

A Review on Effective use of E-Learning through Cloud Computing

K Rajendra Prasad¹, M Suleman Basha²

¹Dept. of CSE, Institute of Aeronautical Engineering, Hyderabad, India

²Dept. of IT, RGM CET, Nandyal, India

Abstract: Today, data and Communication Technology (ICT) is being employed to remodel the education at an outsized scale thanks to the world development created by the huge proliferation of cheap computers, web broadband property and made education content. Cloud computing, an apace developing data technology has brought new amendment & opportunities thereto trade and within the field of education. it's visualized that, within the close to future, thanks to the recognition of learning on the net and therefore the construction of good web-based learning setting, cloud computing can have a major impact on the tutorial and learning setting, facultative the users (i.e. learners, instructors, and administrators) to perform their tasks effectively and with less price by utilizing the obtainable cloud-based applications offered by the cloud service suppliers. Cloud computing is very ascendible, creates virtualized resources for users and can have a major impact on the tutorial setting within the future. For the establishments that are below budget shortage, cloud computing is a superb different as there's no want of paying from now on capital for the computers and network devices.

Therefore, the target of this paper is four folds. First off to introduce the characteristics of E-Learning and analyze the idea of cloud computing. Secondly, in E-learning design, introduce cloud computing. Thirdly, to explain the design of E-learning cloud. And lastly, the conclusions are drawn.

Keywords: Cloud Computing, E-learning, Higher Education, Traditional Learning.

I. INTRODUCTION

E-Learning services are used in education system since computers are initially utilized in that. There is a trend to move towards the grouping learning services, wherever computer based services are integrated with classroom based things. There are various approaches to E-learning.

Computer-based learning (CBL) denotes to the employment of computers. And it is a key part of the tutorial setting i.e. a room wherever computers are used for teaching functions. Computer-based trainings (CBTs) are self-placed learning activities accessible by computers or laptops. CBTs commonly gift content in an exceptionally linear fashion, very like reading an internet book or manual.

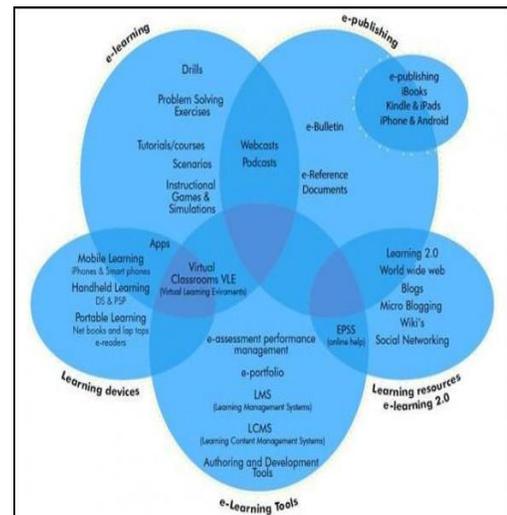


Fig.1 E-learning

In previous web-based E-learning mode, system construction and maintenance are placed in interior of academic establishments or enterprises, which ends in an exceedingly heap of issues existed, corresponding to plenty of investment required, however while not capital gains to come back, while not development potential and tolerance. Thanks to its dynamic measurability and effective usage of the resources Cloud computing is changing into a beautiful technology. It may be utilized beneath circumstances wherever the supply of resources is proscribed. when put next to the existed ancient IT services providing models, cloud computing has several benefits corresponding to reduced direct investment (i.e., software, hardware, and skilled employees to take care of servers and upgrade software), reduced launching time, wherever days become hours, expected performance, high availableness, infinite measurability, tremendous fault-tolerance capability, and increased collaboration, accessibility, and quality, permitting users to use any device, corresponding to a private pc (PC), or a mobile, etc.

Therefore, the employment of cloud computing can have a positive impact on value structure of all the industries victimization IT resources by lowering the whole cost of possession, leading to Associate in Nursing indirect crucial impact on business creation and therefore the economic science performance at national levels, extending to a worldwide level. This advantages the personal similarly because the public sectors, as well as attention, education (and that too for E-learning) and therefore the activities of state agencies. In each domain and business, cloud computing has been attracting vital momentum and a spotlight together of the opportunities that might influence be of vast advantages and empowering in some things, thanks to its flexibility and pay-per-use price structure for organizations. Within the education and learning, this may be known as “E-learning as a Service” (EaaS). Thus, emergence of cloud computing opens a brand new plan to more development for E-learning [1]. However the event of cloud computing is facing several essential problems, the foremost outstanding is that the security issue, with the growing quality of cloud computing, the importance of security show gradual upward trend, become a very important think about the event of cloud computing.

II. CLOUD COMPUTING

Cloud Computing is the most popular buzzwords within the IT space. Several companies and establishments are speeding to outline clouds and supply cloud solutions in numerous ways that [2]. Cloud computing is Internet-based computing, wherever shared resources, software, and knowledge are provided to computers and different devices on demand [3]. It permit users to use applications while not, the requirement to buy, install, or support package on their native computers or servers so as to alter them (users) access their personal files anyplace within the world, anytime, from any internet-enabled device (i.e. phone or desktop computers or laptops) solely the user pay in line with what quantity and the way typically he want services [4]. New advances in processors have all combined to form cloud computing a compelling paradigm. A number of these advancements are virtualization technology, disk storage, broadband net access and quick, cheap servers [5]. One among the foremost vital featured ideas behind cloud computing is measurability, and therefore the key technology that build it doable is virtualization [2]. Virtualization breaks down the physical barriers inherent in isolated resources, and automates the management of those resources as one entity through hypervisor technology corresponding to Virtual Machines.

Cloud computing has essential impact on vital areas of IT, like security, infrastructure, investments, and additional [6]. It away to extend capability or add capabilities on the fly, scale back enterprise IT prices & complexities whereas rising work improvement and repair delivery, permits for way more economical computing by centralizing storage, memory, process and information measure while not finance in new infrastructure, coaching new personnel, purchase package, or licensing new package [7]. So, cloud computing becomes Associate in Nursing convertible technology for several of firms and establishments with its dynamic measurability and use of virtualized resources as a service through the web. Advances in technology provide new opportunities in enhancing teaching and learning therefore cloud computing incorporates a vital impact on the academic atmosphere.

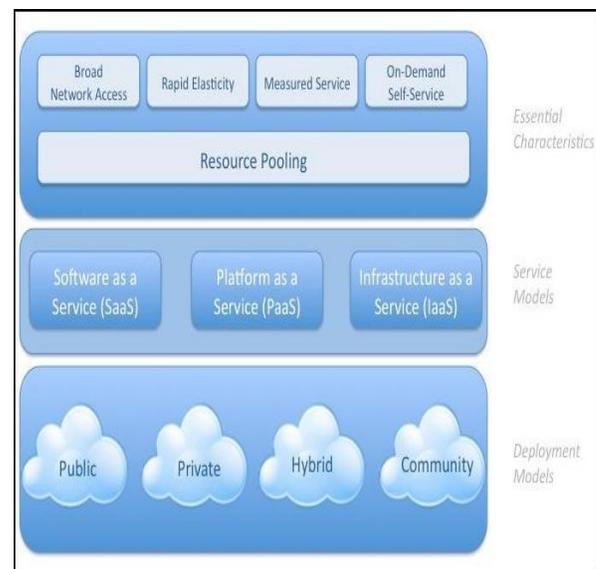


Fig. 2 Cloud Computing Services

Cloud computing is one amongst the new technology trends probably to own a big impact on the teaching and learning surroundings [8]. In Cloud computing, resources may be either outwardly closely-held (public Cloud – as provided by Google and Amazon) or internally closely-held (private Cloud). Public Clouds provide access to external users UN agency ar usually beaked on a pay-as-you-use basis. The personal Cloud is constructed for the access inside the enterprise wherever the users will utilize the power with none charges [9]. The selection to maneuver to the cloud isn't AN all-or-nothing proposition.

International Journal of Emerging Technology and Advanced Engineering

Website: www.ijetae.com (ISSN 2250-2459, ISO 9001:2008 Certified Journal, Volume 7, Issue 8, August 2017)

With differing types of cloud offerings, user has versatile choices concerning those services to get within the cloud and that to stay on-site. User priorities and security needs confirm the amount of cloud capabilities to explore. There are 3 distinct set of services provided by the cloud:

- *Infrastructure as a service (Iaas)* - the potential provided to the patron to use process, storage, networks, and alternative elementary computing resources [8] wherever they're ready to deploy and run whimsical computer code, which might embrace operative systems and applications. the patron doesn't manage or management the underlying cloud infrastructure however has management over operative systems, storage, deployed applications, and probably restricted management of choose networking elements (e.g., host firewalls).
- *Platform as a service (Paas)* – Cloud platform services deliver a computing platform and/or service, typically intense cloud infrastructure and sustaining cloud applications [9]. It facilitates development and preparation of applications while not the value and complexness of shopping for and managing the underlying infrastructure (hardware (server, storage and network), and associated computer code (operating systems virtualization technology, file system) [CC].Cloud platform give all of the facilities needed to support the whole life cycle of building and delivering net applications and services entirely obtainable from the net [10].
- *Software as a service (Saas)* - the potential provided to the patron is to use the provider's applications running on a cloud infrastructure. The applications are accessible from numerous consumer devices through a skinny consumer interface comparable to an online browser (e.g., web-based email). the patron doesn't manage or management the underlying cloud infrastructure together with network, servers, operative systems, storage, or perhaps individual application capabilities, with the attainable exception of restricted user-specific application configuration settings.

III. CLOUD COMPUTING AND E-LEARNING

The emergence of cloud computing offers smart chance for the event of E-learning faculties or the opposite instructional institutes needn't worry concerning the development of the E-learning surroundings or the investment of monumental capital and human and material resources to construct the system.

These problems are handled by the E-learning cloud suppliers; UN agency will customize it for users. In E-learning cloud model, information storage is distributed, information management is centralized and there's virtualization of knowledge services. E-learning cloud surroundings provides massive information center that has mass information storage and high-speed computation capability. Cloud computing platform give services within the variety of rental, to students and lecturers. Cloud computing ensures virtualization which is able to scale back the quantity of servers needed. within the cloud platform, lecturers and directors UN agency enter their requests for IT resources like server, software, storage, etc. will instantly understand whether or not these resources are obtainable or not. If they're obtainable, request is submitted that mechanically gets routed to the cloud administrator for approval. To confirm that requests may be consummated in a {very} very short amount of your time, this method is machine-controlled. Designing and management of use of resources are necessary activities of the cloud. The arrange can give required capability by computing resources needed to make new solutions and to fulfill application performance goals i.e. promote teaching and researching

IV. CLOUD FOR E-LEARNING

E-learning is associate change for technology, ideas and tools, giving new content, ideas and ways for education, however it cannot fully replace academics. The academics can play leading role and participate in developing and creating use of E-learning cloud that may be a migration of cloud computing technology within the field of E-learning and includes all the mandatory hardware and software package computing resources to be engaged in E-learning. Once these computing resources square measure virtualized, they're created obtainable to be used to students and alternative academic businesses within the kind of rent base from cloud vendors. E-learning cloud design is shown in Figure 3.

It consists of 5 layers particularly hardware resource and infrastructure layer, software package resource layer, resource management layer, service layer and business application layer [11].

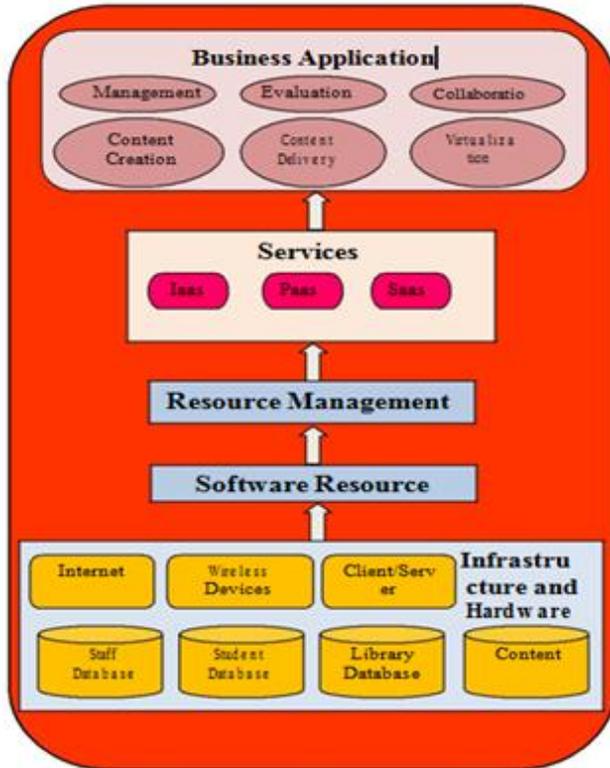


Fig 3: E-Learning through Cloud Computing

V. CLOUD FOR E-LEARNING

E-learning is associate change for technology, ideas and tools, giving new content, ideas and ways for education, however it cannot fully replace academics. The academics can play leading role and participate in developing and creating use of E-learning cloud that may be a migration of cloud computing technology within the field of E-learning and includes all the mandatory hardware and software package computing resources to be engaged in E-learning.

1) *Hardware resource and infrastructure layer Hardware resource*

This is the foremost necessary layer for the overall infrastructure of the system and handles the essential computing things like physical memory and mainframe. The physical host pool is dilated dynamically and memory is climbable at any time to feature extra memory so as to supply the uninterruptable power to the middleware services for the cloud primarily based E-learning systems.

Cloud Computing helps to create the hardware resources shared and accessed as knowledge resources in secure and climbable means by permitting the hardware layer to run just like the net.

2) *Software package resource layer*

This layer consists of in operation systems and therefore the middleware. To supply the sorted interface for the software package developers, several software package solutions get combined, with the assistance of middleware technology. So, software package developer's square measure ready to implant the various styles of applications created for E-learning system within the cloud that helps the cloud users to use those applications through cloud.

3) *Resource management layer*

With the assistance of this layer, we are able to bring home the bacon low coupling between software package and hardware resources. Moreover, virtualization and programming strategy of cloud computing helps in achieving the uninterrupted on-demand distribution of software package for various hardware resources.

4) *Service layer*

Service layer is split into 3 levels i.e. SaaS (Software as a service), PaaS (Platform as a service), IaaS (Infrastructure as a service). These layers facilitate the cloud customer's use the assorted kinds of cloud resources for his or her product like software package resource, hardware resource, and infrastructure resource. In SaaS, users use software package via the net while not the requirement to get, install or maintain the software package. They merely pay a monthly fee. In PaaS, users use the platform of the service supplier as their IT resolution by paying fee to them. Let's say, databases. In IaaS, the hardware needed to run a business is provided by cloud service suppliers and therefore the customers simply manage their application software package.

5) *Business application layer*

This layer principally consists of content production, academic objectives, content delivery technology, assessment/evaluation criteria and education management part [12]. This layer frames the enlargement of cluster of elements for E-learning. Application layer is engaged within the integration of teaching resources within the cloud computing model.

International Journal of Emerging Technology and Advanced Engineering

Website: www.ijetae.com (ISSN 2250-2459, ISO 9001:2008 Certified Journal, Volume 7, Issue 8, August 2017)

The interactive programs square measure principally for the academics, in keeping with the learners and teaching desires, engineered by absolutely utilizing the obtainable info resources and therefore the course content and therefore the progress could also be updated at any time by creating changes in keeping with the feedback. Sharing of teaching resources embrace teaching material, teaching info (such as digital libraries, info centers).

VI. BENEFITS OF E-LEARNING CLOUD

When E-learning is enforced with the cloud computing technology, it provides various blessings. A number of them are:

- 1) *Reduced Costs:* In E-Learning the users needn't have high finish organized computers to run the applications. They'll run the applications from their laptop, mobiles, pill laptop having minimum configuration with net property through cloud. The user ought not to pay cash for giant memory in native machines, since the information is formed and accessed within the cloud. It's cheaper as organizations conjointly ought to pay as per their usage and want to pay just for the house they have.
- 2) *Improved performance:* Since the cloud primarily based E-learning applications have most of the applications and processes in cloud, shopper machines don't produce issues on performance once they area unit operating.
- 3) *Fast package updates:* E-learners get updates instantly since cloud primarily based application for E-learning runs with the cloud power and thence the software's get mechanically updated in cloud supply.
- 4) *Better document format compatibility:* The cloud powered E-learning applications don't have to worry regarding those styles of issues. Since some file formats and fonts don't open properly in some PCs/mobile phones, because the cloud primarily based E-learning applications open the file from cloud.
- 5) *Benefits for lecturers and students:* Cloud primarily based E-learning permits students to require on-line courses, attend the net exams, get feedback regarding the courses from instructors, and send their comes and assignments on-line to their lecturers. it's conjointly advantageous to lecturers as they'll prepare on-line tests for college students, produce higher content resources through content management systems, assess the tests, homework, comes taken by students, send the feedback and communicate with students through on-line forums.
- 6) *Virtualization:* it's the foremost vital feature of cloud design whose goal is to change body tasks whereas rising quantify and overall hardware-resource utilization. Here, the appliance readying atmosphere and physical platform is managed, financed, migrated, and backup through virtualization platform that place the hardware(together with servers, storage and networking equipment), comprehensive virtualization, so as to create a pool of shared, distributed on-demand.
- 7) *Fault free operation:* The cloud automatic data processing system will give a better quality of service by group action mass storage and superior computing power. These systems sight the node failure on their own and exclude it so the traditional operation of the system doesn't get affected.
- 8) *Provides simple and wider accessibility:* Cloud primarily based E-learning has the target to supply easy accessibility to pricey package running on high performance processors to rural students finding out at the establishments that don't have correct facilities. Immense capital is needed to implement the cloud design however its advantages can justify the price simply.
- 9) *Centralized knowledge storage:* Since the most a part of the applications and knowledge is hold on into the cloud, losing a cloud shopper isn't any longer a serious incident. A replacement shopper is connected in no time at any moment.

VII. CONCLUSION

Cloud computing may be a recently developed advanced Internet-based computing model and has recently emerged as a paradigm for managing and delivering services over the web. Through the analysis, we lean towards to believe that, by suggests that of cloud computing mass knowledge storage, high-speed computing capabilities, also as its ideal allocation and also the sharing mode of resources, we are able to produce associate E-learning application model supported cloud computing. Cloud computing will facilitate communities and nations in remodeling education. A complete world of information will currently be created accessible to lecturers and students through cloud primarily based services that may be accessed anytime, anywhere, from any device. Cloud computing helps students across the world to accumulate the newest skills and coaching they have to reach the world data society by lowering the price and simplifying the delivery of academic services.

International Journal of Emerging Technology and Advanced Engineering

Website: www.ijetae.com (ISSN 2250-2459, ISO 9001:2008 Certified Journal, Volume 7, Issue 8, August 2017)

Some issues appreciate platform security, technical standards, regulative and alternative services don't seem to be well resolved nevertheless in apply and area unit unfinished for future analysis and exploration. E-learning application model supported cloud computing won't stop its pace to proceed. Because the cloud computing technologies become a lot of refined and also the applications of cloud computing become progressively widespread, E-learning will definitely begin a replacement era of cloud computing.

REFERENCES

- [1] Cloud Computing: a New Business Paradigm for Elearning. Xiao Laisheng , Wang Zhengxia
- [2] Bo Dong, Qinghua Zheng, et al. "An E learning Ecosystem Based on Cloud Computing Infrastructure", "the Ninth IEEE International Conference on Advanced Learning Technologies", China /2009.
- [3] <http://www.wikinvest.com>, Cloud Computing.
- [4] <http://www.salesforce.com>, what is cloud computing.
- [5] <http://code.google.com>, Google App Engine
- [6] <http://www.infoworld.com>, what cloud computing really means. By Eric –Knorr and G. Gruman.
- [7] Thomas. P. Y. "Cloud computing: A potential paradigm for Practising the scholarship of teaching and learning", University of Botswana.
- [8] E. Tuncay, "Effective use of Cloud computing in educational institutions," *Procedia Social Behavioral Sciences*, p. 938–942, 2010.
- [9] R. Buyya, C.S. Yeo & S.Venugopal, "Market-oriented Cloud computing: Vision, hype, and reality of delivering IT services as computing utilities," *10th Ieee Int. Conf. High Performance Comput. Comm.*, p. 5–13, 2009.
- [10] ANALYSIS OF SECURITY ISSUES IN CLOUD BASED E-LEARNING Gunasekar Kumar, Anirudh Chelikani
- [11] H. Xin-ping, Z. Zhi-mei , D. Jian, "Medical Informatization Based on Cloud Computing Concepts and Techniques", *Journal of Medical Informatics*, 2010, Vol.31, No.3, pp.6-9.
- [12] Wheeler, B. and S. Waggener."Above-Campus Services: Shaping the Promise of Cloud Computing for Higher Education", November/ December, 2009.