AUTOMATION OF A TELEGRAPHER'S WORKPLACE
ON THE RAILROAD

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В данной статье описывается автоматизация рабочего места телеграфиста на железной дороге. Программа представляет собой автоматизированное рабочее место позволяющее: составление и отправку телеграмм, использование шаблонов телеграмм, автоматический прием телеграмм, долговременное хранение принятых и переданных телеграмм в архивах и в БД, а также автоматическое разбиение телеграмм на части, при превышении максимальной длины. Программное обеспечение разрабатывалось на языке JAVA, позволяющем организовать мульти платформенную работу приложения. База данных разработана в СУБД MySql.

Ключевые слова: *автоматизированное рабочее место, железнодорожная станция, аутентификация, кроссплатформенный, программный модуль, многопоточный.*

This article describes software for automation of a telegrapher's workplace on the railroad. This software represents an automatic workstation which allows preparing and sending of telegrams, use of telegram templates, automatic telegram reception, long-term storage of received and sent telegrams to the archives and databases and automatic partitioning telegrams apart in excess of the maximum length. Software was developed in JAVA which allows organizing a cross-platform application work. Database is developed in MySQL DBMS.

Key words: *automated workstation, railway station, authentication, cross-platform, program module, many-thread.*

Nowadays the automation of a telegrapher's workplace on the railroad is carried out by using the software "IPC 256", arranging communication between a computer and telegraph blocks. This software allows you to serve from one to 256 telegraph channels, each of then can work with the individual rate of 50, 100 or 200 baud in full-duplex or half-duplex mode. Physical interface of telegraph lines is a- 4-wired. While connecting your computer to the telegraph line special adapters accomplishing conversion of an analog signal into digital for further processing of the information received by a telegrapher's on a personal computer are used.

The given method of the workplace automation is ineffective and outdated for the present day in connection with the appearance of IP networks on the railways. The demand in high-speeds, security, and storage of the data transmitted between the stations, as well as increasing the number of subscribers has increased. To fulfill the given requirements there is a replace of telegraph blocks for personal computers, and connection of the stations tools IP networks using the protocol TCP / IP.

In this connection, there is a necessity of the existing software replacement workplace for the more modern one permitting to realize the above mentioned demand's in the field of transmitting data between the railway stations by means of IP networks using the protocol TCP / IP.

To perform the given task on the initial phase of the development of software it was necessary to carry out the analyzes of the principle of the telegraph operator's, by the results of which the designing of the database began. As a result of the hardware analysis and operating systems, communication distance server DBMS MySql (database management system) was chosen, which will enable in future to expand automation server and local data storage which will workplace expand in the future telegraph connecting additional software modules , as well as promote telegrapher's centralized work.

The database was designed with AWP (automation of workplace) telegraph relational structure containing a set of relations, including all the information which must be stored in the database. Manipulation's of the given database created in SQL language and organized in the form of stored procedures and functions.

Relational database structure was developed with the possibility to administer without the direct interference of developers and administrators. The given property allows to use it not only on the definite railway station, but also at the other areas of communication. So, the main tasks in the development of the database were not only its optimization and structuring, but abstraction from certain conditions of stations and communication facilities as well.

According to the results of development Infological, datological and physical database models, the phase of software interface design which allows to control and monitor the created database, and also to perform the data transfer.

Software was developed in JAVA which allows, to organize a cross-platform application work. The Technology of JAVA SE (Standard edition) is the main publication of JAVA, containing compilers, API, Java Runtime Environment is a more productive opportunity for creating of a custom's application in the first place – for the desktop and the server-side application. Algorithm of this software interface includes the following possibilities:

• Treatment and control of comfortable reference information of the subscribers, as well as multicast delivery, control of correct connection, set of standards templates for the preparation of telegrams.

• Telegrams provides a special blank forms, as well as automatic formation of reference data sender calculation of the number of words send on the recipient's address and assessment of its route index.

• Work in manual mode. In this mode, the PC is transformed into an ordinary telegraph terminal and allows to negotiate On Line.

Just to fulfill this algorithm the task of the creating individual modules performing definite task separately and combined by base unit software was put forward. In the course of the further development of AWP, a structure of separate modules, allowing to speed up the process of program was created. There was also necessity of many-thread work application allowing to start in parallel regime: a server module installed organizing listening for getting the data of input port and the user module, sending the data through organizing an installed output port. Thanks to the modular structure, AWP got an opportunity to perform a number of operations automatically:

• connection and querying to the database MySql;
• organization of standalone server and user modules;
• assignment of module reference information;
• formation templates;
• protection of input and output information.

In it's turn, each operation is an independent software product suitable for the use both separately of the main module as well as in the structure of modules. This means autonomy and abstraction of the developed modules enabling they're, reuse and refactoring, as well as facilitating the maintenance of the software product as a whole.

In this way, in the development of software module there was an opportunity in future to update and correct possible errors in the modules not terminating in this keys the work of the basic module . Due to the modular structure the problems connected with a complexity of the developed AWP appeared. Also, due to this thread work with a production server and client modules, launched in basic module was realized. This enabled the application not to become dependent of the remote server part as parallel thread simultaneously implement the work booth in listening and sending the data to ports.

Graphical interface was developed by using the library Swing. Swing provides more flexible interface components, Swing components were designed for the same cross-platform work. The data components support specific, dynamically, attached kinds views and behavior, thanks to which adaptation to graphical interface the platform. Thus, applications, using Swing can look like a native application for the operating system. At the expense of the use of this library convenient intuitive user interface, including in itself just the such a components as a text editor for typing telegrams was provided.

According to the results of the software development it is necessary to note the appeared facilities:

- The use of free server DBMS MySQl allowing the expansion of ARM.
- The use of stored procedures allowing to speed up the process of the client's interaction with the server and ensure the possibility of changing interactions with the database, depending on the changing rules of distance communication.
- The use of module structure software interface, solving the problem software code iteration , and further updating any module without affecting the integrating of the software.
- The Use of Module authentication restricting the access for external users not belonging to this institution.
- Preparation and sending of telegrams.
- The use of templates telegrams.
- Automatic partitioning telegrams apart in excess of the maximum length.
- Automatic telegram reception.
- Automatic sending of official telegrams.
- Long-term storage of received and sent telegrams to the archives and databases.
- View archives of APM and DB.
- Register-keeping.
- Distinction of level access to program functions.

Consequently, to above enumerated, the new developed version of the software is not only the solution of the problems put above at the definite railway station, but it also allows to use it at any other stations without changing its basic structure. Meanwhile the software was developed with the use of free of charge program products, which also has a positive effect on its implementation and application.

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