Open Learning in the Metaverse

Stephen Downes

https://www.downes.ca

October 18, 2022

As a new generation of digital technologies evolves we are awash in new terms and concepts: the metaverse, the fediverse, blockchain, web3, acitivitypub, and more.

Participants will see clearly the relation between such diverse concepts as digital badges and credentials, cloud-based services, open data management, activity records and tools interoperability, and persistent digital objects such as digital IDs and non-fungible tokens.

This is a technical presentation that is structured and designed for a non-technical audience.

- This presentation will also consider these technologies from a critical perspective, addressing affordances alongside potential risks and impacts, pedagogical considerations, access and equity, issues of privacy and security, and the role of policy and legislation. Participants will learn specific steps they can take to limit the adverse impacts of new forms of corporate control, surveillance and oversight, disinformation, and related harms.

- Identify and describe a range of emerging technological concepts associated with web3 and the fediverse

- Suggest ways and refer to examples that demonstrate the application of these technologies in open online learning

- Take specific steps to mitigate adverse impacts of these technologies on open learning

What is Open Learning?

"An educational approach which combines the principles of:

- learner-centredness,
- lifelong learning,
- flexibility of learning provision,
- the removal of barriers to access learning,
- the recognition for credit of prior learning experience,
- the provision of learner support,
- the construction of learning programmes in the expectation that learners can succeed,
- and the maintenance of rigorous quality assurance over the design of learning materials and support systems."

Government of South Africa. (2017). Open Learning Policy Framework for Post-school Education and Training. Staatskoerant No. 40772, p. 363. https://static.pmg.org.za/170407openlearningframework-postschooleduc.pdf

What is Open Learning?
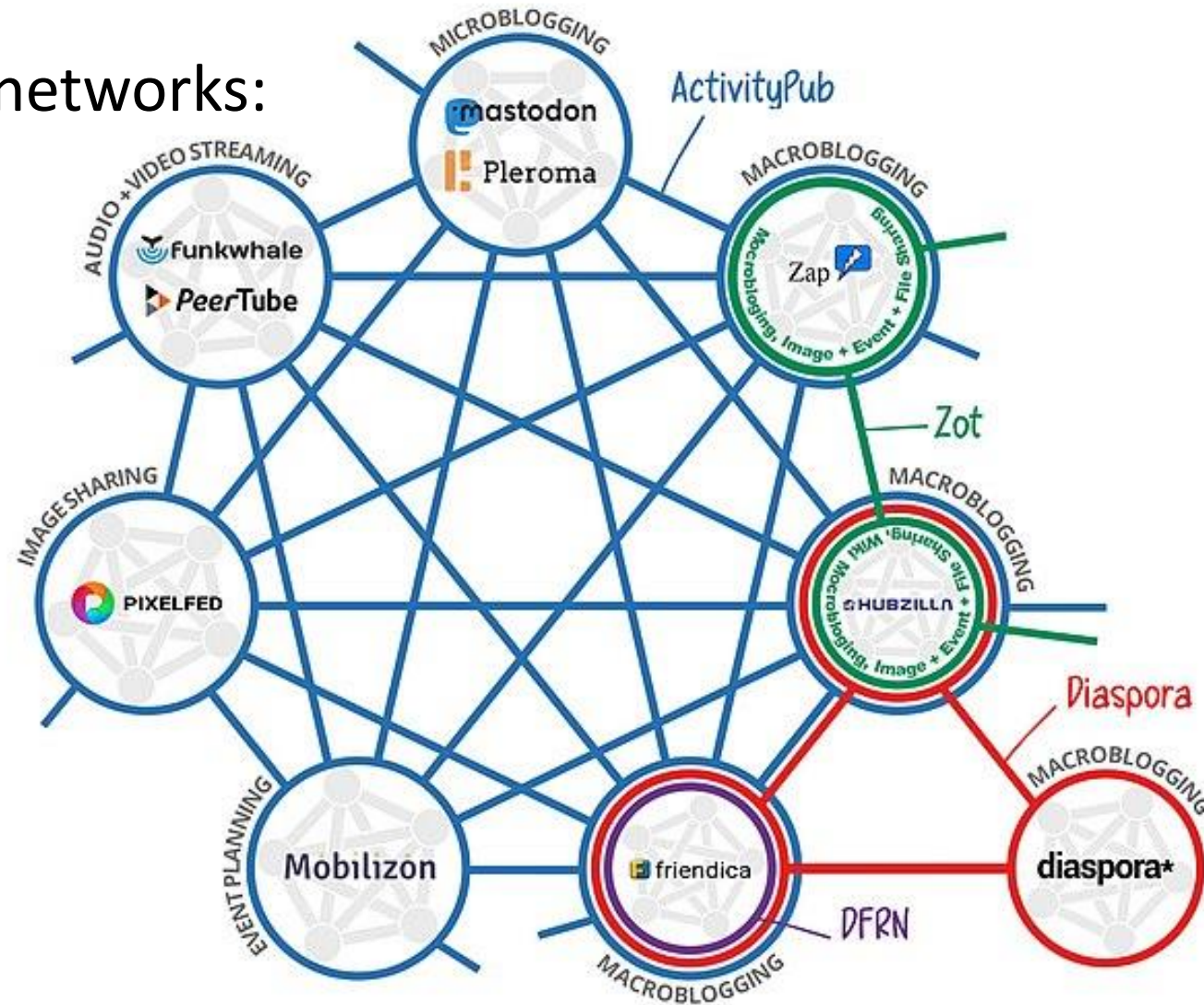
Dimensions of open learning:

Santos, Andreia & Punie, Yves & Castaño-Muñoz, Jonatan. (2016). Opening up Education: A Support Framework for Higher Education Institutions. Publications Office of the European Union, JRC101436
https://publications.jrc.ec.europa.eu/repository/handle/JRC101436

What is the Fediverse?

A network of networks:

Mike Kuketz. (2021). Das Fediverse: Social Media losgelöst von den Fesseln kommerzieller Interessen. Kuketz IT-Security Blog. https://www.kuketz-blog.de/das-fediverse-social-media-losgeloest-von-den-fesseln-kommerzieller-interessen/

The Redecentralization of the Web

Something in common:

Open Learning advocates

Fediverse advocates

REDECENTRALIZE

We've had enough of digital monopolies and surveillance capitalism. We want a world that works for everyone, just like the original intention of the web and net.

We seek a world of open platforms and protocols with real choices of applications and services for people. We care about privacy, transparency and autonomy. Our organisations and tools should fundamentally be accountable and resilient.

https://redecentralize.org/
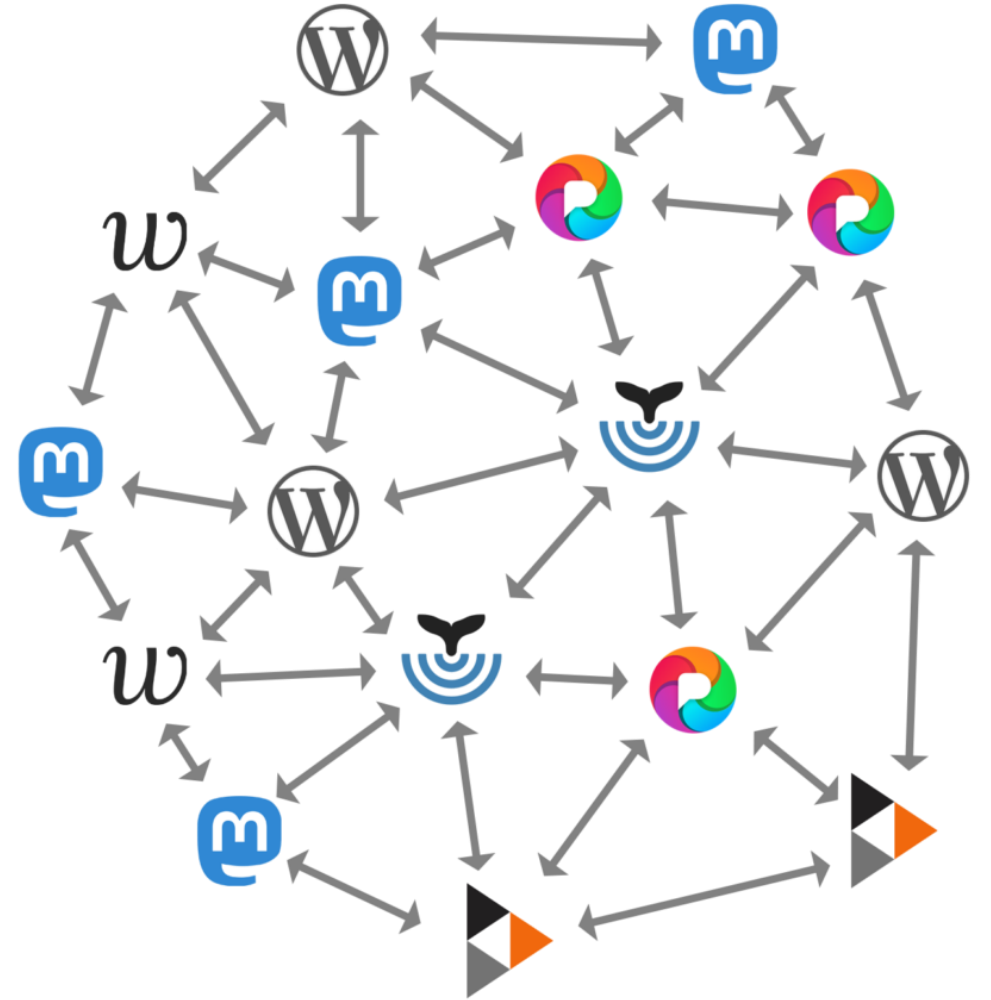
Imagining Redecentralization

A thought experiment:
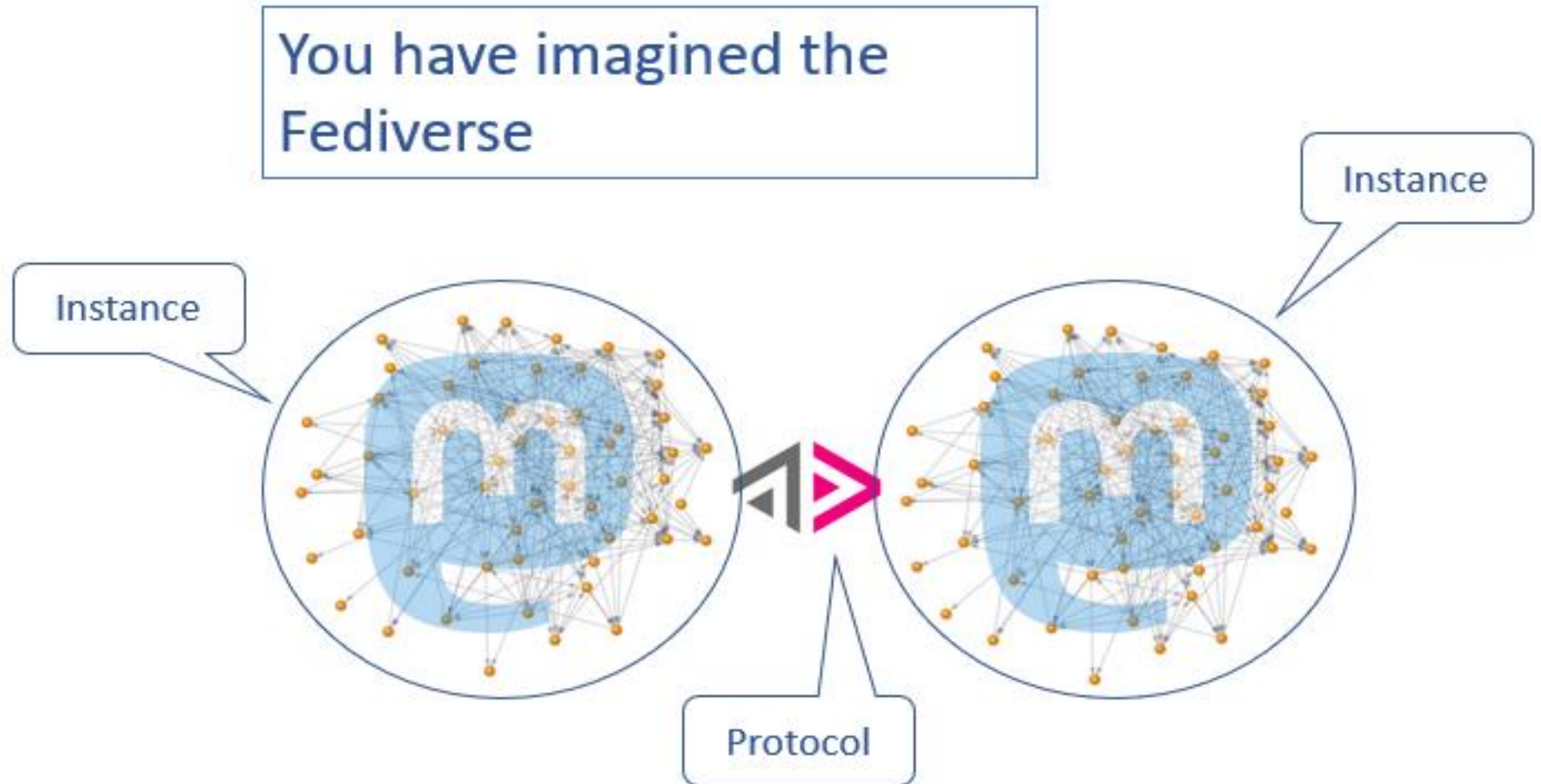
Why the Fediverse?

My site, my rules…

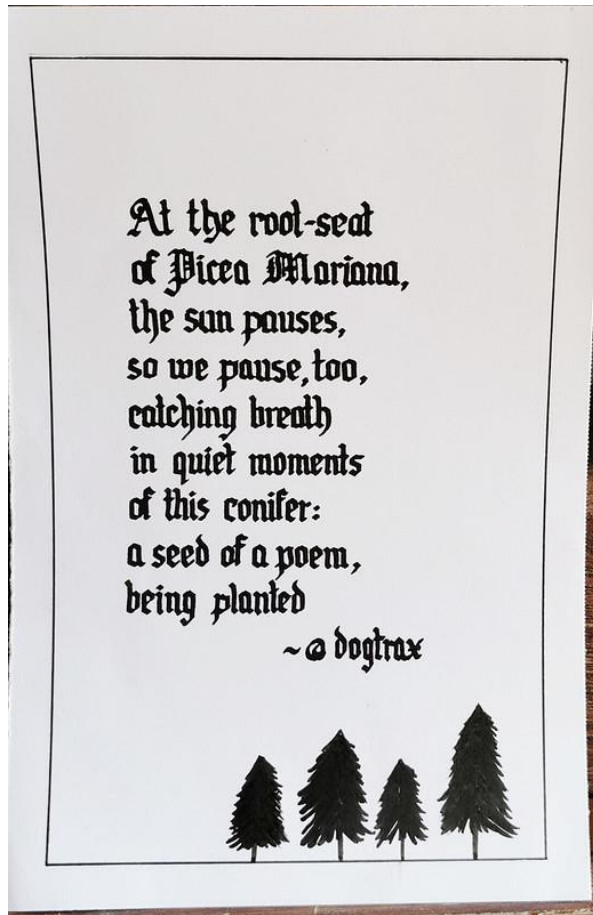"That's one of the many reasons I prefer Mastodon to Twitter: I pay with money, not my data. And there are actually enforced rules against abuse (and a specific no-Nazi policy, as the instance I'm on is based in Germany). No emphasis on 'freedom of speech is always good and we just need more of it to drown out the Nazis' kind of rhetoric on the instance I've joined."

https://blogs.ubc.ca/chendricks/tag/mastodon/

The Pedagogy of Small

Exploring narratives…

At the root-seat
of Picea Mariana,
the sun pauses,
so we pause, too,
catching breath
in quiet moments
of this conifer:
a seed of a poem,
being planted

~@ dogtrax

Some Open Learning Applications

Through this exploration, a series of potential benefits connected to a pedagogy of small have emerged including: making space for consent, accepting incomplete collectivities, celebrating resistance, embracing impermanence, seeking alternate possibilities, having time to have time and welcoming endings.

https://heretothere.trubox.ca/towards-a-pedagogy-of-small-a-continuing-journey/
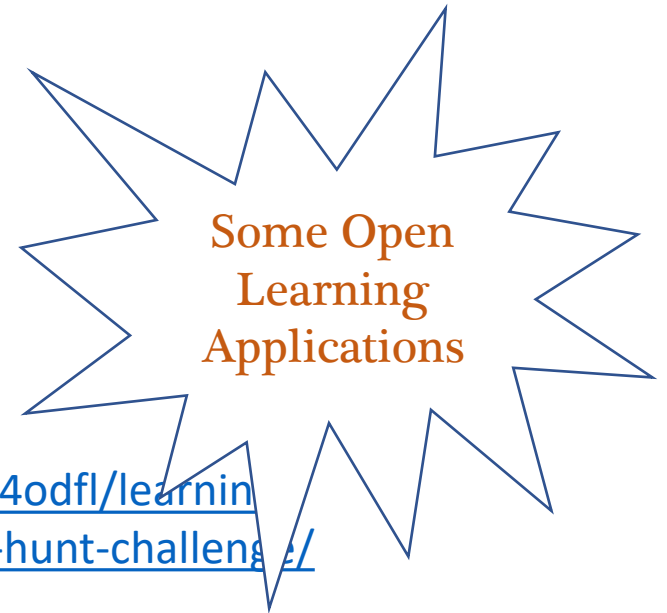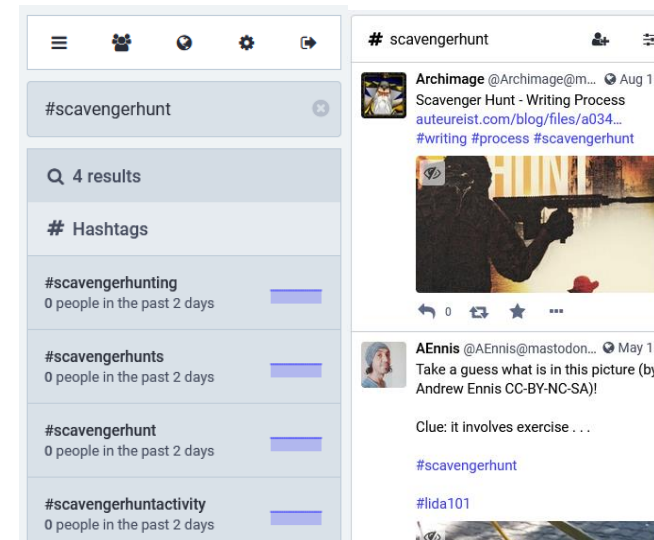
OERu Social Network

Connecting with hashtags
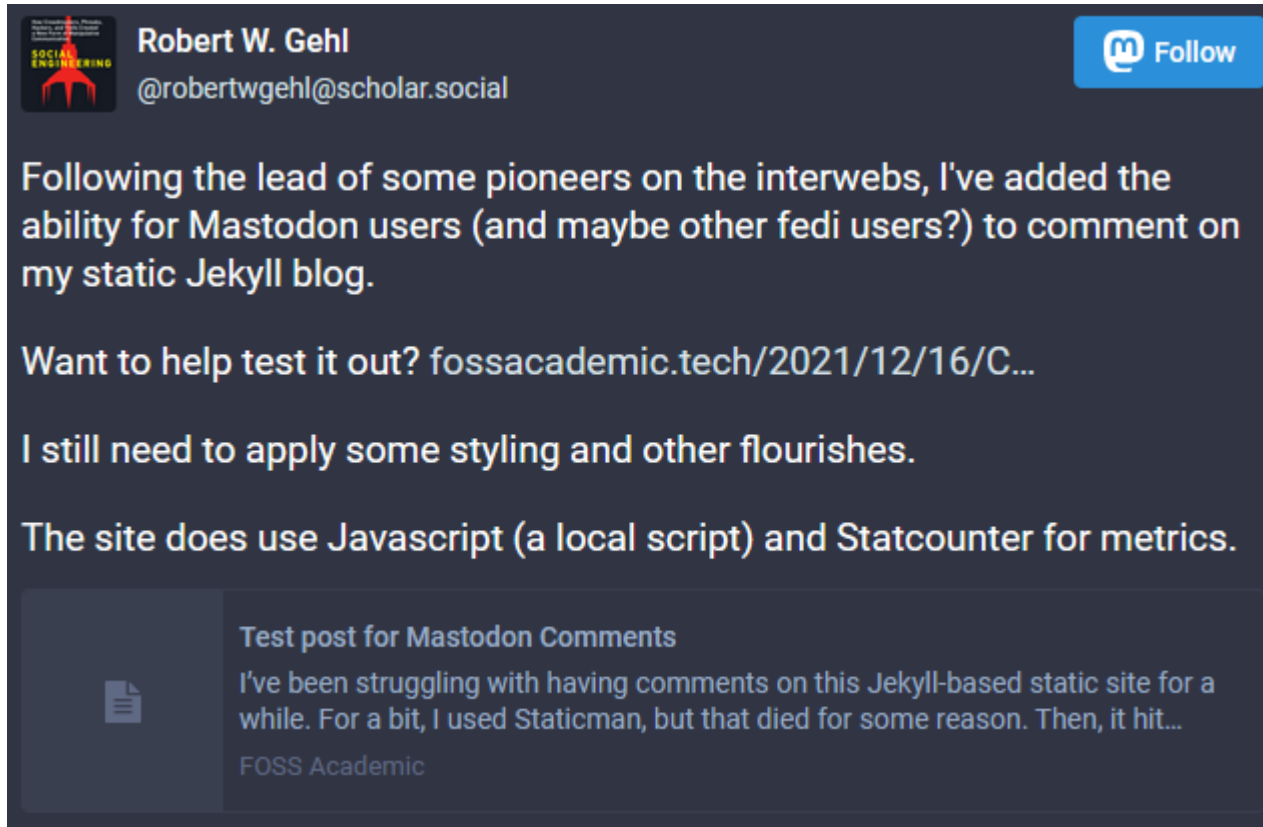

Scavenger hunt challenge
https://pacificopencourses.col.org/as4odfl/learnin
challenges/establish-a-ple/scavenger-hunt-challenge/

#scavengerhunt

Federated Commenting

Social networking and static content

Robert W. Gehl
@robertwgehl@scholar.social
Follow

Following the lead of some pioneers on the interwebs, I've added the ability for Mastodon users (and maybe other fedi users?) to comment on my static Jekyll blog.

Want to help test it out? fossacademic.tech/2021/12/16/C...

I still need to apply some styling and other flourishes.

The site does use Javascript (a local script) and Statcounter for metrics.

Test post for Mastodon Comments
I've been struggling with having comments on this Jekyll-based static site for a while. For a bit, I used Staticman, but that died for some reason. Then, it hit...
FOSS Academic

Some Open Learning Applications

https://fluid.quest/testing-comments-on-fediverse.html

https://scholar.social/@robertwgehl/107457359549037273

Not Just Microcontent

Different Types, Different Platforms

- **Pleroma** ([site](#)): Microblogging platform
- **Friendica** ([site](#)): Personal network
- **Lemmy**: Link aggregator
- **PeerTube** ([Fedi account](#), [site](#)): Video-hosting
- **PixelFed** ([site](#), [Fedi account](#)): Photo Sharing
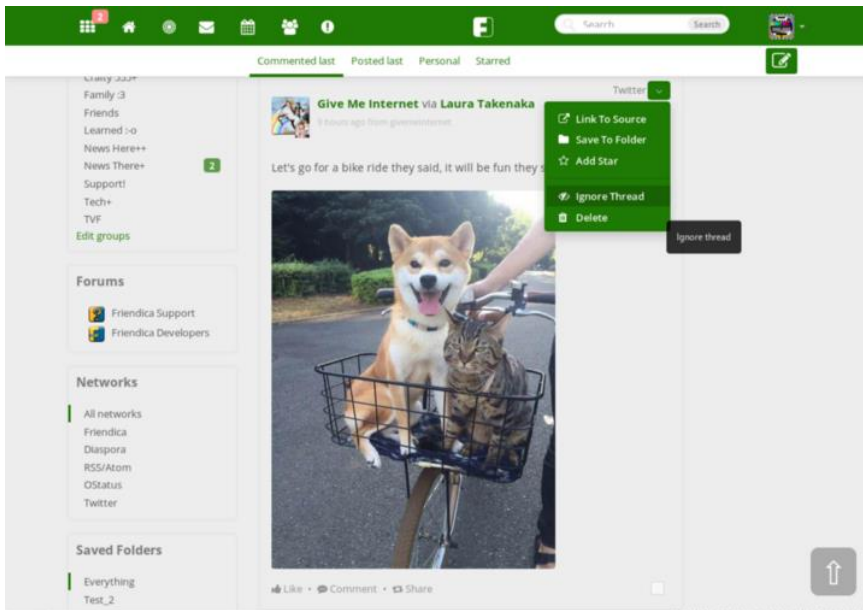- **Pubcast** ([site](#)): Podcasting platform
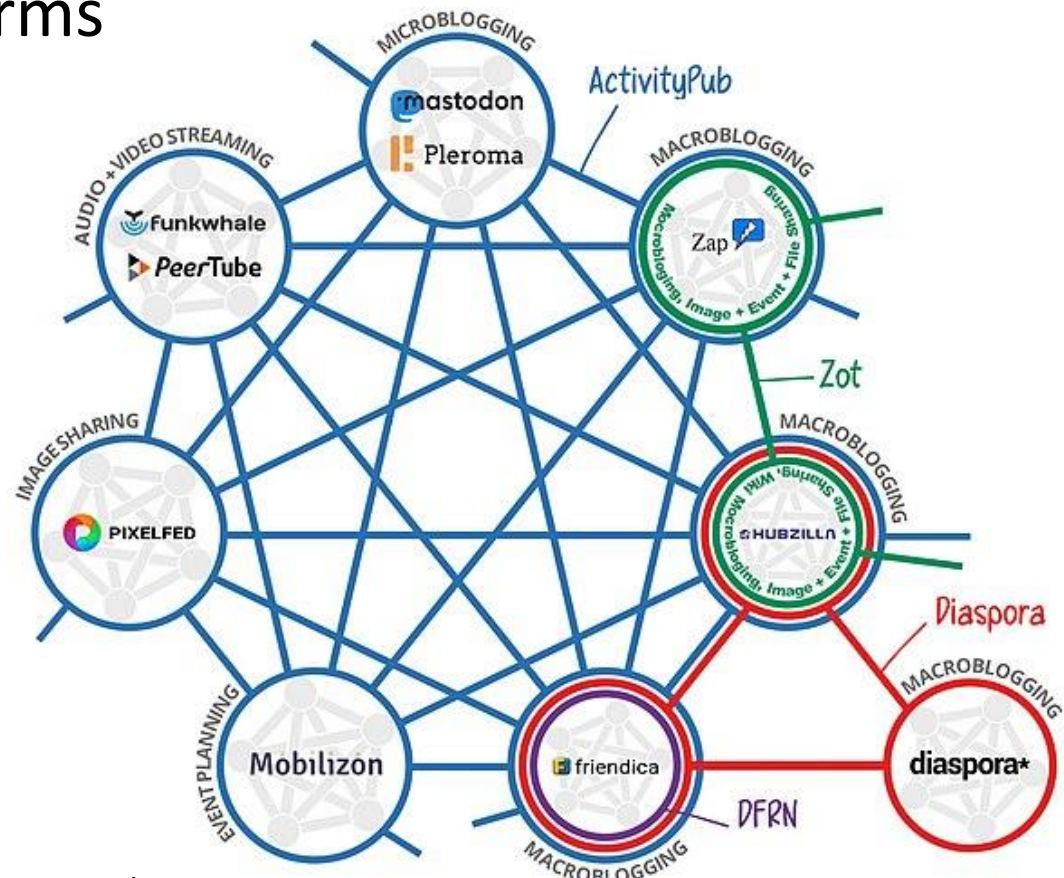
A curated list of Fediverse applications based on the ActivityPub protocol
https://codeberg.org/fediverse/delightful-fediverse-apps

Teaching and Learning With Frendica

Social networking without surveillance

"You have absolute control over your data to do with as you will: you can make it, change it, move it (in case you want to change nodes) or delete it forever. It is not subject to surveillance, data mining, or profiling for the purposes of targeted advertising or demographic data.

"This makes Friendica a space where students can make mistakes on social media that can be taken back; where our younger selves can post things that our embarrassed older selves can delete; where we aren't 100% accountable forever."

Matthew Turner, Teaching and learning with decentralized social networks: Friendica and the Free Network
https://medium.com/welands-smithy/teaching-and-learning-with-decentralized-social-networks-friendica-and-the-fediverse-d2a7afa831bd
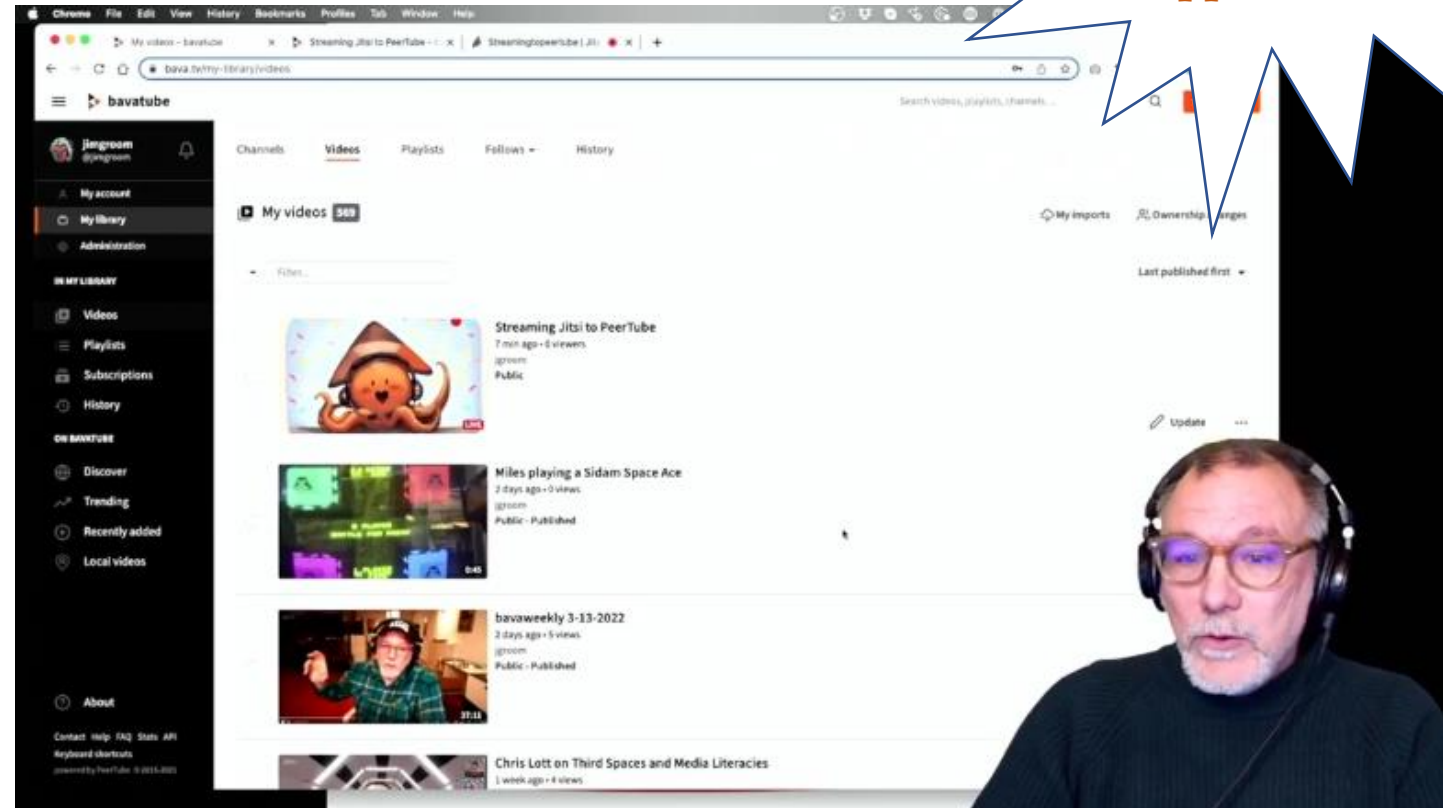
Streaming Jitsi through PeerTube Live

Live conferencing in the Fediverse

"One of the cool things Taylor Jadin discovered recently is how easy it is to stream a Jitsi web video call through PeerTube. After creating a live stream in PeerTube, you would grab the stream URL and the stream key from the Live Settings tab."
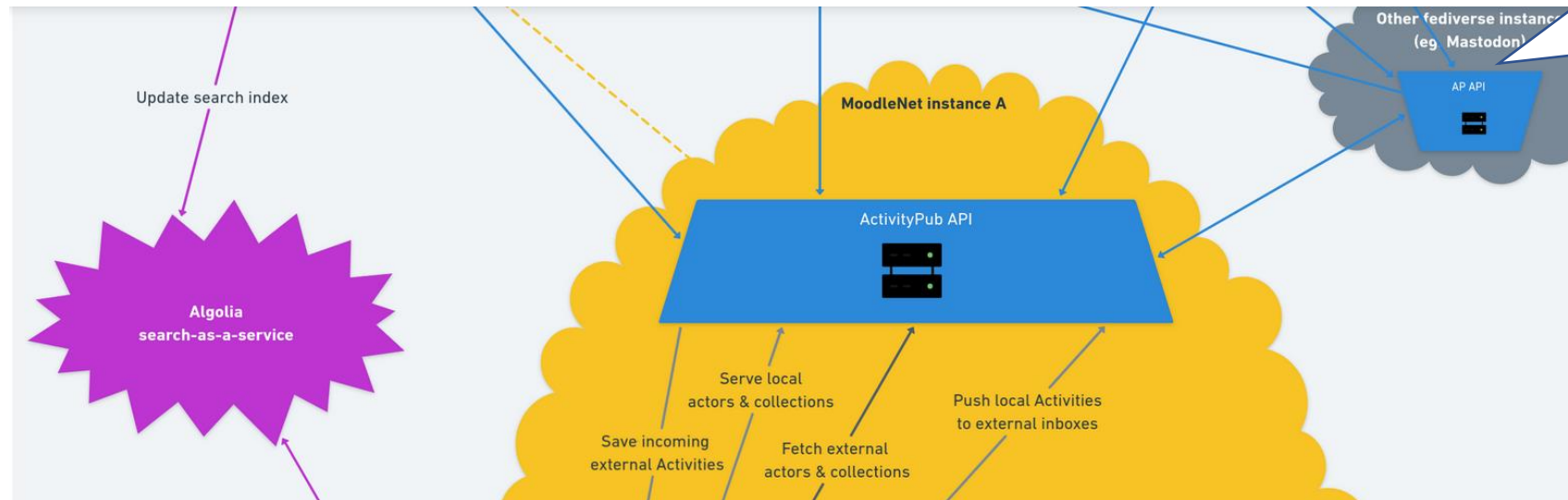
Jim Groom, https://bavatuesdays.com/streaming-jitsi-through-peertube-live/

Some Open Learning Applications

The Original MoodleNet

Federated content sharing in an LMS

Some Open Learning Applications

"There are many benefits to this type of decentralisation, including:
1. **Participation** – encourages diverse contributions
2. **Efficiency** – quicker, more locally-informed decisions
3. **Privacy** – allows organisations to keep some data private"

Doug Belshaw, https://moodle.com/news/moodlenet-what-is-a-federated-social-network/

Next Generation Digital Learning Ecosystem

A Federated Infrastructure…

"An inherently dynamic
living
environment
in which the place and its inhabitants are
interdependent,
and their many
interconnections enable the living
parts to grow in diverse ways."
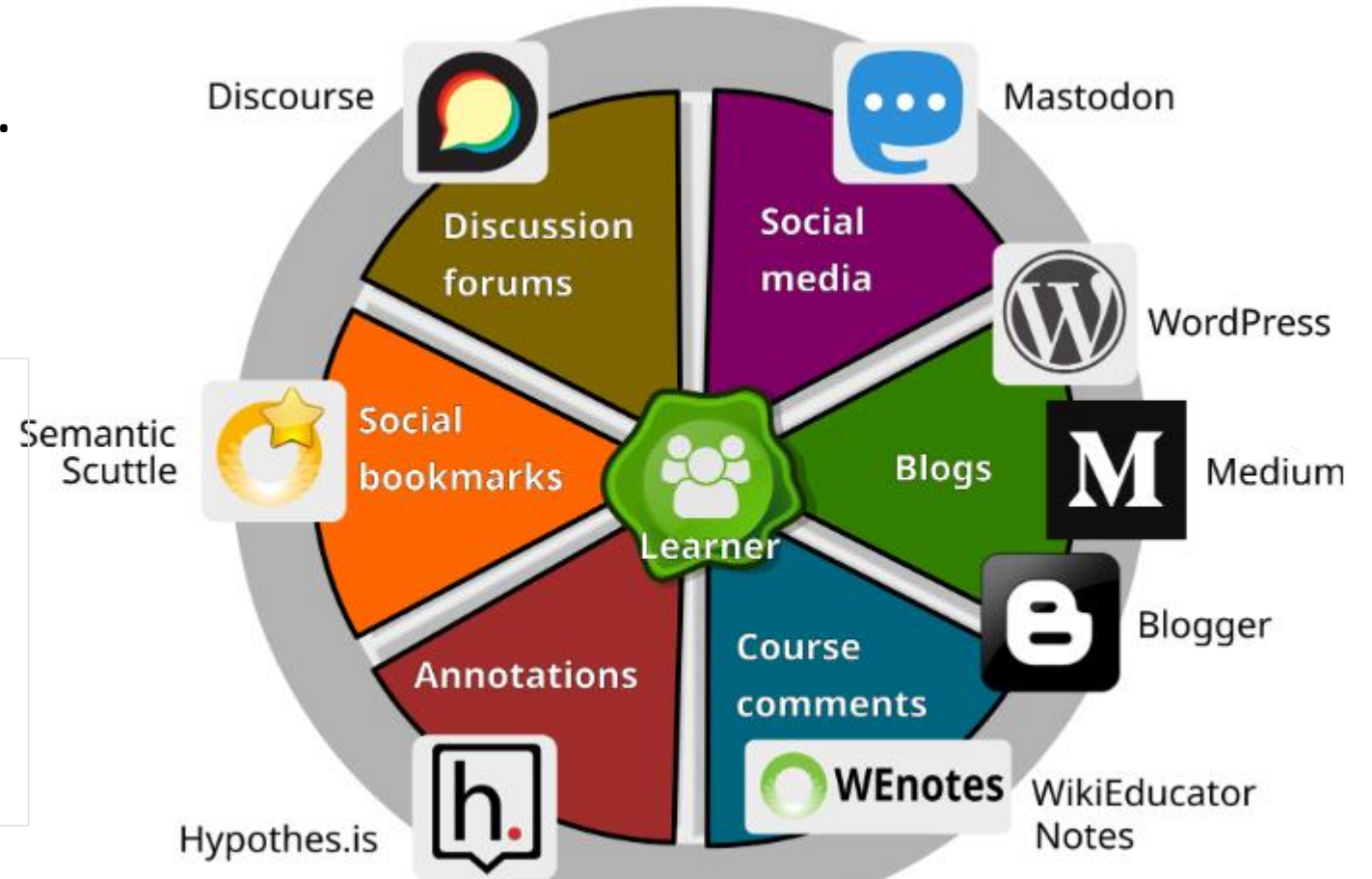
David C. Lane and Claire Goode, Open For All: The OERu's Next Generation Digital Learning Ecosystem. IRRODL 24-4. https://www.irrodl.org/index.php/irrodl/article/view/5763/5630

Decentralization Generally

Common elements of decentralized networks

Instances (aka Hubs, Servers, Pods...)

Individual web servers that can be hosted in the network or in the cloud.

There are different *types* of instance: Mastodon, Frendica, etc.

Instance2
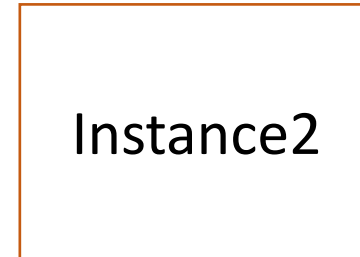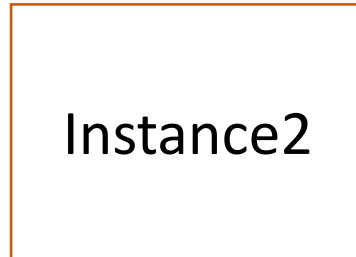
Instance2

Decentralization Generally

Common elements of decentralized networks

Protocols

Languages used by instances to communicate. For example:

- ActivityPub
- Diaspora
- Zot
- Atom
- SMTP
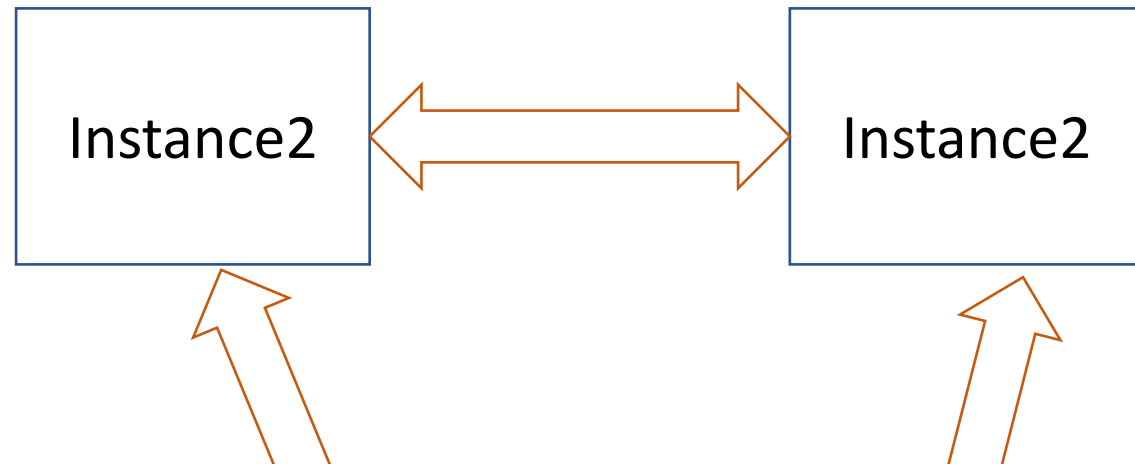
Decentralization Generally

Common elements of decentralized networks

Users (aka subscribers, members, accounts)

Individuals subscribe or create accounts on individual servers
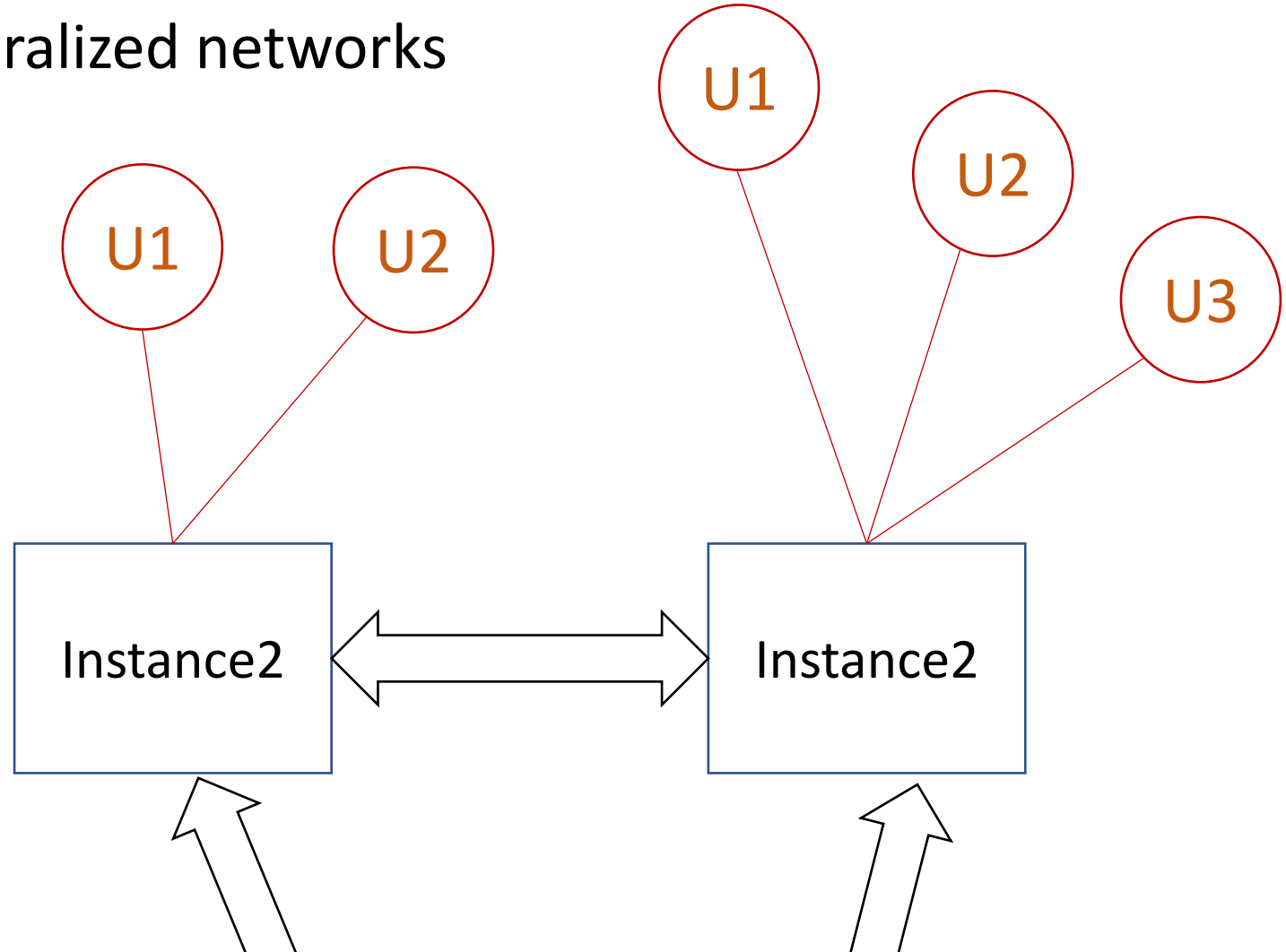
Decentralization Generally

Common elements of decentralized networks

User Addresses

Combine user name and instance address:

@U1@Instance2

@U2@Instance1

@U1

@U2

U1

U2

Instance1.com

Instance2

@U1

@U2

@U3

U1

U2

U3

Instance2.com
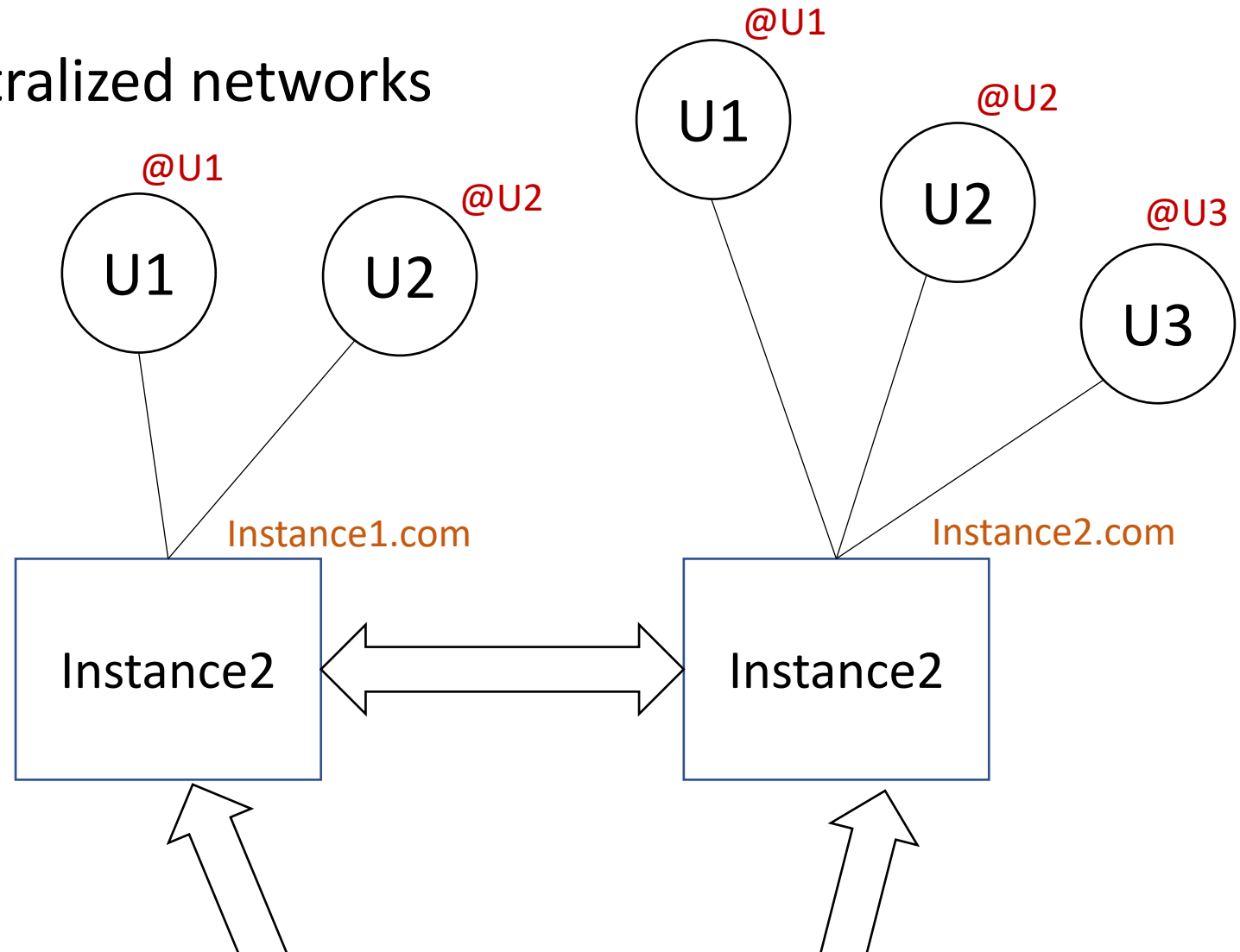
Instance2

Decentralization Generally

Common elements of decentralized networks

Clients

Applications that connect you to instances. Mastodon clients:

- Tusky
- Tooter
- Pinafore
- etc.

Clients exist for iOS, Android, Desktop, Web, Sailfish… (or just use the default web site)

U1   U2

Instance2 ⟺ Instance2

U1   U2   U3

https://joinmastodon.org/apps
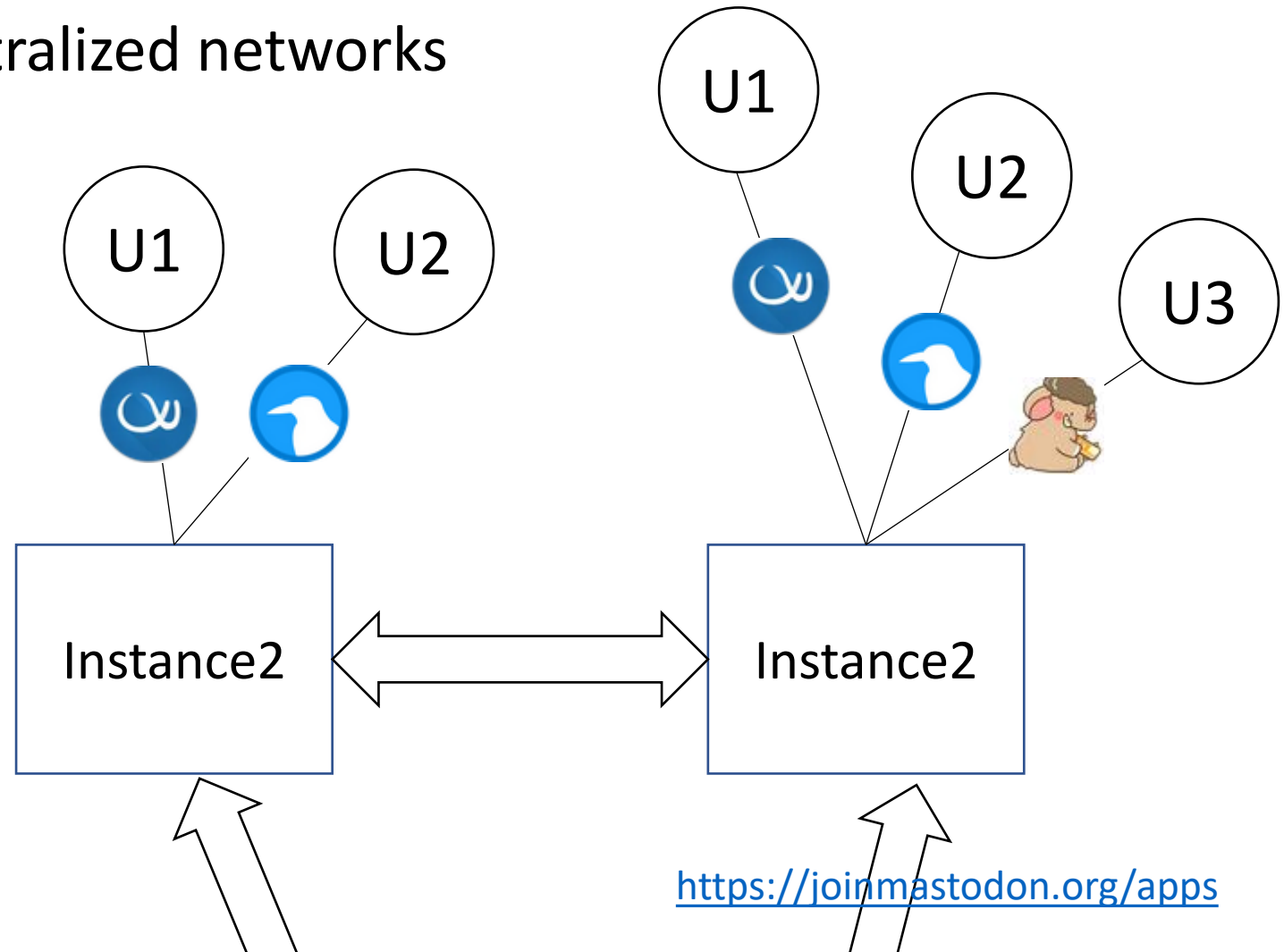
Decentralization Generally

Common elements of decentralized networks

Plugins

Extensions for other software applications that connect with the Fediverse. For Mastodon, plugins exist for:

- WordPress
- Drupal

Or plugins can write to ActivityPub directly, turning your blog into a Fediverse instance
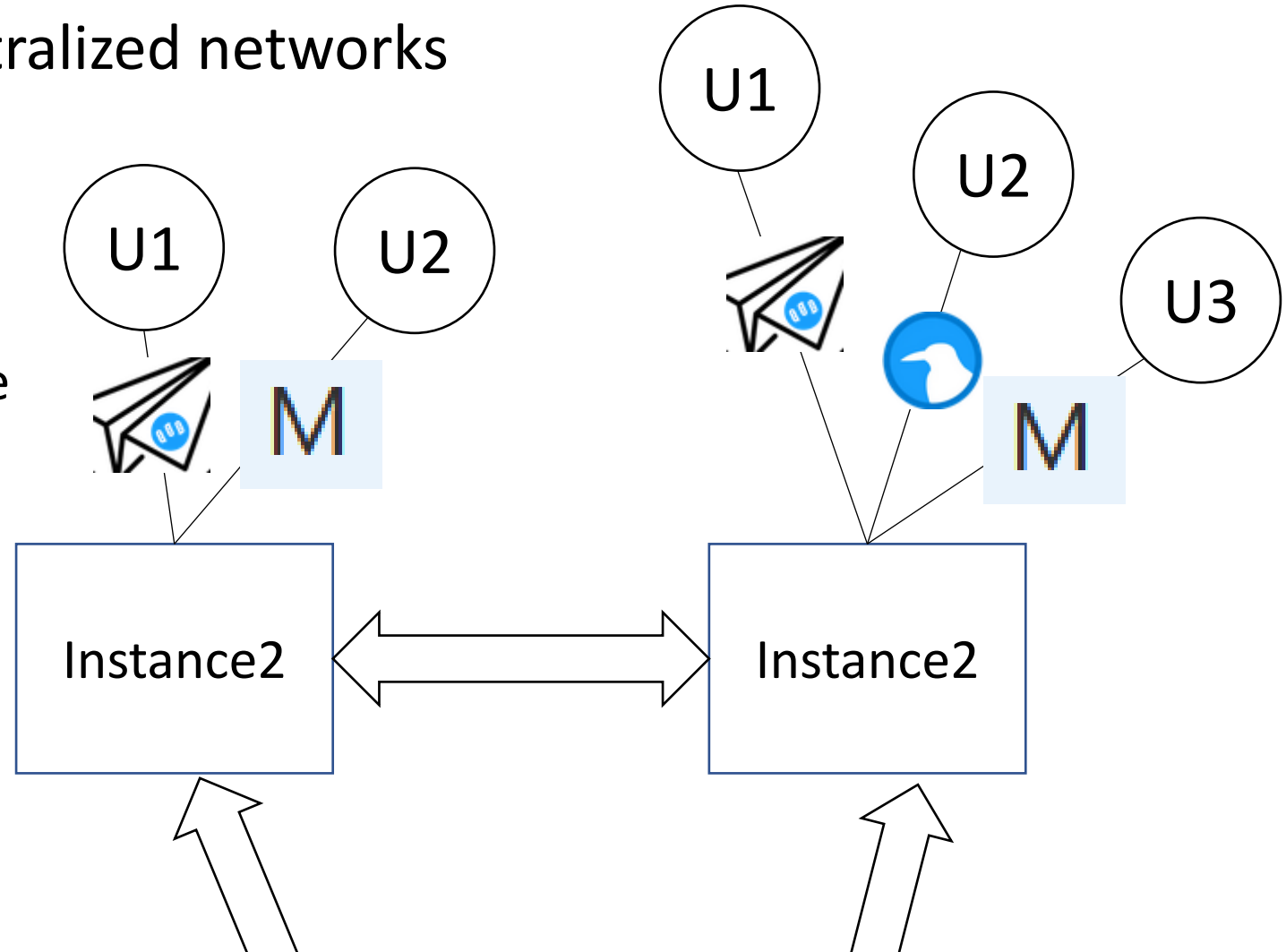
Types of Protocols

Different languages for different purposes

Content Protocol – HTML, XML, PDF

Data protocol - JSON

Linking Protocol – HREF, Dat

Transit protocol – HTTP, ActivityPub

Syndication protocol – FOAF, RSS, OPML, h-card

IPv4

Hypertext Transfer Protocol

User Datagram Protocol

File Transfer Protocol

IPv6

HTTPS

Telnet
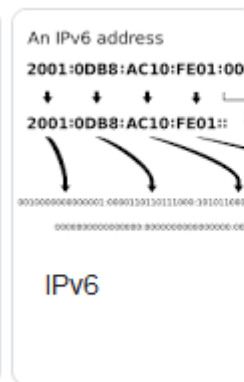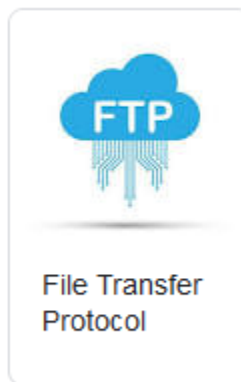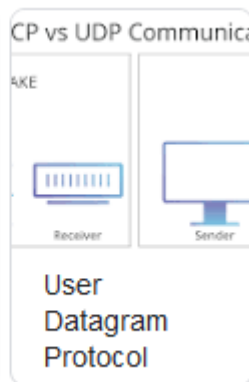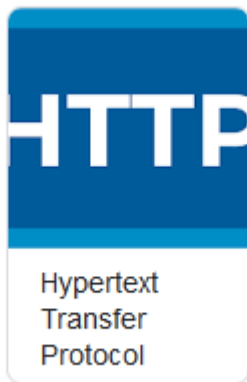
Decentralized Blog Networks

WebMention Protocol and the Indieweb

https://indieweb.org/
https://micro.blog/
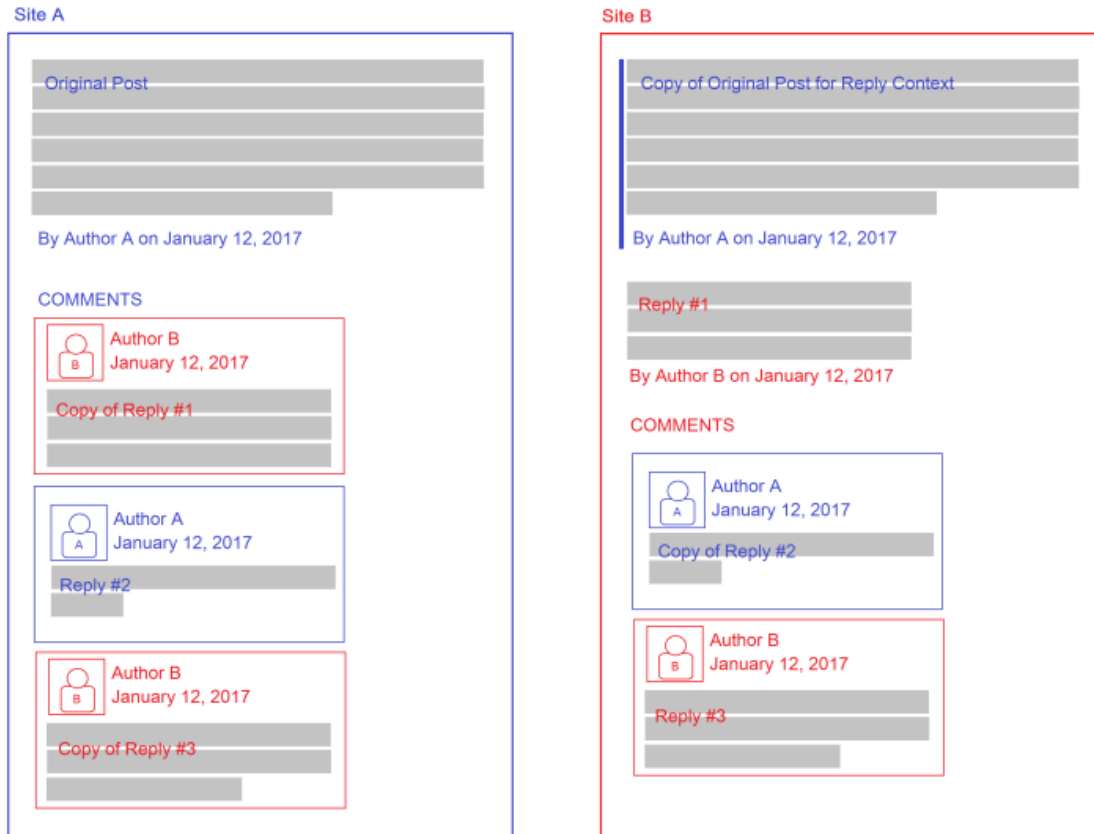
WebMention allows notifications between web addresses, if both sites are set up to send and receive them
https://www.w3.org/TR/webmention/

https://webmention.io/

Webmention.io is a hosted service created to easily receive webmentions on any web page.

Indieweb for Ghana

Creating a personal web presence

Some Open Learning Applications
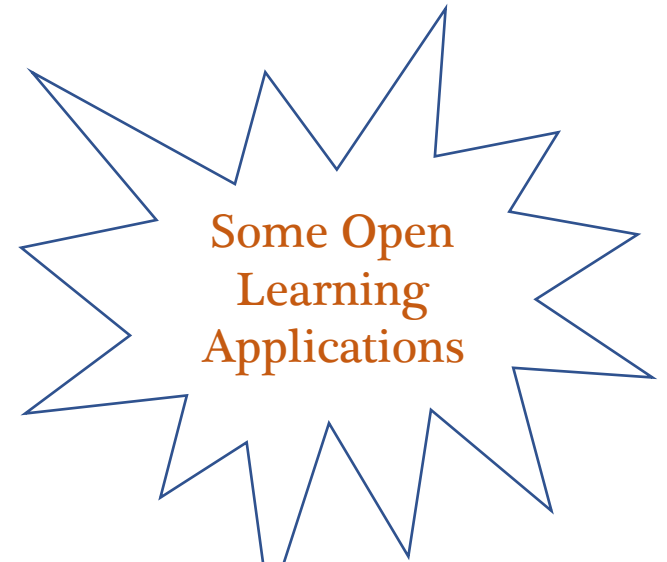
We will be using indieweb building blocks to help students and educators create their own OER. Our program will provide free personal websites to students and educators. As members begin to curate and create OER on their own sites, the community will write or remix these resources to develop collections of community-approved OER.

Abigail Cabunoc Mayes, IndieWeb and OER Ghana | an Open Leaders X program, Mozilla
https://foundation.mozilla.org/en/blog/indieweb-and-oer-ghana-open-leaders-x-program/

Persistence

How do you know it's the same thing?

ARK http://www.cdlib.org/services/uc3/arkspec.pdf
CrossRef http://www.crossref.org
DataCite http://www.datacite.org
DOI http://www.doi.org/
Handle http://www.handle.net/
Perma.CC https://perma.cc/about
PURL http://archive.org/services/purl/
URN http://tools.ietf.org/html/rfc3986
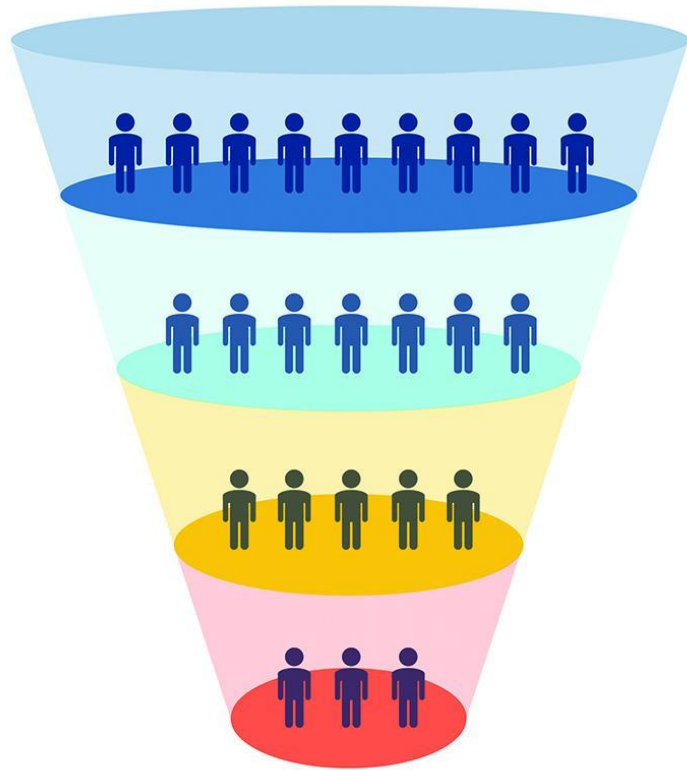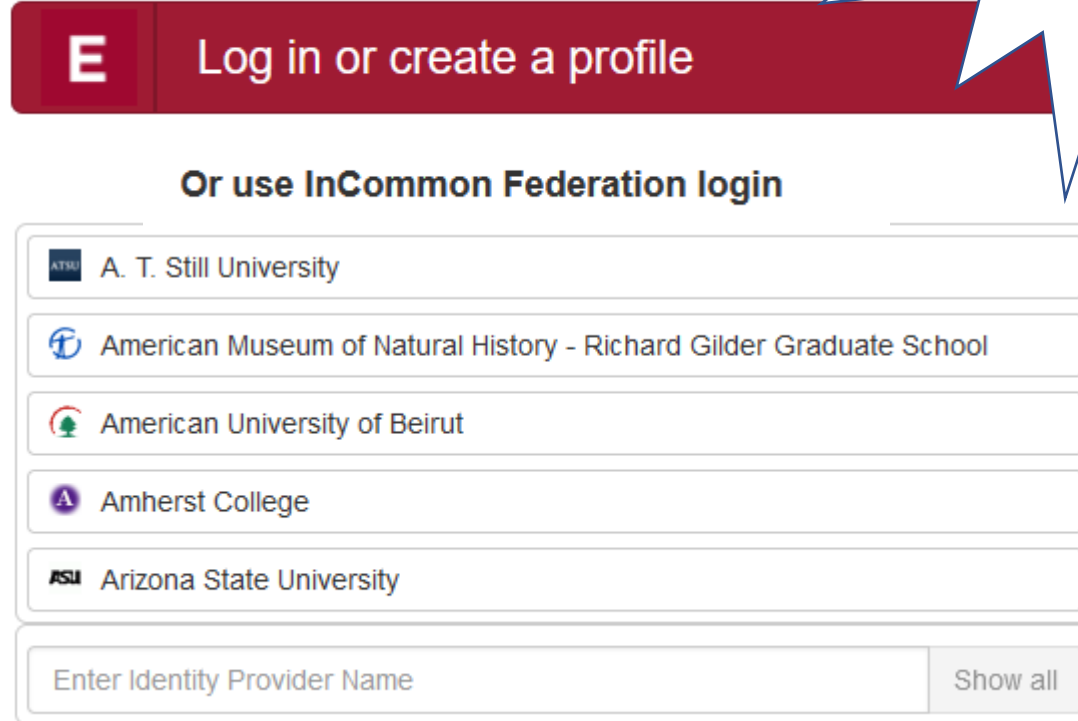
Identity Federations

Single Sign-On and the silo identity providers

Some Open Learning Applications

InCommon uses an identity federation system called Shibboleth to provide a single sign-on.

Shibboleth is an implementation of the Security Assertion Markup Language (SAML) protocol which is similar in spirit to systems used by many webapps that allow you to log in via Google, Facebook, or Twitter.

E Log in or create a profile

Or use InCommon Federation login

A. T. Still University

American Museum of Natural History - Richard Gilder Graduate School

American University of Beirut

Amherst College

Arizona State University

Enter Identity Provider Name | Show all

https://apps.cirrusidentity.com/console/ds/index?entityID=https%3A%2F%2Fsso.educause.edu%2Fsp
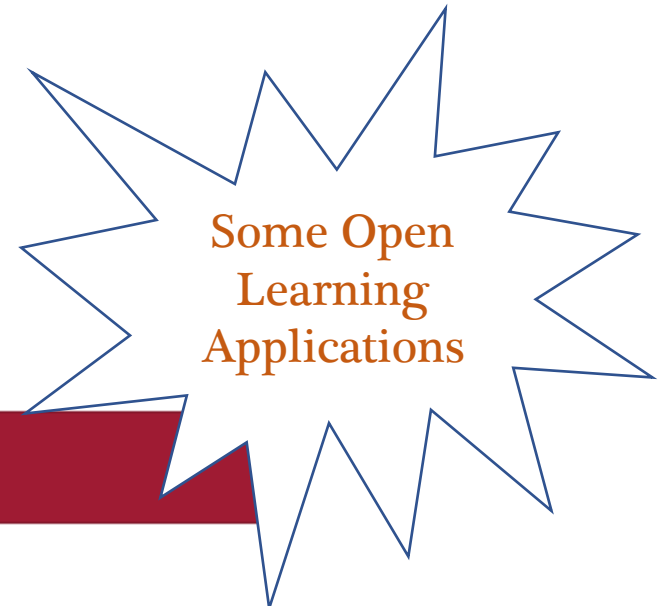
Decentralized Identity

Self-Sovereign Identity and Other Remedies

Scheme

did:**example**:**123456789abcdefghi**

DID Method   **DID Method-Specific Identifier**
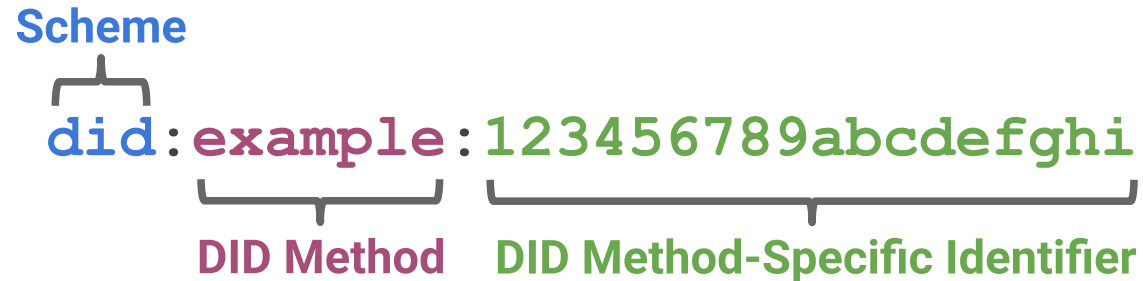
decentralized identifier (DID) - A globally unique persistent identifier that does not require a centralized registration authority and is often generated and/or registered cryptographically. The generic format of a DID is defined in 3.1 DID Syntax. A specific DID scheme is defined in a DID method specification. Many—but not all—DID methods make use of distributed ledger technology (DLT) or some other form of decentralized network. https://w3c.github.io/did-core/

DID and the Fediverse

Same identity, different instances

Sidetree
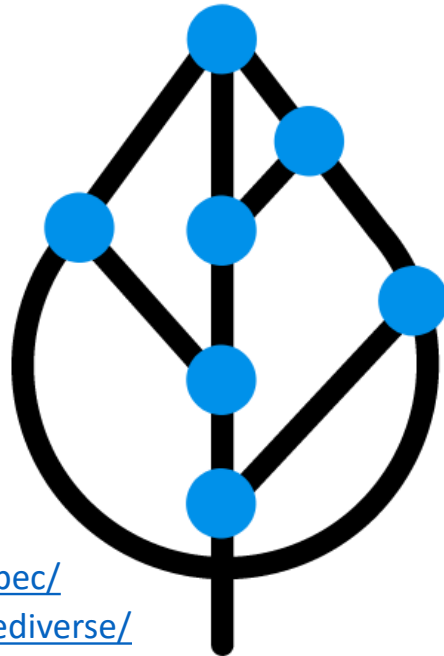
https://identity.foundation/sidetree/spec/
https://blog.identity.foundation/tag/fediverse/

Our goal is to bring self sovereign identity concepts to the current ActivityPub fediverse as soon and as securely as possible.
The hypothesis behind that goal is that long term stability of a federated service crucially depends on persistent trust relations across all participants (developers, admins, users) that are not distorted by the implicit hierarchical structure of a centralized reference system, such as DNS.

Paul Fuxjaeger, Michael Pimmer and Markus Sabadello , Gently introducing DIDs to the Mastodon/ActivityPub Fediverse
https://github.com/WebOfTrustInfo/rwot9-prague/blob/master/topics-and-advance-readings/fediverse-did-integration.md

Following

Connecting people in the Fediverse

OPML - https://github.com/Downes/OPML
Trunk - https://communitywiki.org/trunk
https://communitywiki.org/trunk/grab/Open%20Education
Open Educators on Mastodon
https://edtechfactotum.com/open-educators-on-mastodon/

But note: you can't just click -
https://meshedinsights.com/2017/11/15/open-education-consortium/

Some Open Learning Applications

https://www.linkedin.com/pulse/distributed-future-already-here-its-just-evenly-part-shanan-holm-1d/
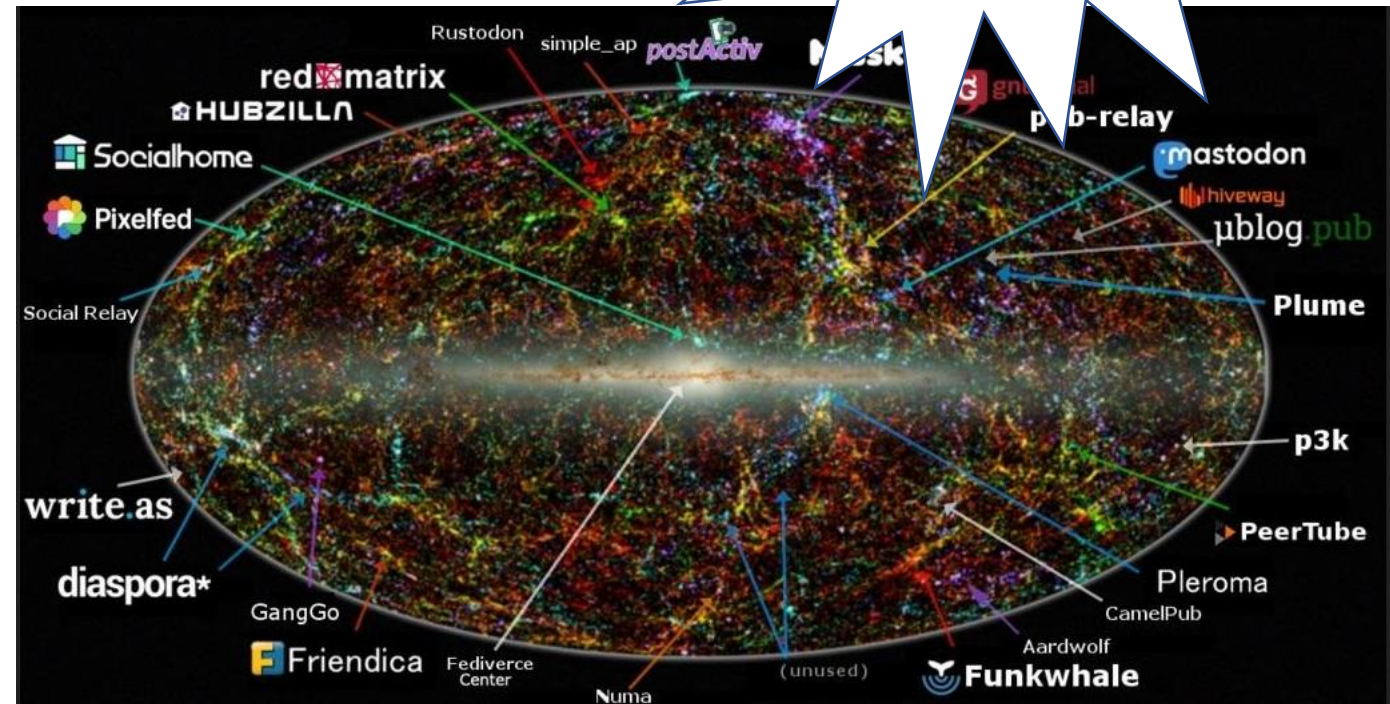
More different types of decentralization

These core concepts apply more generally
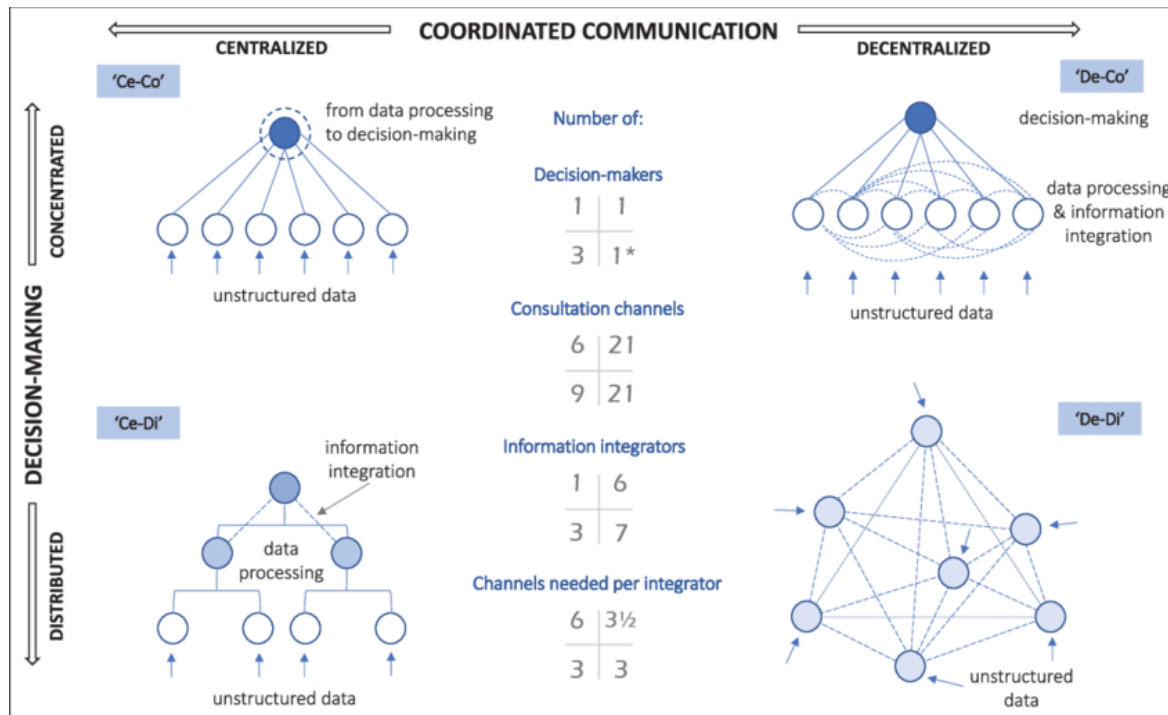
HTML pages
Software repositories
Messaging
Content and data
Ledgers and finance
Virtual worlds

Jean-Philippe Vergne. Decentralized vs. Distributed Organization: Blockchain, Machine Learning, and the Future of the Digital Platform.
https://www.researchgate.net/figure/The-Decentralization-and-Distribution-of-Organization_fig3_344955210

Decentralized Content and Data

- Dat: and IPFS
- Solid - https://solidproject.org/
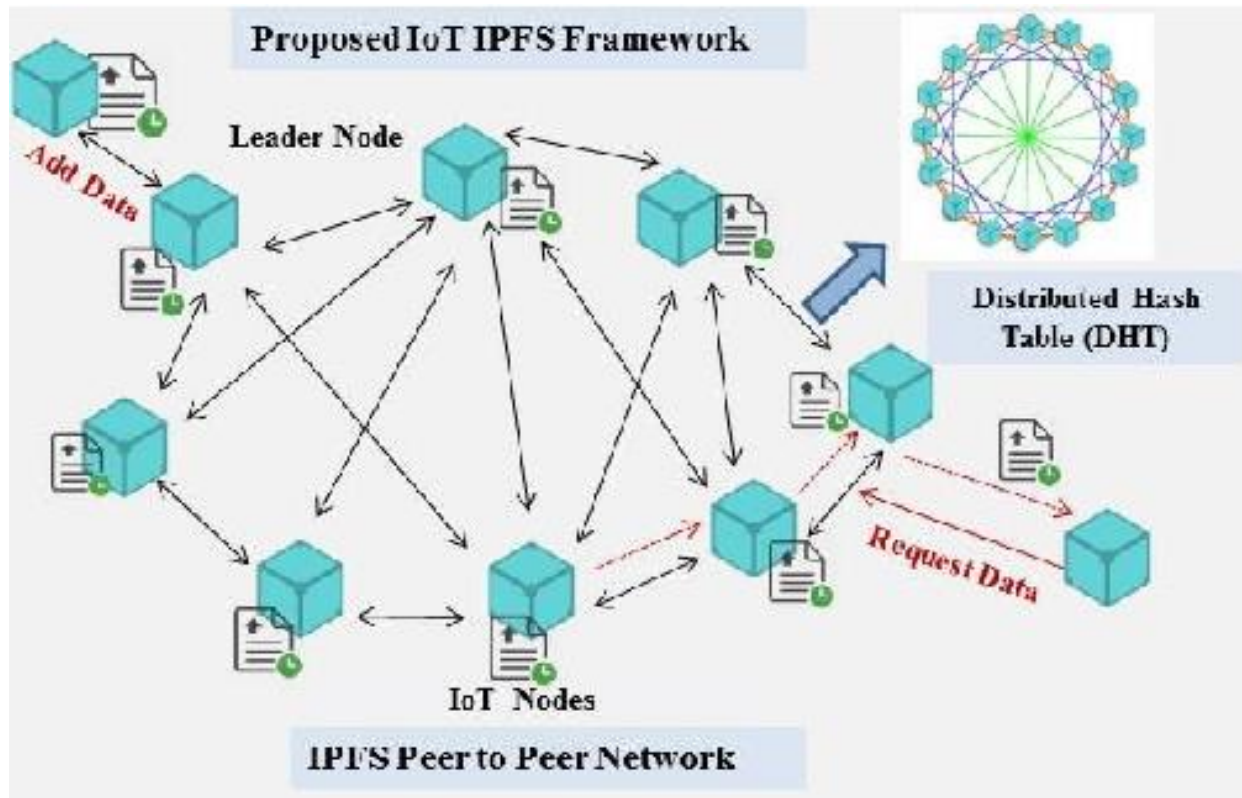
Decentralized Content and Data

Content Addressable Resources for Education

"Content Addressable Resources for Education (CARE) as a method for addressing issues of scale, access, management and distribution that currently exist for open educational resources (OER) as they are currently developed in higher education. CARE is based on the concept of the distributed web (dweb) and, using (for example) the Interplanetary File System (IPFS) provides a means to distributed OER."

Content Addressable Resources for Education (CARE)

1. Upload image or text files to App
2. Load file to IPFS
3. Receive hash address from IPFS (or Git?)
4. Save file metadata to blockchain index
5. Improve file metadata with AI analysis
5. Extend to stand-alone Electron App

https://eric.ed.gov/?id=ED608573
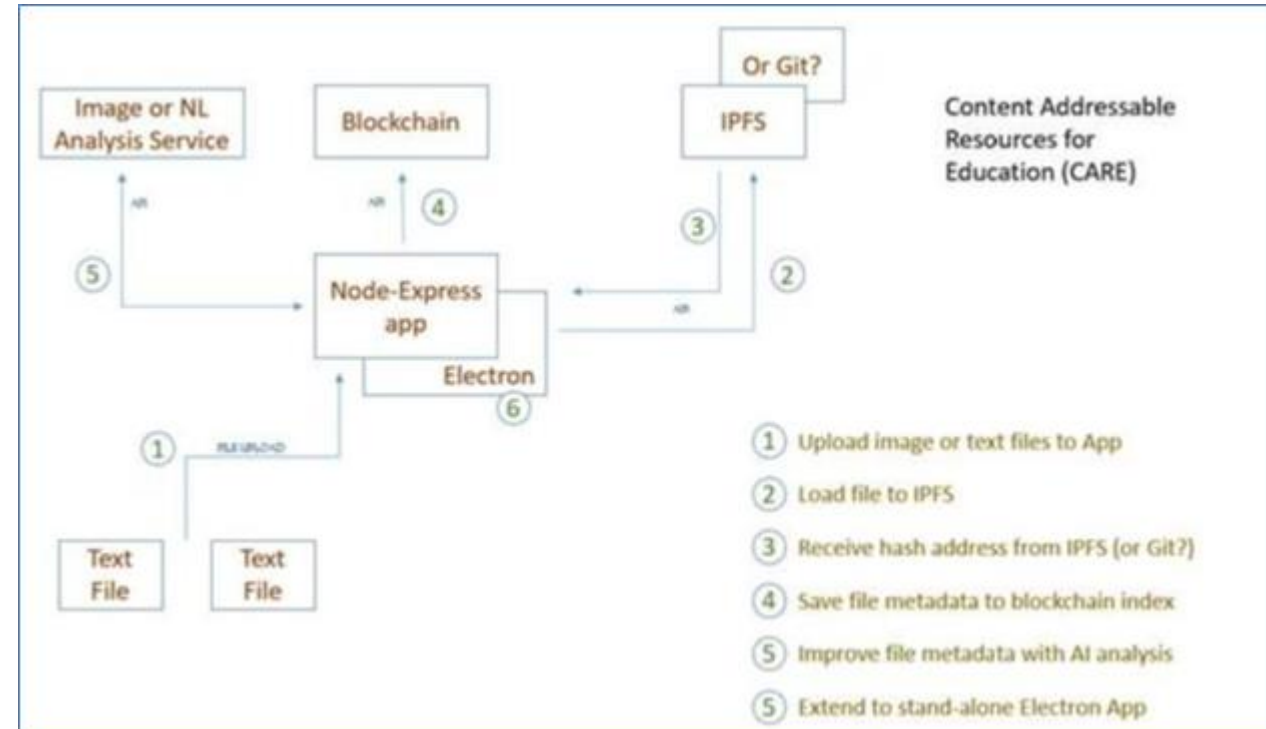
Decentralized Ledgers

Blockchain: Bitcoin, Ethereum, and the rest
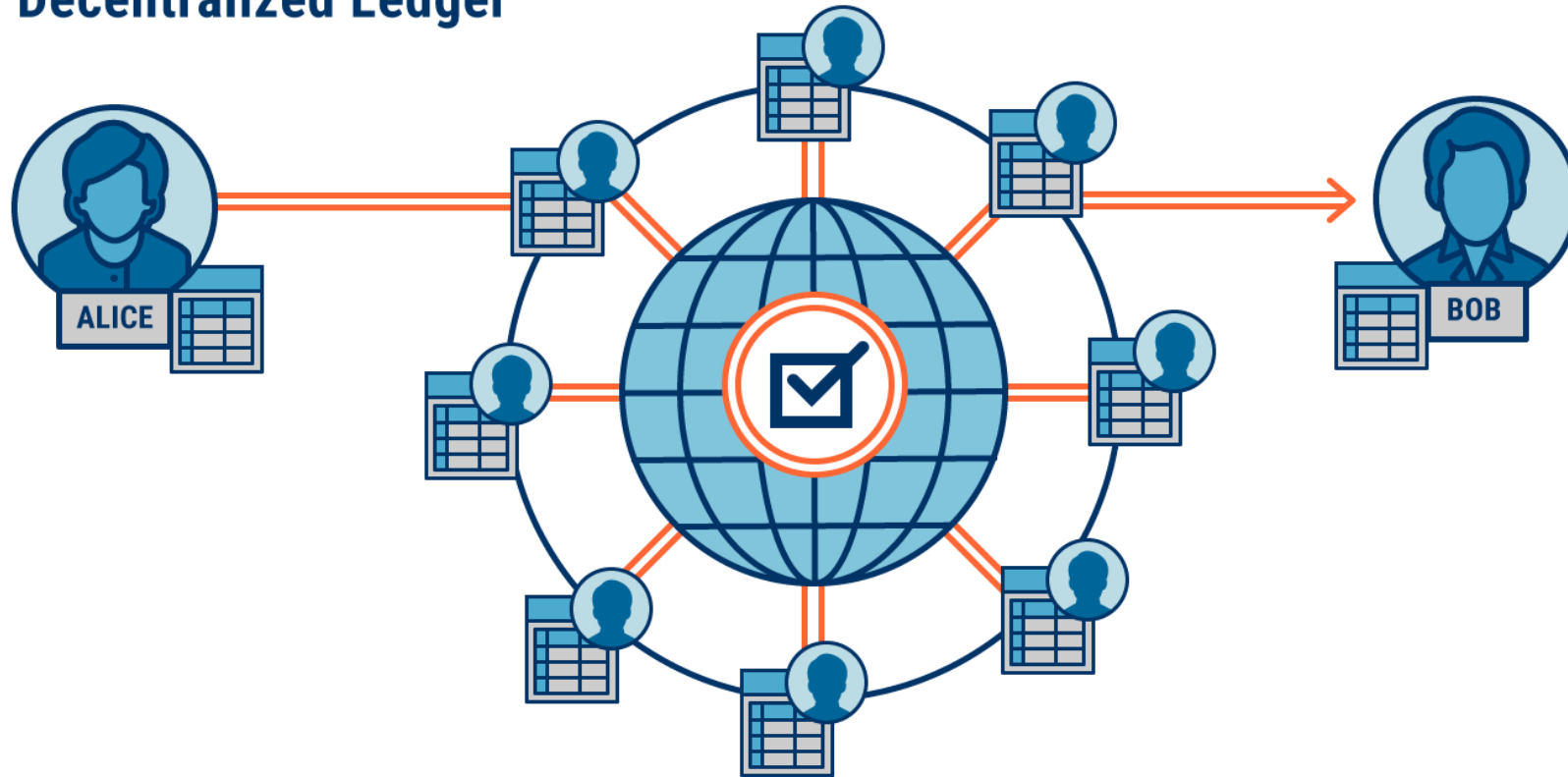
Decentralized Ledgers

Decentralized credentials

Learning application: credentials e.g. Qualichain.
A key output of this pilot is the Badged Open
Course (BOC): "Decentralising Education Using
Blockchain Technology", which introduces
Blockchain technology and its potential for
decentralising and transforming education

https://qualichain-project.eu/the-role-of-web-3-0-and-blockchain-in-the-future-of-education/
https://www.open.edu/openlearncreate/course/view.php?id=7981

Some Open Learning Applications

Decentralized worlds

One world, many servers…

- Metaverse
- Minecraft? https://blog.tcea.org/tag/gaming/
- Decentraland: https://decentraland.org/
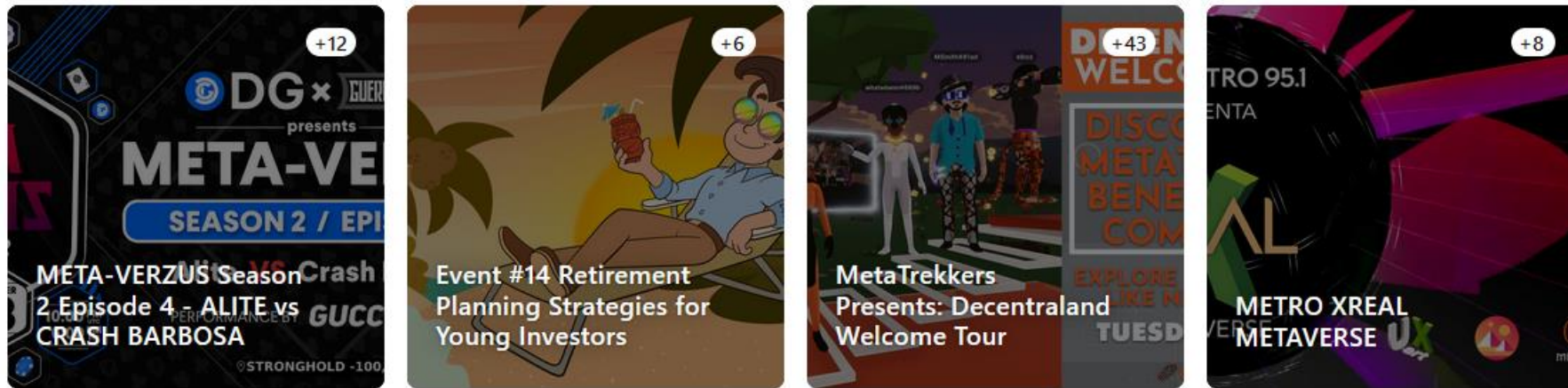
Web3

Web3 is all of the above

"On web3, your access credentials are not based on a username or password, but is based on cryptographic proof of you are who you are, and that proof is the same for any and all websites or platforms users access."

https://web.archive.org/web/*/https://digiday.com/media/wtf-is-web3/

History of web3 Through the Pages of OLDaily

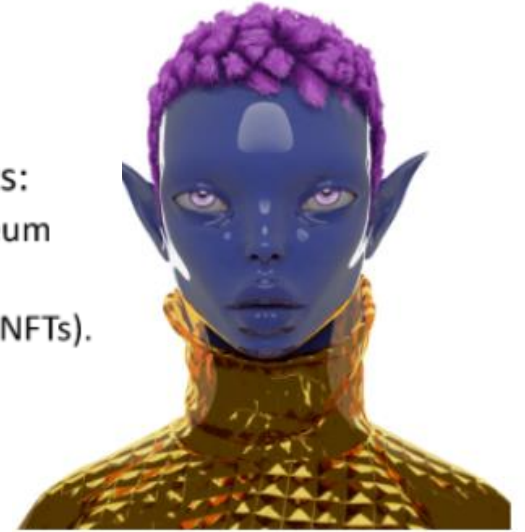https://www.downes.ca/history_web3.htm

https://web3isgoinggreat.com/

The Metaverse

XR (eXtended Reality)

- term that refers collectively to VR, AR and MR

- which includes all XR technologies
- combines it with persistent digital objects:
  - digital currencies such as Bitcoin and Ethereum
  - digital identities
  - digital objects such as non-fungible tokens (NFTs).

VR (Virtual Reality)

- Users enter a completely virtual world
- All sights, sounds, objects and actions are simulated
- Uses a headset like the Oculus or the Vive

AR (Augmented Reality)

- Users see data projected alongside real-world objects
- See-through viewing device like Google Glass or Hololens
- Offers more information about what they are seeing

MR (Mixed Reality)

- Merging of virtual and real environments
- Virtual and real objects interact in real time
- E.g. a virtual dashboard like Behance

Issues

- Sustainability
- Preventing abuse - https://redecentralize.org/events/2019-conference/notes/preventing-abuse-in-decentralized-systems
- Social media choices in open education - https://connect.oeglobal.org/t/social-media-choices-for-open-educators/3892/3
- When inclusion excludes – do interaction patterns really change on Mastodon? https://jennymackness.files.wordpress.com/2018/02/when-inclusion-excludes-mfjm-280218.pdf
- https://www.robinwils.com/technology/why-the-fediverse-sucks/

- Stephen Downes
- https://www.downes.ca

Design Considerations

- Diversity, openness, interactivity(centralization),autonomy
- 5Rs - https://madland.ca/writing/2eyed-open-education - respect, reciprocity, relevance, responsibility, relationships

Misc

- Social search https://search.noc.social/?search=%23school e.g. for #school

- Distributed knowledge graph - https://anagora.org/index - or distributed wiki

- POSSE - post here first and syndicate/cross-post duplicates out to them (POSSE). - https://boffosocko.com/

- Edurne 6 and I have been working on HAHA Academy 7 which seeks to enable p2p knowledge sharing and self-directed learning. (The software component is part of the #software:commonspub ecosystem). https://socialhub.activitypub.rocks/t/the-fediverse-as-an-educational-platform/983/4

Misc (2)

- +1 for THIS topic. We're working on [LearnAwesome.org 2](LearnAwesome.org) which is creating a learning map - and already supports ActivityPub. Both users and topics have inboxes and outboxes and it seems to be working well with about 3,000 active users. https://socialhub.activitypub.rocks/t/the-fediverse-as-an-educational-platform/983/5

- Personal hubs - https://myhub.ai/@mathewlowry/?tags=decentralised

- Activity streams - https://gh.fakev.cn/topics/activitystreams

- Nonlinear blog - https://feeldothink.org/index.php/Feel_Do_Think_-_a_nonlinear_blog

- Learning System based on Decentralized Learning Model using Blockchain and SNS https://pdfs.semanticscholar.org/b118/34fb98bd3abd195e0efd9610630ee8a0b2ed.pdf

The iron law

- https://www.bmc.com/blogs/cap-theorem/