

The Application of Cloud Computing in Education Informatization

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Abstract

This essay mainly focuses on research on the application of cloud computing to education information. Firstly, traditional computer technologies, including virtualization, network storage technology, distributed computing, parallel computing technology, network technology automation techniques, etc., have significantly developed. Google and IBM jointly proposed the concept of cloud computing in 2007. Secondly, cloud computing is of significant importance in adapting to the development of information technology in education. Furthermore, it plays a vital role in creating a flexible, unified, and open platform for educational information, sharing educational resources, and alleviating the information gap between different areas of education. Finally, this paper discusses cloud computing applications in education informatization after analyzing the educational information technology in today's China by studying the basic concepts of cloud computing technology, core technology, and system architecture.

Keywords: cloud computing; virtualization; education informatization; saas;

Introduction

With the fast growth of computer networks since the turn of the twenty-first century, information technologies have been more integrated into our everyday lives, heralding the arrival of the electronic age. The main characters are knowledge

development, the abundance of information, the regular updating of information, and the intense rivalry for skilled employees. Though education is a unique sector, higher education should be seen as one that needs to grow. The quality of their items has to pass the social practice test. Without considering the societal necessities, we cannot examine the composition and caliber of the talent development method. The degree of IT-based education is a crucial indicator of how modernized a nation or region's educational system is.

However, due to China's extensive territory and population, there is a significant disparity in the informationalization of education across different regions, urban and rural areas, and schools. In addition, some public education, resource allocation, and utilization are also deficient in effective monitoring. "information island" and "useless system" are essential issues in the education information system. These issues may be resolved by creating a single, adaptable, and open platform for educational material, raising the bar for academic content. To investigate cloud computing as a means of advancing educational information, we examined the notions of cloud computing and the traits and state of scholarly information.

A Synopsis And Description Of Cloud Computing

The idea behind cloud computing

Many common-sense conclusions have been reached despite disagreement and a lack of consensus regarding what constitutes cloud computing. For example, Google defines cloud computing as network computing and data storage services based on open standards that are Internet-centric, safe, quick, and easy to use. For every netizen, the Internet serves as their data and computer center. However, IBM sees cloud computing as a new IT resource or a virtual pool of computer resources.

It is easy to understand that cloud computing is a hyper Internet-based computer architecture, even with many differing definitions. In the distant data center, thousands of terminals and servers are linked to computer clouds. As a result, cloud computing—which combines many reasonably

priced calculating entities into one robust system over the web—is the ideal example of a system with significant processing capacity. Then, this potent processing capacity was delivered to end users with sophisticated business models like SAAS, PAAS, IAAS, MSP, etc. Users can access the data center via computers, mobile phones, and other terminal modes based on their own needs by simply increasing the “cloud” of processing power, which reduces the processing burden on the user terminal and eventually simplifies it into a simple input and output device.

The way cloud computing functions

Distributed processing, parallel processing, grid computing research, and commercial applications of these computer science ideas are all included in cloud computing. The fundamental building block of the cloud computing architecture comprises several computer servers arranged in a “cloud,” which combines all the resources into one sizable hub for processing and data storage. Meanwhile, a

A range of configuration tools on the servers facilitates the “cloud” aspect of data processing, gathering, and software administration. The servers process the data and deliver search results based on the client’s data requests. According to the categorization of services, the goal is to accomplish monitoring and measurement, guarantee service quality, allocate resources sensibly, and maximize resource efficiency. Super-massive computer and data storage capacity will finally be realized.

By then, we only needed a computer with an internet connection—we didn’t need to worry about storage or figuring out which “cloud” was best for us. However, in a crisis, we may quickly access resources and use cloud services from any place, on any device, including computers, smartphones, and other gadgets.

The benefits of cloud computing

With a solid understanding of the concept and features of cloud computing, we can recognize its benefits:

Security: Cloud computing offers the most dependable and secure data storage facility. Users don't need to be concerned about viruses, data loss, or other issues. An expert staff oversees information management in the "cloud." Furthermore, a firm rights management policy might facilitate data sharing.

Convenience: The users' terminal equipment needs to be minimal. Additionally, using it is simple and easy. Downloading data and software or performing dynamic upgrades on the "cloud" side is unnecessary. All you need is a computer with an Internet connection to access cloud services from anywhere at any time.

Economic productivity. For cloud computing, equipment leasing is required rather than purchasing costly gear. After that, setting up the educational platform would be simple. It is possible to maximize both software and hardware efficiency. Furthermore, we may construct clouds by using the hardware and software resources that are now accessible.

Abundant processing power. Cloud services employ a super server of thousands of machines to give consumers sophisticated computing and data processing capabilities. They are realizing that a home computer is complex.

The kind of technology used in cloud computing applications for education and digitization

Software as a service, or SAAS, is cloud computing that makes a single software program available to thousands of users via a web browser. From the user's standpoint, this means that they don't need permission in advance to buy server hardware or software; for service providers, this means that, compared to traditional software, the price of an application should be much less. Chinese people may save a lot of money using this instructional knowledge, and many software programs are available for free download over the network.

Tech related to virtualization (b). One of the most crucial aspects of cloud computing is virtualization. Typically, it refers to the computation of items based on virtual rather than actual data on execution. Through virtualization technologies, hardware capacity may be increased, making

software re-configuration easier. By enabling a platform to host numerous operating systems and programs that may function independently of one another and affect each other's space, CPU virtualization technology can simulate multi-CPU simultaneous operations on a single CPU, significantly increasing equipment efficiency. With the use of information technology in the classroom, we can address some server overload. Notwithstanding some server idle issues, optimize the effective utilization of instructional materials.

Technology for security. The most sophisticated data center in the world is located in the cloud, and it has a capable technical management staff to assist you in managing your programs and data. With the help of information technology, we can devote more time to designing courses for students and less time to maintaining data throughout the educational process.

Present State Of Information In Education

After years of work, We have made significant progress in developing information technology in education. Based on statistical data, the total investment in IT in China's education in 2006 was 30.48 billion yuan, which accounted for 68% of hardware investment. The China Education and Research Network, which covered 31 provinces, municipalities, and autonomous regions of over 200 cities, networked more than 1,800 teaching and research institution units, more than 2000 users, elected school curricula, credit recognition, and resource-sharing. Additionally, although many colleges and universities have established their campus networks, digital libraries, and other cutting-edge educational information infrastructure, the "School Link" initiative will raise the bar for fundamental education by providing information at the elementary and secondary school levels. Although the primary building of educational information has been achieved so far, it can still not fulfill the demands of China's academic growth, where specific issues persist.

While Infrastructure Moves Quickly, Applications Take Longer.

The primary source of conflict in the present growth of information technology in education is the high investment

in low-output hardware environments and the impact of applying modern instructional material. The field is still in its early stages of development. Although the campus network is built, a significant portion remains idle and is not fully utilized for good. It can be applied to hardware integration and information technology courses, but its impact on education has fallen far beyond expectations. Most of the technology is still in the early stages of exploration and is primarily used as a presentation tool.

Insufficient and unbalanced availability of learning materials

Education and information resources include various items, such as media materials, case studies, books, exams, courseware, and electronic audio-visual assets.

However, the design of China's educational software often focuses on a single topic and one function; as a consequence, subjects cannot be merged across functions, creating operational challenges and the issue of incompatible resources. In addition, there is no efficient management system in place, and many excellent course materials, resources, and other materials are dispersed among numerous prestigious schools, the hands of well-known instructors, and additional local institutions. As a result of poor input, the equipment is outdated, and there are insufficient resources, among other issues. Knowledge gained via education is increasingly closing the gap.

updated sporadically and with little sharing

Information technology has placed a lot of pressure on education due to the rapid development of various technologies, fierce competition for jobs, and the need for schools to provide students with new labs, computer equipment, and related courses to improve students' skills and prepare them for the new environment. However, because of the current network speed, Internet access fees, and other factors, resource sharing between schools cannot keep up with the rapid growth of the Internet, online learning, and distance learning modes. As a result, new challenges related to resource sharing between schools have been raised.

How Cloud Computing Is Used In Information In Education

The future of education's information technology infrastructure will be cloud computing applications, which will contain the educational data needed to create software and hardware environments for resources. Cloud computing integration of these resources will be able to meet the enormous demand for high-speed data processing to alleviate the pressures of the current information age "information explosion" and meet the rapid changes in information technology and software as a service (SaaS) trend in education; significantly improve the types of educational resource utilization, reduce costs, meet the demand for green energy; and ultimately enhance information security. To build academic cooperation projects in China and jointly increase the popularity of cloud computing, Google has announced the commencement of the cloud of academic collaboration programs with Chinese institutions. China has now begun the cloud computing education program. As the first colleges and institutions on the Chinese mainland to participate in this initiative, Tsinghua University and Google collaborated to create "large-scale data processing" courses. As part of this collaboration, Google will provide Tsinghua University's completed professor course materials. Tsinghua University will supply lab supplies and help with resource calculations in the current developing cloud computing research environment. Google engineers actively explain the cutting edge of Google technology while teaching classes at Tsinghua University. Thus, as cloud computing is booming, we should take advantage of the chance to thoroughly examine and use this new technology, the advancement of information technology for educational services.

Learning in a networked setting

According to contemporary conceptions of education, students, who make up most of the teaching staff, should be proactive rather than passive. It will be a trend in contemporary instructional strategies. People have not discovered the optimal, tailored learning strategy in the typical classroom setting. Depending on the sort of cloud services, the student may choose their learning techniques and information at any time while in the cloud. Web 2.0 tools are widely

available on the Internet nowadays. Examples include Sakai Management Network courses, Diigo bookmarks for creating a personalized taste and using iGoogle to customize one's online environment. These Web 2.0 applications fall under the category of cloud services. Control and administration of cloud services may support the fundamental components of virtual learning environments, including text, audio, video, training, and so forth. To provide a customized learning environment for virtual classrooms on-site, instructors and students may interact anytime, anywhere over the network by just connecting via a browser. The learning environment construction barrier is significantly reduced since complicated software operations are not required to be mastered – excellent application of tailored education, perfect for customized training.

Using SAAS in the ITization of education

One kind of cloud service is Software as a Service (SAAS), which Google Apps and Zoho Office provide. Schools may now use these cloud computing services without paying much for commercial software licenses or bear the expense of ongoing maintenance and updates. Some widely used programs, like the Office series, are available on the cloud, have affordable prices, and some are even free. Combining data centers, network centers, libraries, and other data resources with the environment, school reference, and this approach's introduction will be handled through the cloud computing model. The client's local computer only needs to run the graphical interface of the Linux operating system and the Firefox browser to enjoy the cloud; you don't need to worry about whether the application software is up to date, which significantly lowers the costs associated with maintaining and upgrading schools' operating systems and application software. Firefox and Linux are open-source programs for which you may get a free license. One example is the Google Apps cloud computing service, which offers word processing, spreadsheets, PowerPoint presentations, web development, email, and other applications to individual users at no cost. Many educational institutions prefer using Google apps on computers over open-source software designs

due to their convenience and simplicity. It isn't easy to use this open-source software.

Building a net-teaching database among the cloud computing environment's trends

Cloud computing has made a contemporary network of educational resource libraries possible for many people to access. How to create online content in the cloud computing environment of the future

We must consider the current state of affairs in the instructional resource library. Building a library is a long-term endeavor. Thus, planning is also necessary. To promote sustainable and healthy development. The final goal should be providing teaching materials to assist research and teaching; construction should adhere to the general planning process, divide labor, and apply the fundamentals of mechanism innovation while using the most available resources. Reasonably classify, arrange, and assimilate the most recent developments and the outstanding outcomes of external sources, with cloud computing services offering concepts and services to IT architecture, innovation, the building of high-caliber scientific materials, and a practical and suitable library of instructional resources. The first three qualities of the cloud computing environment teaching resource library are stability and speed. Stable, possessing strong, practical, quick search and query skills; second, data storage parameters and categories are apparent. Standardization, user edit and usage, and categorization standards. Favorable to enhance the repository's sustainability. The third is the safe sky's resources. All data and information are stored locally on clouds, eliminating the need for backups or retention. The user-friendly resource-based platform comes in fourth. The resources and related functions are rapidly and readily accessible to all user kinds and levels, and cloud and treatment management is simple – resources for education to maximize transparency and collaboration.

Utilizing cloud computing in a variety of instructional technologies

Information technology is constantly evolving, and as a result, new applications in education have both positive and negative effects on our way of life. Numerous issues emerged as more and more, including the diversity of individual learning, the diversification of teaching styles, the diversity of teaching objectives and levels, the diversified needs for information and expression vectors, the multidisciplinary needs of the construction of information resources, and the inevitable emergence of a wide range of educational information. As a result, information technology in education services must also move in the direction of diversification. The cloud computing platform meets these needs. Google and Microsoft have each released their cloud computing platforms. A great example of using Google Cloud services is the geography curriculum many schools now use, taught via Google Earth Community. Naturally, in keeping with the current state of information technology in education, we can also rent network space and build our network platform, eliminating the need to buy a lot of hardware devices and the hassle of maintaining the system. This has also helped to diversify the development of educational information.

Summary

As cloud computing advances, more personal and educational information processing will be moved to the “cloud” since it is affordable and practical. Cloud infrastructure offers information services to educators, students, and academic institutions. Based on the study above, using cloud computing in education reform will undoubtedly aid in resolving issues with unequal access to learning materials, sluggish updates, and low-speed sharing. Ultimately, there will be a significant improvement in the level of education digitization.

Conclusion

Task scheduling in cloud computing plays a critical role in achieving efficient resource utilization, improved system performance, and enhanced Quality of Service (QoS). By intelligently allocating tasks to available virtualized resources, effective scheduling algorithms help minimize execution time, reduce operational costs, balance

workloads, and ensure scalability in dynamic cloud environments. Although traditional scheduling techniques provide a foundation, the growing complexity of cloud infrastructures demands adaptive, energy-aware, and QoS-driven scheduling approaches. Continued research in this area, incorporating machine learning and optimization techniques, will further enhance the reliability and efficiency of cloud systems, making task scheduling a key enabler for the future growth and sustainability of cloud computing.

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