UNIVERSAL PLATFORM FOR HETEROGENEOUS MOBILE APPLICATIONS TO RETRIEVE INFORMATION

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Abstract: Cloud Computing is an emerging paradigm to share the resources over internet. OpenStack is an open source technology, provides arena to build private cloud which makes the purpose of cloud computing even more customized. Smart devices have become increasingly popular as most efficient computation tool. However, the mobile platforms are tightly coupled to specific hardware which makes applications to be available only to the specified environment. The primary goal of this article is to inject independency in mobile environment using the virtualization technology and cloud computing. To achieve this, inherent features of the mobile system have been provided through cloud. The infrastructure of mobile operating systems is provided as a service in the cloud environment thatcan run applications through handheld devices. This idea makes the system more user-friendly andleads to universal platformfor all platform specific applications.

Keywords: Cloud computing, information retrieval, Universal platform, Mobile OS

I. Introduction

Cloud Computing is a promising technology which permit userstoaccess the shared resourcesvia the internet. Cloud computing can significantly reduce the cost, complexity of owning, operating computers and networks. If an organization avails services from cloud service provider, then it need not to spend on IT infrastructure, hardware or software licences. Cloud services can often be customized and flexible to use.Service providers can offer advanced services that an individual company might not affordable or expertise to develop.

Cloud Computing has become popular due to its dynamic resource provisioning and on-demand self-services(e.g., network, storage, applications, etc). Mobile data communication has also play a vital role in remote data transmission. Current business problems become computational intensive on the move and mobility of enterprise people.Smart mobile devices like tablets, smart phones have limited processing power compared to computing devices such as PC,Laptop [1]. High computational capabilities can be availed from cloud to run mobile applications.

Native applications are designed for specific platform or device. Native mobile applications are relatively faster than web or hybrid applications. Native applications can run on only one type of mobile operating system. For example, the user who owns an iPhone device cannot use a native app which is developed in android. It is very expensive to switch over other devices for such applications.

Hence the goal of this paper is to provide a universal platform in which the user can access any platform's applications. This unanimousplatformisprovidedas a service in a private cloud using virtualization for any time use. It is very inexpensive, takes less time in a virtual platform and saves battery power of the device.

OpenStack is an open source cloud operating system, provides tools for managing the virtual machines on the top of existing resources. OpenStackhas been used because it enables the organisations and research institutions to bestow cloud computing servicesrunningon the hardware[1].

II. Existing Works

Mobile cloud computing integrates the facilities of the mobile users with the potential of the cloud computing [2]. It can extend battery life and allow the mobile user to perform high computational operations using the capabilities of cloud computing. Mobile cloud computinghasmobility and ubiquity as major features and promotes the business [3].The hardware dependency of the mobile devices makes it less reliable for the computing and storage services. However, these services can be performed by higher speed CPU, a larger capacity hard disk and a higher performance Operating System (OS) through cloud computing techniques. The mobile applications, run in the cloud are mostly linked to the server instances in the cloud [10].

Cloud service providers allow computational and storage services to be rented by the consumers for running applications or operating systems in the cloud servers. CPU time, memory usage, storage, server availability, networking throughput and maintenance are under the management of service provider [10].Mobile devices actasa thin client to run the application, actually

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application runs on the resource rich cloud servers transparent to client by virtualization [11].

Mobile devices like smart phones have relatively less battery life and storage to the information processing devices such as workstation or laptop. Dynamic resource providing like compute and storage capacity are facilitated through mobile cloud computing [6].Mobile operating systems Android, iOS, etccan be provided as server platform servicesthat enable multi-tenancy to use resources from the cloud.

Mobile applications are developed in the hardware specific programming languages. For example, Android apps cannot be run on iPhone, Windows or Blackberry. The development cost and time for the native application depends on the number of platforms that providethesameapplication [12]. This causes no portability due to the development of code for other environments. Yet, native applications provide access to the device's hardware, available only in the native app store.

III. Proposed work

The mobile devices are developed with high-end features and also expensive for the consumers to expend them. This paper provides a way for the consumers to utilize the native applications provided in the other platforms to be accessible in their own specific environment.Since the mobile platform landscape is very unstable,this approach can provide significant change in the mobile world for consumers and vendors. Users are needed to virtualize their phone inorder to run platform specific applications using other environments. Virtualization refers to virtualizing mobile operating systems(or virtual machines) running on the same physical hardware. Each OS instance is unaware of the fact that other operating systems on virtual machines are running simultaneously on the same hardware [8]. Now, the user can access any platform without mobile virtualization with the support of cloud. This service is provided in the private cloud which is set up using OpenStack. OpenStack is a framework for implementing IaaSservice which can be used to deploy IaaS infrastructure as discussed in the past [7].

Architecture:

Figure 1

Cloud computing systems actually can be considered as a collection of different services, thus the framework of cloud computing is divided into three layers, which are infrastructure layer, platform layer, and application layer.Infrastructure layer, includes resources of computingand storage. In the bottom layer of the

framework, physical devices and hardware, such as servers and storages are virtualized as a resource pool and computing storage and network services are provided to users, in order to install operation system (OS) and operate software application. Thus it is denoted as Infrastructure as a Service (IaaS).

For a mobile device to access applications from a cloud a private cloud setup is made ready. Private cloud implementation is chosen due to the security issues of public cloud. For management purpose two separate nodes, control and compute node are used in private cloud. The control node acts as the controller for the entire system and thus it is configured with all the set of services like *nova* - a Management Platform that manages compute resources, networking, authorization, and scalability needs of the OpenStackcloud;*glance* - anOpenStack Imaging Service act as a lookup and retrieval system for virtual machine images;*keystone* - provides identity and access policy services for all components in the OpenStack family. It provides authentication and authorization for all components of OpenStack including Swift, Glance and Nova;*swift* - provides a distributed, eventually consistent virtual object store for OpenStack;*horizon* - It can be used to manage instances and images, create key pairs, attach volumes to instances, manipulate Swift containers etc. The compute node is configured with nova service alone that manages the tenant instances.The tenant instances can be used by smart mobile devices (client) which run on the compute node. This idea can be applied to ant thin client tablets, laptops, etc.

Implementation:

A prototype has been implementedwith two modules:

- ➢ Private Cloud IaaS Setup
- ➢ Configuring VM for Mobile Devices

Private cloud is a computing model that uses resources which are dedicated to an organization. A private cloud shares many of the characteristics of public cloud computing including resource pooling, self-service, elasticity and pay-by-use delivered in a standardized manner with the additional control and customization available from dedicated resources. A private cloud is set up using OpenStack. For creating this platform or infrastructure it is required to use virtualization.

While virtualization is an important technological component of private cloud, the key differentiator is the continued abstraction of computing resources from infrastructure and the machines (virtual or otherwise) used to deliver those resources. Only by delivering this abstraction,customerscan achieve the benefits of private cloud – including improved agility and responsiveness, reduced TCO (Total Cost of Ownership), and increased business alignment and focus. Most importantly, a private

cloud promises to exceed the cost effectiveness of a virtualized infrastructure through higher workload density and greater resource utilization.Here we directly virtualize the new machines using Hosted Hypervisor. For example KVM (Kernel Virtual Machine) is a virtualization infrastructure which turns LinuxKernelinto a hypervisor i.e. KVM act as back-end virtualization technology mainly for non-graphic servers. KVM automatically creates a virtual cloud computing platform by means of instance pooling and provides scalability, performance and security.

The users access the private cloud through web browser in the mobile devices and access mobile specific platforms and run the applications of their choice. Provision of using other platforms in a specific environment can be advantageous, consumers need not to use different hand held devices to run platform specific applications.

IV. Conclusion

Using this approach, we can provide a way for the users to consume other platforms without the restriction of having any device physically. The platforms are provided in the cloud such that the computational energy consumedfrom remote cloud, thus giving mobile device longer battery time. It is possible to set up a private cloud with the mobile platforms as services allows users to access it through any light device.

V. Future Enhancements

Even though there are several rules and juristic exist in cloud to control securitythreats, without the proper authentication, there is a chance of mobile users to exploit the services. Hence, it is planned to go for authentication the users to take up the services and also synchronising the changes made and saving the states of the application in the mobile platforms back with the cloud server[9]. This allows the consumers to use more applications having customizations.

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