Comisia Electorală Centrală a Republicii Moldova

Proiectul PNUD „Îmbunătăţirea calităţii democraţiei în Moldova prin suport parlamentar şi electoral"

TERMS OF REFERENCE

for implementation of
the State Registry of Voters

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Introduction

In accordance with the law in force one of the basic tasks of the *CEC* is the creation and maintenance of the *State Registry of Voters.* This Registry is required for all election processes in the Republic of Moldova and should serve as a key tool that would provide a correct answer to questions on identity and voting rights of voters in the required constituency.

The *Law no. 101 of 15 May 2008* does not explicitly define the functionalities offered by the *SRV*, but stipulates the scope of this Registry. However, the need to develop and implement the *SRV* is stipulated in the *Election Code of the Republic of Moldova,* which explicitly specifies the information content of the *SRV*.

Because under the applicable law on registries the *SRV* should be developed as a separate entity to share its resources with other IT systems, such solution has not yet been developed and put into production. Currently the *CEC* is at its first step of extraction data from the *SRP* and their inclusion into a database available through the *SAISE*.

The IT audit mission of the *RMCC* noted that the *SRV* is not fully realized given a set of constraints such as:

- missing or inaccurate external data required to complete the *SRV*;

- low level of provision with computing equipment and ICT knowledge of *LPAs* and polling stations;

- lack of the possibility of being ensured with performance data transport channels sufficient for the interconnection with all *LPAs* and polling stations;

- use of the IDNP code to compile electoral lists, according to the Election Code, which is expected only from 2015.

The creation of an IT system that would allow the automated management of information on the identity and residence permit of the Moldovan citizens with voting right will ensure the provision of quality services by the *CEC* and the compliance by the Moldovan legal framework with the European standards. Due to the *SRV* implementation and use, the time and cost of the registration / update / deletion of data of Moldovan voting citizens and compilation of accurate voters' lists will be reduced, serving as a data source for other information subsystems of the *CEC*.

The direct beneficiaries of the *State Registry of Voters* are:

- Central Election Commission;

- Electoral District Councils;

- Offices of polling stations;

- Citizens of the Republic of Moldova.

Following the implementation of the *State Registry of Voters* 3 categories of benefits are expected:

I. Benefits for Moldovan citizens:

- Online access to voters' information (based on information known to voter) via the WEB service portal provided by the *CEC* to verify the accuracy of the information contained in the *SRV*;

- Referral to the *CEC* on the need for correction in the *SRV* of the voting citizens' data;

- Assurance of certainty that the voting citizen will be included in the electoral lists;

- Implementation of the electronic voting, which will reduce queues and allow voting citizens outside the Republic of Moldova far away from polling stations to exercise their constitutional voting right.

II. Benefits for the Central Electoral Commission:

- Optimization of work processes and reduction of operational costs to maintain up to date information on the list of voting citizens;

- Delivery of an operational and quality service in provision of information on electoral processes;

- Improvement of the quality of information on voting citizens owned and managed by the *CEC*;

- Availability of the *CEC* to perform election processes at any point of time;

- Provision of the possibility to develop and implement all IT subsystems specified in the *SAISE* directly dependent on the *SRV* functionality;

- Implementation of elimination of the double voting and record of traceability of data and identity, residence permit and identity documents of voters;

- Provision of the possibility to implement the electronic voting under the *Law. 101 of 15 May 2008 on the Concept of the State Automated Information System "Elections"*;

III. Benefits for the Electoral District Councils and Offices of Polling Stations:

- Optimization of work processes and reduction of operational costs in the activity of the *Offices of Polling Stations, Electoral District Councils*;

- Increase in the accuracy and quality of voting lists;

- Significant reduction of the number of persons included in additional voting lists;

- Provision of the possibility of automated generation of reports and statistics;

- Implementation of procedures to avoid double voting;

- Exclusion of voting based on annulled identity documents.

This approach (computerization of the process of building and maintaining the *SRV*) will eliminate the costs for the development and management of separate electoral lists for each *LPA,* will remove the interoperability problems between the *CEC* IT systems and external IT systems of other *CPAs* and *LPAs*, will eliminate the need to send materials on voters' identity on paper support, will increase the accuracy and reliability of voting lists and prepare the *CEC* for the implementation of the electronic voting.

1. Background

According to *CEC action plan for 2013* approved by the *CEC Decision no. 1727 of 12 February 2013* for the III-rd quarter of 2013 the development of the *SRV* was planned by developing all regulations and instruction required for the *SRV* functionality.

The concept of *SRV* appears in several legal and regulatory acts such as:

- *Law. 101 of 15 May 2008 on the Concept of the State Automated Information System "Elections";*

- *Law. 1381 of 21 November 1997 on the approval of the Election Code of the Republic of Moldova.*

The Election Code provides for the existence of the *SRV* and specifies in article 38 ' that the following data shall be entered in the *SRV* for each voter:

a) name and surname;

b) date, month and year of birth;

c) state identification number (IDNP);

d) home address (country, city, street, house, apartment);

e) address of residence (country, city, street, house, apartment);

f) serial number of the identity document (ID card, passport, military book).

The conceptualization of the *SRV* must take into account its primary objective: to deliver reliable information on the identity, right to vote, identity and geographical location of voters. The complementary objectives based on data collection managed through the *SRV* will be developed by other modules or IT systems that will use the *SRV* database only to read them.

1.1. Terms used in the Terms of Reference

All acronyms and abbreviations used herein are defined in Table 1.1.

Table 1.1. All abbreviations and acronyms used herein

No.	Abbreviation / Acronym	Description
1.	**CPA**	Central Public Authority
2.	**LPA**	Local Public Authority
3.	**DB**	Database
4.	**CEC**	Central Election Commission
5.	**CATUM**	Classification of Administrative and Territorial Units of the Republic of Moldova.
6.	**KPI**	Key Performance Indicator
7.	**PKI**	Public Key Infrastructure
8.	**SRV**	State Registry of Voters
9.	**SRP**	State Registry of Population
10.	**DBMS**	Database Management System
11.	**ITS**	IT system

No.	Abbreviation / Acronym	Description
12.	**SAISE**	State Automated Information System "Elections"
13.	**IT**	Information Technology
14.	**ICT**	Information and Communication Technology

All common definitions used herein are defined and explained in Table 1.2.

Table 1.2. All definitions of terms used herein

No.	Abbreviation / Acronym	Description
1.	**Database**	set of data organized according to the conceptual structure that describes the basic features and the relationship between entities.
2.	**Digital Certificate**	Virtual "Identity Card" allowing creation of legally binding electronic signature, unambiguous identification of the person in electronic environment.
3.	**Data**	Elementary information units about people, issues, facts, events, phenomena, processes, objects, situations, etc. presented in a form that allows notification, commenting and their processing.
4.	**Personal data**	Any information relating to an identified or identifiable individual (subject of personal data). In this respect an identifiable person is one who can be identified, directly or indirectly, in particular by reference to an identification number or to one or more players specific to their physical, physiological, mental, economic, cultural or social features.
5.	**Electronic document**	Information in electronic form created, organized, processed, stored, transmitted by computer, other electronic devices or software and hardware, signed with a digital signature.
6.	**Workflow**	Administrative process of an organization over which tasks, procedures and information are processed and executed in a specific sequence dictated by predetermined rules (procedure rules) in order to manufacture a product or provide a service.
7.	**Data integrity**	State of data when they keep their content and are interpreted unambiguously in cases of random actions. Integrity is considered preserved if the data were not altered or damaged (deleted).
8.	**Metadata**	Way of assigning semantic value to the data stored in the database (data about data).
9.	**Digital Signature**	Indispensable attribute of electronic document obtained by the cryptographic transformation using its private key, intended to confirm the authenticity of electronic documents.
10.	**Mobile signature**	Innovative service that enables access to e-services by mobile telephone. The "mobile signature" functions as an identity card in the virtual environment, allowing authentication to prove the identity in cyberspace via mobile telephone. The mobile signature allows citizens to sign away documents, reports, statements to institutions or online applications using a mobile telephone or access electronic services, both public and private ones, in a simpler and more convenient way.

No.	Abbreviation / Acronym	Description
11.	**IT system**	Set of software and equipment that provides automatic data processing (automated information system component).
12.	**Information system**	Set of processes and tools for collection, processing and transmission of information necessary for the management (includes manual and automatic data processing technologies).
13.	**Information and communication technology**	Common term that includes all technologies used for exchanging and processing of information.
14.	**Reliability of data**	Level of correspondence of data stored in computer memory or documents, to the actual state in the system that are reflected by these data.

1.2. References and Legal Issues for the IT System Development

The processes of creation, implementation and operation of the *State Registry of Voters* shall not contradict the relevant regulatory and legal documents in force on the activity of *CEC* and development of IT solutions for central public authorities (*CPAs*). Some documents of this category are the following:

1. *Law no. 101 of 15 May 2008 on the Concept of the State Automated Information System "Elections",* Official Monitor no. 117-119 of 04 July 2008.

2. *Law no. 1381 of 21 November 1997 on the approval of the Election Code,* Official Monitor no. 81 of 08 December 1997.

3. *Law no. 764 of 27 December 2001 on the administrative and territorial organization of the Republic of Moldova,* Official Monitor no. 16 of 29 January 2002.

4. *Central Electoral Commission Decision no. 137 of 14 February 2006 on the approval of the Regulation on CEC activity (amended by the Resolution no. 24 of 05 April 2011).*

5. *Central Electoral Commission Decision no. 3364 of 23 July 2010 on the approval of the Regulation on the compilation, management and updates of electoral lists (as amended by the Decision no. 33 of 08 April 2011).*

6. *Report of the Court of Accounts of the Republic of Moldova on audit of information technologies with performance elements at the Central Election Commission,* Decision of the Court of Accounts of the Republic of Moldova no. 3 of 28 January 2013.

7. *Law no. 982 of 11 May 2000 on access to information,* Official Monitor no. 88 of 28 July 2000.

8. *Law no. 1069 of 22 June 2000 on informatics,* Official Monitor no. 073 of 05 July 2001.

9. *Government Decision no. 735 of 11 June 2002 on special telecommunications systems of the Republic of Moldova,* Official Monitor no. 79-81 of 20 June 2002.

10. *Law no. 467-XV of 21 November 2003 on computerization and state information resources,* Official Monitor no. 6-12/44 from 01 January 2004.

11. *Law no. 264-XV from 15 July 2004 on electronic documents and digital signatures,* Official Monitor no. 132-137/710 of 06 August 2004.

12. *Government Decision no. 840 of 26 July 2004 on the creation of the Telecommunications System of public administration authorities,* Official Monitor no. 130 of 30 July 2004.

13. *Government Decision no. 945 of 05 September 2005 on public key certification centres, Official Monitor no. 123-125 of 16 September 2005.*

14. *Government Decision no. 320 of 28 March 2006 on the approval of the Regulation on the application of digital signatures in electronic documents of public authorities,* Official Monitor no. 51-54 of 31 March 2006.

15. *Law no. 133 of 08 July 2011 on personal data protection,* Official Monitor no. 171-175 of 14 October 2011.

16. *Law no. 71-XVI of 22 March 2007 on registries*, Official Monitor no. 70-73/314 of 25 May 2007.

17. *Order no. 94 of 17 September 2009 of the Ministry of Information Development on the approval of some technical regulations (procedure of record of electronic public services, provision of electronic public services, ensuring information security upon the provision of electronic public services, determination of the cost of development and implementation of automated information systems)*, Official Monitor no. 58-60 of 23 April 2010.

18. *Government Decision no. 1123 of 14 December 2010 on the approval of the Requirements for the provision of personal data security upon their processing in information systems of personal data,* Official Monitor no. 254-256 of 24 December 2010.

19. *Standard of the Republic of Moldova SMV ISO CEI 15288:2009 "Systems and Software Engineering. Processes of the system life cycle."*

20. *Technical regulation "Processes of the software life cycle" RT 38370656-002:2006,* Official Monitor no. 95-97/335 of 23 June 2006.

21. Other laws, regulatory acts, standards in force in the area of election and ICT.

In accordance with Article 11 of Law no. 467-XV *"On Computerization and State Information Resources", the State Registry of Voters* may =be classified in the category of state information resources and in this case, according to Article 21 of the same law shall take into account the policy on state information resources developed by the *Ministry of Information Technology and Communications* (MITC) and approved by the *Government of the Republic of Moldova*. In accordance with the *Concept of Automated Information System "Registry of resources and state information systems"* adopted by the Government Decision no. 1032 of 06 September 2006 the certification of the *State Registry of Voters* and registration in the State Registry of Information Resources and Systems run by the *MITC* is required. As a result of the registration, the owner will be issued the IS identifier.

The *Law no. 133 of 08 July 2011 "On protection of personal data"* states the obligation to ensure the confidentiality of personal data. Moreover, according to this law the *CEC* is obliged to registry the *SRV* in the *State Registry of Personal Data Operators* that is managed by the *National Center for Personal Data Protection*.

1.3. Basic Principles of the IT System

Upon designing, development and implementation of the IT system the following general principles must take into account:

- **Principle of legality:** which implies the creation and operation of the IT system in accordance with the national law in force and the relevant internationally recognized norms and standards**;**

- **Principle of reliable data:** provides the data input in the system via authorized and authenticated channels only;

- **Principle of information security:** implies a proper level of integrity, selectivity, accessibility and effectiveness to secure data against losses, alterations, damages and unauthorized access.

- **Principle of accessibility to public information:** involves the implementation of procedures of provision of access to Moldovan citizens to public information by IT solution;

- **Principle of transparency:** requires the design and implementation according to the modular principle, using transparent standards of information and telecommunications technologies;

- **Principle of expansibility:** stipulates the possibility of extension and completion of the IT system with new functions or improvement of the existing ones;

- **Principle of priority of first person / single centre:** implies the existence of a senior responsible person with sufficient rights to make decisions and coordination of activities to create and operate the system;

- **Principle of scalability:** implies the provision of a constant performance of an IT solution upon the increase in the amount of data and request of the IT system;

- **Principle of integration with existing software products:** implies the possibility of the IT solution to be integrated in and interact with the applications already implemented in the *CEC*;

- **Principle of simplicity and convenience of use:** implies the design and implementation of all applications, hardware and software resources available to the System users, based exclusively on visual, ergonomic and logical principles of design.

In particular, for the IT system architecture the following major principles are required:

- provision of adequate security of the IT system to protect information and component subsystem against their unauthorized use or disclosure of personal information or information with limited access;

- recognition of information as property and its proper management;

- minimizing the number of different technologies and products that offer the same or similar functionality by destination.

- development and implementation of the IT system providing the possibility of its reuse for other processes or in terms of ensuring the possibility of developing new functionality;

- the performance must ensure a proper response to the beneficiaries;

- for the developed IT solution the recovery capability after disaster (physical security of information solution) shall be provided through business continuity plan and recovery plan *(Business Continuity and Disaster Recovery Planning)* as part of the implementation plan.

1.4. Destination, Objectives and Tasks of the IT System

The development and implementation of a new IT solution designed to consolidate and manage the data collection of Moldovans with voting right the reengineering of the *CEC* visions on the principles of development and operation of the *SRV* is required.

In this context, before the appearance of reliable external data sources, a number of additional processes are required allowing the check and update in automated and manual mode of external data received to update the content of the *SRV*.

Creation and implementation of the *SRV* will allow the *CEC* to achieve the following objectives:

- automated updating of the *SRV* content based on the information received from external sources of information (*SRP, LPAs, CPAs, citizens*);

- increase in the accuracy and authenticity of data received from external sources and their automated integration into the *State Registry of Voters*;

- implementation of automated procedures for validation and verification of primary information taken from external data sources prior to the execution of the procedure of the *SRV* updating;

- reduction of the necessary time and resources for the process of consolidation and update of data collection for Moldovan voters;

- provision of traceability of voters by maintaining the history of modifications of identity, residence data and identity documents held by voters;

- implementation of official nomenclatures of the Republic of Moldova *(CATUM, Nomenclature of streets and addresses of the Republic of Moldova)* for the realization of framework of interoperability of information subsystems of the *CEC* with existing information systems from the Republic of Moldova;

- elimination of the multiple voting by further integration of monitoring subsystems of the voting process or by excluding the use upon voting of annulled, false or expired identity documents;

- provision of premises for the implementation of the electronic voting based on the digital identity of Moldovan citizens (digital certificate or mobile signature).

The computerization of the consolidation and maintenance of the *SRV* reduces the costs of preparation and administration of the voting lists in the *LPAs*, will eliminate the issues of interoperability between the IT subsystems of the *CEC* and the external systems of other *CPAs* and *LPAs*, will eliminate the need to send materials on voters identity on paper, will increase the accuracy and reliability of voting lists and create preconditions for the implementation of the electronic voting.
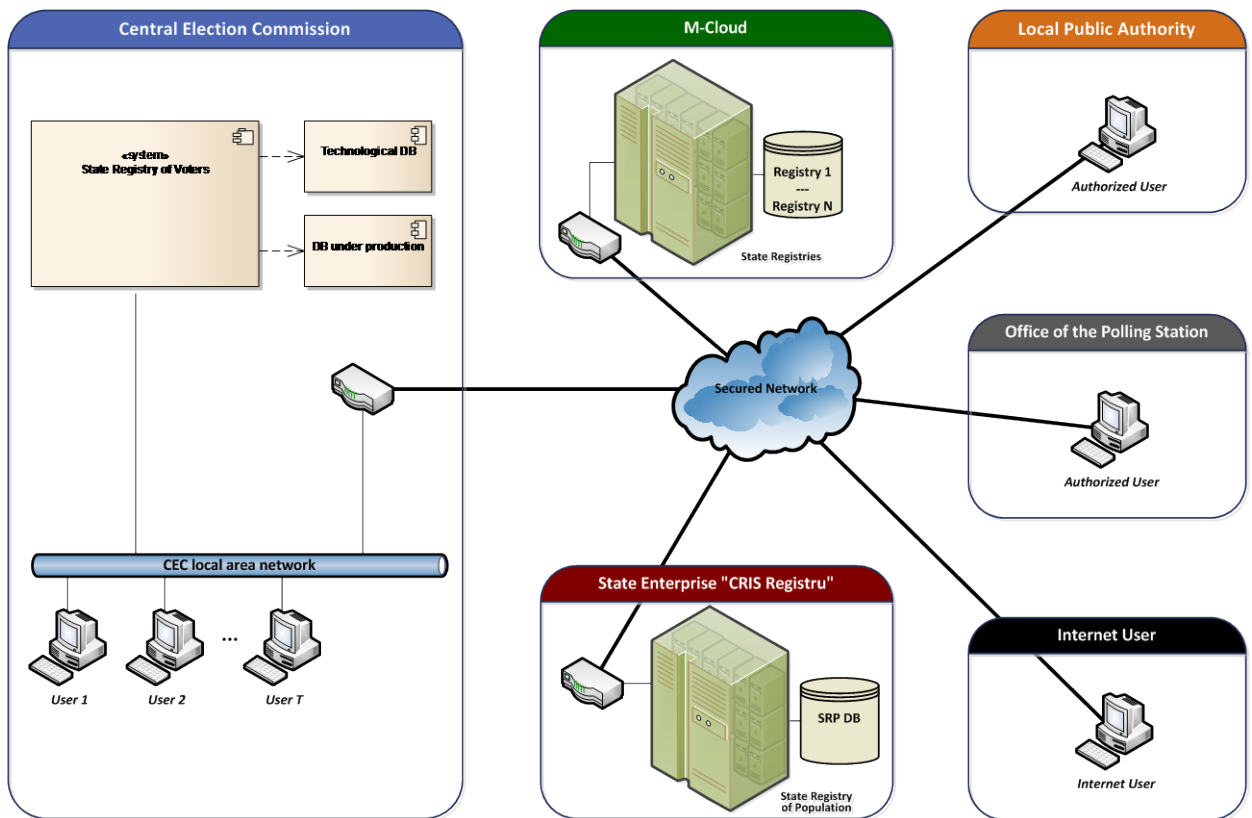
2. Architecture of the IT System

The *SRV* shall provide a WEB interface accessible through a wide use web browser (*Microsoft Internet Explorer, Mozilla FireFox, Opera, Google Chrome* or *Safari).*

From a functional perspective a reliable and scalable solution will be developed both in case of increase in the number of concurrent users and concurrent applications using the resources of the *State Registry of Voters* and in case of increase in the amount of information managed by it.

It would be good if the *State Registry of Voters* will be built using open, non-proprietary solutions, specific to WEB applications (XML, XSL, XHTML, WSDL, SOAP, LDAP, J2EE, etc.) and will allow easy development of components for portal type systems. Since the *SRV* is not an isolated IT solution, but will interact with other IT subsystems of the *CEC* or other *CPAs (SE "CRIS Registru", Ministry of Justice, Center for Special Telecommunications),* the IT solution developed shall provide support for the integration with other IT subsystems.

In order to ensure an adequate level of information security the IT solution delivered shall allow the realization of secured connections between client and the application server to ensure safety of the information sent. The authorized users will authenticate with the username + password and digital certificate or mobile signature. Also, extraction into account the legislation in force, the access of voter to information related to them stored in the *SRV* shall be provided.

The *SRV* shall be developed from Internet /Intranet technologies appropriate to the moment. The interaction of all players of the IT system is shown in Figure 2.1.

Figure 2.1. Architecture of the State Registry of Voters.

As shown in the relevant figure, the cooperative solution of resources to ensure the functionality of the *State Registry of Voters* consists of 4 distinct types of nodes:

- **Data Centre of the CEC** – the *CEC* servers on which the *SRV* will be installed are hosted by all IT subsystems that will interact with the *SRV;*

- **Data Center of the SE "CRIS Registru"** - the equipment of the *SE "CRIS Registru"*, which hosts the *SRP*;

- **M-Cloud** - equipment forming the government cloud (*M-Cloud*) that will host all registries of the *CPAs* relevant to the *SRV* and the *M-Pass* system used for authentication, use of digital signature, mobile signature or service of official time mark of the Republic of Moldova (time stamping service);

- **Client computers** - computers from which users will access (depending on the rights and roles) the functionalities *State Registry of Voters.*

The client computers shall be used as a client application to access and use the *SRV* one of the most popular Web browser. The interface and functionality delivered to each user individually will depend on the user's level, rights and roles.

From a functional perspective there can be distinguished 4 main categories of system users: *Administrators, Authorized CEC users, Authorized users of LPAs, Internet users.* Therefore, all users with access to the *SRV* can be shared in different levels of access:

1. **Administrator access level.** It is the level of access with unlimited rights to the *SRV* functionality. There are users that oversee the functionality of the IT system, define and restrict the rights of access of all users.

2. **CEC Users Access Level.** It is a relatively high level of access to the *SRV* functionality (extraction into account the rights and roles available). At this level it's about the existence of several groups of users with different options of access to resources of the IT system (for users from the CEC, *Electoral District Councils* and *Offices of Polling Stations*) to fulfill the duties.

3. **Access Level of Local Public Authority**. It is the *LPA* access level through which the persons responsible from mayor's offices can analyze the list of voters allocated to polling stations from the settlement and ask making some eventual changes in these lists.

4. **User Internet Access Level.** This level of access is typical to users interacting with the *SRV* from outside the workspaces listed in points 1-4 and corresponds to Moldovan citizens that as required by law in force shall have the right to view their data in the *SRP*. The access could be done through a WEB service available on the website http://www.votează.md.

Regardless of the level of user access to all users' connections to the *State Registry of Voters* will be done via secure connections.

3.   Parties Involved and Roles of the IT System

3.1. Business Roles of the IT System

The following entities are interested in or shall be engaged in the development and proper operation of the system:

- The **Central Election Commission** is a standing public institution established to implement the election policy for the proper organization and conduct of elections. The mission of the Central Election Commission is to create optimum conditions for all Moldovan citizens to freely exercise their constitutional voting right and to be elected in free and fair elections. The *CEC* is responsible for the administration and operation of the *State Registry of Voters.*

- The **UNDP project "Improvement of the quality of democracy in Moldova by parliamentary and electoral support"** as institution that will finance and monitor the development activities and implementation of the *SRV.*

- The **State Enterprise "State Information Resources Centre Registru" (SE "CRIS Registru")** is an enterprise subordinated to the Ministry of Information Technology and Communications, aimed to implement integration projects and form information resources. As owner of the *SRP, the SE "CRIS Registru"* will serve as a leading provider of information for the *State Registry of Voters.*

- The **Ministry of Information Technology and Communications** as the main body of policies and rules on the development and implementation of state information resources.

In the future, other public authorities of the Republic of Moldova shall be involved that will develop IT systems to strengthen and update the information content of the *State Registry of Voters* as:

- **Ministry of Justice** – this connection shall be provided to enable the automated receipt of data on persons temporarily deprived of their voting right at the time of development of the *Judicial Registry*.

- **Ministry of Defence** - this connection shall be provided to enable the automated receipt of data on military persons at the time of development of the *Mobilization Registry* .

- **Ministry of Labour and Social Protection** - this connection shall be provided to enable the automated receipt of data on persons in care centres, retirement homes, etc. at the time of development of the *Automated Information System "Social Assistance"*.

- **Ministry of Education** - this connection shall be provided to enable the automated receipt of data on the temporary residence of pupils and students with voting right studying in other places than the place of their residence at the time of development of the *Registry of Pupils and Students.*

3.2. Owner and Holder of the IT System

The owner of the *State Registry of Voters* is the *Central Election Commission*. The role of owner of the system reflects the administrative aspect related to the *CEC* competence.

The technological aspect of the *SRV* (role of holder of the IT system) will be administered by the *IT* subdivision of the *Central Election Commission*.

The *CEC* is responsible for the smooth operation of the module and information of public authorities serving as target data for the import in the event of technical problems or needs of massive imports or checks.

3.3. IT System Administrator

The *State Registry of Voters* will be hosted in the IT infrastructure of the Central Election Commission and its administration will be performed by the *CEC* IT subdivision.

The administrator has full access to all the functionalities of the system, files and database related to IT solution, rooms where equipment and machinery of software applications or providing safety of the *SRV* managed data are located.

The administrator's responsibilities are:

- ensuring the normal operation of the IT system by ensuring data availability, security and integrity;

- at the written request of the owner of the Registry, the administrator changes the system functionality (within the possibilities allowed by the system), etc.;

- management and provision of operation of the technical equipment of the software applications including the elimination of security of the perimeter of the network and data access:

  a) holding or lease of channels of access in broadband Internet and government network;

  b) management of the WEB server of applications through which services included in the Registry are provided;

  c) administration of the WEB server of applications through which services included in the SRS are provided.

3.4. Users and their Roles in the System

The human roles or other systems that interact with the *SRV* are shown in Figure 3.1.
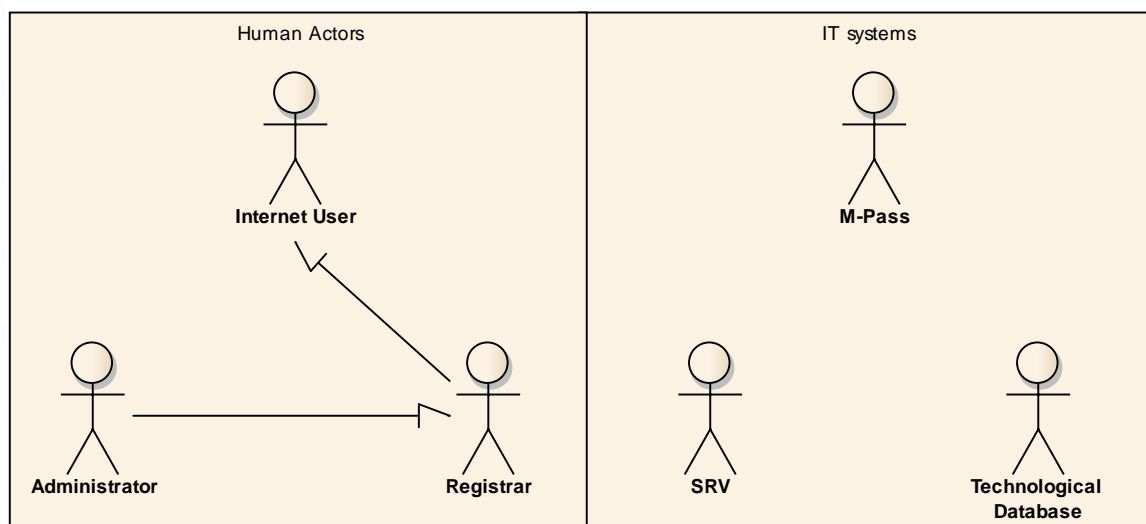
Figura 3.1. Actors of the IT system.

Internet User - represents all Moldovan citizens who interact with the *SRV*. These users will have the following roles:

- view the *SRV* content to access the registry's depersonalized data;

- access detailed information of their profile in case of authentication with valid digital certificate;

- request the updating of their profile based on an electronic form completed and signed with valid digital signature;

- access the public *KPI* indicators provided by the *SRV*.

Registrar –represents all authorized users of the *CEC* interacting with the *SRV*. These users will have the following roles:

- start and monitor the automated processing of the technology DB records;

- start and administrate the provision of assistance of the technology DB recording;

- search in the SRV;

- see details of voters profiles;

- extract in external files of the search results or of the content of voters profiles.

Administrator - human player empowered to ensure the functionality of the *Module of data import from the State Registry of Population* in good conditions. If the technological environment in which the IT system will operate includes capabilities sufficient to perform the administration works and then their implementation in the system is optional.

This category of players has the following distinct roles:

- access to all the functionalities accessible to authorized users;

- management of the system of nomenclatures, classifiers and metadata of the SRV;

- management of the roles and rights of authorized users of the SRV;

- start / suspension of the SRV operation;

- monitoring of the operation of the SRV;

- ensuring information security;

- management of the database;
- management of interfaces for interconnection with external and internal IT systems.

SRV - IT system to be developed (*State Registry of Voters*).

M-Pass - external IT system for authentication in *M-Cloud*, application and check of validity of the digital signature. It allows the authentication of *Internet User* to view in details their profile and apply the digital or mobile signature on the electronic application form for the update of the *SRV* data related to voter.

Technological DB - database strengthened by external applications forming the *SRV* all potential transactions of updating of the *SRV* content (add new voter, update voter database, deprivation of voting right and voter's radiation).

3.5. *Interaction with other IT systems*

To ensure the functioning in optimum conditions of the *State Registry of Voters*, it is necessary to make the interaction with 2 types of IT systems:

1. Interaction with the CEC IT systems.

This interaction represents one of the main objectives of the *SRV* implementation and consists in the delivery of a WEB service for sharing data collection administered by the *SRV* of other CEC IT applications.

2. Interaction with *M-Pass*.

Due to the fact that digital signature or mobile identity could be used to authenticate Moldovan citizens and the application of signature of electronic forms of application of voters data update we consider it appropriate to ensure the integration of the *M-Pass* service generated by the *Special Telecommunications Center* allowing:

- authentication of voter;
- application of the digital or mobile signature.

3. Direct integration with other IT systems.

Given that all the procedures for updating of the *SRV* content will use the technology Database the *SRV* will indirectly interact with the following IT systems that will complement the technology DB:

WEB resources of the CEC:

It will represent the interface of interaction with the *SRV* of Moldovan citizens (through the solutions of the CEC official website) in order to incorporate the technology DB update requests of voters' profiles.

State Registry of Population:

It will be the main source of information designed for strengthening of the *SRV* content explored through the *Module of data import from the SRP*.

Judiciary Registry:

At the time of development of the *Judiciary Registry* the possibility of receipt of data on people's temporary deprived of the voting right will be ensured. In case of this document, such integration is beyond the scope of implementation.

Mobilization Registry:

At the time of development of the *Mobilization Registry* the possibility of receipt of data on military people will be ensured. In this case, such integration is beyond the scope of implementation.

Automated Information System "Social Assistance":

At the time of completion of the *AISSA* implementation the possibility of receipt of data on persons from care centres, retirement homes, etc. will be ensured. In case of this document, such integration is beyond the scope of implementation.

Registry of Pupils and Students:

At the time of development of the *Registry of Pupils and Students* the possibility of receipt of data on temporary residence of pupils and students studying in other places than their residence will be ensured. In case of this document, such integration is beyond the scope of implementation.

4. Functional Model of the Subject to Automation

4.1. IT Objectives of the IT System

Analyzing the modeled field (provision of the *SRV* functionality) all information objects to be taken into account upon the development of the IT solution can be distinguished (Figure 4.1).
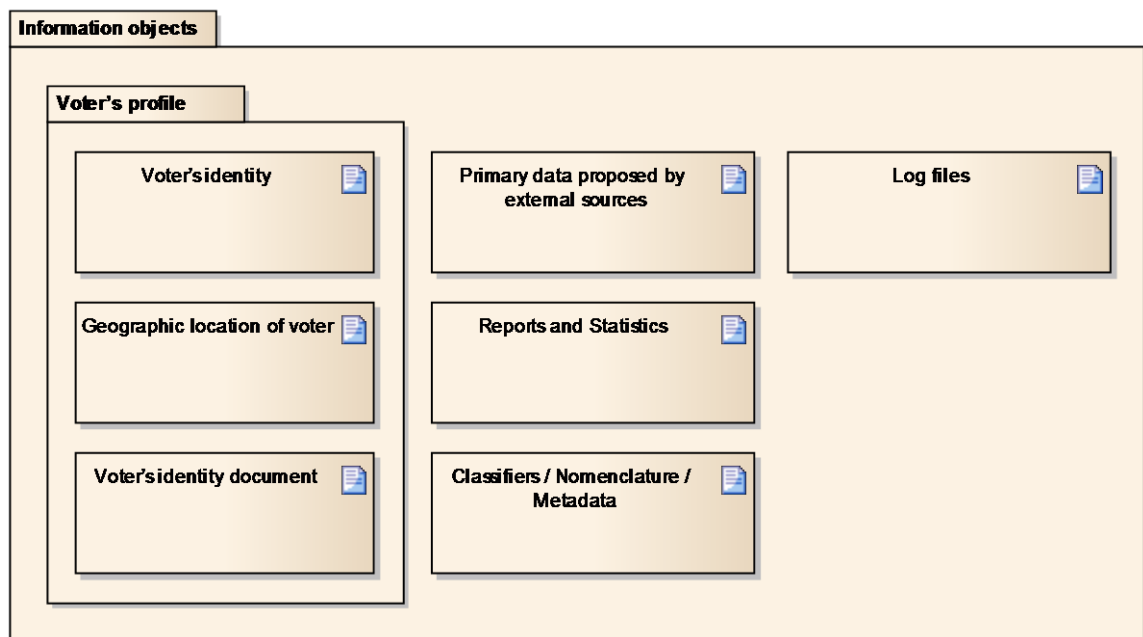
Figure 4.1. Information objects of the State Registry of Voters.

There are 5 categories of information objects that must be taken into account in the design and implementation of IT solution the following:

- Voter's profile;
- Primary data proposed by external sources;
- Reports and statistics;
- Classifiers / Nomenclature / Metadata;
- Log registration of the logging component.

1. Voter's profile.

It is a complex information object that provides all information related to voter stored in the DB in the production of the *SRV*. The voter's profile will store all the data related to identity, geographic location and identity documents held during the exercise of the voting rights.

1.1. Voter's identity.

It is a complex information object that contains all the data that define the identity of the voter. According *to Law no. 1381 of 21 November 1997* for the provision of the *SRV* functionality will contain:

- voter's name;
- voter's surname;
- voter's father name;
- voter's date of birth;
- voter's IDNP code.

1.2. Geographical location of voter.

It is a complex information object that contains all data for of the residence of the voter. This information object will contain the following data relevant to voter's residence visa:

- voter's district / municipality;
- voter's settlement (sector for voters from municipality);
- voter's street;
- voter's building number;
- voter's apartment number.

It should be taken into account that for people who are for a long-term outside of Moldova it is important for this data to be entered into the *SRV*. Since the principles of administrative and territorial division differs from one country to another the universalising of principles of insertion of the geographical location being impossible and since the business objectives of the *SRV* do not include the provision of completeness of the administrative and territorial division of other countries, we believe it is appropriate to insert the voter's textual address (country and city).

1.3. Voter's identity document.

It is a complex information object that contains all available data on the identity document of the voter. The relevant information object will contain the following data related to the voter's valid voter identity document:

- type of identity document;
- series of identification number;
- identification number;
- date of issue of the act;
- act expiration date.

2. Primary data proposed by external sources.

This is an information object that consists of all the records stored in the technology Database designed for the update of the *State Registry of Voters.* In fact, these records will be some rules of the *SRV* update.

The following categories of records of the *SRV* update stored in the technology Database can be defined:

- addition in the SRV of new voters;

- update of data of voter's profile from the SRV;

- deprivation of the voter's voting right from the SRV;

- deletion of voter from the SRV.

3. Reports and statistics.

These are a set of (physically incorporated) standard or ad-hoc generated reports of the *SRV* for all levels of access to the IT system resources to monitor the progress of data collection managed by the *SRV* and activity authorized users.

Given their nature, the reports will be accessible from both the interface with restricted access for authorized users and from the public WEB interface for Internet visitors of the site http://www.cec.md (provision of access to performance indicators (**KPI**) with public nature).

4. Classifiers / Nomenclature / Metadata.

These are an institutional object that consists of all metadata related to the IT system. It will contain national and domestic classifiers used in the *CEC* applicable in the *SRV*. The category of metadata could include: *Classification of Administrative and Territorial Units of Moldova, Nomenclature of Streets and Addresses, Nomenclature of the type of identity documents, etc.*

5. Log files.

These files are information objects designed for IT audit and Implementation of the information security policy. The log files will store all access and management data of the *State Registry of Voters* (connection, data update, data reading, data deletion, error deletion, etc.). The log files will be the base of the mechanism extracting statistics of IT solutions and provision of information security.

4.2. Information Flows and Operation Levels

To ensure the functionality of the *SRV* 3 primary categories of information flows available for different categories of users of the IT system shall be implemented:

- **Technology DB processing automatically.** This is the update mode of data collection of the *State Registry of Voters* based on the update requests contained in the technology Database. This processing mode will be applied only on records provided by the data sources for which the *CEC* has a total trust on the veracity of the data provided. The processing mechanism of this flow is shown in Figure 4.3.

- **Technology DB processing in assisted mode**. This is the update mode of data collection of the *State Registry of Voters* based on the update requests contained in the technology Database. This processing mode will be applied on records provided by the data sources for which the *CEC* has not a total trust on the veracity of the data provided. Thus, once such records are considered, the *SRV* will provide the *State Registry of Voters* suggestions of their processing that they can ignore or apply. Once applied or rejected they either will be integrated into the DB under production or rejected. The processing mechanism of this flow is shown in Figure 4.3.

- **Provision of information to external IT systems.** This is the sharing mode of data collection of the *State Registry of Voters* of other IT applications used by the *Central Election Commission*. The access to and provision of information managed by the *SRV* will be provided through a WEB service.

4.3. Functionalities of the IT System

All of the functionalities delivered by the *SRV* and players that benefit from them are shown in Figure 4.2. In accordance with the scheme described in Figure 4.2 the *SRV* players have access to the following functionalities:

- **UC01. Views data from the SRV.** It is a use case provided to Moldovan citizens through which they will be able to check the information related to their profile in the *State Registry of Voters* (functionality required by the *Election Code* of the Republic of Moldova). In case of public access depersonalized data will be displayed. If the *Internet User* will login via their digital certificate –the *SRV* will display all information related to their profile.

- **UC02. Request of the SRV personal data update**. It is a use case provided to Moldovan citizens through which they may require the update of their profile data in the *State Registry of Voters*. The requests to update the voter's profile will be stored in the technology Database for further processing using the functionality described in UC03 only if the voter authenticates using the digital certificate and applying the digital signature on the electronic form of insertion in the *SRV* of changes related to the voter.
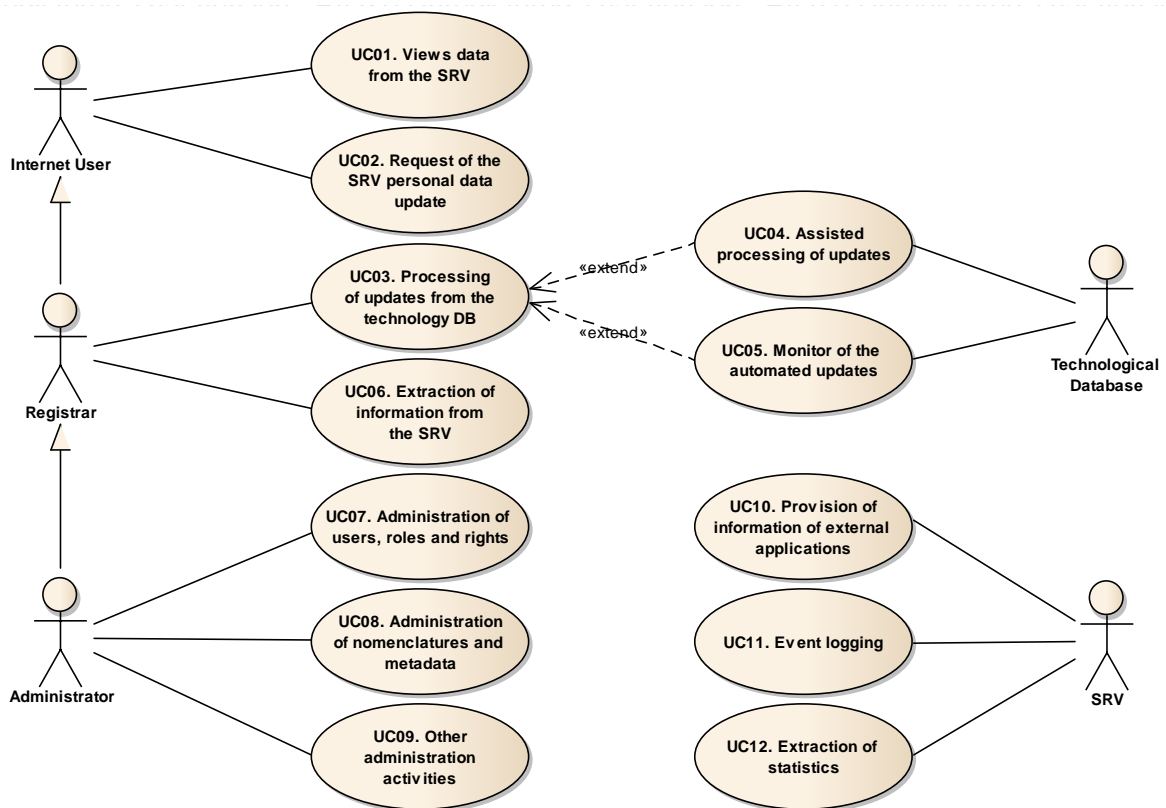
Figure 4.2. Functionalities of the information system.

- **UC03. Processing of updates from the technology DB**. It is a use case that provides all the functionalities of processing the records contained in the technology Database to update the data collection administered through the *State Registry of Voters*. The scenario related to this use case is shown in the scenario of Figure 4.3.

- **UC04. Assisted processing of updates.** It is a use case that provides all functionalities of assisted processing of the relevant records of the technology Database. Through this use case the technology DB records from sources of information considered by the *CEC* to be potentially or partially true will be processed. It is a semi-automated update mode, the *Registrar* having access to an interface of approval or rejection of the application of the *SRV*

update suggestions for updating the technology Database. The scenario related to this update mode is given in the scenario of Figure 4.3.

- **UC05. Monitor of the automated updates.** It is a use case that provides all functionalities of processing automatically of the records of the technology Database. Through this use case only the technology DB records will be processed from sources considered by the *CEC* to be completely truthful. It is a fully automated update system, the *Registrar* having access to an interface of approval or rejection of the automated update process of the Database under production of the *SRV*. The scenario related to this update mode is given in the scenario of Figure 4.3.

- **UC06. Extraction of information from the SRV.** All of the functionalities provided by the *SRV* to the *Registrar* through which it has functionalities to formulate search criteria in the *SRV*, view of the search results, access of relevant voters profiles stored in the Database under production and extraction of lists with results or details of voters in external files (in CSV, PDF or RTF formats).

- **UC07. Administration of users, roles and rights**. The functionalities designed for the Administrator / *SRV* through which the list and integrity of credentials of authorized players of the IT system are administrated. It would be appropriate to implement this using the existing *Active Directory* solution of the *CEC* or other internal solution can be integrated that allows user authentication and authorization.

- **UC08. Administration of nomenclatures and metadata.** It is a functionality designed for the Administrator of the *SRV* whereby they administrate all nomenclatures and metadata related to the *SRV* provided by the *CEC* (including the interface of the IT system). A feature of this use case is provision of functionalities of drafting correspondence tables required for the normalization of data received from external sources according to the identifiers of nomenclatures and classifications used in the *SRV*.

- **UC09. Other administration activities**. This is a set of functionalities beyond the objectives of the implementation of these TOR designed for the *SRV* Administrator, which includes all operations of administration and ensuring of the *SRV* functionality that were not described in other cases of use in Figure 4.2 and will be conducted through mechanisms of the operating system or other IT solutions operated in the *CEC*.

- **UC10. Provision of information of external applications.** This is a set of functionalities provided by the *SRV* to other subsystems of the *Central Election Commission* that require access to the collection of data of Moldovan citizens with voting right *(SAISE, Electoral Lists,* etc.). These functionalities will be delivered via a WEB service. This service could deliver the following information: the answer to the question whether the person has voting right; voter's identification data.

- **UC11. Event logging.** Any event generated within the functionalities implemented in the *SRV* (users accessing the registry, process execution time, made update, result of activity, generated errors, etc.) will be logged and saved in proper tables of the Database.

- **UC12. Extraction of statistics.** It is a functionality provided by the *State Registry of Voters* through which the *SRV* provides to the authorized and public users statistics and performance indicators (***KPI***) related to the *SRV* functionality. In this way key information on the content of data collection could be provided (e.g. *number of citizens with voting right, number of citizens with suspended voting right, number and nature of updates made in a given period, etc*.).

4.4. Generic Workflow of the Technology DB Processing

According to Figure 4.3 the *Registrar* has 2 alternatives of processing of the technological DB records: in automated and assisted mode.

Once the automated processing mode of the technology DB records starts, the *SRV* will distinguish all the records subject to processing automatically (from sources in the accuracy of which the *CEC* has full confidence).

The distinguished records to be processed automatically are processed in order to adapt to the classifications and nomenclatures used in the *SRV* (by means of some tables of correspondence the internal identifiers of external data sources are converted to identifiers of nomenclatures and classifications used in the *SRV*).
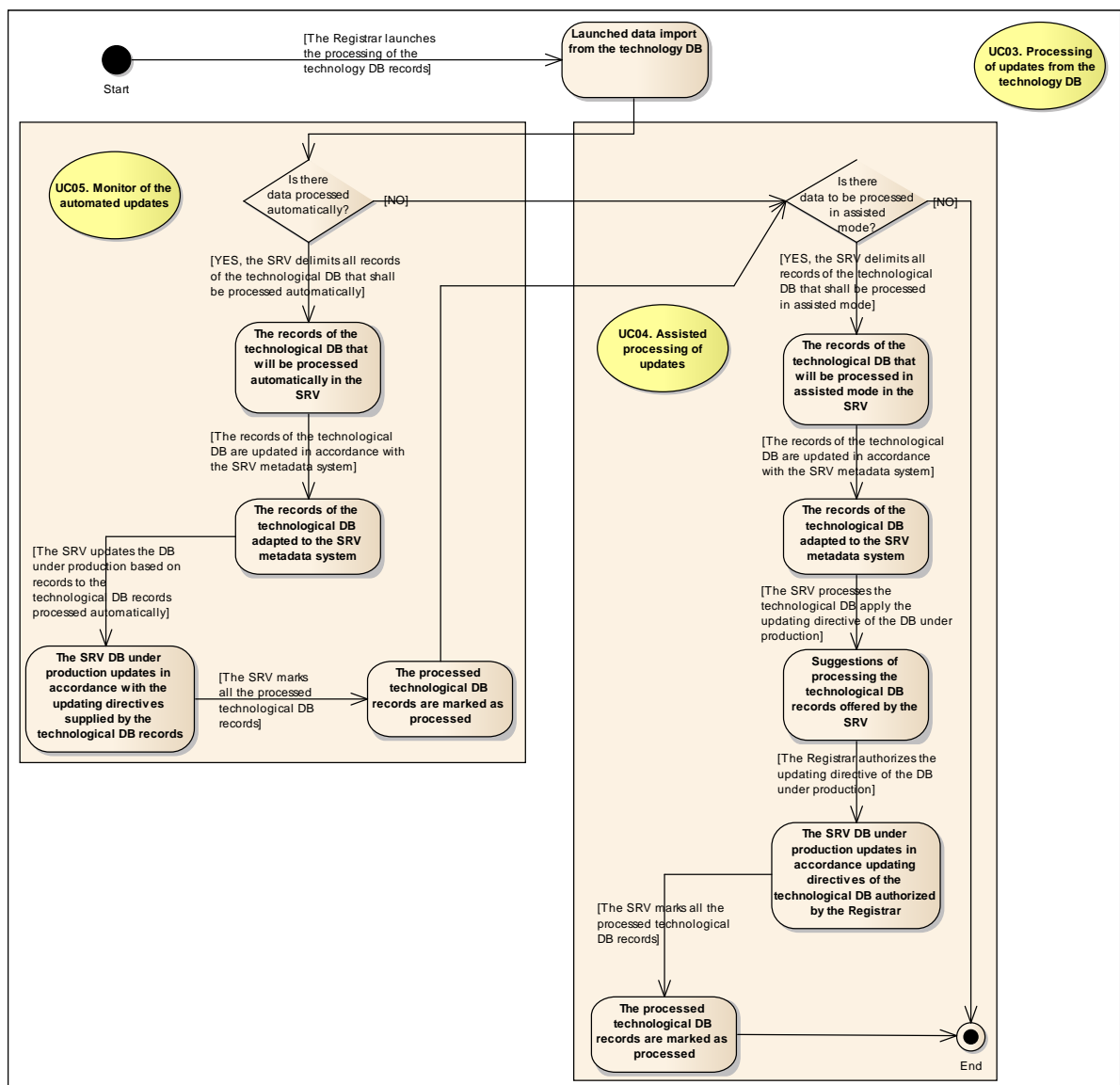
Figure 4.3. Generic Workflow of the Technology DB Processing.

Once the metadata contained in technology DB records are normalized, the *SRV* will update the DB under production given the nature of the requested update in the technological DB (addition of a new voter, update of vote's data existing in the *SRV*, suspension of the voter's voting right from the *SRV*, voter's deletion from the *SRV*). After the successful completion of the processing of the technological DB records, the *SRV* will change the status of the processed record (*example of status: successfully*

processed) for it to not be considered repeated in the subsequent launch of the technological DB automatically.

Once the assisted mode of processing of the technological DB records started, the *SRV* will distinguish all the records subject to processing in the assisted mode (from sources in the accuracy of which the *CEC* has full confidence).

The distinguished records to be processed in the assisted mode are processed for adaption to classifications and nomenclatures used in the *SRV* (by means of some tables of correspondence the internal identifiers of external data sources are converted to identifiers of nomenclatures and classifications used in the *SRV*).

After the normalization of metadata contained in the technological DB records, the *SRV* will suggest to the *Registrar* an action of record application based on its source (a probability of correctness or reliability of the data required to be updated could be shown). Depending on the suggestion provided by the *SRV* and its analysis the *Registrar* will approve, refuse or ignore the update (this could be done by activating a button).

If the *Registrar* approves the update request contained in the technology Database, the *SRV* applies the relevant directive for the update of the DB under production (addition of a new voter, update of voter's data existing in the *SRV*, suspension of the voter's voting right from the *SRV*, voter's deletion from the *SRV*). After the successful completion of the processing of the technological DB records the *SRV* will change the status of the processed record (*example of status: successfully processed*) for it to not be considered again at the subsequent launch of the technology DB in assisted mode.

If the *Registrar* rejects the update request contained in the technology Database, the *SRV* does not apply the relevant directive for the update of the DB under production and changes the status of the processed record (*example of status: processed with refused update*) for it to not be considered again at the subsequent launch of the technology DB in assisted mode.

When the *Registrar* ignores the update request contained in the technology DB, the *SRV* does not apply the relevant directive for the update of the DB under production and does not change the status of the processed record for it to be considered again upon the subsequent launch of the technological DB in assisted mode.

4.5. User Interface of the IT System

The *SRV* shall provide an ergonomic, intuitive and accessible interface to all types of users. The system shall have a unique graphic, pleasant, balanced and distinct design. For the convenience of users, the IT solution will have an on-line contextual help (Romanian version - mandatory) at the level of each user WEB interface.

Depending on the category of user (their right and roles) the IT system will provide a unique interface for each category of user.

The IT System users will have at least 4 levels of access based on the user interface (sets of rights and roles, as well as the optimal number of access groups will be able to be configured by system administrator):

- **Internet User Access Level** - access level by means of a public WEB interface of the *CEC* (http://www.cec.md) containing all the functionalities necessary to view the depersonalized content of the *SRV* and development of electronic forms for the request of information on voter's profile.

- **Registrar Access Level** – the level of the *CEC* authorized users via the user name+password / or digital certificate with roles of administration of the *SRV* content. The user of such level of access will perform all actions of management of the *SRV* content

(adding new voters, voter database update, suspension of the voting right and deletion of voter), retrieval and extraction of information contained in the *SRV*.

- **SRV Administrator Access Level** – the level of user of the highest level of access to the IT system resources. This will allow the access by the user name, password and the physical location of connection (or via a digital certificate). This level, given its role of administration of the proper operation of the IT solution, will provide access to all the functions of the user interface and database content delivered to the user interface.

- **External IT Application Access Level –** the level of access of all the *CEC* IT systems *(e.g. SAISE, electoral lists,* etc.) that will consume the WEB service provided by the *SRV* for the access to the *SRV* data to exercise their functionalities.

The *SRV* will have an interface in Romanian (WEB interfaces made public on the *CEC* website - in Romanian and Russian) and will have integrated search functions by metadata related to the *SRV* database (*e.g. search by geographic area, type of document, voter's status, etc.*).

The information and records retrieval procedures will be carried out through simple searches (specifying search strings) or much complex searches that are possible through more accurate information filtering. Whatever the nature of the information sought is, the user will use the same method for query and retrieval of information for any section of the IT solution.

The user interface of the IT system shall ensure the filtering of the records meeting the criteria of search presented to users according to their access rights. The filtering will be carried out by the IDNP, the data source, the date of updates.

The content of any result table shall be exported in either CSV format or in RTF and PDF formats.

4.6. *Reporting, Audit and Statistics Mechanism*

The IT system will implement functionalities for audit / logging widely used in industry. It is configurable to log technical and business events.

The *SRV* reporting system will distinguish 4 categories of reports:

- **Input Documents** – for each type a template will be created in which document relevant information will be inserted *(example: electronic form provided to Internet users for their profile update request);*

- **Output Documents** - for each type a template will be created in which document relevant information will be inserted (*example: voter's profile, list of voters, etc.*);

- **Performance Indicators** – is a set of KPIs on which basis the *SRV* state can be assessed (date of the last update; frequency of updates; number of voters with changes according to the status per total and detailed regionally, locally and per polling station). The developer will implement up to 20 performance indicators (*KPI*);

- **Public Reports –** such reports include the general public reports containing public data and does not contain personalized data. This class will provide outputs in particular KPIs values of public character.

Extraction into account the principle of ensuring the transparency of the *CEC* activity, the IT solution will publish the public information through the WEB interface http://www.cec.md.

5. IT System Requirements

5.1. *Functional Requirements of the IT System*

5.1.1. UC01: View of the SRV data

FR 01.01. The system will provide public access to the content of the DB under production to *Internet Users* via a WEB interface ensuring functionalities of information search and navigation in the results found.

FR 01.02. In case of anonymous users the DB content under production will be presented as being depersonalized.

FR 01.03. In case of *Internet Users* authenticated by digital certificate or mobile signature depersonalized information will be displayed only for the authenticated *Internet User* profile.

FR 01.04. If the *Internet User* authenticated by the digital certificate or mobile signature detects any irregularities in their data, they can directly request data update (UC02) from the information presentation interface.

5.1.2. UC02: Request of SRV updated personal data

FR 02.01. The system will offer the *Internet User* authenticated by digital certificate or mobile signature an electronic form to request change of the information contained in their *SRV* profile.

FR 02.02. Once completed, signed and sent, the electronic form of request to update the *SRV* voter's profile, the system will insert the corresponding record in the technology DB for further processing.

5.1.3. UC03: Processing of the technology DB updates

FR 03.01. The *SRV* will provide the *Registrars* technology DB processing functionality with all requests to update the DB under production.

FR 03.02. The *SRV* will normalize the identifiers of records contained in the technology DB based on tables of correspondence with the *SRV* metadata identifiers.

FR 03.03. The *SRV* will perform a primary check of the admissibility of update requests contained in the technology DB.

FR 03.04. The *SRV* will log all update transactions of the DB under production.

5.1.4. UC04: Monitoring of automated updates

FR 04.01. The *SRV* will apply all updates from the technology DB for requests which are considered totally secure by automatically changing the status of records after processing.

FR 04.02. The *SRV* will deliver an interface to the *Registrar* for the analysis of automated updates.

FR 04.03. The *SRV* will display a status when operating the automatic updates.

5.1.5. UC05: Processing of assisted updates

FR 05.01. The *SRV* will provide the *Registrar* an interface of processing of the technology DB record in assisted update mode.

FR 05.02. The *SRV* will provide the *Registrar* a suggestion of processing of the technology DB record.

FR 05.03. The *Registrar* may act 3 categories of assisted processing strategies of the technology DB records: update approval, update rejection, update ignoring.

FR 05.04. The *SRV* will change the technology DB records approved or rejected for not being processed at the next start of the assisted update procedure.

5.1.6. UC06: Extraction of information from the SRV

FR 06.01. The *SRV* will provide the *Registrars* a search interface of relevant information by the IDNP voter, geographical area, status, etc.

FR 06.02. The *SRV* will provide mechanisms for filtering and ordering information found by search module for refining the formulated search criteria.

FR 06.03. The *SRV* will present search results in a table convenient to be viewed that will have paging, sequencing and content filtering mechanisms.

FR 06.04. The *Registrar* will be able to access from the list with results details of the user profile.

FR 06.05. The system will allow the export of any table with results or details of the user profile in HTML.

5.1.7. UC07: Administration of users, roles and rights

FR 07.01. The IT system will assign user roles and rights based on the *CEC Active Directory* or *M-Pass* solution.

FR 07.02. The IT system will contain a default category of users created by developer and credentials for them are returned upon the delivery for the category of administrator.

5.1.8. UC08: Administration of Nomenclatures and Metadata

FR 08.01. The system will have a management mechanism of nomenclatures and classifications that contain all the metadata of the Database.

FR 08.02. All the official classifiers of Moldova *(CUATM, Nomenclature of streets and addresses, etc.)* will be fully extracted.

FR 08.03. For official classifiers the rights of making changes will be limited (the update shall be made fully per classifier where they will be operated by the CPA that administrates them).

FR 08.04. For the system of internal nomenclatures and metadata, the IT solution will allow their dynamic definition and management (the proposed solution may be based either on configuration files of nomenclatures or direct administration of the DB tables).

FR 08.05. The system will allow the configuration of correspondence tables to normalize the data imported from external sources with the system of nomenclature and metadata of the *SRV*.

FR 08.06. The system will be able to configure the mode of processing of update categories stored in the technology DB.

FR 08.07.   The system will not allow the deletion of a metadata category if it is used at least in a record of the database.

5.1.9. UC10: Provision of external application information

FR 10.01.   The *SRV* will provide a service for the *CEC* IT applications to share the managed data collection;

FR 10.02.   The transfer of data between the IT applications of the *CEC* and the WEB service provided by the *SRV* will be done through secure connections;

FR 10.03.   The authorization of the access to the WEB service provided by the *SRV* will be done by means of a digital certificate or IP address of access;

5.1.10. UC11: Event logging.

FR 11.01.   The system will log all events related to the use of the SRV based on a solution widely used in industry.

FR 11.02.   For critical events the SRV will mandatorily log all events relating related to the security and viability of the system.

FR 11.03.   For less critical events the SRV administrator will configure (define and stop) the logging processes.

FR 11.04.   Only the Administrator will have access to the system logs.

5.1.11. UC12: Extraction of Statistics

FR 12.01.   The *SRV* will provide the authorized users depending on their rights and roles, the access to the mechanism of extracting reports and statistics.

FR 12.02.   The *SRV* will publish on the WEB interface provided to Internet users all public KPIs.

5.2.   *Non-Functional IT System Requirements*

5.2.1. General System Requirements

The general system requirements are defined by policies and strategies developed and adopted in the Republic of Moldova. It is also important to note that these documents are based on the best practices in the industry and include many organizational measures and a series of technical measures.

The general system requirements specific to the *SRV* include:

SYS001 The IT system guarantees the full storage and integrity of voters' data.

SYS002 The Database management system will be MS SQL Server 2008.

SYS003 The system will manage a database of at least 2.5 million records.

SYS004 The public information will be accessible to anonymous users.

SYS005 The access to functions offered to unauthenticated users is controlled by means of protection against service overload by one or several nodes of the network.

SYS006 Upon the communication of the system with other systems digital certificates for identification will be used.

SYS007 For sensitive transactions (voter addition, update, deletion) immediately after their execution, the service of time mark application *(time stamping)* will be used.

SYS008 The system will ensure the confidentiality of data transmitted and received via communication channels.

SYS009 Access to the system will be controlled.

SYS010 The access to the functions offered to internal users will be carried out with their authentication.

SYS011 The user's actions will be recorded in electronic logs.

5.2.2. Security and Protection Requirements

The system must comply with the technical requirements to IT systems imposed by the *Standard of the Republic of Moldova SMV ISO / IEC 27002:2009 Information Technology. Security Techniques. Code of good practice for information security management.*

At the time of acceptance the following will be checked:

SR001 The IT system ensures complete storage and integrity of all records related to Moldovan voters with voting right.

SR002 In the system communication with other systems the use of digital certificates for identification shall be possible.

SR003 The system will be secured for *OWASP Top 10 vulnerabilities.*

SR004 The system will ensure the confidentiality of data transmitted and received via communication channels.

SR005 Access to the system is controlled.

SR006 The access to the functions offered to internal users is carried out by their authentication.

SR007 The data exchange in the system is carried out only on secured channels.

SR008 The user or system actions are recorded in electronic logs.

5.2.3. Software, Hardware and Communication Channels Requirements

SHC0 The system will be developed based on platforms widely accepted in industry, for which there are specialists in Moldova.

SHC02 The system will deliver strong mechanisms ensuring security of user authentication and authorization procedures with mandatory implementation of the *Active Directory* technology.

SHC03 The public interface of the system can be accessed via communication channels of at least 128kbps.

SHC04 The system is able to be virtualized at hardware-software level.

SHC05 The demonstration of the ability of virtualization by delivering to the Beneficiary a system image that can be uploaded and functional with minimum configurations on one of the virtualization solutions on the market is required. Currently the Microsoft - Hyper-V solution is used in the *CEC* as a virtualization mechanism.

SHC06 The system will be error tolerant providing support for clustering and fail over for the entire platform and its components.

SHC07 It is welcome for the server solution bidder not to limit the use by the beneficiary of some specific software platforms, but to be built using the open, non-proprietary

solutions specific to the Web applications (*XML, XSL, XHTML, WSDL, SOAP, LDAP, J2EE,* etc.) for the Beneficiary to be able to develop it later.

SHC08 The current software architecture of the *CEC* is: Windows 2003 Server, MS SQL Server 2008, IIS 7, ASP .NET, TFS, Microsoft - Hyper-V, Microsoft Visual Studio 2010.

SHC09 It is necessary that at the client level the IT system operates at acceptable performance parameters on the reference configuration. (The reference configuration is an HP notebook computer *HP ProBook4510* with 2GHz processor, 2Gbyte RAM, *Windows XP SP3, FireFox 20*).

SHC10 The parties of publicly available service shall be technologically neutral.

SHC11 The parties of publicly available service shall be technologically neutral.

SHC12 The generic software program recommended for the operation and interaction with the *SRV* represents the WEB explorer.

SHC13   The system will be compatible with at least the 2 latest versions of the following WEB explorers: *Microsoft Internet Explorer, Mozilla Firefox, Google Chrome* and *Opera*.

SHC14 The verification will be carried out by using a set of (modern) platforms with the expectation that the performance parameters will be similar or better than those of the reference configuration

SHC15 The system will be tolerant to errors offering support for clustering and fail over for the entire platform and its components.

SHC16 The compatibility with the FireFox 20 web browser is mandatory.

SHC17 The *SRV* will incorporate a Heart-beat service that will communicate regularly the normal working state of the system.

SHC18 The system will include technical means of configurable logging (logging).

SHC19 The system shall be able to generate at least the following levels of technical logging: *info; warning; error; critical.*

SHC20 The developer will specify the means that will be used in the technical troubleshooting of the system.

SHC21 The developer will prepare means facilitating the system administration functions:

- start of the system components;

- stop of the system components;

- restart of the system components;

- creation of the backup database;

- data restoring from the indicated backup.

SHC22 The system will operate in the TCP-IP networks using the HTTPS protocol.

SHC23 The developer will suggest other network services and utilities required to operate the system.

5.2.4. IT System Documentation Requirements

The IT solution will be accompanied by a complete set of documentation of the IT system, which includes the following components:

DOC01 **The Technical Project** of the delivered information system on which basis all activities of (SRS and SDD) development / acceptance will be carried out.

DOC02 **The Architecture Documentation** of the system describing the models in the UML language that would include a sufficient level of detailing of the architecture and in several sections.

DOC03 **The API Documentation** subject to the integration with other information systems.

DOC04 **The technical project updated and completed** during the development of the information system.

DOC05 **The Administrator Manual** describes the functions of administration, including functions directly exposed from the system and manual procedures required to maintain the maintenance and proper operation of the service.

DOC06 **The User Manual** describes the parts of the IT solution exposed to different human users' roles.

DOC07 **The automated interoperation interfaces with external systems** of the IT system are (technically) specified and documented (in human text).

6.   Final Products and Delivered Components

The final product is composed of software artifacts and system documentation and knowledge transfer to the holder and the system administrator.

The system's artifacts include:

- Complete source code of the modules and components necessary for the compilation of the delivered software product;
- Final product packaged for easy installation in the proposed technological environment;
- Technical project updated and completed during the development;
- Document on the system installation and configuration;
- User Manual;
- Administrator Manual (including the contingency plan);
- All materials related to the SRV users training;
- Technical specifications in the WSDL language for published service interfaces;
- Source code for the applications and components developed within the project.
- Libraries and special tools required for the compilation of the system components (the developer will demonstrate the possibility of compiling the source code on the platform provided by the *CEC*).
- The test plan and the results of the internal (functional, performance, security) tests;
- All of the artifacts copied to removable carriers (CD-R or DVD-R).

The knowledge transfer and support include artifacts and services:

- Training materials;
- Training for users and administrators;
- Assistance during the system piloting period;

- Assistance in the system acceptance test;

- Assistance in putting the system into production;

- Removal of deficiencies identified during the pilot period and upon the acceptance test.

- After putting the system into production the following is necessary:

- Post implementation technical support for a period of 24 months, including corrective, adaptive and preventive maintenance in accordance with the ISO / IEC 14764.

7. SRV Implementation Phases

The design, development, test and implementation of all the *SRV* compartments must be performed by specialized companies and institutions that have expertise in the field and possess the necessary licenses to carry out the works and shall include the following phases:

1. **Phase of development of the legal framework** necessary for the operation of the *SRV* in accordance with the requirements of operation of the registries specified in *Law no. 71-XVI of 22 March 2007 on registries.*

2. **Phase of the IT subsystem development** - which will be divided into phases coordinated with the parties involved (*CEC, UNDP*) in the *SRV* development:

   a. The developer based on the Terms of Reference determines and analyzes the requirements, designs the structure of the IT system and develops the Technical Project *(document containing detailed information on solution architecture, conceptual and physical model of data, all IT system components and interaction between them, the need of hardware and software resources for operation, principles of development of the administrator and user interface, features of implemented legislative rules, users and roles, all standard types of documents implemented, principles of information security, etc.) (up to 1 month).*

   b. The developer develops the software code of the IT system and integrates its modules into a prototype version of the IT system (an initial presentation to the parties will be made proving the existence of all required functionalities in terms of reference and documented in the *Technical Project). (2 months)*

   c. The developer based on the collected databases held by the *CEC* and the *Module of data import from the SRP* consolidates the database under production of the *SRV* (*2-4 weeks*);

   d. The developer tests the subsystem in laboratory mode (internal testing) and prepares the accompanying documentation (the system's functionalities with corrections and adjustments to the objections made in the previous sub-phase, the set of technical documentation are submitted, etc.) (*up to 1 month*).

3. **The IT subsystem implementation phase** will begin upon the approval of the minutes of acceptance by the owner of the IT system in the submitted variant and the signing of the statement of acceptance in experimental operation. At this phase the developer tests the system in experimental conditions, detects and removes performance errors, etc. At the stage of implementation of the IT system the developer prepares the final version of the IT system to be commissioned (*minimum 1 month*).

4. **The training phase** will start with the implementation of the IT solution and will include the training of 2 users from the IT subdivision of the *Central Election Commission* for the

role of *Administrator* and up to 12 users from the relevant subdivisions of the *CEC* for the role of the *Registrar*.

5. **The commissioning of the IT subsystem** begins with the signing of the statement of commissioning of the software system and start of use.

6. **The system maintenance phase** is the period where the system developer assumes the commitment to the owner to assist them in maintaining or changing the software product, maintaining its integrity. In case of the *SRV* we consider that the initial period of 24 months would be sufficient.

8. Requirements on Completion of Bids

8.1. Requirements on the Institutional Power of Tenderers

Eligible to bid are companies specialized in the provision of IT services with minimum 5 years of experience, able to provide maintenance services for 24 months. The experience in the development of IT applications for electoral processes and interaction with the *SE "CRIS Registru"* would be an advantage.

The legal entities interested shall send their technical and price bid containing:

- Detailed description of the enterprise (experience, human resources, managerial and technical skills in the field, etc.;
- Copy of the registration documents;
- Company's portfolio specifying similar implemented projects;
- 3 references of beneficiaries of the company over the last 4 years
- CVs of key staff involved in the project;
- Brief description of the similar IT solutions;
- Detailed proposed technical solution, including restrictions on hardware operation, assessment of activities and their duration.
- Warranty period and technical assistance;
- Detailed financial offer;
- Other relevant documents.

8.2. Requirements to the Qualification of the Tenderer's Staff

All discussions with the beneficiaries of the project will be conducted in Romanian. All the relevant documentation, information solution interface and training and technical support will be conducted in Romanian. All staff involved in the project that will interact directly with the beneficiary must perfectly speak Romanian.

The bidder shall submit the technical bid with summary data on the project staff and its qualifications. Explicitly persons holding the following key positions shall be presented:

- Project Manager;
- Technical Coordinator;
- System Architect;
- Business Analyst;

For these positions CVs of trained persons shall be submitted, given that the proposed team must prove the following skills:

- Licensed in ICT;

- Minimum 5 years of experience in the proposed position;

- Specific experience in ICT proved through the implementation of similar projects like principles of operation or area of interest;

- Knowledge of modern methodologies for design and development of IT solutions;

- Sufficient knowledge of IT system development methodology for the government sector of the Republic of Moldova;

- Certification of the proposed technologies would be an advantage;

- Perfect knowledge of Romanian language (English language would be an advantage).