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## Implementation of an Efficient Platform to Use Android as a Server

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**Abstract:** Nowadays the number of smartphone users are growing rapidly. But the users expects that the smartphones must have PC like functionality, memory, batteries and hardware resources such as CPU are limited. Many researches have proposed conceptual architecture to use server resources in the cloud for mobile devices to solve this resource problem. The system proposed the conceptual architecture of implementation of an efficient platform to use android as a server which enables multiple users to use Android application on cloud server via network. Though Android is designed for physical smartphone, it has an useful feature to construct a server platform. Android is an open source mobile OS and runs on an X86 CPU. In this paper we discussed the direction to take into reality the multitenant architecture for an Android server platform.

**Keywords—**multitenant, server platform, cloud server, Android

### I. INTRODUCTION

The number of Smartphone users and mobile application are growing rapidly. According to a recent report, 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 application for these platforms, users can easily enjoy their individual Smartphone lifestyle. Though smart phones are expected to provide PC-like functionality, memory, batteries and hardware resources such as CPU are limited. Therefore application developers are forced to take these constraints into consideration. To solve this resource problem, some researchers have proposed solution of using server resources in the cloud for smart phones. We can use Android, an open-source mobile OS as a Server Platform which enables many users to use resources on remote cloud servers. Using this mobile OS enable the reuse of much mobile application that is designed to be used on Smartphone interfaces, such as touch panels, software keyboards and many sensors. Since a resolution of mobile OS is small, so it uses a remote application via a network than a desktop OS. 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 including servers.

The system offers a multi-tenant architecture of Android as a Server Platform. Cloud computing is the latest of computing concept. It change the way people use computing resources. Using Internet as the support, cloud computing states that it is possible to provide computing as a "utility" to end users as and when needed. 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 assign remote services with a user's data, software and computation. Smartphone's have evolved rapidly during the last three years.

### II. LITERATURE REVIEW AND RELATED WORK

**Integration of Mobile device and Cloud:** Researches have proposed integration between mobile devices and cloud computing. Satyanarayanan et al. [2] outlined their vision of allowing mobile users to seamlessly use nearby computers to obtain cloud-computing resources by instantiating a "cloudlet" that rapidly synthesizes virtual machines on a nearby infrastructure that can be accessed through a Wireless LAN. Canepa et al. [3] presented a frame work named "Ad Hoc cloud providers". In this frame work, mobile devices can execute their jobs using other device resources around them as if it is executed on one cloud server. Our method is closely related to that of Chun and Maniatis[4]. They suggested the creation of clone VMs to run mobile applications as if 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 search agenda to bring the vision into reality. Their project home page can be found in[5].

**Multi-tenancy:** Royon et al. Proposed multi-user, multiservice execution environment named "virtual service gateway" [6]. They organized existing multi-application environment approaches by modifying Java runtime, and proposed an overlay approach to run virtually original application. As modifying approach has advantages of performance and isolation, overlay approach has advantages of usability on a standard Java Virtual Machine. Bezemer discussed the direction of multi-tenancy[7]. The Proposed System discusses and evaluates a proposed architecture based on some of these features.

**Virtual Smartphone over IP :** Beyond constructing a mobile application platform, the system has previously proposed a proof of concept prototype implementation named "Virtual Smartphone over IP" [8]. An overview of the Implementation is shown in Figure 1. In this prototype, Android-X86[9] is adopted on a mobile server OS running on a hypervisor. The

client program installed on a physical Smartphone can remotely interact and control Android-x86images. These programs enable to use Server side virtual mobile OS applications as if it is running on a physical Smartphone.

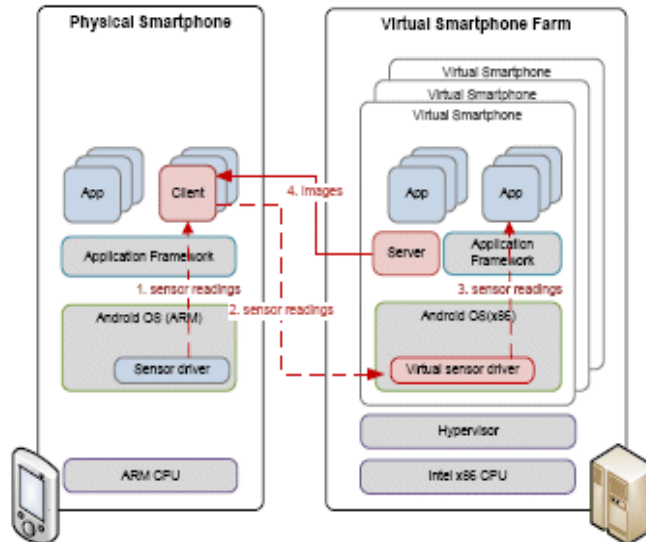


Figure 1: Overview of Virtual Smartphone over IP system.

The performance evaluation using a common Smartphone andA server shows that our virtual Smartphone on a server is at least 10 times faster than on a physical Smartphone.

### III. ANALYSIS OF PROBLEM

**Mobile Application Platform on Cloud Server:** As a numbers of service providers such as Dropbox[10] and Zumodrive[11] provide online storage services, the architecture for remotely using mobile application has many benefits for users on server. This approach, called Mobile Application Platform onCloud Server, intends to handle user data and user applications in a cloud server[12].This approach changes the application development as follows. "Write once, run everywhere. Install once, use everywhere." Figure2 illustrates an overview of the concept. By executing a mobile application in the cloud server ,users and developers free from device limitation such as CPU power ,memory, and battery, and from device software environment such as OS or version. Moreover , once a user installs an application on the cloud server, she/he can use the application anywhere.

Figure2.MobileApplicationPlatform.

**Multitenant for Android :** Multitenancy, Which means that software running on a server provides Services to many users, is one of important features for cloud computing., it is beneficial to share Hardware resources among users From the viewpoint of both economy and ecology. The resource requirements of mobile Oss are smaller so that a mobile OS would be more effective than using a desktop OS. The proposed system examines the multitenant architecture for Android and how to develop it.

**Multi-tenant architecture for Android:** This section discusses the process to construct multitenant architecture for Android based on related work. Figure 2 shows an overview of the architecture android on a server TheproposedSystem discusses the hypervisor layer types of approach, for multitenant architecture. The Hypervisor-layer approach shown in Figure2-(i) uses Virtual Smartphone over IP system

1. Hypervisor: The hypervisor- Layer approach uses the Virtual Smartphone over IP system as already stated in related work. Each user own her/his Android OS image on a server and freely runs her/his application in a separate VM Multitenancy is achieved by running multiple users VMs in a server via a hypervisor.The hypervisor-layer, approach is feasible and good for maintenance [8]. 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.

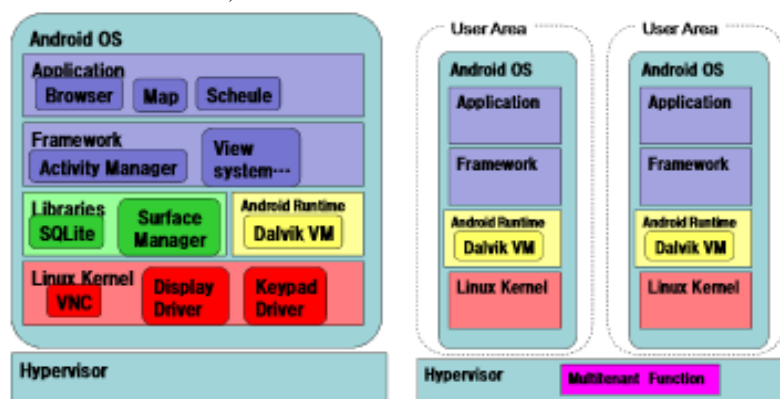


Figure 2:Overview of Android on a server Fig.3-(i)Hypervisor-Layer Approach

#### IV. PROPOSED METHODOLOGY

We propose Android as a Server Platform that Enables many users to use resources on remote cloud servers. The main reason to use Android as a server platform is that it is able to run for Smartphone's and for the x86 platform including servers. The system proposes a multi-tenant architecture of Android as a Server Platform. A pair of VNC-based server and client program is implemented. Server program resides in each Android-x86 image that run on top of VMWARE ESXi while the client program is installed in the physical Android device. The client program enables a user to remotely interact and control Android-x86 images. The client program transmits various events from the physical device to the virtual Smartphone and receives graphical screen updates from the virtual Smartphone. Nowadays the smartphones are widely used in today's market so to make the efficient usage of this smartphone. Whenever, any user wants to access any white paper, he/she has to access the home site such as IEEE for downloading the paper. This could create on multiple downloads for the same institute. This can be reduced by uploading these papers on our server and providing access to such vital documents from this server.

By implementing an efficient platform to use android as a server, the client can interact with server to access the documents from the server without downloading it. The mobile devices are connected to the mobile networks through base stations that establish and control the connections (air interface) and functional interfaces between the networks and mobile devices. Mobile users' request and information are transmitted to the central processors that are connected to the servers providing mobile network services. The subscribers' requests are then delivered to a cloud through the Internet. Cloud controllers present in the Cloud, process the requests to provide the mobile users with the corresponding cloud services. These services are developed based on the concepts of utility computing, virtualization and service-oriented architecture. The details of cloud computing will be different in different contexts. The major function of a cloud computing system is storing data on the cloud and using technology on the client to access that data. The conceptual advantages of an efficient platform to use android as a server are:

1. It provide user easy access to documents/white papers.
2. It can reduce multiple downloads of the same paper from resource website.
3. It increase access with anytime anywhere using android app

#### V. 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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