



Hedera

THE TRUST LAYER OF THE INTERNET



Abi Castro

*Developer Evangelist at Swirls
Labs*

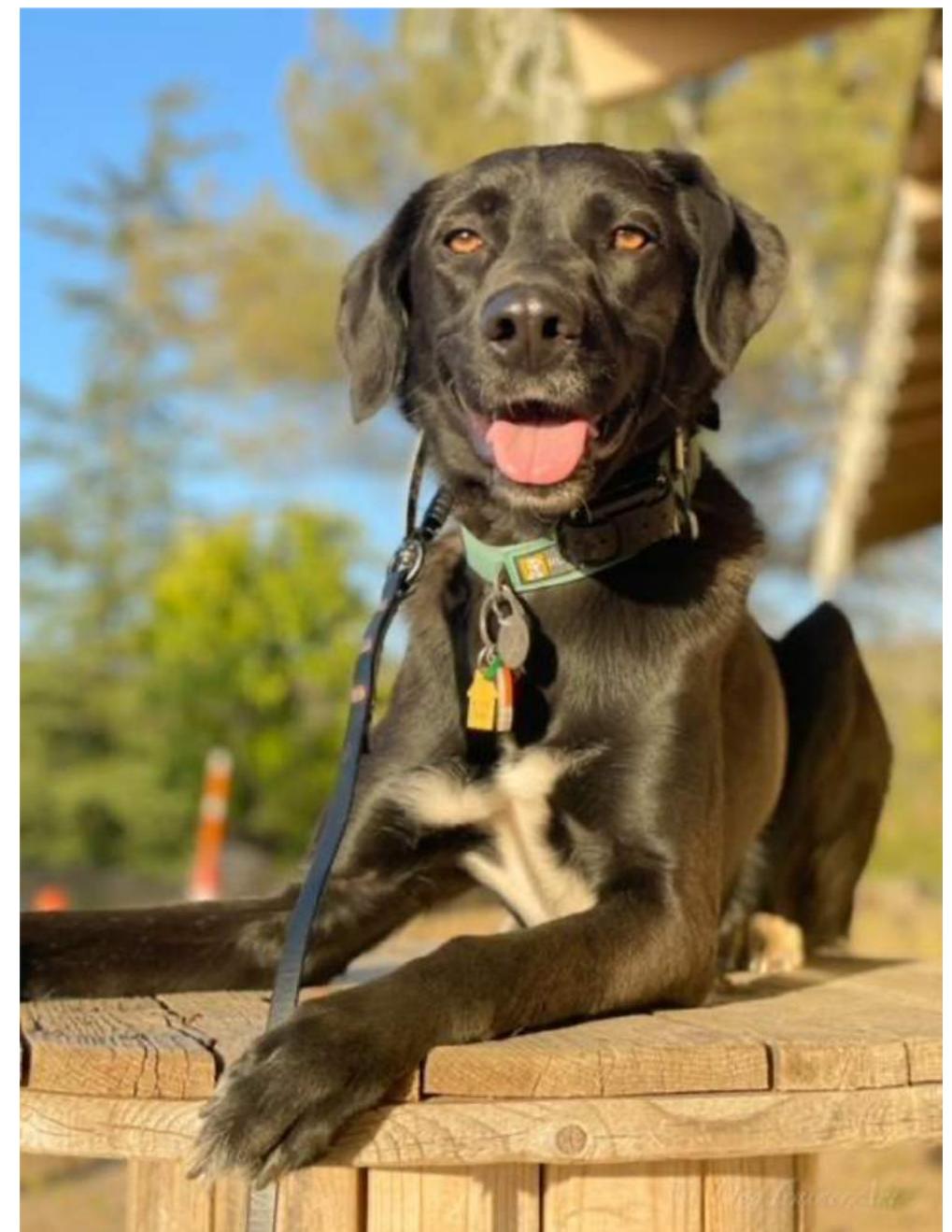
Connect with me!



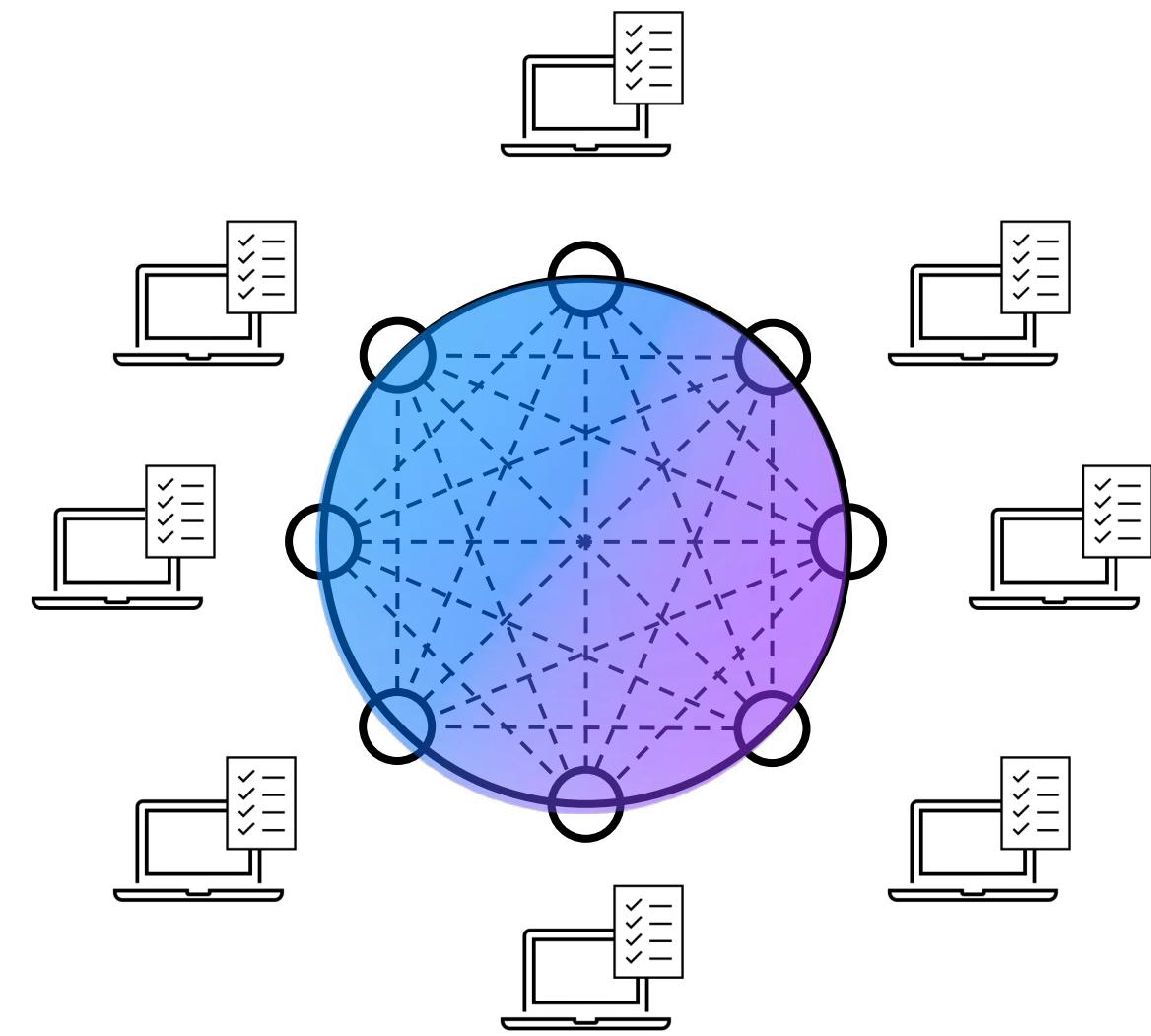
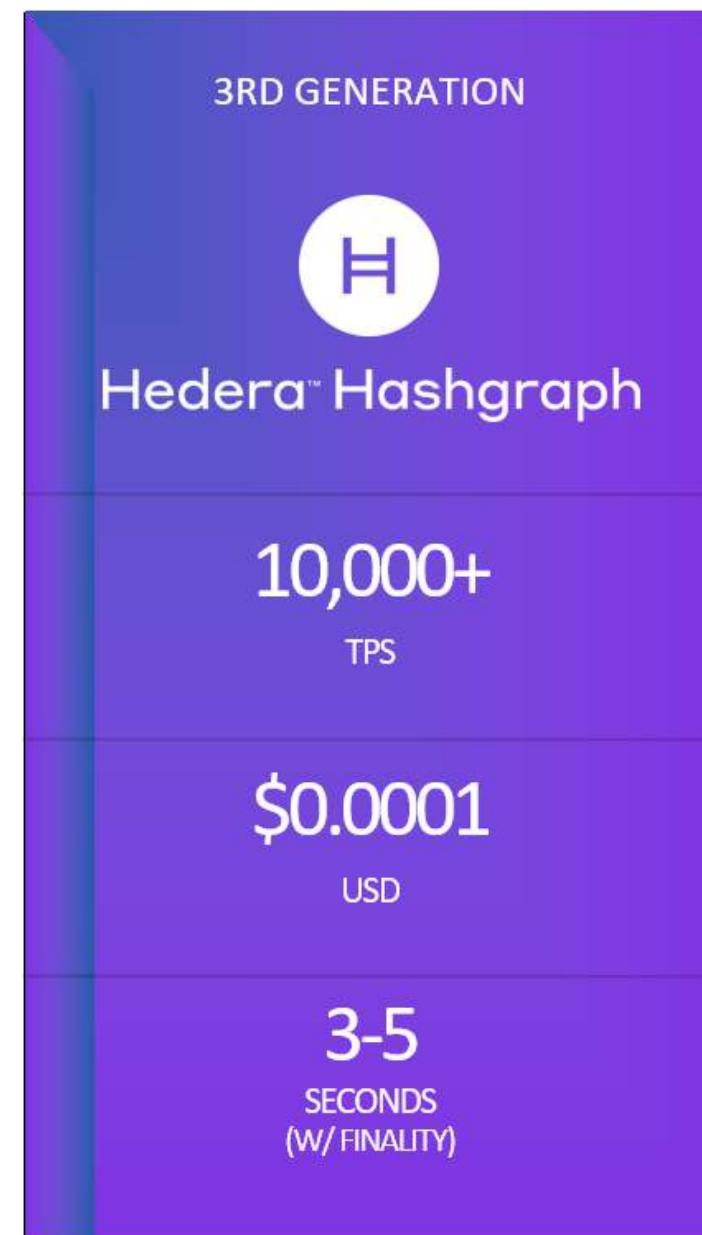
@ridley__



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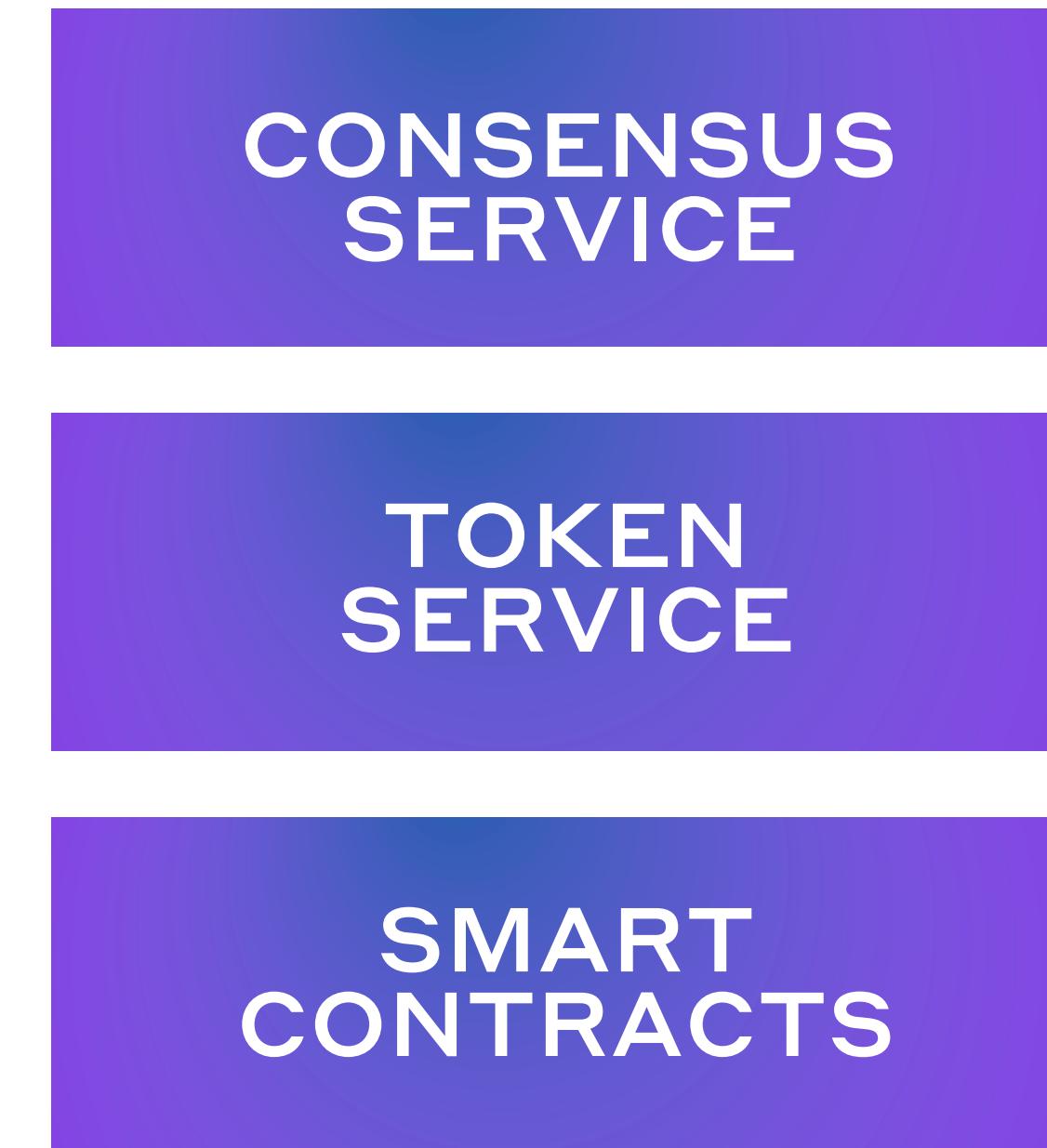


Learn about Hedera, understand Hedera Network Services, dive into a technical workshop and where to learn more

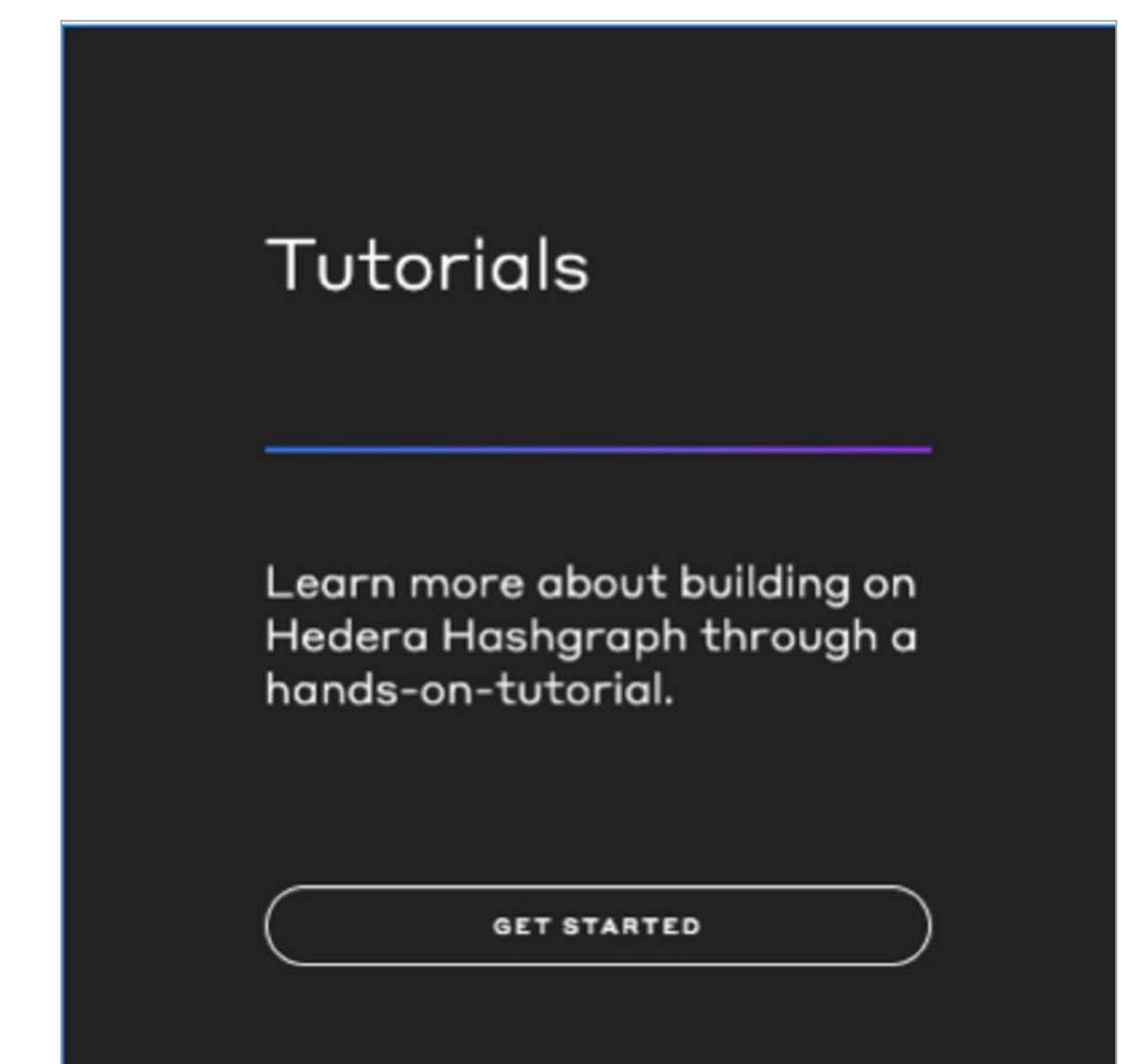


Understand
Hedera Network
Services

Overview of Hedera

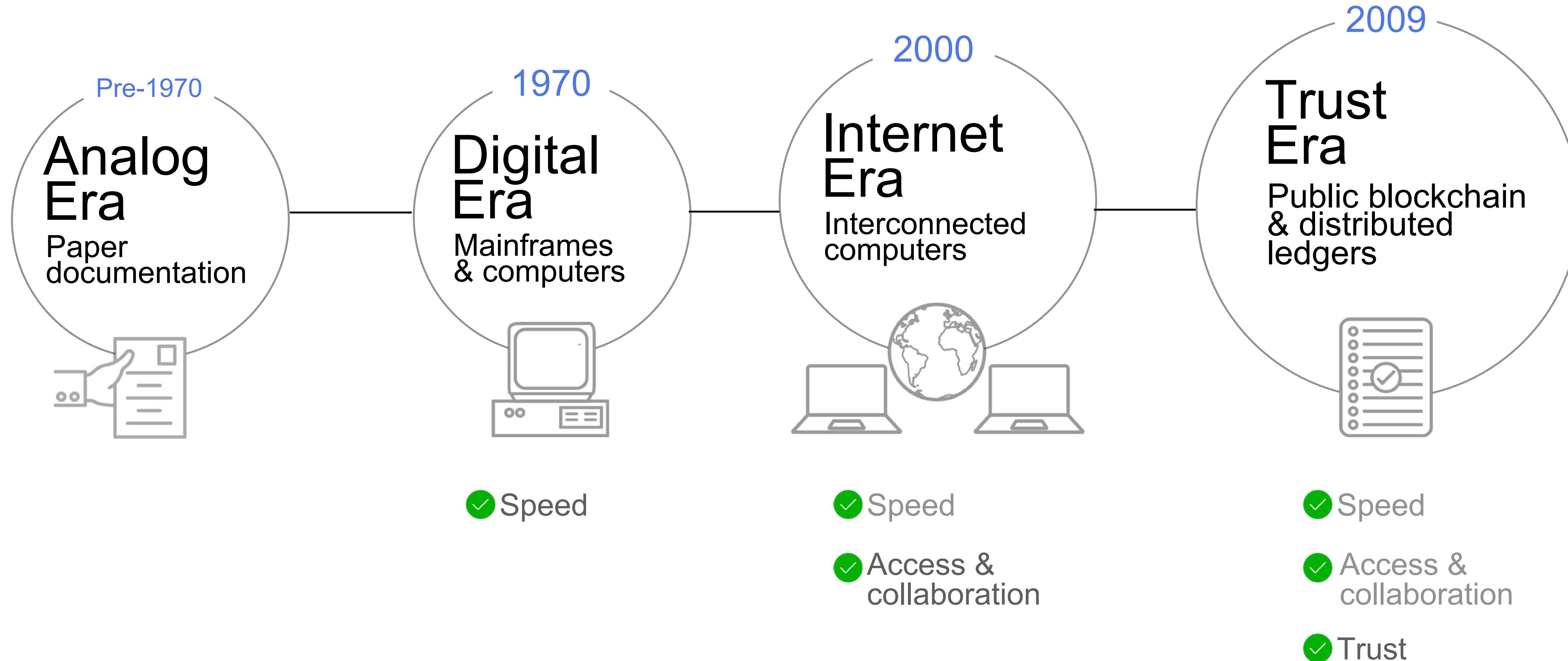


Start Developing on
Hedera



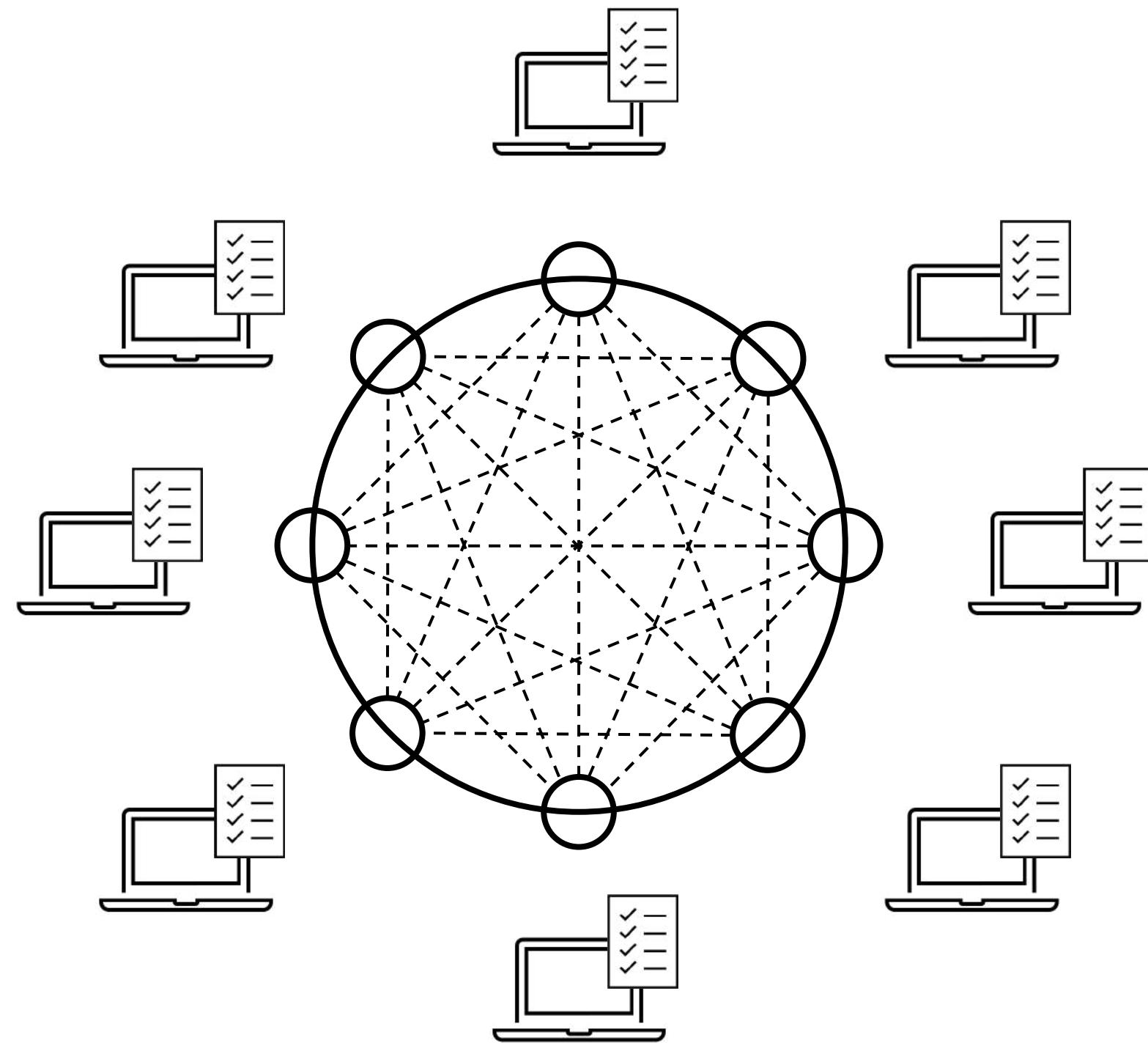
Get Resources and
Learn More

We're entering an era of trust in digital information.



Distributed ledgers are a key component of Web 3.0 because of their qualities

DISTRIBUTED LEDGER



Entire network records and validates each transaction

CENTRALIZED LEDGER



Single authority verifies, records, and executes transactions

Distributed ledgers are a key component of Web 3.0 because of their qualities

No central point of failure to attack

Reliant on strong cryptography to prove data integrity and tamper resistance



Rules for the ledger are determined by a governing concept of some sort

Require a consensus mechanism to determine the rules for adding new transactions to the state of the ledger

Hedera is a third-generation public distributed ledger (DLT)

	1ST GENERATION	2ND GENERATION	3RD GENERATION
TRANSACTIONS PER SECOND	3+ TPS	12+ TPS	10,000+ TPS
AVERAGE TRANSACTION FEE	\$22.57 USD	\$19.55 USD	\$0.0001 USD
AVERAGE TRANSACTION CONFIRMATION	10-60 MINUTES	10-20 SECONDS	3-5 SECONDS (W/ FINALITY)

- Cryptocurrency transactions. For Hedera, range shown for transactions not requiring a transaction record, but can receive a transaction receipt.
- Avg. Bitcoin tx fee from 6/26/20 - 9/24/20 from <https://blockchair.com/bitcoin/charts/average-transaction-fee-usd?interval=3m>
- Avg. Ethereum tx fee from 6/26/20 - 9/24/20 from <https://blockchair.com/ethereum/charts/average-transaction-fee-usd?interval=3m>

A comparison of 3rd Generation DLTs

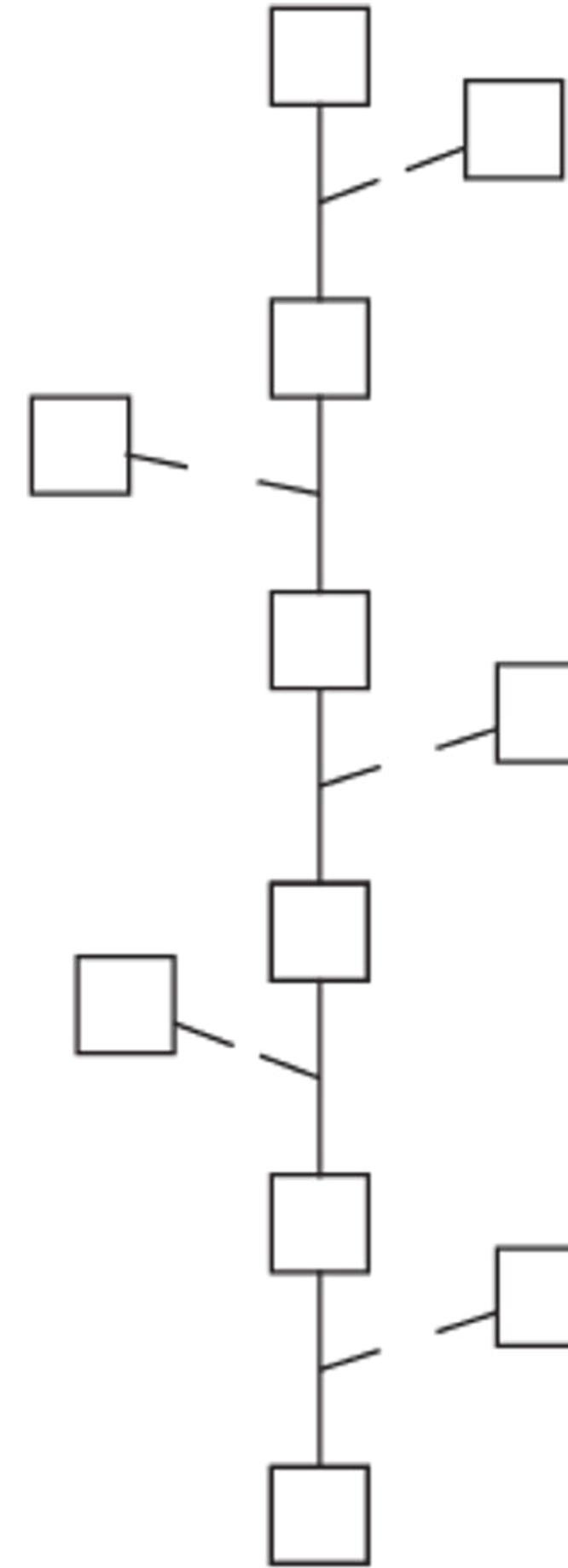
	POLYGON	ALGORAND	(ETHEREUM)	3RD GENERATION
TRANSACTIONS PER SECOND	6500*(CLAIMED)	1,000†(APPROX)	12+TPS	10,000+ TPS
AVERAGE TRANSACTION FEE	\$0.002 USD (VARIABLE)	0.001 ALGO (FIXED)	\$19.55 USD (VARIABLE)	\$0.0001^ USD (FIXED)
AVERAGE TRANSACTION CONFIRMATION	5 - 10 SECONDS (LEADER BLOCK CREATION)	5 SECONDS (LEADER BLOCK CREATION)	10-20 SECONDS (LEADER BLOCK CREATION)	3-5 SECONDS (W/ FINALITY)
ENERGY USE PER TRANSACTION	90+ KWH	0.00534 KWH	102+ KWH	0.00017 KWH

* Actual TPS closer to 53 over a rolling 30 day period - <https://thecoinweekly.com/not-so-fast-are-eth-killers-as-speedy-as-they-claim>

^ Hedera Transaction fees - <https://hedera.com/fees>

† <https://www.algorand.com/resources/algorand-announcements/algorand-2021-performance>

Blockchains



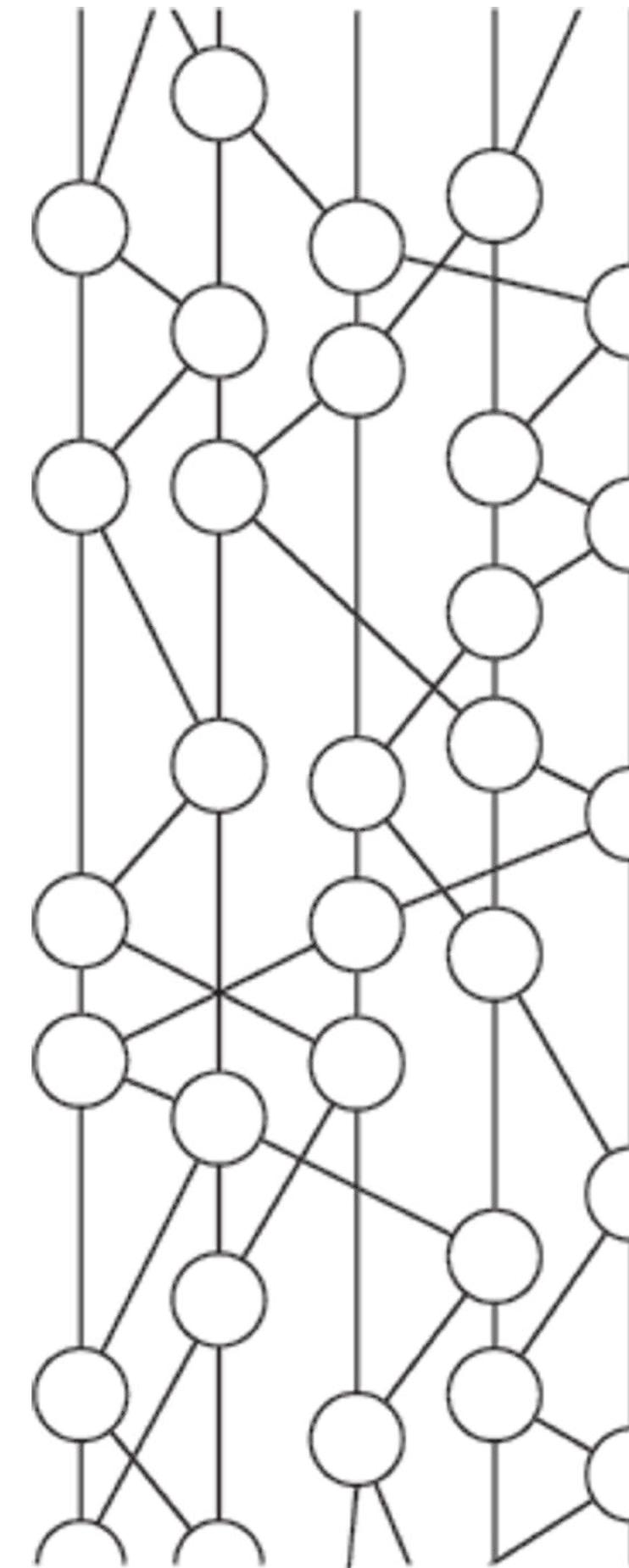
Proof-of-Work (PoW) typically has heavy electrical / computational requirements

No guaranteed consensus, just a
“good enough” probability

Inefficient - “stale” blocks are pruned

Can be difficult to scale beyond
~1,000 tps

Hashgraph



Hashgraph is an **open-source** consensus algorithm and data structure

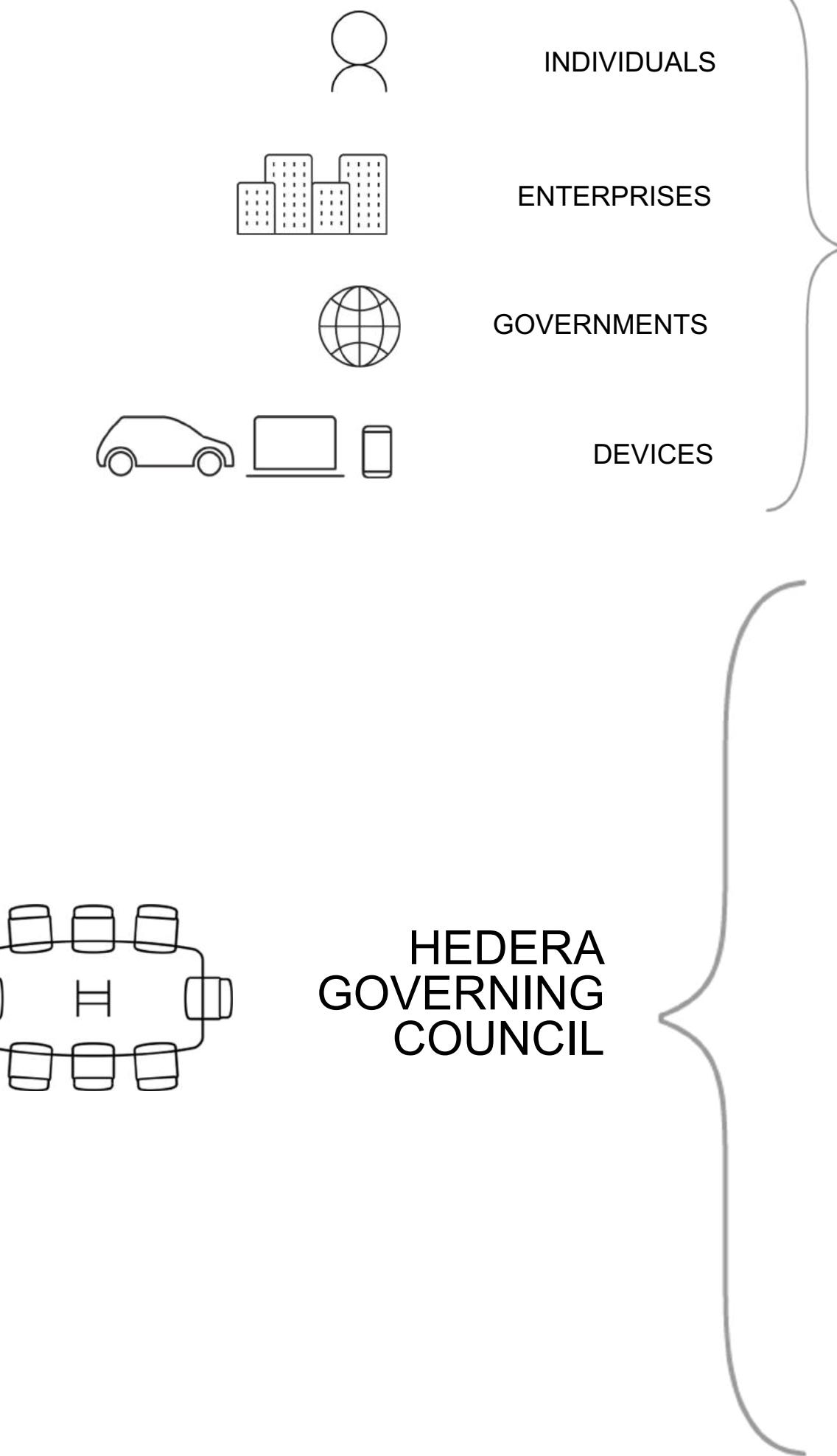
Uses a directed acyclic graph (DAG) and novel inventions:

- Gossip about Gossip protocol
 - Virtual voting

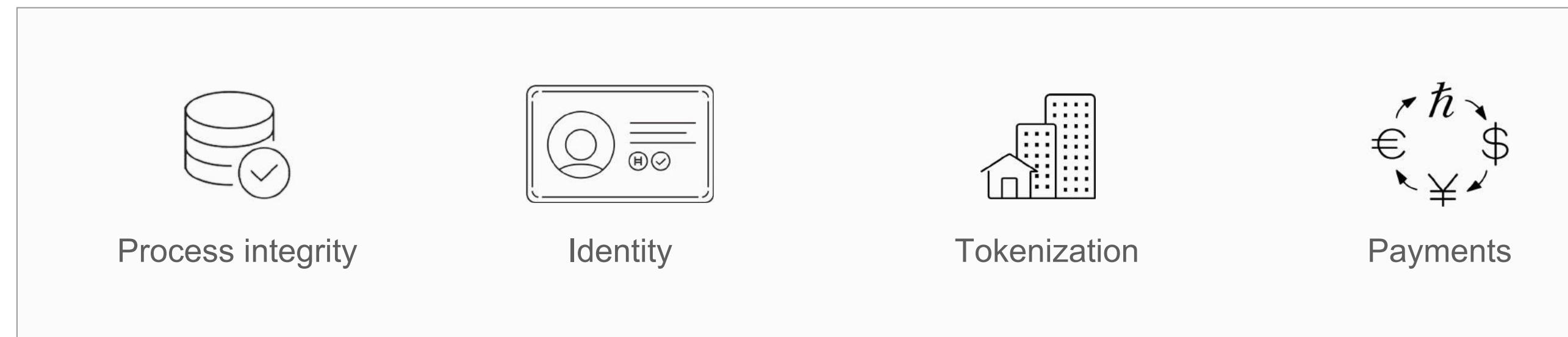
Hedera currently supports
10,000+ cryptocurrency
transactions per second

Finality within 3-5 seconds

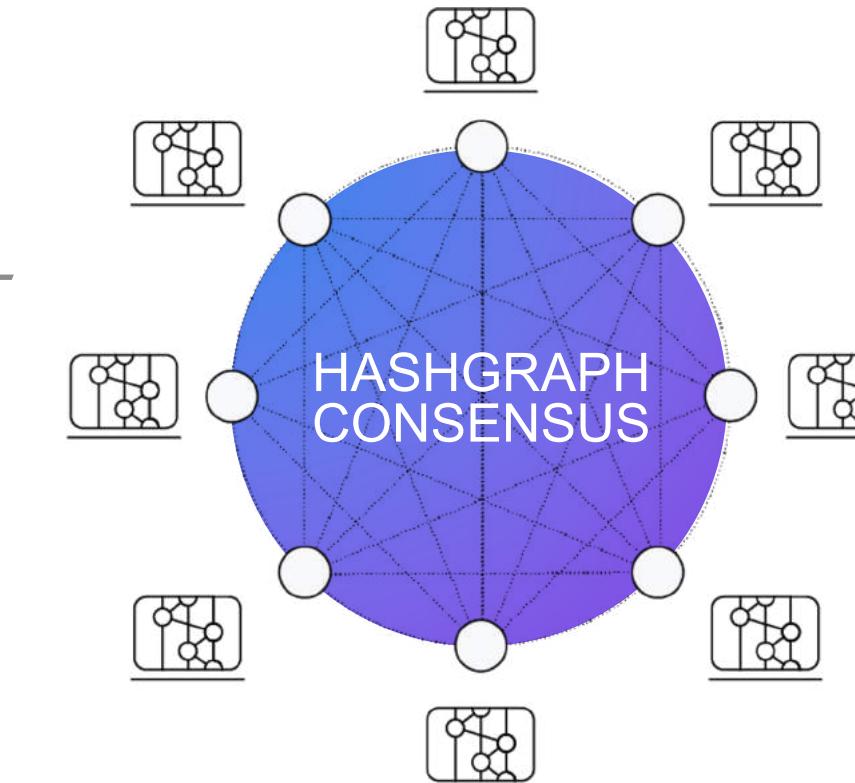
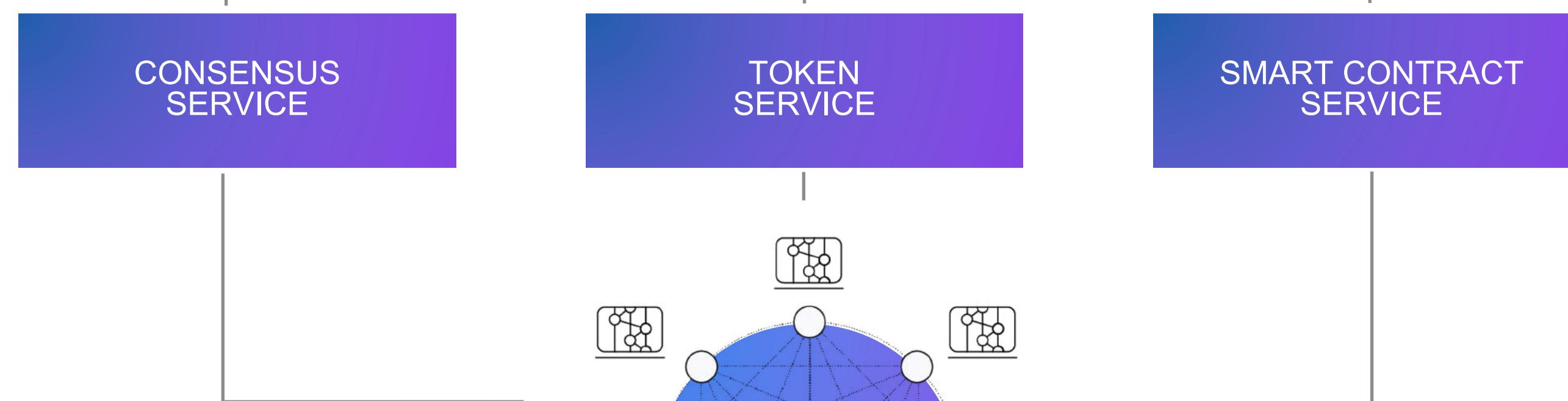
END USERS



APPLICATION USE CASES

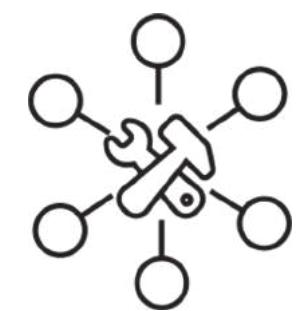


HEDERA GOVERNING COUNCIL



HEDERA MAINNET

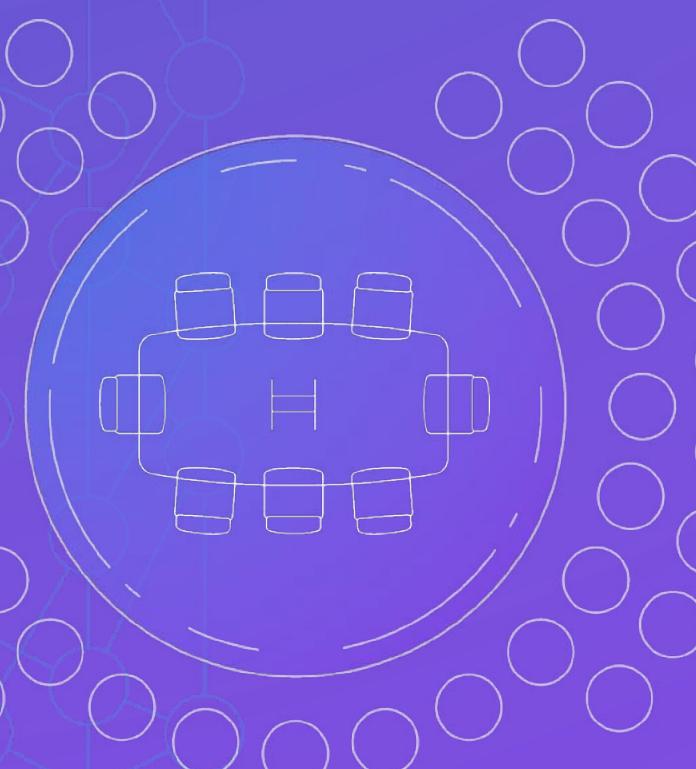
HEDERA NETWORK SERVICES





The Hedera Governing Council

Building the future together.



Up to 39 leading global organizations

11 unique industries and universities across major markets

Every member required to run a network node

Members not compensated beyond network node payments

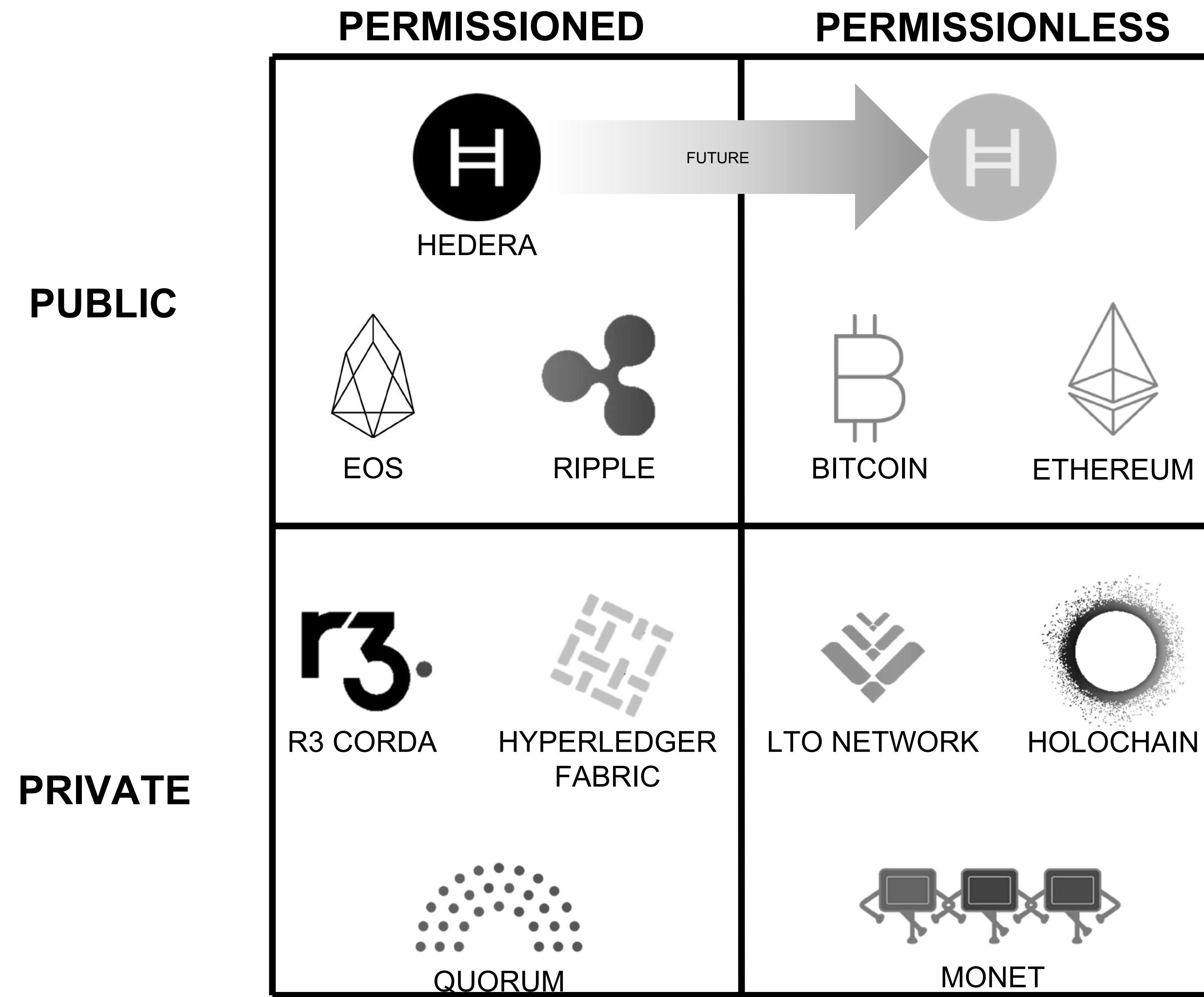
Equal influence per member (equal vote)

5 committees:

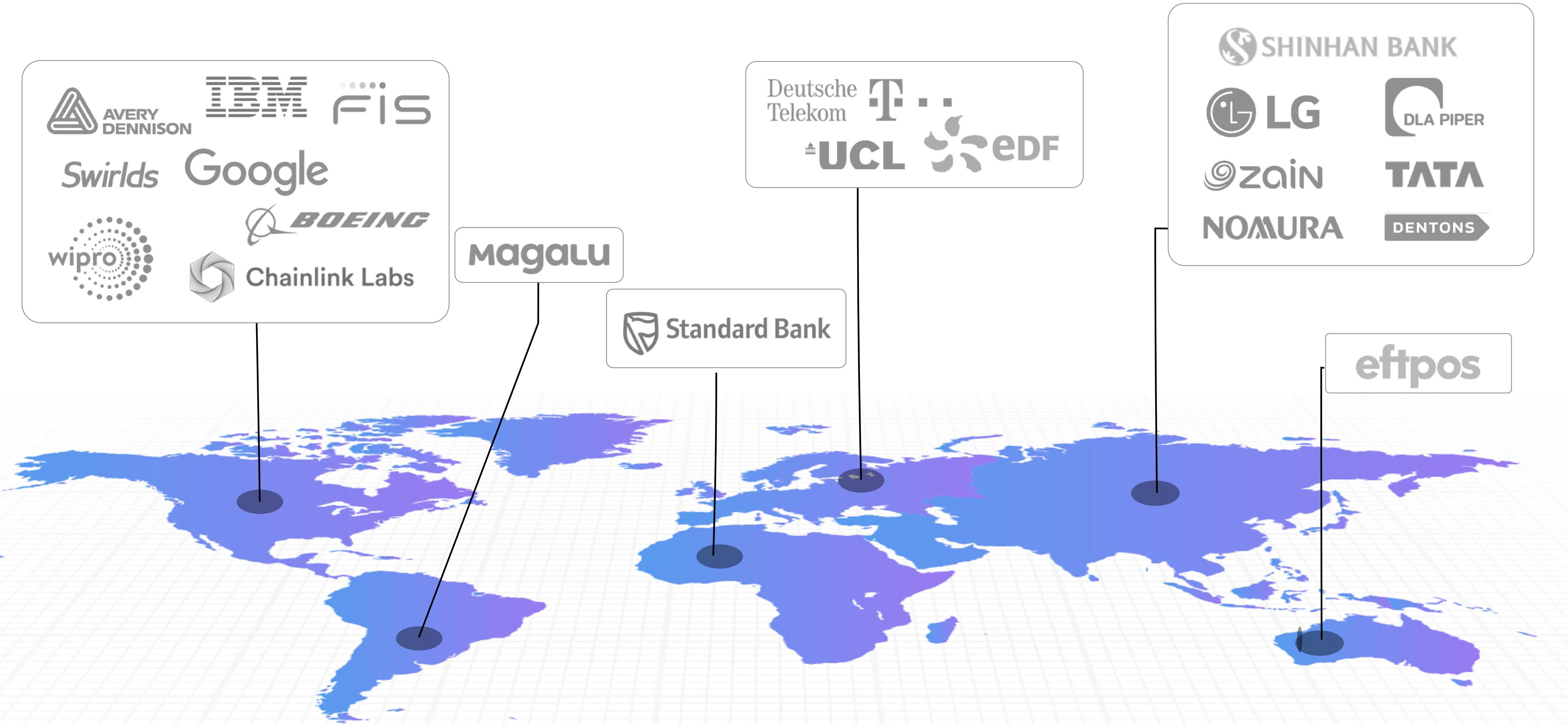
- Membership
- Technical Steering & Product
- Treasury Management & Coin Economics
- Legal/Regulatory
- Marketing

3-year maximum term, with up to 2 consecutive terms

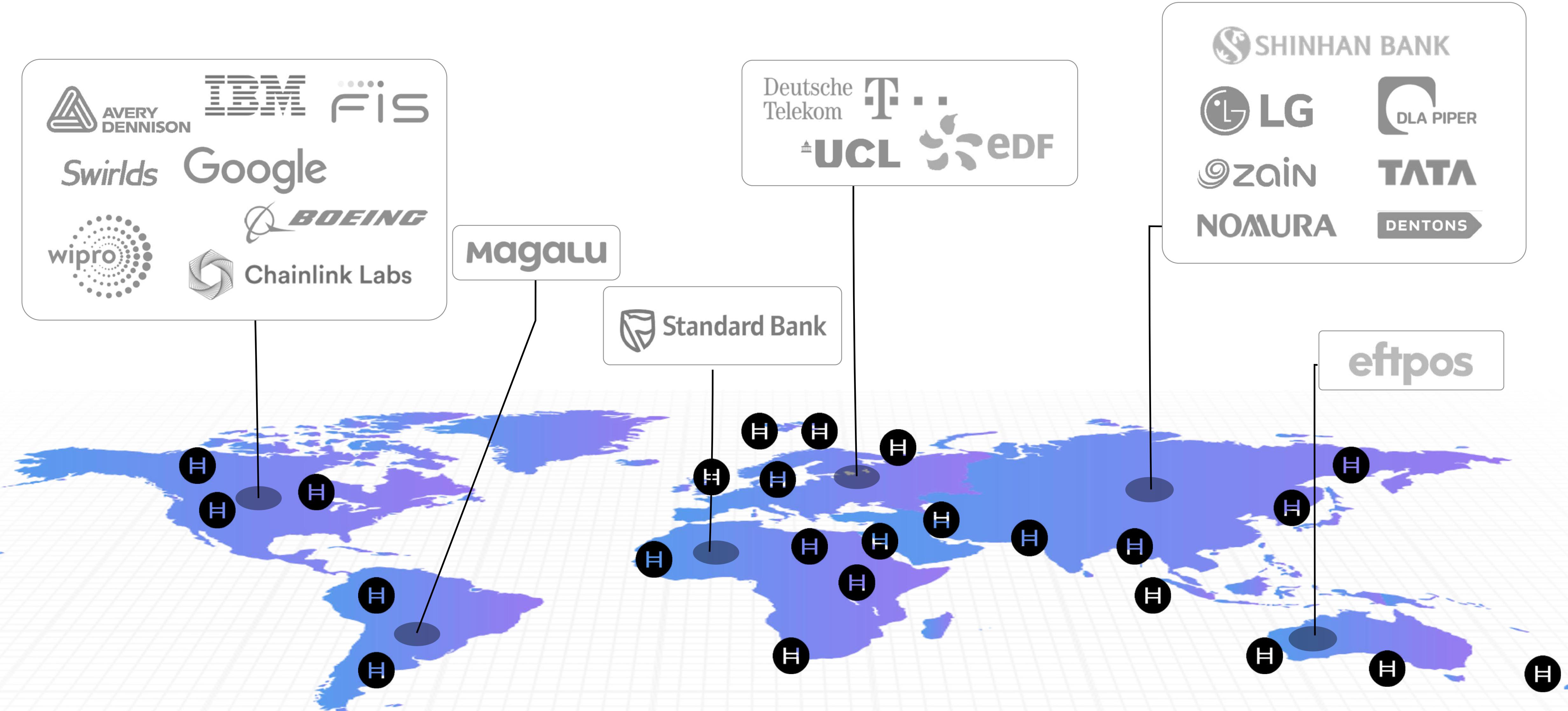
Council membership committee will find replacements



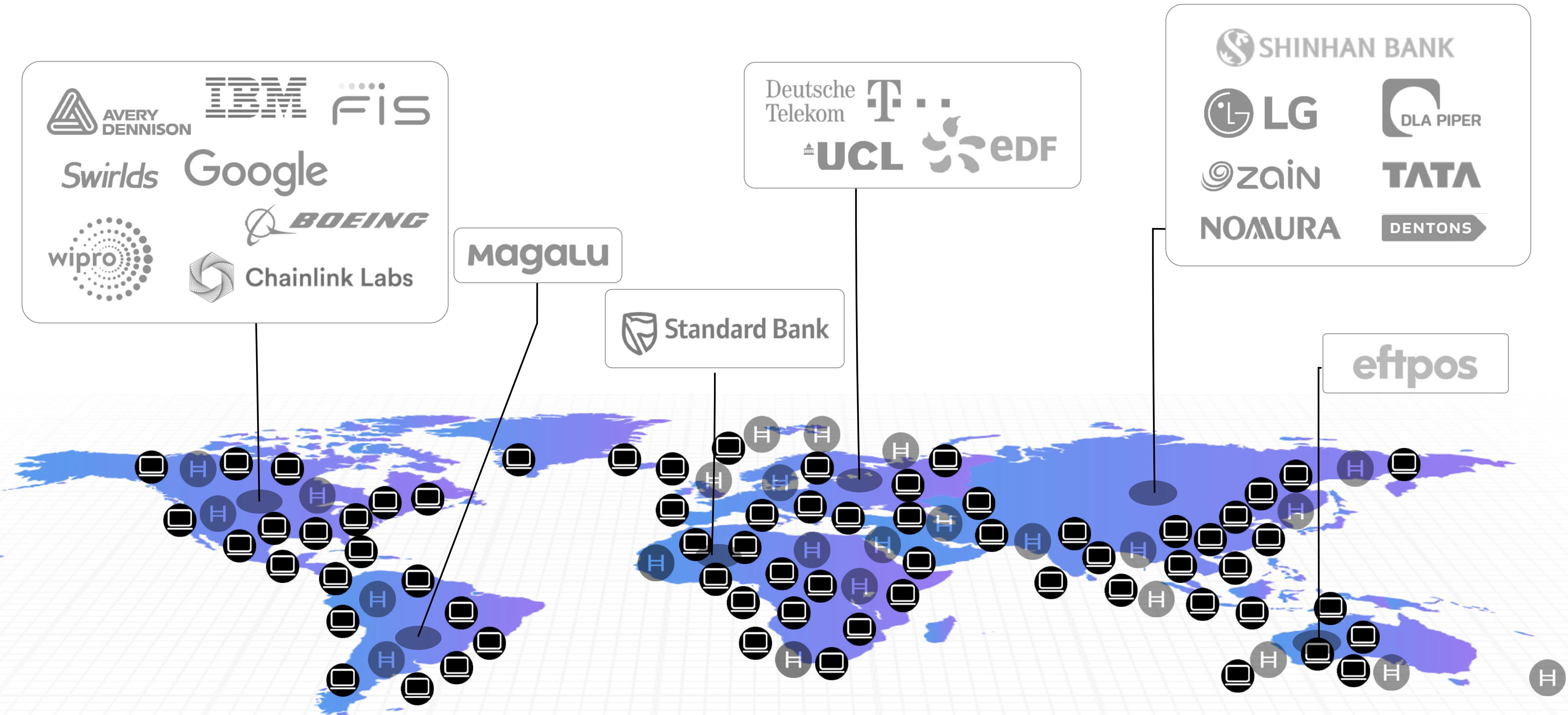
PHASE 1: Up to 39 council members



PHASE 2: KYC'd permissioned nodes



PHASE 3: permissionless nodes





14,000+ DEVELOPERS

Attending global hackathons, meetups, and active in Discord.

100+ APPLICATIONS

In production on Hedera Mainnet, since open access on Sept. 2019

>7,000,000+ TXS/DAY

Far surpassing the daily transaction volume of Ethereum.

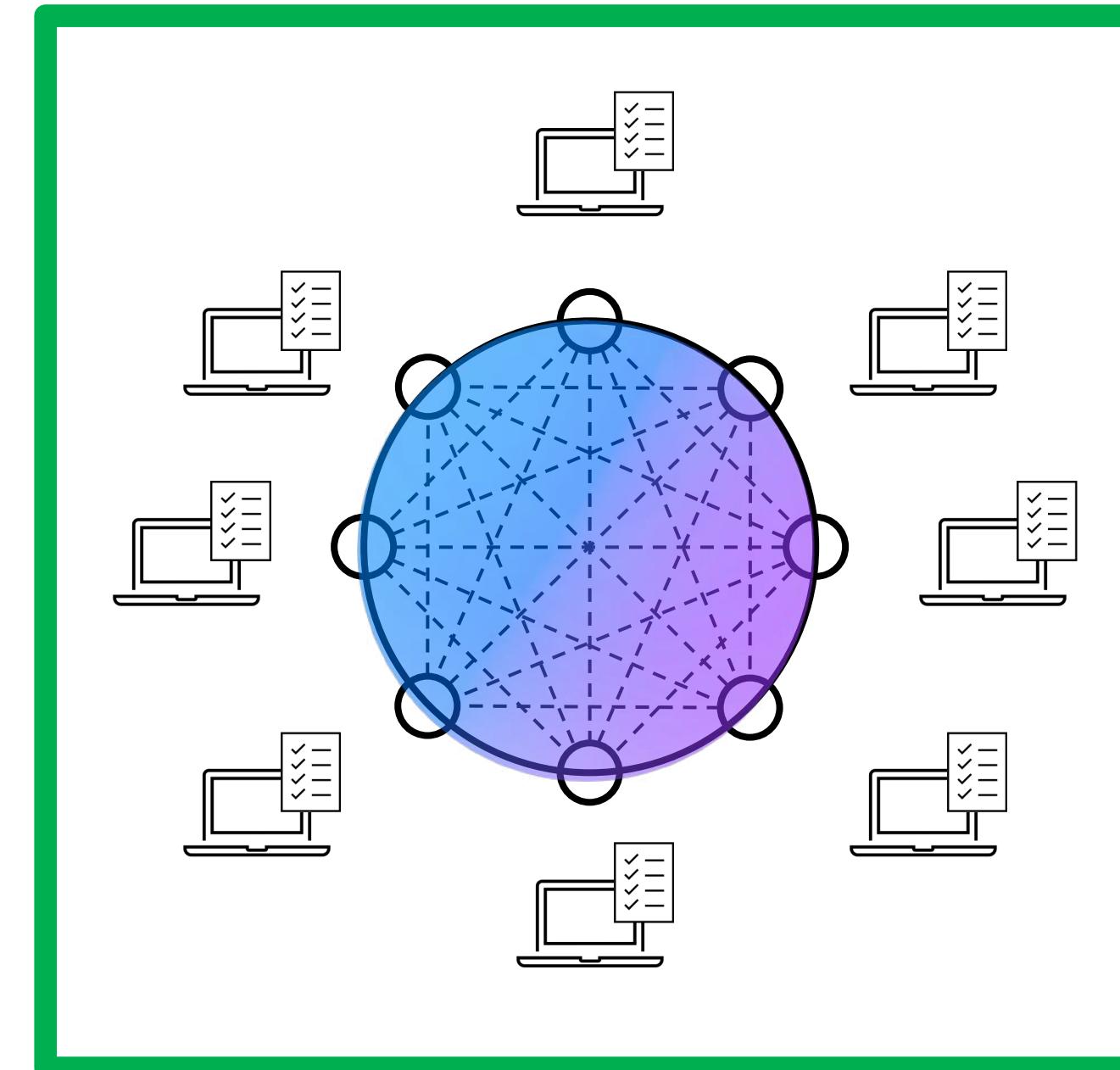
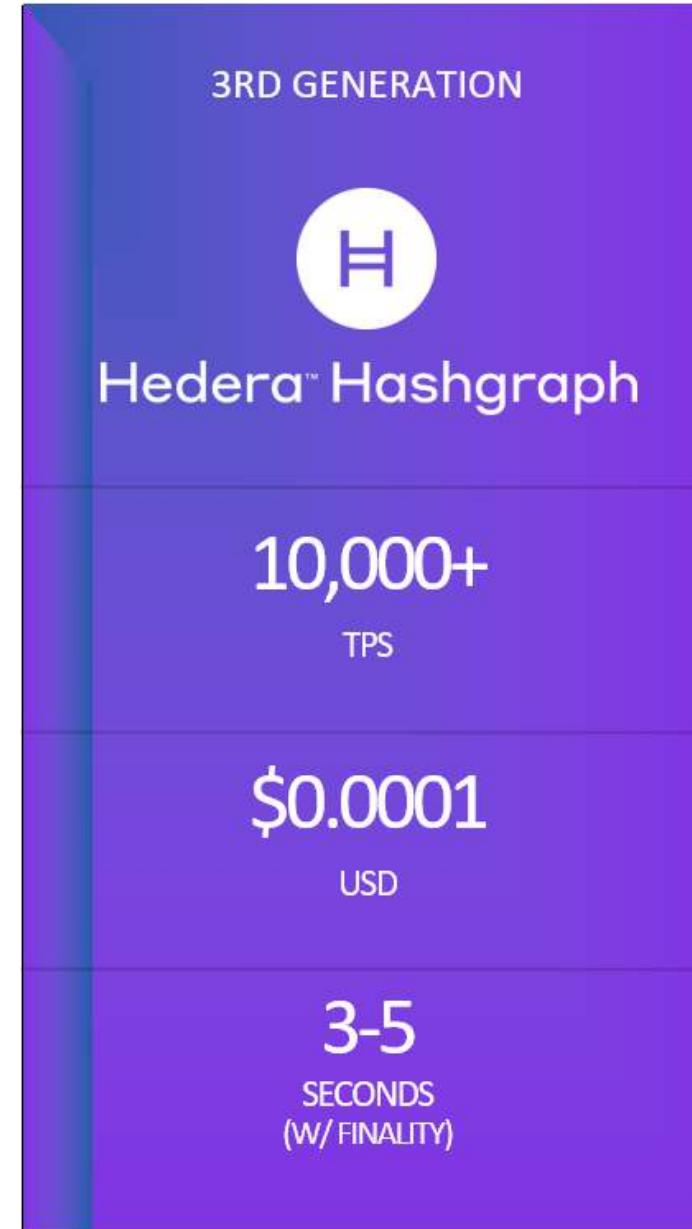
>2,400,000,000+ TXS TO DATE

Most used public DLT surpassing total transaction volume of Ethereum.

>1,000,000+ TOTAL ACCOUNTS ON MAINNET

66,700 accounts created in April 2022 alone.

In this session, you will learn how the **Hedera network functions**, how you can **start development**, and **where to learn more**



Introduction

Understand
Hedera Network
Services

Start Developing on
Hedera

Get Resources and
Learn More

CONSENSUS SERVICE

TOKEN SERVICE

SMART CONTRACTS

Tutorials

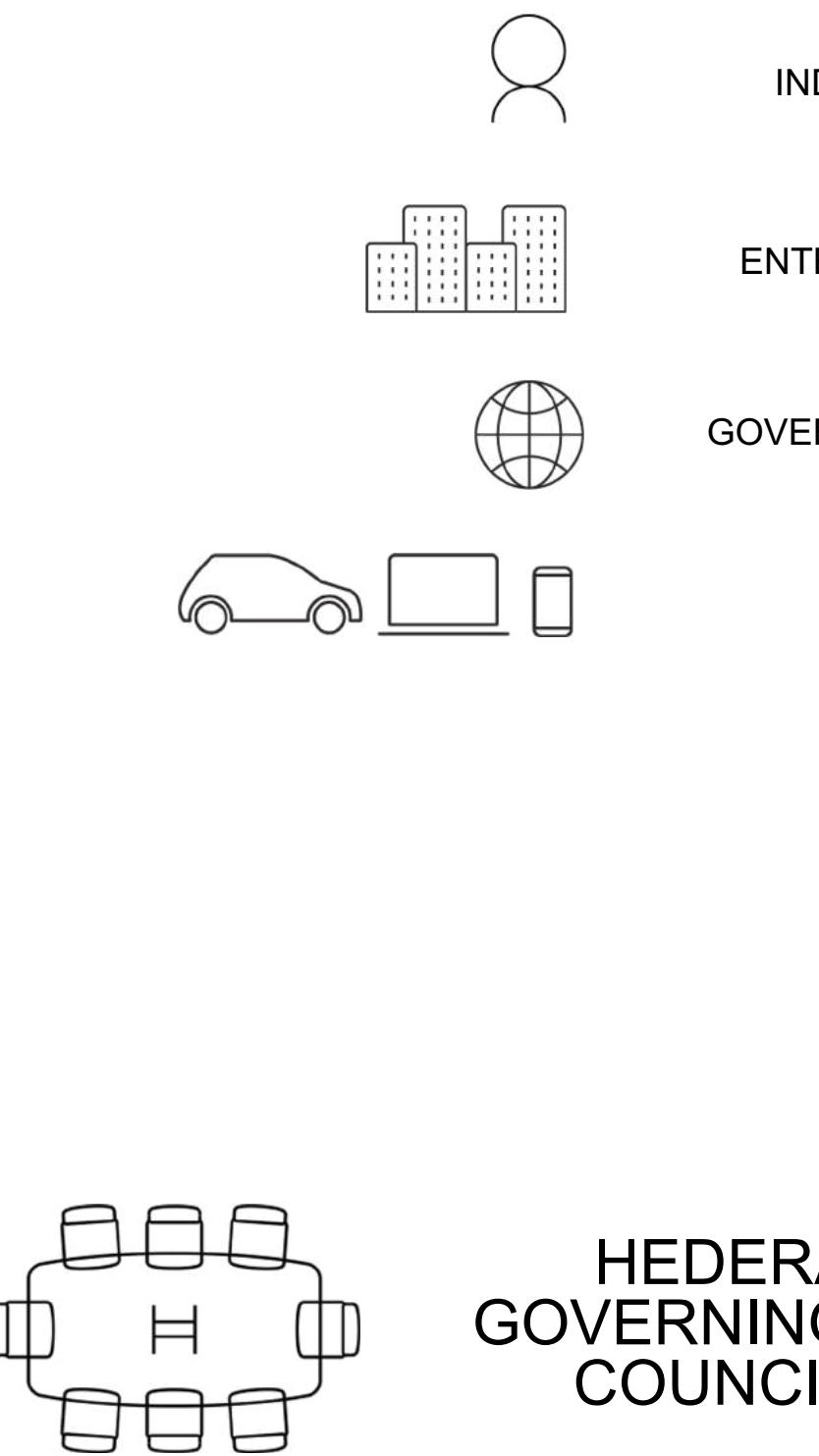
Learn more about building on Hedera Hashgraph through a hands-on-tutorial.

GET STARTED

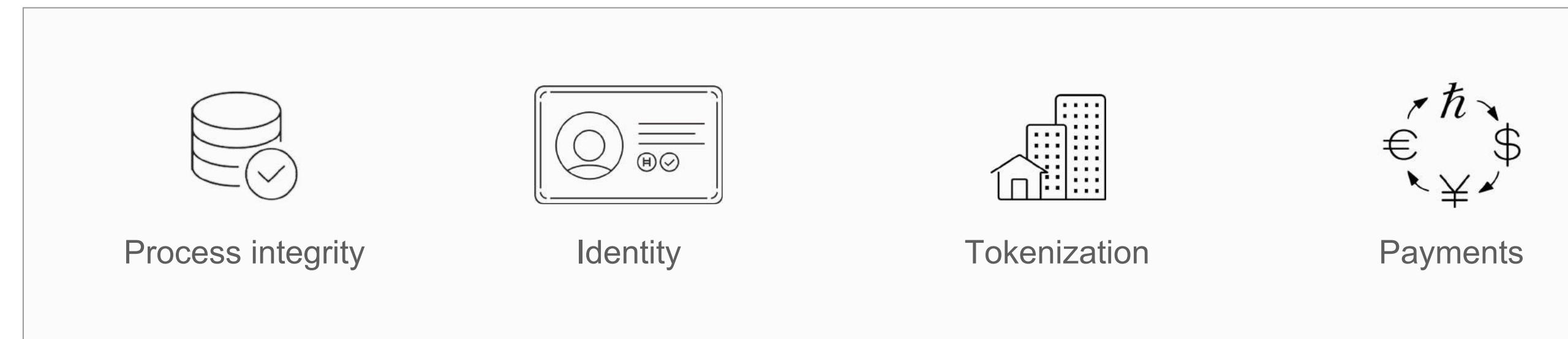


Hedera™ Hashgraph

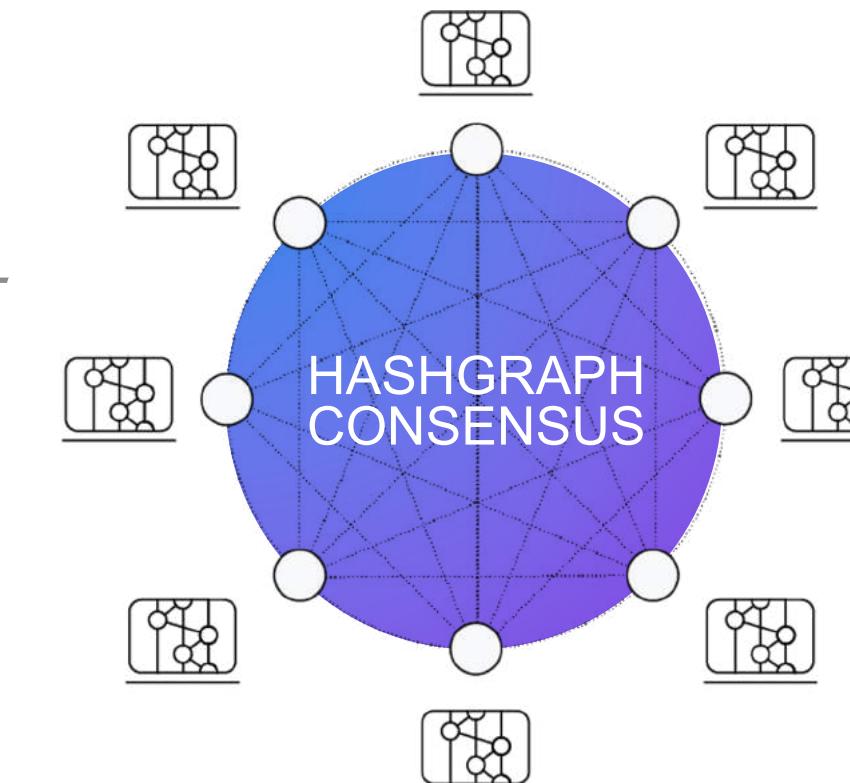
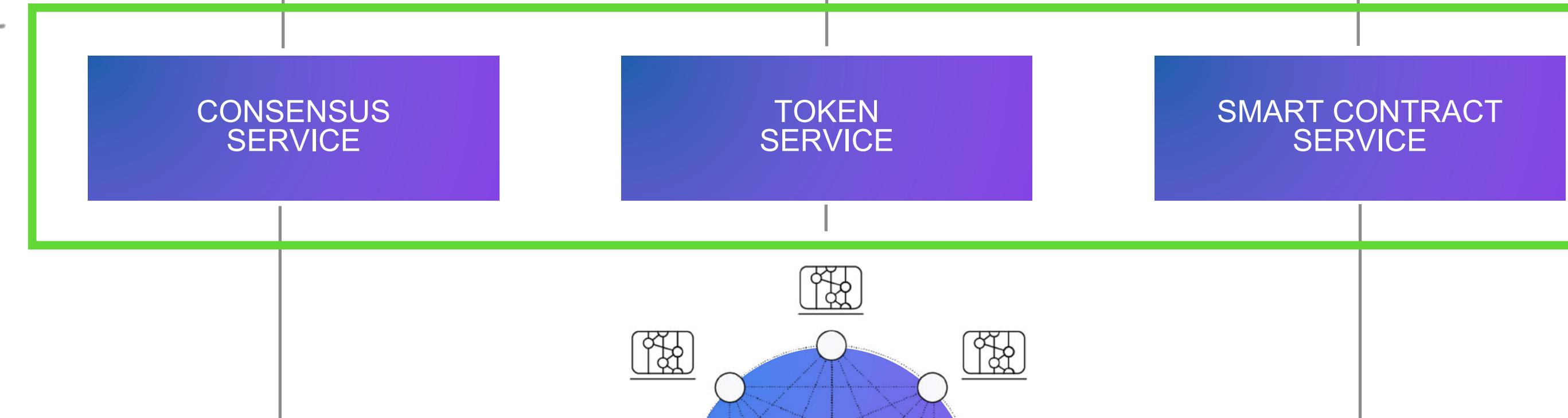
END USERS



APPLICATION USE CASES

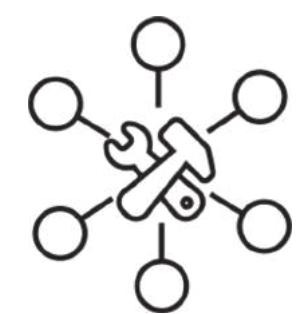


HEDERA GOVERNING COUNCIL



HEDERA MAINNET

HEDERA NETWORK SERVICES



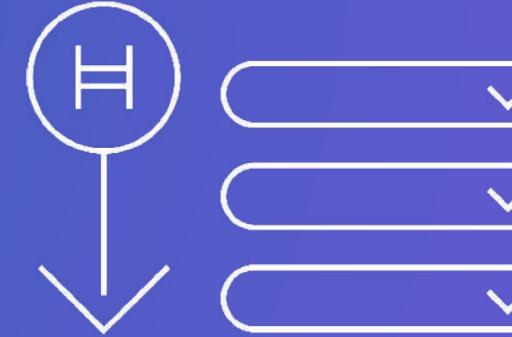
Choose your SDK!



Consensus Service

FEATURES





Consensus Service

Verifiable timestamping and ordering of events for any application or permissioned blockchain framework.

"Advertisers can be more confident that their data is both accurate and tamper-proof, aiding in the fight to reduce ad-fraud and recover the billions of dollars lost each year in wasted ad spend.



TOPIC MANAGEMENT

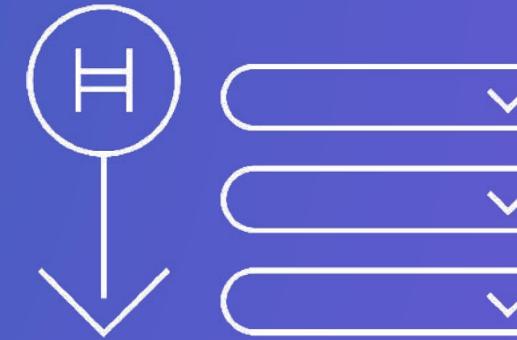
Topics make it simple to organize transactions, so each application only receives the messages it needs.

CONSENSUS ORDER

Messages are put into consensus order and given a timestamp by the Hedera network, with cryptographic proofs, so they are as trustworthy as the full Hedera network.

AUDIT LOG

Messages are cryptographically tied together with a running hash to provide an auditable, tamper-proof log of history.



Consensus Service

Verifiable timestamping and ordering of events for any application or permissioned blockchain framework.

"Only Hedera was able to provide the real-time, tamper-proof logging capabilities that we needed to bring transparency, trust, agnosticism and industry oversight to a platform that connects all coupon industry stakeholders"

 THE COUPON BUREAU

SCALABLE TRANSACTIONS

Message processing and storage are kept outside the Hedera network. This allows higher speed and scalability.

LOW FEES

The high speed and good scaling ensure low, micropayment fees on par with Hedera Cryptocurrency.

HISTORICAL DATA

The Hedera Consensus Service ensures speed and security are kept on the ledger while storage is kept off-ledger. Choose to keep everything, nothing, or anything in between.

Token Service

FEATURES





Asset Tokenization

Native fungible and non-fungible assets on Hedera with performance, security, stability, and low, predictable fees.

"HTS will provide developers and businesses unrivaled new ways to tokenize and issue assets of all types and getting the superior benefits of the underlying hashgraph consensus. We are actively looking at ways of leveraging the HTS for tokenization."

eftpos[®]

LOW PREDICTABLE FEES

Expect low and predictable transaction fees with Hedera Token Service — costing \$1 USD to create a token type and less than 1¢ to transfer

PROGRAMMABLE

Fungible and non-fungible tokens deployed using the Hedera Token Service offer native programmability, such as atomic swaps and scheduled transactions, for on-chain functionality as efficient as hashgraph.

NATIVE TOKENS

No need for slow, expensive, and potentially faulty smart contracts — tokens issued with the Hedera Token Service are native to Hedera. They adopt the same performance, security, and efficiency as hbar.

Smart Contracts

FEATURES





Smart Contracts

Autonomous, self-executing logic to create an entirely new class of applications.

"the one we've already built a use case for [our clients] is around tokenization of assets. The origin of that comes from speaking with our commercial real estate clients who have large, commercial real estate assets that are difficult to deal with."

SCOTT THIEL | PARTNER & HEDERA GOVERNING COUNCIL MEMBER



BUILD USING SOLIDITY

Run smart contracts written in Solidity, unchanged and using existing standards.

FAIR TRANSACTION ORDERING

Like all services, smart contracts are executed in order received, never the amount of gas paid. No need to pay extra to be included earlier in history.

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!



Smart Contracts

Autonomous, self-executing logic to create an entirely new class of applications.

LIVE ON MAINNET – Q1 '22

Ethereum Virtual Machine (EVM)
Compatible

Secure, leaderless architecture

CARBON NEGATIVE

All contracts deployed on Hedera are environmentally sustainable and offset by Hedera's carbon negative initiative.

LOW FEES

The efficiency of hashgraph means your users aren't paying outrageous gas fees – costing you \$1 USD to deploy.

FAST TRANSACTIONS

Deliver a modern user experience with transactions settling in seconds with finality instead of waiting for slow block confirmations.

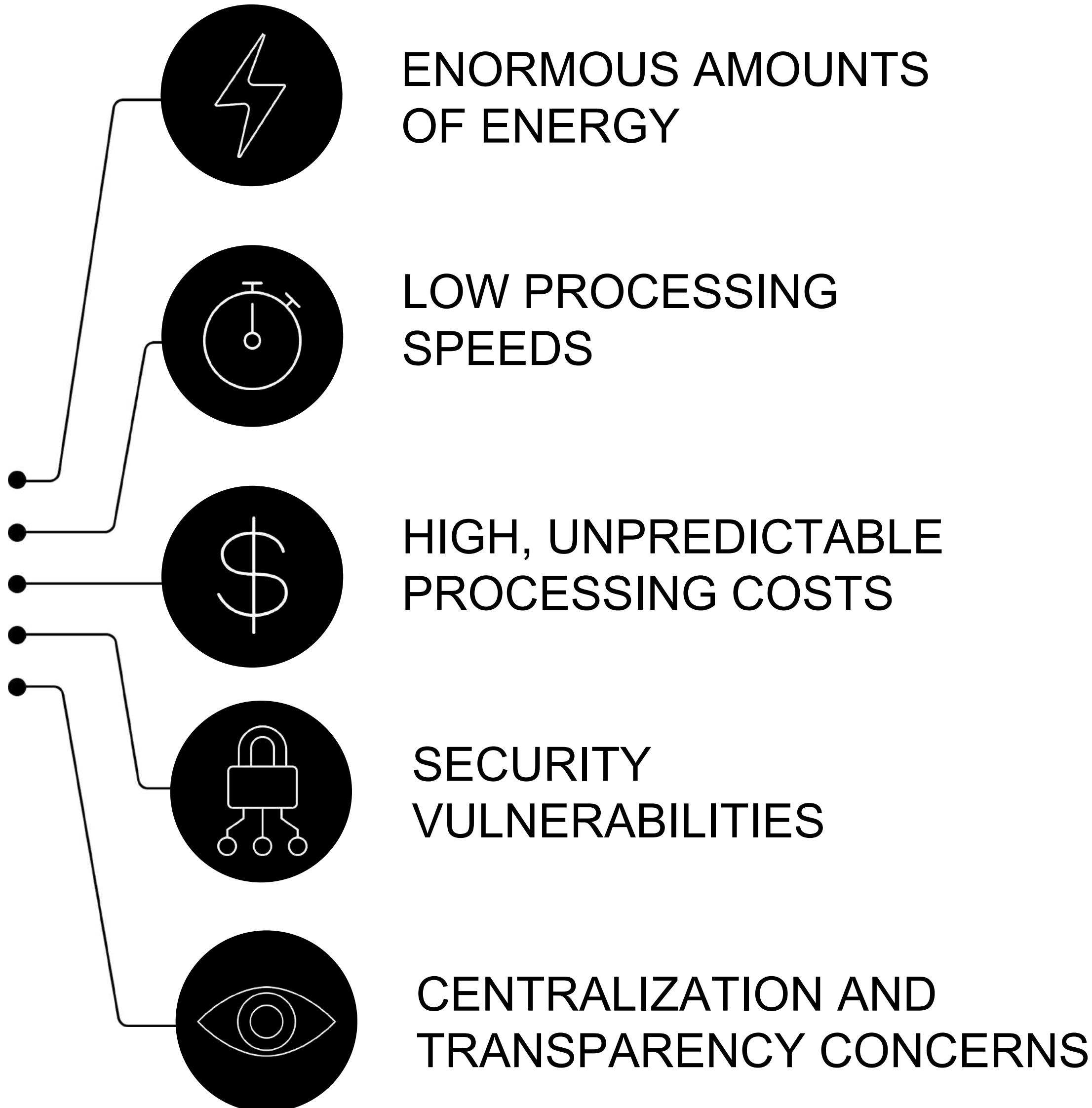


Why Hedera?

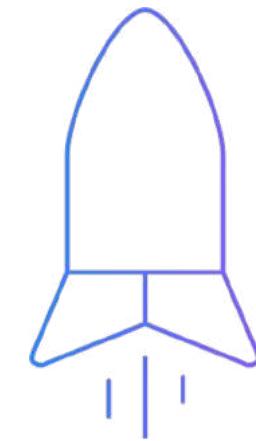
AND WHY IT'S THE FUTURE

The problem

Layer one blockchain-based technologies have inherent weaknesses that pose challenges to mass adoption



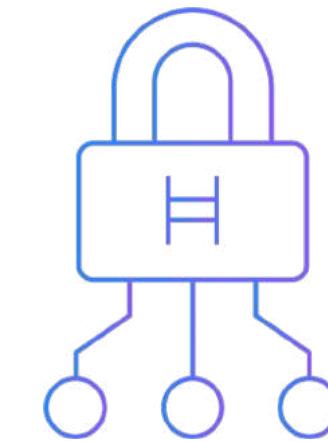
Hedera is the solution



Performance

10,000
TPS+

Finality in
seconds

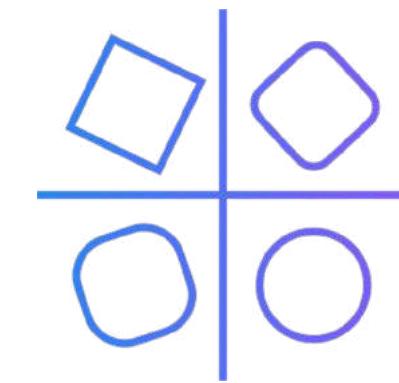


Security

Asynchronous
Byzantine Fault
Tolerance

Not leader-based

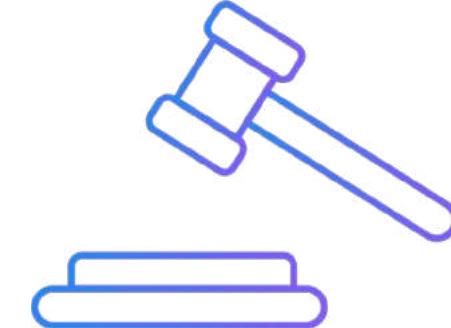
Proof of Stake



Stability

No forking of
the network

Fees stable
in USD



Governance

Run initial
network nodes

Roadmap
Treasury
Management

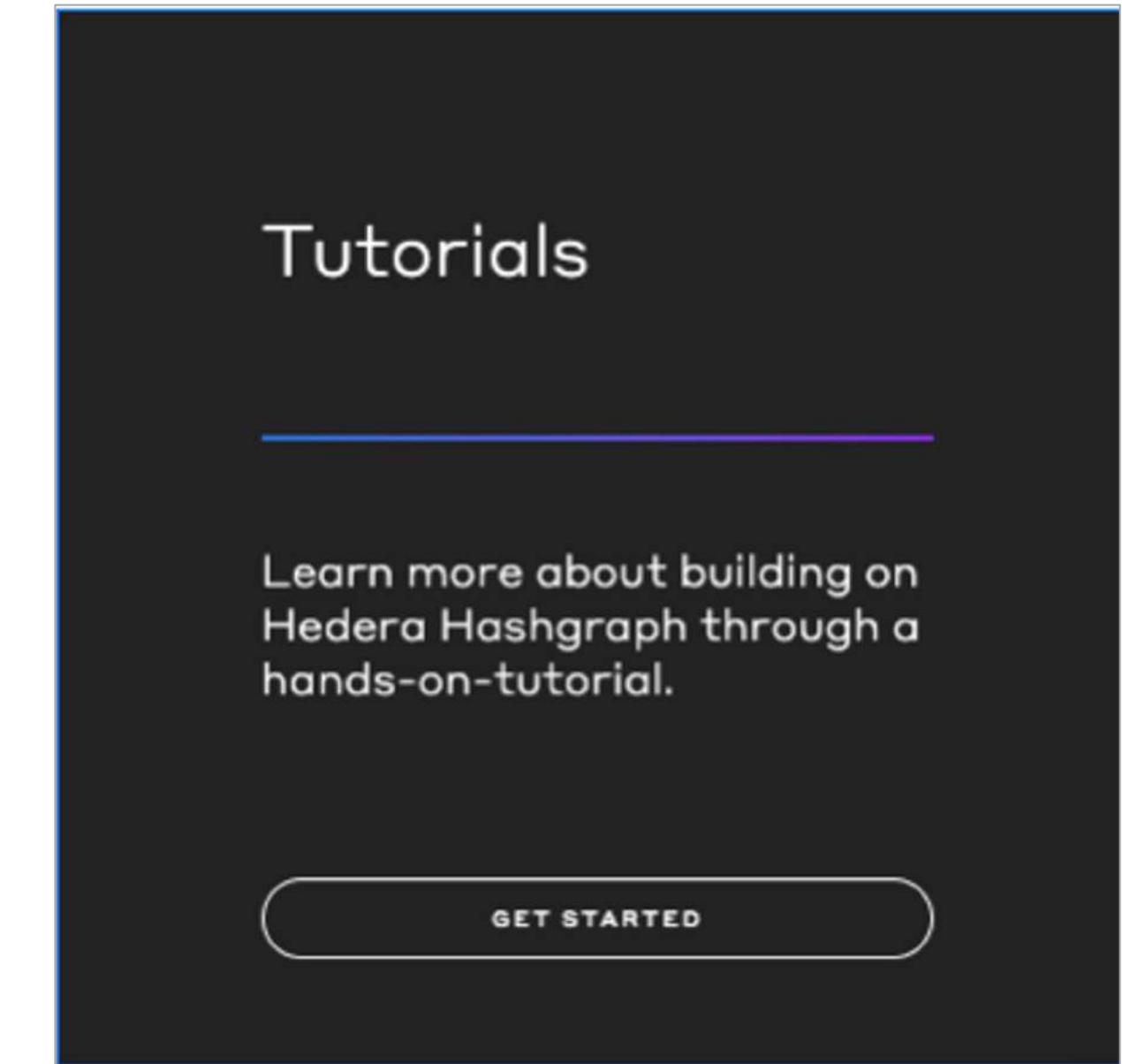
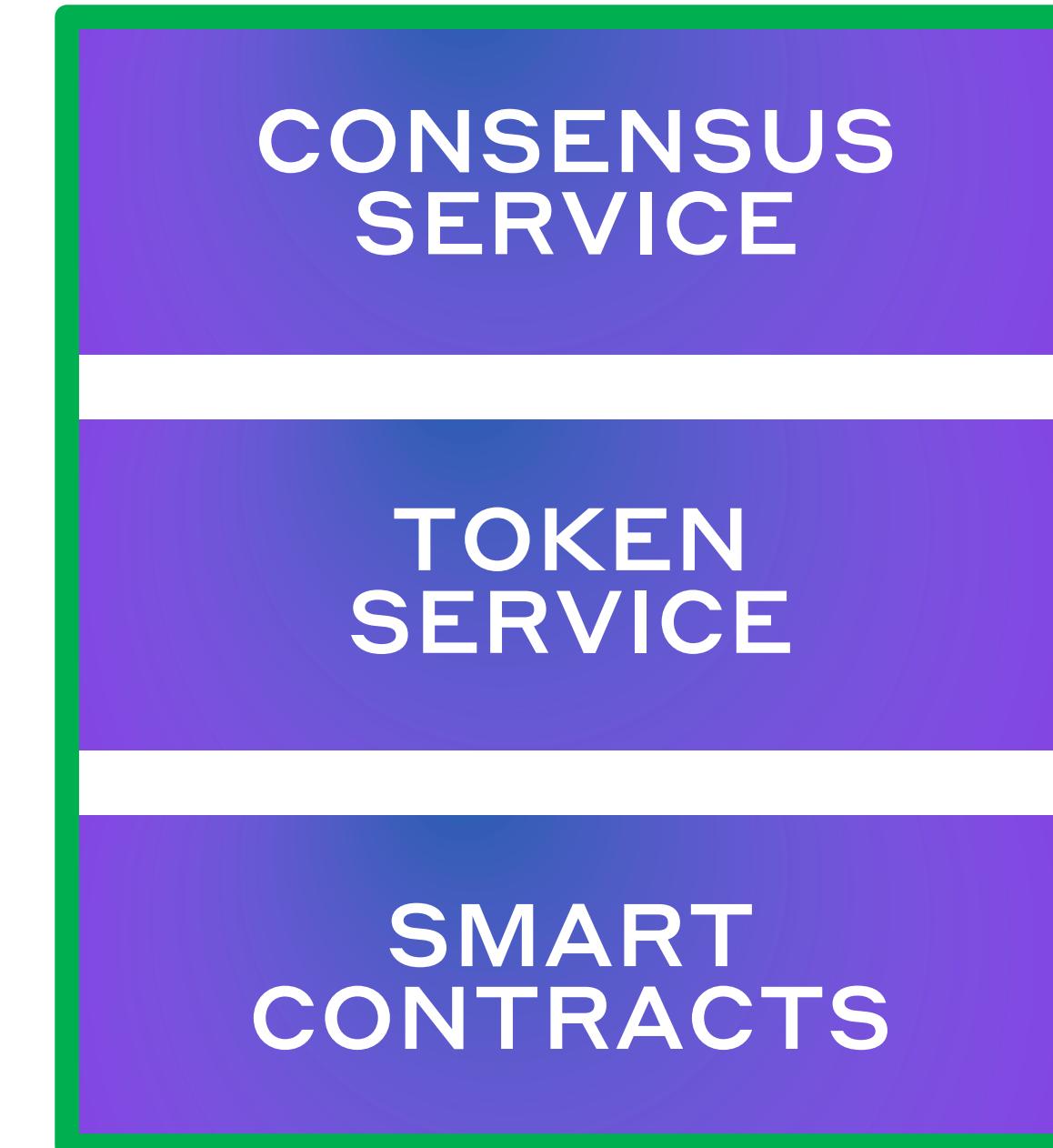
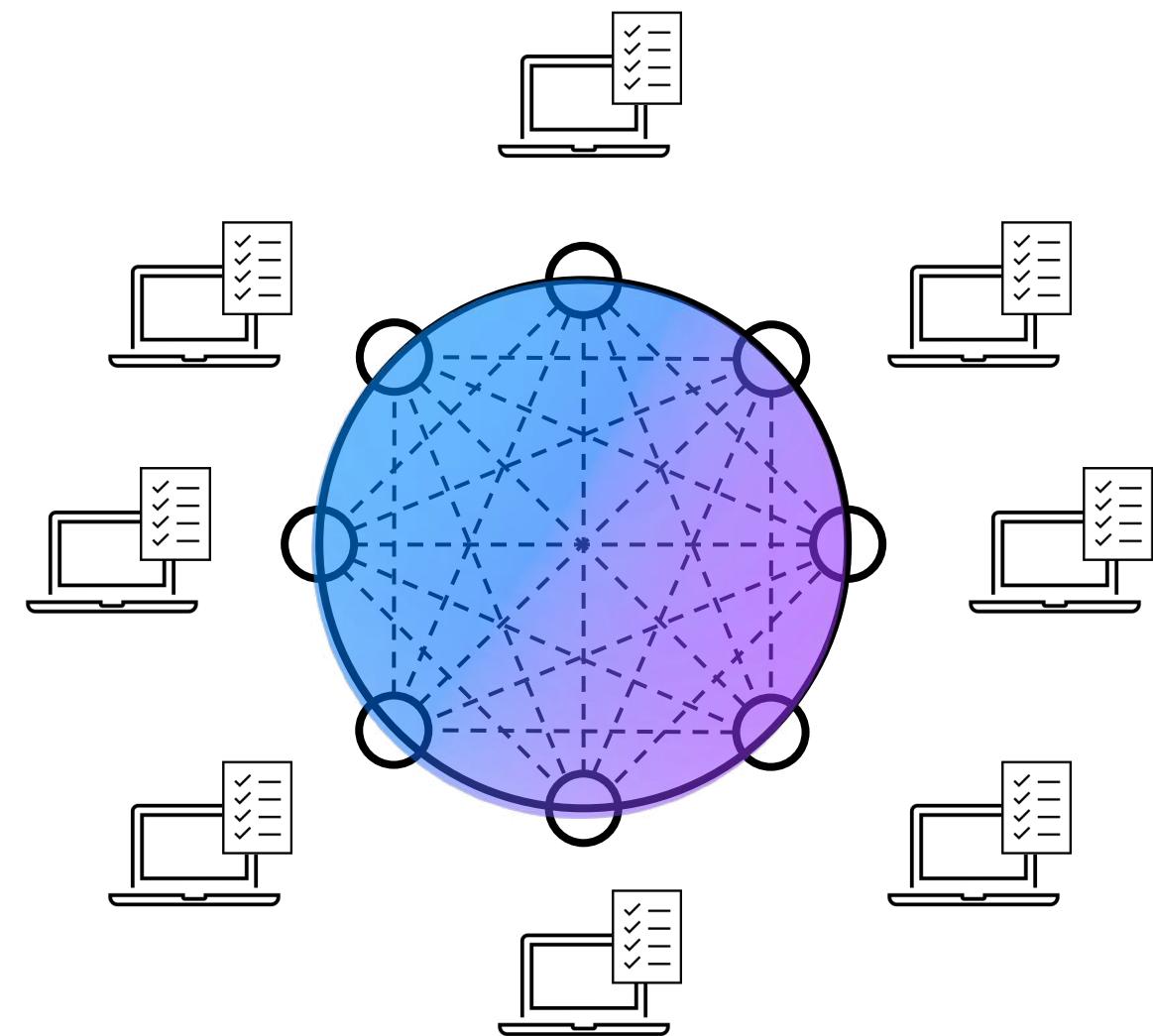
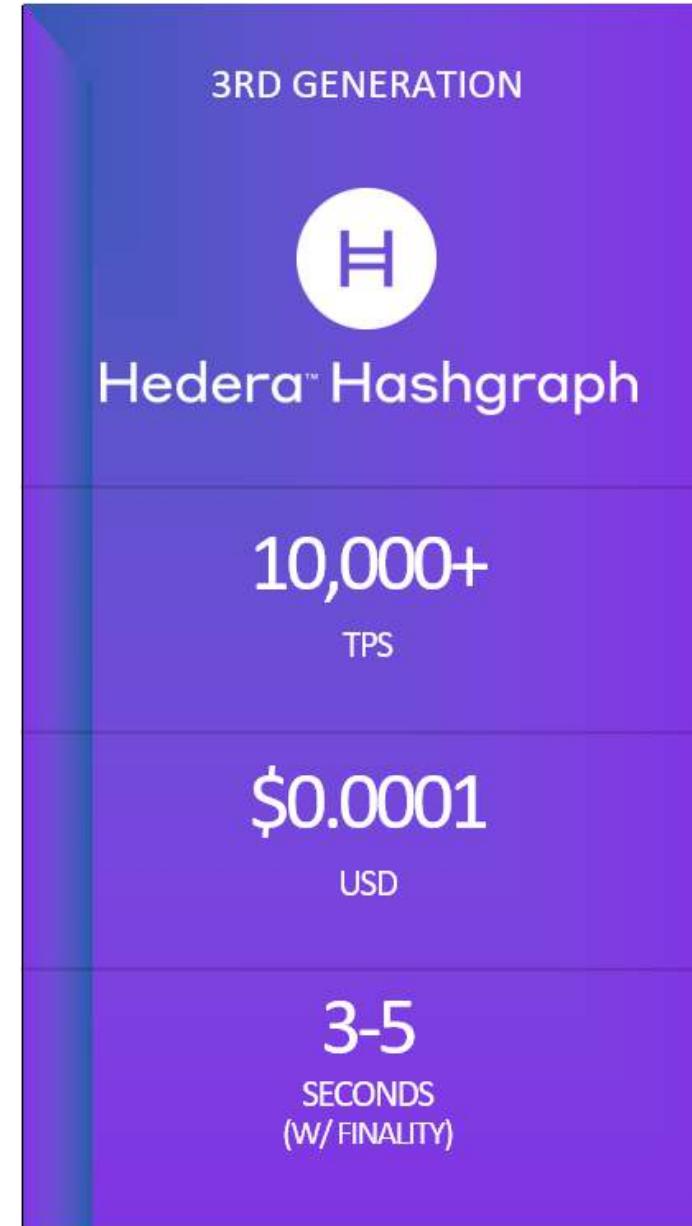


Sustainability

Carbon negative
infrastructure

Lowest carbon
footprint of any
public network

In this session, you will learn how the **Hedera network functions**, how you can **start development**, and **where to learn more**



Introduction

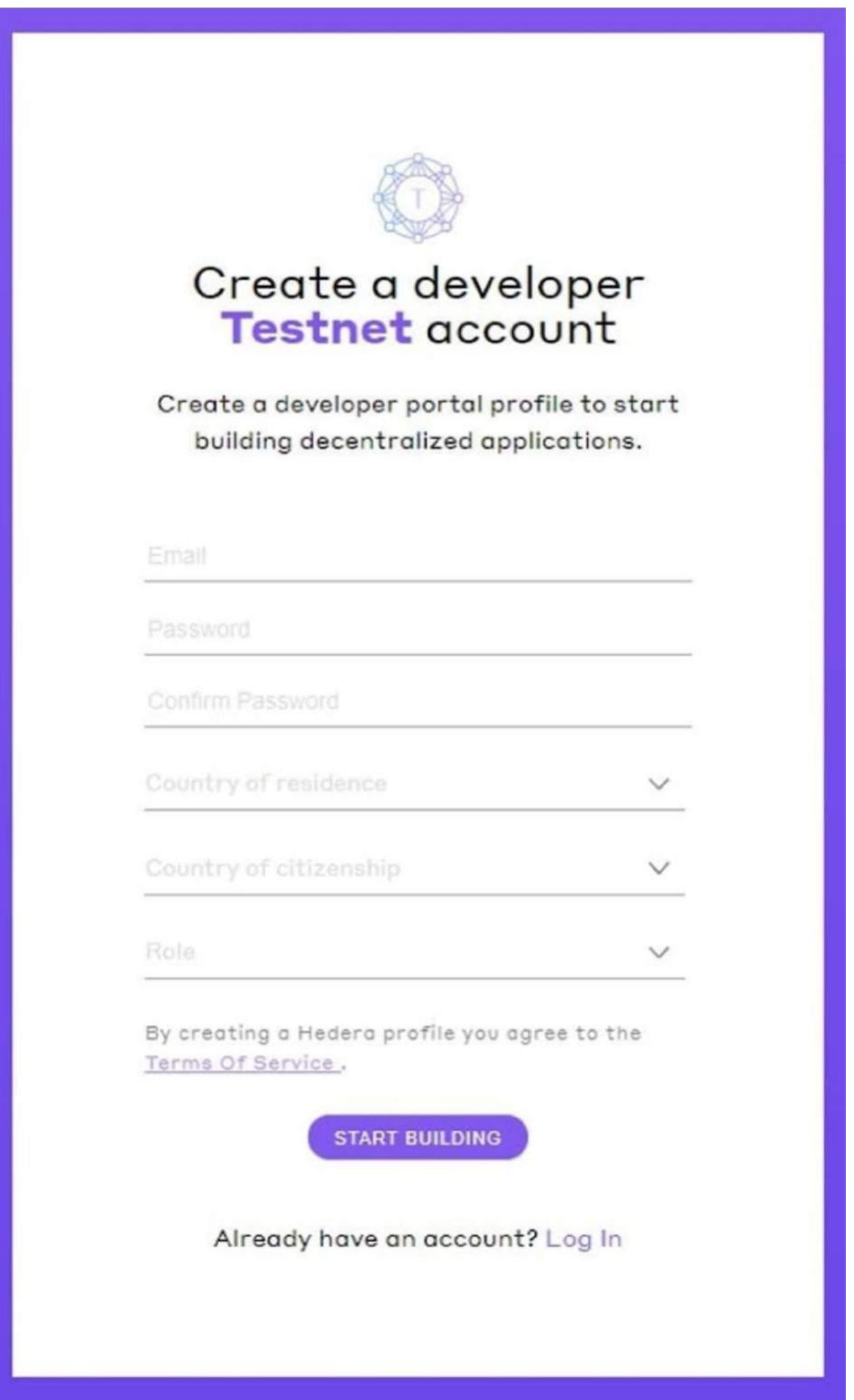
Understand
the Hedera Network

Start Developing on
Hedera

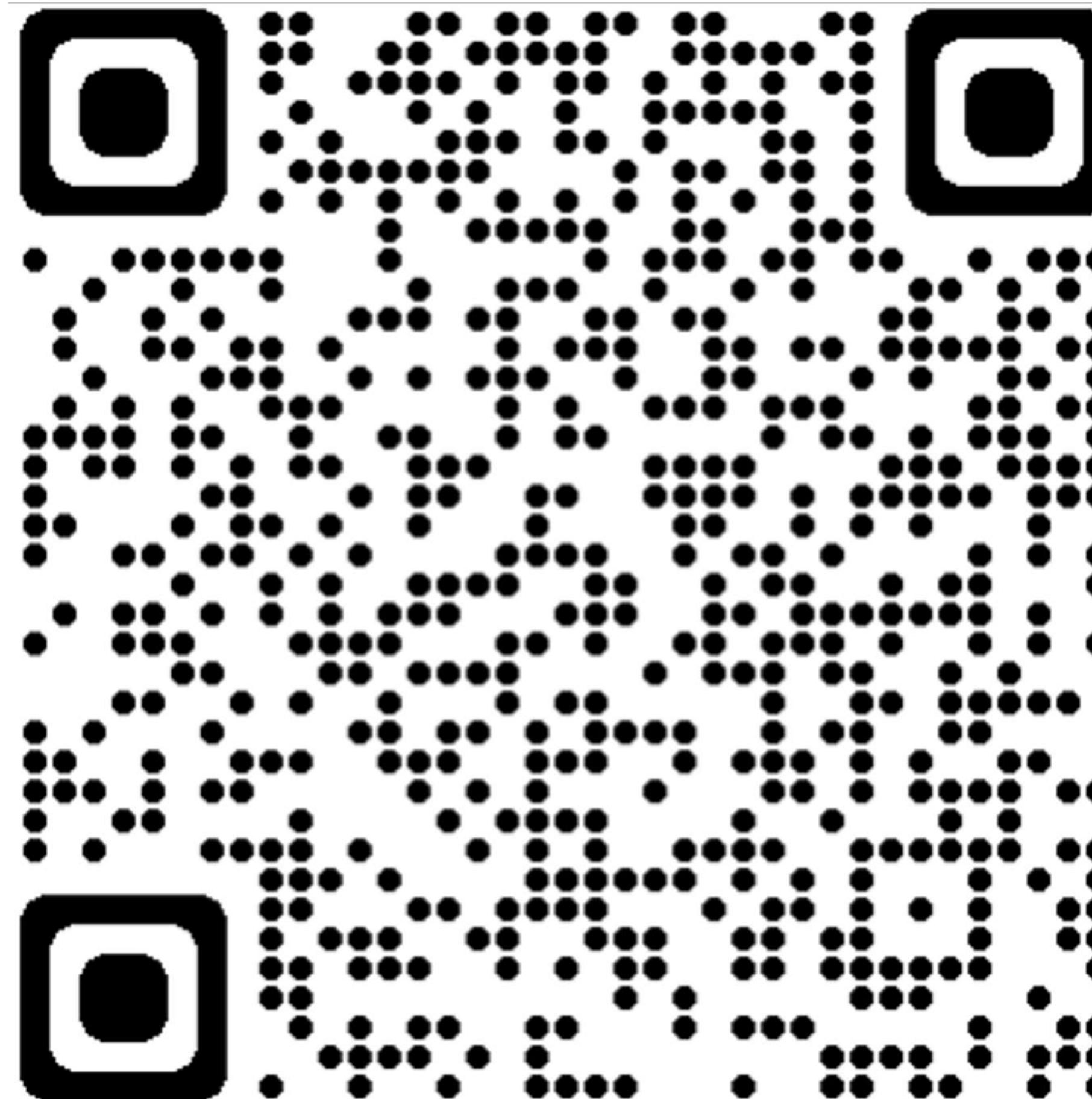
Get Resources and
Learn More

Get a Testnet Account

portal.hedera.com/register



The screenshot shows the 'Create a developer Testnet account' form. It includes fields for Email, Password, Confirm Password, Country of residence, Country of citizenship, and Role. A note states: 'By creating a Hedera profile you agree to the [Terms Of Service.](#)'. A purple 'START BUILDING' button is at the bottom, and a link 'Already have an account? [Log In](#)' is also present.



Fungible Token Creator Example

Code

main · 1 branch · 0 tags

Go to file Add file · Code · About

a-ridley · Update index.js · 25da2b0 · 1 minute ago · 3 commits

.gitignore	create a fungible token using hts	10 minutes ago
README.md	Update README.md	5 minutes ago
createAccount.js	create a fungible token using hts	10 minutes ago
createToken.js	create a fungible token using hts	10 minutes ago
index.js	Update index.js	1 minute ago
mintToken.js	create a fungible token using hts	10 minutes ago
package-lock.json	create a fungible token using hts	10 minutes ago
package.json	create a fungible token using hts	10 minutes ago
yarn.lock	create a fungible token using hts	10 minutes ago

Readme · 0 stars · 1 watching · 0 forks

No description, website, or topics provided.

Readme · 0 stars · 1 watching · 0 forks

Releases

No releases published · Create a new release

Packages

No packages published · Publish your first package

Languages

JavaScript 100.0%

README.md

Hedera Token Service(HTS) Fungible Token Creator Example

To run this example:

- npm install or yarn
- npm run dev or yarn dev

Hedera Documentation

Token Service

We'd love to help you further at:

DOCUMENTATION

Get Started: <https://hedera.com/get-started>

Documentation: <https://docs.hedera.com/guides/>

CODING TUTORIALS

Articles: <https://docs.hedera.com/guides/resources/tutorials>

Videos: https://www.youtube.com/playlist?list=PLcaTa5RR9SuA_8rzCKru8Y_F6iMJPEUD

COMMUNITY

Developer Discord: <https://hedera.com/discord>