Hedera™

Unlocking Trust

The story of Hedera, Hiero & AI enabled Web3 use cases

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Agenda

Part 1 - The Hedera Network

1. Hedera - What and Why?
2. The Hedera Governing Council
3. Hiero - What and Why?

Part 2 - Use Cases

4. Introduction to Google BigQuery
5. Google Public Datasets
6. Sample Use Cases

What & Why?

Overview

Distributed Ledger Technology (DLT) is transforming the way the world does business.

Hedera is the leading enterprise DLT due to its speed, security, stability, and robust governance model.

Hedera Council governs the network and offers members a role in shaping the future of distributed ledger technology.

Enterprises across industries will need to embrace DLT in order to remain competitive.

Why DLT?

Distributed Ledger Technology (DLT) eliminates the need for intermediaries and creates an added layer of trust between parties.

Enhanced Security

Without a single point of failure, the system is more resilient against attacks.

Lower Costs

Direct peer-to-peer transactions reduce the need for intermediaries, lowering costs.

Increased Transparency & Access

All participants have access to the same immutable information, reducing opportunities for fraud and errors.

Atomic settlement

Transactions are immediate and immutable..

Hedera Network Services

HEDERA COUNCIL

Consensus Service

Token Service

Smart Contract Service
(EVM Compatibility)

Hashgraph

Hashgraph
Consensus

HEDERA NETWORK

Click **here** for a 5 min explainer on just how unique the Hashgraph consensus algorithm is!

Why Hedera Stands Apart from all other DLTs

Fair ordering (no MEV)
In Hedera, all txns are ordered fairly. You can not pay to front run as you can on many chains. We are still EVM compatible.
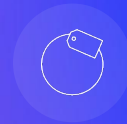
Low, Predictable Process Cost
Hedera provides consistently low and predictable transaction fees.

Fast Processing Speeds
Hedera's high-throughput network enables fast and efficient transactions. Ability to reach 10,000TPS+.

Advanced Security
Hedera's advanced security model ensures data integrity and network resilience.

Low Amounts of Energy
Hedera operates with a low-energy consensus mechanism, minimizing environmental impact.

1 Step to Quantum Resistant
We only have a signature upgrade required, and we've done such an upgrade before.

Hedera in Real Life

abrdn

Real World & Digital Asset Tokenization

Launched its first DLT--based investment by tokenizing part of its £15 billion Lux Sterling money market fund on. The token is issued on Hedera.

EQTYLAB

AI Governance

EQTY Labs uses Hedera's consensus service for ClimateGPT to ensure transparent, immutable tracking of climate data and model workflows.

HYUNDAI
KIA

Sustainability

Hyundai and Kia use Hedera's scalable, energy-efficient network for their Supplier CO2 Emission Monitoring System, which tracks carbon emissions across their supply chain.

KARATE COMBAT

Customer Engagement & Loyalty

Leverages Hedera's token and smart contract services to power fan engagement, voting, and rewards through scalable, secure technology.
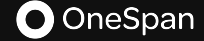
OneSpan

Data Integrity

OneSpan's Trust Vault leverages the Hedera blockchain to secure the long-term integrity and authenticity of digital agreements, offering quantum-safe protection and irrefutable origin dates.

Why Act Now?

DLT initiatives have increased
39%
year-over-year according to Fortune 100 companies and hit a record high in Q1 2024.

BITCOIN.COM NEWS

56%
of Fortune 500 executives say their companies are working on blockchain projects.

COINBASE

Blockchain will generate
$3.1 trillion
in new business value by 2030.

GARTNER

70%
of people surveyed want faster transaction times (that happen in seconds, unrestricted by bank hours or weekends).

THE FEDERAL RESERVE

134 countries
representing 98% of global GDP, are exploring CBDCs.

REUTERS

Why Act Now....?   Trump!

- **Pro Crypto Actions**

  - President Trump revoked the <u>Biden administration's digital assets Executive Order (EO)</u>, and issued a <u>separate EO</u> on bolstering the US's position in digital financial technology

  - President Trump created the <u>Strategic Bitcoin Reserve & US Digital Asset Stockpile</u>

  - Office of the Comptroller of the Currency (OCC) <u>clarifies bank authority to engage in crypto activities</u>

- **President's Council of Advisors on Science and Technology (PCAST)**

  - President Trump <u>reestablished the PCAST</u> – a 24 member group of industry leaders and academics Co-Chaired by David Sacks, the AI and Crypto Czar – to advise the President on science, technology, and innovation policy, focusing on U.S. global tech dominance

- **Pro AI Actions**

  - President Trump rescinded <u>Biden's AI EO</u> and adopted a <u>new EO</u> on Removing Barriers to American Leadership in Artificial Intelligence, demonstrating that the Trump administration hopes to take a fresh and innovation-focused approach to AI

DLT Value Realized

clearstream | DEUTSCHE BÖRSE GROUP

"[W]e are expanding our D7 digital securities infrastructure with DLT components and fostering connections with the main digital payment solutions across the Eurosystem.

DR. STEPHANIE ECKERMANN
CEO, CLEARSTREAM BANKING AG

BlackRock.

"[Y]ou want to talk about issues around money laundering and all that, [DLT] eliminates all corruption, by having a tokenized system...

LARRY FINK
CEO, BLACKROCK

pwc

"Firms waiting for regulatory clarity are likely to be left behind by those forging ahead and pro-actively providing stakeholders with assurance over their governance, risk management and transparency, using both traditional methods as well as real time on-chain evidence.
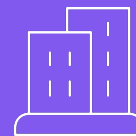
SAGAN RAJBHANDARY
DIRECTOR, CRYPTO ASSETS
PWC AUSTRALIA

euroclear

"FMIs are actively working toward 'the co-creation of tomorrow's financial system—one that's open, inclusive, efficient, and resilient.

VALÉRIE URBAIN
CEO, EUROCLEAR

Institutions need to prepare NOW for DLT

The Hedera Governing Council

-

A world-leading cohort of institutions govern the Hedera public network

A PUBLIC, PERMISSIONED DLT NETWORK

Logos: abrdn, Australian Payments Plus, BitGo, Avery Dennison, Chainlink Labs, COFRA, DELL Technologies, 大成 DENTONS, Deutsche Telekom, DLA PIPER, edf, Google, HITACHI, IBM, IIT Madras, LG, LSE, Magalu, Mondelēz International, NSE, NOMURA, servicenow, Shinhan Bank, Standard Bank, Swirlds, TATA COMMUNICATIONS, UBISOFT, wipro, worldpay, zain

What is Hedera Council?

Hedera Council holds up to 39 seats that oversee the growth and development of the Hedera network; ensuring security and trusted governance.

Hedera Council is comprised of leading global institutions across various industries who also build solutions on Hedera.

Responsibilities

- Oversee network governance and development (equal voting rights)

- Ensure network stability and security

- Promote the adoption and growth of Hedera

- Each member operates a node on the network

- Actively participate in Council activities and meetings (collaborative decision-making processes)

Why Join Hedera Council?

Gain Insight and Influence

- Get a comprehensive view of how leading global companies are leveraging DLT and tokenization.
- Gain strategic influence over the development of the Hedera network.

Exclusive Networking and Collaboration

Join a network of top enterprises and innovators, creating partnerships and collaborations to drive value.

Drive Competitive Advantage

As a Council member, position your organization at the forefront of digital transformation, gaining an edge in the evolving digital economy.

Limited Liability

Hedera is a Delaware limited liability company, a common corporate structure that has strong protections to limit the liability of members.

No Fiduciary Duties

Council Members can be guided by the best interests of their respective companies and are not required to be guided by the best interests of the Council or the Hedera network. Ensures decentralized decision-making and limits potential liability of Council Members.

D&O Insurance

Hedera has "side A" D&O insurance policies that provide an aggregate of $5 million coverage.

Limited Financial Exposure

No Material Equity Investment

Contribution of $100 for membership interests, returned upon exit of the Council.
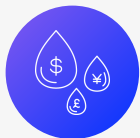
No Capital Contribution

No obligation or expectation of further capital contributions to Hedera.

Minimal Tax Implication

Hedera is taxed as a corporation and there are no pass-through gains or losses that Council Members need to account for due to their holding of membership interests.

No Economic Interest

Functionally Hedera is a not-for-profit association — membership interests is purely for governance, without rights to profits, dividends, distributions, or residuals.

Our platform is designed to allow millions of users to easily access and display NFTs on the Hedera network without worrying about the high energy consumption associated with other public networks.

CHRIS JO SR. VP PLATFORM
BUSINESS HEAD, LG
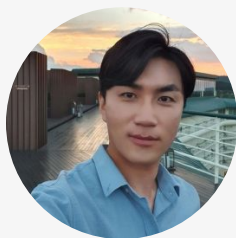
Shinhan Bank

Stablecoins offer a low-cost, fast, and reliable way to transfer value across borders... we are pleased to have demonstrated how the use of Hedera's EVM-compatible technology helps eliminate intermediaries, reduce costs, and speed up the remittance process.

BYUNGHEE KIM
BLOCKCHAIN LEAD, SHINHAN BANK

Hedera has that enterprise focus that we really liked... [By joining the Hedera Council] we can tap into this rich network use cases that are already in flight - already have a lot of thought put behind them - and that can accelerate solutions for our customers.

STEVE TODD
VP DATA INNOVATION AND STRATEGY, DELL

> We see the synergy effect across the enterprise space. It's not just the technology, but we also get the chance to work with peers within the Governing Council.

XIANG XU
GLOBAL COE LEADER DIGITAL STRATEGY, BLOCKCHAIN, MONDELEZ

CONCLUSION

DLT is transforming the way the world does business.

- Hedera is the leading enterprise DLT due to its speed, security, stability, and robust governance model.

- Joining Hedera Council offers strategic advantages, collaborative opportunities, and a role in shaping the future of distributed ledger technology.

- Enterprises participating in the digital economy should explore and adopt DLT/blockchain technology to stay competitive and drive innovation.

About Hiero

- **Hiero** was announced as a **Linux Foundation Decentralized Trust** project in September 2024

- **Hiero** is the **open-source** base of the **Hedera** network

https://hiero.org

About Hiero

- All **source code of Hedera** is being transferred to Hiero

- Hiero is the first fully **vendor-neutral** and open-source **distributed ledger technology**

https://hiero.org

Open Source

- Auditability

- Standardization and Compatibility

- Forkability

- Avoiding Vendor Lock-in

  ... AND SO MUCH MORE
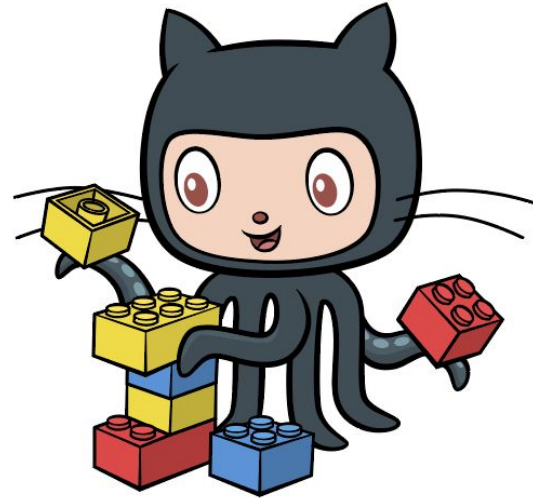
Linux Foundation

- Empower developers

  - ... with infrastructure and services

  - ... with sharing knowledge

  - ... with creating communities

Hiero TSC

- A diverse group of multiple entities (companies / individuals) lead the project (TSC)

- Roadmap is created transparent & in cooperation

Richard Bair

Dr. Leemon Baird

Hendrik Ebbers
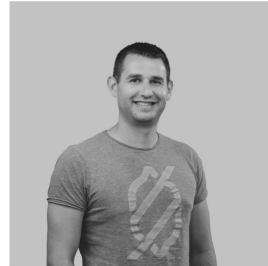
Stoyan Panayotov

Alex Popowycz

George Spasov

Hashgraph

Read here about the open seats on our technical steering committee!

Hiero

Open Source Distributed Ledger Technology

FIND US ON GITHUB

COME COLLABORATE!

Introduction to Google BigQuery

→ BigQuery is a fully managed, serverless data warehouse, allowing users to focus on analyzing data. It's designed to handle petabyte-scale datasets.

→ The pricing model is primarily based on query processing and storage, which can be very efficient for large-scale data analysis.

→ Supports streaming data ingestion, allowing for real-time analysis of data as it arrives.

Market Intelligence for Google Public Datasets

Unlock Unprecedented Market Intelligence now with Hedera data

→ Hedera's data, now seamlessly integrated into Google BigQuery, empowers your company to execute sophisticated, AI-driven analytics.

→ Dive deep into cross-blockchain comparisons without the technical complexities, gaining a decisive edge in today's dynamic markets.

Web3 AI Search

Use Natural Language Processing to Transact on Supported Blockchains

➔ Effortlessly check blockchain balances using natural language commands.

➔ Expanded query and transaction capabilities coming soon, powered by evolving Google Common Schemas.

➔ Simplify fund transfers across diverse blockchains with intuitive, natural language interactions.

Google Public Datasets and Usability

Utilize Development Tools and Testnets

→ Blockchain Development Tools such as mirror nodes, public data schemas and more.

→ Integrated faucets for receiving testnet tokens during development.

Traceability: Ecological Projects

BigQuery facilitates analysis of Methodologies across blockchains, enabling users to verify the uniqueness of Carbon Offsets.

Sample Use case: Gold Futures

A global trading firm intends to offer tokenized Gold Futures contracts.

→ Given the high-value and regulated nature of these instruments, they need to conduct thorough due diligence on potential blockchain platforms.

→ Utilizing Google BigQuery, they can efficiently query vast datasets from multiple blockchains, searching for keywords such as "Gold Futures," "Commodity Derivatives," and "Exchange Traded Contracts," and identify existing implementations of similar financial products. This analysis is performed without the need to deploy and maintain any dedicated hardware.

→ Once relevant data is identified, analysts can delve deeper into the datasets, examining details such as trading volume, settlement mechanisms, regulatory compliance, and other critical factors influencing the viability and security of their tokenized Gold Futures offering.

Sample Use Case: Anti-Money Laundering

Financial institutions are legally required to prevent money laundering and terrorist financing.

➔ Hedera for Identity Verification: Using Hedera to create secure and immutable digital identities, streamlining the KYC process.

➔ Data Aggregation and Analysis: Utilizing data warehouses like Google BigQuery to aggregate customer data from various blockchains provides a near instant monitoring platform for analysts.

➔ Having Hedera Data pushed into Google Bigquery enables many benefits such as Enhanced Fraud Detection, Reduced Risk, Increased Efficiency, and Regulatory Adherence.

Hedera™

Thank You

Appendix

Hedera's Technology Stack

Consensus Service

The Hedera Consensus Service (HCS) **enables business to create secure, verifiable logs of events for both traditional and decentralized applications.** By submitting messages to the Hedera network, HCS assigns trusted timestamps and ensures fair ordering which is key for use cases like supply chain tracking, asset transfers and monitoring.

Build with Native Performance
Create applications that demand high throughput 10,000+ txs per second, per shard

Amplify Trust
Validate the data in a multi-party database, notary service, or anything that needs transparency with shared infrastructure

Guarantee Order
Results in a fair total consensus order, with accurate timestamps, a running hash of order in the topic, along with a state proof that guarantees it is correct

Integrate Into Existing Ecosystems
Open-source integrations with Hyperledger Fabric create new architectures

CREATE TOPIC → SEND → PROCESS → AUDIT
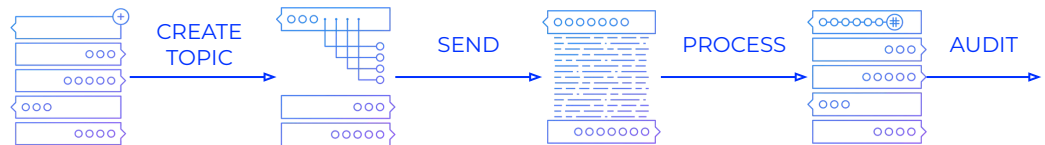
Token Service

The Hedera Token Service (HTS) **enables businesses to efficiently create and manage both fungible and non-fungible tokens directly on the Hedera network**, eliminating the need for complex smart contract. Making it suitable for applications across various sectors, including DeFI and payments.

Tokenization Made Simple
Mint and manage fungible and non-fungible tokens without needing to deploy a smart contract

Tokenize Natively
High-throughput, compliance configurations, and on-chain programmability

Low, Predictable Fees
Offers low and predictable transaction fees on the Hedera public network, costing less than 1c USD to transfer any sum of a tokenized asset.

Hedera Smart Contracts

The **Hedera Smart Contract Service allows businesses to deploy Ethereum-compatible smart contracts on the Hedera network**, enabling seamless integration with existing Solidity codebases and development tools.

EVM Smart Contracts

Hedera is EVM compatible and enables smart contracts written in Solidity, to be run unchanged using existing standards

Fair Transaction Ordering

Like all services, smart contracts are executed in order received, rather than the amount of gas paid. No need to pay extra to be included earlier in history. No possibility of front running. No MEV.

Modern Tooling

Using the most ubiquitous web3 tooling, libraries and environments, such as Ethers, HardHat, Foundry, Truffly, and more, that utilize JSON-RPC

Admin Privileges

Transparently define administrative keys to a contract, allowing owners to make sometimes drastically needed alterations to an otherwise immutable contract... Or not, it's up to your implementation!

Hedera Guardian

The Hedera Guardian is an **open-source platform that leverages the Hedera network to create auditable, traceable, and reproducible records of environmental assets, such as carbon credits**. By digitizing measurement, reporting, and verification processes, it enhances transparency and reduces fraud in sustainability markets.

Make Climate Finance Auditable
Ensure climate finance transactions are easily verifiable, publicly transparent, and accurate

Digitize & Open Source Methodologies
Fund and encourage development of open source methodologies that lead to high quality assets

Scale Validation & Verification
Scale both through the growth of existing verification bodies and new orgs

Make Sustainability Reporting Credible
Developing standards for sustainability reporting to ensure credibility and accuracy using Guardian based assets

Stablecoin Studio

Stablecoin Studio is an **open-source toolkit that simplifies the issuance and management of stablecoins on the Hedera network**. This helps business efficiently deploy stablecoin applications with enhanced transparency and security.

Proof-of-Reserve for Treasury
Built-in proof-of-reserve functionality that delivers provability in treasury management

Robust Administration
Includes Hedera-native token administration functionalities, enabling issuers to burn, mint, freeze, wipe and pause

Easy-to-Use Development Kit
The Open-Source TypeScript SDK and Management CLI streamline smart contract interactions, easing operations without specialized expertise
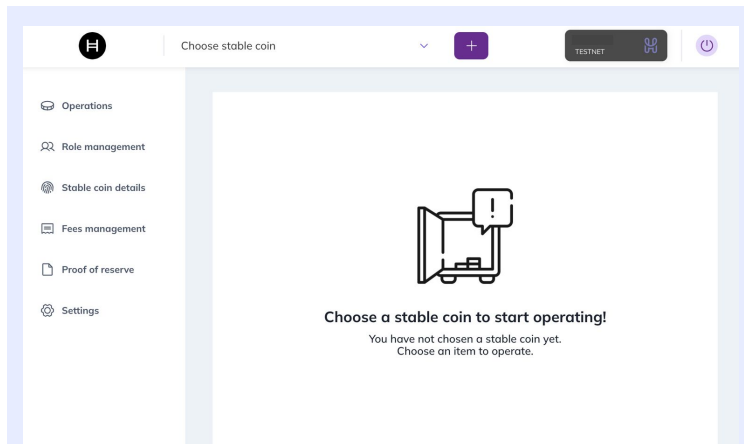
Asset Tokenization Studio

OVERVIEW

The Approach: Supercharging the ERC-1400 Standard

The ERC 1400 standard is one of the most widely adopted formats for security tokens.

PROBLEM

ERC 1400 does not have the foundation to support all details of assets on chain.
(E.g. using basic 1400 standards require managing bond specific actions and data off-chain, adding risk)

Using the Hedera Smart Contract Service (EVM), the Asset Tokenization Studio Extends the ERC-1400 functionality through a set of modules by including asset-specific metadata on-chain
(E.g. coupons, KYC, whitelisting, regulation, etc.)

Unique Advantages of Tokenization on Hedera

Hedera Token Service (HTS) includes native compliance controls like **token association**, **KYC flags**, and configurable permissions at the account level. Providing **enhanced security**, **regulatory adherence,** and **fraud prevention for enterprises and financial institutions**.

Supporting both **HTS and ERC-based tokens**, Hedera enables seamless interoperability between **native Hedera assets**, **Ethereum-compatible smart contracts,** and **hybrid tokenization models** for maximum flexibility.

Active ongoing tokenization use cases currently on Hedera

abrdn   ARCHAX   DIAMOND STANDARD   USD Coin

RED SWAN   Shinhan Bank   Standard Bank
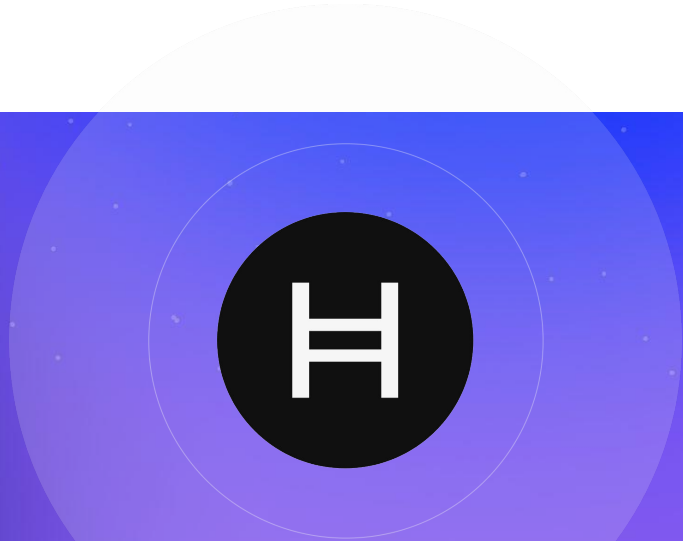
Tokenization of the world starts now

Digital Representation of Assets

Tokens can represent ownership or rights to an underlying asset such as real estate, commodities, artwork, etc.

Fractional Ownership

Tokenization allows for the division of assets into smaller, more manageable parts making assets more available.

Cross-Border

Tokenized assets can be traded globally without intermediaries, Individuals in unbanked regions can participate.

Increased Liquidity

Fractional ownership and easier transfer of assets increase the liquidity of traditionally illiquid assets.

> Within this decentralized, next generation internet, almost every asset in the world will eventually be tokenized and represented on distributed ledgers, allowing these assets to be fractionalized, shared, and transferred across the globe instantly and without intermediary involvement. The world will be tokenized.

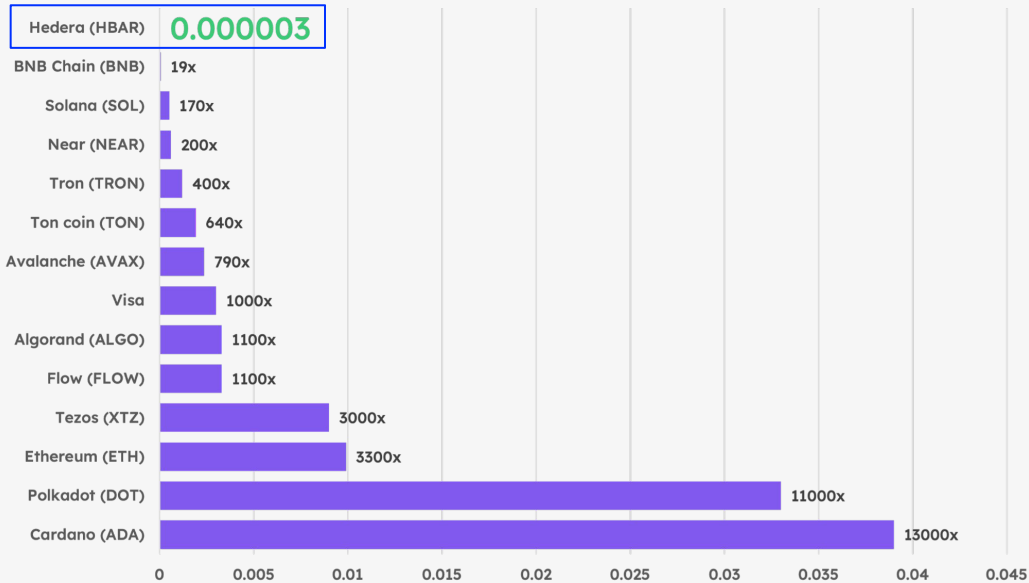2022 ARTICLE IN NASDAQ BY DR. LEEMON BAIRD

Relative to Selected Peers

	TXS per second (1 shard)	Fees per transfer	Speeds to settle transaction	Security	Decentralization	Governance
Hedera	10,000+	$0.0001 fixed	3-7 seconds	Finality ABFT ('Gold Standard' of security, verified w/ Coq proof)	Nodes spread across the globe and currently operated by 21 Council Members (room to expand up to 39) with equal vote before moving to public node operation	Hedera Council
Polkadot	1,000	$0.60 variable	12-60 seconds	Finality Byzantine Fault Tolerant	230 validator nodes	Web3 Foundation
Algorand	1,000	$0.0012 variable	5 seconds	Finality Byzantine Fault Tolerant	1,612 nodes 228 voters	Algorand Foundation
Stellar	1,000	$0.001 variable	3-5 seconds	Finality Not Byzantine Fault Tolerant (Security Vulnerabilities)	17 node operators, 60% centralized around Foundation nodes	Stellar Foundation
Ethereum	20	$5.75 variable	10-20 seconds	No Finality	Public node operation with a small number of mining pools	Centralization around Ethereum Foundation

Hedera is the Greenest Proof of Stake Network

KWH/TRANSACTION

Network	kWh/Transaction
Hedera (HBAR)	**0.000003**
BNB Chain (BNB)	19x
Solana (SOL)	170x
Near (NEAR)	200x
Tron (TRON)	400x
Ton coin (TON)	640x
Avalanche (AVAX)	790x
Visa	1000x
Algorand (ALGO)	1100x
Flow (FLOW)	1100x
Tezos (XTZ)	3000x
Ethereum (ETH)	3300x
Polkadot (DOT)	11000x
Cardano (ADA)	13000x

(x-axis: 0, 0.005, 0.01, 0.015, 0.02, 0.025, 0.03, 0.035, 0.04, 0.045)

Sources: Data as of 2023 (https://hedera.com/ucl-blockchain-energy)

UCL CENTRE FOR BLOCKCHAIN TECHNOLOGY

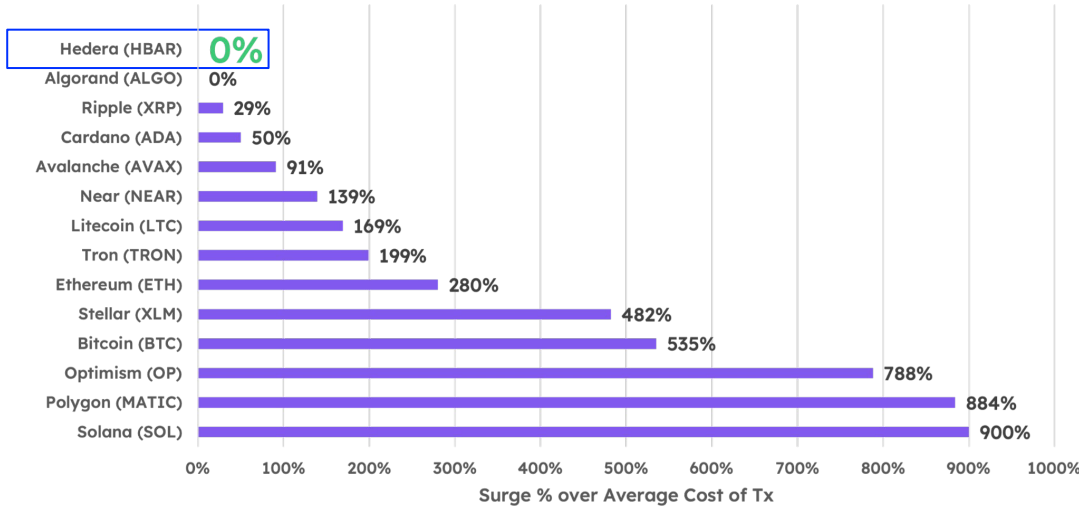The efficiency of hashgraph consensus enables Hedera to be the most sustainable public network, based on average energy consumed per transaction (0.000003 kWh), according to a recent study conducted by University College London.

In addition, Hedera has committed to being a carbon-negative public network through the purchase of quarterly carbon credits to offset the small amount of emissions from all public-facing infrastructure.

Hedera has Affordable & Predictable Fees

Surge Pricing % over Average Tx Cost (1-year)

Network	Surge % over Average Cost of Tx
Hedera (HBAR)	**0%**
Algorand (ALGO)	0%
Ripple (XRP)	29%
Cardano (ADA)	50%
Avalanche (AVAX)	91%
Near (NEAR)	139%
Litecoin (LTC)	169%
Tron (TRON)	199%
Ethereum (ETH)	280%
Stellar (XLM)	482%
Bitcoin (BTC)	535%
Optimism (OP)	788%
Polygon (MATIC)	884%
Solana (SOL)	900%

Sources: 1-year data, March 25, 2023-2024. Average transaction costs where available.
*Surge pricing is calculated by taking % change between AVERAGE price and MAX price over 365 days on the mainnet protocol
1. Fees are subject to change and vary based on service. For full fee list visit: https://docs.hedera.com/hedera/networks/mainnet/fees

charts.coinmetrics.io (XLM, XRP, ADA, TRX)
https://messari.io/project/cardano/charts/fees-and-revenue
https://blockchair.com/litecoin/charts/average-transaction-fee-usd
https://polygonscan.com/chart/avg-txfee-usd
https://tokenterminal.com/terminal/projects/tron
https://beta-analysis.solscan.io/public/dashboard/06d689e1-dcd7-4175-a16a-efc074ad5ce2
https://app.pyor.xyz/dashboards/chains/solana

https://ycharts.com/indicators/bitcoin_average_transaction_fee
https://optimistic.etherscan.io/chart/gasprice
https://snowtrace.io/chart?id=tx&metrics=ecosystem%3Aavalanche%3ATransactions%3A%2
3ef9b20%3Aday%3Aline%3Aline%3Avisible%1y%1%2Cchain%3A43114%3ATransactions%3
A%2327aeef%3Aday%3Aline%3Aline%3Avisible%3Ay2
https://etherscan.io/chart/avg-txfee-usd
https://developer.algorand.org/docs/get-details/transactions/
https://nearblocks.io/charts/txn-fee

LOW PREDICTABLE COST — Hedera™

$0.0001
per transaction [1]

ASSET TOKENIZATION

Hedera fees are _fixed_ and denominated in USD, with transactions carried out using $HBAR.

Hedera by the Numbers

70B+
Lifetime Mainnet
Transactions

8,497+
Max TPS
Registered

200+
Apps
in production on Hedera
mainnet, since open
access on Sept. 2019

6M
Total Accounts
Created

500k+
Active Accounts

20k+
Devs
attending global
hackathons, meetups, &
active in Discord