

TERMS OF REFERENCE

intended to adjust the SAISE for the Mixed Electoral System

Table of Contents

1. Introduction	3
2. General Information	4
2.1. Terms Used in the Specifications	4
2.2. References and Legal Issues of Development Activities.....	6
2.3. Principles used to re-engineer the SAISE IT Subsystems	7
2.4. Goal, Objectives and Tasks covered by the Specifications.....	8
3. Description of SAISE current and future architecture.	10
4. Peculiarities of SAISE re-engineering.....	12
4.1. Requirements for re-engineering the SAISE FB "Preparation"	12
4.1.1. Changes to be applied to "SAISE Admin" ITSS.....	12
4.1.2. WEB Services to be developed within "SAISE Admin" ITSS.....	14
4.2. Requirements for re-engineering the SAISE FB "Voters' List".	15
4.2.1. Changes to be made to the "State Registry of Voters" ITSS.....	15
4.2.2. Peculiarities of "State Registry of Voters" ITSS integration with the "SAISE Admin" ITSS.	17
4.2.3. Changes to be applied to the "Check your name in the SRV" ITSS.....	18
4.3. Requirements for re-engineering the SAISE FB "Voting"	19
4.3.1. Changes to be applied to the "Voter Turnout" ITSS.	19
4.3.2. Changes to be applied to the "Preliminary Results" ITSS.....	20
4.4. Requirements for developing the SAISE Reporting Platform.	22
5. Non-functional Requirements of IT Subsystems	26
5.1.1. General and Performance Requirements	26
5.1.2. Security and Protection Requirements.....	27
5.1.3. Requirements for Software, Hardware and Communication Channels	28
5.1.4. Requirements for data migration.....	29
5.1.5. Aspects related to Information Technology and Industry Initiatives.....	30
5.1.6. Documentation Requirements	31
5.1.7. Requirements for maintenance, warranty/defect liability and support	31
6. Final Product and Delivered Components	33
7. Implementation Stages of the IT System	34
8. Management Arrangement	36
9. Eligibility	37

1. Introduction

Following the amendments to the Moldovan electoral legislation via *Law No. 153 of 14.07.2017*, the electoral system of the Republic of Moldova has been changed from proportional representation to mixed.

Under such circumstances, the term Uninominal Constituency has emerged, as well as new business processes, which are necessary to serve the Uninominal Constituencies activity. Given the amended business processes described in the Electoral Code of the Republic of Moldova, re-engineering of the *State Automated Information System "Elections"* (SAISE) components shall be carried out to align the new provisions.

The conducted analysis enabled to identify the components subject to development and re-engineering for which outsourcing services are to be purchased:

- FB "Voters' Lists";
- FB "Preparation";
- FB "Voting";

The envisaged re-engineering shall cover the following categories of activities:

- adjusting the IT Subsystem data structures and functionalities with the aim to meet the provisions of the Mixed Electoral System;
- decoupling certain functionalities already in place and their implementation through dedicated mechanisms;
- implementing a reporting platform intended to retrieve standard documents or disseminate public data;
- integrating the "*SAISE Admin*" ITSS facilities into the functionalities of other SAISE IT Subsystems;
- developing certain patches for the SAISE database and modules for the migration of data currently held by the CEC so that they match the performed re-engineering.

The re-engineering shall cover the following functional components of SAISE:

- Changing the "*SAISE Admin*" ITSS as per the new requirements specified in Part 3-4;
- Changing the "*State Registry of Voters*" ITSS as per the new requirements specified in Part 3-4;
- Changing the ITSS "*Check your name in the SRV*" as per the new requirements specified in Part 3-4;
- Changing the "*Voter Turnout*" ITSS as per the new requirements specified in Part 3-4;
- Changing the "*Preliminary Results*" ITSS as per the new requirements specified in Part 3-4;
- Developing the *SAISE Reporting Platform* and implementing the reports generated by the aforementioned applications as per the new requirements specified in Part 3-4.

This document, which is intended to re-engineer the key SAISE IT Subsystems in order to implement the provisions of the Mixed Electoral System and align with the latest SAISE development visions, delimits the goals, tasks and functions of the IT solutions, the organisational structure and the regulatory and legislative constraints, the functional and non-functional requirements necessary to develop and employ the IT Subsystems.

The information technologies and national policy in the area of IT solutions intended to underpin the activity of Moldovan Public Authorities have been taken into account upon the development of these Specifications.

2. General Information

The State Automated Information System "Elections" (SAISE) represents an IT solution identified to generate immediate benefits and impact for the CEC activity. This is an IT solution aimed to ensure the IT and information needs of the actors involved in the electoral processes unrolled in the Republic of Moldova, which shall automate, to a great extent, the electoral business processes stipulated by *Law No. 101 of 15.05.2008 on the Concept of the State Automated Information System "Elections"*.

In the context of adopting the Mixed Electoral System in the Republic of Moldova it is required to re-engineer the SAISE in order to implement the peculiarities of Uninominal Constituencies activity and their impact on the electoral system as a whole.

2.1. Terms Used in the Specifications

The acronyms and abbreviations used in this document are defined in Table 1.1

Table 1.1. Abbreviations and acronyms used in the document.

No	Abbreviation/Acronym	Description
1.	API	Application Programming Interface
2.	DB	Database
3.	FB	Function Block
4.	CEC	Central Electoral Commission
5.	KPI	Key performance indicators
6.	SDD	Software design document
7.	DBMS	Database Management System
8.	ITS	IT System
9.	SAISE	State Automated Information System "Elections"
10.	SRS	Software Requirements Specification
11.	SLA	Service Level Agreement
12.	ITSS	IT Subsystem
13.	IT	Information Technology
14.	ICT	Information and Communication Technology
15.	TLS/SSL	The TLS Protocol or its predecessor, the SSL Protocol, are cryptographic protocols that ensure safe communication between two nodes of computers network for such actions as visiting Web pages, e-mail, Internet-fax, exchange of instant messages and other transfers of data.

The definitions and terms used frequently in this document are presented and explained in Table 1.2.

Table 2.2. Definitions and terms used in the document.

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.	Credentials	Set of attributes that define the identity and authenticity of users and systems within the information systems.

No	Abbreviation/Acronym	Description
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 related 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 specific elements related to his/her physical, physiological, mental, economic, cultural or social features.
5.	Data integrity	Data status when they maintain their content and are interpreted unambiguously in cases of random actions. The integrity is deemed preserved unless the data have been altered or damaged (deleted).
6.	Logging	Function of registering information about events. In the information systems, the records on the events include details about date and time, user, undertaken action.
7.	Metadata	The way of assigning semantic value to the data stored in the database (data about data).
8.	"Voter Turnout" ITSS	The IT Subsystem subject to re-engineering under this document, which is intended to record the voter turnout on the day of elections, to eliminate the attempted fraud of voting and to present quickly the data on voting results.
9.	"State Registry of Voters" ITSS	This is a unified integrated information system of Moldovan voters developed on the basis of the State Registry of Population, designed for the gathering, storage, updating, and analyzing the information about citizens of the Republic of Moldova, including those from abroad, who reached the age of 18 years and do not have any legal prohibitions to elect.
10.	Information resource	Set of documented information within the IT system that is maintained according to the legal requirements in force.
11.	"SAISE Admin" ITSS	The IT Subsystem subject to re-engineering under this document, which is intended to computerise the function block "PREPARATION" of the SAISE and deliver all functionalities for SAISE administration.
12.	IT System	Set of software and equipment that shall ensure automatic data processing (automated information system component).
13.	Information system	System for information processing along with the related organisational resources, such as human and technical resources, that supply and distribute the information.
14.	Software Design Document	A guiding Document of the IT System comprising detailed description of the following approaches: data structures and their constraints, the IT System architecture, which provides all conceptual sections of an IT System, the IT System interface covering the conceptualisation of all User interface components, the IT System functionalities comprising detailed description of all IT System implementation scenarios.
15.	Software Requirements Specification	A Document containing detailed description of all interaction scenarios between Users and the IT Application.
16.	IT Subsystem	A component (with the possibility of functional decoupling) of a complex IT system.

No	Abbreviation/Acronym	Description
17.	Information and Communication Technology	Common term that includes all technologies used for information exchange and processing.
18.	Reliability of data	The extent to which the data stored in the computer memory or in documents correspond to the real status of the field-related objects mirrored in those data.

2.2. References and Legal Issues of Development Activities.

The designing, implementation and operation processes related to SAISE IT Subsystems subject to re-engineering in order to adjust them to the Mixed Electoral System requirements shall be compliant with the relevant regulatory and legal documents in force on CEC activity and on developing IT solutions for the Moldovan Public Authorities.

Out of this category of regulatory documents the following can be mentioned:

1. *The Electoral Code of the Republic of Moldova*, adopted on the basis of Law No. 1381 of 21.11.1997, Official Gazette No. 81 of 08.12.1997.
2. Law No. 153 of 14.07.2017 on amendments and addenda to certain legislative acts, Official Gazette No. 253-264 of 21.07.2017.
3. *Law No. 101 of 15.05.2008 on the Concept of the State Automated Information System "Elections"*, Official Gazette No. 117-119 of 04.07.2008.
4. *CEC Decision No. 137 of 14.02.2006 approving the Regulation on CEC activity* (amended by Decision No. 24 of 05.04.2011), Official Gazette No. 39-42 of 10.03.2006.
5. *Law No. 133 of 08.07.2011 on Protection of Personal Data*, Official Gazette No. 171-175 of 14.10.2011.
6. *Government Decision No. 1123 of 14.12.2010 on approving the Requirements for the assurance of personal data security during their processing within the information systems of personal data*, Official Gazette No. 254-256 of 24.12.2010.
7. *Government Decision No. 7104 of 20.09.2011 on approving the Strategic Programme for Governance Technological Upgrading (e-Transformation)*, Official Gazette No. 156-159 of 23.09.2011.
8. *Government Decision No. 128 of 20.02.2014 on Joint Governmental Technological Platform (MCloud)*, Official Gazette No. 47-48 of 25.02.2014.
9. *Government Decision No. 656 of 05.09.2012 approving the Programme on Interoperability Framework*, Official Gazette No. 186-189 of 07.09.2012.
10. *Government Decision No. 1090 of 31.12.2013 on Governmental electronic service for authentication and control of access (MPass)*, Official Gazette No. 4-8 of 10.01.2014.
11. *Government Decision No. 405 of 02.06.2014 on Governmental integrated electronic service for electronic signature (MSign)*, Official Gazette No. 147-151 of 06.06.2014.
12. *Government Decision No. 708 of 28.08.2014 on Governmental electronic service for logging (MLog)*, Official Gazette No. 261-267 of 05.09.2014.
13. *Government Decision No. 700 of 25.08.2014 on open Governmental data*, Official Gazette No. 256-260 of 29.08.2014.
14. *Government Decision No. 701 of 25.08.2014 approving the Methodology for publishing the Governmental open data*, Official Gazette No. 256-260 of 29.08.2014.
15. *Law No. 982-XIV of 11.05. 2000 on Access to Information*, Official Gazette No. 88 art. No. 664 of 28.07.2000.
16. *Law No. 91 of 29.05.2014 on Electronic Signature and Electronic Document*, Official Gazette No. 174-177 of 04.07.2014.

17. *Government Decision No. 945 of 05.09.2005 on Centres for Certification of Public Keys*, Official Gazette No. 123-125 of 16.09.2005.
18. *Government Decision No. 320 of 28.03.2006 approving the Regulation on application of digital signatures on electronic documents issued by Public Authorities*, Official Gazette No. 51-54 of 31.03.2006.
19. *Law No. 467-XV of 21.11.2003 on Computerisation and State Information Resources*, Official Gazette No. 6-12/44 of 01.01.2004.
20. *Order No. 94 of 17.09.2009 issued by the Ministry of Information Development approving certain Technical Regulations (the way of keeping records of public electronic services, providing public electronic services, ensuring information security while providing public electronic services, determining the cost for developing and implementing automated information systems)*, Official Gazette No. 58-60 of 23.04.2010.
21. *Technical Regulation "Software life-cycle processes" RT 38370656-002:2006*; Official Gazette No. 95-97/335 of 23/06/2006.
22. Other laws, regulatory acts, standards in force in the area of ICT.

To re-engineer the SAISE IT Subsystems as per the amendments to *the Electoral Code* in order to meet the principles of Mixed Electoral System operation it is appropriate to implement the principles covered by the following international guidelines and recommendations:

- *Standard of the Republic of Moldova SM ISO/CEI/IEEE 15288:2015 "Systems and Software Engineering. System life-cycle processes"*.
- Michael O. Leavitt, Ben Shneiderman, *Research-Based Web Design & Usability Guidelines*, U.S. Government Printing Office, https://www.usability.gov/sites/default/files/documents/guidelines_book.pdf
- *World Wide Web Consortium (W3C) Recommendations* (<http://www.w3c.org>) on the quality of web page content, possibilities to view the information correctly by the commonly used Internet browsers and compatibility with different IT platforms;
- *W3C Recommendations* (<http://validator.w3.org>) on WEB page testing. All WEB pages generated by the IT applications developed under this project shall be tested as per these Recommendations.

2.3. Principles used to re-engineer the SAISE IT Subsystems

In order to ensure the attainment of the objectives covered by these Specifications in the process of re-engineering the SAISE IT Subsystems aimed at adapting the *provisions* of the Mixed Electoral System full account shall be taken of the following general principles:

- **Principle of legality:** implies the creation and operation of IT Subsystems in accordance with the national legislation in force and with the relevant internationally recognized field-related rules and standards;
- **Principle of dividing the architecture by levels:** consists in designing independently the components of SAISE IT Subsystems according to interface standards among levels;
- **Principle of service-oriented architecture (SOA):** involves dividing the SAISE IT Subsystems functionalities into smaller and distinct units – called services – that can be assigned within a network and can be used together to create new applications to implement the CEC business processes;
- **Principle of reliable data:** provides the input and access of data 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 transparency:** requires the design and implementation according to the modular principle, using transparent standards of information and telecommunication technologies;
- **Principle of expansibility:** stipulates the possibility of extension and completion of IT Subsystems with new functions or improvement of the ones already in place;

- **Principle of priority of first person/single centre:** implies the existence of a senior person in charge with sufficient rights to take decisions and coordinate the activities to create and operate the IT Subsystems;
- **Principle of scalability:** implies the provision of a constant performance of an IT solution upon increased amount of data and IT System stress;
- **Principle of simplicity and convenience of use:** implies the design and implementation of all applications, hardware and software resources available to users based exclusively on visual, ergonomic, and logical principles from the conceptual perspective.

Particularly, for the IT Subsystems architecture subject to re-engineering the following major principles shall be complied with:

1. implementing client-server WEB based solutions with authorised access to the interface and data;
2. providing adequate security to protect the information and component subsystems against their unauthorized use or disclosure of personal data or of classified information;
3. recognizing the information as a valuable asset and its appropriate management;
4. developing and implementing functional components that enable their use for other processes or create opportunities to develop new functionalities (including repeated use of SAISE functionalities already in place);
5. minimizing the number of various technologies and products that offer the same or similar functionalities as per their purpose (reuse of technologies already implemented by CEC);
6. ensuring high-speed processing of service queries addressed to CEC IT Subsystems (authentication, authorisation, logging or notification);
7. ensuring disaster recovery ability (ensuring physical and logical security) as part of the implementation plan.

2.4. Goal, Objectives and Tasks covered by the Specifications

The activities foreseen in these Specifications are aimed at aligning the *State Automated Information System "Elections"* with the recent amendments to the *Electoral Code of the Republic of Moldova* and, namely, implementation of the Mixed Electoral System.

It was considered also to carry out additional changes in some IT subsystems, including the development of new applications foreseen in the SAISE Upgrading Plan, while taking advantage of the re-engineering process.

Considering the aforementioned, these Specifications involve adjusting the following SAISE function blocks to the peculiarities of the Mixed Electoral System:

1. FB "Preparation";
2. FB "Voters' Lists";
3. FB "Voting".

In this context the following IT applications shall be adjusted to meet the Mixed Electoral System features:

1. "SAISE Admin" ITSS;
2. "State Registry of Voters" ITSS;
3. "Check your name in the SRV" ITSS;
4. "Voter Turnout" ITSS;
5. "Preliminary Results" ITSS.

In addition, based on the SAISE Development and Upgrading Plan, it is envisaged to apply the following categories of changes to the aforementioned applications:

1. *"SAISE Admin" ITSS* – develop specific WEB services required for the interaction with the SAISE IT Subsystems and MCloud Platform Services;
2. *"State Registry of Voters" ITSS* – abandoning some native functionalities by reusing the functionalities delivered by *"SAISE Admin" ITSS*. Implementing the electronic signature in business processes of the *"State Registry of Voters" ITSS*;
3. *"Check your name in the SRV" ITSS* – abandoning some native functionalities by reusing the functionalities delivered by *"SAISE Admin" ITSS*;
4. *"Voter Turnout" ITSS* – optimising the processes for delivering the primary data intended for generating reports and infographics to present the real-time voter turnout data;
5. *"Preliminary Results" ITSS* – optimising the processes for delivering the primary data intended to generate reports and infographics presenting the real-time voter turnout data. Implementing the infrastructure of electronic signature in business processes of the *"Preliminary Results" ITSS*.

Resulting from the acquired experience and based on the SAISE Development and Upgrading Plan, it was considered appropriate to implement one new SAISE component:

6. *SAISE Reporting Platform* intended to deliver mechanisms for configuring and generating SAISE documents and reports. Under this Project it is envisaged to configure, implement and generate all the reports of IT Subsystems subject to re-engineering exclusively through the *SAISE Reporting Platform*.

3. Description of SAISE current and future architecture.

The SAISE IT Subsystems are based on WEB interfaces, which are accessible through widely used web browsers (*MS Edge/MS Internet Explorer, Mozilla FireFox, Opera, Google Chrome* or *Safari*). From a functional standpoint, reliable and scalable solutions have been developed for the case of increased number of concurrent users and for the case of increased volume of information managed by it.

As the *SAISE* is not an isolated IT solution and it shall interact with other IT subsystems of the *CEC* or with external IT solutions, the developed application shall support the integration with other IT subsystems.

The SAISE IT Subsystems shall be based on a client-server architecture with at least three levels (that excludes any direct interaction of the application with the database), based on cutting-edge WEB technologies.

In order to ensure an appropriate level of information security, the delivered application shall enable secure connections between the client and application server to ensure the safety of information sent (via VPN channels and TLS/SSL sessions).

The IT solution shall be developed based on the cutting-edge Internet/Intranet technologies. The interaction of all actors and the IT system nodes is shown in Figure 2.1.

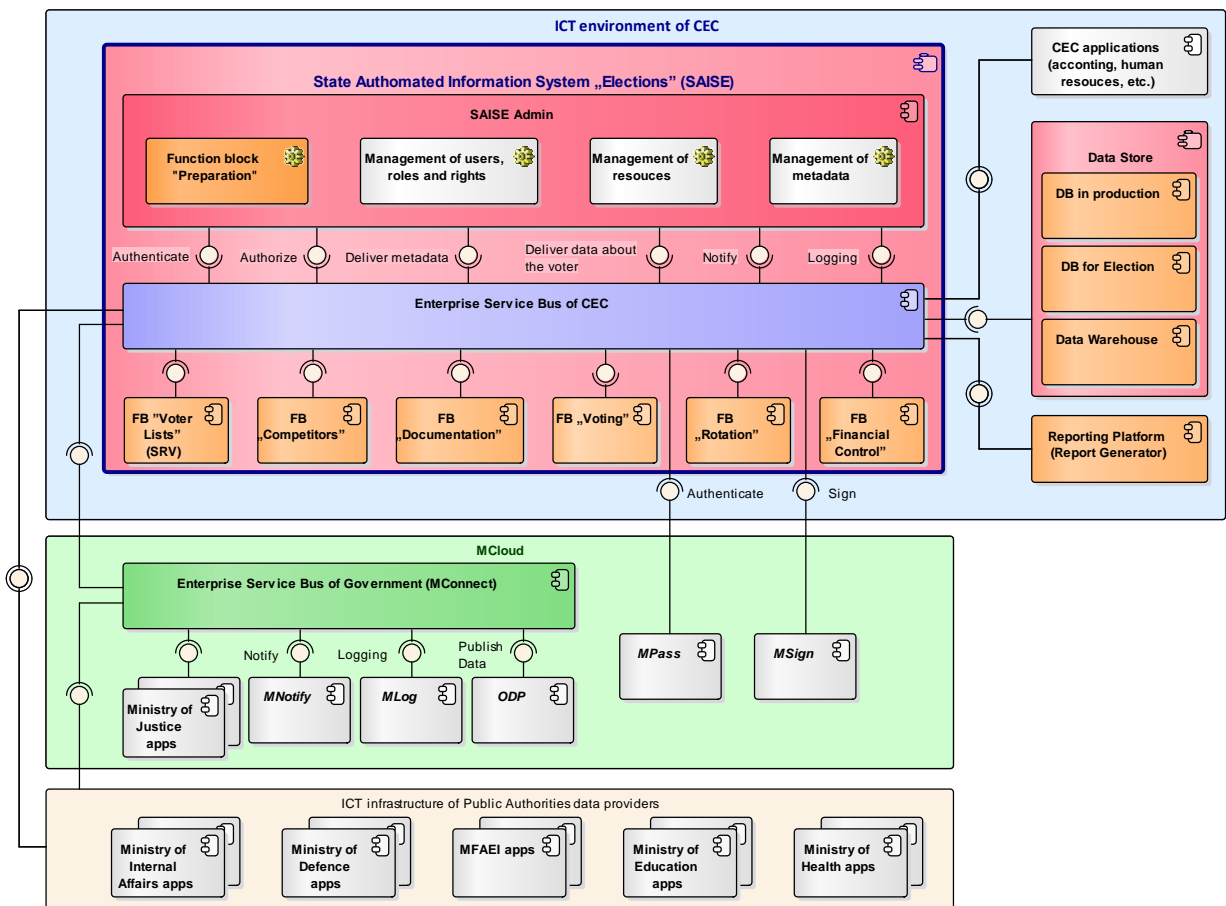


Figure 2.1. SAISE Architecture.

As shown in Figure 2.1, the resource cooperation solution ensuring the SAISE functionality consists of four distinct types of nodes:

1. **CEC Data Centre** – the CEC ICT infrastructure that hosts the *SAISE* and has a range of IT systems installed, with which *SAISE* interacts;

2. **M-Cloud** – the ICT infrastructure of the common governmental technological platform that makes up the governmental cloud (*MCloud*), which hosts a series of IT Systems to interact with *SAISE* or which services are to be used by *SAISE IT Subsystems*. In the long run, all connections with external IT Systems shall be ensured mainly through the interoperability platform *MConnect* (even for the IT Systems that are not hosted by *MCloud*). It is worth noting that a series of *MCloud* Platform Services shall be reused within *SAISE* (*MPass* as an authentication mechanism of Users via electronic or mobile signature, *MSign* for applying the electronic signature within some function blocks, *MNotify* for the integration of Users' notification mechanism, *MLog* to ensure secure logging of critical business events);
3. **Public Authorities Data Centre** – the ICT infrastructure of Public Authorities, which IT Systems would serve as data sources for *SAISE* and interact with *SAISE* either directly, using the services displayed by them, or through the Interoperability Platform (*MConnect*). In the long-run, priority shall be given to interconnections via *MConnect*.
4. **Client computers** – computers from where Users will access the functionalities of *SAISE IT Subsystems* (depending on the assigned roles and rights).

For accessing and using the *SAISE IT Subsystems*, client computers shall use as client application at least two of most popular web browsers (compatibility with *MS Edge/MS Internet Explorer* is mandatory). The interface and functionalities delivered to each User will depend on the User's level, his/her rights and roles.

Regardless of the User's access level, all the connections with the *SAISE* shall be performed exclusively via secure connections (VPN and TLS/SSL).

As shown in Figure 2.1, *SAISE* comprises the following components:

1. **Function Block "Voters' List"** – includes functions of preparing the voter list within a Polling Station and managing the voters' profiles in *SAISE*;
2. **Function Block "Candidates"** – includes functions of recording all candidates and their trustworthy persons in the *SAISE*;
3. **Function Block "Documentation"** – includes functions of issuing registration and accreditation documents, ID/service cards to elected persons, generating samples of organization and disposition documents;
4. **Function Block "Voting"** – includes functions of recordkeeping of voting, of votes expressed for certain candidates, electronic voting, calculating the number of voters who have voted, preparing the preliminary voting results;
5. **Function Block "Rotation"** – includes functions of recordkeeping on persons discharged from elective positions and recordkeeping on persons who can be appointed to vacant elected positions;
6. **Function Block "Financial Control"** – includes control functions over the use of funds by candidates during the election campaigns, recordkeeping on amounts lent to candidates by the state, exercising control over the use and repayment of amounts lent by the state, as well as over the funds provided to political parties (financing of political parties);
7. **Function Bloc "Voter Lists" (State Registry of Voters)** – an IT system to keep the records on Moldovan voters, to collect, store, update and analyse the information on Moldovan citizens who reached the age of 18 and are not legally limited in exercising their civil rights. This IT Subsystem will reuse all relevant Metadata managed via *SAISE Admin* and implement the interoperability framework via services delivered by *SAISE Admin*.
8. **Report Generation Platform** – represents a universal mechanism reused by all CEC computer applications aimed at processing and presenting the data as Reports intended for the generation of standard documents or for processing and retrieval of analytical information.

In the context of activities comprised by these Specifications, it is envisaged to implement or develop the following interfaces displayed by *SAISE* API through “*SAISE Admin*” ITSS:

1. **WEB Service Authenticate** that interacts with all *SAISE* IT Subsystems to deliver a universal and centralised mechanism for User authentication regardless of the *SAISE* application used. Along with the internal authentication mechanism (CEC Authentication Mechanism), *MPass* Service shall be optionally used *for* external users who have digital certificates.
2. **WEB Service Authorise** that interacts with all *SAISE* IT Subsystems to deliver a universal and centralised mechanism for User authorisation (delivering functionalities and data accessible to them) regardless of the *SAISE* application used.
3. **WEB Service Deliver Metadata** that interacts with all *SAISE* IT Subsystems to deliver common Metadata used by them related to the *FB “Preparation”* or to interoperability services implemented within *SAISE Admin*.
4. **WEB Service Deliver Data on Voters** that interacts with all *SAISE* IT Subsystems to deliver the latest data of the Voter’s Profile for different purposes of the *SAISE* IT Subsystems.
5. **WEB Service Notify** that interacts with all *SAISE* IT Subsystems to deliver a universal and centralised mechanism for *SAISE* User notification regardless of the *SAISE* application used. Along with the internal notification mechanism *MNotify* Service shall be optionally used *for* notifying the external users.
6. **WEB Service Logging** that interacts with all *SAISE* IT Subsystems to deliver a universal and centralised mechanism for logging the business events generated by the activity of Users authorised under the used *SAISE* applications. Along with the internal logging mechanism *MLog* Service shall be optionally used *for* logging the critical business events.

In the context of activities comprised by these Specifications, it is envisaged to use or implement the following *MCloud* Platform Services:

1. **MPass** – to ensure the process of authentication and authorisation of Users through the electronic signature;
2. **MSign** – to use the infrastructure intended for the application and validation of electronic signature of documents;
3. **MNotify** – to send notifications to *SAISE* Users *and* to external actors through Email.
4. **MLog** – to log critical business events produced within *SAISE* IT Subsystems.
5. **Portal of Open Data** – to publish the performance indicators, public reports and statistics produced within the implemented business processes.

4. Peculiarities of *SAISE* re-engineering

4.1. Requirements for re-engineering the *SAISE FB “Preparation”*

In the case of “*SAISE Admin*” ITSS, re-engineering will deal to a great extent with the issues related to the interoperability mechanisms among the *SAISE* IT Subsystems as “*SAISE Admin*” ITSS is the most recently developed IT application, which comprises the functionalities necessary for the operation with the term Uninominal Constituency.

4.1.1. Changes to be applied to “*SAISE Admin*” ITSS

Although “*SAISE Admin*” ITSS comprises functionalities intended for configuring and managing Uninominal Constituencies, a series of changes are required for the functionalities of other IT applications subject to re-engineering.

Table 3.1. comprises functional requirements that define the changes to be applied to “*SAISE Admin*” ITSS.

Table 4.1. New functionalities to be developed within “SAISE Admin” ITSS.

Identifier	Binding level	Description of Functional Requirements
FR 01.01	M	<i>The “SAISE Admin” ITSS shall have a functionality intended to manage the Conventional Polling Station term. A Conventional Polling Station is a generic polling station reused for many elections.</i>
FR 01.02	M	The management of Conventional Polling Stations involves the administration of a nomenclature containing all SAISE conventional polling stations to be subsequently used by the “ <i>State Registry of Voters</i> ” ITSS for assigning the relevant voters and devising the voters’ lists afferent to the conventional polling station (adding a station, changing a station, deactivating a station, abolishing a station).
FR 01.03	M	<i>The “SAISE Admin” ITSS will not allow abolishing a conventional polling station if the latter is used at least in one database entry (in this case the station can be just disabled).</i>
FR 01.04	M	<i>The “SAISE Admin” ITSS shall have a mechanism for automated numbering of a polling station depending on the type of elections. Hence, when configuring new elections, “SAISE Admin” ITSS will automatically assign registration numbers to conventional polling stations involved in the elections.</i>
FR 01.05	M	For the same elections a conventional polling station may have several registration numbers (<i>example: for parliamentary polls it will have one number within uninominal constituency and another number for the constituency in case of using political party lists</i>).
FR 01.06	M	<i>The “SAISE Admin” ITSS shall have a mechanism intended for defining the rules for assigning the number to a conventional polling station.</i>
FR 01.07	M	<i>The “SAISE Admin” ITSS shall have a mechanism intended for configuring the Uninominal Constituencies and their attachment to relevant conventional polling stations.</i>
FR 01.08	M	The Developer shall migrate <i>all</i> nomenclatures relevant for the operation of the “ <i>State Registry of Voters</i> ” ITSS into the “SAISE Admin” ITSS, having ensured the functionalities for their management.
FR 01.09	M	One of the categories of key Metadata of the “ <i>State Registry of Voters</i> ” ITSS to be managed through the “SAISE Admin” ITSS and provided to all relevant SAISE applications is the Classifier of Administrative-Territorial Units of the RM (CATUM). The “SAISE Admin” ITSS will enable managing and reorganising the CATUM should an Administrative-Territorial Unit reorganisation reform be unrolled in the Republic of Moldova.
FR 01.10	M	The “SAISE Admin” ITSS shall deliver functionalities intended for managing the value of Metadata (Nomenclatures and Classifiers), having ensured data consistency that make use of their outdated values or those withdrawn from use.
FR 01.11	M	<i>The “SAISE Admin” ITSS shall be able to define the rights of access of Users per relevant conventional polling station and per relevant uninominal constituency.</i>
FR 01.12	M	<i>The “SAISE Admin” ITSS shall have a functionality for freezing/unfreezing the voter’s number in the Voters’ List based on the configurations principles of attribution of number in the Voters’ List defined in the “State Registry of Voters” ITSS.</i>
FR 01.13	M	The Developer shall update the Module for DB generation intended for the operation of “ <i>Voter Turnout</i> ” ITSS to export the data related to the work with

Identifier	Binding level	Description of Functional Requirements
		Uninominal Constituencies, the “frozen” number of the voter in the Voters’ List and the availability of a certificate with the right to vote.
FR 01.14	M	The Developer shall include in the “SAISE Admin” ITSS a widget to access the application for report generation with no need to be authenticated for users with specific role already authenticated in the “SAISE Admin” ITSS.

4.1.2. WEB Services to be developed within “SAISE Admin” ITSS

One of the “SAISE Admin” ITSS objectives is to implement an *Enterprise Service Bus* within the CEC that would implement the CEC interoperability framework. To this end, the adaptation of SAISE key IT Subsystems SAISE to the Mixed Electoral System represents an opportunity for the “SAISE Admin” ITSS to fully attain the objectives for which it has been developed.

Table 3.2 contains the functional requirements intended for implementing WEB services to be displayed for other SAISE IT Subsystems.

Table 4.2. WEB Services to be developed and displayed by the “SAISE Admin” ITSS.

Identifier	Binding level	Description of Functional Requirements
FR 02.01	M	The “SAISE Admin” ITSS will provide API intended for authentication through the digital or mobile signature of SAISE IT Subsystem Users. To this end, “SAISE Admin” ITSS shall be integrated with <i>MPass</i> Platform Service.
FR 02.02	M	The “SAISE Admin” ITSS will provide API intended for applying the digital signature on documents created or processed within the SAISE IT Subsystem business processes. To this end, “SAISE Admin” ITSS shall be integrated with <i>MSign</i> Platform Service. The same service will enable checking the digital signature validity and integrity of the signed electronic document.
FR 02.03	M	The “SAISE Admin” ITSS will provide API intended for notifying via Email the SAISE IT Subsystem Users. To this end, “SAISE Admin” ITSS shall be integrated with the <i>MNotify</i> Platform Service.
FR 02.04	M	The “SAISE Admin” ITSS will provide API intended for logging the critical events of business processes unrolled within SAISE IT Subsystems. To this end, “SAISE Admin” ITSS shall be integrated with <i>MLog</i> Platform Service.
FR 02.05	M	The “SAISE Admin” ITSS will provide API intended for delivery of the metadata related to the nomenclatures and classifiers jointly used by several SAISE IT Subsystems.
FR 02.06	M	The “SAISE Admin” ITSS will provide API intended for publishing the public data generated by business processes unrolled within SAISE IT Subsystems. To this end, “SAISE Admin” ITSS shall be integrated with the <i>Portal of Open Data</i> .
FR 02.07	M	The “SAISE Admin” ITSS will provide API for SAISE IT Subsystems intended for retrieving all the voter’s data recorded in the “ <i>State Registry of Voters</i> ” ITSS. The IDNP Code shall serve as parameter for retrieving the data on voters.
FR 02.08	M	The service for retrieving the data on voters shall deliver the following data about voters:

Identifier	Binding level	Description of Functional Requirements
		<ul style="list-style-type: none"> ■ Last Name; ■ First Name; ■ Patronymic; ■ IDNP; ■ Mail Address (Locality Identifier, Locality Name, Street Identifier, Street Name, House/Block Number, Staircase Number, Apartment number, etc.); ■ Gender; ■ Identifier of Generic Polling Station; ■ Polling Station Number as per the data of the latest elections; ■ Voter's Number in the Voters' List; ■ Uninominal Constituency Identifier; ■ Uninominal Constituency Number; ■ Certificate with the right to vote (if any).
FR 02.09	M	The "SAISE Admin" ITSS will provide API to "Voter Turnout" ITSS for acquiring and storing the data intended for SAISE Reporting Platform.

4.2. Requirements for re-engineering the SAISE FB "Voters' List".

4.2.1. Changes to be made to the "State Registry of Voters" ITSS.

The Developer shall carry out a series of activities imposing the adjusting of data structures and functionalities of the "State Registry of Voters" ITSS to the peculiarities of the Mixed Electoral System. These changes do not impose essential changes to the IT System operation principles, as the "State Registry of Voters" ITSS manages the data at the level of polling stations.

Nonetheless, presenting informative data on Uninominal Constituencies is also required. In the context of "SAISE Admin" ITSS implementation, we deem necessary to eliminate some native functionalities (Authentication, Authorisation, Logging, Notification, User/Role/Right Management) and replace them with the facilities offered by "SAISE Admin" ITSS. Likewise, other types of integration with "SAISE Admin" ITSS would be required that would bring additional value to the "State Registry of Voters" ITSS.

Table 3.3 presents the functional requirements based on which the "State Registry of Voters" ITSS re-engineering activities shall be carried out.

Table 4.3. New functionalities to be developed within the "State Registry of Voters" ITSS.

Identifier	Binding level	Description of Functional Requirements
FR 03.01	M	The Developer shall introduce the term of Conventional Polling Station. Hence, a Conventional Polling Station is a generic station that is not related to certain elections; it represents the configuration of a polling station used, as a rule, for all types of elections.
FR 03.02	M	All voters shall be managed within the geographical area where the conventional polling station is located ("State Registry of Voters" ITSS will disregard the type of elections; the numbering shall be defined by the "SAISE Admin" ITSS).
FR 03.03	M	The "State Registry of Voters" ITSS shall be able to acquire the identification data and configure the conventional polling stations managed through the "SAISE Admin" ITSS.

Identifier	Binding level	Description of Functional Requirements
FR 03.04	M	The "State Registry of Voters" ITSS will display historical and current data on conventional polling station numbering based on the data delivered by "SAISE Admin" ITSS.
FR 03.05	M	The "State Registry of Voters" ITSS will enable limiting the access to data of authorized users as per the uninominal constituency.
FR 03.06	M	The "State Registry of Voters" ITSS shall have a functionality for freezing the Voter's serial number to be exported to the Voters' List.
FR 03.07	M	To assign a number to the Voter in the Voters' List, the "State Registry of Voters" ITSS will enable defining comprehensive grouping/sorting criteria prior to assigning the number in the Voters' List: <ul style="list-style-type: none"> ■ grouping by voters' locality/set of localities; ■ grouping by voters' street/set of streets; ■ ascendant sorting by voter Last Name and First Name according to the mechanisms for their grouping.
FR 03.08	M	When the voters' grouping/sorting criteria are not defined in the Voters' Lists, the "State Registry of Voters" ITSS will assign by default the number in the Voters' List as per the voters' ascendant alphabetical sorting by their Last Name and First Name.
FR 03.09	M	The "State Registry of Voters" ITSS will grant the possibility to configure the principle for generating the voters' numbers in the Voters' List without any constraint until the option is closed (users shall be able to simulate and view the result until the optimal configuration).
FR 03.10	M	To view the configuration results, the authorised users of the "State Registry of Voters" ITSS shall be able to request the CEC Report Generation Platform from the User Interface of the "State Registry of Voters" ITSS to preview the obtained Voters' List.
FR 03.11	M	The process for configuring the principle of assigning the voter's serial number in the Voters' List shall be launched together with the configuration of new elections and completed at the time of exporting the data to the "Voter Turnout" ITSS ("SAISE Admin" ITSS shall have a functionality to activate/deactivate the option to configure the principles for assigning the voter's serial number).
FR 03.12	M	Functionalities for Users management and their roles (they shall be managed via the "SAISE Admin" ITSS facilities) shall be disabled from the "State Registry of Voters" ITSS User Interface.
FR 03.13	M	Functionalities for managing the nomenclatures, which deliver data for other SAISE IT Subsystems, shall be disabled from the "State Registry of Voters" ITSS User Interface (they shall be further managed via the "SAISE Admin" ITSS facilities): <ul style="list-style-type: none"> ■ the Classifier of Administrative and Territorial Units of the RM; ■ the Nomenclature of Streets; ■ the Nomenclature of Voters' types of address; ■ the Nomenclature of Voter's statuses; ■ the Nomenclature of Voters' gender type; ■ the Nomenclature of Voters' types of ID documents; ■ the Nomenclature of constituencies; ■ the Nomenclature polling stations; ■ other categories of relevant nomenclatures.

Identifier	Binding level	Description of Functional Requirements
FR 03.14	M	<i>The “State Registry of Voters” ITSS will deliver cashing functionality for the values of nomenclatures acquired from the “SAISE Admin” ITSS.</i>
FR 03.15	M	<i>The “State Registry of Voters” ITSS will deliver to Users with specific roles a functionality for updating the values of Street Nomenclature from the User Interface of the “State Registry of Voters” ITSS (adding or changing streets).</i>
FR 03.16	M	<i>The “State Registry of Voters” ITSS shall have a functionality to record the certificates with voting right for all relevant categories of elections.</i>
FR 03.17	M	Preparation of a certificate with the right to vote involves applying the digital signature by the electoral official who prepared it.
FR 03.18	M	<i>MSign Platform Service shall be used as mechanism for electronic signature.</i>
FR 03.19	M	At the time of registration of a certificate with the right to vote issued to a Voter, the “State Registry of Voters” ITSS will exclude the name of the Voter from the main Voters’ List.
FR 03.20	M	<i>The “State Registry of Voters” ITSS will log all the actions for configuring/previewing the Voters’ Lists.</i>

4.2.2. Peculiarities of “State Registry of Voters” ITSS integration with the “SAISE Admin” ITSS.

In the context of “State Registry of Voters” ITSS re-engineering, in addition to aligning the IT System with the Requirements of the Mixed Electoral System, integrations with the “SAISE Admin” ITSS are to be implemented. Hence, some native functionalities of the “State Registry of Voters” ITSS shall be replaced with the functionalities delivered by “SAISE Admin” ITSS (reusing the “SAISE Admin” ITSS functionalities through specialised APIs delivered by it).

Therefore, the specialised WEB services delivered by “SAISE Admin” ITSS presented in Table 3.4 are to be implemented.

Table 3.4. Requirements for “State Registry of Voters” ITSS integration with “SAISE Admin” ITSS.

Identifier	Binding level	Description of Functional Requirements
FR 04.01	M	<i>The “State Registry of Voters” ITSS will integrate the User Authentication Service delivered by “SAISE Admin” ITSS through User’s Name+Password, LDAP or digital/mobile signature, using the facilities MPass Platform Service (it will implement the API described by FR 02.01).</i>
FR 04.02	M	<i>The “State Registry of Voters” ITSS will integrate the Authorisation Service delivered by “SAISE Admin” ITSS for the users authenticated through User’s Name+Password, LDAP or digital/mobile signature.</i>
FR 04.03	M	All Users, their roles and rights of access shall be managed exclusively through the facilities of “SAISE Admin” ITSS (the “State Registry of Voters ITSS” will use all the necessary data from the “SAISE Admin” ITSS).
FR 04.04	M	<i>The “State Registry of Voters” ITSS will integrate the Electronic Signature Service delivered by “SAISE Admin” ITSS that uses the facilities of the MSign Platform Service (it will implement the API described by FR 02.02).</i>
FR 04.05	M	<i>The “State Registry of Voters” ITSS will integrate the Logging Service delivered by “SAISE Admin” ITSS. All business events of the “State Registry of Voters” ITSS shall be logged, using the dedicated service displayed by “SAISE Admin” ITSS. The critical business events shall be logged through the MLog Platform Service of MCloud, using the specialised service displayed by “SAISE Admin” ITSS (it will implement the API described by FR 02.04).</i>

Identifier	Binding level	Description of Functional Requirements
FR 04.06	M	The "State Registry of Voters" ITSS will integrate the MNotify Platform Service for user notification via Email when specific business events occur through the specialised service displayed by "SAISE Admin" ITSS (it will implement the API described by FR 02.03).
FR 04.07	M	The "State Registry of Voters" ITSS will integrate the service for receiving the value of Metadata afferent to business processes (data contained by nomenclatures and classifiers of common interest managed through the facilities of "SAISE Admin" ITSS) by "SAISE Admin" ITSS for internal logging of business events or logging of critical events through the MLog Platform Service of MCloud (it will implement the API described by FR 02.04).

4.2.3. Changes to be applied to the "Check your name in the SRV" ITSS

The "Check your name in the SRV" ITSS is a public component of the "State Registry of Voters" ITSS through which the Moldovan citizens may verify the data on their inclusion in the Voters' Lists.

In the context of transition to the Mixed Electoral System it is necessary that citizens receive data on relevant constituencies for parliamentary elections. Likewise, it is useful to integrate the "Check your name in the SRV" ITSS with the "SAISE Admin" ITSS.

Table 3.5 presents the functional requirements on which basis changes to "Check your name in the SRV" ITSS shall be carried out.

Table 3.5. New functionalities to be developed within the "Check your name in the SRV" ITSS.

Identifier	Binding level	Description of Functional Requirements
FR 05.01	M	The "Check your name in the SRV" ITSS will integrate the WEB Service displayed by "SAISE Admin" ITSS intended for retrieving all Voter's data recorded in the "State Registry of Voters" ITSS using the IDNP Code as parameter for retrieving the data about Voters (it will implement the API described by FR 02.07 – FR 02.08).
FR 05.02	M	At the time when the entered IDNP Code and CAPTCHA are valid, the "Check your name in the SRV" ITSS will deliver the following data: <ul style="list-style-type: none"> ■ Voter's initials (the first letter of the Last Name and the first letter of the First Name); ■ Voter's year of birth (with the hidden third digit of the year); ■ Number of the Polling Station (according to the last configured elections); ■ Number of the Constituency (according to the last configured elections); ■ Number of the Voter in the Voters' List; ■ Polling Station address; ■ Availability of a certificate with the right to vote at the time of displaying the data (YES/NO); ■ Polling Station contacts.
FR 05.03	M	If the Voter has got a certificate with the right to vote, which is valid on the date of verification, only restrictive data (if any) of the certificate shall be displayed related to the admissible voting area (example: the Uninominal Constituency within which the person has the right to vote).
FR 05.04	M	The "Check your name in the SRV" ITSS will log any attempt of verification (both successful and failed attempts) in the SRV, having recorded the time,

Identifier	Binding level	Description of Functional Requirements
		the searched IDNP Code and the IP address from where the <i>"Check your name in the SRV" ITSS</i> has been accessed.
FR 05.05	M	The <i>"Check your name in the SRV" ITSS</i> will integrate the Logging Service delivered by <i>"SAISE Admin" ITSS</i> . All verification events related to a Voter shall be logged using the dedicated service displayed by the <i>"SAISE Admin" ITSS</i> (it will implement the API described by FR 02.04).

4.3. Requirements for re-engineering the SAISE FB "Voting".

At present, the Function Block "Voting" is an IT application that performs three functions specific for the voting process:

1. Registers the Voters arrived to the Polling Stations in order to avoid double voting;
2. Prepares and registers the data of Protocols with the voting results in the Polling Station;
3. Calculates and displays voting statistics processed and the preliminary processed voting results.

In the context of re-engineering of the Function Block "Voting", the functionalities have to be divided into distinct applications for Users' specific roles as follows:

1. Reengineering the *"Voter Turnout" ITSS* to adjust it to the Mixed Electoral System and implement certain specific functionalities for uploading relevant data to SAISE Reporting Platform;
2. Reengineering the *"Preliminary Results" ITSS* to adjust it to the Mixed Electoral System and implement the electronic signature;
3. Transferring all presented operative and final reports on *SAISE Reporting Platform*;
4. Developing an application intended to collect and display the notifications on attempted multiple voting.

4.3.1. Changes to be applied to the "Voter Turnout" ITSS.

The Developer shall carry out a series of activities that impose adjusting data structures and functionalities of the *"Voter Turnout" ITSS* to the Mixed Electoral System peculiarities. These changes do not impose essential changes in the IT System operation principles as the *"Voter Turnout" ITSS* manages data at the level of Polling Stations.

However, it is necessary to present informative data on Uninominal Constituencies and carry out some verification related to the Uninominal Constituency when recording the Voters who have got certificates with the right to vote.

Table 3.6 presents the functional requirements on which basis *"Voter Turnout" ITSS* re-engineering activities shall be carried out.

Table 4.6. New functionalities to be developed within the "Voter Turnout" ITSS.

Identifier	Binding level	Description of Functional Requirements
FR 06.01	M	The Developer shall adjust the <i>"Voter Turnout" ITSS</i> User Interface to enable its use on the touch-screen devices (ensuring the possibility to use the IT application from such devices and touch-screen tablets).
FR 06.02	M	Displaying a large range of data about the Voter, covering: <ul style="list-style-type: none"> ■ Last Name; ■ First Name; ■ Patronymic; ■ Date of Birth;

Identifier	Binding level	Description of Functional Requirements
		<ul style="list-style-type: none"> ■ Data of a valid ID; ■ Allocated Number of the Polling Station; ■ Allocated Number of the Uninominal Constituency; ■ Voter's number in the Voters' List; ■ Voter's last address; ■ Availability of a certificate with the right to vote.
FR 06.03	M	<i>The "State Registry of Voters" ITSS shall be able to acquire the identification data and configure conventional polling stations managed via "SAISE Admin" ITSS.</i>
FR 06.04	M	For the Voters who have got certificates with the right to vote, the <i>"Voter Turnout" ITSS</i> shall validate the Voter's admissibility to vote at the Polling Station he/she stopped by (verification of the right to vote at the Uninominal Constituency the Polling Station belongs to).
FR 06.05	M	<i>The "Voter Turnout" ITSS</i> will periodically push to <i>SAISE Reporting Platform</i> quick data on the number of Voters recorded per each separate Polling Station. The interval for data pushing shall be configurable.
FR 06.06	M	Upon the pushing of data on the recorded Voters all the necessary data shall be sent (including controllable redundancy data) for quick generation of reports regarding the voting process.
FR 06.07	M	In case of attesting attempted multiple voting, the event data shall be stored in specialised tables to be used by the <i>"Alerts of Multiple Voting" ITSS</i> .
FR 06.08	M	For the <i>"Alerts of Multiple Voting" ITSS</i> the following data are to be sent: <ul style="list-style-type: none"> ■ Voter's Last Name; ■ Voter's First Name; ■ Voter's Patronymic; ■ Voter's IDNP; ■ Voter's Date of Birth; ■ Voter's last address; ■ Data of Voter's valid ID; ■ Number of the Polling Station that generated the alert; ■ Number of the Uninominal Constituency that generated the alert; ■ Mail Address of the Polling Station that generated the alert; ■ Time when the incident was recorded.
FR 06.09	M	All attempted multiple voting events shall be logged through the <i>MLog Platform Service</i> using the specialised API displayed by the <i>"SAISE Admin" ITSS</i> .
FR 06.10	M	<i>The "Voter Turnout" ITSS</i> will enable configuring other categories of business events to be logged in parallel through the <i>MLog Platform Service</i> .

4.3.2. Changes to be applied to the "Preliminary Results" ITSS

The Developer shall carry out a series of activities that impose adjusting the data structures and functionalities of the *"Preliminary Results" ITSS* to the Mixed Electoral System peculiarities. These changes impose essential changes in the IT System operation principles as it is required to implement a new form/template to record the data of the Protocol prepared by the Polling Station.

In the context of applying advanced technologies in the CEC activity, the implementation of digital signing mechanism for signing the prepared Protocols is considered appropriate. This fact would add legal value to the

prepared form and would eliminate the need for hand signed Protocols on paper for computing the final voting results.

Table 3.7 presents the functional requirements on which basis the *"Preliminary Results" ITSS* re-engineering activities shall be carried out.

Table 4.7. New functionalities to be developed within the "Preliminary Results" ITSS.

Identifier	Binding level	Description of Functional Requirements
FR 07.01	M	<i>The "Preliminary Results" ITSS shall be an application decoupled from the "Voter Turnout" ITSS to be accessed by Users with specific role.</i>
FR 07.02	M	The Developer shall develop a new electronic form intended for entering the protocol data with the voting results for Uninominal Constituency.
FR 07.03	M	The Developer shall ensure the generation of a structured document (in XML or JSON format) that accepts the electronic signature for all types of elections within of the Polling Station: <ul style="list-style-type: none"> ■ Parliamentary elections as per political parties' lists; ■ Parliamentary elections as per Uninominal Constituencies; ■ Referenda; ■ Mayor's elections; ■ Local Councillors' elections; ■ General Mayor's elections; ■ Municipal Councillors' elections.
FR 07.04	M	<i>The "Preliminary Results" ITSS will deliver a functionality to digitally sign the Protocol containing the voting results of the Polling Station.</i>
FR 07.05	M	<i>The "Preliminary Results" ITSS will deliver a functionality to send the prepared Protocol containing the voting results.</i>
FR 07.06	M	<i>The "Preliminary Results" ITSS will enable annulling for a determined timeframe (settled by SAISE) after having sent the Protocol to make changes should errors be detected. As soon as the time settled for corrections has expired, the Protocol shall be annulled only by a User assigned with the role of Administrator.</i>
FR 07.07	M	<i>The "Preliminary Results" ITSS will require applying the digital signature of all members of the Polling Station in charge to sign the Protocol.</i>
FR 07.08	M	<i>The "Preliminary Results" ITSS will integrate the Electronic Signature Service delivered by "SAISE Admin" ITSS that uses the facilities of the MSign Platform Service (it will implement the API described by FR 02.02).</i>
FR 07.09	M	<i>The "Preliminary Results" ITSS will deliver functionality for verifying the validity of the digital signature and integrity of the documents signed.</i>
FR 07.10	M	The Protocol signed digitally shall be considered as a document with final results with the same legal power as the Protocol on paper signed by hand by members of the Polling Station. These forms are considered approved by default and the results contained by them shall be treated as final results.
FR 07.11	M	<i>The "Preliminary Results" ITSS will enable sending the Protocol without signatures (should issues occur in MSign operation). In this case the form shall be treated as a preliminary document with no legal power and shall be approved via a special procedure upon presenting its printed version with the signatures affixed by Polling Station members.</i>

Identifier	Binding level	Description of Functional Requirements
FR 07.12	M	<i>The "Preliminary Results" ITSS shall store in parallel the data of Protocols received in the SAISE Reporting Platform repository, delivering the data in the format required for generating reports and analysis cubes on voting results.</i>
FR 07.13	M	<i>For the annulled Protocol, the "Preliminary Results" ITSS shall have a functionality to withdraw the data sent to SAISE Reporting Platform.</i>
FR 07.14	M	<i>The "Preliminary Results" ITSS will send a receipt to the User assigned with specific role from the Polling Station who shall confirm that the Protocol was received and recorded.</i>
FR 07.15	M	<i>The "Preliminary Results" ITSS will enable the generation of a report with the Protocol for the voting results to be printed out and signed by hand by the Polling Station members. Printing may be activated at any stage of form completion, while the report shall be generated through the SAISE Reporting Platform.</i>
FR 07.16	M	<i>The events of signing, sending the Protocol, as well as the attempted multiple voting shall be logged alternatively through MLog using the specialised API displayed by "SAISE Admin" ITSS.</i>

4.4. Requirements for developing the SAISE Reporting Platform.

The SAISE Reporting Platform represents one of the main SAISE components to be developed as per the architecture displayed in Figure 2.1 of this document. At present, the mechanisms for generating most SAISE reports are implemented within the programme code of SAISE IT Subsystems.

This fact affects the operation performance of these IT Subsystems during the period of maximum load (on the day of elections and presenting the final results of elections). Due to these reasons it was deemed rational to develop a separate application to generate and display the reports to be retrieved within the SAISE business processes or presented to general public.

Table 3.9 presents the functional requirements on which basis the SAISE Reporting Platform shall be developed and configured.

Table 4.9. Functionalities of the SAISE Reporting Platform.

Identifier	Mandatory	Description of Functional Requirement
FR 08.01	M	<i>The Developer shall devise a platform for configuring and generating reports intended for SAISE operation.</i>
FR 08.02	M	<i>The SAISE Reporting Platform shall be implemented through a specialised platform for configuring and implementing reports. The access to the configured reports shall be ensured through User interfaces of the relevant SAISE subsystems.</i>
FR 08.03	D	<i>It is appropriate to use the dedicated mechanisms of MS SQL Server 2008 as a platform for configuring and implementing reports (example: Microsoft SQL Server 2008 Report Builder) or free solutions (example: JasperReports).</i>
FR 08.04	M	<i>If a commercial platform is suggested (excepting the Microsoft SQL Server 2008 Report Builder), the Developer shall include the procurement cost of licences in the financial offer.</i>
FR 08.05	M	<i>The SAISE Reporting Platform will generate the following categories of reports:</i> <ul style="list-style-type: none"> ■ Standard documents afferent to SAISE business processes; ■ SAISE analytical and summary reports;

Identifier	Mandatory	Description of Functional Requirement
		<ul style="list-style-type: none"> ■ Infographics afferent to the voting process and the voting result.
FR 08.06	M	<i>The "SAISE Admin" ITSS shall have a widget for direct access to the report generation module, displaying the sets of reports the Users shall have the right of access.</i>
FR 08.07	M	The reports generated through <i>the SAISE Reporting Platform</i> shall have facilities for setting the report generating principles (defining the rules for filtering and/or aggregating the data).
FR 08.08	M	<i>The SAISE Reporting Platform shall enable calling/requesting and populating the reports with data from the User Interface of SAISE IT Subsystems (example: retrieval of Protocol with the voting results from the "Preliminary Results" ITSS).</i>
FR 08.09	M	<p><i>The Developer shall configure within the SAISE Reporting Platform and integrate in the User Interface of the "State Registry of Voters" ITSS the following reports:</i></p> <ul style="list-style-type: none"> ■ Voters' Lists; ■ Certificates with the right to vote.
FR 08.10	M	<p><i>The Developer shall configure within the SAISE Reporting Platform and integrate in the User Interface of the "SAISE Admin" ITSS the following reports:</i></p> <ul style="list-style-type: none"> ■ Ballot paper for uninominal elections; ■ Ballot paper for elections as per the political party lists; ■ Ballot paper for presidential elections; ■ Ballot paper for Mayor's elections; ■ Ballot paper for General Mayor's elections; ■ Ballot paper for the election of Local Councillors; ■ Ballot paper for the election of Municipal Councillors; ■ Ballot paper for the election of District Councillors; ■ Ballot paper for referendum.
FR 08.11	M	<p><i>The Developer shall configure within the SAISE Reporting Platform and integrate in the User Interface of the "Preliminary Results" ITSS the following reports:</i></p> <ul style="list-style-type: none"> ■ Protocol of the Polling Station with the results of parliamentary elections for Uninominal Constituency; ■ Protocol of the Polling Station with the results of parliamentary elections as per the political party lists; ■ Protocol of the Polling Station with the results of presidential elections; ■ Protocol of the Polling Station with the results of Mayor's elections; ■ Protocol of the Polling Station with the results of General Mayor's elections; ■ Protocol of the Polling Station with the results of local councillors' elections; ■ Protocol of the Polling Station with the results of municipal councillors' elections; ■ Protocol of the Polling Station with the results of district councillors' elections; ■ Protocol of the Polling Station with the referendum results. ■ Notice on the receipt of the Protocol sent.

Identifier	Mandatory	Description of Functional Requirement
FR 08.12	M	<i>The SAISE Reporting Platform shall deliver real-time infographics reports with data on voter turnout with disaggregated data by districts and Diaspora.</i>
FR 08.13	M	<i>The SAISE Reporting Platform shall deliver real-time infographics reports with data on voting results for parliamentary elections with disaggregated data by uninominal constituency and candidates.</i>
FR 08.14	M	<i>The SAISE Reporting Platform shall deliver real-time infographics reports with data on voting results for parliamentary elections with disaggregated data by districts and political parties.</i>
FR 08.15	M	<i>The SAISE Reporting Platform shall deliver real-time infographics reports with data on voting results for presidential elections with disaggregated data by districts and candidates.</i>
FR 08.16	M	<i>The SAISE Reporting Platform shall deliver real-time infographics reports with data on voting results for mayors' elections with disaggregated data by Mayoralties and candidates.</i>
FR 08.17	M	<i>The SAISE Reporting Platform shall deliver real-time infographics reports with data on voting results for the elections of local councillors with disaggregated data by Mayoralties and candidates.</i>
FR 08.18	M	<i>The SAISE Reporting Platform shall deliver real-time infographics reports with data on voting results for the elections of district and municipal councillors with disaggregated data by districts/municipalities and candidates.</i>
FR 08.19	M	<i>The SAISE Reporting Platform shall deliver real-time infographics reports with data on voting results for the referendum.</i>
FR 08.20	M	The generation of operative reports stipulated in the functional requirements FR 09.12-FR 09.19 shall be done based on a separate data stock in order not to affect the performance of "Voter Turnout" ITSS and "Preliminary Results" ITSS.
FR 08.21	M	<i>The SAISE Reporting Platform shall deliver analytical reports with final data regarding voter turnout disaggregated by districts, localities, Polling Stations and Diaspora.</i>
FR 08.22	M	<i>The SAISE Reporting Platform shall deliver analytical reports with final data regarding the results of parliamentary elections by uninominal constituency with disaggregated data by districts, localities and Polling Stations.</i>
FR 08.23	M	<i>The SAISE Reporting Platform shall deliver analytical reports with final data regarding the results of parliamentary elections as per the political party lists with disaggregated data by districts, localities and Polling Stations.</i>
FR 08.24	M	<i>The SAISE Reporting Platform shall deliver analytical reports with final data regarding the results of presidential elections as per the political party lists with disaggregated data by districts, localities and Polling Stations.</i>
FR 08.25	M	<i>The SAISE Reporting Platform shall deliver analytical reports with final data regarding the results of Mayors' elections with disaggregated data by localities and Polling Stations.</i>
FR 08.26	M	<i>The SAISE Reporting Platform shall deliver analytical reports with final data regarding the results of General Mayor's elections with disaggregated data by localities and Polling Stations.</i>
FR 08.27	M	<i>The SAISE Reporting Platform shall deliver analytical reports with final data regarding the results of local councillor elections with disaggregated data by localities and Polling Stations.</i>

Identifier	Mandatory	Description of Functional Requirement
FR 08.28	M	<i>The SAISE Reporting Platform shall deliver analytical reports with final data regarding the results of district councillor elections with disaggregated data by districts/municipalities, localities and Polling Stations.</i>
FR 08.29	M	<i>The SAISE Reporting Platform shall deliver analytical reports with final data regarding the results of referenda with disaggregated data by districts/municipalities, localities and Polling Stations.</i>
FR 08.30	M	The generation of operative reports stipulated in the functional requirements FR 09.21-FR 09.29 shall be done based on a separate data stock in order not to affect the performance of <i>"Preliminary Results" ITSS</i> and to be presented through the CEC official Website.
FR 08.31	M	All the reports and documents generated through <i>SAISE Reporting Platform</i> shall be exported in DOCX, XLSX and PDF format.

5. Non-functional Requirements of IT Subsystems

5.1.1. General and Performance Requirements

The general system and performance requirements are defined by the policies and strategies developed and adopted in the Republic of Moldova. It is worth mentioning that these acts are stemming from the industry best practices and comprise many organisational measures, as well as a series of technical measures.

The general system requirements specific for the SAISE IT Subsystems subject to re-engineering are presented in Table 4.1.

Table 4.1. General System Requirements of SAISE IT Subsystems subject to re-engineering.

Identifier	Binding level	Description of Requirements
TGEN 001	M	All User Interfaces and the DB content shall be prepared in Romanian, using the Romanian diacritical marks.
TGEN 002	M	The User Interface elements shall comply with Level A of Web Content Accessibility Guidelines (WCAG) 2.0.
TGEN 003	M	The User Interface shall be optimised to 1360x768 resolution, avoiding the appearance of scrollbars for User Interfaces presented by the IT solution.
TGEN 004	M	Where appropriate, the SAISE IT Subsystems subject to re-engineering shall have the possibility to adjust the User Interface (it will deliver a responsive interface) depending on the device used by it (<i>notebook, netbook, PC, smartphone, tablet, etc.</i>)
TGEN 005	M	For all the SAISE IT Subsystems subject to re-engineering compatibility with <i>W3C XForms standard</i> shall be ensured.
TGEN 006	M	The SAISE IT Subsystems subject to re-engineering shall be optimized in terms of minimal transfer of data between the client computer and server, with a special emphasis on avoiding to the extent possible the useless requests, implementation of AJAX with JSON, minimising the load of server resources necessary for authentication, authorisation and logging procedures.
TGEN 007	M	The SAISE IT Subsystems subject to re-engineering shall have an architecture of at least three levels (with distinct level for data) based on SOA services.
TGEN 008	M	The potentially variable information of SAISE IT Subsystems (parameters, methods of data storage, methods of connection with external services, etc.) shall be configurable and not require solution recompilation or direct interventions into the DB.
TGEN 009	M	The SAISE IT Subsystems subject to re-engineering shall use open standards for formats and communication protocols.
TGEN 010	M	The parts of services displayed to the public by SAISE IT Subsystems subject to re-engineering shall be technologically neutral (Operating system, Internet browser, etc.).

Performance requirements specific for the SAISE IT Subsystems subject to re-engineering are defined in Table 4.2.

**Table 4.2. Performance Requirements set for SAISE IT Subsystems
subject to re-engineering.**

Identifier	Binding level	Description of Performance Requirements
PERF 001	M	The average time for server response shall not exceed three seconds upon the system nominal load.
PERF 002	M	Depending on specific IT Subsystem, SAISE shall ensure capacities for authentication/authorisation of more than 4000 concurrent Users within ten minutes (example: "Voter Turnout" ITSS).
PERF 003	M	For "SAISE Admin" ITSS, concurrent activity for at least 20 concurrent Users shall be ensured, while the displayed services shall be able to respond to at least 1000 concurrent queries.
PERF 004	M	For "State Registry of Voters" ITSS concurrent activity of at least 500 concurrent Users and concurrent servicing for at least 150 queries shall be ensured.
PERF 005	M	For "Check your name in the SRV" ITSS simultaneous processing of at least 1000 queries for voter verification in the Voters' List shall be ensured.
PERF 006	M	For "Voter Turnout" ITSS timely processing of at least 500 simultaneous queries shall be ensured.
PERF 007	M	For "Preliminary Results" ITSS timely processing of at least 100 simultaneous queries shall be ensured.
PERF 008	M	For SAISE Reporting Platform simultaneous servicing of at least 20000 Internauts with reports afferent to the voting process or the voting results shall be ensured.
PERF 009	M	Prior to the delivery of the IT solution, all performance tests shall be conducted.
PERF 010	M	Performance testing shall include at least two components: system <i>load testing</i> and system <i>stress testing</i> .

5.1.2. Security and Protection Requirements

The IT Subsystems subject to re-engineering shall comply with the technical requirements imposed on IT Systems by the *Moldovan Standard SM ISO/CEI 27002:2017 – Information Technology. Security Techniques. Code of best practices for information security management*.

The IT solution shall comply with the Security and Protection Requirement defined in Table 4.3.

Table 4.3. Security and Protection Requirements.

Identifier	Binding level	Description of Security and Protection Requirements
SR 001	M	The IT Subsystems subject to re-engineering shall guarantee full storage and integrity of DB content.
SR 002	M	Access to functions granted to non-authenticated users shall be monitored using protection means against overstressing the service by one or several network hubs.
SR 003	M	All fields of forms filled in by users must be validated by type of both the client and the server.
SR 004	M	The IT Subsystems subject to re-engineering shall be protected against OWASP Top 10 vulnerabilities.

Identifier	Binding level	Description of Security and Protection Requirements
SR 005	M	The IT Subsystems subject to re-engineering shall ensure confidentiality of data transmitted-received via communications channels.
SR 006	M	Access to IT Subsystems subject to re-engineering shall be monitored.
SR 007	M	Access to functions for internal users shall be granted by their authentication, using User + Password, active directory or electronic/mobile signature.
SR 008	M	Users' actions shall be entered into electronic logs.
SR 009	M	The IT Subsystems subject to re-engineering shall make a periodic sound signal that tells about its functional status.

5.1.3. Requirements for Software, Hardware and Communication Channels

Table 4.4 contains the assurance requirements for software, hardware and communication technology for the SAISE IT Subsystems subject to re-engineering

Table 4.4. Assurance requirements for software, hardware and communications technology of SAISE IT Subsystems.

Identifier	Binding level	Description of Requirements for Software, Hardware and Communication Channels
SHC 001	M	All IT Subsystems to be developed as per the provisions of these Specifications shall be compliant with the following platform constraints: <ul style="list-style-type: none"> ■ Windows Server 2012 R2; ■ IIS 8; ■ .NET 4.5, ■ MS SQL Server 2008 Enterprise R2.
SHC 002	M	The SAISE IT Subsystems shall have the possibility to be installed on both dedicated servers and on Cloud solutions.
SHC 003	M	It is required to demonstrate the virtualisation capacity by delivering to the Beneficiary an image of the system that can be loaded and become functional with minimum configurations on one of the virtualisation solutions available on the market.
SHC 004	M	All the developed IT Subsystems shall be accessed through communication channels of at least 128kbps.
SHC 005	M	Technologies used to develop the current SAISE Subsystems shall be used in the process of SAISE Subsystems re-engineering.
SHC 006	M	The developed IT Subsystems shall be able to be virtualised at the level of software-hardware.
SHC 007	M	The developed IT Subsystems shall be tolerant to errors by offering support for clustering and fail over for the whole platform and its components.
SHC 008	M	It is necessary the service parts displayed to the public to be technologically neutral.
SHC 009	M	Verification shall be done by using a set of (modern) platforms expecting that the performance parameters are similar or even better than those contained in reference configuration.
SHC 010	M	The generic software recommended for the operation and interaction with all developed IT Subsystems represents the WEB browser.

Identifier	Binding level	Description of Requirements for Software, Hardware and Communication Channels
SHC 011	M	The developed IT Subsystems shall be compatible with at least two the most recent versions of the following WEB browsers: <i>MS Edge/MS Internet Explorer, Mozilla Firefox, Google Chrome, Safari and Opera.</i>
SHC 012	M	Compatibility with <i>MS Edge /MS Internet Explorer</i> browser is mandatory.
SHC 013	M	The developed IT Subsystems shall include configurable means for technical logging.
SHC 014	M	The developed IT Subsystems shall be able to produce at least the following levels of technical logging: <i>info; warning; critic; error.</i>
SHC 015	M	The Developer shall list the means to be used for troubleshooting the developed IT Subsystems.
SHC 016	M	The IT Subsystems will be operated in TCP/IP networks and, in particular, in HTTPS.
SHC 017	M	The Developer shall suggest other network and utility services necessary for the operation of IT Subsystems.

5.1.4. Requirements for data migration

The Developer shall carry out data migration, as well as patches to the DB in production to ensure its compatibility with the newly managed IT objects. The requirements set for the migration process are defined in Table 4.5.

Table 4.5. Requirements for data migration.

Identifier	Binding level	Description of Accepted Initiative
MIGR 001	M	The Developer shall develop patches to adjust the current <i>SAISE</i> DB structure to the newly developed data structures.
MIGR 002	M	The Developer shall ensure migration of data sets, which, as per the functional requirements, shall be moved to " <i>SAISE Admin</i> " ITSS.
MIGR 003	M	The category of migrated data includes: <ul style="list-style-type: none"> ■ Nomenclatures; ■ Classifiers; ■ Users' Profiles; ■ Users' Roles.
MIGR 004	M	<i>The CEC</i> shall prepare the data sets to be migrated. The data format shall be commonly agreed.
MIGR 005	M	In the process of data migration, <i>the Developer</i> shall be responsible for: <ul style="list-style-type: none"> ■ defining the methodology applied for data migration; ■ devising the detailed plans for data migration; ■ ensuring software tools to be used for data migration; ■ defining the quality rules for preparing the sets of data for migration and their implementation at the level of tools used in the process; ■ mapping the data made available by the <i>CEC</i> with the newly developed data structures; ■ defining the criteria for data reconciliation; ■ participating in activities aimed at data cleaning and enrichment; ■ verifying and validating the quality of data sets for importing; ■ importing the prepared data;

Identifier	Binding level	Description of Accepted Initiative
		<ul style="list-style-type: none"> ■ identifying exemptions and errors in the process of data importing.
MIGR 006	M	<p><i>The Developer</i> shall propose the Methodology for populating the initial data to the CEC. The Methodology shall comprise at least the following elements:</p> <ul style="list-style-type: none"> ■ the manner of preparing the data; ■ the manner of mapping the data structures; ■ the manner of cleaning the data and ensuring their quality; ■ the manner of completing the types of data or attributes required by "SAISE Admin" ITSS and missing in the data sets held by the CEC; ■ the manner of importing the data; ■ the manner of reconciling the migrated data; ■ the recovery plan (at each key stage of data migration); ■ the plan for launching into production.
MIGR 007	M	<i>The Developer</i> shall prepare and propose detailed plans for data population to the CEC.
MIGR 008	D	<i>The Developer</i> shall ensure specialised software tools of ETL type (<i>Extract Transform Load</i>) to be used in the process of data migration and provide full documentation for the use of such tools, having ensured the training of CEC persons in charge for the use of such tools.
MIGR 009	M	All activities afferent to data migration shall be unrolled in operation environments monitored by CEC, located in the CEC LAN. The data shall never leave the CEC Information System.
MIGR 010	M	In the process of data stocking, <i>the Developer</i> shall commit itself to comply with the security policy and standards approved and applied by CEC.
MIGR 011	M	<i>The Developer</i> shall devise and deliver the Methodology for data migration (strategy for data migration) to "SAISE Admin" ITSS.
MIGR 012	M	<i>The Developer</i> shall devise and deliver the Plan for data migration to "SAISE Admin" ITSS .
MIGR 013	M	All relevant data sets held by CEC shall be migrated completely and correctly to <i>e-Parliament</i> (the applications the data are to be migrated from shall be fully operational).

5.1.5. Aspects related to Information Technology and Industry Initiatives

The requirements on aspects related to Information Technology and Industry Initiatives in force on the territory of the Republic of Moldova are defined in Table 4.6.

Table 4.6. Requirements on aspects related to Information Technology and Industry Initiatives.

Identifier	Binding level	Description of Accepted Initiative
INI 001.	M	All developed SAISE IT Subsystems shall be able to use <i>MPass</i> Platform Service as authentication mechanism intended for authentication through the electronic or mobile signature.
INI 002.	M	All developed SAISE IT Subsystems shall use as authorisation mechanism the User Authorisation Service of CEC Interoperability Framework delivered by <i>SAISE Admin</i> .
INI 003.	M	The relevant developed SAISE IT Subsystems shall use <i>MSign</i> Platform Service as mechanism for applying and validating the digital signature.

Identifier	Binding level	Description of Accepted Initiative
INI 004.	M	All developed SAISE IT Subsystems shall be able to use the <i>MLog</i> Platform Service of <i>MCloud</i> as logging mechanism for critical business processes.
INI 005.	M	All developed SAISE IT Subsystems shall be able to use the <i>MNotify</i> Platform Service of <i>MCloud</i> as notification mechanism.
INI 006.	M	All developed SAISE IT Subsystems shall be capable to use the <i>Portal of Open Data</i> as public data dissemination mechanism.

5.1.6. Documentation Requirements

The IT solutions developed as per the provisions of these Specifications shall be accompanied by a full set of documentation of IT solutions covering the sections included in Table 4.7.

Table 4.7. Documentation requirements for IT Subsystems subject to re-engineering.

Identifier	Binding level	Description of Documentation Requirements for the Developed Applications
DOC 001	M	The Developer shall prepare and publish interactive guidance materials included in the User Interface of the developed IT products.
DOC 002	M	The Developer shall prepare and deliver the Technical Design (SRS+SDD) for each SAISE IT Subsystem subject to re-engineering.
DOC 003	M	The Developer shall prepare and deliver User's Manuals in Romanian.
DOC 004	M	The Developer shall prepare and deliver Administrator's Manuals in Romanian.
DOC 005	M	The Developer shall prepare the testing scenarios for all SAISE IT Subsystems subject to re-engineering to meet the Mixed Electoral System requirements for pre-acceptance and final acceptance.
DOC 006	M	The Developer shall prepare and deliver the Guide on installation and configuration of developed IT Subsystems (to include at least guidelines for code compilation, installation of application, hardware and software requirements, platform description and configuration, application configuring, and disaster recovery procedures).
DOC 007	M	The Developer shall prepare and deliver the Architecture Documentation for the developed IT Subsystems with the description of models in UML language to include a sufficient level of details in terms of Architecture in several cross-sections (including the data logical and physical model).
DOC 008	M	The Developer shall prepare and deliver API documentation displayed for integration with other IT Systems.
DOC 009	M	The Developer shall deliver all electronic mediums necessary to describe and validate the interfaces in WSDL language.
DOC 010	M	The Developer shall deliver the source code for all applications and components developed under the Project.

5.1.7. Requirements for maintenance, warranty/defect liability and support

The Developer shall ensure post-delivery defect liability period and technical support comprising the sections included in Table 4.8.

Table 4.8. Defect liability period and technical support provided for the delivered IT solutions.

Identifier	Binding level	Description of the defect liability period and technical support
GMS 001	M	The Developer shall cover the defect liability period and provide technical support for 12 months following the acceptance of provided services.
GMS 002	M	The defect liability period and technical support shall comply with the National Standard <i>SM ISO/CEI 14764:2015 – Software Engineering. Software life-cycle processes. Maintenance.</i>
GMS 003	M	The Beneficiary shall be able to report all technical issues that could occur through a ticketing mechanism, E-mail or instant message.
GMS 004	M	The Developer shall ensure support to document the technical issues and their traceability for the Beneficiary.
GMS 005	M	The deadline for response and remedying the reported issues should be at most eight working hours following the time of their reporting.
GMS 006	M	For major complexity issues the remediation period shall not exceed 72 hours.
GMS 007	M	The Developer shall prove its ability to provide post-delivery technical support in compliance with the requirements of GMS 001-GMS 006.
GMS 008	M	Upon signing the final acceptance documents for the SAISE IT Subsystems <i>subjected to re-engineering to meet the peculiarities of the Mixed Electoral System</i> , the Developer shall sign a <i>SLA</i> with the CEC that specifies in details the principles for providing the maintenance and support services, as well as the ones covered by the defect liability period for the developed IT solutions.

6. Final Product and Delivered Components

The final output (re-engineered SAISE IT Subsystems) is composed of software artefacts and IT Subsystem documentation, as well as of knowledge transfer to the system Owner and Administrator. Artefacts related to the re-engineered SAISE IT Subsystem deliverables are displayed in Table 5.1.

Table 5.1. Artefacts delivered for the re-engineered SAISE Subsystems.

Identifier	Binding level	Artefact Brief Description
DELIV 001	M	Complete source code of modules and components necessary to compile the delivered software.
DELIV 002	M	Final products packed for easy installation in the proposed technological environment.
DELIV 003	M	Technical design (SRS+SDD) of the re-engineered IT Subsystems.
DELIV 004	M	Documentation on configuration and deployment of re-engineered SAISE IT Subsystems (guidelines for deployment).
DELIV 005	M	User's Manuals.
DELIV 006	M	Administrator's Manuals (including the Contingency Plan).
DELIV 007	M	Training documentation (intended for the trainers to train the CEC staff in using the IT Subsystems).
DELIV 008	M	Upgrading Plan of the SAISE re-engineering activities, including all the mentioned ITSS.
DELIV 009	M	Test scenarios for pre-acceptance and final acceptance.
DELIV 010	M	Technical specifications for the published and used interfaces.
DELIV 011	M	SLA for the defect liability, maintenance and post-implementation technical support.
DELIV 012	M	All artefacts copied on electronic medium (CD-R or DVD+-R).

In addition to the artefacts related to the SAISE IT Subsystems deliverables, all the services needed for knowledge transfer indicated in Table 5.2. shall be provided.

Table 5.2. Knowledge transfer services related to delivered artefacts.

Identifier	Binding level	Artefact Brief Description
DELIV 012	M	Training of Administrators (two System Users assigned with the role of <i>Administrator</i>).
DELIV 013	M	Assistance during the SAISE IT Subsystems testing in production (pilot implementation period).
DELIV 014	M	Assistance in testing the SAISE IT Subsystems acceptance.
DELIV 015	M	Assistance in putting the system into production.
DELIV 016	M	Solving the deficiencies identified during the pilot period and acceptance testing.
DELIV 017	M	Post-implementation technical support (after bringing the system into production) for a 12-month period, including corrective, adaptive and preventive maintenance, in compliance with SM ISO/CEI 14764:2015.

7. Implementation Stages of the IT System

The *SAISE ITSS* designing, building, testing and implementation activities shall be carried out in compliance with the following schedule:

1. **IT System development stage**, which shall be subdivided into phases coordinated with CEC as follows:
 - a. *The Developer* shall consider the Terms of Reference, the scope of work and, with the approval of the direct Beneficiary (CEC), shall propose its vision regarding the development of IT Subsystems subject to re-engineering through a Technical Design containing two documents: SRS and SDD (**one month, 31 of March 2018 the latest**);
 - b. *The Developer* shall develop the Programme Code required for SAISE re-engineering, demonstrating that all functionalities described by the Specifications related to SAISE IT Subsystems are in place (**this stage shall not exceed three months, 30 of June 2018 the latest**):
 - "SAISE Admin" ITSS;
 - "State Registry of Voters" ITSS;
 - "Check your name in the SRV" ITSS;
 - "Voter Turnout" ITSS;
 - "Preliminary Results" ITSS;
 - SAISE Reporting Platform.
 - c. *The Developer* shall test all the re-engineered IT Subsystems in laboratory mode (in-house testing) and prepare the related documentation (the IT Subsystems functionalities shall be presented with the corrections and adjustments made during the previous sub-stage, as well as the technical documentation set, etc.). This stage shall last five weeks, cumulative. The testing must cover the following stages:
 - each subsystem shall be subject to *stress testing* and *load testing* aimed at checking the extent to which it meets the CEC expectations according to the delivered by CEC *Performance testing requirements and expectations*;
 - based on *load* and *stress testing* results, the Developer, as appropriate, shall carry out all the required adjustments and changes, having prepared an improved version of the IT product.
 - the improved version of the subsystem shall be subject to *stress testing* and *load testing* aimed at checking the extent to which it meets the CEC expectations. Where necessary, direct improvements are carried out until all the issues have been addressed.
2. **The System Implementation, Production Stage** shall begin with the approval of the Protocol of acceptance by CEC of re-engineered SAISE Subsystems in the submitted version and the signing of the statement of acceptance in pilot operation. At this stage the Developer shall prepare the final version of the IT system to be put into operation. The implementation period shall not exceed **two months, 31 of August the latest**, during which the Developer shall provide the assistance required to correct the errors, address the deficiencies detected by the application Users, monitor the applications functioning and react quickly to resolve the identified issues.
3. **The training stage** shall start in parallel with the implementation of the IT solution and cover the training of 20 CEC and CICDE users in applying and managing the new SAISE functionalities.
4. **The system commissioning** begins with the signing of the IT System Commissioning Statement and starting its operation.
5. **The maintenance stage, defect liability period and support** is the timeframe during which the Developer shall take the obligation relative to the Beneficiary to grant assistance in maintaining the capacity of the IT system to provide services, as well as in changing the software, while maintaining its integrity. The duration of this stage shall be **9-month period** and set as per the contractual clauses.

8. Management Arrangement

The contractor will work under the guidance of the Department of Information Technology and Management of Voters' Lists of the Central Electoral Commission and in close cooperation with EDMITE Project for both substantive and administrative aspects of the assignment and under the direct supervision of the Electoral Specialist, EDMITE Project, Senior Project Officer and UNDP IT Strategic Adviser.

Language

All discussions with the beneficiaries of the project will be conducted in Romanian and Russian. All the relevant documentation, information solution interface and training and technical support will be conducted in Romanian.

Key Deliverables of the Work

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

	Deliverables	Tentative timeframe
1	Technical Design (containing the SRS and SDD) submitted, discussed and accepted by the Beneficiary	by 31 March 2018
2	Programme Code developed, with all functionalities in place and demonstrated, including: <ul style="list-style-type: none"> • "SAISE Admin" ITSS; • "State Registry of Voters" ITSS; • "Check your name in the SRV" ITSS; • "Voter Turnout" ITSS; • "Preliminary Results" ITSS; • SAISE Reporting Platform. 	2 April – 30 June 2018
3	In-house Testing Stage completed, including: <ul style="list-style-type: none"> • <i>stress testing and load testing</i> of each subsystem, according to the CEC <i>Performance testing requirements and expectations</i>; • carry out, based on the stress and load testing, all the required adjustments and changes, having prepared an improved version of the IT product. • <i>stress testing and load testing</i> of the improved version of each subsystem, aimed at checking the extent to which it meets the CEC expectations. <i>Where necessary, direct improvements are carried out until all the issues have been addressed.</i> • related documentation prepared and delivered. 	by 31 July 2018
4	Production Stage completed, including: <ul style="list-style-type: none"> • Final version of the IT system to be put into operation – prepared. • Application functioning – monitored. • Deficiencies detected by the application users – addressed. 	2 July – 31 August 2018
5	Training stage of the relevant staff conducted	2 July – 28 September 2018
6	System commissioning conducted	by 28 September 2018
7	Maintenance and support stage accepted by the Beneficiary and completed	1 November 2018 – 31 July 2019

9. Eligibility

Successful bidder must meet the following minimum qualification requirements:

For the company:

- a. Minimum 5 years of working experience in developing IT systems;
- b. Minimum 2 IT projects of similar complexity implemented and their brief description;
- c. Certification in ISO 27001;
- d. Company must have permanent branches in the Republic of Moldova (in case the bidder is a foreign company);
- e. The experience in the development of IT applications for electoral processes would be a strong asset.

The bidder shall submit the technical bid with clear CVs (based on the template indicated in the RfP) of the project staff and the qualifications of each staff proposed.

The staff holding the following key positions shall be presented explicitly (the number of persons should be minimum, but not limited to):

- 1x Project Manager/ Team Leader, in case the bidder is a foreign company, this specialist must be local;
- 2x Senior Developer/ Business Analyst, in case the bidder is a foreign company, this specialist must be local;
- 2x Developer;
- 1x Tester;

Qualifications and requirements of proposed staff:

Project Manager/ Team Leader:

- a. Licensed in ICT (master degree will be an advantage);
- b. Minimum 3 years of experience in the proposed position;
- c. Specific experience in ICT proved through the implementation of similar projects like principles of operation or area of interest (min 1 project of similar complexity in which the person was involved should be mentioned explicitly in his/her CV);
- d. Experience of working in IT system development methodology for the government sector of the Republic of Moldova would be an advantage;
- e. Proved certification in Project Management (Prince, PMI, etc.) would be a strong asset;
- f. Excellent knowledge of Romanian and English languages.

Senior Developer/ Business Analyst (s):

- a. Licensed in ICT (master degree will be an advantage);
- b. Minimum 3 years of experience in the proposed position;
- c. Proved certification in MTA in Software Development certification is a must;
- d. Proved working experience in technologies related to the SAISE development platform: C#, Asp.Net MVC, jQuery, NHibernate, SSRS, MCSO would be an advantage;
- e. Specific experience in ICT proved through the implementation of similar projects like principles of operation or area of interest (min 1 project of similar complexity in which the person was involved should be mentioned explicitly in his/her CV);
- f. Perfect knowledge of Romanian. English language will be an advantage.

Developer(s):

- a. Licensed in ICT (university degree will be an advantage);

- b. Minimum 2 years of experience in the proposed position;
- c. Proved certification in MTA in Software Development certification would be an advantage;
- d. Proved working experience in technologies related to the SAISE development platform: C#, Asp.Net MVC, jQuery, NHibernate, SSRS, MCSD would be an advantage;
- e. Perfect knowledge of Romanian and/or Russian.

Tester:

- a. Licensed in ICT (university degree will be an advantage);
- b. Minimum 2 years of experience in the proposed position;
- c. Proved working experience technologies related to the SAISE development platform: C#, Asp.Net MVC, jQuery, NHibernate, SSRS would be a strong asset;
- d. Proved ISTQB certification will be an advantage;
- e. Perfect knowledge of Romanian and/or Russian.

UNDP Moldova is committed to workforce diversity. Women, persons with disabilities, Roma and other ethnic or religious minorities, persons living with HIV, as well as refugees and other non - citizens legally entitled to work in the Republic of Moldova, are particularly encouraged to apply.