MiCAR White Paper

Constellation Network (DAG)

Version 1.0 - July 2025

White Paper relating to a crypto-asset, other than an asset-referenced or e-money token, drafted pursuant to the Markets in Crypto-Assets Regulation (MiCAR)

Prepared and filed by: Constellation Foundation Company Ltd.

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COMPLIANCE STATEMENTS

01. Date of Notification

2025-07-30

02. Statement in accordance with Article 6(3) of Regulation (EU) 2023/1114

This crypto-asset white paper has not been approved by any competent authority in any Member State of the European Union. The offeror of the crypto-asset is solely responsible for the content of this crypto-asset white paper.

03. Compliance statement in accordance with Article 6(6) of Regulation (EU) 2023/1114

This crypto-asset white paper complies with Title II of Regulation (EU) 2023/1114 of the European Parliament and of the Council and, to the best of the knowledge of the management body, the information presented in the crypto-asset white paper is fair, clear and not misleading and the crypto-asset white paper makes no omission likely to affect its import.

04. Statement in accordance with Article 6(5), points (a), (b), (c) of Regulation (EU) 2023/1114

The crypto-asset referred to in this crypto-asset white paper may lose its value in part or in full, may not always be transferable and may not be liquid.

05. Statement in accordance with Article 6(5), point (d) of Regulation (EU) 2023/1114

False

06. Statement in accordance with Article 6(5), points (e) and (f) of Regulation (EU) 2023/1114

The crypto-asset referred to in this white paper is not covered by the investor compensation schemes under Directive 97/9/EC of the European Parliament and of the Council. The crypto-asset referenced in this white paper is not covered by the deposit guarantee schemes under Directive 2014/49/EU of the European Parliament and of the Council.

Summary

07. Warning in accordance with Article 6(7), second subparagraph, of Regulation (EU) 2023/1114

This summary should be read as an introduction to the crypto-asset white paper. The prospective holder should base any decision to purchase this crypto-asset on the content of the crypto-asset white paper as a whole and not on the summary alone. The offer to the public of this crypto-asset does not constitute an offer or solicitation to purchase financial instruments and any such offer or solicitation can be made only by means of a prospectus or other offer documents pursuant to the applicable national law.

This crypto-asset white paper does not constitute a prospectus as referred to in Regulation (EU) 2017/1129 of the European Parliament and of the Council (36) or any other offer document pursuant to Union or national law.

08. Characteristics of the crypto-asset

Constellation Network is a decentralized protocol that without intermediation enables anyone to build their own application specific blockchain, designed for scalable data validation. Its native token, DAG, is a functional asset used to secure validator participation, enable delegated staking, and govern the allocation of protocol-level incentives. It is used for feeless peer-to-peer transactions, and required as collateral to operate validator nodes. Metagraphs on the network use DAG to pay for snapshot validation and data anchoring. There are no restrictions on transferability beyond protocol-enforced rules.

Any modifications to incentives or governance mechanisms are determined through a multiparty governance mechanism, ensuring that ownership and transferability remain intact.

The DAG token does not confer any ownership rights in a legal entity and is not backed by any reserves or collateral. Its core functionalities are exclusively accessible within the Constellation Network ecosystem.

09. Information about the quality and quantity of goods or services to which the utility tokens give access and restrictions on the transferability

Not applicable

10. Key information about the offer to the public or admission to trading

DAG is being admitted to trading on crypto-asset trading platforms in accordance with Regulation (EU) 2023/1114 (MiCA). This admission aims to facilitate broader access and liquidity in a regulated framework. The names of the trading platforms for which admission is sought are: Kraken, Coinbase, Crypto.com.

Part A – Information about the offeror or the person seeking admission to trading

A.1 Name

Constellation Foundation Company Ltd.

A.2 Legal Form

Exempted Foundation Company registered under the Foundations Companies Law

A.3 Registered Address

Genesis Trust & Corporate Services Ltd., Elgin Court, Elgin Avenue, George Town, Grand Cayman KY1-1106, Cayman Islands

A.4 Head Office

Same as registered address

A.5 Registration Date

2018-05-22

A.6 Legal Entity Identifier

Not applicable

A.7 Another Identifier Required Pursuant to Applicable National Law

Foundations Companies Law, Registration Number: 337197

A.8 Contact Telephone Number

(707)-656-2140

A.9 E-mail Address

info@constellationnetwork.io

A.10 Response Time (Days)

5

A.11 Parent Company

Not applicable

A.12 Members of the Management Body

Full Name	Business Address	Function
Benjamin Jorgensen	468 North Camden Dr Suite 200 PMB 91201 Beverly Hills, CA 90210	CEO
Michael Brand	468 North Camden Dr Suite 200 PMB 91201 Beverly Hills, CA 90210	COO
Benjamin Diggles	468 North Camden Dr Suite 200 PMB 91201 Beverly Hills, CA 90210	CSO

A.13 Business Activity

Constellation Foundation Company Ltd. is a Cayman Islands–registered Foundation Company established to steward the development, governance, and ecosystem growth of the Constellation Network. Its core mission is to support the advancement of decentralized, scalable infrastructure for data validation through application-specific blockchains known as metagraphs.

The Foundation's primary activities include funding open-source protocol development, fostering ecosystem innovation through grants and incentive programs, and promoting the adoption of Constellation's decentralized architecture across industries. It plays a central role in coordinating validator participation, supporting education and compliance initiatives, and enabling strategic partnerships to drive responsible innovation.

The Foundation also oversees treasury management and ensures transparent, community-driven governance of the DAG token.

A.14 Parent Company Business Activity

Not applicable

A.15 Newly Established

False

A.16 Financial condition for the past three years

As of Q1 2025, and over more than three years of operation, the Foundation has demonstrated consistent financial stability. At year-end 2022, 2023, and 2024, the Foundation reported total current assets of approximately USD 20.1 million, USD 16.6 million, and USD 26.1 million respectively. A portion of these funds has been, and will continue to be, allocated to support the operational and ecosystem growth needs of the issuing entity, in line with the Foundation’s long-term mission and the network’s development objectives.

A.17 Financial Condition since registration.

Not applicable

Part B – Information about the issuer, if different from the offeror or person seeking admission to trading

Not applicable

Part C - Information about the operator of the trading platform in cases where it draws up the crypto-asset white paper and information about other persons drawing the crypto-asset white paper pursuant to Article 6(1), second subparagraph, of Regulation (EU) 2023/1114

Not applicable

Part D – Information about the crypto-asset project

D.1 Crypto-asset project name

Constellation Network

D.2 Crypto-assets name

DAG

D.3 Abbreviation

DAG

D.4 Crypto-asset project description

Constellation Network is a scalable, fee-less blockchain infrastructure that enables the creation of custom blockchains, referred to as metagraphs, tailored to specific applications and data standards. It offers core blockchain capabilities, including token issuance, decentralized applications, and wallet integration, while its architecture departs from traditional linear chains to deliver greater efficiency, speed, and flexibility. Designed for modularity and high-throughput performance, the network supports a wide range of use cases from enterprise data systems to Web3 and IoT applications.

D.5 Details of all natural or legal persons involved in the implementation of the crypto-asset project

Name	**Role**	**Business Address**
Constellation Foundation Company Ltd.	Issuer	Genesis Trust & Corporate Services Ltd., Elgin Court, Elgin Avenue, George Town, Grand Cayman KY1-1106, Cayman Islands

		Registration Number: 337197
Stardust Collective Wyoming DAO LLC	Decentralized Network Governance	Wyoming, USA
Constellation Network, INC.	Development and Ecosystem Support	468 North Camden Dr Suite 200 PMB 91201 Beverly Hills, CA 90210

Relevant natural person:

Benjamin Jorgensen, CEO and Co-Founder,

https://www.linkedin.com/in/bjorgensen/

D.6 Utility Token Classification

False

D.7 Key Features of Goods/Services for Utility Token Projects

Not applicable

D.8 Plans for the token

The DAG token was initially issued in 2018 to provide security and scalability to data validations and network state. Our plan is to further improve network governance, security, and scalability. While governance may adapt over time, the core functionalities and principal features of the DAG token are expected to remain stable, continuing to support the security, coordination, and utility of the Constellation protocol.

D.9 Resource allocation

Not applicable

D.10 Planned Use of Collected Funds or Crypto-Assets

Not applicable

Part E – Information about the offer to the public of crypto-assets or their admission to trading

E.1 Public Offering or Admission to Trading

'ATTR' – admission to trading

E.2 Reasons for Public Offer or Admission to Trading

Constellation Foundation Company Ltd. is seeking the admission of DAG to trading on regulated platforms and has prepared this White Paper in accordance with the disclosure requirements set forth under MiCAR. The primary objective of this initiative is to provide investors in the European Union and European Economic Area with access to the DAG token within a transparent and MiCAR-compliant framework. Constellation Foundation aims to establish a clear and reliable regulatory basis for the token, fostering greater market confidence and enhanced investor protection.

E.3 Fundraising Target

Not applicable

E.4 Minimum Subscription Goals

Not applicable

E.5 Maximum Subscription Goal

Not applicable

E.6 Oversubscription Acceptance

Not applicable

E.7 Oversubscription Allocation

Not applicable

E.8 Issue Price

The price at issuance in 2018 was USD 0.06

E.9 Official Currency or Any Other Crypto-Assets Determining the Issue Price

USD

E.10 Subscription Fee

Not applicable

E.11 Offering Price Determination Method

Not applicable

E.12 Total Number of Offered/Traded Crypto-Assets

At the time of the notification of the present White Paper, the circulating supply of DAG is approximately 3,693,588,685 tokens. DAG follows a flexible supply model without a fixed maximum supply. New tokens are introduced through a predefined emission schedule tied to metagraph activity and network participation, with a long-term emission target of 0.5% annually. The total supply will adjust over time based on protocol-defined issuance mechanisms and governance-approved changes.

E.13 Targeted Holders

ALL

E.14 Holder Restrictions

Not applicable

E.15 Reimbursement Notice

Not applicable

E.16 Refund Mechanism

Not applicable

E.17 Refund Timeline

Not applicable

E.18 Offer Phases

Not applicable

E.19 Early Purchase Discount

Not applicable

E.20 Time-Limited Offer

Not applicable

E.21 Subscription Period Beginning

Not applicable

E.22 Subscription Period End

Not applicable

E.23 Safeguarding Arrangements for Offered Funds/Crypto-Assets

Not applicable

E.24 Payment Methods for Crypto-Asset Purchase

Not applicable

E.25 Value Transfer Methods for Reimbursement

Not applicable

E.26 Right of Withdrawal

Not applicable

E.27 Transfer of Purchased Crypto-Assets

Not applicable

E.28 Transfer Time Schedule

Not applicable

E.29 Technical Requirements Holders

Not applicable

E.30 Crypto-asset service provider (CASP) name

Not applicable

E.31 CASP Identifier

Not applicable

E.32 Placement Form

NTAV

E.33 Trading Platforms Name

Kraken, Coinbase, Crypto.com

E.34 Trading Platforms Market Identifier Code (MIC)

Not applicable

E.35 Trading Platforms Access

Access to the token is available through the websites and mobile applications of the trading platforms listed above under Section E.33. Each platform governs its own fees, trading limits, and user verification procedures, which may include trading and withdrawal fees as well as Know Your Customer (KYC) and Anti-Money Laundering (AML) compliance requirements.

E.36 Involved Costs

Applicable fees depend on the pricing structure of the platform through which the crypto-asset is accessed. Additional costs may also arise when transferring the crypto-asset off the platform, such as network or “gas” fees associated with blockchain transactions.

E.37 Offer Expenses

Not applicable

E.38 Conflicts of Interest

Constellation Network is not aware of any conflicts of interest among its management or affiliates with respect to the listing or trading of DAG. MiCAR-compliant Crypto-Asset Service Providers are required to implement robust measures to identify, manage, and mitigate conflicts of interest. Potential holders are strongly encouraged to review the conflict of interest policy of their respective service provider before engaging in any transaction.

E.39 Applicable Law

The DAG token does not fall under the jurisdiction of any single legal framework or governing entity. However, for the purposes of legal clarity in connection with its issuance by the issuer, the applicable law shall be that of the Cayman Islands, except where mandatory conflict-of-law rules under applicable European Union or national legislation require the application of a different substantive law.

E.40 Competent Court

In the event of any dispute arising in connection with the DAG token or its issuance, use, or trading, the competent court shall be the courts of the Cayman Islands, subject to the mandatory provisions of European Union or national law that may designate a different competent jurisdiction.

Part F – Information about the crypto-assets

F.1 Crypto-asset type

Other Crypto-Asset: Under MiCAR, the crypto-asset described in the present white paper does not qualify as an electronic money token (EMT) or an asset-referenced token (ART). It is a digital representation of value that can be stored and transferred using distributed ledger technology (DLT) or similar technology, without embodying or conferring any rights to its holder. The asset does not aim to maintain a stable value by referencing an official currency, a basket of assets, or any other underlying rights. The value of the crypto-asset is entirely determined by market forces—specifically, the dynamics of supply and demand—and is not supported by any stabilization mechanism. It is neither pegged to a fiat currency nor backed by external assets, which differentiates it from EMTs and ARTs. Moreover, the crypto-asset does not qualify as a financial instrument, deposit, insurance policy, pension product, or any other regulated financial product under EU law. It does not confer any financial entitlements contractual claims on its holders, thereby placing it outside the regulatory scope governing traditional financial instruments.

F.2 Crypto-asset functionality

DAG is used as collateral by validator nodes, supports delegated staking, and powers protocol-level functions such as governance and transaction processing. It is also used by metagraphs to pay for data validation and anchoring. All transfers between wallets on the Constellation protocol are feeless by design. DAG is not linked to any specific service or product and does not grant ownership rights or revenue share. It follows a rule-based flexible supply model, with emissions gradually declining over time, offset in part by network activity such as snapshot fees.

While DAG serves functional roles in transaction processing, staking, and governance, these uses do not meet the MiCAR definition of a “Utility Token” under Article 3(1)(11). DAG does not provide access to a specific good or service offered by the issuer.

F.3 Planned application of functionalities

All functionalities of DAG are fully operational on Constellation Network's mainnet and actively used.

F.4 Type of crypto-asset white paper

OTHR

F.5 The type of submission

NEWT

F.6 Crypto-asset characteristics

DAG is the native digital asset of the Constellation Network, operating on a Layer 0 protocol built around a directed acyclic graph (DAG) architecture. DAG enables metagraphs to run on the Constellation Network, delegated staking, and protocol-level fee payments known as snapshot fees.

The token is transferable between wallets that support the Constellation protocol.

DAG does not represent ownership rights, revenue share, or access to a good or service provided by the issuer. It facilitates network participation and governance, specifically allowing holders to influence how protocol incentives are allocated. Security and network functions are handled at the protocol level.

F.7 Commercial name or trading name

DAG

F.8 Website of the issuer

https://constellationnetwork.io/

F.9 Starting date of offer to the public or admission to trading

2025-09-01

F.10 Publication date

2025-08-29

F.11 Any other services provided by the issuer

Not applicable

F.12 Identifier of operator of the trading platform

PGSL

F.13 Language or languages of the crypto-asset white paper

EN (English)

F.14 Digital token identifier code used to uniquely identify the crypto-asset or each of the several crypto assets to which the white paper relates, where available

The DAG token has not been assigned an ISO 24165 Digital Token Identifier (DTI).

F.15 Functionally fungible group digital token identifier, where available

Not available

F.16 Voluntary data flag

False

F.17 Personal data flag

False

F.18 LEI eligibility

False

F.19 Home member state

Ireland

F.19 Host Member States

Austria, Belgium, Bulgaria, Croatia, Cyprus, Czech Republic, Denmark, Estonia, Finland, France, Germany, Greece, Hungary, Italy, Latvia, Liechtenstein, Lithuania, Luxembourg, Malta, Netherlands, Norway, Poland, Portugal, Romania, Slovakia, Slovenia, Spain, Sweden.

Part G – Information on the rights and obligations attached to the crypto-assets

G.1 Purchaser Rights and Obligations

Purchasers of DAG do not acquire contractual rights or obligations from a central issuer, as Constellation Network operates as a decentralized protocol. Holding DAG enables the user to transfer the token, delegate it to a validator node, or participate in governance processes related to protocol incentive distribution. Token custody, use, and management remain the responsibility of the holder, including safeguarding private keys and complying with applicable laws.

G.2 Exercise of Rights and Obligations

There are no enforceable contractual rights or obligations tied to DAG. Participation in staking or governance is executed through the protocol, and usage is subject to the network's technical rules. DAG holders can delegate tokens or interact with the protocol via supported interfaces like Stargazer Wallet or integrated applications. Execution of token functions depends on user-controlled wallets and network performance.

G.3 Conditions for modifications of rights and obligations

Changes to the functionality or governance of DAG are subject to community coordination and open-source development processes. No single party can unilaterally modify the network's functionalities. Proposed changes may be introduced through protocol upgrades or metagraph development and are subject to consensus from stakeholders. Users are responsible for remaining informed of any changes and ensuring compliance with their local regulations.

G.4 Future public offers

Not applicable.

G.5 Issuer retained crypto-assets

Treasury currently holds 268M DAG tokens

G.6 Utility token classification

False

G.7 Key features of goods/services of utility tokens

Not applicable.

G.8 Utility tokens redemption

Not applicable.

G.9 Non-trading request

True

G.10 Crypto-assets purchase or sale modalities

Not applicable.

G.11 Crypto-assets transfer restrictions

There are no protocol-level restrictions on the transfer of DAG. However, external platforms such as centralized exchanges may impose compliance-based restrictions according to regional laws.

G.12 Supply adjustment protocols

True

G.13 Supply adjustment mechanisms

DAG follows a flexible supply model with emissions determined by a formula that considers validator activity, network participation, and protocol development needs. The emission rate begins at 6% and gradually declines to a long-term target of 0.5%. Snapshot fees from metagraphs help offset new supply, creating a balancing mechanism between network expansion and token issuance.

The supply adjustment mechanism is automated and rule-based, with emission allocations distributed across protocol infrastructure, validators, delegators, and ecosystem initiatives. No single entity can arbitrarily change issuance parameters; updates require transparent governance processes aligned with network consensus.

G.14 Token value protection schemes

False

G.15 Token value protection scheme description

Not applicable

G.16 Compensation schemes

False

G.17 Compensation scheme description

Not applicable

G.18 Applicable law

The DAG token does not fall under the jurisdiction of any single legal framework or governing entity. However, for the purposes of legal clarity in connection with its issuance by the issuer, the applicable law shall be that of the Cayman Islands, except where mandatory conflict-of-law rules under applicable European Union or national legislation require the application of a different substantive law.

G.19 Competent court

In the event of any dispute arising in connection with the DAG token or its issuance, use, or trading, the competent court shall be the courts of the Cayman Islands, subject to the mandatory provisions of European Union or national law that may designate a different competent jurisdiction.

Part H – Information on the underlying technology

H.1 Distributed ledger technology (DLT)

Constellation Network operates on the Hypergraph Transfer Protocol (HGTP), a decentralized, public blockchain ecosystem designed for scalable, low-cost transactions and custom blockchain development for data-driven applications. Unlike traditional linear blockchains, Constellation uses a Directed Acyclic Graph (DAG) architecture that enables concurrent processing across multiple independent chains & validator types simultaneously. Data is aggregated at the global layer into a single event stream connecting independently defined data validation consensus layers. The network employs a unique Proof of Reputable Observation (PRO) consensus mechanism, allowing for asynchronous transaction validation of multiple independently defined blockchains under a uniform standard.

The architecture consists of two primary abstraction layers: Layer 0 (Global L0 or Metagraph L0), which serves as the final consensus and aggregation layer, and Layer 1, which performs speculative execution based parallel transaction processing and verifications. This dual-layer approach enables horizontal scaling, while maintaining security and decentralization. The network supports customizable metagraphs—independent custom blockchains that can define their own validation logic, token economies, and data structures while anchoring to the Hypergraph for global consensus.

Constellation's design allows for processing various data types beyond simple transactions, including IoT sensor data, complex business logic, and external API integrations. The network achieves finality through pooling-based consensus with non-homogenously applied transaction validation definitions, where validated blocks from L1 layers are aggregated into snapshots at the L0 layer according to per-metagraph criteria, and finally aggregated to the global event layer. This architecture supports both the native DAG token and custom L0 tokens issued by metagraphs, all following the same token standard for interoperability, and allows for custom defined L0 transaction types.

H.2 Protocols and technical standards

Constellation Network operates on a unique architectural framework combining microservice design principles, event-stream based data-orchestration, and blockchain technology into a complete framework. The network utilizes the Proof of Reputable Observation (PRO) consensus protocol, which allows for extensive

customization through the assignment of human-input label ratings to validators based on their historical behavior and peer assessments, in addition to automated validator checks on sharded variable validation definitions for fast, event driven settlement.

Consensus Architecture: The network employs a multi-layer consensus model where Layer 1 handles initial speculative validation using DAG-based parallel processing, Layer 0 provides final consensus and global state finalization, and ordering among distinct sub-networks. Consensus rounds require multiple participants, and the 'Global' Layer 0 acts primarily as an ordering for independent 'metagraph' Layer 0 microservice event streams.

Native Transaction Types and Token Standards: Constellation implements the L0 Token Standard, providing a unified interface for both DAG and metagraph-issued tokens. The standard supports advanced blockchain interoperability features including:

- Delegated Staking;
- Token locking mechanisms for staking, governance, and DAOs;
- Fee transactions for data-associated payments;
- Cross-chain atomic locking operations, for contract spend allowances;
- Per-network reward implementations for individual chain extensions.

Data Standards and Validation: The network supports custom data types through the Data Application framework, allowing metagraphs to define their own schemas, validation logic, and serialization methods. All data updates are cryptographically signed and can include arbitrary structured data beyond simple value transfers. Each microservice defines its own unique interoperable API schemas, allowing fine-grained distinctions between on-chain data, indexer events, stateful data, off-chain enrichment, and custom non-chain API access.

Interoperability Standards: Metagraphs maintain sovereignty while anchoring to the global network through standardized snapshot submissions to the core aggregated event stream. The architecture supports cross-metagraph communication and external integrations through REST APIs, enabling seamless interaction with traditional systems and other blockchains.

Security Standards: The network employs ECDSA signatures on secp256k1 for transaction signing, with SHA-512 hashing for message integrity. Federated seed

lists are maintained as part of the release process for the global layer and per-metagraph. Rating labels are maintained by individual node operators.

H.3 Technology used

Constellation Network leverages a comprehensive technology stack designed for scalability, flexibility, and enterprise integration. The core protocol, Tessellation, is implemented in Scala, providing functional programming benefits including type safety, immutability, and concurrent processing capabilities. The network runs on the Java Virtual Machine (JVM), enabling integration with existing enterprise Java libraries and tools.

The Euclid SDK serves as the primary development framework for building metagraphs, offering modular docker based components for currency operations, data processing, and custom business logic implementation. Developers can create metagraphs using familiar programming paradigms while leveraging built-in consensus, validation, and state management capabilities.

For transaction signing and wallet operations, the network supports dag4.js, a JavaScript library enabling browser-based interactions, and integrates with the Stargazer wallet browser extension for user-friendly asset management. The architecture supports REST API-based communication between nodes, maintaining transport layer agnosticism for flexibility in deployment scenarios.

Metagraphs can incorporate external dependencies, libraries, and API integrations directly into their validation logic, enabling use cases such as:

- Real-time data ingestion from IoT devices;
- Integration with machine learning models;
- Oracle functionality without separate infrastructure;
- Complex business process automation.

The network includes built-in monitoring through integrations with Grafana dashboards, Prometheus metrics collection, and automated health checking services. State management supports both on-chain storage for immutable records and off-chain calculated state for efficient data processing, with developers able to integrate external databases or storage solutions as needed.

Link to the official technical documentation:

https://docs.constellationnetwork.io

Link to the core code repository:

https://github.com/Constellation-Labs/tessellation

H.4 Consensus mechanism

Constellation employs the Proof of Reputable Observation (PRO) consensus mechanism, a novel approach combining stake-based validation with reputation scoring & federated seed lists to ensure network security and efficiency. Unlike traditional Proof-of-Work or Proof-of-Stake systems, PRO evaluates validators based on their historical performance, peer scores, and stake contribution.

The consensus process operates asynchronously across multiple layers. At Layer 1, transactions undergo initial validation through DAG-based sharded parallel processing, where small groups of nodes (typically 3) form consensus units. These units can process transactions concurrently, enabling speculative horizontal scaling without bottlenecks. Layer 0 aggregates validated L1 blocks into snapshots through a deterministic facilitator selection process, ensuring global state consistency.

Core network validators must stake 250,000 DAG as collateral to participate in consensus, providing economic security against malicious behavior. The PRO scoring system allows manual reputation rating values to be assigned, and stability health checks provide an automated node operator evaluation mechanism. Transaction finality is near instantaneous, and supports custom metagraph transaction definitions.

H.5 Incentive mechanisms and applicable fees

Constellation's economic model allows for feeless currency transactions with an anti-spam heuristic. For more resource intensive operations or extended custom transactions, fees and incentives are determined through a federated marketplace mechanism, allowing customizability at the metagraph level. Global rewards follow a conventional mining model, rewarding node operators for individual participation through the verification of their signatures during consensus. The network operates on the Metanomics model, featuring a flexible token supply with controlled inflation starting at 6% and gradually decreasing to 0.5%.

Currency transactions are feeless by default according to a balance heuristic, with optional priority boosting for faster processing. Metagraphs can implement custom

fee logic for their L0 tokens. Global data fees use a more complex formula based on the amount of validation work required for processing. Global validators stake 250,000 DAG as collateral, and receive rewards distributed from network emissions, and from delegators.

H.6 Use of Distributed Ledger Technology

True

H.7 DLT Functionality Description

Constellation uses distributed ledger technology through its Hypergraph architecture, a Directed Acyclic Graph (DAG) structure that enables concurrent consensus validation and sequential event aggregation with sharded validation. Validators stake collateral and earn reputation and stability scores to participate in validation. The dual-layer architecture is used both for global event settlements as well as per-application consensus to support fast, high throughput data driven applications. By using snapshot-based progression, partial validation and custom logic, Constellation provides a scalable and flexible DLT framework uniquely supporting use cases beyond conventional smart contracts.

H.8 Audit

True

H.9 Audit outcome

The network's core protocol implementation has been reviewed for security vulnerabilities, with particular focus on the consensus mechanism, cryptographic implementations, and state validation processes.

The Constellation protocol undergoes continuous security reviews through both internal assessments and community code reviews. The open-source nature of the codebase allows for transparent verification of security practices. Key security validations have covered aspects related to cryptographic verifications, double spending, and internal library dependencies. Here is the link to a recent security audit:

https://drive.google.com/file/d/1cE-_Ch7xyqxTVKnst5SppvqW69Ri7y2Z/view?usp=sharing

Part I – Information on risks

I.1 Offer-related risks

The admission to trading of DAG carries inherent risks related to market volatility, liquidity constraints, and trading conditions. While DAG should be widely used for staking, node operator collateral, decentralized applications, financial transactions, metagraph network fees, and more, its price might be highly volatile and influenced by market sentiment, macroeconomic trends, institutional adoption, and speculative activity.

Although DAG should have liquidity on large exchanges, conditions may change at any time. External factors such as exchange delistings, regulatory changes, broader financial instability, or potential legal restrictions in some jurisdictions may potentially affect market accessibility.

I.2 Issuer-related risks

Constellation (DAG) does not have a central issuer, as it operates on a decentralized, permissionless blockchain maintained by independent validators, developers, and node operators. As a result, many issuer-specific risks, such as financial stability, operational risks, or conflicts of interest, do not apply. However, the DAG ecosystem is subject to certain risks, including regulatory and legal uncertainty, as different jurisdictions may impose restrictions on exchanges, custodians, and financial institutions offering access to DAG.

Network governance and protocol risks also exist, with the Stardust Collective serving as a key governance body coordinating ecosystem development and community initiatives. While this structure provides organized development, governance disagreements, protocol delays, or conflicts between different stakeholder groups could create uncertainty. Additionally, validator and network centralization risks may arise if validation power becomes concentrated among few entities, potentially impacting decentralization and security. Future advancements in cryptographic technologies, such as quantum computing, may also introduce potential risks to the network's security model, requiring ongoing protocol evolution and adaptation.

I.3 Crypto-assets-related risks

Constellation (DAG) is a decentralized digital asset with no central issuer, eliminating risks associated with centrally controlled crypto-assets. However, DAG is subject to market, liquidity, custody, regulatory, and technological risks that could impact its trading, adoption, and security. Market risk remains significant, as DAG's price can be highly volatile and influenced by technology adoption rates, network usage, competition from other solutions, and broader cryptocurrency market movements.

The token's value may be vulnerable to shifts in market sentiment and competitive pressures. Liquidity risk exists as DAG trades on a limited number of exchanges compared to more established crypto-assets, potentially affecting trading volumes and price discovery during market stress or regulatory actions.

Custodial and self-custody risks require users to securely manage private keys, with permanent loss possible if keys are compromised or lost. The staking requirement for validators represents significant value at risk. Regulatory and taxation risks vary across jurisdictions, with evolving compliance requirements potentially affecting DAG's use in enterprise applications and data validation services.

Protocol risks arise from Constellation's multi-layer architecture and custom metagraph implementations. While the consensus mechanism provides scalability, the complexity increases potential attack surfaces, and vulnerabilities in metagraph validation logic could compromise data integrity or lead to token losses. Interoperability and cross-chain risks exist as Constellation integrates with other networks and traditional systems through bridges and external API connections, introducing additional attack vectors that could affect token transfers or data validation integrity.

Quantum computing threats pose long-term risks to DAG's cryptographic security, potentially impacting key management and consensus mechanisms. Continuous protocol upgrades will address this issue, following standard practices in the cryptocurrency ecosystem. Despite these risks, DAG continues to develop its ecosystem focused on enterprise data validation and scalable blockchain infrastructure, with ongoing protocol enhancements aimed at strengthening its position in the Layer 0 market.

I.4 Project implementation-related risks

Constellation, as a decentralized and open-source blockchain, has no central issuer, but certain risks affect its development and adoption. Protocol upgrades and governance rely on community consensus and the Stardust Collective's coordination, which can lead to delays or disagreements among network participants.

Scalability challenges may emerge as metagraph deployments and overall transaction volume increases, though the DAG architecture's horizontal scaling capabilities mitigate congestion risks. Regulatory uncertainty varies across jurisdictions, potentially impacting DAG's role in enterprise data validation, government applications, and institutional adoption.

Validator centralization risks related to node staking requirements can potentially affect decentralization and security. Security threats include potential bugs in the PRO consensus mechanism, metagraph or SDK vulnerabilities. Quantum computing risks could pose future challenges to Constellation's cryptographic security, necessitating advancements in encryption methods.

Market volatility remains a key risk, impacting DAG's liquidity and enterprise confidence. Despite these challenges, Constellation continues to evolve, with ongoing network enhancements, enterprise partnerships, and expanding use cases strengthening its role in the scalable blockchain infrastructure ecosystem.

I.5 Technology-Related Risks

Constellation operates on a decentralized blockchain using a Proof of Reputable Observation (PRO) consensus mechanism, ensuring scalable, low-cost transactions without traditional mining or staking. However, several technology-related risks remain. Private key management is crucial, as the loss or theft of private keys results in permanent loss of funds. The multi-layer architecture (L0/L1) introduces complexity compared to single-layer blockchains, where the steep learning curve, or complexity of application implementations may lead to poorly written or unaudited applications. Consensus failures, or scaling related failures, could cause network instability, congestion, or loss of funds.

Constellation's consensus model combines economic stakes with reputation scoring, but validator centralization risks could emerge if reputation manipulation or coordinated attacks compromise the staking and rating system. Protocol

upgrades and governance follow community coordination through the Stardust Collective, which may delay critical updates or lead to governance disputes. Security risks include potential bugs in the PRO mechanism, data storage layer, cryptographic verifications, or data application API. The use of Scala and JVM introduces dependencies on underlying libraries where security vulnerabilities could affect network operations.

Additionally, dependence on third-party services, such as centralized exchanges and external API integrations for metagraphs, introduces counterparty risks including hacks, service disruptions, and regulatory restrictions depending on the applications implementation. Despite these challenges, Constellation continues to evolve, with ongoing improvements in consensus algorithms, metagraph capabilities, and enterprise integration features.

I.6 Mitigation measures

Constellation implements multiple measures to minimize identified risks. For consensus security, the PRO mechanism combines economic stakes with reputation scoring, making attacks costly and detectable. The global staking requirement for validators ensures significant economic commitment, while ratings, federated seed lists, and reputation scores provide additional security layers against malicious actors.

Constellation minimizes technology and operational risks through ongoing network enhancements, continuous code review enabled by open-source development. Security risks are mitigated through end to end testing, continuous integration, automated monitoring services, and periodic security audits.

To protect against governance risks, the decentralized Stardust Collective serves as the primary coordination body between independent validators, developers, and community stakeholders. This structure facilitates organized decision-making while maintaining decentralization through distributed validator participation and community input mechanisms. Regular governance reviews and stakeholder engagement ensure that decision-making processes evolve with network maturity, preventing concentration of control while maintaining operational effectiveness. Additionally, the modular architecture supports governance flexibility by enabling protocol improvements and security updates without requiring disruptive network-wide changes, ensuring long-term adaptability as the ecosystem expands.

For long-term cryptographic security, the development team monitors quantum computing advances and prepares for eventual migration to post-quantum algorithms, with the modular architecture enabling cryptographic upgrades or changes in cryptographic key algorithms without network disruption.

Part J – Information on the sustainability indicators in relation to adverse impact on the climate and other environment-related adverse impacts

Constellation operates on a consensus mechanism known as Proof of Reputable Observation (PRO), which is designed to significantly reduce energy consumption compared to traditional blockchain models. Unlike Proof-of-Work (PoW) systems, which require large-scale computational resources and result in high energy expenditure, PRO leverages a combination of stake-based validation, reputation scoring, and federated seed lists to validate transactions efficiently and securely with minimal computational overhead.

The architecture of the protocol supports asynchronous execution across multiple layers. A scalable, DAG-based Layer 1 handles parallel transaction processing, while a Layer 0 aggregation layer provides data finality and ordering. Validation is performed selectively through extensible federated Metagraph applications, allowing for targeted processing and reducing excess energy usage. This structure supports horizontal scalability and maximizes energy efficiency without compromising network integrity.

Constellation's economic model is designed to balance sustainability with network functionality. By default, currency transactions are feeless, leveraging anti-spam heuristics. For more complex or resource-intensive operations, fees are determined dynamically through a federated marketplace, with flexibility to customize fee logic at the Metagraph level. Validators earn rewards from network emissions and delegator contributions, based on their performance and the amount of $DAG staked as collateral. The Metanomics model features controlled token inflation—starting at 6% and gradually decreasing to 0.5%—ensuring long-term economic sustainability.

The energy and emissions metrics below were calculated on a best-effort basis, using available network data and standard estimation methodologies. These figures are intended to offer a transparent view of the protocol's environmental footprint and are subject to refinement as more precise tracking tools are deployed:

- Total energy consumption: approximately 163,702.05 kWh per year
- Renewable energy usage: 19.23% of total consumption
- Energy intensity: estimated at 0.0469 kWh per transaction
- Scope 1 GHG emissions (direct): 0.00 tCO_2e/year

- Scope 2 GHG emissions (indirect, purchased): 45.06 tCO_2e/year
- GHG intensity: 0.0785 $kgCO_2e$ per transaction

These sustainability characteristics place Constellation among the more energy-efficient distributed ledger technologies, supporting environmentally responsible innovation in the blockchain space.