Swarms (SWARMS)
White paper

In accordance with Title II of Regulation (EU) 2023/1114 (MiCA)

N	Field	Content
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01	Date of notification	2025-06-19
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 operator of the trading platform 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 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 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 referred to 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	**Warning** 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 admission to trading 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	Swarms (SWARMS) is a Solana-based crypto-asset designed to function as the native token of the Swarms platform. It serves as the medium of exchange within the project's decentralized agent ecosystem and enables governance participation. Holders can transfer SWARMS in whole or part to third parties and all associated usage rights and obligations follow the token upon transfer.
09	Information about the quality and quantity of goods or services to which the utility tokens give access and restrictions on the transferability	N/A
10	Key information about the offer to the public or admission to trading	Kraken seeks admission to trading of the SWARMS token so as to be compliant with MiCA and in keeping with its mission to make available for trading to its clients a wide range of assets.

Part I – Information on risks

I.1	Offer-Related Risks	**General Risk Factors Associated with Crypto-Asset Offerings** The admission to trading of crypto-assets, including SWARMS, is subject to general risks inherent to the broader cryptocurrency market. **Market Volatility** The value of SWARMS may experience substantial fluctuations driven by investor sentiment, macroeconomic developments, and market conditions. **Regulatory Risks** Changes in legislation, applicable laws, compliance requirements or the implementation of new regulatory frameworks could affect the availability, trading, or use of such assets. **Security Risks** The risk of exploitation, hacking or security vulnerabilities of the underlying protocol and/or contracts of the token leading to a loss. **Reputational Risks** The potential for damage to an organization's credibility or public trust, which can negatively impact stakeholder confidence and overall business viability.
I.2	Issuer-Related Risks	**Governance-Concentration Risk** Although Swarms governance is open to Swarms holders, large token holders or the project team could exert outsized influence on protocol decisions. **Financial Stability Risk** The financial condition of the issuer, including challenges in cash flow or profitability, may influence the project's ability to meet its objectives. If financial difficulties arise, they could impact the operations or sustainability of the issuer. **Dependence on Key Personnel** The project's success is heavily dependent on the expertise and efforts of its core team. Swarms was co-founded by a small group of individuals. The loss of key team members or any breakdown in the team's functioning (for instance, due to internal governance issues or disputes) could slow down or jeopardize the project's progress and, by extension, diminish the utility and community trust in SWARMS.
I.3	Crypto-Assets-related Risks	**Market Volatility** The crypto-asset market is subject to significant price volatility, which may affect the value of SWARMS. Prices can fluctuate rapidly and unpredictably due to various factors, including market sentiment, economic indicators, technological developments, regulatory news, and macroeconomic trends. This high level of volatility may lead to sudden gains or losses and can impact the liquidity and tradability of the crypto-asset.

		Liquidity Liquidity refers to the ability to buy or sell a crypto-asset without causing significant price impact. SWARMS may experience periods of low liquidity, meaning that it could be difficult to enter or exit positions at desired prices or volumes. Reduced liquidity may result from limited market participation, exchange restrictions, or broader market conditions. This can lead to increased price volatility, slippage, and difficulty in executing transactions. **Cybersecurity & Technology Risks** Risks arising from vulnerabilities in the blockchain technology used by the project or platforms. Example risks include smart contract exploits, compromise of platforms, forking scenarios, compromise of cryptographic algorithms. **Adoption and Utility Risk** The value of SWARMS is directly linked to the adoption of the platform. If users and developers do not continue to utilize Swarms as expected – for example, if fewer decentralized applications (dApps) launch or user activity declines – demand for SWARMS could decrease, negatively impacting its value and utility. **Custody & Ownership Risk** The risk related to the inadequate safekeeping and control of crypto-assets e.g. loss of private keys, custodian insolvency leading to a loss.
I.4	Project Implementation-Related Risks	**Development Delays or Shortfalls** Swarms has planned several features and milestones. There is a risk that some of these planned developments could be delayed, scaled back, or not achieved as intended. Such delays or failures in delivering core features would directly impact the usefulness of SWARMS, since the token's utility is tied to these features. If advanced capabilities are not implemented on schedule or at quality, user adoption and confidence in the project could decline. **Adoption and Network Effect Risks** The value of SWARM's utility is correlated with the Swarms platform's user base and community participation. There is a risk that the platform may not attract or retain a large active user community. **Reliance on Third-Party Technology** Swarms relies on certain third-party technologies and integrations (for example, the underlying blockchain network of Solana for token transfers). If any critical external technology encounters problems the implementation of Swarms services could be disrupted. This could prevent users from accessing features, damaging the token's utility and the project's reputation.

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Scaling and Infrastructure
As usage grows, Swarms will need to scale its infrastructure (e.g., servers for data processing, APIs, etc.). If the team fails to scale the technology appropriately, users might face poor performance or downtime. Any significant technical outages or data inaccuracies on the platform can erode user trust.

Regulatory Compliance
As the project progresses, it may encounter regulatory challenges that impact its design, implementation, or operation. Evolving legal and compliance requirements could necessitate changes to the project's architecture, user interface, or overall business model, potentially resulting in development delays, increased costs, or the need to rework key components.

Operational Risks:
As a relatively new platform, Swarms may face operational challenges such as smart contract bugs, user interface issues, or lack of customer support infrastructure. Operational hiccups could harm Swarm's reputation and deter users.

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<td>I.5</td>
<td>Technology-Related Risks</td>
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Smart contract risks
SWARMS uses smart contracts to facilitate automated transactions and processes. While these contracts enhance efficiency and decentralization, they also introduce specific technical risks. Vulnerabilities such as coding errors, design flaws, or security loopholes within the smart contract code may be exploited by malicious actors. Such exploits could result in the loss of assets, unauthorized access to sensitive information, or unintended and irreversible execution of transactions.

Blockchain Network Risks
SWARMS operates on a public blockchain infrastructure, which is maintained by a decentralized network of participants. The functionality and reliability of the crypto-asset are dependent on the performance and security of the underlying blockchain. Risks may include network congestion, high transaction fees, delayed processing times, or, in extreme cases, outages and disruptions. Additionally, vulnerabilities or failures in the consensus mechanism, attacks on the network (e.g., 51% attacks), or protocol-level bugs could impact the operation and availability of SWARMS.

Risk of Cryptographic Vulnerabilities
Technological advancements, such as quantum computing, could pose potential risks to cryptocurrencies.

Privacy
Transactions involving SWARMS are recorded on a public blockchain, where

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		transaction data is transparent and permanently accessible. While public addresses do not directly reveal personal identities, transaction histories can be analyzed and, in some cases, linked to individuals through data aggregation or external information sources. This transparency may pose privacy concerns for users seeking confidentiality in their financial activity. Participants should be aware that transaction data on public blockchains is not inherently private and could be subject to scrutiny by third parties, including regulators, analytics firms, or malicious actors.
I.6	Mitigation measures	**Use of Established Standard** SWARMS is implemented using a well-tested token standard (SPL on SOL) which has been widely used and vetted. By adhering to a standard protocol and not using unproven custom code where unnecessary, the project reduces the likelihood of unknown bugs.

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

A.1	Name	N/A
A.2	Legal form	N/A
A.3	Registered address	N/A
A.4	Head office	N/A
A.5	Registration Date	N/A
A.6	Legal entity identifier	N/A
A.7	Another identifier required pursuant to applicable national law	N/A

A.8	Contact telephone number	N/A
A.9	E-mail address	N/A
A.10	Response Time (Days)	N/A
A.11	Parent Company	N/A
A.12	Members of the Management body	N/A
A.13	Business Activity	N/A
A.14	Parent Company Business Activity	N/A
A.15	Newly Established	N/A
A.16	Financial condition for the past three years	N/A
A.17	Financial condition since registration	N/A

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

B.1	Issuer different from offeror or person seeking admission to trading	true
B.2	Name	Not available
B.3	Legal form	Not available
B.4	Registered address	Not available
B.5	Head office	Not available
B.6	Registration Date	Not available
B.7	Legal entity identifier	Not available
B.8	Another identifier required pursuant to applicable national law	Not applicable
B.9	Parent Company	Not available
B.10	Members of the Management body	Not available
B.11	Business Activity	Not available
B.12	Parent Company Business Activity	Not available

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

C.1	Name	Payward Global Solutions LTD
C.2	Legal form	N/A
C.3	Registered address	N/A
C.4	Head office	N/A
C.5	Registration Date	2023-07-11
C.6	Legal entity identifier of the operator of the trading platform	9845003D98SCC2851458
C.7	Another identifier required pursuant to applicable national law	N/A
C.8	Parent Company	N/A
C.9	Reason for Crypto-Asset White Paper Preparation	Kraken seeks admission to trading of the SWARMS token so as to be compliant with MiCA and in keeping with its mission to make available for trading to its clients a wide range of assets.
C.10	Members of the Management body	

Full Name	Business Address	Function
Shannon Kurtas	70 Sir John Rogerson's Quay, Dublin 2, Ireland	Board Member

		Andrew Mulvenny	70 Sir John Rogerson's Quay, Dublin 2, Ireland	Board Member
		Shane O'Brien	70 Sir John Rogerson's Quay, Dublin 2, Ireland	Board Member
		Laura Walsh	70 Sir John Rogerson's Quay, Dublin 2, Ireland	Board Member
		Michael Walsh	70 Sir John Rogerson's Quay, Dublin 2, Ireland	Board Member
C.11	Operator Business Activity	PGSL is the operator of a Trading Platform for Crypto Assets, in accordance with Article 3(1)(18) of Regulation (EU) 2023/1114 (MiCA).		
C.12	Parent Company Business Activity	Payward, Inc., a Delaware, USA corporation, is the parent company of a worldwide group of subsidiaries (the following paragraphs use the term "Payward" or "Payward Group" to refer to the group) collectively doing business as "Kraken." Payward's primary business is the operation of an online virtual asset platform that enables clients to buy and sell virtual assets on a spot basis, including the transfer of crypto-assets to and from external wallets. Payward, through its various affiliates, offers a number of other services and products, including: * A trading platform for futures contracts on virtual assets ("Kraken Derivatives"); * A platform for buying and selling NFTs; * An over-the-counter ("OTC") desk; * Extensions of margin to support spot trading of virtual assets; * A benchmark administrator; and * Staking services.		
C.13	Other persons drawing up the crypto-asset white paper according to Article 6(1), second subparagraph, of Regulation (EU) 2023/1114	N/A		

C.14	Reason for drawing the white paper by persons referred to in Article 6(1), second subparagraph, of Regulation (EU) 2023/1114	N/A

Part D- Information about the crypto-asset project

D.1	Crypto-asset project name	Swarms
D.2	Crypto-assets name	N/A
D.3	Abbreviation	N/A
D.4	Crypto-asset project description	The Swarms project is a decentralized crypto-asset initiative that combines artificial intelligence agents with blockchain technology. It aims to create a "decentralized agent economy" on the Solana network, whereby independent AI agents can interact and transact using the SWARMS token. The project's platform provides tools for developers to deploy and coordinate multiple AI agents, a marketplace for users to discover and utilize agent services, and a governance system.
D.5	Details of all natural or legal persons involved in the implementation of the crypto-asset project	Kye Gomez is the public facing founder of Swarms, ultimately sponsoring the github repository.
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 SWARMS project officially launched in December 2024, introducing both the SWARMS token and the initial framework for its AI agent platform. Since launch, the team has rolled out key components, including an open-source Agent API in January 2025 to facilitate deployment and management of AI agents on the network, release of v6.0 with decentralized multi-agent orchestration. The project's past milestones primarily involve establishing the core technology and initial community governance structures. Refer to the project team website for any further information regarding future milestones.
D.9	Resource Allocation	No formal fundraising round or venture capital investment has been publicly disclosed for the Swarms project. The Swarms team is actively building DAO governance, where users send/stake SWARMS tokens to an official treasury address to join the DAO.
D.10	Planned Use of Collected Funds or Crypto-Assets	Currently the DAO has proposed a 10M token fund to support infrastructure, partner integrations, and R&D. No further explanation or allocation of funds has been explained.
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
E.2	Reasons for Public Offer or Admission to trading	Making secondary trading available to the consumers on the Kraken Trading platform in compliance with the MiCA regulatory framework
E.3	Fundraising Target	N/A

E.4	Minimum Subscription Goals	N/A
E.5	Maximum Subscription Goal	N/A
E.6	Oversubscription Acceptance	N/A
E.7	Oversubscription Allocation	N/A
E.8	Issue Price	N/A
E.9	Official currency or other crypto-assets determining the issue price	N/A
E.10	Subscription fee	N/A
E.11	Offer Price Determination Method	N/A
E.12	Total Number of Offered/Traded crypto-assets	1 000 000 000 maximum supply
E.13	Targeted Holders	ALL
E.14	Holder restrictions	N/A

E.15	Reimbursement Notice	N/A
E.16	Refund Mechanism	N/A
E.17	Refund Timeline	N/A
E.18	Offer Phases	N/A
E.19	Early Purchase Discount	N/A
E.20	time-limited offer	N/A
E.21	Subscription period beginning	N/A
E.22	Subscription period end	N/A
E.23	Safeguarding Arrangements for Offered Funds/crypto-assets	N/A
E.24	Payment Methods for crypto-asset Purchase	N/A
E.25	Value Transfer Methods for Reimbursement	N/A

E.26	Right of Withdrawal	N/A
E.27	Transfer of Purchased crypto-assets	N/A
E.28	Transfer Time Schedule	N/A
E.29	Purchaser's Technical Requirements	N/A
E.30	crypto-asset service provider (CASP) name	N/A
E.31	CASP identifier	N/A
E.32	Placement form	NTAV
E.33	Trading Platforms name	N/A
E.34	Trading Platforms Market Identifier Code (MIC)	N/A
E.35	Trading Platforms Access	N/A
E.36	Involved costs	N/A

E.37	Offer Expenses	N/A
E.38	Conflicts of Interest	All listings decisions made by Payward Global Solution Ltd are made independently by staff of the entity in line with internal policies. PGSL publishes a conflict of interest disclosure on its website advising of potential conflicts that may arise.
E.39	Applicable law	Any dispute relating to this white paper shall be governed by and construed and enforced in accordance with the laws of Ireland without regard to conflict of law rules or principles (whether of Ireland or any other jurisdiction) that would cause the application of the laws of any other jurisdiction, irrespective of whether SWARMS tokens qualify as right or property under the applicable law.
E.40	Competent court	Any disputes or claims arising out of this white paper will be subject to the exclusive jurisdiction of the Irish courts.

Part F - Information about the crypto-assets

F.1	Crypto-Asset Type	SWARMS is classified as a crypto-asset other than an asset referenced token or e-money token under MiCA, (EU) 2023/1114.
F.2	Crypto-Asset Functionality	The SWARMS token's primary functionalities include serving as a medium of exchange within the Swarms agent platform, enabling governance rights, and providing incentives for participants. **Payment and Transactions:** SWARMS is used for transactions in the platform's marketplace (e.g., users pay in SWARMS for deploying or accessing AI agent services). **Governance:** Holding SWARMS allows participation in the Swarms DAO; token holders can propose and vote on changes or initiatives, thereby influencing project direction. **Staking and Rewards:** SWARMS may be staked or provided as liquidity in certain contexts (such as to support decentralized exchange pools or future network components), with participants potentially earning rewards.
F.3	Planned Application of Functionalities	The basic token function of SWARMS (transferability) is currently active. Additional functionalities tied to the Swarms platform (marketplace enhancements, developer tools) are being introduced in phases. For instance, the use of SWARMS as a universal payment method within all agent-related services is being rolled out through newly released APIs (such as subscription

		and billing APIs expected in 2025).
A description of the characteristics of the crypto-asset, including the data necessary for classification of the crypto-asset white paper in the register referred to in Article 109 of Regulation (EU) 2023/1114, as specified in accordance with paragraph 8 of that Article		
F.4	Type of white paper	OTHR
F.5	The type of submission	NEWT
F.6	Crypto-Asset Characteristics	SWARMS is a fungible SPL token created on the Solana blockchain via the pump.fun platform (token address: 74SBV4zDXxTRgv1pEMoECskKBkZHc2yGPnc7GYVepump). It has a fixed maximum supply of 1 000 000 000 units and is freely transferable on the Solana network.
F.7	Commercial name or trading name	N/A
F.8	Website of the issuer	https://swarms.world/
F.9	Starting date of offer to the public or admission to trading	2024-12-25
F.10	Publication date	2025-07-17
F.11	Any other services provided by the issuer	N/A
F.12	Identifier of operator of the trading platform	PGSL

F.13	Language or languages of the white paper	English
F.14	Digital Token Identifier	D3N4300BB
F.15	Functionally Fungible Group Digital Token Identifier	N/A
F.16	Voluntary data flag	Mandatory
F.17	Personal data flag	true
F.18	LEI eligibility	N/A
F.19	Home Member State	Ireland
F.20	Host Member States	Austria, Belgium, Bulgaria, Croatia, Cyprus, Czech Republic, Denmark, Estonia, Finland, France, Germany, Greece, Hungary, Italy, Latvia, Lithuania, Luxembourg, Malta, Netherlands, Poland, Portugal, Romania, Slovakia, Slovenia, Spain, Sweden, Iceland, Liechtenstein, Norway

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

| G.1 | Purchaser Rights and Obligations | **Right of Transfer:**
The holder can transfer the SWARMS tokens to third parties. Upon transfer, all rights and obligations are transferred to the new holder.

Trading:
If the SWARMS token is listed on cryptocurrency exchanges, holders can trade their tokens there. |

		Governance: Within the Swarms ecosystem, holders may vote on governance proposals affecting the Swarms platform.
G.2	Exercise of Rights and obligations	**Transfers:** To transfer SWARMS, a holder uses a digital wallet supporting Solana SPL tokens. Transfers of SWARMS are executed by initiating a blockchain transaction. **Trading:** Trading the token on exchanges follows the procedures of the trading platforms (for example, complying with exchange KYC rules and placing orders on the market). **Governance:** To exercise voting rights, holders must use the official Swarms DAO governance portal (or compatible interface) and may need to satisfy any minimum token thresholds for proposal submission or voting.
G.3	Conditions for modifications of rights and obligations	The rights and obligations attached to SWARMS as described in this white paper reflect information available at the time of issuance. This white paper is issued by Kraken and does not constitute a commitment or guarantee by Swarms or any other party regarding future modifications. No promises, warranties, or assurances are made herein regarding future token functionality, and this section is provided solely for informational purposes.
G.4	Future Public Offers	The project team has not announced any future public offers of SWARMS.
G.5	Issuer Retained Crypto-Assets	The team initially retained 20M tokens. A DAO proposal in 2025 approved an increase to 100M (10%).
G.6	Utility Token Classification	false
G.7	Key Features of Goods/Services of Utility Tokens	false

G.8	Utility Tokens Redemption	N/A
G.9	Non-Trading request	This white paper reflects a request to admit the token to trading.
G.10	Crypto-Assets purchase or sale modalities	N/A
G.11	Crypto-Assets Transfer Restrictions	Kraken may, in accordance with applicable laws and internal policies and terms, impose restrictions on buyers and sellers of these tokens.
G.12	Supply Adjustment Protocols	false
G.13	Supply Adjustment Mechanisms	Not applicable.
G.14	Token Value Protection Schemes	false
G.15	Token Value Protection Schemes Description	N/A
G.16	Compensation Schemes	false
G.17	Compensation Schemes Description	N/A

G.18	Applicable law	Any dispute relating to this white paper shall be governed by and construed and enforced in accordance with the laws of Ireland without regard to conflict of law rules or principles (whether of Ireland or any other jurisdiction) that would cause the application of the laws of any other jurisdiction, irrespective of whether SWARMS tokens qualify as right or property under the applicable law.
G.19	Competent court	Any disputes or claims arising out of this white paper will be subject to the exclusive jurisdiction of the Irish courts.

Part H – information on the underlying technology

H.1	Distributed ledger technology	N/A
H.2	Protocols and technical standards	The Swarms token is based on Solana (SOL), which utilizes decentralized Distributed-Ledger technology. This protocol provides the foundation for secure transactions and smart contracts. SPL Token Standard: The SPL standard is a technical protocol for issuing and managing tokens, ensuring that the Swarms token is compatible with most wallets, exchanges, and decentralized applications (dApps).
H.3	Technology Used	The SWARMS token uses the existing SPL token standard on Solana.
H.4	Consensus Mechanism	Solana uses Proof-of-Stake with Tower BFT and Proof-of-History, where leaders are pre-selected by stake and transactions, including Swarms transfers, receive sub-second confirmation and high throughput.
H.5	Incentive Mechanisms and Applicable Fees	SWARMS relies on the existing incentive mechanisms and fee structures of the Solana blockchain.
H.6	Use of Distributed Ledger Technology	false
H.7	DLT Functionality Description	N/A

H.8	Audit	false
H.9	Audit outcome	N/A

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

S.1	Name	Payward Global Solutions Limited
S.2	Relevant legal entity identifier	9845003D98SCC2851458
S.3	Name of the crypto-asset	swarms

S.4	Consensus Mechanism	Solana uses a unique combination of Proof of History (PoH) and Proof of Stake (PoS) to achieve high throughput, low latency, and robust security.
		
		Core Concepts:
		1. Proof of History (PoH):
		   - Time-Stamped Transactions: PoH is a cryptographic technique that timestamps transactions, creating a historical record that proves that an event has occurred at a specific moment in time.
		   - Verifiable Delay Function: PoH uses a Verifiable Delay Function (VDF) to generate a unique hash that includes the transaction and the time it was processed. This sequence of hashes provides a verifiable order of events, enabling the network to efficiently agree on the sequence of transactions.
		2. Proof of Stake (PoS):
		   - Validator Selection: Validators are chosen to produce new blocks based on the number of SOL tokens they have staked. The more tokens staked, the higher the chance of being selected to validate transactions and produce new blocks.
		   - Delegation: Token holders can delegate their SOL tokens to validators, earning rewards proportional to their stake while enhancing the network's security.
		
		Consensus Process:
		
		1. Transaction Validation:
		     Transactions are broadcast to the network and collected by validators. Each transaction is validated to ensure it meets the network's criteria, such as having correct signatures and sufficient funds.
		2. PoH Sequence Generation:

A validator generates a sequence of hashes using PoH, each containing a timestamp and the previous hash. This process creates a historical record of transactions, establishing a cryptographic clock for the network.

3. Block Production:

The network uses PoS to select a leader validator based on their stake. The leader is responsible for bundling the validated transactions into a block. The leader validator uses the PoH sequence to order transactions within the block, ensuring that all transactions are processed in the correct order.

4. Consensus and Finalization:

Other validators verify the block produced by the leader validator. They check the correctness of the PoH sequence and validate the transactions within the block. Once the block is verified, it is added to the blockchain. Validators sign off on the block, and it is considered finalized.

Security and Economic Incentives:

1. Incentives for Validators:

- Block Rewards: Validators earn rewards for producing and validating blocks. These rewards are distributed in SOL tokens and are proportional to the validator's stake and performance.
- Transaction Fees: Validators also earn transaction fees from the transactions included in the blocks they produce. These fees provide an additional incentive for validators to process transactions efficiently.

2. Security:

- Staking: Validators must stake SOL tokens to participate in the consensus process. This staking acts as collateral, incentivizing validators to act honestly. If a validator behaves maliciously or fails to perform, they risk losing their staked tokens.
- Delegated Staking: Token holders can delegate their SOL tokens to validators, enhancing network security and decentralization. Delegators share in the rewards and are incentivized to choose reliable validators.

3. Economic Penalties:

Slashing: Validators can be penalized for malicious behavior, such as double-signing or producing invalid blocks. This penalty, known as slashing, results in the loss of a portion of the staked tokens, discouraging dishonest actions.

S.5	Incentive Mechanisms and Applicable Fees	Solana uses a combination of Proof of History (PoH) and Proof of Stake (PoS) to secure its network and validate transactions. Incentive Mechanisms: 1. Validators: - Staking Rewards: Validators are chosen based on the number of SOL tokens they have staked. They earn rewards for producing and validating

blocks, which are distributed in SOL. The more tokens staked, the higher the chances of being selected to validate transactions and produce new blocks.

- Transaction Fees: Validators earn a portion of the transaction fees paid by users for the transactions they include in the blocks. This provides an additional financial incentive for validators to process transactions efficiently and maintain the network's integrity.

2. Delegators:
- Delegated Staking: Token holders who do not wish to run a validator node can delegate their SOL tokens to a validator. In return, delegators share in the rewards earned by the validators. This encourages widespread participation in securing the network and ensures decentralization.

3. Economic Security:
- Slashing: Validators can be penalized for malicious behavior, such as producing invalid blocks or being frequently offline. This penalty, known as slashing, involves the loss of a portion of their staked tokens. Slashing deters dishonest actions and ensures that validators act in the best interest of the network.
- Opportunity Cost: By staking SOL tokens, validators and delegators lock up their tokens, which could otherwise be used or sold. This opportunity cost incentivizes participants to act honestly to earn rewards and avoid penalties. Fees Applicable on the Solana Blockchain

Transaction Fees:
1. Low and Predictable Fees:
Solana is designed to handle a high throughput of transactions, which helps keep fees low and predictable. The average transaction fee on Solana is significantly lower compared to other blockchains like Ethereum.

2. Fee Structure:
Fees are paid in SOL and are used to compensate validators for the resources they expend to process transactions. This includes computational power and network bandwidth.

3. Rent Fees:
State Storage: Solana charges rent fees for storing data on the blockchain. These fees are designed to discourage inefficient use of state storage and encourage developers to clean up unused state. Rent fees help maintain the efficiency and performance of the network.

4. Smart Contract Fees:
Execution Costs: Similar to transaction fees, fees for deploying and interacting with smart contracts on Solana are based on the computational resources required. This ensures that users are charged proportionally for the resources they consume.

S.6	Beginning of the period to which the disclosure relates	2024-05-28
S.7	End of the period to which the disclosure relates	2025-05-28
S.8	Energy consumption	235.26700 kWh/a
S.9	Energy consumption sources and methodologies	The energy consumption of this asset is aggregated across multiple components: To determine the energy consumption of a token, the energy consumption of the network(s) solana is calculated first. For the energy consumption of the token, a fraction of the energy consumption of the network is attributed to the token, which is determined based on the activity of the crypto-asset within the network. When calculating the energy consumption, the Functionally Fungible Group Digital Token Identifier (FFG DTI) is used - if available - to determine all implementations of the asset in scope. The mappings are updated regularly, based on data of the Digital Token Identifier Foundation. The information regarding the hardware used and the number of participants in the network is based on assumptions that are verified with best effort using empirical data. In general, participants are assumed to be largely economically rational. As a precautionary principle, we make assumptions on the conservative side when in doubt, i.e. making higher estimates for the adverse impacts.