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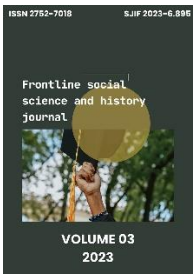

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Research Article

POSSIBILITIES OF USING CLOUD TECHNOLOGIES IN THE HIGHER EDUCATION SYSTEM

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ABSTRACT

The article discusses the possibilities of using cloud technologies in the higher education system. The goal is to learn how to integrate cloud technologies into the field of education, which leads to an increase in the effectiveness of the educational process. This goal is achieved through the following actions: an analysis of service models is performed and cloud models are described to determine the most suitable for the educational sector. The strengths and weaknesses of cloud technologies and the key features common to any cloud product are highlighted.

KEYWORDS

Educational institution information environment, cloud computing, cloud models, cloud technologies

INTRODUCTION

The computerization of information technologies and all spheres of education has been one of the main directions of the development of society for many years. New information technologies are

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introduced into the educational process, educational institutions are provided with computers, and the possibility of constant use of the Internet is created. These processes formed a new scientific and technical basis for the development and use of virtual tools in the field of education.

Creating a virtual educational environment is one of the important methodological and pedagogical tasks of effectively organizing the educational process. It consists of the development of the infrastructure of the higher education system, that is, the information environment, which implies the introduction of new information services. New information technologies are used not only as tools, to solve individual pedagogical problems but also to provide new opportunities for the educational process. The expansion of information technology capabilities requires the creation of a new information infrastructure to meet the needs of the educational process, which, of course, is a great burden for higher education. Various approaches and methods form the basis of the information systems that provide the activity of the virtual space of the educational institution. One such tool is cloud technology, which is a promising field that offers great benefits in data management.

There are three main types of cloud models: Platform as a Service (PaaS), Infrastructure as a Service (IaaS), and Software as a Service (SaaS). Let's take a look at these cloud models to see how they can be applied to higher education learning.

The PaaS model allows you to rent a platform for developing and deploying applications. This model is a service provided over the Internet, consisting of software, an operating system, and a database. Usually, this platform focuses on specific programming languages like Java or Python and is mainly used by software developers.

The IaaS model consists of an operating system and an application, its service provides the consumer with the capabilities of network processing and storage systems, as well as many other basic computing resources for the deployment and use of various applications. The consumer manages the main components of the cloud but does not manage the operating system.

The SaaS model allows the consumer to use ready-made applications because the provider

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supports the service in the cloud infrastructure. Applications are available using a variety of devices or through thin client interfaces such as software interfaces that offload heavy data processing tasks to a web browser or server. In this model, the user does not directly manage the underlying cloud infrastructure, networks and servers.

There are many SaaS offerings available today, ranging from industry-specific projects to consumer applications such as e-mail. Google Office Packages, Google Apps for Education, Office Online, Office, etc. It is this platform that is of great interest to the educational process in higher education.

The main features of clouds Let's look at a few main features that any cloud product can have: first, it is flexibility, which allows the user to instantly change the amount and time of use of allocated computing resources. Second, meter usage services allow the user to pay only for the computing power they need. Third, on-demand self-service (on-demand self-service) is a feature that allows consumers to obtain the required amount of tools and resources to manage the required computing power without the help of system administrators. Fourth, is network access (ubiquitous access to the network), which ensures the availability of cloud services from any device, anywhere and at any time. And finally, hardware independence, allows cloud services to be independent of the health of a particular device [4].

Issues of deployment and use of cloud resources in educational institutions are usually resolved by agreement. However, there are different ways to access cloud resources and this can happen remotely. Therefore, today the educational community uses several models of providing cloud services, the difference between them is in the methods of accessing them:

– a private cloud (private cloud) that provides services within one company, both client and provider. This is an option for the implementation of the cloud concept, when the company creates it for itself, within the organization;

– public cloud (public cloud) is a cloud infrastructure that is almost ready for wide open access and use. It is used by many companies in various industries as well as educational institutions. It is important to note that the maintenance and management of this cloud model is direct user;

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- public cloud (public cloud) - this infrastructure has similar characteristics to private and public clouds, it is designed to be managed by a certain group of users or organizations with common tasks. Examples of public clouds are the Windows Azure platform, Amazon web services, Google App Engine [13];

– hybrid cloud (hybrid cloud) - this cloud infrastructure is a combination of two or more different types of clouds, which includes unique objects interconnected with standardized or proprietary technologies, which allows you to transfer data and applications from one component to another. For example, load balancing across clouds.

Public cloud services are most suitable and most used for educational institutions. With the experience of using cloud technologies today, a number of foreign higher education systems are successfully using cloud technologies.

The most commonly used cloud model for educational environments is SaaS, as mentioned above. We came to this conclusion after studying all cloud models and the experience of using them in various educational institutions. This model has a number of advantages: the educational institution does not need to create and maintain a data processing center, which reduces financial and organizational costs; the user can have their own applications on the service provider's platform, etc.

The analysis made it possible to highlight the following advantages of using cloud technologies in the educational process: from a financial point of view, technologies provide economic efficiency, which is an important factor for an educational institution. Similar expediency is observed in the free provision of services such as e-mail by external providers.

An important advantage of the technical feature is the low demand for hardware, in which the minimum condition for operation is a constant connection to the Internet. From a financial point of view, technology provides economic efficiency, which is an important factor for an educational institution.

Didactic opportunities for cloud services. The didactic parameters of cloud technologies provide a wide range of online tools and services that provide secure connection and collaboration between teachers and students, which is of greatest interest in this article. Taking into

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account the considered services, we determine the didactic possibilities of cloud technologies and confirm the feasibility of using them in the educational process. Cloud computing allows students and teachers to share and edit a variety of documents. With the help of the cloud, you can quickly introduce new programs and products into the educational process, because the service can be used in any area. Teachers will be able to create interactive lessons and team teaching for more students. Cloud technologies have a number of technical shortcomings that do not affect their didactic properties. Constant reliance on a network connection is one such disadvantage, requiring the creation of copies of documents in local folders and in the cloud. Privacy of personal information is very important when using cloud services. Data may be lost as a result of server failure or loss of control over data after an agreement to work with an online service.

Currently, the most common service systems based on cloud computing technology in education are Live@edu from Microsoft and Google Apps Education Edition from Google [1]]. They are cloud-based web applications that provide students and teachers with tools to improve communication and collaboration. Learning management systems can be used when using cloud services. Support for such systems is provided by external providers. It is recommended for educational institutions that cannot afford to purchase and maintain software and expensive equipment.

The Windows Azure cloud service developed by Microsoft can also be used in the educational process. However, Windows Server requires the purchase and installation of your local server. The Windows Azure in Education platform allows teachers to use innovative technologies in the educational process. This gives students access to professional software and practical skills needed for their future careers. With this service, it will be possible to diagnose and test the necessary modern applications. The Azure platform can be used in universities to solve various educational problems. First, Windows Azure allows you to use cloud technologies in the preparation of dissertations and coursework. Secondly, using this platform, you can perform voluminous and complex calculations that require large computing resources, as well as virtual machines based on Linux or Windows. This gives students access to professional software and practical skills needed for their future careers. With this

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service, it will be possible to diagnose and test the necessary modern applications.

Students will have the opportunity to work together on projects, create personal accounts, distance learning and create educational programs. The totality of services provided by such an educational resource to a particular user creates a personalized information and learning environment for teachers and students. Google develops and provides many applications and services that can be accessed from any browser window. Google Education Collections includes a collection of free and ad-free tools that enable teachers and students to communicate, teach and learn more effectively and interactively. Online services for Google universities have a number of advantages, which make it possible to use them in any educational environment where there is an Internet network.

Web Tutor is a program that helps to create a corporate portal for the HR department and automate processes related to personnel management: selection, evaluation, testing, training and development. The functionality of the modular approach provides an opportunity to quickly organize special systems based on a set of software tools depending on the goals set for the client.

Sharing knowledge is developed by the Russian company Competentum. The competitive advantage of this platform is the ability to independently organize a complete distance education course, develop courses, prepare and conduct training, and monitor the level of knowledge of students. Teachers can adjust the time allotted for completing assignments using refiles Andes, multimedia tools. The level of the student's knowledge is evaluated using an electronic test.

CONCLUSION

In conclusion, it can be said that summarizing the above, we can conclude that cloud technologies are an important tool for improving the educational process. They make it possible to create an interactive environment, increase the level of knowledge of students, choose learning methods, and also contribute to the development of important competencies in students, such as interaction, quick problem-solving, and the development of communication skills.

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On the management side, cloud technologies help to significantly reduce costs for educational institutions and increase the efficiency of using computing resources. Their use allows you to reduce the number of personnel servicing the equipment and get rid of the need for the services of third-party specialists. In addition, it is necessary to talk about the public cloud model, which provides access to data to any user, as long as there is an Internet connection. The priority of using cloud technologies is data protection and security. Most contracts with cloud service providers include clauses guaranteeing the security and confidentiality of customer data. Today, despite the fact that cloud service providers guarantee the security and privacy of personal data, customers cannot be sure of their reliable protection. At the same time, despite the above disadvantages, Cloud technologies are indispensable and in demand in many fields of activity, including education.

Cloud technologies are a means of solving pedagogical problems and provide qualitatively new opportunities for learning. They create opportunities for the development of didactics and new methods, new forms of the educational process, and open opportunities for students and teachers, as well as for developers of resources directly related to the educational process. In our opinion, the main goal of cloud technologies in the educational process today is to achieve maximum efficiency and increase the overall level of education at the expense of existing effective educational tools without negative consequences. Cloud technologies make it possible to ensure the creation of competitive education.

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