THE EDUCATION AS A SERVICE (EAAS): CHANGING THE SHAPE OF E-EDUCATION

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Abstract: Cloud Computing (CC) in education is a better way than the traditional learning system and offers flexibility, reliability durability, security Etc... The platform of cloud education can be delivered from inside the institution itself or outside the institution or can be delivered by a combination of both places, depending upon the institution's needs. EaaS (Education as a Service) is used to deliver the best and most advanced software and computer lab resources to all students, researches faculties and all the staff who are involved in the teaching/learning process in schools, colleges and universities. This paper elaborates how EaaS can provide affordable and updated education services which change the theme from traditional education to cloud- based education.

Keywords: Education as a service (EaaS), Private Cloud, Public Cloud, Virtualization, application as a Service (AaaS), Security, Cloud Service Providers(CSP), Cloud Computing Architecture (CCA), XaaS (anything as a Service).

1. Introduction

A cloud is defined as flexible hosted resource pools delivered on the internet. Cloud defined by NIST (National Institute of Standards and Technology) is a model for enabling convenient, on-demand network access to a shared pool of configurable computing resources that can be rapidly provisioned and released with minimal management effort or cloud provider interaction. Cloud provides on demand self service - ready to use services with minimal intervention from provider [1].Indian government is encouraging to the parents to send their children's to school and college and Indian government is providing the various schemes to promote education in country but lack of Facilities, good teachers, lack of latest books and labs facilities because of that some serious affects is occurring the students results and this thing is discouraging them to continue their education. And the biggest challenge is in front of Indian government and the parent is also lack of infrastructure and the maintenance of that this thing really hard to handle like teaching staff, non teaching staff, accommodation, warden ,appliance is impossible for this kind of population for any government. Cloud Computing can help to find the better solution that suits for situation and it's in budget too, cloud computing is available almost anywhere as we discussed In this paper early the cloud computing is safe and secure system you can always go with this environment. It is totally performance oriented tracking technology, you can track your teachers, students and staff's performance always, you can check your institutes quality by checking the attendance ,weekly report and daily report best facility from cloud based system is provided to user is institute can measure teachers progress by taking feedback from students as well as from parents every parent is synched with all program they can see their Childs progress on-demand access to critical information using any device from anywhere. Both public and private institutions can use the cloud to deliver better services, even as they work with fewer resources.

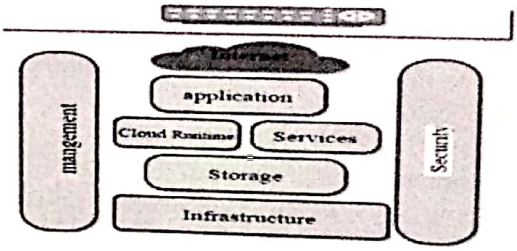

Fig1.Cloud Computing Architecture (CCA)

2. Cloud Architecture

The biggest and general Challenge in the cloud computing has no standard or single architectural method. When talking about the cloud architecture it is mainly divided in to two sections Front End and Back End they connect to each other through network usually internet (Wireless, wired) the front end is for the side of internet user and the back end is cloud section of the system. The front end includes client computer (or computer network) and the application required to access the computing system some of the system have unique applications that provides the internet access to clients and the back end system have many computers and there servers to provide this whole cloud computing tree and to run this whole theme In theory, a cloud computing system could include practically any computer program you can imagine, from data processing to video games. Usually, each application will have its own dedicated server. A central server administrate the system monitoring the whole thing like the trafficking, client demands, bugs, heat, security and all the maintenance related issues to ensure that everything is running smoothly or not. It follows set of rules called protocols and uses a special kind of software called middleware the middleware allows the networked computer to communicate with each other, most of the time server

doesn't run at full capacity, this is the main problem in the server system, Server used more power and the most of the servers power is going waste it's possible to fool a physical server into thinking it's actually multiple servers.

2.1 Cloud Computing Services

The cloud E-Education service is really useful for the students and teachers this virtual machines, virtual world is changed the whole world of education, we use for the education Infrastructure, Application, Platform, and Software this services is help to build our EaaS. The education as a service is manages all the students Using cloud computing the E-study services can be designed in some ways the service able to run on the laptop, mobile without connectivity, the service can also run from the school/college servers or from a data centre or third party server that is accessed via internet. EaaS provide the updated tools that are useful for the short operations like editing and enhancing the system one can do the things easily, a private cloud can best for establishing the EaaS in low cost. EaaS is designed especially for the education that's why the made of this service is so good and reliable you can rely on that everything is designed under the circumstances of the education. EaaS stores lesson plans for various subjects as data storage in private cloud and allow teachers and students to access anywhere and anytime.

a. Software as a Service (SaaS)

Its software that needed for computer laboratories and the teaching materials that accessed via a web browser and it's available on paid basis (monthly/ annually) it's according to your CSP. It's different from the traditional way where the educational institute buy a license and ownership that may cause for the installation and maintains to the institute SaaS is faster and cost effective way to get implemented also the SaaS vendors are provided you the recent updates and it's regularly as they implement.

b. Platform as a service (PaaS)

it is another SaaS variation this another service from cloud computing delivers development environment as a service students teachers can build their own application that is connected to the vendors server it is kind easy way to make the application you can define your own data limit and make your own software too.

c. Application as a Service (AaaS)

This service of cloud computing is used for the student evaluation by conducting their exam, question paper is send through email using cloud AaaS service is uses as application platform, Online MCQ (Multiple Choice Question) conducted without the need of installing the required application, this facility allows the institute to minimize the cost of exams.

d. Infrastructure as a Service(IaaS)

This service of cloud computing is the main service this will provide you the whole setup that means the infrastructure The service provider owns the equipment and is responsible for housing, running and maintaining it. The client typically pays on a per-use basis.

3. Environment Roles in Cloud Computing

In cloud environment the individual roles are identified to the typical role to the distribution in service oriented architectures and in same in the virtual organisations, as the roles played strongly to the individual business models it has to be like his a clear definition of what type of roles involved in order to ensure common understanding.

3.1 Cloud Service Providers (CSP)

CSP's offers cloud to customers either via dedicated API's, Platform as a Service (PaaS), Virtual Machines (VM) and or direct access to the resources Infrastructure as a Service (IaaS). the cloud service providers are mainly give their services through above three ways these ways are flexible from the service providers, if institution have huge infrastructure they can go with the IaaS but institution is small they should go with PaaS it depends on the CSP's.

3.2 Cloud Resellers

The Cloud resellers have collect cloud space (rent space on day basis or data basis) from the CSP's to provide the larger infrastructure to their customers large/ small amount of space as per costumer requirement as per the market call/competition. This relates to the community clouds in so far as the cloud resellers may use a single interface to a merged cloud infrastructure.

3.3 Software/services

Vendors do changes as well as enhances their own services and capability of that service of cloud, vendors are more flexible with the Costumer/end user about the SaaS because SaaS is cheap service and reliable to use and popular in this cloud computing era.

3.4 Cloud Computing Users/ End Users/Local People

The cloud costumers or users they are using cloud as a service directly from Google Drive, One Drive, Drop box etc... These users are not in concert with CSP's they are the Costumers of the cloud resellers.

4. Why We Need Cloud based Education?

Cloud computing is basically make education so simple with this valuable and cheap facilities. Without any hard installation miscellaneous work the system gives maximum results in minimum infrastructure as well as minimum time.

4.1 Easy to use

Having grown up the cloud software is easy to use and understand, fundamental computer knowledge is sufficient to handle the cloud applications and software, That mean the teachers and students doesn't need to spend more time to learn the system, the cloud based education requires a little time to be friendly and the every institute demands that they want simple, reliable and easy applications, same that cloud provides these are the reasons that's why cloud is Popular in recent days.

4.2 Get Start Quick

Institution wise cloud based software/applications

can be set up in just a couple of days for such a huge application only customer has follow the two Steps like sign in and follow the commanding rules and you can use its very simple and comes with friendly GUI (Graphical User Interface).

4.3 Better Student Collaboration

Many Cloud programs facilitate the such a flexible advantage that student prefer file sharing of cite multiple authors this is really useful for the students mean student can easily share files with each other by group or by individual, Here in the cloud system they all of freedom and they can transfer the files without caring of formats like (jpg, pdf) etc... Students can invite, ping their peers/ classmates to work on the same project at same time as well as their teachers for observation.

4.4 Flexible with Curriculum (anywhere anytime)

The institutes files and software's are on the internet via Cloud Computing means they are always available for you in your personal cloud space, you can have them no matter if there is day or night its available 24/7.This gives students lot of choices as when, and how they want to study as well as teachers have freedom to choose their own flexible time to work, and they can monitor their students' progress from home, at the same time parents will involve in this.

4.5 Resources required minimum investment

When everything is the perfect there is main thing is the economical boundaries, everything is came in front of money but don't worry the EaaS is here. There is no extra special hardware to buy for EaaS. You can install on your basic feature PC it's easy and it's reduce the time and money for the institution.

4.6 Scalability

When it comes with scalability our system is best in that you can add, delete, user very smoothly you can allocate the priorities to the various users, everything is going so smooth with the help of this system.

4.7 Low maintenance

As software is maintained by the supplier the end user have to care about the basic precautions like they keep UPS (uninterrupted power supply) for their server machines. This basic precaution can make the system longer and better, the software maintains its very low your service provider will provide you the life time maintains for your system, customer should check for regular update if you want auto update (you should turn on automatic update option) when you turn on this automatic update option you can receive the current updates from the vendors its will help you to debug your problems (if they occur).

4.8 Low Data Storage Cost

Data Storage cost is cheap in the initial stage suppose you want 20GB data it's easy and institution or business firm can easily pay for that. As well as cloud providers are providing that facility Pay-As You-Go (PAYG) this is flexible data allocation policy provides the facility actually you can pay only that data you used. Some CSP's provide the data insurance if the data loss, CSP's server burned they can always transfer your data in encrypted format (for the security reasons) to another server. No more worries about your valuable data; this is best advantage about the cloud service.

4.9 Security and reliability

The Cloud educational system seeks solutions that provide data security, for upload and download, and heat problem, debugging managed through cloud.

- Data is private without users permission it is not available for third parties.
- Filed Backed up at monthly/weekly/daily basis.
- Cloud Education system is able to retrieve all files when there is any change.
- The level of security is more strict compare to other systems.
- Cloud Based educational system used the Cryptographic method for data security.
- Encryption Used in data Ware House to store your data safely.
- The Education Cloud Server Saves Your data on different servers no more worries about the Data loss.
- The Education Cloud infrastructure is designed in a way that can keep minimum device failure and rescue system powerful.

4.10 Collaboration tools

The Education Cloud Computing enables collaboration between users to enhance and extends the learning process. Students are able to exercise and enhance safety and security using online collaboration methods like chat; they can help each other's by using chat method always. Chat is always good collaboration method used in the computer world its flexible and reliable to you can send your feelings, emotions it allows you to connect in real time. Administrator can allow to Student-To-Student chat, Teacher-To-Student or group chats, Video Chat allow one-to-one, one-to-many broadcasts with the facility of screen sharing and best duplex white board and freehand writing tool for online tutoring support or problem solving.

5. Education as a Service (EaaS) architecture

The cloud service for education is mainly a broad thing it has more services in that we use the platform, software and infrastructure as a services these as different level different ways to use services EaaS is the service that make education simple and long lasting, its very flexible and cheap service in the cloud computing, the EaaS enhances the effectiveness of education and alleviate constrained lab resources for learning.

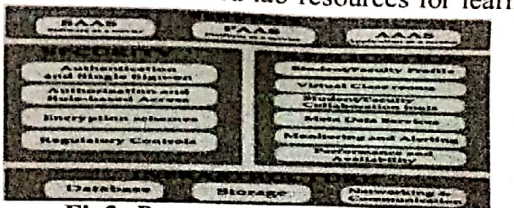

Fig2. Proposed Architecture of Education as a Service (EaaS)

5.1 Infrastructure Needed

1 server Pc, 16GB RAM, TB Hard Disk (ROM), UPS (Uninterrupted Power supply), Monitor ,printer, scanner,1MBps LAN Connection, projector Computers as per number of your students/staff in your institution.

5.2 Security

In every aspect of Cloud computing security is most important thing in that but our system EaaS is the best when it came to the Security, this system is framed like this it can tolerate maximum of security things in that, the CSPs re considered the following capabilities about the security,

- Authentication is main issue in cloud computing, hackers first attack is on the authenticity that's why to know your system is safe or not just check your authenticity.
- Encrypted data is using in the whole procedure the data is readable for the machine only with particular access
- The Education cloud computing has the inbuilt feature called regulatory control using this method admin can know who accessed the data or information it include tracking the application, data it is control that the individual is from which country its locates the position.

5.3 Applications

Education as a service (EaaS) uses the application and that application has this following features se see that one by one.

- **Virtual Classroom** teachers are able to create the virtual classroom in which the student and teachers are in collaboration.
- **Monitoring and alert service** the service is monitor all the system and monitors all the up and downs how much data is using, who is attending the class in these recent days all the schools and colleges are with have CCTV's in there campus. The system can monitor the whole campus and mainly the practical in the lab or the field.
- **Performance and availability** performance describes how the application is work under the load, when Net traffic occurs in the peak working hours, at that time you can measure the performance of your application.
  Now the availability some time on the internet we see the availability of the site or application, in EaaS the application is easily available in the peak hours like evening time or exam time.
- **Collaboration tools/Communication Software/add-ons** in recent days the collaboration tools means nothing but the social media we can interact with each other with this collaboration tool via Chat, Video call etc...
- **Teachers, students profile** and there and address and email everything is provide by the application.

6. Challenges

In the cloud some challenges like data privacy, data protection still plague in market about this mainly in the private clouds, when we talk about the public cloud almost every public cloud provider takes the numbers of customers like type of customers, personal information, like sex, address phone number. And the technical information like amount of data, process time, visits, sites etc...CSP's use this data for advertising by selling the data to call centres marketing sites. When it comes to security cloud computing suffers a lot there are so many security issues like loss of data, identity theft, data theft. There is also a possibility of fake user's malicious users and they affect many users per year as you see the statics.

7. Conclusion

The loud computing is on demand computing the main feature in this paper its flexibility you can access it anywhere from your portable devices like mobile, tablet, laptop Etc...

EaaS provides custom domain email id they start with their institutes name like abc@ycmou.ac.in.the e-mail service collaboration tools and the storage flexibility its good compare to other third party service provides in market. Many students can collaborate their work with their classmates who are in class or out of class, like in abroad they work simultaneously same time and on same assignment using EaaS. The Conclusion of this paper is EaaS provides you better service, flexibility, security and it enhances your work by reducing your cost EaaS system is Eco friendly too it can save the papers like notebook, papers, printing material etc...

8. Future Scope

The Present EaaS system it's good, but it has so many security issues like data phishing, data privacy, and these issues are mainly in the private cloud that may institutes use for their infrastructure and the one cyber issues is there so many CSP's are still selling the private data. The future work is probably on the security sector and the government of India have to take initial step about this cyber issue this paper suggests some of legal issues like we have to apply law and order and make them strict than they are now. Some research needed about the security we can do that by designing the algorithms that may enhances the security level of private cloud.

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