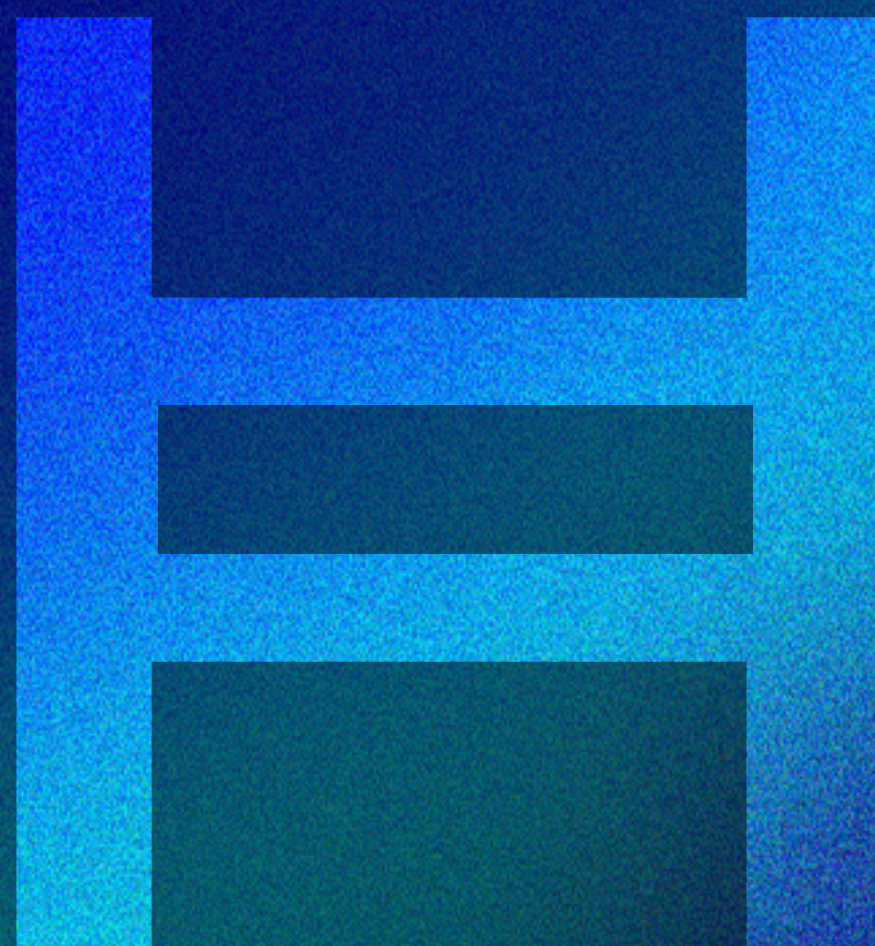




# HBAR MiCA White Paper

Prepared by the MiCA Crypto Alliance





# Index

|  |                |
|--|----------------|
| <b>I. Compliance with duties of information</b>  | <b>Page 2</b>  |
| <hr/>  |                |
| <b>II. Summary</b>   | <b>Page 4</b>  |
| <hr/>  |                |
| <b>Part A: Information about the offeror or the person seeking admission to trading</b>  | <b>Page 8</b>  |
| <hr/>  |                |
| <b>Part B: Information about the issuer, if different from the offeror or person seeking admission to trading</b>                                      | <b>Page 9</b>  |
| <hr/>  |                |
| <b>Part C: Information about the operator of the trading platform</b>  | <b>Page 11</b> |
| <hr/>  |                |
| <b>Part D: Information about the crypto-asset project</b>  | <b>Page 13</b> |
| <hr/>  |                |
| <b>Part E: Information about the offer to the public of crypto-assets or their admission to trading</b>  | <b>Page 19</b> |
| <hr/>  |                |
| <b>Part F: Information about the crypto-assets</b>   | <b>Page 22</b> |
| <hr/>  |                |
| <b>Part G: Information on the rights and obligations attached to the crypto-assets</b>   | <b>Page 25</b> |
| <hr/>  |                |
| <b>Part H: Information on the underlying technology</b>  | <b>Page 27</b> |
| <hr/>  |                |
| <b>Part I: Information on the risks</b>  | <b>Page 40</b> |
| <hr/>  |                |
| <b>Part J: Information on the sustainability indicators in relation to adverse impact on the climate and other environment-related adverse impacts</b> | <b>Page 47</b> |

# I. Compliance with duties of information

| N  | Field  | Content   |
|----|--|---|
| 00 | Table of contents  | <div>I. Compliance with duties of information 2</div> <div>II. Summary 4</div> <div>Part A: Information about the offeror or the person seeking admission to trading 8</div> <div>Part B: Information about the issuer, if different from the offeror or person seeking admission to trading 9</div> <div>Part C: Information about the operator of the trading platform 11</div> <div>Part D: Information about the crypto-asset project 13</div> <div>Part E: Information about the offer to the public of crypto-assets or their admission to trading 19</div> <div>Part F: Information about the crypto-assets 22</div> <div>Part G: Information on the rights and obligations attached to the crypto-assets 25</div> <div>Part H: Information on the underlying technology 27</div> <div>Part I: Information on the risks 40</div> <div>Part J: Information on the sustainability indicators in relation to adverse impact on the climate and other environment-related adverse impacts 47</div> |
| 01 | Date of notification   | Not applicable (N/A)  |
| 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 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.  |

| N  | Field   | Content   |
|----|---|---|
| 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 or the deposit guarantee schemes under Directive 2014/49/EU of the European Parliament and of the Council. |



## II. Summary

| N  | Field  | Content   |
|----|--|---|
| 07 | Warning in accordance with Article 6(7), second subparagraph, of Regulation (EU) 2023/1114 | <p>Warning</p> <p>The summary should be read as an introduction to the crypto-asset white paper.</p> <p>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.</p> <p>The offer to the public of the 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.</p> <p>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 or any other offer document pursuant to Union or national law.</p> |
| 08 | Characteristics of the crypto-asset  | <p>HBAR is the native cryptocurrency of the Hedera public network. The network uses a consensus mechanism called hashgraph to enable fast, low-cost, and energy-efficient digital transactions. HBAR supports secure and fair operations in a decentralised environment and is suitable for both public and enterprise use. The total supply of HBAR is fixed and capped at 50 billion units.</p> <p>Purchasers of HBAR can use the token for several purposes. The primary use is to pay for services on the Hedera network, including transferring tokens, storing data, and running smart contracts. These payments are used to compensate the computers (called nodes) that maintain the network, covering their operational costs.</p>   |



| N | Field | Content   |
|---|-------|---|
|   |       | <p>Holders of HBAR may also choose to stake their tokens to support the network’s security. Staking means assigning HBAR to a network node without transferring ownership, such that the more HBAR a node is assigned, the higher their influence in consensus. In return, stakers may earn rewards for their participation in determining which nodes are the most trustworthy. Staking is optional, but makes it more difficult for malicious actors to attack the ledger as long as two thirds of the validation power remains honest. There is no fixed minimum or maximum amount required per staker although there are minimums and maximum stake thresholds for nodes to receive stake. Unlike other networks, there is also no lock-up period; staked tokens remain under the holder’s control and can be moved or unstaked at any time.</p> <p>The terms of staking including how rewards are calculated, the list of eligible nodes, and technical requirements are determined by the Hedera Council (the “Hedera Council”), a consortium of up to 39 leading organizations around the world organized through Hedera Hashgraph, LLC, a Delaware limited liability company based in the United States. The Hedera Council may change the criteria for eligible nodes and the calculation of rewards over time. For example, the Hedera Council may adjust reward rates, introduce or remove staking limits, or update the list of eligible nodes. Any such changes are announced through the Hedera Council’s public governance and communication channels.</p> <p>Under MiCA, HBAR is a token of the “other” category as it is not referenced by assets, it does not purport to maintain a stable value by being backed with currency, nor is it merely intended to provide access to a particular good or service. Rather it acts as a general medium of exchange that can be used for the payment or exchange of external goods or services in addition to the services offered by the Hedera network. Holding HBAR also does not confer any ownership rights or governance roles in the Hedera Council.</p> |



| N                 | Field   | Content   |  |          |          |          |                   |                               |                            |  |                |                                       |                                       |                                   |
|-------------------|---|---|--|----------|----------|----------|-------------------|-------------------------------|----------------------------|--|----------------|---------------------------------------|---------------------------------------|-----------------------------------|
| 10                | Key information about the offer to the public or admission to trading | <p>HBAR was not offered through a traditional public offering nor an Initial Coin Offering (ICO). Instead, it is available for trading on numerous wallets and crypto asset exchanges globally. This method allows users to purchase HBAR directly from the open market.</p> <p>The totality of hbars were initially minted in 2017. A very small amount of coins (6.7 million HBAR) was released in the following months to early users to test the network as part of its community testing program. Since, hbars have been acquired by buyers by regulated investment contracts: Simple Agreements for Future Tokens (SAFTs) under applicable securities laws (US Securities Act of 1933), specifically Regulation D. The initial SAFT purchasers were presented with an option to acquire additional hbars in exchange for agreeing to a prolonged, pre-determined schedule for token release. After the Hedera network became operational, Token Purchase Agreements (TPAs), which are classified as physical forward agreements under applicable law, were entered to sell hbars to eligible contract participants (ECPs). Physical forward agreements are excluded from the definition of swap agreements under relevant commodity laws, but were nevertheless reported to the applicable US regulator for the purpose of full transparency. The TPAs were offered to support the ongoing operations of the network.</p> <p>The multiple SAFT series included an initial sale to early users as part of a community testing programme, and later Open Access for the general public. Details of the SAFT offerings follow:</p> <table><tr><th></th><th>Series 1</th><th>Series 2</th><th>Series 3</th></tr><tr><td>Dates of offering</td><td>December 2017 to January 2018</td><td>January 2018 to March 2018</td><td>April-August 2018 (institutional) ; August 1-18, 2018 (accredited crowdsale)</td></tr><tr><td>Price per coin</td><td>\$1.00 pre-split / \$0.001 post-split</td><td>\$5.00 pre-split / \$0.005 post-split</td><td>SAFT 3A: \$0.12; SAFT 3B: \$0.096</td></tr></table> |  | Series 1 | Series 2 | Series 3 | Dates of offering | December 2017 to January 2018 | January 2018 to March 2018 | April-August 2018 (institutional) ; August 1-18, 2018 (accredited crowdsale) | Price per coin | \$1.00 pre-split / \$0.001 post-split | \$5.00 pre-split / \$0.005 post-split | SAFT 3A: \$0.12; SAFT 3B: \$0.096 |
|                   | Series 1  | Series 2  | Series 3   |          |          |          |                   |                               |                            |  |                |                                       |                                       |                                   |
| Dates of offering | December 2017 to January 2018   | January 2018 to March 2018  | April-August 2018 (institutional) ; August 1-18, 2018 (accredited crowdsale) |          |          |          |                   |                               |                            |  |                |                                       |                                       |                                   |
| Price per coin    | \$1.00 pre-split / \$0.001 post-split                                 | \$5.00 pre-split / \$0.005 post-split   | SAFT 3A: \$0.12; SAFT 3B: \$0.096  |          |          |          |                   |                               |                            |  |                |                                       |                                       |                                   |



| N                      | Field       | Content  |   |          |          |          |                    |        |         |   |                 |    |     |     |             |             |             |               |                       |     |     |     |                        |      |      |       |                   |    |    |   |
|------------------------|-------------|--|---|----------|----------|----------|--------------------|--------|---------|---|-----------------|----|-----|-----|-------------|-------------|-------------|---------------|-----------------------|-----|-----|-----|------------------------|------|------|-------|-------------------|----|----|---|
|                        |             | <table><tr><th></th><th>Series 1</th><th>Series 2</th><th>Series 3</th></tr><tr><td>Total funds raised</td><td>\$4.7m</td><td>\$14.5m</td><td>SAFT 3A: \$81.5m; SAFT 3B: \$22.3m; Total: \$103.8m</td></tr><tr><td>% of SAFT funds</td><td>4%</td><td>12%</td><td>84%</td></tr><tr><td>Total coins</td><td>4.9 billion</td><td>2.9 billion</td><td>922.5 million</td></tr><tr><td>% of total SAFT hbars</td><td>56%</td><td>33%</td><td>11%</td></tr><tr><td>% of total hbar supply</td><td>9.8%</td><td>5.8%</td><td>1.84%</td></tr><tr><td># SAFT purchasers</td><td>40</td><td>80</td><td>778 total (528 for SAFT 3A and 302 for SAFT 3B)</td></tr></table> <p>Note that, as part of the terms of the original licence agreement, the Hedera Council distributed 2.5 billion coins (5%) to Swirlds, Inc. Independent of the licence agreement, an additional 1 billion coins are allocated to Swirlds investors (excluding the Hedera Council founders).</p> <p>At the time of submission of this whitepaper, there is still an unallocated supply of 67,018,958 hbars (0.13%), which could be distributed to network operations or ecosystem development.</p> <p>Following its initial distribution, HBAR became available on multiple trading platforms, including major exchanges like Binance, Coinbase, Huobi, and OKEx, where it is traded against various fiat and cryptocurrency pairs.</p> <p>Proceeds from HBAR sales were and are used to fund the development of the network, including open-source and ecosystem development (e.g. grant programmes), and compensation to founders, executives, employees and contractors in accordance to compensation schedules. Until 2022, when all intellectual property was purchased and acquired by the Hedera Council, this also included monthly compensation to Swirlds, Inc. as part of the Hashgraph License Agreement.</p> |   | Series 1 | Series 2 | Series 3 | Total funds raised | \$4.7m | \$14.5m | SAFT 3A: \$81.5m; SAFT 3B: \$22.3m; Total: \$103.8m | % of SAFT funds | 4% | 12% | 84% | Total coins | 4.9 billion | 2.9 billion | 922.5 million | % of total SAFT hbars | 56% | 33% | 11% | % of total hbar supply | 9.8% | 5.8% | 1.84% | # SAFT purchasers | 40 | 80 | 778 total (528 for SAFT 3A and 302 for SAFT 3B) |
|                        | Series 1    | Series 2   | Series 3  |          |          |          |                    |        |         |   |                 |    |     |     |             |             |             |               |                       |     |     |     |                        |      |      |       |                   |    |    |   |
| Total funds raised     | \$4.7m      | \$14.5m  | SAFT 3A: \$81.5m; SAFT 3B: \$22.3m; Total: \$103.8m |          |          |          |                    |        |         |   |                 |    |     |     |             |             |             |               |                       |     |     |     |                        |      |      |       |                   |    |    |   |
| % of SAFT funds        | 4%          | 12%  | 84%   |          |          |          |                    |        |         |   |                 |    |     |     |             |             |             |               |                       |     |     |     |                        |      |      |       |                   |    |    |   |
| Total coins            | 4.9 billion | 2.9 billion  | 922.5 million                                       |          |          |          |                    |        |         |   |                 |    |     |     |             |             |             |               |                       |     |     |     |                        |      |      |       |                   |    |    |   |
| % of total SAFT hbars  | 56%         | 33%  | 11%   |          |          |          |                    |        |         |   |                 |    |     |     |             |             |             |               |                       |     |     |     |                        |      |      |       |                   |    |    |   |
| % of total hbar supply | 9.8%        | 5.8%   | 1.84%   |          |          |          |                    |        |         |   |                 |    |     |     |             |             |             |               |                       |     |     |     |                        |      |      |       |                   |    |    |   |
| # SAFT purchasers      | 40          | 80   | 778 total (528 for SAFT 3A and 302 for SAFT 3B)     |          |          |          |                    |        |         |   |                 |    |     |     |             |             |             |               |                       |     |     |     |                        |      |      |       |                   |    |    |   |



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

This section is currently N/A as the crypto asset was not offered to the general public (see Sec. II, N.10) and has already been admitted to trading on multiple exchanges around the world.

| N    | Field   | Content |
|------|---|---------|
| 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 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

| N             | Field  | Content  |          |          |                  |             |              |   |               |              |   |             |              |   |
|---------------|--|--|----------|----------|------------------|-------------|--------------|---|---------------|--------------|---|-------------|--------------|---|
| B.1           | Issuer different from offeror or person seeking admission to trading | TRUE   |          |          |                  |             |              |   |               |              |   |             |              |   |
| B.2           | Name   | Hedera Hashgraph, LLC. (previously Hashgraph Consortium, LLC)  |          |          |                  |             |              |   |               |              |   |             |              |   |
| B.3           | Legal form   | N/A as LEI is provided in B.7  |          |          |                  |             |              |   |               |              |   |             |              |   |
| B.4           | Registered address   | N/A as LEI is provided in B.7  |          |          |                  |             |              |   |               |              |   |             |              |   |
| B.5           | Head office  | N/A as LEI is provided in B.7  |          |          |                  |             |              |   |               |              |   |             |              |   |
| B.6           | Registration date  | 2017-10-05   |          |          |                  |             |              |   |               |              |   |             |              |   |
| B.7           | Legal entity identifier  | 25490049T42L118ZYK52   |          |          |                  |             |              |   |               |              |   |             |              |   |
| B.8           | Another identifier required pursuant to applicable national law      | Delaware File Number 6536557<br>Federal EIN: 46-4716239  |          |          |                  |             |              |   |               |              |   |             |              |   |
| B.9           | Parent company   | N/A as LEI is provided in B.7  |          |          |                  |             |              |   |               |              |   |             |              |   |
| B.10          | Members of management body   | <table> <tr> <th>Identity</th><th>Function</th><th>Business Address</th></tr> <tr> <td>Bill Miller</td><td>Board Member</td><td>10845 W Griffith Peak Drive, Suite 200, Las Vegas, NV 89135</td></tr> <tr> <td>Tom Sylvester</td><td>Board Member</td><td>10845 W Griffith Peak Drive, Suite 200, Las Vegas, NV 89135</td></tr> <tr> <td>Duncan Moir</td><td>Board Member</td><td>10845 W Griffith Peak Drive, Suite 200, Las Vegas, NV 89135</td></tr> </table> | Identity | Function | Business Address | Bill Miller | Board Member | 10845 W Griffith Peak Drive, Suite 200, Las Vegas, NV 89135 | Tom Sylvester | Board Member | 10845 W Griffith Peak Drive, Suite 200, Las Vegas, NV 89135 | Duncan Moir | Board Member | 10845 W Griffith Peak Drive, Suite 200, Las Vegas, NV 89135 |
| Identity      | Function   | Business Address   |          |          |                  |             |              |   |               |              |   |             |              |   |
| Bill Miller   | Board Member   | 10845 W Griffith Peak Drive, Suite 200, Las Vegas, NV 89135  |          |          |                  |             |              |   |               |              |   |             |              |   |
| Tom Sylvester | Board Member   | 10845 W Griffith Peak Drive, Suite 200, Las Vegas, NV 89135  |          |          |                  |             |              |   |               |              |   |             |              |   |
| Duncan Moir   | Board Member   | 10845 W Griffith Peak Drive, Suite 200, Las Vegas, NV 89135  |          |          |                  |             |              |   |               |              |   |             |              |   |



| N                 | Field                            | Content  |          |          |                  |                   |                          |   |            |              |   |
|-------------------|----------------------------------|--|----------|----------|------------------|-------------------|--------------------------|---|------------|--------------|---|
|                   |                                  | <table> <tr> <th>Identity</th><th>Function</th><th>Business Address</th></tr> <tr> <td>Monique J. Morrow</td><td>Independent Board Member</td><td>10845 W Griffith Peak Drive, Suite 200, Las Vegas, NV 89135</td></tr> <tr> <td>Frank Wang</td><td>Board Member</td><td>10845 W Griffith Peak Drive, Suite 200, Las Vegas, NV 89135</td></tr> </table>  | Identity | Function | Business Address | Monique J. Morrow | Independent Board Member | 10845 W Griffith Peak Drive, Suite 200, Las Vegas, NV 89135 | Frank Wang | Board Member | 10845 W Griffith Peak Drive, Suite 200, Las Vegas, NV 89135 |
| Identity          | Function                         | Business Address   |          |          |                  |                   |                          |   |            |              |   |
| Monique J. Morrow | Independent Board Member         | 10845 W Griffith Peak Drive, Suite 200, Las Vegas, NV 89135  |          |          |                  |                   |                          |   |            |              |   |
| Frank Wang        | Board Member                     | 10845 W Griffith Peak Drive, Suite 200, Las Vegas, NV 89135  |          |          |                  |                   |                          |   |            |              |   |
| B.11              | Business activity                | <ul style="list-style-type: none"> <li>Development and operation of software platforms that support distributed consensus computing, including Platform-as-a-Service (PaaS) offerings built on distributed ledger technology for cryptographically securing and processing data related to crypto-asset transactions.</li> <li>Providing a website featuring information about distributed ledger computing; software as a service (SAAS) services featuring software for distributed ledger technology, cryptocurrency, virtual currency, and digital tokens, namely, software for authenticating, facilitating, and processing data; platform as a service featuring computer software platforms for distributed ledger technology and authenticating, facilitating and processing data in the fields of cryptocurrency, virtual currency, and digital tokens; providing information in the field of computer software and distributed ledger technology.</li> </ul> |          |          |                  |                   |                          |   |            |              |   |
| B.12              | Parent company business activity | N/A as no parent company.  |          |          |                  |                   |                          |   |            |              |   |



# 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. Indicators C.1 to C-12 of this whitepaper are not applicable as this white paper has not been drawn up by the operator of a trading platform. Operators of trading platforms may complete this section.

| N    | Field  | Content              |
|------|--|----------------------|
| C.1  | Name   | N/A                  |
| C.2  | Legal form   | N/A                  |
| C.3  | Registered address   | N/A                  |
| C.4  | Head office  | N/A                  |
| C.5  | Registration date  | N/A                  |
| C.6  | Legal entity identifier  | N/A                  |
| 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  | N/A                  |
| C.10 | Members of management body   | N/A                  |
| C.11 | Operator business activity   | N/A                  |
| C.12 | Business activity of parent company  | N/A                  |
| C.13 | Other persons drawing up the crypto-asset white paper according to Article 6(1), second subparagraph, of Regulation (EU) 2023/1114 | MiCA Crypto Alliance |



| N    | Field  | Content   |
|------|--|---|
| C.14 | Reason for drawing the white paper by persons referred to in Article 6(1), second subparagraph, of Regulation (EU) 2023/1114 | <p>As part of its mission to establish best practices in MiCA compliance and conformance, and assist in implementing them, the MiCA Crypto Alliance draws up white papers and makes them freely available to the wider blockchain ecosystem. The act of writing this white paper does not constitute an offer to the public or an admission to trading. Parties seeking to reuse this whitepaper in terms of Articles 4(7) and 5(4)(b) of MiCA may do so at no cost. If they require individualised confirmation on consent, they may reach out at <a href="http://micacryptoalliance.com/contact-us">http://micacryptoalliance.com/contact-us</a>.</p> |

# Part D: Information about the crypto-asset project

| N                        | Field  | Content  |      |                  |                       |  |      |                  |       |   |                   |  |                          |   |                |   |       |  |                       |  |
|--------------------------|--|--|------|------------------|-----------------------|--|------|------------------|-------|---|-------------------|--|--------------------------|---|----------------|---|-------|--|-----------------------|--|
| D.1                      | Crypto-asset project name  | Hedera / Hedera Hashgraph  |      |                  |                       |  |      |                  |       |   |                   |  |                          |   |                |   |       |  |                       |  |
| D.2                      | Crypto-asset’s name  | N/A as DTI is provided in field F.13   |      |                  |                       |  |      |                  |       |   |                   |  |                          |   |                |   |       |  |                       |  |
| D.3                      | Abbreviation   | N/A as DTI is provided in field F.13   |      |                  |                       |  |      |                  |       |   |                   |  |                          |   |                |   |       |  |                       |  |
| D.4                      | Crypto-asset project description   | The Hedera network is a public network that leverages the hashgraph consensus algorithm to provide high throughput, low-latency transactions, and improved security over traditional blockchain systems. It supports a variety of applications like cryptocurrency, smart contracts, file storage, and consensus service. The public network is governed by a Council of leading international organisations that establishes policy for Council membership, sets the network rules, manages the platform’s treasury of coins, approves changes to the platform codebase and keeps a mirror node with the full history of transactions.  |      |                  |                       |  |      |                  |       |   |                   |  |                          |   |                |   |       |  |                       |  |
| D.5                      | Details of all natural or legal persons involved in the implementation of the crypto-asset project | <div><div>Hedera Council</div><table><tr><th>Name</th><th>Address/Domicile</th></tr><tr><td>Hedera Hashgraph, LLC</td><td>10845 W Griffith Peak Drive, Suite 200, Las Vegas, NV 89135, United States</td></tr></table><div>Hedera Council Members</div><table><tr><th>Name</th><th>Address/Domicile</th></tr><tr><td>Abrdn</td><td>1 George Street, Edinburgh, EH2 2LL, United Kingdom</td></tr><tr><td>Arrow Electronics</td><td>9151 E Panorama Circle Centennial US-CO 80112 US</td></tr><tr><td>Australian Payments Plus</td><td>255 George St, Sydney NSW 2000, Australia</td></tr><tr><td>Avery Dennison</td><td>8080 Norton Parkway Mentor, Ohio 44060, United States</td></tr><tr><td>BitGo</td><td>445 Sherman Avenue, Suite 200, Palo Alto, California, 94306, United States</td></tr><tr><td>Blockchain for Energy</td><td>2909 Rogerdale Road, Houston, Texas, 7742, United States</td></tr></table></div> | Name | Address/Domicile | Hedera Hashgraph, LLC | 10845 W Griffith Peak Drive, Suite 200, Las Vegas, NV 89135, United States | Name | Address/Domicile | Abrdn | 1 George Street, Edinburgh, EH2 2LL, United Kingdom | Arrow Electronics | 9151 E Panorama Circle Centennial US-CO 80112 US | Australian Payments Plus | 255 George St, Sydney NSW 2000, Australia | Avery Dennison | 8080 Norton Parkway Mentor, Ohio 44060, United States | BitGo | 445 Sherman Avenue, Suite 200, Palo Alto, California, 94306, United States | Blockchain for Energy | 2909 Rogerdale Road, Houston, Texas, 7742, United States |
| Name                     | Address/Domicile   |  |      |                  |                       |  |      |                  |       |   |                   |  |                          |   |                |   |       |  |                       |  |
| Hedera Hashgraph, LLC    | 10845 W Griffith Peak Drive, Suite 200, Las Vegas, NV 89135, United States                         |  |      |                  |                       |  |      |                  |       |   |                   |  |                          |   |                |   |       |  |                       |  |
| Name                     | Address/Domicile   |  |      |                  |                       |  |      |                  |       |   |                   |  |                          |   |                |   |       |  |                       |  |
| Abrdn                    | 1 George Street, Edinburgh, EH2 2LL, United Kingdom  |  |      |                  |                       |  |      |                  |       |   |                   |  |                          |   |                |   |       |  |                       |  |
| Arrow Electronics        | 9151 E Panorama Circle Centennial US-CO 80112 US   |  |      |                  |                       |  |      |                  |       |   |                   |  |                          |   |                |   |       |  |                       |  |
| Australian Payments Plus | 255 George St, Sydney NSW 2000, Australia  |  |      |                  |                       |  |      |                  |       |   |                   |  |                          |   |                |   |       |  |                       |  |
| Avery Dennison           | 8080 Norton Parkway Mentor, Ohio 44060, United States  |  |      |                  |                       |  |      |                  |       |   |                   |  |                          |   |                |   |       |  |                       |  |
| BitGo                    | 445 Sherman Avenue, Suite 200, Palo Alto, California, 94306, United States                         |  |      |                  |                       |  |      |                  |       |   |                   |  |                          |   |                |   |       |  |                       |  |
| Blockchain for Energy    | 2909 Rogerdale Road, Houston, Texas, 7742, United States   |  |      |                  |                       |  |      |                  |       |   |                   |  |                          |   |                |   |       |  |                       |  |



| N                               | Field   | Content  |      |                  |                |  |       |  |                   |   |         |   |                  |  |           |  |                             |  |        |   |         |   |     |   |            |                                     |                |   |     |  |                |  |        |  |                        |   |                                 |  |                     |   |            |  |
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|                                 |   | <table><tr><th>Name</th><th>Address/Domicile</th></tr><tr><td>Chainlink Labs</td><td>50 California Street, San Francisco, CA 94111, United States</td></tr><tr><td>Cofra</td><td>Grafenauweg 10, 6300, Zug, Switzerland</td></tr><tr><td>Dell Technologies</td><td>1 Dell Way, Round Rock, TX 78664, United States</td></tr><tr><td>Dentons</td><td>233 South Wacker Drive, Suite 5900, Chicago, IL 60606-6361, United States</td></tr><tr><td>Deutsche Telekom</td><td>Friedrich-Ebert-Allee 140, 53113 Bonn, Germany</td></tr><tr><td>DLA Piper</td><td>160 Aldersgate Street, London, EC1A 4HT, England, United Kingdom</td></tr><tr><td>EDF (Électricité de France)</td><td>22-30 Avenue de Wagram, Paris, 75008, France</td></tr><tr><td>Google</td><td>1600 Amphitheatre Parkway, Mountain View, CA 94043, United States</td></tr><tr><td>Hitachi</td><td>2535 Augustine Drive, 3rd Floor, Santa Clara, CA 95054, United States</td></tr><tr><td>IBM</td><td>1 New Orchard Road, Armonk, New York, 10504-1722, United States</td></tr><tr><td>IIT Madras</td><td>Chennai, Tamil Nadu, 600 036, India</td></tr><tr><td>LG Electronics</td><td>LG Twin Towers, 128 Yeoui-daero, Yeongdeungpo-gu, Seoul, 150-721, South Korea</td></tr><tr><td>LSE</td><td>Houghton Street, London, WC2A 2AE, England, United Kingdom</td></tr><tr><td>Magazine Luiza</td><td>Rua Do Comercio, 1924, Centro, Sao Paulo, 144000-490, Brazil</td></tr><tr><td>Nomura</td><td>5-32-23 Maesawa Higashikurume City, Tokyo, Japan</td></tr><tr><td>Mondelēz International</td><td>905 West Fulton Market, Suite 200, Chicago, IL 60607, United States</td></tr><tr><td>Nairobi Securities Exchange PLC</td><td>55 Westlands Road, P O Box 43633. Nairobi, 00100. KENYA.</td></tr><tr><td>Nomura Holdings Inc</td><td>1-13-1 Nihonbashi, Chuo-ku, Tokyo 103-8645, Japan</td></tr><tr><td>ServiceNow</td><td>2225 Lawson Lane, Santa Clara, CA 95054, United States</td></tr></table> | Name | Address/Domicile | Chainlink Labs | 50 California Street, San Francisco, CA 94111, United States | Cofra | Grafenauweg 10, 6300, Zug, Switzerland | Dell Technologies | 1 Dell Way, Round Rock, TX 78664, United States | Dentons | 233 South Wacker Drive, Suite 5900, Chicago, IL 60606-6361, United States | Deutsche Telekom | Friedrich-Ebert-Allee 140, 53113 Bonn, Germany | DLA Piper | 160 Aldersgate Street, London, EC1A 4HT, England, United Kingdom | EDF (Électricité de France) | 22-30 Avenue de Wagram, Paris, 75008, France | Google | 1600 Amphitheatre Parkway, Mountain View, CA 94043, United States | Hitachi | 2535 Augustine Drive, 3rd Floor, Santa Clara, CA 95054, United States | IBM | 1 New Orchard Road, Armonk, New York, 10504-1722, United States | IIT Madras | Chennai, Tamil Nadu, 600 036, India | LG Electronics | LG Twin Towers, 128 Yeoui-daero, Yeongdeungpo-gu, Seoul, 150-721, South Korea | LSE | Houghton Street, London, WC2A 2AE, England, United Kingdom | Magazine Luiza | Rua Do Comercio, 1924, Centro, Sao Paulo, 144000-490, Brazil | Nomura | 5-32-23 Maesawa Higashikurume City, Tokyo, Japan | Mondelēz International | 905 West Fulton Market, Suite 200, Chicago, IL 60607, United States | Nairobi Securities Exchange PLC | 55 Westlands Road, P O Box 43633. Nairobi, 00100. KENYA. | Nomura Holdings Inc | 1-13-1 Nihonbashi, Chuo-ku, Tokyo 103-8645, Japan | ServiceNow | 2225 Lawson Lane, Santa Clara, CA 95054, United States |
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| Chainlink Labs                  | 50 California Street, San Francisco, CA 94111, United States                  |  |      |                  |                |  |       |  |                   |   |         |   |                  |  |           |  |                             |  |        |   |         |   |     |   |            |                                     |                |   |     |  |                |  |        |  |                        |   |                                 |  |                     |   |            |  |
| Cofra                           | Grafenauweg 10, 6300, Zug, Switzerland  |  |      |                  |                |  |       |  |                   |   |         |   |                  |  |           |  |                             |  |        |   |         |   |     |   |            |                                     |                |   |     |  |                |  |        |  |                        |   |                                 |  |                     |   |            |  |
| Dell Technologies               | 1 Dell Way, Round Rock, TX 78664, United States                               |  |      |                  |                |  |       |  |                   |   |         |   |                  |  |           |  |                             |  |        |   |         |   |     |   |            |                                     |                |   |     |  |                |  |        |  |                        |   |                                 |  |                     |   |            |  |
| Dentons                         | 233 South Wacker Drive, Suite 5900, Chicago, IL 60606-6361, United States     |  |      |                  |                |  |       |  |                   |   |         |   |                  |  |           |  |                             |  |        |   |         |   |     |   |            |                                     |                |   |     |  |                |  |        |  |                        |   |                                 |  |                     |   |            |  |
| Deutsche Telekom                | Friedrich-Ebert-Allee 140, 53113 Bonn, Germany                                |  |      |                  |                |  |       |  |                   |   |         |   |                  |  |           |  |                             |  |        |   |         |   |     |   |            |                                     |                |   |     |  |                |  |        |  |                        |   |                                 |  |                     |   |            |  |
| DLA Piper                       | 160 Aldersgate Street, London, EC1A 4HT, England, United Kingdom              |  |      |                  |                |  |       |  |                   |   |         |   |                  |  |           |  |                             |  |        |   |         |   |     |   |            |                                     |                |   |     |  |                |  |        |  |                        |   |                                 |  |                     |   |            |  |
| EDF (Électricité de France)     | 22-30 Avenue de Wagram, Paris, 75008, France                                  |  |      |                  |                |  |       |  |                   |   |         |   |                  |  |           |  |                             |  |        |   |         |   |     |   |            |                                     |                |   |     |  |                |  |        |  |                        |   |                                 |  |                     |   |            |  |
| Google                          | 1600 Amphitheatre Parkway, Mountain View, CA 94043, United States             |  |      |                  |                |  |       |  |                   |   |         |   |                  |  |           |  |                             |  |        |   |         |   |     |   |            |                                     |                |   |     |  |                |  |        |  |                        |   |                                 |  |                     |   |            |  |
| Hitachi                         | 2535 Augustine Drive, 3rd Floor, Santa Clara, CA 95054, United States         |  |      |                  |                |  |       |  |                   |   |         |   |                  |  |           |  |                             |  |        |   |         |   |     |   |            |                                     |                |   |     |  |                |  |        |  |                        |   |                                 |  |                     |   |            |  |
| IBM                             | 1 New Orchard Road, Armonk, New York, 10504-1722, United States               |  |      |                  |                |  |       |  |                   |   |         |   |                  |  |           |  |                             |  |        |   |         |   |     |   |            |                                     |                |   |     |  |                |  |        |  |                        |   |                                 |  |                     |   |            |  |
| IIT Madras                      | Chennai, Tamil Nadu, 600 036, India   |  |      |                  |                |  |       |  |                   |   |         |   |                  |  |           |  |                             |  |        |   |         |   |     |   |            |                                     |                |   |     |  |                |  |        |  |                        |   |                                 |  |                     |   |            |  |
| LG Electronics                  | LG Twin Towers, 128 Yeoui-daero, Yeongdeungpo-gu, Seoul, 150-721, South Korea |  |      |                  |                |  |       |  |                   |   |         |   |                  |  |           |  |                             |  |        |   |         |   |     |   |            |                                     |                |   |     |  |                |  |        |  |                        |   |                                 |  |                     |   |            |  |
| LSE                             | Houghton Street, London, WC2A 2AE, England, United Kingdom                    |  |      |                  |                |  |       |  |                   |   |         |   |                  |  |           |  |                             |  |        |   |         |   |     |   |            |                                     |                |   |     |  |                |  |        |  |                        |   |                                 |  |                     |   |            |  |
| Magazine Luiza                  | Rua Do Comercio, 1924, Centro, Sao Paulo, 144000-490, Brazil                  |  |      |                  |                |  |       |  |                   |   |         |   |                  |  |           |  |                             |  |        |   |         |   |     |   |            |                                     |                |   |     |  |                |  |        |  |                        |   |                                 |  |                     |   |            |  |
| Nomura                          | 5-32-23 Maesawa Higashikurume City, Tokyo, Japan                              |  |      |                  |                |  |       |  |                   |   |         |   |                  |  |           |  |                             |  |        |   |         |   |     |   |            |                                     |                |   |     |  |                |  |        |  |                        |   |                                 |  |                     |   |            |  |
| Mondelēz International          | 905 West Fulton Market, Suite 200, Chicago, IL 60607, United States           |  |      |                  |                |  |       |  |                   |   |         |   |                  |  |           |  |                             |  |        |   |         |   |     |   |            |                                     |                |   |     |  |                |  |        |  |                        |   |                                 |  |                     |   |            |  |
| Nairobi Securities Exchange PLC | 55 Westlands Road, P O Box 43633. Nairobi, 00100. KENYA.                      |  |      |                  |                |  |       |  |                   |   |         |   |                  |  |           |  |                             |  |        |   |         |   |     |   |            |                                     |                |   |     |  |                |  |        |  |                        |   |                                 |  |                     |   |            |  |
| Nomura Holdings Inc             | 1-13-1 Nihonbashi, Chuo-ku, Tokyo 103-8645, Japan                             |  |      |                  |                |  |       |  |                   |   |         |   |                  |  |           |  |                             |  |        |   |         |   |     |   |            |                                     |                |   |     |  |                |  |        |  |                        |   |                                 |  |                     |   |            |  |
| ServiceNow                      | 2225 Lawson Lane, Santa Clara, CA 95054, United States                        |  |      |                  |                |  |       |  |                   |   |         |   |                  |  |           |  |                             |  |        |   |         |   |     |   |            |                                     |                |   |     |  |                |  |        |  |                        |   |                                 |  |                     |   |            |  |

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|---------------------------|---|---|------|--|------------------|--------------|--|---|---------------|--|---|---------|--|---|---------------------|--|--|---------|--|--|-------|--|--|----------|--|--|------------|--|--|------|--|------------------|---------------------------|--|---|---------------------|--|---|-----------------------|--|--|
|                           |   | <table><tr><th colspan="2">Name</th><th>Address/Domicile</th></tr><tr><td colspan="2">Shinhan Bank</td><td>20 Sejong-Daero 9-Gil, Daekyung Building, Seoul, Jung-gu, South Korea</td></tr><tr><td colspan="2">Standard Bank</td><td>5 Simmonds Street, Johannesburg, 2001, South Africa</td></tr><tr><td colspan="2">Swirlds</td><td>3400 North Central Expressway, Suite 470, Richardson, TX 75080, United States</td></tr><tr><td colspan="2">Tata Communications</td><td>Tower 4, 4th to 8th Floor Equinox Business Park, LBS Marg, Kurla (W), Mumbai, Maharashtra, 400070, India</td></tr><tr><td colspan="2">Ubisoft</td><td>2 Avenue Pasteur, 94160, Saint-Mande, France</td></tr><tr><td colspan="2">Wipro</td><td>Doddakannelli, Sarjapur Road, Bengaluru, 560035, India</td></tr><tr><td colspan="2">Worldpay</td><td>8500 Governors Hill Drive, Cincinnati, OH 45249, United States</td></tr><tr><td colspan="2">Zain Group</td><td>Airport Road, Shuwaikh, Post Box 22244, Kuwait City, 13083, Kuwait</td></tr></table> <p>Other persons involved in the implementation of the crypto-asset project</p> <table><tr><th colspan="2">Name</th><th>Address/Domicile</th></tr><tr><td colspan="2">The Hashgraph Association</td><td>Churerstrasse 54, 8808 Pfäffikon, Switzerland</td></tr><tr><td colspan="2">The HBAR Foundation</td><td>90 Elgin Avenue , George Town, KY1-9001, Cayman Islands</td></tr><tr><td colspan="2">Hashgraph Foundry Inc</td><td>3400 N. Central Expressway, Suite 470 Richardson 75080, Texas, United States</td></tr></table> | Name |  | Address/Domicile | Shinhan Bank |  | 20 Sejong-Daero 9-Gil, Daekyung Building, Seoul, Jung-gu, South Korea | Standard Bank |  | 5 Simmonds Street, Johannesburg, 2001, South Africa | Swirlds |  | 3400 North Central Expressway, Suite 470, Richardson, TX 75080, United States | Tata Communications |  | Tower 4, 4th to 8th Floor Equinox Business Park, LBS Marg, Kurla (W), Mumbai, Maharashtra, 400070, India | Ubisoft |  | 2 Avenue Pasteur, 94160, Saint-Mande, France | Wipro |  | Doddakannelli, Sarjapur Road, Bengaluru, 560035, India | Worldpay |  | 8500 Governors Hill Drive, Cincinnati, OH 45249, United States | Zain Group |  | Airport Road, Shuwaikh, Post Box 22244, Kuwait City, 13083, Kuwait | Name |  | Address/Domicile | The Hashgraph Association |  | Churerstrasse 54, 8808 Pfäffikon, Switzerland | The HBAR Foundation |  | 90 Elgin Avenue , George Town, KY1-9001, Cayman Islands | Hashgraph Foundry Inc |  | 3400 N. Central Expressway, Suite 470 Richardson 75080, Texas, United States |
| Name                      |   | Address/Domicile  |      |  |                  |              |  |   |               |  |   |         |  |   |                     |  |  |         |  |  |       |  |  |          |  |  |            |  |  |      |  |                  |                           |  |   |                     |  |   |                       |  |  |
| Shinhan Bank              |   | 20 Sejong-Daero 9-Gil, Daekyung Building, Seoul, Jung-gu, South Korea   |      |  |                  |              |  |   |               |  |   |         |  |   |                     |  |  |         |  |  |       |  |  |          |  |  |            |  |  |      |  |                  |                           |  |   |                     |  |   |                       |  |  |
| Standard Bank             |   | 5 Simmonds Street, Johannesburg, 2001, South Africa   |      |  |                  |              |  |   |               |  |   |         |  |   |                     |  |  |         |  |  |       |  |  |          |  |  |            |  |  |      |  |                  |                           |  |   |                     |  |   |                       |  |  |
| Swirlds                   |   | 3400 North Central Expressway, Suite 470, Richardson, TX 75080, United States   |      |  |                  |              |  |   |               |  |   |         |  |   |                     |  |  |         |  |  |       |  |  |          |  |  |            |  |  |      |  |                  |                           |  |   |                     |  |   |                       |  |  |
| Tata Communications       |   | Tower 4, 4th to 8th Floor Equinox Business Park, LBS Marg, Kurla (W), Mumbai, Maharashtra, 400070, India  |      |  |                  |              |  |   |               |  |   |         |  |   |                     |  |  |         |  |  |       |  |  |          |  |  |            |  |  |      |  |                  |                           |  |   |                     |  |   |                       |  |  |
| Ubisoft                   |   | 2 Avenue Pasteur, 94160, Saint-Mande, France  |      |  |                  |              |  |   |               |  |   |         |  |   |                     |  |  |         |  |  |       |  |  |          |  |  |            |  |  |      |  |                  |                           |  |   |                     |  |   |                       |  |  |
| Wipro                     |   | Doddakannelli, Sarjapur Road, Bengaluru, 560035, India  |      |  |                  |              |  |   |               |  |   |         |  |   |                     |  |  |         |  |  |       |  |  |          |  |  |            |  |  |      |  |                  |                           |  |   |                     |  |   |                       |  |  |
| Worldpay                  |   | 8500 Governors Hill Drive, Cincinnati, OH 45249, United States  |      |  |                  |              |  |   |               |  |   |         |  |   |                     |  |  |         |  |  |       |  |  |          |  |  |            |  |  |      |  |                  |                           |  |   |                     |  |   |                       |  |  |
| Zain Group                |   | Airport Road, Shuwaikh, Post Box 22244, Kuwait City, 13083, Kuwait  |      |  |                  |              |  |   |               |  |   |         |  |   |                     |  |  |         |  |  |       |  |  |          |  |  |            |  |  |      |  |                  |                           |  |   |                     |  |   |                       |  |  |
| Name                      |   | Address/Domicile  |      |  |                  |              |  |   |               |  |   |         |  |   |                     |  |  |         |  |  |       |  |  |          |  |  |            |  |  |      |  |                  |                           |  |   |                     |  |   |                       |  |  |
| The Hashgraph Association |   | Churerstrasse 54, 8808 Pfäffikon, Switzerland   |      |  |                  |              |  |   |               |  |   |         |  |   |                     |  |  |         |  |  |       |  |  |          |  |  |            |  |  |      |  |                  |                           |  |   |                     |  |   |                       |  |  |
| The HBAR Foundation       |   | 90 Elgin Avenue , George Town, KY1-9001, Cayman Islands   |      |  |                  |              |  |   |               |  |   |         |  |   |                     |  |  |         |  |  |       |  |  |          |  |  |            |  |  |      |  |                  |                           |  |   |                     |  |   |                       |  |  |
| Hashgraph Foundry Inc     |   | 3400 N. Central Expressway, Suite 470 Richardson 75080, Texas, United States  |      |  |                  |              |  |   |               |  |   |         |  |   |                     |  |  |         |  |  |       |  |  |          |  |  |            |  |  |      |  |                  |                           |  |   |                     |  |   |                       |  |  |
| D.6                       | Utility Token Classification                              | FALSE   |      |  |                  |              |  |   |               |  |   |         |  |   |                     |  |  |         |  |  |       |  |  |          |  |  |            |  |  |      |  |                  |                           |  |   |                     |  |   |                       |  |  |
| D.7                       | Key Features of Goods/Services for Utility Token Projects | Not applicable as the Hedera network is not a Utility Token Project.  |      |  |                  |              |  |   |               |  |   |         |  |   |                     |  |  |         |  |  |       |  |  |          |  |  |            |  |  |      |  |                  |                           |  |   |                     |  |   |                       |  |  |
| D.8                       | Plans for the token                                       | <p>Important milestones:</p> <ul style="list-style-type: none"><li>• 2012-2015: Leemon Baird’s ground research towards the invention of the hashgraph.</li><li>• 2015-2016: Baird partners with Mance Harmon (Swirlds) to develop proofs of concept and commercialise hashgraph.</li><li>• 31 May 2016: Hashgraph whitepaper is published.</li><li>• Q1-Q2 2017: Seed investment round by Swirlds.</li><li>• Q3-Q4 2017: Founding team, business development team, legal</li></ul>  |      |  |                  |              |  |   |               |  |   |         |  |   |                     |  |  |         |  |  |       |  |  |          |  |  |            |  |  |      |  |                  |                           |  |   |                     |  |   |                       |  |  |



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|   |       | <p>team and recruitment team are brought onboard. “Hashgraph Consortium, LLC” is created as a Delaware company. Hashgraph technology is displayed publicly for the first time at TechCrunch Disrupt in San Francisco (California).</p> <ul style="list-style-type: none"><li>• Q1 2018: First formal meeting of the executive team. Hedera is selected as the brand and company name. HBAR logo is designed. First Letters of Intent by potential Council Members. Launch event is held. HederaHashgraph.com goes live.</li><li>• Q2 2018: Company name is formally changed to Hedera Hashgraph, LLC. The multi-member LLC Agreement (document governing the Hedera Council) is drafted.</li><li>• Q3 2018: Hedera network MainNet goes live and 50 billion HBAR are minted.</li><li>• Q4 2018: First Hedera network developer conference and global hackathon. COQ proof by Carnegie Mellon academic confirms hashgraph’s asynchronous byzantine fault tolerance.</li><li>• Q1 2019: First Hedera Council members (Deutsche Telekom, DLA Piper, Magazine Luiza, Nomura Holdings, Inc., and Swisscom Blockchain) are announced, and the first Council meeting takes place.</li><li>• Q2 2019: Phase two of the Community Testing Programme begins.</li><li>• Q3 2019: Hedera network’s Mirror Node software enters alpha. Hedera mainnet (beta) is made openly accessible.</li><li>• Q4 2019: The Hedera Boost programme to support startups building on the Hedera network is launched.</li><li>• Q1 2020: Hedera Consensus Service (HCS) is launched on MainNet. Hedera.com goes live.</li><li>• Q2 2020: Hedera network surpasses Ethereum in the daily number of transactions processed.</li><li>• Q3 2020: Hedera network’s Mirror Node software enters beta. Hedera previewnet goes live. All of the Hedera network services, including HCS, enter open source under Apache 2.0 licence on August 6, 2020. Hedera’s State Proof software enters alpha.</li><li>• Q4 2020: The code for the hashgraph platform enters open review. Hedera Token Service (HTS) is launched on the previewnet and the Tokenization on Hedera whitepaper is published.</li><li>• Q1 2021: HTS is launched on the MainNet.</li><li>• Q2 2021: Hedera network reaches one billion (1,000,000,000) MainNet transactions in just one year, six months, and 28 days. The Hedera Public Mirror Node becomes available.</li></ul> |

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|---|-------|--|
|   |       | <ul style="list-style-type: none"> <li>Q3 2021: Hedera Council adopts environmental sustainability as a core value and officially commits to a carbon-negative network. The Hedera Council allocates 10.7 billion hbars (at the time, approximately \$5,000,000,000) to the newly established independent grant-giving organisation, the HBAR Foundation.</li> <li>Q1 2022: The Hedera Council votes to purchase and open source the intellectual property rights to the hashgraph consensus algorithm. Hedera Smart Contract Service (HSCS) 2.0 is launched on the TestNet and then on the MainNet.</li> <li>Q2 2022: The Hedera Council further decentralises the Hedera network with the transition of the Development and Management teams, including Dr. Leemon Baird and Mance Harmon, from the Hedera Council to Hashgraph Foundry (f/k/a Swirlds Labs). Last IP payment to Swirlds.</li> <li>Q3 2022: The hashgraph platform, including the hashgraph consensus algorithm, enters open source under Apache 2.0 licence, making the entire Hedera network, including the services code and developer tools, open source. Native staking is introduced on the Hedera network.</li> <li>Q4 2022: EVM archive node functionality enabled to query the state of smart contracts on Hedera.</li> <li>Q1 2023: Mainnet upgrade with a code change preventing smart contracts from using a delegate call to call a precompiled contract. Mutable metadata fields for fungible and non-fungible tokens are enabled. The Hedera Council approves a formal Council Development Policy to guide recruitment of new members.</li> <li>Q2 2023: The Hedera Council approved the allocation of 3.735 billion hbars to fulfill contractual obligations including SAFT redemptions and operational costs and to support ongoing ecosystem development.</li> <li>Q3 2023: Security enhancements of the Hedera smart contract service (HSCS), introduction of changes in the staking algorithm including a 2.5% maximum reward, launch of the Stablecoin Studio, reduction of NFT minting fees and implementation of bulk minting pricing to optimize large-scale issuance.</li> <li>Q4 2023: Separation of the roles of Hedera Council Chair and President, release of HSCS Security Model v2, and release of on-chain smart contract verification.</li> </ul> |



| N   | Field               | Content   |
|-----|---------------------|---|
|     |                     | <ul style="list-style-type: none"><li>• Q1 2024: Launch of a new anonymous testnet faucet, revamp of Hedera Portal UI for improved developer onboarding, and allocation of 4.86 billion hbars to ecosystem enablers The HBAR Foundation, Hashgraph Association and DLT Science Foundation as part of ecosystem decentralization and growth efforts.</li><li>• Q2 2024: Introduction of support for dynamic NFTs and advanced token metadata; Hedera joinder of the Crypto Information Sharing and Analysis Center (Crypto ISAC).</li><li>• Q3 2024: Launch of the Asset Tokenization Studio, founding of the DeRec (Decentralized Recovery) Alliance, founding of the Linux Foundation Decentralized Trust, and donation of the entirety of the Hedera source code to it (“Hiero” project).</li><li>• Q4 2024: Founding of the MiCA Crypto Alliance and upgrade of the Hedera-operated Mirror Node.</li><li>• Q1 2025: Release of the Standards SDK open-source toolkit consolidating multiple Hashgraph Consensus Standards into a unified framework, including an AI Agent Communication Protocol and recursion within the Hedera Consensus Service.</li></ul> <p>The future plans for the Hedera network include key milestones:</p> <ul style="list-style-type: none"><li>• Reaching 39 organisations in the Hedera Council.</li><li>• Enabling community mirror nodes.</li><li>• Enter “phase 4” of Hedera Governance where the faculties of the Council and the management team are further reduced.</li><li>• Enabling weighted staking.</li><li>• Enabling community consensus nodes.</li><li>• Depermissioning of the network, allowing anyone to run a Hedera network validator node.</li></ul> |
| D.9 | Resource Allocation | <p>The Hedera network project has committed significant resources to ensure the robust deployment and sustainable growth of its network. As outlined in the current treasury allocation, a total of 49,932,981,042 hbars (99.87% of the total supply) have been designated for various strategic initiatives as follows:</p> <ul style="list-style-type: none"><li>• Initial Development Costs and Licensing: 3,869,316,000 hbars (7.74%) have been allocated for the initial development and licensing of the hashgraph technology, including payments to Swirlds, Inc. for ongoing use and the acquisition of intellectual property rights.</li></ul>   |

| N    | Field   | Content   |
|------|---|---|
|      |   | <ul style="list-style-type: none"><li>• Purchase Agreements: 12,698,348,449 hbars (25.40%) are used for regulated sales contracts such as Simple Agreements for Future Tokens (SAFTs) and Token Purchase Agreements (TPAs) to support network functionality and operations.</li><li>• Network Governance and Operations: 8,116,201,648 hbars (16.23%) cover compensation for founders, executives, and contributors, adapting to the evolving governance and operational needs of the network.</li><li>• Ecosystem and Open Source Development: 25,249,114,945 hbars (50.50%) are dedicated to fostering the ecosystem's growth through community incentives, developer grants, and significant initiatives led by the Hedera Council to decentralise and enhance network activities.</li></ul> <p>The remaining 67,018,958 hbars (0.13% of the total supply) are unallocated, reserved for future strategic uses as determined necessary by the Hedera Council at its discretion. The Hedera Council may allocate these funds to:</p> <ul style="list-style-type: none"><li>• Support the LLC's operational continuity (through compensation structures and expenses).</li><li>• Fund independent ecosystem development organisations such as The HBAR Foundation, The Hashgraph Association and Exponential Science.</li></ul> <p>These planned allocations are subject to adjustment based on strategic reviews and may vary with the actual and forecasted value of hbars. A part of the existing supply has also not yet been released, but has been allocated as per section D.9. These hbars will be used to afford contractual commitments such as those established in SAFTs and TPAs.</p> |
| D.10 | Planned Use of Collected Funds or Crypto-Assets | N/A as no other funds will be collected via public offering.  |



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

Not applicable as the crypto asset was not offered to the general public (see Sec. II, N.10) and has already been admitted to trading on multiple exchanges around the world. During or at the end of the transition period established in Article 143(2) (b) of Regulation (EU) 2023/1114, operators of trading platforms may complete parts of this section.

| N    | Field  | Content |
|------|--|---------|
| E.1  | Public Offering and/or Admission to trading                              | N/A     |
| E.2  | Reasons for Public Offer and/or Admission to trading                     | N/A     |
| 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 any 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 CryptoAssets                              | N/A     |
| E.13 | Targeted Holders   | N/A     |
| E.14 | Holder restrictions  | N/A     |

| N    | Field   | Content |
|------|---|---------|
| 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 /CryptoAssets | 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     |



| N    | Field                    | Content |
|------|--------------------------|---------|
| E.35 | Trading platforms access | N/A     |
| E.36 | Involved costs           | N/A     |
| E.37 | Offer Expenses           | N/A     |
| E.38 | Conflicts of Interest    | N/A     |
| E.39 | Applicable law           | N/A     |
| E.40 | Competent court          | N/A     |

# Part F: Information about the crypto-assets

| N  | Field                                  | Content   |
|--|--|---|
| F.1  | Crypto-Asset Type                      | Cryptoassets other than ARTs and EMTs.  |
| F.2  | Crypto-Asset Functionality Description | HBAR enables users to perform a variety of actions on the Hedera network, such as executing smart contracts, making payments, and accessing file storage services. The crypto asset's utility is designed to ensure efficient operation and fair access across the network. It is integral to maintaining the Hedera network's health, used for paying transaction fees, and participating in consensus decisions.  |
| F.3  | Planned Application of Functionalities | All main crypto asset functionalities have already been deployed, whereas mainnet functionalities are updated or improved constantly.   |
| 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           | <p>HBAR is the native crypto asset of the Hedera network and hence inherits the characteristics of the hashgraph ledger, including high throughput and low latency. For the same reason of inheriting the characteristics of the ledger, HBAR transactions are low energy, with each transaction costing 0.00025 kWh (see section J).</p> <p>The crypto asset itself has a fixed supply and is divisible by 100,000,000, with the minimum unit being the tinybar (<i>th</i>). HBAR's supply is fixed and set at 50 billion coins.</p> <p>The crypto asset symbol is a lower case, italicized HBAR (<i>h</i>). The written way to express HBAR cryptocurrency is hbars, and is equivalent to writing US dollars. It can also be expressed as HBAR, which is equivalent to writing USD.</p> |

| N    | Field   | Content   |
|------|---|---|
| F.7  | Commercial name or trading name   | N/A as DTI is provided.   |
| F.8  | Website of the issuer   | <a href="https://hedera.com/">https://hedera.com/</a>   |
| F.9  | Starting date of the offer to the public or admission to trading  | 2019-10-01 <sup>1</sup>   |
| F.10 | Publication date  | 2025-06-27  |
| F.11 | Any other services provided by the issuer   | <ul style="list-style-type: none"> <li>• <b>Promoting Public Awareness of DLT:</b> Increasing understanding of DLT's benefits and applications through campaigns, webinars, and collaborations.</li> <li>• <b>Educational Services:</b> Offering training in DLT and blockchain technologies to equip individuals with the skills needed for implementation and development.</li> </ul> |
| F.12 | Language or languages of the white paper  | English   |
| F.13 | 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 | DHQPD433B   |
| F.14 | Functionally Fungible Group Digital Token Identifier, where available   | DHQPD433B   |
| F.15 | Voluntary data flag   | FALSE   |
| F.16 | Personal data flag  | TRUE  |
| F.17 | LEI eligibility   | TRUE  |
| F.18 | Home Member State   | N/A as the crypto asset was not offered to the general public (see Sec. II, N.10) and has already been admitted to trading on multiple exchanges around the world.  |
| F.19 | Host Member State   | N/A as the crypto asset was not offered to the general public (see Sec. II, N.10) and has already been admitted to trading on multiple exchanges around the world.  |



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

| N    | Field  | Content   |
|------|--|---|
| G.1  | Purchaser Rights and Obligations                       | N/A as the crypto asset was not offered to the general public (see Sec. II, N.10), has already been admitted to trading on multiple exchanges around the world, and there is no contract governing how crypto asset-holders may hold or use the crypto assets.  |
| G.2  | Exercise of Rights and obligations                     | N/A   |
| G.3  | Conditions for modifications of rights and obligations | N/A   |
| G.4  | Future Public Offers                                   | N/A   |
| G.5  | Issuer Retained Crypto-Assets                          | 0   |
| G.6  | Utility Token Classification                           | FALSE   |
| G.7  | Key Features of Goods/ Services of Utility Tokens      | N/A   |
| G.8  | Utility Tokens Redemption                              | N/A   |
| G.9  | Non-Trading request                                    | FALSE   |
| G.10 | Crypto-Assets purchase or sale modalities              | Multiple CASPs support the trading of HBAR, including major cryptocurrency exchanges like Binance, Coinbase, Huobi, BitGo and OKEx. HBAR is typically offered on exchanges without a firm commitment basis, meaning the exchanges facilitate trading among participants and do not guarantee the sale of tokens. Access to trading platforms typically requires users to register an account, complete KYC verification, and fund their account. Each platform may have different access requirements and fee structures. |
| G.11 | Crypto-Assets Transfer Restrictions                    | None  |

| N    | Field                          | Content  |
|------|--------------------------------|--|
| G.12 | Supply Adjustment Protocols    | FALSE  |
| G.13 | Supply Adjustment Mechanisms   | N/A  |
| G.14 | Token Value Protection Schemes | FALSE  |
| G.15 | Compensation schemes           | None   |
| G.16 | Applicable law                 | There is no written legal agreement between the issuer and the crypto asset-holder that sets out the laws that govern the legal relationship between those two parties. In the absence of such an agreement, the laws that govern that relationship will depend on the location of the issuer and the given crypto asset-holder and characteristic performance of the legal relationship, and any agreed intention of the issuer and crypto asset-holder.  |
| G.17 | Competent court                | There is no written legal agreement between the issuer and the crypto asset-holder that sets out which jurisdiction's courts will have authority to deal with a dispute between the crypto asset-holder and the issuer. In the absence of such an agreement, the laws of the competent court will depend on the location of the issuer and the given crypto asset-holder and characteristic performance of the legal relationship, and any agreed intention of the issuer and crypto asset-holder. |

# Part H: Information on the underlying technology

| N   | Field                             | Content  |
|-----|-----------------------------------|--|
| H.1 | Distributed ledger technology     | N/A as DTI is provided.  |
| H.2 | Protocols and technical standards | <p>The Hedera network uses a directed acyclic graph (DAG), a non-blockchain form of Distributed Ledger Technology (DLT) where transactions are not sequentially produced but processed partially in parallel. The hashgraph consensus mechanism is based on a gossip protocol that efficiently disseminates information across the network. This mechanism is underpinned by asynchronous Byzantine Fault Tolerance (aBFT), which provides robust security by ensuring that the network can reach consensus even in the presence of malicious nodes. Technical standards used include cryptographic or transport level standards:</p> <ul style="list-style-type: none"> <li>• <b>CNSA standards</b> in Hedera <b>TLS</b> (Transport Layer Security) protocol connections between nodes and as as part of cryptographic operations for on-chain operations: <ul style="list-style-type: none"> <li>◦ <b>384-bit SHA-2 hashes</b> (considered “quantum resistant” per CNSA 2.0 Quantum Computing Guidance 2024) in Hash-based Message Authentication Code (HMAC).</li> <li>◦ <b>256-bit AES keys</b> for symmetric encryption.</li> <li>◦ <b>RSA with 2048-bit keys</b>.</li> </ul> </li> <li>• <b>Ed25519</b> signature algorithm for public-private key pairs.</li> <li>• <b>ECDSA (secp256k1)</b> key type signature algorithm for public-private key pairs.</li> <li>• Support for <b>simple keys, key lists, and threshold keys</b>.</li> </ul> <p>Hedera was designed to allow for changes to meet new demand and evolving standards. For example, the anticipated challenges posed by quantum computing would require fundamental changes in most DLTs, but Hedera is able to introduce new cryptographic algorithms without undertaking a hard fork, has demonstrated this capability by including ECDSA_SECP256K1 support after the network launched, and will be able to similarly introduce post-quantum algorithms.</p> |



| N   | Field           | Content  |
|-----|-----------------|--|
|     |                 | <p>In addition, the Hedera Smart Contract Service runs an Ethereum Virtual Machine (EVM) environment, supporting token standards ERC-20 and ERC-721.</p> <p>Furthermore, the Hedera network supports interface standards:</p> <ul style="list-style-type: none"> <li>• <b>gRPC and gRPC variants like gRPC-Web:</b> for interaction with the Hedera Consensus Service (HCS) and Hedera Smart Contract Service.</li> <li>• <b>PKCS #11</b> (Cryptographic Token Interface Standard), enabling secure key operations via hardware security modules in TLS configurations.</li> <li>• <b>REST:</b> RESTful endpoints define HTTP-based APIs for querying indexed ledger data (historical data) via mirror nodes.</li> <li>• <b>Protobuf:</b> Protocol Buffers define serialisation format for structured data exchanged with the network (for transaction construction and signing).</li> </ul> <p>Finally, the Hedera network also supports developer standards, in the form of official SDKs (Software Development Kits) in Java, JavaScript/Typescript and Go. These SDKs have been open-sourced in the <a href="#">Hiero SDK</a>.</p>   |
| H.3 | Technology Used | <p>The Hedera network utilises a unique approach to distributed ledger technology called the hashgraph consensus, which is distinct from traditional blockchain. This technology enables fast, fair, and secure transaction processing with high throughput and low latency. Some of its key elements include:</p> <ul style="list-style-type: none"> <li>• <b>Gossip Protocol:</b> The foundational communication mechanism in hashgraph is the gossip protocol. Each node in the network randomly communicates with another node and shares the latest information it knows. This process ensures that information spreads rapidly and efficiently across the network.</li> <li>• <b>Gossip about Gossip:</b> To add another layer to this, the Hedera network does not just gossip transactions but about events which include information about previous events. This means each node not only shares its and the latest transactions but also includes additional information about how it learned those transactions. This meta-information constructs a graph of the transaction history, which is crucial for the consensus process.</li> <li>• <b>Virtual Voting:</b> Unlike traditional DLTs which send voting messages via message-passing, hashgraph uses virtual voting to achieve consensus. Due to the history of how transactions are gossiped,</li> </ul> |

| N | Field | Content   |
|---|-------|---|
|   |       | <div> <ul style="list-style-type: none"> <li> <b>Event Nodes and Consensus Timestamps:</b> In hashgraph, events are transactions or groups of transactions, which include timestamps. When a node creates an event, it tags the event with two hashes: the hash of the last event it created (parent hash) and the hash of the last event it received from another node (other hash). These linked events form a directed acyclic graph (DAG) of events known as the hashgraph. </li> </ul> <p>Through these hashes, each node keeps track of the “see” and “strongly see” relations which help in determining the famous witness events that decide consensus. A consensus timestamp is then assigned to each event, which is the median of the times when the event was first received by the nodes, ensuring a fair ordering based on when transactions were seen, not just when they were reported.</p> <ul style="list-style-type: none"> <li> <b>Efficiency, Fairness and Finality:</b> Hashgraph’s approach allows for consensus without the extensive computational and energy costs associated with proof-of-work systems. The rapid propagation of information ensures that consensus is reached quickly and efficiently, while the virtual voting and event structuring maintain the integrity and fairness of the transaction order. Once an event reaches consensus, it is assigned a consensus timestamp which ensures deterministic finality. </li> </ul> <p>For a more in-depth description of the features of the consensus mechanism, see section H.4.</p> <p>To maintain the ledger, the Hedera network uses types of nodes:</p> <ol style="list-style-type: none"> <li> <b>Consensus Nodes:</b> These nodes are responsible for processing transactions, maintaining the state of the network, and ensuring transaction ordering. They play a critical role in the consensus mechanism of the Hedera network, verifying the order and validity of transactions. As of now, these nodes are operated under permission from the Hedera Council, which comprises various highly diversified organisations. The current strategy moves towards a model that incorporates non-Council operated nodes in a staged manner. </li> <li> <b>Mirror Nodes:</b> Unlike Consensus Nodes, Mirror Nodes do not participate in the consensus process because they cannot create events. Instead, they play a vital role in providing access to the history of transactions without bearing the burden of processing transactions. They enable enhanced query capabilities by storing the </li> </ol> </div> |

| N   | Field               | Content  |
|-----|---------------------|--|
|     |                     | <p>history of transactions, making them essential for applications that need to fetch historical data. For developers and businesses looking to integrate with the Hedera network or utilise its data, mirror nodes offer a streamlined way to access historical data through REST APIs, reducing the complexity and resource requirements of running a full node.</p>   |
| H.4 | Consensus Mechanism | <p>The Hedera network uses the hashgraph consensus algorithm, which relies on Proof of Stake. Like other DLTs, the system starts with broadcasting of data packets through a “gossip protocol”, i.e. a system where nodes (computers) enter in contact with each other in a random fashion, sync (they share all their information or updates with each other), and continue to broadcast information to/sync with other nodes, resulting in an exponential growth in the dissemination of information and, as a result, an eventual convergence in knowledge about the transactions being submitted in the network.</p> <p>However, the data packets in the hashgraph are not mere transactions but “events” (gossip syncs are also events). Events in the hashgraph include not just the transactions itself, its timestamp, and the hash of the previous event (“self-parent”) – like in any other DLT – but also a second hash: The hash of the last event from the immediately preceding gossip by another node (i.e. the last event of the other node prior to the gossip sync event, “other-parent”). By including this additional information overhead, nodes are not just gossiping about transactions, but engaging in “gossip about gossip”. That is, by including the other-parent, a node is not only gossiped the information about the transactions received in themselves, but also about their ordering: When the other node learned about this transaction, and what the ancestors of each event are for each node. As a result, nodes are not merely receiving loose transactions but the graph of the transactions – the “hashgraph”, which each node stores.</p> <p>After the transactions have been broadcast, DLTs will usually require a voting system, a leader-system, or a combination of both to achieve consensus. To achieve an agreement of what transactions are permanently stored, and in what order, nodes submit messages with their votes in this regard, or a leader node (block proposer) that will make this decision is selected by the protocol (through a system that</p> |



| N | Field | Content   |
|---|-------|---|
|   |       | <p>could be mining, staking, others), or messages containing votes about electing a leader node. None of this happens in the hashgraph. Thanks to the initial overhead submitted in the form of the two hashes, all nodes have a copy of the hashgraph and can calculate a total order of the events getting the same answer. Furthermore, all broadcast transactions are accepted as long as they are valid, with no node being allowed to exercise a leader's discretion.</p> <p>As a result of this architecture, copies of the hashgraph are always necessarily consistent, by definition. Due to asynchronicity, these copies may not be identical if a node has "seen" events that another node has not yet seen – although eventually this will happen – but the consistency of the ordering is ensured. If two nodes have a given event, they are guaranteed to also have all its ancestors.</p> <p>This ordering is calculated in rounds of elections, but these elections do not have messages sending votes. Instead, each node is able to locally apply the protocol's voting algorithm to calculate what vote another node would have sent if it were actually sending votes over the internet. In each of these voting rounds, each node votes (i.e. is simulated to vote) on the events they can "strongly see". Strongly seeing an X event is having in storage multiple independent Y events which contain event X as their ancestor.</p> <p>This data structure not only saves bandwidth by not requiring voting messages, but also strongly mitigates dishonest behaviour, as through virtual voting even malicious nodes vote honestly. As a form of malicious behaviour consists in sending inconsistent votes to other nodes, other DLTs require messages with "receipts" of each vote received, which entails additional overhead that the hashgraph does not require.</p> <p>The content of the voting is always the response to a YES/NO question (e.g. whether an event is famous, whether an event is a witness to another event, etc.), which is calculated in a purely algorithmic manner. In voting rounds, the "received round" is also calculated, as well as the "received time". If two events are recorded in the same round, they are ordered based on their received time. If there is still a tie, the tie is resolved by arranging them according to their signatures. This has a unique implication: Fair ordering of transactions.</p> |

| N | Field | Content   |
|---|-------|---|
|   |       | <p>Every distributed ledger faces the problem of not just arranging what transactions are stored, but also in what order. Furthermore, it is also crucial that this order is “fair”, which in the Hedera network is defined as follows: A transaction has been received by the network once it has reached a significant fraction of the entire community of nodes; once a transaction has been received by the network, it is fair that this transaction is placed after all the transactions received before itself, and before all the transactions received after itself. In hashgraph, this is achieved by calculating the median timestamp of an event (the median of the times at which each node says it first received an event). This ensures fair timestamping and fair ordering of transactions.</p> <p>Nevertheless, this system would be vulnerable to numerous nodes joining the network, colluding and biasing the median in their favour. In this scenario, the hashgraphs would still be consistent, but ordering would not be fair. To avoid this, the Hedera network started as a permissioned network with trusted nodes run only by identifiable, highly reputable world-leading organisations who have a reputation to protect and are therefore unlikely to collude. As the network matures and it progresses towards a permissionless architecture, a Proof of Stake system is introduced into the virtual voting algorithm, such that e.g. the median timestamp becomes a weighted median, whereby nodes’ votes are valid by the percentage of the stake held by each node. As a result, if a Sybil attack is attempted (an attack in which a malicious actor seeks to manipulate a vote by creating numerous fake identities casting the votes), it would not succeed unless the attacker has amassed a very significant fraction of the total stake (<math>\frac{1}{3}</math>). The coin distribution schedule and the managed path to depermissioning in accordance to the maturity of the network mitigates this possibility, as the Hedera Council makes sure to make decisions on coin economics and permissioning in a safe way.</p> <p>Staking is optional. Tokens remain fully liquid, with no lock-up period, and there is no fixed minimum or maximum amount that an individual account must stake. To be eligible for rewards, an account must be staked for a minimum of 24 hours.</p> |

| N | Field | Content   |
|---|-------|---|
|   |       | <p>Each node has a configurable maximum stake threshold which sets an upper limit on the amount of weight a node can contribute to consensus. Any stake above this threshold does not increase the node's influence or the proportion of rewards distributed. This cap is designed to prevent any single node from accumulating excessive influence, supporting fair transaction processing and Sybil resistance. The maximum stake per node is currently fixed at 450 million HBAR, and both this value and the minimum of 0 (zero) HBAR can be updated through network governance.</p> <p>Rewards for accounts staking on the Hedera network are distributed from the staking reward account (ID: 0.0.800), which has no keys and cannot return funds. Any community member can contribute HBAR to this account.</p> <p>The Hedera Council sets the reward rate and may update it over time. The reward rate is currently capped at a maximum of 2.5% annually. Rewards are calculated based on several factors including the amount staked to a given node, the total amount stakes on the network and node performance, and accrue in full-HBAR units.</p> <p>Indirect staking is also supported: If one account stakes to another that is itself staked to a node, both balances count towards the node's weight, but only the directly staked account receives rewards. Accounts may also stake without opting into receiving rewards.</p> <p>Other networks address the problem of transaction ordering by simply taking turns to elect a leader (block proposer) that will select the batch of transactions added to the shared ledger, with the consensus timestamp being the timestamp decided by the leader. This however results in a transaction ordering that is not only not fair by definition, but potentially also corrupted: If leaders collect fees and may decide which transactions are added to the ledger earlier than others, there is an incentive to bribe the leaders to front-run transactions ahead of others, which introduces all sorts of negative possibilities in the network's landscape. Leader-based systems are also vulnerable to other attacks, e.g. attacks that concentrate on shutting down each leader's turn and "follow the leader" once the leader changes. The hashgraph, in turn, is leaderless and does not have these problems.</p> |



| N | Field | Content  |
|---|-------|--|
|   |       | <p>In addition, in the hashgraph, once sufficient consensus is reached on a round and history can be considered immutable for all events up to the round. This ensures that all subsequent events (even those yet to be discovered) are assigned to later rounds. A member can then compile all transactions from these events, input them into a database in their agreed-upon order, and compute the resulting state from these transactions. Since every member adheres to the same order, they will all arrive at the identical state. This is a consensus state, which each member can hash and digitally sign the hash, putting the signature into a new transaction. When signatures from at least one-third of the population are gathered, this collection, along with the consensus state, forms a signed state that represents the official consensus for the system at the beginning of the round. This signed state can be shared with individuals outside of the community, who can then verify the signatures and, as a result, trust the authenticity of the state. At this point, all previous transactions could be deleted (they may also be kept) without any negative consequence, as the system is still immutable and secure and the state can be trusted. This feature of the consensus is called a “signed state” and is another advantage over alternative architectures. Other DLTs cannot guarantee consensus in this fashion, even by resorting to leaders, but only approximate it probabilistically while building in inefficiencies. For instance, in Bitcoin’s proof of work it is possible that two blocks are mined almost simultaneously or that, for any other reason, the community starts building on two branches of the transaction history at the same time. While eventually one branch will be abandoned and can be discarded, as the other branch accumulates more “work”, this is inefficient as many honest transactions could be discarded. Furthermore, at no particular point in time it is really known that consensus has been achieved. Rather, there is a probability of confidence that increases over time. In turn, in the hashgraph there is full confidence in consensus and furthermore, no transactions need to be discarded, and no branches are pruned.</p> |

| N   | Field                                    | Content   |
|-----|--|---|
| H.5 | Incentive Mechanisms and Applicable Fees | <p>Incentives to validators in the Hedera network are very low. Most DLTs need to set high incentives for validators (usually in the form of high fees or block rewards) because they are designed to punish malicious or under-performant validators, with a financial penalty called “slashing” in Proof of Stake or by wasting high electricity bills in Proof of Work. These penalties are not necessary in the Hedera network as the scope for malicious validator activity is significantly reduced, there being no leaders to bribe, no possibility of altering the fair-ordering of transactions via front-running, etc. As a result, with near-nil losses to compensate for, there is a very low staking reward to validator nodes emerging from fees only and from a rewards account funded by the Hedera Council. Unlike other DLTs, in the Hedera network no new coins are minted to incentivise validators.</p> <p>The values of the transaction fees are set by the Hedera Council, in accordance with the compute power required for each transaction type. These fee values are set in US Dollars but paid in HBAR; with the exchange rate being updated regularly to reflect current market rates.</p> <p>The fee structure has fixed and variable components. The fixed components are based on the following structure:</p> <ul style="list-style-type: none"> <li>• <b>Cryptocurrency Service:</b> Creating a cryptocurrency is charged at \$0.05, whereas automatic renewal of a crypto account incurs a charge of \$0.00022. Both deleting and approving allowances are billed at \$0.05 each. Updating cryptocurrency details costs \$0.00022, and a standard crypto transfer is \$0.0001. Custom fees for crypto transfers are set at \$0.002, and deleting a cryptocurrency account costs \$0.005. Retrieving account records or balances and acquiring information or stakers all cost \$0.0001 each, with the exception of getting the account balance, which is free.</li> <li>• <b>Consensus Service:</b> Creating a topic costs \$0.01, updating a topic is \$0.00022, and deleting a topic is priced at \$0.005. Submitting a message to a topic or retrieving topic information costs \$0.0001.</li> <li>• <b>Token Service:</b> Creating a token costs \$1.00, but with custom fees, the cost is \$2.00. Updating a token, updating the fee schedule, deleting a token, minting fungible tokens, burning tokens, granting or revoking KYC, freezing or unfreezing tokens, pausing or unpausing tokens, wiping tokens, and updating NFTs are all \$0.001 each. Associating or dissociating tokens costs \$0.05. Minting non-fungible</li> </ul> |

| N   | Field                                | Content   |
|-----|--------------------------------------|---|
|     |                                      | <p>tokens is \$0.02, and bulk minting 10,000 NFTs is priced at \$200. Retrieving various token-related information costs \$0.0001. If updating multiple NFTs in a single call, the charge is \$0.001 per NFT.</p> <ul style="list-style-type: none"><li>• Schedule Transaction: Creating a schedule costs \$0.01, signing a schedule is \$0.001, and deleting a schedule is also \$0.001. Retrieving schedule information is \$0.0001.</li><li>• File Service: This service charges \$0.05 for creating, updating, or appending to files, and \$0.007 for deleting a file. Retrieving file contents or information costs \$0.0001.</li><li>• Smart Contract Service: creating a contract is \$1.00, updating a contract is \$0.026, and deleting a contract costs \$0.007. Making a contract call costs \$0.05, local calls are \$0.001, and retrieving bytecode or contract-related information costs \$0.05 and \$0.0001 respectively. Automatic renewal for contracts is \$0.026.</li><li>• Miscellaneous: Executing an Ethereum transaction, a PRNG transaction, and retrieving version information are priced at \$0.0001, \$0.001, and \$0.001 respectively. Accessing data by key and receiving transaction receipts or records are free, except for transaction records, which cost \$0.0001. (all values in US Dollars)</li></ul> <p>The variable components means that actually charged fees might display discrepancies with the description above. These components account for the transaction complexity derived from the varying amount of resources that can be consumed from one transaction to another. An updated fee structure can be found at <a href="https://hedera.com/fees">https://hedera.com/fees</a> and <a href="https://docs.hedera.com/hedera/networks/mainnet/fees#transaction-and-query-fees">https://docs.hedera.com/hedera/networks/mainnet/fees#transaction-and-query-fees</a>.</p> |
| H.6 | Use of Distributed Ledger Technology | TRUE  |



| N   | Field                         | Content   |
|-----|-------------------------------|---|
| H.7 | DLT Functionality Description | <p>The hashgraph technology in general provides functionalities that include but are not limited to, achieving consensus at scale with finality in seconds, supporting millions of transactions per day, and maintaining high security and fairness through cryptographic time-stamping. Relying on hashgraph technology, the Hedera network offers a number of main functionalities:</p> <ol style="list-style-type: none"> <li><b>1. Cryptocurrency Service:</b> This service allows for the creation, management, and transfer of cryptocurrencies within the Hedera network. It includes functionalities like creating accounts, transferring tokens between accounts, managing account properties through updates, and removing permissions through deletions. Advanced features include automatic renewals of crypto accounts and allowance management for decentralised approval mechanisms.</li> <li><b>2. Consensus Service (HCS):</b> Designed for applications requiring a secure, verifiable logging and messaging service, this allows users to create, manage, and delete topics that can be used for posting messages. Messages within these topics achieve consensus across the network, ensuring that they are recorded in a timely, immutable manner, providing traceability and reliability in communication.</li> <li><b>3. Token Service (HTS):</b> This service facilitates the creation and management of fungible and non-fungible tokens (NFTs) on the Hedera network. It supports operations such as token creation, association or dissociation with accounts, token minting and burning, and setting up KYC/AML compliance checks. It enables the tokenization of assets with robust management tools for broad application across various sectors.</li> <li><b>4. File Service (HFS):</b> It enables the storage, modification, and retrieval of files within the Hedera network. This service is key for applications that need decentralised, secure, and verifiable file storage solutions. It supports operations like file creation, updating, appending, and deletion, alongside capabilities to fetch file contents or metadata.</li> <li><b>5. Smart Contract Service (HSCS):</b> Utilising the Solidity programming language, this service allows the deployment and execution of smart contracts on the Hedera network. It supports contract creation, updates, deletions, and various types of contract calls. This service leverages the Hedera network's fast, fair, and secure properties to provide a powerful environment for running decentralised applications.</li> </ol> |

| N   | Field | Content  |
|-----|-------|--|
|     |       | <p>The Hedera network also offers secondary functionalities:</p> <p><b>6.Scheduling Service:</b> This feature allows users to schedule transactions to be executed at a future time or under specific conditions, facilitating delayed or conditional transactions. It supports creating, signing, and deleting scheduled transactions, making it ideal for automation and coordination of agreements and commitments in a decentralised environment.</p> <p><b>7. Network Service:</b> It handles operations that pertain to the broader network or its nodes rather than to user-controlled entities. This service is crucial for managing and overseeing the overall health and functionality of the network, ensuring that operations are scoped at a level that affects the entire system or significant parts of it.</p> <p><b>8.Freeze Service:</b> It is used by privileged accounts to temporarily halt network operations during scheduled maintenance windows. This service is essential for performing updates or modifications to the network without disrupting the integrity or performance of ongoing processes. It ensures that these actions are controlled and reversible, providing a safeguard during critical maintenance activities.</p> <p><b>9.Util Service:</b> This service encompasses utility operations on the network, which include a variety of tasks that support the network's operational efficiency but do not fit neatly into the primary service categories. These operations might involve cleanup, diagnostics, or other maintenance-related activities that help in optimising the network performance and security.</p> <p>Other functionalities involve:</p> <p><b>10.Mirror Nodes:</b> The Hedera network enables (and the Hedera Council also runs) nodes that provide access to historical data without burdening the main network, allowing developers to access transaction records and other historical data efficiently (see section H.1).</p> <p><b>11. Miscellaneous Functionalities:</b> The Hedera network offers a range of services like Ethereum transaction compatibility, pseudo-random number generation, and system version management. These services provide additional tools and functionalities needed by developers for application development and management on the Hedera network.</p> |
| H.8 | Audit | TRUE   |

| N   | Field         | Content  |
|-----|---------------|--|
| H.9 | Audit outcome | <p>The Hedera network's underlying consensus algorithm, hashgraph, has undergone a rigorous audit which confirmed its status as Asynchronous Byzantine Fault Tolerant (ABFT). Asynchronous Byzantine Fault Tolerance is a robustness standard that ensures reliability of the network even under less-than-ideal conditions, i.e. that transactions are agreed upon and recorded accurately and fairly even in the presence of malicious participants or if some participants fail. The term "asynchronous" in ABFT means the Hedera network does not require all nodes to operate in perfect timing or sequence, allowing it to handle delays and discrepancies without disrupting ongoing transactions. "Byzantine" refers to the ability to withstand not only failures but also malicious intents from within the network, ensuring that even under such adverse conditions, the network can reach a consensus and validate transactions accurately. ABFT is considered the "gold standard" for security in distributed networks.</p> <p>This audit was carried out using a computer-verified mathematical proof conducted through the Coq Proof Assistant system, a renowned tool for checking the validity of mathematical proofs through formal verification methods.</p> <p>This verification was led by Karl Crary, an Associate Professor of Computer Science at Carnegie Mellon University, ensuring an independent and credible review. The confirmation of hashgraph's ABFT status highlights its reliability, providing the highest level of security possible for distributed systems.</p> <p>The Hedera Council has also engaged FP Complete, an IT engineering specialist, to conduct a comprehensive independent audit of the Hedera network, including the new Hedera Token Service. This audit involved an in-depth code review and technical documentation analysis to assess the security, stability, and correctness of the Hedera software.</p> <p>The audit by FP Complete focused on validating the quality of engineering work performed by the Hedera Council's development team, with special attention to the robustness, security, and audibility of the software. The results from FP Complete's audit confirm the technical rigour of the Hedera Council's development processes and the reliability of the Hedera network and token service.</p> |



# Part I: Information on the risks

| N   | Field                | Content  |
|-----|----------------------|--|
| I.1 | Offer-Related Risks  | N/A as the crypto asset was not offered to the general public (see Sec. II, N.10).   |
| I.2 | Issuer-Related Risks | <ul style="list-style-type: none"> <li> <b>Treasury Risks:</b> While the Hedera Council counts on a Treasury to support its activities, and the Hedera network’s nodes generate revenue through transaction fees and services, this treasury is not unlimited. In this context, insufficient network usage may pose a risk to the ability to support core operations related to node running and technical work. </li> <li> <b>Internal Efficiency and Control Risks:</b> <ul style="list-style-type: none"> <li> <b>Resource Allocation Efficiency:</b> The Hedera Council's financial health depends significantly on its ability to allocate resources efficiently across its technology development and market expansion. Mismanagement could lead to financial strain or inability to sustain long-term development. </li> <li> <b>Operational Integrity:</b> Effective internal controls are crucial to manage and mitigate risks related to fraud, operational errors, and maintaining the integrity of the network. Weaknesses in these controls could undermine stakeholder confidence and operational efficiency. </li> <li> <b>Governance Practices:</b> Robust governance is vital to maintaining investor and user trust, and Hedera’s governance model is what attracts regulated enterprises to build on this network due to safe and trustworthiness attributes. At the same time, increasing decentralisation is crucial for success in the cryptoasset space. Hedera achieves decentralisation even in a permissioned setting through geographic distribution, independent trusted enterprise-based decision-making and a transparent governance structure, as well as a staged approach towards the future inclusion of non-Council nodes in consensus. The Council's distributed, independent and transparent governance structure was designed to address these objectives and promote greater confidence in the efficiency and decentralised nature of decision-making processes. Nevertheless, any perceived or actual deficiencies in the Hedera network’s governance practices could potentially deter investment and destabilise the platform’s credibility. </li> </ul> </li> </ul> |

| N   | Field                        | Content   |
|-----|------------------------------|---|
|     |                              | <ul style="list-style-type: none"> <li>• <b>Partnership Dependencies:</b> The Hedera Council collaborates with various enterprises and industries to enhance its network utility, notably Hashgraph Foundry, Inc. (f/k/a Swirlds Labs). Any disruptions in these partnerships or failure to meet collaborative objectives could adversely affect its operational goals.</li> <li>• <b>Regulatory Risks:</b> As a company governing a technology platform that crosses multiple jurisdictions, the Hedera Council must navigate a complex landscape of regulatory requirements, including data privacy, cybersecurity, financial regulations, securities regulations, commodities regulations, and more. Changes in legislation or non-compliance could lead to fines or restrictions on operations. For instance, as described in E.14, Hedera Council Members may filter transactions in compliance with international sanctions, which can affect the utility of HBAR for crypto asset holders in the corresponding jurisdictions.</li> </ul>   |
| I.3 | Crypto-Assets- related Risks | <ul style="list-style-type: none"> <li>• <b>Pricing Volatility:</b> Crypto-asset prices are susceptible to significant fluctuations due to market dynamics.</li> <li>• <b>Liquidity Conditions:</b> Insufficient liquidity on exchanges or trading platforms could lead to large price swings, impacting the ability of holders to sell their assets without significant price concession.</li> <li>• <b>Market Demand:</b> The risk that the Hedera network may not achieve expected levels of market adoption can affect HBAR's utility and value.</li> <li>• <b>Impact of Large Transactions:</b> Large transactions by major holders (often termed as 'whales') could significantly influence the price, leading to potential manipulation or unintended price destabilisation.</li> <li>• <b>Broader Economic Conditions:</b> Wider economic downturns or financial market instability could lead to decreased investment in crypto-assets, adversely affecting their price and liquidity.</li> <li>• <b>Regulatory Changes:</b> Potential impacts of evolving regulatory landscapes on the offer and trading of crypto-assets.</li> <li>• <b>Scam risks:</b> Frauds and scams related to fake crypto asset giveaways, identity theft, social engineering, and phishing schemes by malicious actors present a risk of loss for HBAR holders.</li> <li>• <b>Irreversibility risks:</b> Payments made under coercion, deceit, by mistake, or unlawfully are irreversible. While Council nodes may filter transactions on IP for regulatory compliance, the Council does not</li> </ul> |

| N   | Field                                | Content   |
|-----|--------------------------------------|---|
|     |                                      | <p>not have the ability to reverse transactions, delete or freeze accounts (see E.14). In this context. While a court can mandate a compensatory transaction, it lacks the technical means to implement such an order without the private keys associated with the relevant address, akin to the limitations with physical cash. These risks can be mitigated through the use of intermediaries, particularly those that are regulated and have robust customer support. However, this approach reintroduces the conventional risks associated with dependence on third parties.</p> <ul style="list-style-type: none"> <li>• <b>Private Key Management Risks:</b> Loss, theft, or improper management of private keys needed to access crypto-assets can result in irreversible loss of access to the assets.</li> <li>• <b>Custodial Risks:</b> Private key management risks may be mitigated by resorting to custodians, however these risks are shifted then to the third party, enabling potential losses due to failures in safeguarding the crypto-assets on their side.</li> <li>• <b>Privacy Risks:</b> HBAR transactions are publicly recorded on the Hedera network, potentially exposing user activities. Hedera network accounts are pseudonymous, and addresses offer pseudonymity, but the transparent and immutable record of all HBAR transactions could allow for the development of forensic and intelligence methods that could potentially trace addresses back to real-world identities.</li> <li>• <b>Taxation risks:</b> It cannot be guaranteed that transactions against HBAR, whether or not against other crypto assets, do not incur tax consequences.</li> <li>• <b>Regulatory risk:</b> The lack of regulatory harmonization or the lack of regulation altogether may present additional risks to HBAR holders.</li> </ul> |
| I.4 | Project Implementation-Related Risks | <p>Risks related to the Hedera network project at large include:</p> <ul style="list-style-type: none"> <li>• <b>Technical Delays and Overruns:</b> Risks of delays in development timelines or budget overruns due to unforeseen technical challenges, complexity in technology integration, or underestimation of resource requirements.</li> <li>• <b>Quality Assurance:</b> Potential issues with software bugs, security vulnerabilities, or performance shortfalls that could emerge despite testing, particularly as new updates or features are deployed.</li> <li>• <b>Dependency on Third Parties:</b> With the Hedera network being on a path to decentralisation, reliance on external partners or service</li> </ul>   |



| N   | Field                    | Content  |
|-----|--------------------------|--|
|     |                          | <p>providers such as Hashgraph Foundry Inc. could introduce delays and additional risks, as failure to deliver on commitments can derail project timelines and objectives. Similarly, the independence of third parties may introduce risks in terms of public image as third parties are free to set their own communication policy.</p> <ul style="list-style-type: none"><li>• <b>Adoption by Users:</b> Risk that new features or updates are not adopted by users due to lack of perceived benefits, complexity in transition, or user resistance to change.</li><li>• <b>Community Support:</b> Lack of Hedera Improvement Proposals on the side of the Hedera developer community may result in a lower pace of technological progress than would otherwise be possible. Furthermore, misalignment with community expectations or failure to adequately engage community stakeholders can result in poor adoption or negative publicity.</li><li>• <b>Market Penetration:</b> Challenges in penetrating target markets due to strong competition, lack of market readiness, or ineffective marketing strategies.</li><li>• <b>Human Resources:</b> On the path to decentralisation, the Hedera Council has an ever-decreasing amount of personnel, however this is still non-zero. Its (and its partners') dependency on key personnel and the challenge of maintaining a skilled workforce in a competitive market. The loss of key developers or executives, at either the Hedera Council or key external partners or service providers, or difficulty in attracting talent, can impact project continuity and success.</li></ul> |
| I.5 | Technology-Related Risks | <p>The Hedera network is susceptible to the following technology-related risks:</p> <ul style="list-style-type: none"><li>• <b>1/3 Attacks:</b> If one third of the nodes (weighted by stake) were compromised, this could potentially halt the acceptance of the correct transactions and affect fair ordering of transactions. This is exacerbated by the possibility of firewall attacks, which a malicious actor could use to separate a third of the network from the rest of it.</li><li>• <b>Attacks on Network Proxies and Specific Hedera Services:</b> Despite the robustness of the Hedera mainnet, proxies providing access to the network could be subject to vulnerabilities, enabling smart contract exploits (HSCS).</li><li>• <b>Code Quality and Bugs:</b> Software bugs and defects in new releases or updates could compromise system functionality, security, and user trust.</li></ul>   |

| N | Field | Content   |
|---|-------|---|
|   |       | <ul style="list-style-type: none"><li>• <b>Protocol Updates:</b> Updates to the Hedera protocol required cryptographically-signed transactions, which introduces risks.</li><li>• <b>Weighted voting cryptography:</b> Enabling weighted voting in the virtual consensus algorithm, whereby node votes are weighted by their stake, requires modifications to the current cryptography of the Hedera network – which currently relies on rounding of the stake and is thus not entirely precise. Delays in the technical project of achieving these modifications could potentially delay the depermissioning of the network.</li><li>• <b>Quantum Computing Risks:</b> As most systems on the internet, the Hedera network relies heavily on cryptography, notably public-key cryptosystems based on classical assumptions. If quantum computing were to break classical assumptions, this would pose a risk to the Hedera network’s cryptography that would need to be managed.</li><li>• <b>Sharding Risks:</b> While highly scalable on its own, eventually the Hedera network will scale via sharding. Shards will require some technical breakthroughs, delays which would affect the technological pace of the network. Furthermore, each shard will individually be subject to the same risks that currently affect the network as a whole (e.g. every individual shard will be susceptible to <math>\frac{1}{3}</math> attacks and this will need to be managed).</li><li>• <b>Interoperability Risks:</b> Success for the Hedera network as a crypto asset project is more likely if the protocol is fully interoperable with other projects. Delays in achieving interoperability would concordantly harm the success of the network as a whole.</li><li>• <b>Other attacks:</b> Certain conceivable attacks targeting the Hedera network are not failures of its consensus mechanism, as they would be equally effective in a single-server setup. For instance, if attackers could control internet traffic and delay messages, they could isolate nodes entirely by disconnecting them from the rest of the internet to ensure a particular set of transactions never reaches the nodes at all, similar to executing a denial of service attack. Such a strategy would disrupt communication regardless of whether the attacked nodes were interacting with a decentralised network or a central server, making it a broader internet security issue rather than a specific flaw in the consensus system.</li></ul> |

| N   | Field               | Content  |
|-----|---------------------|--|
| I.6 | Mitigation measures | <p>The following mitigation measures are in place:</p> <ul style="list-style-type: none"><li>• <b>Issuer-Related Risks:</b><ul style="list-style-type: none"><li>◦ The Hedera Council maintains robust financial reserves and employs stringent budgeting practices to manage its Treasury effectively. This ensures long-term sustainability and buffers against potential decreases in network usage or revenue.</li><li>◦ Regular internal audits assess and enhance the effectiveness of operational controls, reducing the risk of fraud and operational errors.</li><li>◦ The Hedera Council commits to transparency in its decision-making processes. Regular disclosures on governance practices and strategic decisions are made to keep stakeholders informed and involved. All meeting minutes from Hedera Council Meetings are not just published but recorded on-chain.</li><li>◦ The Hedera Council continually works towards increasing the decentralisation of the Hedera network. This includes expanding the number of nodes and distributing governance roles across a broader set of stakeholders to reduce central points of failure and improve network resilience.</li><li>◦ By engaging with a variety of partners across different sectors and regions, the Hedera Council spreads its dependency risks and enhances its operational resilience.</li><li>◦ The Hedera Council's legal team proactively engages with regulatory developments and ensures compliance across all jurisdictions in which it operates.</li><li>◦ Hedera Council signers follow strict operational security procedures including key management and single-purpose laptops.</li></ul></li><li>• <b>Crypto-Assets-related Risks:</b> The Hedera Council does not seek to influence the price of HBAR, which is subject to forces of supply and demand. However:<ul style="list-style-type: none"><li>◦ The Hedera Council's communication policy seeks to educate HBAR holders and prospective holders about the various market risks.</li><li>◦ The Hedera Treasury Allocation Plan has been designed carefully to avoid disrupting the market.</li><li>◦ The Hedera Council's Policy team is constantly engaging with regulators to minimise the negative aftereffects of the evolving</li></ul></li></ul> |



| N | Field | Content  |
|---|-------|--|
|   |       | <ul style="list-style-type: none"><li>• <b>Project Implementation-Related Risks:</b><ul style="list-style-type: none"><li>◦ Continuous security assessments and updates fortify the Hedera network’s defences against new vulnerabilities.</li><li>◦ The Hedera ecosystem players maintain active channels for community interaction and feedback, ensuring that the community’s voice is heard and considered in project development.</li><li>◦ Hedera Council’s partners actively work to encourage developer activity and Hedera Improvement Proposals.</li><li>◦ Hedera Council actively works to reduce any dependencies on particular partners.</li><li>◦ Hedera Council upholds the highest Human Resources standards and constantly works to achieve the highest level of operational efficiency and quality.</li></ul></li><li>• <b>Technology- Related Risks:</b><ul style="list-style-type: none"><li>◦ The Hedera Council strictly vets new Council members and will only enable full depermissioning of the network under conditions that would make a ⅓ attack unfeasible.</li><li>◦ Hedera Council and Hashgraph Foundry constantly conduct internal security audits to identify and rectify vulnerabilities before they can be exploited.</li><li>◦ A rigorous code review process involving multiple senior developers is followed to catch potential bugs before software release.</li><li>◦ Hedera Council actively maintains a bug bounty programme.</li><li>◦ Hedera network adheres to the CNSA standard, which the US government employs to secure its Top Secret data. This standard mandates the use of at least 256-bit AES keys in TLS connections and 384-bit SHA-2 hashes. SHA-384 is considered "quantum resistant" per the CNSA 2.0 Quantum Computing guidance published in Dec 2024. These larger key sizes make AES and SHA-2 typically regarded as secure against potential future quantum computers, even those of considerable size. If required, new cryptographic algorithms (including those tested by NIST as part of their post-quantum work) can be introduced in Hedera without undertaking a hard fork, as demonstrated by the introduction of ECDSA_SECP256K1 support post-network launch.</li><li>◦ The Hedera Council team and its partners actively work to facilitate interoperability, make the technical breakthroughs that will enable sharding, and lay the groundwork for post-quantum cryptography on the Hedera network.</li></ul></li></ul> |

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

## Mandatory Information on principal adverse impacts on the climate

| N   | Field   | Content   |
|---|---|---|
| General Information                           |   |   |
| S.1   | Name  | Hedera Hashgraph, LLC.  |
| S.2   | Relevant legal entity identifier                        | 25490049T42L118ZYK52  |
| S.3   | Name of the crypto-asset                                | HBAR  |
| S.4   | Consensus Mechanism                                     | Hashgraph Proof of Stake  |
| S.5   | Incentive Mechanisms and Applicable Fees                | Hedera network’s validator incentives are limited, minimising reliance on penalties and rewards. Transaction fees, denominated in USD but paid in HBAR, vary by service type and are based on computational requirements. They are regularly updated to align with market exchange rates. Validator rewards come from transaction fees and a Council-managed rewards account, with no new HBAR minted for this purpose. |
| S.6   | Beginning of the period to which the disclosure relates | 2024-05-09  |
| S.7   | End of the period to which the disclosure relates       | 2025-05-08  |
| Mandatory key indicator on energy consumption |   |   |
| S.8   | Energy consumption                                      | 46,466.82545 kWh per calendar year  |

| N                         | Field  | Content  |
|---------------------------|--|--|
| Sources and methodologies |  |  |
| S.9                       | Energy consumption sources and methodologies | Data provided by the MiCA Crypto Alliance as a third party, with no deviations from the calculation guidance of Commission Delegated Regulation (EU) 2025/422, Article 6(5).<br>Full methodology available at :<br><a href="https://www.micacryptoalliance.com/methodologies">https://www.micacryptoalliance.com/methodologies</a> |

Supplementary Information on the principal adverse impacts on the climate and other environment-related adverse impacts of the consensus mechanism

| N  | Field                                 | Content  |
|--|---------------------------------------|--|
| Supplementary key indicators on energy and GHG emissions |                                       |  |
| S.10   | Renewable energy consumption          | 0.3946177594   |
| S.11   | Energy intensity                      | 0.00021 kWh per transaction  |
| S.12   | Scope 1 DLT GHG emissions-controlled  | 0 tCO2eq per calendar year   |
| S.13   | Scope 2 DLT GHG emissions – purchased | 13.02924 t CO2eq per calendar year   |
| S.14   | GHG intensity                         | 0.00006 kg CO2eq per transaction   |
| Sources and methodologies                                |                                       |  |
| S.15   | Key energy course & methodologies     | Data provided by the MiCA Crypto Alliance as a third party, with no deviations from the calculation guidance of Commission Delegated Regulation (EU) 2025/422, Article 6(5).<br>Full methodology available at :<br><a href="https://www.micacryptoalliance.com/methodologies">https://www.micacryptoalliance.com/methodologies</a> |
| S.15   | Key GHG sources & methodologies       | Data provided by the MiCA Crypto Alliance as a third party, with no deviations from the calculation guidance of Commission Delegated Regulation (EU) 2025/422, Article 6(5).<br>Full methodology available at :<br><a href="https://www.micacryptoalliance.com/methodologies">https://www.micacryptoalliance.com/methodologies</a> |



Optional information on the principal adverse impacts on the climate and on other environment-related adverse impacts of the consensus mechanism

| N                   | Field  | Content  |                            |                            |           |              |      |              |     |              |       |              |         |              |              |             |                  |              |       |              |      |              |
|---------------------|--|--|----------------------------|----------------------------|-----------|--------------|------|--------------|-----|--------------|-------|--------------|---------|--------------|--------------|-------------|------------------|--------------|-------|--------------|------|--------------|
| Optional Indicators |  |  |                            |                            |           |              |      |              |     |              |       |              |         |              |              |             |                  |              |       |              |      |              |
| S.17                | Energy mix   | <table><tr><th>Energy source</th><th>Percentage {DECIMAL-11/10}</th></tr><tr><td>Bioenergy</td><td>0.0419126260</td></tr><tr><td>Coal</td><td>0.1254243206</td></tr><tr><td>Gas</td><td>0.2874233009</td></tr><tr><td>Hydro</td><td>0.0858538592</td></tr><tr><td>Nuclear</td><td>0.1571084368</td></tr><tr><td>Other fossil</td><td>0.035426182</td></tr><tr><td>Other Renewables</td><td>0.0025591953</td></tr><tr><td>Solar</td><td>0.0911392039</td></tr><tr><td>Wind</td><td>0.1731528750</td></tr></table> | Energy source              | Percentage {DECIMAL-11/10} | Bioenergy | 0.0419126260 | Coal | 0.1254243206 | Gas | 0.2874233009 | Hydro | 0.0858538592 | Nuclear | 0.1571084368 | Other fossil | 0.035426182 | Other Renewables | 0.0025591953 | Solar | 0.0911392039 | Wind | 0.1731528750 |
|                     |  | Energy source  | Percentage {DECIMAL-11/10} |                            |           |              |      |              |     |              |       |              |         |              |              |             |                  |              |       |              |      |              |
|                     |  | Bioenergy  | 0.0419126260               |                            |           |              |      |              |     |              |       |              |         |              |              |             |                  |              |       |              |      |              |
|                     |  | Coal   | 0.1254243206               |                            |           |              |      |              |     |              |       |              |         |              |              |             |                  |              |       |              |      |              |
|                     |  | Gas  | 0.2874233009               |                            |           |              |      |              |     |              |       |              |         |              |              |             |                  |              |       |              |      |              |
|                     |  | Hydro  | 0.0858538592               |                            |           |              |      |              |     |              |       |              |         |              |              |             |                  |              |       |              |      |              |
|                     |  | Nuclear  | 0.1571084368               |                            |           |              |      |              |     |              |       |              |         |              |              |             |                  |              |       |              |      |              |
|                     |  | Other fossil   | 0.035426182                |                            |           |              |      |              |     |              |       |              |         |              |              |             |                  |              |       |              |      |              |
|                     |  | Other Renewables   | 0.0025591953               |                            |           |              |      |              |     |              |       |              |         |              |              |             |                  |              |       |              |      |              |
|                     |  | Solar  | 0.0911392039               |                            |           |              |      |              |     |              |       |              |         |              |              |             |                  |              |       |              |      |              |
| Wind                | 0.1731528750   |  |                            |                            |           |              |      |              |     |              |       |              |         |              |              |             |                  |              |       |              |      |              |
| S.19                | Carbon intensity   | 0.28040 kg CO <sub>2</sub> eq per kWh  |                            |                            |           |              |      |              |     |              |       |              |         |              |              |             |                  |              |       |              |      |              |
| S.22                | Generation of waste electrical and electronic equipment (WEEE) | 0.10565 t per calendar year  |                            |                            |           |              |      |              |     |              |       |              |         |              |              |             |                  |              |       |              |      |              |
| S.23                | Non-recycled WEEE ratio  | 0.6411165995   |                            |                            |           |              |      |              |     |              |       |              |         |              |              |             |                  |              |       |              |      |              |
| S.24                | Generation of hazardous waste                                  | 0.00005 t per calendar year  |                            |                            |           |              |      |              |     |              |       |              |         |              |              |             |                  |              |       |              |      |              |
| S.25                | Generation of waste (all types)                                | 0.10565 t per calendar year  |                            |                            |           |              |      |              |     |              |       |              |         |              |              |             |                  |              |       |              |      |              |
| S.26                | Non-recycled waste ratio (all types)                           | 0.6384145453   |                            |                            |           |              |      |              |     |              |       |              |         |              |              |             |                  |              |       |              |      |              |
| S.27                | Waste intensity (all types)                                    | 0.000005 g per transaction   |                            |                            |           |              |      |              |     |              |       |              |         |              |              |             |                  |              |       |              |      |              |
| S.29                | Impact of the use of equipment on natural resources            | Land use: 1,371.02638 m <sup>2</sup>   |                            |                            |           |              |      |              |     |              |       |              |         |              |              |             |                  |              |       |              |      |              |
| S.31                | Water use  | 230.06476 m <sup>3</sup> per calendar year   |                            |                            |           |              |      |              |     |              |       |              |         |              |              |             |                  |              |       |              |      |              |
| S.32                | Non-recycled water ratio                                       | 0.7314552053   |                            |                            |           |              |      |              |     |              |       |              |         |              |              |             |                  |              |       |              |      |              |

| N                         | Field                                       | Content   |
|---------------------------|---|---|
| Sources and methodologies |   |   |
| S.33                      | Other energy sources and methodologies      | Data provided by the MiCA Crypto Alliance as a third party, with no deviations from the calculation guidance of Commission Delegated Regulation (EU) 2025/422, Article 6(5).<br>Full methodology available at:<br><a href="http://www.micacryptoalliance.com/methodologies">www.micacryptoalliance.com/methodologies</a>  |
| S.33                      | Other GHG sources and methodologies         | Data provided by the MiCA Crypto Alliance as a third party, with no deviations from the calculation guidance of Commission Delegated Regulation (EU) 2025/422, Article 6(5).<br>Full methodology available at:<br><a href="http://www.micacryptoalliance.com/methodologies">www.micacryptoalliance.com/methodologies</a>  |
| S.33                      | Waste sources and methodologies             | Data provided by the MiCA Crypto Alliance as a third party, with no deviations from the calculation guidance of Commission Delegated Regulation (EU) 2025/422, Article 6(5). Estimates on individual node weight, hazardous components and depreciation rate are used.<br>Full methodology available at:<br><a href="http://www.micacryptoalliance.com/methodologies">www.micacryptoalliance.com/methodologies</a>  |
| S.33                      | Natural resources sources and methodologies | Data provided by the MiCA Crypto Alliance as a third party, with no deviations from the calculation guidance of Commission Delegated Regulation (EU) 2025/422, Article 6(5). Usage of natural resources is approximated through land use metrics. Land use, water use and water recycling are calculated based on energy mix-specific estimates of purchased electricity land intensity, purchased electricity water intensity, and water recycling rates. Full methodology available at:<br><a href="http://www.micacryptoalliance.com/methodologies">www.micacryptoalliance.com/methodologies</a> |

# MiCA Crypto Alliance

**The MiCA Crypto Alliance** is a leading collaborative initiative simplifying regulatory compliance across the crypto industry. We provide verified sustainability data and write MiCA-compliant white papers to help token issuers, CASPs and crypto projects meet their disclosure obligations under MiCA.

This alliance focuses on standardising compliance efforts among its members, offering exclusive resources like sustainability indicators and white paper elaboration tools tailored to meet MiCA requirements. By leveraging the collective expertise of its members, the MiCA Crypto Alliance will help reduce the complexities and costs associated with compliance, while setting a high standard for transparency, market integrity, and consumer protection. For more details on joining the MiCA Crypto Alliance.

Visit: [micacryptoalliance.com](https://micacryptoalliance.com)

Contact us: [mica@dltscience.org](mailto:mica@dltscience.org)

