



Haym @SalomonCrypto

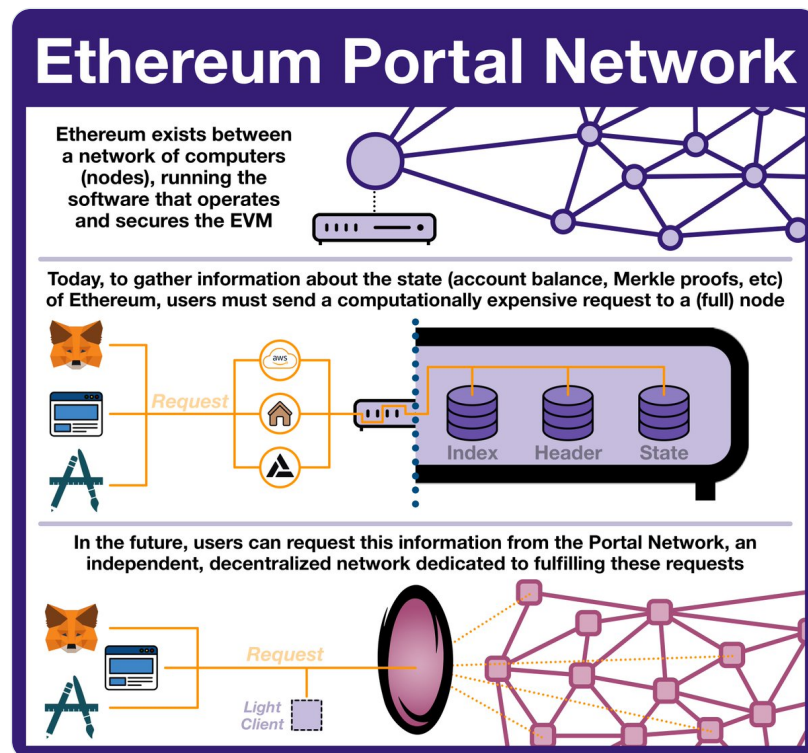
Nov 10 · 25 tweets · [SalomonCrypto/status/1590511259379650561](https://twitter.com/SalomonCrypto/status/1590511259379650561)

Tr

(1/24) [@ethereum](https://twitter.com/ethereum) Light Clients and the Portal Network

In order for Ethereum to achieve its potential as the World Computer, it needs to support decentralized, trustless access. Today, that is just not possible... but the path is clear.

We are going to need the Portal Network.



(2/24) [@ethereum](#) is a distributed computing platform. A network of 1,000s of computers (nodes) coordinating using Proof of Stake (PoS) to keep the Ethereum Virtual Machine (EVM) in sync.

The EVM is the shared computing platform, the blockchain its history and \$ETH its lifeblood.

**Haym**  
@SalomonCrypto · [Follow](#)



(1/21) [@ethereum](#): The Big Picture

From 1492 to 2022, the context, technology and vision of the World Computer. The complete, top-to-bottom case for [\\$ETH](#).

An (unprecedented) mega-thread.



3:00 PM · Sep 3, 2022

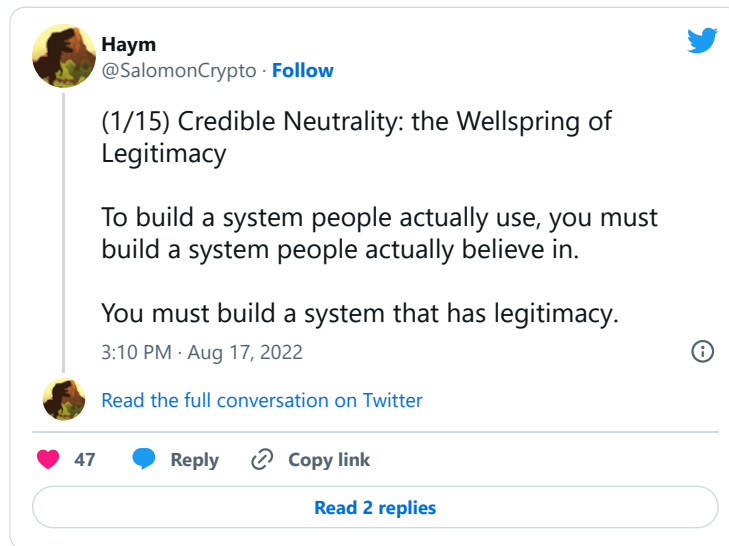
 [Read the full conversation on Twitter](#)

 993  Reply  Copy link

[Read 47 replies](#)

(3/24) This "network of nodes" is the foundation upon which [@ethereum](#) ultimately derives its value. The more decentralized, the more value.

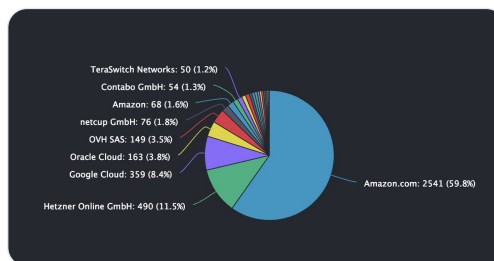
From decentralization comes credible neutrality. Without credible neutrality, we might as well be using FB-dollarroos in Farmville-DeFi.



(4/24) There are currently ~10k nodes. So you can think of this as ~10k individual computers running the [@ethereum](#) clients.

If you want to be specific, you need to look at cloud providers. More than 25% of nodes run on @AWS, which makes decentralization more complicated.

Top 10 Countries				
Total 9,240 nodes found				
#	Countries	± Last 24 Hours	Last 24 Hours	Last 7 Days
1	United States	4,684(50.26%)	~331.58%	~26.10%
2	Germany	2,320(24.90%)	~38.46%	~43.75%
3	Canada	275(2.95%)	~70.37%	~16.82%
4	Russia	225(2.41%)	~66.67%	~26.40%
5	United Kingdom	205(2.20%)	~58.33%	~42.76%
6	Singapore	177(1.90%)	~57.14%	~42.74%
7	Japan	173(1.86%)	0.00%	~44.36%
8	Ireland	172(1.85%)	~100.00%	~22.61%
9	Finland	150(1.61%)	~99.36%	~28.83%
10	France	116(1.24%)	~150.00%	~10.06%



(5/24) Not all nodes are made the same. While there have been valiant efforts to get a node running on some very humble hardware, in general a node ranges from a \$1k+ dedicated computer to a full data center.

And all nodes require unlimited bandwidth and constant maintenance.



(6/24) Today, to access [@ethereum](#), the choice is to run a node yourself (less than 10k people globally), or to use a centralized platform like [@AlchemyPlatform](#) or [@infura\\_io](#).

Users send requests & transactions over an internet API; these platforms execute them on their behalf.

**Haym**  
@SalomonCrypto · Follow

(1/28) [@Ethereum](#) Basics: Accessing the World Computer

In order to access Ethereum, you need a node. But running a node is a big deal, it requires serious hardware, bandwidth and active maintenance.

Today we have centralized solutions, but the future of Ethereum is trustless.

12:21 AM · Nov 9, 2022

[Read the full conversation on Twitter](#)

295   Reply   Copy link

[Read 14 replies](#)

(7/24) These Nodes-as-a-Service platforms are great tools that have (and will continue to) provide incalculable value to the [@ethereum](#) ecosystem. Without them, the vibrant ecosystem we have today would not be possible.

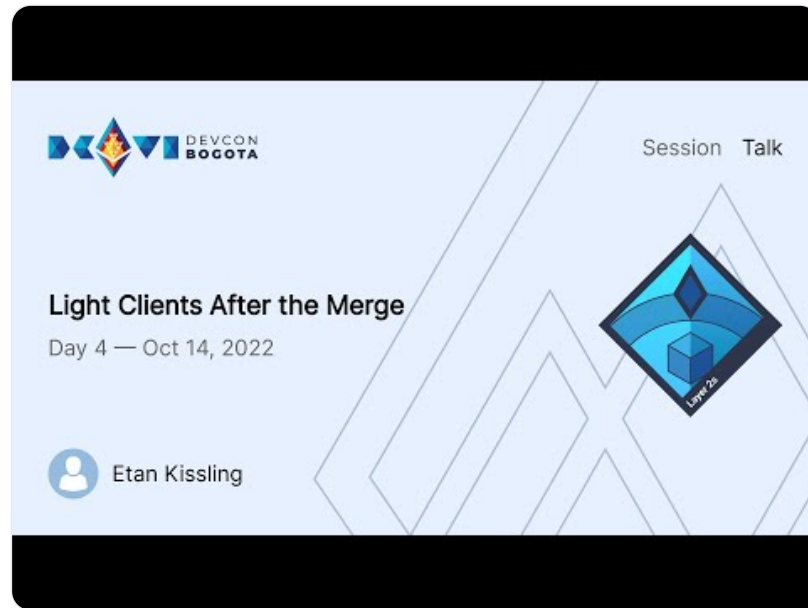
But they are inherently centralizing.

(8/24) What's the point of decentralizing [@ethereum](#) if the vast majority of people access it through one or two centralized entities?

It is trivially easy for a government to affect a corporation. Ethereum isn't credibly neutral if the only two gateways can be compromised.

(9/24) Today, you can only access [@ethereum](#) via a node, but in the future you will be able to use a light client.

A light client (currently theoretical) can directly and trustlessly interact with Ethereum without having access to a full node.



<https://www.youtube.com/embed/ZHNrAXf3RDE>

(10/24) Statelessness is an important milestone on the way to light client support. [@ethereum](#) must be able to support access to the EVM state without actually running the (extremely heavy duty) software before a light client is realistic.

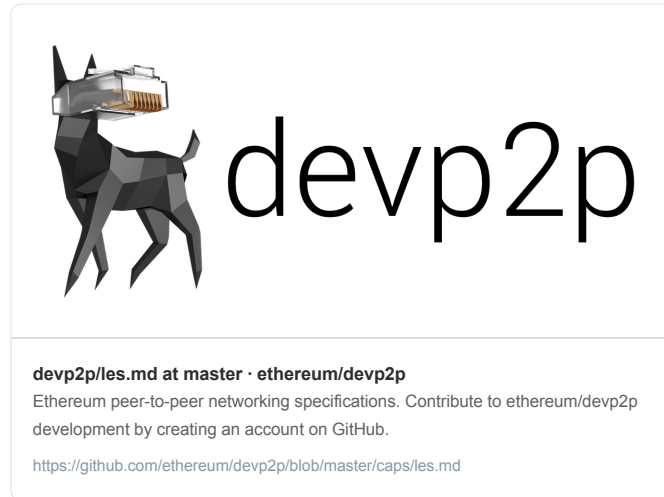


(11/24) While statelessness is a big, important step towards light clients, it doesn't get us all the way there.

The problem is actually pretty subtle, and only really came apparent during the previous attempt at light client support: Light Ethereum Subprotocol (LES).

(12/24) TL;dr LES allowed light clients to request Merkle proofs and other data needed to trustlessly interact with [@ethereum](#) from a full node.

A light client could ask "what is Alice's balance" and the node would reply with cryptographic proof.



(13/24) But operating [@ethereum](#) is already a difficult task. LES drastically increases both the computational and bandwidth demands on these nodes.

Light clients are supposed to support decentralization, LES just increases node costs thereby decreasing decentralization.

(14/24) As [@pipermerriam](#) said, the LES nodes that are out there are being run "by the goodness of hobbyists' hearts... or people who misconfigured their client on accident."

But don't worry, the LES lesson was learned, and Piper and his team have got the solution.

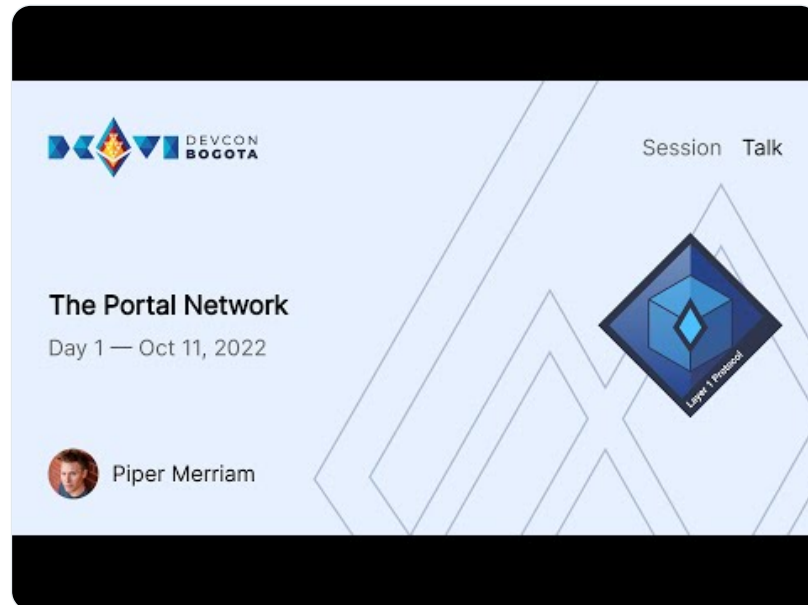
(15/24) In the future, your in-browser wallet, cell phone, ANYTHING will be able to trustlessly interact with [@ethereum](#).

In order to access Ethereum they will turn to the Portal Network.

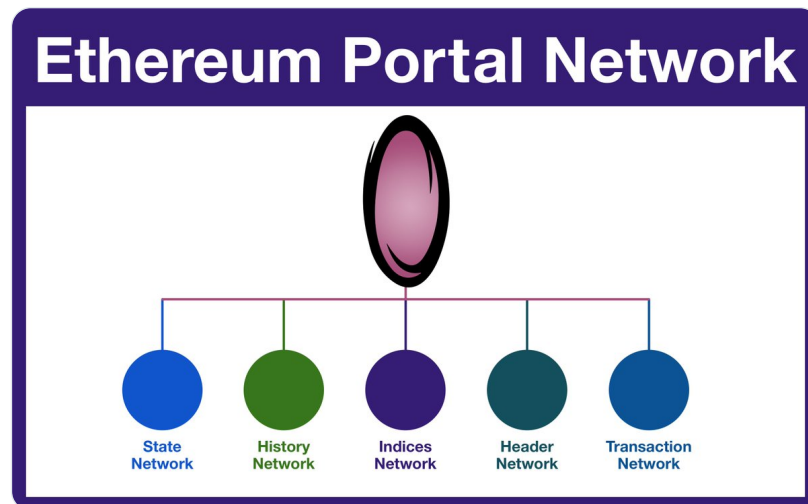
[ethportal.net](http://ethportal.net)

(16/24) The Portal Network is a group of networks that are dedicated servicing @ethereum light clients.

Nodes in the Portal Network opt in to the specific networks they want to support with whatever resources they have available.



<https://www.youtube.com/embed/0stc9jnQLXA>



(17/24) The ethos of the Portal Network is "contribute what you can." No participant is too modest, no computer too slow.

Each operator can subscribe to the networks they want to support and, once subscribed, can tune the amount they are willing to store/process.



(18/24) The idea is very similar to BitTorrent.

The key takeaway: the more network participants, the stronger the network becomes, both in terms of available storage capacity and ability to process requests.

[en.wikipedia.org/wiki/BitTorrent](https://en.wikipedia.org/wiki/BitTorrent)

(19/24) Let's say you want to make a swap on [@Uniswap](#).

Today, your wallet will connect with [@infura.io](#), gather the information it needs to craft a transaction and then send back a signed transaction.

In the future, your wallet will query ~4 Portal Network networks.

(20/24) First, your wallet will send a request to the Header Network to get the latest header and get the current state of the EVM.

Next, it will access the State Network to build a transaction.

Once built and signed, it will broadcast it to the Transaction Network.

(21/24) Think of the Transaction Network like the mempool, the place where pending transactions wait to be executed.

In order to process the mempool, a node must be able to handle the entire (HUGE) mempool. The Transaction Network allows much more broad participation.

(22/24) Once broadcast to the Transaction Network, the light client will subscribe to the History Network and look for the transaction it submitted.

All of these steps come with cryptographic proof, so the light client can verify each step without trusting anyone.

(23/24) Today, the Portal Network is a research project. In a nod to the principles of [@ethereum](#), 3 independent teams are building clients to support it.

Together with statelessness, the Portal Network makes Ethereum light clients entirely possible.

(24/24) And while this is incredibly cool for decentralization and trustless access, light clients are so much bigger. Light clients are THE step-change.

Don't worry if you aren't there yet, stay tuned and I'll show you.

Want to peek ahead? Light clients + middleware!

**Haym**  
@SalomonCrypto · [Follow](#)



(1/25) @Ethereum Roadmap: Middleware

Think back to 2015, does the Ethereum we have today look like what you were imagining back then?

Now think forward to 2030, or even 2122. What will that version of the World Computer look like?

Are you ready for the Middleware Gold Rush?



5:01 PM · Nov 6, 2022 

 [Read the full conversation on Twitter](#)

 319  Reply  Copy link

[Read 9 replies](#)

More of a long-form reader? Try this:

**Haym**  
@SalomonCrypto



## Ethereum Portal Network


**Ethereum Portal Network | Haym**


(1/24) @ethereum Light Clients and the Portal Network In order for Ethereum to achieve its potential as the World Computer, it needs to support decentralized, trustless access. Today, that is just n...

<https://typefully.com/SalomonCrypto/vlmb3UA>

Like what you read? Help me spread the word by retweeting the thread (linked below).

Follow me for more explainers and as much alpha as I can possibly serve.

**Haym**  
@SalomonCrypto · [Follow](#)



(1/24) @ethereum Light Clients and the Portal Network

In order for Ethereum to achieve its potential as the World Computer, it needs to support decentralized, trustless access. Today, that is just not possible... but the path is clear.

We are going to need the Portal Network.


### Ethereum Portal Network




Ethereum exists between a network of computers (nodes), running the software that operates and secures the EVM

Today, to gather information about the state (account balance, Merkle proofs, etc) of Ethereum, users must send a computationally expensive request to a (full) node

In the future, users can request this information from the Portal Network, an independent, decentralized network dedicated to fulfilling these requests

1:06 AM · Nov 10, 2022

[Read the full conversation on Twitter](#)

 175  Reply  Copy link

[Read 5 replies](#)

...