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"EFFICIENT IMPLEMENTATION OF PLATFORM AS A SRVICE USING ANDROID BASED CLOLD SERVER"

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Abstract: Thenumber of Smartphone user sand mobile application sare growing rapidly.Though smart phone sare expected to have PC like functionality, hardware resources such as CPUs, memory and batterie sare stilllimited. To solve this resource problem, many researches have proposed architectures to use server resources in the cloud for mobile devices. The system proposed conceptual architecture of development of android cloud for efficient implementation of platform as a service, which enables multiple user Android applications on cloud server via network. Though Androidis mainly designed for physical Smartphone, Android's to other feature sare useful to constructa server platform. Android is open-source product and run so nanx86 CPU. Android isanopen-source mobileOS initiated by Google. The main reason to use Android as a server platform is that it is able to run not only for smart phones but also for the x86 platform include in gservers. We show three types of multi-tenant architecture for an Android server platform and discuss the direction to take toitreality.

Keywords: Server platform, Cloud servers, Cloud computing, Multi-tenancy

1. INTRODUCTION

The number of Smart phone users and mobile application are growing rapidly. According to are centreport, 45 million people in the U.S. own Smartphone's and 234 million people subscribe to the mobile phone application stores

[1].There are several mobile Operating Systems (OSs), such as Symbian, iOS, Android, and Windows Mobile .Because thousands of application developers construct many kinds of applications for these platforms, users can easily enjoy the irindividual Smartphone life style.Though Smart phone's are expected to PC-like functionality, hardwarere sources such as CPUs, memory, and batteries are stilllimited. There fore, many application developers are forced to take into account these limitations. To solve this resource problem, some researches have proposed using server resources in the cloud for Smartphone's.

From this background, we propose Android as a Server Platform that enables many users to use resources on remote cloud servers. The proposed system discuss our analysis of process to adopt Android as a server OS as follow. Using a mobile OS enables there use of many mobile applications that is designed to be used on Smartphone interfaces, such as software key boards, touch panels and many sensors. Since are solution of mobile OS is small, it is better to usear emote application via a networkt han adesktop OS. Android is an open-source mobile OS initiated by Google. The main reason to use Android as a server platform is that it is able to run not only for Smart phone's but also for the x86 platform in cluding

servers. The system proposes a multi-tenant architecture of Android as a Server Platform.

Cloud computing is the latest of computing paradigms. It promises to change the way people use computing resources. Using Internet as the backbone, cloud computing asserts that it is possible to provide computing as a "utility" to end users "as and when needed" basis. Cloud computing has a potential to serve users of all kinds: individual users, institutions, industry at large. Cloud computing is the use of computing resources such as hardware and software that are delivered as a service over a network typically in the form of internet. Cloud computing entrusts remote services with a user's data, software and computation. Smartphone's have evolved rapidly during the last three years. Now a day, the advances in processor, memory, flash storage, and mobile communication, and software, smart phones have enabled sophisticated applications for mobile users. The current leading brands for smart phones in the market are Google Android, Apple iPhone, Microsoft Window Mobile, Black-Berry RIM and all support applications such as multimedia playback, Internet browsing, email, voice mail, social networks and location-based Services. Still, the limited hardware resources and the constrained battery capacities have strongly impacted their user experiences. Today, many Smartphone users take advantage of low-cost or free cloud-based services. The combination of smart phone and cloud-based service has worked quite successfully and has become very popular, as it essentially offloads computational workload and data storage from the user's smart phone. That way, an application could consume less power by having most of the application workload [2]. Related work describes the Integration of Mobile device and Cloud and the concept of Multi-tenancy. It also describes the Virtual Smartphone over IP. Analysis of process describes the using mobile applications running on a server.

2. LITERATURE REVIEW AND RELATED WORK

IntegrationofMobiledeviceandCloud: Researches have proposed integration between mobile devices and cloud computing. Satyanarayan anetal. [3]outlined their visiono fallowing mobile user stoseamlessly use near by computer stoobtain cloud-computing resources by instantiatinga"cloud let" that rapidly synthesizes virtual machine sonanear by infrastructure that can beaccessed througha Wireless LAN. Canepaetal. [4]presented a frame work named" AdHoccloud providers".At this frame work, mobile devices can execute their jobs using other device resources around them a sifitisexecuted on onec loud server. Our approac his closely related to that of Chunand Maniatis[5]. They proposed the creation of clone Vmstorun mobile application sasif they were running on mobile devices. They recognized five categories of augmented execution to speed up mobile applications, namely Primary, Background, Mainline, Hardware, and Multiplicity, and presented are search a genda to bring the vision in toreality.Their project home page can be foundin[6]. Ourmulti-tenant architecture for Android can be seen a specific study of Multiplicity.

Multi-tenancy: Royonetal. Proposed multi-user, multi-service execution environment named" virtual service gateway" [7].They classified existin gmulti-application environment approac hes by modifying Java runtime, and proposed an overlay approach to run virtually original application. As modifying approach has advantages of performance and isolation, over lay approach has advantages of us ability on a standard Java Virtual Machine. Bezemer discussed the direction of multi-tenancy [8]. This new concept of providing software service isgenerally known as SaaS (i.e., Software as a Service). However, the adaptation of such a model necessitates that the applications which are required to be provided as a service should be generalized for users or groups of users. The users or user groups ordinarily correspond to a company or group of companies/businesses and are termed as tenants. In this regard, the architecture of SaaS applications needs to be customized to support certain characteristics — e.g., configurability, maintainability and scalability — to support diverse number of users [9]. Theyrecognizedfivefeaturesofamultitenantplatform,namely Performance,Scalability,Security,Zero-Down time and

Maintenance, to prevent maintenance nightmare. The proposed

System discusses and evaluates aproposed architecture based on some of these features.

VirtualSmartphoneoverIP : Beyond constructing a mobile application platform, the system has previously proposed a proof of concept prototypeimplementation named" Virtual Smartphone overIP" [10].An overview of the implement ationis shown in Figure 1.In this prototype, Android-X86[11] is a dopted on a mobile server OS running on a hypervisor. The client program installed on aphysical Smartphone can remotely interact and control Android-x86images. The client programtransmits various events from the physical device not only the key board butal so the touch screen and various sensors such as GPSs, accelerometer, and the rmometers, to the mobile server OS and receives graphicals creen up dates from it viaVirtual Network Computing(VNC). These programs enable to use server sidevirtualmobileOSapplicationsasifitisrunningonaphysical Smartphone.

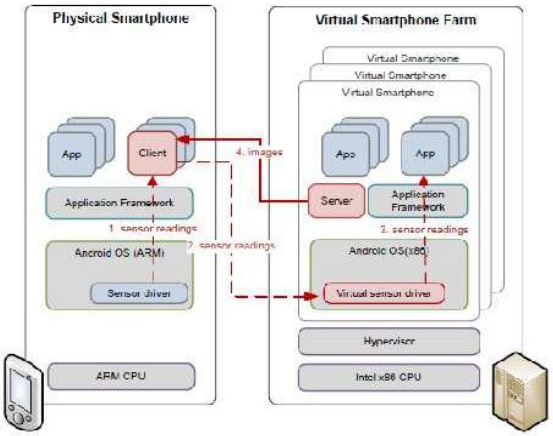

Figure1:OverviewofVirtualSmartphoneoverIPsystem.

Theperformanceevaluationusingacommon Smartphonea nd aservershowsthatourvirtualSmartphoneonaserverisatleast 10timesfasterthanonaphysicalSmartphone.

3. ANALYSIS OF PROBLEM

MobileApplicationPlatformonCloudServer : Asanumbersofserviceproviderssuchas Dropbox[12]andZu modrive[13]provideonlinestorageservices,thearchitecturefo rremotelyusingmobileapplicationonserverhasmanybenefitsf orusers.Thisapproach,calledMobileApplicationPlatformon CloudServer,intendstohandlenotonlyuserdatabutalsouserap plicationsinacloudserver [14].Thisapproachchangestheapplicationlifecycleasfollows. "Writeonce,runeverywhere.Installonce,useeverywhere."Fig ure2illustratesanoverviewoftheconcept.Byexecutingamobil eapplicationinthecloudserver,usersanddevelopersfreefromd evicelimitationsuchasCPUpower,memory,andbattery,andfr omdevicesoftwareenvironmentsuchasOSorversion.Moreov er,onceauserinstallsanapplicationonthecloudserver,she/heca nusetheapplicationanywhere,ananydevice.

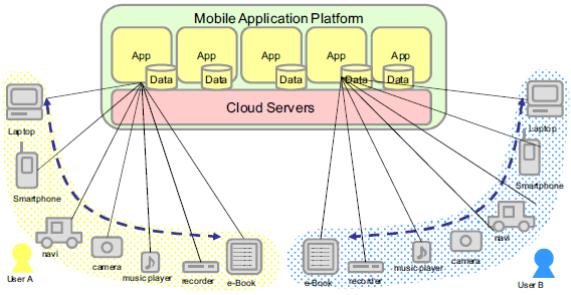

Figure2.MobileApplicationPlatform.

MultitenantforAndroid : Multi-tenancy,whichmeansthatsoftwarerunningonaserverprovides servicestomanyusers,isoneofimportantfeaturesforcloudcom puting.Fromtheviewpointofbotheconomyandecology,it isbeneficialtoshare hardwareresourcesamongusers.UsingamobileOSwouldbem oreeffectivethanusingadesktopOSbecausetheresourcerequir ementsofmobileOSsaresmaller.However,tothebestofourkno wledge,thereisstillnoservicethatusesAndroidasmulti-tenantsystem.The proposed systemdiscussesthemulti-tenantarchitectureforAndroidandhowtoconstructit.

Multi-tenant architecture for Android

:Thissectiondiscusse+stheprocesstoconstructmulti-tenantarchitectureforAndroidbasedonrelatedwork. The proposed systemdiscussesthethreetypesofapproach,hypervisor-layer,kernel-layer,andframework-layer,formulti-tenantarchitecture.

1. Hypervisor: Thehypervisor-Layer approac huses the Virtual Smartphone over IP system as already state din related work. Each user own sher/his Android OS image on a server and freely run sher/his application in aseparate VMMulti-tenancy is achieved by running multiple users VM sina server via a hypervisor.
2. Kernel-layer :The second approach implements multi-tenant function in kernel-layer. This approach changes android Os to run multiple user application in separate processes. This approach is similar to an ordinary thin client server running multiple user application in a server. The main challenge is that original Android supports only one display and keypad device since android is mainly designed to work on a Smartphone.
3. Framework-layer : Another approach is to create a multi-tenant function at framework-layer, similar to existing a Java-based multi-tenant framework. This approach remodels Android the framework and APIs to support multiple user application. The main challenge is how to run exiting Android application in modified framework.

The quantitative evaluation of these three types of architecture as, the hypervisor-layer, approach is feasible and good for maintenance [10]. However, it have a scalability limitation caused by a hypervisor. Because each VM try to separately maintain their resources, it is difficult to control unused resources. The other two approaches have advantages in scalability but have disadvantages in maintenance because they change the android OS. From the viewpoint of running existing application, the kernel-layer approach is better because it does not changes Android runtime environment. Moreover, we assume that the kernel-layer approach is easy to develop because Android is implement based on the Linux kernel so that can support multiple displays, keypads, and application.

4. PROPOSED METHODOLOGY

We propose Android as a Server Platform that enable smany users to user esources on remote cloud servers. Them ainreason to use Android as a server plat form ist hatit is able to run not only for Smartphone 'sbutal so for the x86 plat form in cluding servers. The system propose s amulti-tenant architecture of Android as a Server Platform. We have three Android system which are connected to Android control server as shown in the figure. When client send any request to server, the server will check if any system is available those don't have any work load at that current time, to provide the result to client. If such system is available it provide the result to client according to its request. The advantages of the proposed work are:

1. By using this methodology the system is increase the resources.
2. Lots of android system are used at a time for their respective task on server increase the processing power of their system or device.
3. If the user connect to server through the network, and at the same time it uses the one or more application then the server reduce the response time of the device.
4. by using this android system the overall system efficiency will improve.

5. EFFICIENT IMPLIMENTATION OF PLATFORM

A pair of VNC-based server and client program is implemented. Server program resides in eachAndroid-x86 image that run on top of VMWARE ESXi while the client program is installed in the physicalAndroid device. The client program enables a user to remotely interact and control Anroid-x86 images. Theclient program transmits various events from the physical device to the virtual Smartphone and receivesgraphical screen updates from the virtual Smartphone.A virtual sensor driver can be implemented in the Android-x86 image. Most modern Smart phone isequipped with various sensor devices such as GPS, accelerometer and thermometers. While VNC itselfsupports only keyboard and mouse as the primarily input devices,

client program can be extended totransmit sensor readings (accelerometer, orientation, magnetic field and temperature etc) to the virtualsensor driver in the Android-x86 image. The virtual sensor driver can be implemented in such a way thatthe sensor readings from the physical Android device would appear to come from the Anroid-x86 imagesitself. This is an important feature as it allows Android applications in an Android-x86 image to obtainsensor readings from the physical Smartphone without any modification.

In the functional overview of this multi-tenant architecture two new functions are defined for enabling multi-tenant forAndroid. The first function is the multiple application controller installed in an Android OS, and the secondis the user area manager located in a host OS. The multiple application controller enables running of multipleapplications as if each application is running on independent physical Smartphone. It is importantrequirement to decrease implementation cost for Android OS because of maintenance about OS version upproblem. The user area manager controls server resources and act as an interface between a terminal and themultiple application controller.

6. CONCLUSION

The proposed system Development of Android cloud for efficient implementation of platform as a service, system that enables the use of sharing server-side Android OS among multiple users. The system also showed the technical difficulty and approach related to multi-tenant architecture for Android OS, which is originally designed to use single user. The proposed Android architecture is planning to develop a prototype system about multi-tenant. The system believes that proposed architecture shows high performance on virtual image-based virtualization for mobile application.

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