

Approaches of Cloud Computing in E-learning

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ABSTRACT

Cloud computing refers to the use and access of multiple server-based computational resources via a digital network , In cloud computing, applications are provided and managed by the cloud server and data is also stored remotely in the cloud configuration.

The conventional education system application are becoming not being suitable for requirements of social development and educational development and not being able to catch up with the changes of learning demand in time, thus computer networks have brought opportunities for it. However, in traditional web-based e-learning mode, system construction and maintenance are located in interior of educational institutions or enterprises, which results in a lot of problems existed, such as a lot of investment needed, but without capital gains to return, without development potential and staying power.

we introduced cloud computing to e-learning is feasible and it can greatly improve the efficiency of investment and the power of management, which can make e-learning system development into a virtuous circle and achieve a win- win situation for suppliers and customer.

Keywords—cloud computing; e-learning; business modes

I. INTRODUCTION

E-learning[1] is a self-paced learning activities accessible via a computer or handheld device. Content is delivered via the Internet, intranet/extranet, audio or video tape, satellite TV, and CD-ROM. It provide learning stimulus beyond traditional learning methodology from textbook, manual, or classroom-based instruction. This implies a "just-in-time" instructional and learning approach.

Advantages of e-learning

1) SCHEDULE TIMINGS

Class work can be scheduled around personal and professional work

2) SELECTS OWN

Learners may have the option to select learning materials that meets their level of knowledge and interest

3) TIME CONSUMING

It moves faster i.e, individualized approach allows learners to skip material they already know and understand and move onto the issues they need training on.

4) CONVENIENCE

eLearning enables employees to review information as often as they like, move forward and backward through the instruction at the pace they are comfortable with

5) PERSONALIZED LEARNING

It encourages students to peruse through information by using hyperlinks and sites on the worldwide Web.

6) COST

Reduces travel cost and time to and from school

II. EXISTING SYSTEM

In traditional web-based e-learning mode, system construction and maintenance are located in interior of educational institutions or enterprises. There left a lot of problems such as significant investment needed but without capital gains for them, without development potential and staying power, Time consuming.[5][10]

Traditional e-learning network is located in a campus network or an Intranet with its construction, maintenance, and investment being made by schools or enterprises for all.

There are six parts in its components including intelligent IP network infrastructure, operation and development of curriculum, content creation, content management, teaching management, delivery and expansion. Among them, the intelligent IP network infrastructure constitutes the foundation of digital campus network load platform, mainly to meet the service quality requirements. Data, voice and video integration, multicast technology, security, manageability, caching, content distribution technology in new generation intelligent network of facilities provides a highly available and controlled infrastructure.[12]

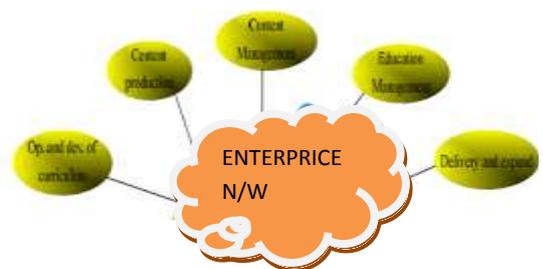


Fig.1. Tradional e-learning network

Production center in network center has two functions: the production of video courses and the production of elearning. Production of video programs can collect image acquisition in real-time, and the object captured in real-time can be produced or broadcasted or controlled or stored by IP-based television production class system. This content can become directly into the object of a further production of those materials. E-learning production can create

textbased learning programs and multimedia educational content.[6]

Content management center also composed of two parts: e-learning content management server and content distribution. E-learning content server uses the advanced Internet learning concepts, focusing on the transmission of multimedia, hypertext learning content, focusing on the intercommunion among learners, focusing on learning effect of the inspection and management, focusing on international standards, which is a comprehensive and overall learning management system. Content distribution system is available on centralized management for a large number of large files and multimedia streams, coupled with the contents of the engine in access points, so users in access points can break the bandwidth bottleneck in widearea network, learn and study improved. Content broadcast station in access points uses content engine technology, which is new terminal content equipment with content delivery network ideas.[8] When users in access points need to do e-learning, they can access to rich multimedia content by visiting the center e-learning website including large files and multimedia streaming accessed from the content network in local network engine, breaking low frequency bandwidth bottlenecks on wide area networks, and achieving true multimedia.

III. PROPOSED SYSTEM

E-learning is an Internet-based learning process, using Internet technology to design, implement, select, manage, support and extend learning, which will not replace traditional education methods, but will greatly improve the efficiency of education. As e-learning has a lot of advantages like flexibility, diversity, measurement, opening and so on, it will become a primary way for learning in the new century.[1][4]

In this paper, we introduced cloud computing to e-learning, built an e-learning cloud, and made an active research and exploration for it from the following aspects: its work mode, architecture, construction method,

external interface with the business model, challenges and solutions etc.[9]

Our results suggest that the introduction of cloud computing into e-learning is feasible and it can greatly improve the efficiency of investment and the power of management, which can make e-learning system development into a virtuous circle and achieve a win-win situation for suppliers and customers.

IV. E-LEARNING CLOUD COMPUTING MODEL

Clearly, the traditional e-learning network is built and maintained by schools or enterprises, and their applications are also developed by themselves. Therefore, the costs of equipment investment, development and maintenance are afforded by schools or enterprises themselves, which would take a lot of expenditure. If moving e-learning system going out of schools or enterprises, entrusting its construction, maintenance, development and management to vendors, opening it up to multiple users through the Internet and letting them use on-demand and payment is based on the amount of used servers, it can not only reduce charges for schools or enterprises, but for suppliers it can also achieve economies of scale. This business model of e-learning system is called e-learning cloud model on cloud computing. [5]

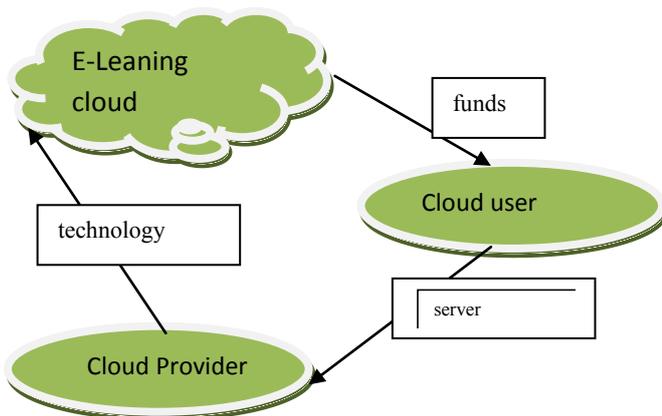


Fig.2. Business models of e-learning cloud computing

In e-learning cloud computing business model, cloud provider is responsible for building and

maintaining elearning cloud, providing technical support to e-learning cloud. Cloud users paid to cloud provider for services from e-learning cloud, services accessed on-demand. In Figure 2, during the cycle, servers support users, funds support provider, technologies support e-learning cloud, what is a business cycle is a virtuous cycle.

B. E-learning Cloud Architecture E-learning cloud is a migration of cloud computing technology in the field of e-learning, which is a future elearning infrastructure, including all the necessary hardware and software computing resources engaging in e-learning. after these computing resources are virtualized, they can be afforded in the form of services for educational institutions, students and businesses to rent computing resources.[11][15]

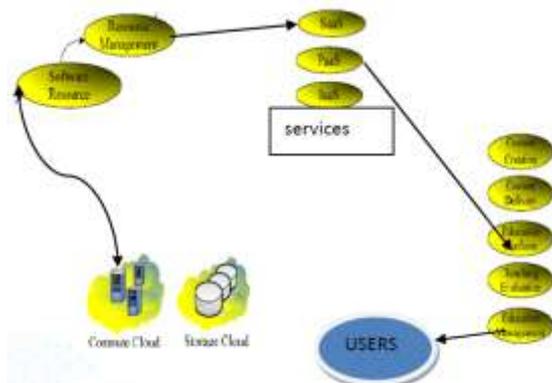


Fig 3. Cloud computing basic architecture

V. CHALLENGES AND SOLUTIONS FOR E-LEARNING CLOUD COMPUTING

Demands are made by users, supplier is responsible for developing the system, which is the commercial value a cloud computing lies. There are three levels services provided in cloud computing, namely, IaaS, PaaS, and SaaS. As e-learning cloud computing is a new thing, which faces a double of challenges from suppliers to users. [2,12,3]

1) Charge. The core introducing cloud computing to elearning is the introduction for market mechanism, so howto charge becomes a particularly important problem. Charge can be

made for schools or for personnel, but it is very complex. Solution: Set up a market-oriented charging mechanism, and combine two types of fees: school fees and individual fees, with school charging for general resources and individual charging for special resources.

2) Bandwidth. E-learning cloud computing services is Internet-based. All of the application data must be transported based on a remote network, data traffic surging with a very high bandwidth requirement. But at present bandwidth is clearly insufficient. Solution: Build broadband networks and take fiber optic and leased line for communication.

3) Security. Part of e-learning data is confidential, but when these institutions store the data to equipment afforded by cloud computing service provider, priority accessing to the data is not the owner, but cloud computing service provider. Therefore, there is a possibility that e-learning confidential data can not rule out being leaked. Solution: Important data uses encryption technology for storage and transmission.

4) User idea. E-learning cloud, as a cloud computing infrastructure and IT service delivery and usage patterns, subverts traditional idea of the use of computing resources, so the user's awareness and acceptance will profoundly affect future operation and development mode for e-learning cloud. Solution: Build successful cases, and promote their applications as an opportunity.

5) Educational forms and methods. E-learning cloud challenges traditional educational forms and methods. But e-learning can not completely replace teachers, it is only a updating for technology, concepts and tools, giving new content, concepts and methods for education, so the roles of teachers can not be replaced. Solution: Let teachers play leading roles and participate in developing and making use of e-learning cloud.

6) Education management rules. Because of a difference between school education and e-learning cloud education, the introduction of e-learning cloud computing will bring a lot of new

problems. Solution: Establish a suit of comprehensive management rules for e-learning mode based on cloud, including teaching content management, course management, examination management, performance management, student management, teacher workload management and so on.

7) Resource development. There will have a group of e-learning cloud materials of high quality, high-grade, for elearning program, which requires investing a lot of human and material resources and using the intelligence of educational experts, technical experts and art experts in cooperation to create a set of scientific, interesting and artistic learning resources. Solution: A variety of experts are organized by e-learning providers to complete the work. These above questions are challenges and solutions for e-learning cloud computing in its promotion and development. For challenges and opportunities are existed simultaneously, we should confront these challenges and find more solutions for them, e-learning cloud computing will get a broad development and application.

V. CONCLUSIONS

E-learning is an Internet-based learning process, using Internet technology to design, implement, select, manage, support and extend learning. Cloud computing is a recently developed advanced Internet-based computing model. By combination of cloud computing and e-learning, building cloud-based e-learning system opens up new ideas for the further development of e-learning[5]. In this paper, we introduced cloud computing to e-learning, built an e-learning cloud, and made an active research and exploration for it from the following aspects:[9] its work mode, architecture, construction method, external interface with the business model, challenges and solutions etc. Our results suggest that the introduction of cloud computing into e-learning is feasible and it can greatly improve the efficiency of investment and the power of management, which can make e-learning system development into a virtuous circle and achieve a win-win situation for suppliers and customers.

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