

Open Learning in the Fediverse

Stephen Downes

<https://www.downes.ca>

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

What is Open Learning?

Dimensions of open learning:

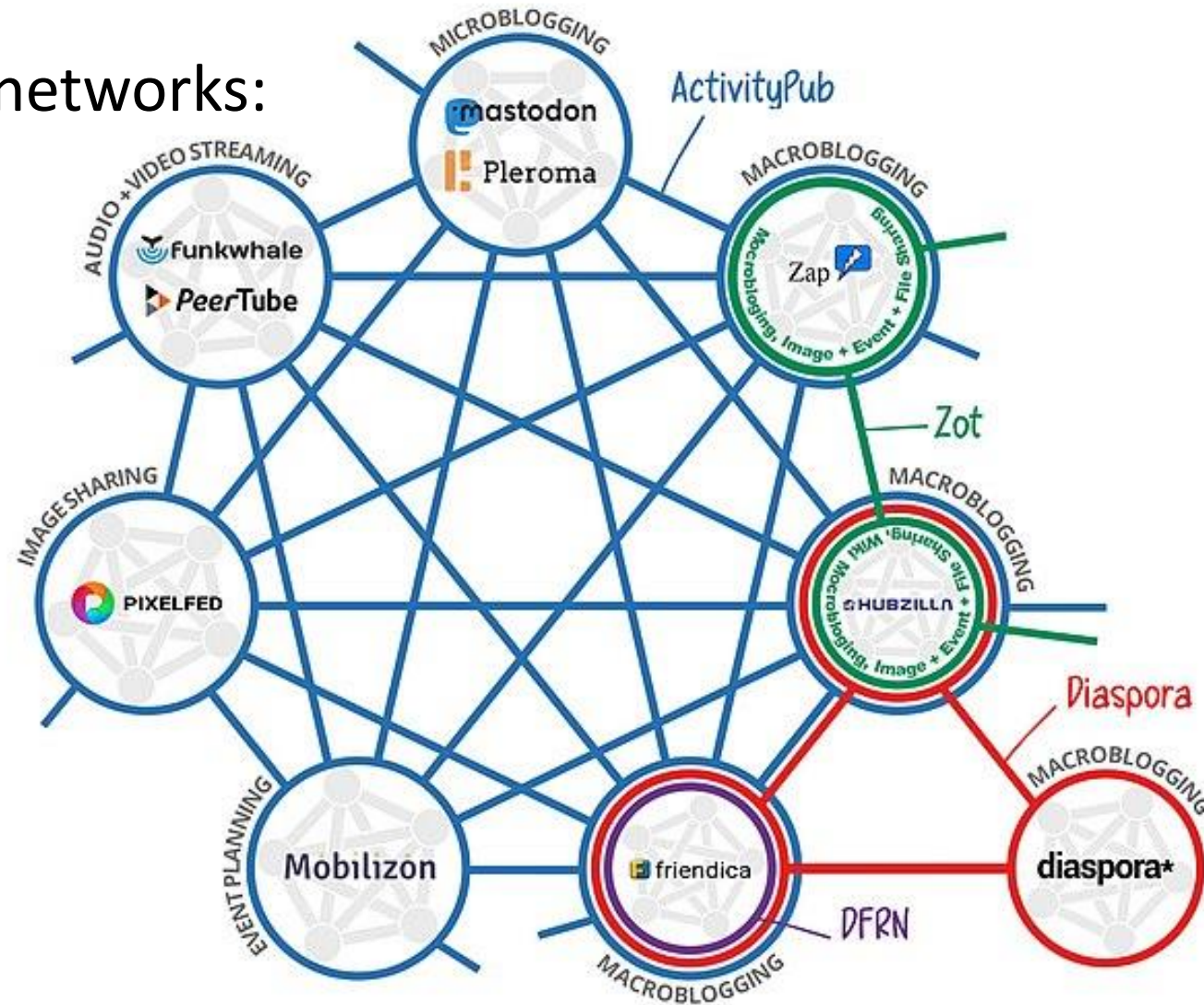


Santos, Andreia & Punie, Yves & Castaño-Muñoz, Jonatan. (2016). Opening up Education: A Support Framework for Higher Education Institutions. Publications Office of the European Union, JRC101436

<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-losgelost-von-den-fesseln-kommerzieller-interessen/>

The Redecentralization of the Web

Something in common:

Open Learning
advocates

Fediverse
advocates

A banner for Redecentralize.org featuring a space-themed background with a view of Earth from space. The word "REDECENTRALIZE" is written in large, white, bold, sans-serif capital letters across the top. Below the title is a green horizontal bar. Underneath the bar, there are two paragraphs of white text. The background shows the curvature of the Earth with city lights and stars in the dark sky.

REDECENTRALIZE

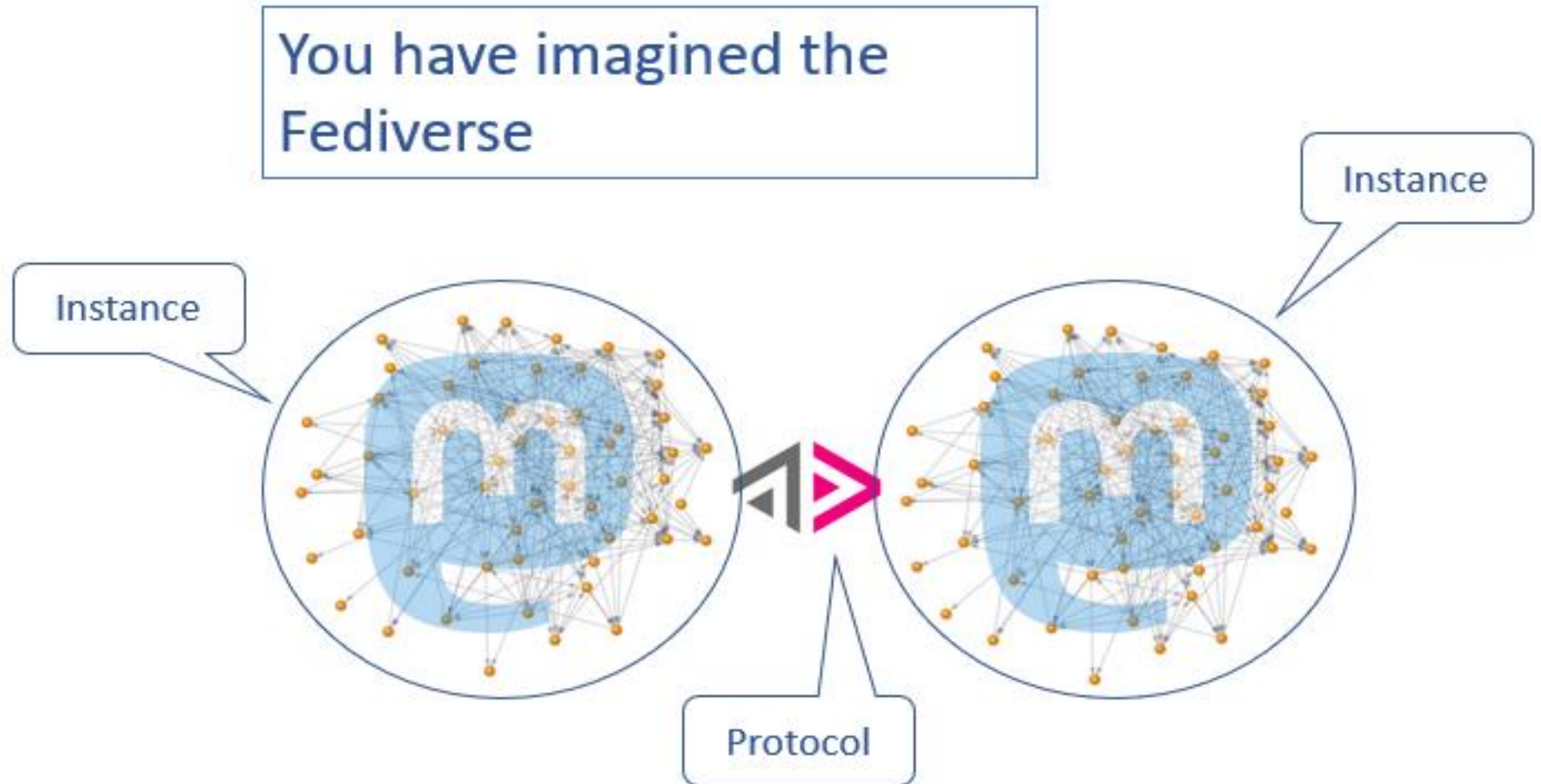
We've had enough of digital monopolies and surveillance capitalism. We want a world that works for everyone, just like the original intention of the web and net.

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:

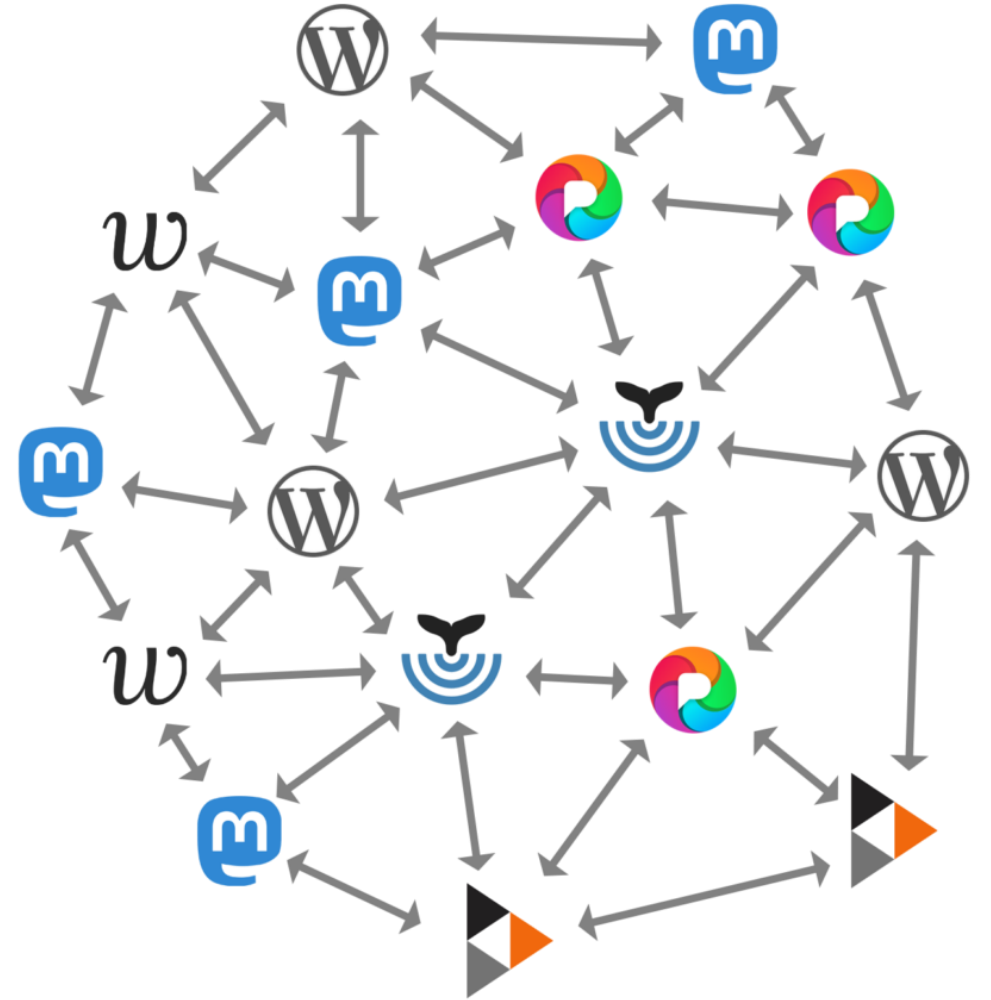


Why the Fediverse?

My site, my rules...

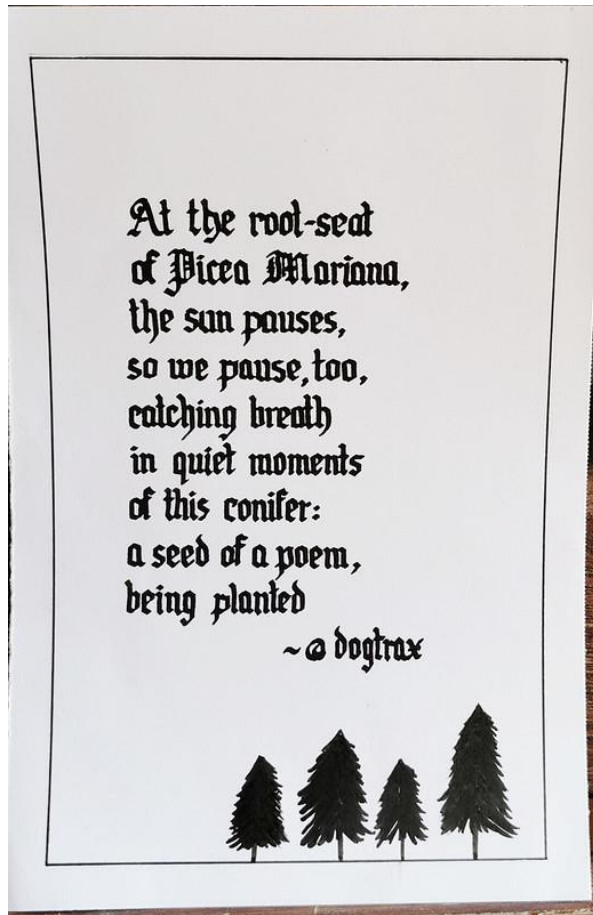
“That’s one of the many reasons I prefer [Mastodon](#) to Twitter: I pay with money, not my data. And there are actually enforced rules against abuse (and a specific no-Nazi policy, as [the instance I’m on](#) is based in Germany). No emphasis on ‘freedom of speech is always good and we just need more 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...



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

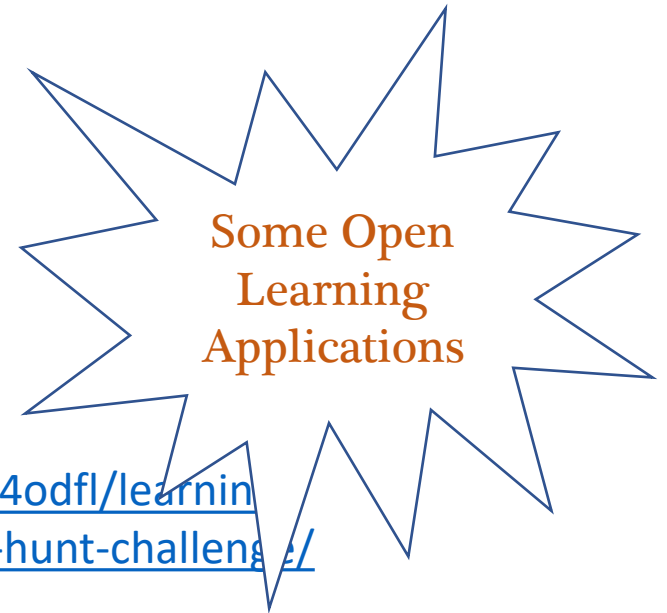
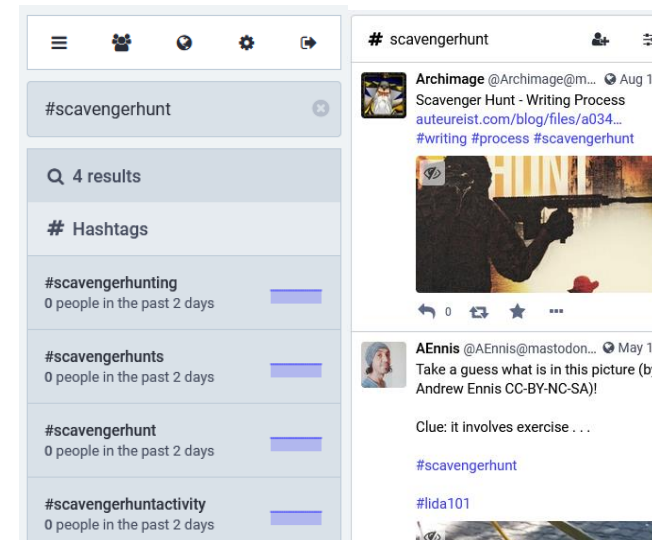
Connecting with hashtags



Scavenger hunt challenge

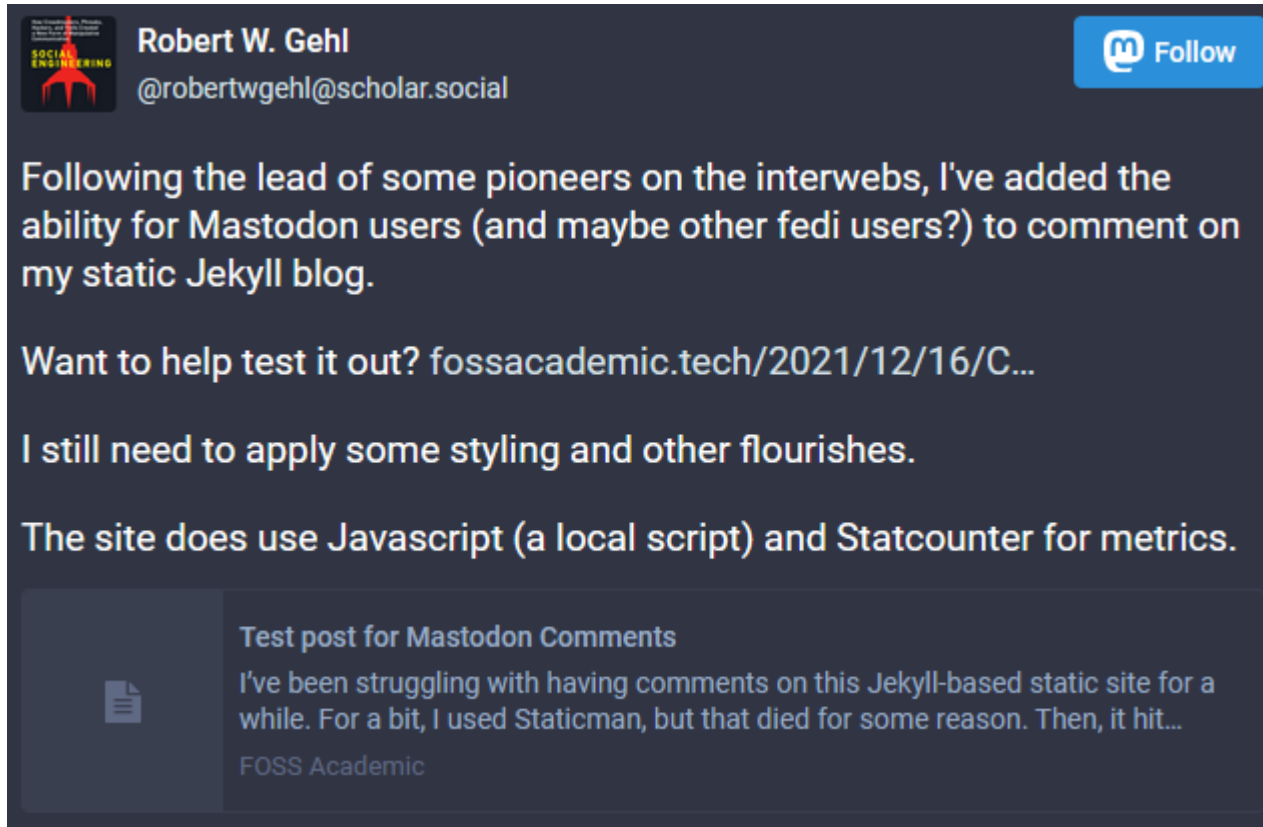
<https://pacificopencourses.col.org/as4odfl/learning-challenges/establish-a-ple/scavenger-hunt-challenge/>

#scavengerhunt



Federated Commenting

Social networking and static content



A screenshot of a Mastodon post from Robert W. Gehl (@robertwgehl@scholar.social). The post is on a dark background and contains the following text: "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." Below this, it says "Want to help test it out? fossacademic.tech/2021/12/16/C..." and "I still need to apply some styling and other flourishes." The final line reads "The site does use Javascript (a local script) and Statcounter for metrics." At the bottom, there is a link preview for a document titled "Test post for Mastodon Comments" with a snippet of text: "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..." and the domain "FOSS Academic". A blue "Follow" button is visible in the top right corner of the post.

Robert W. Gehl
@robertwgehl@scholar.social

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



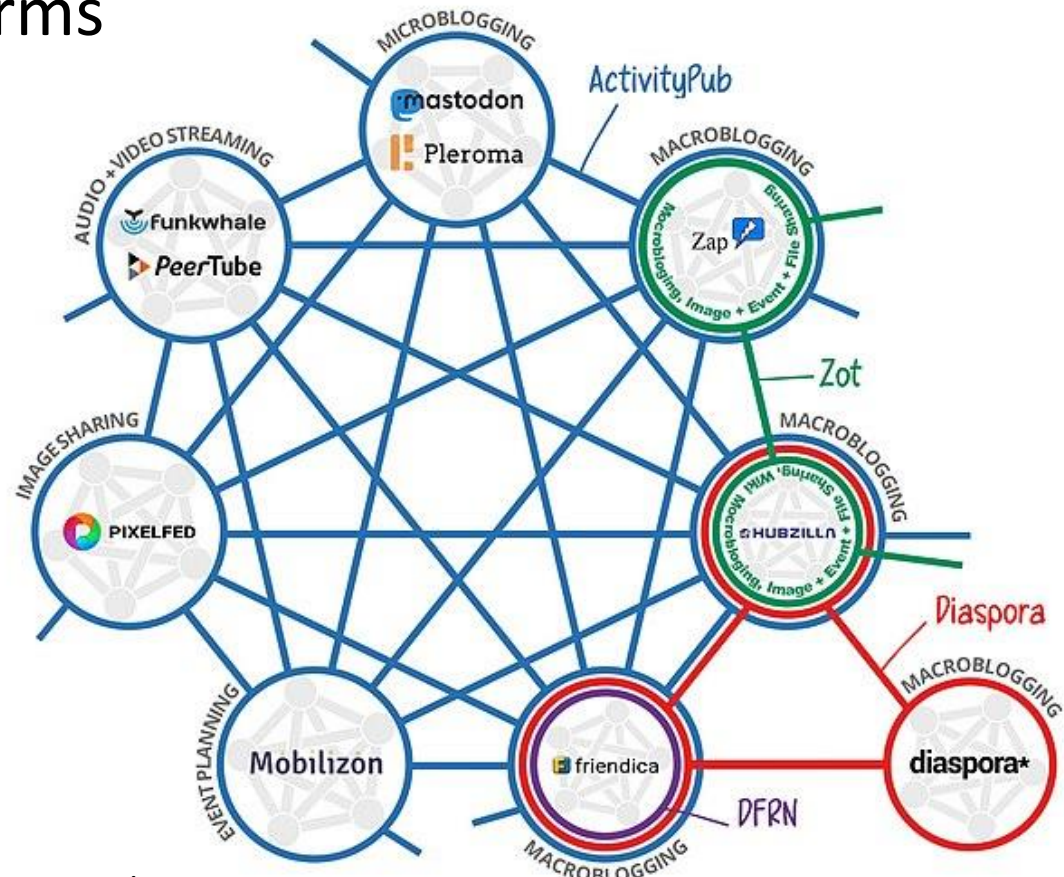
<https://fluid.quest/testing-comments-on-fediverse.html>

<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

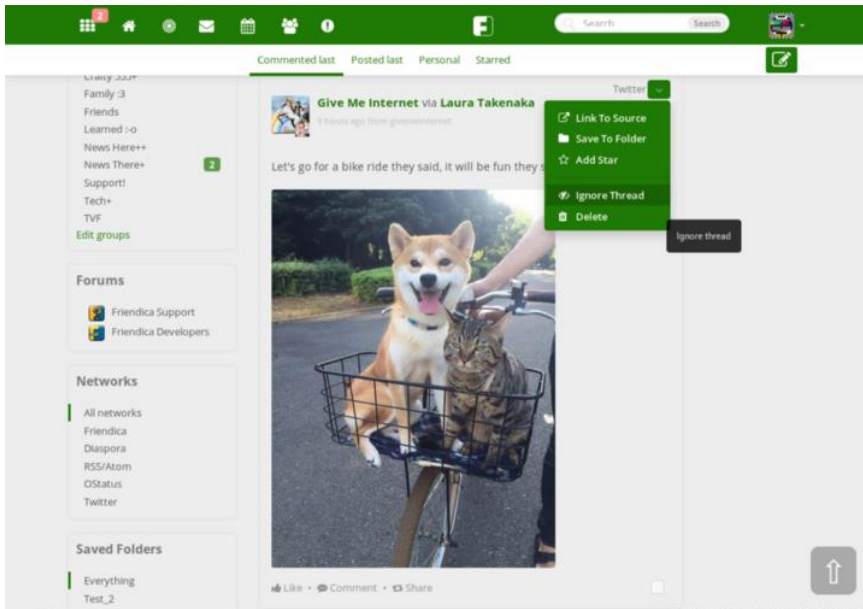


A curated list of Fediverse applications based on the ActivityPub protocol
<https://codeberg.org/fediverse/delightful-fediverse-apps>

Teaching and Learning With Friendica

Social networking without surveillance

Some Open
Learning
Applications



“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>

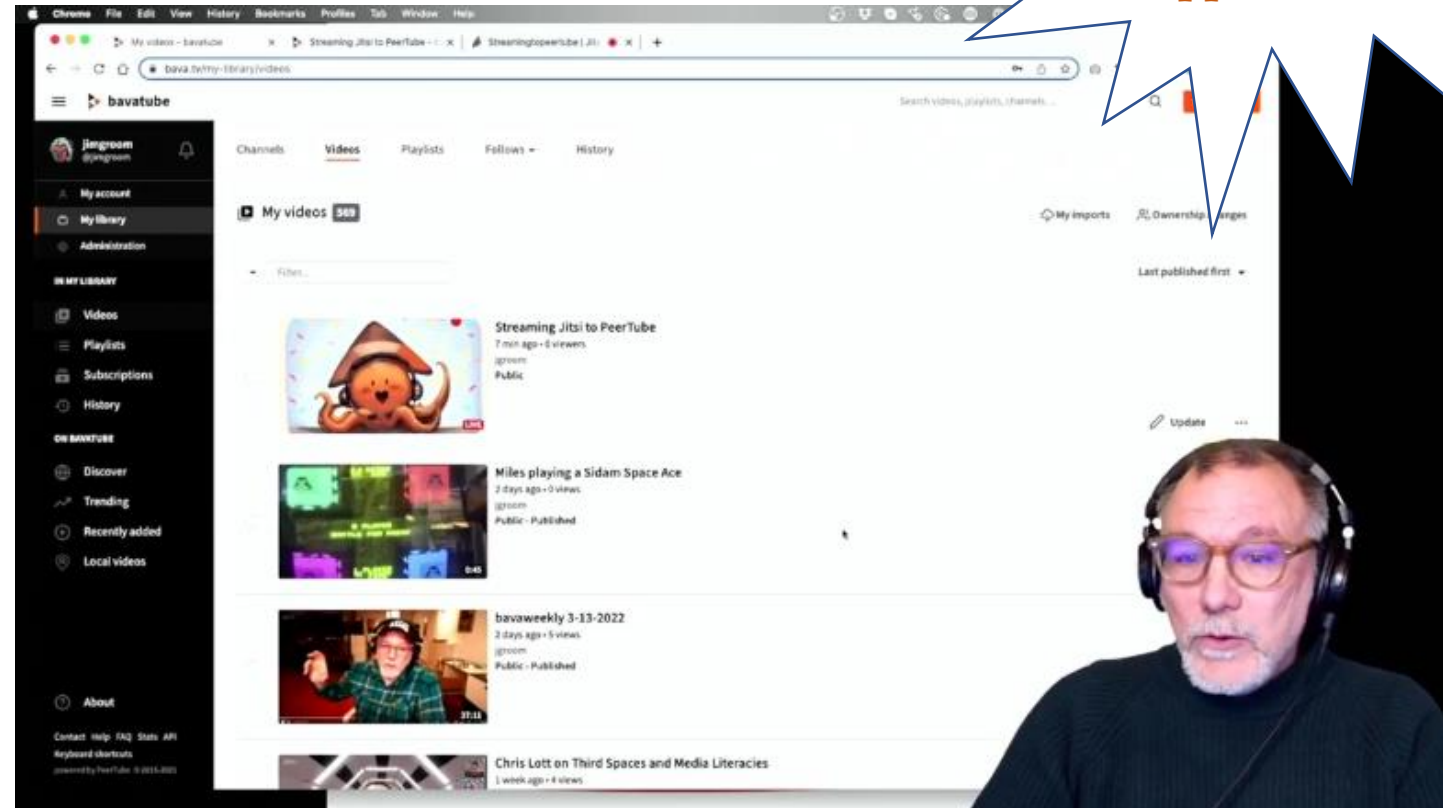
Streaming Jitsi through PeerTube Live

Live conferencing in the Fediverse

Some Open Learning Applications

“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.”

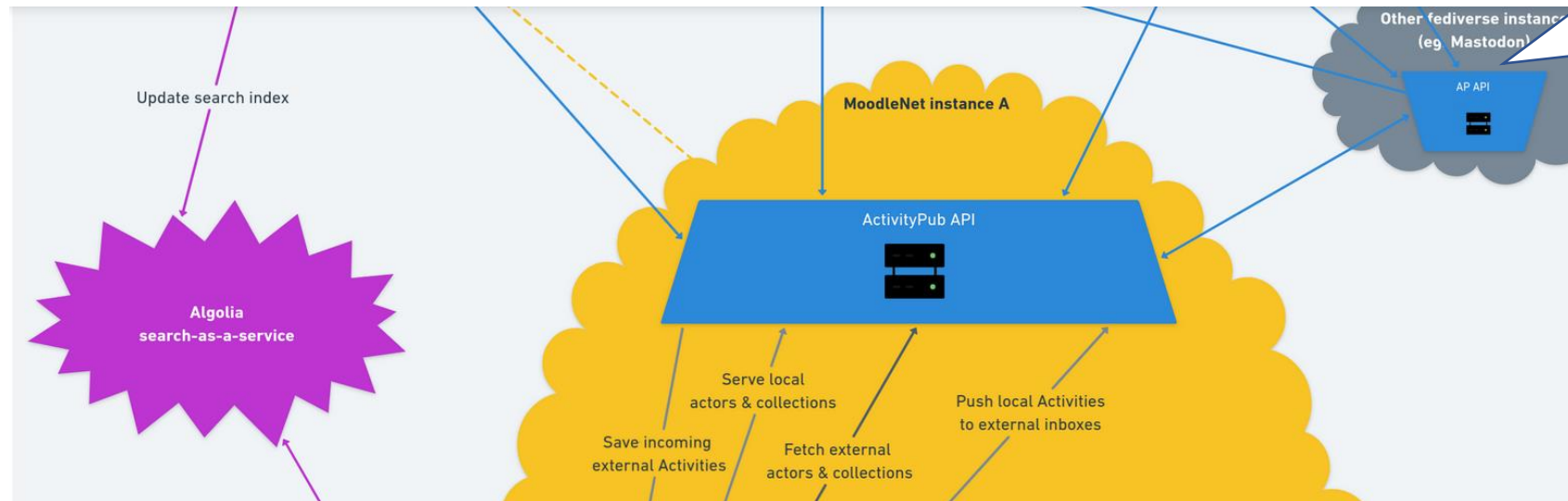
Jim Groom,
<https://bavatusdays.com/streaming-jitsi-through-peertube-live/>



The image shows a screenshot of a web browser displaying the PeerTube website. The browser's address bar shows the URL 'bava.tv/my-library/videos'. The website interface includes a navigation menu on the left with options like 'My account', 'My library', 'Administration', 'My library', 'Videos', 'Playlists', 'Subscriptions', 'History', 'On PeerTube', 'Discover', 'Trending', 'Recently added', and 'Local videos'. The main content area shows a list of videos under the heading 'My videos 968'. The top video is titled 'Streaming Jitsi to PeerTube' with a thumbnail of a cartoon character wearing a hat and headphones. Below it are other videos like 'Miles playing a Sidam Space Ace' and 'bavaweekly 3-13-2022'. In the bottom right corner, there is a small video feed of a man wearing glasses and a headset, identified as Jim Groom.

The Original MoodleNet

Federated content sharing in an LMS



Some Open
Learning
Applications

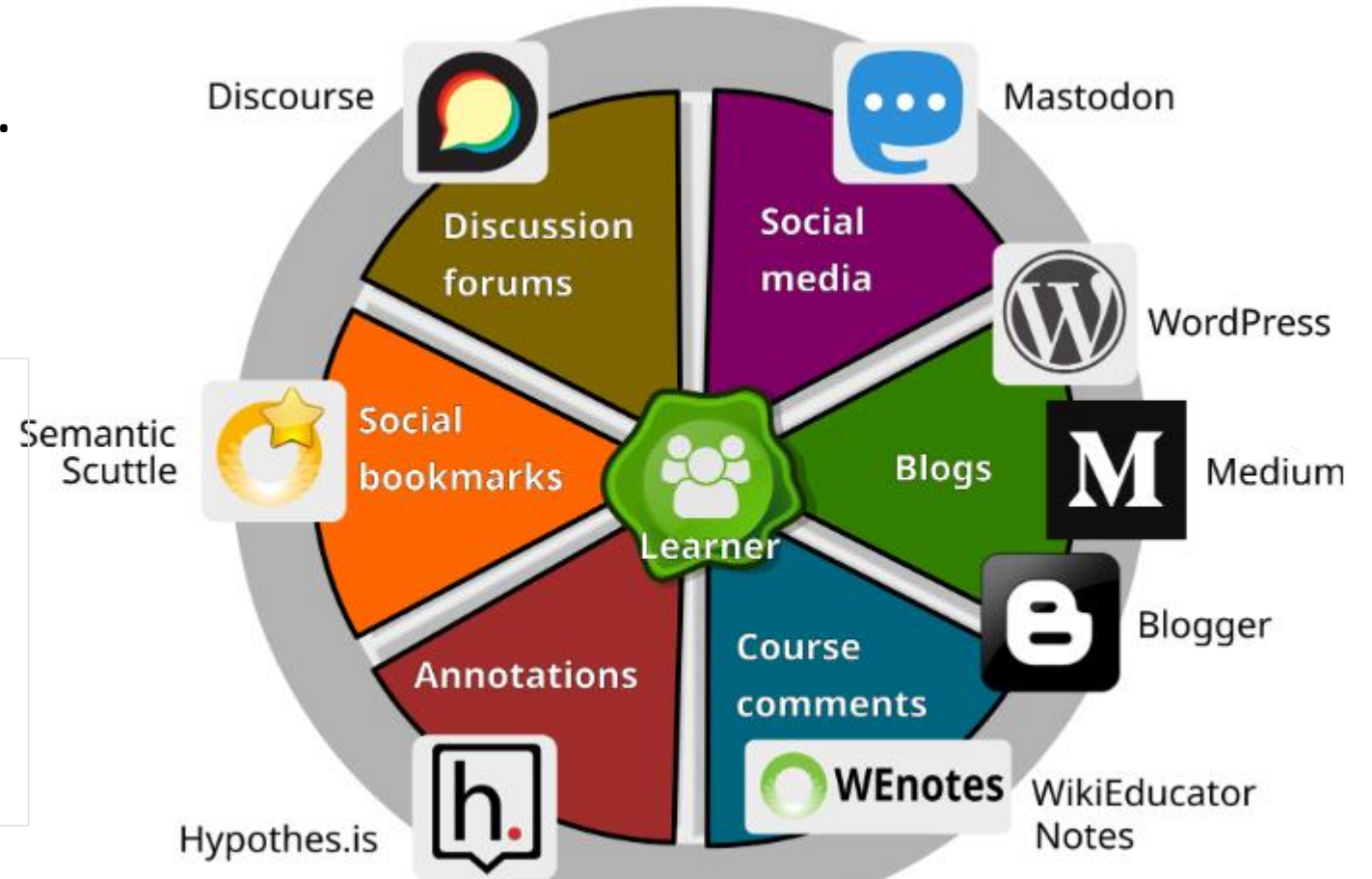
“There are many benefits to this type of decentralisation, including:

- 1.Participation** – encourages diverse contributions
- 2.Efficiency** – quicker, more locally-informed decisions
- 3.Privacy** – allows organisations to keep some data private”

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>

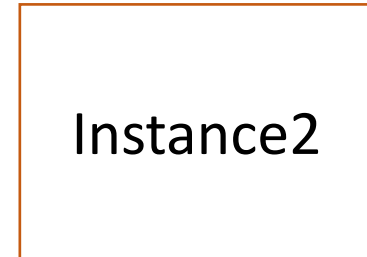
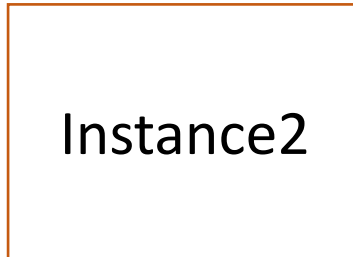
Decentralization Generally

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, Fren dica, etc.



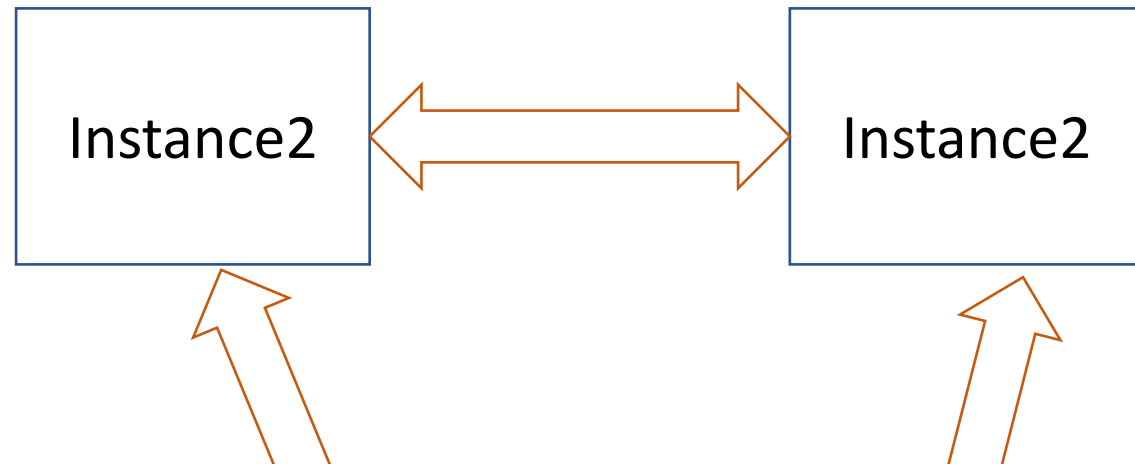
Decentralization Generally

Common elements of decentralized networks

Protocols

Languages used by instances to communicate. For example:

- ActivityPub
- Diaspora
- Zot
- Atom
- SMTP

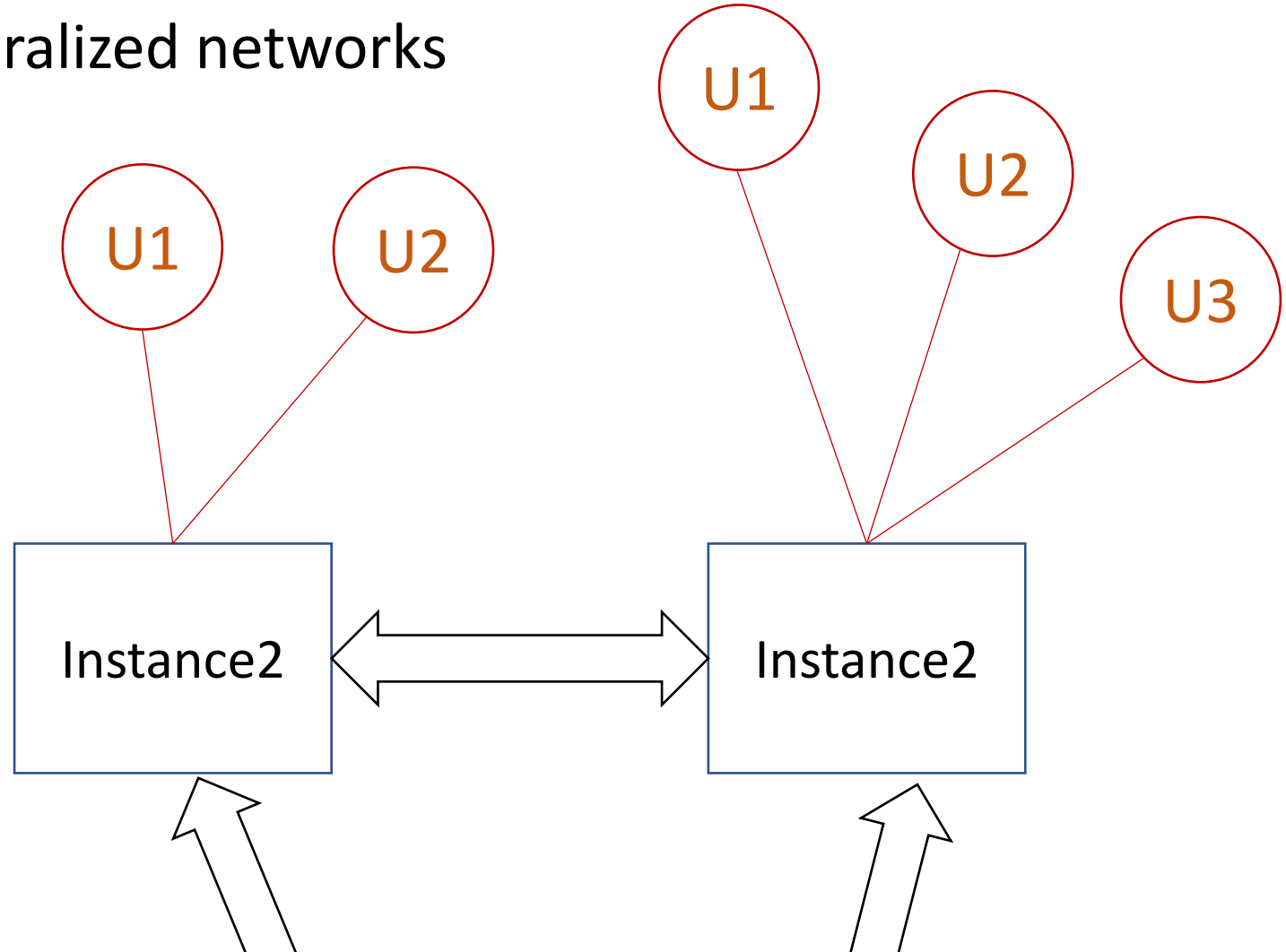


Decentralization Generally

Common elements of decentralized networks

Users (aka subscribers, members, accounts)

Individuals subscribe or create accounts on individual servers



Decentralization Generally

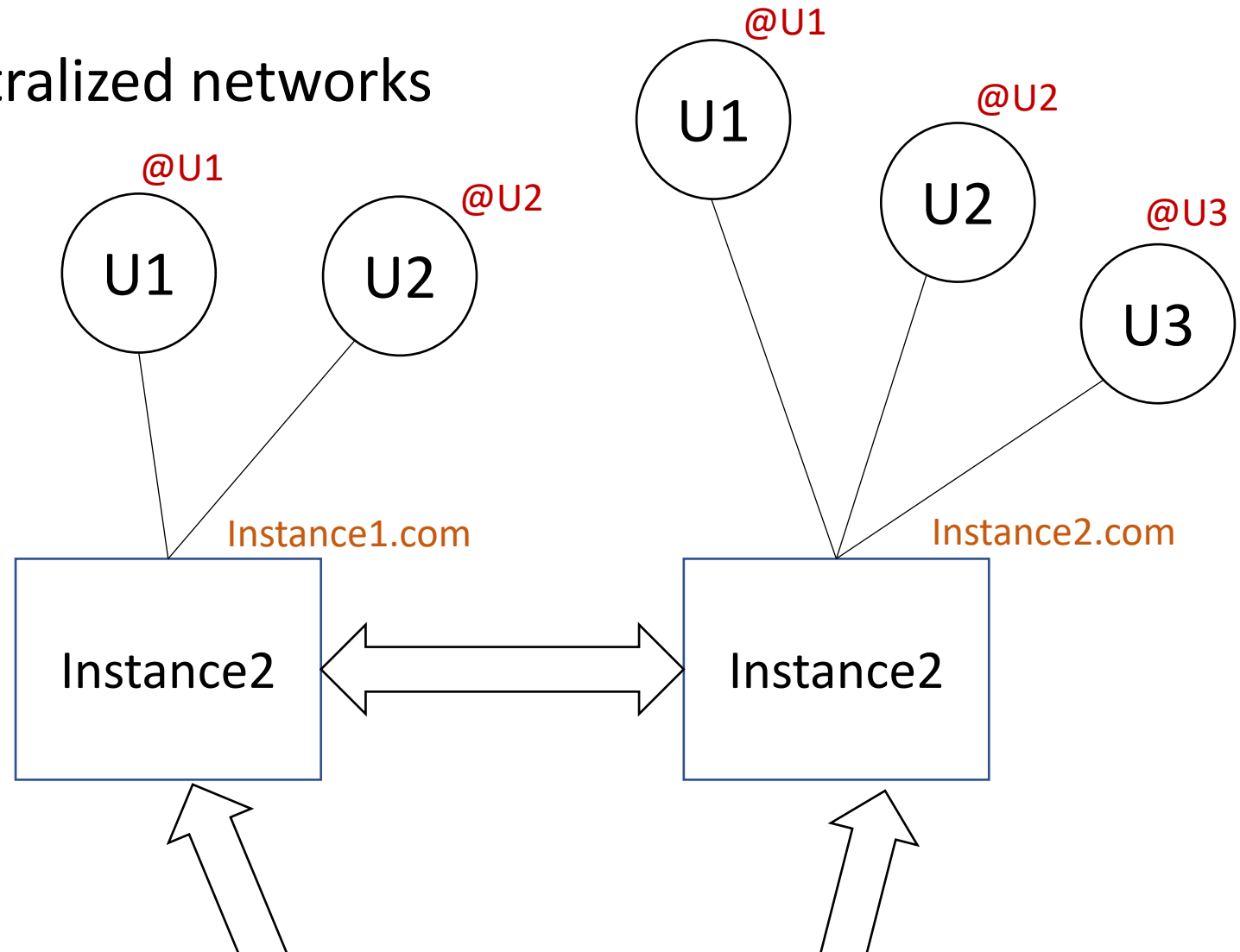
Common elements of decentralized networks

User Addresses

Combine user name and instance address:
address:

@U1@Instance2

@U2@Instance1



Decentralization Generally

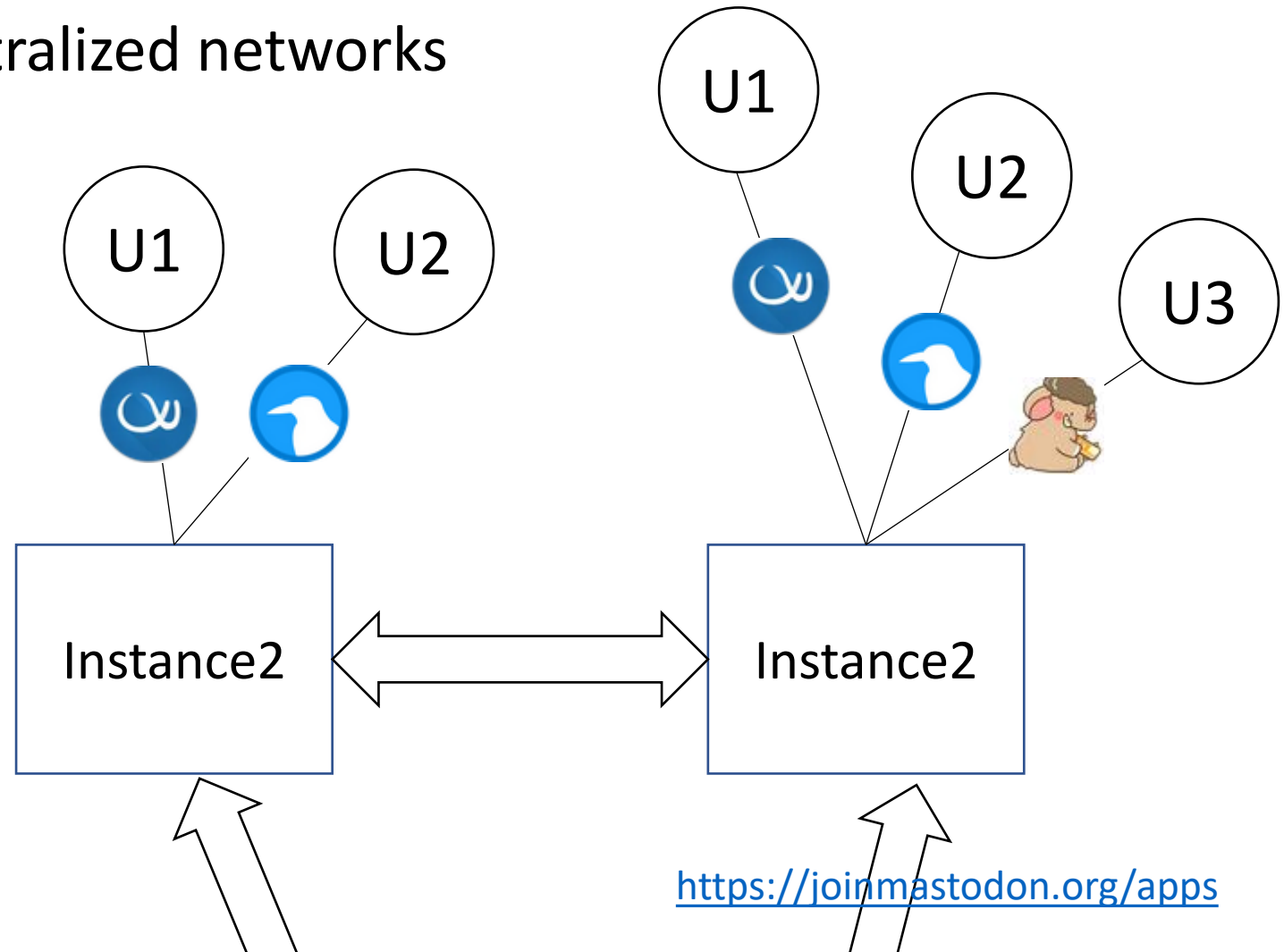
Common elements of decentralized networks

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)



Decentralization Generally

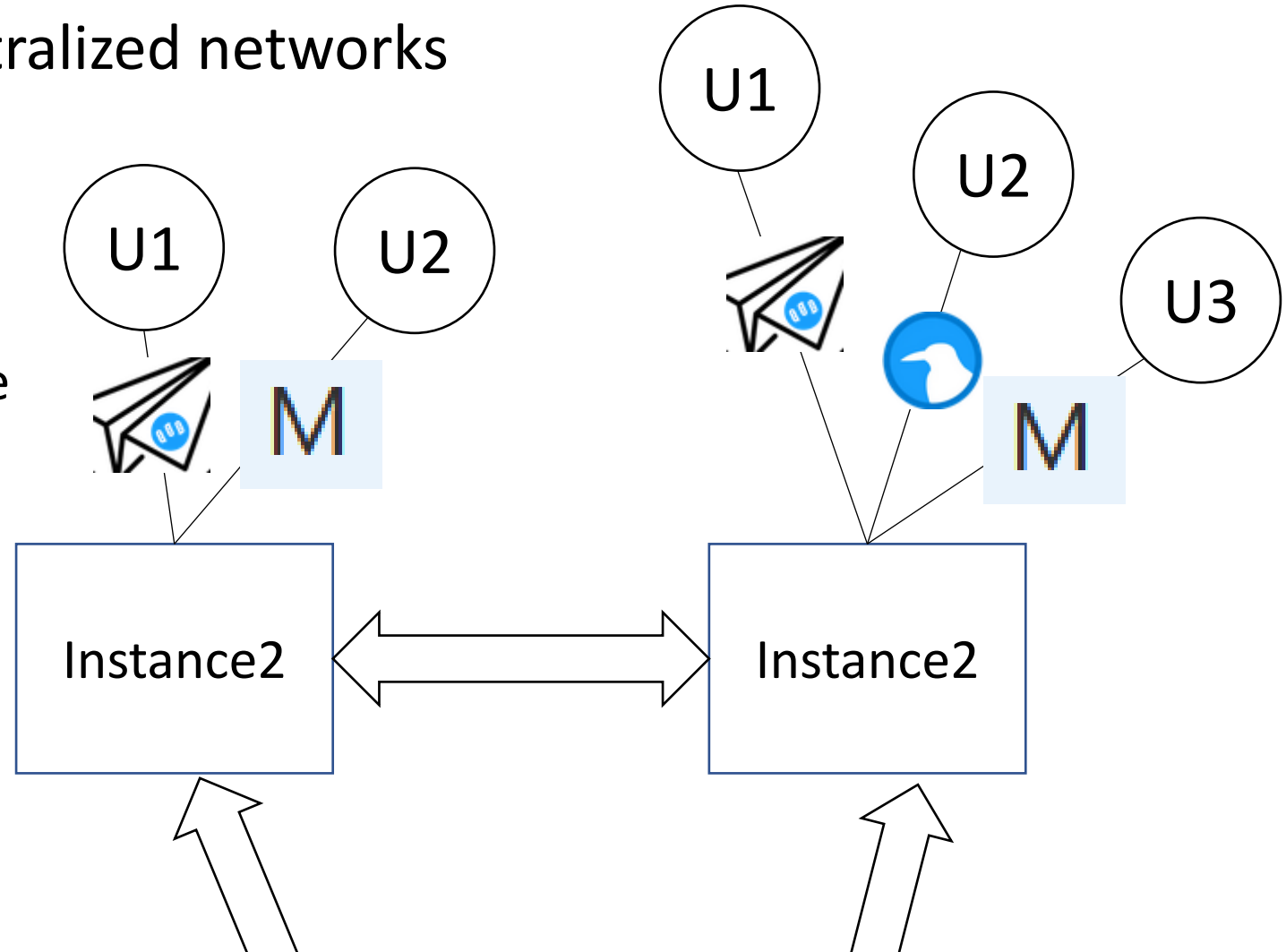
Common elements of decentralized networks

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

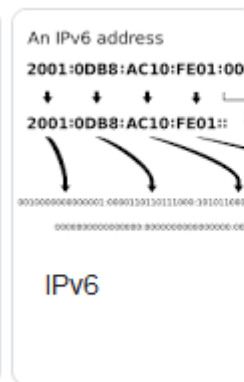
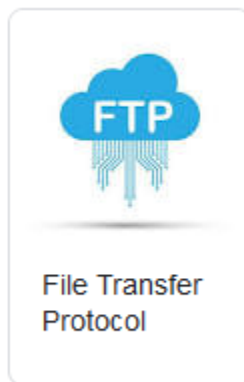
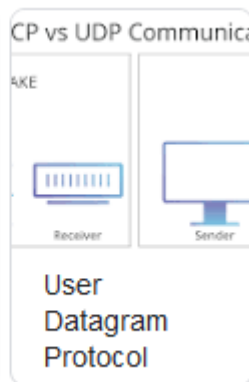
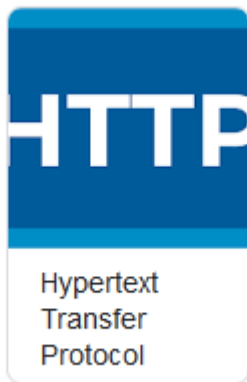
Data protocol - JSON

Linking Protocol – HREF, Dat

Transit protocol – HTTP, ActivityPub

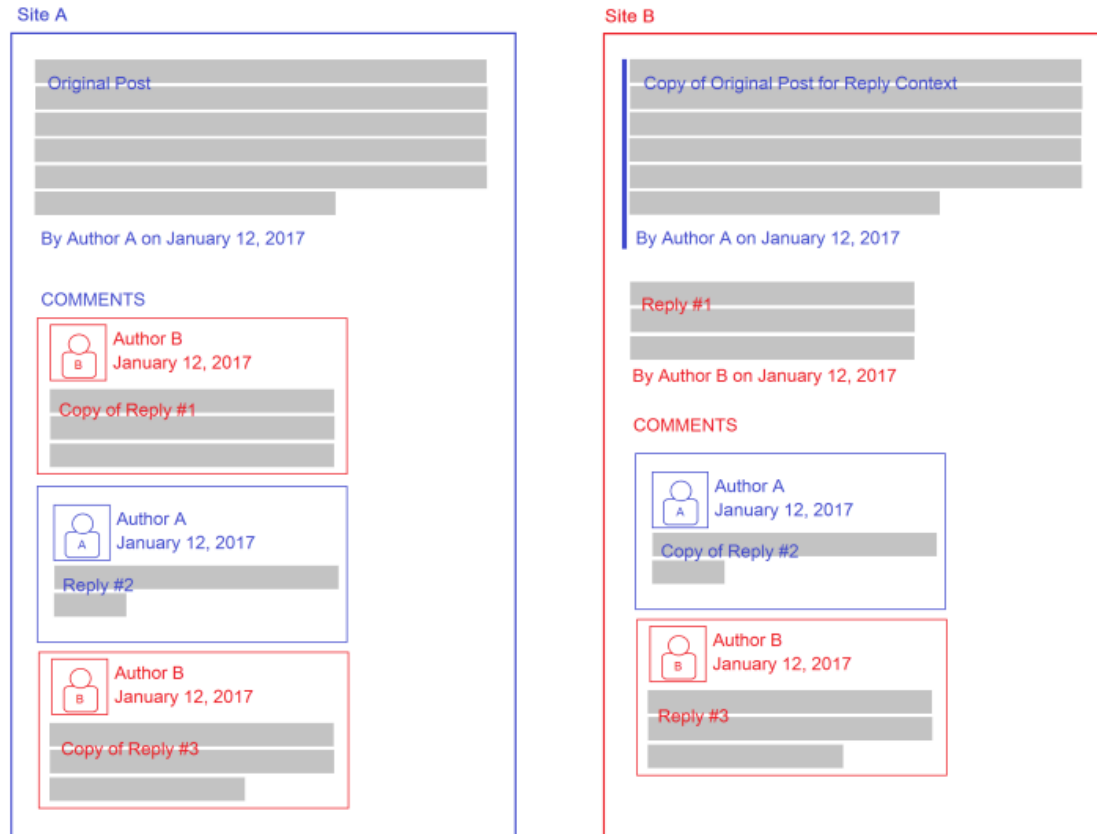
Syndication protocol – FOAF, RSS, OPML, h-card

16		
TOS	Flags	Total length
Fragmentation	Fragment offset	Fragment offset
Protocol	Header checksum	
Source address		
Destination address		
Options		
Data		
IPv4		



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

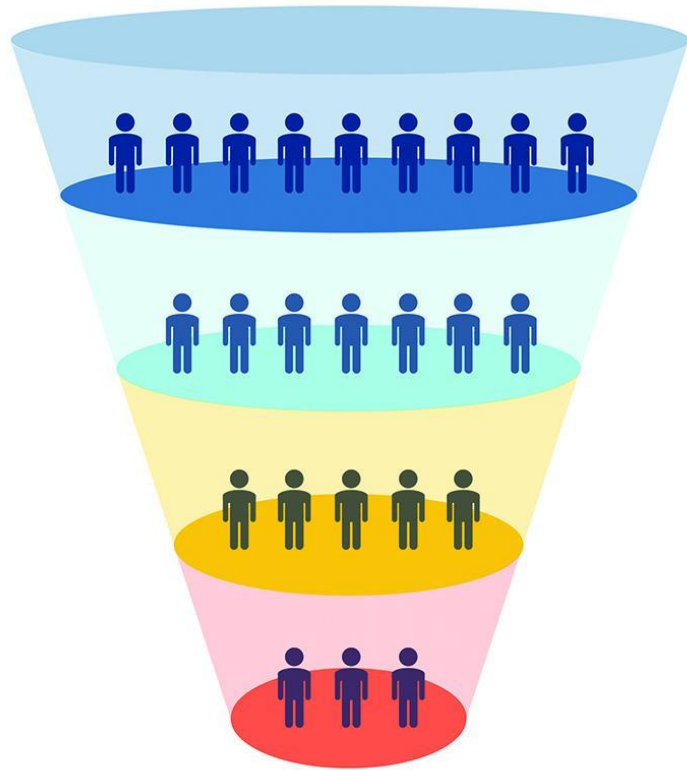
Creating a personal web presence



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.

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/>

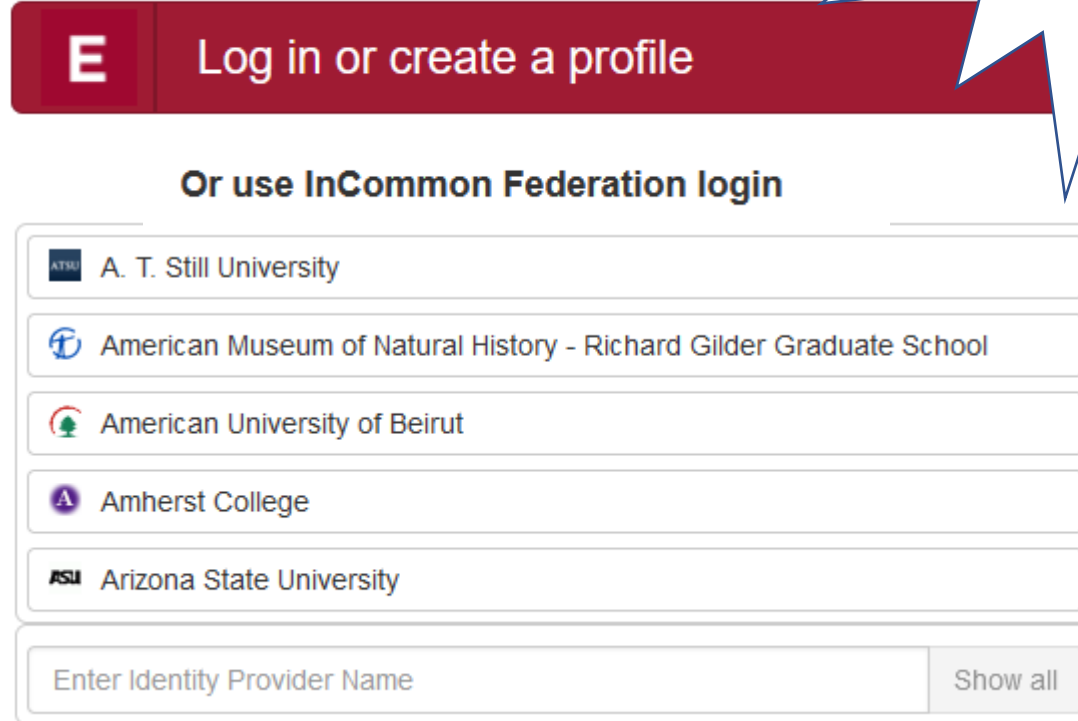
URN <http://tools.ietf.org/html/rfc3986>

Identity Federations

Single Sign-On and the silo identity providers

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.

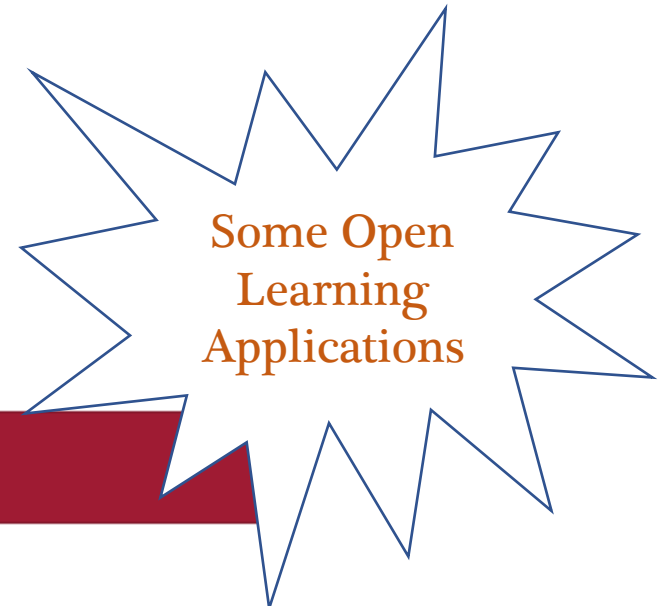


E Log in or create a profile

Or use InCommon Federation login

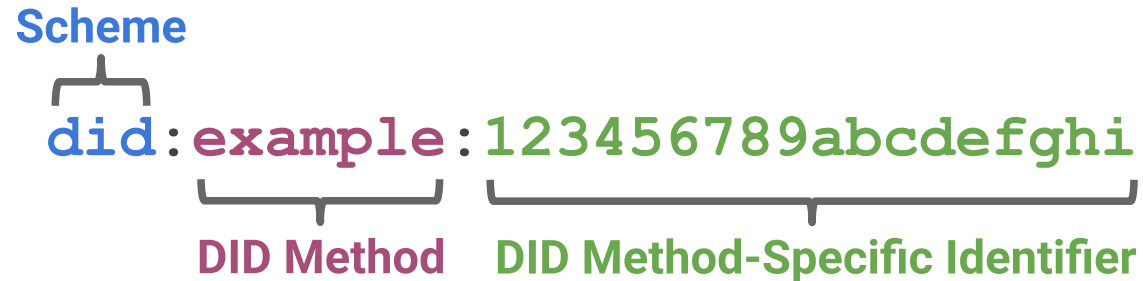
- A. T. Still University
- American Museum of Natural History - Richard Gilder Graduate School
- American University of Beirut
- Amherst College
- Arizona State University

Enter Identity Provider Name Show all



Decentralized Identity

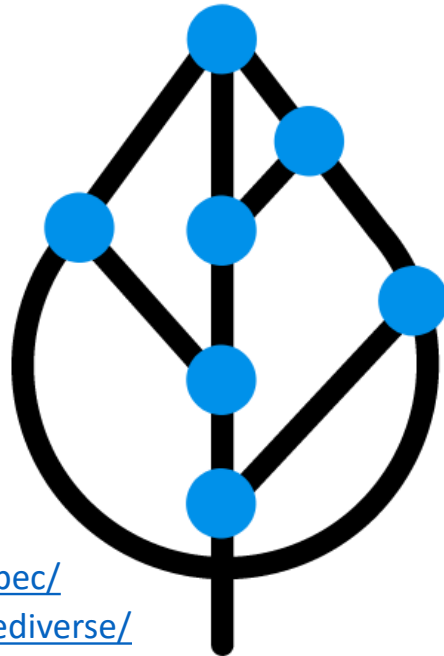
Self-Sovereign Identity and Other Remedies



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>

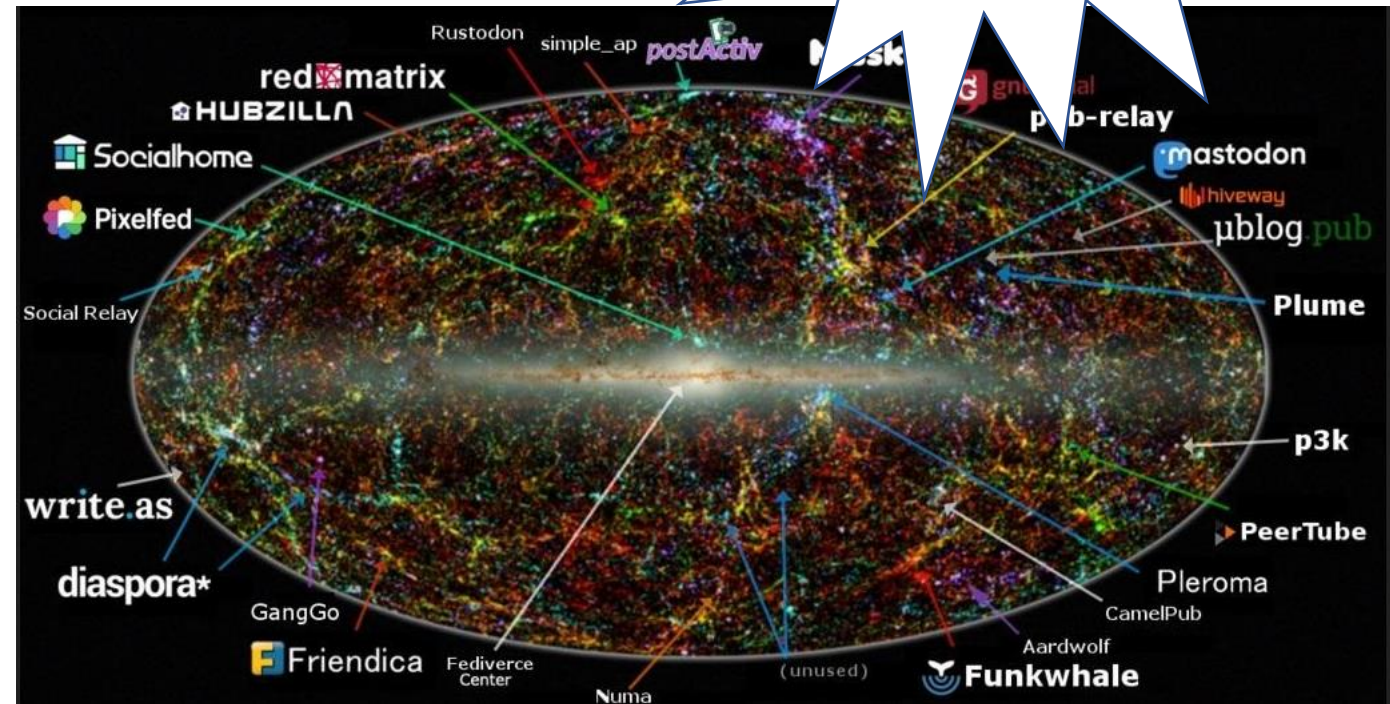
Trunk - <https://communitywiki.org/trunk>
<https://communitywiki.org/trunk/grab/Openn%20Education>

Open Educators on Mastodon

<https://edtechfactotum.com/open-educators-on-mastodon/>

But note: you can't just click -

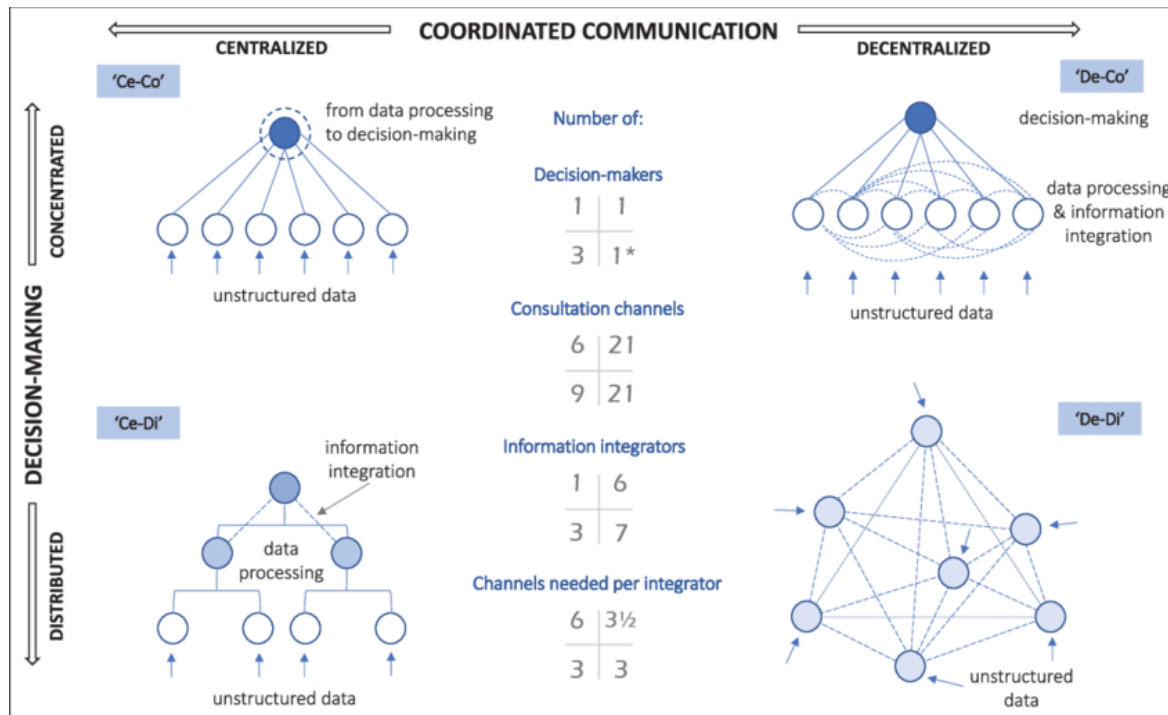
<https://meshedinsights.com/2017/11/15/open-education-consortium/>



<https://www.linkedin.com/pulse/distributed-future-already-here-its-just-evenly-part-shanan-holm-1d/>

More different types of decentralization

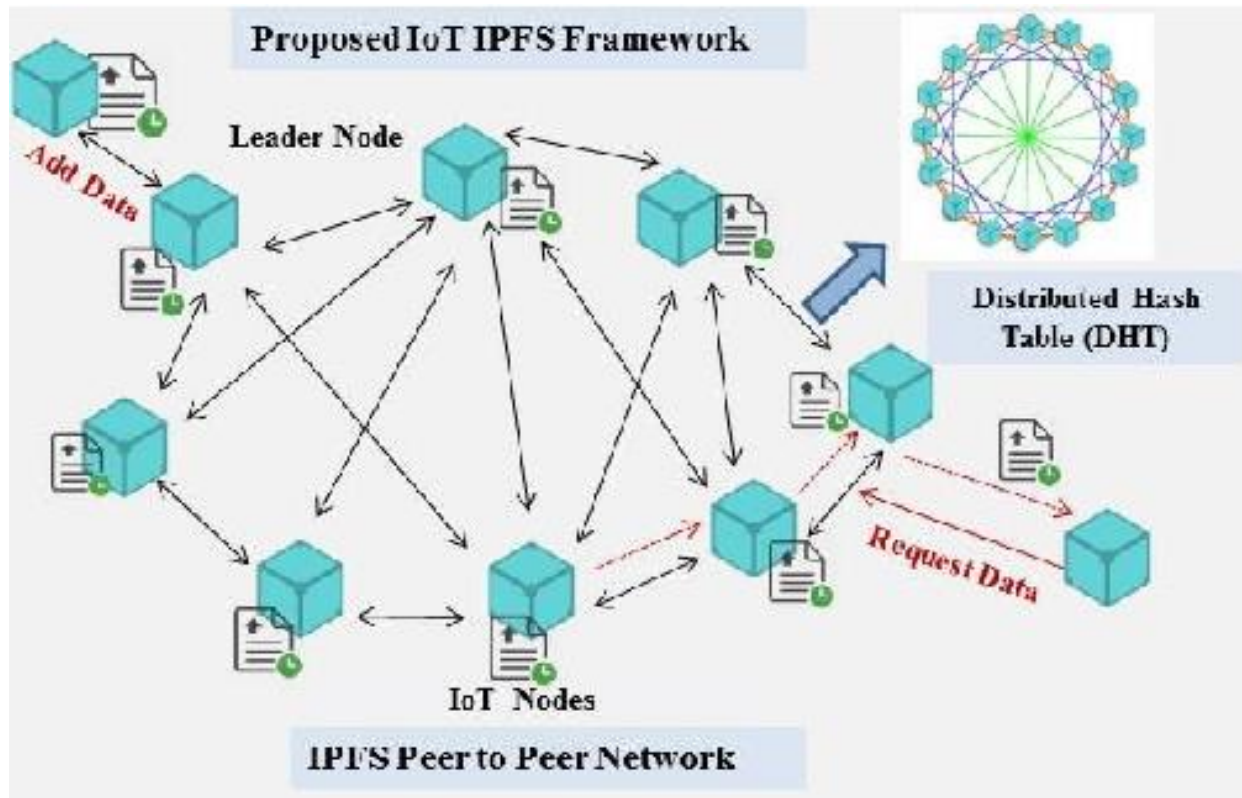
These core concepts apply more generally



HTML pages
Software repositories
Messaging
Content and data
Ledgers and finance
Virtual worlds

Decentralized Content and Data

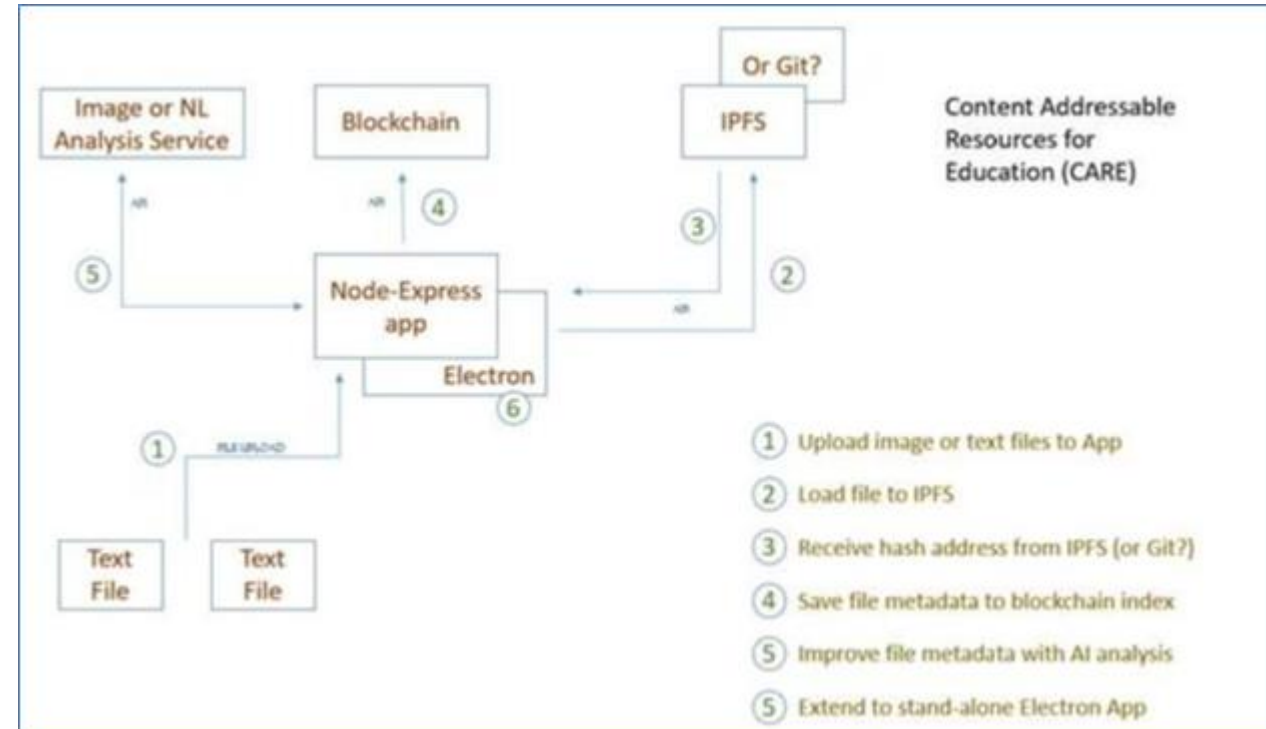
- Dat: and IPFS
- Solid - <https://solidproject.org/>



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.”

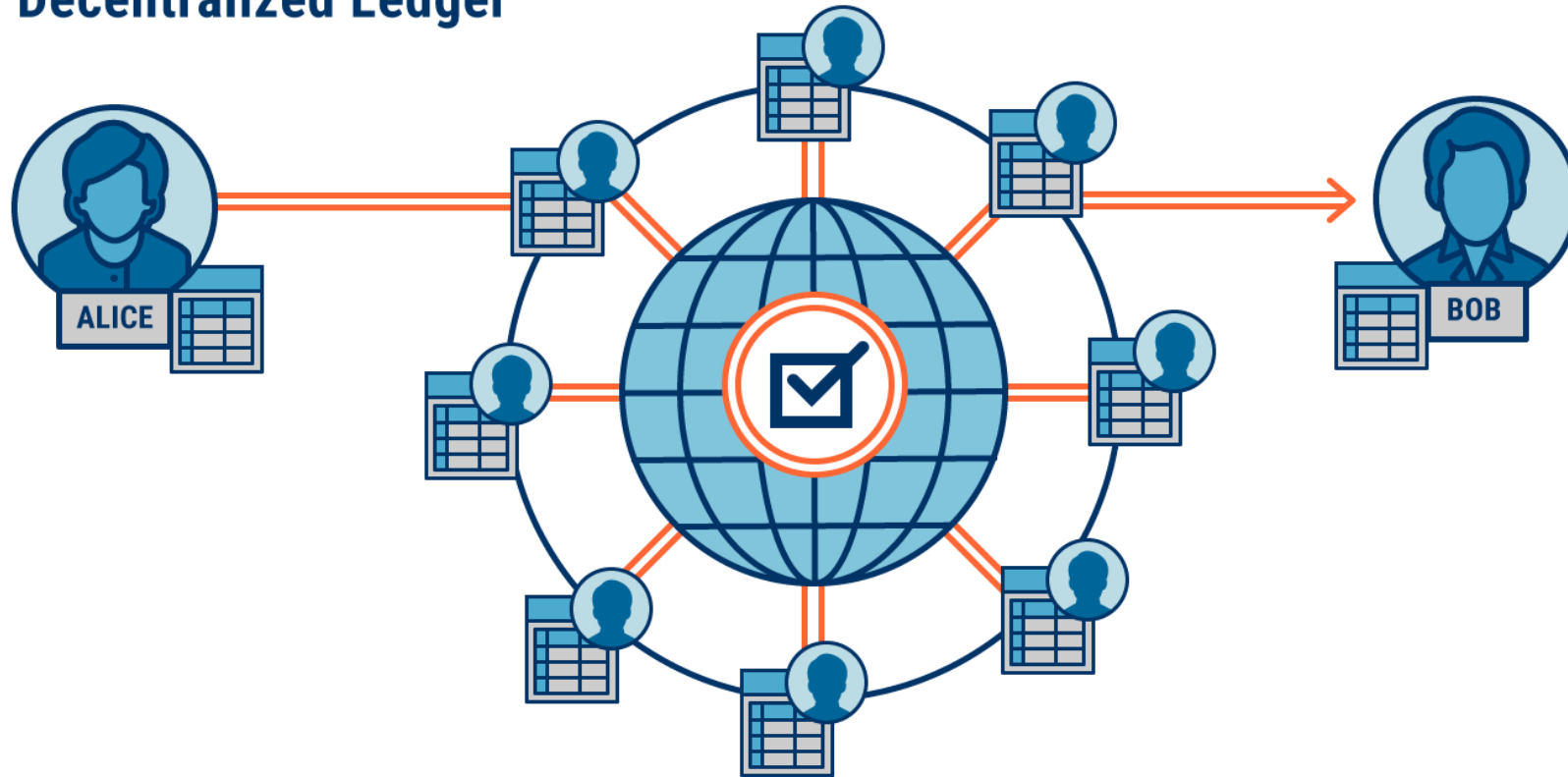


<https://eric.ed.gov/?id=ED608573>

Decentralized Ledgers

Blockchain: Bitcoin, Ethereum, and the rest

Decentralized Ledger



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/>

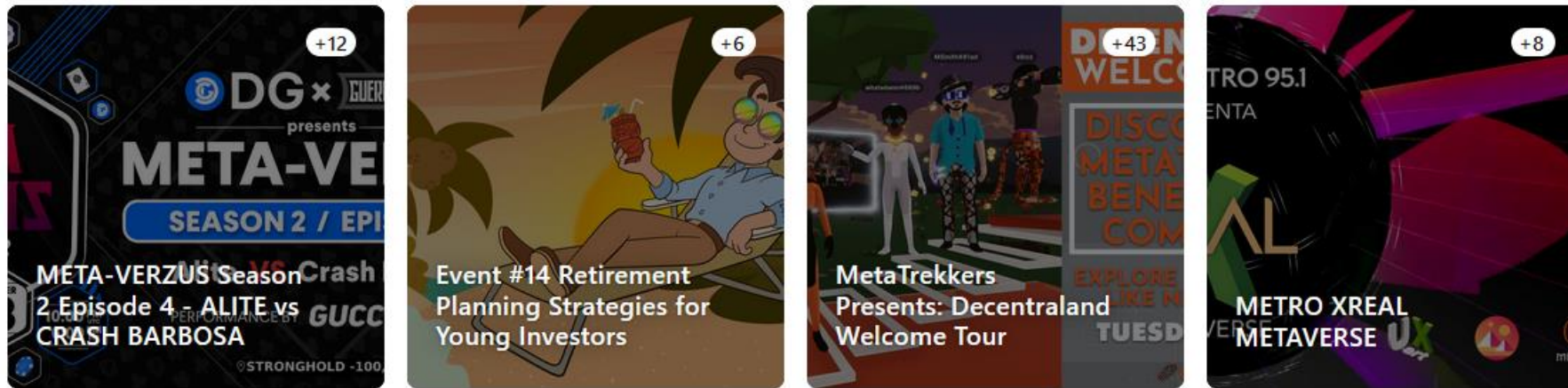
<https://www.open.edu/openlearncreate/course/view.php?id=7981>



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



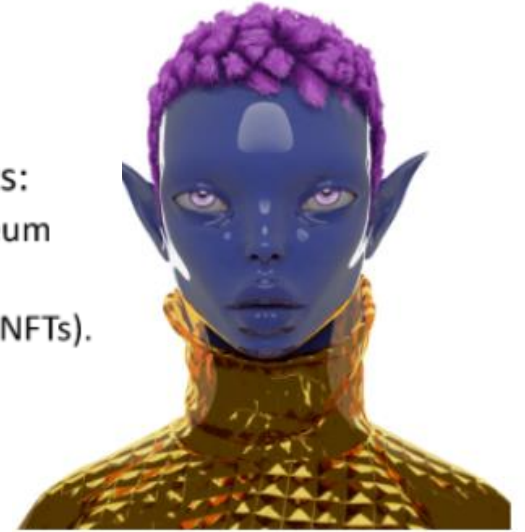
<https://web3isgoinggreat.com/>

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://recentralize.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](https://LearnAwesome.org/2) 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](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/>