A Review on Current Trend in Mobile Cloud Computing Security Issues

Mr. Dulal Kumbhakar[1]

[1]*Contractual Lecturer, BCA Department, Vivekananda Mahavidyalaya, Hooghly, West Bengal, India. (E-mail: dulalkumbhakar69@gmail.com)*

Abstract— Now a day's rapid development of modern technology Mobile users, Government, businessmen and individuals try to expand their functions in terms of cost reduction, better resource utilization, and high business volume and enhance client's services. To implement these they depend on different modern computing technology instead of manual process. For this, Mobile cloud computing (MCC) is an emerging type concept combining of many Internets based computing fields that provides shareable processing resources and data on demand basis. Also it provides users and enterprises with various capabilities to store and process their data with minimal management effort. This paper reviews the current trend in MCC security issues and challenges.

Keywords— Mobile Cloud Computing, Security issues trend, Research issues and challenges.

I. INTRODUCTION

Mobile Cloud Computing is the combination of cloud computing, mobile computing and wireless networks to bring rich computational resources to mobile users, network operators, as well as cloud computing providers in efficient and secure manner. The ultimate goal of MCC is to enable execution of rich mobile applications on different mobile devices, with high quality of services [1, 2]. In m-commerce environment, MCC provides business opportunities for mobile network operators as well as cloud providers. More comprehensively, MCC can be defined as a rich mobile computing technology that provides unified elastic resources of varied clouds and network technologies toward unrestricted functionality, storage, and mobility to serve a multitude of mobile devices anywhere, anytime through the channel of Ethernet or Internet instead of heterogeneous environments and platforms based on the pay-as-you-use principle [2].

Need of security in MCC is very much important as mobile devices can encounter several security threats while they are exposed to the outside, which can cause different virus attacks [3].The security and privacy protection services can be achieved by using lightweight secure cloud application frame work that provides security with minimum communication and processing overhead on mobile devices and also provides the user management, key management, encryption on demand, intrusion detection, authentication, and authorization services to mobile users [7].

Famous global analytical consulting company, Gartner Company, predicted more than 80% want to access the internet from their own mobile devices despite the using PCs by the year 2017. As the work place becomes more mobile applications and cloud computing introduced an active dynamic technology (MCC) for mobile devices to eliminate some problems in performance of mobile devices like low battery power, less processing power, low storage, less security(reliability and privacy), week internet connectivity and less energy. Several enterprises upgrade mobile device technology to increase the battery power Capacity, storage capacity, network availability, and network & data security. According to Gartner through 2017, 90% of enterprises will have two or more mobile operating systems to support the above applications [4].

In the near future, as developers move away from native apps, the world will see more consumer applications of mobile cloud computing developed incorporated with the cloud framework implementing by an interface or browser on a mobile device.

The remainder of this paper is arranged as follows. The next Section classifies the different aspects of security issues trend. Section III contains the comparative studies on security issues and challenges in MCC during 2012-17. Finally, paper concludes in Section IV.

II. CLASSIFICATION ON DIFFERENT ASPECTS OF SECURITY ISSUES TREND IN MCC

Mobile computing may face several problems and challenges in various aspects, such as communication problem, security issue, hand-off delay, computing ability issue, and so on.

Mobile communication issues:

- *Low bandwidth*: One of the biggest issues, because the radio resource for wireless networks is much scarcer than wired networks.

- *Service availability:* Mobile users may not be able to connect to the cloud to obtain a service due to traffic congestion, network failures, and mobile signal strength problems.
- *Heterogeneity:* Handling wireless connectivity with highly heterogeneous networks to satisfy MCC requirements (always-on connectivity, on-demand scalability, and energy efficiency) is a difficult problem.

Security Issues

Security issues trend may occur on different aspects in MCC environment.

(1) Organizational Security issues:-

When a mobile cloud user wants to store data or host applications on the public cloud, then he loses its ability to have physical access to the servers where the potential information is saved. As a result, potentially those data is at risk from insider attacks. Efficient cloud security architecture should recognize the issues that will arise with security management.

(2) Physical Security issues:-

The physical location where mobile cloud client's data is stored in the cloud must be protected in order to prevent unauthorized access of client's data. But sometimes firewalls and encryption process unable to protect data of the client from the theft, fires, floods etc. It is noted that Mobile cloud service provider (CSP) is not only store and process client's data, they should responsible for protect client's data by controlling physical location security, network firewalls.

(3) Technological Security issues:-

Technological Security issues are associated with the hardware & technology tools that are provided by the Mobile Cloud Service Provider (MCSP). In the public cloud, with the multi user facility, for this resource sharing problems may be occurred , and there is another issue may be found related to technology due to weak portability (changing MCSPs).It should be the use of extensive virtualization in implementing Mobile cloud infrastructure that brings unique security concerns for clients of a public cloud service.

(4) Data security issues:-

A number of security issues' are associated with Mobile cloud data services: - not only traditional security issues, such as network eavesdropping, illegal data invasion, and denial of service attacks, but also there are Mobile cloud computing specific issues, such as side channel attacks, virtualization vulnerabilities, and abuse of Mobile cloud services. The following possible data security requirements reduce the above mentioned issues-(i) data integrity (ii) data confidentiality and (iii) data availability.

(i) Data integrity –

The data integrity refers to the confidence of data that are stored in the Mobile cloud computing server and the data cannot be manipulate in any way by unauthorized party . For this MCSP will have its own identity management system to control access to information and computing resources. Cloud providers either integrate the customer's identity management system into their own infrastructure, using federation or SSO technology, or a biometric-based identification system, or provide an identity management system of their own.

(ii) Confidentiality-

Data confidentiality is the property that data contents are not made available or disclosed to illegal users. Out sourced data is stored in a cloud and out of the owners' direct control. Only authorized users can access the sensitive data while others, including CSPs, should not gain any information of the data. Meanwhile, data owners expect to fully utilize cloud data services, e.g., data search, data computation, and data sharing, without the leakage of the data contents to CSPs or other adversaries.

(iii) Access Availability-

This property ensures that the Clients have access to their own data and data owner can select some restriction of access to his data outsourced to Mobile cloud. Only Legal users can be authorized by the owner to access the data, while others cannot access owner data without permissions. Further, different users should be granted different access privileges with regard to different data items. The access availability must be controlled only by the owner in un-trusted cloud environments.

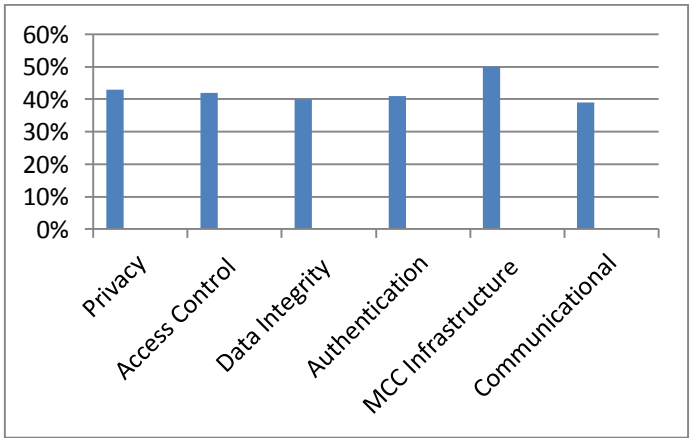

Fig.-1 Chart on proposed research work related to security issues in MCC.

From the above figure we can observe that the maximum research works had proposed on MCC Infrastructure i.e. nearby 50% and proposed research works on communicational issues in MCC is nearly 39% that is the minimum compared to others.

III. IN THIS SECTION WE HAVE CONSIDERED 20 RESEARCH PAPERS IN THE AREA OF MCC SECURITY ISSUES DURING 2012-17. THE DETAILS OF THESE PAPERS ARE REPRESENTED IN THE FORM OF FOLLOWING TABLE.

Sl. No	Domain	Year	Researcher's Name	Work
1	Cloud and mobile device integration.	2012	M.Rajendra Prasad, Jayadev Gyani, P.R.K.Murti.	How Mobile Cloud Computing will eliminate the commercial and technical fragmentations and application providers and enterprises will be able to access valuable network and billing capabilities across multiple networks.
2	working concepts of MCC and different security issues.	2013	A.Cecil Donald, S. Arul Oli, L. Arockiam.	Provide some solutions that increase the security in the Mobile Cloud Environment like Intrusion Detection System (IDS) and Cloud Intrusion Detection System Services (CIDSS) take place in the cloud which obviously saves the device CPU process and memory.
3	The issues and challenges of MCC.	**2013**	AbidShahzad and Mureed Hussain.	A complete understanding of MCC by explaining its architecture, the issues and challenges of MCC like, data security, infrastructure security and communication channel security.
4	Overview on Mobile Cloud Computing security issues	**2013**	D. Popa, K. Boudaoud, M. Cremene , M. Borda.	Work on dividends of MCC issues like mobile threats and Cloud threats and they presented the security issues that may affect the data, the applications, the device and the user's privacy.
5	Overview on MCC	2013	Ruay-Shiung Chang , Jerry Gao , Volker Gruhn , Jingsha He, George Roussos, Wei-Tek Tsai.	They presented the three generations of service infrastructure in MCC by comparing their key features and limitations and provide some possible solutions on different issues and challenges in MCC.
6	Issues on MCC.	2014	Dhammapal Tayade.	Deployed a number of mechanisms for providing data security so that Mobile Cloud Computing can be widely accepted by a number of users in future.
7	Security on MCC	2014	QijunGu and Mina Guirguis.	Mechanisms that ensure the security of mobile cloud computing architectures and eliminate the threats against the availability, privacy and integrity of MCC architectures in which the mobile devices and the cloud jointly perform.
8	Security of 741utilize data privacy in MCC.	2014	M. Padma, M.Lakshmi Neelima.	Address all security issues like Data Ownership, Privacy, Data Security and other Security issues and provide the data security plan which reduces the security risks and additionally to cut costs and elaboration to adopt the cloud computing in mobile environment.
9	Issues for mobile cloud computing.	2014	Shuchi Srivastava.	They identified nine major threads to security in clouds and they provide the preventive measures (e.g. Mobile network user's security measures and Measures for cloud Security) that could be taken to deal with such problems.
10	Mobile Storage Augmentation (MSA).	2014	Nazanin Aminzadeh, Zohreh Sanaei, Siti HafizahAb Hamid.	They worked on open issues of MSA(Mobile Storage Augmentation) in MCC like Energy-awareness, Trust, Data integrity etc.
11	Review on security concerns in MCC.	2014	Bhavya Sareen, Sugandha Sharma, Mayan kArora.	They worked on Proposed security mechanism AES (Advanced Encryption Standard)

				Encryption which will secure the data on the Smartphone's by using the Cloud as a computational backup.
12	Issues on MCC.	2014	Jaspreet Kaur Aulakh, Sugandha Sharma, Mayank Arora.	Identify some issues in Mobile Cloud Computing such as operational issues, End user level issues, and Service and Application level issues, Management of data issues and discussed about related works on MCC security issues by the researchers.
13	Computing securities in MCC.	2015	T. Chidambaram, M. Durairaj.	Working concepts of MCC and its various security algorithms such as RSA, AES, DES and Blowflies encryption algorithms to secure the data in MCC.
14	Overview of MCC.	2015	Prof. Sneha U. Bohra, Miss. Poonam S. Sharma.	Details discussion for the use of Internet increases very much along with Mobile cloud infrastructure then the chances of different network related issues and challenges are increasing**.**
15	Data security on Mobile device.	2015	Sujithra M, Padmavathi G , Sathya Narayanan.	The worked on Evaluation metrics using by Symmetric key algorithms, Asymmetric key algorithms and Combination of these algorithm as a Hybrid Approach algorithms. By which performance of computing devices will be high and proved that AES algorithm is better than other algorithms in speed up ratio.
16	Security challenges in Mobile computing.	2015	Dr. Pranav Patil.	Framework of the classes of quality, disconnections, information access modes and scale of operation in mobile cloud computing.
17	Data storage issues in MCC.	2016	Nareshvurukonda, B.Thirumala Rao**.**	Identified the data storage issues such as data breaches, data theft, and unavailability of cloud data and provide proposed schemes such as SecCloud for Securing cloud data, FADE, a protocol for data privacy and integrity, TimePRE, a scheme for secure data sharing in Cloud.
18	Issues in MCC	2016	Nirbhay K. Chaubey, Darshan M. Tank.	They introduced security related issues in MCC in two categories: the security for mobile users and the security for data and draw the Comparison analysis of various techniques proposed by the researcher to solve Security and Privacy Issues in MCC.
19	Review on MCC technologies.	2017	Kusum Lata, Er.Sugandha Sharma.	They worked the review on computational issues on MCC such as offloading scheme and they also discussed about static & dynamic offloading scheme.
20	Issues on MCC.	2017	Hasveen Kaur, P. S. Mann.	They reviewed two most popular techniques for cloud data encryption: i) full disk encryption ii) fully homomorphic encryption in manager and cloud based. But the main problem is in fully homomorphic encryption is of key management and key sharing which reduces the reliability of the scheme. For key management and key sharing, they proposed Diffie-hellman algorithm and HMAC and OTP on the basis of secret key generation to increase the reliability of the scheme.

Table-1. Some of the papers published about the Security issues and challenges in the area of MCC.

IV. CONCLUSIONS

Mobile cloud computing is the most important emerging technology in modern age. It makes easier to human's lives in every field. However, one thing must be important to understand the security risks and challenges when we utilize the modern technology. Cloud computing is no exception. Since the development of mobile technology MCC combines

the utility of both mobile computing and cloud computing, by this means providing best services for mobile users. MCC expands more options for access benefits in appropriate manner. The expanding services of MCC are restricted by its security trend widely. The need of various securities is very much essential on various concerned areas of MCC. My future work would be focused on enhancement of existing security frame works and different authentication technologies to keep data secured using cryptography algorithms. Finally my aim will be delivered a more reliable security framework in Mobile cloud computing.

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Author Profile:

Author Name: Mr. Dulal Kumbhakar.
Designation: Contractual Lecturer, BCA Department, Vivekananda Mahavidyalaya, Hooghly,West Bengal, lndia.
Acedemic Qualifications: MCA, SET-2013 Qualified, Organized by West Bengal College Service Commission.
Research area: Cloud Computing and Mobile Cloud Computing .