

Enhanced Security Protocol for Mobile computation offloading and accessing data offline

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Abstract : Primary concern for majority of users in the world has been low battery life . A survey conducted in 2005 found users from around 15 countries to have battery life of a mobile to be the top most priority . Mobile systems nowadays have plenty of features such as wide range network bandwidth, increased processor performance and enhanced storage capacity which eventually leads to lower battery life. A better way to accommodate a larger battery can be achieved with the help of computation offloading. It allows to shift our storage and computation over cloud thus leading the designers to accommodate a larger battery life . Offloading computation can be done in variety of ways like cluster, grid or cloud. Uploading your entire data over cloud has only one disadvantage that we won't be able to access data while being offline . This paper will be focussing on how to access data without internet and providing enhanced security protocols for content over cloud .

Keywords : computation offloading , energy efficient , security threats .

I. INTRODUCTION

Cloud computing has revolutionised the computer industry since it came out in 1990s. Cloud computing is ubiquitous . It is reliable, easy to access shared pool of resources like storage, applications and services. The main reason for it's success was unlimited capacity, ease of use , immense collaboration and cost effective . To be able to save your data over the internet has further reduced the need to buy external storages. Now, it has been further upgraded to store incredible amount of data over cloud . The main focus is to increase the battery life of the mobile by performing entire computation over the cloud . Every application, software and now in the future devices are going to adopt Cloud computing. It is the future of computing and people have already comported this tech. into there lives. Battery life will certainly increase as designers will find more and more space to accommodate battery as unnecessary things that occupied the space before would have moved over the cloud. Offloading computation has several advantages like low initial capital investment , shorter startup time, easier disaster recovery and low operation and maintenance cost . The only disadvantage that it has is that it can't be accessed when being offline. Cloud computing has already firmed it's steps into the ground by bringing ground-breaking innovation. But it still has to go a long way. Being a prime software it is

supposed to have threats from Cyberattacks which are increasing in numbers every year . To eliminate the threats and to access the data without internet invention still has to be resolved .

II. LITERATURE SURVEY

Lateef Ahmad et al [1] have proposed an campus network which has been proved to be effective than the existing models in terms of load, delay and throughput .

R. Charanya et al [2] proposed various Computing challenges the account holder have to face and the security issues that occur .

Filippo Rebecchi et al [3] have proposed His survey strongly advocates the use of alternative mobile access networks for offloading purposes.

Dejan Kovachev et al [4] proposed Framework for Computation Offloading in Mobile Cloud Computing where he proved that local execution time where the entire execution load is on CPU can be reduced when the computation will occur on cloud using remote cloud .

Cong Shi et al [5] proposed COSMOS: Computation Offloading as a Service for Mobile Devices where he made COSMOS which solves 2 major challenges how to share and manage cloud resources .

Mazedur Rahman et al [6] examine and reviews existing vitality sparing methodologies. His survey had results in three perspectives: A) portable devices, B) system infrastructures communications C) cloud infrastructures registering programming.

Juntunen et al. [7] proposed Factors affecting technology evolution .The paper focused on MCO which is mobile computation offloading over the cloud and identified several factors affecting the technology evolution of MCO, including both drivers and restraints.

The research papers helped in understanding how the mobile computation can be more energy efficient where Mazedur discusses various energy saving techniques, how the cellular systems can be more dependant on the cloud on computation than simply relying on basic hardware computation thus increasing speed and efficiency , various increased security measures and different types of cyberattacks that are threatening our privacy and how it can be prevented .

III. SAVING ENERGY ON MOBILES

Mazedur Rahman[6] and Li B et al[8] discussed energy saving techniques and proposed strategies and provided various solutions in 3 perspectives : cellular systems , comms. and computer software and also examines the limitations and future needs in energy saving for mobile cloud computing. Balan RK[9] discussed the main reason for offloading computation is saving energy by accommodating a larger battery into our familiar mobile systems . Transferring entire data onto the cloud have great benefits such as we can access the content from any device like pc, mobile , tablet etc. , the content over cloud is free and can store unlimited amount of data , affordable price etc. thus leading into creating a larger battery life as the amount of space saved by removing the SD card slots . Our mobile phones will become way more energy efficient than before. Saving energy on our phones will lead to having more productive results as people will be able to perform more tasks which earlier they were not able to achieve and it will also eliminate the need to carry power cords , power banks or an additional battery .

IV. DRAWBACKS OF MOBILE COMPUTATION OFFLOADING

This paper will be focussing on cloud based mobile computation offloading also known as MCO which was also discussed by Juntunen [7] where he proposed computation over cloud and the security threats . Filippo Rebecchi [3] overcame drawbacks of mobile computation offloading . He proposed an alternative method for mobile computation offloading . The survey showed potential to weaken the stress of mobile network congestion . A great deal of researches and surveys have been conducted to overcome mobile computation offloading drawbacks .

Time and load consumption also cast a major drawback in mobile computation offloading . All the computational tasks performed on CPU can also drain the battery of the cellular system . Dejan Kovachev [4] et al proposed “Framework for Computation Offloading in Mobile Cloud Computing “ where he mentioned that execution load on CPU can be reduced when the computation will occur on cloud using remote cloud .But , the two main drawbacks of computation offloading mainly threat related and accessing data offline .

A) Security threats and untrustworthy authentication

With innumerable benefits there has to be some drawbacks. Moving your precious data over the cloud will certainly have some security threats from hackers. Cloud does not have a secured service for it’s users as it provides a minimal amount of security where your entire data is secured by a simple easy-to-hack password. Cyberattacks nowadays occur on a daily basis and it’s relatively unchallenging for a hacker to hack into cloud account. Weak passwords and non-updated access credentials may results in such security breaches. There are several types of cyber-attacks mainly traffic hijacking , Data Breaches , Data loss ,Hacked Interface and APIs , APT parasite ,Cloud services abuses etc.

In order to avoid this type of attack, Three-factor authentication should be used. Moreover, cryptography and stenography can be also be used to protect our content.

There are several types of obstacles in Cloud computing :

R. Charanya [2] identifies and prevents challenges in network , host and application level .

Some of the security problems that occurred are:

- *Breach on data through fibre-optics Network:* Data transfer through the fiber optics was considered a safe and secured way of data transfer .Later ,Verizon’s optical network was discovered which was an illegal way of getting the data which is deliberately placed to eavesdrop .
- *Sniffer Attack:* The data that is not encrypted can be easily read by the hackers.
- *DNS attack:* Sender and the receiver gets a illegal route of connection for transfer of data .
- *Google Hackin :* Ideal search engine for the hackers to get important information .
- *Cookie Poisoning:* Unauthorised personnel can change the cookies.
- *Security concerns with hypervisor:* Malicious code can get into the system .

B) Content over cloud can't be accessed without Internet .

One major drawback to consider when uploading data over cloud is that the users won’t be able to access data without an internet connection. Moreover, a constant internet connection is required which is still scarcely available to people living in the rural areas . People having the internet connection still might face problems when entering into a basement of some building , going inside a tunnel etc. These issues have a huge impact in our day to day work . Managing and sharing of data also has been an issue in mobile computation offloading . It is a time and energy consuming process . Cong Shi [5] et al proposed “COSMOS: Computation Offloading as a Service for Mobile Devices”, where he made COSMOS which solves 2 major challenges how to share and manage cloud resources. They also performed some extensive experiments which proved to be energy-efficient and are currently trying to minis the cost of their proposed model .

V. OVERCOMING DRAWBACKS s

A) Three Way Authentication for Securing online data .

Table 1: Security problems and there preventive methods .

Security problem	Attacks	Attack Type	Preventive Methods

Table 1: Security problems and there preventive methods .

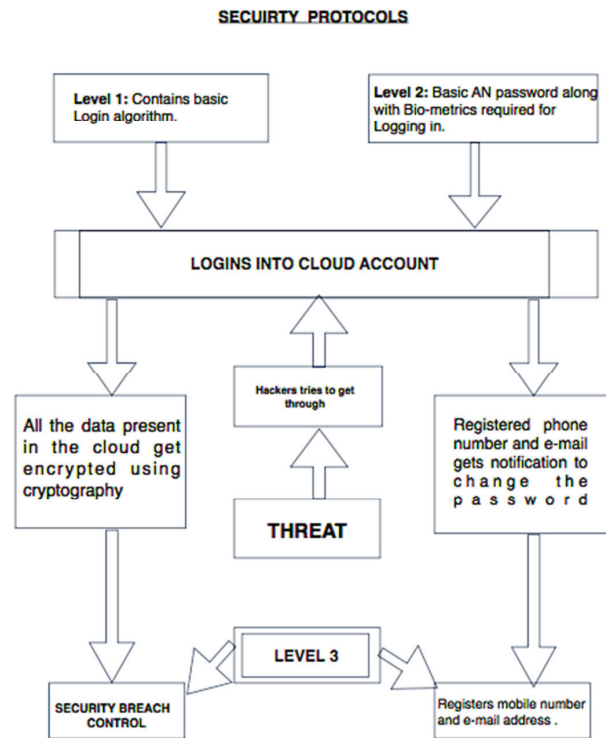
Security problem	Attacks	Attack Type	Preventive Methods
Network Level	DNS Level	Sender and the receiver gets a illegal route of connection for transfer of data .	Domain name system security extensions
Host Level	Security concerns with the hypervisor	Single hardware unit is difficult to monitor multiple Operating systems. Malicious code get control of the system and block other guest OS.	Hook safe that can provide generic protection against kernel mode root-kits
Application Level	Cookie Poisoning	Unauthorised person can change or modify the content of cookies .	Cookies should be avoided .
Online Level	Google Hacking	Google search engine is best option for the hacker to access imp information	Prevent sharing of any sensitive information

Three way authentication allows the user to go through a series of security protocols in order to secure their cloud account. There are 3 Levels where each levels requires the user to go through these protocols as directed. The password that he creates in the first level needs to be updated every month. Only the third level won't be mandatory to update.

- **First Level:** First level requires the user to create a password containing Alpha-Numerics (AN) which will be the basic need to Login into the account. It contains basic logging into account algorithm.

- **Second Level:** With the ever growing use of biometrics there should be an upgrade in security protocols. Every software Enhanced security protocols should not only use a basic Alpha-Numeric password but also use our finger prints to Login into account. After the password is entered while signing-up the user will have to add the bio-metrics. The finger print signature will be linked to the password entered by the user and every time the user Logins into the account the AN is checked with the finger print. If matched then the user is provided the access and if not the account goes into Security Breach Level 3 .

- **Third Level :**



There are 2 parts :

- 1) In the third level user has to register his mobile number and email-address which will be authenticated . After the process of authentication completes the registered mobile number and email-address will be saved and will be used for notifications. The user's mobile number and email ID's will be getting start to get notifications - " There has been a breach into the account , change Password IMMEDIATELY ". This kind of message will appear when the user unable to access the account in more than 3 tries .

2.) Security Breach Control:

The user will immediately receive a notification on both if any kind of security threat appears . When the threat is acknowledged the data present in the cloud will be encrypted using Cryptography so that even if the hacker is

able to get through the security he won't be able to comprehend the data .

B) Accessing data without Internet

Uploading data over cloud has tremendous amount of advantages ranging from free upload storage, can be accessed from any device, free to low fees required. This has been the most important and most used features of the users since the 90s and will be used more and more in the near future. Every software and now device is going to use Cloud computing. It has only one drawback that is the data the user saved over the cloud is inaccessible when there is no internet connection.

It is also very simple to use. The user when Logins into his account will be introduced with these pockets. Later when he wants to add any of the data to the pockets he can simple click on add button present in the cloud account and then chose which pocket he is going he wants to put the data in .

- *Accessing data without internet connection can be done in 2 steps :-*

1). CHARACTERISTICS OF POCKET SYSTEM :-

The user when creates the account will have the option to store the data over the cloud . When the uploading process is done the user will get 3 pockets (folders) to store data in.

a). Anytime Pocket :-

In this pocket the user will store the data which he or she is going to use on a daily basis such as - pictures , social media links , bank account , credit or debit card details , phone numbers and whatever file the user needs constantly . The files stored in Anytime pocket as the name suggests can be accessed anytime by the user without the intervention of internet as the file stored would have downloaded all of the data to the mobile systems . The user can update , delete and restore any of the files present in this pocket .

b). Cruise Pocket :-

User can select the files that he or she is going to use in the upcoming 3 days and the data will get copied to the mobile system and will be available to use for the specified time only . After the completion of that specified time , the content will automatically delete . The user when opting for this option will be asked for the time for which he wants to save the data over to the mobile. The time available to select lies from 3 hours minimum to 1 month maximum. It can used in situations where the user is planning a trip to a place where he won't be able to use the Internet.

The procedure for using this feature is :-

The user selects the data from the cloud. After selecting the user specifies the time period for which he is going to use the data . The download starts automatically after the completion of time-selection. The user is able to use the download data for the specified time without the internet intervention, After the completion of the speci-

fied time , the data gets deleted automatically from the mobile system .

c). Sealed Pocket :-

As the name suggests "Sealed Pocket" it contains the data which is sealed and cannot be taken out. It is referring to the content saved in the cloud itself. The user won't be able to save the data present in the sealed pocket to their respective mobile systems. The data present in it will only be accessible as long as there is Internet connection. Simply put, the user has to access data over the cloud only. There is no option provided for downloading this data. This pocket can be used to store the most important files , applications or folders as every-time the user Login's into his account he will have to go through the various security protocols . Hence, all the files present in this pocket are much more secured than the data present in other pockets.

B). Storing all files in External Device:- Mobile systems are stripped of all the features just to have a increased battery life . Increased battery life has definitely increased efficiency as prime concern of people have been removed which was limited battery usage . Having increased battery life means that storage in the mobile systems have decreased but that doesn't that the mobiles do not have No-storage at all .The decrease in Storage lead to the invention of Pocket system which helped the user to store limited amount of data onto their mobile systems .

The pocket system reduced the need of user to store all the files in the system but not eliminated it . Hacking does scare the user into saving his entire data into an external storage such that when if his account is hacked, he still has a way to access the from some other external device. To store the data in an external device is also necessary. Those devices can be a personal computers , Tablets , Hard-drives , pen-drives etc . Most widely used amongst these are hard-drives as they are easy to carry , are compact , affordable and lot of storage space is available that is upto 1 or even more Terabytes . Now hard-drives also have connectivity to the mobile systems .Storing all the files in an external device inclusion with the pocket system eliminates the drawback of accessing data without the internet. The user now has the option of containing all the files in the mobile which he requires the most while keeping all it's content over the cloud as well as on an external device .

VI. CONCLUSION

This paper proposed an enhanced security protocol for the content that the user uploads over to the cloud. The user must feel safe and secured when he is uploading the content over to the cloud account. Enhanced security protocols does not only make the account more secure but it also makes a job of a hacker a lot more difficult than ever before . The cyberattacks are definitely going to decrease using these three security levels where level adds a barrier for the hacker and security and satisfaction for the user that his data is safe. Furthermore, even if the account is hacked the data will get encrypted automatically using cryptography and the stolen data won't be of any use to the hacker . The paper also focusses on ac-

cessing data without the internet which can be done in two ways where the first way introduces pocket system where there are 3 pockets namely - anytime , cruise and sealed . Anytime pocket is used to store the data which the user is going to be using the most like phone numbers . Cruise pocket can be used when the user is planning to go on a trip and wants to save the data for that period of time where internet won't be easily accessible. Lastly, Sealed pocket is the one where the data always relied in the cloud. The data present in this pocket cannot be accessed without the internet.

The practical implementation of this mostly includes software development. The proposed idea can be made into a reality with ease. Some companies have already been streamlined into modular mobile systems where mobile computation is the prime part. Mobile computation offloading is the future of the mobile systems and my proposed idea is definitely going to set a impact in software development.

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