

Mobile Cloud Computing

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ABSTRACT

Cloud computing is used to offer programmes to mobile devices via mobile cloud computing. These mobile apps can be delivered remotely utilizing development tools that provide speed and flexibility. Cloud services allow for speedy development and revision of mobile cloud applications. It combines mobile app development and cloud-based technologies to make cloud and mobile app distribution easier. In distant data centers, data is stored and apps are run. Despite its increasing popularity, fully achieving the potential of mobile computing is difficult due to inherent constraints such as resource scarcity, frequent disconnections, and mobility. By executing mobile apps on resource providers outside of the mobile device, mobile cloud computing can address these issues. In this paper, we provide an in-depth analysis of mobile cloud computing research, with an emphasis on mobile cloud computing's unique problems. We propose a taxonomy based on the major issues in this field and the many approaches taken to overcome them. We finish the paper with a critical assessment of difficulties that have yet to be fully addressed, as well as recommendations for future research.

INTRODUCTION

Mobile cloud computing is a new cloud service model that follows the trend of extending the cloud to the network's edge. It contains a variety of mobile gadgets that are intimately linked to their owners. They'll be directly involved in a number of cloud operations that extend beyond the cloud's borders into the full cyber-physical system. Mobile phones will overtake PCs as the most used Web access device worldwide by 2013, according to Gartner. As a result, mobile devices will grow increasingly crucial and will be present in practically every area of our everyday lives.

In this letter, we define mobile cloud computing, as well as its scope, recent advances, and research

challenges. Our discussion is based on an Arizona State University mobile cloud computing platform. Then we show mobile cloud computing applications.

WHAT IS MOBI-CLOUD COMPUTING?

The goal of mobile computing research is to better understand how portable devices perceive and learn about their own status as well as the context of their mobility and networking in order to better support mobile applications in an ad hoc communication environment. Cloud computing research primarily focuses on ways to manage computing, storage, and communication resources shared by multiple users in a virtualized and isolated environment (the NIST provides a more detailed definition of cloud computing in). Mobile cloud computing is more complicated than simply combining mobile and cloud computing technology.

A thin client device that requires services from a powerful server is considered in the traditional client-server service model. We can see the computing model as a virtual-physical interactive model in the new MCC paradigm, where the virtualized system and the physical system interact to provide services to each other. On top of a physical system made up of processing, networking, and storage equipment. The virtual system is a simplified depiction of its underlying physical systems thanks to virtualization and abstraction techniques.

WHY TO ADOPT MOBILE CLOUD COMPUTING?

Mobile Cloud Computing, a relatively new phrase, is gaining traction in terms of implementation and appeal. Mobile cloud computing will be fueled by the very existence of mobile phones. Almost everyone nowadays owns a smartphone and is familiar with all

of its features. Almost 89 % of the world's population is now using and accessing cloud computing. Every industry has adopted the cloud, and both businesses and consumers have reaped the benefits. Because they now understand how secure cloud can be, many firms have chosen cloud services to store their essential data.

Previously, there were numerous concerns expressed about the technology and its applicability in enterprises, with everyone concerned about data security in the cloud. Cloud technology has proven everyone incorrect over the years, demonstrating how readily it can improve data storage and access from any location and device.

MOBILE CLOUD COMPUTING APPLICATIONS

Mobile cloud computing is a cloud service platform that can serve a variety of mobile app situations. These mobile app situations contain several similar characteristics that we have previously explored, which are described as follows:

- User-centric security and privacy protection: Protecting users' data and allowing them to determine what information should be exposed and what information should be kept private is a big motivation for mobile users adopting mobile cloud computing applications.
- Individual and collective sensing capabilities: Mobile cloud computing apps can understand the context of a given application circumstance by utilizing the sensing capabilities of each mobile device.
- Personal information assistant services and features: A mobile device can be used to learn about a user's activities and behaviors. These previously taught activities and behaviors can aid mobile users in correcting poor habits and completing daily tasks.
- Because of their tiny size and portability, mobile devices are susceptible to damage and loss. Mobile cloud offers a number of services to preserve mobile users' data and restore it in the event of failure, loss or update.
- Dedicated VMs are available at all times for function, data, and trust. Mobile application functions, data, and trust validations can be

delegated to virtual machines even if mobile devices and users are unavailable.

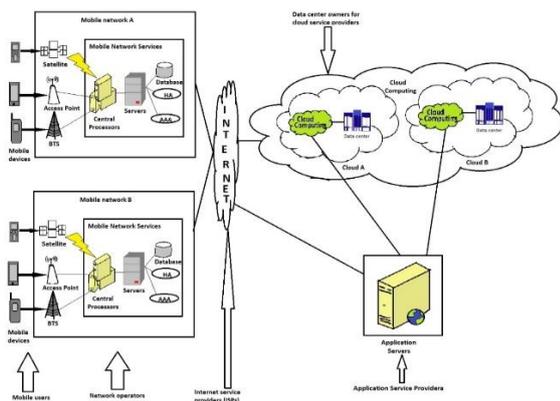
ARCHITECTURE OF MOBILE CLOUD COMPUTING

Mobile cloud computing is a novel platform that combines mobile devices and cloud computing to produce a new infrastructure in which the cloud does the heavy lifting of computation-intensive operations and data storage. Data processing and storage take place outside of mobile devices in this new architecture. MCC is an architectural solution that integrates the computing power of mobile devices such as smartphones and tablets with cloud-based resources. MCC's mobile devices may supplement resources from multiple cloud-based accounts remotely rather than locally as a result of computational augmentations. The general architecture of MCC can be depicted in Figure based on the notion of MCC. Base stations (e.g., base transceiver station, access point, or satellite) build and control the connections (air links) and functional interfaces between the networks and mobile devices, as shown in Figure.

Requests and information (such as ID and location) from mobile users are sent to central processors connected to servers that provide mobile network services. Based on the home agent and subscribers' data recorded in databases, mobile network providers can provide services to mobile users such as authentication, authorization, and accounting. The requests of the subscribers are then delivered to a cloud over the Internet. Cloud controllers execute requests in order to offer mobile users with the appropriate cloud services. Utility computing, virtualization, and service-oriented architecture are used to create these services (e.g., web, application, and database servers). Depending on the situation, the intricacies of cloud architecture may differ. To compare cloud computing to grid computing, for example, a four-layer design is explained. A service-oriented architecture called Aneka, on the other hand, is introduced to allow developers to design. With the help of application programming interfaces (APIs) and numerous programming models, Microsoft. With the help of application programming interfaces (APIs) and numerous programming models, NET applications present an architecture for constructing market-oriented clouds and a proposal for web-delivered

business services. Mobile apps take advantage of this IT infrastructure to provide the following benefits:

- Extended battery life
- Improvement in data storage capacity and processing power.
- Improved synchronization of data due to “store in one place, access from anywhere” policy.
- Improved reliability and scalability.
- Ease of integration.



ADVANTAGES OF MOBILE CLOUD COMPUTING

FLEXIBILITY: Mobile cloud computing allows you to store and retrieve data from any device that is linked to the internet from anywhere in the globe. This enables for seamless data sharing anytime information is required.

MULTIPLE PLATFORM SUPPORT: Cloud computing supports a variety of platforms, you can use mobile cloud computing regardless of the platform you're using to execute your applications.

DATA AVAILABILITY AT ALL TIMES: When you use mobile cloud applications, you can obtain real-time data whenever you want. This allows you to view your data whenever you want, as well as save it to the cloud if you want to surf offline.

COST EFFICIENCY: This service is incredibly cost-effective because there are no excessive costs associated with mobile cloud computing because it is now based on simply paying for what you use.

DATA BACKUP: Your phone is continually generating new data, the mobile cloud application

assists you in backing up your data to the cloud when it needs to be kept secure or when it is not in use.

DATA RECOVERY: If you lose your essential data due to a disaster, the cloud application will always allow you to restore your data from the cloud by following a certain procedure. If you are connected to the internet and have enough storage space on your device, you can recover your data from any location.

DISADVANTAGES OF MOBILE CLOUD COMPUTING

DATA PRIVACY: Most of the time, the user has sensitive content on the cloud, and there can be a network breach during the data transfer, resulting in data loss. It is critical to select the correct service provider who will keep your data safe at all times and in any circumstance.

CONNECTIVITY: When the service you wish to utilize is totally reliant on an internet connection, it's critical to ensure that the connection is always up so that your cloud connection isn't disrupted, potentially affecting data transfer.

Performance is another well-known issue with cloud computing. Because apps are hosted on remote servers and accessed over public networks, response times and application performance may be affected. There must be an internet connection. A program that does not have internet access is frequently unusable.

Except for these concerns, there are no negatives because the cloud has come a long way and many flaws have been overcome, making the service ideal for any enterprise or individual.

CONCLUSION

Mobile cloud computing has a bright future since it has made it very simple to access data and apps stored in the cloud without suffering the high fees connected with the technology. While not everyone can afford to buy and operate large devices like laptops or desktop PCs, most individuals can afford a smartphone with a low-cost mobile data plan. Major software companies like Microsoft and Adobe already have suites targeted for mobile app consumers that can be run from mobile devices. A new transdisciplinary study topic based on traditional mobile computing and cloud computing is mobile cloud computing. The description is based on

the mobile cloud computing system's current development at Arizona State University. We walk through the design elements of mobile cloud computing and how it might help current mobile apps. A number of significant research concerns are discussed in order to emphasize our current and future work. We hope that this paper will aid interested researchers and system architects in the development of new mobile cloud computing features and a better understanding of the multidisciplinary nature of mobile cloud computing.

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