



Towards a Local-First Desktop

with Modal,
p2panda,
and Reflection



 *Tim Cook*
Apple

 *The President*

 *Satya Nadella*
Microsoft

 *Jeff Bezos*
Amazon

**In 2025 everyone
realized they're
utterly dependent
on the US**

**This could have
been our moment.**

We weren't ready.

We don't currently have

Daily-drivable phone OS

iOS/GrapheneOS level security

Good collaborative tools (Google Docs et al)

Multi-device sync

**We need to be more
organized, focused,
and strategic**

**We also need to
build for a world that
is more uncertain
than ever**

Modal

Collective



Emancipatory Computing

Software Freedom

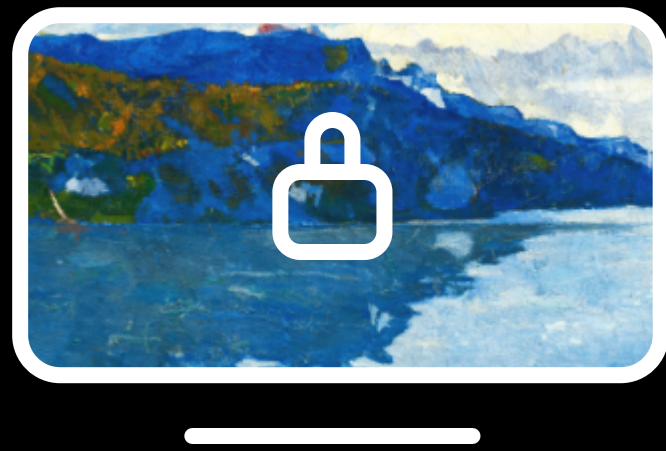
Design-First

Respects your Attention

Adversarial Security

Hardware Longevity

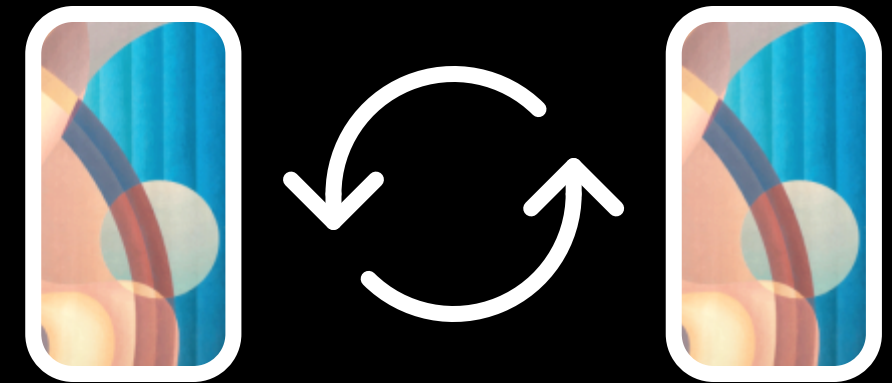
Post-Internet



Actually Secure



Daily-Drivable Phone



Local-First Sync



Image-Based



Hardware Longevity



App Ecosystem

Development

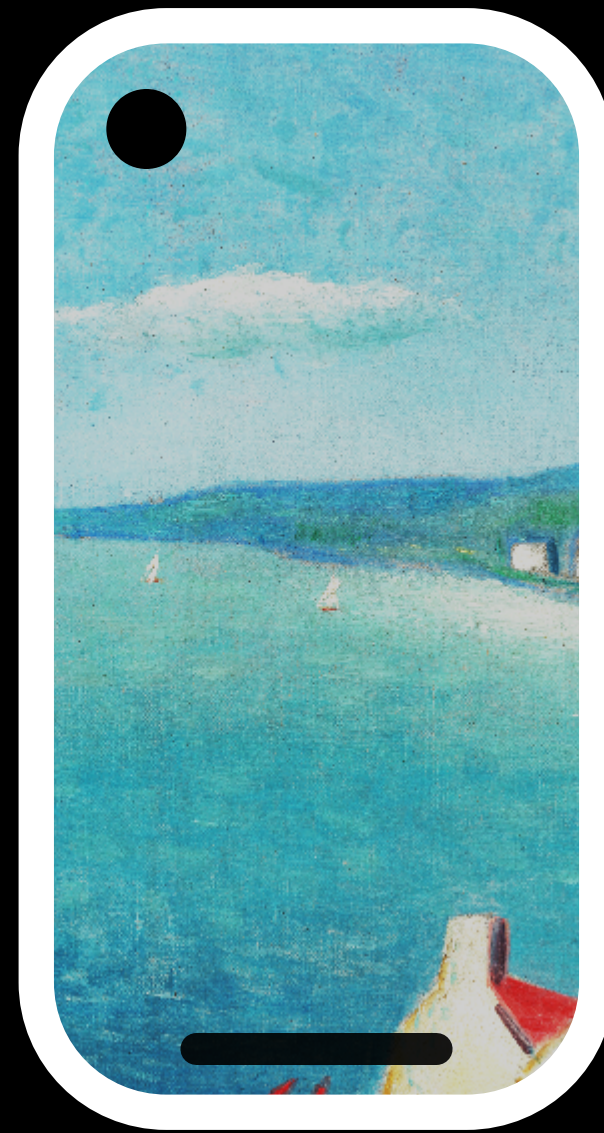
Design

Organizing

Grant Writing

Policy Campaigning

More



A free software iPhone

The Stack

Flatpak

p2panda

GTK+Adwaita

GNOME

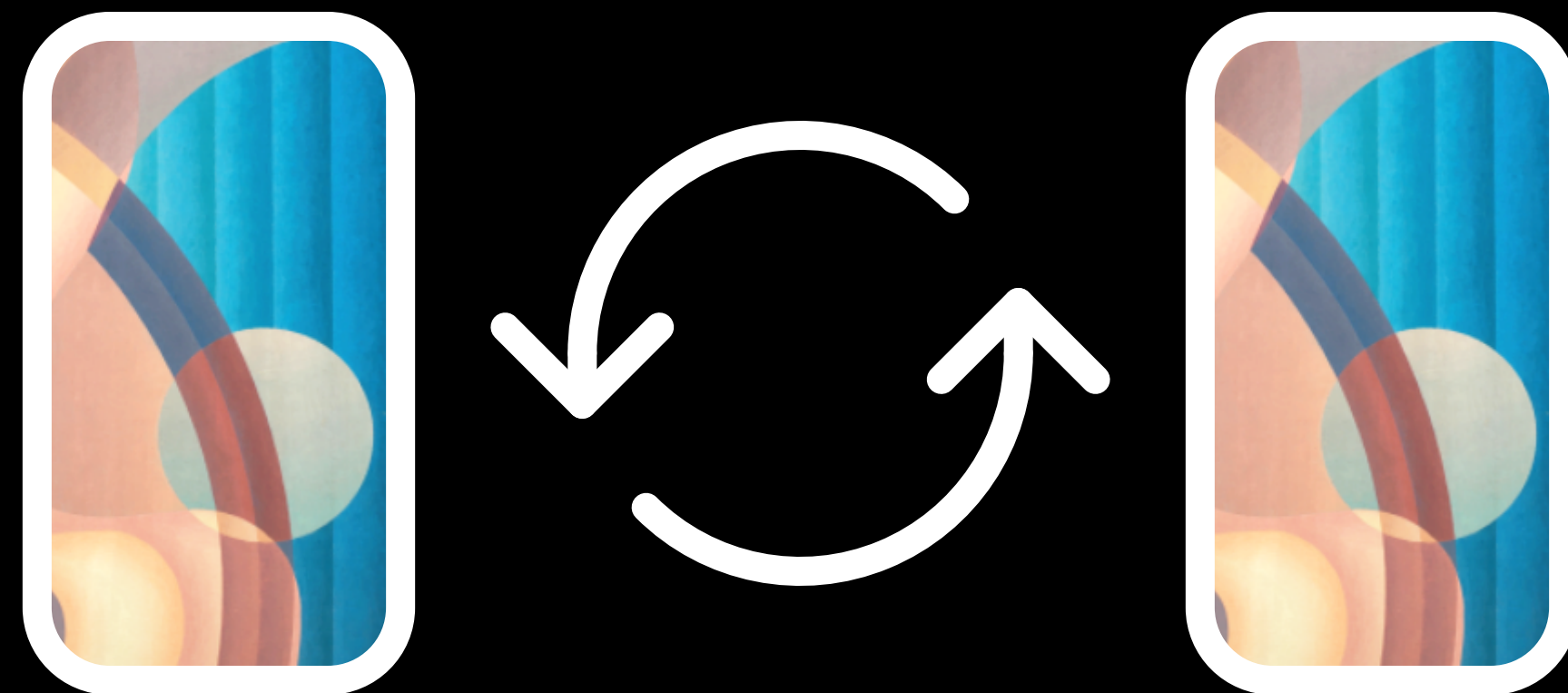
Freedesktop

systemd

Linux

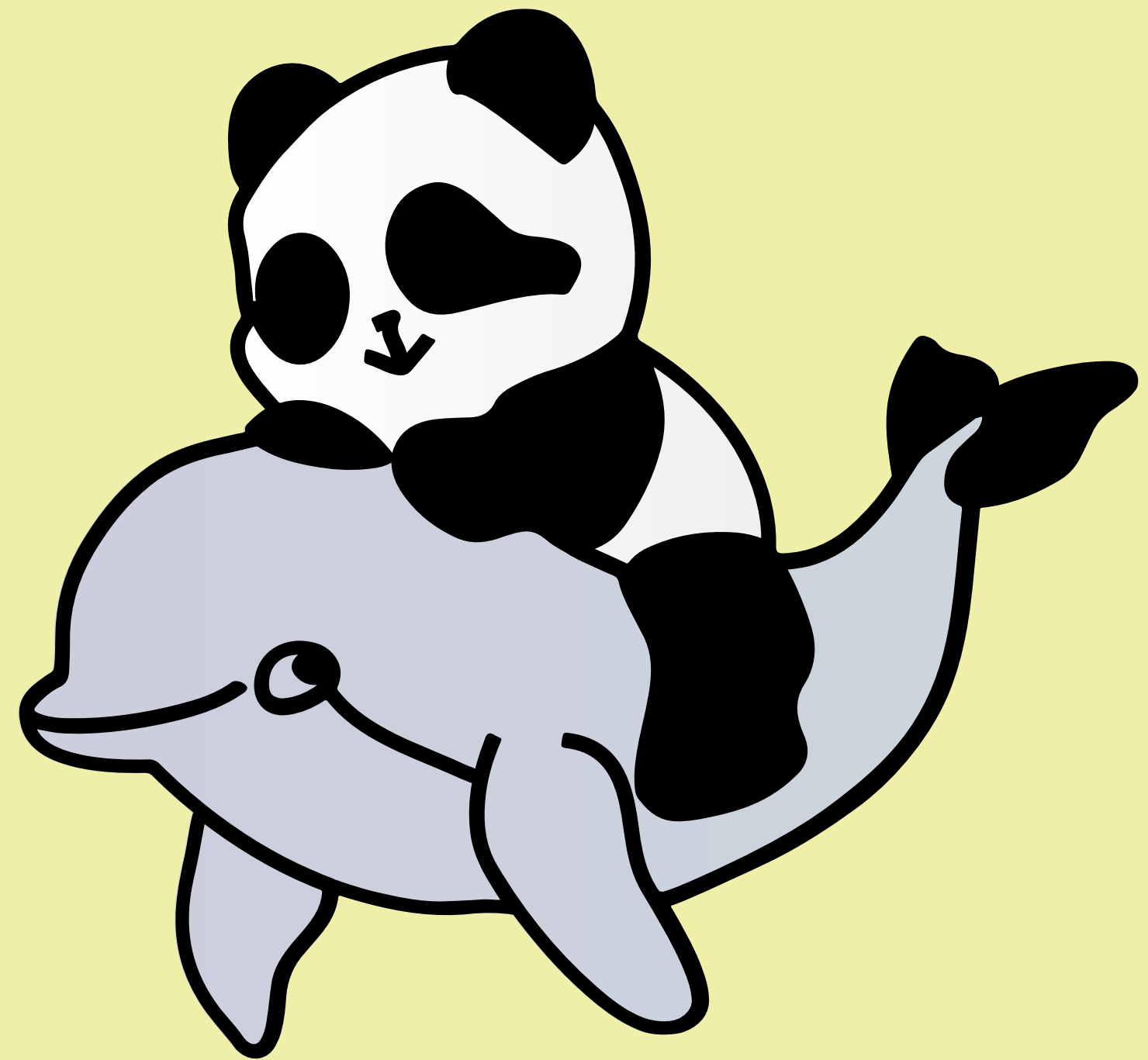
**Upstream work in
existing projects to
push things forward**

**Where we're going
we'll need resilient
networking**



Local-First Sync

p2panda



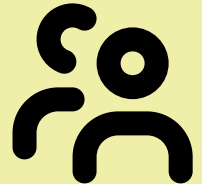
Team



Building Blocks for P2P Applications

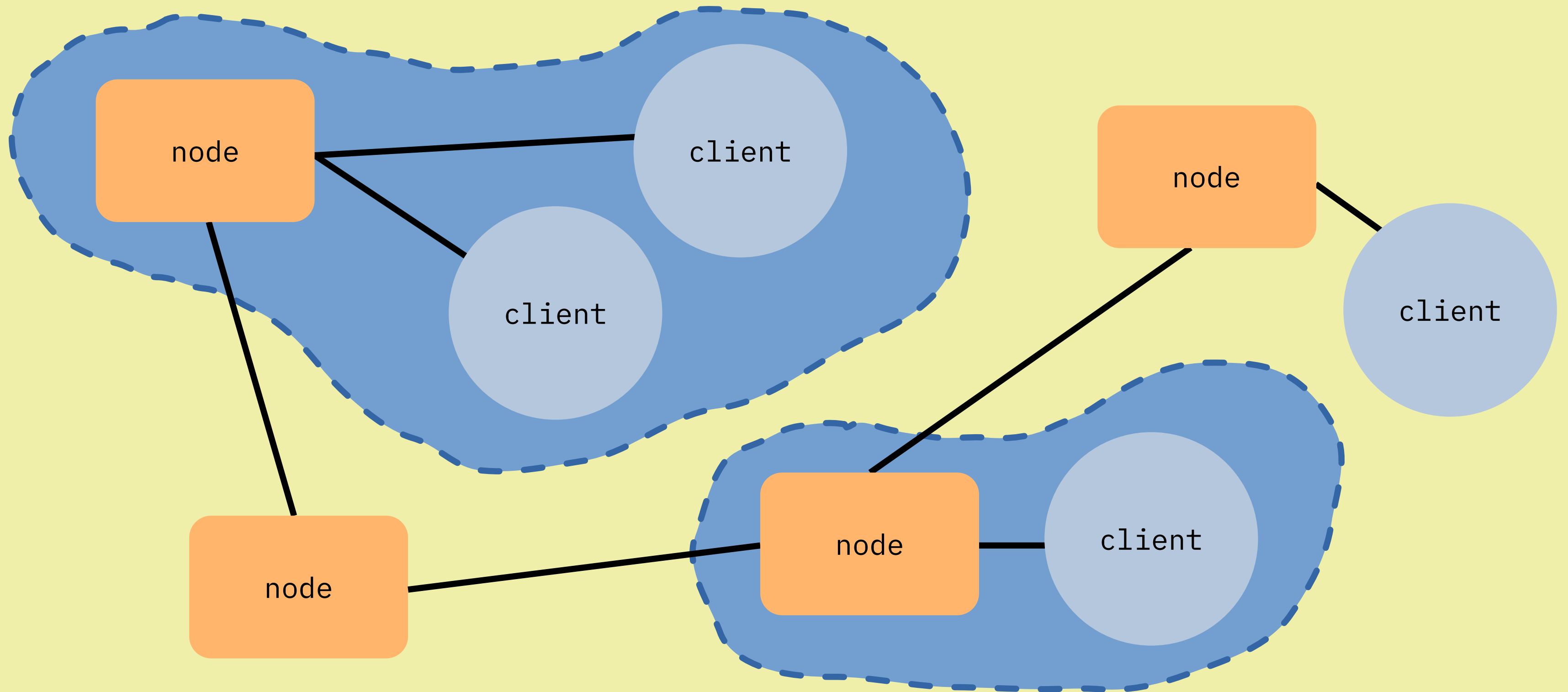
 **Confidential Discovery & Sync**

 **Key Agreement for Groups
(with Forward Secrecy)**

 **Group CRDT**

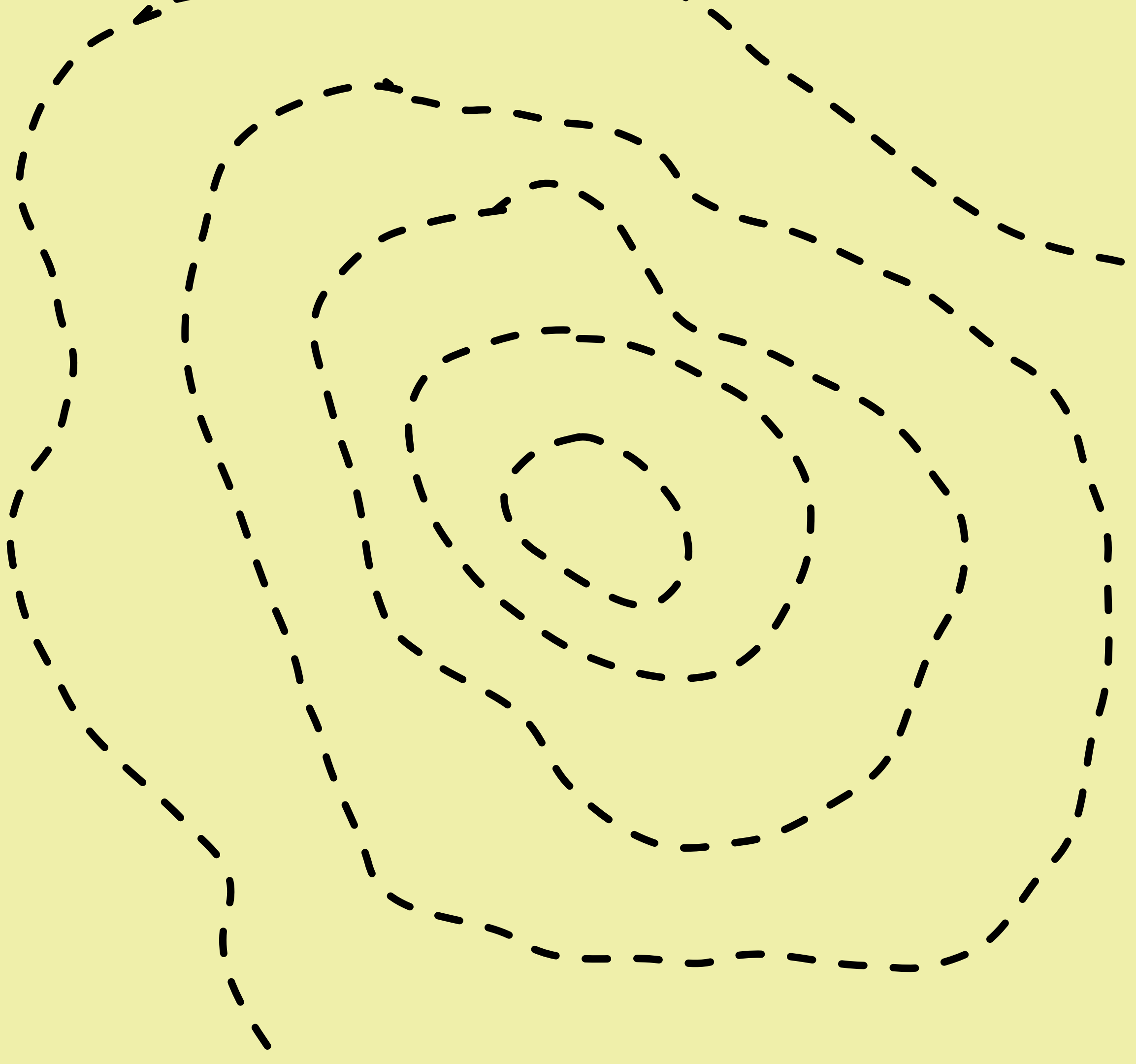
 **Garbage Collection**

 **Introspection Tools**

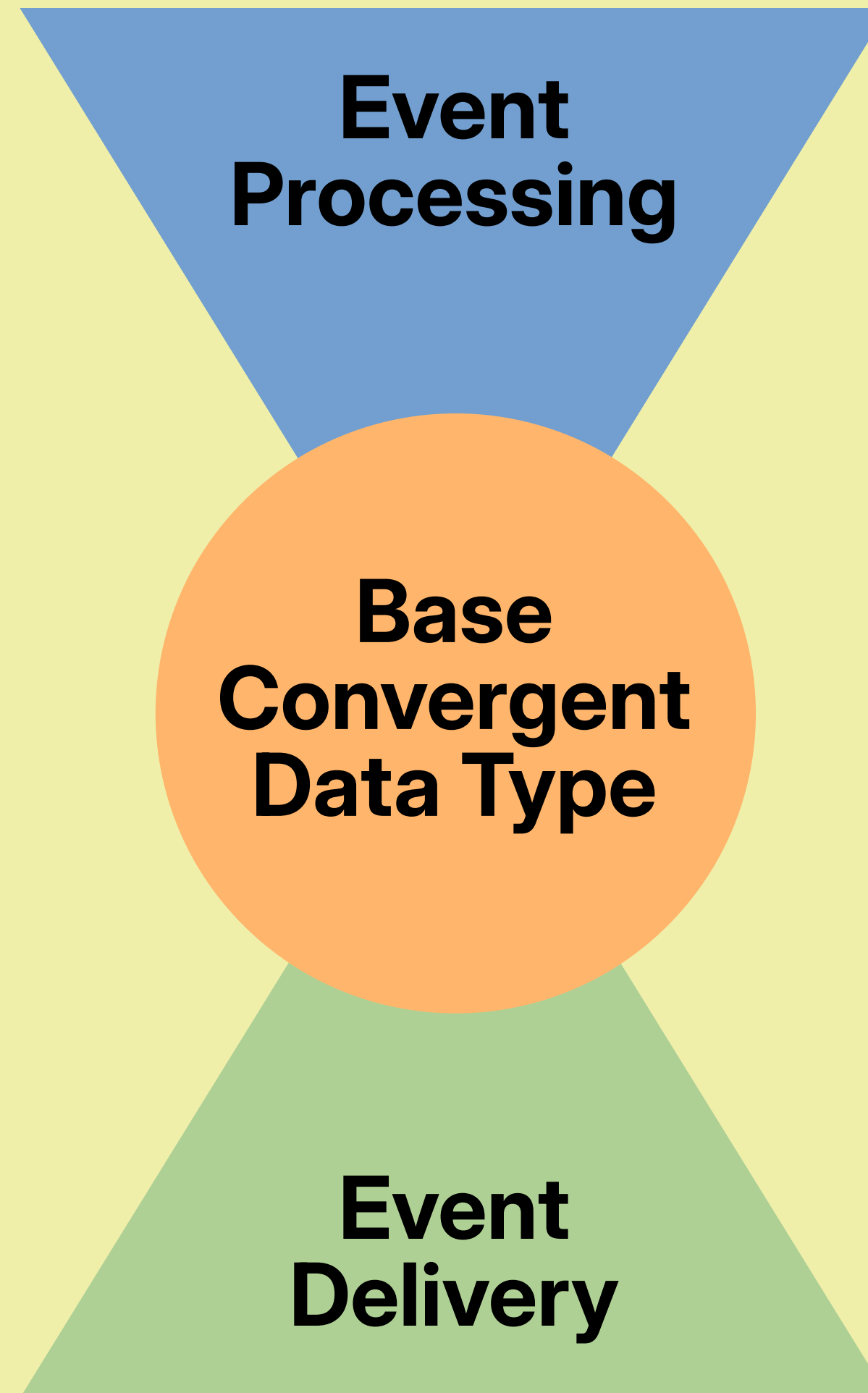


Federated, Decentralized or Both

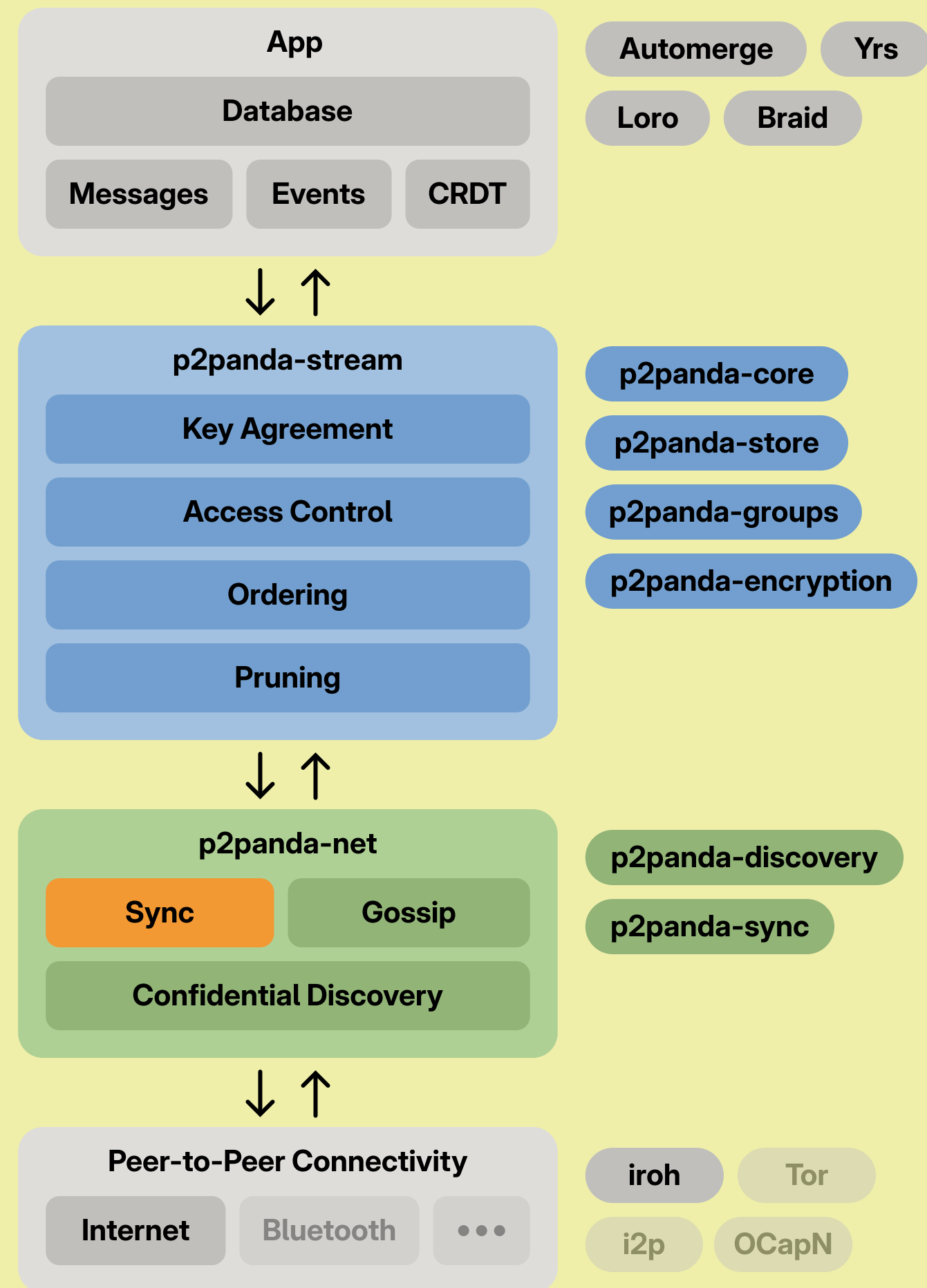
Post Internet



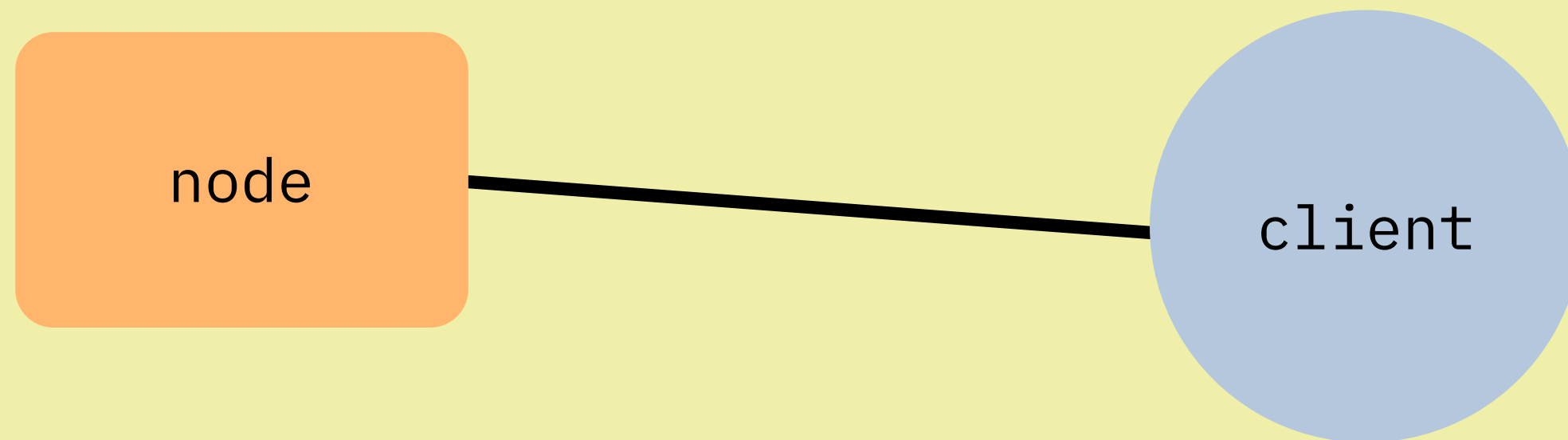
Walkaway Stack



p2panda Stack



High Level APIs



p2panda Node

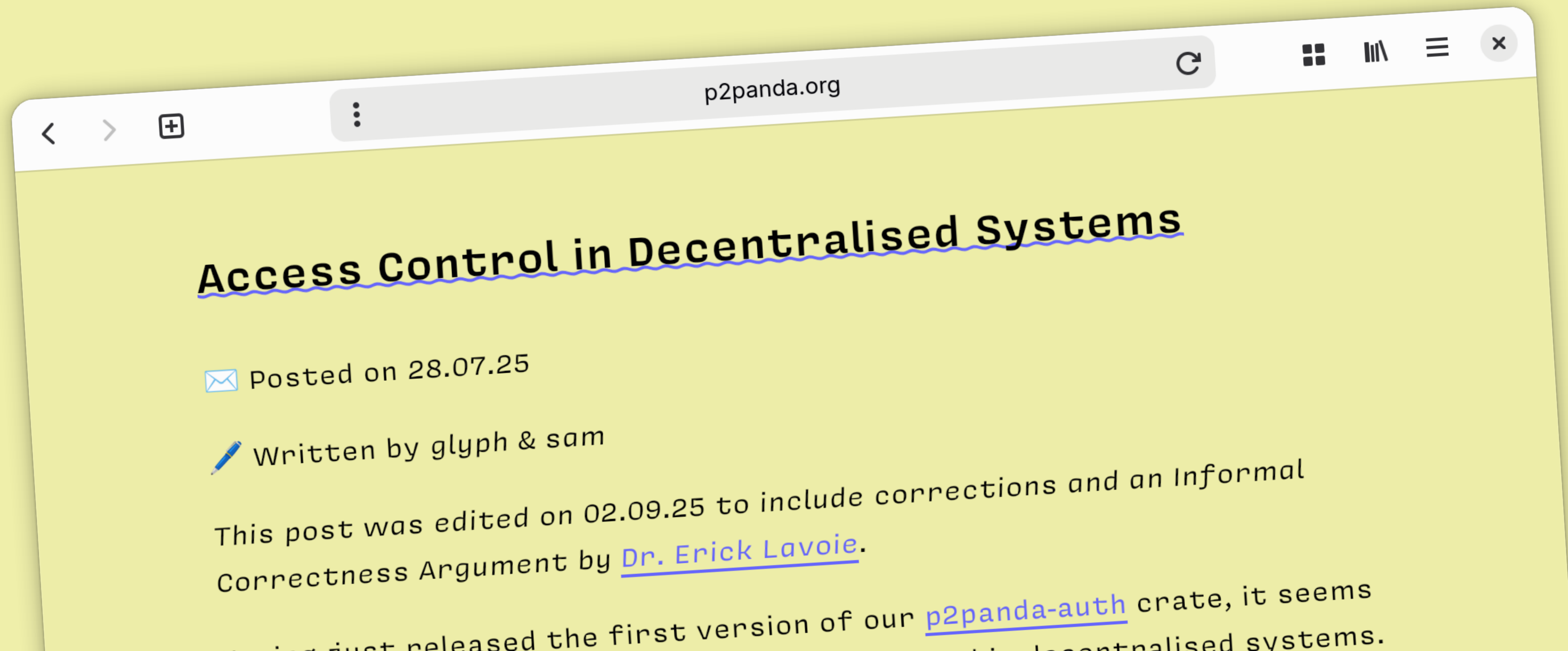
- Publisher/subscriber pattern
- Eventually consistent
- "Scoped" event streams

p2panda Client

- Stateful stream consumers
- Composable event processors
- Crash resilience

Research Blog

p2panda.org



Events

P2P Basel

P4P Unconference

DWeb Seminar

Walkaway Lectures

Collaborations

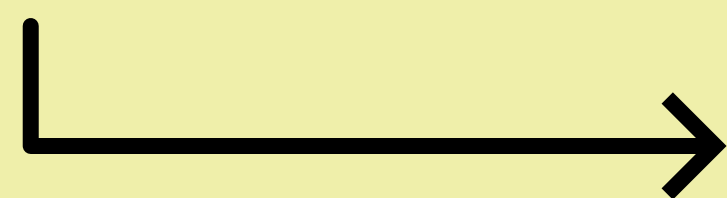
Toolkitty

Dash Chat

Merri-bek Tech



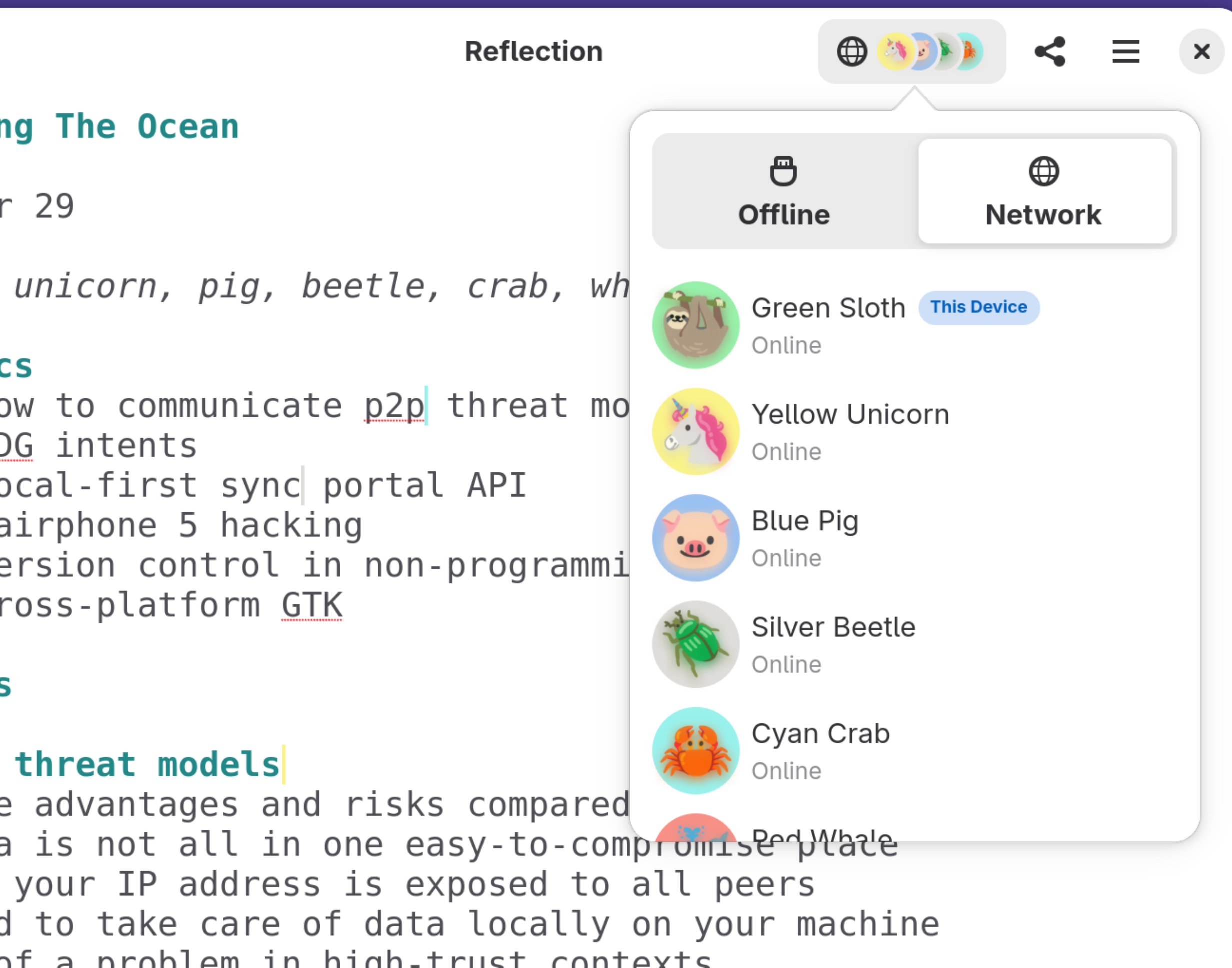
Putting it all together in a real app



Ecosystem of Local-First
GNOME Apps



Desktop Integration



Reflection

Collaborative local-first
note taking

Today

Native GTK

Local-First

Flathub Beta

macOS (experimental)

Near Future

Stability

User Testing

GObject Bindings

Documentation

Reflection Developer Labs

Online
March 2026



User Interface Research

Permission Management



Green TigerPermission 

Online



Yellow Flamingo 

Online



Red Elephant 

Last seen February 6, 19:23



Admin

Add, remove, and promote members



Writer

Read and edit the document



Reader

Read the document

Remove Peer

Remove and Block Peer

Connection Mode 

Offline

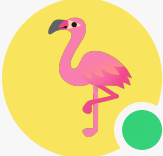
Bluetooth

Network

1.2 MB

0.0 MB

Join Requests



Yellow Flamingo

Online





Red Elephant

Last seen 19:23





Blue Panda 

Online

This Device



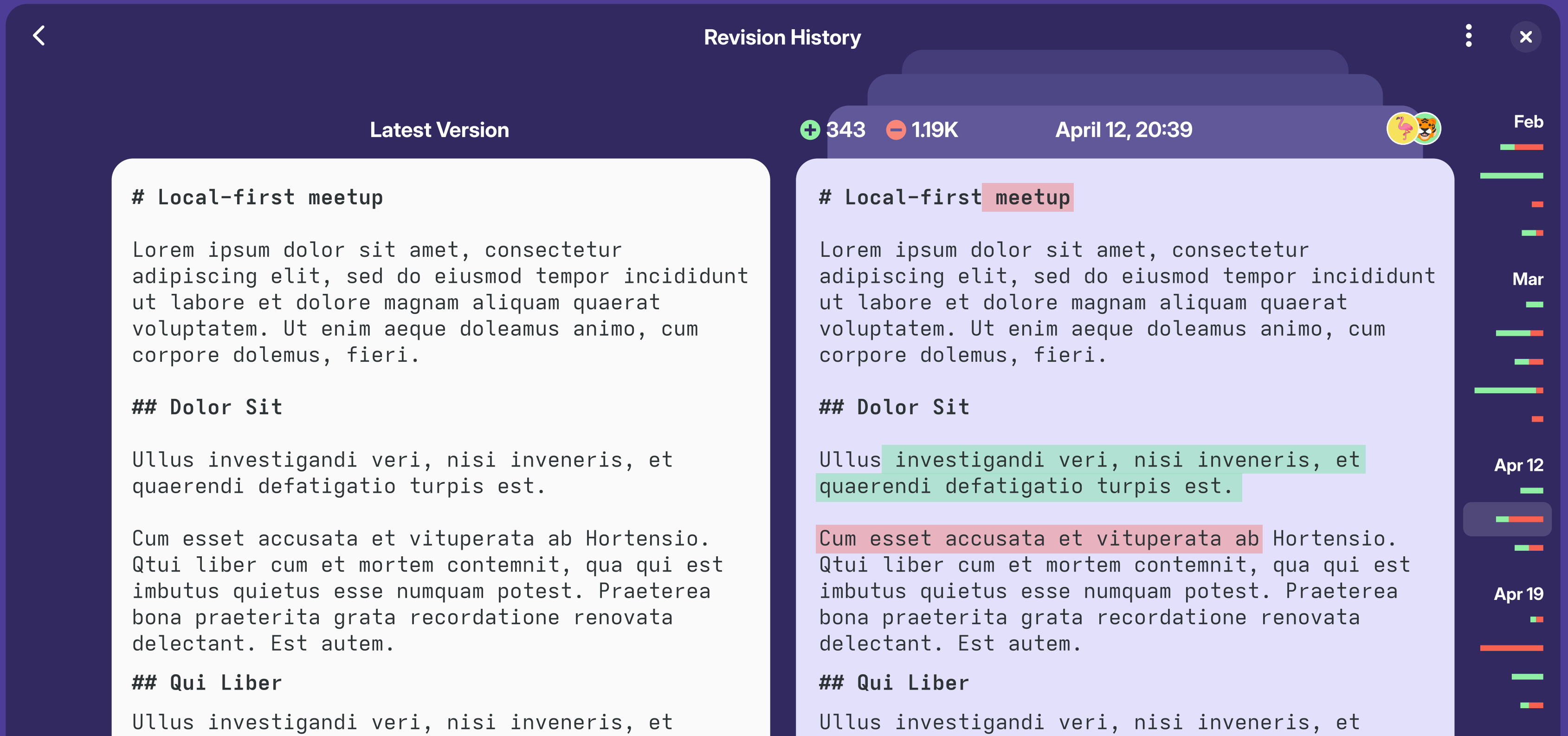


Green Tiger 

Online



Revision Control



Zones

Spaces

+ Add

Design Team

↓ 10 MB ↑ 34 MB

Boiling The Ocean

↑ 22 MB

Alps Trip 2025

offline Book Club

8

22

3

36

Design Team

Archive

Blog Posts

GNOME 50 Announcement

Tips for Circle Apps

GNOME Shell Ideas

Introducing Test Ride

Designing for Local-First

TPM UX in GNOME OS

Using Blender for Wallpapers

Conference Talks

Meeting Notes

Meeting Chair Rotation

Design Team / Blog Posts / Designing ...ocal-First

Designing for Local-First

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**Most of this applies
to any app**

▼ Podium

≡

Podium

Local-First Collaboration

Demo Time

▶ | ▼

Local-First Collaborative Slides



Podium

These slides are being edited collabora
people, and it even works without inte

Local-First is dope

No gods, no servers

Demo time

Show off collaboration

Connection Mode ⓘ

 Offline

 Bluetooth

 Network

 1.2 MB

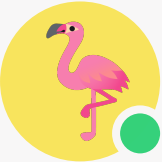
 0.0 MB

 Blue Panda

This Device

Online

 Green Tiger
Online

 Yellow Flamingo
Online

Local-First at the System Level



“Lazy” Identity

Key Management
Pet Name System
Multi-Device
Group Support

Save "Jan H" to Contacts

Add context for the new contact "Jan H" to prevent impersonation

Emoji

How do you know them?

Boxing

Save Contact

Search Contacts...

Recently Seen

6

Angela Avery

You

2 devices • Online

M

Marco

Pingpong

4 devices • Online

E

Erzsébet

Amir

1 device • Online

Jan H

Boxing

4 devices • Syncing

Tuukka Katainen

Biology

1 device • Last seen Feb 1

Sofia

Picnic

8 devices • Last seen Jan 22

AK

Amir Khan

France

2 devices • Last seen Jan 2

Contact Details

Jan H

Boxing

4 devices • 4 shared documents

Syncing 2 devices

Devices

Green Pineapple

Directly Verified

Syncing

3.1 MB

1.6 MB

Yellow Cupcake

Syncing

Purple Watermelon

Online

Shared Documents

Local-first meetup

8

Last updated 23:36

Admin

Design Meeting August 27

3

Last updated August 28

Writer

Sync

Sync Any Data
Manage Access
Support Nodes

Support Nodes

Manage Support Nodes



Ensure your devices are always in sync by adding an always-online Support Node. These serve as an encrypted data backup and ensure sync works even if other devices are offline.

They can not see your data, but they can see your device's **IP address and approximate location**.

p2relay relay.p2panda.org

5/10 devices connected • Expires in 8 months



Anticloud ff783b40

2 devices connected



Compost Party bba3405e

Offline



+ Add Support Node



Blue Panda



This Device

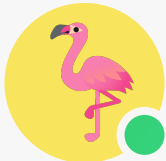
Online



Green Tiger



Online



Yellow Flamingo



Online



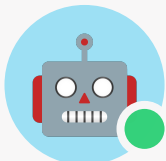
Red Elephant



Last seen February 6, 19:23



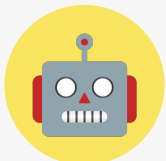
Support Nodes



p2relay relay.p2panda.org



Online



Anticloud ff783b40



Last seen 20:50



Multi-Transport

Internet

Bluetooth LE

USB Stick

Prototype as part of NLnet grant

**Now's the time to
get involved!**





February 13–15
Berlin

Boiling Ocean IX

The

**Peer-to-Peer Identity and
the Walkaway Stack**

● ● ● ● ● ● ● ● ●



Thanks

modal@mastodon.design

modal.cx

hi@modal.cx