Hello, Helia!

A(nother) new IPFS implementation in JavaScript

Helia

Helia

IP Stewards Team

Maintainer

- js-ipfs
- js-libp2p
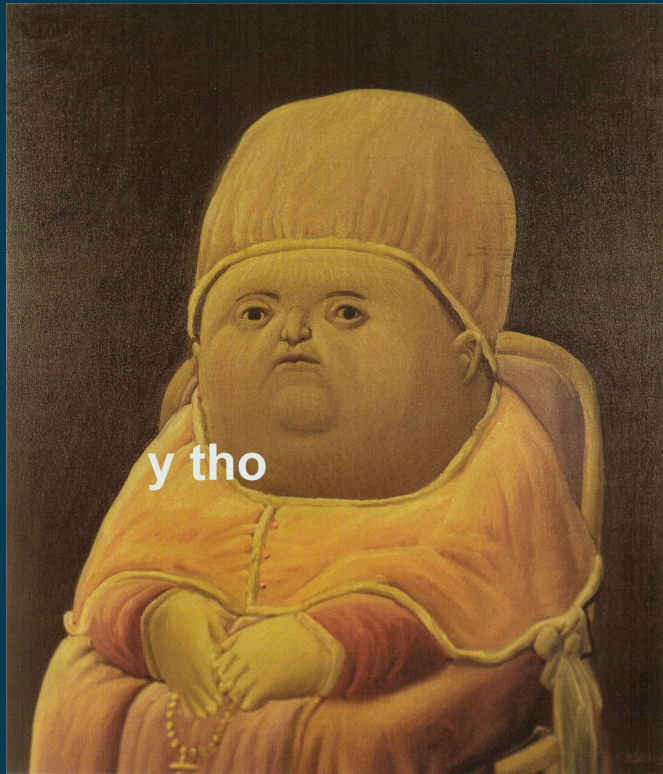- Many supporting libraries

Alex Potsides

Protocol Labs

What is it?

Helia

- **Replacement for js-ipfs**
- **Smaller**
- **Faster**
- **More productive?**

y tho

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Helia

- **Big**

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- **Big**
  - **Big API**

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- **Big**
  - **Big API**
  - **Big Bundle**

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● **Bad connectivity**

Kubo

Browsers

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- Bad connectivity
- (Actually completely unrelated to js-ipfs)

Transports

	Go	Rust	JavaScript	Nim	C++	Swift	JVM	Python	Erlang
libp2p-tcp	Done	Done	Done	Done	Done	In Progress / Usable	Done	Prototype / Unstable	Done
libp2p-quic	Done	Prototype / Unstable	Missing	Missing	Missing	Missing	Missing	Missing	Missing
libp2p-websocket	Done	Done	Done	Done	Missing	In Progress / Usable	Done	Missing	Missing
libp2p-webtransport	Done	Missing	Prototype / Unstable	Missing	Missing	Missing	Missing	Missing	Missing
libp2p-webrtc-browser-to-server	Prototype / Unstable	In Progress / Usable	In Progress / Usable	Missing	Missing	Missing	Missing	Missing	Missing
libp2p-webrtc-star	Missing	Missing	Done	Missing	Missing	Missing	Missing	Missing	Missing
libp2p-webrtc-direct	Prototype / Unstable	Missing	Done	Missing	Missing	Missing	Missing	Missing	Missing

Legend: ● Done ● In Progress / Usable ● Prototype / Unstable ● Unimplementable / Unsupported ● Missing
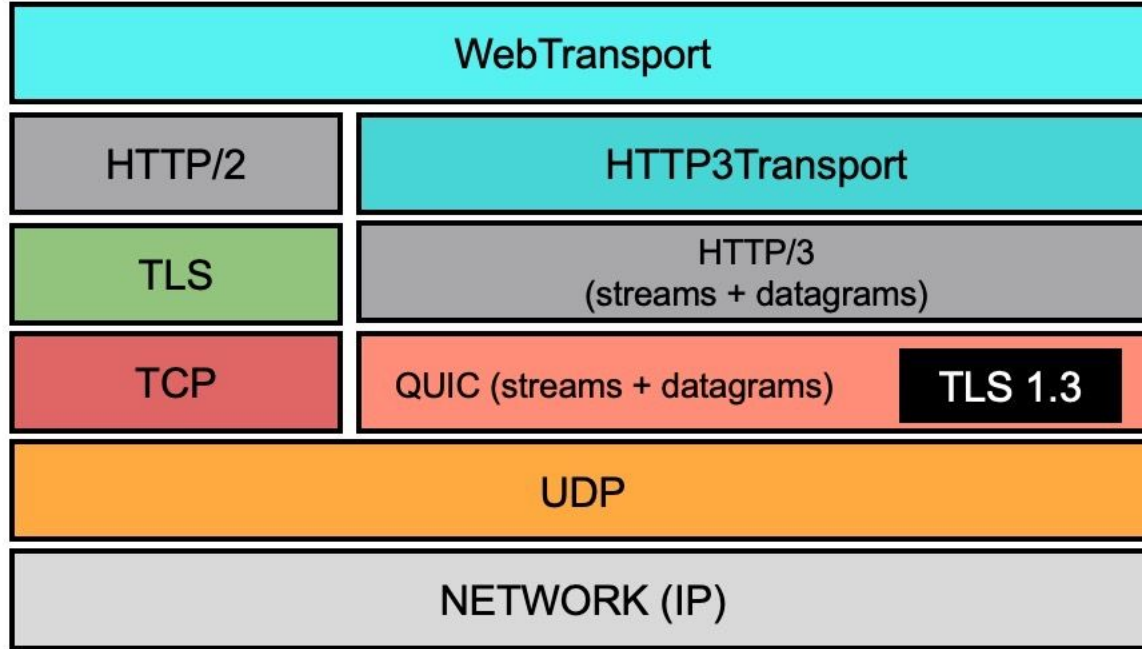
Enough libp2p, back to Helia

Helia

Very simple API
- **Blockstore**
- **Datastore**
- **Pinning**
- **libp2p**

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Blockstore
- put/get blocks by CID
- bitswap backed by local store

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Datastore
- put/get data keys
- IPNS names
- DHT provider records
- etc

Pinning

- **Garbage collection**

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Libp2p
- Pub/Sub
- DHT
- Protocol streams
- etc

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- **Lightweight**
- **Favour composition**

File Systems

In the beginning there was UnixFS

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Then UnixFS v1.5

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Then UnixFS v1.5

Sort of?

UnixFS v2?

UnixFS v2?

Don't ask

Then??

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Wouldn't it be nice to support multiple file systems?

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Demo

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Observability

Logging?

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DEBUG=*

or

localStorage.debug = '*'

libp2p:upgrader:error error multiplexing outbound stream Error [ERR_STREAM_PREMATURE_CLOSE]: Premature close
    at new NodeError (node:internal/errors:399:5)
    at Socket.onclose (node:internal/streams/end-of-stream:149:30)
    at Socket.emit (node:events:525:35)
    at TCP.<anonymous> (node:net:322:12) {
  code: 'ERR_STREAM_PREMATURE_CLOSE'
} +2ms
  libp2p:upgrader:error Failed to upgrade outbound connection Error [ERR_STREAM_PREMATURE_CLOSE]: Premature close
    at new NodeError (node:internal/errors:399:5)
    at Socket.onclose (node:internal/streams/end-of-stream:149:30)
    at Socket.emit (node:events:525:35)
    at TCP.<anonymous> (node:net:322:12) {
  code: 'ERR_MUXER_UNAVAILABLE'
} +0ms
  libp2p:tcp:socket 83.173.236.99:4001 socket was already destroyed when trying to close +0ms
  libp2p:dialer:error dial to /ip4/83.173.236.99/tcp/4001/p2p/12D3KooWBbkCD5MpJhMc1mfPAVGEyVkQnyxPKGS7AHwDqQM2JUsk failed Error [ERR_STREAM_PREMATURE_CLOSE]: Premature close
    at new NodeError (node:internal/errors:399:5)
    at Socket.onclose (node:internal/streams/end-of-stream:149:30)
    at Socket.emit (node:events:525:35)
    at TCP.<anonymous> (node:net:322:12) {
  code: 'ERR_MUXER_UNAVAILABLE'
} +2ms
  libp2p:mplex:trace incoming message { id: 0, type: 'NEW_STREAM (0)', data: '0' } +0ms
  libp2p:mplex new receiver stream 0 +0ms
  libp2p:mplex:trace incoming message { id: 1, type: 'NEW_STREAM (0)', data: '1' } +2ms
  libp2p:mplex new receiver stream 1 +2ms
  libp2p:mplex:trace incoming message {
  id: 0,
  type: 'MESSAGE_INITIATOR (2)',
  data: '132f6d756c746973747265616d2f312e302e300a0f2f697066732f69642f312e302e300a'
} +2ms
  libp2p:mss:handle read "/multistream/1.0.0" +0ms
  libp2p:mss:handle respond with "/multistream/1.0.0" for "/multistream/1.0.0" +0ms
  libp2p:mplex:trace receiver stream 0 send {
  id: 0,
  type: 'MESSAGE_RECEIVER (1)',
  data: '132f6d756c746973747265616d2f312e302e300a'
} +2ms
  libp2p:mss:handle read "/ipfs/id/1.0.0" +1ms
  libp2p:mss:handle respond with "/ipfs/id/1.0.0" for "/ipfs/id/1.0.0" +0ms
  libp2p:upgrader outbound: incoming stream opened on /ipfs/id/1.0.0 +22ms
  libp2p:peer-store:proto-book:trace add await write lock +18s
  libp2p:peer-store:trace get await read lock +18s
  libp2p:mplex:trace receiver stream 0 send {
  id: 0,
  type: 'MESSAGE_RECEIVER (1)',
  data: '0f2f697066732f69642f312e302e300a'
} +2ms
  libp2p:peer-store:key-book:trace set release write lock +22ms
  libp2p:connection-manager:trace checking limit of maxConnections. current value: 1 of 200 +0ms
  libp2p:peer-store:proto-book:trace get wait for read lock +4ms
  libp2p:upgrader outbound: starting new stream on ['/ipfs/id/1.0.0'] +5ms
  libp2p:mplex new initiator stream 0 +11ms
  libp2p:mplex:trace initiator stream 0 send { id: 0, type: 'NEW_STREAM (0)', data: '0' } +6ms
  libp2p:mss:select select: write ["/multistream/1.0.0", "/ipfs/id/1.0.0"] +29ms
  libp2p:peer-store:address-book:trace get got read lock +23ms
  libp2p:mplex:trace initiator stream 0 send {
  id: 0,
  type: 'MESSAGE_INITIATOR (2)',
  data: '132f6d756c746973747265616d2f312e302e300a0f2f697066732f69642f312e302e300a'
} +3ms
  libp2p:peer-store:address-book:trace get release read lock +5ms
  libp2p:peer-store:proto-book:trace add got write lock +23ms
  libp2p:connection-manager:auto-dialler:error could not connect to peerStore stored peer Error: dial with more addresses than allowed
    at DefaultDialer._createDialTarget (file:///Users/alex/Documents/Workspaces/ipfs/js-ipfs/node_modules/libp2p/dist/src/connection-manager/dialer/index.js:148:27)
    at async DefaultDialer.dial (file:///Users/alex/Documents/Workspaces/ipfs/js-ipfs/node_modules/libp2p/dist/src/connection-manager/dialer/index.js:92:26)
    at async DefaultConnectionManager.openConnection (file:///Users/alex/Documents/Workspaces/ipfs/js-ipfs/node_modules/libp2p/dist/src/connection-manager/index.js:306:32)
    at async AutoDialler._autoDial (file:///Users/alex/Documents/Workspaces/ipfs/js-ipfs/node_modules/libp2p/dist/src/connection-manager/auto-dialler.js:91:21) {
  code: 'ERR_TOO_MANY_ADDRESSES'
} +297ms
  libp2p:connection-manager:auto-dialler connecting to a peerStore stored peer 12D3KooWAqdjCtJRfyKfZkDRTe9SubqmNwJ3dBA3yUF9NKru1qfE +44ms
  libp2p:connection-manager dial to PeerId(12D3KooWAqdjCtJRfyKfZkDRTe9SubqmNwJ3dBA3yUF9NKru1qfE) +44ms
  libp2p:dialer creating dial target for 12D3KooWAqdjCtJRfyKfZkDRTe9SubqmNwJ3dBA3yUF9NKru1qfE +43ms
  libp2p:peer-store:address-book:trace get wait for read lock +16ms

Progress events for everything

Demo

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CID?

SID VICIOUS - USA - 1978

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Demo

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Phew!

Is it ready?

- **Helia v1 has been released!**
- **Helia UnixFS v1 has been released!**
- **Helia IPNS v1 has been released!**

Yes!

Helia

How to help?

- **Port your apps**
- **Convert examples**
- **Tell me your use cases & woes**

The end!

- **https://github.com/ipfs/helia**
- **https://github.com/ipfs/helia-unixfs**
- **https://github.com/ipfs/helia-ipns**
- **https://github.com/ipfs-examples/helia-examples**

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