

Mobile Cloud Computing–Implementation Problems and Solutions

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Abstract

Mobile Cloud Computing (MCC) Has Been Introduced as A Potential Technology With Explosive Growth Developing mobile applications and cloud computing language concepts. From Mobile to the Cloud. The objective is to remove the obstacles associated with storage, bandwidth, diversity, and security. To Get Rid of Computing Loads of Mobile Devices Loading execution shipping technique is recommended for the migration process between machines. Offloading Exec In which area of the code will a decision be taken permanently or dynamically depending on the execution time? And state affairs. The success of MCC depends on efficient neutralization techniques that meet the requirements. Customer Consumption. In this paper, first, we look at the benefits of saving MCC and demonetization benefits and Time to leave. Then we offer various elimination techniques for building wireless networks. Proper use of the cloud We show when the model will be used and how it accelerates and empowers application. Finally, we suggest a rich application model for MCC that will improve the cellular industry in the future.

Keywords: MCC: Mobile Cloud Computing, SaaS, PaaS, IaaS, Security Issues, Virtual machine

INTRODUCTION OR OVERVIEW OF MCC

Mobile Cloud Computing (MCC) is a methodology or model wherein convenient applications are gathered, energized and encouraged using conveyed processing development. It gives a convenient customer a component rich application passed on over the Internet and powered by cloud-supported system. Most applications worked for cell phones requires escalated registering force and programming stage support for application execution. Some low-end yet program empowered cell phones can't bolster such applications. With the coming in portable distributed computing, the assets regarding registering, stockpiling and platform bolster required to execute these applications are accessible through the cloud and, in principle, a more noteworthy number of gadgets can be upheld. It's imperative to underscore the "in principle" part of the portable cloud. While there is a lot of potential, improvement right now still in its earliest stages.

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Why We Choose MCC

These are the accompanying explanation, which clears our uncertainty, why we pick Mobile Cloud Computing.

i. Fast Development

Cloud organizations are creating versatile applications which are helping clients on everyday schedule. These applications think of updates which constantly improve the presentation of the applications. As organizations are improving their applications normally this prompts the way that there is a quick improvement in versatile Cloud Computing.

ii. Adaptable

The applications assembled are of more prominent reach and adaptable. There are an assortment of improvement approaches and gadgets which bolstered by portable Cloud Computing. In MCC, the client can choose the administrations which require for their business which makes it increasingly adaptable (Figure 1).

The architecture model of MCC is as:

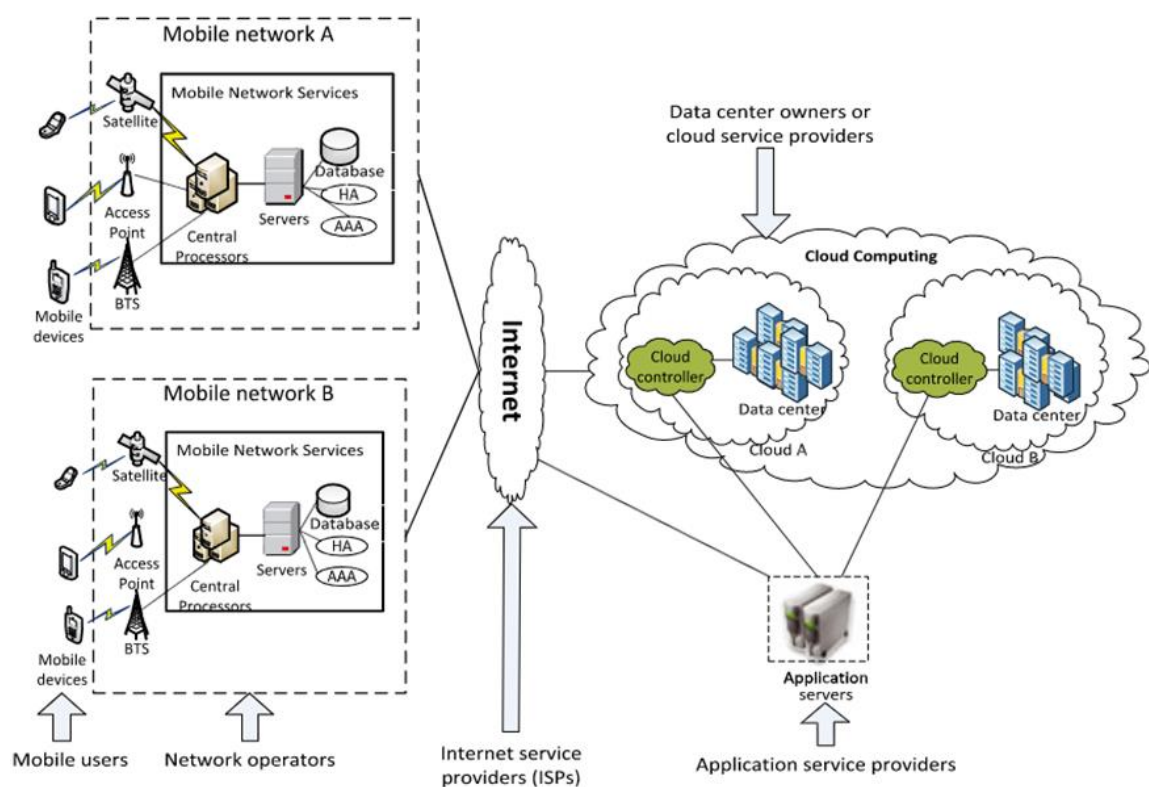


Figure 1. Internet architecture diagram.

iii. Secure

Versatile Cloud Computing is solid and difficulties up all the information in the cloud and keeps it secure. That sponsored up can recover whenever in a safe way [1]. These applications ensure by a secret phrase so that if the versatile is lost or taken the cloud doesn't confront any hazard. Starting with one telephone then onto the next the procedure is exceptionally simple and no information is lost.

Various services of MCC

Basically MCC have 3 types of services, which are:

- SaaS (Google Docs)
- PaaS
- IaaS (Amazon EC2)

They all services are provided by the cloud Data Centers.

BACKGROUND OF MCC

Mobile Computing

Portable Computing is human–PC association in which a PC is depended upon to be sent during normal usage, which considers transmission of data, voice and video. Convenient figuring incorporates adaptable correspondence, compact gear, and versatile programming. Correspondence issues

consolidate exceptionally designated frameworks and system sorts out similarly as correspondence properties, shows, data associations and strong progressions. Hardware joins PDAs or device portions. Compact programming deals with the characteristics and essentials of flexible applications.

Cloud Computing

Distributed computing is the movement of preparing organizations—including servers, accumulating, databases, arranging, programming, assessment, and understanding—over the Internet ("the cloud") to offer snappier headway, versatile resources, and economies of scale [2]. You normally pay only for cloud organizations you use, cutting down your working costs, run your establishment even more capably and scale as your business needs change.

Types of cloud computing: 3 type of cloud environments are:

- Public
- Private
- Hybrid

Advantages of MCC

- Increased Resource Availability
- Unskilled Hosting
- Enhances Security and Reliability
- Reduces Long WAN Latency
- Increased Low-cost Resources
- Green Computing

Applications of MCC

- mobile-Games
- Mobile commerce
- Mobile healthcare
- Pc Software's on Mobile
- Assistive technologies
- Video making & editing software
- Backup & recovery
- Business process
- Anti-virus applications
- File converters

CHALLENGES AND SECURITY ISSUES IN MCC

Security Issues in MCC

- *Classification:* As cloud condition includes enormous no. of client to offer support, expands enormous no. of passages of portable clients and applications. Every client's information ought to be secure and secretly oversaw. Just approved client have rights to get to approved information.
- *Security:* Privacy is want of an individual to control client's very own data. In cloud numerous prospects like insider client dangers, outer aggressor dangers, information spillage and so on can harm protection of cloud client.
- *Multi-occupancy:* In multi-tenure of cloud, gathering of client shared assistance gave by single programming or application. In such a situation, every portable client's information is confined and stays imperceptible to other versatile client.
- *Item reusability:* A model equipped for creating cloud based applications with reusability by recovering the segments from the cloud part store by utilizing design coordinating calculations and different recovery strategies.
- *Information remanence:* Information secrecy could be broken inadvertently, because of information

remanence.

- *Programming Confidentiality*: It alludes to believing that particular application or procedures will keep up and handle the client's very own information in secure way.
- *Respectability*: Integrity in cloud alludes to shielded from unapproved cancellation, alteration, burglary. Information honesty in straightforward terms is the upkeep of soundness of any information during exchanges like exchange, recovery or storage. Deletion, change can be deliberately or unexpectedly.
- *Approval*: It is the component by which a framework figures out what level of access a specific verified client ought to need to make sure about assets constrained by the framework.
- *Accessibility*: Availability is main consideration which give access to administrations, information and instruments anyplace, whenever. It has for quite some time been the situation that to fabricate frameworks with this sort of unwavering quality and accessibility implies enormous expenses for organizations.

CHALLENGES IN MCC

1. Challenges of mobile communication

- *Problems by less bandwidth*
- *Absence of Resource*

For beating this impediment of cell phones and there assets, they are added to the cloud framework so they can be utilized on whenever on anyplace premise makes it simple for the greater part of cutting edge applications. As the cell phone exhibitions, and the asset limitations of cell phones continuing expanding and fixed gadgets will remain and should be represented the sorts of utilization chose for portable distributed computing [3].

2. Challenges of mobile apps

- *Portable Cloud Convergence*
- *Interoperability*

3. Challenges regards network

- *Difficulties of Wireless Network and Access Control Policies:*
- *Consistent Connection Handover:*

4. Challenges in security

- *Data Security Devices Privacy*
- *Data Hacking*

5. Solutions of Various Challenges & Security Issues

We have various challenges in mobile cloud computing. Some solutions are:

- *Challenge of restrictions in cell phones*: Virtualizations and Image, Task relocation.
- *Challenge of Quality of Communication*: Transmission capacity overhauling, Data conveyance time diminishing.
- *Challenge of Division of utilizations administrations*; Versatile application division component.

Solutions of Security Issues are

- Encryption of data by effective algorithm.
- Confidential third parties.
- Identity based encryption techniques.
- SSAM - Security service admission model.

According to above comparison Table 1 the effective encryption algorithm is Blowfish Algorithm.

In this above Table 2 we can see that the shortest time of execution is of Blowfish algorithm and the highest processing time of 1036 bytes/sec is also of Blowfish algorithm.

Table 1. The comparison of some encryption algorithms is:

Algorithm	Megabytes (2 ²⁰ bytes) Processing	Time Taken	MB/Second
Blowfish	256	3.976	64.386
Rijndael (128-bit key)	256	4.196	61.010
Rijndael (192-bit key)	256	4.817	53.145
Rijndael (256-bit key)	256	5.308	48.229
Rijndael (128) CTR	256	4.436	57.925
Rijndael (128) OFB	256	4.837	52.925
Rijndael (128) CFB	256	5.378	47.601
Rijndael (128) CFC	256	4.617	55.447
DES	128	5.998	21.340
(3DES)DES-XEX3	128	6.159	20.783
(3DES)DES-EDE3	74	6.499	9.848

Table 2. The Comparison of execution time (in sec.) on a P-2 266 MHz system is:

Input Size (bytes)	DES	3DES	AES	BF
20,527	24	72	39	19
36,002	48	123	74	35
45,911	57	158	94	46
59,852	74	202	125	58
69,545	83	243	143	67
137,325	160	461	285	136
158,959	190	543	324	158
166,364	198	569	355	162
191,383	227	655	378	176
232,398	276	799	460	219
Average Time	134	383	228	108
Bytes/sec	835	292	491	1,036

On 2.4Ghz machine the highest processing time is again of Blowfish algorithm (Table 3).

So, we can say that the best encryption algorithm is Blowfish Algorithm.

The Performance graph with CBC of these algorithms with CBC technique is:

Here the lowest execution time is of Blowfish Algorithm and the highest execution time is of AES algorithm (Figure 2).

Table 3. The comparison on a P-4 2.4 GHz system is:

Input Size (bytes)	DES	3DES	AES	BF
20,527	2	7	4	2
36,002	4	13	6	3
45,911	5	17	8	4
59,852	7	23	11	6
69,545	9	26	13	7
137,325	17	51	26	14
158,959	20	60	30	16
166,364	21	62	31	17
191,383	24	72	36	19
232,398	30	87	44	24
Average Time	14	42	21	11
Bytes/sec	7,988	2,663	5,320	10,167

ARCHITECTURES TO IMPLEMENT MCC

We also have some architectures which are best to implement the MCC in real world. They architectures are as follows:

- **Clone Cloud Architecture in MCC:**

Clone cloud is developed in 2011 by B. Chun. The inside strategy is using virtual machine

development advancement to offload execution squares of uses from mobile phones to Clone Cloud perfectly and for the most part, in order to totally or semi-therefore widen or alter the PDA based execution to a passed on circumstance (wireless figuring notwithstanding circulated processing).

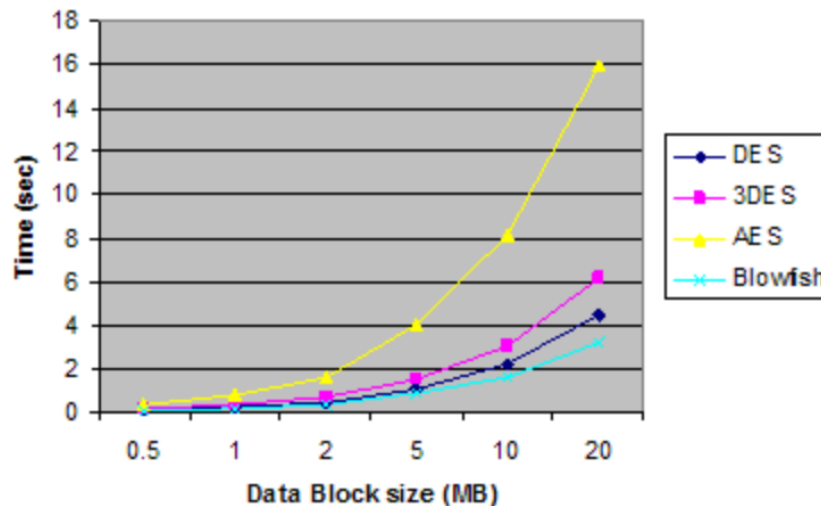


Figure 2. Performance graph of algorithms in CBC.

In a Clone Cloud system the 'Clone' is a copy portrayal of a wireless running on a virtual machine. By show up diversely according to mobile phones, such a 'clone' has greater hardware, programming, sort out, essentialness resources in a virtual machine which gives logically sensible condition to process obfuscated endeavours [4].

The Clone Cloud will be out of reach if compact customers walk around the sign's outwardly debilitated zone (Figure 3).

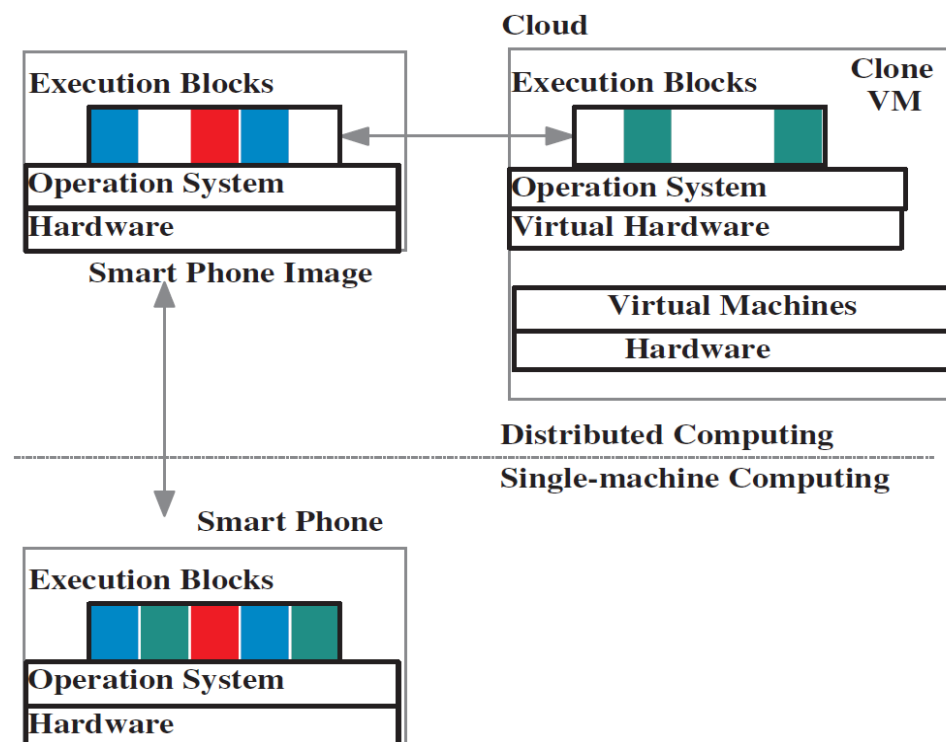


Figure 3. Clone cloud architecture of MCC.

- **AlfredO Architecture of MCC**

AlfredO is a middleware stage to thusly disperse different layers of usage in mobile phones and cloud, separately, by showing applications as a use outline, and finding the perfect modules [5]. The test result shows that such stage improves the presentation of uses in disseminated registering effectively. AlfredO system contains three bundles (the interface embodiment on Java classes and organizations): Alfredo Client and Renderer on the client and Alfredo Core on the server (Figure 4).

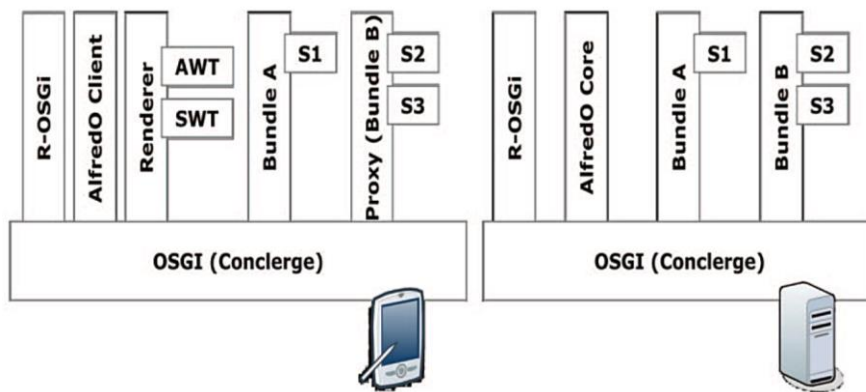


Figure 4. AlfredO architecture of MCC.

- **Cloudlets**

Cloudlet is introduced by M. Satyanarayanan, which gives rapidly prompt changed organization to PDAs using virtual machine (VM) development for disentangling transmission limit affected postponement among devices and cloud, and so forth [6]. The maker fought that despite the way that circulated registering is a better than average response for phone's benefit necessity, long WAN dormant deferral is an obstruction for its presentation (Figure 5).

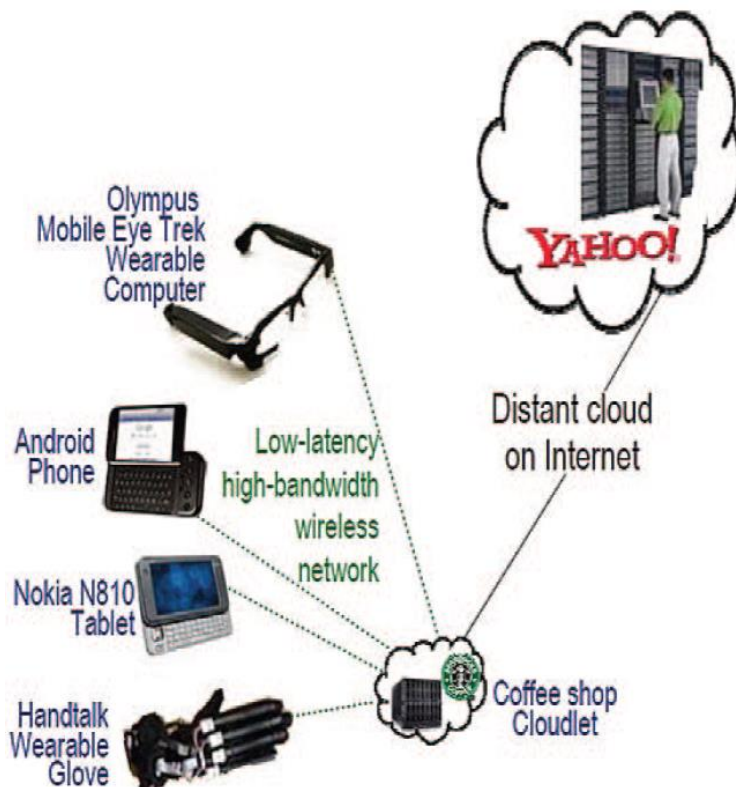


Figure 5. Cloudlets in MCC.

Cloudlets have future to research and get best method to implement the MCC.

CONCLUSION

The MCC has the biggest opportunities in future. Now all the companies are shift their database on the cloud and Mobile is the easiest and fastest method to access that cloud services. Here I give solutions of the security issues in implementation of any MCC network. I also provide the best algorithm to encrypt over data on cloud. I provide some Architecture Models which are best in implementation of MCC environment anywhere. Cloudlets have the various future scope to grow and implement in real world.

REFERENCES

1. Milon Biswas, Md Whaiduzzaman. Efficient Mobile Cloud Computing through Computation Offloading. International Journal of Advancements in Technology. 2018;10(1):2-7.
2. Xing Chen, Shihong Chen, et al. Framework for context-aware computation offloading in mobile cloud computing. Journal of Cloud Computing. 2017;6(1).
3. Han Qi and Abdullah Gani. Research on mobile cloud computing: Review, trend and perspectives. 2012 Second International Conference on Digital Information and Communication Technology and it's Applications (DICTAP). 16-18 May 2012; Bangkok, Thailand, IEEE.
4. Samaher Al-Janabi, Ibrahim Al-Shourbaji, et al. Mobile Cloud Computing: Challenges and Future Research Directions. 2017 10th International Conference on Developments in eSystems Engineering (DeSE). 14-16 June 2017; Paris, France, IEEE.
5. Dipali S. Yadav, Prof. Kanchan Doke. Mobile Cloud Computing Issues and Solution Framework. International Research Journal of Engineering and Technology (IRJET). 2016;3(11):1115-1118.
6. Miss. Poonam S. Sharma, et al. Mobile Cloud Computing: Its Challenges and Solutions. International Journal of Computer Science and Mobile Computing. 2015;4(5):287-293.