ISSN (Online) : 2278-1021
ISSN (Print) : 2319-5940

International Journal of Advanced Research in Computer and Communication Engineering
Vol. 3, Issue 7, July 2014

A Study of Mobile Cloud Computing And Challenges

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Abstract: Cloud Computing technology has brought great opportunities to the development of Mobile cloud computing. However it is also facing unprecedented challenges. According to the advantages of cloud computing, based on the status mobile cloud, the paper first discussed the impacts of cloud computing for mobile cloud and analyzed the field and the prospects of its possible applications in mobile cloud then presented the application and promotion of cloud computing technology is a long-term system works, not only need to build the data center, integrate resources, enhance service capabilities, and also need to make information security. Mobile Cloud Computing (MCC) has revolutionized the way in which mobile subscribers across the globe leverage 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.

Keywords: Cloud Computing, Mobile Cloud computing, Mobile Cloud Information, Challenges.

I. INTRODUCTION

The application of information technology will not only change the way of information interaction to shorten the distance of the world, but also conducive to social and economic development, improvement of production efficiency. Especially with the emergence and application of cloud computing technology, the resurgence of the climax of the national information construction, being seen as the third IT wave following the computer technology and Internet technology.

Currently, the countries in the world for the study of cloud computing technology is not very nature, Research in developed countries started earlier, and has made outstanding achievements in the basic framework, technical support, platform building. Business opportunities in the field of "Cloud Computing" and all have been engaging in these studies. Now, Cloud Computing has been used and promoted in the field of healthcare, manufacturing, financial services, energy, communication and other key areas, which will play an important role for improving the efficient use of resources, information and integration.

II. CLOUD COMPUTING TECHNOLOGY OVERVIEW

Cloud computing is a distributed computing technology, through a computer network the huge computing handler will be split and analyzed by a number of separate servers, then ultra-millions or even hundreds of millions of information services will be available within seconds, so the users not only can get super computing capabilities but also can reduce resource inputs and waste. This is a paid service usage model, with ready access to demand unlimited expansion metering pay features, including IaaS (Infrastructure-as-a-Service), PaaS(Platform-as-a-Service), SaaS (Software-as-a-Service) and three levels of service. Thus, cloud computing means computing power can be used as a commodity or service to e circulated and consumed through the internet.

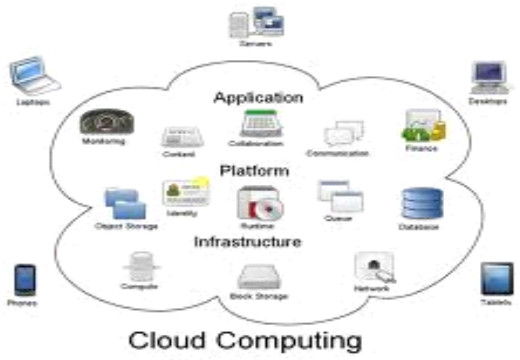

Figure 2.1. Cloud Computing

It is sold on demand, typically by the minute or the hour; it is elastic -- a user can have as much or as little of a service as they want at any given time; and the service is fully managed by the provider (the consumer needs nothing but a personal computer and Internet access).

A. Essential Characteristics:

On-demand Self Service: A consumer can unilaterally provision computing capabilities, such as server time and network storage, as needed automatically without requiring human interaction with each service provider.

Broad Network Access: Capabilities are available over the network and accessed through standard mechanisms that promote use by heterogeneous thin or thick client platforms like mobile phones, laptops, PDAs etc.

Resource Pooling: The provider's computing resources are pooled to serve multiple consumers using a multi-tenant model, with different physical and virtual resources dynamically assigned and reassigned according to consumer demand. The customer does not have control or

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knowledge over the exact location of the provided resources. Examples of resources include storage, processing, memory, network bandwidth and virtual machines.

Rapid Elasticity: Capabilities can be rapidly and elastically provisioned, in some cases automatically, to quickly scale out and rapidly released to quickly scale in.

Measured Service: Cloud systems automatically control and optimize resource use by leveraging a metering capability at some level of abstraction appropriate to the type of service (e.g. storage, processing, bandwidth and active user accounts).

B. Service Models

1) Software as a Service (SaaS)

Software as a Service supports a software distribution with specific requirements. In this layer, the users can access an application and information remotely via the Internet and pay only for that they use. Sales force is one of the pioneers in providing this service model. Microsoft's Live Mesh also allows sharing files and folders across multiple devices simultaneously.

2) Platform as a Service (PaaS)

Platform as a Service offers an advanced integrated environment for building, testing Accepted in Wireless Communications and Mobile Computing and deploying custom applications.

- Google App Engine
- Microsoft Azure
- Amazon Map Reduce/Simple Storage Service

3) Infrastructure as a Service (IaaS)

IaaS is built on top of the data center layer; IaaS enables the provision of storage, hardware, servers and networking components. The client typically pays on a per-use basis. Thus, clients can save cost as the payment is only based on how much resource they really use. Infrastructure can be expanded or shrunk dynamically as needed. Example:

- Amazon EC2 (Elastic Cloud Computing)
- S3 (Simple Storage Service)

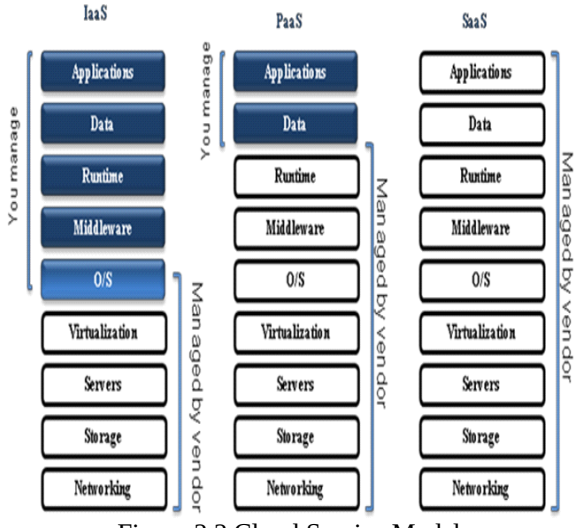

Figure 2.2 Cloud Service Model

C. Deployment Models

1) Private Cloud

The cloud infrastructure is operated solely for an organization. It may be managed by the organization or a third party and may exist on premise or off premise.Exampl:

- Amazon VPC (Virtual Private Cloud)
- VMware Cloud Infrastructure Suite
- Microsoft ECI data center.

2) Public Cloud:

The cloud infrastructure is made available to the general public or a large industry group and is owned by an organization selling cloud services. Example:

- Google App Engine
- Microsoft Windows Azure

3) Hybrid Cloud:

The cloud infrastructure is a composition of two or more clouds (private, community, or public) that remain unique entities but are bound together by standardized or Proprietary technology that enables data and application portability (e.g., cloud bursting for load-balancing between clouds). Figure below illustrates Public, Private and Hybrid cloud deployment example.

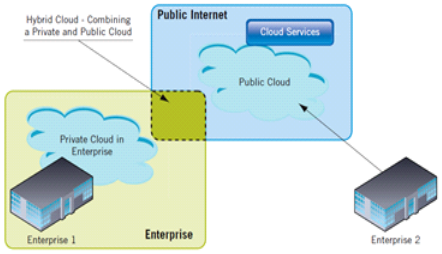

Figure 2.3 public, private, hybrid deployments

Community Cloud

The cloud infrastructure is shared by several organizations and supports a specific community that has shared concerns (e.g., mission, security requirements, policy, and compliance considerations). It may be managed by the organizations or a third party and may exist on premise or off premise.

D.Cloud Computing Challenges

The new paradigm of cloud computing provides an array of benefits and advantages over the previous computing paradigms and many organizations are migrating and adopting it. However, there are still a number of challenges, which are currently addressed by researchers, academicians and practitioners in the field.

1) *Performance*: The major issue in performance can be for some intensive transaction-oriented and other data intensive applications, in which cloud computing may lack adequate performance. Also, users who are at a long distance from cloud providers may experience high latency and delays.

2) *Securityand Privacy*: Companies are still concerned about security when using cloud computing. Users are worried about the vulnerability to attacks, when

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information and critical IT resources are outside the firewall. The main challenge to cloud computing is how it addresses the security and privacy concerns of businesses thinking of adopting it.

3) *Control*: A quantity of IT wings or departments are concerned because cloud computing providers have a full control of the platforms. Cloud computing providers typically do not design platforms for specific companies and their business practices.

4) *Bandwidth Costs*: Cloud computing, companies can save money on hardware and software; however they could incur higher network bandwidth charges. Bandwidth cost may be low for smaller Internet-based applications, which are not data intensive, but could significantly grow for data-intensive applications.

5) *Reliability: Cloud* computing still does not always offer round the clock reliability. There were cases where cloud computing services suffered few hours' outages. In the present and future days to expect more cloud computing providers, richer services, established standards and best practices.

III. MOBILE CLOUDCOMPUTING

The mobile cloud is an instance of technology using cloud computing in mobile environment. The cloud computing is based on a collection of many old and few new concepts in several research fields like Service-Oriented Architecture(SOA), distributed and grid computing as well as virtualization and allows users to temporary utilize computing infrastructure over the network, supplied as a service by the cloud-provider at possibly one or more levels of abstraction.

The mobile cloud is divided into five layers in perspective of the composability of the system.

- Cloud Application Layer
- Cloud Software Environment Layer
- Cloud Software Infrastructure Layer
- Software Kernel
- Hardware and Firmware

Mobile Cloud Computing (MCC) will help to overcome limitations of mobile devices in particular of the processing power and data storage. It might also help to extend the battery life by moving the execution of commutation-intensive application "to the cloud". However, a significant gain in battery stand-by time will require that the wireless connectivity for the MCC operation is at least as energy-efficient as the state of the art.

A.ARCHITECTURES OF MOBILE CLOUD COMPUTING

The general architecture of Mobile Cloud Computing (MCC) can be shown in, mobile devices are connected to the mobile networks via base stations (e.g., base transceiver station (BTS), access point, or satellite) that establish and control the connections (air links) and functional interfaces between the networks and mobile devices. Mobile users' requests and information (e.g., ID and location) are transmitted to the central processors that are connected to servers providing mobile network services.

Here, mobile network operators can provide services to mobile users as AAA (for authentication, authorization, and accounting) based on the home agent (HA) and subscribers' data stored in databases. After that, the subscribers' requests are delivered to a cloud through the Internet. In the cloud, cloud controllers process the requests to provide mobile users with the corresponding cloud services. These services are developed with the concepts of utility computing, virtualization, and service-oriented architecture (e.g., web, application, and database servers.

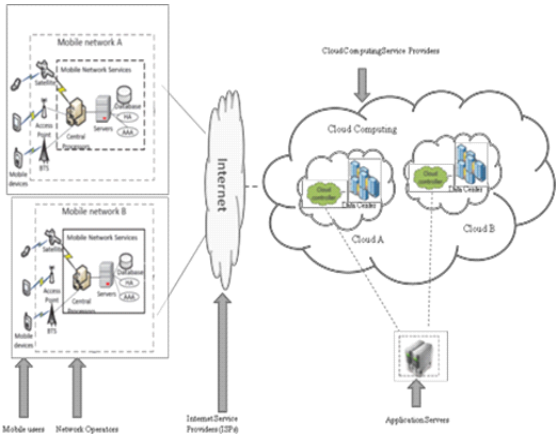

Figure 3.1 Architecture of Mobile Cloud Computing

IV. APPLICATIONS OF MOBILE COMPUTING IN CLOUD ENVIRONMENT

The rise in sales of mobile devices and increasing development in the field of mobile cloud computing, mobile applications have gained a growing share in the global mobile market. Some of the applications of mobile computing are as follows:

A. M-Commerce in Cloud Computing

Mobile commerce (m-commerce) is a business model for commerce using mobile devices. The m-commerce applications generally fulfill some tasks that require mobility (e.g., mobile transactions and payments, mobile messaging, and mobile ticketing). The m-commerce applications have to face various challenges (e.g., low network bandwidth, high complexity of mobile device configurations, and security). Therefore, m-commerce applications are integrated into cloud computing environment to address these issues .Proposes a 3G e-Commerce platform based on cloud computing.

B. M-Learning in Cloud Computing

Mobile learning (m-learning) is designed based on electronic learning (e-learning) and mobility. However, traditional m-learning applications have limitations in terms of high cost of devices and network, low network transmission rate, and limited educational resources. Cloud based m-learning applications are introduced to

solve these limitations, for example utilizing a cloud with the large storage capacity and powerful processing ability, the applications provide learners with much richer services in terms of data (information) size, faster processing speed, and longer battery life.

C. M-Health Care in Cloud Computing

The purpose of applying MCC in medical applications is to minimize the limitations of traditional medical treatment (e.g., small physical storage, security and privacy, and medical errors. Mobile healthcare (m-healthcare) provides mobile users with convenient helps to access resources (e.g., patient health records) easily and quickly. Besides, m-healthcare offers hospitals and healthcare organizations a variety of on-demand services on clouds rather than owning standalone applications on local servers.

D. M-Banking in Cloud Computing

Mobile banking (also known as m-Banking, SMS Banking, etc.) is a term used for performing balance checks, account transactions, payments etc., via a mobile device such as a mobile phone or Personal Digital Assistant (PDA). Mobile banking today is most often performed via SMS or the mobile Internet but can also use special programs, called clients, downloaded to the mobile device.

E. M-Game in Cloud Computing

Mobile game (m-game) is a potential market generating revenues for service providers. M-game can completely offload game engine requiring large computing resource (e.g., graphic rendering) to the server in the cloud, and gamers only interact with the screen interface on their devices .It demonstrates that offloading (multimedia code) can save energy for mobile devices, thereby increasing game playing time on mobile devices.

Other Uses

Mobile cloud computing also helps mobile users to share photos and videos with people on popular social networking websites like Face book and twitter. Mobile users are also provided with cloud services such as- map and other applications that provide location-based services. Example:Finding the local whether, road traffic or nearby restaurants.

V. CONCLUSION

Mobile Cloud Computing, as a development and extension of Cloud Computing and Mobile Computing, is the most emerging and well accepted technology with fast growth. The combination ofcloud computing, wireless communication infrastructure, portable computing devices, location-based services, mobile web etc laid the foundation for the novel computing model. In this paper overview of Mobile cloud computing that includes architecture, Application, Challenges of cloud computing.

VI. FUTURE WORK

The emerging cloud computing technology offers a natural solution to extend the limited capabilities of mobile devices. The resulting new paradigm of mobile cloud computing is being embraced by researchers and practitioners as an exciting new way to extend the capabilities of mobile devices and mobile platform, which has the potential for profound impacts on the business environment and people day life.

BIBLIOGRAPHY

- Antony T.Velt, "Cloud Computing a practical approach "Tata McGraw Hill Education Pvt.Limited**.**
- Michael Miller," Cloud Computing: Web based Applications that change the way you work and Collaborate online", Que Publishing, August 2008.
- Haley Beard, "Cloud Computing Best Practices for Managing and Measuring Processes for on demand computing, Applications and Data Centers in the Cloud with SLAs", Emereo Pvt. Ltd, July 2008.
- Prof (Dr.) Andreas Polze, "A Comparative Analysis of Cloud Computing Environments

REFERENCES

[1] G.H Forman and J.Zahorjan, "The Challenges of Mobile Computing," IEEE Computer Society Magazine, vol. 27, Issue 4, Pages: 38-47, 1999.

[2] M. Satyanarayanan, "Mobile computing: the next decade," in Proceedings of the 1st ACM Workshop on Mobile Cloud Computing & Services: Social Networks and Beyond (MCS), June 2010.

[3] White Paper, "Mobile Cloud Computing Solution Brief," AEPONA, November 2010.

[4] S. Pendyala and J. Holliday, "Performing Intelligent Mobile Searches in the Cloud Using Semantic Technologies," in IEEE International Conference on Granular Computing, pp. 381, September 2010.

[5] X. Yang, T. Pan, and J. Shen,"On 3G Mobile E-commerce Platform Based on Cloud Computing," in Proceedings of the 3rd IEEE International Conference on Ubi-Media Computing (U-Media), pp. 198 201, August 2010.

[6] X. Chen, J. Liu*, J. Han, and H. Xue, " Primary Exploration of Mobile Learning Mode under a Cloud Computing Environment," in Proceedings of the International Conference on E-Health Networking, Digital Ecosystems and Technologies (EDT), vol. 2, pp. 484 - 487, June 2010.

[7] H. Gao and Y. Zhai, "System Design of Cloud Computing Based on Mobile Learning," in Proceedings of the 3rd International Symposium on Knowledge Acquisition and Modeling (KAM), pp. 293 - 242, November 2010.

[8] Jean Li, "Study on the Development of Mobile Learning Promoted by Cloud Computing," in Proceedings of the 2nd International Conference on Information Engineering and Computer Science (ICIECS), pp. 1, December 2010.

[9] D.Hong, Tiding, Chonhole, "A Survey of Mobile Cloud Computing Architecture, Approaches, "July 2011.

[10] Hoang T. Dinh, Chino Lee, Dusit Niyato, and Ping Wang, "A survey of Mobile Cloud Computing: Architecture, Applications and Approaches", Wireless Communications and Mobile Computing, 2011.

BIOGRAPHY

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