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MIGRATION TECHNIQUES IN MOBILE CLOUD

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Abstract—Mobile cloud computing is one of the machinery important in today's mobile environment run by using mobile devices in cloud surroundings. It combines the features of both mobile computing and cloud computing, in that way provides optimal services to the users of mobile strategy. As Mobile Cloud Computing is the most essential fields with growing age of today's fast internet using and mobile world along with its uses it has to faces some of the issues and challenges some of them are address in this paper. Because the information is cloud computing and accessing it with mobile devices all the transaction goes through the network so it is vulnerable to attack. For keeping the use of this essential tool of constant in this advance world we are giving some of the solutions to these challenges to address in the field of Mobile Cloud Computing.

Key Words—Mobile computing, cloud computing, mobile cloud com-putting, mobile cloud application

INTRODUCTION

The smart mobile devices and cloud computing technologies, mobile cloud computing has emerged as a new computing paradigm for building the next generation MCC applications. MCC promises to bring new exciting MCC applications beyond mobile computing(MC) applications by combining cloud computing . mobile computing and data analytics at the fingertip of a human operator.

In this paper we survey existing and conjecture future generation MCC applications. We limit our survey to infrastructure based MCC applications where the hardware infrastructure remains static and provides services to the mobile users . We provide insights for the enabling technologies and challenges that lie ahead for us to move forward from MC to MCC for building the next generation MCC applications. In Section we provide an overview of MCC extending MC. we survey existing MCC applications and speculate future generation MCC applicationscloud computing provides significant benefits to mobile users as cloud infrastructures and platforms supply virtually large-scale computing power with elastic scalability and higher resource sharing and usage. This may overcome many traditional limitations in mobile computing.

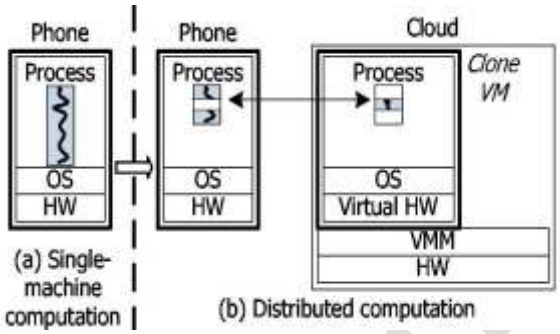
Cloud Computing offers a lot of return by allowing users to use connections like servers, networks, and storages, platforms containing middle ware services, operating systems and software's for application programs eliminating the requirement for users to plan ahead for acquiring different resources for storage and computing power. Particularly, resources can be dynamically added and released depending on service demand and with minimal management effort. As a result, the availability of cloud computing services in a mobile environment, also called mobile cloud computing. The increasing scenario towards Mobile Cloud Computing With the detonation of mobile applications and the support of CC for different variety of services for mobile users, mobile cloud computing (MCC) is introduced as an integration of cloud computing with the mobile computing and mobile devices. Though, along with the efficacy of this topic of mobile cloud computing research still needs to be done on several issues as well as possible frameworks to support cloud computing on mobile devices. So that this much important topic can gain its advantage easily.

About Mobile Cloud Computing

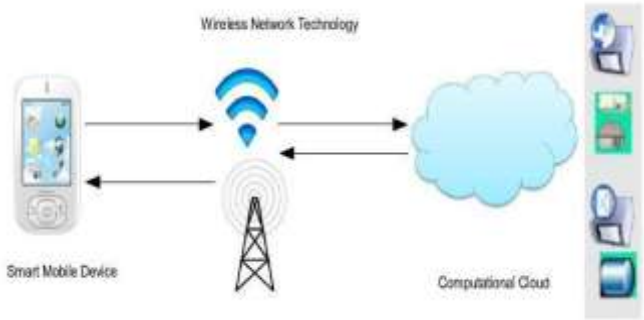
Mobile cloud computing is the advanced edition or it's the arrangement of the two mostly important practical computing paradigm describe above i.e. cloud computing and mobile computing. MCC defines by Aepona , as a new distributed computing paradigm for mobile applications whereby the storage and the data processing are migrated from the Smart mobile devices to property rich and powerful centralized computing data centers in computational clouds. As MCC is based on the cloud concept the centralized applications, services and resources are accessed over the wireless network technologies based on web browser of the smart phones. Many of the business people are attracted by SMDs at low cost The objective of MCC is to use the computing potentials of SMDs by

employing resources and services of computational clouds.

Mobile cloud computing technique try to focus on alleviating resources limitations in SMDs by employing different strategies of augmentation; such as screen augmentation, energy augmentation, storage augmentation and application processing of SMD. present are number of approaches and quarrel to MCC handles that are needed to high-end hardware, reduces ownership and maintenance cost, and alleviates data safety and user privacy. The MCC model is composed of three major components consisting of smart phones, PDAs, etc., wireless internet technology and computational cloud. This is done as these Devices use wireless network technology protocols or Wi-Fi to access the services of computational cloud in mobile environment. If SMD inherit its nature of mobility, it needs to execute location aware services which consume resources and then turned as a low-powered client. Fig. shows a universal representation of MCC in which the cloud that provides off-device storage, processing, queuing capabilities. It also includes the security mechanism integrated with SMD with the use of wireless network



technologies. MCC utilizes cloud storage services for provided that online storage and cloud processing services for augmenting processing capabilities of our mobile devices.



Mobile Cloud Computing (MCC) 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. Mobile cloud storage space is a form of cloud storage that is accessible on mobile devices such as laptops, tablets, and smart phones. portable cloud storage providers present services that allow the user to create and organize records, folders, music, and photos, similar to other cloud computing modals. Services are used by both individuals and companies. Most cloud file storage providers offer limited free use and charge for additional storage once the free limit is exceeded. These expenditure are usually charged as a monthly subscription rate and have different rates depending on the amount of storage desired.

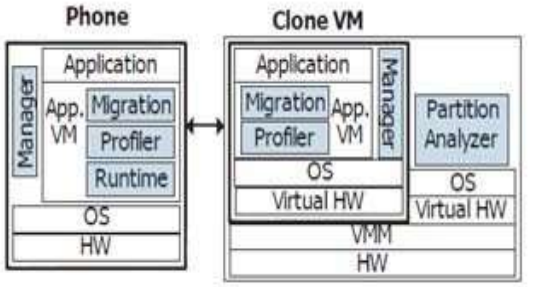
Migration using Clone Cloud:

The previous classification preferred duplicating the runtime situation and then executes the application either on the cloud or the device. It makes the clone of the device in order to achieve a better performance. Making a clone runtime environment had some advantages as well as disadvantages . The advantages include enhanced
CPU and memory resources to be utilized efficiently. Another benefit included that it did not required any modification as the portable machine and replica can run identical barrier. The application on the cloud need to access physical hardware on the mobile devices. When one processor is replaced by another, it can access all the resources from the cloud which is another

disadvantage. Another disadvantage is duplicating a device and then executing it on cloud increases the complexity.

Clone Cloud system model. mock-up Cloud trans- forms a single-machine implementation (mobile device computation) into a distributed execution (mobile device and cloud computation) automatically.
The Clone Cloud prototype meets all design goals mentioned above, by rewriting an unmodified application exe-cutable. While the modified executable is running, at automatically chosen points individual threads migrate from themobile 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 fea-tures of the hosting platform such as the fast CPU, network, hardware accelerators, storage, etc.
Eventually, the thread re-turns back to the mobile device,

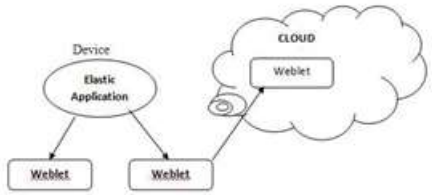
along with remotely created state, which it merges back into the original process. The choice of where to migrate is made by a partitioning component, which uses static analysis to discover constraints on possible migration points, and dynamic profiling to build a cost model for execution and migration. A mathematical
optimizer chooses migration points that optimize objective given the application and the cost model. Finally,
the run-time system chooses what partition to use.



Clone Cloud prototype architecture.

Migration using Concept of Weblets:

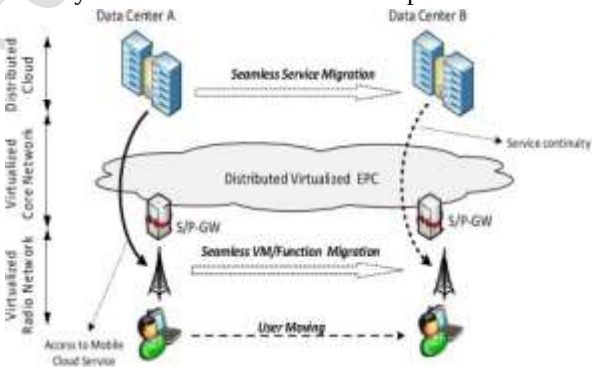
It uses an elastic application representation that supports partitioning a single application into multiple components called Web lets. Web lets are nothing but a type of internet web design and it usually handled by a single individual and organization and located at a single site.



Web let is independent of location and also it can be run on mobile devices or migrated to cloud. The launching of a web let depends upon some factors which includes battery stage, CPU load. This approach empowers flexibility and optimized give considering some factors such as device status, application performance measures, cloud status and preferences.. In this elastic application is partitioned or spitted into smaller components so that the execution occurs partially on device and partially on the clouds. The partitioning is done in order so that web let have minimum dependency on others and to reduce the communication overhead. In execution configuration, the applications are partitioned and then assigned to the execution units for processing on the device or on the cloud

VM Migration:

One of the features of portable cloud computing is mobility. Task mobility refers to ability to allow users to continue the operation of their tasks on different nodes. This can be achieved using the VM migration. VM migration uses the concepts of virtual machines in which the VM migration transfers the whole VM to another computer, resulting into a coarse grained load balancing among VM's. This system of VM relocation can be performed using 3 steps. It stores the entire state of virtual machine encapsulated by set of files stored on shared storage. Secondly, the precision state and active memory of VM is migrated over a high speed network, enabling the virtual machine to move between the source and the target machine. The record for these transactions is maintained in a bitmap. When all the system state is copied, VMotion suspend the source and starts operating on target host. By using a Gigabit Ethernet network, the whole process takes less time .The sources and destination hosts simulates the network used by virtual machine. It checks whether the new physical location of the virtual MAC address is known or not. Even after migration, the virtual network identity and network connections are preserved.



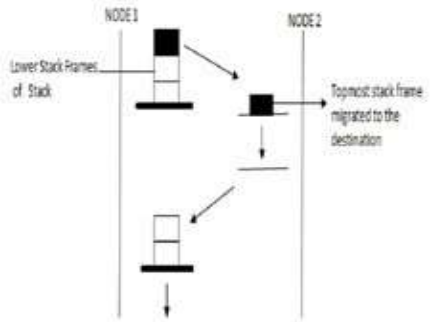
Mobile Cloud Computing (MCC), Virtual Machine (VM) migration based process offloading is a dominant approach to enhance Smart Mobile Devices (SMDs).

A challenging aspect of VM deployment is the additional computing resources usage in the deployment and management of VM which obliges computing resources for VM creation and configuration. The management of VM comprises computing resources exploitation in the monitoring of VM in entire lifecycle and physical resources management for VM on SMDs.
migration based application offloading requires additional computing resource.

Stack on Demand Migration Concept:

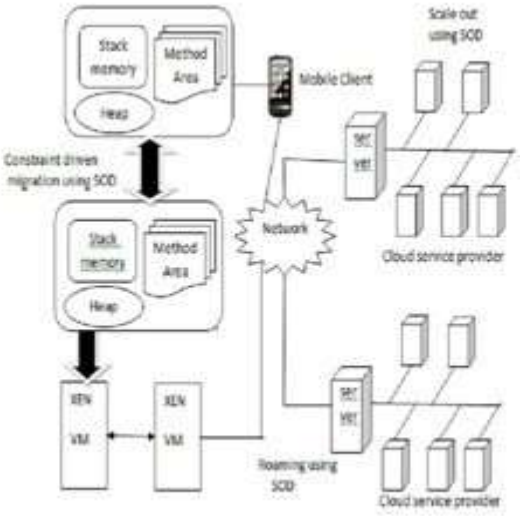
In this Each stack is made up of number of stack frames, each containing state of the method invocation. In this migration mechanism, the stack frames are chopped into segments and only the topmost stack frame is pushed. When the top most segments finishes and pops the values that are returned are sent to the next site to continue the execution. SOD migrates only the required portion to the destination site required to continue the execution. By partial stack relocation, the migration charge can be reduced .It allows different parts of the stack migrate to different sites, forming a distributed workflow. So in the case of SOD only the top most frame is required to carry out the execution while the required data and code can be brought up in an on demand fashion. It also makes the use of immunity handlers so that execution flow is normal.SOD can dynamically move input processing to the position where there is greatest demand.SOD allow the migration of light weight and portable task for better resource utilization and saves maximum of network bandwidth. stack-on-demand (SOD) approach is used to support computation mobility throughout the mobile cloud environment. The approach is fully adaptive, goal-driven and transparent. By downward task migration, applications running on the cloud nodes can exploit or take control of special resources in mobile devices such as GPS and cameras.

With a restorable MPI layer, task migrations of MPI parallel programs can happen between cloud nodes or be initiated from a mobile device. Our evaluation shows that SOD outperforms several existing migration mechanisms in terms of migration overhead and latency. All our techniques result in better resource utilization through task migrations among cloud nodes and mobile nodes



Migration using eXCloud and VM :

This method has extended the concept of SOD and introduced a middleware system named Extensible Cloud (eXCloud) along with SOD and VM system to achieve multi-level mobility. In this SOD is integrated atop VM. eXCloud is a multilevel mobile cloud infrastructure which provides transparent runtime support for scaling the mobile application. eXCloud [8] allows different levels and different granularity of mobility in devices as well as the cloud. The eXCloud combines both cloud node as well as mobile node. The objects present in cloud node are different from those present in mobile node. The high level views are very similar in both nodes but the implementation is different. The communication components are present in cloud node so it makes the use of VM while resource manager is present in mobile node and not in cloud node. So SOD migration is required for mobile node. Thus eXCloud makes the use of both SOD integrated with VM. To build a truly elastic mobile cloud computing infrastructure, we introduce eXCloud (eXtensible Cloud) - a middleware system with multi-level mobility support, ranging from as coarse as a VM instance to as fine as a runtime stack frame, and allows resources to be integrated and used dynamically



in Method Hierarchy Migration:

Another task migration policy which also extended the concept of SOD migration is a Twin Method Hierarchy (TMH). In this paper, the overhead is reduced using Twin Method Hierarchy is introduced. In this method state capturing and state restoration is done. In case if there are extra conditional branching, the overhead will be increased in the execution of the applications. This overhead is dependent upon the frequency of execution of the functions. During pre-processing some extra codes are added to obtain and send Meta data required for migration. When these application run, added codes will also be executed getting the process to get migrated. In the TMH, the original methods are duplicated to allow instrumented and original methods are used at different stages.

During the normal execution the original methods are executed while the instrumented methods with restoration statements are executed during restoration. Methods will be instrumented as, firstly method are duplicated into another set M' while original methods are in set M. In duplicated methods, checking statements are added at the beginning [2] .For normal execution the original methods of set M are used. While during restoration methods from M' will be used. After restoration is completed, these newly executed functions will be a part of set M. Thus TMH reduces the overhead for performing the migration.

CONCLUSION

The efficient utilization of resources from the cloud through a mobile device is required. So task migration becomes an important factor for resource utilization. New mechanism should be developed in order to reduce the access latency and the overhead during migration . Few of the techniques are already developed ,but it requires more attention to achieve scalability, granularity in the available task migration techniques to be used with minimum overhead for future purposes. With the above developed techniques, migration between mobile and cloud can be extended to migration of bigger tasks.

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