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Review: Analysis and Comparison of Smartphone in cloud computing

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ABSTRACT

Smartphone cloud Computing is the combination of Mobile computing and cloud computing. This smart phone clod computing is a new model for cloud computing which is best compactable with smart phone, it has mobility and ubiquity for ease access. This paper presents a review on the background and principle of MCC, characteristics, recent research work, and future research trends. Although several striking research work has been conducted in the high computing counterparts of mobile technology, the field of cloud computing for mobile world is vastly unexplored. In this paper, we introduce the concept of Smartphone Cloud Computing (SCC).

Keywords: Smartphone, Cloud, Computing, IT, WiFi, Resource, Cluster

INTRODUCTION:

Since last few years, there is rapid growth in the field of network based computing and its applications such as cloud computing, web store etc. The most significant research topic is cloud computing. The cloud computing technology has emerged as a new information technology infrastructure for the fast developing IT industry. In cloud computing, information is permanently stored in large-scale data centers on the Internet all over the world and temporarily accessed and cached on clients including desktops and portable PCs, sensors, etc. With the "cloud" as a metaphor for the Internet, cloud computing promises to deliver massively scalable IT-enabled data, software, and hardware capabilities as a service to external clients with Internet accesses. The cloud computing is a set of services which are provided by an Internet-based cluster system. These clusters mainly consist of some servers, organizing the various resources of computers according to a certain management strategy and offers safe, fast, transparent and reliable services.

The advancement in this cloud computing is that it has the best ubiquity and mobility. Mobility has become a very popular word and rapidly increasing part in today's computing area. An incredible growth has taken place in the development of mobile devices such as, Smartphone, PDA, GPS Navigation and laptops with a variety of mobile computing, networking and security technologies. In addition, with the development of wireless technology like WiMAX, Ad Hoc Network and WIFI, users may be surfing the Internet much easier but not limited by the cables as before. Thus, those mobile devices have been accepted by more and more people as their first choice of working and entertainment in their daily lives.

Mobile computing is based on a collection of three major concepts: hardware, software and communication. The concepts of hardware can be considered as mobile devices, such as Smartphone and laptop, or their mobile components. Software of mobile computing is the numerous mobile applications in the devices, such as the mobile browser, anti-virus software and games. The communication issue includes the infrastructure of mobile networks, protocols and data delivery in their use. The use of Smartphone is best to increase the ubiquity of this service. The combination of Smartphone and cloud computing generates a new computing mode namely Smartphone cloud computing. In this SMC (Smartphone Cloud Computing) we can easily access the cloud computing by our Smartphone which can increase the ubiquity and mobility for the cloud computing system.

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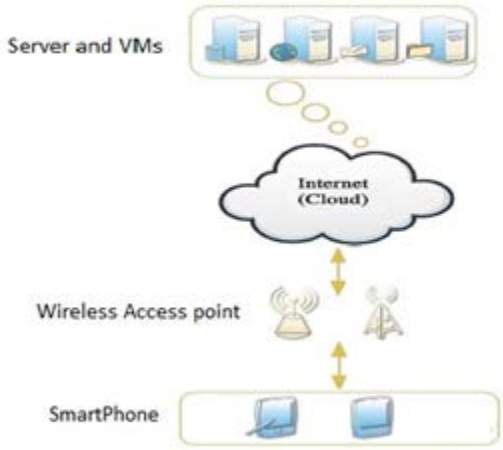

Figure 1: Smartphone Cloud Computing

Literature Review

Regarding recent advances in mobile communication technologies, a new wave of user demands for rich mobile service experience has been fuelled. Mobile users always expect broadband Internet access wherever they go, interact with each other via social networks while moving; furthermore, they are seeking ubiquitous access to a wealth of media-based contents and services. Because mobile devices are resource limited inherently, it is essential for the cloud to provide computational support for many media-rich applications.

Nowadays, the mobile devices get greater improvement than before, some Smartphone such as iPhone 4S, Android serials, Windows Mobile serials and Blackberry, are no longer just traditional mobile phones with conversation, SMS, Email and website browser, but are daily necessities to users. Meanwhile, those Smartphone include various sensing modules like navigation, optics, gravity, orientation, and so on which brings a convenient and intelligent mobile experience to users.

Concept and principle

Like Cloud Computing, there are a lot but nonconsensual definitions on what Smartphone cloud computing is. In this paper, we describe smartphone computing and cloud computing, which provide cloud based services to users through the Internet and smartphones. In Smartphone cloud computing, the previous mobile device-based intensive computing, data storage and mass information processing have been transferred to 'cloud' and thus the requirements of mobile devices in computing capability and resources have been reduced, so the developing, running, deploying and usage mode of mobile applications have been totally changed. On the other hand, the terminals which people used to access and acquire cloud services are suitable for mobile devices like smart phone, PDA, Tablet, and iPad but not restricted to fixed devices (such as PC), which reflects the advantages and original intention of cloud computing.

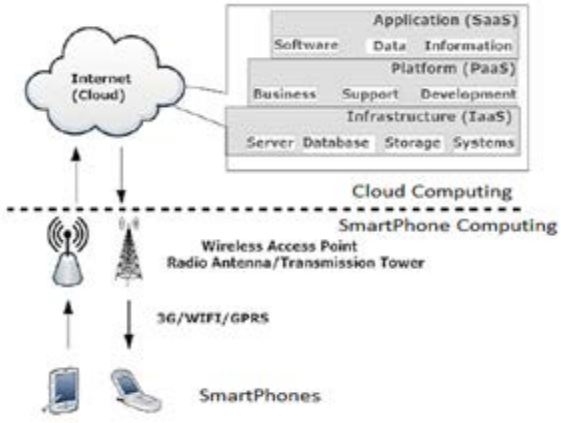

Figure 2: Architecture of smart phone cloud computing

As shown is the Fig. 2, Smartphone cloud computing can be simply divided into cloud computing and Smartphone computing. These smart phones are connected with a hotspot or base station by 3G, WIFI, or GPRS. The user send service requests to the cloud through a web browser or desktop application, then the management component of cloud allocates resources to the request to establish connection, while the monitoring and calculating functions of mobile cloud computing will be implemented to ensure the QoS until the connection is completed. In smart phone cloud computing, a convenient and rapid method for users to access and receive data from the cloud is necessary. The challenge of smart phone cloud computing comes from the characters of mobile devices and wireless networks, as well as their own restriction and limitation, and such challenge makes application designing, programming and deploying on mobile and distributed devices more complicated than on the fixed cloud devices. In Smartphone cloud computing environment, the circumscriptions of mobile contrivances, quality of wireless communication, types of application, and support from cloud computing to mobile are all paramount factors that affect assessing from cloud computing.

Limitations

Nowadays the smart phones have been improved in many aspects like CPU, Processor Speed, Performance, Platform, RAM, Memory, Size of Screen, sensing technology, still have some limitations like limited computing ability, energy resources.

The smart phones main limitation is it battery ,it have to charge daily as it consumes more power during dialing calls, messaging , internet browsing , apps etc. Mainly Smartphone have some challenges like limitation of Smartphone , quality of communication , division of applications services but these limitations have some solutions virtualizations and image , task migration , bandwidth upgrading , data delivery time reducing , Elastic application division mechanism respectively .

As indicated by past improvement inclines, the expanded versatile figuring capacity and quick advancement of screen innovation will prompt more muddled applications conveyed in smart phones. In the event that the battery innovation can't be enhanced in a short time, then how to adequately save battery control in smart phone is a noteworthy issue we meet today.

Related Work

Various researches by many scientific communities have been done in related challenges. Some them are mention here. Clone cloud is introduced by B. Chun (number) in 2011, The Clone Cloud prototype meets all design goals mentioned above, by rewriting an unmodified application executable. While the modified executable is running, at automatically chosen points individual threads migrate from the mobile device to a device clone in a cloud; remaining functionality on the mobile device keeps executing, but blocks if it attempts to access migrated state, thereby exhibiting opportunistic but very conservative concurrency. The migrated thread executes on the clone, possibly accessing native features of the hosting platform such as the fast CPU, network, hardware accelerators, storage, etc. Eventually, the thread returns back to the mobile device, along with remotely created state, which it merges back into the original process. The choice of where to migrate is made by a partitioning component, which uses static analysis to discover constraints on possible migration points, and dynamic profiling to build a cost model for execution and migration. A mathematical optimizer chooses migration points that optimize objective (such as total execution time or mobile-device energy consumption) given the application and the cost model. Finally, the run-time system chooses what partition to use. Figure 2 shows the high-level architecture of our prototype.

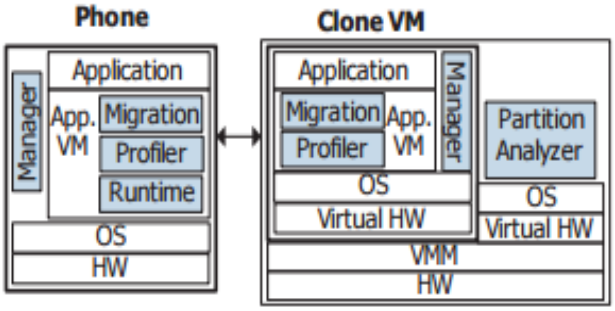

Figure 2. The CloneCloud prototype architecture.

Figure 3: The high-level architecture of our prototype

X. Zhang (number) proposed a new model on *Elastic Application*. This model includes the partition of a single application into multiple components called *web lets*, and a dynamic adaptation of web let execution configuration. While a web let can be platform independent (e.g., Java or .Net byte code or Python script) or platform dependent (native code), its execution location is transparent – it can be run on a mobile device or migrated to the cloud, i.e., run on one or more nodes offered by an IaaS provider. Thus, an elastic application can augment the capabilities of a mobile device including computation power, storage, and network bandwidth, with the light of dynamic execution configuration according to device's status including CPU load, memory, battery level, network connection quality, and user preferences. This paper presents the motivation behind developing elastic applications and their architecture including typical elasticity patterns and cost models that are applied to determine the elasticity patterns. We implement reference architecture and develop a set of elastic applications to validate the augmentation capabilities for smart phone devices. We demonstrate promising results of the proposed application model using data collected from one of our example elastic applications. The above proposed model can reduce power consumption of smart phones but still they meet a potential long interaction response in data transmission between a cloud and terminals.

According Y. Lu (Number), by the help of Visualized Screen, it moves screen rendering from smart phones to a cloud as a service. In the proposed solution only smart phone's screen is virtualized in cloud, which involves a collection of data in display images, text contents, video and audio, input of keyboard, touching, and pen on smart phones while in other applications energy-intensive computing run on cloud. Therefore, parts of applications and interactions are offloaded and executed in cloud, and some light power consumption operation or applications are deployed in local smart phones, which could effectively reduce power consumption and interaction delay.

Conclusion:

With high increment of data computation in commerce and science, the capacity of data processing has been considered as a strategic resource. Mobile cloud computing and its extension as a development of mobile computing and cloud computing has inherited high mobility and scalability. This technology is new and poised for rapid growth in mobile devices and cloud technologies. It is a new way to deliver existing services driven by the demands of new technology such as smart phones and tablets. The cloud computing concepts provides an opportunity for the development of mobile applications. It allows maintaining a very thin layer in mobile devices for user application and shift the computation and processing overhead to the virtual environment. A cloud application needs a constant connection that might prove to be an Achilles heel for the cloud computing movement.

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