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METHODS OF ENSURING EFFECTIVE AND SAFE DATA EXCHANGE IN INFORMATION SYSTEMS USED IN THE EDUCATIONAL SYSTEM

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Abstract. In the development of modern information technologies, fast and secure exchange of information is gaining importance. Optimizing the process of data exchange and ensuring security through various technological solutions serves to increase the efficiency of information systems. This article explores effective and safe data sharing methods and data protection.

Key words: data exchange, data protection, Information systems.

Introduction

Based on the globalization of the economy, the exchange of information between different countries is increasing. This process creates new opportunities in many areas such as commerce, finance, education and health.

Today, the digital economy is developing rapidly and the volume of data is increasing day by day. At the same time, the demand for efficient, secure and fast data sharing methods is also increasing. This situation makes it necessary to develop new and effective algorithms and to further improve the existing ones. Security and privacy are important when sharing data. By developing and optimizing algorithms for data sharing methods, data theft or illegal use can be prevented. This increases users' confidence in using information systems and ensures their safety.

Literature analysis

Data exchange is one of the most widely used and rapidly developing processes in various fields. This process ensures fast, efficient and secure exchange of information on a global scale.

Shannon defined the basic principles of information theory in his works, and his mathematical model of data exchange is still used today in the fields of data transmission, coding and encryption [1].

Tim Berners-Lee's article on the creation of the World Wide Web[2] analyzes the global network of information sharing on the Internet and how it has affected global information sharing.

Researchers Whitfield Diffie and Martin Hellman created the foundations of asymmetric encryption and fundamentally changed the way data is transmitted securely in electronic communication[3]. Several technologies [4] and protocols cryptographic algorithm have been used most successfully [5] to ensure the security of data transmission in networks.

The data exchange model is the core of the data exchange implementation, and it has a complete data storage and access mechanism[6].

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With the development of digital technologies, security, flexibility, etc. are greatly increased in these platforms with multiple user access at the same time[7].

Satoshi Nakamoto shed light on Bitcoin and the blockchain technology behind it, proposing new ways to exchange data in a decentralized and secure manner[8].

Geoffrey Hinton, Yann LeCun, Joshua Bengio are known for their major work in the field of deep learning. Their work created a revolution in data processing and analysis, which in turn greatly influenced the development of artificial intelligence[9].

Powerful, versatile, convenient and relatively safe educational information systems are used for users[10].

Privacy and convenience for users Information systems used in cloud-based business processes should be protected from illegal access to data, manipulation, denial of service and other threats[11].

Methods

Information systems help to improve the quality of education, strengthen the relationship between teachers and students, and provide educational materials through modern and interactive methods. This not only improves the educational process, but also strengthens the role of educational institutions in society.

Various methods and technologies are used to reduce the risk of illegal acquisition or breach of data. Encryption is one of the most effective ways to protect data. This method renders the data unreadable so that only individuals who have the secret key can decrypt the data.

Hybrid cryptography is used to encrypt data and provide a high level of security. For security, there are Advanced Encryption Standard (AES) and Triple Data Encryption Standard (3DES). Rivest-Shamir-Adleman (RSA) is an asymmetric encryption method that helps create a hybrid cryptography paradigm. The security of the derived key can be further increased using the Least Significant Bit image steganography technique (LSB).

Security protocols SSL/TLS encrypts data between websites and browsers, one of the most common ways to ensure security during data transmission. Another common method is authorization and authentication, which is used to identify and approve users who have access to data.

Passwords are used to authenticate users. Two-step authentication (2SV) is a two-step verification of the user (for example, password and SMS code), biometric methods such as fingerprint, face recognition, voice authentication are used for biometric authorization (Fig. 1).

Resuls

Information systems used in higher education systems are also designed for effective management of large volumes of data, which is important in the management of large-scale databases of HEIs. operating information systems work with the PostgreSQL database, which ensures data security, scalability and speed. Thanks to the use of technologies such as Node.js and React, the platform has a fast and flexible interface, which makes it convenient for users and allows them to easily access educational materials. Advanced features of data warehouse management systems are used to ensure security and data privacy, such as data encryption, transaction management, and user rights control.

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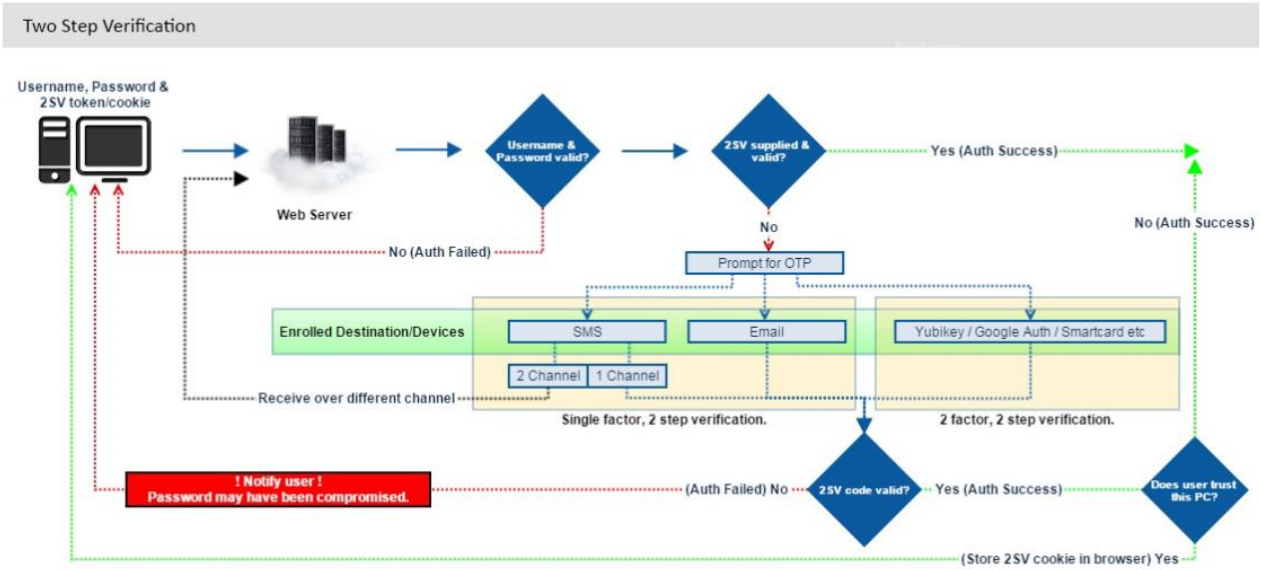

Figure 1. 2SV model.

Information systems use data masking or tokenization to hide real data and display it only to authorized users. To ensure a high level of transparency and reporting in data sharing, maintaining audit logs records all data sharing transactions and allows them to be audited and analyzed later. Encryption and digital signature are used to continuously monitor and monitor the flow of data and the process of their use.

Conclusion

It can be concluded that modular and scalable architecture, NoSQL databases, data separation and replication, cloud technologies, big data technologies, automatic measurement and monitoring, DevOps practices and security policies may apply. These approaches help to make the system efficient, reliable and flexible.

Ensuring the safety of information exchange in the information systems used by the higher education system is in the main place, and for this purpose, several information systems can be shown. One of them is the Mentalaba information system. A system with a web-based infrastructure for data sharing and analysis provides administrative and technical requirements and the capabilities to meet them and data exchange standards. This can be seen in the picture below (Fig 2).

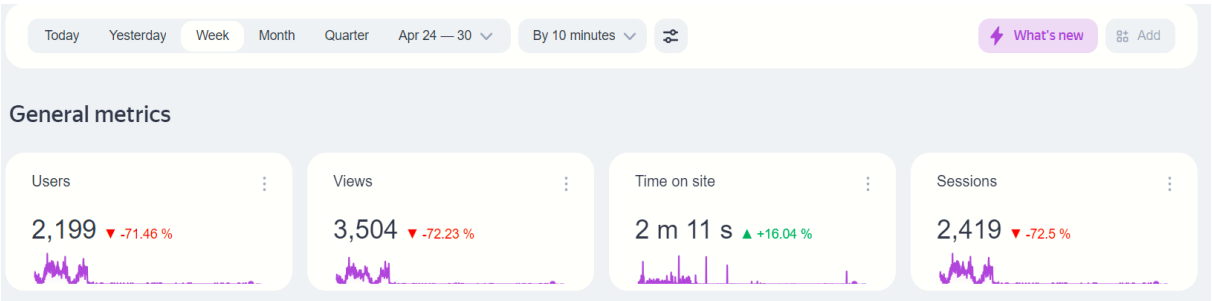

Figure 2. Number of visitors.

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According to the statistical data obtained from the mentalaba.uz information system on the universities whose admissions have been opened since the beginning of this year in the field of HEIs it can be seen from the system that more than 2000 people used the site in the last 1 week.

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