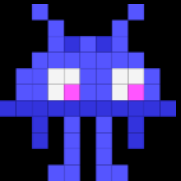
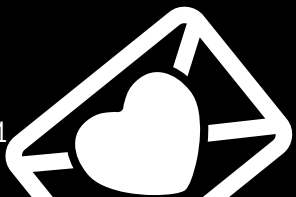


Radicle

Peer-to-Peer Code Collaboration



A Story of Conviction and Passion

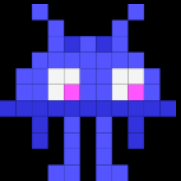


Hey, I'm Lorenz!

I contribute to Radicle...

Why do you do this?

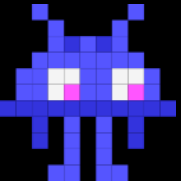
We need a future home for open
source.



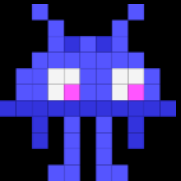
Lorenz



Git



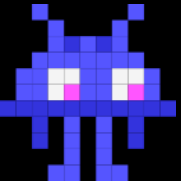
Lorenz  decentralized Git



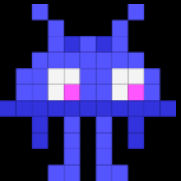
Lorenz



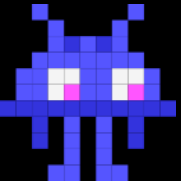
centralized Git



Radicle 📶 decentralized Git



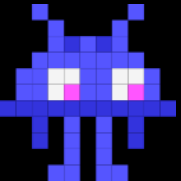
Lorenz ❤️ Radicle and Git



Why Radicle?

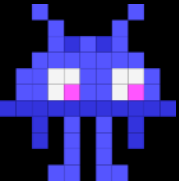
We need a future home for open source.

Radicle is the most advanced peer-to-peer forge I know.



Short Chronology

- Started 2018-01 in Berlin
- Development of current protocol foundation since 2022-07 (previously based on IPFS, not anymore).
- Radicle is developed *on Radicle* since 2023-01.
- Released 1.0.0 on 2024-09-10
1.6.0 World Logic Day
1.6.1 2026-01-21

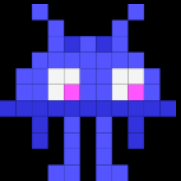


Local-First

- No roundtrips to servers, thus *fast*.
- Works offline.
- Social artifacts (patches, issues, governance) must be *conflict-free*.
- Listen to fintohaps
13:20 @ K.3.201!

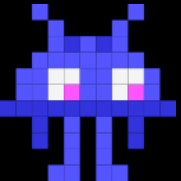
Peer-to-Peer

- No servers, but gossip between peers.
- No user database.
- Users share their storage and availability.
- User is always in control.



Interfaces

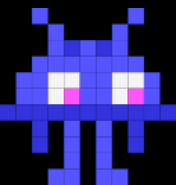
CLI, Desktop, Web



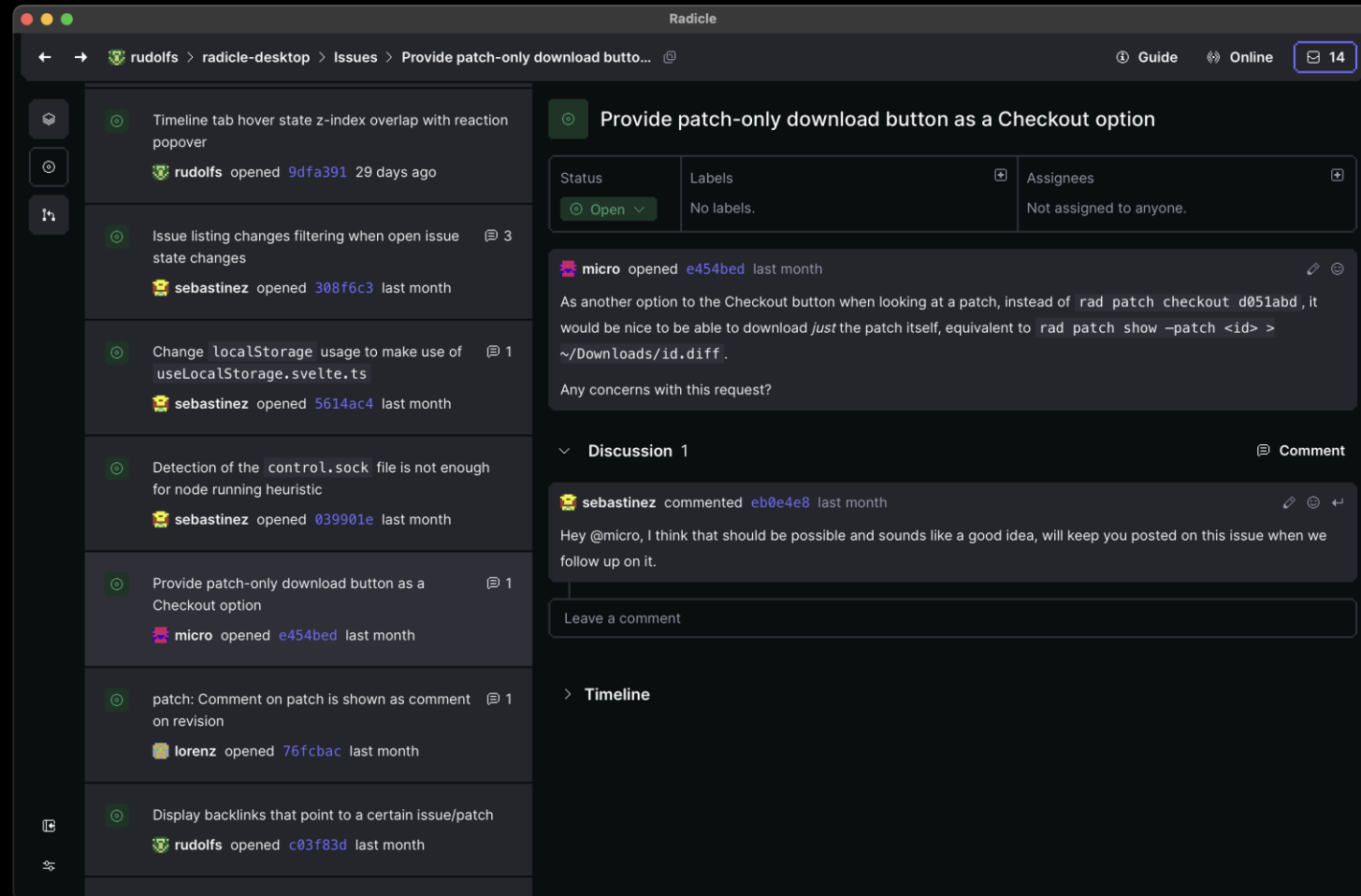
Radicale CLI

```
[I] lorenz@wsl ~-> rad ls
```

Name	RID	Visibility	Head	Description
experiment	rad:zHFjVxWCFEHW2uED43oh7gSsJ8SP	private	7e7ce96	
heartwood	rad:z3gqcJUoA1n9HaHKufZs5FCSGazv5	public	91eb6fc	Radicale Heartwood Protocol & Stack
infra	rad:zDKA4hxFpFeJPp2mvXQFpqNHQmFt	public	2d56704	The NixOS infrastructure configurations
nur	rad:z3WFXKNQgDcHHATJx1PxL1XhDot9u	public	084e5b5	Nix User Repository
rad-ix	rad:z2PJNraeUwrbiKchmoecVMVQjj3Rf	public	98a7f19	The Radicle Indexer
radicle-desktop	rad:z4D5UCArafTzTQpDZNQRuqsw3ury	public	e48cc10	Radicale desktop app
radicle-explorer	rad:z4V1sjrXqjvFdnCUbxPFqd5p4DtH5	public	1416286	Radicale web interface
radicle-git	rad:z6cFWeWpnZNHh9rUW8phgA3b5yGt	public	f70012f	Git libraries for Radicle
radicle-infra	rad:z254T5p17bdFpmzfDojsdjo4HjpoZ	public	48e0466	Radicale Infrastructure as Code (NixOS, OpenTofu, ...)
radicle-link	rad:z4GaM5EUGJm462FQg4RtWyMt7NAqX	public	99f4255	The second iteration of the Radicle code collaboration protocol.
radicle-nix	rad:zTGn5tnYJgF8qd6KDuodURvUvwLe	public	d7bb432	Packages, Modules etc. for using Nix and Radicle together.
radicle-scripts	rad:z2UsLkj3UXjbxwZMGpQ9VeVLDCYUQ	public	93a4c46	
radicle-tui	rad:z39mP9rQAaGmERfUMPULfPUIi473tY	public	d4484a8	Radicale terminal user interface
radicle.xyz	rad:z371PVmDHdjJucejRoRYJcDEvD5pp	public	3ef1a1f	Radicale website including documentation and guides
radicle.xyz-desktop	rad:z4Rxw3J2gX8SJgUYJ3h1KvQCAYoKS	public	9075ef9	Radicale Desktop Landing page and Documentation
rips	rad:z3trNYnLWS11cJWC6BbxDs5niGo82	public	329dee9	Radicale Improvement Proposals (RIPs)



Radicle Desktop

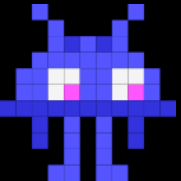


The screenshot displays the Radicle Desktop application window. The title bar reads "Radicle". The breadcrumb navigation shows the path: `rudolfs` > `radicle-desktop` > `Issues` > `Provide patch-only download butto...`. In the top right corner, there are links for "Guide" and "Online", and a notification badge showing "14".

The left sidebar contains a list of issues:

- Timeline tab hover state z-index overlap with reaction popover (opened by `rudolfs` 29 days ago)
- Issue listing changes filtering when open issue state changes (opened by `sebastine` last month)
- Change `localStorage` usage to make use of `useLocalStorage.svelte.ts` (opened by `sebastine` last month)
- Detection of the `control.sock` file is not enough for node running heuristic (opened by `sebastine` last month)
- Provide patch-only download button as a Checkout option (opened by `micro` last month)
- patch: Comment on patch is shown as comment on revision (opened by `lorenz` last month)
- Display backlinks that point to a certain issue/patch (opened by `rudolfs` last month)

The main content area shows the details for the issue "Provide patch-only download button as a Checkout option". It includes a status bar with "Open", "No labels", and "Not assigned to anyone". The issue description, opened by `micro` last month, discusses an alternative to the checkout button, suggesting a download of the patch itself using the command `rad patch show -patch <id>`. A discussion section shows a comment from `sebastine` agreeing with the idea. A comment input field is visible at the bottom of the discussion section.



Radicle Explorer (Web App)

Source

Issues136

Patches23

Delegates1/4

Seeding ScopeAll

Settings

Help

rosa.radicle.xyz > heartwood > Patches > 7535a1425881289a79dac4dceaa21a9df98435ed

policy: change the default scope from 'all' to 'follow'

Copy linkCheckout

ReviewsNo reviews

LabelsNo labels

AttachmentsNo attachments

Open+39-25adeopened 7535a14 3 days ago

As per the Security > Issue with default value for Scope being All zulip conversation. Change the default scope for cloned, seeded and newly initialised repositories from 'all' to 'follow'.

ActivityChangesRevision 7535a14

22 files modified with 39 insertions and 25 deletions

crates/radicle-cli/examples/rad-block.md

@@ -38,7 +38,7 @@ \$ rad seed

Repository	Name	Policy	Scope
rad:z42hL2jL4XNk6K8oHqQaSWfMgCL7ji	block	all	
rad:z42hL2jL4XNk6K8oHqQaSWfMgCL7ji	block		

crates/radicle-cli/examples/rad-clone-connect.md

@@ -3,7 +3,7 @@ automatically connect to the necessary seeds.

\$ rad clone rad:z42hL2jL4XNk6K8oHqQaSWfMgCL7ji

Seeding policy updated for rad:z42hL2jL4XNk6K8oHqQaSWfMgCL7ji with scope 'all'

Seeding policy updated for rad:z42hL2jL4XNk6K8oHqQaSWfMgCL7ji with scope 'followed'

Fetching rad:z42hL2jL4XNk6K8oHqQaSWfMgCL7ji from the network, found 2 potential seed(s).

Target met: 1 seed(s)

Creating checkout in ../heartwood..

crates/radicle-cli/examples/rad-clone-partial-fail.md

@@ -10,12 +10,13 @@ \$ rad node routing

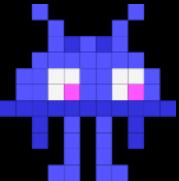
rad:z42hL2jL4XNk6K8oHqQaSWfMgCL7ji z6Mkt67GdsW771SMEFRuP4pSZxJRJh6kj6Y48WRqVv4N1tRk

When she tries to clone, one of those will fail to fetch. But the clone command still returns successfully.

\$ rad clone rad:z42hL2jL4XNk6K8oHqQaSWfMgCL7ji --timeout 3

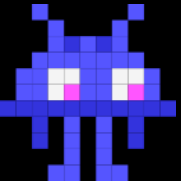
Seeding policy updated for rad:z42hL2jL4XNk6K8oHqQaSWfMgCL7ji with scope 'all'

Seeding policy updated for rad:z42hL2jL4XNk6K8oHqQaSWfMgCL7ji with scope 'followed'



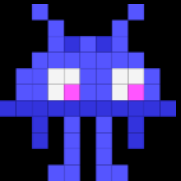
High-Level Design

Git + x



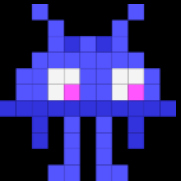
Take Git

- Content Addressability
- Immutability of Data
- Efficient Sync Protocol
- Wide Acceptance



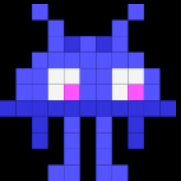
Add On

- Globally unique repository addresses
- Repository metadata including permissions
- Discovery of replicas
- Self-certifying, sovereign, user identity (like PGP)
- Lots more for social artifacts like patches and issues (fintohaps' talk, 13:40 @ K.3.201)



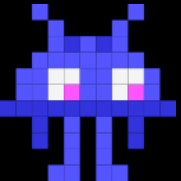
git push is ~~a lie~~ local first

1. ~/.../foo\$ git push rad://z3gqcJUoA1n...CSGazv5 main
 2. A **Git remote helper** sends objects across your filesystem to ~/.radicle/storage/z3gqcJ...Gazv5
That's fast.
 3. A long-running process, called Radicle Node, picks up your changes and announces the new references to the network.
- Retains mental model of pushing to send over the network.



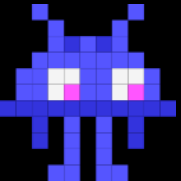
Radicle Node

- Clients (CLI, Desktop, TUI, HTTP Daemon) interact with:
 - Radicle Storage via the filesystem (git push)
 - Radicle Node via JSON over Unix socket (commands)
- Peers to other nodes
 - Currently bootstrapped via {iris,rosa}.radicle.xyz (both also reachable as Onion services).
 - In the future DNS-SD combined with DHT?



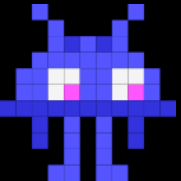
Radicle Peer-to-Peer Connections

- Noise_XK_25519_ChaChaPoly_SHA256 over TCP
- Simple multiplexer (inspired by QUIC) over two sub-protocols:
 - Git (for syncing)
 - Gossip (metadata about nodes and repositories)
- Supports Tor via SOCKS out of the box.
- That's it!



Messages

- Announcements (3)
- Subscriptions (1)
- Informational (1)
- Keepalive (ping and pong)



Announcement Messages

- Node

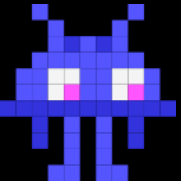
Introduces the node to the network.

- Inventory

Lists the available repositories.

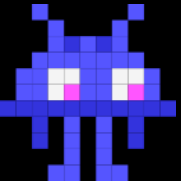
- Refs

Git references changed, e.g. user pushed.

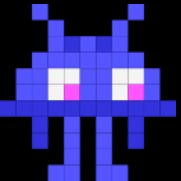


Subscription Messages

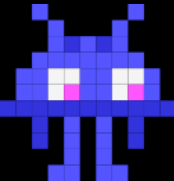
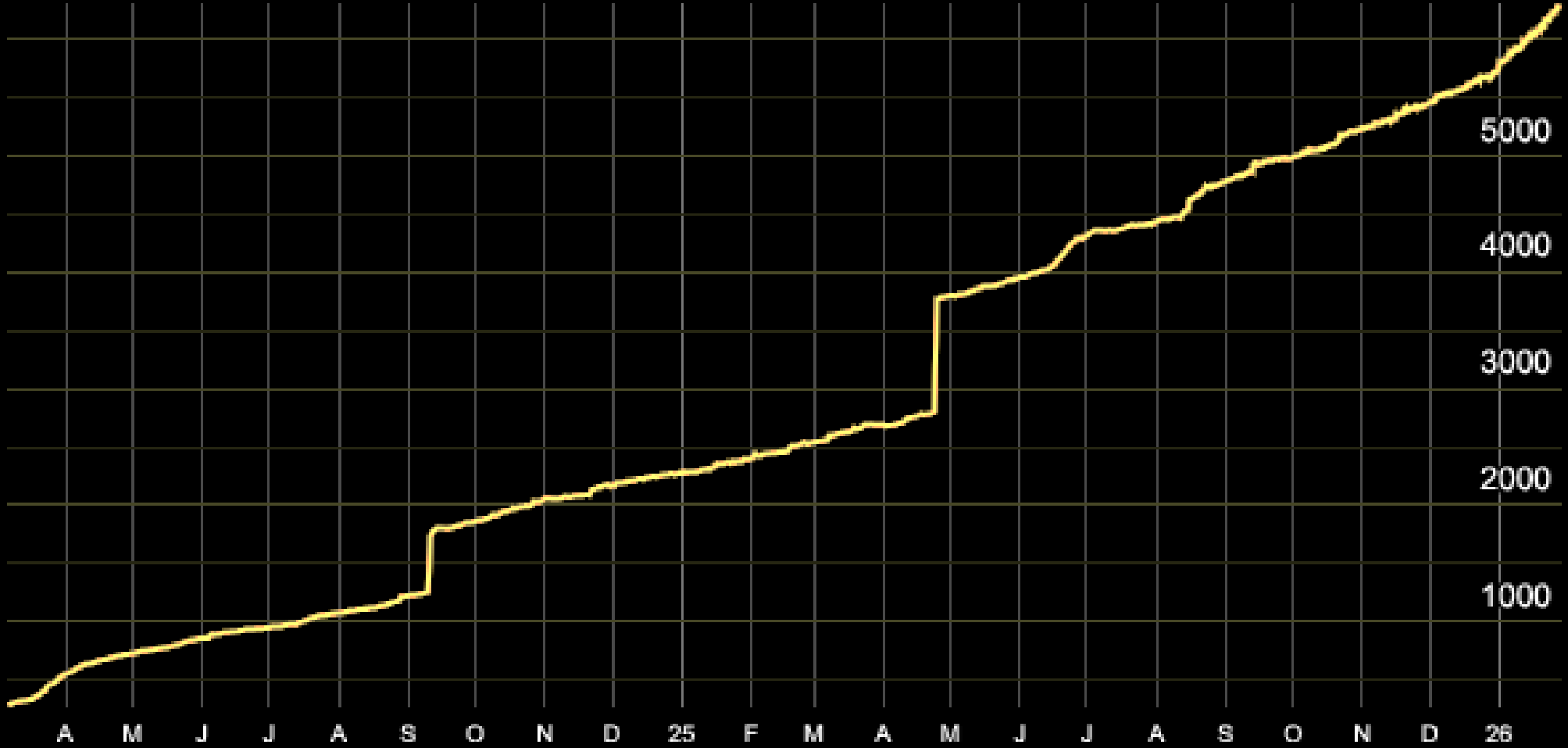
- Subscribe to updates for repositories by sending a bloom filter.
- Includes start and end point in time.



The Network Today



Repositories



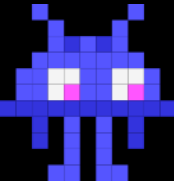
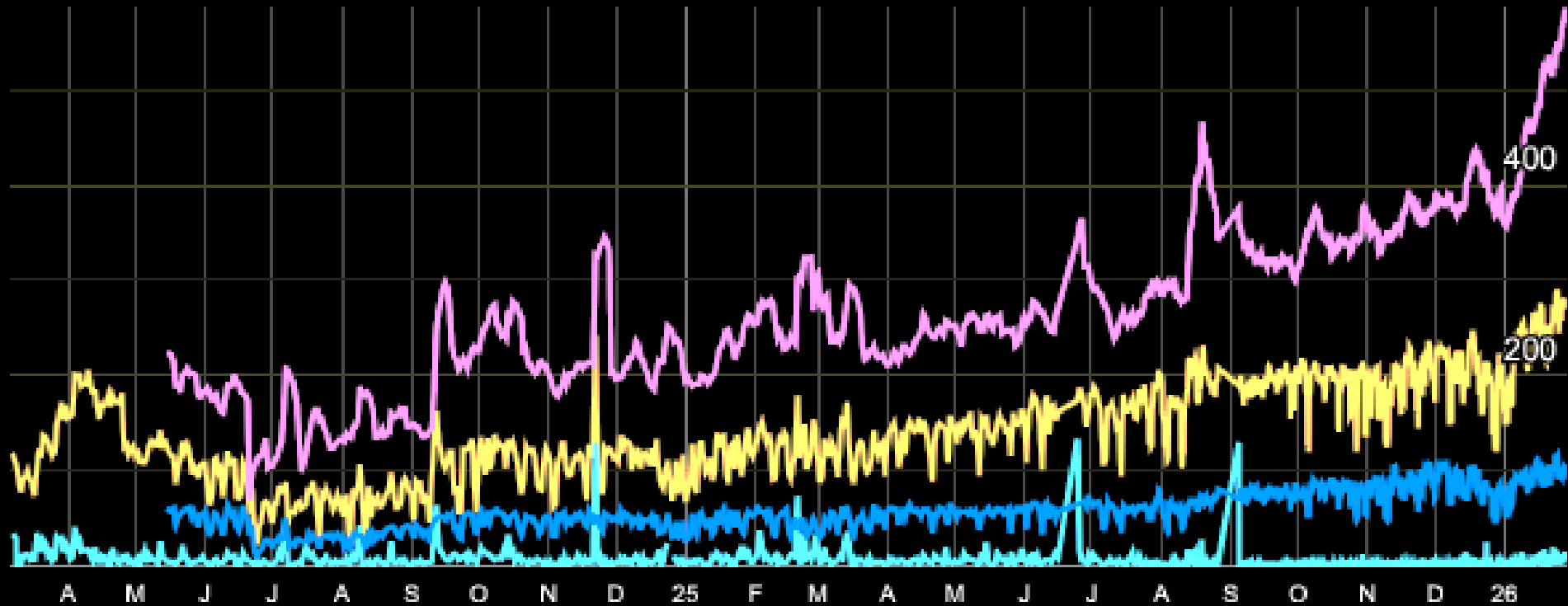
Nodes

Daily Active Nodes

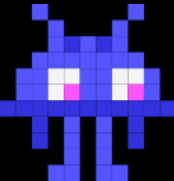
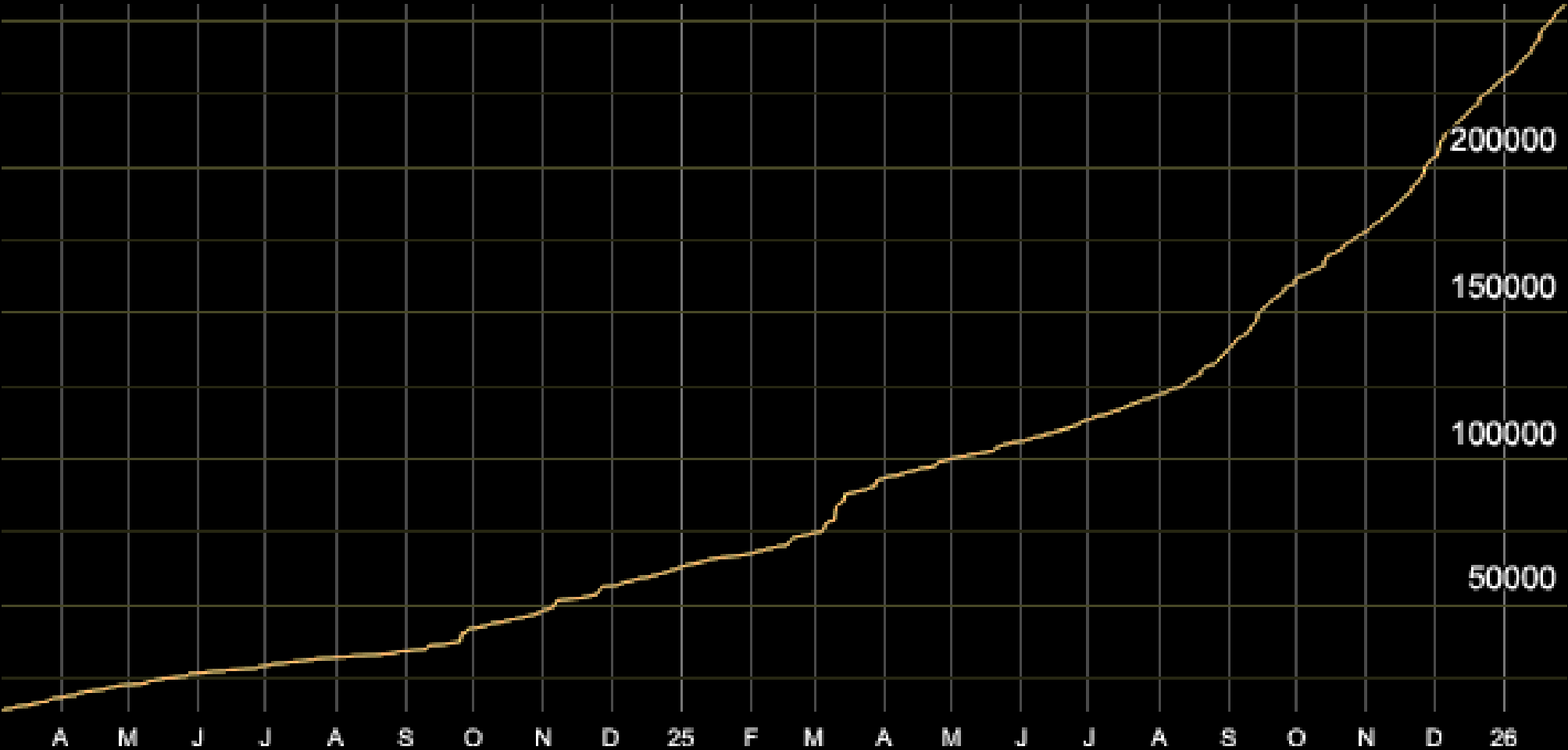
Daily New Nodes

Daily Public IP Nodes

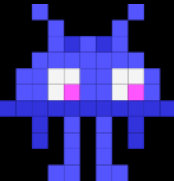
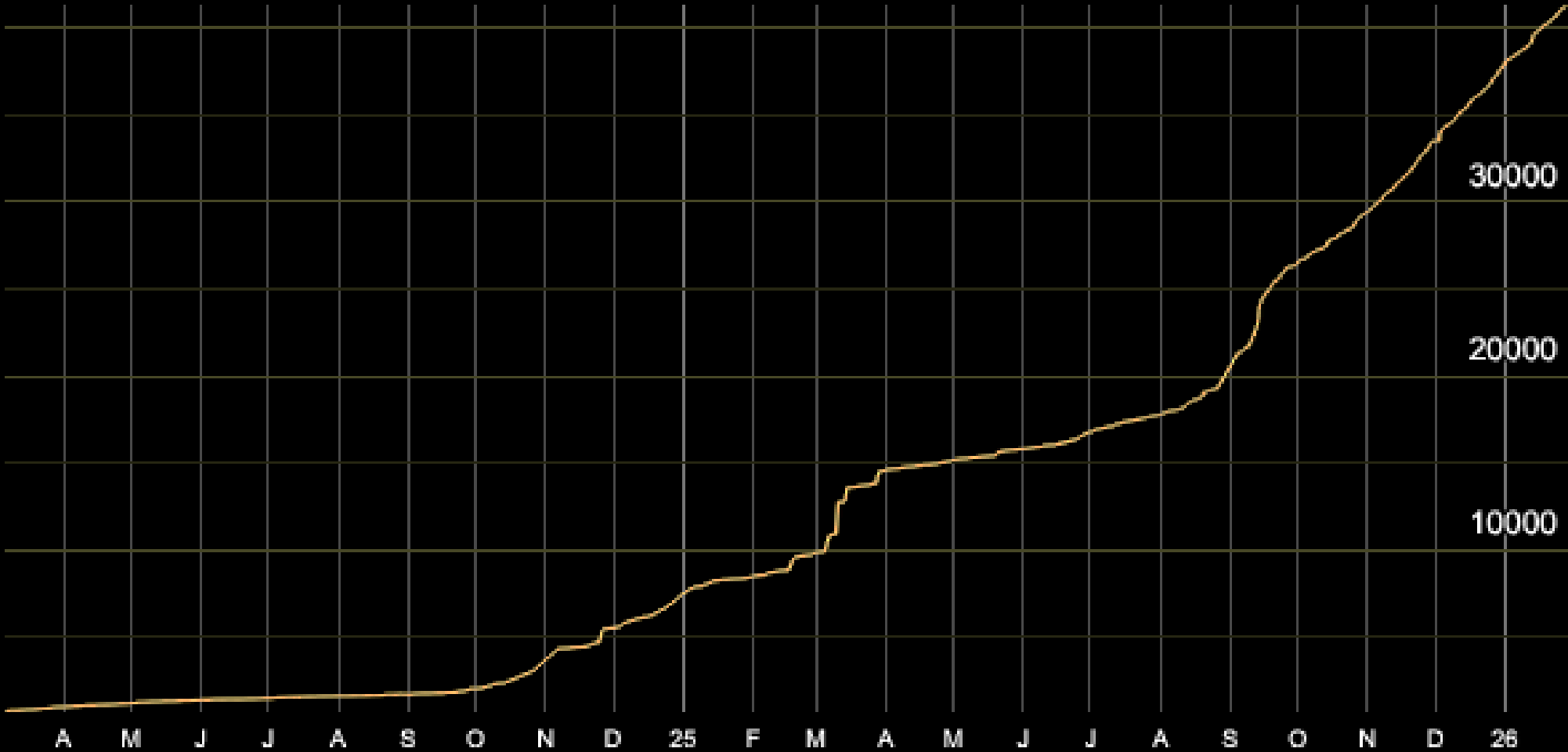
Weekly Active Nodes



Pushes

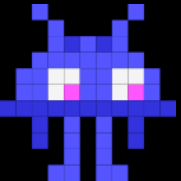


Patches



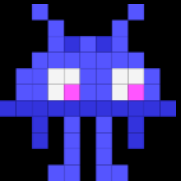
Operating a Node

- Nodes are persistently address by their Ed25519 key.
- You decide which repositories you want to replicate (“seed”) and can change your mind any time.
- You can join the global de facto main network or roll your own.
- Nodes can announce change of their IP address, TCP port.



The Road Ahead

- Separation of user and node concepts.
- Multi-Device Support
- Identities that allow key rotation.
- Fine-Grained Replication Policies
- Hole Punching (iroh?)
- Discovery via DNS-SD and mDNS.



Free your code!

radicle.xyz

Read

app.radicle.xyz

Surf

radicle.zulipchat.com

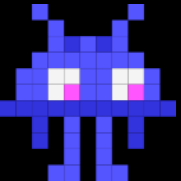
Chat

@radicle@toot.radicle.xyz

Toot

Open Local First After Party

Talk



Private Repositories and Networks

- Majority of repository owners (“delegates”) decides which nodes (specified by their Ed25519 key) may fetch and replicate the repository.
- Users can configure nodes to connect with, forming their own, private, Radicle network.

