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APPROACHES TO DESIGNING TELECOMMUNICATION SYSTEMS AND THEIR USE IN COMPUTER SCIENCE TEACHING

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A B S T R A C T

This article studies and analyzes the software developments of information exchange in telecommunication technologies, and their role in the transfer of information, especially the aspects of high-quality communication transmission, is analyzed. The aspects of the interdependence of modern communication transmission tools today are considered.

Also, the experiences of database management and their management are studied, and the most popular programs used in data transmission are analyzed and conclusions are drawn. The telecommunication environment of educational materials is formed, and the participants of the educational process are highlighted in terms of their interdependence. In order to make a decision on the choice of a database management system that implements the database in teaching computer science using telecommunication technologies, the main features and characteristics of several common database management systems were considered and applied: PostgreSQL - object-oriented database management system: MySQL, Firebird, Oracle Database, Microsoft SQL Server, IBM DB2, Sybase, etc.

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INTRODUCTION

Telecommunication - remote communication (lat.); - a set of technical means (devices, software systems) capable of exchanging information with each other and connected to a common communication environment constitutes a telecommunication system. By telecommunication systems we understand spatially distributed systems that provide the ability to receive and exchange information at any time of the day and anywhere in the world.

A.A. Zelensky gives the following definition: these are systems that allow you to transmit and distribute data, texts, images, transmit audio and multimedia information, broadcast stereo programs, deliver e-mail messages, and provide Internet services.

A generalized version of the definition is as follows: these are telephone and telegraph communication lines, mobile and satellite radio networks, computer technologies and the integration of computer networks and systems, including the global Internet.

Telecommunications systems are the main link between all participants in information exchange. Modern telecommunications systems allow bringing external and internal communications to a

qualitatively new level. Any telecommunications system consists of server devices that transmit information to each other using specialized protocols, as well as respond to requests from subscriber devices.

Servers organize the use of the system's common network resources (information storage devices and communication channels). For communication between system servers, conventional communication lines and currently rapidly developing wireless communication lines are used.

Metods

Telecommunication systems are the main link between all participants in information exchange. Modern telecommunication systems allow to bring external and internal communications to a qualitatively new level.

At the current level of technology and technical means, telecommunication systems can include the following elements:

- data transmission networks - designed to solve the problem of organizing a single high-speed and reliable information transmission environment that ensures the stable operation of all participants in the educational process;
- geographically distributed multiservice networks - allow to significantly expand the functional capabilities of the institution's infrastructure by integrating students, administration and teachers into a single electronic workspace;
- telephone systems - allow the educational institution to significantly save on telephone conversations;
- information reception, correction and processing systems - allow to save resources and automate the processing of external and internal data flows (faxes, e-mails, requests) through the website, which significantly increases the speed of responses and the quality of feedback;
- information security systems in the network - designed to integrate geographically distant objects into a single information network to provide remote access to information system resources;
- centralized monitoring and control systems for information networks - designed to centrally manage the information network and diagnose its status, diagnose the status of communication channels and network devices, and monitor the quality of work.

The advantages of telecommunication technologies are undeniable. Their use is one of the promising directions for improving the educational process, as it allows you to solve current educational problems more quickly. When using modern telecommunication systems, it is possible to qualitatively accelerate the process of information transfer.

Thus, new telecommunication systems open up new opportunities for interaction for a person, but also pose the most complex problems of a general philosophical nature. Databases are one of the parts of telecommunication systems and have radically changed the way of working in secondary vocational education institutions. In recent years, the development of database technology has led to powerful and user-friendly systems. Thanks to this, databases have begun to be used at all stages of education, in addition to the secondary vocational education system.

Different sources give different definitions of the concept of "database". Connolly T., Begg K. in the book "Design, Implementation and Maintenance" [1] give the following definition of the concept of "database" - a common set of logically related data (and a description of this data), designed to meet the information needs of an organization.

Another definition of a database is a repository of data objects, that is, a set of concepts or phenomena described by the database, with the ability to search for these objects by properties. A database can be considered not only as tables that index files with data in various formats, but also as these files themselves, since they are an untyped knowledge base in such a database.

In addition, it can be used as an auxiliary tool that allows you to perform a certain useful function:

storing program settings, Internet addresses for sending advertising, etc. Also, a database is defined as a collection of information (about real objects, processes, events) related to a specific topic or task, organized in such a way as to provide a complete and convenient representation of the collection. In general, a database is a means of storing information.

A database is an information structure implemented by a computer that reflects the state of objects and their relationships. Since the basis of any database is the information structure, databases are divided into three types: tabular, network, hierarchical.

A hierarchical database consists of a collection of ordered objects, represented as an ordered collection of multiple instances of the same type of network. A network type consists of a single "root" record type and an ordered collection of zero or more sub-network types. A network type is generally a collection of record types organized hierarchically. The network approach to organizing data is an extension of the hierarchical approach. A network database consists of a collection of records and a set of relationships between those records.

The most common in practice are relational databases. The name "relational" (visual) is associated with the fact that each record in a table contains information about only one specific object. A relational database is a collection of interrelated tables, each of which contains information about objects of a certain type.

Each row of the table contains information about one object, and the columns of the table contain various descriptions of these objects - attributes. The rows of the table are called records. All records have the same structure - they consist of fields that store the attributes of the object. Each field of the record has a single description of the object and a clearly defined data type (for example, a text string, a number, a date, etc.). All records have the same fields, only they contain different attribute values.

Analysis of the experience of using databases allows us to identify a common set of their performance characteristics: completeness - the more complete the database is, the higher the probability that the necessary information will be available in it (however, there should be no redundant information); correct organization - the better the database is structured, the easier it is to find the necessary information in it; relevance - any database must be correct and complete, that is, the database must fully correspond to the state of the object it represents at any time; usability - the database must be simple and easy to use and have advanced methods of accessing any information.

Conclusions

We will review the main features and descriptions of several common database management systems to help you decide which database management system to use for your database. PostgreSQL is an object-oriented database management system. It is an alternative to both proprietary database management systems (such as MySQL and Firebird) and commercial systems (Oracle Database, Microsoft SQL Server, IBM DB2, various Sybase database management systems).

PostgreSQL's strengths include:

- support for almost unlimited database sizes;
- powerful and reliable transaction and replication mechanisms;
- an extensible system of built-in programming languages: SQL, PL/pgSQL, PL/Perl, PL/Python and PL/Tcl are supported initially, as well as support for loading C-compatible modules;
- support for many programming languages: C/C++, Java, Perl, Python, Ruby, ECPG, Tcl, PHP, etc.;
- inheritance;
- an easily extensible type system.
- Firebird (FirebirdSQL) is a powerful, compact, cross-platform, free database management system that provides the most complete support for ANSI SQL standards, running on Linux, Windows and various

Unix platforms.

Firebird offers excellent parallelism, high performance, and strong language support for stored procedures and triggers. Firebird has been used in industrial systems under various names since 1981. It is a commercially independent project of C and C++ programmers, technical consultants, and developers of multiplatform database management systems, based on 69 source code releases by Borland Corporation. It was released as an open source version of Interbase 6.0 on July 25, 2000.

MySQL is a free database management system. MySQL is owned by MySQL AB, which develops and maintains the application. It is available under the GNU General Public License and its own commercial license. In addition, MySQL AB develops functionality at the request of licensed users, which is why the replication mechanism appeared in almost the earliest versions.

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Administrators can configure server security, create backups, transfer data, and perform a number of other tasks. Others can create queries of any complexity to retrieve data for further analysis, export, or reporting [4].

PHPMyadmin is an open-source program for managing MySQL databases. PHPMyadmin is a web interface that allows you to manage a MySQL server, execute commands, and view the contents of tables and databases through a browser. Managing MySQL databases without directly entering SQL commands allows you to use PHPMyadmin to manage special databases.

The choice of environment for designing a telecommunications database of educational materials is based on the following criteria: server management and database development, user management and system security, data viewing and editing, a clear graphical interface, visibility, data editing, searching, grouping, sorting and filtering, creating and executing SQL queries, working with several selected objects at the same time. The main approaches to designing a network database of educational materials are considered below.

The most necessary service in terms of organizing the educational process is broadcasting the schedule of basic and additional lessons, the schedule of exams, the schedule of laboratory and practical work.

As a result of summarizing and analyzing the obtained structure for the use of modern cloud technologies in education and the design and implementation of telecommunication systems, we have obtained a universal mechanism that can be used in any existing areas of educational activity, including in the system of secondary vocational education.

Thus, taking into account the characteristics of information, telecommunications and "cloud" services allows you to quickly solve current educational problems, accelerate the process of data transfer, and deliver information to a specific user in a targeted manner.

Their use in creating a database provides systematic storage of large amounts of data, differentiated access to specific tables, selection, insertion, deletion, and modification of data in tables, and increases the efficiency of interaction between teacher and student.

Conclusions

To make a decision on the choice of a database management system that will implement the database in teaching computer science using telecommunication technologies, the main features and characteristics of several common database management systems were considered and applied: PostgreSQL - object-oriented database management system: MySQL, Firebird, Oracle Database, Microsoft SQL Server, IBM DB2, Sybase, etc.

In the design of a network database in computer science education: the design of a telecommunication database model of educational materials for differentiated teaching of computer science, the main stages of database design, the two components of a telecommunication database - content and application were shown.

Taking into account the characteristics of information, telecommunications and "cloud" services in computer science education allows for the rapid solution of current educational problems, accelerates the process of data transfer, and provides targeted delivery of information to a specific user. Their use in creating a database provides systematic storage of large amounts of data, differentiated access to certain tables, selection, insertion, deletion and modification of data in tables, and leads to an increase in the efficiency of interaction between the teacher and the student.

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