CARDANO Explained

What You Should Know About
THE GREEN BLOCKCHAIN PLATFORM

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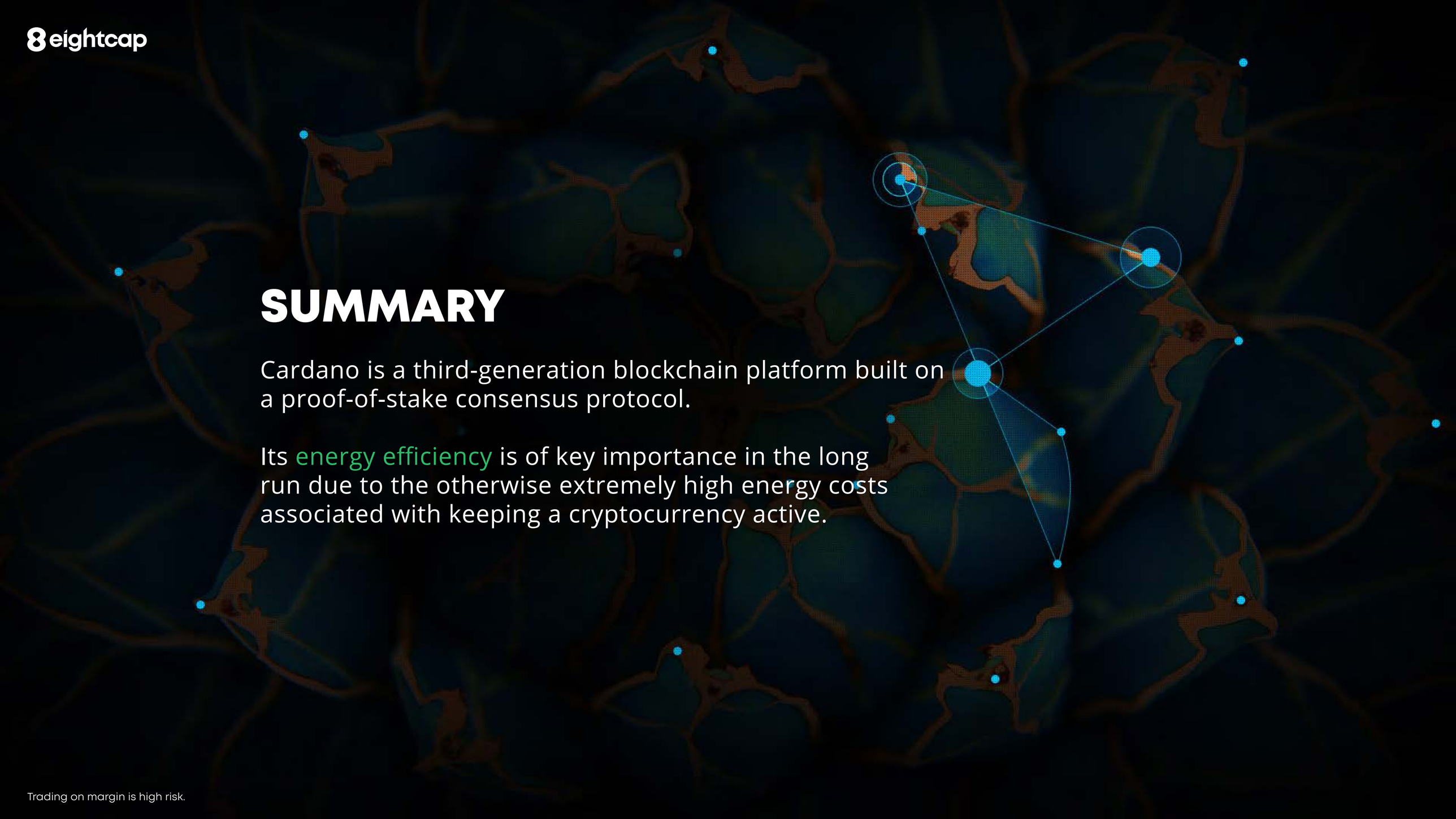


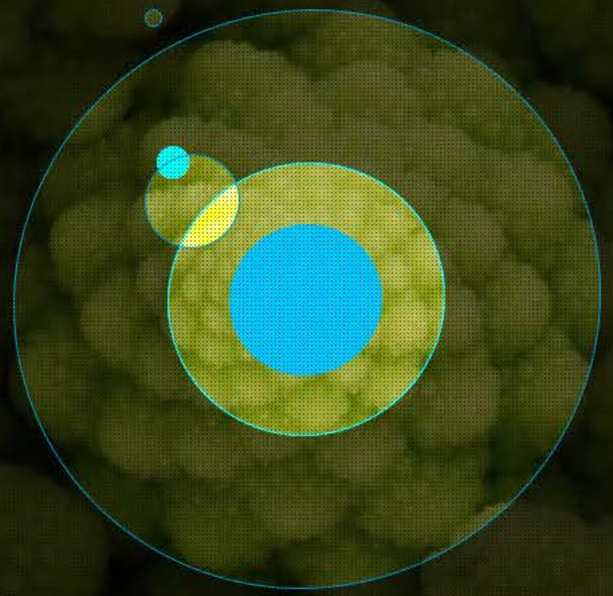
SUMMARY

Cardano is a third-generation blockchain platform built on a proof-of-stake consensus protocol.

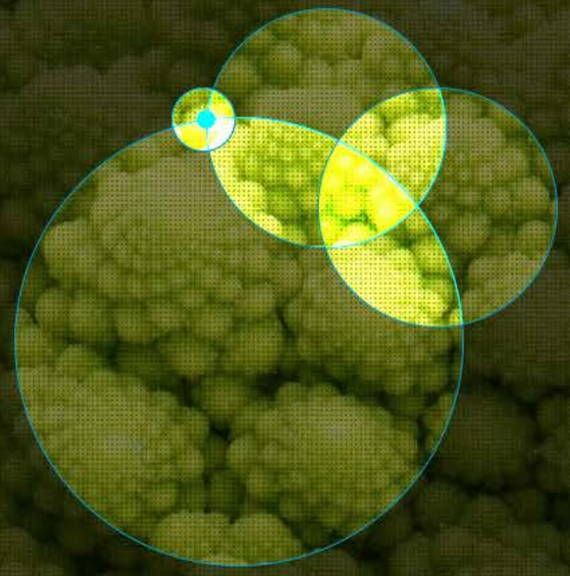
Its energy efficiency is of key importance in the long run due to the otherwise extremely high energy costs associated with keeping a cryptocurrency active.

AN ENVIRONMENTALLY SUSTAINABLE PROTOCOL

When you think of the words ‘blockchain’, ‘protocol’, ‘cryptocurrency’, what is the first thing that comes to mind? Perhaps mining a seemingly endless stream of tokens, increased security and privacy made possible by the lack of a centralized institution, a meme even or a whole decentralized network.
Even if we have all of these bases covered, a question still remains. How can we implement cryptocurrency transactions and other secure blockchain operations in an energy-efficient fashion on a global scale as much as possible and be able to keep it going pretty much forever? The answer to that is somewhat predictable, although hardly an easy task – by going green, environmentally-friendly. Essentially what Cardano is already trying to achieve.
Cardano is a blockchain network and platform

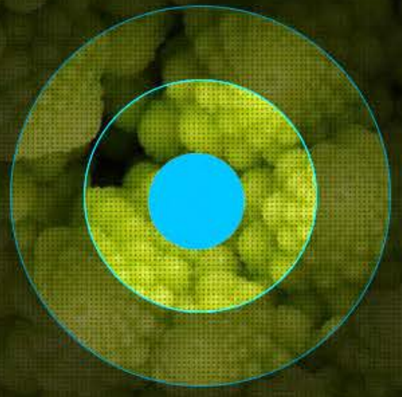


AN ENVIRONMENTALLY SUSTAINABLE PROTOCOL



whose focus is to create a sustainable future not only for cryptocurrencies but essentially for all major fields. This includes the education, retail, agriculture, government, finance, and health care world enterprises where energy use is high and security is of utmost importance.

Its cryptocurrency – ADA, is valued as one of the top virtual tokens on the market. Throughout the years, it has been going up and down. However, it has managed to keep a solid position in the top 5 in terms of market capitalization. At the time of writing, Cardano has a market cap of almost $71 billion.



CARDANO: WHO, WHEN, WHAT, WHY, HOW?

WHO?

The man behind the name Cardano that we know today is Charles Hoskinson. If his name rings a bell, it's because Hoskinson is one of the eight co-founders of the second largest cryptocurrency and the biggest blockchain platform, Ethereum (ETH). It was at the Bitcoin Education Project in 2013, though, where he met Vitalik Buterin and ventured to create ETH. They disagreed on whether to push for a non-profit decentralized organization and a for-profit entity with a formal governing structure, which was Hoskinson's idea. As disagreements usually go, one left the room and, in this case, it was Hoskinson. During a six-month sabbatical, he was approached by Jeremy Wood, a former Ethereum colleague, who had an idea he wanted to share. Together, they formed IOHK, a project that is now an engineering and research company. Not just any engineering company, though. It builds

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cryptocurrencies and blockchains for academic institutions, corporations, and government entities. With an initial investment of a few hundred thousand dollars, contracts to build crypto began piling up. Being paid in BTC, IOHK's returns kept growing and growing. Along with the boom of the crypto market, they liquidated. And bam, "IOHK can now stay open for decades".

WHEN?

In 2015, Cardano, the most potent project of IOHK, was born after the company's funds had grown sufficiently and an ICO took place. This allowed it to start with a market cap of $600 million. It strengthened its roots even more at the University of Edinburgh and the Tokyo Institute of Technology where a number of similar research projects were sponsored by Hoskinson and IOHK. They served as Cardano's

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wings that allowed it to leave the nest and launch officially in 2017. By the end of 2017, its market cap had reached $10 billion. The platform later extended to the Cardano Foundation and EMURGO, which are the other two main businesses of IOHK.

The Cardano Foundation's role is more of a legal one. It aims to ensure that the blockchain network is being developed and promoted as an accountable solution built upon security and transparency. This is maintained by regulators in multiple jurisdictions. Among its missions are to facilitate strategic partnerships and ensure stakeholder accountability while driving the adoption of the main platform, growing the community, and shaping legislation and commercial standards for decentralized infrastructure.

On July 12, 2021, the CF launched the Cardano Developer Portal. It allows users to get acquainted with the tools and ways of implementing Cardano in

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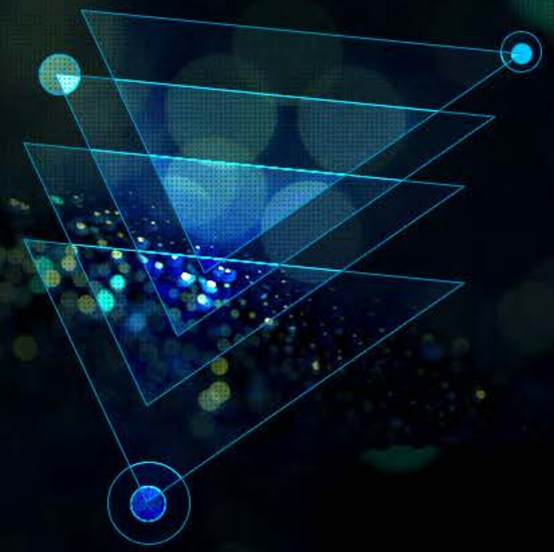
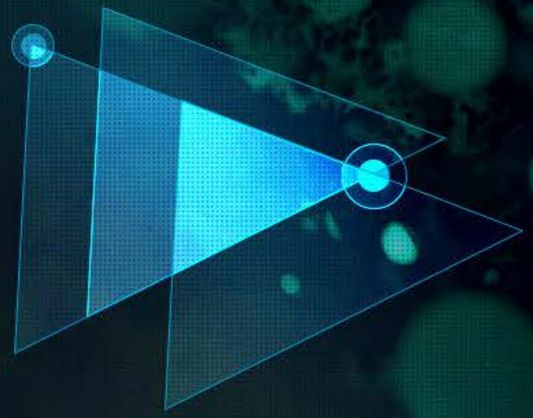
applications and websites. Anyone can now join the project's ever-growing community of developers. Educational materials are spread throughout the portal that explains tokens, how they are minted and even ways to create NFTs. Funding a project can be cumbersome and Cardano knows it – that's why they've also provided guidance on how to do it when users decide to build on their network.

On the other hand, we have EMURGO – the commercial arm of the Cardano blockchain. It works with people from various fields and with various needs, all the way from developers and startups to enterprises and governments. Projects posted on their web page show how clients have chosen their services. These include blockchain, enterprise, app and web development, education, digital marketing, design, and UI/UX, and IT consulting.

On September 27, 2021, EMURGO launched the $100 million Cardano ecosystem investment vehicle – a



CARDANO: WHO, WHEN, WHAT, WHY, HOW?



project that looks to put money into promising startups and companies. Two entities, EMURGO Africa and EMURGO Ventures, support regional startups and developing markets respectively. Their goal is to assist with the facilitation of solution and service building on Cardano and to get people to adopt the idea of blockchain technology.

WHAT?

The meaning of Cardano is far from a mysterious element or a car brand (although who knows what may happen someday). Cardano is actually the name of an Italian polymath – Gerolamo/Girolamo Cardano. He is best known for his contributions to the fields of mathematics and physics, although his proficiencies ranged vastly. From a physician apt in biology and chemistry to a philosopher and writer

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knowledgeable in astrology and astronomy, he also took care of his family through various means, including gambling by casting horoscopes.

Combination locks can be said to have inspired today's passwords and encryption keys. Well, it was Cardano who managed to construct the first such mechanical device. Security over personal belongings must have been tight with him around.
He is also said to be responsible for the spreading of the idea of the gimbal suspension, describing it in detail after it had been in haze for a few thousand years. That's the same as the one used in compasses and in pretty much anything that requires the traditional three-axis balance. Ships and submarines navigate through the same stable table as proposed by Cardano. Rocket engines utilize gimbals to control thrust and this system is used for the Space Shuttle (first rocket to perform multiple flights in orbit),

CARDANO: WHO, WHEN, WHAT, WHY, HOW?

Saturn V (rocket used to perform the moon landing), and Falcon 9 (SpaceX' reusable alternative) rockets. Also, those smooth action shots that are achieved in movies – they're achieved by mounting cameras onto gimbals, used as stabilization systems

Other notable achievements of Cardano are the hypocycloids that helped build high-speed printing presses and negative numbers that assisted mathematicians in proving the existence of imaginary numbers. Put simply, Cardano has done a lot and it is no wonder his name lives on to this day.

However, perhaps his proposal most intimately related to today's Cardano, aside from the combination locks, is the Cardan grille – a cryptographic writing tool. It utilizes a grid where hidden messages can be written by cloaking them inside an ordinary letter so it wouldn't appear like a cipher. The Cardan grille is a method that requires time to take full shape and literary skill

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to avoid mistakes, but when done correctly, it can be hard to spot, even when the grille itself is at hands' reach. In a way, very similar to how the Cardano platform operates – slowly trying to make a change for the better while relying on its community's devotion and abilities.

WHY?

In a nutshell, Cardano's mission is to provide secure blockchain solutions without raising the electricity bill to the moon. (More on that in the next section.)

HOW?

Using a proof-of-stake model – a greener alternative to the traditional proof-of-work protocols.

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WHO?

Imagine a world where you don't have to go through a multitude of institutions in order to receive ownership and control over your own credentials and know which products you buy are legitimate. Cardano's enterprise goals are able to provide that to anyone who is willing to invest in blockchain technology.

The academic field is one of the first places where we see that implemented.

Certifications and achievements become a part of a larger, tamper-proof ecosystem. As a result, they can be instantly verified by institutions whenever students and job seekers need to prove what they have done thus far and who they are.

Looking at the retail industry in its current state, the number of counterfeit goods has been growing and negatively impacting the global economy. In 2018 alone, counterfeit goods inflicted a $300

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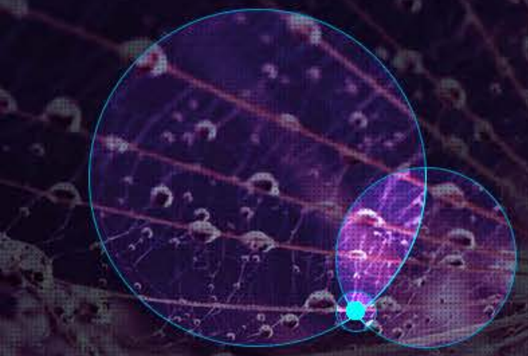
billion loss to the world's markets. Brand reputation is crucial to having customer confidence. Not to mention that fake products can be found when attempting to buy medicine as well. If only there was a blockchain technology that could scan products sold online and verify their authenticity...

Most of us eat on a daily basis and more or less care about what we put into our stomachs. However, it can sometimes be a challenge for stakeholders along the supply chain to ensure that all steps from production to distribution are done in the manner intended. Blockchain technology facilitates the process of certification and traceability for farmers, hauliers, and retailers alike. This way, the supply chain can be observed with transparency.

Governments have systems for verification and the issuance of credentials, keeping control far from individuals. This means that the verification method of a document's authenticity through third-party agencies becomes much more costly and involves labor, extending the time



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needed to perform the operation. With blockchain technology, users can gain control of credentials and be able to share them at any point in time wherever and with whomever they decide.

Financial institutions also benefit from this kind of technology. When onboarding new clients, identity verification is key. Through a streamlined utilization of reusable credentials that have been verified, this makes the KYC & AML fields benefit both ways. Less steps to take for users, less resources, time, and fees for the institution. In the health care sector, medication does not always come without risk.

Legitimate manufacturers are not the only ones who lose from counterfeit and substandard products. Public health is at risk as well. Control over who can acquire medicine from online pharmacies is weak. The World Health Organization (WHO) estimated 50% of online medicine is either fake or substandard. Just like the general retails and agriculture sectors, healthcare products can be regulated through a blockchain solution technology by verifying their origin and supply chain. This way, manufacturers retain their legitimate status and more importantly, patients' safety and well-being are as close to guaranteed as can be.

ADA – THE CRYPTOCURRENCY

WHO?

ADA is the name of the mathematician who is regarded as the first computer programmer – Ada King, Countess of Lovelace, or just Ada Lovelace. She took Charles Babbage's proposal of a computer for general purposes (Analytical Engine) and recognized it as more than just a machine for pure calculation and number-crunching. What prepared the soil for the future was her publishing of the first algorithm to be used by a computer. It was in the form of notes to an article on the Analytical Engine by military engineer and seventh prime minister of Italy Luigi Menabrea. Questions born by her "poetical science" mind were pointing towards how Analytical Engine can be viewed as an example of technology as a collaborative tool that society can relate to.

Knowing what this name stands for, Cardano's choice to use it for its cryptocurrency seems like

ADA - THE CRYPTOCURRENCY

a natural step – a change for the better by using computers to collaborate. A digital currency for anyone from anywhere to use anytime. Every transaction being recorded on the Cardano blockchain securely, but also transparently and permanently. Stakeholders are all ADA holders. For now, they can delegate their portion to a stake pool and earn rewards, but in time, they are set to also be able to use ADA for applications and services on the platform. Two types of wallets – Daedalus and Yoroi, have their unique selling points depending on the holder's preferences.

So far, so good. However, this sounds a bit like Ethereum, doesn't it? Given the person behind both, it can be understood why. Here is where ADA and ETH split paths.

THE ELECTRIC BILL OF POW

Consensus protocols are the foundation of blockchains. They are algorithms that are responsible for validating and securing the next block in a blockchain. Most cryptocurrencies, including bitcoin, ether, dogecoin, and other famous tokens, utilize proof-of-work (PoW) algorithms to produce blocks. This is often linked to high energy usage as well as a need for potent machines that can be as productive as possible.

Until late 2018, we thought it was easy for anyone to set up a rig and get more or less a reasonable number of transactions verified by mining Bitcoin every day. However, a Diar report exhibited a few points that make the future of mining a bit bleak. To produce the correct hashes, more power and better hardware had to be used. Bitcoin's mining revenues had reached $4.7 billion, yet profitability was decreasing, as scale was increasing. The bigger the token, the bigger the computational difficulty.

Individual miners could still

THE ELECTRIC BILL OF POW

yield some profits but with the increase of electricity usage and the cost for hardware, this is becoming less the case. As a result, mining is now more of an activity that parties with larger funds could afford to invest so that losses could be avoided. From the same report it was established that at the time, China was about the only country where mining could yield profit while performing at retail electricity prices, those being $0,008 kW/h.

Mining requires serious hardware capabilities and nowadays, due to the global chip shortage,it's even hard to find GPUs, let alone buy them at a reasonable price. The PoW algorithm in Bitcoin leaves a serious footprint on our environment's energy consumption. On a global level, the yearly numbers are equal to the electricity needed to power Poland, that of almost 180 TWh. Electronic waste is comparable to the small IT equipment waste of countries like the

THE ELECTRIC BILL OF POW

Netherlands, around 24.61 kt. If we take the energy needed to mine bitcoins for a year, we could basically power half the UK, almost 2/3 of AU, or around 5% of the US. An estimated $9 billion go into mining to produce an income of $21 billion worth of BTC.

That's not even factoring the carbon intensity of BTC, which is equal to that of Bangladesh where climate change has introduced various problems that has also led to extremely high carbon emissions - almost

85 Mt CO2, which is around 1/4 of the emissions in countries like the UK. Yet even Bangladesh has been working on reducing carbon emissions and succeeding. In the long run, if we factor bitcoin as well as every other PoW-based coin, the amount of CO2 produced could become quite terrifying.

THE TECHNOLOGY BEHIND POS' LOW-ENERGY COST

On the other end of the spectrum, we have the proof-of-stake consensus algorithm which is relatively new in the blockchain generating part of town. Instead of miners allotting computing power to earn the rights to mine blocks, users are allotted mining rights proportional to their stakes held.

There is also the proof-of-burn (PoB) algorithm, which is third in line. It is considered a PoW without energy waste. The inventor of PoB makes an analogy that makes the process easy to understand – miners "burn" coins to get virtual rigs that they then use to mine blocks. An example of a cryptocurrency that uses the PoB implementation is Slimcoin. PoB has yet to grow, but it may have a considerable role in the future.

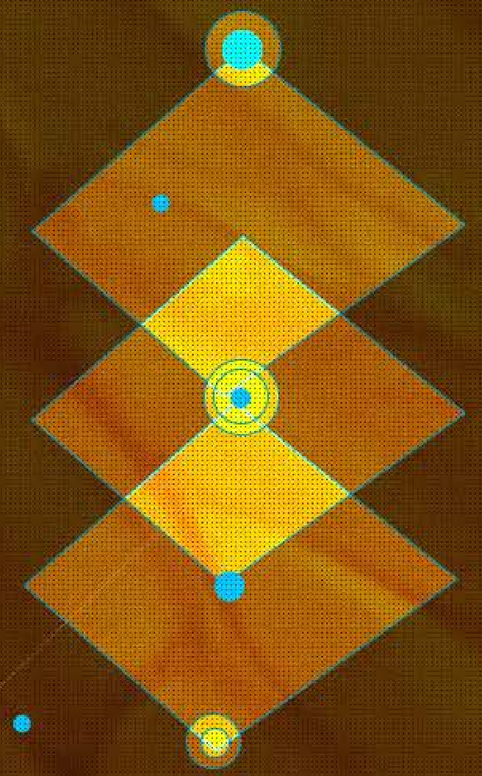
Going back to PoS, Cardano utilizes what is called Ouroboros – the name itself, a classic reference to the serpent or dragon eating its own tail, a symbol for the eternal cyclic renewal. In a

THE TECHNOLOGY BEHIND POW'S LOW-ENERGY COST

similar fashion, when you hold a stake of ADA, you participate in an agreement to serve as a block validator within an existing stake pool together with other stakeholders. The bigger your stake on the network, the more control you have to create new blocks.

If we were to take the same level of decentralization – 100 pools, for instance, which is above Bitcoin's current network capabilities, Cardano's energy consumption would be approximately 0.01567GWh per year. In comparison, Bitcoin's would be around 67,000 GWh annually. That's a difference of four million.

What puts Ouroboros a cut above the rest of the PoS protocols currently available is its randomness – the primary part of Ouroboros' first, Classic implementation published in 2017. Meaning, it is unbiasedly random when it follows the leader selection algorithm and generates information. This also applies to the subsequent

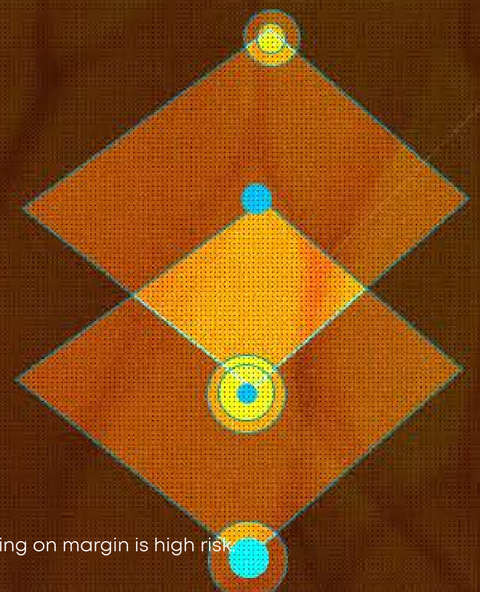


THE TECHNOLOGY BEHIND POW'S LOW-ENERGY COST

security assurances provided. Random is hard to predict and at such a "rhythm", patterns cannot be formed. Consequently, the protocol's security is increased due to its constant unpredictability. Despite this lack of exploitation, Ouroboros remains transparent and stands out as a coercion-proof protocol that goes through rigorous amounts of security analysis.

The dividing parts of the Ouroboros protocol are called slots and epochs. A slot is a single unit while an epoch is an aggregation of slots. Each slot lasts 20 seconds and each epoch is 5 days' worth of slots. As long as 51% of the stake is controlled by participants following the protocol, attackers from alternative versions of the blockchain cannot breach the security frame. Slot leaders are responsible for the adding of a block to the chain after they are elected for a given slot. They then pass the torch to the next leader.

Furthermore, when a

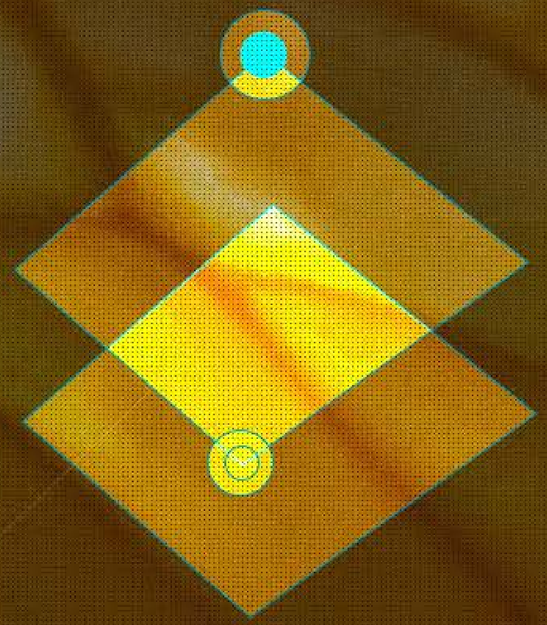


THE TECHNOLOGY BEHIND POW'S LOW-ENERGY COST

slot is settled, the last several blocks still pending verification are skipped and instead, the latest verified block from the queue is taken as a settlement delay. As such, this not only decreases the chance of a failure in the protocol, but stakeholders can also go offline for a given period, no longer than the settlement delay itself, and they would still be synced to the blockchain.

Ouroboros BFT, Praos, Genesis, and Hydra are the architectures that followed.

Each of them introduced improvements, security patches to prevent adaptive attackers from making their way in, and scalability solutions to the challenges of minimal storage per node, low latency, and high-transaction output. The upcoming Crypsinous and Chronos implementations are expected to take the protocol to a new level.



MORE THAN JUST A PUFF OF GREEN

Blockchain technology is a path to a generation of internet security and authentication that Cardano is more than willing to walk. Just as at the time of founding, it has continued to remain transparent with its community and work on multiple instances of decentralization to ensure that it provides the level of security it aims to achieve. ADA's value remains stable and healthy for the moment, which may change with time, but for traders, either could be a chance to make profits. Whatever the case, if we were to set expectations for what's coming next based on everything up until now, then ADA, Ouroboros, and Cardano's future as a whole are clear – further exploration, iteration, and optimization through research in order to drive positive change.


Now you are all caught up.
Happy trading!
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Trading on margin is high risk.

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1 https://coinmarketcap.com/all/views/all/
2 https://www.abc.net.au/news/2021-05-10/what-is-dogecoin-elon-musk-saturday-night-live/100128024
3 https://nextspaceflight.com/launches/details/1915
4 https://kabosu112.exblog.jp/9944144/
5 https://www.reddit.com/r/ads/comments/dsxz3/lmbo_look_this_fukken_doge/
6 https://en.wikipedia.org/wiki/Doge_(meme)
7 https://knowyourmeme.com/memes/comic-sans

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8 https://www.vice.com/en/article/jp5x3d/dogecoins-founders-believe-in-the-power-of-meme-currencies
9 https://papers.ssrn.com/sol3/papers.cfm?abstract_id=3091219
10 http://www.reddit.com/r/dogemarket
11 http://www.cnn.com/2014/02/26/tech/innovation/dogecoin-cryptocurrency-tech-irpt/
12 https://en.wikipedia.org/wiki/Poker
13 https://gizmodo.com/reddit-users-lose-real-money-after-meme-currency-bot-di-1795125165
14 https://www.digitaltrends.com/social-media/dogecoin-jamaican-bobsled-team-olympics/
15 https://icanhas.cheezburger.com/
16 https://www.forbes.com/sites/matthickey/2014/03/17/such-generosity-most-expensive-tweet-ever-sends-11000-to-kenyan-water-charity-via-doge-coin/?sh=253d635324cb
17 https://motorsports.nbcsports.com/2014/03/25/nascar-fans-on-reddit-use-dogecoin-to-sponsor-josh-wise/

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18 https://uniswap.org/
19 https://bitcoin.org/en/faq#:~:text=Bitcoin%20is%20unique%20in%20that,1%2C000%2C000%20bits%20in%201%20bitcoin
20 https://papers.ssrn.com/sol3/papers.cfm?abstract_id=3091219
21 https://coinmarketcap.com/currencies/dogecoin/
22 https://arstechnica.com/tech-policy/2014/02/harvard-supercomputing-cluster-hijacked-to-produce-alt-cryptocurrency/
23 https://www.theguardian.com/technology/2014/mar/04/dogecoin-bitcoin-imperial-college-student-mine

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24 https://coinmarketcap.com/currencies/dogecoin/historical-data/?start=20130428&end=20201214
25 What are meme coins - The people-driven market phenomenon explained
26 https://decrypt.co/70386/elon-musks-spacex-launching-dogecoin-moon-mission

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27 https://finance.yahoo.com/quote/DOGE-USD/
28 https://www.cnbc.com/2021/04/08/a-large-chunk-of-the-retail-investing-crowd-got-their-start-during-the-pandemic-schwab-survey-shows.html
29 https://decrypt.co/70359/dogecoin-sinks-to-0-43-day-after-elon-musk-snl-appearance
30 https://cryptoslate.com/sorry-pleb-elon-musk-is-really-your-dogefather/
31 https://twitter.com/IanElli16374574/status/1391254625928548352
32 https://t.co/KMobi8OHo3
33 https://www.birminghammail.co.uk/news/uk-news/how-much-energy-bitcoin-use-20591978

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34 https://www.forbes.com/sites/jonathanponciano/2021/03/09/bill-gates-bitcoin-crypto-climate-change/?sh=5137b9be6822
35 https://www.birminghammail.co.uk/news/uk-news/what-most-energy-efficient-cryptocurrency-20588731
36 https://markets.businessinsider.com/news/currencies/mark-cuban-dogecoin-holdings-3250-dallas-mavericks-valid-payment-mechanism-2021-5?op=1
37 https://foreignpolicy.com/2021/02/11/dogecoin-how-does-it-work-elon-musk-cryptocurrency/
38 https://www.news18.com/news/tech/dogecoin-has-a-warning-for-everyone-do-not-fall-for-scams-that-promise-to-double-your-coins-3722831.html
39 https://www.vice.com/en/article/9kng57/dogecoin-my-joke-cryptocurrency-hit-2-billion-jackson-palmer-opinion
40 https://thestonkmarket.com/elon-musk-facing-fbi-investigation-for-dogecoin-ponzi-scheme/
41 https://en.wikipedia.org/wiki/Ponzi_scheme
42 https://www.ft.com/content/2c3dd96c-b1b1-42fd-ab46-8b4791bf1270
43 https://www.gfinityesports.com/cryptocurrency/dogecoin-how-many-coins-in-circulation-is-there-a-cap/