

IPFS PING

Brussels, Belgium
2023

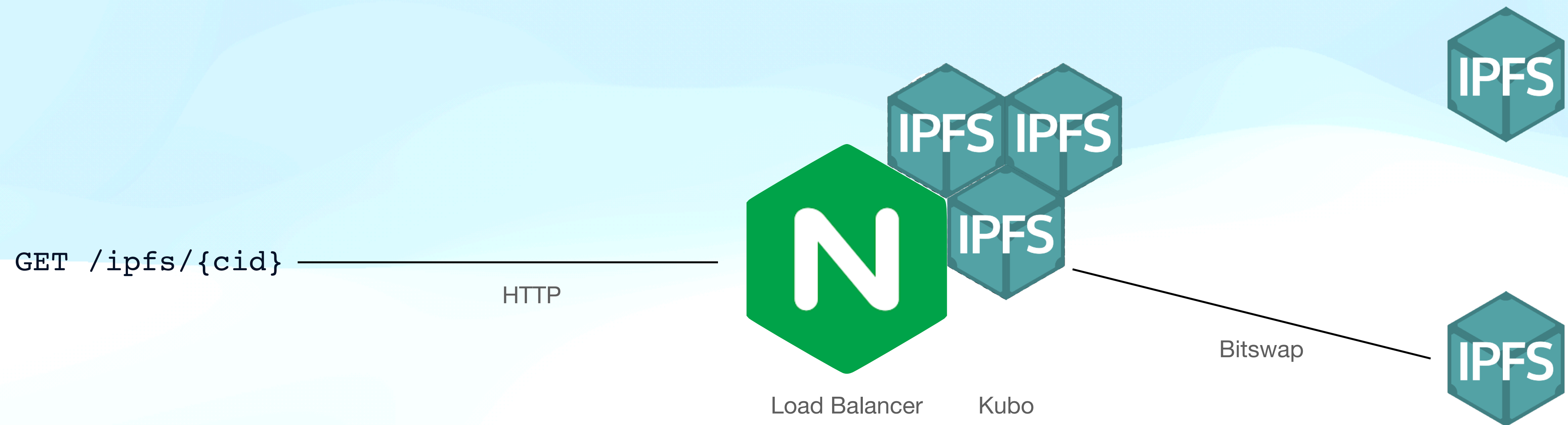
HTTP Gateways

What is Rhea?

Will Scott - April 17th - IPFS ping

Requests to ipfs.io today

Requests today





Google My Maps



Imagining Decentralization

Decentralization

GET /ipfs/{cid}



SATURN



Decentralization



Project Rhea



Project Rhea

- Enable Filecoin Retrievals
- Validate Saturn as a CDN
- Reduce Centralized Infrastructure Cost

Agenda

Agenda

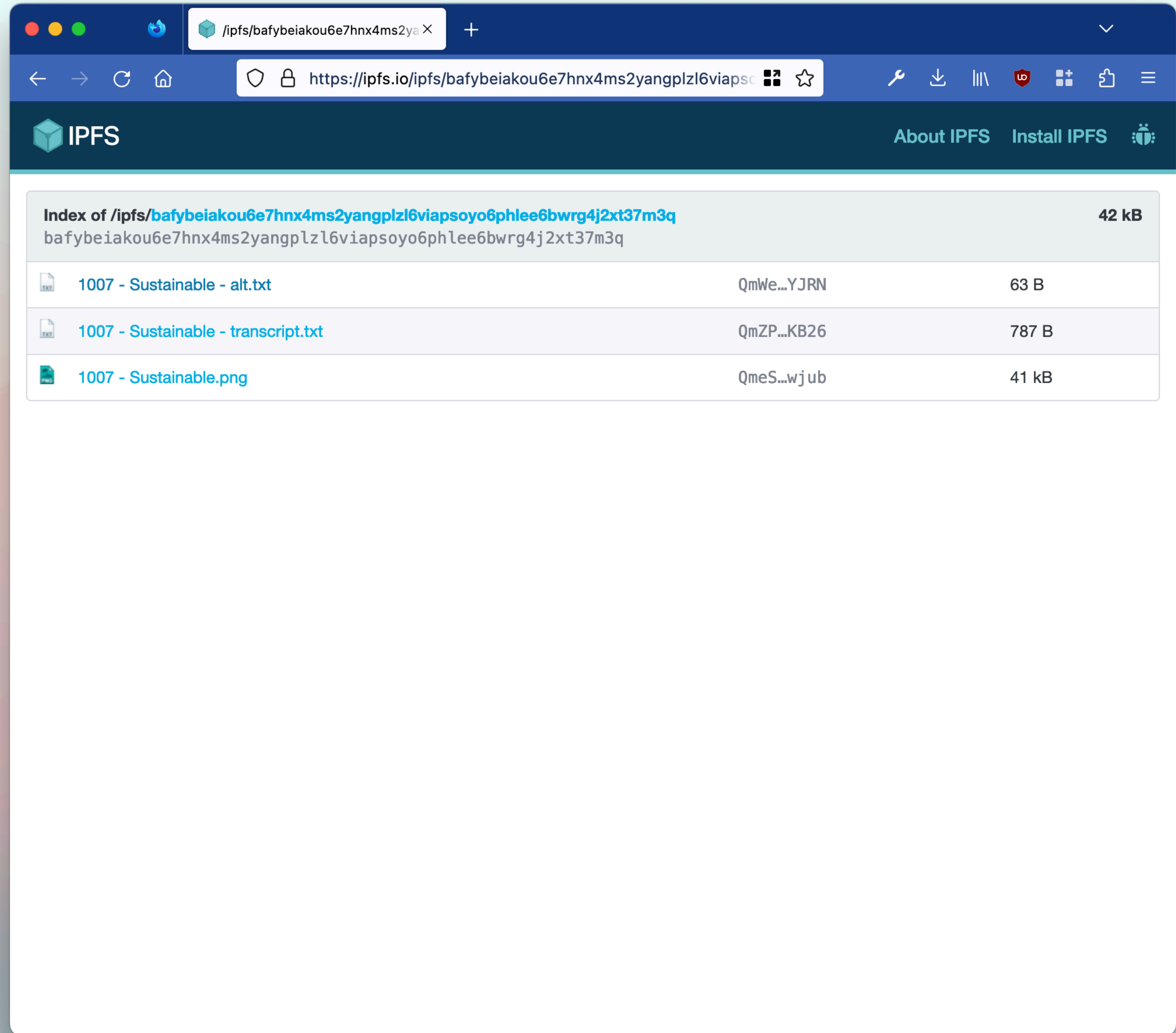
✓ What is Rhea

- Trust Model
- Fetching Content
- Performance
- Component Systems

Talking about Trust

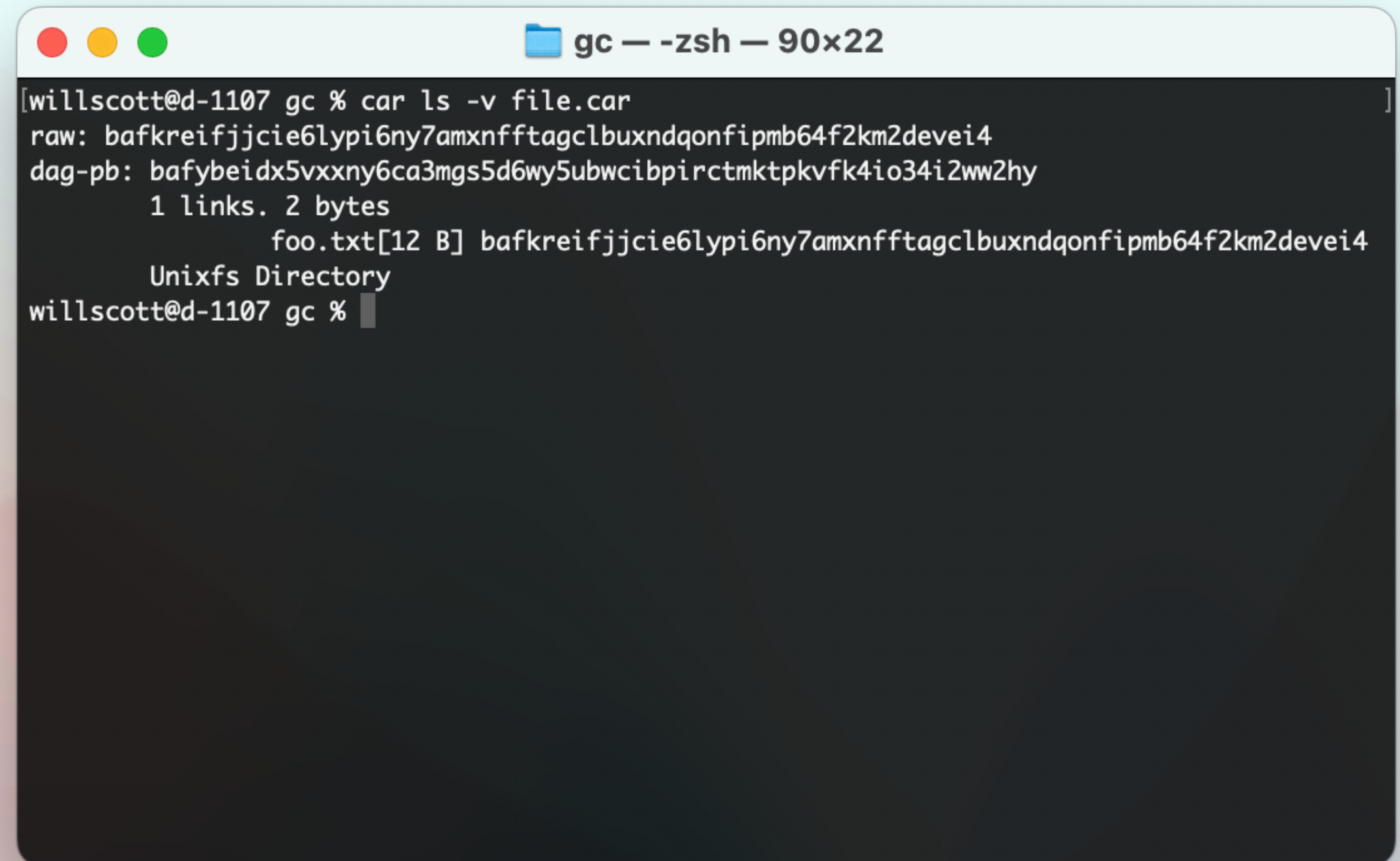
Trust

- Rendered pages from the gateway are generally not verifiable by the client



Trust

- What's missing
 - Metadata blocks
- Won't, or Can't
 - There isn't a way for a client to signal that it promises to verify
 - Range requests are hard

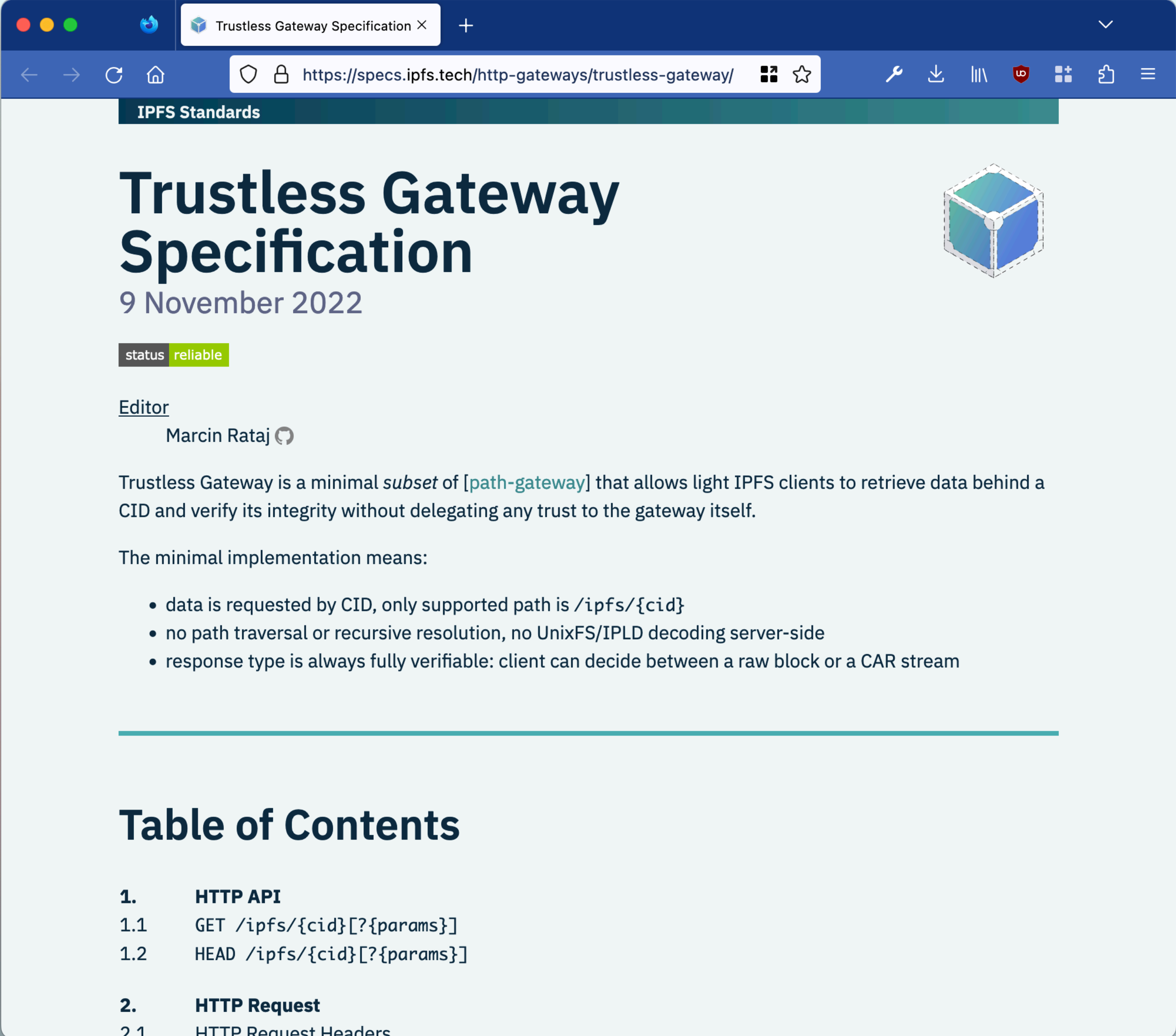


```
gc — -zsh — 90x22
[willscott@d-1107 gc % car ls -v file.car
raw: bafkreifjjcie6lypi6ny7amxnfftagclbuxndqonfipmb64f2km2devei4
dag-pb: bafybeidx5vxxny6ca3mgs5d6wy5ubwcibpirctmktpkvfk4io34i2ww2hy
      1 links. 2 bytes
              foo.txt[12 B] bafkreifjjcie6lypi6ny7amxnfftagclbuxndqonfipmb64f2km2devei4
      Unixfs Directory
willscott@d-1107 gc %
```


Trust

Trustless gateway

- Accept:
 - application/vnd.ipld.raw
 - application/vnd.ipld.car
- GET /ipfs/cid[/path][?depth=]
[&bytes=a:b]



The screenshot shows a web browser window displaying the 'Trustless Gateway Specification' page. The browser's address bar shows the URL 'https://specs.ipfs.tech/http-gateways/trustless-gateway/'. The page has a dark blue header with the 'IPFS Standards' logo. The main heading is 'Trustless Gateway Specification' with a date of '9 November 2022'. A status badge indicates 'status reliable'. The editor is listed as 'Marcin Rataj'. The text describes the gateway as a minimal subset of the path-gateway, allowing light IPFS clients to retrieve data behind a CID and verify its integrity without delegating trust. It lists three key features: data is requested by CID, no path traversal or recursive resolution, and the response type is always fully verifiable. A 'Table of Contents' section is at the bottom, listing '1. HTTP API' with sub-items '1.1 GET /ipfs/{cid}[?{params}]' and '1.2 HEAD /ipfs/{cid}[?{params}]', and '2. HTTP Request' with sub-item '2.1 HTTP Request Headers'.

IPFS Standards

Trustless Gateway Specification

9 November 2022

status reliable

Editor
Marcin Rataj

Trustless Gateway is a minimal *subset* of [\[path-gateway\]](#) that allows light IPFS clients to retrieve data behind a CID and verify its integrity without delegating any trust to the gateway itself.

The minimal implementation means:

- data is requested by CID, only supported path is `/ipfs/{cid}`
- no path traversal or recursive resolution, no UnixFS/IPLD decoding server-side
- response type is always fully verifiable: client can decide between a raw block or a CAR stream

Table of Contents

- 1. HTTP API
 - 1.1 GET /ipfs/{cid}[?{params}]
 - 1.2 HEAD /ipfs/{cid}[?{params}]
- 2. HTTP Request
 - 2.1 HTTP Request Headers

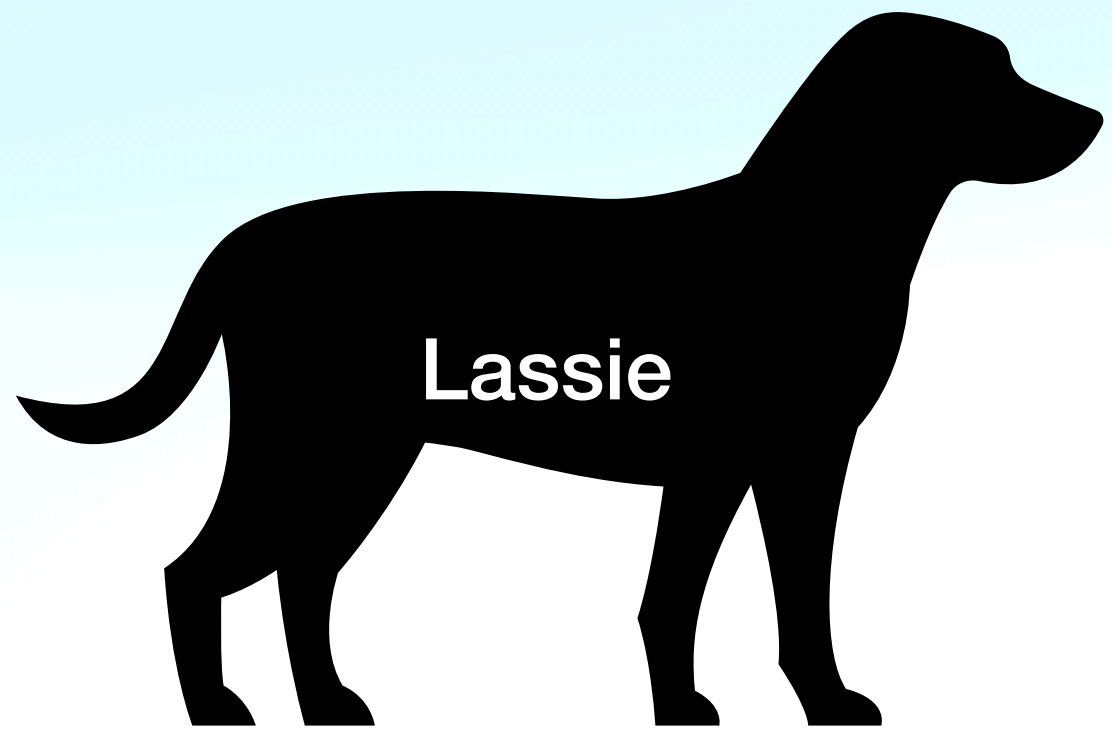
Show me the Bytes

Show me the Bytes

- Enable Filecoin Retrievals
 - Support bitswap on filecoin Storage Providers
 - Extend bitswap sessions to support other transports
 - Write another scheduling layer above bitswap



IPNI

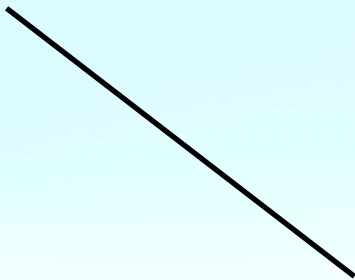


Bitswap

Graphsync

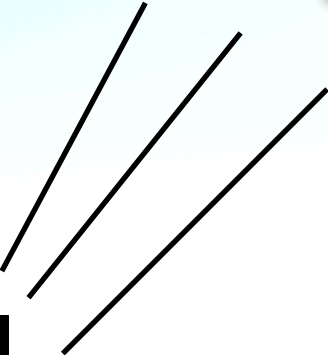
Infura

Cassette

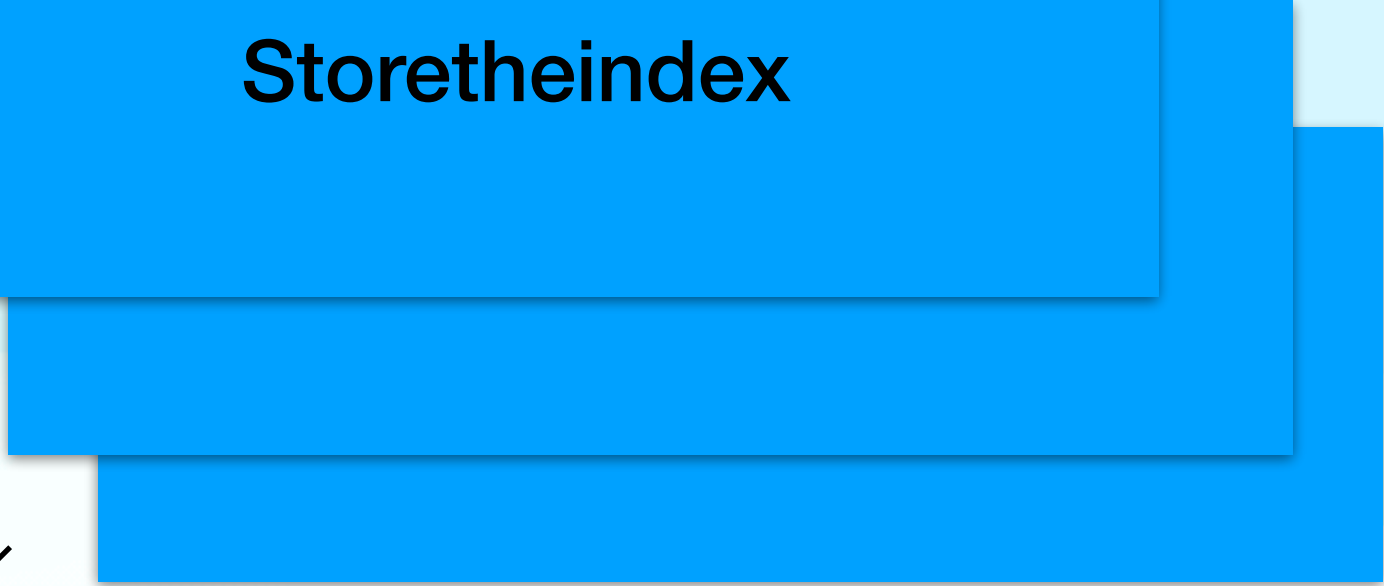


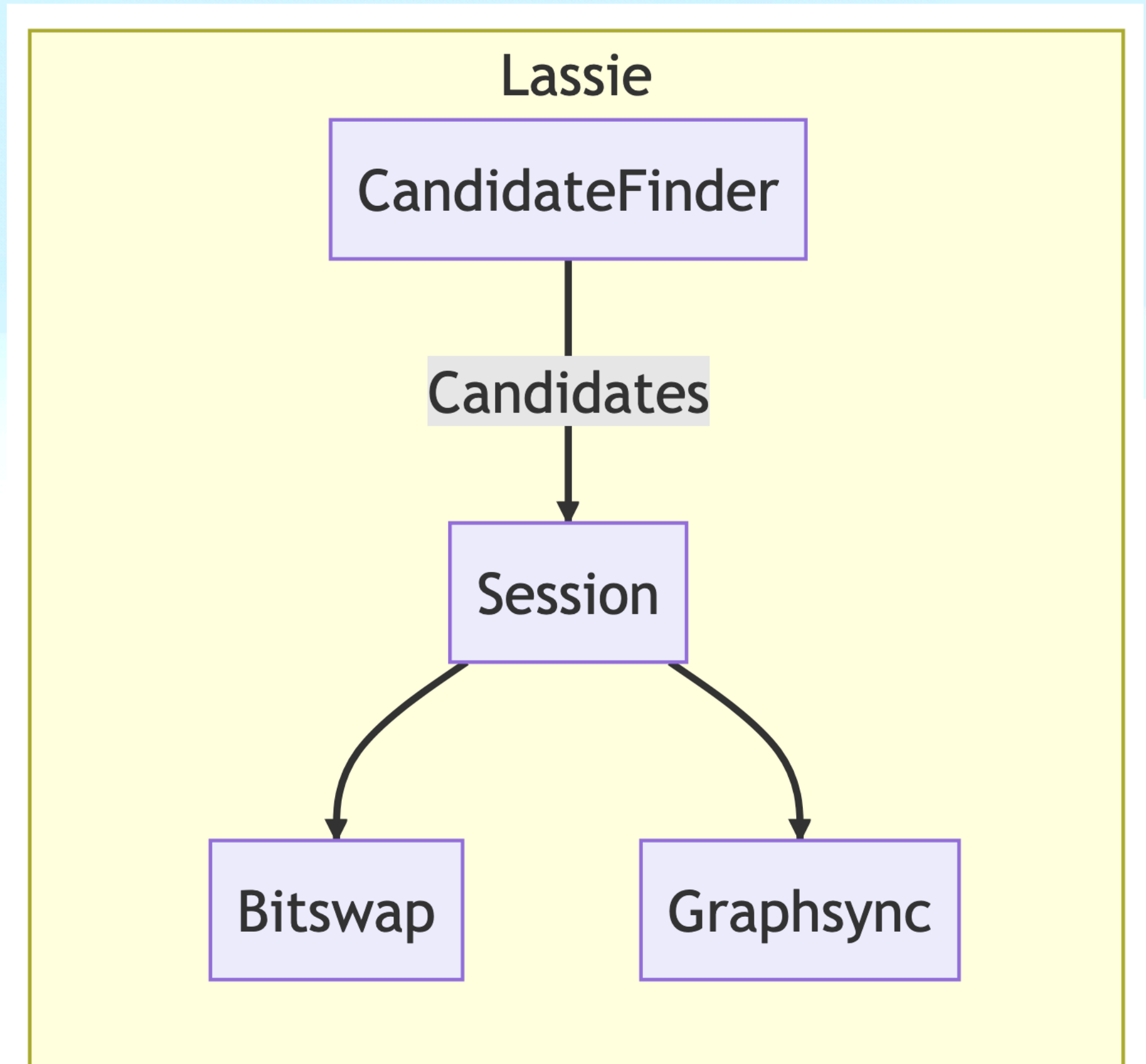
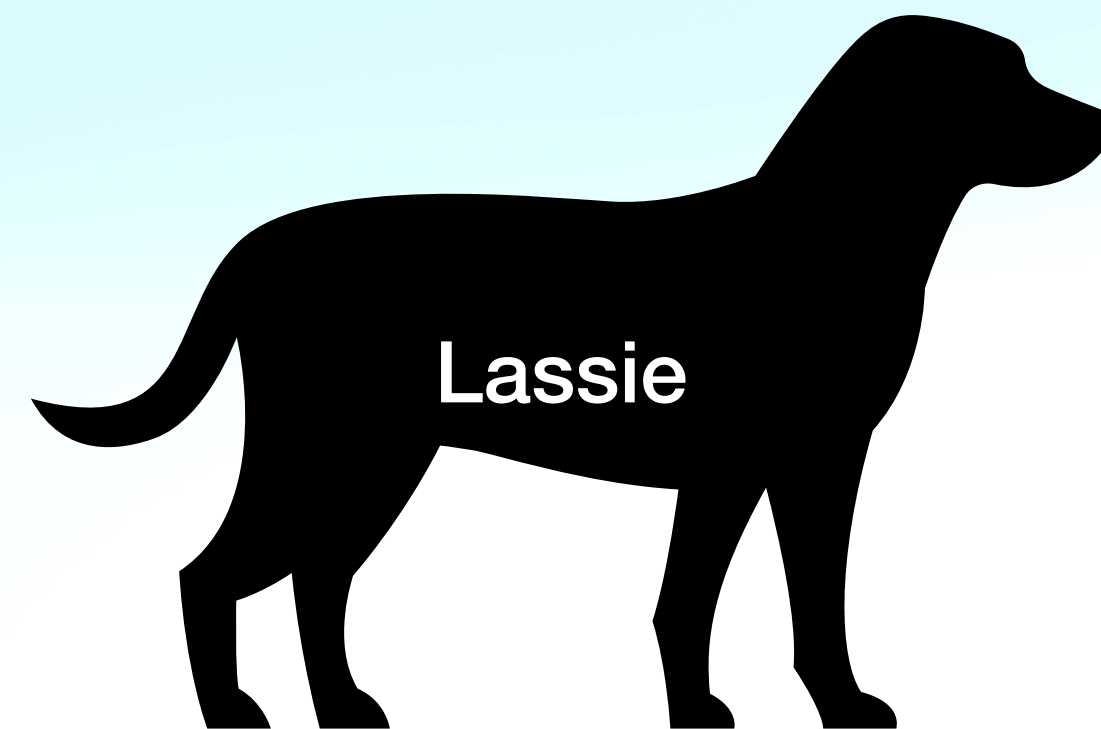
CascaDHT

Indexstar
IPNI



Storetheindex





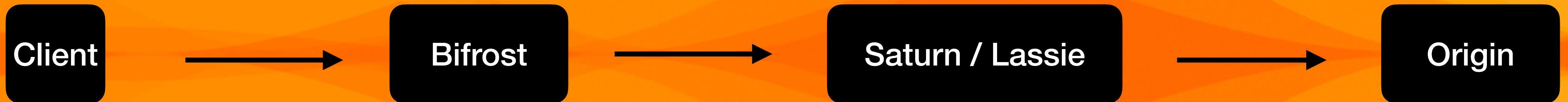
Caching and Performance

Performance

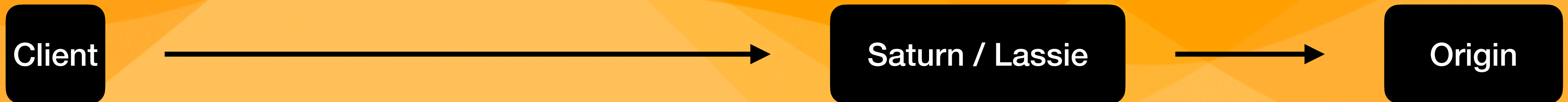
Current



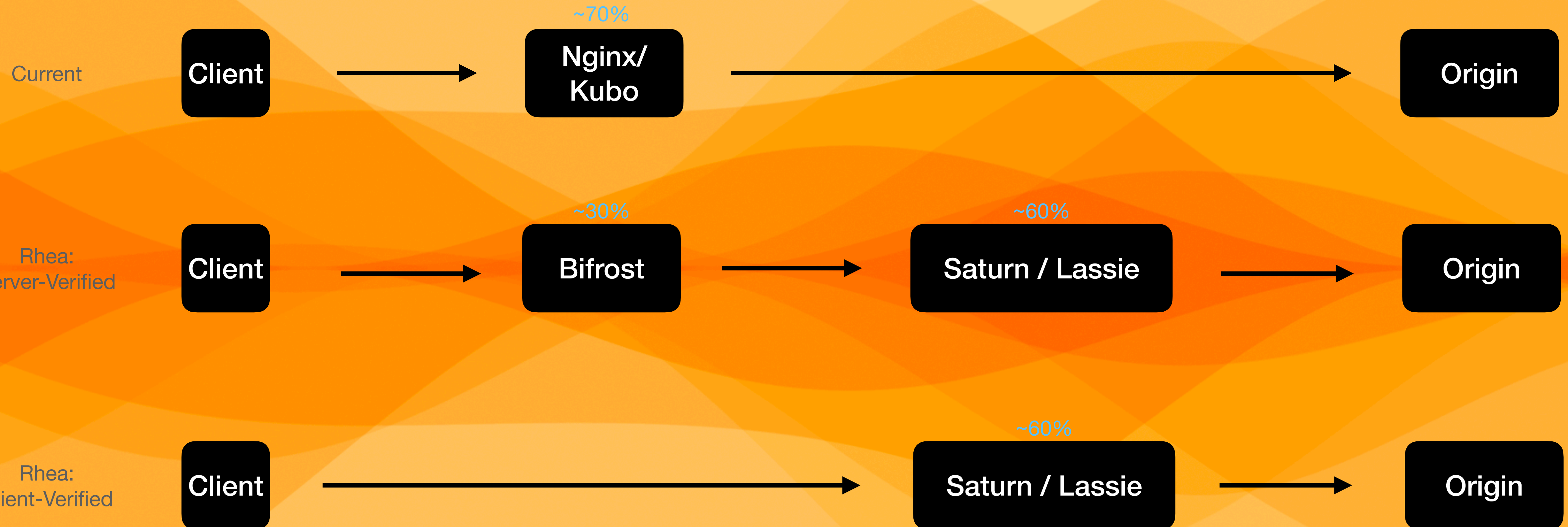
Rhea:
Server-Verified



Rhea:
Client-Verified

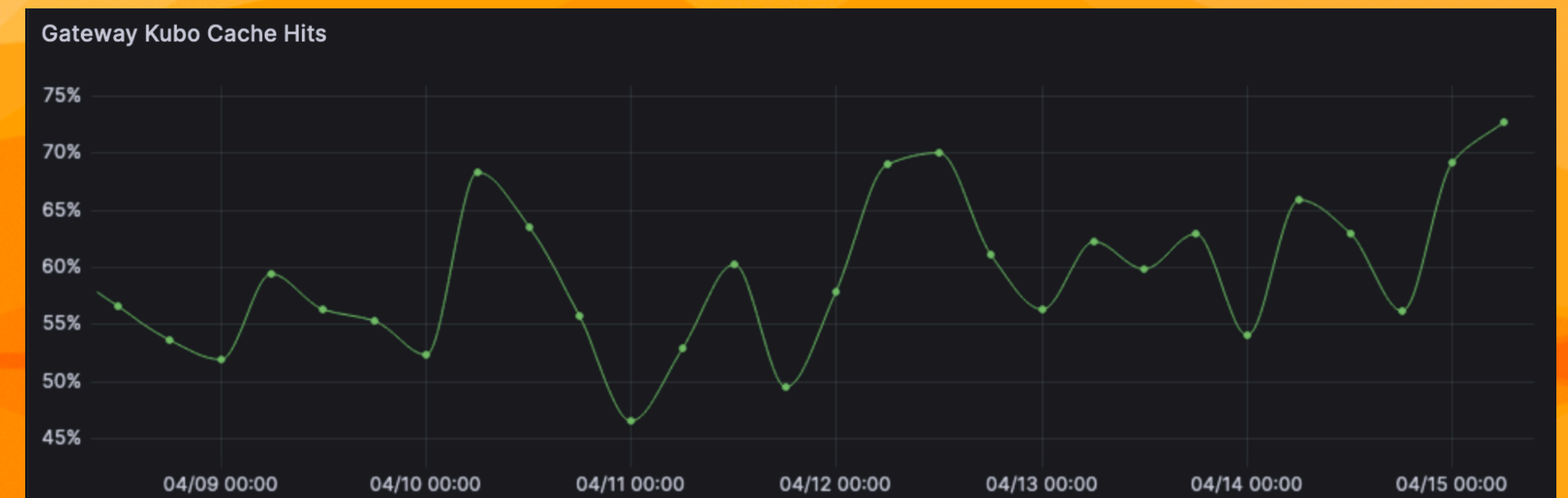
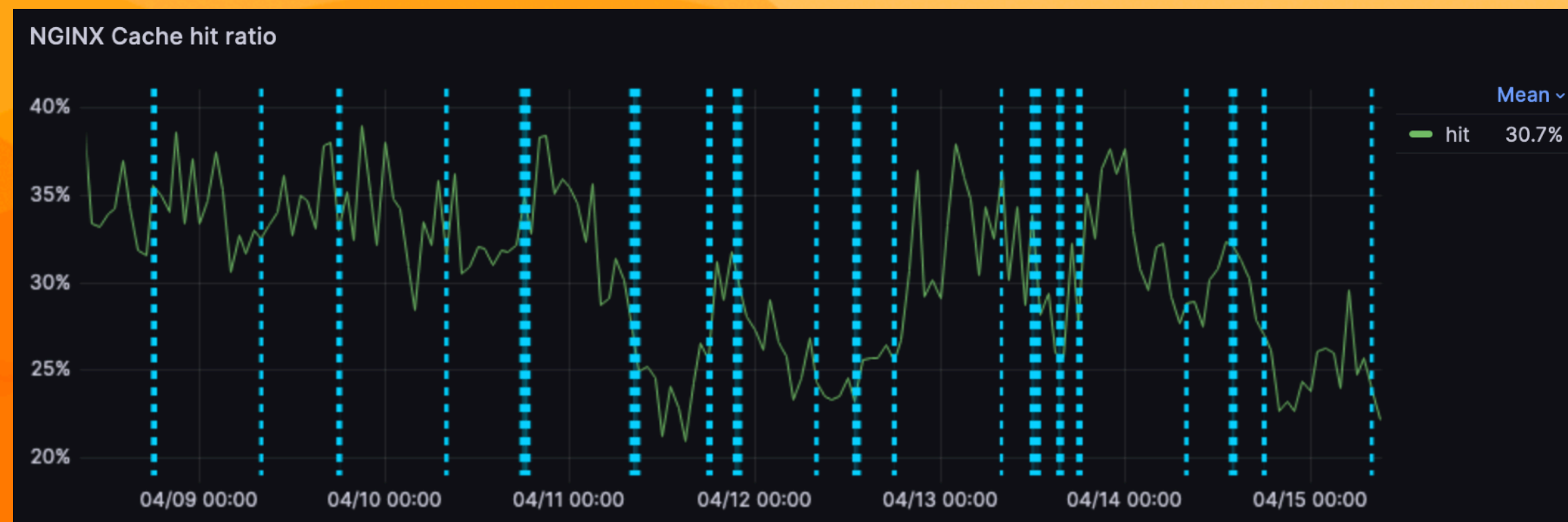


Cache hit rates



Cache hit rates

Current Gateway



Current

Client

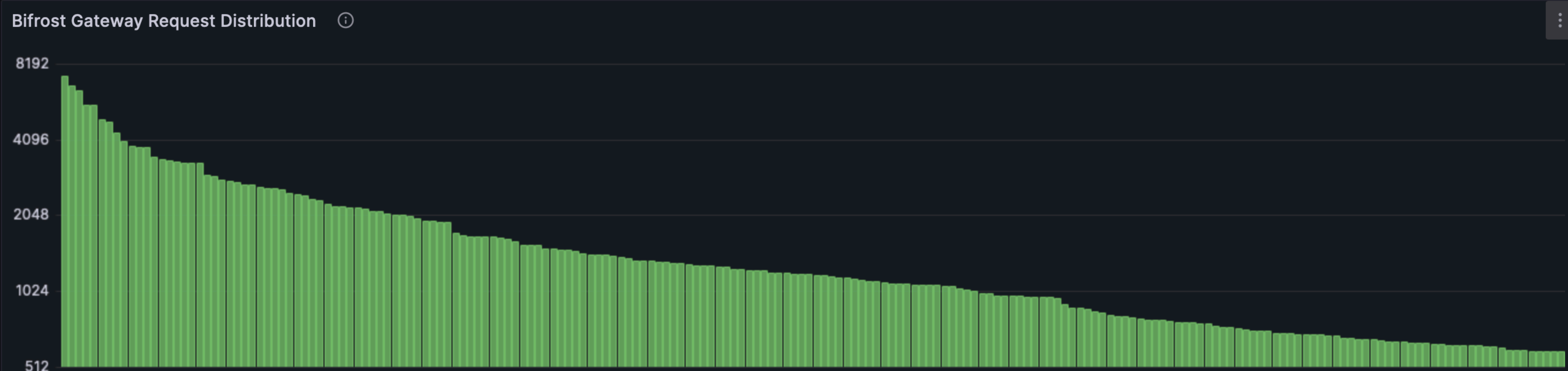


Nginx/
Kubo



Origin


Performance



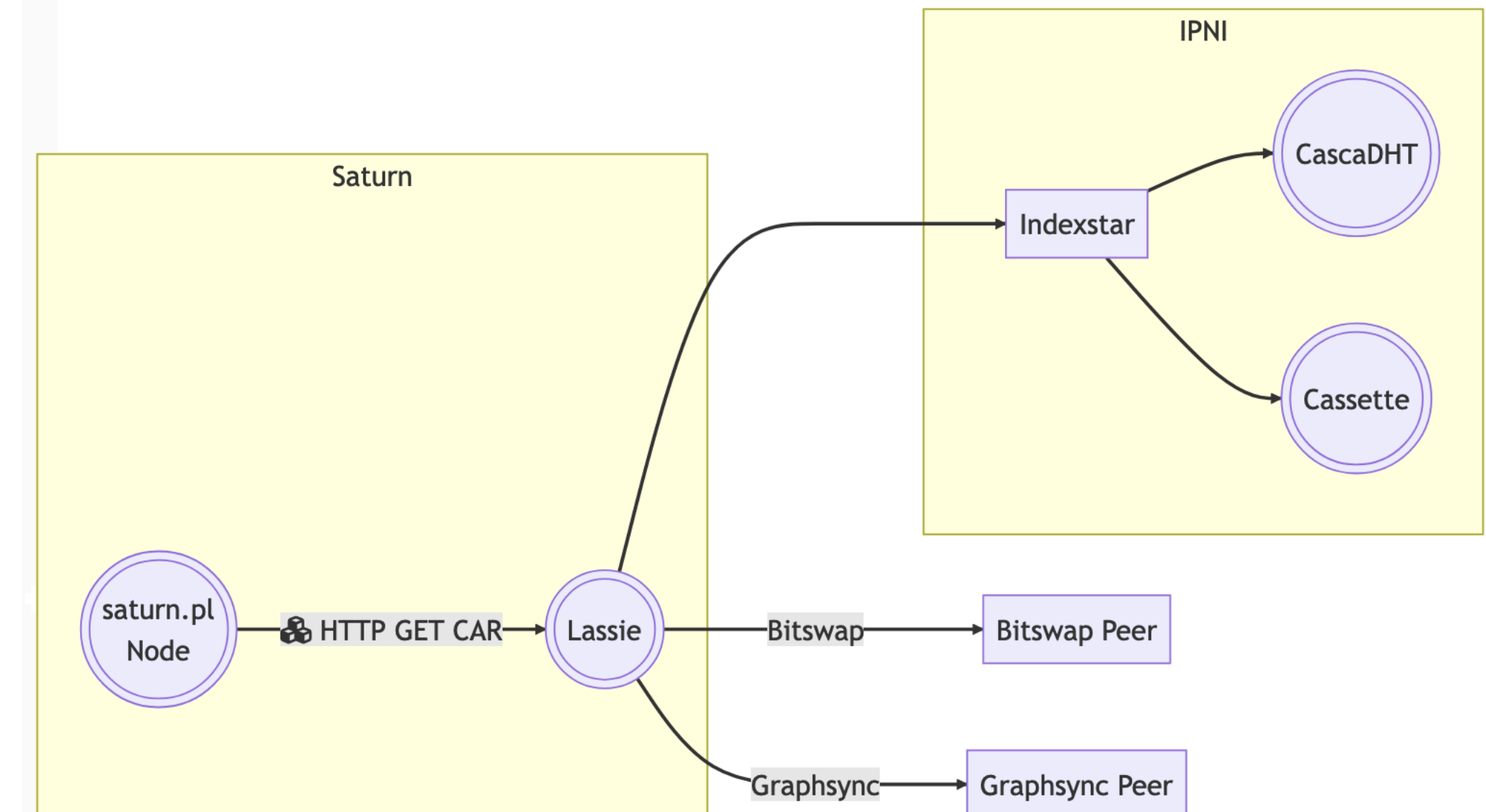
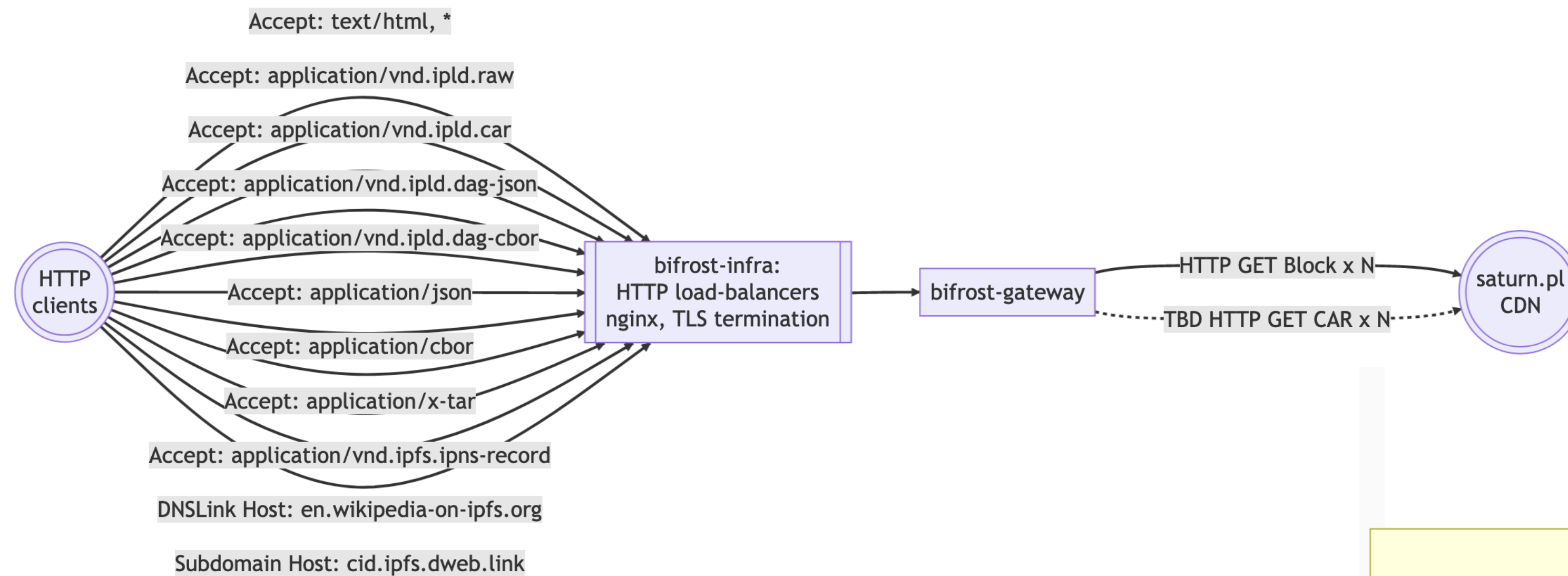
The background features a series of overlapping, wavy, organic shapes in various shades of teal, light blue, and dark blue. These shapes create a layered, mountain-like or cloud-like effect against a solid dark blue background. The text is centered horizontally and partially overlaid by these shapes.

What are we building?

What are we building?

- Bifrost-Gateway
 - Boxo / Gateway
 - Caboose
- L1-Node
 -  LASSIE
- IPNI
 - Cascadht, Cassette

What are we building?



Progress to Date

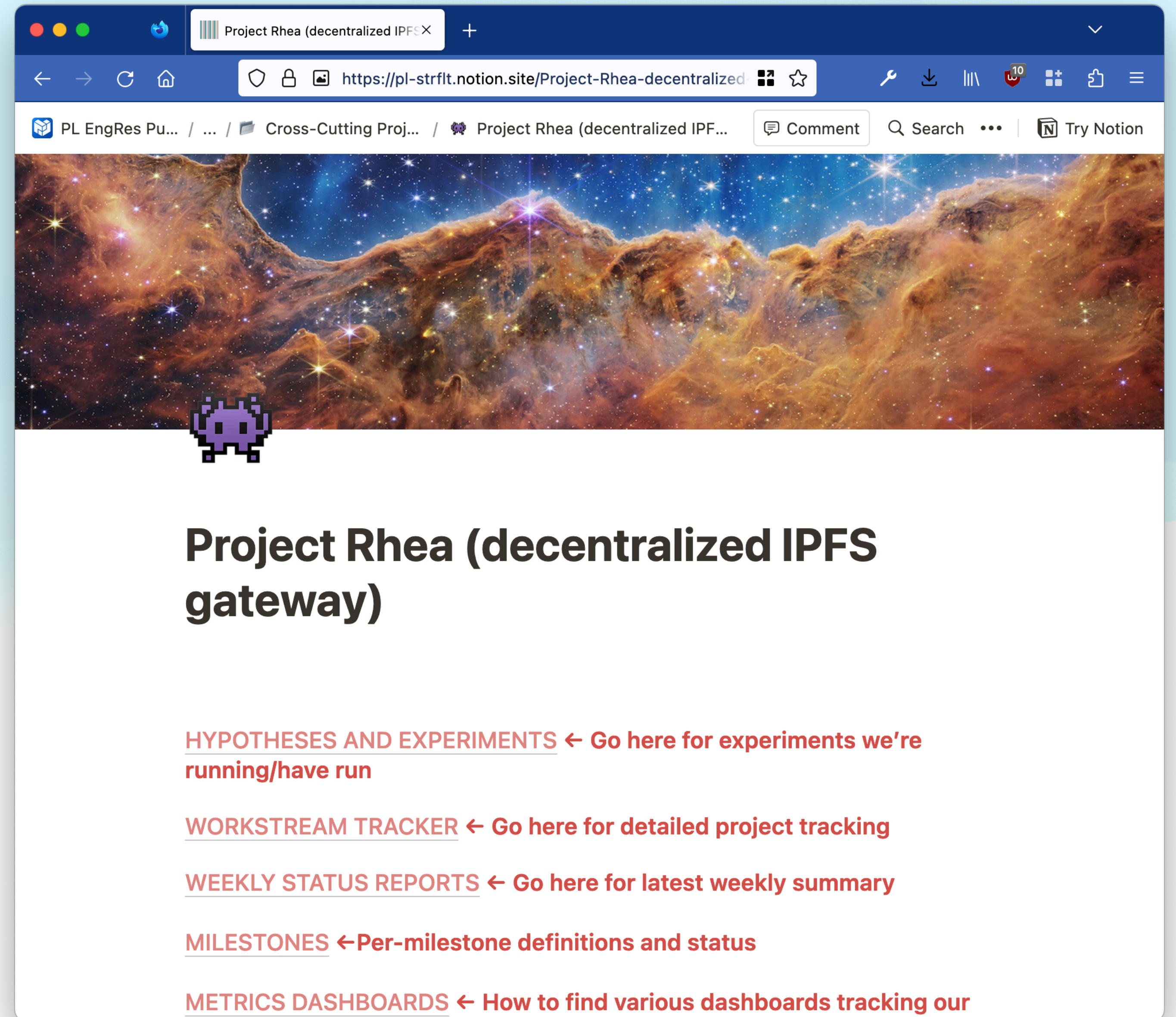
Progress to Date

- 30% production traffic mirrored to bifrost-gateway / saturn
- Partial rollout of verifiable-car requests
 - Currently: “Fetch CAR into shared memory blockstore and serve response along with a blockservice that does block requests for missing data”
 - Next: “do the walk locally. if a path segment is incomplete, make follow-up requests”

Progress to Date

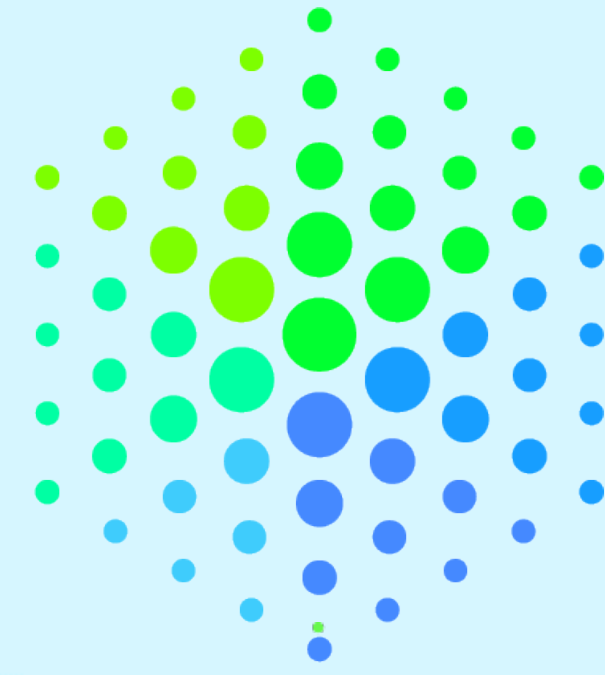
- Caboose
 - Current: uses a dynamic ‘stable hash’ assignment of known nodes
 - Next: fixed-size pool of “best” nodes.
- Lassie
 - Current: Identifying upstream over-fetching / amplification
 - Next: HTTP transport

Progress to Date



Progress to Date

[illegible]



HTTP Gateways

Will Scott - April 17th