# Cardano Blockchain

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*Abstract* — this paper describes Cardano Blockchain according to the best knowledge of Vasil St. Dabov as of 20.07.2020.

*Keywords* — *blockchain, distributed database, Cardano Community*

## I. INTRODUCTION

Bitcoin set the beginning of "the first generation blockchains" in 2009.

Ethereum set the start of "the second generation blockchains" in 2015.

Cardano has been the leader of the "third generation blockchains" since 2017.

Cardano Main Net went public on 29.09.2017.

Some author's remarks about the term "Blockchain" will follow.

Many authors describe blockchain as "distributed database" and/or "distributed ledger". Such descriptions capture only certain dimensions of "blockchain" phenomenon.

According to the author "Blockchain is complex, evolving, human-machine system that includes decentralized immutable ledger which is supported by cryptographic technologies". This description presumes "public, permission-less blockchain". Blockchains belong to a class of systems that could be researched adequately only by using inter-disciplinary approaches. The author has developed an inter-disciplinary approach called "holonistics" which description is out of the scope of this paper.

As a result of applying this innovative approach the author came to certain conclusions part of which will follow.

Innovative technologies including Third Generation Blockchain Tech, Artificial Intelligence, Internet of Things, and Quantum Computing would give the possibility to build an infrastructure that could eventually be the base for implementing functions and services that will support harmonious development of every human and humanity as whole.

## II. 3 CHALLENGES TO BE MET BY CARDANO

### A. Scalability

Cardano should be able to run adequately having billions of users.

### B. Interoperability

Cardano should be able to interact easily with: the other blockchains, the legacy IT systems, the outside world.

### C. Sustainability

Cardano should be able to develop sustainably preserving its viability in a longest possible lifespan.

## III. 3 FORCES DRIVING INITIAL DEVELOPMENT OF CARDANO

Cardano has been driven since it had went public at the end of September 2017 by 3 organizations: Cardano Foundation, Input Output Hong Kong and Emurgo.

### A. Cardano Foundation

Cardano Foundation is a non-profit organization registered in Zug, Switzerland in 2016. The Foundation's core mission is "to standardize, protect and promote" Cardano Protocol technology. 23 people were listed working in Cardano Foundation as of 20.07.2020.

### B. Input Output Hong Kong - IOHK

IOHK is a company founded by two US citizens: Charles Hoskinson and Jeremy Wood, registered in 2015 in Hong Kong. IOHK was contracted to design, develop, test, implement, and support Cardano Blockchain in its First "Life Cycle": 2015 - 2020. CEO of

IOHK is Charles Hoskinson. 231 members were listed in "Team" section of IOHK website as of 20.07.2020.

### C. Emurgo

Emurgo is a company founded by Ken Kodama, registered in Japan in 2017. Emurgo is a founding member of Cardano Protocol. According to LinkedIn on 20.07.2020 EMURGO is a global blockchain technology company /more precisely – group of companies, registered in: Japan, Singapore, Indonesia and India/ providing solutions for developers, startups, enterprises & government, with headquarters in Singapore. CEO of Emurgo is Ken Kodama. 43 employees were listed in the web site of Emurgo as of 20.07.2020.

### D. The Fourth Force – Cardano Community

Following the natural evolution of Cardano a third force emerged – Cardano Community. Cardano Ambassadors are notable members of Cardano Community that contribute for the development of Cardano. They are nominated by the Community and approved and supported by Cardano Foundation.

The author who had joined Cardano Community in October, 2017, has been Cardano Ambassador since he was approved by Cardano Foundation in the beginning of May, 2019.

## IV. USING CARDANO

Cardano users could be included in 3 main groups: End-users, Organizations, and Developers.

### A. Endusers

The vast majority of Cardano /eventual/ users could be expected to be persons living all over the world.

### B. Organisations

Organizations of different type could be expected to start using Cardano at certain stage of its development.

### C. Developpers

Developers are crucial for the evolution of Cardano.

## V. CARDANO CURRENT STATE OF DEVELOPMENT

As of 20.07.2020 Cardano Main Net is federated. All the blocks are validated by "core nodes" controlled by IOHK, Emurgo and Cardano Foundation.

The native token of Cardano is ADA. Current price of ADA according to CoinMarketCap is close to $ 0.12.

Cardano consensus protocol used at the moment is Ouroboros BFT. It is Proof of Stake /PoS/ protocol that belongs to Ouroboros family of PoS protocols. This family of PoS protocols is a result of research and design made by IOHK. The first paper titled "Ouroboros: a provably secure Proof-of-stake blockchain protocol" was presented by IOHK at CRYPTO2017 conference in August 2017. The Ouroboros family includes: Classic, BFT, Praos, Hidra. Two protocols of Ouroboros family were implemented until now: Ouroboros Classic and Ouroboros BFT.

## VI. CARDANO 2020 ROADMAP

Cardano Decentralization via "hard fork" is planned to start on 29.07.2020. It will result by August/September 2020 in a system that will cover all the functionalities of "the First Generation Blockchains", including Bitcoin. Using a fraction of the energy consumed by Bitcoin.

After the start of a hard fork Cardano will enter a hybrid phase in which new member of the family - Ouroboros Praos will be implemented via "hard fork combinator" which will work initially along with Ouroboros BFT for some weeks. Gradually the use of Ouroboros BFT will go down and at the end of the hybrid phase /expected in September 2020/ Ouroboros will become the one and only protocol used in Cardano. All the blocks will be validated by stake pools. The number of the active pools is expected to be at least 250 initially. Cardano, in this way, will be more decentralized than Bitcoin sometime in September 2020.

Bringing "on chain native assets" is planned to happen by October 2020.

The "Smart contracts" "Era" codenamed "Goguen" should be entered by November 2020 via rollout of its first phase - "Plutus Foundations". The second phase, codenamed "Plutus Platform" may be rollout in Q1 of 2021. Since than Cardano is expected to cover all the functionalities of "the Second Generation Blockchains", including Ethereum.

"On chain and off chain governing functions" that address "sustainability" /challenge/ should be implemented by December 2020 by which Cardano is expected to enter the "Era" codenamed "Voltaire".

**Fig. 1.** Charles Hoskinson and Ken Kodama

### VII. Cardano: the second "life cycle": 2021+

Cardano development could be described in the terms of Lifespan Cycles.

2020 will conclude the First "Life Cycle" of Cardano.

Cardano Second "Life Cycle" is expected to start on 01.01.2021. It has to be approved by Cardano Community using "Voltaire" Governing functions. Author's expectations are that Input Output Global Inc., registered in Wyoming, USA /which had become the parent company of IOHK/, will receive the mandate to design, develop, test, implement and support the Second "Life Cycle" of Cardano Blockchain.

### VIII. Cardano second birthday celebration in Plovdiv

Cardano Second Birthday celebration took place in Plovdiv on 28.09.2019. The Event included a conference in the Aula of Agricultural University Plovdiv.

Honorable guests included Charles Hoskinson and Jeremy Wood – the cofounders of IOHK, Ken Kodama – the founder of Emurgo (Fig. 1), Manmeet Singh,

Domino Burki – council members of Cardano Foundation and Hinrich Pfeifer – General Secretary of the Foundation.

The Cardano blockchain development program was presented by Charles Hoskinson (Fig. 3).

Unusual and unique part of the Event was the creation of permanent land art installation "9 trees of Cardano" in the Campus of the University by planting 9 trees from 3 endangered species: Ginkgo biloba, Metasequoia glyptostroboides and Sequoia sempervirens. Every tree was positioned in a vertex of an enneagram that defines the shape of the installation (Fig. 4).

#### References

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**Fig. 2.** Charles Hoskinson and Vasil Dabov

**Fig. 3.** The Cardano blockchain development program was presented by Charles Hoskinson



**Fig. 4.** The event ended with the planting of "9 Cardano trees" on the university campus