

Decentralized Platforms: Comprehensive Comparative Analysis

Section 10 – Platform Deep Profile: ActivityPub / Fediverse
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10.1 Overview

Attribute	Value
Full name	ActivityPub (+ Activity Streams 2.0)
Type	W3C decentralized social networking protocol
Primary identity	Actor URI + WebFinger (@user@domain)
Core concepts	Actors, Activities, Objects, inbox/outbox, S2S federation
Official site / spec	https://www.w3.org/TR/activitypub/ • activitypub.rocks
Primary design goal	Interoperable federation of social activities across independent servers

The Fediverse is the network of servers that speak ActivityPub. Software includes Mastodon, Misskey, Pixelfed, PeerTube, Lemmy and many others. Users on different servers can follow, reply, boost/like and form a shared social graph.

10.2 History and Design Philosophy

W3C Recommendation January 2018. Builds on Activity Streams 2.0. Goals: C2S API + S2S federation + open extensible vocabulary. In practice growth has been strongest on the server-to-server side. Evolution continues via FEPs (Fediverse Enhancement Proposals) and implementation conventions.

10.3 Architecture

Client A Client B ActivityPub S2S Instance A Instance B (Actor HTTP + signatures (Actor inboxes) inboxes)

Actor has inbox + outbox. Activities (Create, Follow, Like, Announce, ...) act on Objects (Note, Image, ...). Delivery is push to addressee inboxes. Server auth typically via HTTP Signatures.

10.4 Identity, Software and Status

Identity: @user@domain via WebFinger → Actor URI. Domain-tied; migration tools exist with varying completeness.

Major software: Mastodon (microblogging, largest), Misskey family, Pixelfed (photos), PeerTube (video), Lemmy/PieFed (forums), Friendica/Hubzilla, GoToSocial/Akkoma/Pleroma, plus events/blogs/music/books apps.

Status Aug 2026: ~18k+ active instances, ~16M accounts (aggregate stats); Mastodon still largest share; FEPs active; Threads partial federation with limited practical impact; E2EE work ongoing but not yet network-wide default; bridging experiments with Nostr/AT Protocol.

10.5 Strengths and Limitations

Strengths: large multi-application network effect; open W3C standard + FEPs; multi-vendor interoperability; cultural/organizational diversity; strong for public social and media; expanding bridges.

Limitations: domain-tied identity; instance-level moderation/trust; E2EE not widespread; pure C2S API underused; protocol gaps filled by convention; UX friction around instances and remote interaction.

10.6 Comparative Position

Dimension	vs Nostr	vs Matrix	vs Peergos	vs Solid
Primary purpose	Public social federation	Real-time messaging	Private storage+social	Personal data ownership
Identity	@user@domain	@user:server	Cryptographic	WebID
E2EE	Limited/emerging	Strong	Storage-focused	App/server dep.
Network effect	Large (multi-app)	Large (messaging)	Small	Small
Best for	Open social web	Secure team chat	Confidential data	User-controlled pods

ActivityPub / the Fediverse is the strongest open, multi-application public social network in this survey.

10.7 Key Primary Sources

- <https://www.w3.org/TR/activitypub/> • Activity Streams Core & Vocabulary
- <https://activitypub.rocks> • FEPs: codeberg.org/fediverse/fep
- Mastodon, Misskey, Pixelfed, PeerTube, Lemmy project docs; SocialHub discussions