EGAAS

ELECTRONIC GOVERNMENT AS A SERVICE

WHITE PAPER

Annotation

This document describes the basic principles of technical implementation of eGaaS –
a common international state and business management system the concept of which is
presented in eGaaS Manifest. Before reading the White Paper: eGaaS, it is recommended
to go through eGaaS Manifest.

Introduction

eGaaS is a universal blockchain platform for organizing economic, public and social activities
of citizens and their communities on a global scale. eGaaS offers a secure mechanism for
storage of data and their use in drawing up various contracts governing relations between
people and organizations.

Unlike existing blockchain projects attempting to solve specific problems, eGaaS offers a
comprehensive solution for transfer of all the tools needed for state and business
management to a blockchain platform. eGaaS has a mechanism for creation of registries of
objects involved in legal and economic relations – natural and legal persons, real estate,
securities, etc. eGaaS offers world's central banks the opportunity to open accounts for all
citizens and organizations, which would allow to carry out transactions in national currencies.
To conduct business operations, eGaaS supports the technology of smart contracts, that
automatically implement the algorithm of deals with registry objects using transactions
between the central bank's accounts.

eGaaS is the first to implement a smart law formation and execution mechanism. Smart laws
are electronic algorithms that describe the rules and conditions for State law implementation
The credibility of smart laws is confirmed by digital signatures of representatives of legislative
bodies or by referendum. Smart laws regulate the creation and execution of smart contracts
and automatically regulate the relationship between individuals and organizations in all areas
of government activity – from civil registration to tax deductions.

So by combining the financial system, registry structure, smart contract and smart law
mechanisms into a common blockchain platform, eGaaS serves as an efficient tool for the
government, business and citizens, which can be used to manage any activity.

The eGaaS blockchain

The eGaaS blockchain platform is a peer-to-peer (P2P) network, where each node contains
a complete database of the system. To synchronize database changes and to protect it
against unauthorized changes the blockchain technology is used. Current database changes
sent to the network by users – values entered, new objects, their attributes and relationships

added – accumulate on the node that currently has the right to create a block. The node checks both the entries (transactions) and their compatibility with each other, signs a formed block with a private key and sends it to the network. Other nodes check the right of the signing node to create block, the validity and compatibility of the transactions in the block and the correctness of the signing. If the nodes do not find any error, they execute the transactions prescribed in the block, that is, modify the databases synchronously.

Block formation method

To ensure high speed of transactions (at least one million transactions per second), nodes that are authorized to form and sign blocks are selected using the delegated-proof-of-stake method (DPoS). At the initial stage of eGaaS functioning (before States are joined the platform), a fixed number of nodes authorized to form blocks is set. These nodes are determined via periodic (once a day) voting among all the network nodes (at least 100). The vote weight is proportional to the amount of the network internal currency EGS in the node account. After the first five States join the eGaaS platform, the right to create and sign blocks will be transferred to the nodes of these States. These States are given the status "recognized". In the future, new States can join the network (with the status "recognized" given to them) via voting among the recognized States. Recognized States also determine the number of free (not belonging to States) nodes to which the right to create blocks will be delegated. These nodes will serve as backup ones.

Nodes with signing right form blocks sequentially. If a block is not created within the allotted time (fixed in the eGaaS settings), the right to create the block moves to the next node in the list. Thus the functioning of any State cannot be interrupted if its node (data center) fails and the network will maintain its operability even when there is only one node (although this would significantly slow down the speed of transactions).

Block creation fee

For creating a block, each node receives a fee from the transactions contained in that block. To ensure eGaaS efficiency, the fee for processing transactions is set such that it is sufficient for the maintenance of each network node (each datacenter in the future). The fee is paid in the currency in which the transaction was made provided that most countries recognize that currency as a means of payment. Otherwise, the fee will be paid in EGS. The fee is calculated every month – based on the average cost incurred by nodes on datacenter maintenance. This calculation principle will allow each node – no matter how small the country it belongs – to maintain its functionality irrespective of the number of transactions and the size of the blockchain database.

Internal currency: EGS

When eGaaS network is launched, 100 million units of the internal currency EGS will be emitted. The main purpose of EGS is to protect the network against attacks: database operations (creation of a new table, new column, entry of data, use of smart contracts and smart laws, etc.) are paid. The price of operations is set at a level that does not limit users' possibility to work but prevents mass operations aimed at disrupting the functioning of the network. At the initial stage, ESG is also used to form a list of nodes, delegated for creation of blocks.

eGaaS network protection

The eGaaS database is protected against unauthorized modification by the following means:

1. Restricting the number of nodes that can create and sign blocks;

2. Checking the correctness of formation of all blocks by the network nodes;
3. Storing the complete database version on each network node;
4. Blocking the possibility of modifying the blockchain blocks without consent from all nodes.

Protection against entering of invalidated information into the database is secured through:

1. Strict delineation and verification of the rights of different categories of users on data entry;
2. Checking of transaction conditions stated in smart contracts (practically all transactions are implemented when the relevant smart contracts or smart laws have been executed);
3. Checking of smart contracts for compliance with the active smart laws of the State.

Smart laws

Laws and smart laws

The eGaaS law is a set of data and algorithms needed to achieve a strictly certain result prescribed in the State law. The eGaaS law (hereinafter simply "the law") prescribes the objects involved in achieving the results, actions (transactions) required to achieve the results, and conditions of performing the actions. The action provided for by the law must be executed in compliance with all the conditions prescribed in the law. Laws are formed and approved by the legislative bodies of the State.

Smart law is an autonomous part of the law that performs a single act constituting a separate phase in implementation of the law or a separate item of the law. Each smart law spells out the original data, the action and conditions for implementation of the action.

A law contains a set of smart laws, necessary and sufficient for achievement of the final result. The legislature adopts a law and not a smart law. Although voting can take place both for the law as a whole and for each smart law alone.

The legislative system of a State

Laws are divided into constitutional, central and local.

Constitutional laws determinee the structure of state power. They establish:

1. The list of state bodies and the method of their formation;
2. Restrictions on nomination of candidates for elected office;
3. Timing and frequency of elections;
4. Conditions for eligibility to vote;

5. The vote counting principle and winner declaration conditions;
6. The rights of elected bodies and officials in legislative and supervisory activities.

Constitutional laws governing elections contain a smart law called "Voting", which counts the votes of eligible citizens (records their votes confirmed by a personal electronic keys) and sums up the voting result all within a statutory period.

A special constitutional law establishes which constitutional law parameters can be changed by a constitutional majority of the legislature, and which ones can be changed only by a referendum, and who can initiate such changes.

Central laws regulate the main relations between the State, citizens and organizations. Such relations include the civil status of citizens, taxes, registration of organizations, and others.

Local laws are adopted by regional legislatures and can establish the rules of relations between citizens and organizations of some territorial entity if

1. These relations are not regulated by the central laws (local smart laws will not be able to change parameters controlled by central laws) or
2. The central laws give permission to modify some central law parameters within specified limits (tax rates, fees, etc.).

The rules of procedure of legislative bodies – quorum, number of votes for adoption and amendment of laws – are prescribed in special smart laws and controlled automatically.

Structure of laws and smart laws

The mechanism of the laws and smart laws of eGaaS is based on the following principle: any complex algorithm of the law can be implemented using a system of basic smart laws, which perform a certain single action using a data set described in them and subject to established limitations

Only timer smart laws and cycle smart laws are program specific. Timer smart laws control the timing and frequency of execution of other smart laws. Cycle smart laws define the conditions and implement repeated execution of some smart law on a set of similar objects.

A law contains at least one smart law performing an action required to achieve the results specified in the law. A law may contain two or more smart laws, which use different initial data and conditions to achieve one result. A law may contain special smart laws for initiation, suspension, renewal and termination of the law.

In a situation where the blockchain database has not enough information for automatic execution of a smart law, that is, when certain actions (for example, canceling a certain restriction of the law or providing benefits) requires the decision of the competent authority or entity (court, municipality, tax inspector), the smart law may contain a condition that controls input of offline data signed with the electronic key of the body or person specified in the law.

Smart laws are launched by user actions (data and key input), system events (such as transactions) and other smart laws or smart contracts. The launching of a smart law means

sending that smart law and initial data to the eGaaS network. After that, the node signing the next (current) block checks whether the data comply with the conditions prescribed in the smart law and if yes, performs the transaction established in the smart law (makes a record in the database) and/or launches the next smart law.

The law can access existing blockchain data and also require the creation of new objects (tables) necessary for its operation. In the latter case, some smart laws under the law fill tables, while others use these data for their work. When smart laws are implemented, the repository for intermediate data (variables), which are required for implementation of a law (for example, the time a smart law was last launched) is used. If necessary, smart law execution is followed by reporting (creation of reports).

Smart contracts

Contracts and smart contracts

eGaaS contract is a set of data and algorithms needed to achieve a particular result in a social or business activity. The eGaaS contract (hereinafter simply "contract") prescribes the objects involved in achieving the results, actions (transactions) required to achieve the results, and conditions of performing the actions. The main purpose of contracts is to ensure automatic execution of actions prescribed in them in compliance with all the conditions specified in the contract. The main advantage of contracts is that they cannot be changed and their actions cannot be cancelled in circumvention of the conditions prescribed in the very contract. Contracts are formed by organizations and individuals for implementation of joint (contract) activity, but can also be used to achieve private objectives.

Smart contract is an autonomous part of the contract that executes a single action constituting a separate phase of implementation of the contract or a separate item of the contract. Each smart contract spells out the original data, the action and conditions of performing the action. A contract contains a set of smart contracts necessary and sufficient to achieve the final result.

Contracts and smart contracts: structure

The mechanism of eGaaS contracts and smart contracts is based on the same principle as the mechanism of laws and smart laws: any algorithm of the contract can be implemented using a structure from the elementary smart contracts which perform a certain single action using a data set described in them and subject to established limitations.

Everything said about the structure of laws, types of smart laws and ways of launching them fully applies to smart contracts – they are implemented in the same way programmatically. The only difference is that contracts regulate the relationship between two or more private or legal persons, and, accordingly, are signed with the electronic keys of the parties to the agreement.

In addition to execution automaticity and protection against tampering, eGaaS contracts and smart contracts have a significant advantage when it comes to interaction with the law system: a smart contract cannot be adopted for execution by the eGaaS platform if it

contains an action that violates existing laws (for example, conducting a transaction or purchasing a product by an organization that is not properly licensed). Another distinctive feature of eGaaS smart contracts is that their actions can be cancelled by the court of the State under whose jurisdiction the smart contracts fall. Therefore, due to direct association with the legislative and judicial systems of the State, as well as direct access to eGaaS registry objects and financial system, smart contracts become a complete tool to manage business and other activities.

Conclusion

eGaaS, combining a financial system, registry structure, smart contract algorithm and smart law formation and execution mechanism in a single blockchain platform, should be seen as a fundamentally new tool for efficient transfer of most activities of the State and business to blockchain technology.

If the Ethereum project can be considered as a kind of a distributed computer used by programmers, then eGaaS should be seen as an operating system that can be used by the State, business and citizens to build a transparent and trust-based relationship between them.

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