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## Analysis of Solving E-Learning Problems using Cloud Computing

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**ABSTRACT:** There are two great equalisers in life - the internet and education. By combining the two, e-learning will be the great equaliser in the next century. By eliminating barriers of time, distance, and socio-economic status, individuals can now take charge of their own lifelong learning. E-learning is more cost saving & cost effective than traditional learning. E-learning is Internet-enabled learning. E-Learning stands for electronic learning, which means delivering a course in a school, college, for training programs or for distance learning through computer. It is the intentional use of networked information and communication technology (ICT) in teaching and education. The growth of e-learning is openly related to the development of ICT and is constructive because of the decreasing hardware and software costs. Cloud Computing provides a platform to support e-learning as it delivers the computing resources both hardware and software as a service over the internet.

**KEYWORDS:** E-learning, ICT, Cloud Computing, Information Technology, Learning etc

### I INTRODUCTION

The term e-learning may be trendy, but the concept itself has been around for decades. E-Learning is training that takes place through a network, usually over the Internet or a company's intranet. It has its roots in the world of computer-based training that appeared in the early 1980s and used CD-ROMs to teach mostly technical skills to mostly technical people. Lately, e-learning has changed to be a tool widely used in both the academic and corporate worlds. With today's e-learning, companies can train salespeople to use a new product, even if offices are in distributed locations. On the academic front, e-learning allows people to take online courses from universities in various subjects. Some popular and well-known universities around the globe, such as Stanford and Harvard, already offer non-degree courses over the Web, while some other universities offer entire degree programs.

One will find that e-learning is much more flexible than the traditional on-campus university courses as one can study using his/her own computer and the Internet, wherever his/her location. Many online courses allow e-learners to study at their own pace, any place, any time, but within given deadlines. However, some may require e-learners to interact synchronously, that is, in real time, with other colleagues and/or lecturers.

### II CLOUD COMPUTING

Cloud computing is defined as a type of computing that relies on sharing computing resources rather than having local servers or personal devices to handle applications. Cloud computing is comparable to grid computing, a type of computing where unused processing cycles of all computers in a network are harnessed to solve problems too intensive for any stand-alone machine.

In cloud computing, the word cloud (also phrased as "the cloud") is used as a metaphor for "the Internet," so the phrase cloud computing means "a type of Internet-based computing," where different services — such as servers, storage and applications — are delivered to an organization's computers and devices through the Internet.

Cloud offers services that can be grouped into the following categories:

**A. Infrastructure as a service (IaaS)** is the foundation of all the cloud services (bottom layer) . It supplies a set of virtualized infrastructural component such as virtual machines.

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**B. Platform as a service (Paas)** is a middle layer in cloud services. It enables programming environment to access and utilize additional application building block.

**C. Software as a service (Saas)** operates on the virtualized and pay-per-use costing model whereby software applications are leased out to contracted organization by specialized saas vendor.

## III DEPLOYMENT MODEL



Fig(1)Cloud Computing Deployment Models

## IV TECHNOLOGICAL CHALLENGES IN CLOUD COMPUTING

Cloud computing challenges have always been there. Companies are increasingly aware of the business value that cloud computing brings and are taking steps towards transition to the cloud. A smooth transition entails a thorough understanding of the benefits as well as challenges involved. Like any new technology, the adoption of cloud computing is not free from issues. Some of the most important challenges are as follows.

**A. Security and Privacy:** The main challenge to cloud computing is how it addresses the security and privacy concerns of businesses thinking of adopting it. The fact that the valuable enterprise data will reside outside the corporate firewall raises serious concerns. Hacking and various attacks to cloud infrastructure would affect multiple clients even if only one site is attacked. These risks can be mitigated by using security applications, encrypted file systems, data loss software, and buying security hardware to track unusual behavior across servers.

**B. Service Delivery and Billing**

It is difficult to assess the costs involved due to the on-demand nature of the services. Budgeting and assessment of the cost will be very difficult unless the provider has some good and comparable benchmarks to offer. The service-level agreements (SLAs) of the provider are not adequate to guarantee the availability and scalability. Businesses will be reluctant to switch to cloud without a strong service quality guarantee.

**C. Interoperability and Portability:**

Businesses should have the leverage of migrating in and out of the cloud and switching providers whenever they want, and there should be no lock-in period. Cloud computing services should have the capability to integrate smoothly with the on-premise IT.

**D. Reliability and Availability:**

Cloud providers still lack round-the-clock service; this results in frequent outages. It is important to monitor the service being provided using internal or third-party tools. It is vital to have plans to supervise usage, SLAs, performance, robustness, and business dependency of these services.

**E. Performance and Bandwidth Cost:**

Businesses can save money on hardware but they have to spend more for the bandwidth. This can be a low cost for smaller applications but can be significantly high for the data-intensive applications. Delivering intensive and complex



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data over the network requires sufficient bandwidth. Because of this, many businesses are waiting for a reduced cost before switching to the cloud. All these challenges should not be considered as road blocks in the pursuit of cloud computing. It is rather important to give serious consideration to these issues and the possible ways out before adopting the technology.

## V.E LEARNING

Education via the Internet, network, or standalone computer. e-learning is essentially the network-enabled transfer of skills and knowledge. e-learning refers to using electronic applications and processes to learn. e-learning applications and processes include Web-based learning, computer-based learning, virtual classrooms and digital collaboration. Content is delivered via the Internet, intranet/extranet, audio or video tape, satellite TV, and CD-ROM. E-learning was first called "Internet-Based training" then "Web-Based Training" Today we will still find these terms being used, along with variations of e-learning such as elearning, Elearning, and eLearning. And using cloud computing we are saving time as well as hardware. The base requirement for e-learning is that everyone must be equipped with basic knowledge of technology and e-learning can be used for regular academic courses or continuous education, company trainings, online tests.

E-learning offers a lot of value compared to more traditional training options in cloud computing, like facilitated sessions or lectures. E-learning.

**In cloud computing environment can be either an asynchronous or synchronous activity:** Traditionally, e-learning has been asynchronous, which means there is no predetermined time for the learning to take place without any software. Everyone can go at their own pace, and take their time to learn what they need to know, when they need to know it. However, more synchronous e-learning is now being offered through web conferencing and chat options. The great thing about e-learning is it gives you the option to do one, or both.

**Using cloud computing it has a global reach:** E-learning can simply be placed online and easily accessed by people around the world. There is no need for expensive travel or meetings across multiple time zones and no need to worry about any software or tools.

**Using cloud Environment spans multiple devices/mobile:** Online courses can work on computers as well as on mobile devices using Cloud environment, such as smartphones and tablets. This means e-learning courses can literally be in the hands of the people who need them, at all times.

**It is just-in-time/needs-based:** It's possible to create, publish, and share a course within a few hours. The software is so easy to use that almost anyone can create engaging courses.

**reduces costs:** using cloud computing All of the above-mentioned factors result in a cost savings for organizations that use e-learning courses to replace some of their traditional instructor-led training.

## VI CLOUD COMPUTING FOR E-LEARNING

The e-learning system cannot completely put back teachers; it is only a usage of technology to transport lectures, giving new contents, concepts and method for education, so that the role of teachers cannot be replaced. E-learning in the Cloud can be understood as Education Software-as-a-Service, platform as a service and infrastructure a service. It can be implemented quickly because the hardware, software and infrastructure requirements of the user are low.

As specified by A. following are the suitability of developing e-learning services within cloud computing:

**Accessed via Web:** Students or teachers can access from anywhere, anytime the browser-based applications through various devices like mobile, laptop and desktop computers provided internet access is available and no need to any more hardware and software.

**No client-side software needed:** Since the system construction and maintenance are not located in interior of educational institutions or enterprises, it has reduced many costs like installation cost (as there is no installation), maintenance cost, deployment and server administration cost, total lower ownership cost, IT staff cost.

**Pay per usage:** Because of this, one can gain access to more sophisticated application, as one has to pay according to usage. that is one of the biggest advantage of cloud computing for e learning.

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**Scalability:** Since the application is running on a server farm, the scalability is inherent to the system SaaS server may support many educational institutions. Therefore, as the students or teachers' need grows, the software performance will not degrade.

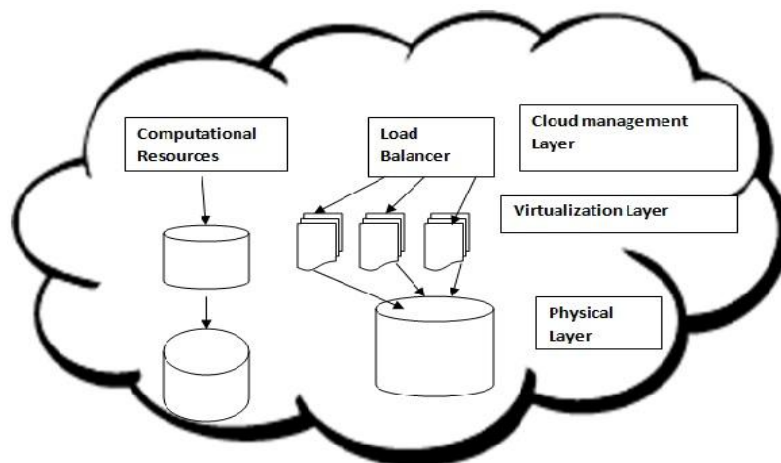
**Improved Improbability:** It is almost impossible for an intruder to determine where the machine is located that stores some wanted data like tests, exam papers, results.

Crash recovery is not needed at client side. If a client computer crashes there is no loss of data as nothing is there on client side, everything is on the cloud. No need for back up.

**Virtualization:** it is not difficult to replace a damaged cloud located server without major costs.

## VII CLOUD BASED E-LEARNING ARCHITECTURE

Cloud computing is a model for enabling ubiquitous, convenient, on-demand network access to a shared pool of configurable computing resources (e.g., networks, servers, storage, applications and services) that can be rapidly provisioned and released with minimal management effort for E learning . Cloud computing has now become a highly demanded service or utility due to the advantages of high computing power, cheap cost of services, high performance, scalability, accessibility as well as availability for E learning.



Fig(2): Cloud based E-Learning Architecture

**Cloud Management Layer:** Management tools provide capabilities to regulate images with automated provisioning and de-provisioning, monitor operations and meter usage while tracking costs and allocating billing.

**Virtualization layer:** In computing, virtualization refers to the act of creating a virtual (rather than actual) version of something, including virtual computer hardware platforms, operating systems, storage devices, and computer network resources in E learning.

**Physical Layer:** this layer includes all the physical architecture of the system. It contains Internet/Intranet, system software, information management system and some common software and hardware. This layer is the lowest level of cloud service middleware and this layer provides the basic computing power like physical memory, CPU, memory. we can also specify the e-learning features provided by IaaS ,PaaS and SaaS cloud as follows

by IaaS:

- Scalability.
- No investment in hardware.
- Utility style costing.
- Location independence.
- Physical security of data centre locations.
- No single point of failure.



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## by PaaS:

- Operating system
- Server-side scripting environment
- Database management system
- Server Software
- Support
- Storage
- Network access
- Tools for design and development
- Hosting

## by SaaS:

- Reduced time to benefit
- Lower costs
- Scalability and integration
- New releases (upgrades)

## VIII.CONCLUSION

Successful preparation for online learning is not significantly different from classroom preparation. As with any new concept, however, it is important for an instructor to communicate how existing practices integrate with a new concept (in this case, learning online). Cloud computing is an effective paradigm from education perspective. Learners can have the opportunity to gain quick and economical access to various applications and resources. Cloud computing reduces the organizational expenses like software license cost, hardware costs and maintenance costs. In this paper cloud based e learning has been discussed. Using cloud computing e learning we do not worry about any software, infrastructure etc. By above diagram we discussed how to manage multiple users as well as load on server using cloud computing e Learning.

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