Callisto Network whitepaper

Revision 0.9, 16 January 2018, Dexaran, Ethereum Commonwealth

These notes are intended to formally document and describe the features and concepts of the Callisto (CLO) cryptocurrency. This specific document will thoroughly explain the technical details of the Callisto protocol, Cold staking, Official Smart-contract Auditing Department of CLO & ETC along with its intended benefits.

Abstract

The blockchain paradigm when coupled with cryptographically-secured transactions has demonstrated its utility through a number of projects, not least Bitcoin. Each such project can be seen as a simple application on a decentralized, but singleton, compute resource. We can call this paradigm a transactional singleton machine with shared-state. Ethereum implements this paradigm in a generalised manner. Furthermore it provides a plurality of such resources, each with a distinct state and operating code but able to interact through a message-passing framework with others. We discuss its design, implementation issues, the opportunities it provides and the future hurdles we envisage.

Callisto intro

An important point is the ability to implement key platform features using built-in mechanisms: smart-contracts. Callisto aims to define protocols and provide a reference implementation of built-in cold staking, governance system and development funding mechanism based upon smart-contracts.

Callisto overview

Callisto is a decentralized open source crypto platform based on go-Ethereum source code with its own cryptocurrency CLO.

The main goal of Callisto is to research and develop a reference implementation of self-sustaining, self-governed, self-funded blockchain ecosystem and development environment. Callisto aims to establish a secure and contribution-friendly environment for further protocol development and improvements. It will rely on built-in system of smart-contracts to achieve this goal.

One of the main problems of Ethereum smart contracts is the lack of tools to make them secure. Smart-contract hacking results in millions of dollars loss for the whole ecosystem. Callisto is intended to solve this problem for CLO and ETC ecosystems with "Official Smart-contract Auditing Department of CLO & ETC". This represents a completely free opportunity of professional smart-contract auditing for end user.

Another problem of each progressive blockchain is protocol upgrading. Hard-forking is a stressful process for mining pools, exchanges and other network participants. Callisto seeks to mitigate the problems of hard-forking with establishing **Planned Hard-forking Dates**: **5 March** and **11 November**. Each protocol update should only be performed on one of these days. This approach allows each member of the network to know about upcoming updates and to prepare in advance. If the specific update code is not in the ready for use state at the time of the Planned Hard-forking Date then it should be delayed to the next one.

Official Smart-contract Auditing Department

A standard procedure of secure smart-contract development at ETC & CLO ecosystem will be establish. This standard procedure will necessarily include the audit of smart-contracts. Usually auditing is quite expensive and some developers neglect it before launching their smart contracts.

Utilizing capabilities of Callisto network, we aim to establish a free-for-everyone system of smart-contract auditing.

1. A registry of audited smart-contracts will be created. Every smart-contract that successfully passes the security audit will receive an officially audited status. Otherwise contract will remain non-audited by default.
2. Everyone will be allowed to submit auditing requests and this is completely free for smart-contract developers.
3. A full-time team of smart-contract auditors that will review each requested smart-contract will be hired. This takes time but it is better to wait rather than to launch a smart-contract with a critical vulnerability that will result in millions of dollars lost or stolen.
4. Smart-contract auditors will be paid with CLO from the Callisto treasury.
5. ETC and CLO smart-contract auditing requests will be accepted for free. We aim to improve the security of ETC ecosystem at all.

This is even more important since we plan to implement Callisto core features with built-in Callisto capabilities i.e. smart-contract systems.

Initial launch stage

At the first launch of Callisto network, there will be no treasury smart-contract deployed. The purpose of this is to establish an official auditing team first and rely on audited contracts for further upgrades. Callisto development team will receive a full amount of treasury fee at this stage. 20% of the initial treasury funding is allocated to the Callisto team to finalise the defined goals and establish a final version of Callisto treasury contract. 10% of the initial payment for the treasury will be held by the Callisto team and deposited into the cold-staking contract after the Callisto Hardfork No. 1, that enables cold staking protocol.

Total treasury fee of this stage is 30% which includes:

- Development funding: 20%
- First Stake allocation: 10%

Callisto development team adheres to a policy of complete financial transparency. Funding distribution will be as follows during the initial launch period:

Yohan Graterol: *0x4667d0c30E6f58ef935ddAb560d41E030E4d2AeB*
Dexaran: *0x01000b5fe61411c466b70631d7ff070187179bbf*
Eduar Tua: *0x93195e6A2cDAAEEa1e7186279089e09c89BBaE09*
Carlos Sampol: *0x37006d230C9b0dA7A00011Efb1Acc3388fbD3c6A*

Callisto treasury: *0x74682fc32007af0b6118f259cbe7bccc21641600*

The rest of Callisto treasury funding will be allocated for the Official Department of Smart-contract auditing for ETC & CLO.

- Yohan Graterol, CTO and Co founder, rewards per month: 500,000 CLO
- Dexaran, CEO and Co founder of Callisto, rewards per month: 500,000 CLO
- Eduar Tua, Go developer, rewards per month: 150,000 CLO
- Carlos Sampol, React developer, rewards per month: 150,000 CLO

Planned hard forks.

Cold staking stage

The planned Callisto hardfork No. 1 (11 Nov, 2018) enables cold staking protocol. 10% of the total volume of CLO emissions for the entire time of the initial stage of launch will be deposited into the staking contract. This allows early cold staker to receive an initial reward as if they were staking during the initial stage.

The First Stake offers the highest reward for the earliest stakers. The amount of staking reward will decrease with time to the normal staking reward amount of 20% of treasury pool.

Total treasury fee of this stage is 30% which includes:

- Development funding: 10%
- Cold staking allocation: 20%

Final stage

The planned Callisto hardfork No. 2 (5 May, 2019. This may be delayed) enables governance system. Cold stakers will be allowed to participate in proposal submitting and proposal voting. A development proposal that was approved by cold stakers voting will receive funding. Callisto team and the Official Smart-contract Auditing Department will operate through proposal submitting since this stage.

Total treasury fee of this stage is 30% which includes:

- Treasury allocation: 10%
- Cold staking allocation: 20%

Callisto development

Callisto project is open source and open for contributions. There will be a Callisto development team at the early stages of the project. Callisto development team is responsible for the implementation of the core features of Callisto ecosystem that will allow to make it a completely decentralized and self-sustaining network.

Further development will become completely decentralized once a Callisto treasury smart-contract will be deployed. Further development goals and roadmap milestones would be defined through the Callisto treasury smart-contract. The development and implementation of this milestones would be funded through the Callisto treasury smart-contract as well.

Every participant of Callisto network that holds CLO can become a cold-staker. Cold-staker is an account that locked its funds in the Callisto treasury smart-contract for 1 month or longer. Each cold-staker account can participate in the decision making process by submitting a development proposal to the Callisto treasury smart-contract or voting FOR or AGAINST already existing proposals.

Cold stakers will be compensated for being a CLO holders and participating in the Callisto development governance with a portion of treasury CLO. A total amount of CLO allocated for each cold-staker depends on total amount of cold stakers that are currently on Callisto network.

Cold-staking does not require account owner to run a full node. It is relying on treasury smart-contract. Each participant of the Callisto network is allowed to become a cold-staker at any time if he will deposit his stake to the Callisto treasury smart-contract. A full stake + staking reward can be withdrawn from the treasury contract at any time after a month since the stake deposit. The account that have withdrawn its funds from the treasury smart-contract will no longer be a cold-staker.

Callisto treasury smart-contract

Callisto treasury smart-contract is a program written in solidity programming language and deployed at the Callisto network. Treasury smart-contract implements a governance system of Callisto network. It serves to submit proposals, vote proposals, fund approved development proposals.

Every participant of Callisto network is capable of submitting a development proposal. Only cold-stakers are capable of voting FOR or AGAINST proposals. The treasury balance is a 10% fee from each Callisto block.

Callisto cold staking protocol

For more information see Moonlight protocol description.

Cold staking is a core feature of Callisto protocol that is intended to incentivize coin holders for holding CLO coins during a significant amount of time, thus increasing "store of value" feature of Callisto. Cold staking protocol will be implemented in solidity smart-contracts. Currently there is a Moonlight 1.0 version that has serious limitations and hurts Callisto network bandwidth. Moonlight 2.0 is currently in development. The second version of the protocol allows stakers to claim rewards for the custom period of time.

The protocol version only affects the method of picking up the reward and the network bandwidth. Staking reward does not depend on Moonlight protocol version. The staking reward depends on the number of cold stakers that currently exist and their stake. The more stakers are participating in the cold staking at the moment the lower reward each staker earns.

Technical details

- POW Algo: Dagger Hashimoto (Ethash)
- Block interval: ~15sec
- Block reward: 600 CLO (30% treasury fee)
- 100% compatible with Ethereum Virtual Machine
- The maximum supply: 6,500,000,000 CLO.

Callisto implements an Ethereum Virtual Machine, which allows to run Ethereum-compatible smart-contracts written in solidity or viper programming languages.

Callisto emission and maximum supply is increased compared to ETC 72% of total Ethereum (and ETC) supply was distributed during the crowdsale. This would have a negative effect if we sent such a huge amount of coin to the cold staking. As the result it is necessary to increase the neutral CLO emission to compensate a huge amount of pre-distributed stake.

Goals

Callisto primary goal is to boost the growth and the adoption of Ethereum Classic as a community and as a platform.

Such as important goals for us we have:

- Research, define and develop reference implementation of cold staking protocol, built-in governance system and self-funding mechanism.
- Improve the security level of the whole Ethereum Classic and Callisto ecosystem with official auditing team and secure contracts registry.
- Research experimental possibilities of scaling and cross-chain interaction.

Roadmap

Q1 2018

- Launch the test network with the current Golang Ethereum client -Byzantium compatible- (done).
- Create a public infrastructure for developers (done).
- Update Classic Ether Wallet with Callisto network support (done).

Q2 2018

- Update ClassicMask with Callisto Network
- Research the POS and DPOS protocol implementation possibility.

Q3 2018

- DexNS support for the Callisto protocol
- Testnet 2.0 launch
- Marketing team creation
- Launch explorer with advanced features as:
    - Humanly readable transactions including the smart contracts transactions
    - Token explorer
    - Testnet support (Callisto, Ethereum, Ethereum Classic)

Q4 2018

- Launch mobile app wallet for Callisto, Ethereum Classic, and Ethereum. Compatible with custom Ethereum node.
- ETC-CLO swap channel implementation
- Planned Hardfork No. 1: Cold staking implementation

Q1 2019

- eWASM implementation research
- New address (c-address) type. Address abstraction implementation.
- Experimental SWARM implementation.

Q2 2019

- Researching sidechain implementation

November 2019

- Planned Hardfork No. 2: On-chain governance system