International Journal of Engineering Research & Management Technology
ISSN: 2348-4039
July-2020 Volume 7, Issue-4
Email: editor@ijermt.org
www.ijermt.org

IMPLEMENTATION OF CLOUD COMPUTING TECHNOLOGY-A SMART WAY OF TODAY'S EDUCATION SYSTEM

[1]Momin Mohammed Nadeem, [2]Dr.AshaAmbhaikar
[1]Ph.D. Scholar, Kalinga University, Naya Raipur, Chhattisgarh, India
[2]Prof. & HOD (Computer Science & Eng.), Kalinga University, Naya Raipur, Chhattisgarh, India

ABSTRAC:
Education is highly important in today's society.For a country's economic growth, education plays an important role.In its varying situation, and there is a need of new technology to integrate with the education system. Cloud plays a significant role in today's education.Now a days cloud computing is the vast growing area in each area due to which we can minimize the required computing resources, minimize the cost and enhance the performance. We can use cloud computing technology under education system to enhance the quality of education. Many colleges run under one roof (University) with same syllabus, exam system, and admission system. So if we apply cloud computing technology in education system we can make it more transparent system that it minimizes the communication gap between student and faculty and student and parent.This paper focuses on basic introduction of cloud Computing and how cloud computing can be introduced in the education to improve teaching and learning methodology which can bring a revolution in the field of education.
Keywords: Cloud computing, Educational *Sector,e-learning, Security, Benefits,Applications, Implementation etc.*

INTRODUCTION:

During the last two decades the evolution of distributed computing has changed the working of scientific and commercial applications. This progress has evolved several newer applications. The latest evolution of distributed computing is Cloud computing [1]. In Simple form Cloud computing means storing and accessing data and programs over the Internet instead of computer's hard drive [2]. In other words cloud computing provides shared resources, software and information through Internet as a PAYGO (Pay-as-you-go) basis. Cloud computing can be a welcomed optioned in the universities and educational institutes for studies. It gives a better choice and flexibility to the IT departments by building multipurpose computational infrastructure once and then uses it for several purposes for several times. Teaching is now not just restricted to classroom with students. Today Education is heavily dependent on Information technology. Cloud Computing provides the solution for this problem. With the help of cloud computing the user uses the platform and application on-campus or off-campus or combination of both depending on the institutions need. It offers services at the least cost to users like student, staff who can acquire it anywhere any time.
The cloud helps ensure that students, teachers, faculty, parents, and staff have 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.

CLOUD COMPUTING – WHAT IS IT AND WHAT DOES IT MEAN FOR EDUCATION?

The opportune distribution of Education accumulation of articles on registering and training, The Tower and the Cloud conveys consideration regarding numerous ranges where the cloud may encroach on instruction. Given the size of that book and the extent of this article, it is illogical to practice every one of the worries here. I will guide regard for a couple of the papers though. The Gathering Cloud: Is this the end of the center? Is a magnificent general beginning stage? Yanosky‟ s „From Users to choosers: The cloud and the changing state of big business power‟ and Goldstein‟ s „The Tower, the Cloud, and the IT pioneer and workforce‟ both location the effect distributed computing will probably have on IT administration and procedure with HE establishments. [2].

FROMTRADITIONAL E-LEARNING NETWORK TO CLOUD EDUCATION:

E-learning is an Web based learning procedure, utilizing Internet innovation to plan, execute, select, oversee, bolster and develop realizing, which won't supplant conventional training systems, yet will significantly enhance the Proficiency of instruction. As e-learning has a ton of favourable circumstances like adaptability, differing qualities, estimation, opening et cetera, it will end up being an essential route forlearning in the new century as in Fig Architecture of simplified Learning System.

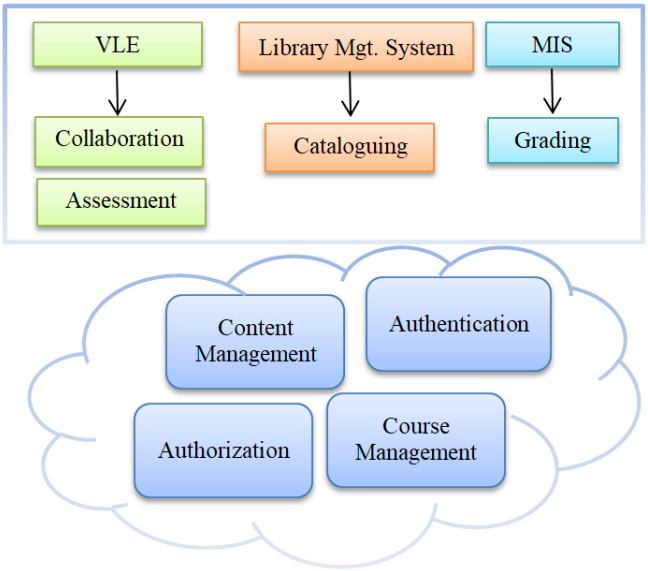

Fig 1: Existing E-learning Architecture

Mendez illustrates that in traditional online learning mode, framework development and upkeep are situated inside the instructive organizations or endeavours, which prompted a great deal of issues, for example, noteworthy speculation required however without capital additions for them, which prompts an absence of improvement potential. Conversely, cloud-based e-learning model presents scale effectiveness system, i.e. development of e-learning framework is endowed to distributed computing suppliers, which can make suppliers and clients to accomplish a win-win circumstance. The cloud based environment bolsters the formation of new era of e-learning frameworks, ready to keep running on an extensive variety of equipment gadgets, while putting away information inside the cloud. [3]

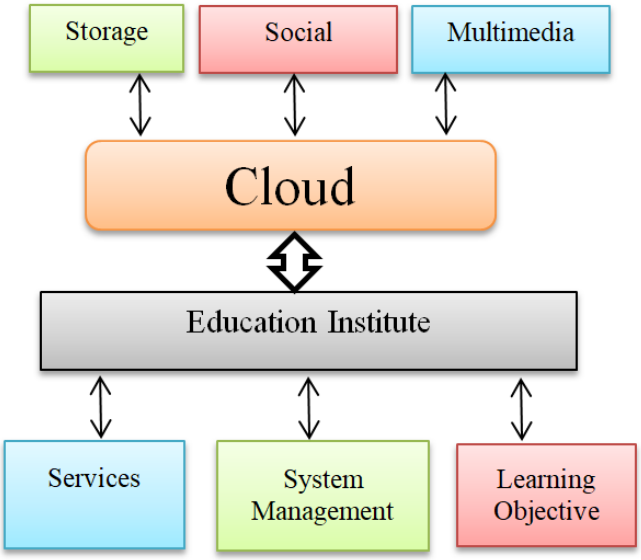

Fig 2: Cloud Based E-learning Architecture

CLOUD BASED EDUCATION SYSTEM:

As the adoption of cloud computing increases, many academic institutions are introducing cloud computing technologies into their education systems, promising and delivering more scalable and

reliable education services. Many universities have acknowledged the potential benefits of leveraging cloud computing for economic reasons, as well as for more advancedteaching and data sharing [22]. A number of studies were conducted to investigate the benefits of using cloud computing for e-learning systems [8 - 10] and to suggest solutions for cloud computing-based e-learning systems [6, 10, 11]. Pocatilu et al., [9] presented cloud computing advantages for e-learning as being low cost with higher data security, virtualization, centralized data storage, and the possibility of monitoring data access. They also specified cloud computing benefits for e-learning in terms of the characteristics of the three cloud service models: infrastructure (e-learning systems can be run on the provider's infrastructure), platform (e-learning systems can be implemented based on the provider's development interface), and service (e-learning systems can use provider developed solutions). Bora and Ahmed [10] examined the benefits of adopting cloud computing for e-learning and found it is low cost, offers improved performance, provides instant software updates and improved document format compatibility and data security. Additionally, it provided many benefits for students and teachers, such as online courses, exams, assignments, projects, feedback, forums, and e-learning content and resource management.

Several companies including are accelerating delivery of cloud-based education systems to educational institutes as a way of generating future business, and several learning management systems are also now supporting cloud-based educational services [8]. Although much work has been done to date with regard to adopting cloud computing for educational systems, further studies need to be conducted to develop more diverse forms of cloud-based education systems, in more innovative and efficient ways. Meanwhile, most of the current cloud-based education systems are concentrating on delivering and sharing learning materials and teaching activities, rather than constructing and supporting an integrated, total cloud-based educational environment.

PROPOSED E-LEARNING SYSTEM:

In the proposed system each individual user acts as a data owner, which provides various services to the cloud service provider from its resources. Any educational institute can acquire the required resources from these service providers on the basis of their requirement and budget available with them. A local server is associated with each institute which controls everything, from every request to the cloud service provider to each system for that institute. A user can request their desired resources and (or) services from these server to cloudafter verification. The server collects the required resources and provide to the user for use. See figure 3.In addition there are some providers who have the agreement with the cloud system and offers different services to the user [3].

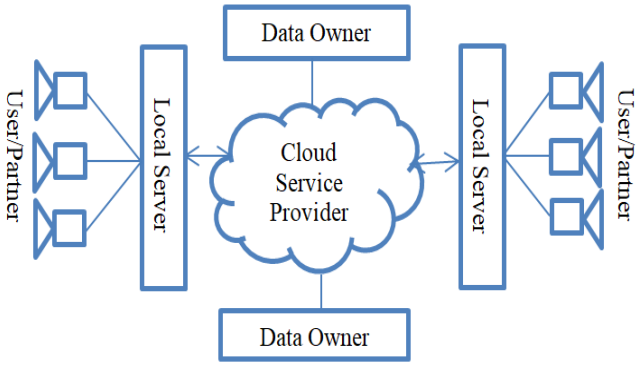

Fig 3: Proposed System Architecture

Resource Allocation Process:

At a particular time interval, the server collects the request from each client and then combines these requests according to the group service and summarize them. The Architecture of Cloud Service Provider has two sub-layers.

1. The upper sub-layer performs first before any service is delivered such as security, authentication, verification etc. To monitor the operation of cloud an additional sub-layer, government central control system, is there to monitor the cloud.
2. The lower sub-layer offers the resources and services to the user on their demand such as SaaS, Paas, Iaas for e-learning solution.

Process of User Request:

In the proposed system each user communicates with local server for receiving required resources and services from cloud. The process is depicted in figure 4. The steps of the process are summarizing below.

1. User sent its request to local server with necessary identification information about him i.e. User id and password.
2. Local server verifies the user by its authenticating module and then sends a form with appropriate information according to the tag of user.
3. User provides required service specifications to local server.
4. Local server verifies the current available resources, data security, pricing policy etc. for the user request according to its specification and sends the detail back to user.
5. If the user satisfies with this detail it sends an acknowledgement to the local server.
6. The local server served the user request as early as resources are available to it's from cloud.

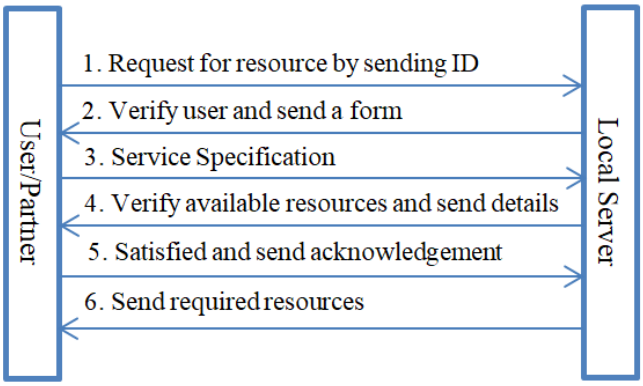

Fig 4: Steps of Communication

Monitoring Resource Process:

In the proposed system, there is a facility to use the resources which are unused. There is a process to identify those resources which are unused at the user request time. This process of unused resource identification is depicted in the figure 5 [3].

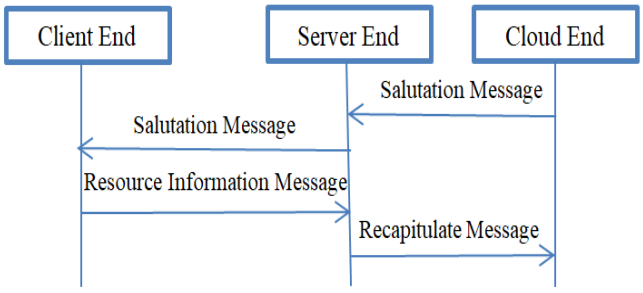

Fig 5: Process of Resource Monitoring

The cloud sends a greeting message periodically to each server linked with an institute to find out the condition of their clients. Each server prepared several copy of this greeting message and forwards each copy to its associated client under. The server waits for the clients to receive the Resource Information Message When all the information from the client comes, the server generates reiterate message based on collected information from the client end and sends back the message to the cloud system.

ADVANTAGES OF CLOUD BASED E-LEARNING SYSTEM:

1. GUI Facility - various services on the cloud have GUI support, which are simple to use and easily understandable and make it easy to user for the user without any complexity.

2. Performance Improvement - all the required resources, services and data to complete a particular task is available on the clouds, which reduce the time for searching them and make it possible to complete your task within specified time and cost more efficiently.

3. Worldwide data contact - all your data is available on the internet and available worldwide instantly, so you don't need to carry your document with you all time.

4. Gadget autonomy - it is one of the best advantages. You don't need to bind with a single system, as your document are available on cloud you are able to use it anytime, also there is no requirement to purchase a new software for doing a particular work on different platform. Shift to another device(s), your data or document are still available for your use.

5. Modified education - Cloud computing provide various learning choice to student. Using this, students have right to use many software, resources that go well with their learning to improve it and make it interesting and also helpful for teacher to make the study topic more effective which will attract a lot of student.

6. Lesser Costs - with the cloud the cost will be lesser for the use of new software, technology required for the e-learning. Teachers and students can easily use any new technology on cloud without purchasing, installing on their own system. It also some services on the pay on demand option also.

7. Ease of access - in cloud data is available all the time (24*7), which help the teachers and students to easily access the data, information from anywhere at any time, just by login.

8. No additional transportation - all the data, information is available on the internet so both teacher or student no needs to worry about the additional lab, classroom facilities and they are free to access cloud services.

IMPLEMENTATION OF CLOUDCOMPUTING TECHNOLOGY IN EDUCATION SECTOR:

Cloud computing technology can provide solutions for the above mentioned problems in education system. Cloud computing enables users to control and access data via the Internet.The main users of a typical higher education cloud include students, Faculty, administrative staff, Examination Branch and Admission Branch as shown in Figure 1. All the main users of the institution are connected to the cloud .Separate login is provided for all the users for their respective work. Teachers can upload their class Tutorials, assignments, and tests on the cloud server which students will be able to access all the teaching material provided by the teachers via Internet using computers and other electronic devices both at home and college and 24X7. The education system will make it possible for teachers to identify problem areas in which students tend to make mistakes, by analyzing students' study records. In doing so, it will also allow teachers to improve teaching materials and methods.

This will not only make it possible for students to use online teaching materials during class but they will also be able to access these materials at home, using them to prepare for and review lessons. Utilization of cloud computing systems will reduce the cost of operation because servers and learning materials are shared with other colleges

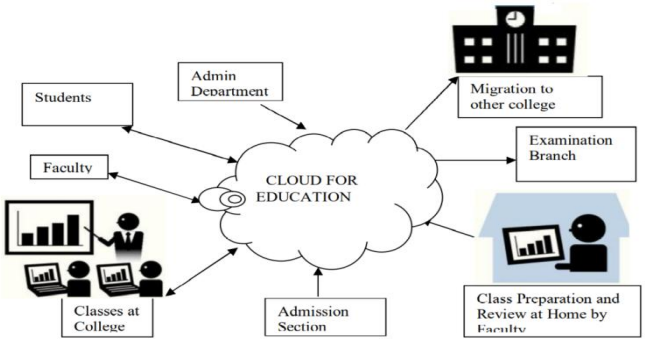

Fig 6: Educational Cloud's Services

In the traditional deployment model, all Information Technology resources are housed and managed in-house. Many aspects of these services and tools may be migrated to the cloud and consumed directly over the Internet either as fullyfunctional applications (SaaS), development platforms (PaaS) or raw computing resources (IaaS).Figure 2 shows how the different categories of university users may consume cloud services.

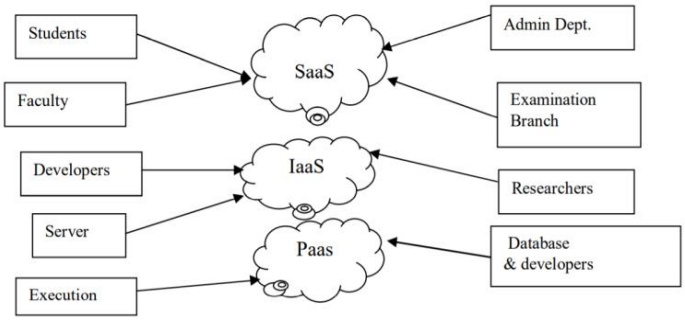

Fig 7: Educational Cloud Computing System

As many colleges run under one university with same syllabus, exam etc. Even if with same syllabus we run individual teaching system. So there will be central cloud server where all the computing (s/w and h/w) resources will be there where each end user can communicate through API and perform the appropriate operation.

Admin:- Super person i.e. administrator to all sub-administrators. There will be one admin assigned to each college to handle college activities. Super admin will have all the authorities.
Student:-Student will able to see his/her own attendance, assignments given by faculty, sample question papers, projects, result , video lecture, can put up query anywhere ,anytime and any type of device. So that even if some of the lectures missed out due to genuine reason it can be done by video lectures. Here we can minimize student-faculty communication gap.
Faculty:-Faculty can put up attendance of student, upload video lectures (even if some student don't understood/recall the can refer particular lecture video file.), upload assignments, sample question papers, sample solution to the answers, result of the student etc.
Parent:-Parent can also communicate to the cloud server to check the performance of his/her child like attendance, result etc. Here we minimize student-parent communication gap.
Placement: - In which details of placement companies would be provided so that student can understand the industry requirement.
Examination:-where student exam details can be put up. Student can also see their results.
Admission:-In which all student details can be maintained.

Based Education System for the Universities
The college's needs to take after every one of the standards and regulation of the state and nation for building up a cloudfor training the same number of nations are extremely strict in cross more extensive exchange of data. Once the college sets up where their information will dwell and gives the measure of information security an understanding called SLA (Service Level Agreement) can be made with the cloud administration supplier. The SLA is a record which can guarantee instructive cloud clients in regards to the administrations gave by the cloud. It tries to distinguish the clients require and streamlines complex issues and makes a relationship between the client and the administration supplier. It determines the protection, consistency and trustworthiness. [6] Privacy is one of the imperative elements which must be taken nurture distributed computing, as the administration supplier may require some individual data which is identified with the There are numerous arrangements that can guarantee the security and insurance of delicate information in the cloud. [7] [8], [9], [10]
These are;

1) Encryption and decryption
2) Authorization identity management
3) Firewalls
4) Mask or de-identify of the data

LEARNING PERFORMERS IN CLOUD ENVIRONMENT [12]:

A Learning Actor is any entity involved in the learning process like management, students, instructors, lab staff etc. There are five types of resources that can be provisioned and a Learning Actor can consume over the Internet [13].

1) **Application assets.** Instructive Software applications are conveyed through Software as a Service (SaaS) model or mashups of worth included applications.
2) **Learning procedures**. Applications uncovered as utilities or errands. Learning procedure sharing is the learning-driven application outsourcing that backings provisioning, reuse and creation.
3) **Software assets** including middleware (cloud-driven working frameworks, application servers, databases) and advancement assets (improvement, testing apparatuses, and organization instruments).
4) **Base assets** including processing force, stockpiling, and machine provisioning.

THE APPLICATION OF CLOUD COMPUTING IN EDUCATION SECTOR [14]:

1. The Construction of Net-Teaching Database

Distributed computing made a present day system of showing asset library building where numerous can gain from. Later on, distributed computing environment, how to assemble internet showing asset library we need to consider the issue has ended up. Library building is a long haul venture, there must be long haul arranging. To empower sound and maintainable improvement. Instructing Resources to bolster showing and research ought to be a definitive goal, Training and Learning as a Service (E-LaaS) system.

2. Learning underthe Network Environment

Current training speculations feel that the understudies who ought to be the principle group of educating are not passive but rather activity. It will be a propensity of cutting edge instructing systems. In the customary showing environment, individuals have been neglected to locate a perfect of individualized learning methodology. Times in the cloud, the learner as per the kind of cloud administrations, free decision learning substance and learning routines.

3. Application of SAAS in Education Information

Software as a Service (SAAS) is a Cutting edge training hypotheses feel that the understudies who ought to be the primary assemblage of instructing are not inactive but rather activity. It will be a propensity of current educating routines. In the customary showing environment, individuals have been neglected to locate a perfect of individualized learning methodology. Times in the cloud, the learner as indicated by the kind of cloud administrations, free decision learning substance and learning techniques.

VI.KEYBENEFITS OF CLOUD COMPUTING TECHNOLOGY FOR INSTITUTIONS AND STUDENTS:

With the development of educational cloud, new web applications such as Lecture Tools, Slide share etc allows the lecturer to get their work done in their web browsers rather storing and carrying it on the hard drive. Its gives the benefits such as; [7]

1. Accessibility:24 X 7 access to infrastructure and content that is needed by this system without failure. From anywhere one canlogin and access thefiles.

2. Go Green: Educational cloud will surely reduce the carbon footprint.Protection of environment by using green technologies.

3. Reduced Costs: Cloud-based services can help institutes reduce the costs to update infrastructureand accelerate the use of new technologies to meet evolving educational needs. Students can use new IT technologies for free without having to purchase, install and keep these

applications up to date on their computers. It also provides the facility ofSoftware free or PAYGO for some applications.

4. User Friendly: This new facility is user friendly and no need to worry about the additional software licenses. It is easy to understand and easy to operate.

5. No Extra Infrastructure: Colleges and governments are now free to focus on their goals that is making more research facilities available to the students and making the environment global in spite wasting time on worrying about the buildings, labs, teachers etc.

6. Personalized Learning: Using an Internet-connected device, students can access a wide array of resources and software tools that suit their learning styles and interests.Cloud computing affords opportunities for greater student choice in learning.

Cloud computing has the potential for improving the efficiency, cost and convenience for the universities and educational sectors, but it has few limitations such as; [7]

- All application can't run on cloud
- Dissemination politics, intellectual property
- Organizational support
- Speed and lack of Internet can affect work methods
- Risk related to data protection and security and its integrity

SECURITY ISSUES:

In cloud computing we are saving our important and crucial data in one place and it will be easy for hack. Protection of data is a major security issue. Educational Institutions may consider that their data is more secure if it is hosted within the institution. Transferring data to a third party for hosting in a remote data Centre, not under the control of the institution on and the location of which may not be known presents a risk. Some cloud providers now provide guarantees in their contracts that personal data will only be stored in particular countries. It has been suggested that the provision of cloud services through a single provider is a single point of failure and that it would be better to contract more than one cloud provider in order to minimize risk. Another security issue is Unsolicited advertising in which cloud providers will target users with unsolicited email or advertising.

CONCLUSION:

In today's fast moving life people want all the facilities at their maximum convenience which is provided by the cloud computing over the internet, this is one of the reasons for the growing popularity of cloud computing.The cloud allows us to access our work anywhere, anytime and share it with anyone. It frees us from needing a particular machine to access a file or an application like a word processor or spreadsheet program. In the present paper a cloud education system is introduced and how it is beneficial for students, faculty and the educational institutes for providing quality education.The main aim of the paper is to highlight the implementation of cloud computing in education will shape a 'revolution' in the traditional education system.

REFERENCES

1. IBM,"IBM Introduces Ready-to-Use Cloud Computing",http://www 03.ibm.com/press/us/en/pressrelease/22613.wss, November 15,2007.
2. White Paper Cloud Computing , Alternative sourcing strategy for business ICT. Published by:T-Systems Enterprise Services GmbH MainzerLandstrasse 50 60325 Frankfurt, Germany
3. Gaurav Bhatia, MohnishAnand, PriyaShrivastava," Cloud Computing Technology In Education System", International Journal of Advanced Technology & Engineering Research (IJATER), ISSNNO:2250-3536 Volume2,Issue2,March2012.
4. .KiranYadav, "Role of Cloud Computing in Education", International Journal of Innovative Research in Computer and Communication Engineering,Vol. 2, Issue 2, February 2014.
5. .SajuMathew,"Implementation of Cloud Computing in Education - A Revolution", International Journal of Computer Theory and Engineering, Vol. 4, No. 3, June 2012.
6. Shakeel Ahmed, Hemant Kumar Mehta, "On Applying Big Data and Cloud Computing for Quality Improvement in Higher Education", in Int'l Conf. on Advances in Big Data Analytics.

7. AmarpreetsinghArora,A proposed architecture of cloud computing based on e-learning system, International Journal of Applied Services Marketing Perspectives Volume 1, Number 1, July -September 2012 , July-September 2012.
8. Joseph Simuro,Hybrid Clouds, January 2011.[online available from: http://business.ezinemark.com/cloud-computing-hybrid-clouds31ebc17a874.html]
9. Role of cloud computing in education by kiranyadav, International journal of innovative research in computer and communication engineering.Vol-2 Issue-2 Feb-2014.
10. Cloud computing Implementation, Management and security by John Rittinghouse and James Ransome.
11. **11.**Prof. L. J .Sankpal, AnkushKawalkar, SuhasBhattu, GaurangParnaik, AkashSagar,"Cloud Computing in Education System",International Journal of Advanced Research in Computer and Communication Engineering Vol. 3, Issue 2, February 2014.
12. SunitaManro,JagmohanSingh,RajanMaro ,"Cloud Computing in Education: Make India Better with the Emerging Trends", High Performance Architecture and Grid Computing Communications in Computer and Information Science Volume 169, 2011, pp 131-139.
13. Sultan, N. 2010. Cloud Computing for Education: a new dawn? http://www.sciencedirect.com/science/article/pii/S0268401209001170.
14. Wang, Bo, and HongYu Xing. "The application of cloud computing in education informatization."Computer Science and Service System (CSSS), 2011 International Conference on.IEEE, 2011.
15. Maskare, Poonam R., and Sarika R. Sulke. "Review Paper on E-learning Using Cloud Computing." (2014).
16. R. N. Katz, The Tower and the Cloud: Higher Education in the age of cloud computing, 2008
17. Riahi, Ghazal. "E-learning Systems Based on Cloud Computing: A Review."Procedia Computer Science 62 (2015): 352-359.
18. http://in.pcmag.com/networking-communications-software/38970/feature/what-is-cloud-computing
19. Enterprise Cloud computing by GautamShroff
20. NIST, The NIST Definition of Cloud Computing : Recommendations of the National Institute of Standards and Technology September 2011 [Available online: http://csrc.nist.gov/publications/nistpubs/800-145/SP800-145.pdf
21. Ji- SeongJeong, Mihye Kim and Kwan – HeeYoo, A content oriented smart education system based on cloud computing, International journal of multimedia and ubiquitous engineering, Vol.8, No.6 (2013), pp.313-328 http://dx.doi.org/10.14257/ijmue.2013.8.6.31