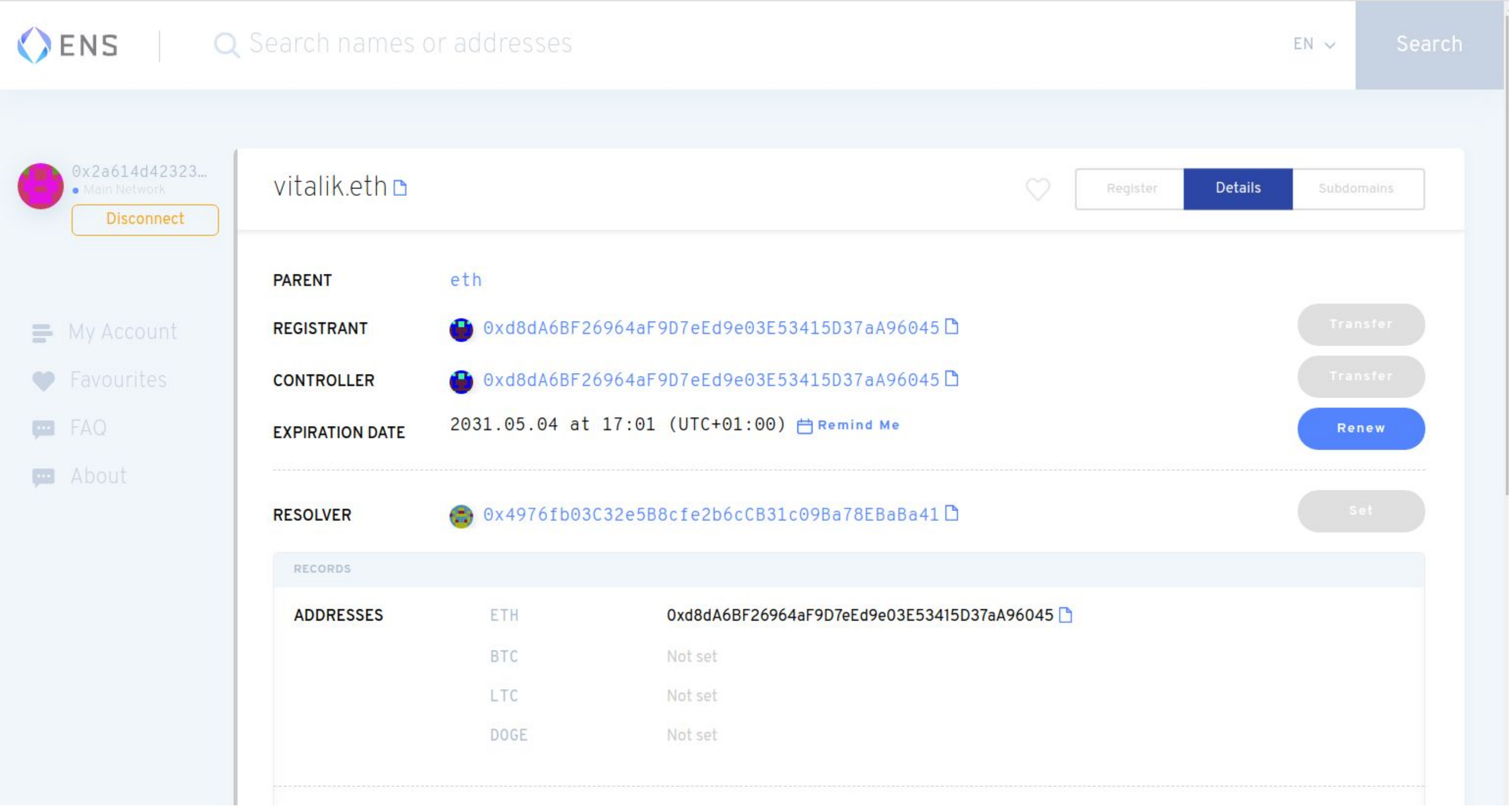
Introduction to Remix

Week 1
Lesson 5

Lesson Plan

Review of last lesson
ENS and unstoppable domains
Infura etc.
Remix

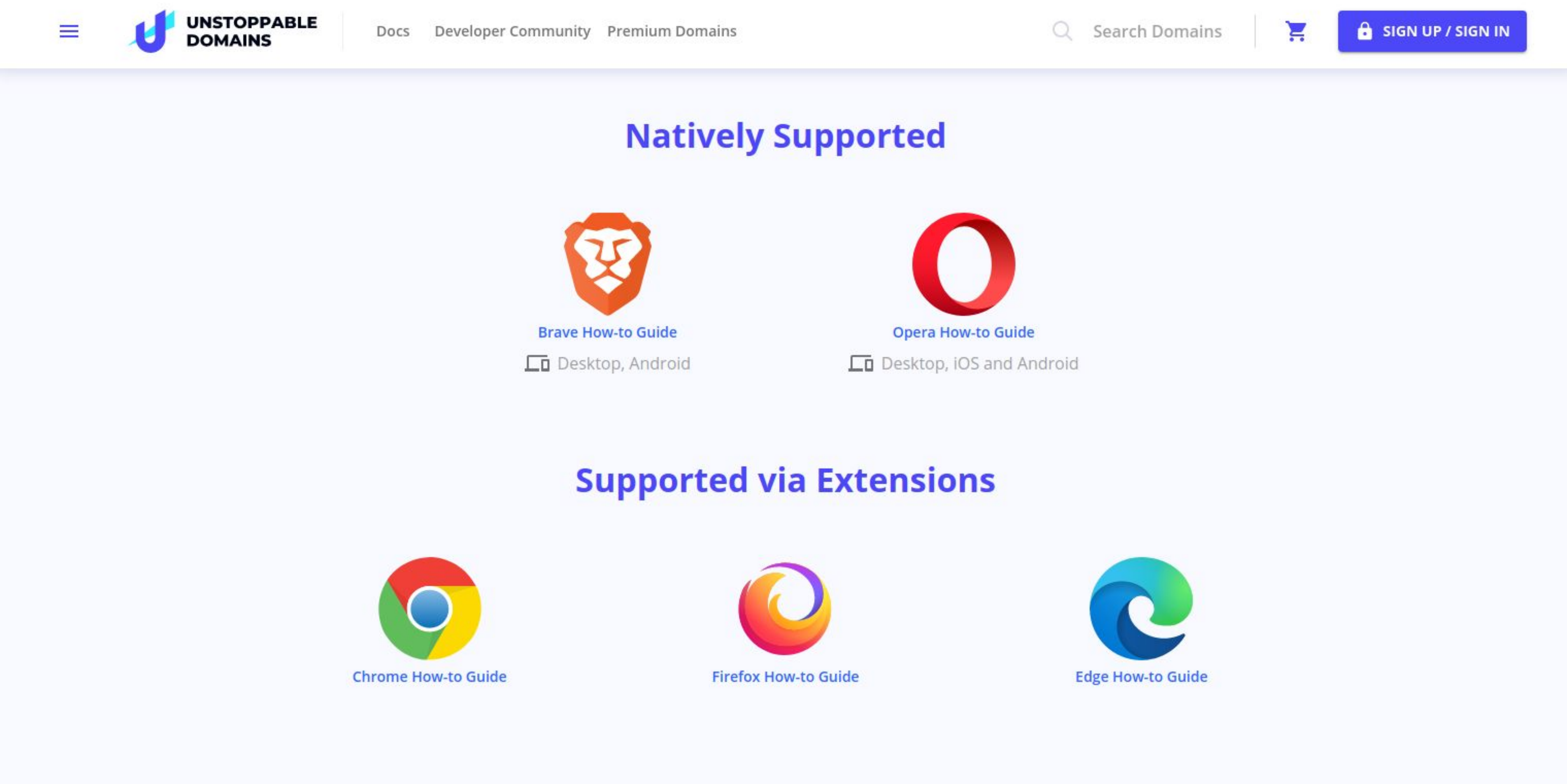


vitalik.eth

PARENT	eth
REGISTRANT	0xd8dA6BF26964aF9D7eEd9e03E53415D37aA96045
CONTROLLER	0xd8dA6BF26964aF9D7eEd9e03E53415D37aA96045
EXPIRATION DATE	2031.05.04 at 17:01 (UTC+01:00) Remind Me
RESOLVER	0x4976fb03C32e5B8cfe2b6cCB31c09Ba78EBaBa41

RECORDS

ADDRESSES	ETH	0xd8dA6BF26964aF9D7eEd9e03E53415D37aA96045
	BTC	Not set
	LTC	Not set
	DOGE	Not set



Natively Supported

Brave How-to Guide

Desktop, Android

Opera How-to Guide

Desktop, iOS and Android

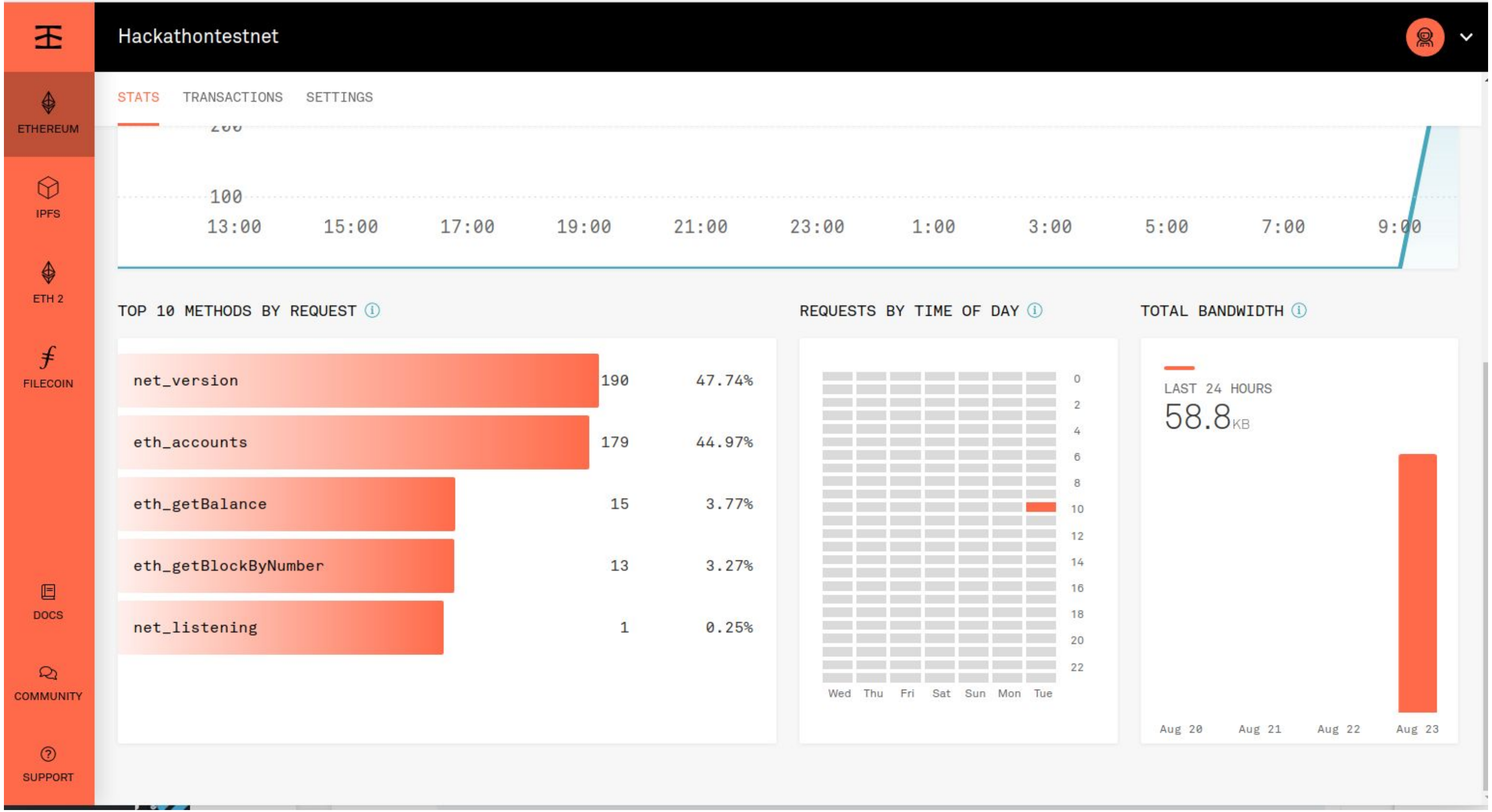
Supported via Extensions

Chrome How-to Guide

Firefox How-to Guide

Edge How-to Guide

Infura.io



TOP 10 METHODS BY REQUEST

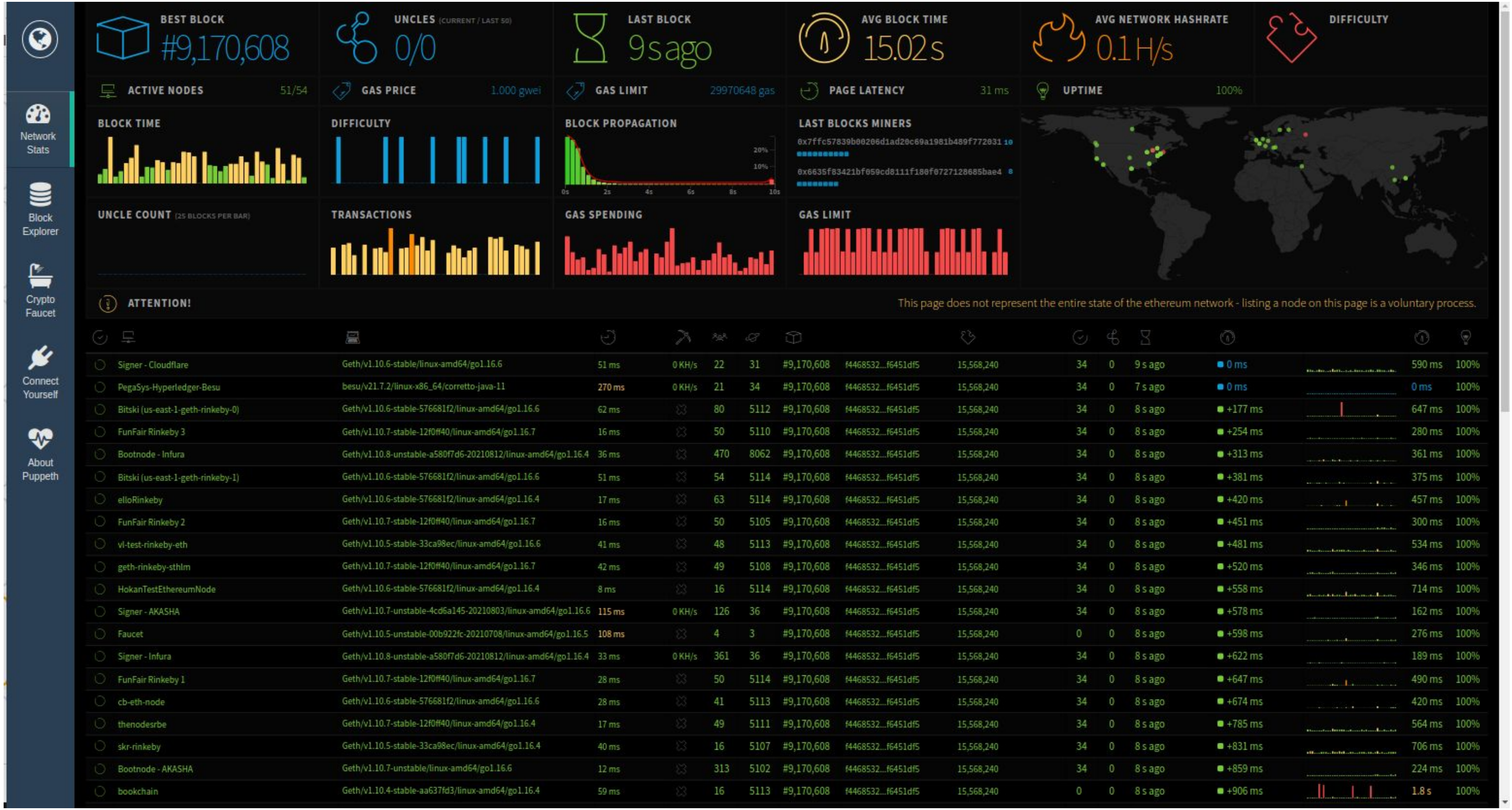
net_version	190	47.74%
eth_accounts	179	44.97%
eth_getBalance	15	3.77%
eth_getBlockByNumber	13	3.27%
net_listening	1	0.25%

REQUESTS BY TIME OF DAY

TOTAL BANDWIDTH

LAST 24 HOURS
58.8KB

https://www.rinkeby.io



BEST BLOCK #9,170,608

UNCLES (CURRENT / LAST 50) 0/0

LAST BLOCK 9s ago

AVG BLOCK TIME 15.02s

AVG NETWORK HASHRATE 0.1 H/s

DIFFICULTY

ACTIVE NODES 51/54

GAS PRICE 1.000 gwei

GAS LIMIT 29970648 gas

PAGE LATENCY 31 ms

UPTIME 100%

LAST BLOCKS MINERS

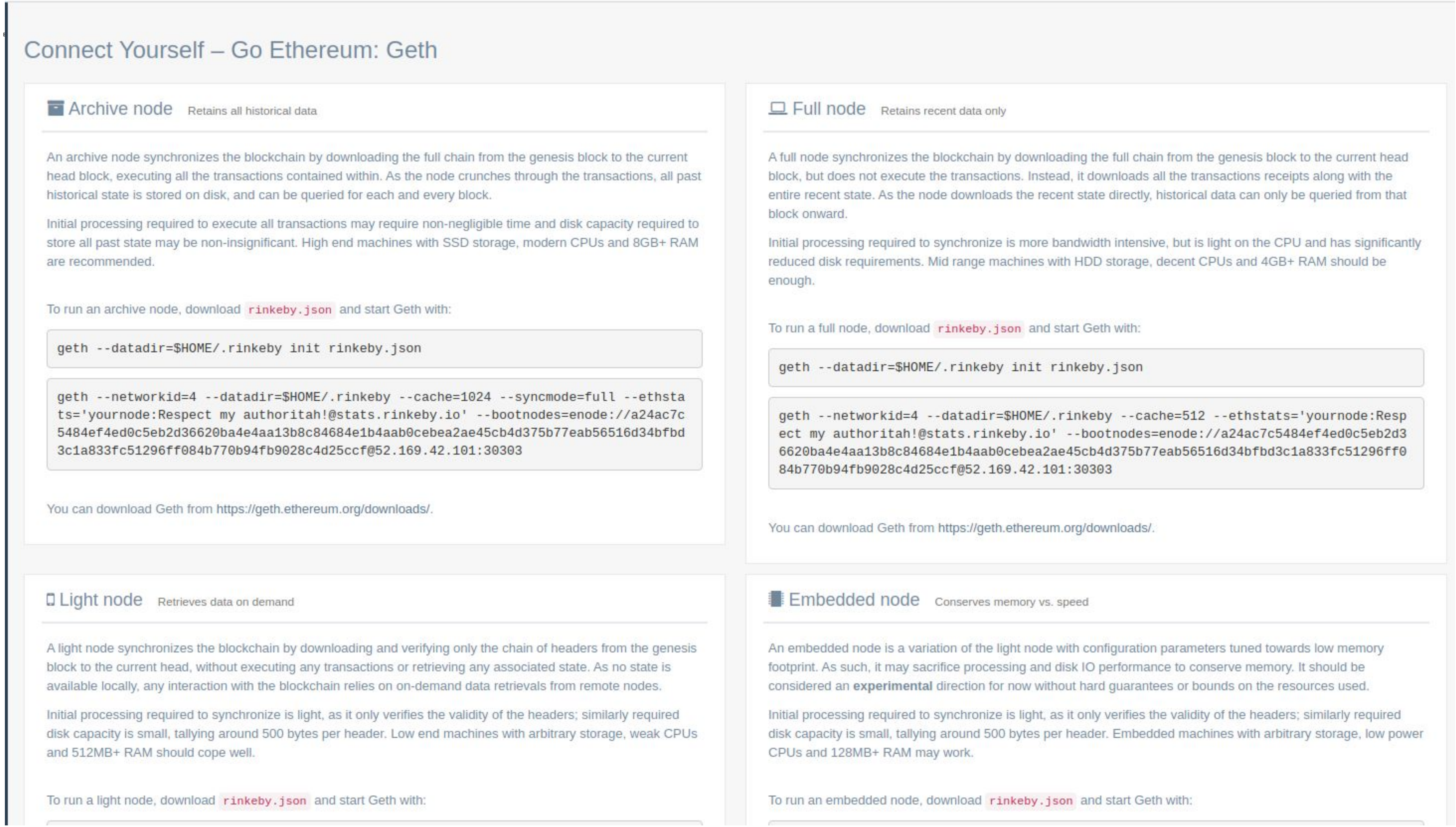
0x7ffc57839b00206d1ad20c69a1981b489f772031 10

0x6635f83421bf059cd8111f180f0727128685bae4 8

ATTENTION!

This page does not represent the entire state of the ethereum network - listing a node on this page is a voluntary process.

○	Signer - Cloudflare	Geth/v1.10.6-stable/linux-amd64/go1.16.6	51 ms	0 KH/s	22	31	#9,170,608	f4468532...f6451df5	15,568,240	34	0	9 s ago	● 0 ms		590 ms	100%
○	PegaSys-Hyperledger-Besu	besu/v21.7.2/linux-x86_64/corretto-java-11	270 ms	0 KH/s	21	34	#9,170,608	f4468532...f6451df5	15,568,240	34	0	7 s ago	● 0 ms		0 ms	100%
○	Bitski (us-east-1-geth-rinkeby-0)	Geth/v1.10.6-stable-576681f2/linux-amd64/go1.16.6	62 ms	☒	80	5112	#9,170,608	f4468532...f6451df5	15,568,240	34	0	8 s ago	● +177 ms		647 ms	100%
○	FunFair Rinkeby 3	Geth/v1.10.7-stable-12f0ff40/linux-amd64/go1.16.7	16 ms	☒	50	5110	#9,170,608	f4468532...f6451df5	15,568,240	34	0	8 s ago	● +254 ms		280 ms	100%
○	Bootnode - Infura	Geth/v1.10.8-unstable-a580f7d6-20210812/linux-amd64/go1.16.4	36 ms	☒	470	8062	#9,170,608	f4468532...f6451df5	15,568,240	34	0	8 s ago	● +313 ms		361 ms	100%
○	Bitski (us-east-1-geth-rinkeby-1)	Geth/v1.10.6-stable-576681f2/linux-amd64/go1.16.6	51 ms	☒	54	5114	#9,170,608	f4468532...f6451df5	15,568,240	34	0	8 s ago	● +381 ms		375 ms	100%
○	elloRinkeby	Geth/v1.10.6-stable-576681f2/linux-amd64/go1.16.4	17 ms	☒	63	5114	#9,170,608	f4468532...f6451df5	15,568,240	34	0	8 s ago	● +420 ms		457 ms	100%
○	FunFair Rinkeby 2	Geth/v1.10.7-stable-12f0ff40/linux-amd64/go1.16.7	16 ms	☒	50	5105	#9,170,608	f4468532...f6451df5	15,568,240	34	0	8 s ago	● +451 ms		300 ms	100%
○	vl-test-rinkeby-eth	Geth/v1.10.5-stable-33ca98ec/linux-amd64/go1.16.6	41 ms	☒	48	5113	#9,170,608	f4468532...f6451df5	15,568,240	34	0	8 s ago	● +481 ms		534 ms	100%
○	geth-rinkeby-sthlm	Geth/v1.10.7-stable-12f0ff40/linux-amd64/go1.16.7	42 ms	☒	49	5108	#9,170,608	f4468532...f6451df5	15,568,240	34	0	8 s ago	● +520 ms		346 ms	100%
○	HokanTestEthereumNode	Geth/v1.10.6-stable-576681f2/linux-amd64/go1.16.4	8 ms	☒	16	5114	#9,170,608	f4468532...f6451df5	15,568,240	34	0	8 s ago	● +558 ms		714 ms	100%
○	Signer - AKASHA	Geth/v1.10.7-unstable-4cd6a145-20210803/linux-amd64/go1.16.6	115 ms	0 KH/s	126	36	#9,170,608	f4468532...f6451df5	15,568,240	34	0	8 s ago	● +578 ms		162 ms	100%
○	Faucet	Geth/v1.10.5-unstable-00b922fc-20210708/linux-amd64/go1.16.5	108 ms	☒	4	3	#9,170,608	f4468532...f6451df5	15,568,240	0	0	8 s ago	● +598 ms		276 ms	100%
○	Signer - Infura	Geth/v1.10.8-unstable-a580f7d6-20210812/linux-amd64/go1.16.4	33 ms	0 KH/s	361	36	#9,170,608	f4468532...f6451df5	15,568,240	34	0	8 s ago	● +622 ms		189 ms	100%
○	FunFair Rinkeby 1	Geth/v1.10.7-stable-12f0ff40/linux-amd64/go1.16.7	28 ms	☒	50	5114	#9,170,608	f4468532...f6451df5	15,568,240	34	0	8 s ago	● +647 ms		490 ms	100%
○	cb-eth-node	Geth/v1.10.6-stable-576681f2/linux-amd64/go1.16.6	28 ms	☒	41	5113	#9,170,608	f4468532...f6451df5	15,568,240	34	0	8 s ago	● +674 ms		420 ms	100%
○	thenodesrbe	Geth/v1.10.7-stable-12f0ff40/linux-amd64/go1.16.4	17 ms	☒	49	5111	#9,170,608	f4468532...f6451df5	15,568,240	34	0	8 s ago	● +785 ms		564 ms	100%
○	skr-rinkeby	Geth/v1.10.5-stable-33ca98ec/linux-amd64/go1.16.4	40 ms	☒	16	5107	#9,170,608	f4468532...f6451df5	15,568,240	34	0	8 s ago	● +831 ms		706 ms	100%
○	Bootnode - AKASHA	Geth/v1.10.7-unstable/linux-amd64/go1.16.6	12 ms	☒	313	5102	#9,170,608	f4468532...f6451df5	15,568,240	34	0	8 s ago	● +859 ms		224 ms	100%
○	bookchain	Geth/v1.10.4-stable-aa637fd3/linux-amd64/go1.16.4	59 ms	☒	16	5113	#9,170,608	f4468532...f6451df5	15,568,240	0	0	8 s ago	● +906 ms		1.8 s	100%



Connect Yourself – Go Ethereum: Geth

Archive node Retains all historical data

An archive node synchronizes the blockchain by downloading the full chain from the genesis block to the current head block, executing all the transactions contained within. As the node crunches through the transactions, all past historical state is stored on disk, and can be queried for each and every block.

Initial processing required to execute all transactions may require non-negligible time and disk capacity required to store all past state may be non-insignificant. High end machines with SSD storage, modern CPUs and 8GB+ RAM are recommended.

To run an archive node, download `rinkeby.json` and start Geth with:

```
geth --datadir=$HOME/.rinkeby init rinkeby.json
```

```
geth --networkid=4 --datadir=$HOME/.rinkeby --cache=1024 --syncmode=full --ethsta
ts='yournode:Respect my authoritah!@stats.rinkeby.io' --bootnodes=enode://a24ac7c
5484ef4ed0c5eb2d36620ba4e4aa13b8c84684e1b4aab0cebea2ae45cb4d375b77eab56516d34bfbd
3c1a833fc51296ff084b770b94fb9028c4d25ccf@52.169.42.101:30303
```

You can download Geth from https://geth.ethereum.org/downloads/.

Full node Retains recent data only

A full node synchronizes the blockchain by downloading the full chain from the genesis block to the current head block, but does not execute the transactions. Instead, it downloads all the transactions receipts along with the entire recent state. As the node downloads the recent state directly, historical data can only be queried from that block onward.

Initial processing required to synchronize is more bandwidth intensive, but is light on the CPU and has significantly reduced disk requirements. Mid range machines with HDD storage, decent CPUs and 4GB+ RAM should be enough.

To run a full node, download `rinkeby.json` and start Geth with:

```
geth --datadir=$HOME/.rinkeby init rinkeby.json
```

```
geth --networkid=4 --datadir=$HOME/.rinkeby --cache=512 --ethstats='yournode:Resp
ect my authoritah!@stats.rinkeby.io' --bootnodes=enode://a24ac7c5484ef4ed0c5eb2d3
6620ba4e4aa13b8c84684e1b4aab0cebea2ae45cb4d375b77eab56516d34bfbd3c1a833fc51296ff0
84b770b94fb9028c4d25ccf@52.169.42.101:30303
```

You can download Geth from https://geth.ethereum.org/downloads/.

Light node Retrieves data on demand

A light node synchronizes the blockchain by downloading and verifying only the chain of headers from the genesis block to the current head, without executing any transactions or retrieving any associated state. As no state is available locally, any interaction with the blockchain relies on on-demand data retrievals from remote nodes.

Initial processing required to synchronize is light, as it only verifies the validity of the headers; similarly required disk capacity is small, tallying around 500 bytes per header. Low end machines with arbitrary storage, weak CPUs and 512MB+ RAM should cope well.

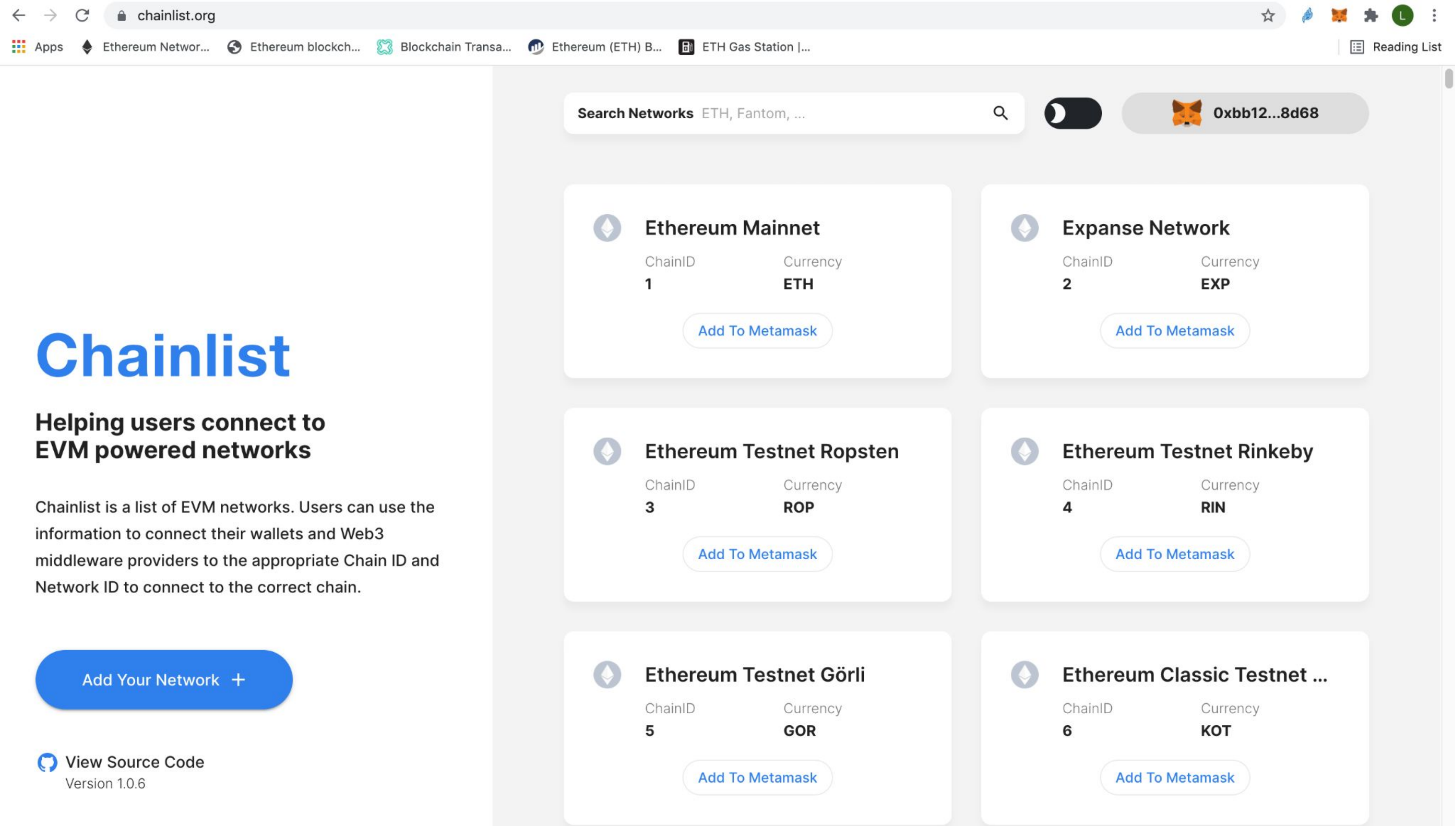
To run a light node, download `rinkeby.json` and start Geth with:

Embedded node Conserves memory vs. speed

An embedded node is a variation of the light node with configuration parameters tuned towards low memory footprint. As such, it may sacrifice processing and disk IO performance to conserve memory. It should be considered an **experimental** direction for now without hard guarantees or bounds on the resources used.

Initial processing required to synchronize is light, as it only verifies the validity of the headers; similarly required disk capacity is small, tallying around 500 bytes per header. Embedded machines with arbitrary storage, low power CPUs and 128MB+ RAM may work.

To run an embedded node, download `rinkeby.json` and start Geth with:



Chainlist

Helping users connect to EVM powered networks

Chainlist is a list of EVM networks. Users can use the information to connect their wallets and Web3 middleware providers to the appropriate Chain ID and Network ID to connect to the correct chain.

Add Your Network +

View Source Code
Version 1.0.6

Ethereum Mainnet

ChainID 1
Currency ETH

Add To Metamask

Expanse Network

ChainID 2
Currency EXP

Add To Metamask

Ethereum Testnet Ropsten

ChainID 3
Currency ROP

Add To Metamask

Ethereum Testnet Rinkeby

ChainID 4
Currency RIN

Add To Metamask

Ethereum Testnet Görli

ChainID 5
Currency GOR

Add To Metamask

Ethereum Classic Testnet ...

ChainID 6
Currency KOT

Add To Metamask

Protocol and application layers

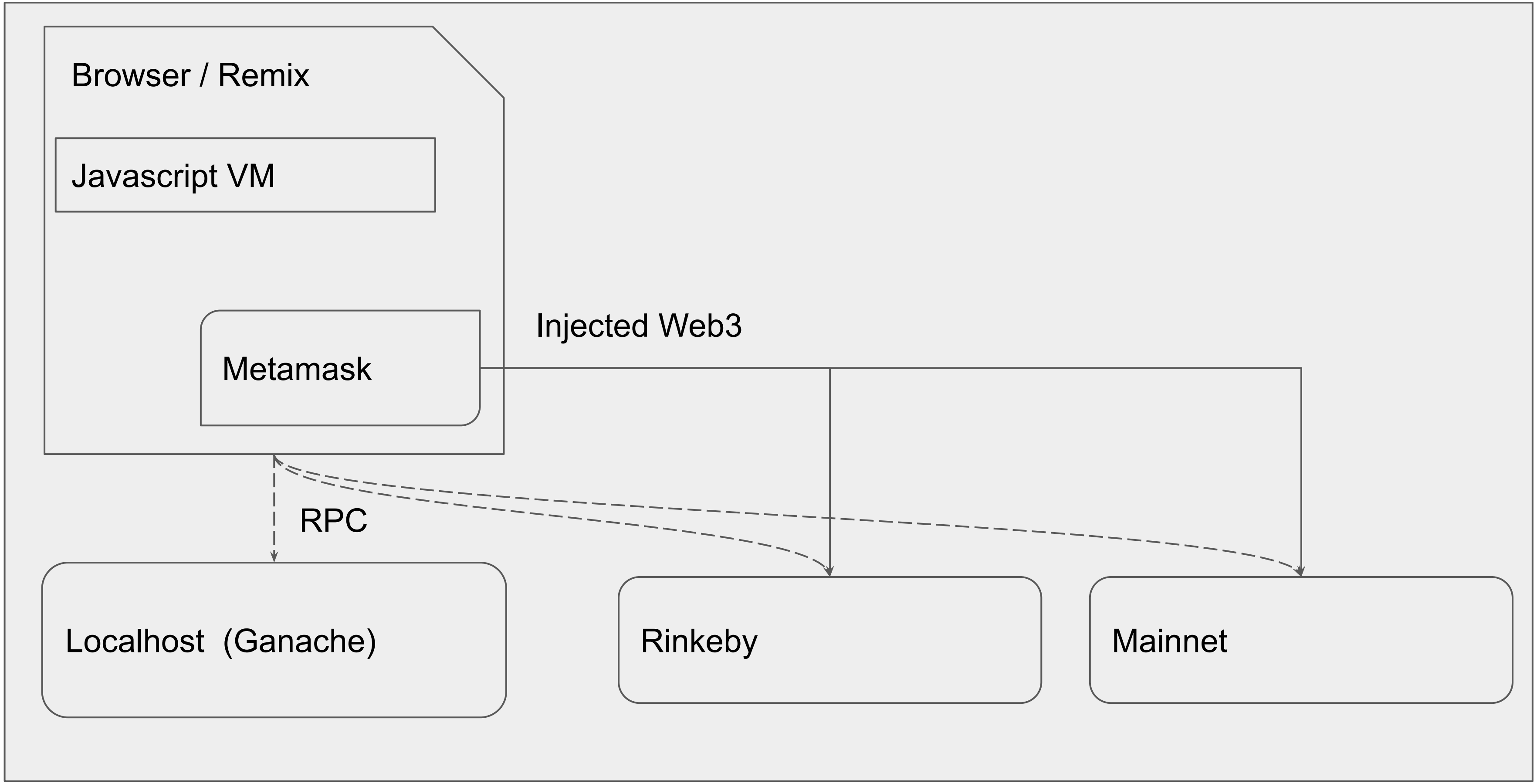
Application layer
(Smart contracts)

Token transfer

Protocol layer
ETH transfer

Precompiled contracts

Remix Environments



Remix Demonstration

Homework

Imagine you are designing a new client for Ethereum, and wish to make it as lightweight as possible.

What do you consider the minimum data that you would need to store on the node, and can you justify why you want each set of data.

Remember a node can ask other nodes for data if they do not have it.

Next lesson
Introduction to Solidity