

Cloud-based Education: For Improving Efficiency, Cost and Convenience

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ABSTRACT

The increasing popularity of E-Learning has invented new terms to education, as Virtual Classroom Learning, where students can interact with the professors from their home. Virtual learning is an effective alternative to traditional classroom learning. Virtual learning provides the methodologies and solutions such as distance learning and hybrid classes. It will have a significant impact on the educational environment in the upcoming days. One way to implement virtual classroom is using cloud computing. Cloud computing is an emerging new computing paradigm for delivering computing services. This computing approach relies on a number of existing technologies, e.g., the Internet, virtualization, grid computing, Web services, etc. Cloud computing is a construct that allows us to access applications that actually reside at a location other than our computer and it is highly scalable and use virtualized resources that can be shared by all the users. In this paper it is argued that cloud computing is likely to be one of those opportunities sought by the educational institutes that cannot afford much money (due to its flexibility and pay-as-you-go cost structure with improvements in efficiency and flexibility of education). Cloud computing is an excellent alternative for educational institutions which are especially under budget in order to operate their information systems effectively without spending more for the computers and network devices. For big institutes, Cloud computing helps to cut operational and capital costs and let IT departments focus on strategic projects instead of keeping the datacenter running.

General Terms

SaaS (Software as a Service): It allows storing applications on the cloud. Thus no separate installation is needed for each system or user.

Keywords

Cloud based learning, virtual learning, virtual classroom, software as a service, Cloud computing, e-learning.

1. INTRODUCTION

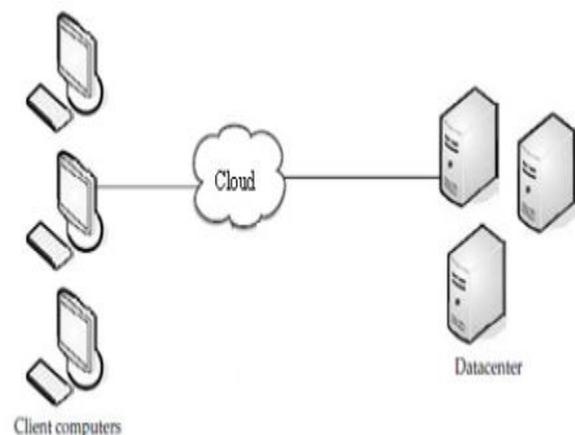
Educational demands are forcing institutions to think new ways to reallocate their limited resources to better support new ways of learning. This change is moving educational institutions to depend more heavily on cloud services to increase their resources and better satisfy the needs of their students as well as teachers.

1.1 What is Cloud Computing?

Cloud Computing is currently one of the new technology trends which likely have a significant impact on teaching and learning environment. Cloud computing is a construct that allows a user to access applications that actually reside at a location other than his/her computer. A user on the Cloud can

communicate with many servers at the same time and these servers exchange information among themselves.

The cloud computing contains following components:



Client Computers can be PC, laptop, mobile, PDA or any system which are connected to the internet. All the applications and data is stored on the collection of servers which is known as Datacenter. The main feature of cloud computing is that all the data is not stored on a single server, instead on multiple servers some data is stored and the servers are in geographically different locations. But for the user, it looks like a single server communication. If something were to happen at one server, causing a failure, the service would still be accessed through another server. Thus it ensures security and flexibility.

1.2 Existing system

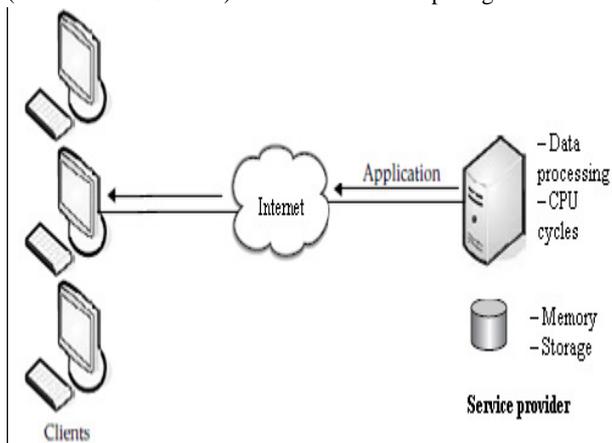
The currently existing E-learning system is an Internet based learning process, using Internet technology to design, implement, select, manage, support and extend learning. This e-learning system will not completely replace traditional education methods, but will just improve the efficiency of education. Though e-learning have lot of advantages like flexibility, diversity it has many limitations i.e. cost, maintenance, development. In e-learning model, system construction and maintenance are done inside the educational institution, which leads to lot of problems. It includes problems such as significant investment for resources which can't be afforded by small institutions. For large institutions it will lead to capital gains for them which leads to lack of development potential.

2. PROPOSED MODEL

Our proposed cloud-based learning model i.e. Virtual Learning represents an innovative shift in the field of learning, providing rapid access to specific knowledge and information. This project aims at providing distance education programs offered by institutes in order to facilitate students to gain the academic facilities from any workstation connected to the Internet. This cloud-based virtual learning project is extension of e-learning system, which can run on a wide range of hardware devices, while storing data inside the cloud. We can replace the existing e-learning methodology. In this we can offer online tutoring that can be delivered anytime and anywhere through a wide range of electronic learning solutions such as Web-based courseware, online discussion groups, live virtual classes, offline virtual classes, video and audio streaming, virtual whiteboard, and online exams. We can keep all the videos of theory lectures on the cloud, for performing practical we can keep the compiler in the cloud. When a live lecture is being streamed at the same time we can store it for offline purpose, which can be accessed at any time. For problems faced by the students, they can interact with the teacher using discussion group. After completion of chapter teacher can take online exams. Any notice can be sent to a student by using messages or email or online notice board. Teachers can add notes in the form of ppt, doc, pdf etc. These notes can be directly viewed or downloaded by the students to desktop, laptop, or mobile devices. The beauty of cloud computing is that another company hosts the application (or suite of applications, for that matter). This means that service providers handle the costs of servers, they manage the software updates, and depending upon usage institutes pay less for the service. The institutions need not buy the equipments which will result in fewer capital expenditures. By having someone else host the applications, institutions neither need to buy the servers nor pay for the electricity to power on and cool them. Thus it will be convenient for outsiders and remote students who can simply log in and use their applications wherever they are.

3. METHODOLOGY

To implement the mentioned scenario, we can use combination of SaaS (Software as a Service) model and DaaS (Database as a Service) model of cloud computing.



Software as a Service (SaaS) is the model in which an application is hosted as a service to user who accesses it via the Internet (in our case, it is student and staff). When the software is hosted off-site, the educational institutions don't have to maintain it or support it. The service provider does all the patching and upgrades as well as keeping the

infrastructure running. Also institutions are billed based on the usage of the application. SaaS applications differ from earlier distributed computing solutions in that SaaS was developed specifically to use web tools, like the browser. This makes them web-native. It was also built with a multitenant back end in mind, which enables multiple customers to use an application. SaaS provides network-based access to commercially available software. Since the software is managed at a central location, customers can access their applications wherever they have web access.

4. BENEFITS

Our proposed cloud-based learning model can benefit the institutions in following ways:

- Familiarity with the WWW: Most students have access to a computer and know how to use it on the browser. So no special training is needed to students. Thus it makes application simple to use.
- Smaller staff for management: IT systems require the overhead of salaries, benefits, insurance, and building space. This responsibility is taken by cloud service provider which results in reduction of overhead to the institutions.
- Best availability of application: For Cloud based application; the entire world is open to that application via Internet without any installations of additional software.
- High Security: In cloud based applications, Secure Sockets Layer (SSL) is widely used and it is trusted. This allows user to reach their applications securely without any overhead like virtual private networks (VPNs).
- Ease of use: There are no servers to provision and no redundant systems to worry about. Institutions don't have to worry about buying, installing, and maintaining hardware/software for the database.
- Increasing bandwidth will allow users to access their applications with low latencies and good speeds. Thus institutions can trust on the service providers.
- Improved database management: If there is a fault in one database system, it will only affect one fragment of the information, not the entire database. Institutions don't have to worry about faults, as it is responsibility of cloud service providers.
- Flexibility: Systems can be changed and modified without harm to the entire database.
- Management: Large database require more cost for database maintenance and optimization task. Using cloud storage, this management can be provided as part of the service for much less expense. The provider will often use external labor pools to take advantage of lower labor costs there. So it's possible that organizations using the service in America, the physical servers are in Washington State, and the database administrator is in the India.
- Low Price: It is less expensive to create a network of smaller computers with the power of one large one.
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5. CONCLUSION

Higher educational institutions recognize that adopting the latest technologies and solutions is essential to staying competitive and retaining students. Cloud computing as an exciting development is a significant alternative today's learning system. Cloud based learning can actually help institutions to reduce high expenditures on hardware, software and IT maintenance. Students and administrative staff have the opportunity to quickly and economically access various application platforms and resources through the browser on demand. Thus it automatically reduces the cost of organizational expenses and offers more powerful functional capabilities. This learning can benefit to the institutes which are running in under budget cost and in the rural areas of the world. Thus cloud based learning system eliminates the responsibility of the maintenance burden of educational organization, which results in reduced cost, simplified scalability. With this virtual classroom system, the organization can reach to rural areas of the world and this can increase in education in rural areas.

6. REFERENCES

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