1.1.1.1 ANNEX No. 1

Approved

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«___» _____ 2021

Terms of Reference

for development and implementation
of the automated information system
"Stock exchange"

2. GENERAL INFORMATION

2.1.PURPOSE OF THE DOCUMENT

The present ToR defines the main requirements for development and implementation of an automated information system "Stock Exchange" into CJSC «Kyrgyz stock exchange».

2.2.FULL NAME OF AN AUTOMATED SYSTEM AND ITS REFERENCE DESIGNATION

Information system "Stock Exchange".
Reference designation: AIS "Stock Exchange", further – the System or AIS

2.3.BASIS FOR PERFORMANCE OF WORK

The basis for performance of work is the signed Agreement.

2.4.TERMS OF THE BEGINNING AND COMPLETION OF WORKS

Terms of the beginning and completion of works are established according to the Schedule approved and agreed by the Parties and are reflected in the Contract.

2.5.FINANCING ORDER

The order of financing of works on the project of AIS "Stock Exchange" is defined by terms of the contract.

2.6.ORDER OF A REGISTRATION AND PRESENTATION OF RESULTS TO THE CUSTOMER

Results of separate stages of creation of the System are made out by the relevant double-sided acts of an acceptance with transfer of the technical and operations documentation provided by the Contract.

The structure and functionality of the System is defined by CJSC Kyrgyz stock exchange on the basis of the Contract and the present ToR.

2.7.LIMITS OF APPLICABILITY OF THE DOCUMENT

The ToR (S) on AIS "Stock Exchange" describes requirements to the System in organizational and functional project aspects and is the main document in the Project documentation kit defining requirements and an order of creation of the System. All other documents during creation of the System should be agreed with this document and its additions.

2.8.LIST OF REDUCTIONS

SE SE	Automated trading systemStock Exchange
AIS	Automated information system
DB	Database
DBMS	Database management system
ICT	Information and communication technologies
INN	Taxpayer identification number
IS	Information system / information systems
IT	Information technologies
JSON	JavaScript Object Notation
KSE	Kyrgyz Stock Exchange
LAN	Local computer network
LE	Legal entity
NP	Natural person
REFERENCE DATA	Normative reference information
SOA	Services Oriented Architecture
ToR	Terms of Reference
XML	Extensible Markup Language

2.9.ASSIGNMENT AND PURPOSES OF CREATION OF THE SYSTEM

Trades Administrator - an employee of the Exchange who is responsible for organizing and conducting trades on the Exchange and has the authority on behalf of the Exchange to perform certain actions in the trading system (administration of the trading system).

Exchange - Closed Joint Stock Company “Kyrgyz Stock Exchange”.

Exchange trading - is carried out through the functioning of trading sessions. Trading session - a time within one working day of the Exchange, during which exchange trading is carried out.

Cash account - reflects the state of the Exchange member's monetary positions in currency.

Application - submission by a trader on behalf of a trading participant of an offer to the trading system in order to conclude a purchase and sale transaction.

Limit order - an order indicating the price of securities. Submission of a limit order in the trading system means an offer to bidders to buy or sell securities with an indication of the price. In this case, the trading participant who submitted a limited order for the purchase of securities agrees to conclude a transaction at a price lower than the price specified in his application, and the trading participant who submitted a limited order to sell securities agrees to conclude a transaction at a price higher than the price specified in his application.

When a new limit order is submitted, it is checked for the presence of counter orders and, if there are any, the transaction is concluded in accordance with the algorithms described in the description of the methods of auction types of trading.

Market order - submission of a market order to the trading system means an offer to trading participants to buy or sell securities without specifying a price, which stipulates the desire of the trading participant who submitted it to conclude a deal at the best counter price at the time of filing the order. Trades are concluded automatically according to the priority rules in the trading system.

Three additional options are defined for market orders:

- "Only the entire volume" - in this case, if the entire volume of the order is not satisfied, then the deal is not concluded and the order is automatically withdrawn from the auction;
- "At one price" - means that the deal can be concluded only at one price and if the entire volume of the order cannot be satisfied at one price, the rest of the order is converted into a limit order at the price corresponding to the best opposite price that existed when the order was submitted and making a deal;
- "Withdraw the remainder" - a type of order in which from the moment of submitting an order to the trading system, the unsatisfied volume is automatically removed from trading

Execution of an exchange transaction - settlement of a transaction in securities concluded on the Exchange through the fulfillment by the parties of obligations arising from the transaction.

Iteration - separate stage of trading by the discrete trading method for a financial instrument, during which the cut-off price is selected and deals are concluded at this price.

Quotation of securities - the price offered by a trading participant for the purchase and (or) sale of securities, declared in the Exchange's trading system.

Broker - an operator having the highest authority to perform actions in the Trading System on behalf of the Exchange.

Market maker - trading participant who, in accordance with the requirements of the Exchange, assumes obligations to maintain the liquidity of securities admitted to trading.

Trading method - a standard set of sequential actions of the Exchange's trading system, facilitating the conclusion of exchange transactions in securities.

Auction type of trading - a type of trading designed to conclude market transactions, and includes the following methods.

- open tradings;
- special trading method;
- frankfurt;
- fixing;

Registration type of trades - the type of trades, intended for the conclusion of registration transactions by the direct orders method.

Observer - an individual who is allowed to view the course and results of trades in the trading system.

Official list of the Exchange - a list of securities that have passed the listing procedure.

Trading system user - trader and trading administrator.

Delivery versus payment - a method of execution of a concluded exchange transaction, in which the delivery of securities to the buyer and the transfer of money to the seller (payment) can be carried out only if there are, respectively, securities and money in the amount determined by the terms of such a transaction.

Position account - an account in the Trading System that reflects the state of the trading account for each individual financial instrument.

Exchange Regulations - an internal document of the Exchange.

Market transaction - a transaction concluded in the course of an auction type of trading.

Registration transaction - a transaction concluded in the course of the registration type of trading.

Registrar - an organization that maintains the register of the issuer of a security in accordance with the legislation of the Republic of Kyrgyzstan.

Repo, repo deal - a transaction with a financial instrument, which includes the simultaneous conclusion of two opposite to each other in the direction of transactions (opening deal and closing deal) with different terms of execution for the same number of financial instruments.

Repo obligations - obligations of a participant to execute a repo closing deal.

The Automatic Repo Market - a specialized market in the Trading System intended for concluding repo transactions, where trading is carried out at the rate of return of the repo transaction. The calculation of the value of financial instruments that are the subject of a repo transaction and the required number of them to secure a repo transaction is carried out by the Trading System automatically.

Close deal - a buy-sell deal with the direction opposite to the opening deal, equal to the number of the opening deal with a different execution time from the time of the repo deal conclusion. The closing deal is an integral part of the repo deal.

Opening deal is a buy and sell deal at a certain value of a certain amount of an instrument. The date of execution of the opening deal is the date of the conclusion of the repo deal at the Exchange trades. The opening deal is an integral part of the repo deal.

Spread - the limits of fluctuations in the price of buying and selling securities, calculated using the market price of the Exchange, established in order to prevent price manipulation.

Weighted average price - the price of one security of a certain issuer, type, determined as a result of dividing the total amount of all transactions with a specified security, made through the Exchange for a certain period of time, by the total number of securities for specified transactions.

Trading system - the Exchange's software and hardware complex, through which trading in securities is carried out.

Trader - an individual who is a regular employee of a trading participant, authorized by him to participate in trading held by the Exchange and who has received admission to the Exchange trading system.

Cut-off price - the price of securities at which the maximum possible volume of transactions is ensured.

Net price - the price of a security as a percentage of par, excluding accumulated interest.

Dirty price - the price of a security in Kyrgyz soms or as a percentage of par, taking into account the accumulated interest.

Trading Member - a broker and / or dealer who has passed the registration procedure and entered into an agreement on participation in trading.

The authorized state body for regulation of the securities market - the State Service for Regulation and Supervision of the Financial Market under the Government of the Kyrgyz Republic under the Ministry of Economy and Finance of the Kyrgyz Republic.

Financial instrument, instrument - a financial asset admitted to trading on the Exchange and used as an object of a purchase and sale transaction in the Trading System;

Electronic digital signature (EDS) - the requisite of an electronic document obtained as a result of cryptographic transformation of information using a private signature key, and allowing to establish the absence of distortion of information in an electronic document from the moment the signature is generated and to check the ownership of the signature to the owner of the signature key certificate.

3. ASSIGNMENT AND PURPOSES OF CREATION OF THE SYSTEM

SE "Stock Exchange" is intended for complex informatization and business process automation in the field of the production activity of an automation object connected with related to exchange trading.

Main objectives of creation of the System are:

- Modernization of the Stock Exchange of the “Kyrgyz Stock Exchange“ CJSC;
- Creation of convenient software tools for remote servicing of bidders;
- Output on the new level of personal information protection and safety at data exchange by participants;
- Implementation of a unified data exchange format for the integration of the Kyrgyz stock market into the world capital market.

4. CHARACTERISTIC OF THE AUTOMATION OBJECT

4.1.ORGANIZATIONAL SCPILOT (AUTOMATION OBJECT DEFINITION)

The object of automation in this Project is the Kyrgyz Stock Exchange CJSC, which is associated with the conduct of exchange trading.

5. REQUIREMENTS TO A SYSTEM IN GENERAL

5.1.1. REQUIREMENTS TO STRUCTURE AND FUNCTIONING OF THE SYSTEM

5.1.1.1 List of subsystems, their assignment and main characteristics

The system should be implemented as a part of the following functional subsystems:

- *The subsystem of management of reference data* - is intended for the centralized maintaining the reference books and qualifiers necessary for ensuring execution of the automated functions.
- *Trading system* - designed to automate the main processes associated with conducting exchange trading.
- *"Front-office" subsystem* - designed to automate interaction with external users of the System using a web client and mobile application.
- *The contractual subsystem* – is intended for input and processing of the complete information on the signed agreements with clients.
- *The billing subsystem* – is intended for calculations of cost of the rendered services.
- *The subsystem of the analysis and reporting* – is intended for creation of the reports, the analysis which are available in the System yielded and providing results of the analysis in a form, necessary for adoption of management decisions.
- *The integration subsystem* – provides information exchange with external information systems (information systems of registrars, exchanges, etc.) for ensuring execution of the automated functions.
- *The subsystem of setup and configuration* – provides modification of structure and creation of new sections, adding of new signs on screen forms and reports.
- *The subsystem of security and audit* – provides a security setting and access rights of users to sections.

The list of problems of the automated SE is divided into the applied processes revealed at a stage of inspection and the system processes necessary for support of operations of SE and ensuring required parameters of safety, integrity, productivity and reliability.

5.1.1.2 Requirements to number of hierarchy levels and extent of centralization of a system

The software of the System should provide functioning on three-level architecture and should coreference datast of the following components:

- *Level of data storage (DB);*
- *Application server;*
- *Client application.*

Level of data storage provides storage and data access.

Application server application provides business logic implementation.

Client applications (web client and mobile application) provide the user with an interface for viewing, entering and editing data, generating reports and executing processes.

5.1.1.3 Requirements to ways and means of communication for information exchange between system components

For ensuring information exchange, components of the System should work as a part of a single corporate network.

For network and network interconnection protocols of TCP/IP should be used.

5.1.1.4 Requirements to characteristics of interrelations of the created system with external systems

Interrelation of a system with other information systems it has to be carried out through web services or intermediate files (in the XML form SE, JSON, DBF, Excel or CSV).

For implementation of interaction with adjacent systems creation of the configured integration services allowing to carry out information exchange in the automatic or manual mode with fixing of results of import in special technological logs should be provided in the System.

In case of import of information, which cannot be unambiguously identified or processed during import operations System should provide mechanisms of permission of the arising conflicts.

5.1.1.5 Requirements for diagnosing of a system

Constant diagnosing and monitoring of software should be carried out for the purpose of timely warning of emergence of faults. It is necessary to provide diagnosing of the following system components:

- Status of tasks;
- Loading of server resources;

- Response time;
- Status of transactions and their availability;
- Functioning of processes.

5.1.2. REQUIREMENTS TO INDICATORS OF PURPOSE OF SE

5.1.2.1 General requirements

Production requirements to assignment indicators are included below:

- The system should provide a possibility of storage of historical data for an unlimited time;
- The system should support work of the users who are on geographically distributed objects;
- The possibility of increase in number of at the same time working users on different hierarchy levels of an automation object should be provided;
- Step-by-step building, both productivity, and functional structure of a system should be provided;
- The principle of open architecture of creation of a system providing a possibility of embedding and interaction with any other systems should be implemented.

Additional requirements to assignment indicators are included below:

- Table 5-1.

№	Indicator	Value	Expansion
1	Number of users of system	45	100 000
2	Number of bidders	19	100
3	Number of the securities	1500	7000
4	The number of transactions in day	1000	70 000

Degree of adaptability of a system to deviations of parameters of an automation object

The system should provide adaptation of architecture of the System because of change (modification) of business processes of the enterprise, and, as a result, change of business logic of the automated processes.

The system should provide setup and configuration change of the automated jobs of users, a possibility of a re-implementation of users within the KSE corporate network.

5.1.2.2 Acceptable limits of upgrade and development of a system

The system should provide a possibility of upgrade and development for increase in degree of adaptability at increase in limits of changes of parameters of an automation object, over specified earlier and also in need of change of structure of requirements to the carried-out functions

and types of providing.

Upgrade and development of a system should be carried out by experts in data domain and application programmers by means of the corresponding software automating process of upgrade and the development and also documenting the received results. The look and type of this

software is specified during implementation of the Project.

The system should provide opportunities for extension of functionality via:

- Expansion of structure of attributes of each section of the System (fields of scalar types, fields with reference books);
- Possibilities of dynamic creation and setup of the qualifier of any structure and also its binding to any object of the System with use of extenders;
- Subsystems of integration on the basis of which the standard functionality on loading/unloading of data from external sources is provided;
- Possibilities of setup of representations and any quantity of printing forms of records of different sections.

5.1.3. REQUIREMENTS TO RELIABILITY AND AVAILABILITY

The system should work in the round-the-clock mode.

Limit time of post fallback recovery of working capacity technical and software of the System, commercially important information is defined by the following table.

Table 5-2.

№	The parameter defining maximum permissible failure	Value
1	The maximum single idle time of a system (specify in minutes)	30 minutes
2	Time for recovery of system operations in case of accident, failures (to specify in minutes)	from 30 to 120 min. Depending on the

		level of accident or failure.

Additional requirements:

- Use of own and system means of reservation and archiving of information;
- Monitoring of a system status in general and its separate components.

5.1.4. REQUIREMENTS FOR INFORMATION SECURITY

The system must provide the following tools to ensure System safety:

- Identification and authentication of users of the System;
- Access control of users to the System;
- Registration of events of safety in the System;
- Registration of events of safety in the System;
- Identification of incidents and response to them.

5.1.5. ELECTRONIC DIGITAL SIGNATURES, CONTROL OF INTEGRITY AND CRYPTOGRAPHIC PROTECTION

- The mechanism of control of integrity should be implemented by implementation of cryptographic control of integrity of data in a system (including at storage) and also at export of these data to other systems or subsystems and/or their import from other systems or subsystems.
- In a system control of integrity of data of a security subsystem should be provided (logs of audit, information on the rights of users in a system, the list and settings of functionality of applied roles, tables with hash values of passwords of users, etc.).
- At detection of violation of integrity to the system administrator the corresponding message should be displayed and system will be blocked further before clarification of the reasons and bug fixing.
- The applied cryptographic algorithms should conform to the standards adopted in KR, besides, they should be certified by authorized bodies.
- The EDS system can be compatible to the certification centers accredited by authorized body.
- An opportunity to sign the EDSs of files/message with data unloaded in external systems should be implemented.

- The possibility of holding a procedure of verification of the EDS at assorted loading of message files with data, REFERENCE DATA, etc. should be implemented (only the files/message having the correct EDS should be loaded into the System).
- Possibility of use as the carrier of secret key of the EDS of the hardware carrier of type.
- Impossibility of storage of secret keys of the EDS on disks.
- Rejection of the file/message in processing when obtaining negative result of verification of the EDS of the arrived file/message ("the EDS is not correct", "the EDS is not registered", "the EDS is absent"). Emergence of this situation should be reflected in the log of audit.
- Possibility of use of cryptographic procedures for protection against unauthorized changes of document.
- The documents created, processed and transferred to other subsystems or in external the EXPERT should be signed with the EDS.
- Technological process of exchange of the protected documents should be implemented with respect for the principle of continuity at the intermediate stages of transfer or processing of the document (without procedures of resigning).
- In a system it can be used or the EDS of the user who is carrying out input, confirmation or unloading of information, or EDS of an automated system (the EDS the EXPERT) if processes of creation, modifications or unloading are carried out in the automatic mode.

5.1.6. USER SYSTEM ACCESS CONTROL REQUIREMENTS

The system should provide control of the access levels of users to different groups of Pilot Operation rations.

During the work with each subsystem users are divided into the following roles:

- *the system administrator* – is the administrator of each subsystem of the System. Has the rights to define the access level of other users.
- *the operator* – has the necessary rights determined by its official duties for adding and editing information, and execution of functions of a subsystem or the module.
- *The user* – has the rights only for viewing the necessary information volume determined by its official duties.

The information volume and functionality of subsystems and system modules available to work of each user are coordinated at a stage of setup of the rights of the System.

5.1.7. REQUIREMENTS TO ERGONOMICS AND AESTHETICS

Visual interaction between the user and System should be based on the basis of the intuitive and clear interface. Different subsystems should be issued in uniform style, with a possibility of group and individual preference of the interface elements. The system of printing should contain a customizer and appearance of documents. The system of the help should provide the hint to the user at any stage of execution of a task.

5.2.REQUIREMENTS TO TYPES OF PROVIDING

5.2.1. REQUIREMENTS TO SOFTWARE OF THE SYSTEM

The estimated software should provide the preset algorithms coordinated about the stock exchange implemented according to the current legislation and approved by normative reference documents.

5.2.2. REQUIREMENTS TO INFORMATION SUPPORT OF THE SYSTEM

5.2.2.1 Content, structure and organization of data

Information support should be sufficient on the volume and content for execution of requirements of Section 5 of the real TOR.

Information support should include:

- the dictionary of the basic descriptions (object types, objects and their attributes, rules of reaction to events and so forth) accepted in the System;
- Normative help information of accounting items;
- System of the organization of the database and contemporary records (event log and historical database);
- Forms of output documents;
- System of classification and data coding;
- System checkerboard patterns and reference books;
- Specific requirements to the organization of the user interface, including ways of information display on the screen.

The main requirements imposed to classification and data coding in the System are requirements for providing:

- the uniform principles of the organization and maintaining the normative help information in the System;
- unambiguous identification of the classified accounting items;
- compatibility with the external information resources and sources of information used;
- unification of process of the classification and data coding which is subject to accumulation and processing in a system.

The structure of attributes of objects of information support and also the system of coding and classification of information should be specified during implementation.

5.2.2.2 Information exchange

The system should have an opportunity to work completely in a standalone mode. Information exchange with adjacent systems and between components of the System should be carried out with use standard for the selected application software for data access. The regulations of implementation of information exchange should be developed as a part of documentation of organizational support.

Data exchange with adjacent systems can be carried out in the following modes:

- *Database* – data transmission at the level of the distributed online requests to a DB.
- *SOA architecture* – the online addressing data with use of Internet technologies. For this purpose on each party of interaction the Web service providing integration about the System is unrolled, and data are transferred in the universal XML-format unified for all participants of interaction.
- *File exchange* – export/import of data from files the DBF, XML, Excel and CSV format.

  Requirements to information exchange:

- The system should provide the uniform mechanism and a format of data for data exchange between components;
- At each step of import/export of data the protocol of results of control should form;

5.2.2.3 Application of database management systems

For storage of all information arrays of the System the single system of management of databases (SMD) should be used.

DBMS should have effective protection against illegal access and allow to differentiate access rights to data of different categories of users.

5.2.2.4 Data protection from destructions at accidents

The safety of information in the System should be ensured at all faults.

The system should provide storage of all data, both in the main storage, and on backup copies during unlimited time;

Data storage should be carried out in the most optimum way, excepting duplication of data.

In case of accident or failure in process of execution of the user tasks recovery of the database to a status at the time of the last complete system of transaction should be provided.

5.2.3. SOFTWARE REQUIREMENTS OF THE SYSTEM

Use of widely known, having wide experience of implementation architectural concepts and software products is necessary. The system should use client-server technologies, according

to criteria:

- access to real data, operations of access and data modification should be based on data in the server, but not on loading procedures or unloadings of data files;
- the software of the client should not be resource intensive;

Work benches for a configuration of screen forms and generation of requests should be a part of the System.

The system should be created on the modular basis allowing to add, change easily functionality of the System.

The system should provide authentication and separate data access on a unique user name and the password for each user.

The system should provide setup of all necessary forms of account, structure and data view available to viewing or editing. All Operations, which change the System state, should be reflected in the special log.

5.2.4. REQUIREMENTS TO TECHNICAL SUPPORT OF THE SYSTEM

Technical support of the System is not a part of this ToR.

5.2.4.1 Requirements to communication channels

Communication between the server and jobs of the System should be carried out by means of a local area network or on dedicated lines of communication.

The system should ensure functioning of the client software at the throughput of 512 Kbps and above.

5.2.4.2 Requirements to System servers

Delivery of the System is not a part of this ToR.

5.2.4.3 Requirements to workstations

Delivery of the hardware of workstations of the System is not a part of this ToR.

5.3.RIGHTS FOR INTELLECTUAL PROPERTY

The contractor transfers to the Customer the exclusive rights to all software and source codes developed within the contract. The contractor has no right to carry out those competences, which were transferred to the Customer, and also to delegate these powers to other persons.

5.3.1. REQUIREMENTS TO PATENT PURITY

Patent purity of the System should be provided in the territory of the Kyrgyz Republic.

The creation of the System provided by the present document should not lead to violation of copyright and related rights of the third parties.

When using in the System of the third-party programs and databases developed by the third parties, terms of use of these software should not impose the restrictions interfering use of the System by the Customer.

6. FUNCTIONAL REQUIREMENTS

6.1.SUBSYSTEM OF MANAGEMENT OF REFERENCE DATA

6.1.1. BASIC FUNCTIONS OF THE SUBSYSTEM

The subsystem of maintaining reference data is intended for maintaining databases, timely updating of information in databases and maintenances of the System.

The normative help information is understood as set of the reference books containing the input, output and intermediate stored data, which should be sufficient for execution of the automated functions of the System.

The system should give to the user an opportunity of work with reference books – navigation, viewing, editing, adding new and removal of the available records of the reference book, according to access rights.

The system should support hierarchical structure of reference books.

All system modules should use the uniform database of the normative help information, all used handbook data should be present at the System in the single copy.

Reference data can be the following types:

a. Versional (supporting the change history) and non -versional;
b. Approved (the approvals undergoing the procedure at users) and not approved.

The supplier should provide import of these their handbook data from the existing systems.

6.1.2. CLASSIFICATION OF THE NORMATIVE REFERENCE DATA

In the System the following types of the help information should be implemented:
On a way of administration:

- **The system help information** is used in a kernel of the System and means its editing only by the developers or system administrators.
- **The reference help information** is used in system Operation and for creation of summary reports, means its editing by forces of the persons resporeference datable for maintaining uniform reference data, with the subsequent automatic distribution of changes on all levels of organizational and technical structure of the System.

On a way of the organization:

- **The reference book** – a flat set of the same records.
- **The qualifier** – a hierarchical set of the same records.
- **The applied reference book** – the reference book implemented by system extenders.

6.1.3. MAIN ACCOUNTING ITEMS

6.1.3.1 Partners

1. Partners are used for the description of information on legal entities and individuals which should be used in different sections of a system.

2. In spite of the fact that the Partner can participate in work different subsystems of the System, he should be described only once and in each subsystem on him the link should be established.
3. In a system work with the following types of partners should be supported:

- Depositors;
- Depositaries;
- Brokers;
- Registrars;
- Commercial banks.

4. Information on the Partner should include the following attributes:

a. Name (Name);
b. Type of the Partner (SPINNING TOPS, FL, other);
c. Biographical particulars;
d. Contact persons;
e. Address data;
f. Payment details;
g. The additional attributes determined by the user.

6.1.3.2 Issuers

The system should allow storage of the following attributes:

- Registration data;
- Contact information;
- Address;
- Authorized capital;
- Other configurable fields.

6.1.3.3 Securities

Securities:

- type of tool,
- name of the tool,
- short name of the tool,
- exchange identifier,
- code of the Securities (ISIN),

- name of the class of tool,
- the nominal value of the tool,
- symbolic currency code of the instrument denomination,
- the minimum allowable number of instruments in one application, pieces (lot),
- quotes,
- the opening price is determined:

– as the closing price of previous trades,
– as the weighted average price of previous trades,
– as the cut-off price of the pre-trading period,
– as the price of the first deal

- the average price of morning trades is determined:

– as the average price of the previous morning session,
– as the average price of the last deal.

- coupon paper, when specified, displays options:

– coupon annual rate,%,
– number of payments per year,
– date of last payment,
– next payment date,
– the date from which NO starts

- issuer,
- registrar,
- other configurable fields.

6.1.3.4 Bidders

The guide contains information on the bidders:

- exchange - place of accreditation,
- bidder name,
- member ID,
- status (active / inactive),
- Kind of activity,
- License,
- address,
- ITN,
- checking account,
- other information.

6.1.3.5 Exchanges

The guide contains information on exchanges that have contractual relations with the KSE:

- Name;
- Partner;
- Address,
- Contact phone numbers,
- List of Securities;
- trading currencies;
- other configurable fields.

6.1.3.6 Depositaries

The handbook contains information on depositories that have contractual relations with the KSE:

- Name;
- Partner;
- Address,
- Contact phone numbers,
- List of Securities;
- other configurable fields.

6.1.3.7 Registrars

The Registrar Directory contains information on registrars:

- Name;
- Partner;
- Address,
- Contact phone numbers,
- other configurable fields.

6.1.3.8 Trading sectors

Trading Sector reference contains information on trading sectors:

- Listing / non-listing of corporate securities (shares, bonds);
- Municipal securities;
- Government securities;
- Listing / non-listing of mortgage-backed securities;
- Listing / non-listing by housing certificates;

- Currency;
- Precious metals;
- Other configurable sectors.

6.1.3.9 Trading methods

Trading method reference contains information on trading methods:

- Open trading method;
- Direct order method;
- Frankfurt trading method;
- Special trading method;
- Fixing method.

6.1.3.10 Trading Schedule

The trading schedule reference contains information about the opening and closing times of the trading session by trading sectors and clearing trading sectors:

- Opening of the session by trading sectors;
- Closing the session by trading sectors;
- Cleaning sectors.
- other configurable fields.

6.1.3.11 Types of accounts

The account types reference contains information on the accounts of the exchange:

- Cash account, opens on a market sector and includes options:
– Sector in which a cash account is opened,
– Account number,
– The trading participant managing this money account,
– Incoming position for money,
– Purchase limit,
– Position opening limit,
– Other custom fields,
- Position account includes the following options:
– Trading account,
– Tool,
– Incoming position,
– Incoming position rate,
– Sell Limit,
– Purchase limit,
– Maximum deviation from the opening price, %,
– other configurable fields,
- Trading account, divided into 3 types of accounts:
– Client account;
– Own account;

– Initial placement account.
– Other custom fields.

6.1.3.12 Types of orders

The Order Types Reference contains information about the types of orders in the Trading System:

- Limited order, includes the following options:
– Order direction (sale, purchase)
– Price,
– Quantity,
– Volume,
– Exposing as a whole package without splitting (as a whole lot),
– Expiration time,
– Expiration date,
- Market order includes the following options:
– Order direction (sale, purchase),
– Quantity,
– Volume,
– Only the whole volume,
– For one price,
– Remove the remainder,
– Exposing as a whole package without splitting (as a whole lot),
– Other custom fields.

6.1.3.13 Types of services

Information about the types of services provided:

- Name of service,
- service group,
- type of order, if necessary,
- presence or absence of VAT,
- other custom fields.

6.1.3.14 States

The States Directory includes information on the countries whose securities are traded in the trading system:

- State name,
- other custom fields.

6.1.3.15 Cities / regions

The city guide includes a list of the cities in which the issuers are located.

- City name,
- State,
- other custom fields.

6.1.3.16 Banks

The reference book of banks includes a list of banks in which there are current accounts of trading participants:

- Bank name,
- BIK,
- Фввкуыы,
- other custom fields.

6.1.3.17 Currencies

Directory of currencies in accordance with the international standard ***ISO 4217:2008. Codes for representing currencies and funds.***

6.1.3.18 Currency rates

In addition to manual input, the System must support automatic import of information about exchange rates from external sources..

5.1.3.19. Markets

Markets guide includes the following markets:

- Corporate securities,
- Government securities,
- Municipal securities,
- Currency,
- Precious metals

5.1.3.20. Types of securities

- Simple promotion,
- Preferred share,
- Bonds,
- Shares,
- Housing certificates,
- Mortgage-backed bonds,
- Municipal bonds,

- Other custom fields.

5.1.3.21 Index and Capitalization

The index and capitalization reference book includes the Index and Capitalization indicators as of the dates of trading days, these indicators are calculated according to the methodology for calculating the index and capitalization (Application No. 3).

5.1.3.21. Traders

The traders' guide includes a list of traders, traders who have received admission to the trading system:

- An identification number,
- Password set,
- Full name,
- The name of the trading participant in which he is a trader,
- Information about the certificate of qualification (No., date of issue, type of activity),
- Period of validity of the power of attorney,
- Other custom fields.

6.2.TRADING SYSTEM

6.2.1. SCHEDULE AND RULES OF TRADING

The system should provide the ability to customize the trading schedule and rules for trading by market sectors by the trading administrators.

6.2.2. SETTING SECTORS

The system should provide the ability to customize market sectors.

6.2.3. TRADING MODES

Organization of bidding in the bilateral counter auction mode;

Support for one-way auctions;

Organization of trades in the mode of conclusion of negotiated deals;

Other trading modes.

6.2.4. TRADING METHODS

The trading system allows traders to conclude deals in the following ways:

- **by open bidding:**

with the start of trading on a financial instrument, it is allowed to enter orders for it into the Trading System. Orders can be both limited and market.

All orders accepted by the Trading System for the same type of financial instrument are added to the queue of unsatisfied sell and buy orders.

Orders are ranked in the queue in ascending order of prices specified in sell orders and decreasing prices in buy orders, and if prices are equal, in the order in which they are received by the Trading System, which gives priority to orders submitted earlier when concluding deals.

A buy / sell order accepted by the Trading System is satisfied due to existing orders from the queue of unsatisfied buy / sell orders. In this case, the satisfaction of the order begins with a buy / sell order containing the highest / lowest price, and progressively continues either until this sell / buy order is fully satisfied, or until the purchase / sell orders available at the price are exhausted.

Partially unsatisfied applications remain in the corresponding queues of unsatisfied applications. The deal is considered concluded in the amount of satisfaction of the application and at the price of satisfaction.

A participant who has entered into a deal using the open trade method does not know his counterparty.

A previously entered order is changed by deleting it, followed by entering a new, adjusted order. Cancellation of a previously entered application is made by deleting it. In all cases, the change and cancellation of a previously entered order is allowed only in its unsatisfied volume during trading.

After the close of trading, traders stop entering, changing and canceling orders; all applications in the queues of unsatisfied applications are canceled.

- **direct deals method:**

in the Trading System for certain financial instruments, it may be possible to conclude direct deals between participants.

To conclude a direct deal, a participant submits a direct application to the trading participant with whom he intends to conclude a transaction, indicating price, quantitative and other conditions. The participant who received a direct application, satisfying it, concludes a purchase / sale transaction.

Participants are also given the opportunity to submit direct (indicative) quotes. Indicative quotes mean the intention of the Trading Member who submitted them to conclude a deal with any Trading Member on the terms specified in the quote.

To conclude a deal based on indicative quotes, a Trading Member interested in concluding a deal applies to the Trading Member who announced the quote by submitting a direct application on the terms announced in the quote.

A trader who has announced an indicative quote has the right not to conclude a deal at the quoted quote.

- **by the method of special trades:**

the method of special trading is intended for conducting placements or redemptions of securities and other financial instruments in the Trading System.

Placement or redemption is carried out on the day and period for accepting applications previously announced to all trading participants.

Orders from participants during this period can only be accepted in one direction: to buy or to sell, depending on the terms of placement or buyout. Participants can submit limited and market orders and can only see their own orders.

At the end of the period for accepting orders, the Exchange generates a summary list of orders ranked by price, indicating the volume of market orders, without the names of trading participants who submitted orders, and transfers it to the organization carrying out the placement or redemption to determine the cut-off price and the volume of placement or redemption.

After the cut-off price is determined, orders are satisfied.

Market orders are satisfied first. They are satisfied in the amount not exceeding the allowed volume of market bids satisfaction (as a percentage of the volume of placement or redemption), if there are more market bids, then they are satisfied partially, in accordance with the percentage ratio of the allowed volume to the volume of market orders.

Satisfaction of limited orders is carried out in two ways. The first method is gratification at the cut-off price. The second method is satisfaction at the stated price.

When orders are satisfied at the cut-off price, satisfaction is carried out at a single price - the cut-off price.

When orders are satisfied at the declared price, the satisfaction is carried out at the price that was indicated in the order when it was submitted to the Trading System. Satisfaction of orders begins with orders with the highest or lowest price until the cut-off price is reached and the volume of placement or redemption is satisfied.

Only a part of the submitted order can be satisfied at the cut-off price. Among the orders filed at the same price, orders filed earlier in time have priority.

- **by the method of Frankfurt trading:**

The use of the Frankfurt trading method is possible in two ways: preventing price manipulations and trading when placing or redeeming securities and other instruments.

If in the properties of the instrument sector the standby mode of 15 minutes is enabled and the waiting time (the period for accepting orders) is specified, then when an attempt is made to conclude a deal during trades using the open trades method, the Trading system automatically switches trades to the standby mode, in which trades are conducted using the Frankfurt trades method. time specified in the option (period for accepting applications).

Bidders receive a message about the opening of a 15-minute Frankfurt auction for an instrument, indicating the price and quantity of the instrument, as well as the closing time of the auction.

During the announced period of time, everyone can submit only limited applications. During the standby mode, participants can only cancel those applications that were submitted after it began. Applications submitted before the start of the standby mode cannot be canceled.

The "Quotes" window during the period for accepting orders provides information on the total amount of an instrument that participants want to buy or sell at the corresponding price, ie. the "Sell" and "Buy" columns are represented by an increasing number of instruments at each price.

According to the "Quotes" window, users can determine the price or prices at which it is possible to conclude the maximum volume of transactions.

The period for accepting applications lasts not less than the time set by the sector parameter of 15 minutes and ends after the time set by the additional waiting sector parameter has elapsed from the moment a new order is submitted or any order is canceled. The end time of the standby mode, adjusted in this way, is displayed in the title of the window “Quotes».

For convenience, entering a new order and cancellation of an order submitted during the standby mode are highlighted in the line of financial instruments in bold for a few seconds.

At the end of the period for accepting orders, the Trading system automatically determines the cut-off price in accordance with the algorithm.

After determining the cut-off price and concluding deals using the Frankfurt trading method, trading in the instrument continues using the open trading method (in this case, the information in the "Quotes" window is re-formed for further use of the open trading method).

Trades using the open trades method continue until the next attempt to conclude a transaction, in which case the described procedure for conducting trades in the standby mode is repeated. Thus, trades may exceed the trading end time set in the schedule (regulations).

This method of applying the Frankfurt trading method is mainly used when trading in low-activity sectors of the market, where it is required to prevent the conclusion of transactions at prices significantly different from market prices.

Frankfurt trading on placement or redemption

When trading is opened in the "Placement" mode, trading participants submit only limited orders at the time of accepting orders.

During the period for accepting orders, traders, in contrast to the application of the Frankfurt trading method in the "Standby Mode", can only see their own orders (which can be canceled). The "Quotes" window does not provide information about orders submitted by other participants.

At the moment of closing the period for accepting orders, the determination of the cut-off price and the conclusion of transactions will be automatically carried out by the Trading System in accordance with the description of the algorithm.

- **fixing method:**

the period of time for receiving preliminary orders for buying and selling at the established starting price is announced.

At the end of the period for accepting applications, the difference between the total sale and the purchase at the starting price is announced.

In case of a positive difference (supply exceeds demand), the broker lowers the rate of the financial instrument with a predetermined step, in case of a negative difference (demand exceeds supply) - increases it.

Participants can submit additional bids to reduce the gap between supply and demand.

At the moment of balancing supply and demand, the rate is fixed, and all transactions are concluded at a single fixed price.

6.2.5. EXECUTION OF EXCHANGE TRANSACTIONS

Execution of an exchange transaction is carried out by the Exchange depository in accordance with the internal documents of the Exchange depository.

The execution of a market transaction consists of the following sequential stages:

- sending a message from the Exchange to the Exchange's depository about the parameters of the concluded deal;

- verification by the Exchange depository of the sufficiency of the required amount of securities and money for settlements under the exchange transaction, and the implementation by the Exchange depository of their mutual delivery in accordance with the terms of the market transaction;

- sending to the Exchange a message from the Exchange depository about the results of the exchange transaction execution;

- notification of trading participants about the results of the execution of an exchange transaction.

An Exchange deal is considered executed after the Exchange receives a message from the Exchange depository about the successful completion of mutual settlements on it.

If the Exchange receives a message from the Exchange depository about the impossibility of executing an exchange transaction, such a transaction is subject to cancellation.

6.2.5.1 Execution of market transactions

A market transaction is executed on a delivery versus payment basis according to the "T + n" settlement scheme - the transaction is settled within n working days from the date of its conclusion.

6.2.5.2 Execution of registration transactions

Execution of a registration transaction is a procedure during which the Exchange depository delivers only securities in accordance with the terms of such a transaction. The execution of a registration transaction is carried out according to the "T + 0" settlement scheme - the transactions are settled on the day of its conclusion.

If a market transaction is concluded during the sale of state blocks of shares, its execution is carried out on a delivery versus payment basis according to the "T + p" settlement scheme - the transaction is settled on the p-th business day from the date of its conclusion.

Establishment of the value - "p" is determined by the Exchange internal document regulating the procedure for the sale of state blocks of shares.

6.2.6. CANCELLATION OF EXCHANGE TRANSACTIONS

The exchange transaction can be canceled:

- in case of its non-fulfillment, based on the message of the Exchange depository;
- by mutual agreement of the participant (participants) of the trades - the party (parties) to the transaction until the moment of its execution, on the basis of their written application;
- in all other cases - by a court decision, on the basis of a court decision that has entered into legal force.

After providing the Exchange with the grounds for canceling the exchange transaction in accordance with the requirements of this article, the Exchange cancels the specified exchange transaction within one business day. The procedure for canceling an exchange deal consists in changing its corresponding status in the Exchange's trading system. If necessary, the Exchange has the right to issue a certificate of cancellation of an exchange transaction.

6.2.7. SETTING UP ALGORITHMS FOR DETERMINING APPLICATIONS AND PROCESSING TRANSACTIONS

The System should be able to customize the algorithms for converting orders and converting trades for non-standard trading methods.

6.2.8. CLEARING AND CALCULATION

Interaction is carried out with the settlement depository (Application No. 2).

6.2.9. MAINTENANCE OF ACCOUNTS

The system should implement the ability to open and maintain the following types of accounts in the context of market sectors:

- cash,
- trade,
- positional.

6.2.10. REPO

The system should support direct and automatic REPO transactions. The system must support both negotiated and non-addressed repo orders.

REPO trade, buy-back trade - a securities trade, consisting of two parts:

i. For the first part of the repo transaction, on the date of its conclusion, the seller of the securities is obliged to deliver the securities, and the buyer is obliged to pay cash.

ii. On the date of execution of the second part of the repo transaction, the buyer of securities under the first part of the repo transaction is obliged to deliver the securities, and the seller under the first part of the repo transaction is obliged to pay cash in accordance with the terms of the concluded repo transaction.

iii. To conclude a direct repo deal, participants use the nego deals method. When submitting direct orders, the parameters of the opening and closing deals are indicated.

iv. When a direct transaction is concluded in the Trading System, a repo-obligation is formed, which on the day of the reverse transaction - the closing transaction signals the counterparties about the need.

v. The automatic repo market allows you to place and raise funds secured by securities (repo object) by concluding repo transactions, standardized in terms of the term, using the open trading method.

vi. As the main trading parameter - the order price, the percentage rate of return of the repo transaction is used.

6.3.FRONT-OFFICE

The subsystem implements the functionality for automating the work of market participants.

The System must implement client applications for remote servicing of the following categories of users:

- brokers,
- traders,
- exchanges,
- depositaries.

Depending on the roles of users, the following functions should be available to them:

- view your own accounts and positions;

- viewing accounts under management;
- entry of orders;
- viewing the status of orders, cancellation and replacement of orders;
- viewing messages (address and system-wide);
- other.

The system must support the ability to sign documents and messages using a digital signature, as well as verification of the authenticity of the digital signature.

The System should be able to send notifications to users when custom events occur via email, SMS and other communication channels.

6.3.1. OBTAINING EXCHANGE INFORMATION

Display of exchange information in a mode as close as possible to real time. The broker / client's workstation allows you to monitor the current state of the market and the history of completed transactions. Information should be available both in tabular and graphical form.

It should be possible to receive and display the following data:

- Table of current trades
- Information on the financial instrument
- Table of current quotes
- Table of current positions
- Providing
- Order table
- Table of stop orders
- Deals table
- Table of cash positions
- Table of trading accounts
- Table of client accounts (for a broker)
- Table of estimated prices
- REPO
- Notifications, with the ability to integrate with external messaging systems, e-mail servers and SMS gateways
- Market news

6.3.2. CONDUCTING TRANSACTIONS

The broker / client's workstation allows you to see the state of your own funds, form orders for the purchase / sale of instruments and transfer them to the server of the trading system. The system should support the creation of client orders directly from information objects (cards, tables, graphs, etc.), as well as from custom templates.

The system should provide the following main functions:

- **Entry of orders**

The order submitted by the trader must contain the data provided for by the order form or the software of the trading system. Submission of an application is a necessary and sufficient evidence that the trading participant who submitted it agrees to conclude a transaction in a security on the terms specified in the application or better.

If a trading participant uses the direct orders method to conclude transactions, he can submit only limited orders, while transactions are concluded in accordance with the algorithm of this trading method.

Orders can be submitted to the trading system with the indication of the date. After the expiry of the declared date, the order is automatically canceled by the trading system.

The application contains the following fields:

- financial instrument,
- trading account,
- direction of operation - Buy / Sell,
- price,
- type of order,
- quantity,
- Client code,
- conditions of performance,
- other custom fields.

- **Cancellation and replacement of orders**

A trader has the right to change or cancel a previously submitted application at any time of trading. A previously entered order is changed by deleting it, followed by entering a new, adjusted order. Cancellation of a previously entered application is made by deleting it. In all cases, the

change and cancellation of a previously entered order is allowed only in its unsatisfied volume during trading.

The withdrawal operation is available for active orders. It is impossible to withdraw completed orders. If the order is partially executed, then only the unsatisfied balance is withdrawn.

- **Stop orders**

Formation and transfer for execution of a new order with additional conditions, which are controlled by the System. When creating a stop order, in addition to the main order fields, the:

- type of stop order,
- conditions of order execution,
- term and time of validity of the order.

A conditional order (stop order) - a previously prepared limit order that is transmitted to the exchange's trading system when a condition (stop price) occurs. A stop order is used to limit the amount of losses when trade prices change in the direction opposite to the expected one.

Stop price is a condition for order execution in the form of a boundary value of the price of the last transaction for an instrument.

- **Orders with conditions**

The condition for the execution of the transaction determines the procedure for processing the remainder of the order in case of its partial execution:

- "Immediately or reject" - the order is executed only in full, ie. if there are counter orders in the trading system at a price not worse than the specified one and with the number of instruments exceeding the order volume.
- "Add to queue" - the unexecuted balance is queued with the price specified in the order. If there is a market order and there are no counter orders, then the unexecuted balance is removed from trading.
- "Withdraw the balance" - the unexecuted balance is withdrawn from the auction.
- "Auction of the closing period" - submission of an application for the auction of the closing period.

By default, the ticket has the condition "Add to queue»

- **Closing positions**
- **Reversal of positions**

Each trade has the following attributes:

- Instrument code in the trading system,
- Deal number,
- Number of the order, on the basis of which the deal was executed,
- Direction of the order (sale, purchase),
- Price,
- Quantity,
- Volume,
- The trading account on which the transaction was carried out,
- The identifier of the user who made the transaction,
- Date and time of the transaction,
- Status of settlements under the transaction,
- Deal type,
- Other attributes.

6.3.3. BROKER OPERATIONS

The system must support the following main functions:

- Viewing the positions of trading participants;
- Working with client limits;
- REPO transactions;
- Entry, replacement and cancellation of orders,
- View quotes,
- Receiving and sending messages,
- Participation in the auction;
- Receiving reports;
- Receiving contracts;
- Others.

6.3.4. EXPORT AND IMPORT OF DATA

The subsystem must support the ability to export data in CSV, XML and PDF formSE. The ability to filter data for export must be implemented.

6.3.5. CLIENT APPLICATIONS

The broker / client workstation should be implemented as a web client application. In addition, a mobile application is required for brokers and traders to work.

The minimum set of mobile application features should include:

- viewing information on quotes,
- viewing accounts and positions,
- entering, replacing and canceling applications,
- viewing reports,
- view messages and notifications.

The final functional composition of the mobile application should be clarified during the design of the System.

6.3.6. COMMUNICATION SYSTEM

A messaging system between market participants should be implemented.

6.4.CONTRACTUAL SUBSYSTEM

6.4.1.1 Maintaining a database of contracts

1. Conclusion / renewal of the contract.
2. Possibility to conclude and record contracts for several types of services. Formation of a contract for each consumer, printing of a contract in an approved standard form.
3. Ability to maintain electronic versions of documents (scanned copies, files);
4. Prolongation / renewal of the agreement;
5. Registration of the contract.
6. And others.

6.4.1.2 Maintaining a personal account under a contract

1. Maintaining a personal account of Consumers, reflecting the following information:

a. contract number,

b. account number,

c. counterparty data.

2. Maintenance of tariffs and tariff plans.
3. Accounting for other types of events in accordance with the configuration of the System;

4. Formation of notices of invoices for services.
5. Formation of reports.
6. And others.

6.5.CALCULATION SUBSYSTEM

6.5.1.1 Main functions

The main functions of the module are:

- Performing the following calculations (individually and in batch mode):
- Calculation of the cost of services;
- Recalculation of the cost of services for the client;
- Calculation of penalties, interest.
- Formation and sending of invoices for printing;
- Electronic mailing of invoices (e-mail, mobile messages, etc.);
- Export of charges for various categories of clients;
- Formation of reports, acts of reconciliation, etc.

6.5.1.2 Settlement regulations implemented in the System

The system must implement the following scenarios for settlements with customers:

- Periodic charges ("billing")
- Recalculations (calculations when material facts change in the past)

Recalculations are made when the parameters of the calculation of services are changed, which occurred in the past and were not registered in the personal account when making settlements.

6.6.ANALYSIS AND REPORTING SUBSYSTEM

6.6.1.1 The main functions of the Subsystem

1. Formation of statistical, analytical and other reports according to predefined forms.
2. Ability to export and send reporting forms via email.
3. Formation of various reports (customer turnover, balance sheets on a monthly basis, for a period, on an accrual basis, for each counterparty, for groups (types) of services, etc.). A preliminary list of reports is presented in Application No. 1.
4. Building pivot tables and data presentation. View is an online report generated from relational data.

5. The view must provide customization:

- Composition and hierarchy of columns and rows (analytical features);
- The composition of the displayed data for analysis;
- Statistical functions for superimposing on data;
- Visual selection of a filter for each column or row;
- Setting up sorting for each column and row;
- Setting the format of the displayed data;
- Saving settings in a user profile;
- Export data of the current view to Excel, PDF, MS Word.

6.6.1.2 Basic reporting forms

The following standard reports must be configured within the contract:

1) Report on concluded transactions (securities, trading participants);
2) Report on concluded deals (market, sector, last deal);
3) Report on concluded transactions (in the context of trading participants);
4) Report on concluded transactions (trading participants, registration / market transactions);
5) Report on concluded transactions (parties to the transaction, chronology);
6) Report on concluded transactions (chronology);
7) Report on concluded deals (by sectors);
8) Report on concluded transactions (provided by the NBKR);
9) List of concluded transactions (provided by Central Securities Depository CJSC);
10) List of canceled transactions (provided by Central Securities Depository CJSC);
11) Report on concluded transactions (by regions);
12) Report on concluded transactions (by industry);
13) Report on transactions with securities (placement);
14) Report on transactions with securities (secondary market);
15) Information about orders in the trading system;
16) Consolidated list of applications;
17) Report on commission fees;
18) Report on transactions with securities;
19) Report on five participants;
20) Exchange contract;
21) Exchange certificate;
22) Report on commission fees (full amount for the period);

23) Report on the structure of the commission fee (by bidders);
24) Report on the structure of the commission fee (for financial instruments);
25) Report on transactions in brokerage and dealer firms (submitted to the GKRS);
26) Report on transactions in securities (submitted to the GKRS);
27) Emissions;
28) Market price;
29) ST-Bills exchange contract;
30) STB exchange certificate;
31) List of concluded ST-Bills transactions (provided by Central Depository CJSC);
32) Report on transactions in STB brokerage and dealer firms (provided to the GKRS);
33) Report on concluded ST-Bills transactions (securities, trading participants);
34) Report on transactions for brokerage and dealer firms (primary market);
35) Report on transactions for brokerage and dealer firms (secondary market);
36) Transactions with securities in the context of trading methods (open trading, Frakfurt method, special trading, direct orders method)
37) and other reports in accordance with Application No. 1.

The list and content of reports will be clarified during the design phase of the System.

6.6.1.3 Reporting tools

The System should provide a flexible software toolkit for generating reports by the maintenance personnel.

The reporting toolkit should provide:

- Ability to add new reporting forms;
- Ability to add new details to existing types of reporting forms;
- Creation of the structure of the report in WYSIWYG mode;
- Ability to change the layouts of reporting forms.
- Management of the complete life cycle of the report, from development to management and publication;
- Export of printable in various form SE (including PDF, JPEG, as well as XML and CSV).

Report management should ensure:

- Scalability, security and scheduling of automatic report generation;

6.6.1.4 Types of displaying reporting forms

1. in the form of a printed form for previewing and printing the report;

2. In the form of files in MS Excel, MS Word, PDF or XML format.

6.7.SUBSYSTEM OF INTEGRATION

6.7.1. BASIC FUNCTIONS OF THE SUBSYSTEM

1. Import of payments from payment agents (banks, post office, payment organizations, payment system operators, etc.).
2. Data exchange with trading systems. Supports SWIFT MT messages as well as ISO 20022.
3. Exchange of data with commercial banks.
4. Exchange of data with depositories.
5.Exchange of data with brokers.
6. Exchange of data with government agencies through the "Tunduk" system.
7. Export of data to the accounting system.
8. Import / export to / from external applications and information systems.

Data export / import formSE and the order of interconnection will be clarified during implementation.

6.7.2. API FOR DATA EXCHANGE WITH BROKERS

The system must have an API based on the REST architecture for automated interaction and data exchange with information systems of brokers. The API, as standard, must support the following functions:

- receipt of exchange information;
- receiving information on one's own accounts and positions;
- receipt of data on managed accounts;
- entry of orders, receipt of order status, cancellation and replacement of orders;
- viewing of messages (address and system-wide).

The API must implement mechanisms to protect against unauthorized access, including the use of EDS, as well as journaling requests. The System must provide for the possibility of expanding functions.

The final functional composition of the API shall be defined at the design stage.

6.7.3. OPPORTUNITIES FOR CUSTOMIZING INTEGRATION PACKAGES

1. Possibility of flexible customization of templates for exporting data to other systems in case of changes in the structure and composition of the transmitted data.
2. The ability to configure the automatic start of the procedure for exporting data to other systems upon the occurrence of a certain event (for example, creating, changing or deleting a record in the database).
3. The ability to flexibly configure all kinds of schedules for the automatic start of the procedure for importing / exporting data from / to other systems.
4. The system must include an API implemented in the form of web services (SOAP, REST) to access logical entities (data).

6.8.SETTING AND CONFIGURATION SUBSYSTEM

6.8.1. BASIC FUNCTIONS OF THE SUBSYSTEM

1. Ensuring security and auditing (storing the credentials of the System users, and their authentication and authorization when working with the accounting system).
2. Administration and configuration of the System.
3. Setting up additional details for each section of the System (fields of scalar types, fields with reference books);
4. Setting up the structure of additional classifiers, as well as binding it to any object of the System using extension tools;
5. Setting up the integration subsystem, on the basis of which the standard functionality for loading / unloading data from external sources is provided;
6. Setting up views (printable forms).

6.9.SECURITY AND AUDIT SUBSYSTEM

The System must provide software tools to ensure information security:

- *Requirements for identification and authentication of System users:*
  - Identification and authentication of users;
  - Management of identifiers, including the creation, assignment, destruction of identifiers;
- *Requirements for managing user access to the System:*
  - Management (establishment, activation, blocking and destruction) of user accounts;

- Implementation of the necessary methods (discretionary, mandatory, role-based or other method), types (read, write, execute or another type) and access control rules;
- Separation of powers (roles) of users, administrators and persons ensuring the functioning of the system;
- Determination and granting of the minimum necessary rights and privileges to users, administrators and persons ensuring the functioning of the system;
- Restriction of unsuccessful attempts to enter the system (access to the information system);

▪ *Requirements for registration of security events in the System:*

- Determination of security events to be recorded and their storage periods;
- Determination of the composition and content of information on security events subject to registration;
- Collecting, recording and storing information about security events for a specified storage time;
- Monitoring (viewing, analysis) of the results of registration of security events and response to them;
- Protection of information about security events;

▪ *Requirements for ensuring the integrity of the System:*

- Control of software integrity;
- Ensuring the possibility of software recovery in the event of emergency situations;
- Restriction of users' rights to enter information into the system;
- Controlling erroneous actions of users on entering and (or) transferring personal data and warning users about erroneous actions;

▪ *Requirements for detecting and responding to incidents:*

- Identification of persons responsible for identifying incidents and responding to them;
- Detection, identification and registration of incidents;
- Timely informing the persons responsible for identifying incidents and responding to them about the occurrence of incidents in the information system by users and administrators;
- Analysis of incidents, including identification of sources and causes of incidents, as well as assessment of their consequences.

7. REQUIREMENTS FOR TRAINING

7.1.KSE STAFF TRAINING

Includes identification of necessary resources, types of activity and methodology by means of which knowledge for system Operation which will be unrolled, will be transferred to different users. The supplier must develop a detailed plan of training which will be complete after contract award.

Training will be provided in the Russian or Kyrgyz languages.

The supplier should carry out the separate technical training program for training of technicians of IT department of the Buyer. The supplier should provide training at the Russian and/or Kyrgyz language about technical operations and configurations of the software delivered with a new system.

7.2.PLAN OF TRAINING

The supplier should provide a detailed plan of training at the end of a stage of pilot implementation. The plan should include:

- Definition of the purposes and volume of training
- Definition of training materials
- Definition of logistics for training
- Development of training events
- Names of courses which will be provided;
- Course duration
- Who should visit each course (role / resporeference datability)
- Orientation of a course (functional or technical)
- Necessary skills
- Development of the diagram of training and preparation of assessment of training.

7.3.COVERAGE OF THE PROGRAM OF TRAINING

The program of training should cover:

- Manual of the company
- Users of a system
- Personnel of KSE (up to 10 people)

- Trainers among employees of KSE.

8. STRUCTURE AND CONTENT OF WORKS OF IMPLEMENTATION OF SE SOFTWARE

No	Stage	Content of works (resporeference datability) of the Performer	Results of works
1.	**Stage No. 1. Inspection of objects of implementation and preparation of the specified TOR** 1. Exit inspection 2. ToR of TOR on system implementation on the basis of reports on inspection	1. Conduct full and high-quality examination of automation objects within the Contract; 2. Prepare protocols of an interview of employees of KSE; 3. Prepare documents on inspection of automation objects of KSE; 4. Specify with KSE plan of the project. 5. Prepare the specified ToR;	1. Report on inspection. 2. The ToR, including applications: 2.1. Regulations of work in the System (the description of business processes); 2.2. Models of the forms of account necessary for implementation of the System; 2.3. Uniform techniques of calculations of indicators of the System.
3.	**Stage No. 2. System development** 1. Development of the work documentation on the System 2. Adaptation and setup of the System	1. Carry out system development, in agreed time frames of carrying out these works and notify on the termination KSE; 2. Develop a set of the work documentation on the System. 3. Develop the program and a test procedure of the System on the basis of integration test. 4. Carry out acceptance tests of the System on the Performer's equipment, according to integration test.	1. Set of the modifed work documentation: 1.1. Structure declaration of databases. 1.2. General description of the System; 1.3. Regulations of work with the System; 1.4. Guide of the system administrator. 1.5. User guide of the System; 1.6. Program and test procedure.

No	Stage	Content of works (resporeference datability) of the Performer	Results of works
	3. Development of regulations of carrying out Pilot Operations 4. Development of regulations of training of employees of KSE	5. Prepare and coordinate with KSE protocol carried out by the PSI.	
	Stage No. 3. System implementation and Training 1. Installation and setup of the System on an object 2. User training and administrators	1. Regarding system implementation: 1.1. Assistance in installation and setup of the System for jobs of users and the server. 2. Regarding carrying out training: 2.1. Prepare educational and methodical documentation, prepare and coordinate about KSE program and the Plan of carrying out training; 2.2. Provide user training; 2.3. Hold final testing by results of a course; 2.4. Analyze results of testing and give an assessment to readiness of personnel for work with the System.	1. Protocol of user training; 2. The protocol of system implementation on KSE object.

No	Stage	Content of works (resporeference datability) of the Performer	Results of works
4.	**Stage No. 4. Preparation for trial Operation** 1. Development and approval of the program and technique of carrying out acceptance tests of a system 2. Carrying out acceptance tests 3. Development of the concept of carrying out Pilot Operation of the System on pilot objects 4. Input of the System in trial Operation	1. Develop the program and a test procedure of the System on the basis of integration test. 2. Carry out acceptance tests of the System on the Performer's equipment, according to integration test. 3. Prepare and coordinate with KSE protocol carried out by the PSI. 4. Develop the Concept of carrying out trial Operation of the System on KSE objects. 5. Participate in work of the commission on check of readiness of the System for start in trial Operation.	1. Program and test procedure. 2. Protocol of carrying out acceptance tests 3. The order of KSE start of the System in trial Operation on pilot objects. 4. Concept of carrying out trial Operation of the System
5.	**Stage No. 5. Trial Operation** **1.** Correction of Operations **2.** Completion of the System according to the list of completions.	1. Resolve all comments revealed as a result of carrying out the PSI in agreed time frames; 2. Assistance to specialists of KSE during the work with the System and when comparing results of work;	1. The protocol of achievement of criteria of trial Operation of the System on KSE objects; 2. The order of KSE start of the System in commercial Operation on objects;

No	Stage	Content of works (resporeference datability) of the Performer	Results of works
	3. Updating of the work documentation on a system. **4.** Maintaining log of changes. Elimination of notes according to the log. **5.** Verification of results of calculation. Control of indicators of the project. **6.** Input of a system in commercial Operation in pilot objects	3. Completion (adaptation) of the System according to the list of the completions displayed in the log of changes;	3. The delivery-acceptance certificate of the software product taking into account completions.

9. ORDER OF DEVELOPMENT, CONTROL AND ACCEPTANCE OF SE

9.1.GENERAL REQUIREMENTS

Adaptation and system implementation is carried out step by step. The list of works on each stage is defined by the item. 7 of the real ToR.

Acceptance of work on each stage is carried out as acceptance of reporting documentation.

After execution of each stage of the party (KSE and the Contractor) make out the act of an acceptance of a stage of works.

For coreference dataderation and acceptance of documentation on creation of the System the following documents should be shown:

- ToR;
- Operational documentation.

9.2.ORDER OF ACCEPTANCE OF WORK

9.2.1. TYPES OF ACCEPTANCE OF WORK

Control and acceptance of the System in Operation is carried out on the basis of results of tests of the System. The following types of tests of the System should be carried out:

- preliminary testing (on end stage No. 3 "Completion of the System" for the purpose of check of compliance of the System to the ToR and definition of a possibility of its commissioning.).
- trial Operation (Pilot Operations – stage No. 6).

9.2.2. THE REGULATING DOCUMENTS

Types, structure, volume, and test methods of the System are defined by the following documents:

1. The program and test procedure including:
   - object of tests.
   - test objective.

     o requirements to the System.
   - requirements to documentation.
   - order of carrying out tests.
   - technique of carrying out tests.
   - list of the reporting under tests.
   - control example (test script).

2. The concept of carrying out trial Operation containing:
   - plan of carrying out Pilot Operations.
   - purposes of carrying out and criteria of Pilot Operations.
   - organizational, functional framework of Pilot Operations.
   - preparation of Pilot Operations.
   - carrying out Pilot Operations.

9.2.3. STRUCTURE AND VOLUME OF TESTS

For carrying out tests of KSE must provide (according to requirements of the ToR)

- Provision of employees which functional duties will include work with the System;
- mounting and commissioning of the server hardware, the LAN and communication channels meeting the requirements described in the section "Requirements to technical support of the System»;
- connection of the workstations entering a computer network;
- installation of the system software on servers and workstations according to the requirements described in the section "Requirements to workstations».

At a stage of carrying out preliminary tests of the System, it is necessary to carry out:

- tests for working capacity and compliance to the ToR, according to the program and a test procedure (the scenario of the test).
- issue the test sheet of the System and the register of notes.
- eliminate faults and make changes to documentation on the System, according to the test sheet.

At a stage of carrying out trial Operation it is necessary:

- develop the plan and the concept of carrying out Pilot Operations.
- carry out a cycle of works in the System.
- make the analysis of results of Pilot Operations.
- execute completion (if necessary) of the System.
- carry out additional adjustment (in need of) technical means.
- issue and sign the act of end of Pilot Operations.
- issue and sign the act of readiness of the System for commercial operations.

10. MAINTENANCE REQUIREMENTS

The Contractor shall provide maintenance of the System within 12 months from the date of commissioning. The regulations for the provision of maintenance services for the System must be agreed between the KSE and the Contractor before putting it into operation.

11. REQUIREMENTS TO DOCUMENTATION

11.1. GENERAL REQUIREMENTS TO DOCUMENTATION

All documents should be issued in Russian. The structure of documents for the general software delivered as a part of the System can correspond to a set of delivery of the company – manufacturer. Documentation on components of a system is allowed to be included as separate partitions in documentation into a system in general.