HODL

Constellation

21 December 2021

Abstract

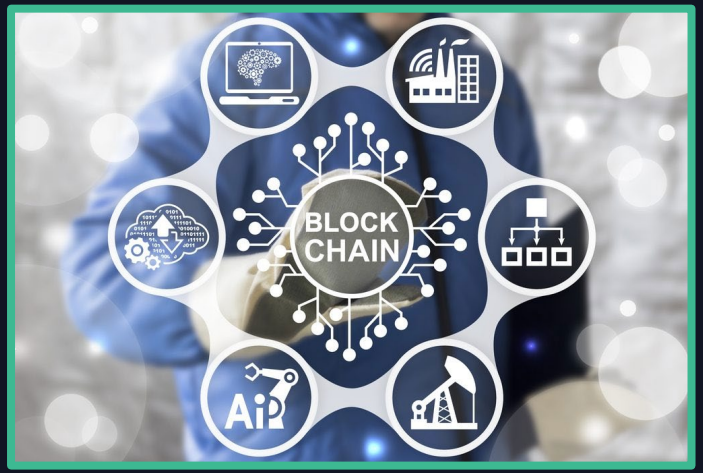
Ever since the success of Bitcoin, many companies embraced blockchain technology. Some companies have started building blockchain solutions, while others started implementing blockchain solutions in their business processes. However, current solutions have limited capabilities and are unable to bridge all business processes onto the blockchain.

Through digitalization, many companies now rely on big data for their day-to-day business. Inherent to blockchain design, every action would implicate a transaction. These transactions often come at a high- and fluctuating fee, limiting the efficiency when transporting essential business data. Additionally, these networks often have a limiting throughput and are not built to manage complex business logic.

Constellation Network, founded in 2017, aims to provide an open-source framework that allows everyone to build and conduct business on a blockchain. Constellation provides a highly scalable, fast, and feeless infrastructure. To secure the sharing and storing of data, the network provides data assurance tools while also benefiting from blockchain capabilities such as immutability, security, auditability, and traceability.

'Centralized systems are too expensive and not fast enough to process, validate and manage the volumes of data required for making quick decisions in the field without significant security risks.'

- Department of Defense,
United States of America



Source: karmelsoft.com

Preface

Over the last few decades, all industries have seen a shift towards digitalization. Business processes and documents moved from paper to online. This allowed for more extensive and detailed business processes, which in turn led to an exponential increase in stored data.

The rise of blockchain technologies attracts businesses, however, no traditional blockchain is currently able to manage complex business logic. Blockchains are not yet equipped to handle the efficient and secure transportation of large amounts of data.

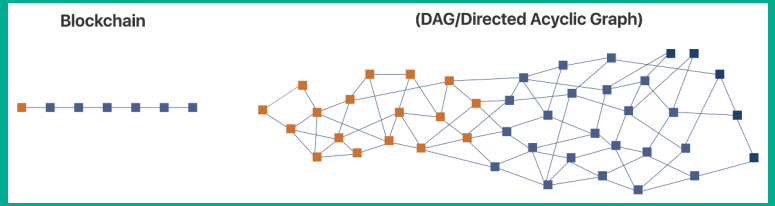
On traditional blockchains, every action implicates a transaction. Due to this structure, these transactions come at a high- and fluctuating fee, making the transportation of data inefficient and costly.

Constellation Network| Problem statement

Preface

Current blockchain projects also face issues with regard to the scalability and speed of the network. The limiting transaction throughput interferes with the big data streams of today's society. In combination with the complexity of current protocols, the adoption of blockchain technology in modern business is limited.

Constellation Network aims to provide an open-source framework that allows everyone to build and conduct business on a secure network. By creating a highly scalable, fast, and feeless infrastructure, Constellation bridges real-world businesses with crypto economies.



Source: cbcamerica.org

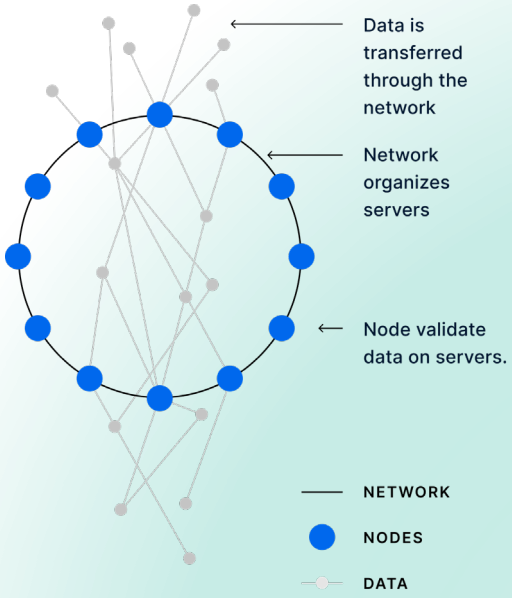
Constellation Network| Solution

Overview

Where WordPress once created a framework for developing websites and businesses on HTTP; Constellation was the first to create a Layer 0 Standard for blockchain businesses built with HGTP logic.

HGTP is a distributed ledger technology known as a directed acyclic graph (DAG) protocol. This protocol makes Constellation highly scalable while also maintaining decentralization. The security of the network is maintained by Proof-of-Reputable-Observation: a consensus mechanism built on the reputation of the nodes.

To support businesses with their move to blockchain, Constellation created Hypercube – a user-friendly interface that allows developers to create their own blockchain businesses within a state channel. All these state channels together create the decentralized Layer 0 Standard. By using the Hypercube, organizations can deploy their own blockchain, mint their own tokens, and create a complete framework for the move to a blockchain-based business.



Source: constellationnetwork.io

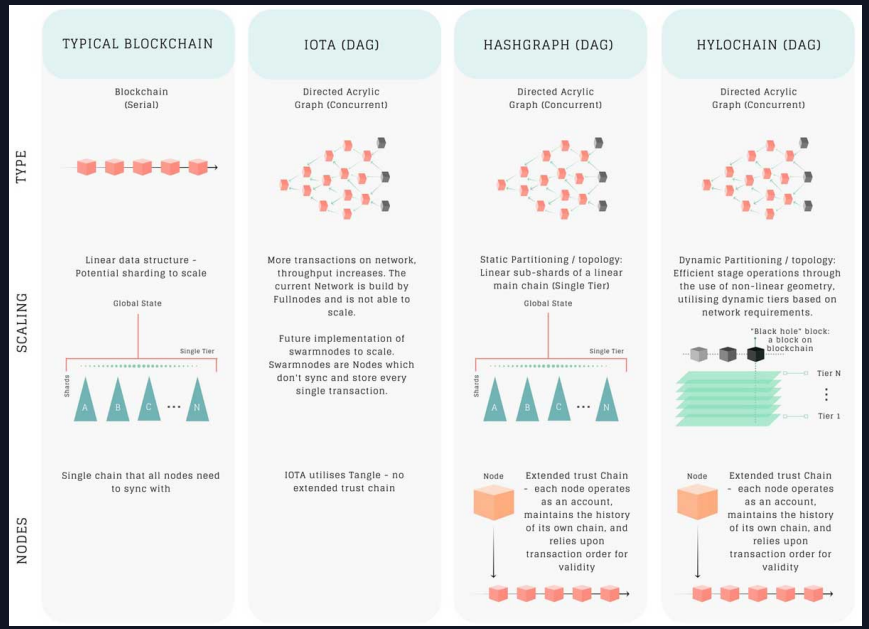
Constellation Network| Technology

Hypergraph Network

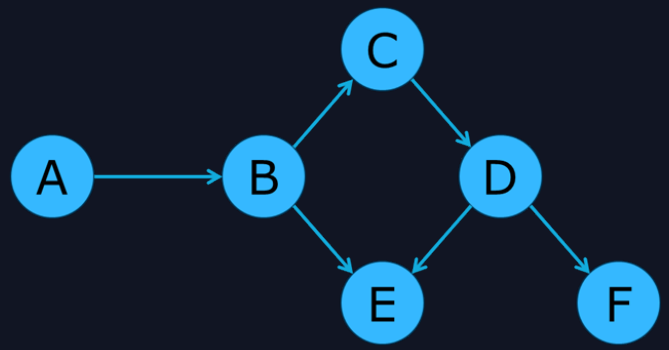
Constellation uses the Hypergraph Network for approving transactions. The Hypergraph Network uses a Directed Acyclic Graph (DAG) for transaction validation. DAGs are useful because they allow for the visualization of different types of data flows. They are often referred to as data pipelines.

Constellations' network is divided into nodes. A node sends a transaction to a handful of nodes which then spreads the transaction through the network (not necessarily to all nodes). Constellation opens the traditional complex mechanism of consensus by allowing a broad range of devices to validate transactions.

The data within the nodes flows in bundles and is differentiated by rank. This allows for a distributed model of operation while also achieving high transactional throughput.



Source: constellationnetwork.io



Consensus mechanism

As consensus mechanism, Constellation uses Proof-of-Reputable-Observation. This mechanism is also known as Proof-of-Meme, a reputation-based system that aims to secure honest nodes within the system. There are certain factors that determine the reputation of a node: availability, loyalty to the network integrity, and history of the network. These scores are not given out randomly but are decided using machine learning algorithms that track node behavior.

The consensus mechanism is unique in the sense that it is not triggered with each transaction. Rather, whenever it finds a conflict in some part of the data, it triggers a conflict resolution mechanism. This considers the reputation of the nodes that observed and signed the data wherein the conflict occurred. Thus, a proof of reputable observation has been performed.

Achieving scalability

A peer-to-peer architecture has the advantage of network stability and efficient capacity management even in the case of high network load. With no central authority to verify the validity of transactions, it is instead verified by neighboring nodes which then route the transactions through the most efficient path available.

1. Star (light nodes)
These are lightweight devices interacting with the network (think mobile devices). Users initiate a so-called Stars and transactions are then sent through this newly formed node. Each Star only contains a local chain of its personal history.

2. Star Clusters
When Stars partake in consensus, they are clustered based on their neighboring Stars. Hash blocks are formed from these clusters when consensus is reached for all transactions and their order of occurrence within the transaction pool.

3. Galaxies (full nodes)
These are the validators of the system. They decide on the delegates and have the power to delete invalid transactions. Star clusters can become a Galaxy once a certain reputation threshold has been reached.

4. Black Holes
These are locality-sensitive hash blocks. It is the equivalence of blocks in a blockchain. Galaxies can become Black Holes once their reputation has reached a certain threshold and are then merged into the global state of the network.

Hypercube

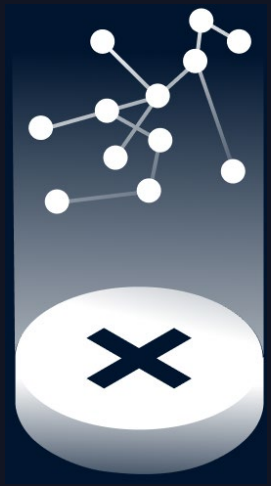
To help organizations migrate their business to a decentralized business, Constellation has created Hypercube. Hypercube has a user-friendly interface with open-source developer tools. The interface allows anyone to deploy their own blockchain, mint their own cryptocurrency, and move their processes and data to a secure blockchain environment. The Hypercube consists of multiple tools to support this transition.

State Channel builder
Every organization can build on top of Constellations' Layer 0 standard by using the state channel builder. Users can configure their blockchain, define their data types and token strategy, and select a hosting provider. The builder can be used in a staging and production environment.

Minting tool
The minting tool allows for a business to mint its own cryptocurrency. From utility-token to stable coin. The cryptocurrencies can be stored in the Hypercube Wallet.

Block Explorer
The Hypercube Block Explorer can be used to view all transactions on your network.

Node deployer
The Hypercube also provides the possibility to become a node operator. Node operators will be rewarded for validating transactions on the Hypergraph.



Use Cases

The main application of Constellation Network is bridging the gap between traditional business and crypto economies. With the user-friendly Hypercube, organizations can create their own State Channels on top of Constellations' Layer 0 Standard.

Constellations' network allows for secure, fast, scalable, and feeless transactions, making it extremely useful for the complex and data-driven businesses of today.

Due to the Layer 0 foundation and the ability to handle a large sum of transactions, the network is popular in many different markets. Especially in organizations that process large streams of data. Adoption is growing rapidly amongst the sectors of the Internet of Things (IoT), machine learning, mobility (automotive), and the futuristic vision of autonomous everything.

Notible use-cases consist of GeoJam, Alkimi Exchange, Lattice Exchange, the U.S. Air Force and MOBI. The latter two will be elucidated in the following slide.

'While blockchain technology has some broadstroke use cases — many of which have made headlines over the past year — we believe there are bigger and more complex opportunities beneath the surface.'

- Ben Jorgensen, CEO of Constellation

Constellation Network| Use Cases

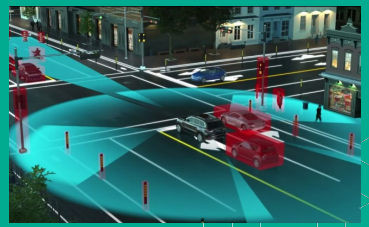
U.S. Air Force

Earlier this year, the United States Air Force announced that Constellation Network was offered a contract to provide data security services. Constellation and Kinnami Software Corporation have been developing end-to-end data security solutions using blockchain encryption and distributed data management for the United States Transportation Command. Together they want to achieve the secure exchange of data with commercial partners on missions involving the operations of aircraft and ships. The collaboration with the U.S. Air Force dates back to 2019.

Source: RTTnews.com

MOBI

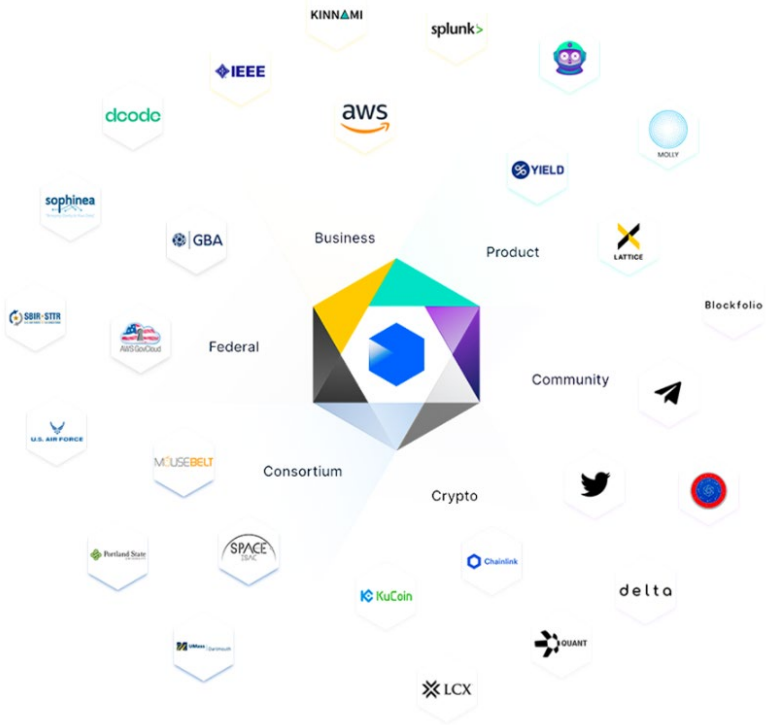
Mobility Open Blockchain Initiative (MOBI) is a global nonprofit smart mobility consortium. MOBI was created to help the mobility industry apply secure, peer-to-peer Distributed Ledger Technology to improve people's lives by making mobility more efficient and affordable, reducing congestion and pollution, and improving safety. Modern vehicles and self-driving cars all create an exponential amount of data through onboard sensors and radars. As one of its members, Constellation supports MOBI by providing scalability and processing solutions for the large data streams that are created.



Source: constellationnetwork.io

1 https://cointelegraph.com/news/us-air-force-prioritizes-blockchain-security-with-new-constellation-network-contract
2 https://medium.com/@Cryptopleb4_32442/constellation-network-x-mobi-eea874908be9

Constellation Network| Ecosystem



Partners

Due to its unique design for processing big data, Constellation has acquired a broad network of 28 partners. These consist of federal, business, product, community, crypto and consortium partners. Constellations' partners help to provide and support their technology, while others adopt their solution to improve the world.

A long-term partner of Constellation is Quant network. Through their Overledger technology, Quant solves the interoperability of blockchain protocols at scale. The interconnectivity of both technologies allows for cross-chain big-data transportation, meeting the needs of a digital future.

Other notable partners are Space ISAC, Amazon Web Services, and the Government Blockchain Association (GBA).

Source: constellationnetwork.io

Community

Despite the relatively small market capitalization, Constellation Network has a strong community. The project is technology-driven, therefore creating a community believing in its technical framework.

The technical knowledge needed to understand Constellation suppresses the growth of its community. Constellation gains the most exposure through its Twitter following, showing a strong engagement with its community.

Social channels

Website: constellationnetwork.io

Whitepaper: constellationnetwork.io/whitepapers/

Github: github.com/Constellation-Labs/constellation

Twitter: twitter.com/conste11ation

Telegram: t.me/constellationcommunity

Discord: discord.com/invite/kDTsyfQ

LinkedIn: linkedin.com/company/constellation-labs/

Reddit: reddit.com/r/constellation/

Medium: medium.com/constellationlab

Youtube: youtube.com/channel/UChMBV4al3p_iO4bnfzcIzVQ

Constellation Network | Team overview

Ben Jorgensen
CEO & Co-Founder

Experience

- Co-Owner Ittoryu GOZU
- Co-Owner A-Five Meats
- Co-Founder Klick Push
- General manager Strategy GiftConnect

Wyatt Meldman-Floch
CTO & Co-Founder

Experience

- Data Engineer Rally Health
- Lead Backend Engineer Arrived.us
- Platform Engineer at Zignal Labs

Benjamin Diggles
CSO & Co-Founder

Experience

- Board of Advisors Portland State University
- UX & UI Development contractor at Universal
- AppCloud Director at Oracle

Matthias Goldmann
COO & Co-Founder

Experience

- Advisor at Howl Live Inc.
- Founding Partner & CEO at Software Suite Worldwide
- Consultant/auditor Banking & Real Estate at PwC

*This page does not include the entire team.

Constellation Network| Team

Constellation was founded in 2017 by Ben Jorgensen, Wyatt Meldman-Floch, Benjamin Diggles, and Mathias Goldmann. Besides Constellation, all founders are also Co-Founders of Lattice Exchange, a decentralized exchange build on top of Constellation. Throughout the years, Constellations' team has grown to eighteen employees and eleven advisors who want to make continuous improvements to their product.

The CEO, Ben Jorgensen, is an entrepreneur at heart, he has started multiple businesses in multiple sectors. After his studies at the University of Arizona and the University of Southern California, Ben had several roles as Business Developer. His entrepreneurial career started of as Co-Founder of Klick Push. Later he became managing partner at MZ Dining Group, Co-Owner of A-Five Meats and Co-Owner of Ittoryu GOZU. His focus is to develop sustainable and scalable businesses while optimizing human creative innovation.

Ben Jorgensen
CEO & Co-Founder

Wyatt Meldman-Floch
CTO & Co-Founder

Wyatt Meldman-Floch, the Chief Technology Officer at Constellation, has gained a good deal of experience throughout his career. Before co-founding Constellation, he worked as data-, platform-, and lead front-end engineer at multiple organizations. Meldman-Floch is the creator of Hypergraph, the protocol that forms the base of the Constellation network.

Constellation Network| Team

Benjamin Diggles
CSO & Co-Founder

Benjamin Diggles is active as a Chief Strategy Officer within Constellation Network. His focus is on go-to-market of emerging Enterprise software solutions. He has been active within web, software development, and digital design for over 20 years. He started his career as a consultant and has worked for Universal Pictures & Disney Pictures, Webtrends, and Oracle. He co-founded several businesses and is currently on the board of advisors of Portland State University.

Matthias Goldmann is Constellation's Chief Operations Officer. Goldmann studied Anthropology at the University of Wisconsin-La Crosse and the Johann Woldgang Goethe University. He started his career at the European Central Bank and later became a Consultant and auditor for PwC. In 2017 he co-founded a blockchain incubator where he fulfilled the role of Chief Investment Officer. Besides his activities for Constellation and Lattice Exchange, he is a licensed systemic coach & psychotherapist who coaches leaders in academia and German Fortune 500.

Matthias Goldmann
COO & Co-Founder

Conclusion
The founders of Constellation Network have a broad range of experience. The entrepreneurial drive and experience helps with a clear strategy and the development of its business. Constellation has the resources to create the technology in-house, while benefitting from the large network of its advisors and entrepreneurial history.

Constellation Network | Coinmetrics

HODL

Ticker: DAG

General

Token type	Utility
Rank	200
Market cap	$ 383,447,389
Full diluted Market cap	$ 546,533,150
Cap	Low
Circulating supply	2,485,565,378 DAG
Total supply	3,550,000,000 DAG
Max supply	4,000,000,000 DAG
Reported volume 24H	$ 881,994

Pricing

Price in USD	$ 0.15
All time high in USD	$ 0.46
All time low in USD	$ 0.0008968
Price in BTC	0.00000314 BTC
Price in ETH	0.00003832 ETH
Decimals	8

ICO

ICO Price	$ 0.0345
ICO Start Date	15/06/2018
ICO End Date	15/06/2018
Soft cap	-
Hard cap	$ 33,700,000
Total USD raised	$ 33,700,000
Percentage raised	100%

Calculations

Average supply inflation 30 days	17,777,777.78 DAG
Average inflation rate	0.05%
Total supply deflation	450,000,000 DAG
Total percentage deflation	11.25%
Volatility (30-day avg.)	High
Liquidity (30-day avg.)	Low

Distribution

Total address count	19,000 approx.
Top 10 percentage total supply	4,60%
Top 100 percentage total supply	11,67%
Top 500 percentage total supply	19,64%

*Address distribution is based on historical data provided by the team.

Constellation

General

The ticker of Constellations' token is DAG. The token is the financial state channel of the Constellation Network. It allows for seamless exchange and interaction between the various state channels and nodes that make up the network. Functions within the HGTP network are transaction fees, collateral for node operators, network incentives, and governance. All these use-cases contribute to the speed, security, and decentralization of the HGTP network.

Token utilities

Transaction fees
Basic functionalities of the network are always excluded from transaction fees. These functionalities include one-off Peer-to-Peer payments. However, for serious data processing or data exchanges, more throughput is needed. This can be acquired through micropayments or by becoming a node operator for the network.

Network incentives
In order to incentivize nodes to contribute their resources to the network, Constellation rewards them with DAG tokens. The network incentives of Constellation have had two different phases. In its initial phase, one hundred foundation nodes were added to the network. These nodes receive 25,000,000 DAG per month for their commitment to the network. To maintain a stable economy, they have decided to lock 85% of their rewards until there is sufficient market liquidity. In phase two, node operators are rewarded based on the number of transactions per second of the network.

Deposit for node operators
In order to become a node operator, a node must stake 250,000 DAG. Constellation has chosen to start the network with 100 nodes that have been approved and whitelisted. Constellation will host the nodes for the enterprise client and burn 10,000,000 DAG for each partnership that is onboarded. The network is becoming more stabilized, and the number of nodes will be increased to 1,000.

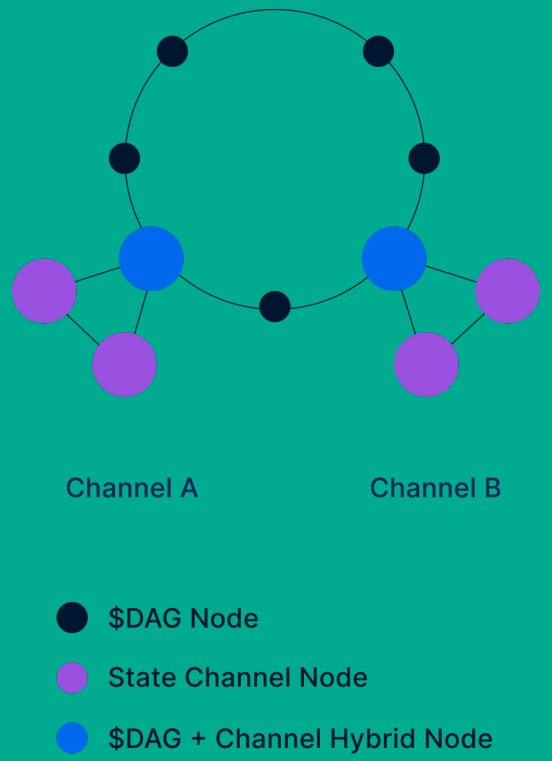
Governance
Constellation promotes community governance so that the community can participate in the decision-making process and make new proposals for improvements or changes to features and/or parameters of the HGTP network and the governance model.

Flow of the DAG token

The Constellation network is supported by three different full nodes: DAG nodes, state channel nodes, and hybrid nodes. All three types of nodes provide consensus on the network.

As mentioned earlier, you can only qualify to become a node operator on the network if you deposit 250,000 DAG into the node. This serves as a deposit to ensure that the node validates the correct data. If a node confirms a wrong transaction, then it will be charged a penalty which will flow back to the node rewards pool.

This process ensures that the DAG token has a proper circulation within Constellations' HGTP network.



Node rewards pool

Nodes that secure and maintain the network are rewarded from the DAG node reward pool. As mentioned earlier, nodes receive 25,000,000 DAG per month for their commitment to the network. However, recently this structure has been changed and the receivable rewards depend on the throughput of the network. With this, rewards are issued to the nodes in a balanced manner. In the first 2.5 years, 50% of all tokens have been made available for node rewards. In a step function manner, the supply halves for each successive 2.5-year period. By gradually increasing the liquidity through the rewards over a period of 10 years, it functions similarly to a Bitcoin halving with an interval of 2.5 years.

Parameters						
Snapshot time	5	min				
Hourly snapshots	12					
Total Rewards Pool	1,600,000,000					
Period (years)	**Amount/Period**	**6 months**	**1 month**	**1 day**	**1 hour**	**per snapshot**
1 - 2.5	853,333,333.20	170,666,666.64	28,444,444.44	948,148.15	39,506.17	3,292.18
2.5 - 5	426,666,666.60	106,666,666.65	17,777,777.78	592,592.59	24,691.36	2,057.61
5 - 7.5	213,333,333.30	53,333,333.33	8,888,888.89	296,296.30	12,345.68	1,028.81
7.5 - 10	106,666,666.65	26,666,666.66	4,444,444.44	148,148.15	6,172.84	514.40

Constellation| Tokenomics partial conclusion

Token allocation

Many community members felt that in the first version of token allocation, the founders and the foundation had a too large allocation. The Constellation team made some changes because they believed in the power of open source and wanted the long-term commitment of the community. Accordingly, they decided to burn the entire founder token allocation. This resulted in the burning of 288,000,000 DAG tokens. On top of that, they doubled the allocation for the node rewards.

Purpose	Amount	new %	old %
Private Sale	730,124,835	19.67	18.25
Foundation	764,810,165	20.60	19.12
Advisors & Partners	537,065,000	14.47	13.43
Validator	1,600,000,000	43.10	40.00
Community	80,000,000	2.16	2.00
	3,712,000,000	100.00	
Burn	*288,000,000*		*7.2*
	4,000,000,000		*100.00*

Value of the DAG token

All of Constellations' tokens are in circulation except for the tokens used in the node reward pool. This reward pool has roughly the same inflation structure as Bitcoin. The supply of tokens that will come into circulation will be halved every 2.5 years. Inflation decreases over time. This will most likely cause adoption to outpace inflation, which is good for the network.

The value of the DAG token comes from its utilities on the HGTP network. Users who want to make transactions that require high bandwidth must pay a fee to the node operators. This ensures that the DAG token has a real utility and that no new tokens are required to give node operators an incentive to actively keep the network secure.

Constellation| Tokenomics partial conclusion

Coin Metrics

Initially, Constellation Network raised $33.7 million during its ICO. With its positive price movement, Constellation managed to achieve a top 200 ranking according to CoinGecko statistics. With a market cap of close to 380 million and a fully diluted market cap of nearly 550 million, the project is still undervalued.

A unique aspect of Constellation is its low inflation rate. All its tokens are in circulation except for those used as network incentive. On average 17,777,777.78 DAG are released into circulation each month, leading to a very low inflation rate of 0.05 percent per month. Therefore, inflation has almost no influence on the price of the DAG token.

The max supply and the total supply have a disparity as several token burns have already taken place. The largest burn of DAG tokens took place with the burn of the tokens intended for the founders of Constellation. This burn was initiated together with the community and is a good indication that the team is driven to build a successful network for the long term.

In total, there are about 19,000 holders of the DAG token. The distribution of DAG tokens is very well distributed as there are no wallets that hold a large percentage of tokens. Together, the top 10 token holders own 4.6 percent of the total supply, which is positive for the decentralization of the network.

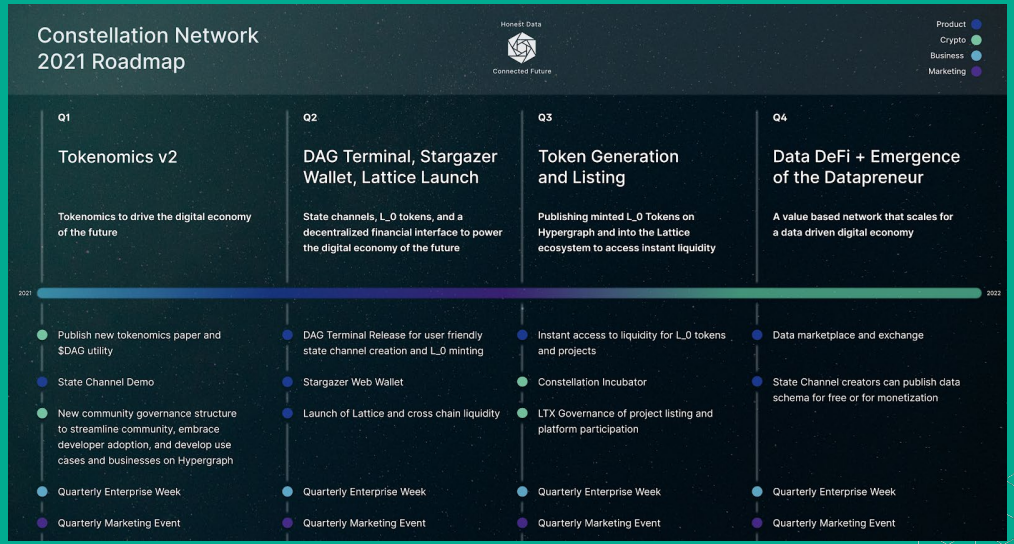
Constellation Network| Roadmap

Recent achievements

At the start of 2021, Constellation shared their roadmap for the upcoming year. Main targets included the launch of their new tokenomics, State channels, Dag Terminal, Stargazer Wallet with multi-chain support, Lattice Exchange, Constellation Incubator, and Data marketplace.

So far, all mentioned goals for the first 3 quarters of the year have been reached. Progress on the Data marketplace and exchange has not yet been shared.

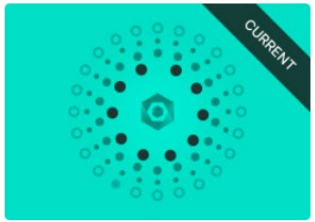
A major milestone was reached with the launch of Lattice Exchange earlier this year. Lattice is a decentralized exchange that aims to support cross-chain swaps and a multitude of decentralized finance (DeFi) applications. The exchange is built on Constellations' hypergraph and has realized a market capitalization of 23 million US Dollars at the time of writing.



Source: medium.com/constellationlabs/

Future roadmap

Constellation is working on their Mainnet 2.0. With the upgrade, Constellation aims to improve the speed, scalability and efficiency of its network. The roadmap to Mainnet 2.0 is divided in 3 phases and is scheduled to launch in the second quarter of 2022.

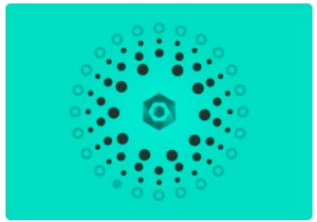


Phase 1

L_0 Token Development

Prepare Mainnet 2.0 to ensure it can effectively manage business needs and real-world utility.

- Focus on testing.
- Onboard quality projects in the accelerator and incubator program.
- Build in parallel with the Constellation team.
- Document and build out L_0 tokens for the projects in the next few months.
- Launch node operators signup.

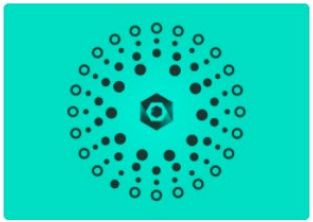


Phase 2

Deploy to Test Net

Ensure Mainnet 2.0 is sound and secure and won't suffer downtime that interferes with business functions.

- Launch the node operator signup.
- Onboard hundreds of nodes that apply.
- Onboard L_0 tokens to establish the path to cross-chain swapping.
- Conducting a third-party security audit.
- Stress-test the network.
- Building continues in parallel with the protocol.



Phase 3

Mainnet 2.0 Push to Production

Bring all business online.

- Deploy all L_0 tokens for instant network utility.
- Open a path for L_0 tokens to have cross-chain capabilities.
- Bring hundreds more node operators online.

Constellation Network| Exchanges

Listing

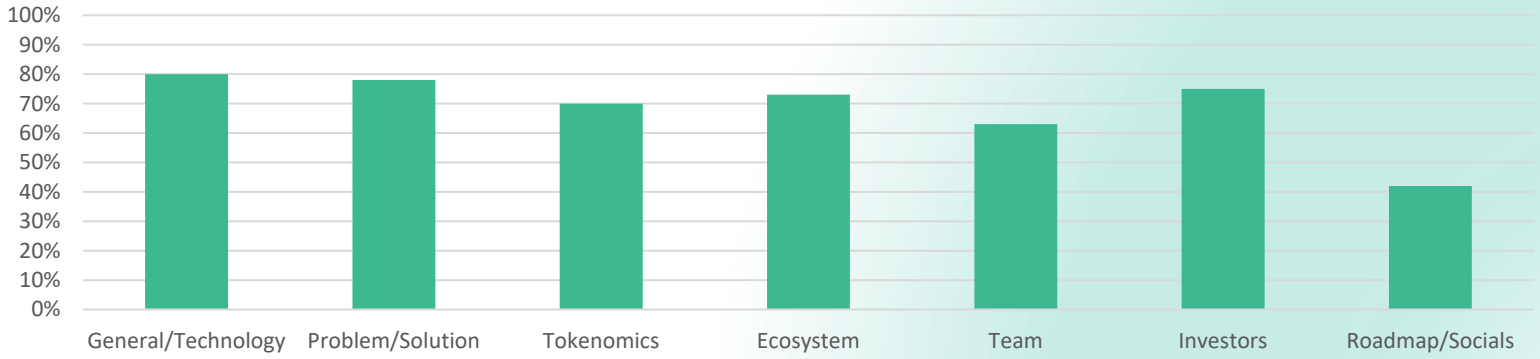
The DAG token has been listed on KuCoin, LCX Exchange, and HitBTC. However, almost 100% of its trading volume is through KuCoin. Even though DAG has also been listed on LCX Exchange and HitBTC, these provide close to no trading volume.

This scarce availability limits the adoption of DAG but provides potential price action with future listings.

Constellation Network| Hodl Score

Final Hodl Score
70%

Constellation



*Categories differentiate in weight measurements to determine the final Hodl score

Constellation Network| Final conclusion

General remarks

The issues of existing blockchain technology such as speed, scalability, and ensuring economic incentive slow down the technology's mass adoption and prove it difficult for developers to build applications with solid business logic. Constellation is an open-source framework with strong development tools that anybody can build on, while also assuring speed, scalability, and a well-functioning reward system. As the creator of the first Layer 0 state channel standard, Constellation Network is designed to handle complicated business logic and meet real-world requirements. Constellation Network's team possesses a diverse set of skills, successful entrepreneurial experience, and a deep grasp of technology. That enables the project to scale quickly, extend its network of partners, and ensure product-market fit.

Long term investment

Constellation Network offers a wide range of options for anybody to start a project in its ecosystem. The project's goal is to contribute to the shift that blockchain technology is bringing to the world by providing tools for ambitious entrepreneurs to build scalable businesses. Developers may easily construct state channels and utilize the benefits of blockchain, yet still, ensure commercial viability and effectiveness. Through the project's state channels and L 0 standard, Constellation allows anybody to enter the rapidly expanding cryptocurrency space.

To create applications using Hypergraph, one needs to stake $DAG, which ensures the token's utility within the ecosystem and proves its long-term sustainability. Connecting the $DAG token utility with projects within the ecosystem increases long-term network value. By offering feeless cross-chain transactions, Constellation Network welcomes projects from other ecosystems, which contributes to the ecosystem's future attractiveness.

Risks and threats

The possible risks of Constellation Network's solution are rooted in the centralization of DAG technology. Currently there are 110 foundational nodes, which provides a risk until the decentralized node voting has taken place. Failure to evolve DAGs might leave the network vulnerable to attacks. Another factor to consider when analyzing DAG solutions is that they have not yet been evaluated and properly tested on a large business scale, hence their practical efficiency is not yet well-known. Although DAG-based solutions have been already on the market, they still have a long road ahead towards mass adoption.

About Hodl

At Hodl.nl, we believe that investors deserve an experienced, trusted, and responsible partner who provides exposure to the emerging market of cryptocurrency. With our expertise in traditional finance, data analysis, and cryptocurrencies, we have joined forces and created an optimized investment strategy. Hodl operates within existing regulatory frameworks and is one of the first cryptocurrency investment funds to receive a registration with the Dutch Authority Financial Markets.

For more information about Hodl or one of our funds, please visit:

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HODL| “Hold On for Dear Life”

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