

THE FEDIVERSE SIX MONTHS FROM NOW



Stephen Downes

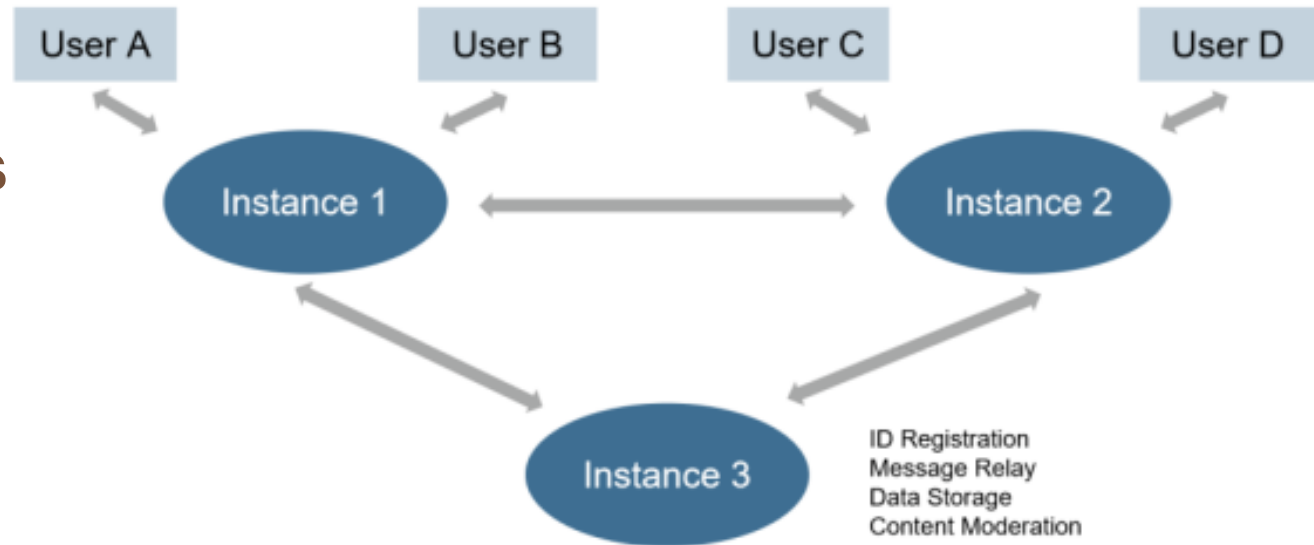
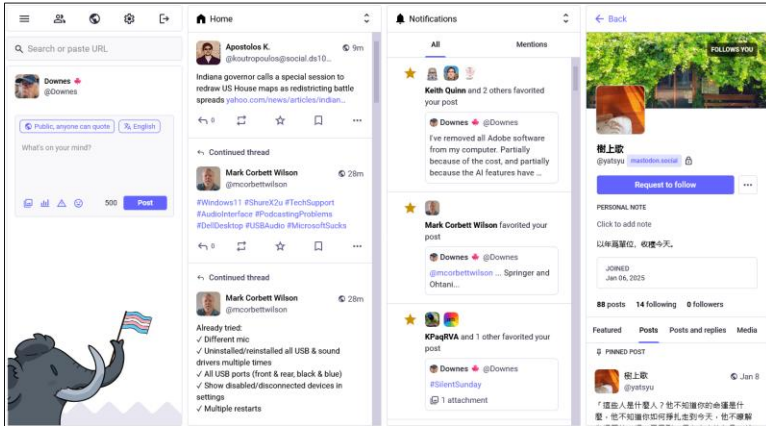
Reclaim Open Conference

November 5, 2025



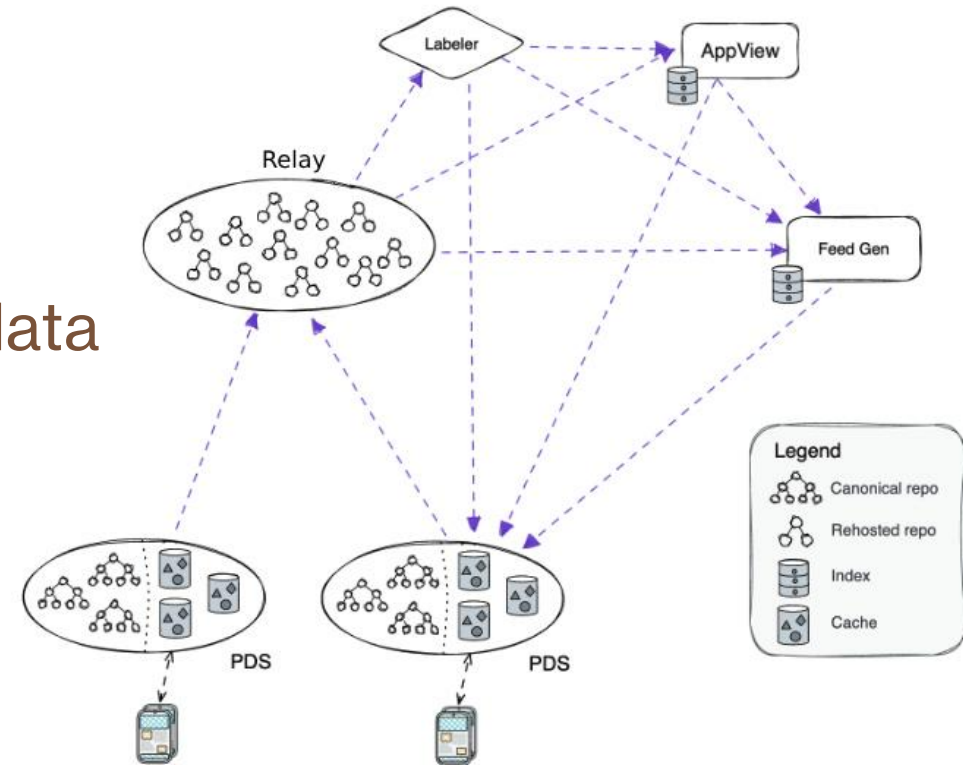
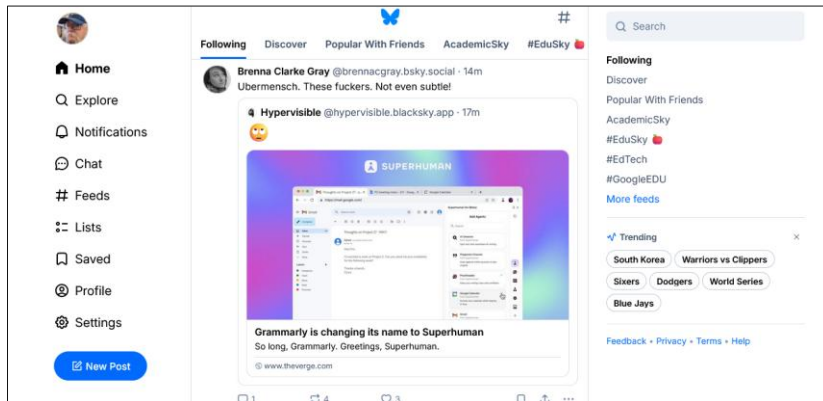
WHAT IS THE FEDIVERSE?

- Multiple servers (aka 'instances') instead of a single server
- Interactions between users on different servers

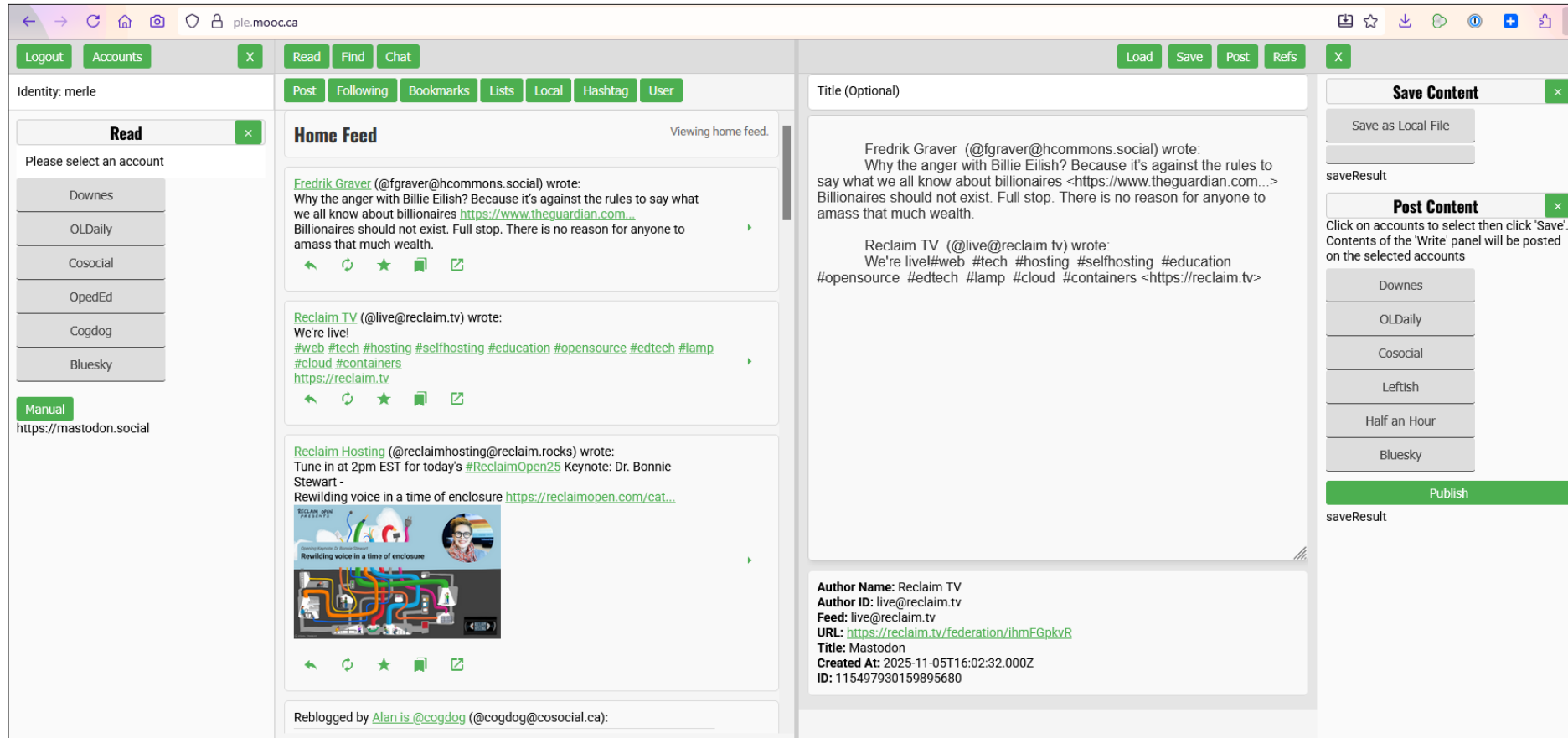


ACTIVITYPUB vs ATMOSPHERE

- Multiple personal data servers (PDS)
- Relay aggregates (new) content from PDSs
- App provides a 'view' from the Relay data



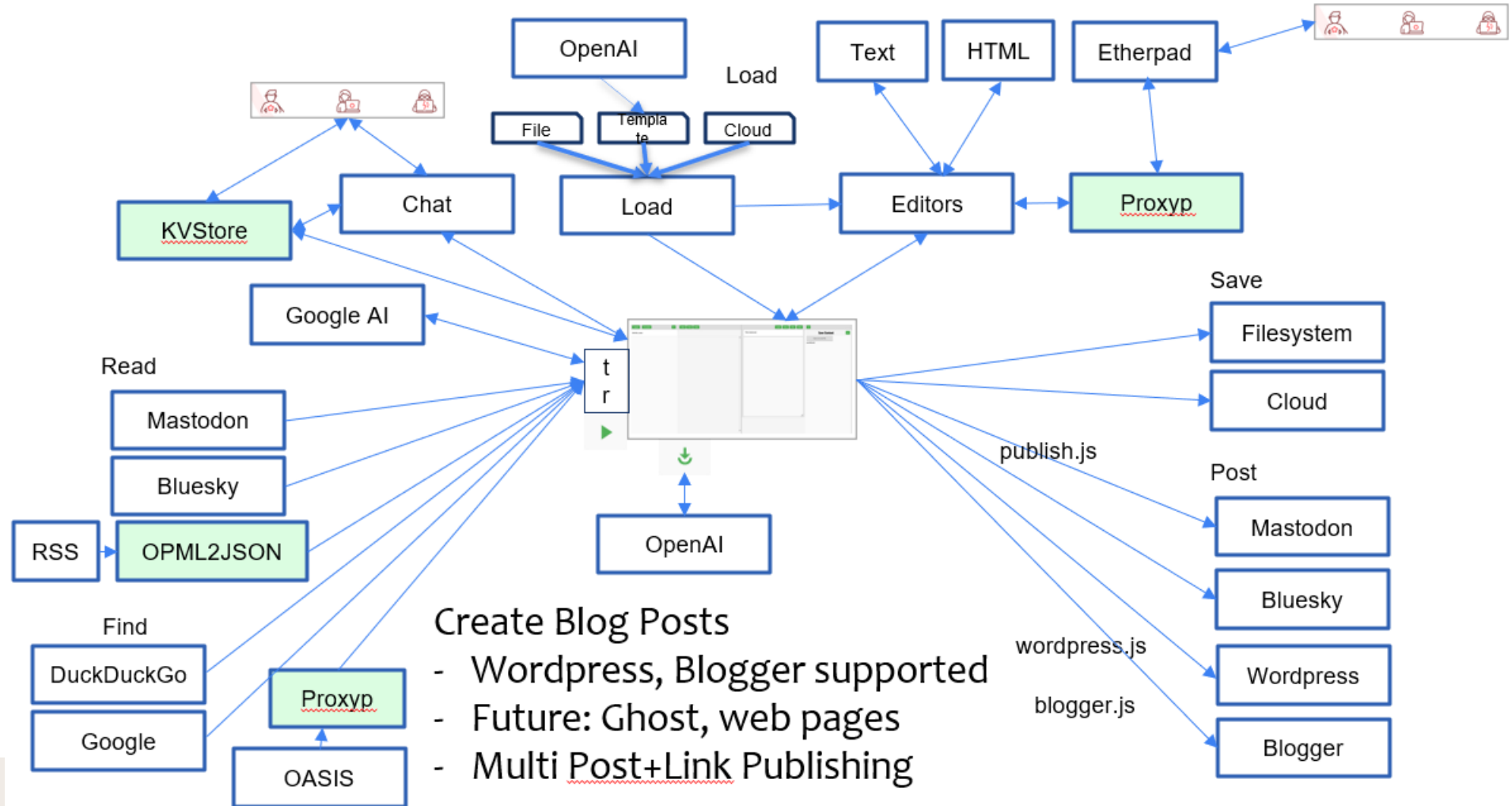
WHERE I'M COMING FROM



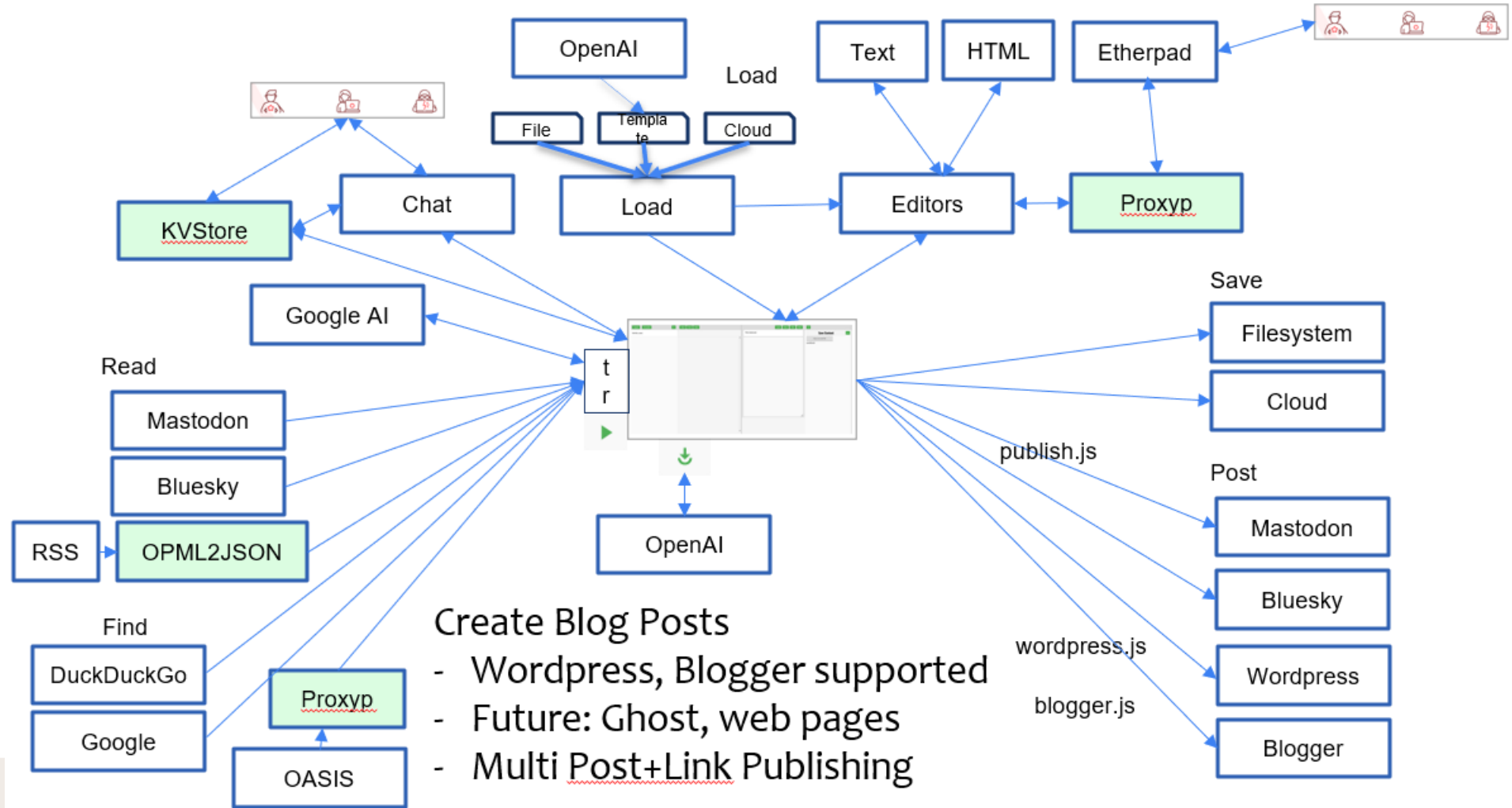
<https://ple.mooc.ca>

<https://www.downes.ca/presentation/594>

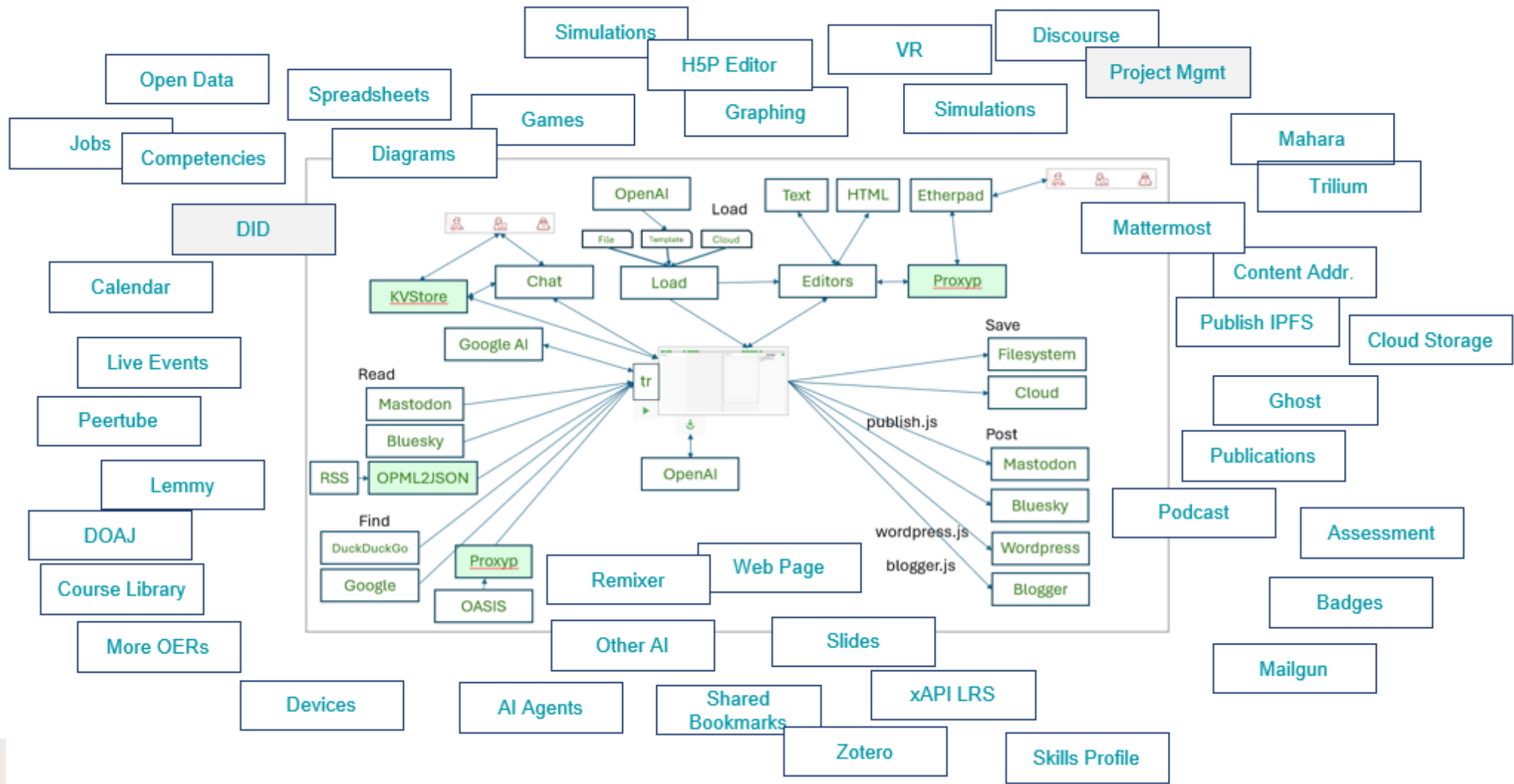
WHERE I'M COMING FROM



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THE FUTURE



DESIGN CONSIDERATIONS

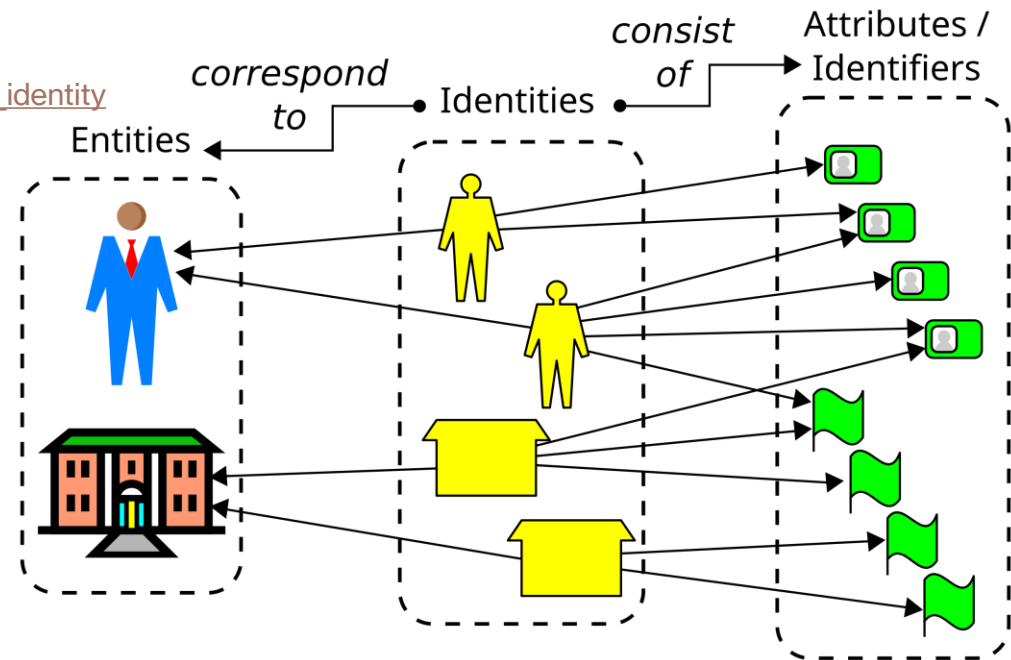
Issues related to decentralized identity

- OAuth2 <https://auth0.com/intro-to-iam/what-is-oauth-2>
- OIDC <https://openid.net/developers/how-connect-works/>
- Self-Sovereign Identity https://en.wikipedia.org/wiki/Self-sovereign_identity

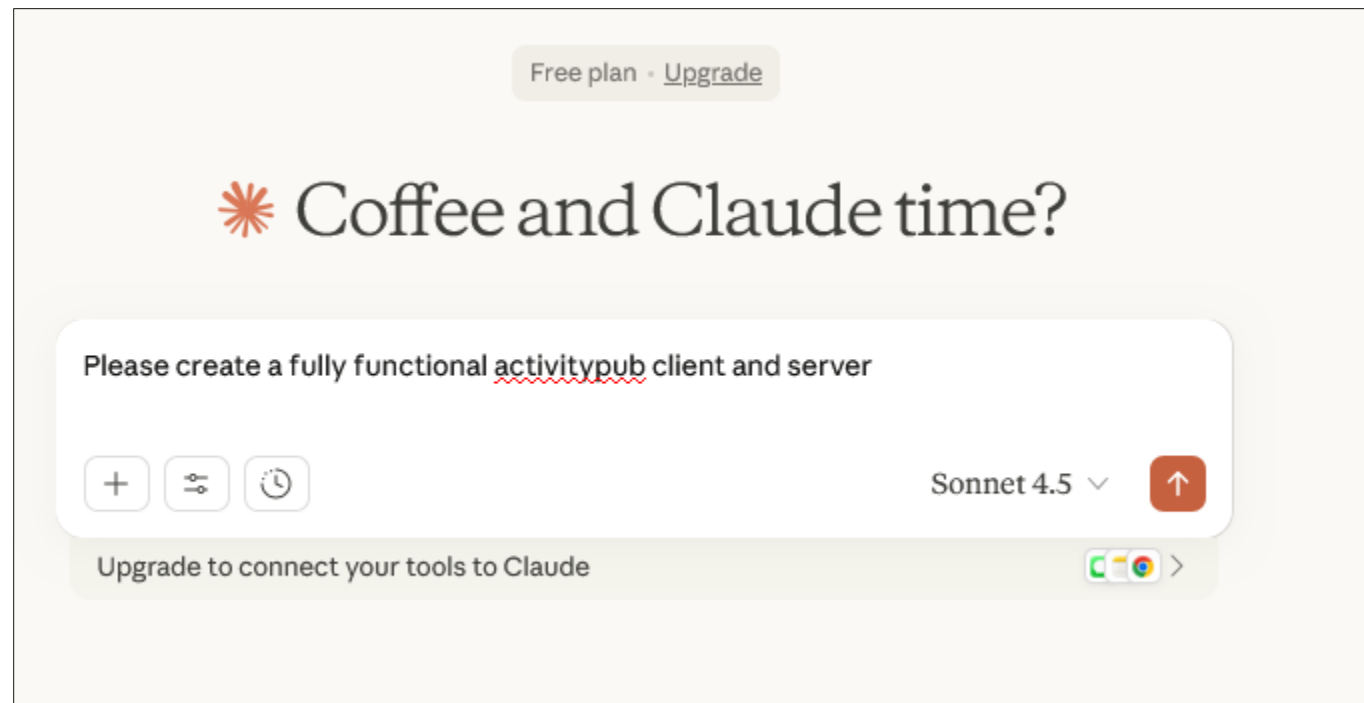
Key-Value Stores

- Cloud, e.g. Vault
- Host, e.g. 1Password

Dock. Decentralized Identity: The Ultimate Guide.
<https://www.dock.io/post/decentralized-identity>



THE REAL FUTURE



THE REAL FUTURE

Building an ActivityPub client and server

SD

Please create a fully functional activitypub client and server

I'll create a fully functional ActivityPub client and server for you. This will be a complete implementation that can federate with other ActivityPub servers like Mastodon.

ActivityPub Client & Server

Interactive artifact

I've created a fully functional ActivityPub client and server! Here's what it includes:

Key Features:

- 1. Complete ActivityPub Implementation:**
 - Valid Actor objects (Person type)
 - Create activities for posts (Notes)
 - Follow, Like, and Announce (boost) activities
 - Proper inbox/outbox/followers/following endpoints
- 2. Client Features:**
 - Create and switch between multiple users
 - Compose and publish posts
 - Follow other users
 - Like and repost (announce) posts
 - View user profiles with follower counts
- 3. Server Functionality:**
 - Generates ActivityPub-compliant JSON-LD objects

How can I help you today?

Sonnet 4.5

Create Your Account

Choose a username

Create Account

THE REAL FUTURE

Building an ActivityPub client and server

- Follow other users
- Like and repost (announce) posts
- View user profiles with follower counts

3. Server Functionality:

- Generates ActivityPub-compliant JSON-LD objects
- Implements the ActivityStreams vocabulary
- Proper addressing (to/cc fields)
- Public key infrastructure references

4. Federation View:

- See the actual ActivityPub JSON being generated
- View your Actor object
- Inspect activity payloads
- See server endpoint structure

How It Works: The app generates real ActivityPub objects that would federate with servers like Mastodon, Pleroma, or Pixelfed. All data persists across sessions using storage, and the JSON structures follow the W3C ActivityPub specification exactly.

Try creating an account, making some posts, following users, and then check the Federation tab to see the actual ActivityPub protocol messages being generated!



Claude can make mistakes. Please double-check responses.

How can I help you today?

Sonnet 4.5

 ActivityPub

HomeUsersFederation

Downes
@Downes@myserver.social

Federation

This is a working ActivityPub implementation. The server generates valid ActivityPub objects including Actor profiles, Notes (posts), Follow, Like, and Announce activities.

Your Actor Object

```
{
  "@context": "https://www.w3.org/ns/activitystreams",
  "id": "https://myserver.social/users/Downes",
  "type": "Person",
  "preferredUsername": "Downes",
  "name": "Downes",
  "inbox": "https://myserver.social/users/Downes/inbox",
  "outbox": "https://myserver.social/users/Downes/outbox",
  "followers": "https://myserver.social/users/Downes/followers",
  "following": "https://myserver.social/users/Downes/following",
  "publicKey": {
    "id": "https://myserver.social/users/Downes#main-key",
    "owner": "https://myserver.social/users/Downes",
    "publicKeyPem": "-----BEGIN PUBLIC KEY-----\n...\n-----END PUBLIC KEY-----"
  }
}
```

Sample Activity (Last Post)

```
{
  "@context": "https://www.w3.org/ns/activitystreams",
  "id": "https://myserver.social/users/Downes/activities/1762360556819",
  "type": "Create",
  "actor": "https://myserver.social/users/Downes",
  "published": "2025-11-05T16:35:56.819Z",
  "to": [
    "https://www.w3.org/ns/activitystreams#Public"
  ],
  "cc": [
    "https://myserver.social/users/Downes/followers"
  ],
  "object": {
    "@context": "https://www.w3.org/ns/activitystreams",
```

THE SORT OF SERVICES LEADING TO THIS

- ActivityPub Fuzzer – emulates different dialects that are used in ActivityPub

<https://asml.cyber.harvard.edu/2025/10/01/introducing-the-asml-activitypub-fuzzer-improving-testing-in-the-fediverse/>

- Ibis Wiki – integration with OAuth https://ibis.wiki/article/Ibis_0.3.0_-_Fediverse_Integration_OAuth_and_More

- Privacy-preserving interoperability

<https://socialwebfoundation.org/2025/07/09/report-privacy-preserving-interoperability-and-the-fediverse/>



- Fedify - Typescript library for building fediverse servers
<https://fedify.dev/>

Image: <https://www.einpresswire.com/article/636875889/fedica-expands-into-the-fediverse-by-offering-new-social-media-tools-for-mastodon-facebook-instagram>

SINGLE SIGN-ON – FOR THE WORLD

- Many accounts, one identity (or more than one, my choice)
- Eg. W3C's DID specification <https://www.w3.org/TR/did-1.0/>
- Connected with 'real' digital identity services (e.g. EUDI, ORCID, etc) <https://digital-strategy.ec.europa.eu/en/policies/eudi-regulation> <https://orcid.org/>

ChatGPT 5 ▾

Let's Create One Now

Tell me which you want:
Reply with A, B, or C.

Option	Type	Best For	Difficulty
A	did:key	Immediate use, dev, cryptography	★
B	did:web	Domain-owned identity	★★
C	did:ion	Long-term decentralized identity	★★★

✅ If you choose A — did:key, I will:

- generate a fresh keypair for you
- give you your DID
- give you your DID document
- explain how to store and use it

🌟 **Important:** I will **never** store your keys, but still generate only if you confirm.

⚠️ **Before I generate anything**

I need one thing from you:

+ Ask anything

ChatGPT can make mistakes. Check important info. See [Cookie Preferences](#)

✅ **DID Document Template (for your did:key)**

Replace the `id` and key values with yours:

```
json
{
  "@context": [
    "https://www.w3.org/ns/did/v1"
  ],
  "id": "did:key:z6Mkok...yourKey",
  "verificationMethod": [
    {
      "id": "did:key:z6Mkok...yourKey#z6Mkok...yourKey",
      "type": "Ed25519VerificationKey2018",
      "controller": "did:key:z6Mkok...yourKey",
      "publicKeyMultibase": "zYourPublicKeyMultibase"
    }
  ],
  "authentication": [
    "did:key:z6Mkok...yourKey#z6Mkok...yourKey"
  ],
  "assertionMethod": [
    "did:key:z6Mkok...yourKey#z6Mkok...yourKey"
  ],
  "capabilityDelegation": [
    "did:key:z6Mkok...yourKey#z6Mkok...yourKey"
  ],
  "capabilityInvocation": [
    "did:key:z6Mkok...yourKey#z6Mkok...yourKey"
  ],
  "keyAgreement": [

```


PERSONAL DISTRIBUTED DATA SERVER

- Following from (e.g.) Ian O'Byrne's discussion of a digital garden

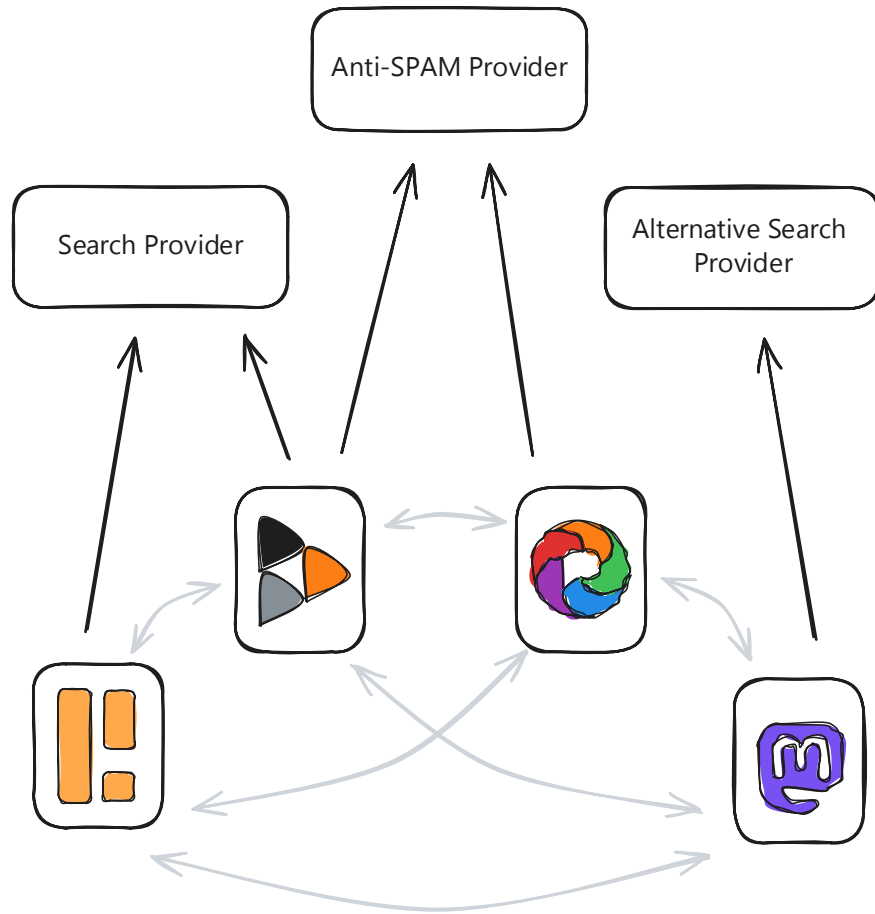
<https://www.youtube.com/watch?v=3xAyZxcQiaw>

- PWSAC (Publish wherever syndicate as convenient)
- Build your own PDS:

<https://github.com/bluesky-social/pds>



FEDIVERSE SERVICE PROVIDERS



- Eg. All-of-fediverse relays
- Eg. Bridgy connects to Indieweb, etc. <https://fed.brid.gy/>
- Ed. Fedi-Buzz Relay
<https://relay.fedi.buzz/>
- Relay List <https://relaylist.com/>

Image: <https://socialhub.activitypub.rocks/t/fediverse-relays/4626>

DISTRIBUTED COMMUNITIES

- Eg. Bonfire, which builds fediverse platforms; open science version Open Science Network.

<https://bonfirenetworks.org/>

<https://openscience.network/>

- Decentralized Communities

<https://tchop.io/resources/glossary/community-building/decentralised-communities>



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<https://www.downes.ca>

