

Android Based Cloud Computing Using Microsoft Azure

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Abstract: In the present world of information technology 'e' is gaining drive and if not the whole thing is made digitally possible, on the other hand the amount of smart phone users and mobile applications are growing rapidly. Due to the augmentation of e learning skills, it requires some innovative ideas and ways for the proposal of learning possessions via digital setting. For this purpose we can make use of the looming technology called cloud computing which is being used by almost all the sectors nowadays. It is a kind of computing which is known for its scalability and resources are virtualized so that it can be shared by users from anywhere. An out of the ordinary development from the above mentioned areas will be the creation of remote laboratories in the cloud. To get rid of the speculation made in setting up of infrastructure like labs or workshops, "virtualization" technology can be used. This idea will pave way in both easy on the pocket aspects and mobile learning environment. Cloud usage reduces the cost for setting up of learning atmosphere as well the human resource and intricacy in resource sharing, safeguarding concerns. In our experiment, the server side part is deployed by the cloud computing called Microsoft azure.

Keywords: Cloud computing, microsoft azure, virtual lab, SaaS

1. Problem Statement

Cloud computing is the upcoming area in the real networks, but to utilize this cloud computing resource computer like hardware is required. Managing the cloud computing through mobile is not an easy job till now. Smart phones are expected to have PC-like functionality, hardware resources such as CPUs, memory and batteries are still restricted. To overcome this cloud computing application can be initiated using android smart phones. While considering on technical aspects, there are several benefits to think about, first and foremost, it is necessary to preserve conventional offloading benefits, such as allowing applications that cannot, otherwise, be executed on mobile devices due to a lack of resources. For example, if memory is not enough then creating instances of those objects on any remote device will allow the application to be executed. Second, performance can be enhanced if the execution sequence of an application can be reordered for increasing the level of parallelism. On relating to all the above mentioned points, a concept called virtual laboratory came into thought. For this, services of cloud computing such as IaaS and SaaS are used in our experiment to achieve multi-tenancy. In this virtual lab the students can right to use the required stuffs like software's without installing it in mobile phone and also can have the access to lab materials such as video instructions, question patterns etc. So this provides portability (can work from anywhere) for the user as well reduces the time (no need to visit the lab every time). This approach offers the opportunity to enhance the e-learning experience with new ways of teaching. To implement this cloud computing platform called Microsoft Azure is used.

2. Introduction

The means of using information technology has radically altered after the existence of cloud computing and world wide web. cloud permit to access all the needed things anywhere at any time. It liberates us from requiring a exact machine to access a file or any application. So this cloud

computing turned out to be a flexible technology for more or less all the areas and it is prone that there will be a noteworthy impact in educational setting in future. Cost effectiveness is the majorly concerned advantage because there is no need of any capital for setting up of any infrastructure for computers and networked devices, moreover the steady exclusion of hardware and software costs endow with superior flexibility to the administration. The educational tasks can be carried out by users(students) with the assistance of cloud based application which has been developed for this particular implementation and because of this there will be loads of advantages like backup, storage, accessibility, collaboration, resource and time consciousness. The altered definitions of cloud services with respect to the virtual education are illustrated below,

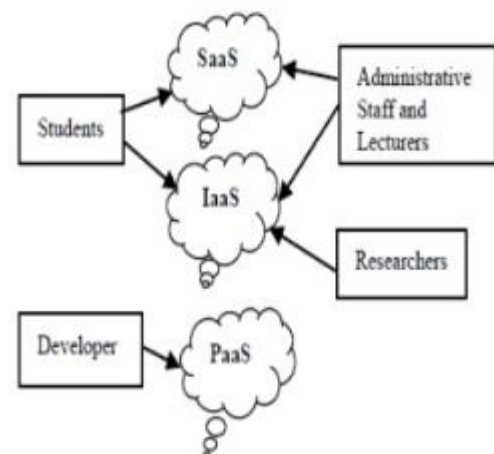


Figure 1: University using the services of cloud

IaaS(integrate to it)- A university's computational infrastructure is virtualized including software installation. This infrastructure will be used as the base for the creation of virtual lab.

PaaS(build on it)-Virtualized resources with installed required packages are shared.

SaaS(consume)- It is the most common model of implicit laboratory.

DaaS- data as a service used as an extra feature for providing data sources as a service.

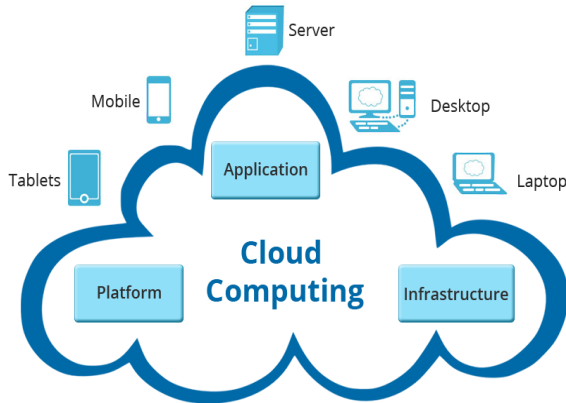


Figure 2: cloud services and handheld devices

3. Literature Survey

[1]. The pervasive computing provides the smart phones consumers a new loaded experience. But with the smart phone there are major problems like CPU, memory etc. In this paper, the architecture proposed has to use the server resources in the cloud for portable tools i.e., the multiple users on cloud can use the mobile application platform like SaaS with the help of network. this class of approach revolutionize the application protocol as "Write Once Run Anywhere" and we can tell it as install once run anywhere so the multi tenancy property of cloud has been deployed on cloud server. i.) the installation of multiple execution regulator on android os , and ii.) is the customer area administrator positioned in a host OS, these are the two utilities used for facilitate multitenant for android. it is alleged that anticipated architecture gives superior performance for mobile applications by virtualization.

[2].Cloud computing has its promising space in education sector and so the idea of virtual laboratory got its existence. In this paper model called Application as a Service is incorporated and proposed an loom for the plan and execution of virtual learning labs, for cracking inter disciplinary inconvenience with the use of computational resources and application packages which are in the cloud of distributed computational environments. This advancement does not involve any supplementary labours to gain unique computational resources and the mechanism of special software. VLL can be well thought-out as a opinionated remote access distributed hard software complex which can reproduce any substances and course of action. Based on the AaaS representation, VLL is offered as software, which functions in a circulated computing background.

[3].The significance of situated learning gives the framework in which learning takes place and it is allied with learning from anywhere so that it can be achieved with the help of cloud computing because of its omnipresent

property, connectivity and data admittance across diverse circumstances. the software structural design has been developed for the amalgamation of cloud with the computer application i.e., by providing relevant geological information and discussion boards. In these learning situations, novice are capable to observe the material world by confining sensor and geo-positional facts and accomplish logical inquiries and explores in innovative modes that slot in a lot of the vital features recommended by situated learning.

[4]. Software as a service is one of the key features of cloud computing technology and as on the stipulate basis cloud platform will let to produce occurrences of virtual machine. the potential to level of up and down of the application resources i.e., pay for the resources only when it is needed is the attractive point of using SaaS and primarily it will be cost effective than the traditional hosting methodologies. In this paper they mainly focused on the under and over usage of resources. For this multi-tenant property of cloud along with virtualization can be made used, the plan of a tenant-based load balancer to share out needs pertaining to every tenant. Tenant based load balancing is wished to acquire the pro's of seclusion parallelism in web application, implies that demand from clients are absolutely self-determining of each other. So it is obvious that tenant-based model has been used to embark upon the in excess of and lesser consumption when Saas podiums are implemented on cloud computing environment.

[5].By the constant progression of the internet , E-learning seems to be the budding and more demandable application in assorted areas. Conventional web based learning is deficient in unstable workload and security risks of external executable objects and these are tackled by way of desktop grid and cloud computing. The assimilation of both desktop grid and e-learning system gives a condition where every client gets served and also allow the unpaid helpers to resolve tasks, by this scalability achievement is done by retaining the reasonable fraction sandwiched between the quantities of both volunteers and online users. This desktop grid completely progresses the on the whole system performance. A consideration in upcoming exertion embraces the consumption of resource agent for reasonable and well-organized distribution of resources in desktop grid commune.

4. Implementation

There are 3 modules in our deploying process,

- 4.1 Android application development
- 4.2 cloud configuration
- 4.3 Server side configuration

So we need to create one android application for client side, we need to setup a cloud infrastructure for the communication of client and server and finally need to write a server side code to run our process.

4.1 Android application development:

"Android studio" has been used to create a client side application. It is an integrated development environment

(IDE) for developing on the Android platform. It is freely available under the Apache License 2.0.

-->Application is the android mobile client that access a service made by the server and the application flow is as follows,

- i. main activity
- >sign in
- >sign up
- ii. sign up(for new user)
- iii. sign in(already registered user)
- iv. cloud compiler
- v. e_learning
 - >lecture notes
 - >quiz
 - >links to refer

First and foremost there should be an individual login for each and every student, new users can make use of the sign up and existing user can go with usual login procedure.

4.1.1 Cloud Compiler

The vibrantly scalable and virtualized resources are offered as a provision with the help of internet. So that end user need not to encompass the awareness concerning the equipment infrastructure that cloud supports them. Indeed the cloud servers give the impression to cover superior excellence and improved suppleness rather than the devoted servers. One most noted benefit of using cloud server is that upgrading is easy while compared to the traditional server and you can pay for the horsepower what you needed today then if it seems to require more resources means, straight away we can get it easily. In our intact task cloud server performs the same as the central server. we all know that without having the JRE,JVM it is not possible to run a java program, in our implementation all these needed software are added as a plug-in along with the azure cloud platform. So whenever the client needs it, service will be made available in a on expenses manner and client is not required to have the software in android mobile.



Figure 3: snapshot of cloud compiler

Above snapshot is a part of our android application, "code here" space is to type code of java language, once it is over we need to "save" the code. After saving it will get converted to ".java file" and later that has to be "uploaded"

so that it will get saved in you folder of mobile. After that we directly concentrate on cloud element for the execution and finally if you give download, your output will be available in "output" space.

4.1.2 E-Learning

It is the next constructive feature of our application where users can have access to the stuffs uploaded by organization.



Figure 4: snapshot of e-learning

There are 3 section like lecture, quiz, link to refer. If you click on lecture tab it will direct you to a page where lab materials are shared by the respective person in-charge. Next is the quiz tab, here the students can have their supposed quiz tests and model questions will be posted for orientation. Last is the link to refer, here some links of some proficiency will be mentioned for students further clarification and understanding.

4.2 Cloud Configuration

Microsoft Azure is used for developing, managing and for hosting purposes and it runs on computers that are actually positioned in Microsoft data hubs. Familiarity of windows, azure SDK, scalability and flexibility, cost benefits and pricing model, support resources, interoperability are some of the important reasons for using azure as our cloud computing podium.

4.2.1 Steps for Azure Configuration:

- a) login to azure-->select+new-->compute-->mobile service-->create-->give url name-->create a new SQL database instance then click next
- b) To specify database settings -->Give server login name and password then click finish. After this, link will be generated for you.

mobile services

NAME	STATUS	SUBSCRIPTION	BACKEND	LOCATION	URL
aspanu	Ready	Pay-As-You-Go	JavaScript	West US	https://aspanu.azure-mo...
myandroidapp11	Ready	Pay-As-You-Go	JavaScript	West US	https://myandroidapp11...
tesingazure	Ready	Pay-As-You-Go	JavaScript	West US	https://tesingazure.azure...
aspanu1	Ready	Pay-As-You-Go	JavaScript	West US	https://aspanu1.azure-m...

Figure 5: azure service creation of URL

4.2.2 In Eclipse

Eclipse is the predominantly used integrated development environment. It has a foundation workspace and for modifying the setting it provides a extendable plug-in methods.

- a. File-->new project-->Dynamic web project-->In that dynamic web project window specify project name and change the dynamic web module version as 2.5 then finish it.
- b. In project Explorer select the project(for example test is project name) -->click the 'publish to azure' icon in the tool bar---> one license window will appear, click 'OK'
- c. Import the publish setting file(click)-->login to azure account and download-->save it-->browse the downloaded setting file to the subscription-->give server name-->remote access user name password-->click publish button.
- d. In Eclipse project explorer click on test_onazure-->right click on workerRole1-->Expand the azure submenu--click server configuration --> on JDK tab click 'Use the JDK from this file path for testing locally checkbox--> browse JDK location in your system. click on server tab--> use the server from this file path checkbox and select directory of your server-->click OK--->Run in azure Emulator button on the tool bar-->then click yes.

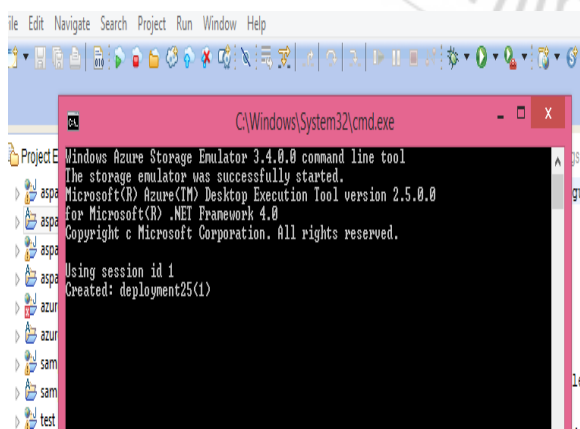


Figure 6: azure emulator

4.3 Server Side Configuration

As we seen earlier android application is developed and deployed parallely cloud configuration is setup and now we

have to incorporate these both to get our final output using plug-in and it consists of major features like workbench and workspace. Workbench components contains range of choices , toolbar knobs and give permission to broaden plug-in user boundaries. Workspace is used to communicate with the resources like projects, files etc. Here the **Cloud Foundry** eclipse plug-in is made used. After the plug-in deployment we can publish our app to the cloud and can make use of it.

5. Conclusion

The planned design will craft a new-fangled tie among cloud computing and e-learning by means of the virtual lab which serves as many feasible users and also make appropriate consumption of cloud resources. So there will be a tremendous way change in teaching methodology with this improved e-learning entrance in education sector. In this approach students and administration staffs can have access to the resources on-demand basis so robotically there will be a lesser amount of cost concerned in managerial charges and additional prevailing efficient capabilities. Therefore the maintenance burden of organization (university) will be flounce away and cloud also endows with instantaneous comprehensive platforms, removal of hardware/software accredit, abridged cost and cut down scalability.

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