BRINGING DECENTRALIZATION TO YOUR DOORSTEP: 5 Years in Browsers

Michelle (Mosh) Lee
IPFS Foundation
FOSDEM, February 2026, Brussels

IPFS Project

- Started in 2015 with two simple, radical ideas:
  Content addressing, all the way down, creates self-certifying data.
  Decentralized networks shaped by users, not platforms.
- Today, a family of protocols to store, verify, and share data across distributed networks – the building blocks for a better web.

People use IPFS for 3 main reasons:

1. Resilient Public Network

Peer-to-peer public network for all. 5+ billion files.

Resilient to censorship and outages.

Content discovery + routing
Data transfer
Data verification
Pinning + persistence
Browser support for ipfs:// + more

2. Private/ Permissioned Data Sharing

Networks for collaborative archiving, large-scale scientific collaboration, local enterprise networks, & more.

Everything from public
+ roll-your-own gateways
ipfs-cluster
ipfsspec
& more

3. Content Addressing

Building blocks for content addressing the whole damn internet. Small, fast, interoperable. BYO networking.

IPLD
Content-Addressed Archives (CAR)
DASL + RASL + MASL
CID Congress series
Interop w/ WARC, ZARR, etc.

IPFS Timeline 2015-2025

2015	go-ipfs alpha
2017	Turkish Wikipedia & Catalan referendum sites mirrored on IPFS
2018	Pinata launches
2019	IPFS Camp #1 (Barcelona)
2020	Filecoin network launch
2021	IPFS in Brave browser, NFT boom, Shoah Foundation verifiable archives
2022	IPFS Camp #2 (Lisbon)
2022	Taiwan's MODA site mirrored on IPFS
2023	Renames: go-ipfs → kubo, js-ipfs → helia, IPFS Thing #2 (Iceland)
2023	IPFS goes to space in p2p satellite comms
2023	Bluesky launches using IPLD
2024	helia/verified-fetch released
2024	Rise of the mini-libs: DASL, atcute, dag-cbrrr, rust_cid_npm
2025	Over 5 billion files on IPFS, 41 million Bluesky users of IPLD, ATProto

IPFS makes computing & the web...

More open

BUSINESS • TECHNOLOGY

Turkey Can't Block This Copy of Wikipedia

'The internet is the planet's most important technology'

By Brady Dale • 05/10/17 7:21am

Taiwan's Ministry of Digital Affairs (MODA) is in the process of integrating the InterPlanetary File System (IPFS), a piece of Web3 technology used for

EUREKA STREET

INTERNATIONAL

Inside Catalonia's cypherpunk referendum

06 October 2017

Blogs | Information democracy | Freedom of expression online

No justification for internet censorship during Catalan referendum

By **EDRi** · October 4, 2017

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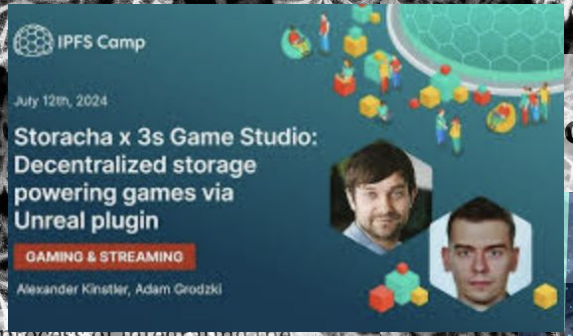
More open



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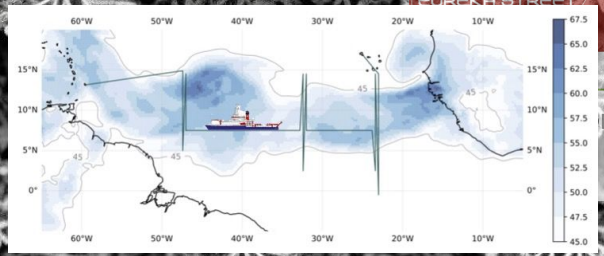
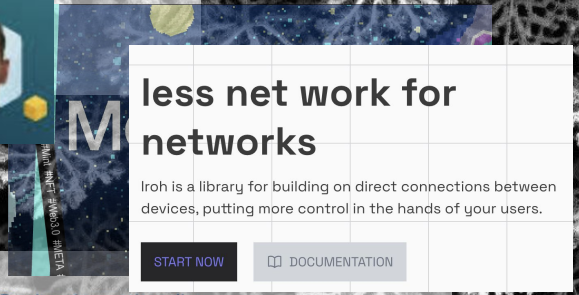
Taiwan's Ministry of Digital Affairs (MODA) is in the process of integrating the InterPlanetary File System (IPFS), a piece





ation democracy | Freedom of expression online

ber 4, 2017

More efficient

IPFS makes computing & the web...

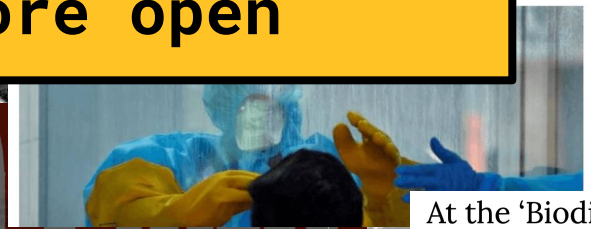
More open

More credible

More efficient

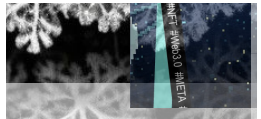
Maharashtra govt onboards blockchain tech for issuing COVID-19 test certificates

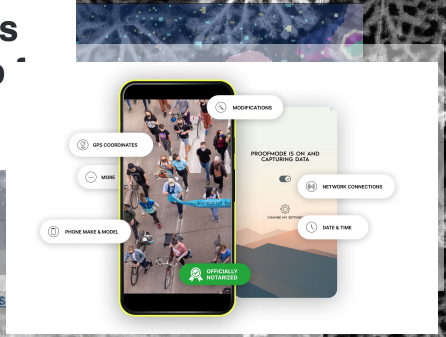
The Maharashtra government, not the onboarded startup, will own and control the data and



ProofMode Provides Verifiable Camera App for 2024 US Election

29 October 2024





At the 'Biodiversity Olympics,' scientists work to democratize rainforest tech

ABHISHYANT KIDANGOOR
29 AUG 2024 AMAZON

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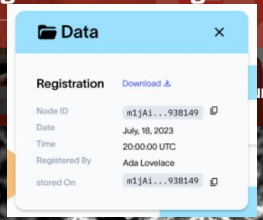


Join us in exploring new ways to protect journalism's most important documents for the future

By distributing how we host primary source materials, news archives and more, we can eliminate single points of failure

Written by Sanjin Ibrahimovic

Edited by Amanda Hickman and Samantha Sunne

We at DocumentCloud, with support from the Filecoin Foundation for the Decentralized Web, are uploading documents for long-term preservation and distribution via the Filecoin network and the InterPlanetary File System (IPFS).

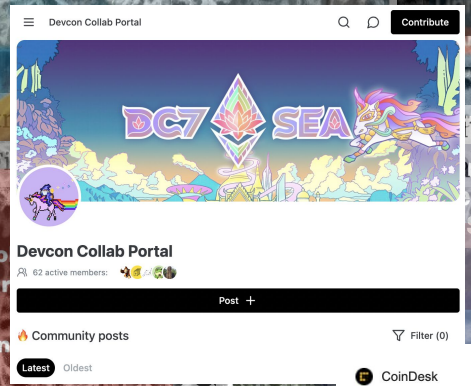
IPFS makes computing & the web...

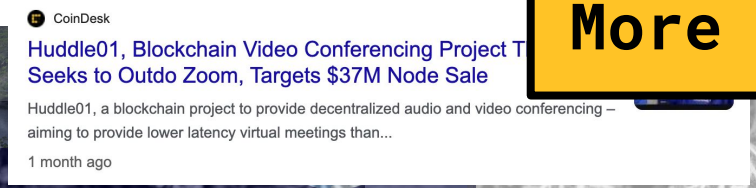
More open

More credible

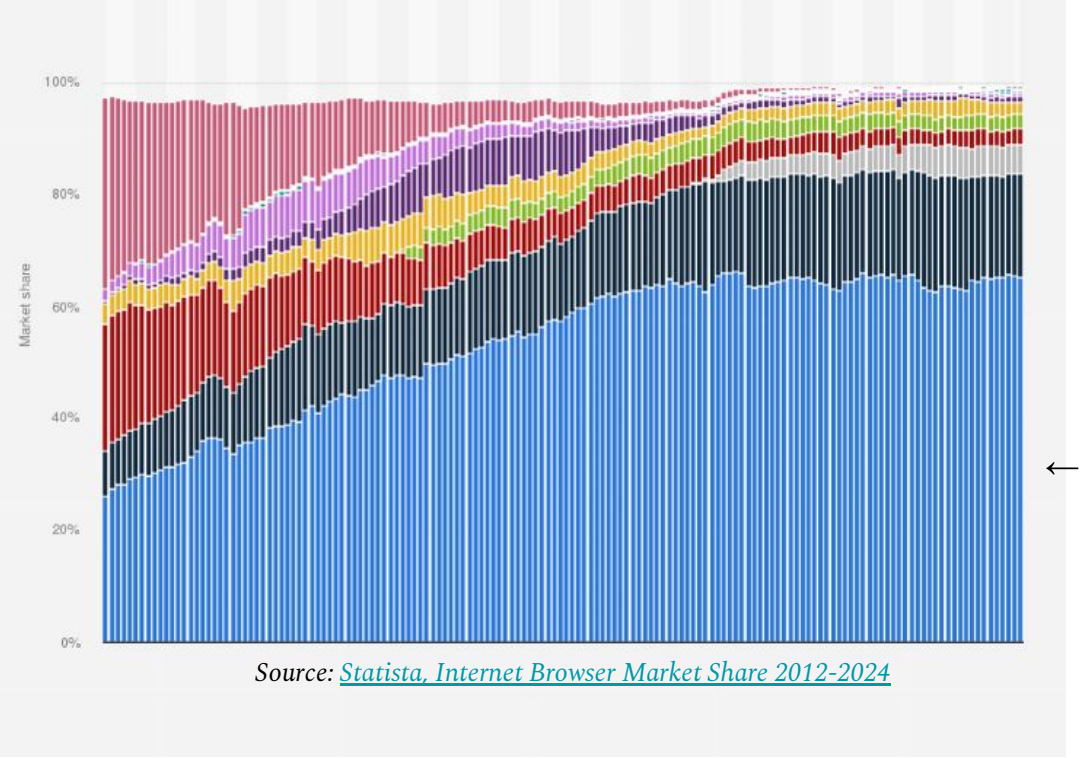
More efficient

More fun





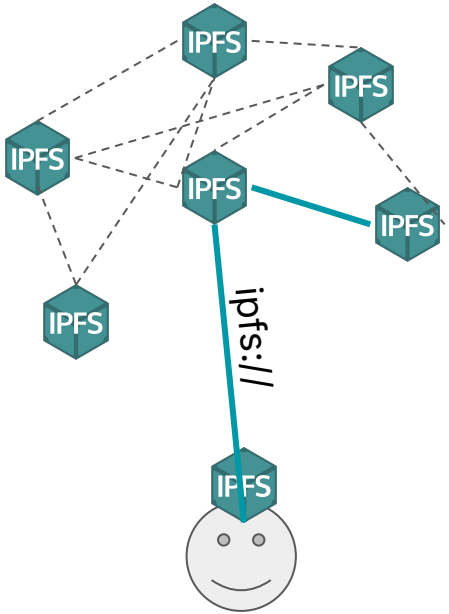
…through a consolidating browser landscape!



Source: Statista, Internet Browser Market Share 2012-2024

← GUESS WHO?

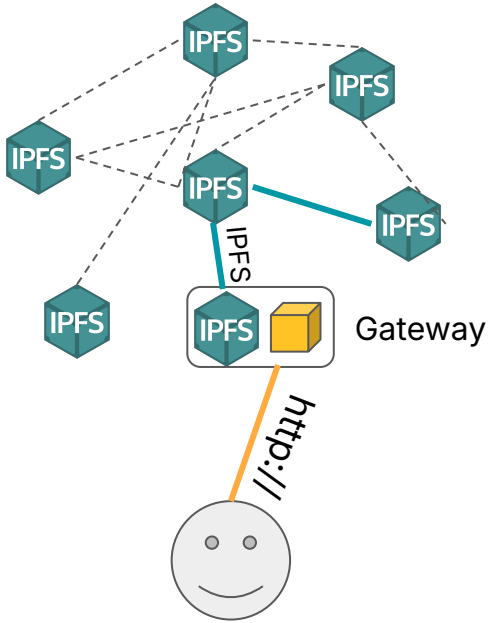
P2P: Theory Meets World



By design, your node talks to other nodes to find & fetch content by CID.

In practice, most web users aren't running a node.

50-100 apps installed, 7-10 daily use. 87% of Chrome extensions have <1,000 installs. IPFS Companion: 50,000.



So in 2018 we introduced gateways (computers that speak both HTTP and IPFS).

P2P: Theory Meets World

ipfs://cid

The ideal way. Most browsers don't support this yet.

```
{
  imageCID: CID(QmbF8cCC478X8ux1e4TLTH8jtGZkyWmGT6BpYMuP8HtGUR),
  metadataCID: CID(QmV7P6QdN3geyyNxGQ5MYpa8sc7arA8kigiK5pV27xJNUx),
  mintedNFTId: '1',
  metadataURI: 'ipfs://QmV7P6QdN3geyyNxGQ5MYpa8sc7arA8kigiK5pV27xJNUx',
  metadataJSON: {
    name: 'Screenshots',
    description: 'Medium & Twitter Screenshots',
    image: 'QmbF8cCC478X8ux1e4TLTH8jtGZkyWmGT6BpYMuP8HtGUR'
  }
},
```

https://ipfs.io/cid

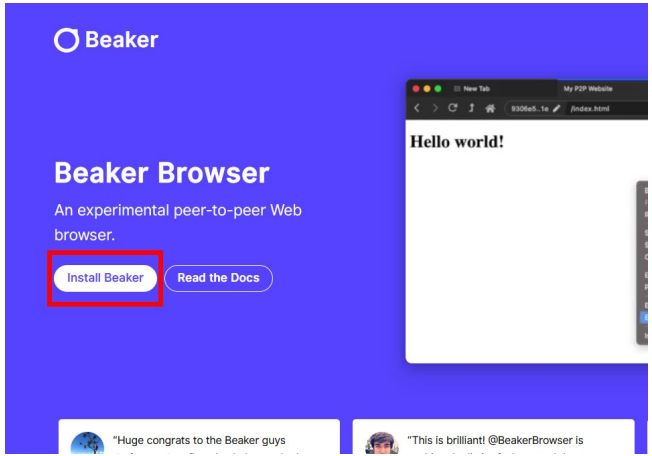
Most users don't have IPFS clients installed, so webapp devs hardcode gateway URLs.

Re-centralization: 2 billion files at peak, 1-4 gateways.

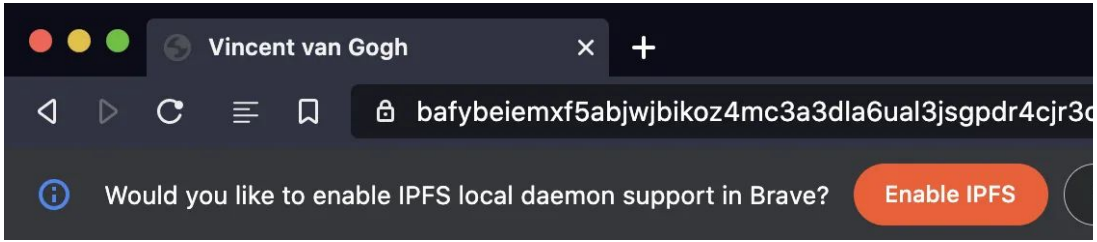
```
22  ipfs.files.add(files, function(err, files) {
23  // 'files' will be an array of objects containing pat
24  if (err) {
25  console.log(err);
26  log(err);
27  } else {
28  console.log(files);
29  document.getElementById('output').innerHTML = "<b>" +
30  <a target='new' href='https://ipfs.io/ipfs/"+files&#9
31  " + "<a target='new' href='http://ipfs.coinmarketrank
32  }
33  })
```

Ok, so let’s make browsers more P2P.

Approach 1: New browsers that embrace Web3



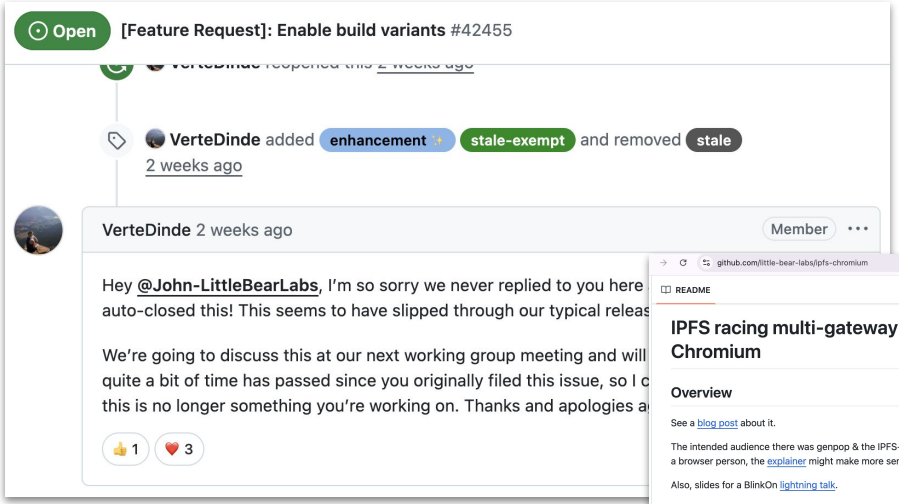
Beaker (dat://)



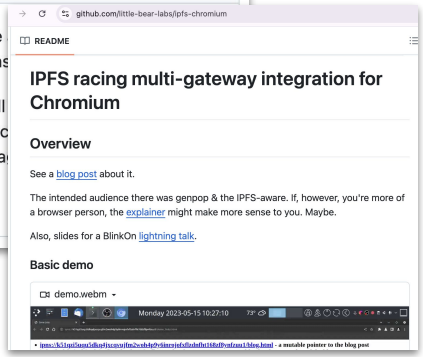
Brave (ipfs://)

...but it's hard to get people to switch browsers.

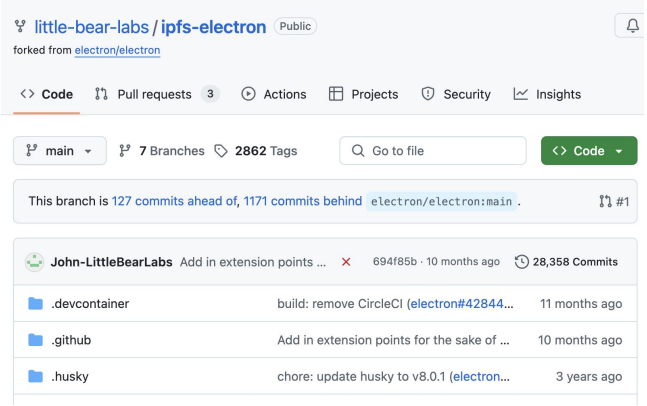
Approach 2: Add ipfs:// to popular browsers



Issues getting response, but only after 1 year



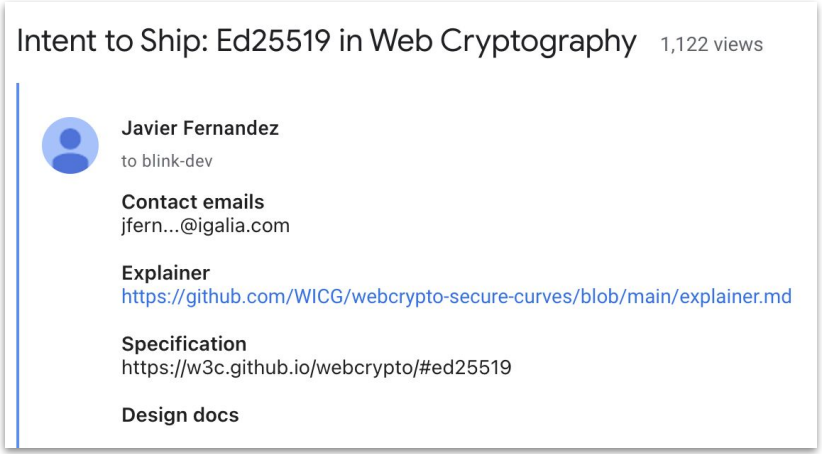
Chromium fork



Electron fork (ipfs://)

...but browsers are (rightly) cautious and progress is slow.

Approach 2: Some successes, but slow.

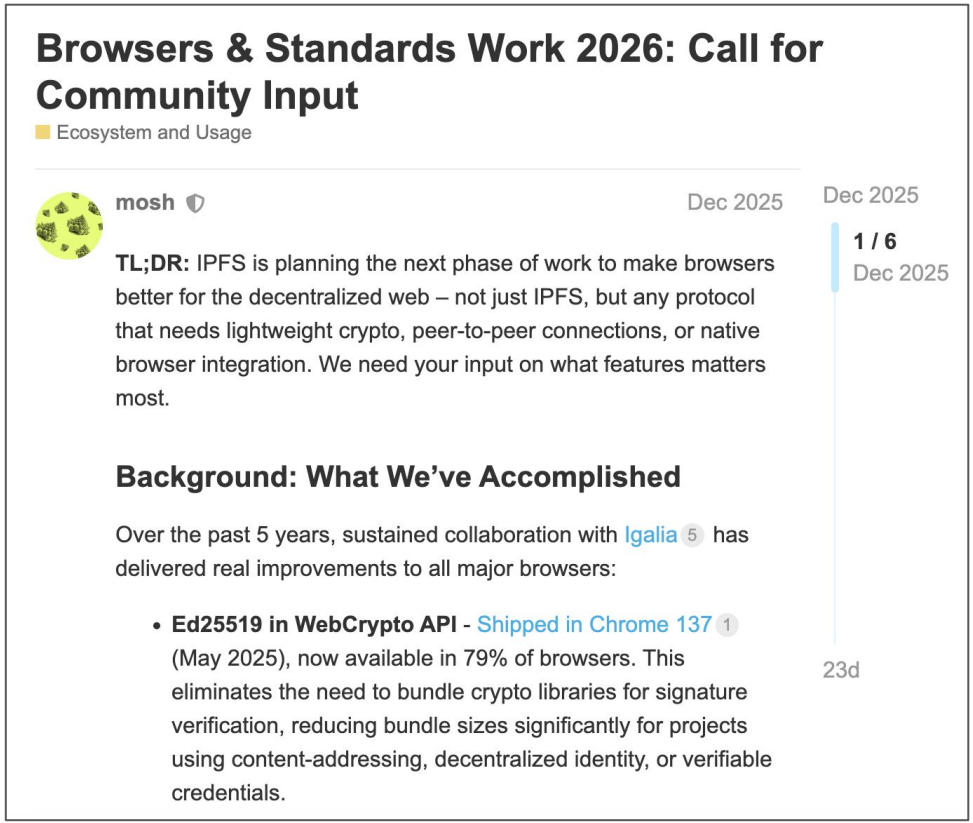


🎉 *Summer 2025: Ed25519 shipped in Chrome!*

2022: Pre-defined custom protocol handlers in Chromium

...we need another path in parallel.

Approach 2: Want to help?



Browsers & Standards Work 2026: Call for Community Input

Ecosystem and Usage

mosh Dec 2025

Dec 2025

1 / 6

Dec 2025

TL;DR: IPFS is planning the next phase of work to make browsers better for the decentralized web – not just IPFS, but any protocol that needs lightweight crypto, peer-to-peer connections, or native browser integration. We need your input on what features matters most.

Background: What We've Accomplished

Over the past 5 years, sustained collaboration with Igalia 5 has delivered real improvements to all major browsers:

- **Ed25519 in WebCrypto API** - Shipped in Chrome 137 1 (May 2025), now available in 79% of browsers. This eliminates the need to bundle crypto libraries for signature verification, reducing bundle sizes significantly for projects using content-addressing, decentralized identity, or verifiable credentials.

23d

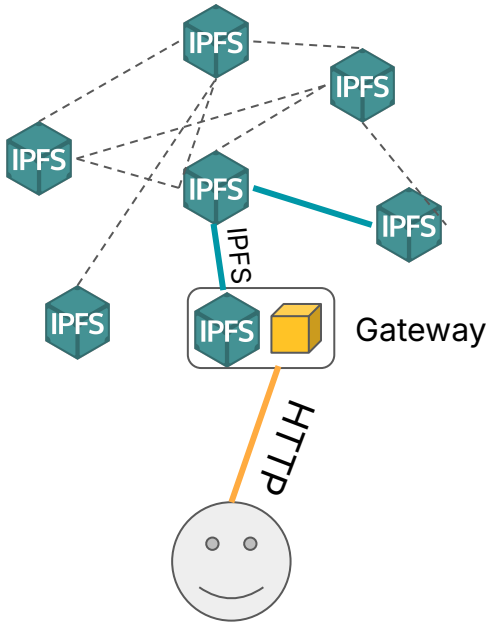
Do you like streaming hashing in WebCryptoAPI? BLAKE3?

Want to webkit to fix localhost bugs? Remote attested TLS?

Share your needs and use cases in the discuss.ipfs.tech forum thread.

Approach 3: New use of old browser capabilities

Service Workers – a scriptable network proxy in a web browser that manages network requests



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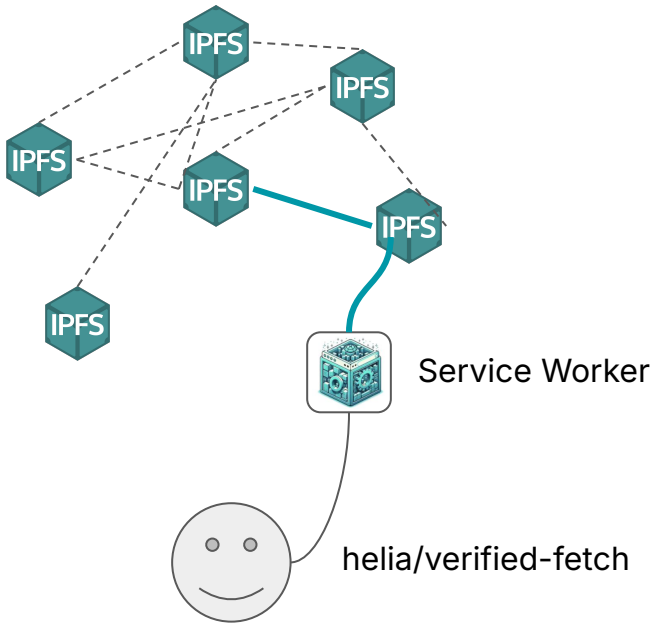


IPFS Drop-in Service Worker Example

Replace centralized IPFS gateways with resilient and verified retrieval gateways or providers with @helia/verified-fetch in a drop-in Service Worker.

This example shows how to use a Service Worker to intercept requests to centralized IPFS gateways and retrieve content directly from providers (or self-hosted gateways) with @helia/verified-fetch.

For more information, check out the deep dive video on YouTube.

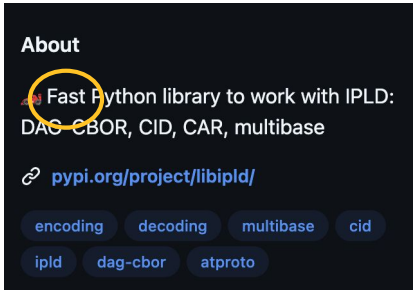
The `helia/verified-fetch` library within a Service Worker facilitates direct verified retrieval of content-addressed data.

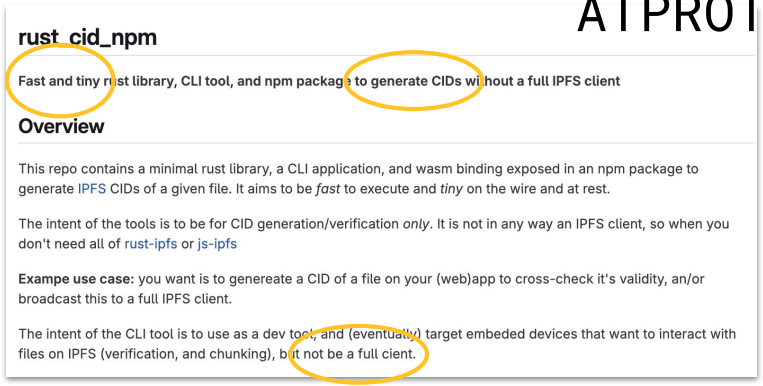
Approach 3: The Post-Gateway Future

- (Now) App devs can add drop-in service workers. Possibilities abound!
- (Soon) ipfs.io gateway experiments to add service workers that push more traffic to true p2p. Progress, monitoring, and metrics published.
- (Late 2026) Expect some rate limiting on gateways.
- Spread the load so the public network can be a true p2p commons.

Approach 4: Don't, Actually

Servers are acceptable if your data is content-addressed + you decentralize who controls the servers.





← COMMUNITY-DRIVEN MINI LIBS for CIDs & CBOR, MANY FROM ATPROTO DEVS

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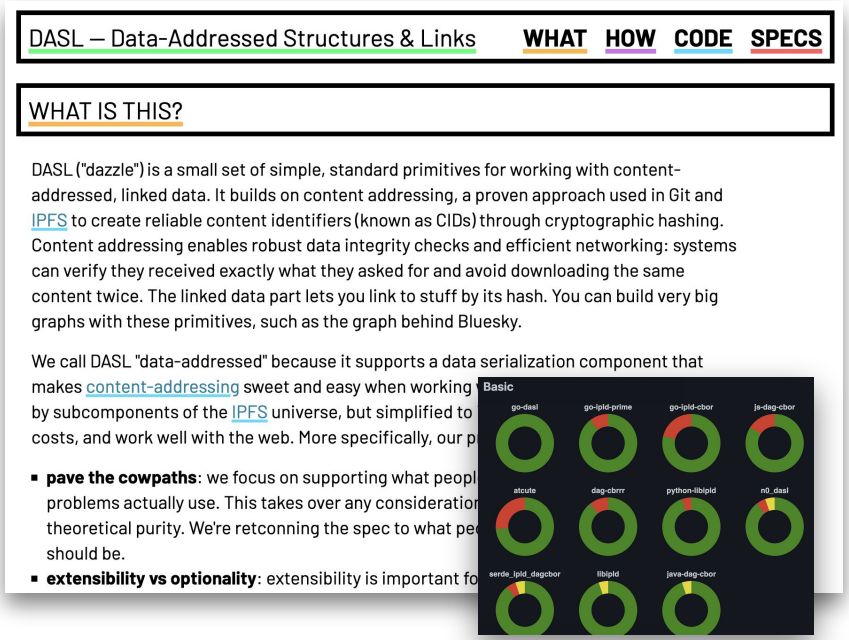

← YOU MADE US WRITE A LIGHTER-WEIGHT IPFS FAMILY SPEC CALLED ✨DASL✨

ROBIN @ 3:15p DECENTRALIZED COMM DEVROOM


THE HILLS ARE ALIVE
WITH A DECENTRALIZED DATA OWNERSHIP AND ARCHITECTURE
STRATEGY DRIVEN BY THE TREATMENT OF DATA AS A PRODUCT
AND FEDERATED GOVERNANCE WITHIN A SELF-SERVE INFRASTRUCTURE

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Juan Benet
...and more.

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