Modernization of Government Services
in the Republic of Moldova
Project ID No. P148537

Terms of Reference

CONSULTING SERVICES FOR THE DESIGN, DEVELOPMENT, CONFIGURATION AND DEPLOYMENT OF THE GOVERNMENT CLIENT SUPPORT SERVICE INFORMATION SYSTEM

I. Background

The Government of Moldova is determined to fundamentally change the way how public services are provided in Moldova through a variety of interventions for modernization of service delivery, which combat corruption, foster a customer care culture, enhance access, as well as increases efficiency in the Moldovan public administration.

From 2006 to 2013, Moldova modernized its civil service legislation and administrative processes under the Central Public Administration Reform (CPAR), supported by the World Bank's administered CPAR Multi-Donor Trust Fund.

In July 2016, the Government of Moldova approved the Public Administration Reform Strategy for 2016-2020[1], that kept the modernization of public services delivery process among its main objectives.

To achieve the stated objectives, the Government requested the World Bank's assistance for a PAR operation, that became effective in June 2018, called Modernization of Government Services Project (hereafter *MGSP* or *the Project*).

The design of the project takes into account the Government of Moldova's vision, stated in the Public Administration Reform Strategy 2016-2020 and makes extensive use of institutional and technological achievements of Governance e-Transformation Project (GeT) implemented by the Government of Moldova and World Bank in the period between November 2011- December 2016.

In 2021, the new Executive issued its governing Programme "Establishing Good Times for Moldova"[2] and set modernization of at least 100 administrative services and access of 100% of active population to electronic public services as some if its objectives. The Government Action Plan 2021 – 2022[3] through its envisaged actions reconfirms the determination of the Government to modernize the administrative service delivery system by improving access to public services through various channels, their efficiency, reduction of unnecessary administrative burdens and cost of services for both beneficiaries and service providers, ensuring a stable level of quality of administrative services.

MGSP continues to play a very important role in achieving the high level objectives set up by the Government. The project aims to improve access, efficiency and quality of delivery of selected administrative services through the following components:

1. Administrative Service Modernization

The key activities under this component focus on re-engineering a group of government to citizen and government to business administrative services; piloting of one-stop-shops for public service

[1] http://lex.justice.md/index.php?action=view&view=doc&lang=1&id=366209
[2] https://www.gov.md/sites/default/files/document/attachments/programul_de_activitate_al_guvernului_moldova_vremurilor_bune.pdf
[3] https://www.gov.md/sites/default/files/document/attachments/pag_2021-2022_ro.pdf

delivery in selected locations and rolling out at national level; increasing public awareness on and advocacy for administrative services, with a particular highlight on e-services.

2. **Digital Platform and Services**

The main objective of this component is to digitize selected re-engineered government services; complete and strengthen a common infrastructure and mechanisms for rapid deployment of ICT-enabled public services; introduce government wide IT Management and Cyber Security standards and procedures. The component finances the procurement of additional shared computing infrastructure elements, digitization of services needed to deliver Government services electronically, as well as the development of a learning management system to mainstream the new digital infrastructure and the modernized services within the government.

3. **Service Delivery Model Implementation**

The objective of this component is to ensure that the institutional capabilities of key government agencies are aligned with and support the new model of public services delivery.

4. **Project Management**

This component supports the Project Implementation Unit (PIU), based in the e-Governance Agency (eGA) and ensures the activity the core e-Governance Agency team.

Existing context:

Electronic services have transformed the way the government interacts with citizens. To become more efficient and increase citizens' access to quality information and services the government institutions should make the transition to service delivery through electronic channels. On the other hand, as such transition leads to reduced human contact in service delivery, a mechanism will be needed by means of which users of public services will receive guidance and support and provide feedback.

In this context, a governmental Client Support Service (hereinafter referred to as GCSS) should be put in place to serve as a single point of contact with the users of public services, which will provide support services, thereby ensuring standardization and streamlining of support processes and, as a result, better public services. The purpose of implementing GCSS is to organize effective and rapid customer - service provider interaction, reduce the quality issues of information systems and quickly resolve incidents. The need for GCSS is also dictated by the pandemic situation caused by a large COVID-19 case numbers and the restrictions aimed to stop the spread of coronavirus.

Putting in place a GCSS will require creating an information system to serve as a single touchpoint between the beneficiaries and providers of public services, as well as between the CSS levels where beneficiaries' requests for advice and support will be handled.

II. Objective of the Assignment

The Client is looking for an ICT consulting company to develop the software solution for Government Client Support Service (GCSS) with demonstrated experience in the design and implementation of similar complexity projects to perform key client-facing activities, and to provide on-going maintenance and technical support.

III. Scope of work and Development approach

The scope of work of this assignment is to design, develop, configure, and deploy the information system as a fully functional product with all functionalities in place, according to the specifications iteratively defined by the Client (the indicative set of requirements is listed in Annex 1 Annex 2, and Annex 3) and following the development approach described below.

The development of the solution will follow agile iterative software development principles. Since there are many interpretations of agile software development and in order to avoid misunderstandings, this section provides key technology principles to be used in development of the solution.

Iterative development

In contrast to waterfall software development approach, the solution shall be developed in iterations named sprints. This means that the implementation of different functionalities will take place in phases with some modules being in production while others still being in development. The priorities of functionalities included in a sprint will be determined by the Client. Sprint duration will be determined by the Client together with the Consultant.

Agile development

The development shall follow agile principles by allowing change and flexibility in implementation. Client will maintain the master list of generic requirements for the solution– product backlog, which consists of ordered business and technical requirements as seen by the Client. Items in product backlog are ordered by the Client by their priorities. Client is free to manage the product backlog by adding new items to it, removing items and reordering them as he/she desires. At the beginning of each sprint, the topmost N items that fit into a sprint are taken, and a sprint backlog is built out of them. Items in sprint backlog are further detailed and distributed to developers. Sprint backlog is not changed during the sprint.

Working product in each iteration

Each sprint ends up in a working product which is presented to the Client for acceptance in the last day(s) of sprint. The working product shall meet the agreed criteria – Definition of Done (e.g. it must be fully functional, fully tested, accompanied with relevant unit tests, accompanied with relevant documentation where necessary, complete commented source code supplied etc.). Payments will be made upon successful delivery of working packages (one or more working products). In case the deliverables contain defects for reasons not imputable to the Client, the Consultant shall fix them without impacting the time schedule and at no additional costs, including possible visits to Client site. Working products from different sprints can be combined into a release deployed in production at Client's discretion. Any incidents reported by the Client after the release, shall be solved by the Consultant according to the agreed Service Level Agreements (SLAs) as defined in Annex 2, p.10 Support and Warranty requirements.

To ensure that the development team is in position to deliver on time working products, a Client representative – typically named the Product Owner in agile methodologies – is permanently available to the team for answering eventual questions, thus not slowing down the implementation pace.

The Consultant will appoint a Scrum Master from the team of key or non-key experts for the entire duration of the project.

The Scrum Master will be responsible for the day-to-day liaison with the Client; s/he must ensure the internal coordination and guidance of the project experts and the project coordination with external counterparts.

The Scrum Master must also ensure the availability of suitable experts in accordance with the project planning documentation.

Client involvement

In contrast with commonly used waterfall model for procurement and implementation of information systems for the government, the Client designated person – Product Owner – will be heavily involved in the development process. The Product Owner will have three core responsibilities:

1. Maintenance of product backlog – the owner will maintain the product backlog up to date, so it reflects prioritized list of desired functionalities.
2. Answering to questions coming from developers – the owner will be at all time available to the development team for answering their eventual clarification questions, thus avoiding complex and formal communication within the project. This is essential to ensure the team has all the information on time to deliver a working product at the end of the sprint.

3. Acceptance of working packages – delivered working packages are presented to the Client for acceptance at the end of each sprint. The Client shall accept the working package or notify the Consultant of any defects during the following sprint.

Although it is not strictly necessary, the Product Owner may participate in team stand up meetings listening for progress and eventual blockers for an immediate reaction.

Product Owner also decides on product releases, as per release plan.

Also, as per the principles of Agile project management methodology, the Client will define the Product Vision Statement and Product Roadmap in order to track progress and to ensure the appropriate product development.

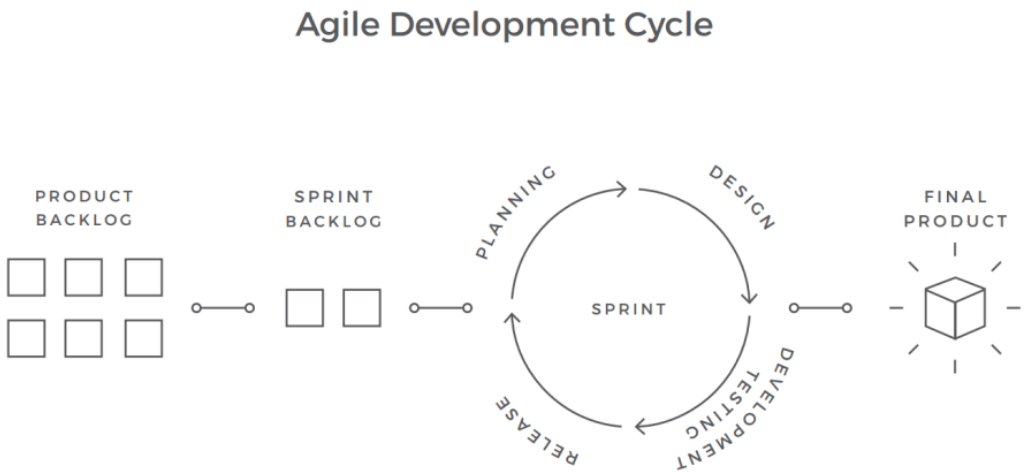

Figure 1. The indicative illustration of the Agile Development Cycle/Process.

Warranty

The Consultant shall provide 12 months of warranty for the developed solution. The warranty period starts after final release. During the warranty period the Consultant shall fix any identified defects.

The development and operations must be in compliance with the legal and regulatory documents listed in Annex 3.

Required technology stack

To preserve e-Government investments, the solution shall be developed using the latest versions of the following technology stack:

- Programming language is C#.
- ORM is Entity Framework Core.
- Web framework is ASP.NET MVC Core.
- RDBMS is Microsoft SQL Server.
- Container engine is Docker.
- Container orchestration is Kubernetes.
- Cache server and session store is SQL Server or Redis.

During the development process, the Consultant or the Client may propose use of additional components required for the development and proper functionality of the solution in production. Upon the Client's approval of such components, the costs for them shall be added through amendments to the contract.

IV. Expected Deliverables

The following deliverables will be provided by the Consultant during this assignment:

1. A fully functional information system with all functionalities developed and deployed according to the requirements defined by the Client during the assignment. The Consultant will deliver compilable and documented source code (including third-party tools and libraries, licenses, where applicable and automation scripts).
2. Technical and End-user documentation developed according to the Client's documentation requirements defined in Annex 2.
3. Training sessions and training materials developed according to the Client's training requirements defined in Annex 2.

Please note that any population with or migration of data is not part of this assignment.

V. Reporting Requirements

The following reports will be provided during the assignment:

a) Sprint Report, including release notes, breakdown and duration of tasks implemented during the sprint, velocity, issues and outstanding problems, proposed actions to be taken;

b) Next Sprint Backlog, including breakdown and estimated duration of tasks proposed to be implemented during the next sprint, resources that the Consultant expects to be provided by the Client and/or actions to be taken by the Client;

c) Training reports, submitted after each training session, including:

- Participants list;
- Training session agenda;
- Training materials (presentations, labs etc.);
- Trainees test results.

VI. Timing

The tasks defined under the current contract are estimated to be performed in 21 months – 9 months for development and 12 months of warranty period. If new functionalities will be identified by the Client based on users' feedback and subject to satisfactory performance, the contract can be extended based on the same fee rates.

VII. Institutional arrangements

The **Client** is responsible for all administrative and procedural aspects, contract and financial management, including acceptance and payment of deliverables/reports expected under the Contract, general project responsibilities and efficient coordination with stakeholders.

A Product Owner will be appointed by the Client and will coordinate and decide on all issues related to the technical elements of the Contract. The Product Owner will issue the administrative notice on the start date of the implementation of the contract and other administrative duties.

The Client will provide the following:

- infrastructure resources for testing and production environments;
- code repository, issue tracking system, CI/CD environment, task management system via the Client's subscription in Azure DevOps. The Consultant shall not include Azure DevOps subscription in its financial proposal;
- Training facilities.

The **Consultant** will ensure that adequate working conditions (workspace/office premises for experts, office equipment, computers, communication facilities, etc.) and services are provided to the Consultant's staff during the lifetime of the project.

The Consultant will be responsible for the day-to-day management of the project team and availability of necessary resources.

The Consultant will organize the Kick-off meeting and initial GCSS Backlog at its premises. All Consultant's Key Experts as specified in the section defining the qualification requirements, shall participate in the Kick-off meeting and initial GCSS Backlog. The costs associated with the Client's presence at the Kick-off meeting will be covered by the Client and shall not be included in the Consultant's financial proposal.

The Consultant will ensure visits to the Client site to provide training to end users.

In case the deliverables contain defects and/or there are delays for reasons not imputable to the Client that may impact project outcome, the Consultant may be requested to visits to Client's site in order to solve the project issues.

The communication languages will be Romanian or English.

The Consultant shall work under the supervision of the appointed Product Owner and report to the Client's Chief Digital Officer.

VIII. Qualification Requirements

Consultant qualifications requirements

The Consultant shall furnish documentary evidence (including information about the completed contracts and contact information of clients from whom the references could be taken or whom the Client may, when necessary, visit to familiarize themselves with the systems put into operation by the Consultant) to demonstrate that it meets the following experience requirements:

1. Have been in operation for at least five (5) years with main part of its business being the development of information systems.
2. Experience in conducting projects similar size and complexity developing web applications proven by at least two (2) contracts with the development phase finalized in the last three (3) years. For ongoing projects, copies of acceptance documents of the entire software solution shall be provided.
3. Experience in software development using agile software development principles (as described in the scope of work and development approach section of the ToR) would be an asset. This shall be demonstrated by presenting the project methodology describing the role of the client.
4. Demonstrated experience using required technology stack would be an asset.

Staff qualifications requirements

The Consultant shall provide a team of the following key experts:

- Key expert 1. Business analyst/Team Leader/Scrum master;
- Key expert 2. Senior software developer;
- Key expert 3. Software developer;
- Key expert 4. Software developer;
- Key expert 5. Database administrator;
- Key expert 6. Software Tester and Trainer;

Each key expert must meet at least one the following requirements:

- Proven experience in web UI design and development using responsive frameworks, progressive web apps;
- Proven experience in database design, development, and optimization;

- Experience in systems' integration, API design and development using SOAP/REST;
- Experience with unit testing;
- Experience in DevOps practices;
- Experience in system analysis.

Per total the entire team of the proposed key experts must meet all the above requirements.

Offers which will not demonstrate that the team covers the above requirements may be subject of disqualification.

For proposed key experts the CVs need to be submitted, demonstrating the minimum qualifications requirements, as detailed below:

Key Expert 1. Team Leader/Scrum master:

The Business analyst/Team Leader/Scrum master shall oversee that all reporting obligations are fulfilled in a timely manner to a high-quality standard.

- university degree in Computer Science or another relevant domain;
- at least 7 years of experience in software development;
- at least 5 years of proven experience in team/project management with the application of Agile methodology, with at least 2 projects implemented in the last 3 years;
- at least 5 years of experience in software development using C#, Entity Framework, ASP.NET MVC, SQL Server and a dependency injection framework;
- certifications in any technology from the required technology stack is an asset;
- ability to communicate in Romanian or English.

Key Expert 2. Senior software developer:

The Senior software developer shall oversee that all reporting obligations are fulfilled in a timely manner to a high-quality standard.

- university degree in Computer Science or another relevant domain;
- at least 7 years of experience in software development;
- participated in at least 2 software development projects in the last 3 years using Agile approach;
- at least 3 years of experience in software development using C#, Entity Framework, ASP.NET MVC, SQL Server and a dependency injection framework;
- certifications in any technology from the required technology stack is an asset;
- ability to communicate in Romanian or English.

Key Expert 3-4. Software developer:

- university degree in Computer Science or another relevant domain;
- at least 5 years of experience in software development;
- participated in at least 2 software development projects in the last 3 years using Agile approach;
- at least 3 years of experience in software development using C#, Entity Framework, ASP.NET MVC, SQL Server and a dependency injection framework;
- certifications in any technology from the required technology stack is an asset;
- ability to communicate in Romanian or English.

Key Expert 5. Data Base administrator:

- university degree in Computer Science or another relevant domain;
- at least 5 years of experience in data base design, data base administration and software development;
- participated in at least 2 software development projects in the last 3 years using Agile approach;
- at least 3 years of experience in software development using C#, Entity Framework, ASP.NET MVC, SQL Server and a dependency injection framework;
- certifications in any technology from the required technology stack is an asset;
- ability to communicate in Romanian or English.

Key Expert 6. Software Tester and Trainer:

- university degree in Computer Science or another relevant domain;
- at least 3 years of experience in data base design, data base administration and software development;
- proven experience in software testing analysis and design;
- proven experience in automated testing;
- proven experience in performance (load and stress) testing;
- proven experience in security testing;
- certification in testing or any technology from the required technology stack is an asset;
- experience in conducting training sessions for end users and ICT specialists;
- experience writing technical and end-user documentation;
- ability to communicate in Romanian or English.

Annexes

Annex 1. Business requirements

This annex describes the business requirements of GCSS IS. The business requirements identify what the IT System does. It also defines the software actors and the specific functionalities provided by GCSS IS.

The business requirements are defined using "use cases". Each use case is described as a set of functions through which the user will act.

1.2. GCSS IS Actors

The Table 2 describes all the categories of actors that interact within the GCSS IS and their hierarchy.

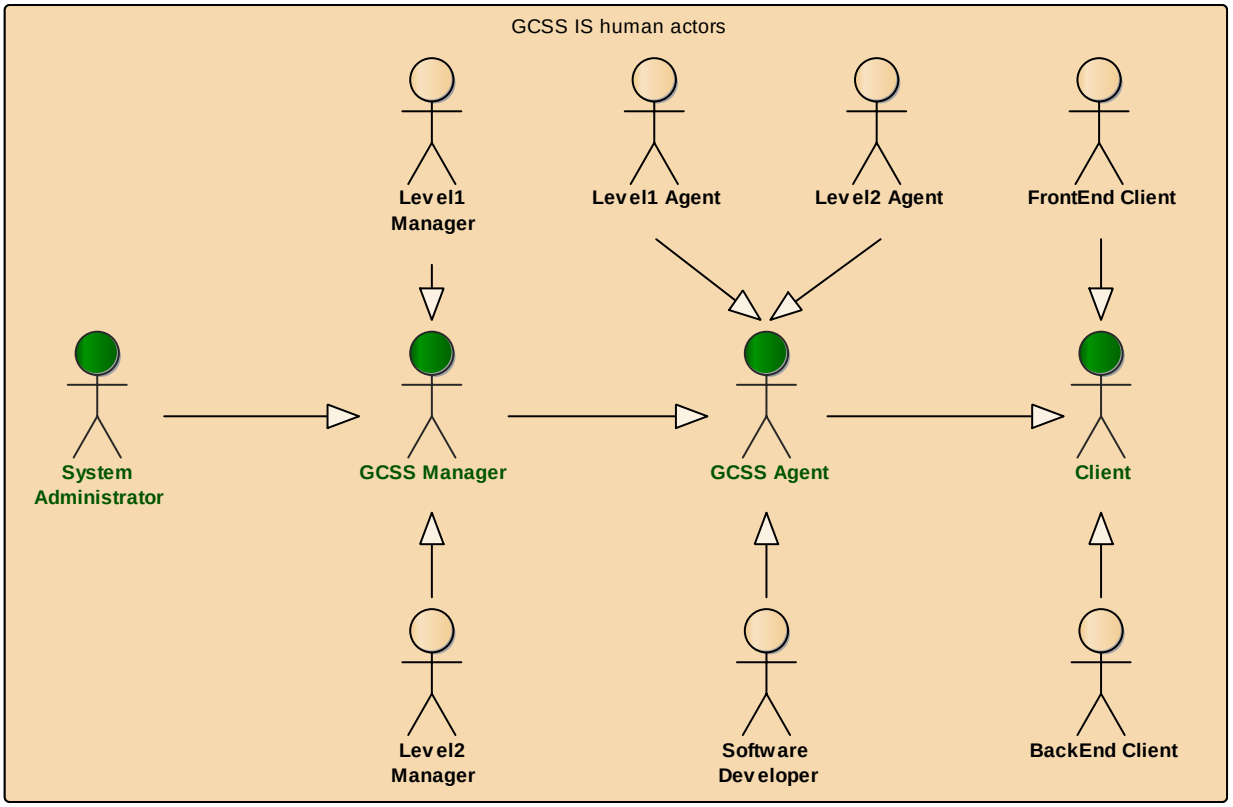

Figure 2. GCSS IS human actors.

Client

Human actor, representing the individuals who contact GCSS to solve technical issues or request advice regarding the operation of the information systems of public authorities maintained by GCSS. The Clients of GCSS IS will be Moldovan citizens or businesses seeking to receive electronic public services and the authorized users of the information systems of public authorities (officials of public authorities). There are two categories of users with this role:

- *FrontEnd Client* - specific to individuals (usually citizens of the Republic of Moldova) who access the FronEnd interface of governmental information systems to request public services;
- *BackEnd Client* - specific to the public sector officials who have authorized access to the BackEnd interface of governmental information systems to perform job-related duties.

GCSS Manager

Human actor, who represents the users of GCSS IS authorized to access the user interface in order to monitor and oversee how technical support requests received by GCSS are processed. There are

several categories of users with this role, and they will have access to similar functionalities provided by the user interface:

- *Level1 Manager* - the GCSS manager of level 1 support line who, with the help of the facilities of GCSS IS, will distribute tasks to Level 1 Agents and oversee their work;
- *Level2 Manager* - the GCSS manager of level 2 support line who, with the help of the facilities of GCSS IS, will distribute tasks to Level 2 Agents and oversee their work.

GCSS Agent

Human actor, who represents the users of GCSS IS authorized to access the BackEnd component of the system and the functionalities for the documentation and processing of technical support requests. The categories of users with this role who will have access to similar functionalities provided by the user interface but will be involved in different contexts of the workflows of GCSS IS are the following:

- *Level 1 Agent* - authorized user of GCSS at first support level who will use the facilities of GCSS IS for the documentation and primary processing of the requests received directly from Client users;
- *Level 2 Agent* - a qualified GCSS specialist at second support level who will use the facilities of GCSS IS to process the requests received from Level 1 Agents;
- *Software Developer* - authorized user of the provider of the GCSS-supported information system who will use the facilities of GCSS IS to process the requests received from Level 2 Agent.

System Administrator

Users in charge of the technical administration of GCSS IS. Although the administration tasks in GCSS IS could be performed by other roles (to be defined later), in the context of this document „System Administrator" will perform all the tasks related to the technical administration of GCSS IS.

1.2. GCSS use cases

Figure 3 shows the main GCSS use cases. Each top-level use case corresponds to an "Epic" in Agile that must be broken down into several "User Stories" (depending on the specifics of the use case).

UC01: Send request for support

A key GCSS IS use case that provides the functionalities necessary to access GCSS in order to request technical support. GCSS IS will provide the following alternatives for requesting technical support from GCSS:

- **UC01.1: Send request through phone call**. This use case provides the functionalities to request technical support by phone. GCSS IS will contain rules for automatically routing the Client to the relevant GCSS Agent (according to the settings defined in UC15 and the IVR menu configured in UC13) and will take into account the Client's previous interactions in order to connect the Client to the same GCSS Agent in case of a repeated call. Based on the contact data provided by the IVR-PBX solution, GCSS IS will create the Client profile to be filled in by GCSS Agent during the phone conversation. If there is a history of Client – GCSS interaction, GCSS IS will automatically pre-fill the ticket form with the Client profile data and the requested IVR options and will display to the GCSS Agent all the relevant information about the Client and the Client's history of interaction with GCSS.
- **UC01.2: Send request through chat**. This use case provides the functionalities for requesting technical support by using instant messaging (GCSS specialized chat). The specialized chat will be provided to the Client by GCSS FrontEnd interface or the interface of the maintained information system (GCSS chat will be integrated in the

interface of the maintained information system). To access the chat will be possible only after the authentication of the Client through MPass and selection of the problem type and information system for which support is requested. GCSS IS will contain rules for automatic routing of the Client to the relevant GCSS Agent (according to the settings defined in UC15 and type of request) and will take into account the Client's previous interactions in order to connect the Client to the same GCSS Agent in case of a repeated call. Based on the contact data provided by MPass, GCSS IS will create the Client profile to be filled out by the GCSS Agent during instant messaging. If there is a history of Client – GCSS interaction, GCSS IS will automatically pre-fill the ticket form with the Client profile data and will display to the GCSS Agent all the relevant information about the Client and the Client's history of interaction with GCSS.

- **UC01.3: Fill and send ticket**. This is a complex use case for GCSS Clients with advanced ICT skills. It will provide a deficiency / error reporting ticket form (similar to the one provided in UC07), which the Client can access only once authenticated through MPass. GCSS IS will contain rules for automatic assignment of the ticket filled and sent by the Client to the relevant GCSS Agent (in accordance with the configurations defined in UC15 and the ticket data) and will take into account the Client's previous interactions in order to connect the Client to the same GCSS Agent in case of a repeated request. Based on the contact data provided by MPass, GCSS IS will create the Client profile to be further filled out by the GCSS Agent during the instant messaging. If there is a history of Client – GCSS interaction, GCSS IS will automatically pre-fill the ticket form with the Client profile data (or will request the missing information).
- **UC01.4: Send request through email**. This is a use case outside GCSS IS for writing and sending e-mails requesting technical support to a dedicated e-mail. This email will further be taken over by GCSS IS, assigned by the GCSS Manager to the relevant GCSS Agent and processed in UC07.

UC02: Check request traceability

This use case allows those seeking technical support to check the status of their technical support requests. Based on the ticket identification data the Clients using the FrontEnd of GCSS IS will be able to track the status of their requests. GCSS IS will deliver the ticket and request status at the time of the traceability check.

Alternatively, the traceability data of the technical support requests could be viewed in the space reserved for the Client in the governmental MCabinet service.

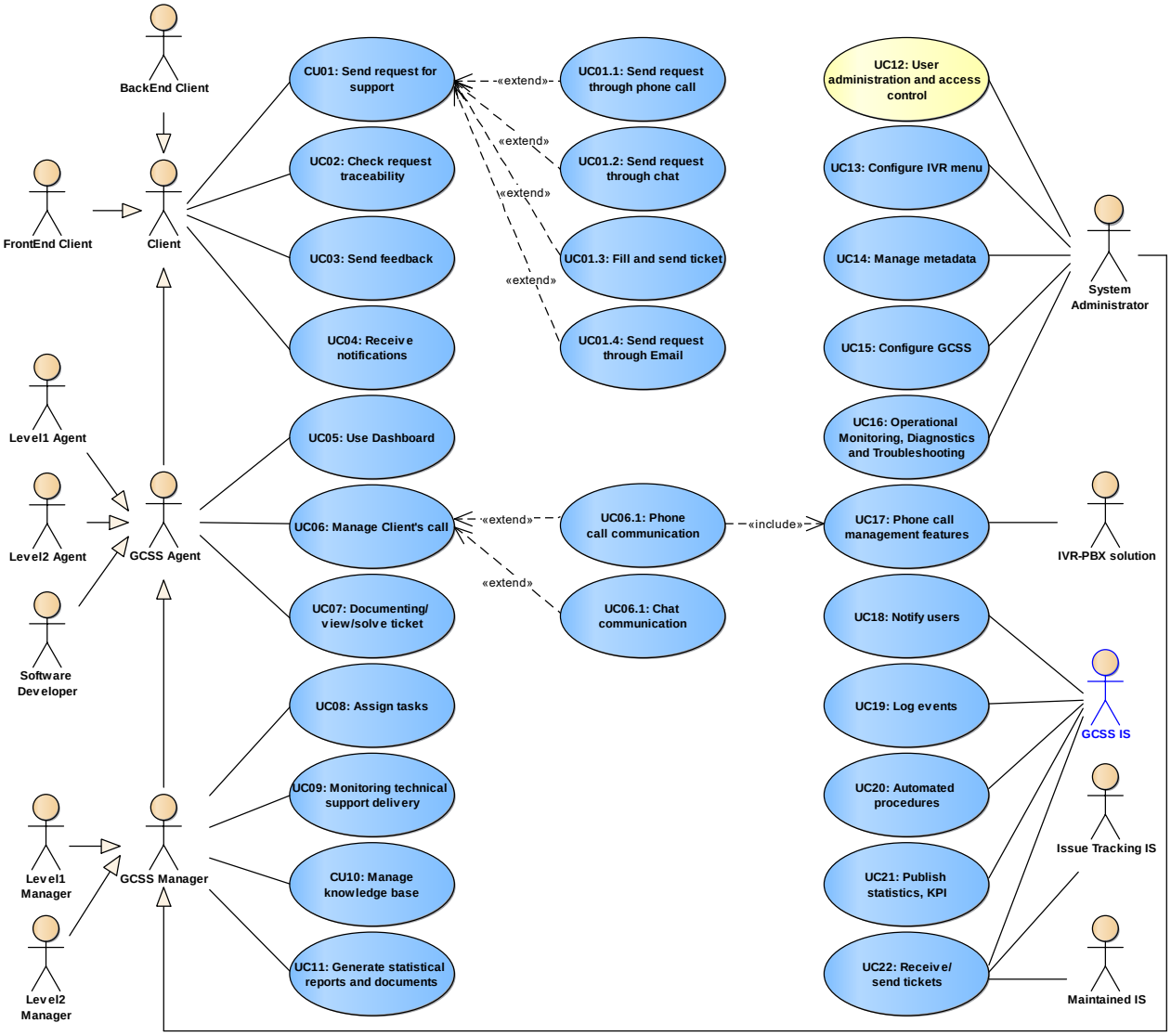

Figure 3. GCSS IS use cases.

UC03: Send feedback

This use case will provide the functionalities for collecting feedback on the technical support provided by GCSS.

The following feedback mechanisms will be put in place:

- phone call to the Client to ask the Client to assess the support provided (e.g. by choosing keys from 1 to 5 on the telephone keypad);
- voting questionnaire on the support provided (when the technical support request is sent through an electronic form);
- e-mail sent to GCSS.

The feedback received by GCSS will be assigned to the technical support cases and to the profiles of the GCSS users who processed the requests.

When feedback has been received, GCSS IS will notify the relevant managerial role. The notification mechanism that will be used will be the platform service MPass.

UC04: Receive notifications

This use case allows the authenticated users, regardless of their roles (GCSS Agent, GCSS Manager, System Administrator and Client), to receive notifications related to the business events in which they are involved.

GCSS IS will generate and send notifications in the requested format. All the categories of authorized GCSS users will be allowed to individually set their preferred configurations for receiving notifications through the personal Dashboard.

The notification mechanism that will be used will be the platform service MNotify.

UC05: Use Dashboard

Use Dashboard is a use case provided by GCSS IS to alert the authorized GCSS user, to allow the latter to view and quickly access all the business events related to his/her job task of providing technical support to Clients (system notifications, workflow events, the tasks to be performed etc.).

The personal Dashboard will also allow authorized users to directly access the functionalities related to the notified business events (e.g., direct access to the electronic ticket form, changing the ticket status etc.)

The Dashboard will be the main page of the user interface of the authorized user of GCSS IS where all user-related elements and notifications will be placed.

The Dashboard will also contain an area (Favorites) dedicated to placing and accessing the tickets or Client profiles in progress in order to make the work of the authorized GCSS users more efficient.

UC06: Manage Client's call

This use case will allow instant communication between GCSS employees and Clients. There are 2 alternatives for making instant communication happen, more specifically:

- **UC06.1: Phone call communication**. This use case enables the communication by phone between the GCSS Agent and the Client by means of the user interface of GCSS IS. It should be noted that GCSS IS will take into account certain configurations and rules defined in UC15 to connect the GCSS Agent that is the most appropriate to handle the technical support request to the phone call (e.g., GCSS Agent specialization, Client's repeated call on the same issue etc.). All the phone calls will be recorded by IVR-PBX solution and further stored in GCSS IS data store. GCSS IS, based on the Client's contact data received through IVR-PBX solution, as well as the historic data stored in the data store of GCSS IS, will provide to the GCSS Agent all the relevant information about the Client (profile data, history of interaction with the Client etc.) and will pre-fill, where appropriate, the technical support request documentation forms. Additionally, there will be phone call management facilities (call acceptance, rejection, suspension, transfer, connecting additional GCSS specialists to the phone call and ending call) for the GCSS Agent.
- **UC06.1: Chat communication**. This use case enables the communication by means of instant messaging between GCSS Agent and Client. The chat solution will be integrated in the user interface of GCSS IS and can be also integrated in the user interface of the maintained information system. GCSS IS will take into account certain configurations and rules defined in UC15 so as to connect the GCSS Agent that is most appropriate to handle the technical support request to that chat (e.g., specialization of GCSS Agent, Client's repeated call on the same issue etc.). All the instant chat conversations will be recorded in the data store of GCSS IS. GCSS IS will provide to the GCSS Agent all the relevant information about the Client (profile data, the history of interaction with the Client etc.) and will pre-fill, where appropriate, the technical support request documentation forms.

Regardless of the way the Client asks for support, all the events of requesting technical support will be logged (including through MLog service) in order to implement the functionality to measure the GCSS performance indicators and monitor potential delays.

UC07: Document/view/solve ticket

This is an essential use case provided by GCSS IS to document and process the technical support requests received from Clients.

GCSS IS will automate as much as possible the documentation of technical support requests (filling out the technical support tickets). In this sense, a large part of the ticket data will be pre-filled with the information contained in GCSS IS (e.g., contact data from PBX, Client profile data stored in GCSS IS or provided by MPass, data related to the type of issue provided by IVR etc.). The filled out ticket will be assigned automatically to the author to be handled by the latter.

GCSS IS will provide an indexed search mechanism for the tickets in the data store of GCSS IS with full text search options and presentation of results depending on the relevance of the content of the tickets for the query. Additionally, navigation facilities will be provided in the ticket store using various filtering, ordering and grouping criteria:

- tickets assigned for resolution;
- tickets sorted / grouped by status;
- tickets sorted/grouped by the related information system;
- tickets sorted/grouped by date of issue/date of assignment/date of status change;
- mixed strategies.

After the search results are displayed, depending on their roles, the authorized users of GCSS IS will be allowed to:

- view the ticket data;
- view/download files attached to the ticket;
- fill out the tickets with data related to the resolution of the reported technical issue;
- define the relation with other tickets;
- initiate tickets for sub-tasks of the ticket;
- attach new files to the ticket;
- change ticket status;
- perform other relevant actions.

Processing a ticket to address a technical problem reported to GCSS involves taking one or several following actions:

- connecting to the maintained information system and identification of the source of the reported problem;
- solving the technical problem and documentation of the problem solving process;
- providing reasons why it is impossible to solve the problem (e.g., lack of specific competences, it is impossible to reproduce the error etc.);
- attaching files that prove that the problem is solved / the problem cannot be solved;
- creating the link to other tickets (merging similar tickets);
- re-assigning the task to another user;
- changing ticket status.

The processing of a ticket is considered completed when the ticket is closed. A ticket will be closed when one of the following events occurs:

- the technical problem has been resolved;
- the reported technical problem cannot be reproduced and the information system works properly;
- the ticket data has nothing to do with the GCSS competences;
- the ticket must be reassigned to a user with more advanced competences;
- the ticket must be escalated;
- the reported technical problem cannot be solved at the moment due to objective reasons.

UC08: Assign tasks

This use case is accessible to and will enable GCSS Managers to assign the technical support tickets (received directly from Clients) to the relevant GCSS users.

GCSS IS by default will assign tickets to the GCSS Agents who have filled in the tickets. If there is only one available Level1 or Level2 Agent who has the skills to handle the maintained information system, the technical support ticket will be automatically assigned to that user.

The assignment functionality involves selecting the user (with relevant competences) who will process the ticket (perform the task) from the list of available users.

GCSS IS will provide GCSS Managers the functionalities enabling them to fully assign the ticket to one user or to several users if the ticket contains several tickets with related tasks – differentiated assignment. Such differentiated assignment allows a ticket to be solved by several users.

GCSS IS will notify users about the tasks that have been assigned to them and the ticket will appear in the Dashboard of the user it has been assigned to.

UC09: Monitor technical support delivery

This use case is for the managerial level of GCSS, allowing them to monitor the work of GCSS Agents due to the following functionalities:

- view the current activities of GCSS Agents (including access relevant records);
- identify current activities encountering deficiencies;
- connect to ongoing phone calls managed by GCSS Agents;
- access and view instant communication between Clients and GCSS Agents;
- involve directly, if appropriate, in providing support to the Client (join the phone call or chat);
- analyze and evaluate the technical support provided.

It should be noted that this use case will allow GCSS Managers to review the tickets processed by GCSS Agents proposed for closing or escalation (from Level 1 to Level 2 or from Level 2 to Software Developer).

The result of the work of a GCSS Agent on the resolution of a ticket will be approved/rejected after the approval/rejection option is activated (e.g., by pressing a button), the text of the resolution is entered and signed electronically.

Depending on the result of the ticket processing, the ticket will be returned to user to be redone (if rejected), re-assigned to a user with a higher competence level or closed (if approved).

CU10: Manage knowledge base

This use case will allow the management of the GCSS knowledge base. The knowledge base contains useful information for GCSS Agents on the escalation of deficiencies, errors and support requests.

The following categories of information could be added to the knowledge base:

- Answers to frequently asked questions;
- Case studies (based on the past requests processed by GCSS);
- User Guides for the maintained information systems;
- Technical documentation of the maintained information systems.

The knowledge base must be indexed (for example with the help of dedicated solutions like SolR, Elastic Search etc.) and allow to define the tags of stored items for their contextual extraction.

UC11: Generate statistical reports and documents

This functionality will be accessible to the authorized users of GCSS IS and will allow generation of documents related to business processes, as well as pre-defined and ad-hoc reports on the informational content of the information system and the activity of authorized users.

Such reports are useful for the analysis of the information base of the information system, the performance of authorized users, in particular the entities they represent, and allows extracting specific performance indicators intended for the analysis of the processes related to the resolution of reported technical problems.

The information system should integrate a solution for the configuration and generation of reports (report generator) which could be also re-used for the configuration and extraction of standardized documents specific to the GCSS IS business processes.

UC12: User administration and access control

This is a use case outside GCSS IS that provides the System Administrators with the functionalities that allow them to manage roles and their associated rights which will be further assigned to the authorized users of GCSS IS.

All the authorized users of GCSS IS (GCSS Agent, GCSS Manager and System Administrator or other roles defined during the operation of GCSS IS) will be managed through the platform service MPass. The user interface access rights and database records will be configured for each role separately or explicitly for each user. These configurations will take into account the specialization of users (e.g., the information systems for which the user can provide technical support) and the language in which the user can talk to Clients.

UC13: Configure IVR menu

This use case provides the functionalities to configure the audio navigation menu of IVR (as part of the IVR-PBX solution and its clone in GCSS IS). This menu is a key element in the phone interaction between those seeking technical support and the relevant representatives of GCSS. This functionality will allow to define the following configurations:

- define the structure of the navigation menu;
- define the information systems that correspond to the navigation menus;
- define the GCSS units/GCSS IS users in charge of answering calls for specific IVR menu options;
- attach voice messages in three languages (Romanian, Russian and English) for each IVR menu option.

UC14: Manage metadata

This GCSS IS use case will allow the management of the GCSS IS metadata system. It is expected that the following categories of metadata will have to be managed:

- Official national classifications (e.g., classification of public authorities; cclassification of the administrative-territorial units of Moldova etc.);
- Classifications and nomenclatures specific to the business processes related to provision of technical support;
- Interoperability classifications/nomenclatures (the metadata set specific to data exchange with external information systems);
- Internal classifications/nomenclatures of GCSS IS (e.g., user interface labels and messages in 3 languages).

UC15: Configure GCSS

This use case provides the functionalities required to configure the operating parameters of GCSS IS. Please note that GCSS IS must be configurable and its adaptation to users' current needs and to the legal framework must be carried out through the user interface, so that no intervention on the program code, its compilation and repeated deployment of the information system is required.

The use case will allow the System Administrator to define at least the following configurations:

- jobs for automatic procedures;
- access paths, values of the variables required for the operation of GCSS IS;
- maintained information systems and their access parameters;
- workflows;
- templates of documents and reports;
- integration parameters with external information systems;
- rules of automatic assignment of tasks to GCSS Agents (phone calls, tickets etc.);
- configurations related to the information security management system;
- other relevant configurations.

UC16: Operational Monitoring, Diagnostics and Troubleshooting

This complex use case allows the access of administrative roles of GCSS IS to the functionalities of monitoring the operating parameters of GCSS IS, diagnosis and troubleshooting of technical issues related to the operation of GCSS IS.

This use case will also provide functionalities for the generation of pre-defined and ad-hoc statistical reports on GCSS IS operating events. These reports are useful for the analysis of processes, information base of the information system, performance of authorized users, allowing to anticipate information security issues. Unlike UC11, UC16 is intended for the information audit processes to assist information security mechanisms.

UC17: Phone call management features

This use case is provided by the PBX solution of GCSS, which will provide all required functionalities for the management of the phone calls of the Clients seeking technical support. The following functionalities of the API of IVR-PBX solution will be integrated by GCSS IS:

- call routing;
- call acceptance;
- taking and recording caller's contact data;
- call rejection;
- call forwarding;

- starting conference calls with several participants;
- call recording.

All the functionalities allowing to manage phone calls will be available from the user interface of GCSS IS.

UC18: Notify users

This use case provides the functionalities to notify Clients and authorized users of IS GCSS. All notifications will be sent through the governmental notification service MNotify.

The authorized users of GCSS IS (GCSS Agent, GCSS Manager and System Administrator) will be able to access notifications in their Dashboards and will have direct access to the electronic form the business event of which has generated the notification.

GCSS IS will automatically generate and send notifications related to any business event or the traceability notifications related to the technical support requests to the authorized users (e.g., ticket creation, distribution, modification, closure) and will take into account the recipients' notification preferences.

UC19: Log events

This use case will allow to log the business events generated by the functional components of GCSS IS. Any event generated during the business processes implemented in GCSS IS will be logged and saved in the appropriate tables of the Database.

A logging mechanism will be developed based on the industry standards and good practices. The information system will provide the appropriate functionalities to configure the business event logging strategy, including the categories of business events to be logged, the logging period (definite or indefinite) etc.

For the critical or sensible business events, additional logging will be carried out through the platform service MLog.

UC20: Automated procedures

This complex use case provides the functionalities that allow activating specific functionalities of GCSS IS and their automatic operation needed for rational use of server resources, launching services specific to the operation of GCSS IS and providing timely data to authorized users. This case will be implemented through a configurable job manager that will configure all the automated procedures. Such procedures could include:

- Automatic distribution of calls / tickets to GCSS Agents according to the criteria configured via UC15;
- Verification of the current tasks of GCSS employees in order to identify any potential performance issues and notification of relevant roles regarding delays or deficiencies;
- Verification of the security issues of GCSS IS which involves implementing automatic procedures for background monitoring of the work of authorized users. These procedures, based on user's behavior, will reveal suspicious activities (e.g., authentication at short intervals from geographically distant regions, etc.). GCSS IS will send notifications to System Administrator about such security alerts and in specific cases will perform automatic operations (e.g., block access).
- Generation of backup copies of GCSS IS in accordance with the continuity procedure used by STISC.
- Other categories of automated procedures identified during the implementation of GCSS IS.

CU21: Public statistics, KPI

This use case provides all required functionalities to generate, export and publish public statistics related to GCSS IS.

This information is a category of KPI indicators or reports with statistics generated automatically by the system (many of which are intended for the Government Open Data Portal). GCSS IS will incorporate regular functions to disseminate various system information that include:

- system messages indicating the system's technical state to the monitoring and administration services;
- values of performance indicators;
- GCSS-related open data sets.

CU22: Receive/send tickets

This use case will provide the required functionalities to exchange data on technical support requests and traceability data with external information systems.

This integration category refers to the exposure of an API to the specialized external information systems to support the automated exchange of data on:

- technical support tickets received from maintained IS, the GCSS email server or Issue Tracking IS;
- technical assistance tickets sent to Issue Tracking IS;
- traceability data of the technical support tickets received from Issue Tracking IS.

The information systems that will likely use the facilities of this use case are:

- *The information systems of public authorities maintained by GCSS*. These information systems could integrate facilities for creating and sending technical support tickets in user interface through a specialized API exposed by GCSS IS or automatically send alerts and errors to GCSS.
- *Issue Tracking IS* of Providers of the governmental information systems maintained by GCSS or of the public authorities the systems of which are maintained by the Unified Support Center. These specialized information solutions can be used as the main mechanism for registration and documentation of the process of addressing technical issues, while the API exposed by GCSS IS will allow the automated exchange of data relevant to GCSS - specific business processes.
- *GCSS email server* to automatically receive the technical support requests through emails.

1.3. GCSS Architecture

GCSS IS must provide a WEB interface, accessible through a widely used Internet browser (MS Internet Exlorer/MS Edge, Mozila FireFox, Opera, Google Chrome or Safari). It must be a reliable and scalable solution to support an increase both in the number of concurrent users and in the amount of managed information.

GCSS IS will be based on a multi-level service oriented architecture (which excludes the direct interaction of the application with the database) based on up-to-date WEB technologies. To ensure an adequate level of information security the information system must allow secure connections between the Client stations and the application server (using VPN connections and TLS/SSL sessions).

GCSS IS will be deployed and will operate on the governmental platform MCloud. GCSS IS must be designed, developed and implemented based on the architecture described in Figure 4.

The architecture shown in Figure 4 is high-level and indicative. It describes the main elements of GCSS IS and how they interact. When designing GCSS IS, the Consultant, jointly with the experts of e-Governance Agency, will design a detailed architecture for GCSS IS. The Consultant will start working on the development of GCSS IS only after the architecture solution of GCSS IS is identified and approved.

As may be seen in Figure 4, the resource cooperation solution for ensuring proper operation of GCSS IS consists of 7 distinct types of nodes:

- **Client computers** – computers from which authorized users will access the GCSS IS functionalities (depending on their rights and roles).
- **ICT infrastructure of GCSS in MCloud** – ICT infrastructure of GCSS in the governmental cloud (MCloud) which will host GCSS IS.
- **Governmental horizontal e-services** – all the common horizontal governmental services GCSS IS will be integrated with in order to reuse certain platform functionalities (authentication, electronic signing, notification, logging, checking credentials, data exchange with external information systems etc.).
- **Maintained Information System** – ICT infrastructure hosting the information system to which GCSS provides technical support.
- **Issue Tracking Information System** – ICT infrastructure hosting issue tracking systems used to register and process error fixing requests.
- **GCSS IVR-PBX solution** – the IVR-PBX solution of GCSS used to communicate with Clients which will expose an API to allow the management of phone calls made by Clients seeking technical support and displaying IVR menu to Clients for interaction with GCSS IS.

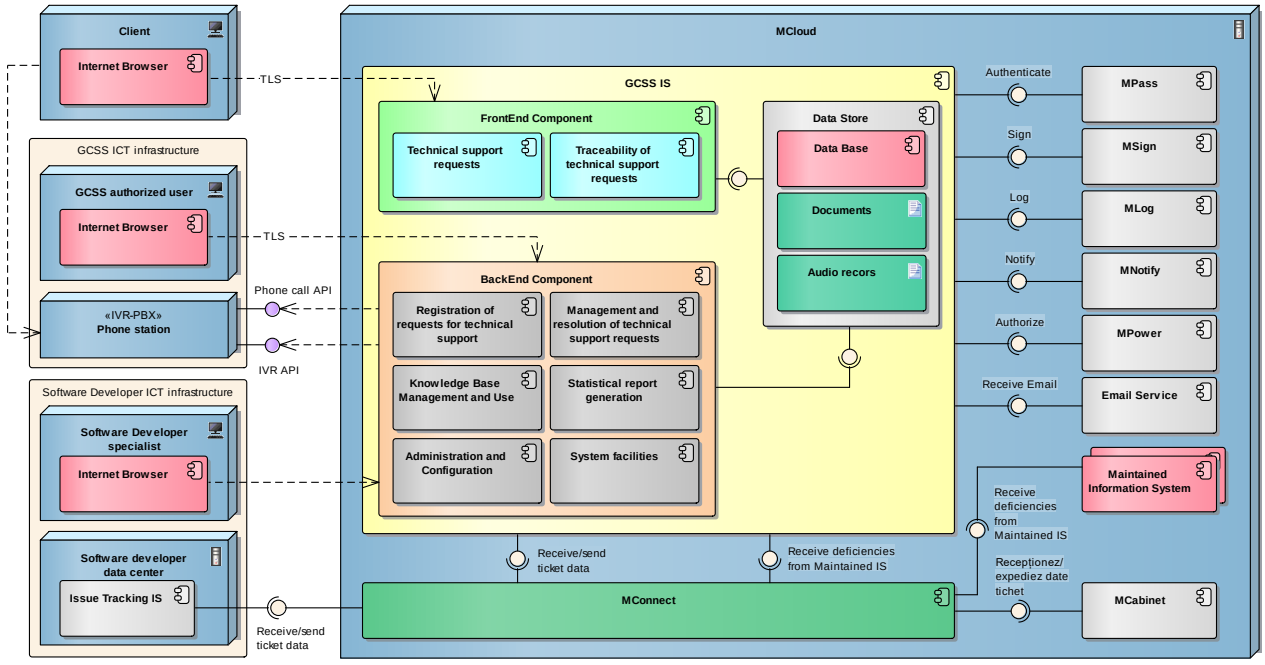

Figure 4. GCSS IS Architecture.

As may be seen in Figure 4, GCSS IS has 3 key components:

- **FrontEnd Component** – the user interface provided by GCSS IS to Clients so that they can access the facilities for requesting technical support in case when deficiencies or errors occur in the operation of governmental information systems.
- **BackEnd Component** – a functional component intended for the authorized users of GCSS, which allows access to the functionalities enabling provision of technical support

to Clients, monitoring the operation of GCSS, configuration and administration of the information system, as well as system facilities required for the proper operation of GCSS IS.

- **Data Store** – a GCSS IS component for storing GCSS IS – related data. It includes both the database and the files used by the authorized users of GCSS IS (textual documents and audio recordings of conversations with Clients).

To implement certain functionalities, GCSS IS will integrate with the following governmental platform services and information systems:

- with the governmental platform service MPass in order to implement user authentication procedures;
- with the governmental platform service MPower in order to check authorized user's credentials allowing the former to take specific actions in GCSS IS;
- with the governmental platform service MSign in order to implement the mechanism for application/verification of the electronic signature on documents and forms created in GCSS IS;
- with the governmental platform service MNotify in order to implement notification of authorized users when specific business events occur;
- with the governmental platform service MLog for logging specific business events;
- with GCSS' email service to receive and integrate the technical support requests or errors;
- with the PBX API that will be consumed by GCSS IS in order to integrate facilities for managing phone calls directly from user interface;
- with IVR API which will be used to route phone calls in order to automatically assign the requests received from Clients by phone for processing.

GCSS IS will expose certain services to the external information systems (through the interoperability platform MConnect) as follows:

- **Receive/send ticket data** – to be integrated with Issue Tracking IS of the Moldovan public authorities or the entities providing client support services to allow the mutual exchange of data on the technical support tickets;
- **Receive deficiencies from Maintained IS** – to be integrated with the information systems for which technical support is provided in order to automatically receive error alerts or alerts of malfunction of the information system maintained by GCSS.

This section sets out the non-functional requirements that must be taken into account at the design, development, implementation and operation stages of DCSS IS.

1.1. Documentation requirements

ID	Requirement category	Description of requirement
1.	**User Documentation**	The Consultant must prepare and deliver the following documentation for end-users: o Interactive guidance included in user interface of GCSS IS adjusted to user role (Client, GCSS Agent, GCSS Manager, System Administrator, etc.) o Downloadable user manuals in PDF format for Client, GCSS Agent, GCSS Manager, System Administrator, etc.) etc. All end-user documentation will be provided in Romanian.
2.	**How-To video tutorials**	The Consultant must prepare How-To video tutorials for GCSS main functions (e.g. ticket filling, ticket traceability, etc.). The tutorials will be provided in Romanian.
3.	**Technical documentation**	The Consultant must prepare and deliver the following technical documentation: o System architecture documentation (including description of models in UML language, which will include a sufficient level of details of the system architecture). o Test strategy. o Compilable and documented source code for applications, components and unit tests developed within the project . o System installation and configuration manual (including code compilation, container image build scripts, system installation, hardware and software requirements, platform description and configuration, backup and disaster recovery procedures). All technical documentation will be provided in English.
4.	**API documentation**	The Consultant must prepare and deliver: o API integration guide. o Integration samples in .NET, Java, PHP, Python. o Human and machine-readable description in a standard description language (e.g. WSDL or Swagger). All API documentation will be provided in English.

1.2. Training requirements

ID	Requirement category	Description of requirement
1.	**Training sessions**	The Consultant must provide on-line training sessions using developed e-learning modules based on Moodle LMS for the following target groups: o GCSS Agents (Level1 and Level2). o GCSS Managers (Level1 and Level2). o System Administrators.
2.	**Training materials**	Training documentation – curricula, training courses (manuals, video tutorials, quizzes, etc.) for administrators, Shippers, Carriers and end-users (individuals and businesses) developed in e-learning platform based on Moodle LMS.
3.	**Training language**	All training content/materials will be provided in Romanian.

1.3. Intellectual Propriety Rights

ID	Requirement category	Description of requirement
1.	**Perpetual software license**	The Consultant must grant to the Client the rights to run and use entire solution with all included software components with no constraints on time, location and offered functionality.
2.	**Redistribution rights**	The Consultant must grant to the Client the right to re-distribute the solution. While the Client does not intend to re-distribute at a massive scale it still envisions the need to transfer the software solution to another state agency due for example to potential reorganization. Also, the Client might get the opportunity to re-deploy the entire e-Government platform elsewhere.
3.	**Full data rights**	The Client keeps full rights on data created by the means of this solution.
4.	**Open data format**	The GCSS IS preserves the data in an open format or includes mechanisms to extract data from the system in an open format thus enabling the capability to transfer/migrate the data into another system.

1.4. Architectural requirements

ID	Requirement category	Description of requirement
1.	**Open standards**	GCSS IS architecture must be based on relevant open standards. The solution architecture shall not use proprietary standards. The architecture must be conceptualized using an integrated vision, based on the good practices of the ICT industry (e.g. using the TOGAF 9.1 approach).
2.	**Service Oriented Architecture**	GCSS IS must be based on a Service Oriented Architecture.

ID	Requirement category	Description of requirement
3.	**Hosting environment**	GCSS IS must not include any hardware components and upon finalization will be deployed on governmental cloud environment (MCloud).
4.	**Running environment**	GCSS IS must run on Docker container engine and shall not depend on specific host OS instance. Building container images shall be automated (refer to the following link for details: https://docs.docker.com/develop). Running in a container-based environment, the application must be elastic, including when adding/removing application container instances (above minimum required instances for HA), changing of configurations and system parameters has no impact on any work in progress, such as any active sessions, requests, etc.
5.	**Multiple sites**	GCSS IS architecture must ensure high availability including during new versions deployment and the possibility to run simultaneously on multiple sites
6.	**Browser compatibility requirements**	GCSS IS must be compatible with latest two major versions (to be considered at the time of system acceptance) of following web browsers: Chrome, Safari, FireFox and Edge.
7.	**API for integration with governmental platform services and third-party systems**	GCSS IS must implement API to be consumed by governmental platform services (e.g. MCabinet) and by third party systems. The full list of logically applicable APIs and their format will be detailed during analysis and design stages.
8.	**Detailed data model**	GCSS IS detailed data model must be described fully in a machine-readable data scheme for example using a DDL language for relational databases. The Consultant must coordinate the detailed data model schema format with the Client in advance.

1.5. System Integration requirements

ID	Requirement category	Description of requirement
1.	**Governmental platform services integration**	GCSS IS must integrate the following governmental platform services: o MPass – for user authentication; o MSign – for digitally signing of documents and digital signature validation; o MNotify – for user notification on specific business events; o MLog – for event logging and generation of statistical reports related to the ICT audit. o MPower – for user authorization. o MCabinet – for data dissemination.
2.	**External Information Systems**	GCSS IS must integrate the following external information systems: o GCSS IVR-PBX solution – to implement the key functionalities necessary to manage the technical support requests received by phone calls; o Maintained IS – to receive automatically the errors and warnings related to the proper functioning of the IT Systems technically supported by GCSS; o Issue Tracking Software – to receive and send data on technical support requests and related traceability events.
3.	**Open data integration**	GCSS IS must publish agreed sets of data in a machine-readable format to Unique Open Data Governmental Portal located at https://date.gov.md using its API.

1.6. System Performance requirements

ID	Requirement category	Description of requirement
1.	**Asynchronous processing**	GCSS IS must use asynchronous processing whenever possible to perform any input-output.
2.	**Concurrent users**	The system standard load and performance shall be guaranteed for 200 concurrent human users.
3.	**Concurrent system requests**	GCSS IS must be designed to respond (via API requests) to at least 400 concurrent external system requests.
4.	**Response time**	Response time for GCSS IS functions must be under 3 (three) second. The Consultant shall list the exceptions, if any, and discuss/agree them with the Client at analysis and design stages.
5.	**Daily transactions**	GCSS IS must be designed to process at least 10000 transactions per day.

ID	Requirement category	Description of requirement
6.	**Key performance Indicators**	GCSS IS must meter and expose its key performance indicators. The Consultant shall propose the list of indicators and discuss/agree them with the Client.

1.7. User Interface requirements

ID	Requirement category	Description of requirement
1.	**Multilanguage User Interface**	GCSS IS must support multilanguage user interface. This support includes data type specific formats (such as date, time, time spans, currencies, etc.). The GCSS IS front-end interface will be delivered with at least Romanian, Russian and English versions. The GCSS IS back-end shall be delivered at least in Romanian and English. The default language for User interface must be the Romanian.
2.	**User Interface accessibility**	User interface must conform at least to Level AA of Web Content Accessibility Guidelines 2.1. https://www.w3.org/TR/WCAG21/
3.	**Responsive/Adaptive design**	The GCSS IS user interface must automatically adapt to various display resolutions. Minimal display width is 480px. The system's UI shall be implemented using progressive web application (PWA) technologies and shall be functional on mobile devices.
4.	**Contextual help**	User Interface elements shall include Tips and Hints for user interface elements.
5.	**Client support**	All pages shall include client support contacts.
6.	**Bookmarks**	All major GCSS IS pages must be bookmarkable and the User shall be able to access bookmarked pages later. The bookmarkable pages will be defined at analyzing stage.
7.	**Friendly URLs**	GCSS IS must use friendly URLs for accessing its pages.

1.8. System maintenance requirements

ID	Requirement category	Description of requirement
1.	**System logs**	GCSS IS must log its various actions and events in a structured manner. Logging shall be configurable and based on extensible logging framework (such as log4net, nlog, etc.). Logging framework shall minimally support JSON format and the following targets: console, rolling files, UDP and HTTP POST.
2.	**Log levels and event log records**	GCSS IS must differentiate events and actions it logs into at least following levels: Critical, Error, Warning, Info, Debug Critical and Error level events shall be logged only for non-recoverable error that require human intervention. Event log records will include at least:

ID	Requirement category	Description of requirement
		○ the type of the event; ○ timestamp when the event took place; ○ event level; ○ system component that produced the event; ○ user/user agent, IP that triggered the event; ○ information object identifier affected; ○ textual details about the produced event.
3.	**Graceful shutdown**	GCSS IS must implement graceful shutdown, i.e. shutting down an application container instance at any time must not impact any work in progress, such as any active sessions, requests, event logs, etc.
4.	**Source code**	The Consultant must supply all the source code for system components that are not available as COTS from third parties. The source code must use package managers for dependencies to 3rd party libraries. All prerequisite software must be part of container image definition and based on public container repository.
5.	**System deployment**	The Consultant must supply the deployment procedure and supporting tools for this. Deployment procedure must cover all the prerequisites before proceeding to system installation. The deployment shall be automated and include database structure initialization and seeding.
6.	**System upgrades**	System upgrades must be automated, including database upgrade/downgrade scripts or code. To enable rolling upgrades in production environment, the recommended practice is to perform database breaking changes in incremental changes.

1.9. System maintenance requirements

ID	Requirement category	Description of requirement
1.	**Secure architecture**	GCSS IS be secure by design and comply with the relevant requirements specified in GD 201 from 28.03.2017 (https://www.legis.md/cautare/getResults?doc_id=98644&lang=ro). The Consultant must supply documentation describing this design and supporting evidences that such a design is secure. Note that the Consultant will coordinate with the Client the format of the documentation, supporting evidence and list of requirements to comply with.
2.	**Least privilege principle enforcement**	The GCSS IS's components must rely on the least privilege principle and run under such a limited privilege account under the OS rights model. The documentation must highlight each of the GCSS IS's components required privilege level and considerations that force use of that level or access.

ID	Requirement category	Description of requirement
3.	**Secrets and addresses**	Secrets (passwords, private keys and certificates, connection strings) and addresses of external services must be clearly delineated in configuration documentation and easily modifiable via automated scripts.
4.	**Secure communication channels**	All GCSS IS's communication with external systems or users takes place over encrypted communication channels.
5.	**No Username/ Password authentication**	GCSS IS must rely on authentication via MPass. Other forms of user authentication must not be used.
6.	**Minimize personal information storage**	GCSS IS must minimize the amount of personally identifiable information stored. For example, there is no need to store a user's First and Second names since this will be provided after authentication by MPass. GCSS IS must comply with the relevant requirements related to personal data processing. Note that the Consultant must coordinate with the Client the list of requirements to comply with.
7.	**Secure against OWASP Top 10 vulnerabilities**	GCSS IS must include security controls for all its components for at least OWASP Top 10 vulnerabilities 2021. Refer https://owasp.org/Top10/
8.	**Health-check API**	GCSS IS must l expose readiness and health-check API via a HTTP GET requests. The health-check shall check the health of as many system components as possible. In case of health check error, a human-readable error message shall be returned.
9.	**Users' roles management**	The users and their roles will be managed in MPass. GCSS IS must retrieve the users' roles from MPass.
10.	**Session expiration**	GCSS IS must include a session expiration mechanism when after a specific period of inactivity, the user is required to authenticate again. The period of inactivity must be configurable and by default it is 15 minutes.
11.	**Authorized access to personal content**	Users are granted access to content designated as belonging to them. Content belongs to a user if it has been assigned/addressed to their personal IDNP.
12.	**Input validation**	All input data must be validated on client and server side.
13.	**User content**	User content can be captured in text format only. GCSS IS must forbid entry of special characters used for formatting and markup of special Web content. Otherwise all UNICODE characters must be possible to enter/view by system's components.
14.	**Unauthorized access attempts**	When GCSS IS registers unauthorized access attempts it must: ○ log such attempts with at least ERROR level; ○ provide users with a warning message that access is not authorized and that abuse will be investigated.

ID	Requirement category	Description of requirement
15.	**Data integrity**	The Consultant must ensure data integrity by providing appropriate solution for prevention of unauthorized internal activities (for ex. deletion or alteration of notifications directly from database).

1.10. Support and Warranty requirements

ID	Requirement category	Description of requirement
1.	**Support**	During the warranty period the Consultant must provide necessary technical assistance to the Client;
2.	**Warranty**	During the warranty period the Consultant must: o fix all defects reported by the Client; o solve all incidents reported by the Client according to the agreed SLAs; Note: The response and resolution time shall not exceed 60 minutes for non-critical errors and 15 minutes in case of critical errors. The incidents must be solved within 2 working days for non-critical errors and within 4 working hours for critical errors starting from escalation time. Hourly progress report will be provided for critical errors.

1.11. Quality assurance requirements

ID	Requirement category	Description of requirement
1.	**Key activities**	The Consultant must organize the acceptance testing process of GCSS IS. GCSS ISS must be tested after the completion of each iteration (if applicable) and during the final acceptance procedure. For that the Consultant must carry out at least the following activities: o define and approve the testing strategy and testing procedure; o prepare detailed test plans, including test scenarios; o receive requests on errors and fix them; o prepare the plan with the final test results, including the status of all identified errors. Test unit coverage for GCSS capabilities will be at least 90%.
2.	**Deliverables**	The Consultant must deliver to Client (for coordination and acceptance) the acceptance testing plan. The Consultant must deliver to Client (for coordination and acceptance) the test scenarios for all categories of functional tests (unit testing, integration testing, system testing, acceptance testing) and non-functional tests (security testing, performance testing, usability testing, compatibility testing.). The Consultant must deliver to Client (for coordination and acceptance) the report on the results of the GCSS IS tests.

ID	Requirement category	Description of requirement
3.	**Acceptance criteria**	The Consultant must perform in common with the Client representatives all the tests planned according to the Test Plan. The testing result report must be accepted by the Client. The acceptance of the testing results will be made if zero critical nonconformities and less than 3 major nonconformities are discovered. Acceptance of the GCSS IS will be dated with the day when all non-conformities found upon delivery will be rectified. The act of acceptance of GCSS IS must be signed by the Supplier and Client representatives.

1.12. Project deliverables acceptance requirements

ID	Requirement category	Description of requirement
1.	**Delivery of deliverables**	The Consultant must send the deliverables to the Client's authorized persons at least 2 days before the expected date of signing their acceptance.
2.	**Examination of deliverables**	The Client's authorized persons will analyse the received deliverable, will prepare the objections, or will sign the deliverable (if deliverable is accepted with no objections). If the deliverable is rejected or returned with objections, Client's authorized persons must identify the issues or non-conformities before address them to Consultant to be fixed.
3.	**Examination and resolution of non-conformities**	At no cost to the Client, the Consultant shall address properly all issues no later than five (5) business days following the date of Approvers' rejection. The Client shall either accept or reject the resubmitted deliverables within five business days. Deliverables shall be deemed accepted when signed by the Client. If the Client neither accepted nor rejected the deliverables within the specified timeframe, the Contractor shall escalate the non-response as per the escalation process defined in the Contract.

Annex 3. Relevant legal acts and regulations

3.1. Laws and regulations related to the activity of GCSS

1. Law no. 241 of 15.11.2017 on electronic communications, Official Gazette no. 51-54 of 14.03.2008.
2. Law no. 25 of 01.03.2018 on the ratification of the Financing Agreement between the Republic of Moldova and the International Development Association and of the Loan Agreement between the Republic of Moldova and the International Bank for Reconstruction and Development to carry out the project "Modernization of Government Services", Official Gazette no. 105-107 of 27.03.2018.
3. Law no. 174 of 25.07.2014 on the organization and operation of the Single National Emergency Call Service 112, Official Gazette no. 231-237 of 08.08.2014.
4. Law no. 234 of 04.02.2022 on public services, Official Gazette no. 34-38 of 04.02.2022.
5. Government Decision no. 546 of 20.07.2011 on approval the Regulation on services provision for the telecommunications system of public administration authorities and the operation of amendments in some Government decisions, Official Gazette no. 118-121 of 22.07.2011.
6. Government Decision no. 414 of 08.05.2018 on measures to strengthen data centers in the public sector and to streamline the administration of the state information systems, Official Gazette no. 157-166 of 18.05.2018.
7. Government Decision no. 822 of 11.11.2020 on the approval of the necessary actions to be taken because of the inventory of existing state information resources and systems and the changes that are being made in some Government decisions, Official Gazette no. 304-312 of 20.11.2020.
8. Government Decision no. 169 of 08.09.2021 on the State Registry of Public Services, Official Gazette no. 230-237 of 01.10.2021.

3.2. Laws and regulations governing ICT sector of the Republic of Moldova

9. Law no. 982 of 11.05.2000 on access to information, Official Gazette no. 88-90 of 28.07.2000.
10. Law no. 1069 of 22.06.2000 on informatics, Official Gazette no. 73-74 of 05.07.2001.
11. Law no. 467 of 21.11.2003 on computerization and state information resources, Official Gazette no. 6-12 of 01.01.2004.
12. Law no. 71 of 22.03.2007 on registers, Official Gazette no. 70-73 of 25.05.2007.
13. Law no. 241 of 15.11.2007 of electronic communications, Official Gazette no. 51-54 of 14-03-2008.
14. Law no. 133 of 08.07.2011 on personal data protection, Official Gazette no. 170-175 of 14.10.2011.
15. Law no. 91 of 29.05.2014 on the digital signature and the digital document, Official Gazette no. 174-177 of 04.07.2014.
16. Law no. 142 din 19.07.2018 on data exchange and interoperability, Official Gazette no. 295-308 of 10.08.2018.
17. Government Decision no. 1123 of 14.12.2010 on the approval of requirements to ensuring personal data protection during their processing within computer systems which contain personal data, Official Gazette no. 254-256 of 24-12-2010.

18. Government Decision no. 7104 of 20.09.2011 on the approval of the Strategic Program for Technological Modernization of the Governance (e-Transformation), Official Gazette no. 156-159 of 23.09.2011
19. Government Decision no. 656 of 05.09.2012 on the approval of the Program on Interoperability Framework, Official Gazette no. 186-189 of 07.09.2012.
20. Government Decision no. 1090 of 31.12.2013 on the governmental electronic authentication and access control service (MPass), Official Gazette no. 4-8 of 10.01.2014.
21. Government Decision no. 128 of 20.02.2014 on the common governmental technological framework (MCloud) (MCloud), Official Gazette no. 47-48 of 25.02.2014.
22. Government Decision no. 405 of 02.06.2014 on the integrated electronic government service of digital signature (MSign), Official Gazette no. 147-151 of 06.06.2014
23. Government Decision no. 700 din 25.08.2014 on open governmental data, Official Gazette no. 256-260 of 29.08.2014.
24. Government Decision no. 708 of 28.08.2014 on the electronic government service of logging (MLog), Official Gazette no. 261-267 of 05.09.2014.
25. Government Decision no. 201 of 28.03.2017 on the approval of the mandatory minimum requirements for cybersecurity, Official Gazette no. 109-118 of 07.04.2017.
26. Government Decision no. 211 of 03.04.2019 on the interoperability platform (MConnect), Official Gazette no. 132-138 of 12.04.2019
27. Government Decision no. 375 of 10.06.2020 on approval of the Concept of the Automated Information System "Register of powers of attorney based on digital signature" (MPower) and the Regulation on keeping the Registry of powers of attorney based on digital signature, Official Gazette no. 153-158 of 26.06.2020.
28. Government Decision no. 376 of 10.06.2020 on approval of the Concept of the Government electronic notification service (MNotify) and the Regulation for Government electronic notification service (MNotify) operation and use, Official Gazette no. 149-151 of 19.06.2020.
29. Government Decision no. 412 of 24.06.2020 on approval of the Regulation on the use, administration and development of the Government Portal of Entrepreneurs, Official Gazette no. 161-164 of 03.07.2020.
30. Government Decision no. 413 of 24.06.2020 on approval of the Regulation on the use, administration and development of the Government Portal of Citizens, Official Gazette no. 161-164 of 03.07.2020.

3.3. National and international standards, methodology, and good practices:

31. Technical regulation “Processes of software lifespan” RT 38370656-002:2006, Official Gazettee no. 95-97/335 of 23.06.2006.
32. Information Technology Infrastructure Library (ITIL) v.4.
33. Standard of the Republic of Moldova SM ISO/CEI/IEEE 15288:2015 - Systems and software engineering. System life cycle processes.
34. Standard of the Republic of Moldova SM ISO/CEI 12207:2014 - Systems and software engineering. Software life cycle processes.
35. Standard of the Republic of Moldova SM ISO/IEC/IEEE 14764:2022 - Software engineering. Software life cycle processes. Maintenance.
36. Standard of the Republic of Moldova SM EN ISO/IEC 27002:2017 - Information technology. Security techniques. Code of practice for information security controls.

37. Standard of the Republic of Moldova SM EN ISO/IEC 15408-1:2020 - Information technology. Security techniques. Evaluation criteria for IT security. Part 1: Introduction and general model.
38. Standard of the Republic of Moldova SM EN ISO/IEC 15408-2:2020 - Information technology. Security techniques. Evaluation criteria for IT security. Part 2: Security functional components.
39. Standard of the Republic of Moldova SM EN ISO/IEC 15408-3:2020 - Information technology. Security techniques. Evaluation criteria for IT security. Part 3: Security assurance components.
40. Michael O. Leavitt, Ben Shneiderman, Research-Based Web Design & Usability Guidelines, https://www.usability.gov/sites/default/files/documents/guidelines_book.pdf
41. World Wide Web Consortium (W3C) recommendations on the quality of web page contents, accurate viewing of information using wide-spread Internet browsers, and compatibility with different computer platforms (http://www.w3c.org).
42. Web Content Accessibility Guidelines http://www.w3.org/TR/WCAG21/