mobile cloud computing

B. The working procedure of mobile cloud computing

The service procedure of mobile cloud computing is that mobile users obtain service catalog by interfaces, then the requirements of clients are sent to the managing system, the managing system finds out the correct data resources by configuration tools and uses suitable system services. These services separate necessary resources from the cloud. After web application is started, the monitoring and calculating function of the system will follow the using situation of the cloud, so as to react quickly, accomplishing synchronizing configuration and load balancing configuration to make sure correct resources to be distributed to suitable clients, which is shown in fig 2.

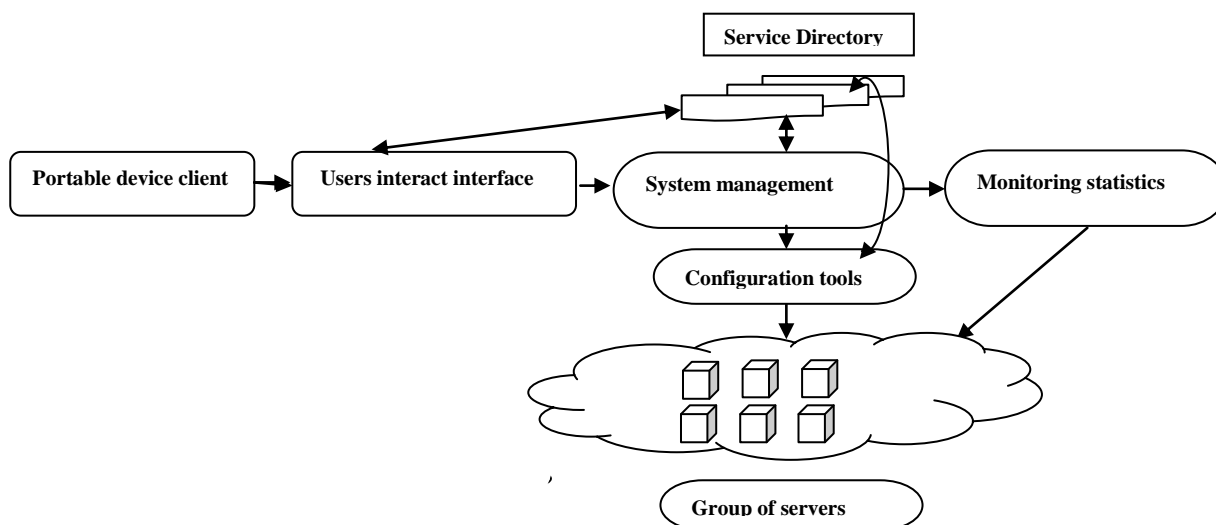


Fig2: Working procedure of mobile cloud computing

C. System architecture of mobile cloud computing

The effectiveness, reliability and security of mobile cloud computing must be based on a complete system architecture. Mobile cloud computing can be divided into four layers, namely access layer, basic managing layer, virtual layer and physical layer.

- **Access layer:** Access layer is also called access control layer, which includes service interface to the client, service registration and reasonable service access. It standardized all kinds of rules, service standards in mobile cloud computing, which is the gateway to cooperation between client and cloud end, can accomplish user registration or service registration and be made and used according to the service.
- **Basic managing layer:** In cloud computing technology, managing layer is located between service and server group, which provides management, service and managing system in mobile cloud computing system architecture. It can take standard operations to services such as acknowledgement, directory, and security and so on, provide standard procedure interface and protocol to application service, hide dissimilarity between bottom hardware and operating system synchronizing, and manage network resources all together. Client management includes mobile account management, environment configuration, interaction management and charging system. Task management includes task configuration, task execution, lifetime management and so forth. Resource management includes load balancing, problem testing, problem recovery and monitoring system. Security management includes client identification, access acknowledgement, security assurance and comprehensive defense.
- **Virtual layer:** Virtual layer means the virtual items such as computing pool, storage pool and network pool, the virtual functions can be realized by software realization. It includes virtual environment, virtual system, and virtual platform and so on.
- **Physical layer:** Physical layer mainly indicates the hardware equipment and technology which supports mobile cloud service; it can be cheap PC and unintelligent cell phones. A cloud with super service can be provided by distributed computers by present network technique, parallel technique and distribution technique. In the period of mobile cloud computing, handheld equipment do not need large enough hard disk, powerful intelligent computing capability, but only need some necessary equipment such as network equipment and basic input and output equipment

4. THE PROBLEM WITH MOBILE CLOUD COMPUTING

All kinds of services of wireless internet of mobile cloud computing will dig into people's life, in the mean time, using all kinds of services of wireless internet will enhance the convenience, however, a lot of problems still remain in the realization of mobile cloud computing[3] .

- **The problem with cell phone platform:** In order to realize cloud computing, a good cell phone end platform is needed to realize input and output procedures. According to the current situation, a smooth client interface is realized in the cell phone end, which mainly includes flash and java. However, currently, most cell phones which support both flash and java are most intelligent cell phones, while most ones in the

future will support them, which means that mobile cloud computing is not far away from us.

- **System problem of cloud end:** As to system and software of cloud end, cloud end should possess asynchronous system of input and output of equipment like cell phone which is in charge of data processing.
- **Stability of bandwidth:** This is a problem which can rely on Mobile Corporation totally. However, it is also the key problem to maintain the stability of cloud computing, Only when the mobile corporation can provide bandwidth that is stable enough, can we talk about mobile cloud computing with low delay.
- **The problem of input and output interface:** Anyhow, the input and output of cell phones are always limited, additional hardware will increase the load, it is also weak in usage, by letting clients to define their own input and output interface, picking out their common functions to form the input interface, and pick out deeper interfaces when needed. As to output interface, we should also make the data briefly, Letting small cell phone screen to provide as much information as possible and maintain the convenience.
- **The problem of service provider:** The difficulty of developing handheld equipment makes not all IT companies can enter the wireless internet soon, but they are eager to Extend the service on the internet to endless internet. In this case, some service providers will no doubt come out and will have a bright future, for example, they can provide information exchange, payment, reading, email delivery, games, SNS and so on. These service providers will provide standard technique interface, making another company to use freely, which exactly the amazing part of mobile cloud is computing.
- **The problem with the loss of battery and network flow:** If an application need a lot of battery and flow, the application will be hard to be used in handheld equipment. In order to solve the problem with the loss of battery and network flow, we can cut down the data exchange rate and amount between handheld equipment and cloud end by optimizing cloud end, which will induce the loss of battery and network flow effectively. As to all kinds of real time messages and noticing service, delivery technique is also very important, access in turn which is popular in PC, cannot be applied to handheld equipment either.

5. APPLICATION OF MOBILE CLOUD COMPUTING

The applications based on mobile cloud computing are everywhere. By mobile cloud computing, the cell phone directing system of Google, voice seeking system of cell phone and the services on Android platform are amazing. Another extraordinary application is the MOTOBUR service proposed by Motorola in October, 2009, which is a typical example of mobile cloud computing and put traditional SMS, Gmail, MySpace, Twitter, and Face Book together to a small screen, therefore, clients can keep in touch with the outside world easily. A typical example of mobile cloud computing in our nation is UCWEB and together communication.

The clients of UCWEB can feel the rapid speed and low flow amount when surfing the internet, which is impossible without the first class web transforming technique, which means transforming a common web to one that is suitable for cell phone. The transforming speed and data compressing ratio is completely due to the mobile cloud computing platform of UCWEB. Together communication is real time service software based on wireless internet. By using mobile cloud computing technique, together information can make sure information is delivered in time while keeping the loss of battery and network flow to the minimum amount. Any selected words and pictures can be downloaded or sent to friends as long as you clicked the right key, which is amazing. Together communication, by making use of a small client end, can not only provide functions like quick delivery, magic information, house keeper, combining cell phone to internet closely, but also provide OPEN API, extending internet to cell phone easily, shortening time and money for internet. All these advantages are thanks to mobile cloud computing.

6. CONCLUSION

The number of mobile users all around the world is 42,800,000, which takes up 1.1 % of all the cell phone users. In the future 5 years, the internet will develop rapidly and in 2014, the number of users will rise up to 0.998 billion, taking up 19% of all users around the world. 2009 is the 3G year for China, when mobile cloud computing will become popular. Various kinds of internet services using mobile cloud computing will also be popular with people's daily life. Mobile cloud computing will not only become popular but also develop continuously during all challenges, which are the opportunities for us.

REFERENCE

- [1] Michael Miller. Cloud Computing Web-Based Applications That Change the Way You Work and Collaborate Online, 2009.4.
- [2] Kang Chen, Weimin Zheng. Cloud Computing System examples and current research situation [J]. Software Journal, 2009 (5) : 1337-1348.
- [3] Peng Wang. Approaching Cloud Computing[M]. Beijing: People's Delivery and Electricity Press, 2009.
- [4] Quan Chen, Qianni Deng. Cloud Computing and its key techniques. Computing Applications. 100 I - 908 I (2009) 09 - 2562 - 06.
- [5] Man Yuan. Mobile Computing. Harbin: Harbin Industrialization University Press. 2008. (8) : 2- 10
- [6] Canfeng Chen. Wide Band Mobile Internet. Beijing: People's Delivery and Electricity Press. 2005 : 43-49.