

CLOUD TECHNOLOGIES AND THEIR ADVANTAGES

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Abstract

This article analyzes the importance of cloud technologies in the context of modern digital transformation and the convenience they create for users. The main types, principles of operation and advantages of cloud computing systems are widely covered. Also, real practical applications are considered on the example of enterprises and the education system. The article reveals the possibilities of effective use of these technologies in the era of developing information technologies.

Keywords: Cloud technologies, cloud computing, data security, IT infrastructure, software as a service (SaaS), platform as a service (PaaS), infrastructure as a service (IaaS).

Introduction

Digital technologies have penetrated into almost all aspects of our lives today, and their impact is growing, from daily activities to socio-economic spheres. Therefore, the integration of digital technologies into tax administration is also creating fundamental changes in this system. Now tax processes are being carried out on the basis of modern digital solutions, abandoning traditional methods. These updates not only simplify the interaction between taxpayers and tax authorities, but also introduce new approaches to the procedures for declaring taxes, making payments, and archiving data.

Information and communication technologies are becoming an integral part of our lives every day. An example of this is the widespread use of modern data storage and management tools, in particular, cloud technologies. Cloud computing has been developing rapidly in recent years, playing an important role in providing users with various opportunities in various areas - automation of work, storage of documents and files, analysis, and remote connectivity. According to experts, in the near future these technologies will definitely become an indispensable tool for many industries.

Cloud applications are technological solutions that provide services to users via the Internet, through which data is stored not on a traditional computer hard drive, but on global server networks. Such services include data storage and backup, software use, integration with social

networks, and technical support. Cloud Computing technology offers users time and money savings, fast processing, convenience, and high-level security.

Also, one of the advantages of cloud technologies is that they allow you to access or manage data from anywhere in the world via the Internet. This is especially convenient for organizations and individuals operating in a mobile work environment. Today, many large and small businesses, government agencies, and educational institutions are using cloud services to organize their activities more efficiently and securely.

Cloud technologies are also a set of services that provide remote access and use of computing resources (such as servers, storage, databases, networks, applications) over the Internet. They allow users to use resources in real time.

Cloud services are divided into:

- SaaS (Software as a Service) - Software products are provided as a service (for example, Google Docs).
- PaaS (Platform as a Service) - Provides the necessary environment and tools for developers (for example, Microsoft Azure).
- IaaS (Infrastructure as a Service) - Infrastructure services consisting of virtual servers and storage systems (for example, Amazon Web Services - AWS).

The advantages of cloud technologies are as follows:

- Flexibility - Resources can be increased or decreased as needed.
- Cost-effectiveness - No large investment in dedicated servers or infrastructure is required.
- Convenience and availability - Systems can be accessed from any device connected to the Internet.
- Security – Data is stored encrypted and automatically backed up.
- Fast integration and updates – Software is automatically updated.

The concept of “cloud computing” is often distinguished from other computing models. Cloud computing refers to systems that are provided exclusively via the Internet, run on centralized servers, and provide real-time services to users. Its essence is that the user does not have to install complex infrastructure and software on a local device to use the service. Therefore, this technology is fundamentally different from traditional “offline” computing, “community computing” (i.e., working on the basis of sharing server resources), and distributed computing types called “grid computing”.

Cloud data storage technology allows users to store, view, and manage their files or data via the Internet at any time and from anywhere. In this model, data is stored on a large number of servers, usually located in different geographical locations. To the user, these servers appear as a single, generalized “cloud”. In fact, this “cloud” consists of an integrated system of many physical servers.

Although cloud services are recognized as a new technological idea, their roots go back to much earlier modern technological approaches. However, today they are gaining great importance precisely due to the developed Internet infrastructure and global digital transformation.

The advantages of cloud technologies include the following:

- Reduced software costs - In many cases, programs can be used by purchasing them only once or even renting them.

• Unlimited storage options - Cloud services allow you to store large amounts of data, providing the user with almost unlimited storage space.

That is, cloud technologies are currently becoming an important strategic tool not only in the IT sector, but also in such areas as education, medicine, economics and public administration. Their implementation allows you to increase efficiency, reduce costs and adapt to the modern digital environment.

The application of cloud technologies can include the following areas:

- In education: Online management of educational resources, distance learning platforms (Moodle, Google Classroom).
- In business: Services for working with customers, accounting, personnel management.
- In medicine: Electronic health cards, storage of analytical data.
- In public administration: Digital government projects, online services for citizens.

Cloud computing technologies have become an integral part of modern IT infrastructures, which incorporate many advanced technologies. Below are the most important features of these technologies.

1. Infrastructure based on virtualization. Virtualization is a technological approach that allows you to increase the efficiency of physical resources (servers, storage devices, network devices, etc.) by transforming them into a logical or virtual representation. With the help of virtual infrastructure, enterprises can use resources flexibly and economically. Virtualization is implemented in the following main areas:

- Server virtualization - dividing server resources into several independent environments;
- Storage virtualization - consolidating data into a single storage pool;
- Network virtualization - dividing network infrastructure into logical partitions;
- Desktop virtualization - centralized management of user work environment resources.

2. Automatic scaling. One of the important advantages of cloud systems is the possibility of automatic scaling. This function allows you to dynamically increase or decrease system resources depending on user demand. In this way, the system adapts to load and maintains service continuity. Automatic scaling is especially effective in microservices architecture and cloud applications.

3. Multitenant (multi-client) architecture. Multitenant architecture allows multiple users (clients) to be served simultaneously on a single software platform. Each user works with their own configurations and data, but they all use a common software environment. This model ensures maximum resource utilization and reduces service costs.

4. Stability and security. Reliable operation of cloud infrastructure and data protection are of paramount importance in any IT solution. Stability ensures the uninterrupted and correct operation of the system, while security protects information and user data from various threats. Together, these two factors serve as an important basis for building reliable, secure and stable systems.

Cloud computing systems can be organized in various forms depending on user needs and security requirements. The most basic classification is based on the differences between private and public clouds.

A private cloud is an infrastructure that is specifically designed for one or more departments within an organization and serves the needs of that organization only. Private clouds provide a high level of security, control, and privacy. Typically, such infrastructures are managed by the organization itself or through a third-party service provider.

Public cloud is an infrastructure that is open to the general public and provides a wide range of services. It can be owned and managed by large commercial enterprises, academic institutions, or government organizations. Public cloud services provide users with remote, fast, and easy access. Their main advantages are cost-effectiveness, automatic updates, and scalability.

Public cloud infrastructure is usually managed by a service provider and operates on servers located within the provider's jurisdiction. This can be important in some cases from the point of view of data security and legal issues.

Cloud technologies are also playing an important role in the modern education system. These technologies not only simplify the learning process, but also increase the efficiency of education. Cloud solutions are expanding the possibilities of organizing the educational process, storing, using, and analyzing data.

Electronic diaries and journals created on the basis of cloud technologies, personal accounts of students and teachers, interactive receptions - all these are vivid examples of digital transformation in education. Through these platforms, students will have the opportunity to do homework, assessments, remotely access educational materials, exchange information and exchange ideas.

Also, through thematic forums, students can conduct discussions with each other, exchange knowledge and experience, solve educational problems without the participation of a teacher or under his guidance. This develops independent thinking and teamwork skills.

The following tools based on cloud technologies are effectively used in the educational process:

- Computer programs and electronic textbooks - to deepen theoretical knowledge;
- Simulators and training systems - to form practical skills;
- Diagnostics and testing systems - to assess the level of mastery;
- Multimedia-based laboratory complexes - to create an interactive learning environment;
- Telecommunications technologies (e.g., email, teleconferencing, electronic libraries) – to provide remote communication and learning.

Cloud technologies Due to the broad scope of the concept of “cloud”, it is logical and effective to classify them based on various criteria – service model (IaaS, PaaS, SaaS), location (shared, private, hybrid) or user types.¹

In conclusion, cloud technologies are opening up many opportunities for users in the digital age. Their advantages are significant in increasing efficiency, reducing costs and ensuring data security. In the future, these technologies are expected to be used in a wider range of areas.

¹ Arutyunov, V.V. (2016). Cloud Technologies in Education. Moscow: BINOM.

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