



# Build on the network

ICP | Internet Computer



# tech history arcs towards open networks

PRIVATE

INFRASTRUCTURE



OPEN

NETWORKS

INFORMATION SUPERHIGHWAY

curated walled-garden network proposed by  
Microsoft and Oracle (1990s), AOL...



THE INTERNET

private routing devices connected by TCP/IP  
create a public global network

TRADITIONAL IT

cloud services, databases, middleware,  
web servers, CDNs, firewalls...



INTERNET COMPUTER

private node machines connected by ICP  
create a public serverless autonomous cloud





INTERNET COMPUTER



INTERNET IDENTITY



**build on the network**

#### OPEN INTERNET SERVICES

build transparent autonomous web3 services that communities run using powerful decentralized governance, with no backdoors for devs, organizations or CEOs

#### SOVEREIGN ENTERPRISES

build unstoppable systems and tech infrastructure on an open network from tamperproof software, w/o need for firewalls, no fear of backdoors, and no corporate cloud kill switches

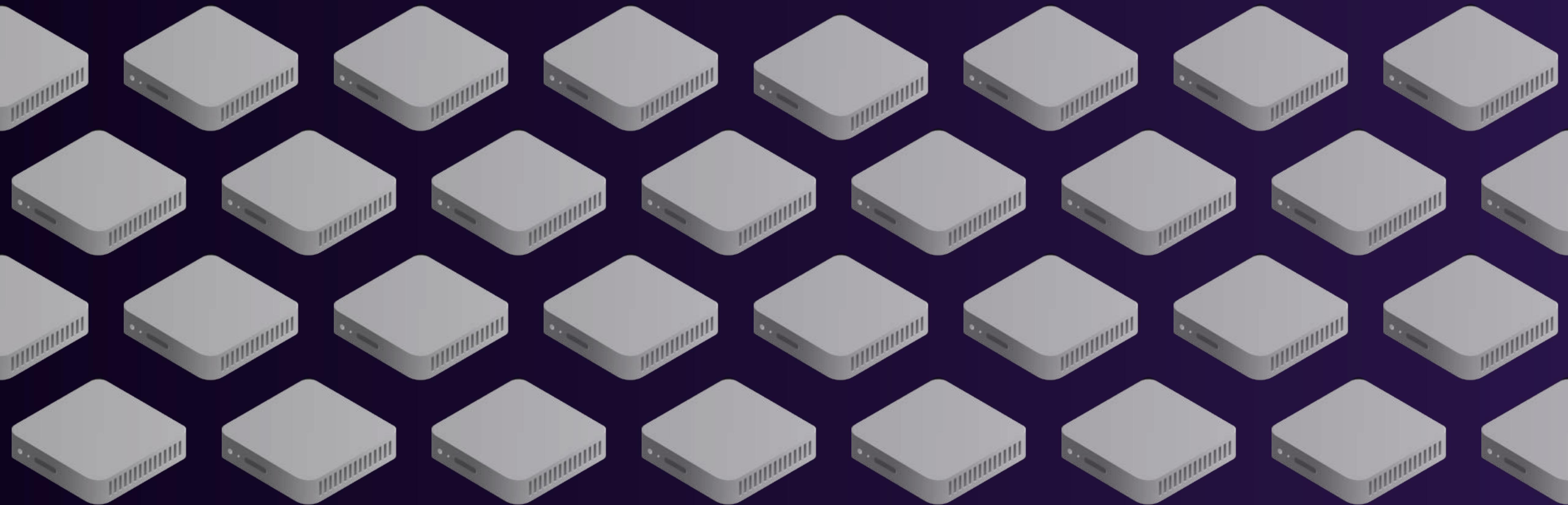


# network

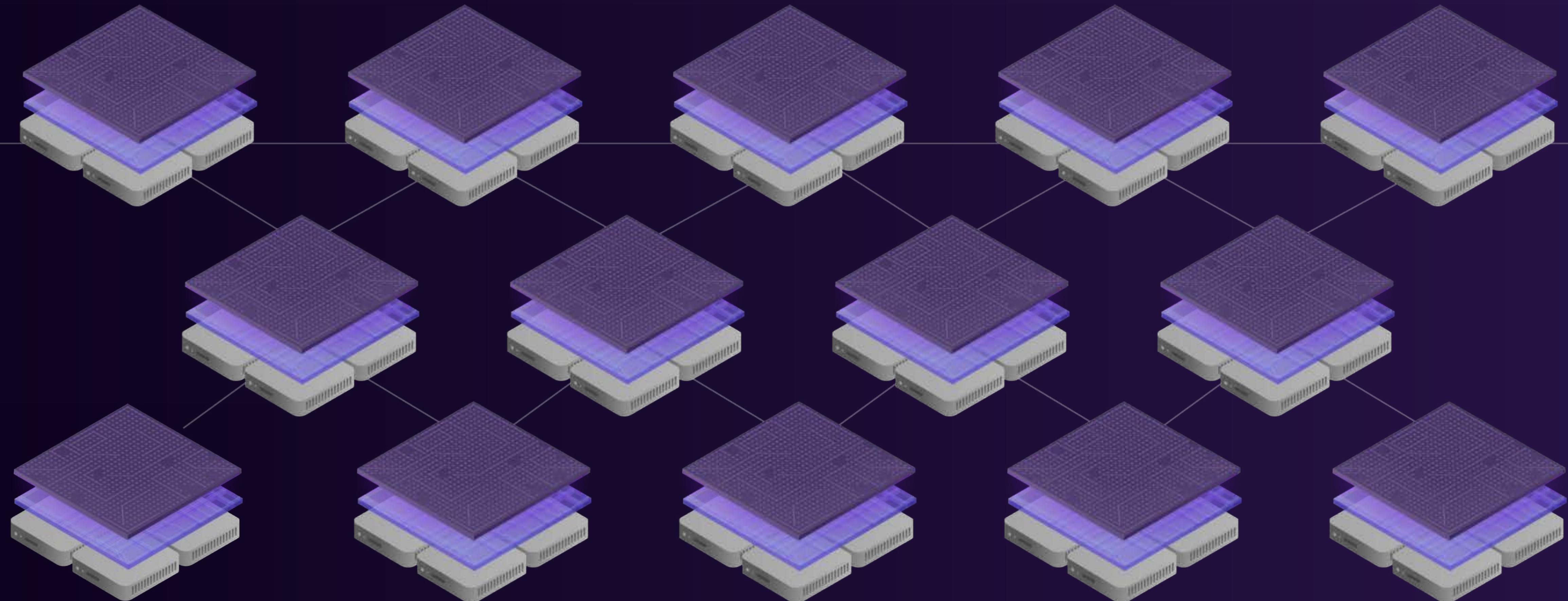
the Internet Computer is created by the ICP, the most advanced network protocol ever devised



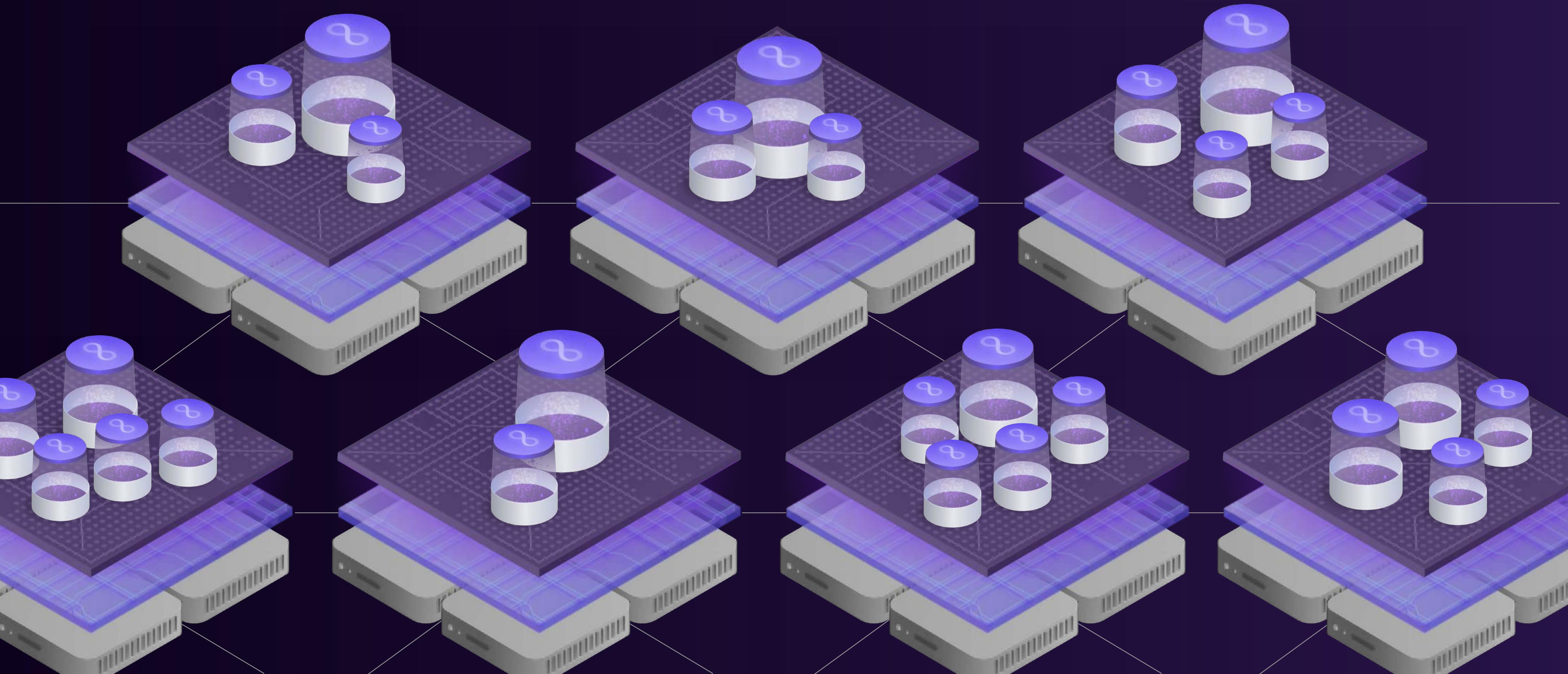
**independent node providers own and operate  
node machines in data centers worldwide**



**Internet Computer Protocol (ICP) combines nodes  
to form efficient subnet blockchains**



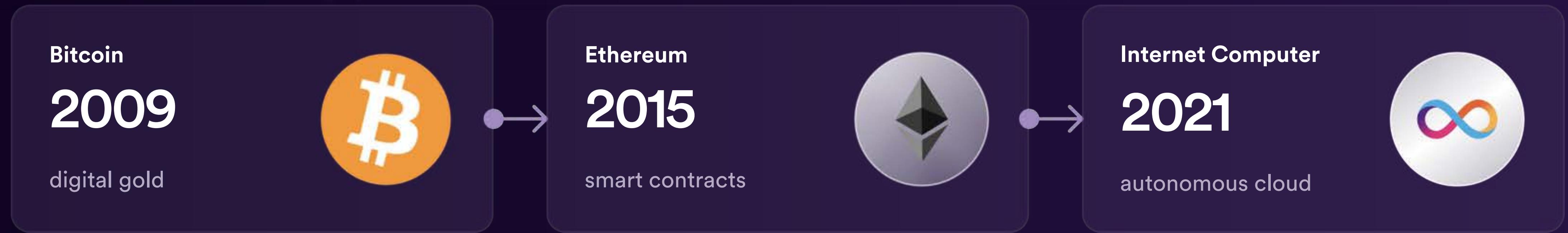
subnet blockchains add capacity for running  
*canister* smart contracts



subnets combine into ONE serverless *autonomous* cloud



# a new form of blockchain network emerges



# canister code

canisters are a new form of smart contract  
that have general application



# smart contracts are a *new form of software*



## ETHEREUM SMART CONTRACTS

### tamperproof

no firewall or security team necessary

### tokenization

hold, process & transmit value like data

### unstoppable

nuke proof, no servers or failing over

### composable

trustless dynamic collaborative building

### autonomous

can remove human control & backdoors

### borderless

code/services have no geography



# canisters are a *new form of smart contracts*



## CANISTER SOFTWARE

### fast

web speed not blockchain speed

### efficient

reduces IT carbon footprints

### scaling

scales services more easily than traditional IT

### low cost

compute costs approach traditional IT

### multi-chain

natively interacts with external blockchains

### http (user experience)

canister code speaks web (http) directly



# software will eat the world. smart contracts can eat software



CANISTER - BASED SYSTEMS



# web3+

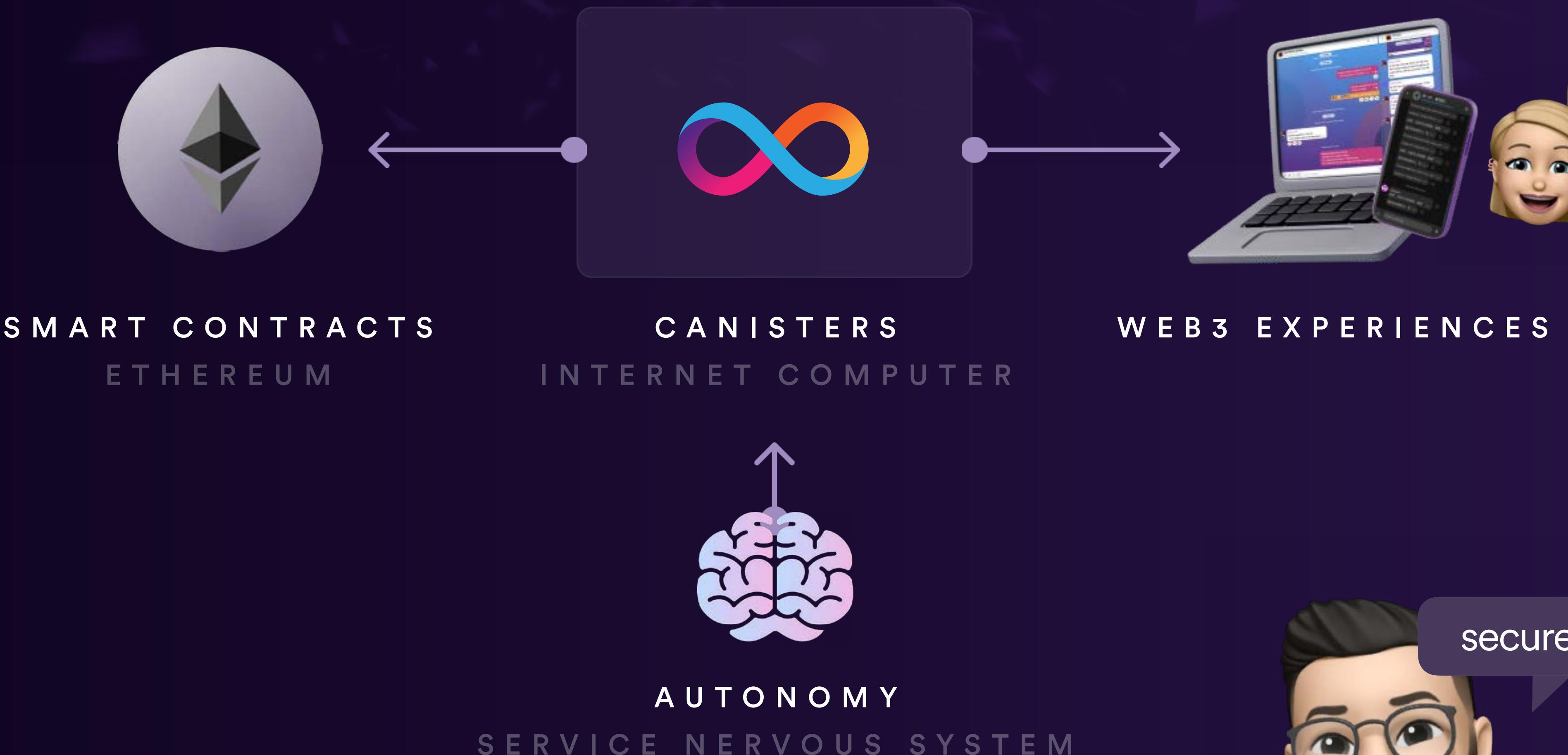
what the Internet Computer can solve for web3 builders  
in today's blockchain ecosystem



# ICP solves for the final frontier of decentralization



# replace centralized IT using Internet Computer canister contracts



# autonomy

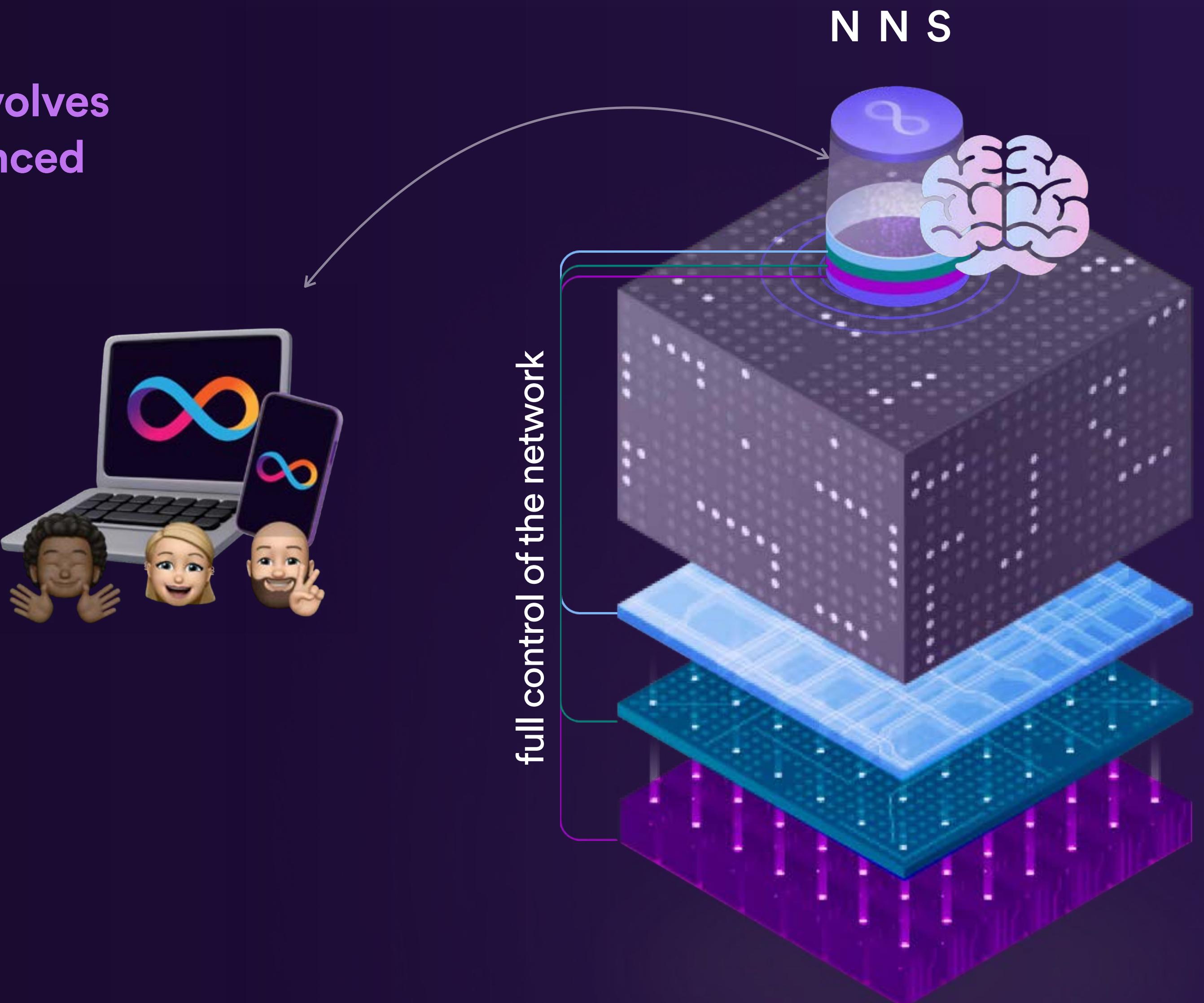
the Internet Computer runs autonomously under the control of  
decentralized governance... so can web3 online services and systems



# Network Nervous System

**the Internet Computer network adapts and evolves autonomously without backdoors using advanced protocol-integrated DAO governance:**

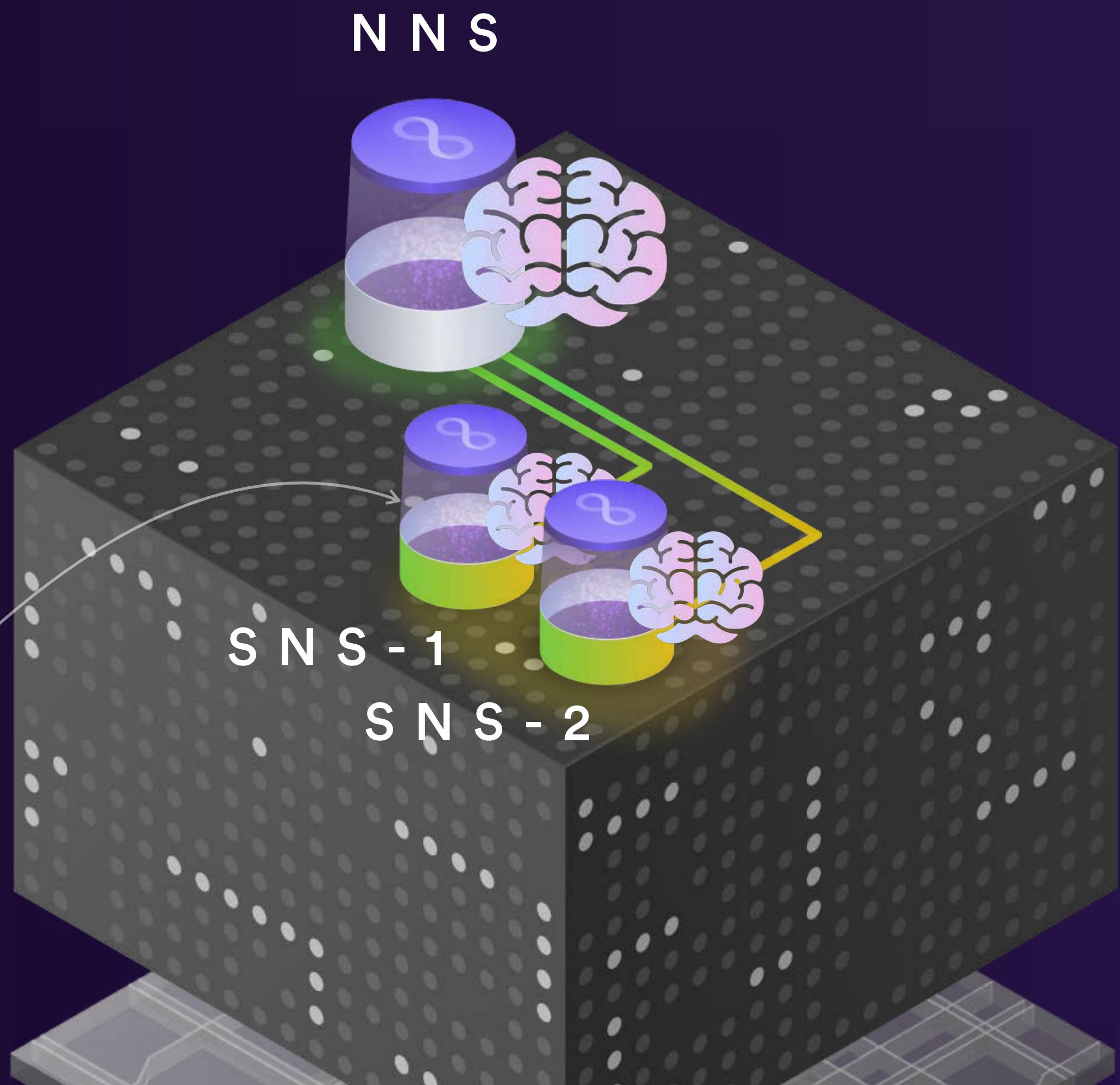
- public, open, transparent and permissionless
- proposals submitted and adopted or rejected
- adopted proposals are executed automatically
- on instruction, nodes update ICP protocol
- on instruction, nodes form into new subnets
- decisions made by algorithmic liquid democracy
- users lock ICP tokens to create “voting neurons”
- neurons can vote automatically by following others
- tens of thousands of users have created neurons
- in 2 years, mainnet upgraded its protocols 145 times
- human control removed to make network autonomous



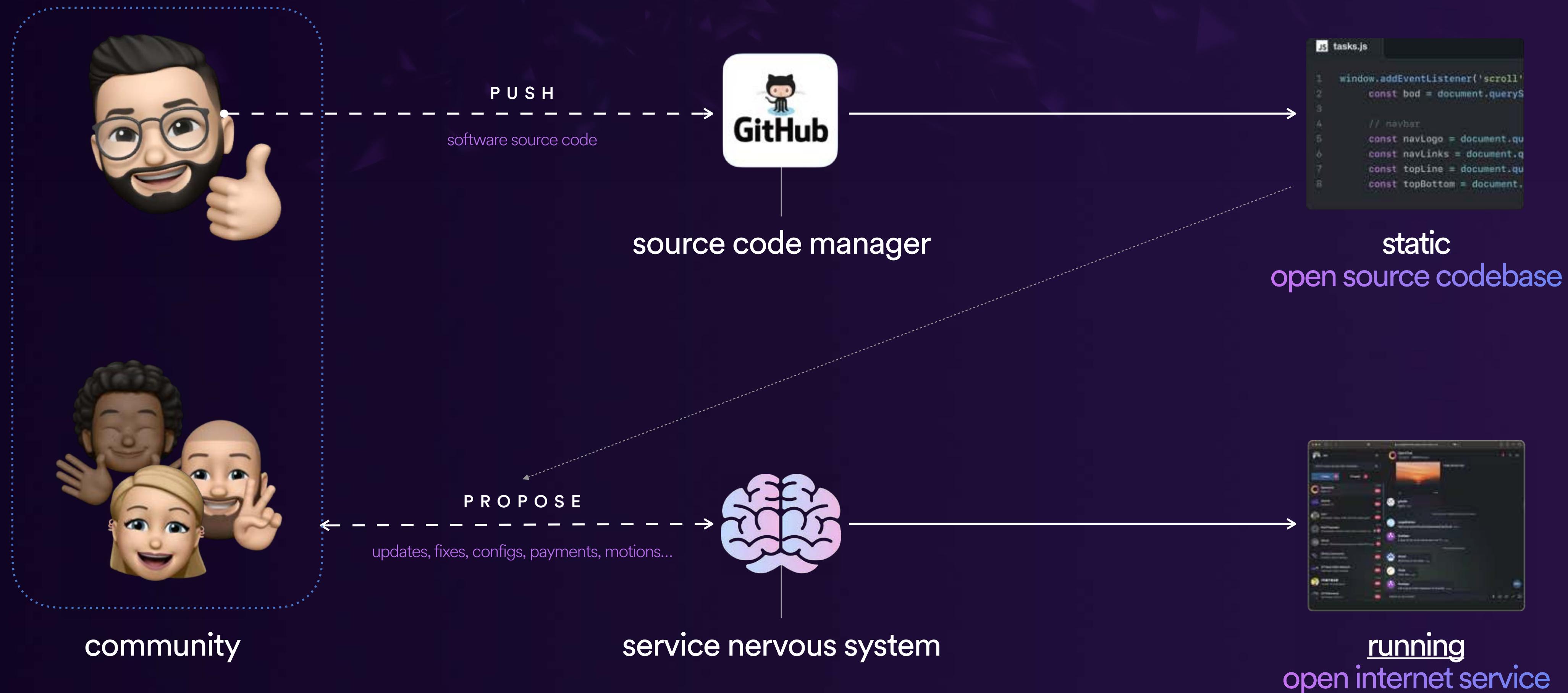
# **democratic web3 services use “service nervous systems”**

**an SNS DAO works similarly to the NNS, but is used to create a web3 “open internet service” or secure enterprise system:**

- open/permissionless or private
- the SNS updates its service’s canisters
- the SNS can perform arbitrary configurations
- an SNS can manage a token treasury (value)
- services can be controlled by communities of millions
- each SNS creates a ledger of native tokens for its service
- tokens incentivize decentralized community workforces
- community fundraising into the SNS is possible
- enterprise systems can distribute control for security
- any complex service can be made autonomous
- the NNS is an SNS factory



# an open internet service (OIS) gives its community 100% control

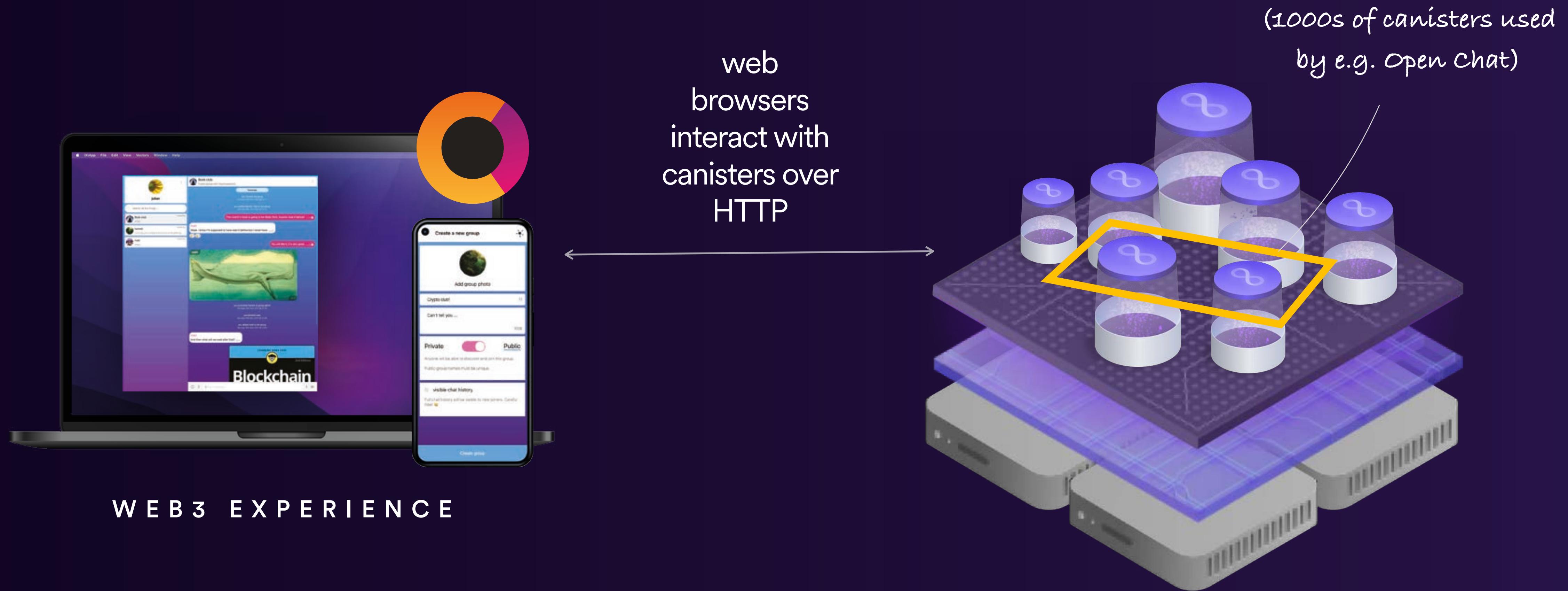


# pure web3

the Internet Computer is a Web3 platform that provides a complete alternative to the traditional IT stack



# end-users interact with services over HTTP (the web)



canister software pays the network for its own computation (“reverse gas”)

# Internet Identity creates RPC transaction sessions



**actually, the entire network has 1(one) master 48-byte chain key!!**



breakthrough depends on hash trees and chain key threshold BLS assemblies...

# Internet Identity

The Internet Computer's identity layer



## Interoperable

Share credentials across different web services and platforms in a privacy-preserving manner.



## Easy to use

No need to remember private keys or manage endless usernames and passwords. Simply unlock your device to connect.



## Controlled by owner

Internet Identity is controlled by the NNS, decentralized control system (or DAO) that manages the Internet Computer's functions.



## Highly secure

Based on FIDO Alliance and W3C standards, cryptographic key pairs are stored in the secure hardware on your device.



## Open source

Developers can audit and contribute to the codebase to ensure that it meets the highest standards of security and transparency.



## No tracking

Based on FIDO Alliance and W3C standards, cryptographic key pairs are stored in the secure hardware on your device.



# Where we are now

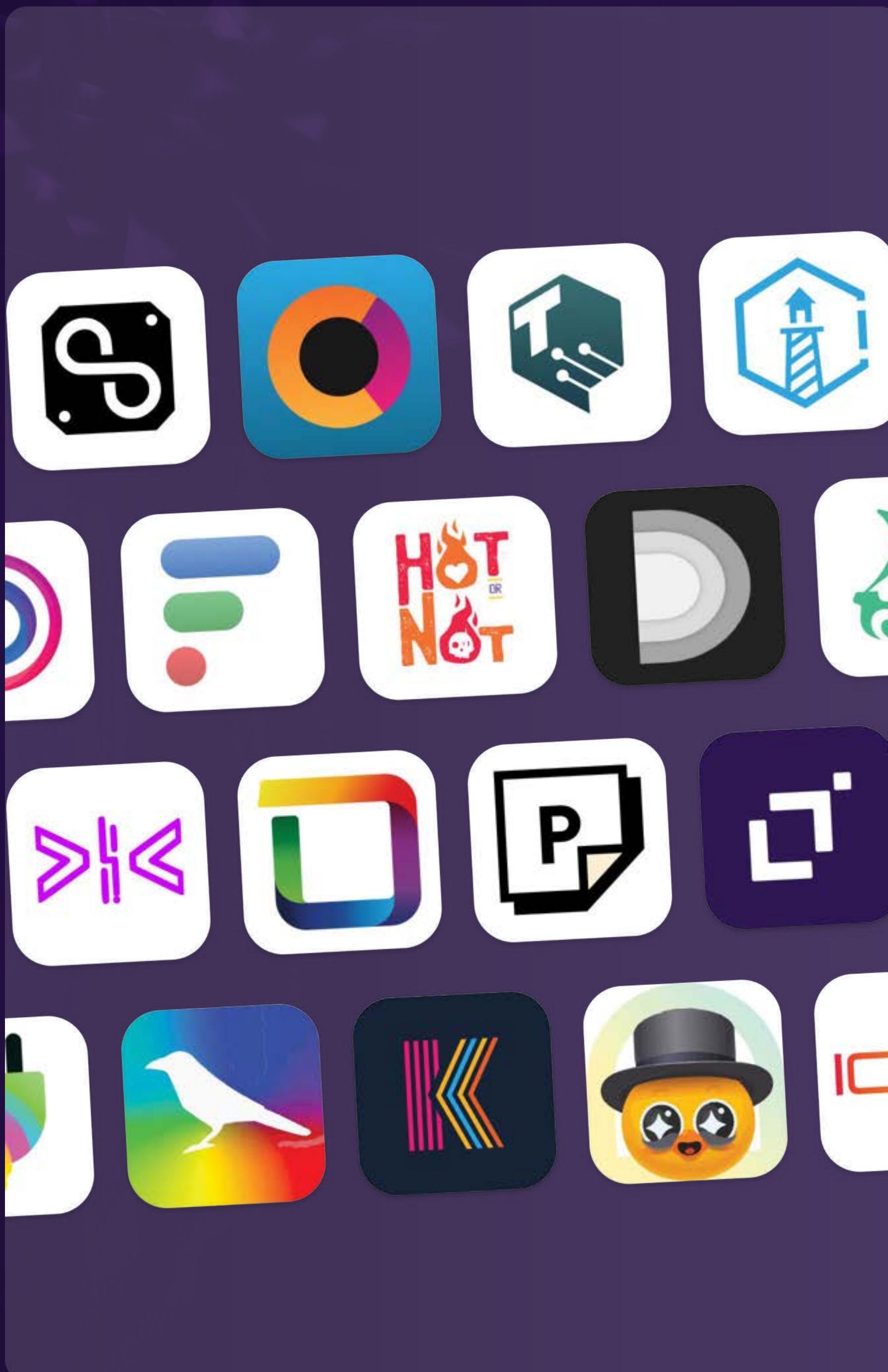
2.2M+

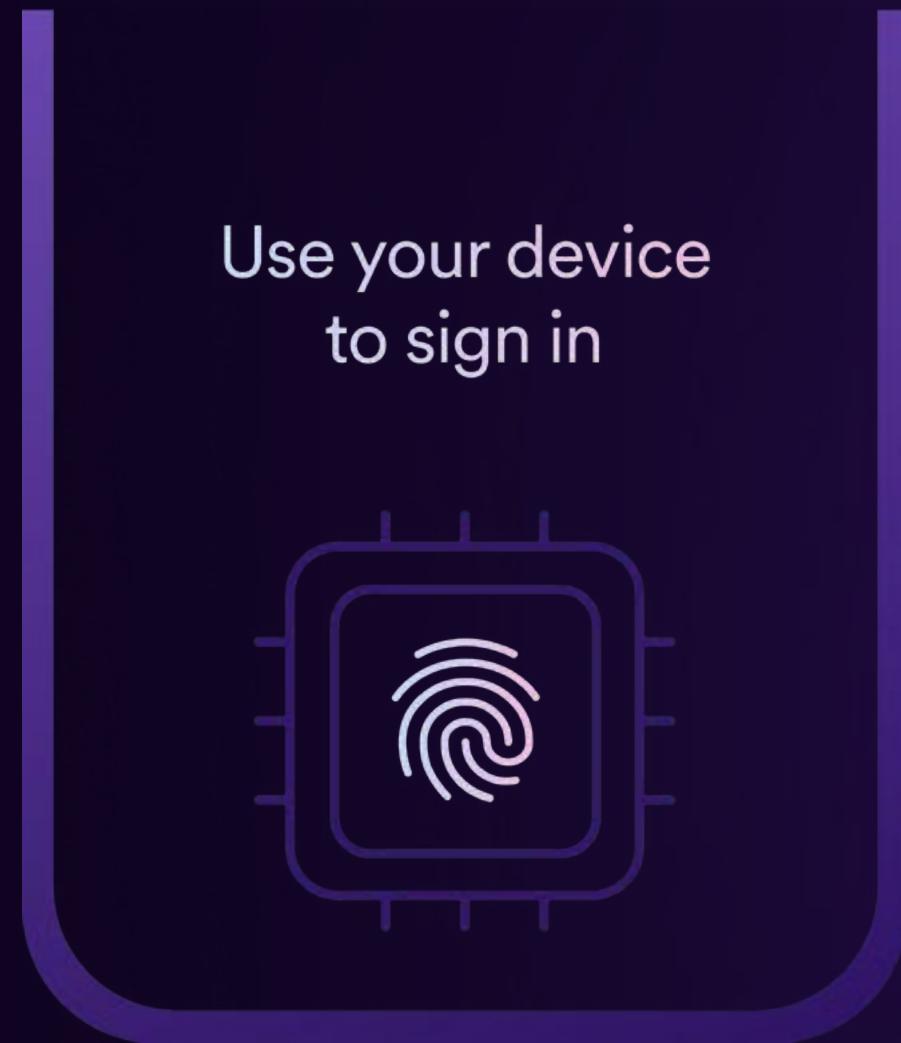
identities created

100+

dapps using II for authentication

Support for relying parties and identity providers coming in 2023...





TPM

+

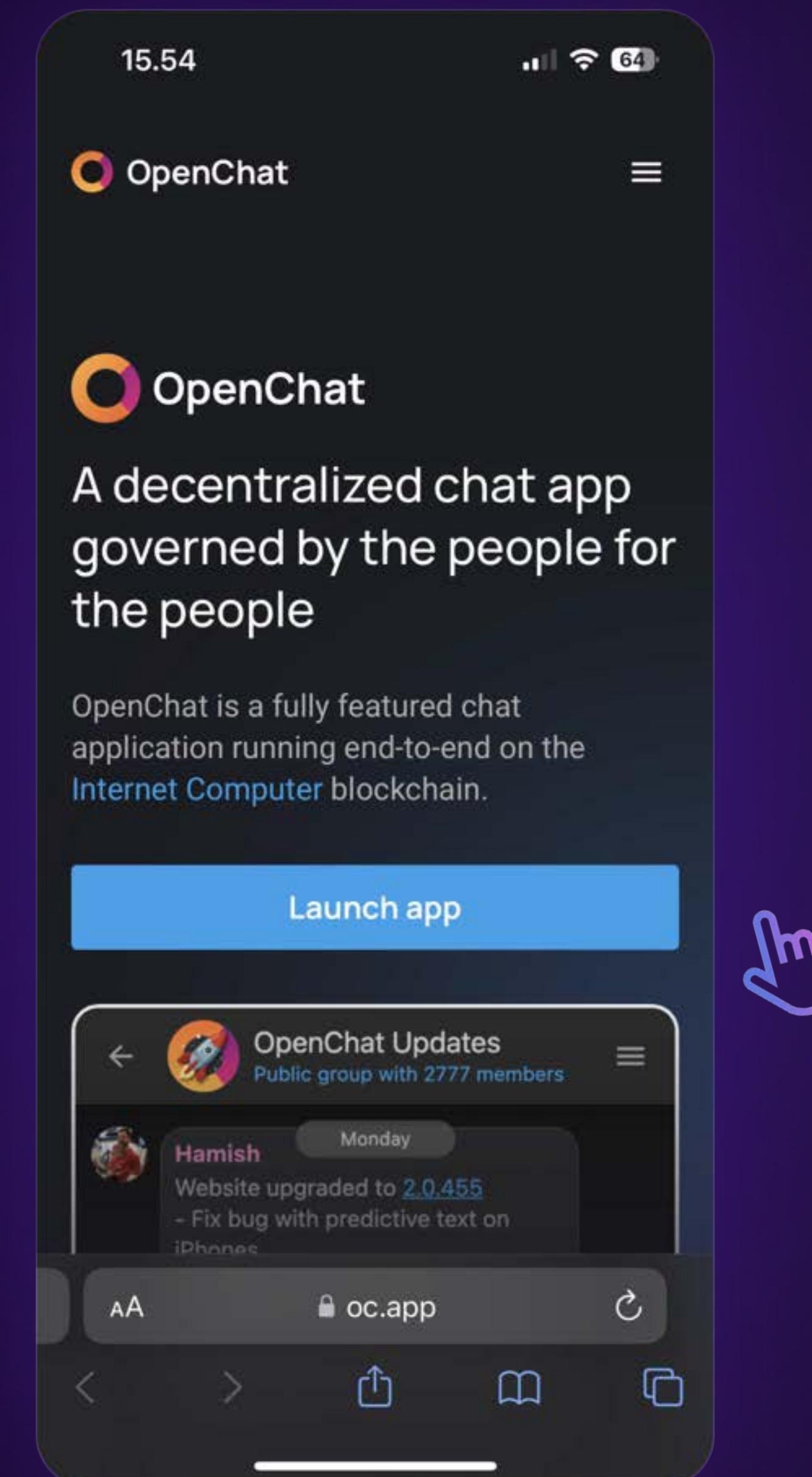


WebAuthn (+ FIDO)

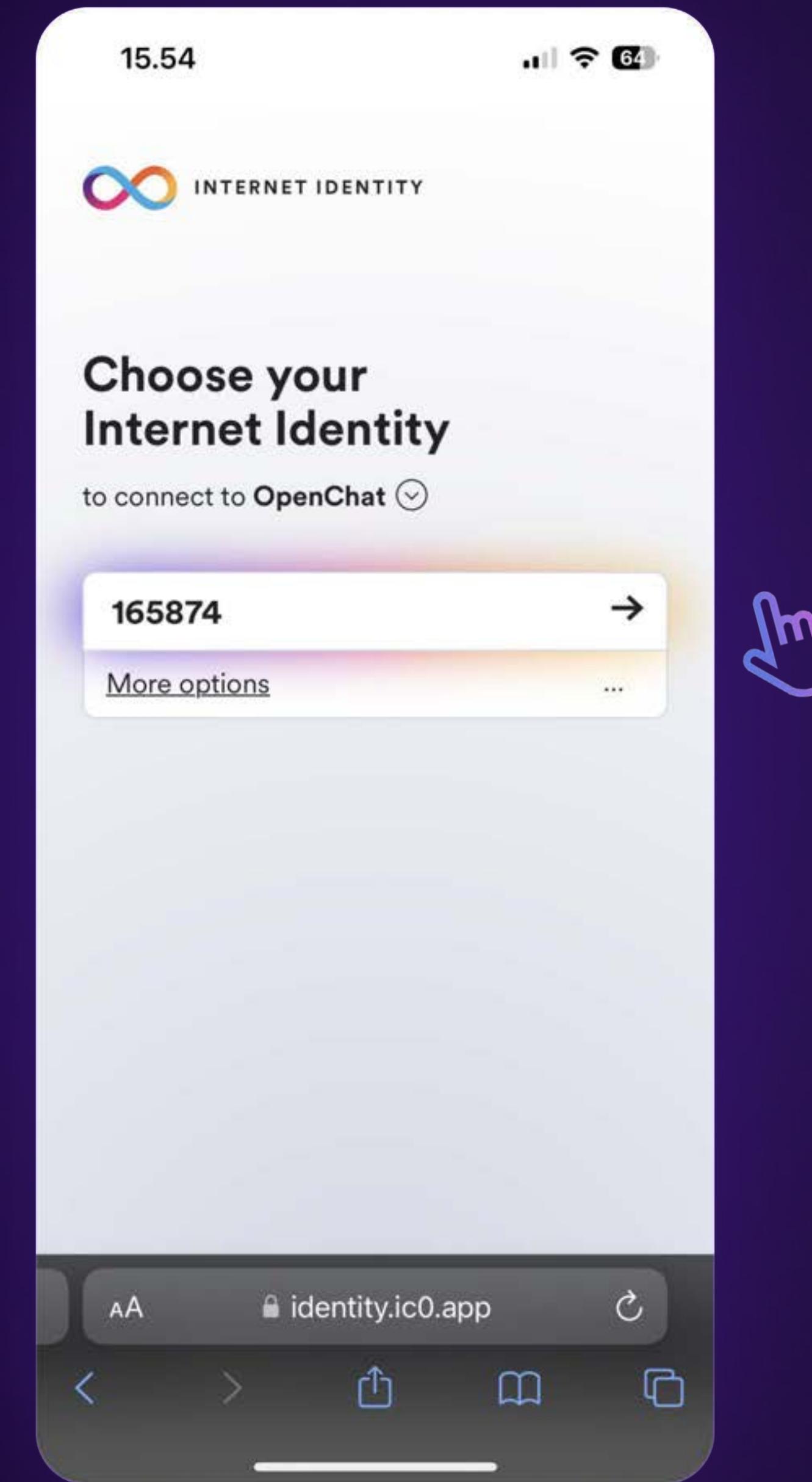
+



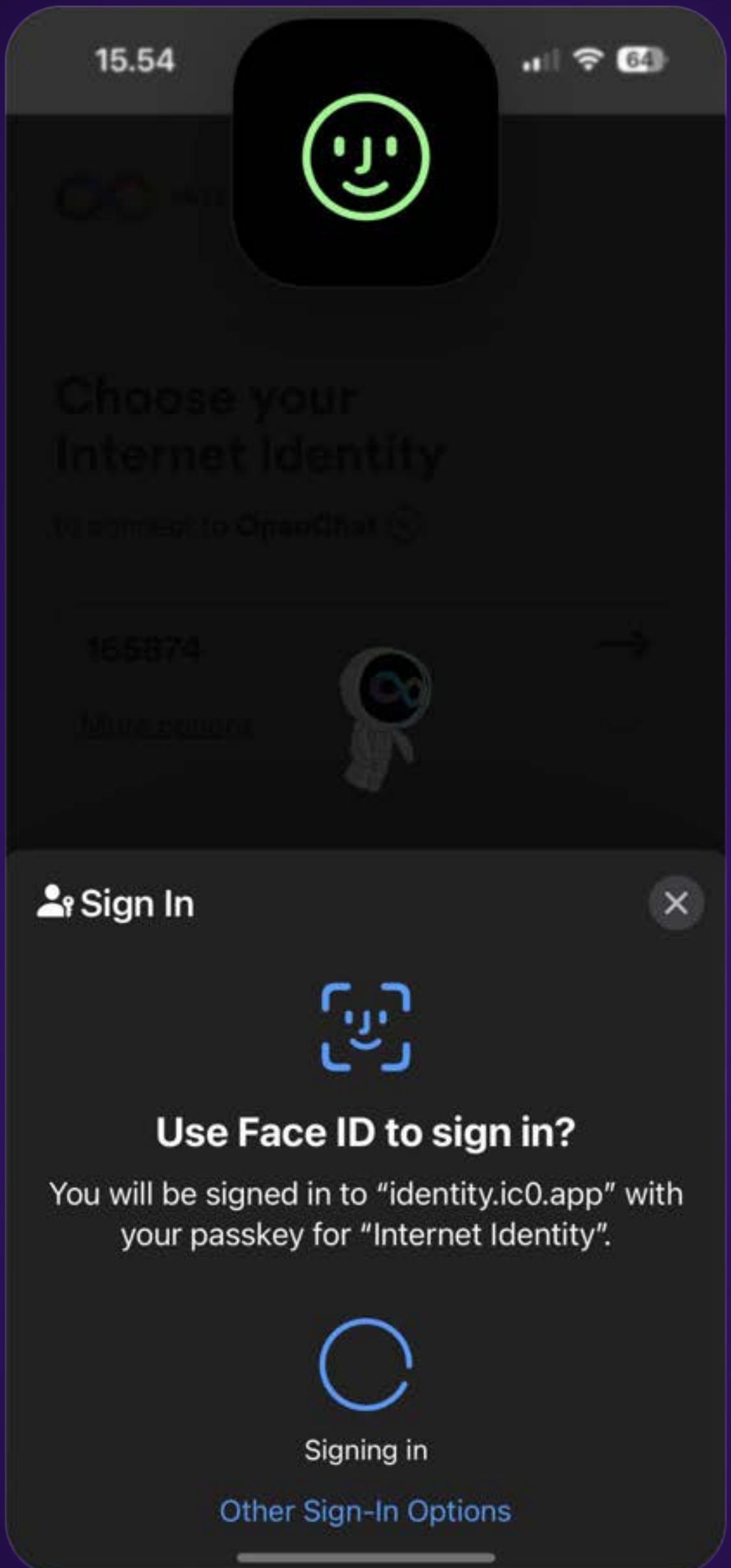
# INTERNET IDENTITY



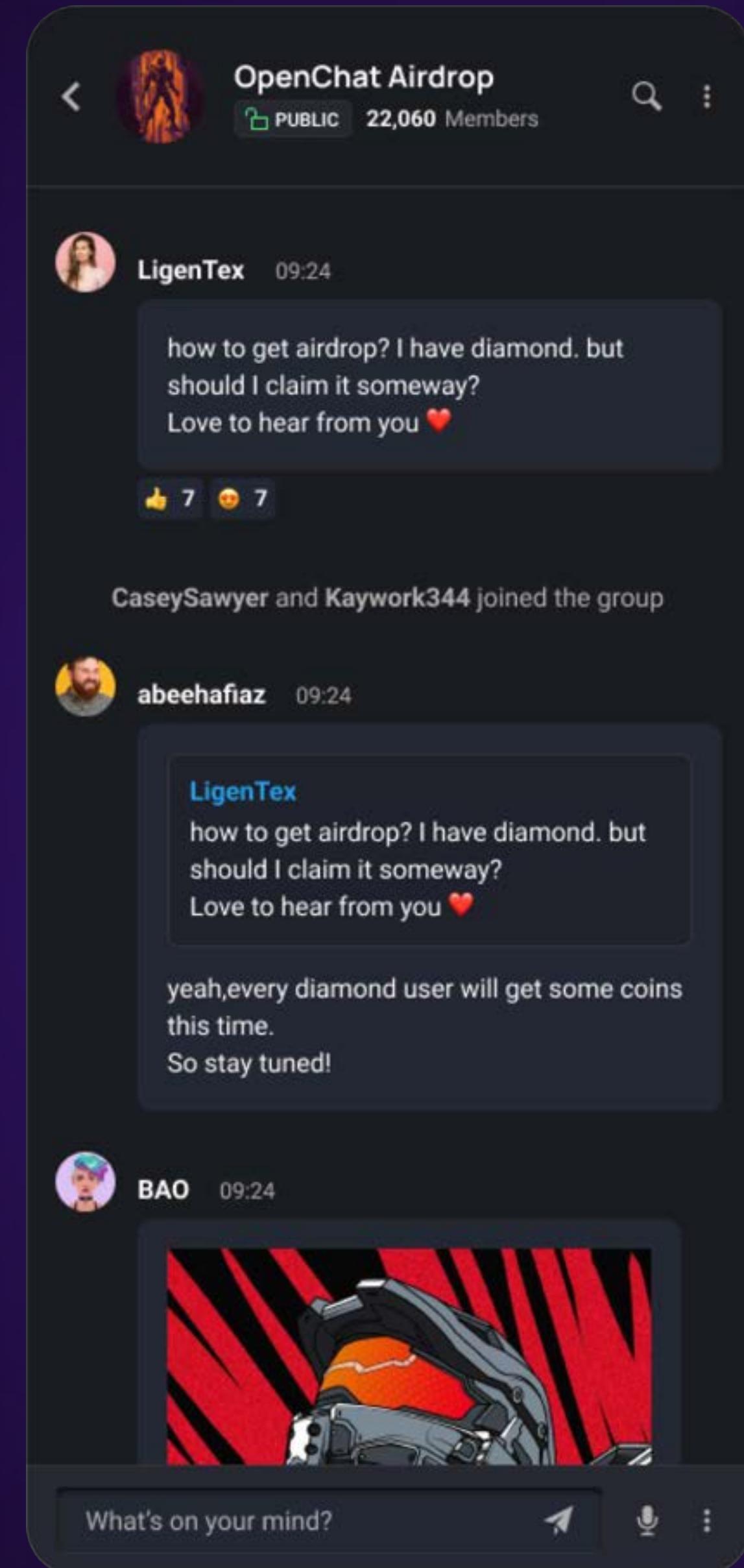
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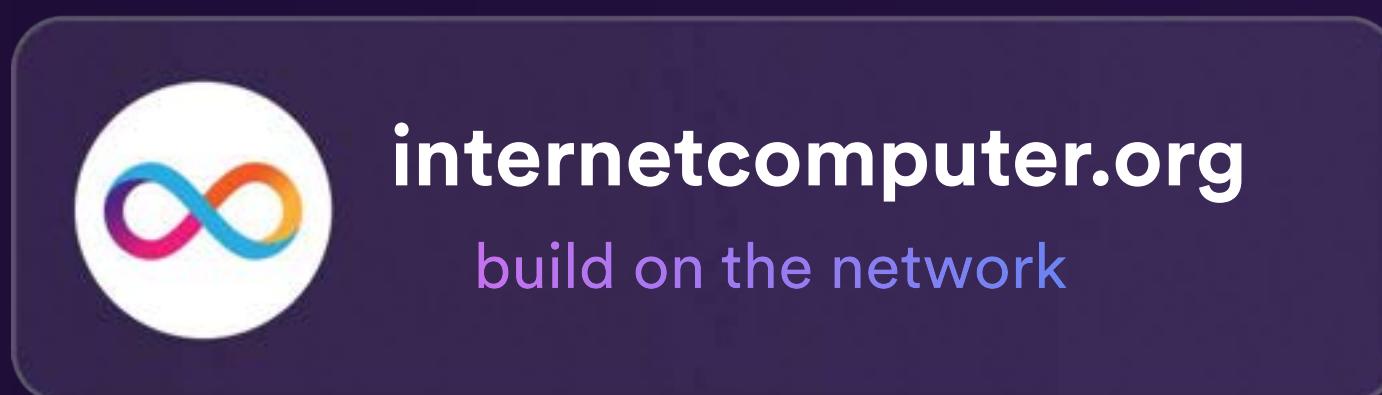
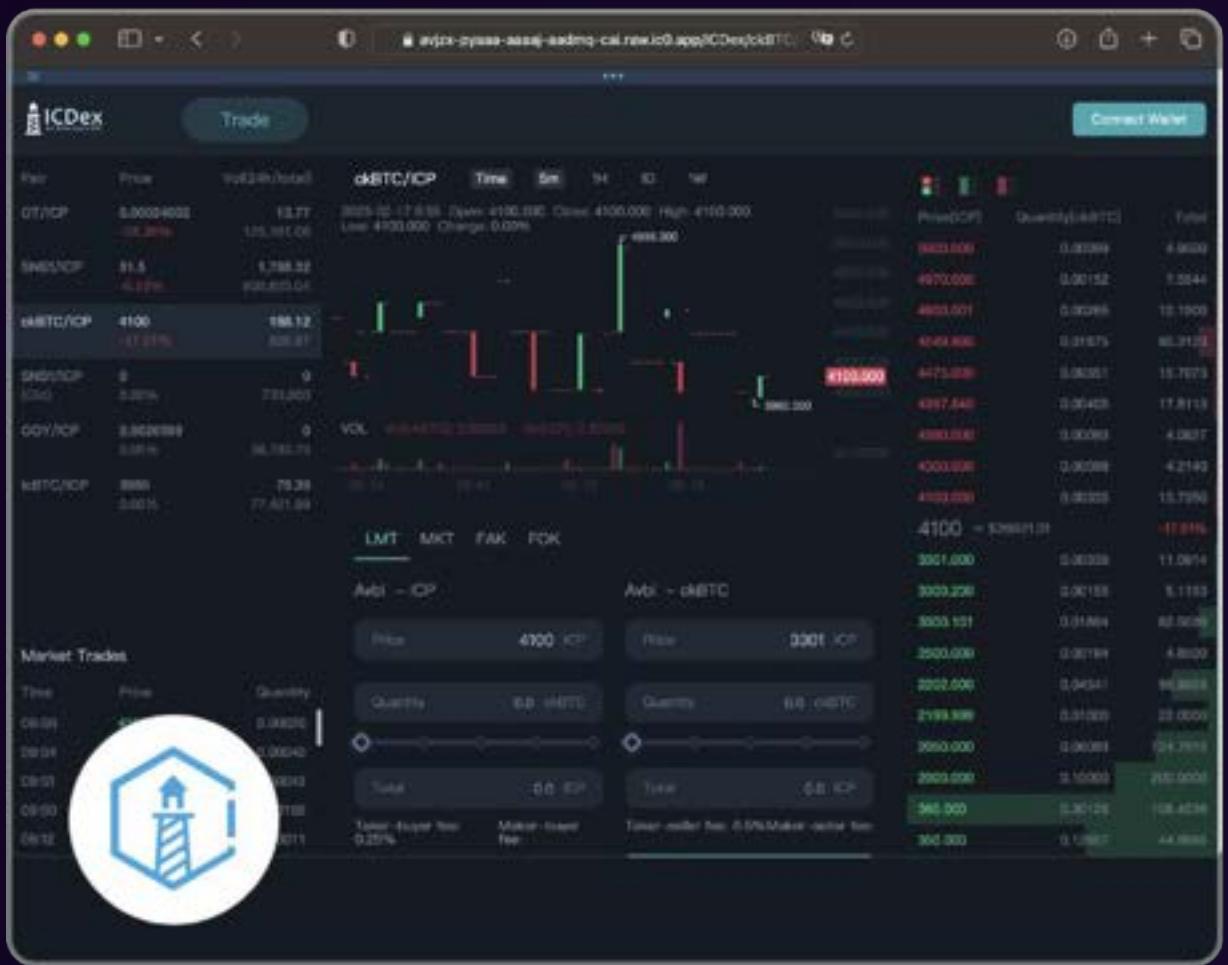
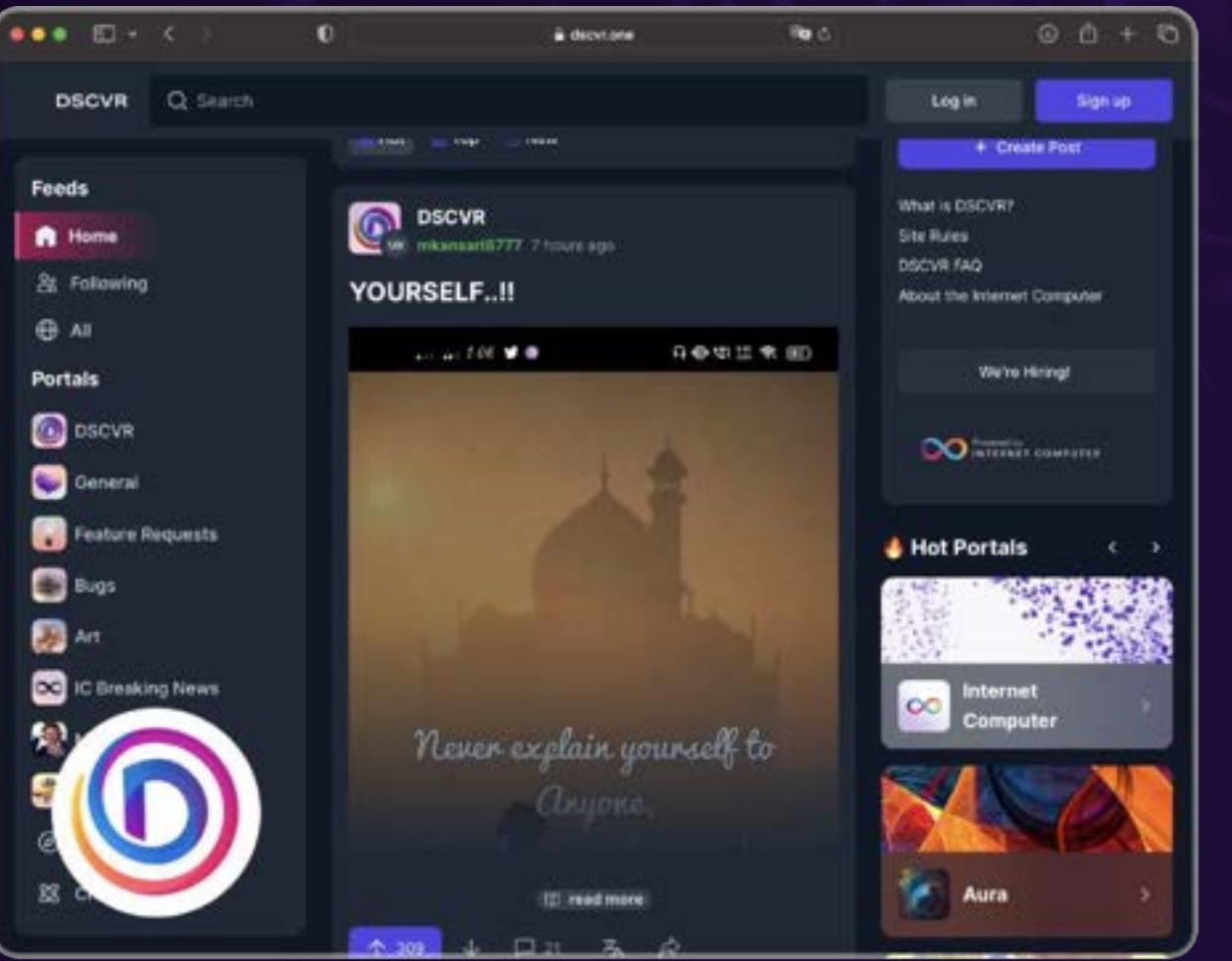
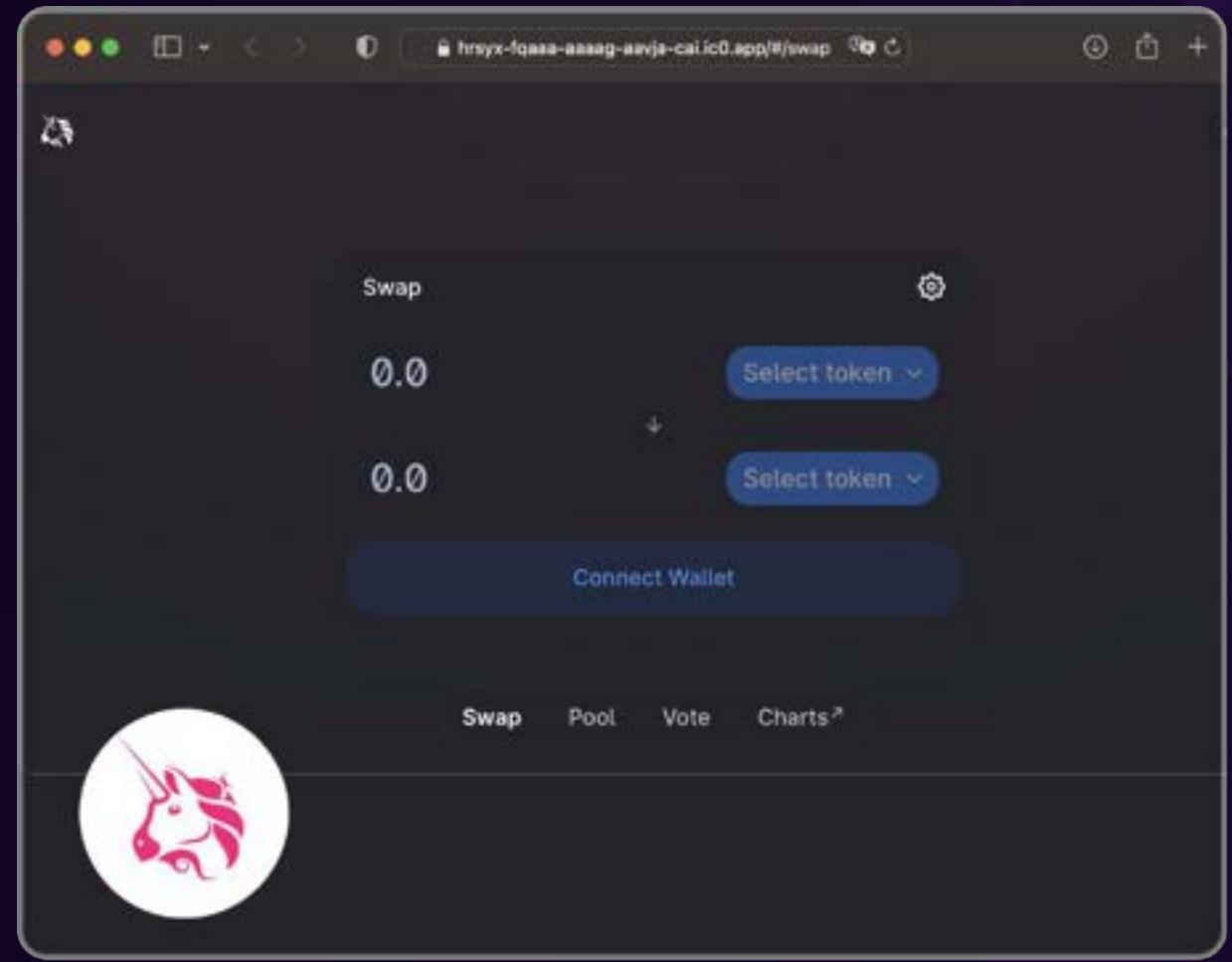
# INTERNET IDENTITY



# INTERNET IDENTITY



# software autonomy can create more powerful web3





# OC.app

- ✓ messaging service runs 100% on network
- ✓ chat accounts also wallets i.e. full SocialFi
- ✓ send satoshis using chat messages (no wallet!)
- ✓ under skin, every message is a blockchain TX
- ✓ the service is an autonomous *protocol*...
- ✓ a community SNS DAO is in exclusive control
- ✓ was first OSI (open internet service) in history
- ✓ protocol/software updates submitted to SNS
- ✓ autonomously adapts and evolves...



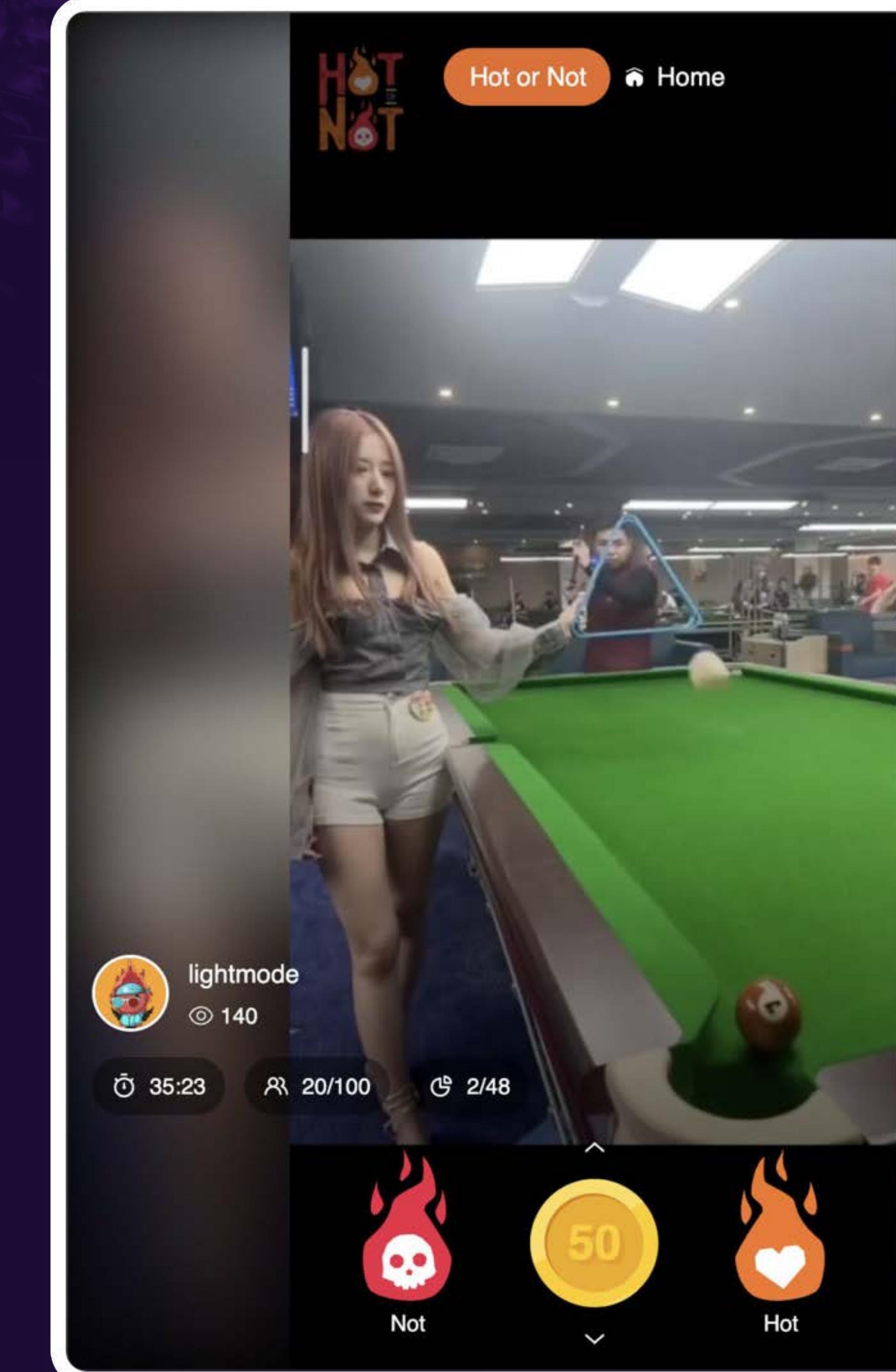
The screenshot shows the OC.app mobile application interface. At the top, there's a header bar with a lock icon, the URL "oc.app/#/vmdca-pqaaa-aaaaf-aabzq-cai", and a date "Friday 18th Nov". On the left, a sidebar shows a profile picture of "Jan" and a search bar. Below the search bar are two tabs: "Chats" (with 10 notifications) and "Threads" (with 1 notification). The main area displays a list of messages in a dark-themed chat interface. The messages are from various users and include links to external content like "https://oc.app/#/ho3ya-saaaa-aaaaf-asnlq-cai". The messages are timestamped and show user profiles and profile pictures.

Message	User	Time
OpenChat diens: Hi	OpenChat	13:58
Distrikt paribeda: hii	Distrikt	13:44
/biz/ Archetypal: image - Yeah, that looks pretty good	/biz/	13:43
NNS Proposals ProposalsBot: Update subnet 2fq7c to replica ve...	NNS Proposals	13:37
Dfinity Virtual: "With the looming launch of official BTC sup..."	Dfinity	13:28
Dfinity Community Nhatlong: Giphy message	Dfinity Community	13:24
ICP Maximalist Network Quynhnga: Giphy message	ICP Maximalist Network	13:05
8年躺平室友群 Landoit: It's quite good!	8年躺平室友群	12:45
ICP Metaverse Ng17Kenny: How'r u?	ICP Metaverse	07:21



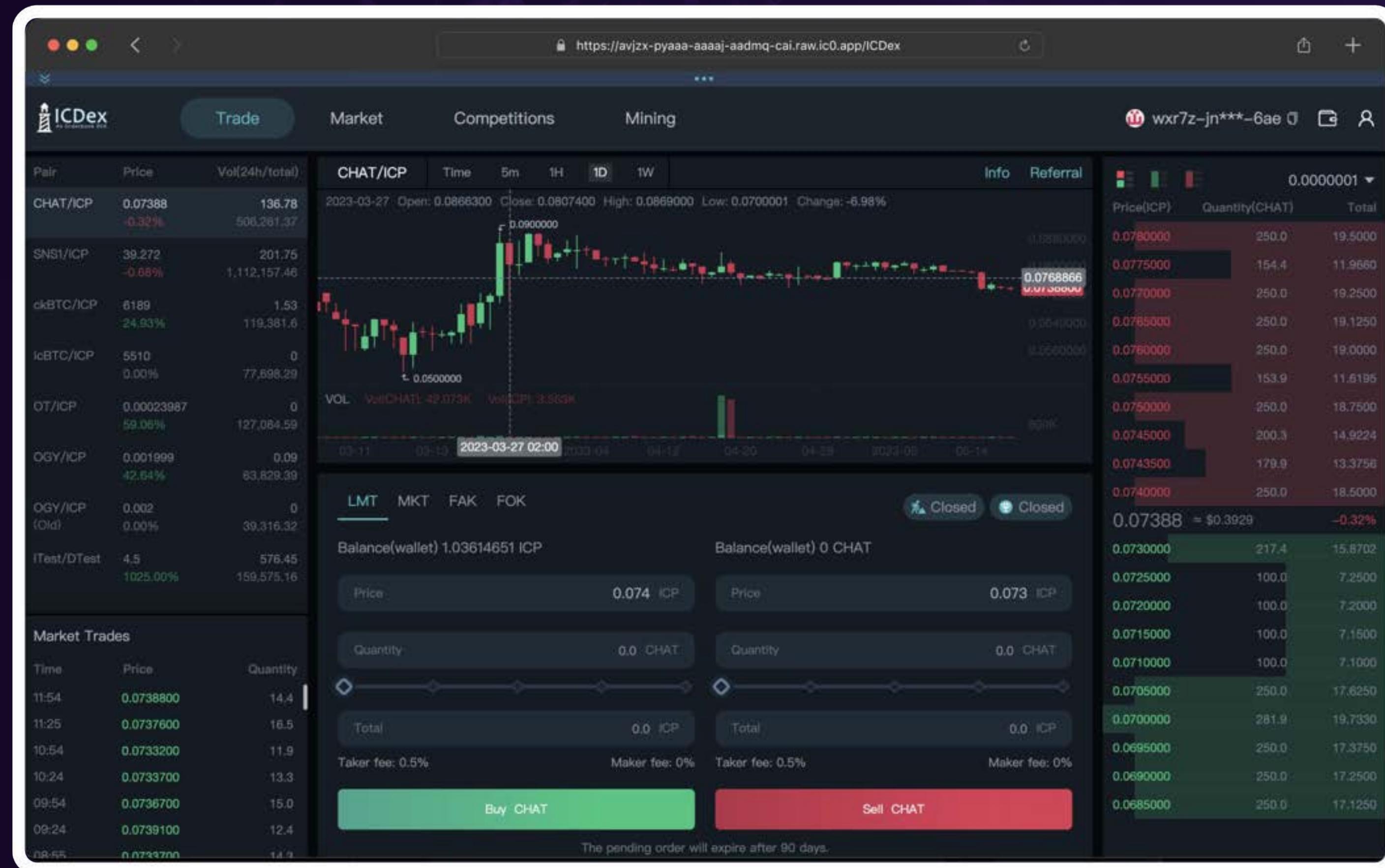
# HotOrNot.wtf

- ✓ tokenized TikTok runs from the network
- ✓ creates an ingenious decentralized economy
- ✓ users bet HOT on whether videos will go viral
- ✓ users help with content moderation too
- ✓ creators of viral videos get HOT tokens
- ✓ eventually, advertisers will pay with HOT tokens
- ✓ the OSI inverts centralized business model....
- ✓ video creators, users, are founderized team members
- ✓ protocol exclusively controlled by SNS DAO



ALPHA

# ICDEX.io – an order book exchange that is a smart contract



✓ Hackproof and transparent

**a grass roots army is  
now building on the  
Internet Computer**

join the movement



W E B 2

Medium

reddit

GoDaddy

Spotify

YouTube

Dropbox

Telegram

twitter

KICKSTARTER

Gmail

W E B 3

nuance

DSCVR

ICNS ICNAMING

CANISTORE

DSocial

IC Drive

OpenChat

distrikt

Funded

DMAIL



# cool services. tiny tech teams.

the web3 services just shown provide sophisticated functionality while scaling to large numbers of users, but...  
only a few engineers are involved



# no cloud. no database servers.

the web3 services just shown are built exclusively from  
Internet Computer-hosted canister code...  
the network is the entire tech stack



# no firewalls. no security teams.

the web3 services just shown are not protected by security infrastructure like firewalls, or security teams, because...

that's not needed for tamperproof canister code



# enterprise

web3 experience demonstrates canister smart contracts can  
deliver important advantages to enterprise



the world will spend \$5 trillion on IT in 2024. 36% is personnel

## T R A D I T I O N A L I T

developers, security team, maintenance...

## C A N I S T E R S

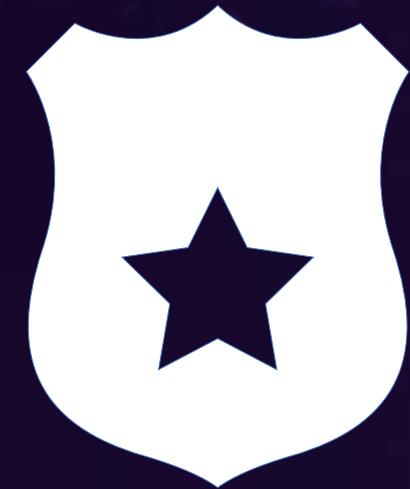


\$1.35 trillion  
in potential savings

complexity

R E D U C E

# systems and services are tamperproof



Gartner Research  
**Cybersecurity spend**

2022  
**\$172 billion**



Gartner Research  
**CPS incident costs**

2023  
**\$50 billion**

*R E D U C E*

*R E D U C E*

serverless cloud model can deliver **compute efficiencies**



Gartner Research  
**Cloud services spend**

2022

\$482 billion

*R E D U C E*

# sovereign

countries relying on cloud infrastructure and closed-source software  
can be spied on and even “switched off”



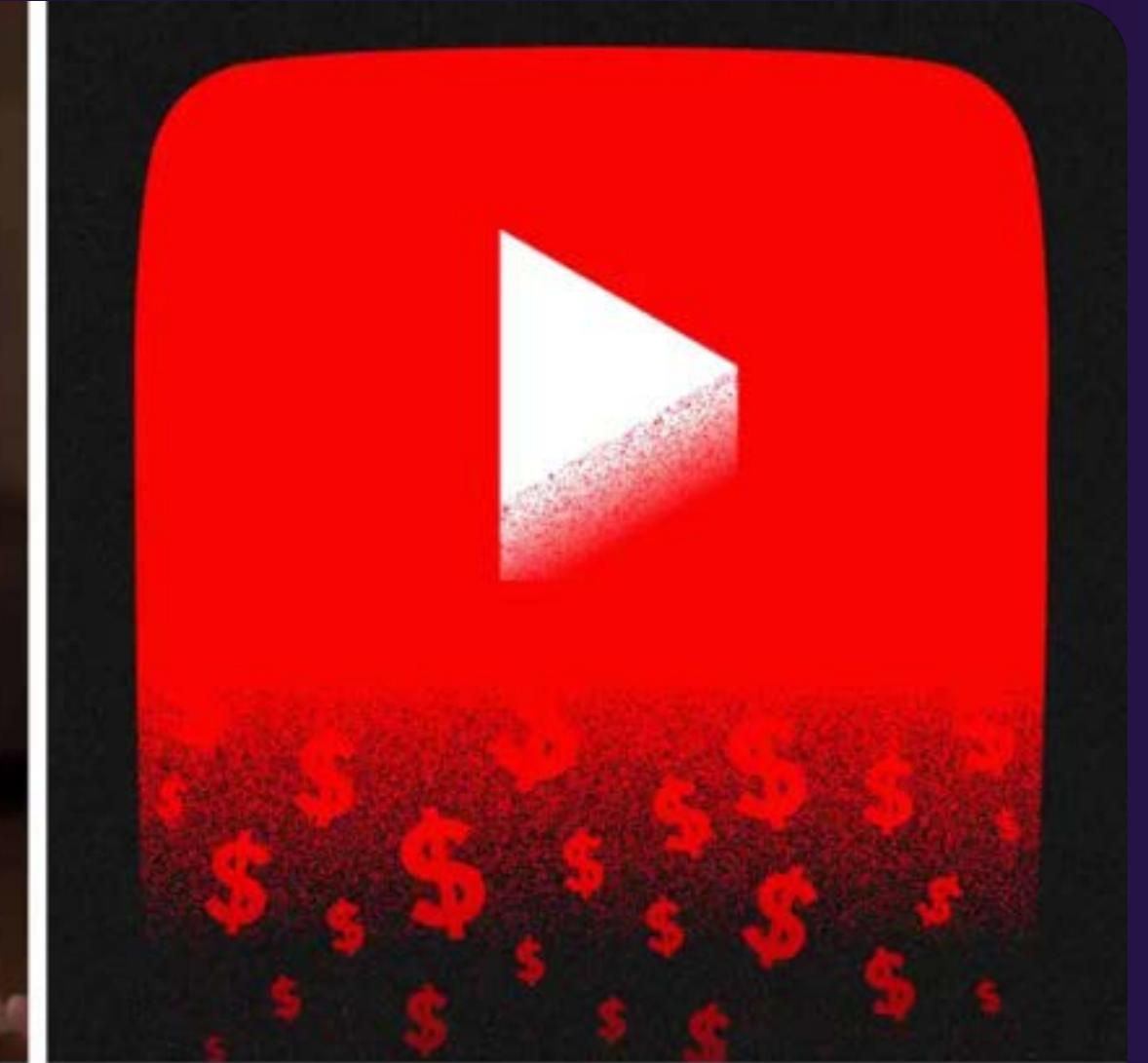
# the future of global identity?



=



# “I use Google for everything”



A top YouTuber is publicly sparring with the platform after he says 'hundreds' of his fans unfairly lost access to their Google accounts

[businessinsider.com](http://businessinsider.com)



# depend on US corporations?

Europe and the World needs tamperproof *open* solutions



**sovereign societies cannot depend on digital foundations in which other states might have kill switches and backdoors**



- Cloud computing services
- Closed-source software
- SSO (single sign-on)
- Security hardware



# sovereign subnets coming

the Internet Computer network will create geographically-local specialized sovereign subnets for nations



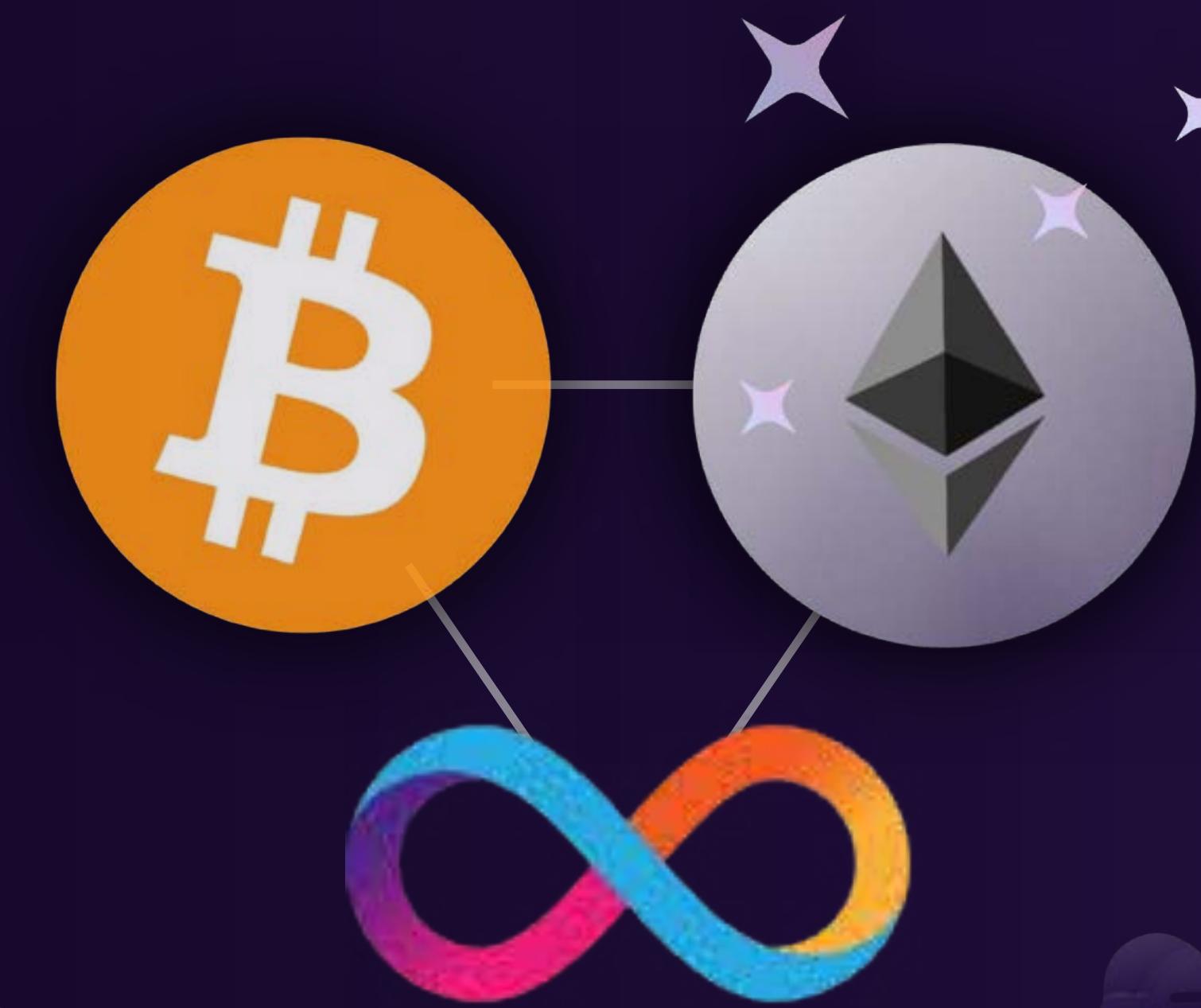
yup, no bridges, just  
trustless cryptography

# multi-chain

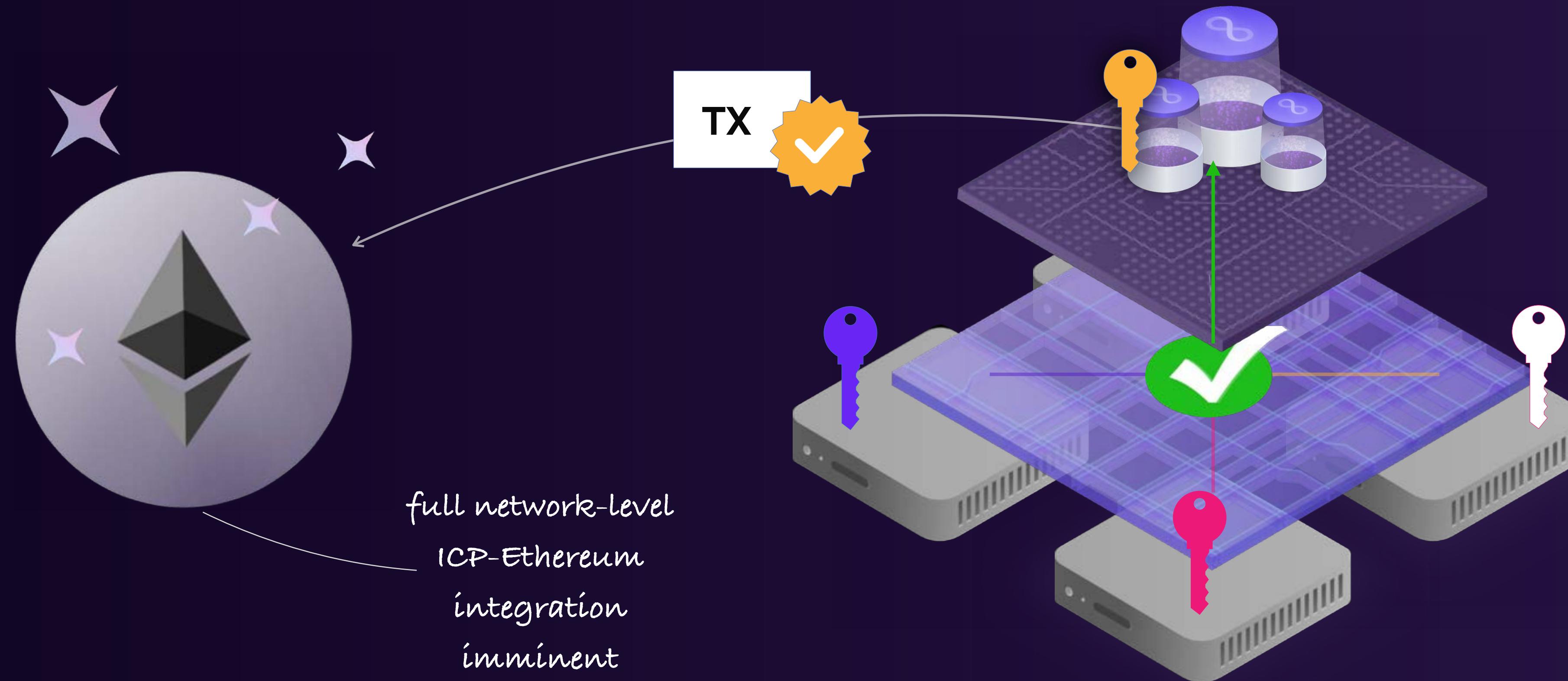
“chain key cryptography” creates transactions on other chains.  
network-level integrations with Bitcoin and Ethereum



time to realize the **World Computer** vision from 2014

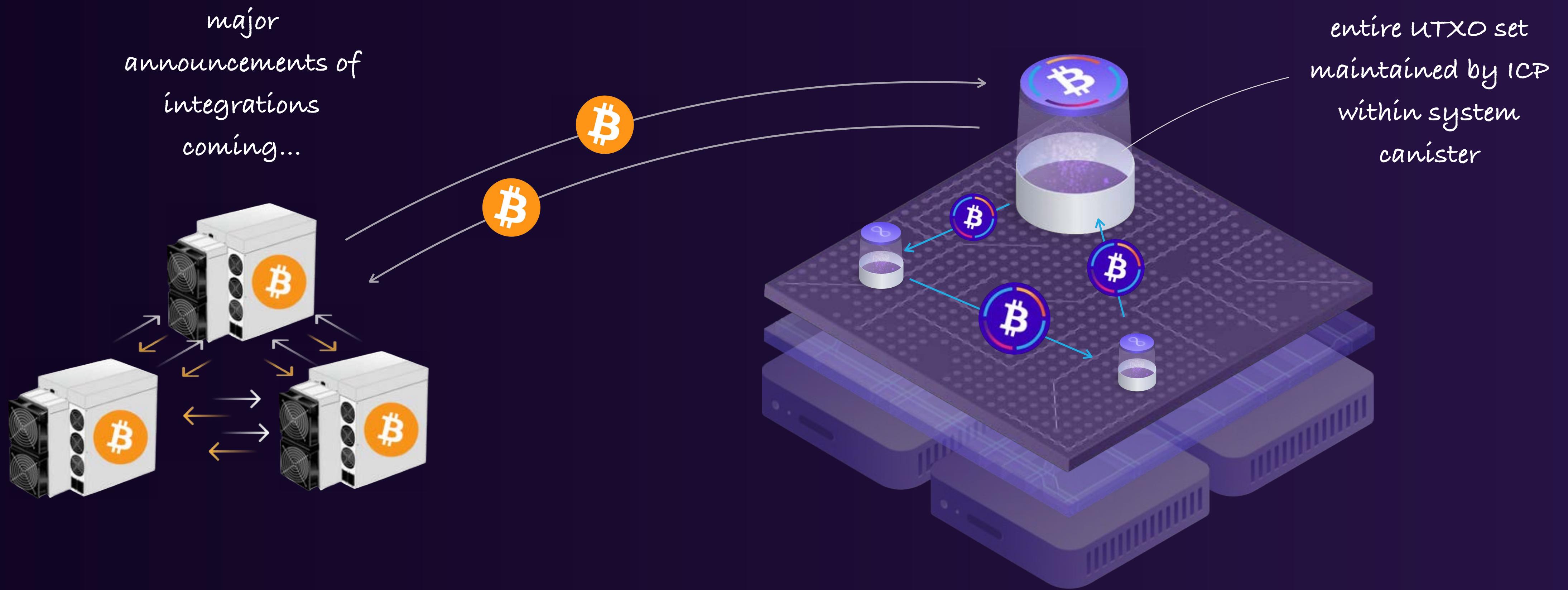


# canisters create accounts and sign TXs on other blockchains



signing is done by ICP using “chain key crypto” — without traditional private keys

# ckBTC is a bitcoin twin that can be directly processed by canister code



“chain-key bitcoin” supports usage of bitcoin in DeFi, social media, games, the metaverse with 1s finality

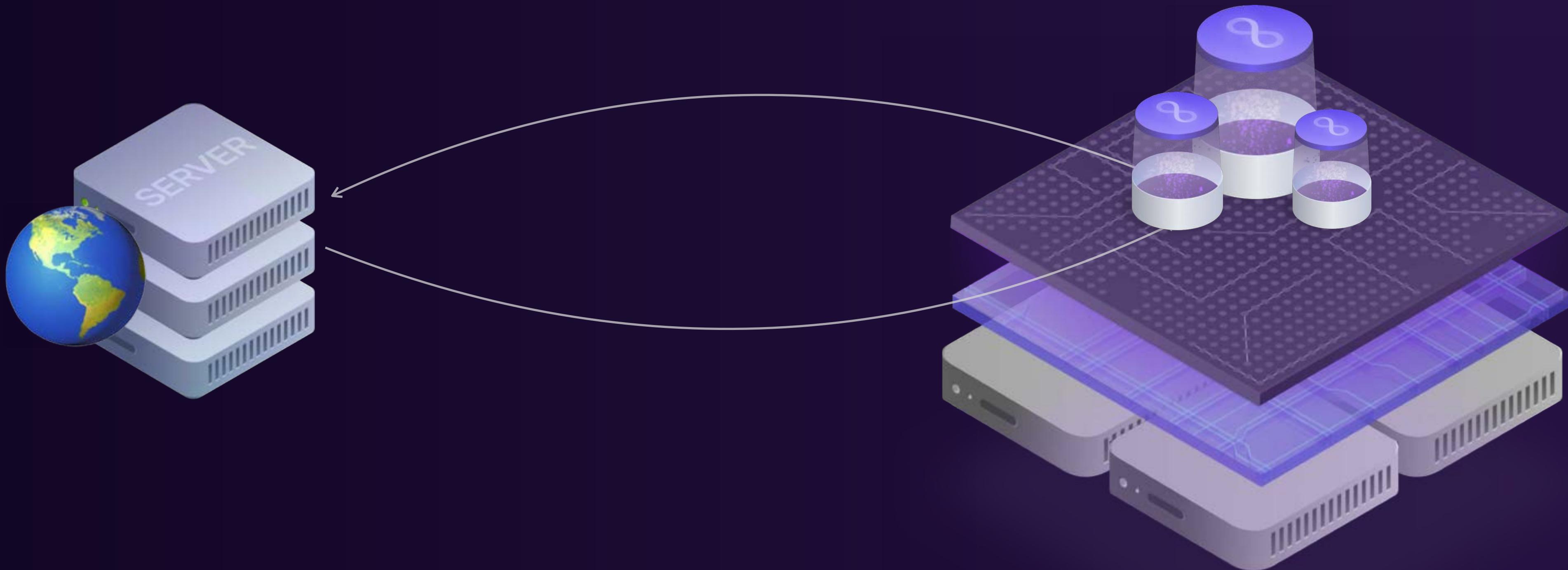
# web2+3

canister smart contracts can trustlessly calls into external web2 systems – the network passes results through consensus



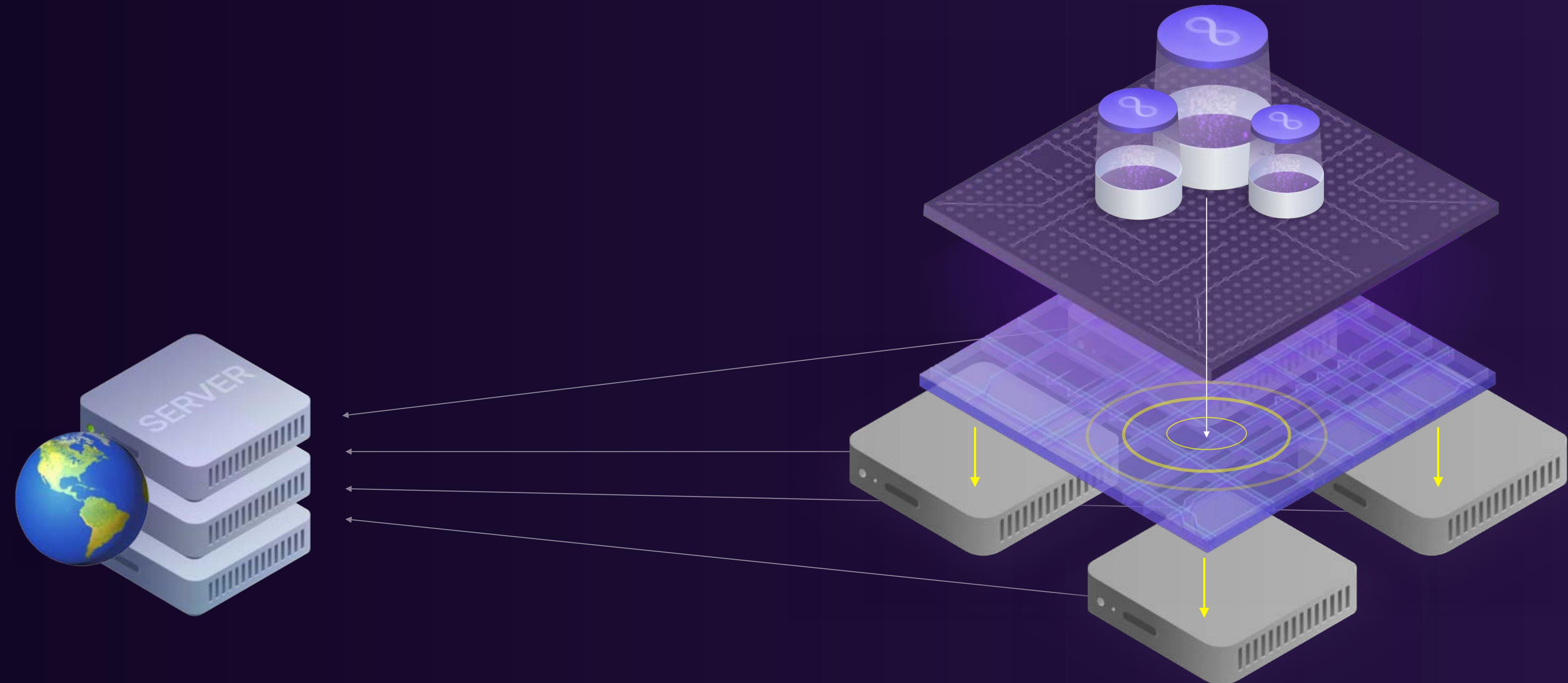
1.

# a canister initiates a call to a web2 service



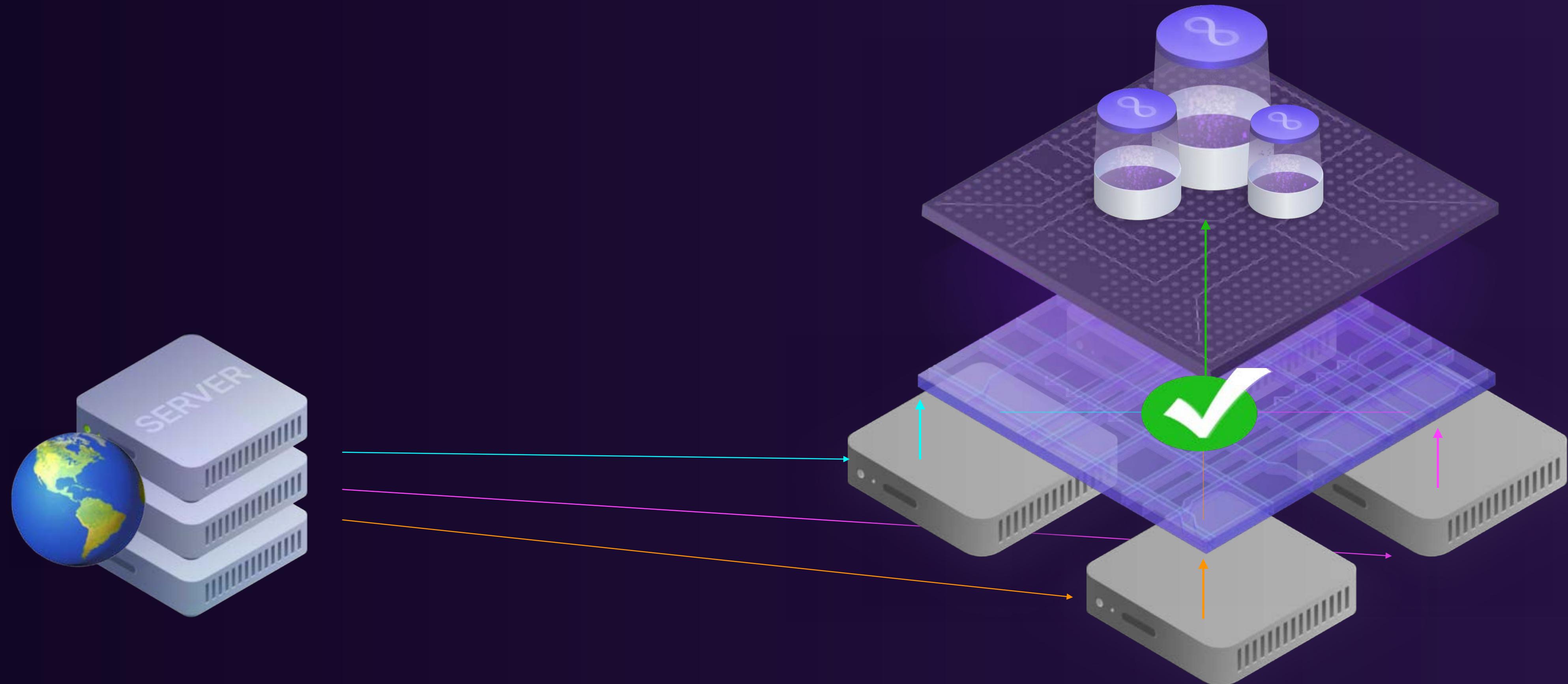
2.

## multiple nodes make call, consensus normalizes result



3.

enables decentralized oracles, web2 integrations, etc



# ai

ICP ai compute units coming in 2023, with a pathway  
to full ai smart contracts

data security

model security

web3 integration



# ai

by 2030 AI will

**in the future  
ai models  
will analyze  
nearly all our  
business  
data**

increase the productivity of  
knowledge workers

**4X**

boost global productivity  
creating extra value

**\$200**  
trillion

**in the future ai  
models will  
generate  
nearly all our  
metaverse  
content**

**in the future  
ai models  
will be inside  
systems e.g.  
compressing  
media data**



# mission

see the majority of the world's systems and services  
reimagined on the public network



# growing canister compute tells a story



**2 011 578 950**

Blocks processed

36 parallel subnets

37.1 MB/s block throughput capacity

## Throughput

Capacity horizontally scales as subnet blockchains are seamlessly combined into one unified blockchain. Blocks and transactions per second are unbounded.

**259 954**

ETH equivalent TX/s

4 754 Transactions/s

## Comparing transactions

Transactions invoke "actor" canister smart contract computations, which subnet blockchains can run concurrently (yet deterministically).



# DFINITY Foundation

- Emerged from early Ethereum community in 2015
- DFINITY Foundation established October 2016
- Swiss not-for-profit foundation not a corporation
- Research centers in Zurich and San Francisco
- World's largest team of cryptographers
- 270+ people globally

**1600+**

research papers

**100 000+**

academic citations

**250+**

technical patents

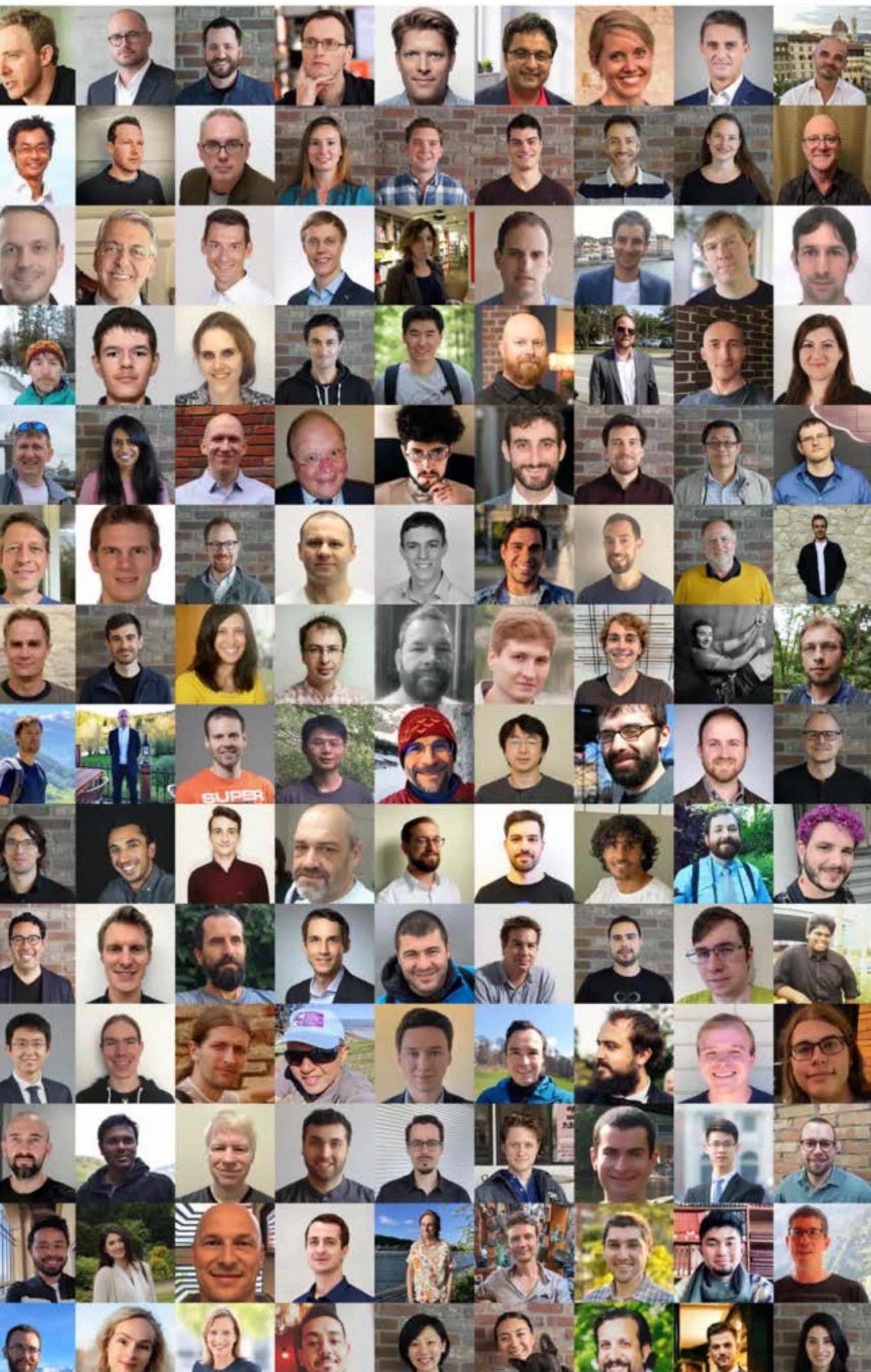


Crypto People +

Google

IBM

facebook



build on the internet using the  
Internet Computer



decentralize  
everything

<https://internetcomputer.org>

