The structure of the system of processing citizens' appeals

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Abstract. This article describes the features of interaction with public authorities. A realization of citizen appeal processing system and defines its mission. Posted scheme of the system processing of citizens. Detailed description of its components and functions as well as features of the program realization is given. Summarizing the existing regulations and experience of interaction with public authorities is described. Depending on the specifics of each of stages of system creation is given. For accounting and analysis of applications of citizens is designed database structure.

Key words: online community, appeal, post, citizen appeals processing, database.

INTRODUCTION

Today, according to the program of electronic government (e-Government) – all public authorities must use in their work electronic reception [1, 2, 3, 4]. This online service be located on the site authority and provide his leadership communication with citizens. However, while the main function of this service is limited to use web interface to create messages that indicated the problem, transfer and save the message.

The public authorities are limited to use both time and human resources. Workers are forced to study appeals during the working day, and electronic appeals can be sent around the clock so in the morning accumulate a certain number of unprocessed appeals. In addition, the institution is obliged to respond to the appeal within 30 days. This term includes the registration appeal, assigning performer, moving between departments, approval and send a reply. Number of employees who are involved in processing appeals is also limited and determined by the organizational structure of authority.

The rules of communication of citizens with authorities usually regulated by national laws and normative acts. In our state requirements for such rules defined in the Law of Ukraine "On citizens' appeals" and the position of the National System of processing appeals to the executive authorities. According to these documents establish standards and criteria for processing appeals [5].

ANALYSIS OF RECENT RESEARCHES AND PUBLICATIONS

Summarizing the existing regulations and experience of interaction with public authorities, can give the process of processing appeals, dividing it into the following stages:

1. the registration appeals;
2. identify the performer to solve formulated in the appeal problems;
3. the time control processing appeals;
4. formulation and coordination of response to appeals;
5. sending replies and feedback to the author of appeals.

Depending on the specifics of each of these stages there are certain tasks associated with processing appeals. Namely:

•   identify the author of appeals;
•   correctness destination appeals for the performer;
•   prioritize appeal;
•   efficiency processing appeal;
•   relevance response to appeal.

To solve the tasks outlined above requires an integrated approach that involves the creation and use of specialized citizen appeal processing system (CAPS). This system can be implemented as a separate service, and subject to the availability of corporate electronic document circulation within the institution – as a component of general information system [6].

By CAPS following requirements:

•   ability to analyze text message appeals;
•   registration and identification of citizens (users CAPS);
•   time control the life cycle of appeal;
•   analysis of current and final results.

In the basic configuration CAPS must perform three main functions: registration and search appeals of citizens, processing of information in the appeal and forming responses to the appeal control of the administration and its CAPS [7].

Execution of each function provides a certain part CAPS:

• the function of registration and search appeals corresponding to appeals creation component that provides design appeal in CAPS, analysis of information from the appeal and record in CAPS, and searches for appeals in web environments;

• the function of processing information in the appeal and forming response to the appeal corresponding to the component processing appeals that provides analysis of information about the author's appeal, text and creating a source appeal, performer recommends this appeal and provides the ability to create and publish response to appeal;

• the function of control the work CAPS and administration responsible core system containing administration tools and knowledge base CAPS, and may include additional tools for modeling CAPS and determining the effectiveness of its use.

For successful operation of any CAPS must include these components. In specific situations to extend the functionality of CAPS necessary to modify the structure and principles of its components or to introduce new components in the CAPS.

THE SCHEME OF THE SYSTEM OF CITIZENS' APPEALS PROCESSING

The key features of this system perform the components of creation and processing of appeals and the core of a system, which provides management and modelling of the work of CAPS and contains guides and custom dictionary (Fig. 1).
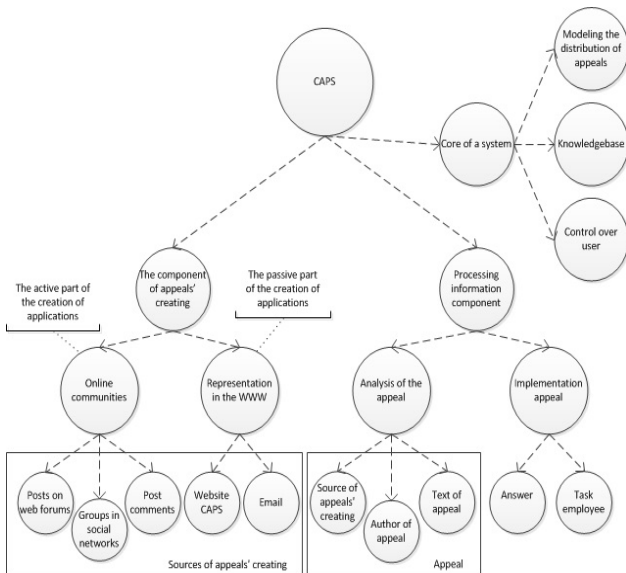

Fig. 1. Operation scheme of CAPS

The component of appeals' creating provides search and registration of citizens' appeals. This component is responsible for communication between CAPS and sources of appeals' creating. The active and passive parts of appeals' creating are highlighted. The active part provides a search of appeals in socially active online environments, and the passive is designed for monitoring of applications' revenue by standard communication services, such as a reverse form of communication on the website of the authority, mail, "hot line".

To use the active part of appeals' creating you should first make certain preparatory actions. The online communities that can be sources of appeals' creating should be determined [8, 9]. You need to analyse their content and determine the compliance between subjects of online community of authority. You must also arrange the use of information about participants of online communities and rules for creating posts in it.

The component of appeals' creating must ensure the flow of applications with some intensity. The adjustment of appeals' creating intensity is carried out by increasing or decreasing the number of sources of appeals' creating, and expanding or narrowing the subjects of appeals.

Analysis of the information obtained through the creation of components of an appeal is made by the means of processing information component [10]. This component is designed to analyse the key constituents of appeal and the purpose for processing appeals. The analysis of appeals also includes structuring parts of appeal and posting their registration data. When parsing an appeal its text and service information are separated. Later the text of the appeal is tested for keywords. The service information includes information about the author, about the source and time of its income. This information will be used in future to prioritize the implementation of appeal, as well as their distribution and processing.

The analysis of information about the author of appeal is carried out to determine the reliability of appeal's data and prioritize the processing of appeals. Information about the author of appeal is received in two ways: from a CAPS user's accounts which is created when registering a new user in the system, as well as from accounts of online communities which cooperate with CAPS. The main objective of analysing the information about the author is to determine the level of CAPS administration's confidence to the author of appeal.

Depending on the results of the analysis of an appeal, the performance of the appeal can be made in two ways. The first method involves the use of ready-made answers to appeals that have been processed before. This method is used when providing answers to the same type of the appeal and requests for information. The second way to perform the appeal involves the creation of a task for the structural unit authority employee which is assigned to the relevant subject.

A separate part of CAPS is the core of the system. It provides functioning of all parts of CAPS. Moreover, the administration and control of CAPS users is carried out while using its tools. The core of CAPS consists of the knowledge base, the administration module and the CAPS modelling work module. The knowledge base contains the information necessary for the operation of CAPS components, the administration module is designed to provide access to resources and control their use, the modelling work module is created to simulate situations in which the use of human resources of authority would be most effective.

COMPONENTS OF THE APPEALS' PROCESSING SYSTEM

The system of appeals' processing is based on client-server architecture with the distribution of access rights for different categories of users. It includes the following major components: the service of appeals' design, the service of requests' search in online communities, the service of creating and processing of appeals, the service of forming responses to the appeals, database system, the service of accounting and control of appeals' processing and the components of modelling the system's work in different situations using the software GPSS World (see. Fig. 2).
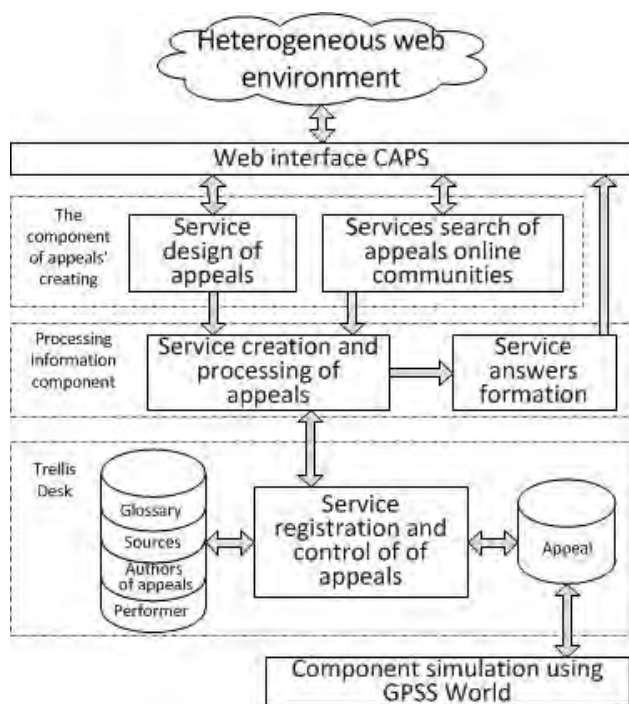

Fig. 2. Components of the appeals' processing system

The CAPS functional is based on the software Trellis Desk, which belongs to a class of programs – departments of service support of users (HelpDesk). The choice of the system is based on the presence of a number of advantages of such systems and the possibility of changes and additions to the program code. [11]

The service of appeals' registration is implemented using basic tools of the Trellis Desk System in a web form with fields for entering information. This service gives an opportunity to input information about the appeal and about the author, and to control the completeness and accuracy of the filled web form. This service provides the minimum level of CAPS implementation. The appeals designed through this service are recorded in a CAPS database and they are appointed with executor according to the chosen subject of appeal. The authors of these appeals can be either registered and unregistered CAPS users. The appeals of registered users have priority in processing.

With the help of service of appeals' search in online communities the appeals are generating on the basis of the content of the online community. This service provides the search of sources of appeals' creation and identification of appeals in the posts of online communities' members. For the work of the service the information from the custom dictionary of CAPS is used. The search of sources of appeals' creation is carried out by a template of query to the search engine Google. Requests consist of search engine operators and keywords that are being searched. Depending on the type of online community a relevant template of search query is used. In this way, for the search of online communities such as web forums the operator Inurl with values forum or viewtopic is used. To search for keywords, the operator Intitle is used. Its value is inserted in the table Term of CAPS database (see. Fig. 4). To locate your search results the operator Inurl (examples of its values can be ua or lviv.ua) is used. The results of search for the sources of appeals' creation are approved by administrator of CAPS and are put in the CAPS database together with statistical and technical information about the source of the creation of appeals. The implementation of this process is carried out by using PHP scripts.

The detection of citizens' appeals in the posts of online communities' participants is done by analysing information from the RSS-file of online community [12, 13]. The web address of this file and the file itself is in a CAPS database in tables RSS Source_options and RSS respectively. Depending on the period of cooperation with the online community there are initial and ongoing identification of citizens' appeals in the posts of online communities' participants. The initial identification of appeals is made in the initial stage of cooperation with the online community. To do this, you fill in the date on which you want to analyse posts in RSS-file for keywords. In the ongoing detection of appeals, a temporary checking of the size and time of online community RSS-file changes is carried out. For the realisation of this process, the library XML :: RSS :: Parser is used. To identify appeals the word-form keywords from the table Term_form is substituded in turn in the parcer. The result of the parser is a table containing information about the date, the author, the text of the post with keywords, the web address of the post topics and keywords that were found in the post. After confirming compliance between the found posts and design rules these appeals are recorded in the table Claim.

With the help of service for forming and processing of appeals the formation of the rating list of created appeals is carried out and the appointing the performer for each appeal is made. Rating list is based on data on the level of credibility to the author of appeal (the field Credibility in the table Declarant), the ranking of sources of appeals' creating (the field Rating in the table Source_options), the rating and the subject of treatment (the field Importance in the table Subject). When processing the text of an appeal the compliance between the text and the subject is checked, the accuracy of the information of appeal and the presence of banned words is controlled. After the checking the request is assigned a status "accepted" – if the application meets the requirements, and "rejected" – otherwise. The definition

of appeal's performer is made by using SQL-query. Further operations of the appeals are made by the means of Trellis Desk system.

With the help of service of formation of responses to the appeal are designed and sent to the author of the appeal. To obtain answers the information from a CAPS database is used. For appeals with the status "done immediately" answers are formed from the CAPS knowledge base, and for appeals with the status "completed" answers are based on information from the field Answer_text in the table Claim. The formed answers to the appeals are sent to the author's e-mail address or posted in the online community, where they were created.

With the help of service of accounting and control of appeals the CAPS database is formed and its content is filled, as well as the basic operations of administration and control over user CAPS are made. The CAPS database consists of references of sources of appeals' creation, performers and custom dictionary; and includes information on current appeals. To administer and monitor the activities of users the tools of Trellis Desk system are used.

A peculiar feature of CAPS is the use of modelling components by the GPSS World [14]. It uis used to model the processing operation of citizens' appeals on the basis of information about the intensity of receipt and processing of applications; the number of performers and information about the performer's working day. The modelling is carried out using GPSS-designed templates code. The results of modelling are obtained by parsing the text of the report design. The results include numerical data reflecting the number of appeals for a period of time, the number of calls in queue, the amount of stale appeals, the workload of performer and the efficiency of processing applications. The sequence of operations to perform simulations is presented in Fig. 3.
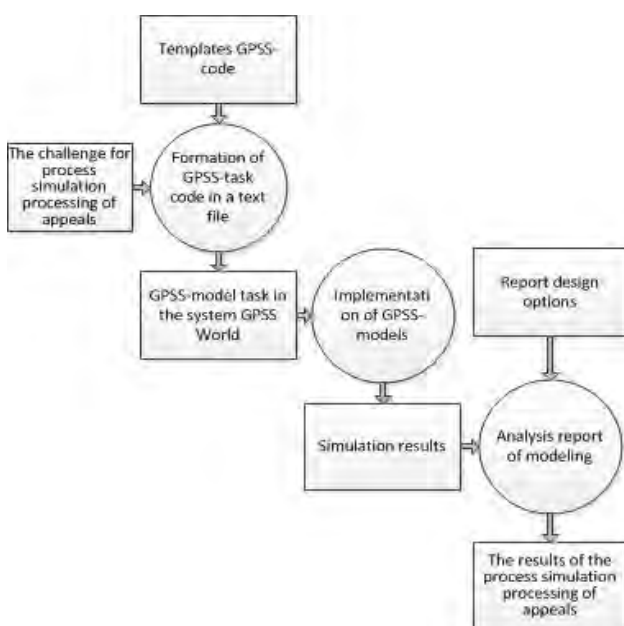
Fig. 3. The scheme of sequence of operations for modelling of appeals' processing

As CAPS is based on Unix-platform, and the system of simulation modelling GPSS World is the only Windows-compatible, the modelling of appeals' processing is performed using software client computer. It should have the installed software GPSS World. The administrator specifies job settings for modelling, which are substituted by CAPS means in the appropriate pattern of GPSS-Code. The administrator plays this code in the model of GPSS World on his\her computer, runs the modelling report and gets the report file with results. The report analyses the relevant CAPS script the administrator receives numerical data on status of appeals' processing.

SOFTWARE IMPLEMENTATION OF COMPONENT APPEALS' PROCESSING SYSTEM

Algorithmic complex for organization of interaction between citizens and public authorities consists of a database and interface of the complex, which includes such working places (WP):

• WP "CAPS Administrator" is created to search for online communities, to fill the custom dictionary, to control CAPS users' accounts, to implement the process of citizens' appeals processing;

• WP "Moderator of the online community" is designed for searching and processing of appeals created from posts of participants in online communities;

• WP "CAPS Operator" is intended for input of information on citizens in CAPS obtained in writing, by email or through a "hot line";

• WP "The author of appeal" is intended to create appeals in CAPS.

Each of working places, apart from "CAPS Administrator" corresponds to a particular level of CAPS implementation. So, the WP "CAPS Operator" corresponds to the minimum level, the WP "The author of appeal" – to the automated level, the WP "Moderator of online community" – to the extended level. The WP "CAPS Administrator" is present in all levels of implementation of CAPS. With the help of the system Trellis Desk the permission to access CAPS opportunities for each job is created.

THE STRUCTURE OF THE DATABASE OF CITIZENS' APPEALS PROCESSING SYSTEM

For proper operation of appeals' processing system, the information that will be processed by this system should be structured. Structuring and accounting of information is carried out by using the CAPS database. The scheme of the database is shown in Fig. 4.

The CAPS database consists of 13 tables, which can form three groups: Service desk – tables containing information about the main CAPS components, Source – tables with the information about the sources of creation of appeals, UserDictionary – tables of custom dictionary.

Tables of the group Service desk include:

• Declarant – contains information about the authors of the appeal and meets the formal model of the author of appeal. The field Credibility contains infor-mation about the rate of credibility of CAPS administration to the appeal's author and is determined by the appropriate;
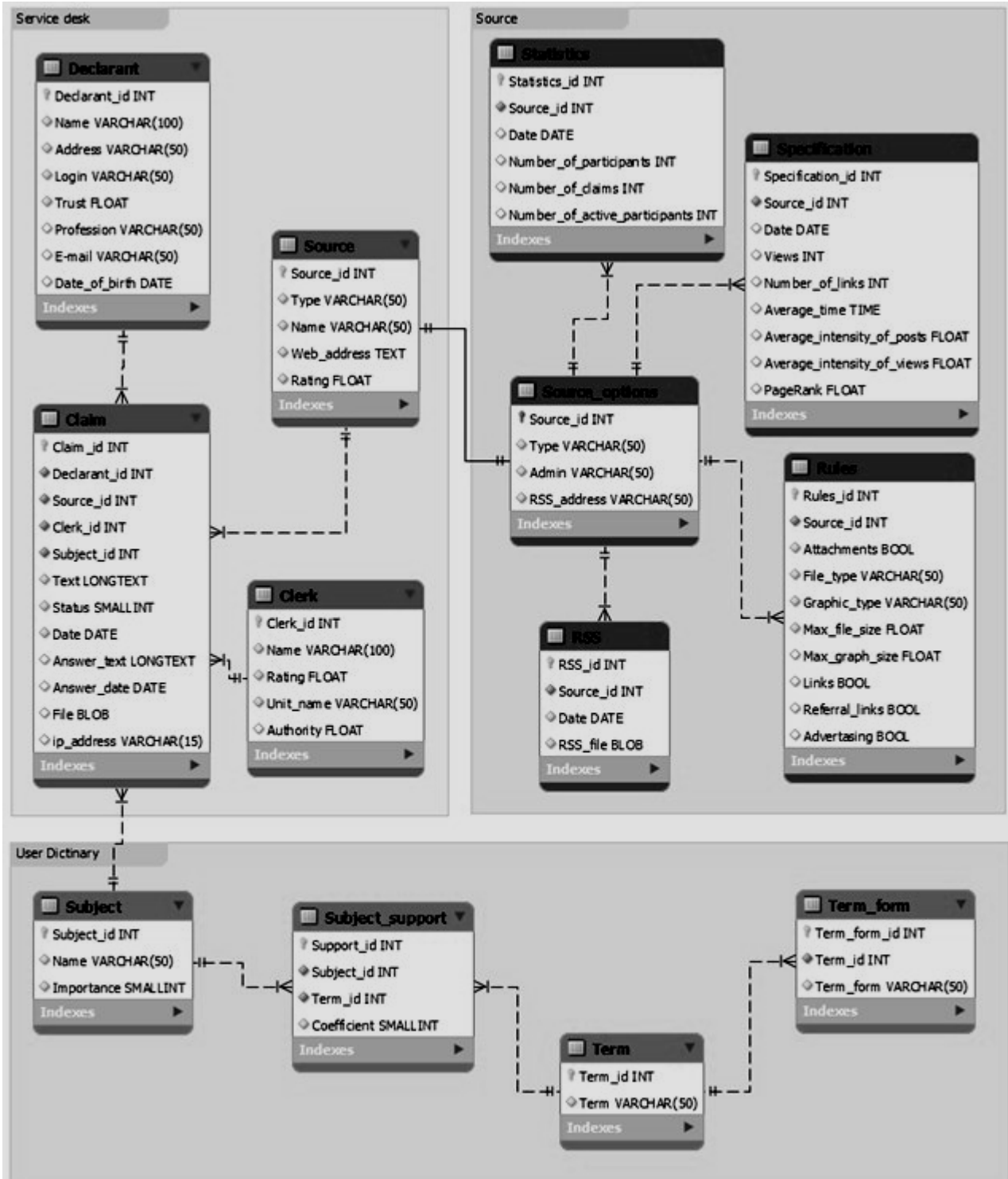
Fug. 4. The scheme of CAPS database brain

• Claim – contains information on the citizens' appeals and meets the formal models of the appeal. The field Status contains information about the state of appeal's processing. This table is linked by the bond one-to-many with a table Subject, and through it with a group of tables of custom dictionary UserDictionary;

• Clerk – contains information about performers of appeals and meets the formal model of performer. The field Authority contains information about the rating of appeal's performer;

• Source – contains information on creating appeals and is relevant to the formal model of performer. This table is linked by the bond one-to-one through the table source_opions with a group of tables containing details on the sources of appeals' creating Source.

The tables of group UserDictionary include such tables: subject, containing information on the subject of authority, subject_support – contains information on keyword matching the subject, term – contains keywords and term_form – contains word-form to the keywords.

The tables of group Source include: source_opions, statistics, specification, containing respectively official, statistical and technical information on the sources of creation of appeals, rules – contains rules for publishing posts in online communities, which are sources of creating appeals, rss – contains information about news channels from the sites of online communities.

CONCLUSION

The paper describes the architecture SOZH, its components and functions .. For registration and analysis of information of citizens using a database. This database is conditionally divided into three parts: Service desk, Source, UserDictinary.

Search for online communities used advanced search engine and templates to find relevant content sections .. Creation Posts requests from members online communities is carried out using a script to parse the news channel of online communities. Analysis of the news channel carried out using the mechanism of regular expressions of Perl. Test subjects appeal and purpose performer by using SQL-queries. Control of the operation carried out by means of SOZH Trellis Desk. Described means the use of simulation tools GPSS World simulation to perform the processing of appeals.

The results showed that the use SOZH searchable Posts in online communities will increase the number of appeals, which in turn will allow better use of human resources authorities to process applications and increase citizen satisfaction and improve the image of the government.

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