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ICON DECENTRALIZED AUTONOMOUS GOVERNANCE SYSTEM

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The On-chain Decentralized Autonomous Governance System for Managing and Implementing Changes to the ICON Network

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1. Introduction

History has shown that successful free-market communities maintain clearly defined methods and processes for decision making. Without such systems in place to allow pseudo-anonymous market participants to coordinate, inflexibility and inefficiencies could cause a free-market to fail as such issues would go unaddressed. Therefore, creating a joint decision making method to develop best practices of the market is an integral component of the market.

Public blockchain is a dynamic evolving ecosystem consisting of multiple anonymous market participants. Thus, in order to discuss various issues outside and inside the ecosystem, participants must be able to decide on changes and management of the code to determine the rules of the protocol. By engaging and negotiating developers, users, and representatives within the blockchain network in both direct and indirect decision-making processes, the system promotes community collaboration among large participants and achieves decentralized autonomous governance.

As the ICON Network takes steps to become one of the first fully operational decentralized autonomous organizations (DAOs), an essential component is a decentralized, autonomous governance protocol. This protocol must have the flexibility to amend given the ever-changing network, political, and macroeconomic conditions, and the immutability & transparency to protect the constituency from corruption and deceit.

With proper distribution of governance power and wealth, the ICON Network strives to be a network in which all interested parties have the opportunity to make an impact on the direction, policies and economics of the network. All of this is offered by Delegated Proof of Contribution, the on-chain governance mechanism of the ICON Network.

2. Governance Components

To fully grasp the purpose of this paper it would be helpful to first understand the definition and scope of its components.

2.1. Public Representatives

A Public Representative (hereinafter referred to as a 'P-Rep') is a representative of the ICON Network that contributes to the ecosystem through participation in block validation and on-chain governance. A total of 100 P-Reps can be elected by ICONists. The top 22 P-Reps ('Main P-Reps') will produce blocks, verify blocks, and participate in

governance, while the bottom 78 P-Reps ('Sub P-Reps') will add further security to the network by storing a copy of the ledger and making themselves available to replace a Main P-Rep if necessary. The top 22 representatives have the authority to produce and verify blocks for a period of 43,120 blocks. This period is called the 'Representative Term'. At the end of each Representative Term, the rank of each representative is recalculated to reflect the delegations of ICONists.

2.2. DApp Booster Program

The Decentralized Application Booster Program (DBP) is a program that selects and rewards DApps to help grow the value of the ICON Network, and all DApps on the ICON Network can register with the DBP and receive delegation from ICONists.

All ICONists can select high-quality DApps that can contribute to increasing the value of the ecosystem by delegating ICX to specific DApps. Only the top 100 DApps are eligible to receive rewards depending on the amount of ICX delegated from ICONists and the Monthly Reward Variable for DApps (i_{dapp}). The top 100 DApps are elected similarly to the Representatives of the ICON Network, where ICONists delegate Staked ICX to their choice of DApps.

2.3. Ecosystem Expansion Projects

An Ecosystem Expansion Project ('EEP') is a project or activity that can contribute to the growth and expansion of the ICON Network. In order to promote self-development of a decentralized network, the system should be designed in such a way that anyone who is willing to contribute to the development or expansion of the ecosystem can do so without relying on a single development or community group.

All EEP Contributors willing to propose a project can submit their project idea on-chain. EEPs include, but are not limited to: ICON Network development, 3rd Party App development, community activities, and education activities.

All ICONists can select high-quality EEPs that can contribute to increasing the value of the ecosystem by delegating ICX to specific EEPs. Only the top 100 EEPs are eligible to receive rewards depending on the amount of ICX delegated from ICONists and the Monthly Reward Variable for EEPs (i_{eep}). The top 100 EEPs are elected similarly to the Representatives of the ICON Network, where ICONists delegate Staked ICX to their choice of EEPs.

3. On-Chain Governance System: Design for Fully Decentralized Autonomous Governance

On-chain governance, without a central body to oversee the honesty of each participant, must have proper economic incentives and a flexible governance framework to operate efficiently. The economic framework of the ICON Network is outlined in the IISS Paper, while the governance framework is detailed below

3.1. Delegated Proof-of-Contribution

Delegated Proof of Contribution (DPoC) is a governance protocol designed to attribute rewards towards those that contribute most to the ICON Network. This system allows the ICON Network to operate a fully decentralized autonomous governance system without reliance on a single entity. This is achieved via making adjustments to the distribution of wealth and governance power. The measure of wealth and governance power is in the form of ICON's native cryptocurrency, ICX, where one ICX is equivalent to one vote.

Through the creation of the Contribution Proposal System, as detailed in a separate paper, the DApp Booster Program, the funding of Ecosystem Expansion Proposals and network-level economic incentives for voting, the ICON Network has made significant changes to the typical distribution of wealth and governance power. Within the ICON Network, 4 groups will receive their fair share of wealth and governance power: Voters, EEP Operators, DApp Operators, and Node Operators (P-Reps and potentially others in the future).

Governance power is earned by receiving votes. ICONists, individuals or entities that hold ICX, have the ability to indirectly participate in governance via delegating their governance power to an individual or entity that can contribute to the network, or by directly contributing to the network themselves.

The economics associated with DPoC are further detailed in the IISS Yellow Paper

3.2. Governance Variable System

The governance variable system is in place to ensure the flexibility of the ICON Network given ever-changing conditions. These variables can be toggled to adjust the incentive structure on the ICON Network, thus giving governing entities the ability to incentivize different behaviors.

The initial system includes seven governance variables,: i_rep, i_dapp, i_eep, r_rep, r_dapp, r_eep, and s. All Representatives can submit the governance variable (i_{rep}), however, only the submissions of the top 22 Representatives will be factored into the final calculation for i_{rep}. The result will be calculated by taking a stake-weighted average of each of the top 22 Representatives' submissions. Representatives can control the currency issuance rate and the size of the reward fund through the use of governance variables.

Item	Name	Description
i_{rep}	Monthly Reward Variable for Representative	A variable that determines the reward amount for contribution by Representatives. This variable represents the monthly amount of ICX that is assumed to be required for the operation of the Representative node. It is determined by the Representatives via a stake-weighted average of their submissions.
i_{eep}	Monthly Reward Variable for EEP	A variable that determines the reward

		amount for an EEP. This variable represents the monthly amount of ICX distributed to an EEP when it receives 1% of the ICX delegation across all EEPs in the top 100.
i_{dapp}	Monthly Reward Variable for DApp	A variable that determines the reward amount for a DApp in the DBP. This variable represents the monthly amount of ICX distributed to a DApp when it receives 1% of the ICX delegation across all DApps in the top 100.
r_{rep}	Annual Delegation Reward Rate for Representative	This variable is the rate received by an ICONist who delegates their ICX to a Representative. The reward rate will change dynamically depending on the amount of ICX delegated across all P-Reps.
r_{eep}	Annual Delegation Reward Rate for EEP	This variable is the rate received by an ICONist who delegates their ICX to an EEP. The reward rate will change dynamically depending on the amount of ICX delegated across all EEPs.
r_{dapp}	Annual Delegation Reward Rate for DApp	This variable is the rate received by an ICONist who delegates their ICX to a DApp. The reward rate will change dynamically depending on the amount of ICX delegated across all DApps in the DBP.
s	Step Price	A variable that determines the price of Step, which can be adjusted via Representatives reaching consensus on a Network Proposal.

Figure 1: Definition of Governance Variables

3.3. Network Proposal System

The Decentralized Autonomous Governance system of the ICON Network relies on a set of Network Proposals with different characteristics. Most Network Proposals can be autonomously executed, however, Text Proposals rely on good-faith execution. Over the

course of time, it is expected that Text Proposals will result in the implementation of additional autonomously executable proposals, as well as further detail best practices on the ICON Network.

All Network Proposals will be available to submit, view, and vote on via a governance dashboard provided by the ICON Foundation. Tutorials and guidelines will be made available upon completion of the dashboard.

In order to pass a Network Proposal, the proposal must receive approval from ⅔+1 of the current P-Reps, as well as reach 67% approval of the stake-weighted vote of the current P-Reps

3.3.1 Text Proposals

Text Proposals are open-ended proposals submitted by P-Reps and, if approved, are executed in good faith as outlined by the ICONstitution. All Main P-Reps can write and submit proposals on-chain. Anything can be proposed as a Text Proposal so that P-Reps can raise discussion topics. Text proposals are different than all others in that they do not provide autonomous execution.

3.3.2 P-Rep Disqualification Proposals

P-Rep Disqualification Proposal is a proposal that Main P-Reps can submit to disqualify a malicious P-Rep, and it should be submitted with the public key of a specific P-Rep. Once it is approved, it gives P-Reps the ability to autonomously disqualify a P-Rep. Disqualified P-Reps are not able to re-register.

3.3.3 Malicious SCORE Proposals

Malicious SCORE Proposal is a proposal that Main P-Reps can submit to freeze and unfreeze a SCORE. Once the SCORE is frozen, will not function until unfrozen. Malicious SCORE Proposals have two options: Freeze and Unfreeze.

3.3.4 Step Price Proposals

Step Price Proposals, if approved, give P-Reps the ability to autonomously adjust the Step Price, which is the base transaction fee on the ICON Network. This Step price can be adjusted within 30% of existing Step Price. Once it is approved, it gives P-Reps the ability to autonomously change the Step Price.

3.3.5. Revision Proposals

Revision Proposals, if approved, give P-Reps the ability to autonomously update their software version. Some updates are only activated after approving in the Revision Proposal. Once it is approved, it gives P-Reps the ability to activate the new software. Not all updates require Revision Proposal. Updates affecting the block structure and consensus process must be activated simultaneously by the Revision Proposal. Updated features will be activated by this proposal.

4. Conclusion

Decentralized Autonomous Governance is one of the most complex yet groundbreaking use-cases of blockchain technology. It enables a level of human organization and decision making unlike ever before.

While it is impossible to plan for all scenarios, it is prudent to plan for change. Flexibility is what makes these systems possible. Despite all the time and effort put into this design, that which makes this design strong is its ability to adapt to the ever-changing conditions of the ICON Network.