

A Study on Mobile Cloud Computing Systems

Vasantha M

Department of Computer Science and Engineering, New Horizon College of Engineering

Bangalore, India

vasantha.nhce@gmail.com

Abstract--Mobile Cloud Computing (MCC) is one amongst the technology essential in today's mobile atmosphere surpass using mobile devices in cloud atmosphere. It combines the options of each mobile computing and cloud computing, thereby provides best services to the users of mobile devices. As MCC remains at the first stage of development, it's necessary to understand a radical understanding of the technology so as to show the direction of future analysis for ever increasing field. As Mobile Cloud Computing is that the most essential fields with growing age of today's quick web victimization and mobile world beside its uses it's to faces a number of the issues and challenges a number of them area unit address during this paper. Because the knowledge is cloud computing and accessing it with mobile devices all the dealing goes through the network thus it's liable to attack. For keeping the utilization of this essential tool of constant during this advance world we have a tendency to area unit giving a number of the solutions to these challenges to deal with within the field of Mobile Cloud Computing. The mechanism that area unit necessary to make it secure and use MCC, the solutions mention here for sleuthing and preventing from attack ought to be properly applied.

Keywords--Mobile cloud computing, Cloud Computing, Mobile Cloud Computing Security

I. INTRODUCTION

As inventions of devices like smart phones, tablets, PDAs, etc., that are getting a necessary part of today's human mode and with this world is moving towards Mobile-world. These devices square measure get even a lot of important since the usage of mobile net, resulting in convenient communication tools. Because the word mobile by itself counsel that they're not delimited by time and place, that is they want of today's busy person. Users of Mobile will get wealthy expertise of varied services from their own mobile applications e.g., iPhone apps, Google apps, etc. that run on the remote servers via wireless networks. This can be the rationale behind creating it essential to the progress of mobile computing (MC) [1]. It becomes a strong trend within the development of various fields like IT technology, commerce, business trade and lots of fields of the life fields. however at identical time, the mobile devices face several challenges in their resources containing battery life, storage capability, bandwidth and communications containing quality and security problems [5]. So, because the use of the smartphones and mobile devices their offered mobile services playacting abundant helpful task, there's have to be compelled to address the challenges facing by these devices. Over the past few years, advances within the field of network primarily based computing and applications has shown that there's a high demand for mobile applications [3]. but some common downside that every one those devices share, still must be addressed: the restricted capabilities of the devices concerning offered resources like processor power, offered memory and energy consumption. Commonly, cloud computing (CC) offers America a range of services that square measure provided by associate degree Internet-based cluster system. Such cluster systems encompass a group of cheap servers or Personal Computers (PCs), organizing the varied resources of the computers. They offers safe, reliable, fast, convenient and clear services cherish knowledge storage, accessing and computing to clients. A technology of Cloud computing (CC) offers its users the likelihood to host and deliver services over the internet by dynamically providing computing resources [4] on demand basis in mobile nature from any remote distance.

With this Cloud computing (CC) has been recognized because the next generation's computing infrastructure. Cloud Computing offers several benefits by permitting users to use infrastructure like servers, networks, and storages, platforms containing middleware services, operative systems and software's for application programs eliminating the need for users to arrange ahead for getting completely different resources for storage and computing power. significantly, resources are often dynamically other and free betting on service demand and with least management effort. As a result, the provision of cloud computing services in a mobile surroundings, additionally referred to as mobile cloud computing [2]. The increasing state of affairs towards Mobile Cloud Computing With the explosion of mobile applications and therefore the support of CC for various kind of services for mobile users, mobile cloud computing (MCC) is introduced as associate degree integration of cloud computing with the mobile computing and mobile devices. However, alongside the quality of this subject of mobilecloud computing analysis still must be done on many problems furthermore as attainable frameworks to support cloud computing on mobile devices. so this abundant vital topic will gain its advantage simply.

II.RELATED WORK

In The mobile cloud computing (MCC) has been transmissible from cloud computing shortly when the cloud computing era begun around year 2007 [6]. MCC incorporates cloud computing properties with the mobile computing setting. As a development and extension of Cloud Computing and Mobile Computing, Mobile Cloud Computing, as a brand new phrase, has been devised since 2009 and thanks to its engaging business model and the inflated range of movable smart-phone, tablet pc, etc. users within the world, the MCC is proving to be a potential future technology. consistent with the highest 10 strategic technology trends for 2012 [6] provided by Gartner (a illustrious international analytical and consulting company), cloud computing has been on the highest of the list, which means cloud computing can have AN inflated impact on the enterprise and most organizations in 2012.The authors of [7] have conferred an outline of MCC security design. Privacy and integrity of the info is important side of MCC security.

The mobile users don't want high processing and storage capabilities services on their mobile devices with the emergence of cloud resources square measure used for all the info process and storage. Therefore, the MCC quality among the mobile users is increasing chop-chop and that is additionally highlighted in [8] that ABI research predicts that the amount of mobile cloud computing subscribers is predicted to grow from forty two.8 millionnaire. 6 June 1944 of total mobile users in 2008 to 998 million and a hundred and ninetieth of total mobile users in 2014. consistent with another report of Juniper shared in [9] that the demand of mobile cloud based mostly application is increasing with speedy part and its value can raise half a mile within the period of 5 years from 2009 to 2014. rather than the advantages which offers by MCC, it's not fulfil the expectations. the sole barrier that prevents the users to adopt mobile cloud computing is that there's risks in terms of security and privacy of the info and services. Most of the IT executives and managers round the world have measure for this. A survey conducted by a look firm Portio and revealed by another analysis firm Colt points that sixty eight of chief data officers (CIOs) have serious considerations regarding the protection of cloud computing [10]Advertisement.

III.ANALYSIS OF THE TECHNIQUES

A.Cloud Computing:

Cloud computing is that the delivery of computing services over the web on the pay-per-use basis. The cloud-computing model permits access to info and resources on anytime and anyplace basis. Cloud services are terribly helpful because it includes on-line file storage, social networking, webmail, and on-line business applications etc. By mistreatment these services, businesspersons will use software system and hardware that are managed by third parties at remote locations. Cloud computing provides a shared pool of resources, together with knowledge storage space, networks, specialised company and user applications conjointly. Cloud computing involving applied science services and describes a kind of outsourcing the computer services, without fear concerning from wherever it is? And from however it is? One should solely pay money for what they consumed.

The thought behind cloud computing is similar: The user will merely use storage, computing power, or specially crafted development environments, without fear concerning its internal operating. Cloud computing is usually Internet-based computing that hides advanced infrastructure of the web [16]. It's a method of computing within which IT-related capabilities and services are provided "as a service", permitting users to access their required technology or services from the web while not gaining data of it, or management over the technologies behind servers providing services. Cloud computing delivers computing resources over the Internet, rather than keeping knowledge on your own drive and offers North American nation freedom to use a service over the web, at another location, to store your info or for mistreatment its its applications.

B. Mobile Computing:

Mobility has become a awfully well-liked word and quickly increasing half in today's computing space. An incredible growth has appeared within the development of mobile devices corresponding to, smartphone, PDA, and laptops with a spread of mobile computing, networking and security technologies. Additionally, with the event of wireless technology and web it becomes a lot of easier and not restricted by the actual workplace or home or organizations. Thus, a lot of and a lot of individuals have accepted those mobile devices and offers support to rise within the technology of mobile computing.

Mobile computing is delineate as a type of human-computer interaction by that a laptop is expected to be transported throughout traditional usage [12]. Mobile computing will be same because the assortment of 3 major concepts: hardware, software package and communication. The ideas of hardware is dependent on mobile devices, corresponding to smartphone and laptop computer, or their mobile elements. The second conception of software package in mobile computing is that the varied mobile applications within the specific hardware devices, corresponding to the mobile browser, anti-virus software package and games hold on at remote distance on another servers. Finally, the communication issue includes the infrastructure of mobile networks, protocols and knowledge delivery in their use, that should be transparent to finish users. With the employment of the cloud-computing conception, it's easier to develop mobile computation somewhat easier.

C. Mobile Cloud Computing:

Mobile cloud computing is that the advanced version or it's the mix of the 2 most vital practical computing paradigm describe higher than i.e. cloud computing and mobile computing. MCC defines by Aepona [11] as a replacement distributed computing paradigm for mobile applications whereby the storage and therefore the knowledge processing are migrated from the sensible mobile devices to resources wealthy and powerful centralized computing data centers in procedure clouds. As MCC is predicated on the cloud conception the centralized applications, services and resources are accessed over the wireless network technologies supported applications programme of the smartphones. Several of the business persons are attracted by MCC as a profitable business possibility since reduces the development, execution value of mobile applications, and mobile users are enabled to amass new technology as a on-demand basis. It permits to realize wealthy expertise of a spread of cloud services for SMDs at low value [15]. The target of MCC is to use the computing potentials of SMDs by using resources and services of computational clouds. Mobile cloud computing technique try and specialise in assuaging resources limitations in SMDs by employing totally different ways of augmentation; like screen augmentation, energy augmentation, storage augmentation and application process of SMD. There are range of approaches and argue that MCC handles that are required to high-end hardware, reduces possession and maintenance value, and alleviates knowledge safety and user privacy. The MCC model consists of 3 major elements consisting of smartphones, PDAs, etc., wireless net technology and procedure cloud. This can be done as these Devices use wireless network technology protocols or Wi-Fi to access the services of procedure cloud in mobile atmosphere.

IV. ISSUES AND SOLUTION FOR MOBILE CLOUD COMPUTING

A. Challenges Regarding Mobile Communication:

1) Low Bandwidth Problem:

In communication network information measure is one among the vital issue because the radio resource for wireless networks are transmitted over networks per the quantity of information measure is gift for transferring the content within the network. Because the information measure restricted sharing the limited information measure among totally different mobile users set within the same space or digital computer and doubtless concerned within the same content to be transferred. This leads to the advance of the standard and this answer is applied in the main for the case once the users in an exceedingly bound space have an interest within the same contents. It collects user profiles that are exploitation the network sporadically and creates call tables, supported that the users decide whether or not or to not facilitate different users transfer contents that can't receive by them thanks to the information measure limitation.

2) Lack of Resource of Mobile Devices:

Mobile device with older desktop laptop shows that however the value options of quality is being achieved. As there's lack of resources makes it onerous for the adoption of mobile cloud computing normally conditions. For overcoming this limitation of mobile devices and there resources, they're supplemental to the cloud infrastructure so they will be used on anytime on anyplace basis makes it straightforward for many of advanced applications. because the mobile device performances, and also the resource constraints of mobile devices occurring increasing and glued devices can stay and should be accounted for the kinds of application designated for mobile cloud computing.

B. Challenges of Network

1) Challenges of Wireless Network and Access Control Policies: Wireless network is base for effecting cloud computing and it's its own intrinsic nature and constraints. For higher performance the consistent network information measure is vital however really variable information rates, longer latency and property with gaps in coverage area unit the most issues related to network within the MCC. Some uncontrollable factors also are accountable like weather for varied information measure capability and coverage [17]. For implementing MCC, accessing the network with heterogeneous access state of affairs and totally different access technologies like WiMAX, WLAN, 4G, and so on, having their own policies and restrictions.

As the wireless network is a crucial issue to support MCC functioning there ought to be the correct mechanism for minimizing the latency, increasing the information measure and decreasing the property gap. we should always keep totally different access schemes for avoiding affiliation failure and affiliation restoration. so as to present quicker access for mobile devices, most suppliers area unit providing 4G/Long Term Evolution (LTE) services. These services on the premise of knowledge storage capability, plug and play options, low latency, etc. This provides transfer peak rates up to a hundred Mbps and transfer up to fifty Mbps

2) Seamless Connection Handover: Currently capital punishment application is terminated or it returns error message once one move from one access purpose of network to a different purpose or one move from Wi-Fi network to 3G-based cellular network. as a result of this creates the case of communication failure and affiliation reestablishment. So, for providing electronic communication victimization cellular network mobile operators try to line up wireless fidelity Aps on street. this method is useful to dump traffic of Wi-Fi systems is reduced, and is to supply seamless in reduced cellular tie up.

C. Challenges Related To Mobile Applications

1) Interoperability: There are unit numerous mobile devices running on totally different platform as well as iPhone, humanoid phones, BlackBerry et al. additionally. This form of devices are unit utilized by folks within the same organization or a group of individuals sharing single network. And in such state of affairs ability issue becomes a significant challenge in pulling/ pushing information across multiple devices. An application that are unit run on mobile cloud infrastructure ought to be supported by bound mobile cloud infrastructure which will simply be judged probably on the idea of its needs against the cloud infrastructure characteristics. in conjunction with the device, network information measure and latency vectors ought to perform computation intensity, network information measure, and network latency properly.

2) Mobile Cloud Convergence: Data distribution is a very important issue for achieving advantage of quality by creating integration with cloud computing with mobile world. As for exploitation this cloud computing application services with mobile devices there some problems with computation of information, battery life and performance of this devices in distributed platform. Mobile cloud convergence is that the technique that gives performance improvement and resolution to the computation power downside. For this there's a partition of application takes place such components that require a lot of computation run on the cloud and run on the mobile device. Wireless technologies, advanced natural philosophy and net are necessary to attain pervasive and present computing.

D. Challenges Regarding Security

1) Information Security Devices Privacy: As cloud computing primarily deals with providing all style of services, knowledge storage and process. As all this can be done remotely, thus security is a very important concern for all United Nations agency are victimisation these services. we tend to are regarding here with Mobile Cloud Computing therefore its necessary to see the safety relating to mobile devices together with cloud computing platform, that is that the key concern during this space. This can be as a result of there's chance of device purloined or misplaced, that ends up in crucial knowledge to be compromised. currently days as numerous security threats are born, cloud platforms additionally offers several sturdy integral security measures like SSL and digital certificates provides on modify external security [18]. Misuse of information from stolen/ misplaced mobile devices are often avoided by wiping of those mobile device remotely. For detection security threats on any mobile device is finished by putting in and running security software's programmers referred to as "Antiviruses" that are promptly offered within the market.

2) Security Attacks and Hacking:

All networking activates square measure prone to one or different variety of malicious attacks. As there's additional use of websites that square measure generally accessing malicious code sites, for accessing the network and operational knowledge of that specific person or organization. There square measure some event at that point when implementing best measures for providing the simplest security policies to knowledge and knowledge trained attackers with best water sport could create incidents that unremarkably inevitable as:

There square measure numerous policies and schemes square measure currently days accessible reminiscent of honest info Practice Principles (FIPP) that need rigorous controls and procedures to guard the privacy of individual persons knowledge moreover as organizations info.

→Encryption is technique that's best for providing only thanks to maintain integrity and confidentiality of knowledge.

→Along side different internal servers net two.0 servers could any mitigate the threat of unauthorized accessing of knowledge through social media, websites and different net sources.

V CONCLUSION

This paper describes the Mobile Cloud Computing that may be a hybrid model that's combination of Mobile devices accessing the services that are remotely out there on the cloud. It's turning into the active research field, thanks to excessive usage of mobile devices by great amount of people and cloud computing by many organization is in initial stage. During this paper we have a tendency to target the today's most vital field MCC because the demand of mobile devices ar increasing. Together with this because the usage of web is additionally will increase considerably the data storage is shifted within the cloud surroundings that ends up in the event of MCC. As all the dealings is on the mobile network with the utilization of web the probabilities of various varieties of threats ar increasing, we have mention a number of the challenges that Mobile Cloud Computing has got to suffer. As we have a tendency to studied that MCC is incredibly important for today's advance technical world, making the wants for locating the answer to the attainable attacks on this MCC technology.

REFERENCES

- [1] 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.
- [2] Han Qi, Abdullah Gani, "Research on Mobile Cloud Computing: Review, Trend and Perspectives", pdf.
- [3] Kemp, R., et al., Cuckoo: a Computation Offloading Framework for Smartphones, in Proceedings of the Sixteenth annual conference of the Advanced School for Computing and Imaging 2010. 2010: Veldhoven, the Netherlands. p. 70-77.
- [4] Zhang, Q., L. Cheng, and R. Boutaba, Cloud computing: state-of-the-art and research challenges. Journal of Internet Services and Applications, 2010.1(1): p. 7-18.
- [5] M. Satyanarayanan, "Fundamental challenges in mobile computing," in Proceedings of the 5th annual ACM symposium on Principles of distributed computing, pp. 1-7, May 1996.
- [6] M. Cooney. (2011, Oct) Gartner: The top 10 strategic technology trends for 2012. [Online]. Available: <http://www.networkworld.com/news/2011/101811-gartner-technology-trends-252100.html>.
- [7] Soeung-Kon, J. -H. Lee and S. W. Kim, "Mobile Cloud Computing Security Considerations", Journal of Security Engineering, no. 9, (2012) April.
- [8] A. N. Khana, M. L. M. Kiaha, S. U. Khanb and S. A. Madanic, "Towards secure mobile cloud computing: A survey", Future Generation Computer Systems, vol. 29, Issue 5, (2013) July.
- [9] M. R. Prasad, J. Gyani and P. R. K. Murti, "Mobile Cloud Computing: Implications and Challenges", Journal of Information Engineering and Applications, vol. 2, no. 7, (2012).
- [10] Morshed, M. S. Jahan, M. M. Islam, M. K. Huq, M. S. Hossain and M. A. Basher, "Integration of Wireless Hand-Held Devices with the Cloud Architecture: Security and Privacy Issues", International conference on Cloud Computing, July-2012.
- [11] "White paper, mobile cloud computing solution brief, aepona," November 2010.
- [12] H. Dinh, C. Lee, D. Niyato, and P. Wang, "A survey of mobile cloud computing: architecture, applications, and approaches," Wireless Communications and Mobile Computing, 2011.
- [13] (Accessed on 20th July 2011) Amazon s3. [Online]. Available: <http://status.aws.amazon.com/s3-20080720.html>
- [14] X. Zhang, A. Kunjithapatham, S. Jeong, and S. Gibbs, "Towards an elastic application model for augmenting the computing capabilities of mobile. devices with cloud computing," Mobile Networks and Applications, vol. 16, no. 3, pp. 270-284, 2011.

- [15] Muhammad Shiraz, Abdullah Gani, “A Review on Distributed Application Processing Frameworks in Smart Mobile Devices for Mobile”.
- [16] “Cloud Computing”, IEEE COMMUNICATIONS SURVEYS & TUTORIALS, VOL. 15, NO. 3, THIRD QUARTER 2013.
- [17] Kyung Mun, Corporate Technology Strategist, Mobile Cloud Computing Challenges? <http://www2.alcatellucent.com/blogs/techzine/2010/mobile-cloud-computing-challenges>. [18] Irmee Layo., “Overcoming Challenges in Mobile Cloud Computing?” <http://cloudtimes.org/2011/07/11/overcoming-challengesin-mobile-cloud-computing/> July 11th, 2011.