



International Journal for Innovative Engineering and Management Research

A Peer Reviewed Open Access International Journal

www.ijiemr.org

COPY RIGHT



ELSEVIER
SSRN

2021 IJIEMR. Personal use of this material is permitted. Permission from IJIEMR must be obtained for all other uses, in any current or future media, including reprinting/republishing this material for advertising or promotional purposes, creating new collective works, for resale or redistribution to servers or lists, or reuse of any copyrighted component of this work in other works. No Reprint should be done to this paper, all copy right is authenticated to Paper Authors

IJIEMR Transactions, online available on 30th April 2021.

Link: <https://ijiemr.org/downloads/Volume-10/Issue-4>

DOI: 10.48047/IJIEMR/V10/I04/105

Title: **DESCRIPTION OF THE AUTOMATED SYSTEM FOR ACCOUNTING AND CONTROL OF SIGNALING DEVICES**

Volume 10, Issue 04, Pages: 510-513

Paper Authors:

Astanaliev Elmurod Tursunali ogli



USE THIS BARCODE TO ACCESS YOUR ONLINE PAPER

To Secure Your Paper As Per **UGC Guidelines** We Are Providing A Electronic Bar Code

DESCRIPTION OF THE AUTOMATED SYSTEM FOR ACCOUNTING AND CONTROL OF SIGNALING DEVICES

Astanaliev Elmurod Tursunali ogli

“Department of Automation and telemechanics of Tashkent state transport university”
master’s student,

e-mail: elmurod1246@mail.ru

Abstract: The article describe the methodology for creating an electronic document management system for technical documentation (EDTD), describes its generalized formalized scheme, presents a formal model of EDTD, automates the process of passing documents in an organization, and provides the following capabilities; The organization is based on the following basic concepts.

Keywords: railway automatics and telemechanics, control of document execution, document management server, user registration, updating database tables executed by the server program.

Introduction

The automated system for accounting and control of signaling devices is designed to automate the processes of passing documents in an organization and provides the following capabilities:

- registration of documents;
- distribution of electronic documents between employees;
- control of the passage of documents, and the execution of related orders;
- creation of reports and logs;
- exchange of electronic messages between employees.

The developed system is multi-user, it provides coordinated joint work of a team of employees. This is due to both the structure of the system and the requirements for its configuration: identification of system users, management of access rights to processed information, ensuring the integrity and safety of information.

The system has a client-server architecture and must be operated in the local network of the organization. Such a design of the system allows you to provide the following key characteristics:

- the organization of an arbitrary, easily changeable number of jobs, determined by the volume of work, the nature of the tasks solved in the organization and the number of workers required for this;

- effective protection of the integrity of information in the multi-user access mode;
- ensuring the safety of information due to its centralized archiving and recovery;
- ensuring the confidentiality of information based on the management of access rights to it.

Document accounting and tracking of their passage in the organization are based on the following basic concepts:

- document registration - the procedure for creating a new document in the system, performed by a user who has the right to change documents - a registrar;
- registration form of a document - a set of features that determine key information about the document, allowing you to find it in the database and track its passage;
- assignment - a task related to the execution of a document issued to an employee by the management of the organization;
- execution of a document - a sequence of actions by an employee (responsible executor) or a group of employees (co-executors) performing instructions for processing a document and further transferring it to subsequent executors;
- document execution control - tracking the actual passage of the document and the timing of its execution in the organization, performed by a specially appointed user - the controller.

Components of the electronic executive system

Server program. The functioning of the document management system is based on the use of a special program - the document management server. The document management server carries out the main functions that ensure the work of users: receiving requests, accessing the database, processing information, issuing results. Until the main program is launched, user interaction with the document management system and work with documents is impossible.

The workflow server program itself runs on a computer connected to the organization's network, which is also called a server. It is possible to select a separate computer for the workflow server or use one of the network workstations, depending on the amount of work with documents. As a rough estimate, we can say that with small, up to a hundred per day, document flows, it is quite acceptable to run a document flow server on a middle-class workstation, while it can be simultaneously used for ordinary office work without a serious decrease in speed. It should be noted, however, that the registration of new documents and the creation of document-related jobs and messages lead to an increase in the size of the database and an increase in the disk space it occupies, therefore, it is necessary to ensure sufficient hard disk capacity to take into account the prospects for an increase in the flow of documents.

Administrative part of the program. A system that many users work with should be centrally managed. This function is performed by a specially designated employee or employees who implement a single consistent policy for configuring and managing the system, who are called system administrators.

The duties of the system administrator include, in particular, the following:

- reflection in the system of the current structure of the organization;
- user registration;
- viewing system messages and error messages;
- updating the database tables.

In addition to these functions, the system administrator also provides starting and stopping the workflow server, configuring and maintaining the system, creating backups of the system databases and restoring the system in case of failures.

Client side. Employees of an organization registered in the system and using it to process documents determined by their job responsibilities are called system users. Depending on the type of activity, the system user is assigned by the administrator the rights to perform certain actions and access certain documents.

The system users can be assigned the following rights:

- control over the execution of tasks and orders. A user endowed with such rights can perform the functions of a controller and monitor the execution of documents and orders to employees;
- system administration. A user endowed with such rights can perform the functions of a system administrator, in particular, create user accounts, assign rights to users, change system settings;
- the user can also be assigned the level of access to each of the available document streams by including in the corresponding list:
- document editing (registrar rights) - a list of users entitled to register new documents in this stream.

The model of the automated system of registration and control of signaling devices and the structure of data processing are shown in Fig. 1 and Fig. 2.

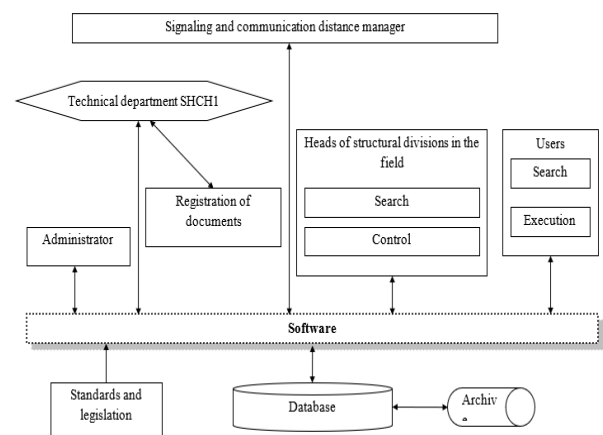


Fig.1. Conceptual model of the automated system of accounting and control of signaling devices

Designing a Server Program

The workflow server program performs several functions:

- processing of customer requests;
- output of service information (logs);
- serves as an intermediary between the client and the database;
- Carries out the user registration procedure.

The structural diagram of the functioning of the automated accounting and control system of signaling devices is shown in Fig. 3.

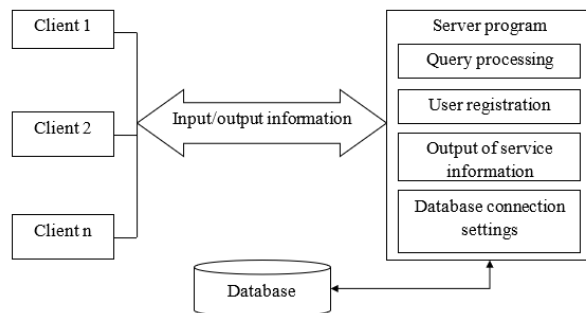


Fig.2. The scheme of functioning of the automated system of accounting and control of signaling devices

Requests to the server program should come over the TCP / IP protocol, since data should not be lost along the way. It was decided to use a set of low-level NetSockets classes as a software means of data transfer, allowing to work with managed connections. Since there can be several clients in a given system (there should be no software restrictions on the number of clients; their number is limited by the network bandwidth and hardware performance), the server program must work with them separately. Thus, it is planned to allocate clients into independent threads, which will be born when a signal about a new connection is received and closed when the user is disconnected. It is necessary to create several possible types of network requests that allow working in different modes of data

transmission: sending, receiving, sending and receiving simultaneously.

To comply with the principles of object-oriented programming, it is required to divide the code by semantic features into separate classes. Based on the functions performed by the server program, three main classes can be distinguished:

- an interface class for interacting with the user;
- class of network interaction with clients;
- class of connection with the database.

All of these classes are interconnected and serve to process client commands. First, the program itself is initialized, then the specified main classes are included. The network class receives commands from the client, uses a helper class for interacting with the database to execute them, sends a response to the client if necessary, and reflects the results of its work on the user interface. Additional structural links can also be used. With the help of this division into classes, encapsulation is implemented - it is a programming mechanism that combines data and code in one block, protecting them from outside interference and misuse. "Encapsulation allows you to combine data and code into an object and hide the object's implementation from the user. In this case, only the specification (interface) of the object is presented to the user. The user can interact with the object only through this interface".

To determine the state of the server and the correctness of the execution of client requests, it is necessary to use the component for recording service information in real time. This replenished list, the so-called event log or log, should be located in the main window of the server program in order to reflect the information in the most convenient way for the system administrator. This should mainly include the results of processing queries to the database, since this is a very vulnerable spot in the system, especially if the server program and the data storage are physically on different computers.

To reduce the number of additional programs, it is necessary to integrate a system user registration tool into the server interface.

As the main identification data, the username (login or pseudonym), real name, surname and patronymic, as well as a password must be entered. It is also necessary to take into account additional user identifiers in the organization: phone number, location address and e-mail. To increase the security level of the system, the password must be stored in an encrypted form in the database.

The last but not least element in the server is the configuration parameters of the connection to the database and its initial deployment. In order for the server to use an arbitrary available host as a data source, it is necessary to enable the administrator to set parameters for connecting to the database server. The connection parameters include the IP address of the computer containing the database, the name of the database itself, the login and password of a user who has access to read, write and update database tables. Also, a utility must be connected to the server for the initial creation of tables in the database and filling them in with the necessary values. This will allow you to prepare this document flow system for work without the help of third-party programs (possibly even paid ones) and knowledge of the SQL language.

Literature:

1. *D.Kh.Baratov, A.Kh. Boltaev, E.T.Astanaliev* (2019) "Functional Support of the Automated Accounting System and Control of Devices in Railway Automation Telemechanics" // *International Journal of Advanced Research in Science, Engineering and Technology*. Vol. 6, Issue 3, March 2019. P.8572-8580.
2. Bulavsky P.E. Conceptual model of electronic document management of technical documentation // *Transport of the Russian Federation*. - 2011. - No. 1 (32). - p. 60-63.
3. Bulavsky P.E. Synthesis of a formalized scheme of electronic document management systems of railway automation and telemechanics / Bulavsky P.E., Markov D.S. // *Izvestia PGUPS*. - 2010. - Issue. No. 4. - p. 63-74.
4. Aripov N.M., Baratov D.Kh. On document circulation in the economy of automation and telemechanics and the introduction of paperless technology for maintaining technical documentation // *Bulletin of TashIIT*. 2015. - No. 2. - 2015. - p.77-81.
5. Bulavsky P.E., Markov D.S., Sokolov VB, Konstantinova T.Yu. Formalization of the algorithmic description of systems for ensuring the life cycle of railway automation and telemechanics // *Automation in transport*. 2015. No. 4 (Volume 1). p.418-432.
6. Dilshod Baratov, Elmurod Astanaliev. (2020). Using innovative technologies of electronic technical document management for railway automation and telemechanics. *International Engineering Journal for Research and Development*. Volume 5, pp. 5-9.
7. Dilshod Baratov, Elmurod Astanaliev. (2020). Methods of control of railway automation and telemechanics devices. *International Scientific online Conference on Innovation in the modern education system, Washington University in St. Louis, USA*. Part 1, pp. 77-80.
8. Dilshod Baratov, Elmurod Astanaliev. Using innovative technologies of electronic technical document management for railway automation and telemechanics. *International Journal on Orange Technologies (IJOT)*. Volume 3 Issue 1, 2021, ISSN: 2615-7071, pp. 7-10.
9. Aripov N.M., Baratov D.Kh. Mirsalikhov E.A. Modeling of electronic document circulation of technical documentation of railway automatics // *Problems of Informatics and Energy*. 2016. No. 2. p.78-84.
10. Baratov D., Aripov N. Formalization of electronic technical document management of railway automatics and telemechanics // *European Applied Sciences*. #eight. 2016. p.33-36.
11. Krukovsky M.Yu. Graph model of composite document flow // *Mathematical machines and systems*. - 2005. - No. 3. - p. 149-163.