Creation of a Performance-Based Contract of Employment Maintenance System in a State Municipal Institution Using a Cloud Service*

Irina V. Testova [1[0000-0003-3406-0231]], Lidiya N. Chirkova [1[0000-0001-8543-5377]], Nikita M. Sorvanov[1]

[1] Northern (Arctic) Federal University named after M.V. Lomonosov, Arkhangelsk, Russia
testovairina@mail.ru

Abstract. Following the Standard form of an employment agreement with an employee of a state institution by the Government Order of the Russian Federation of November 26, 2012, No. 2190-P, a performance-based contract of employment is a new type of an employment agreement, which in more detail specifies the job duties and conditions of remuneration of an employee, criteria, and indicators for granting of incentive payments depending on the results and quality of provided state (municipal) services, social safety net. In the context of the transition of the state to the digital economy, the creation of cloud information systems to ensure the automation of various work processes in-state municipal institutions is becoming the most in-demand. The article describes the features of creating a system for maintaining a performance-based contract of employment for state municipal institutions (hereinafter SPBCSMI) using a cloud service.

Keywords: Cloud Service, Design of Automated Systems, Performance-Based Contract of Employment.

1 Introduction

Currently, the intensive development of the cloud services market enables enterprises to use new tools to reduce the cost of information technology infrastructure and increase the flexibility of the enterprise's computational requirements. The use of such services is dictated by the need to have a personal resource space, which explains the popularity of public clouds.

However, the level of typing of the public cloud and the lack of control from the organization does not meet the requirements of many state municipal organizations, which have increased requirements for the collecting, processing, and storing of corporate information, organization of business processes, and geographical location of the data center. The main advantages of a private cloud come to the fore – the ability to

deploy a cloud service on existing hardware, fulfillment of individual customer requirements, integration with other services, and a higher level of security.

The relevance of the development of a cloud information system (CIS) for maintaining a performance-based contract of employment in a state municipal institution (SPBCSMI) is associated with the need to automate the process of maintaining and centralized control of a performance-based contract of employment for employees of municipal libraries in Severodvinsk, taking into account the score-rating indicators.

2 Development and design of an information system

The following documents have been developed to maintain and carry out work under a performance-based contract of employment: a statement of activities carried out (B1), a statement of the results for the month (B2), a score sheet (B3), a summary statement of performance indicators for all employees of the department (B4), a summary statement of the distribution of the bonus fund of employees of the institution (B5).

A statement of activities carried out is filled in by an employee. It contains the following attributes: document name; performance indicator value and its name; description of the event carried out by the employee; information about the employee: surname, name, patronymic of the employee participating in the event; department; surname, name, patronymic of the employee and the signature of the drafter; document date; the total number of scores in the document, the number of scores awarded, the period.

The statement of the results of the month is filled in by the operator. The statement contains the following attributes: document name; department; processed month, last date of the month; the number and description of performance indicators are filled in the table (for each indicator, the following data are filled in: serial number in the statement; surname, name, patronymic of an employee of the department; planned indicator in natural units; actual indicator in natural units that the employee performed; the number of scores awarded for a given performance indicator); surname, name, patronymic of the employee who prepared the document; the signature of the drafter; document date, the total number of scores of all employees in the document.

Based on statements B1 and B2, the head of the department fills out a score sheet for each employee of his/her department B3. The statement contains document name; processing period; surname, name, patronymic of an employee of the department; department; performance criterion; performance indicator, number, name, and description; the possible number of scores; analysis of the result; the final score for a given performance indicator, surname, name, patronymic of the employee and signature of the drafter; document date; the total number of all employees' scores for the month; employee signature.

Based on the employee score sheets, the head of the department fills out a summary statement on performance indicators for all employees of department B4. The document contains the following attributes: surname, name, patronymic of the director; director's signature; date of approval of the document, document name, the name of the department is filled in the table. The following data are filled below for each department: the

employee's serial number in the statement, surname, name, patronymic of the employee; position held; the number of scores awarded for an employee for the processed month. surnames, middle names of employees, members of the commission for summing up the results for the month; the signature of the committee members; the total number of scores for the month of all employees of the institution.

Based on the summary statement B4 and the order on the amount of the bonus fund, the head of the state institution fills out the summary sheet on the distribution of the bonus fund B5.

The summary sheet on the distribution of the bonus fund of employees B5 contains the attributes: - surname, name, patronymic of the director; director's signature, date of document approval; document name; the name of the department is filled in in the table, for each department, the following data are filled in: the serial number of the employee in the statement, surname, name, patronymic of the employee; position held; the number of scores awarded for an employee for the period being processed, the amount of bonus for each employee; surnames, names, patronymics of employees, members of the commission for summing up the results for the month; the signature of the committee members; the total number of scores for all employees; the total monthly bonus for all employees.

As a result of the analysis of the subject area, all stages of creating an automated system for maintaining a performance-based contract of employment in a municipal institution were implemented, including the development of an architecture based on the client-server architecture and a functional model of the developed system, built using graphic notations IDEF0 and DFD. The diagrams are created in Erwin Process Modeler 7.3.3 environment (Figures 1-3).

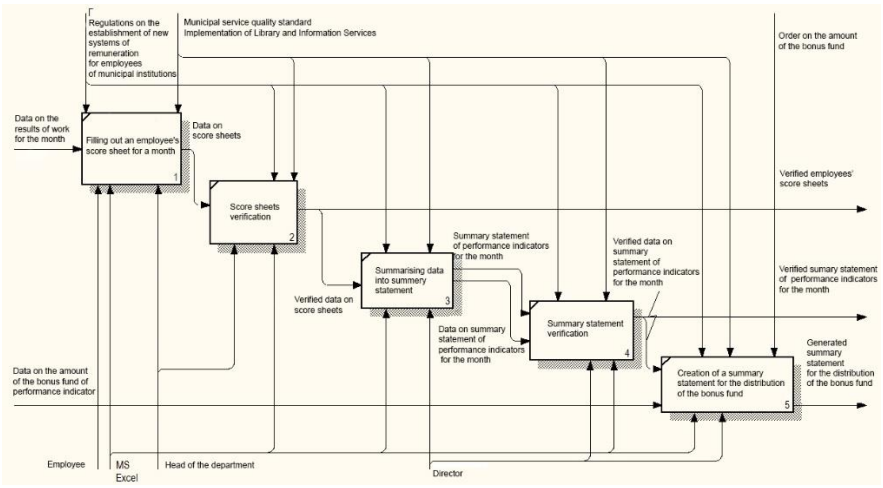

Fig. 1. Context diagram of the model.

Based on the analysis of the AS-IS model of a maintenance system for the performance-based contract of employment in a municipal institution, a new TO-BE model was built – a model for organizing business processes, shown in Figures 2-4.

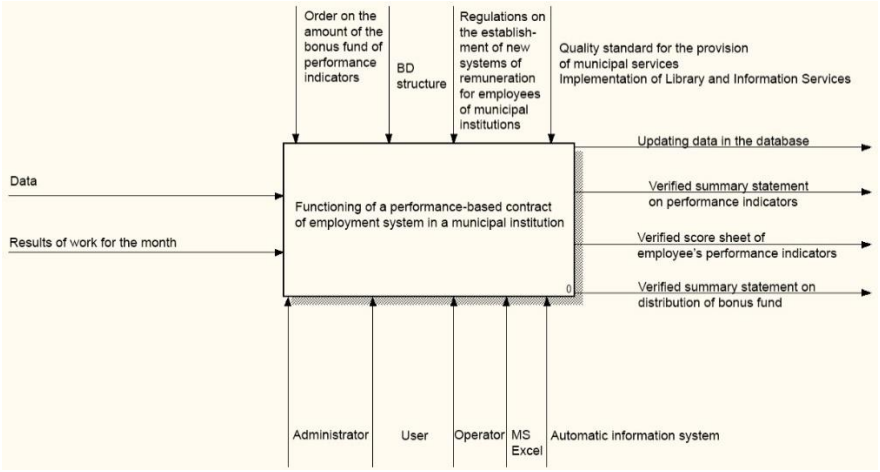

Fig. 2. Model of the functioning of the CIS "SPBCSMI".

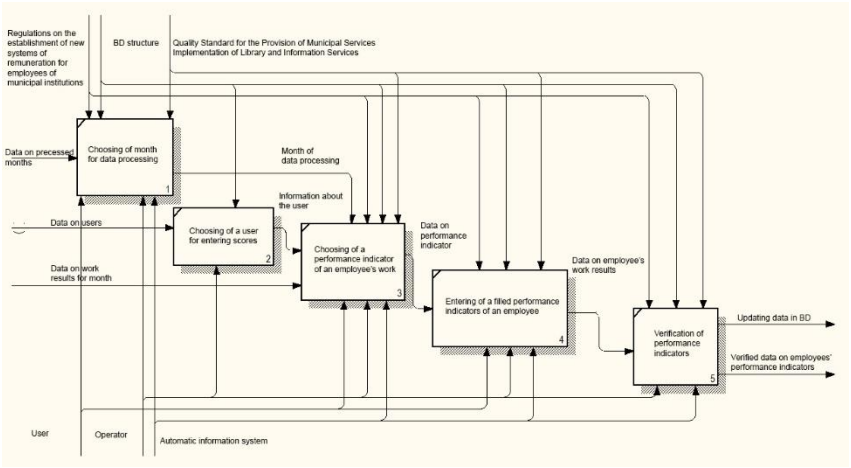

Fig. 3. Decomposition of the block "Entering and editing data according to indicators".

The development of a functional model using graphical notations enables to design of a database (DB) to store all the necessary information, obtain data on requests and calculate bonuses, reduce data redundancy and ensure their integrity. Conceptual, logical, and physical database models are implemented.

To describe the behavior of the system, a use case diagram is built using the UML notation in the Software Ideas Modeler tool environment.

By the requirements for the modeled system, the following roles are defined:

- a user – an employee of the municipal library system,
- an operator – an employee responsible for reviewing and approving scores for users in the system (department head);
- an administrator (director of the institution).

Requirements for the roles have been determined, UML – use case diagrams for the operator and user of the system have been built. The difference between diagrams is the lack of some functionality of users by their roles in the system.

When entering the system, the employee is authenticated in the service – the procedure for verifying the employee of the municipal library to be able to further use the system within the framework of his/her authority. The user enters monthly performance indicators and monitors the filling of a personal score sheet (Figure 4).

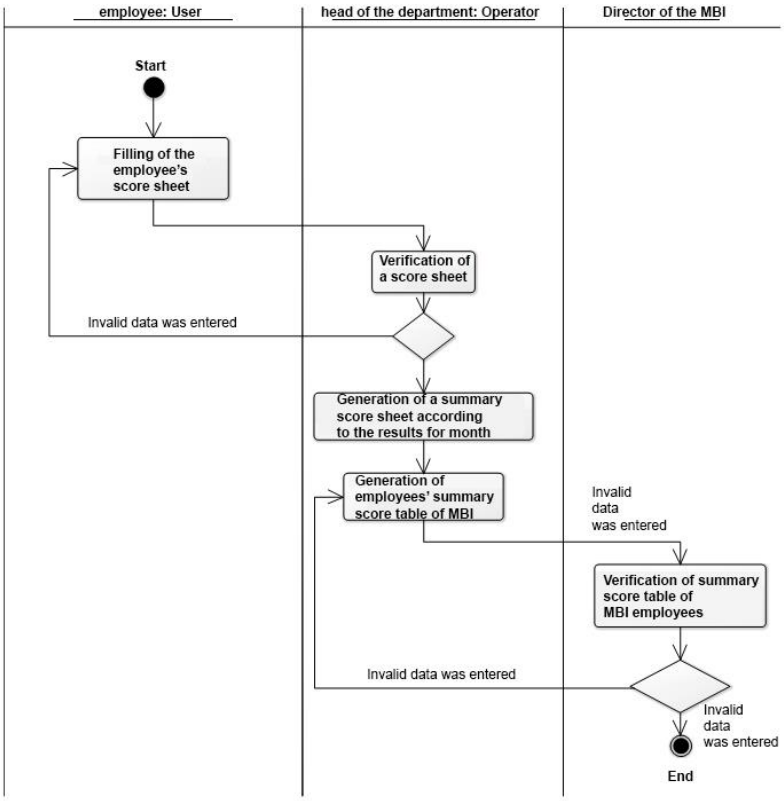

Fig. 4. Activity diagram of filling out statements.

The operator verifies the score sheet, enters scores into the summary score sheet based on the results of the department employee's work for the month, adds newly ar-

rived employees, and blocks the dismissed. Based on the data received, reports are generated for export from the system of the score sheet of performance indicators of each employee, a summary sheet of performance indicators for the month of all employees.

The role of the administrator includes the function of verifying the scores according to the summary sheet and entering the bonus fund data, based on which the export from the system of the summary sheet of the distribution of the bonus fund, the summary sheet of performance indicators and the score sheet of employee performance indicators is carried out.

Cloud service for numerical calculations and visualization of photonic dissipative systems is presented enables numerical simulations and visualizations of a wide variet [8].

3 Conclusions

The article describes the features of creating a system for maintaining a performance-based contract of employment in a state municipal institution using a cloud service.

The system architecture represents the client = server architecture. The client part of the CIS "SPBCSMI" works on all new operating systems (Windows, Linux, Android, IOS). The server part of the CIS "SPBCSMI" can use a free Linux operating system and a free database server; the server part of the CIS "SPBCSMI" can be deployed both on the Internet and on the customer's local network – intranet.

When developing a cloud service, the following modules were created:

- authentication module with limited access rights;
- user control panel;
- scores input module;
- department directories;
- evaluation criteria directories;
- system user directory;
- bonus fund module;
- URL request handler, with the output of the results in demand;
- router module;
- controller modules and related templates;
- Ajax request handler;
- data search module according to the specified search parameters;
- a module for generating an employee's score sheet for the month;
- module for automated calculation and generation of a summary statement of employee performance indicators for the month;
- module for automated calculation and generation of a summary statement on the distribution of the bonus fund for the month.

The prototype of the system was debugged on the OpenServer virtual webserver

For development, the following software tools were used: PHP scripting language, database management system MySQL version 5.6, Case Studio 2 version 2, JavaScript

programming language, technology for interacting with the server without reloading AJAX pages. To reduce PHP code and improve support for large files in the system, the logic of the MVC pattern was applied.

The developed SPBCSMI system provides:

- centralized storage of information about the criteria and performance indicators of employees;
- evaluation of the results of the work of the employees of the institution according to criteria and performance indicators;
- calculation of the financial parameters of a performance-based contract of employment according to the criteria and performance indicators of the institution's employees;
- generation of electronic documents to maintain a performance-based contract of employment with the ability to export to spreadsheets.

The SPBCSMI system allows not only to build a unified process but also can reconfigure for the specifics of any structural unit of a state municipal institution.

The approbation of the work results was carried out based on the municipal budgetary institution “Municipal Library System” in Severodvinsk.

In virtue of continuous proliferation in the exploration of cloud computing, it has become stringent to find the proper scheduling scheme for the execution of workflow under user specifications [10].

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