THE CAPACITY ERA

Storage Days Tallinn

31 August – 1 September 2026

TALLINN, ESTONIA

Hyperscale EFSS with OpenCloud

Wins and Fails of the last 18 month

Peer Heinlein CEO OpenCloud & Heinlein Group



OpenCloud

A story behind the scenes...

A community has to do...

...what a community has to do.

heinlein

IT Consulting & Academy

Heinlein Support has stood for Linux and mail expertise in the data center for over 30 years. Our range of services: IT consulting and practical hand-on, IT services to secure critical IT infrastructure, Linux training and individual hosting operations.

heinlein-support.de ↗

Opentalk

Secure video conferencing

OpenTalk is the secure, intuitive and scalable video conferencing solution for public institutions, providers and companies. Digitally sovereign on-premises or hosted as a SaaS service in our German data centers. This is how you protect your conversations.

opentalk.eu ↗

OpenCloud

File management & file sharing

OpenCloud is the cloud-native solution for file management, file sharing and collaboration - designed to meet the highest enterprise requirements in terms of performance, stability and scalability. Digitally sovereign on-premises or securely hosted via partners.

opencloud.eu ↗

mailbox

E-Mail & Online Office

mailbox offers secure e-mail and a digital workplace for companies, institutions and private individuals. Hosted according to the latest security standards in German data centers. This is how self-determined and free communication works.

mailbox.org ↗


Freedom!

OSS offers the freedom...



OSS offers the freedom...

- To adapt the code to my needs



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- To adapt the code to my needs
- To review the code for security



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- To make features sponsored by me available to the public ("Public Money! Public Code!")



OSS offers the freedom...

- To adapt the code to my needs
- To review the code for security
- To make features sponsored by me available to the public ("Public Money! Public Code!")
- Be able to draw on developments from others



But also the freedom...



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- **Not** to be at the mercy of proprietary licensing strategies (Atlassian! VMware!)



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But also the freedom...

- **Not** to be at the mercy of proprietary licensing strategies (Atlassian! VMware!)
- To choose **another trusted service provider** at any time
- To continue an ongoing project for **as long as I want**

Proprietary software products can be acquired & discontinued by competitors. License changes can lead to a completely new situation (OnPrem => SaaS).



The example of ownCloud

- An Open Source software for file sharing and content collaboration
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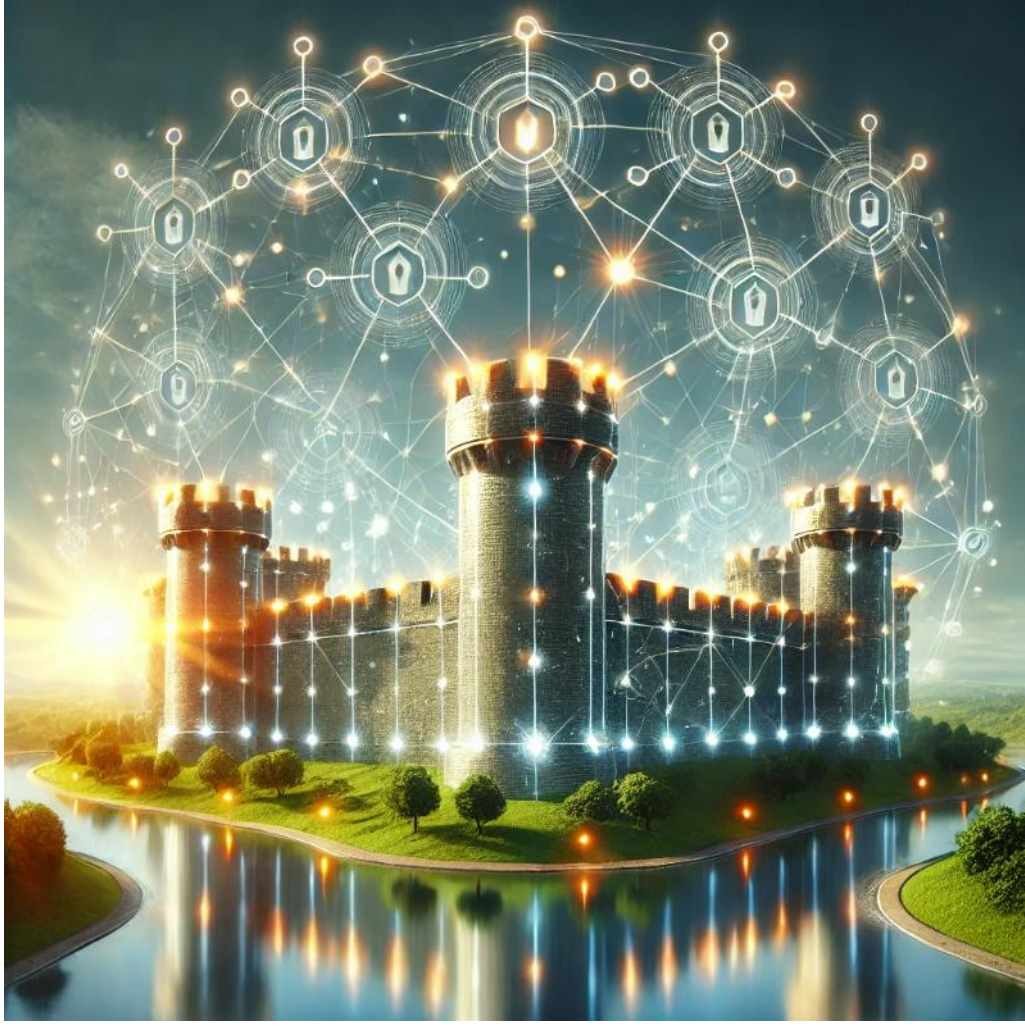
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- Cloud-native, highly scalable, secure programming language!

- The software is published under AGPLv3 and Apache License
- Developed transparently on Github

OpenCloud

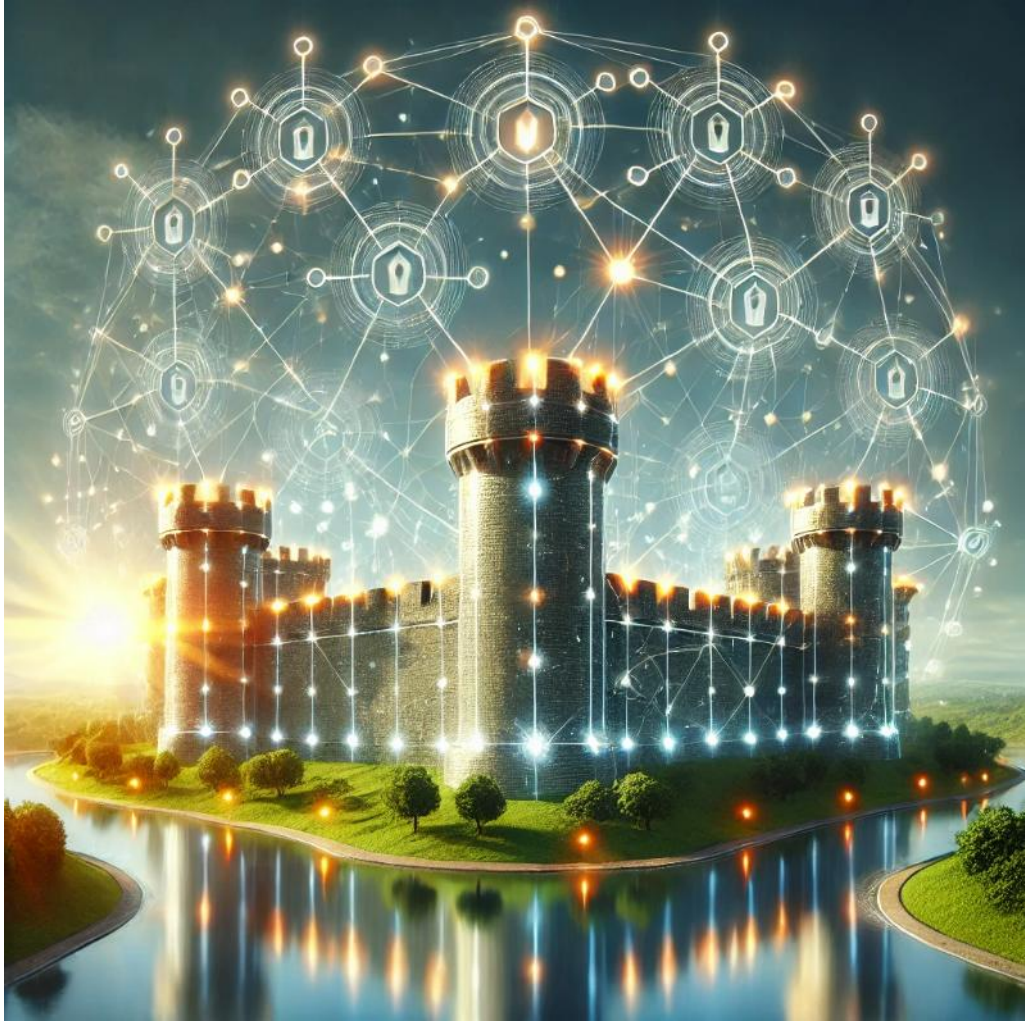
Relevant?

Mission-critical!



Mission-critical!

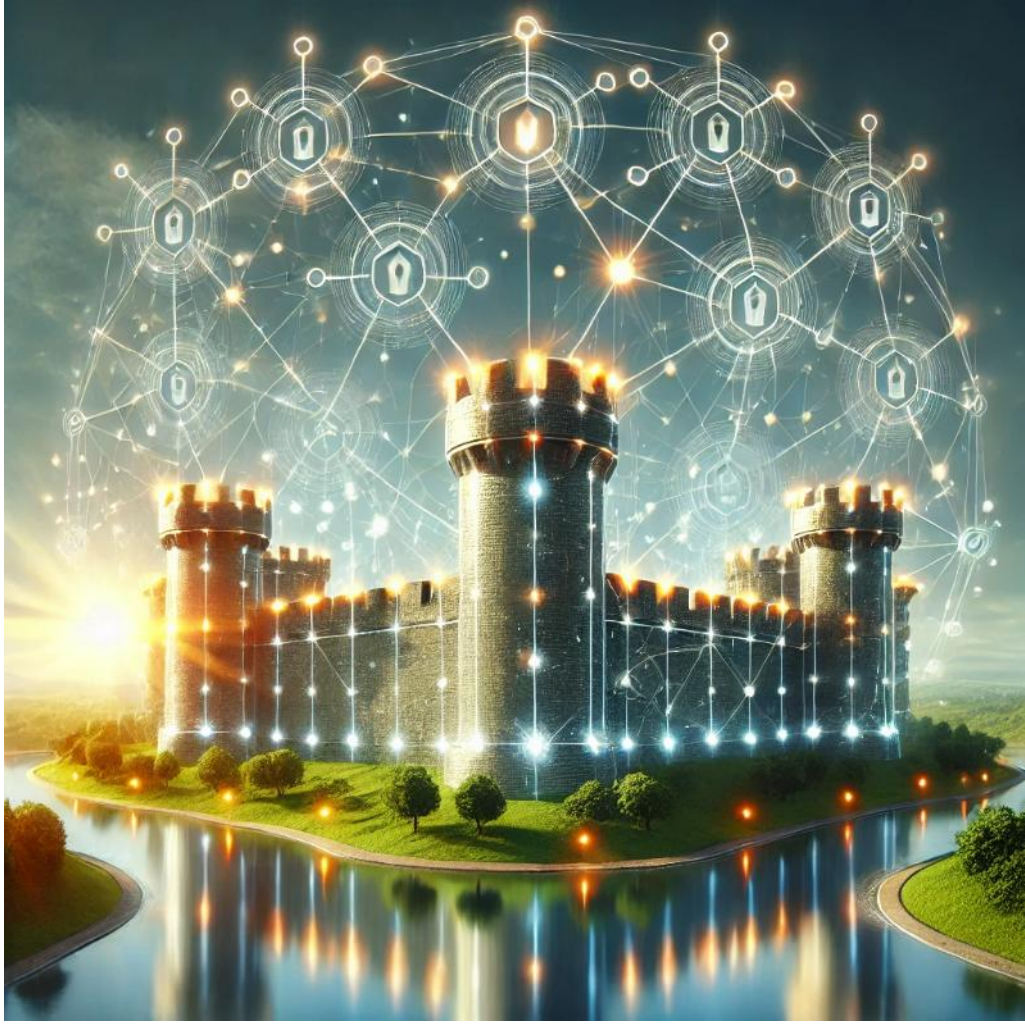
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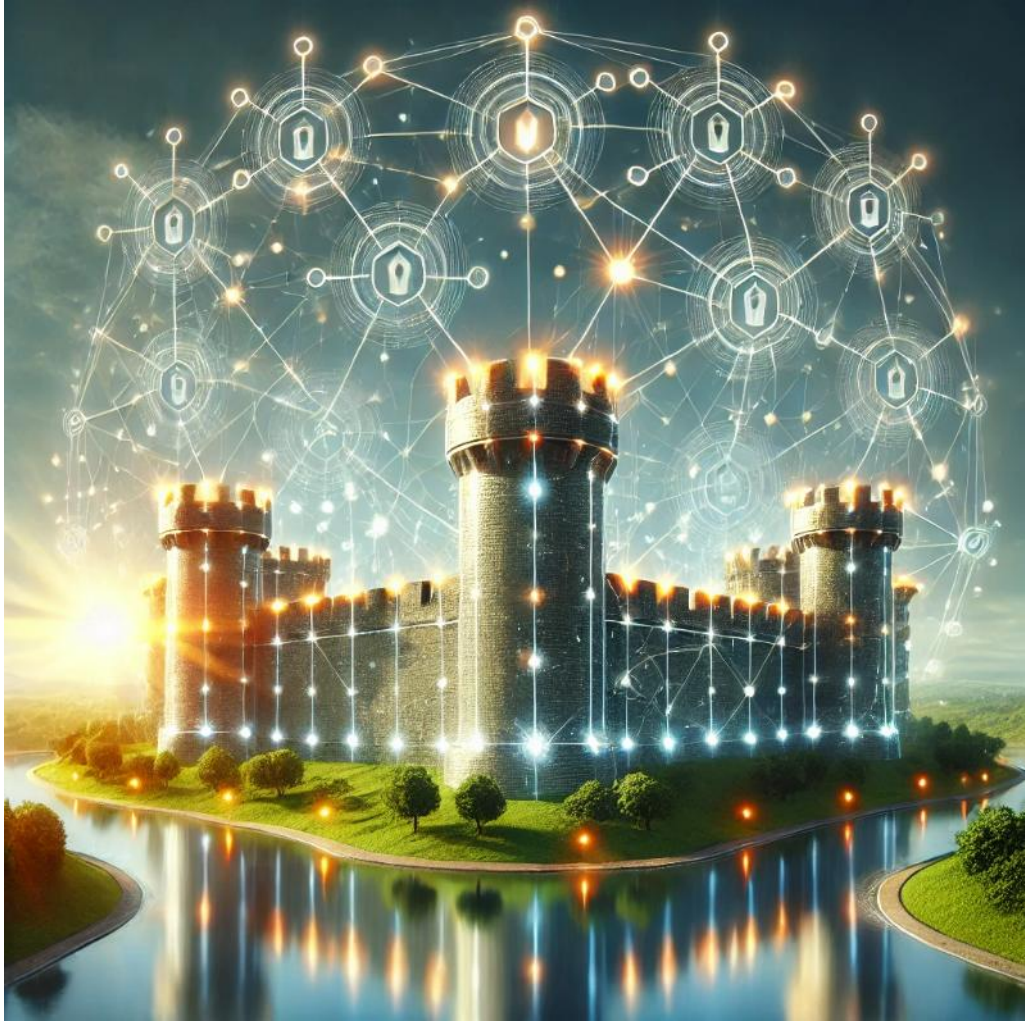
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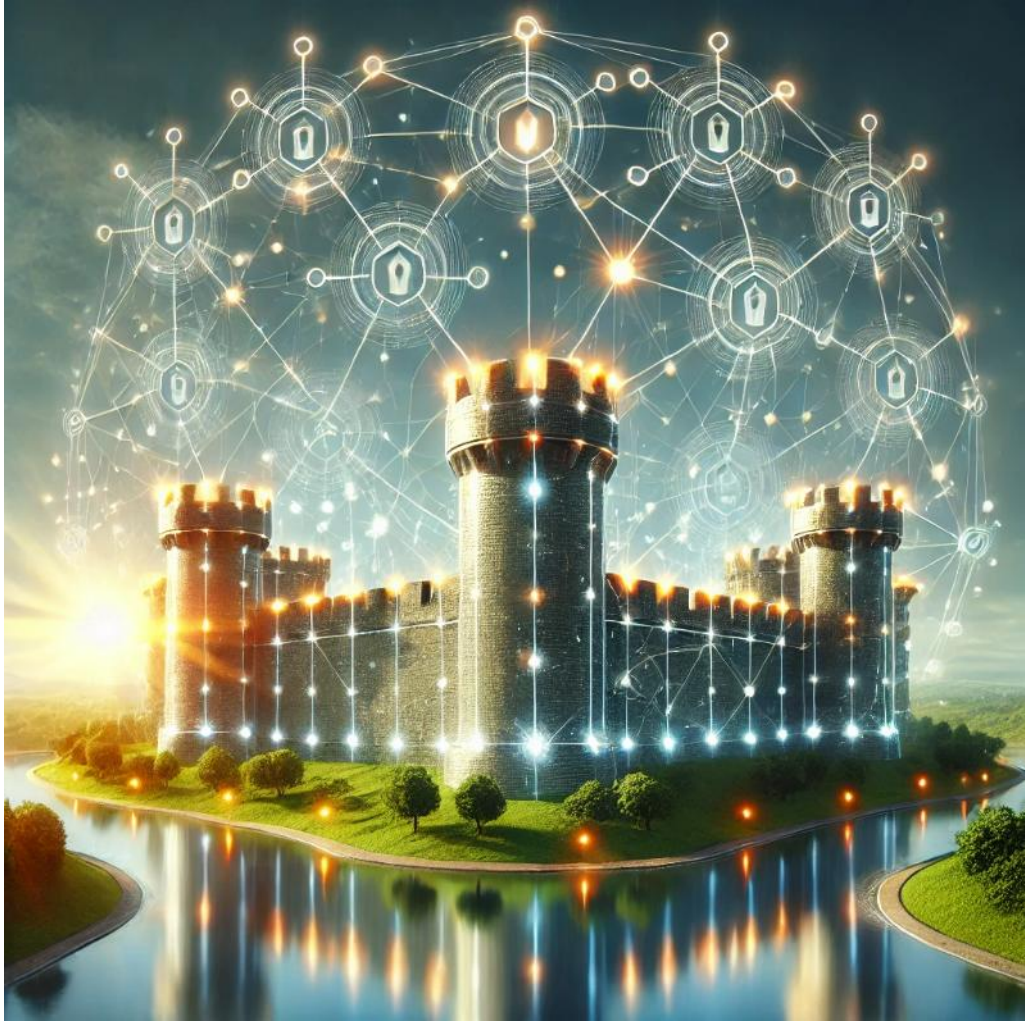
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- So: We have to offer perfect file management, otherwise customers will move to O365 & Co.
- Important for OpenDesk & the Open Source community in general in Germany!



2023: Kiteworks acquires investments

- In 2023, ownCloud was sold to Kiteworks Europe AG, a subsidiary of Kiteworks USA, LLC
- Also acquired: Dracoon from Regensburg (closed-source market competitor)

- Kiteworks acquired a 465 million USD investment in August 2024



What does this mean for us?

- Since then, active applications from dismissed and non-dismissed employees at our company
- Other OSS companies have also contacted me regarding conspicuous applications
- Many discussions in the OSS community regarding Kiteworks' strategy
- We rejected the applications, asking developers to remain in the OCIS project
- Fear that key employees might leave: We want a successful, reliable OCIS for digital sovereignty!



What now?

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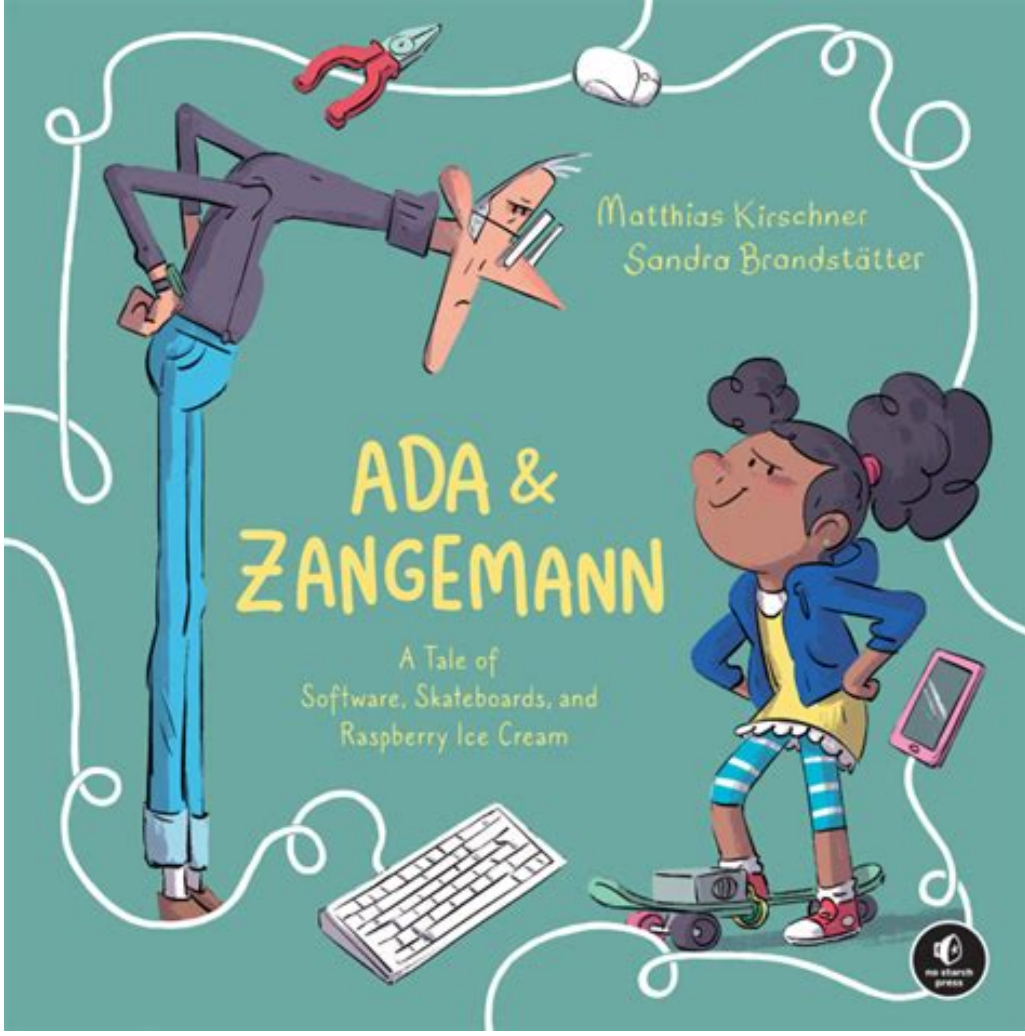
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- The Heinlein Group founded in OpenCloud in September 2024, our work began in January 2025

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- First release on Github in February 2025



Where do we stand today

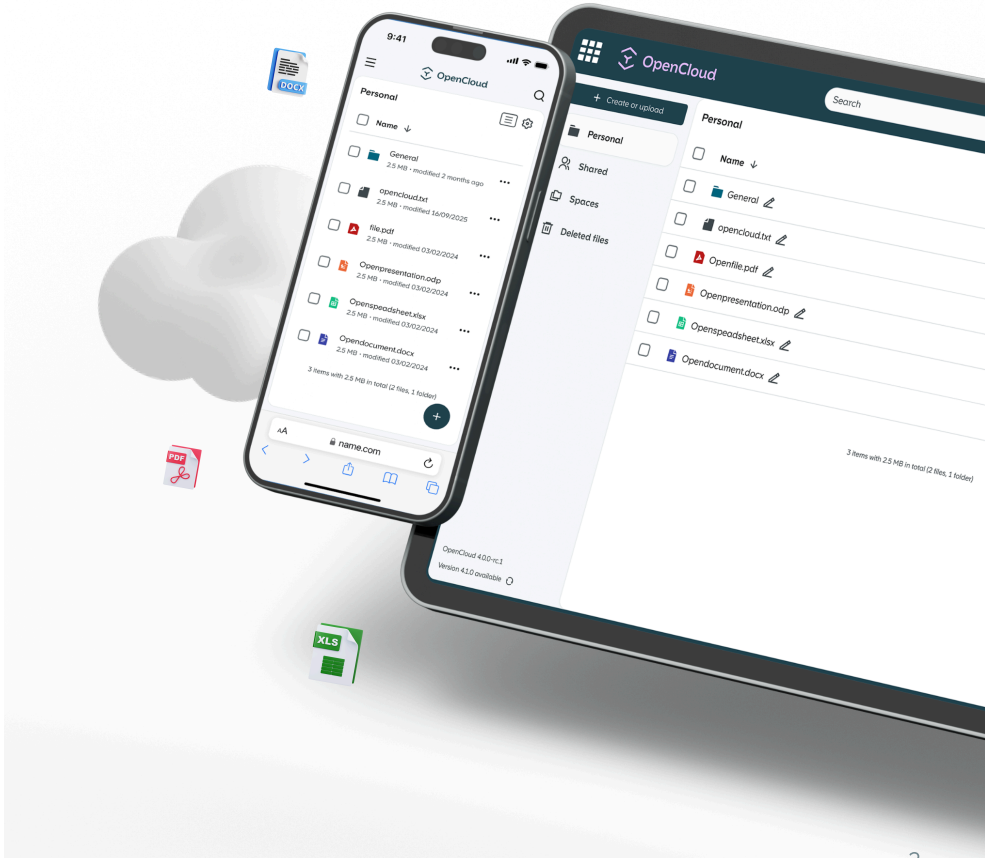
- Customers of the proprietary provider Dracoon are now customers of "Dracoon a Kiteworks Company"
- Those who preferred OSS licenses for sustainable procurement now have OpenCloud as a powerful alternative
- A prime example of why and how an Open Source strategy is so important:

Because it works and enables (digital) sovereignty!



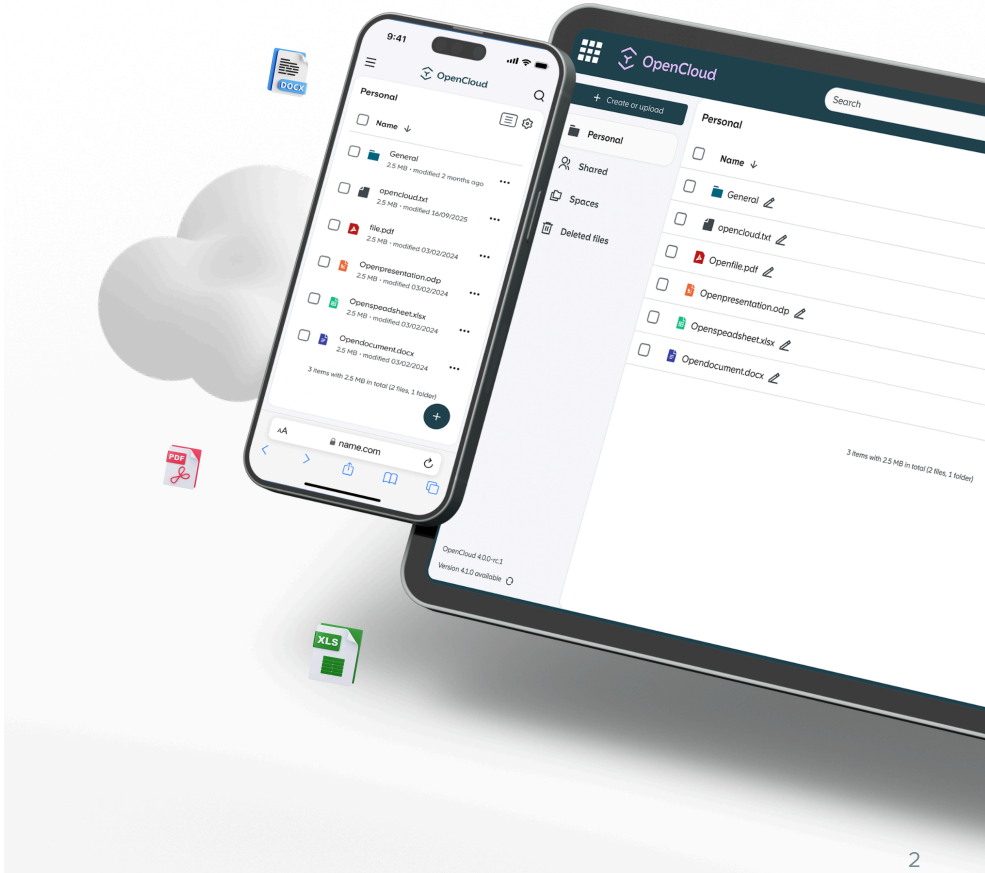

OpenCloud
OpenCloud Hyperscale EFSS
Wins and Fails the last 18 month

What is OpenCloud



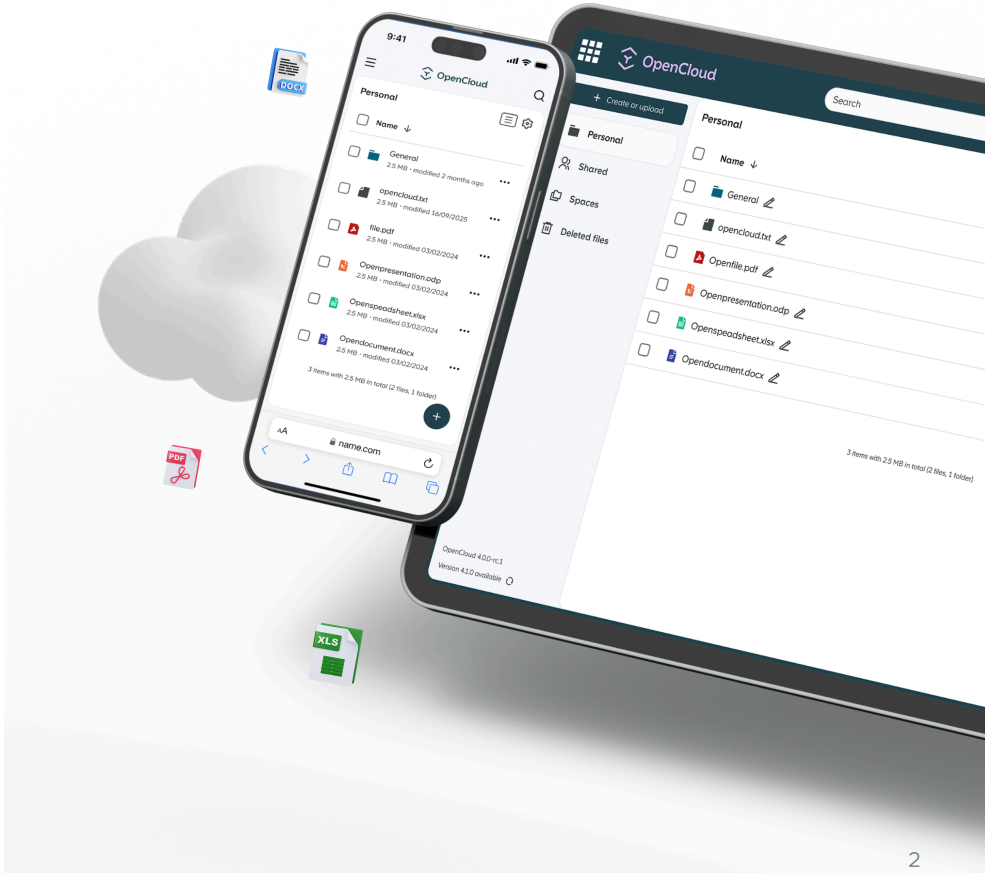
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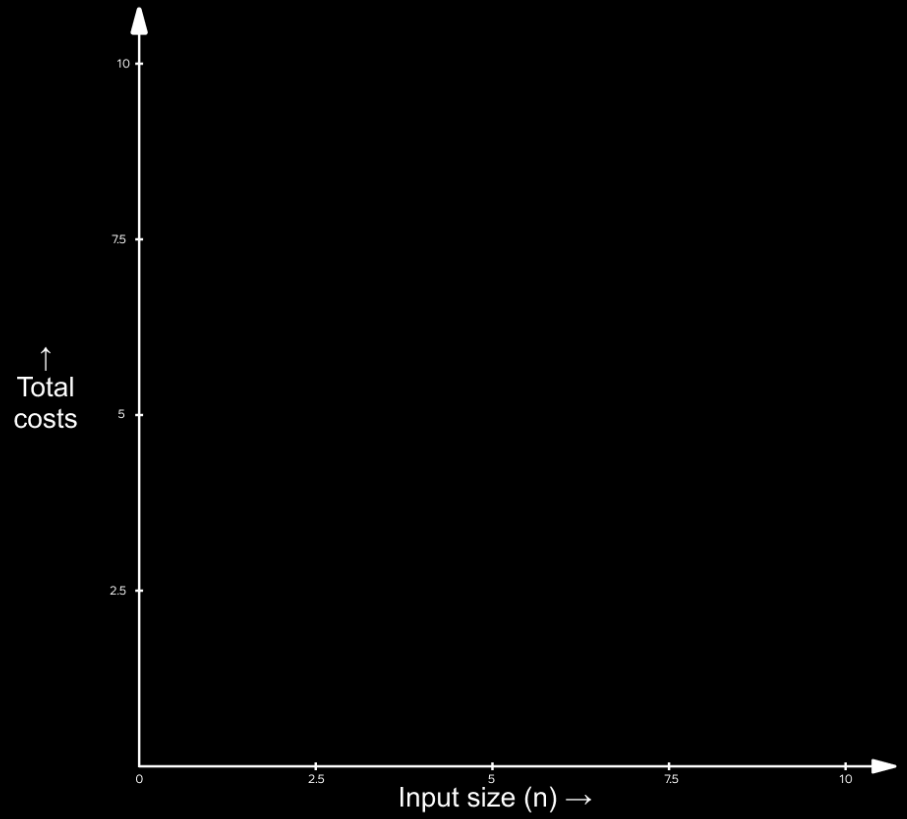
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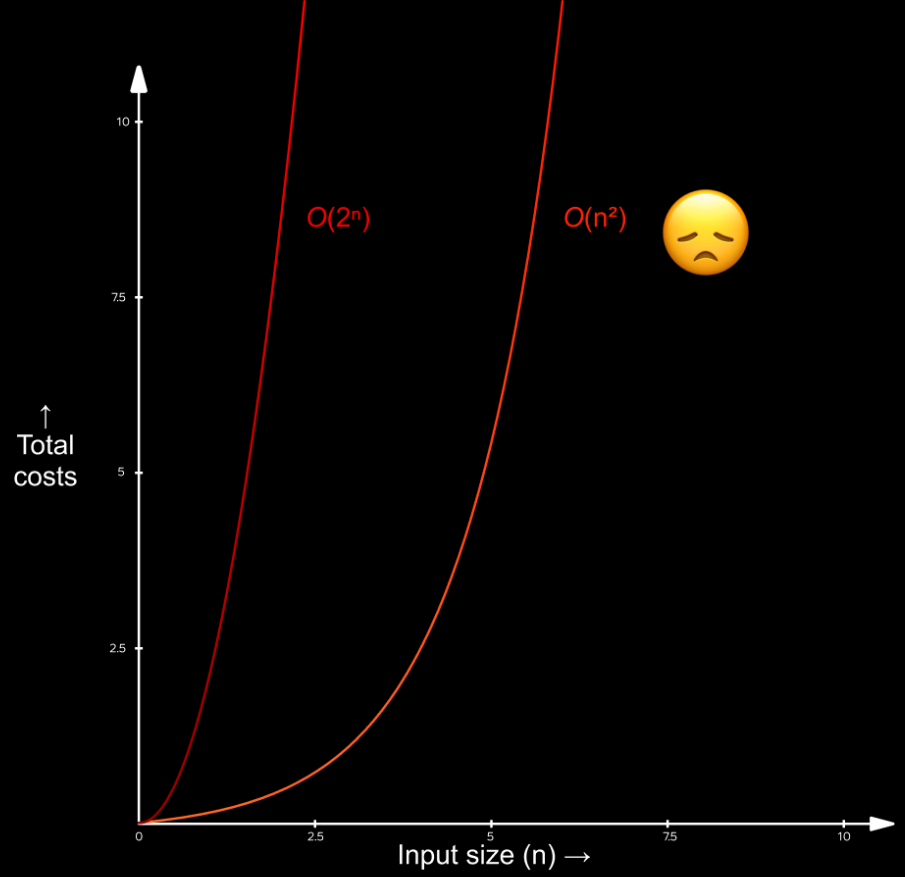


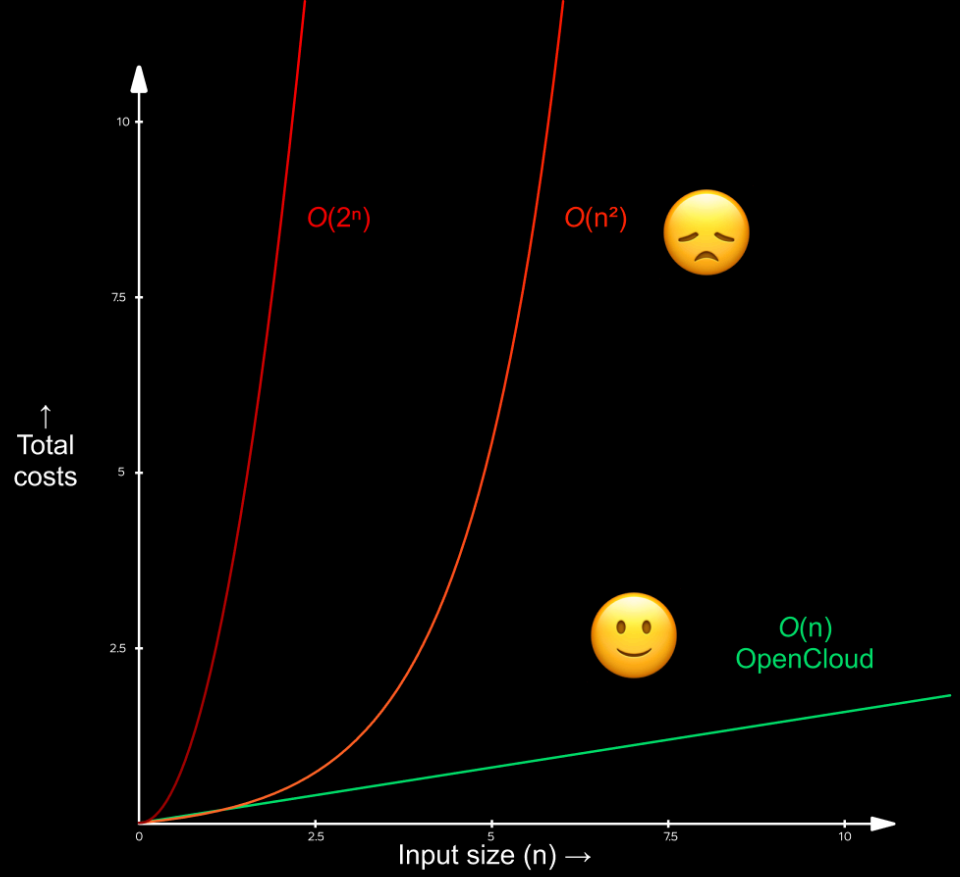
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- **File Cloud** - Sync and Share
- **Modern** techstack - GO, microservices ...
- **Relaible** and **linearly** scalable system
- **Fast** and reactive UI




10
7.5
↑
Total
costs
5
2.5
0
2.5
5
7.5
10
Input size (n) →


10
7.5
5
2.5
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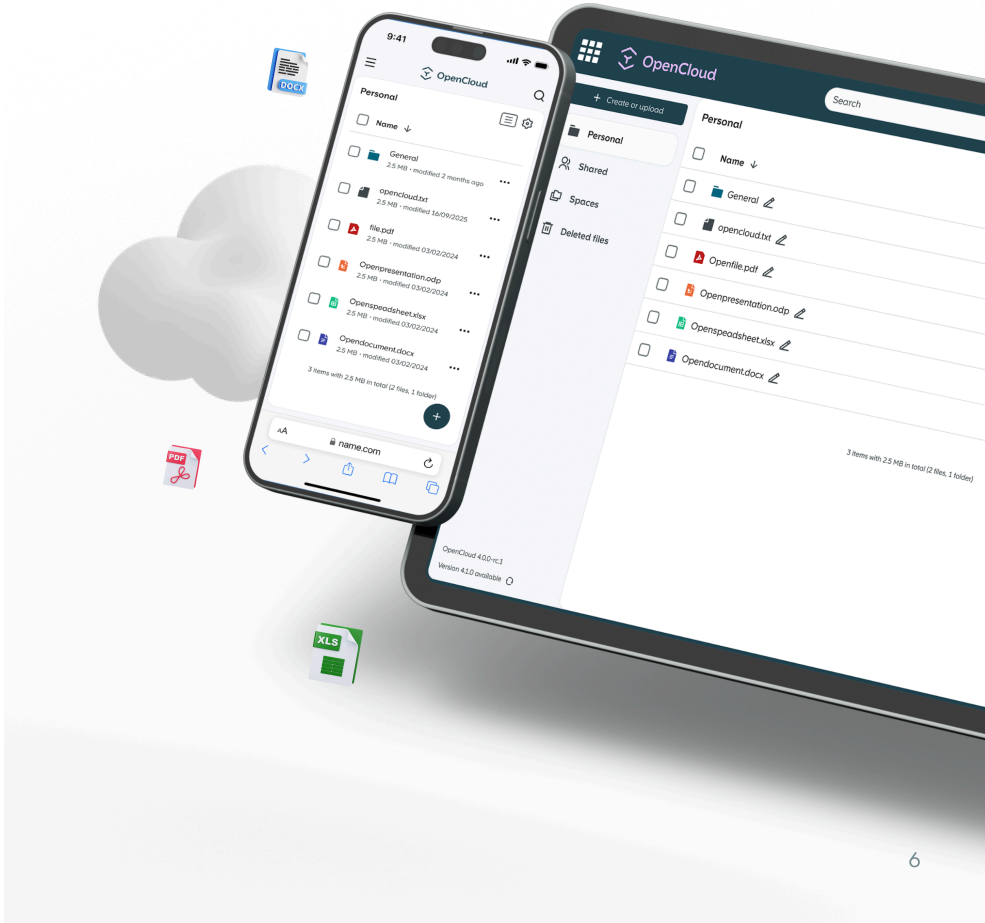


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Goal: **Easy to maintain for Sysadmins** ❤️

* OpenCloud is a fork of OwnCloud Infinite Scale, first commit 2019 by Hugo González Labrador (CERN)



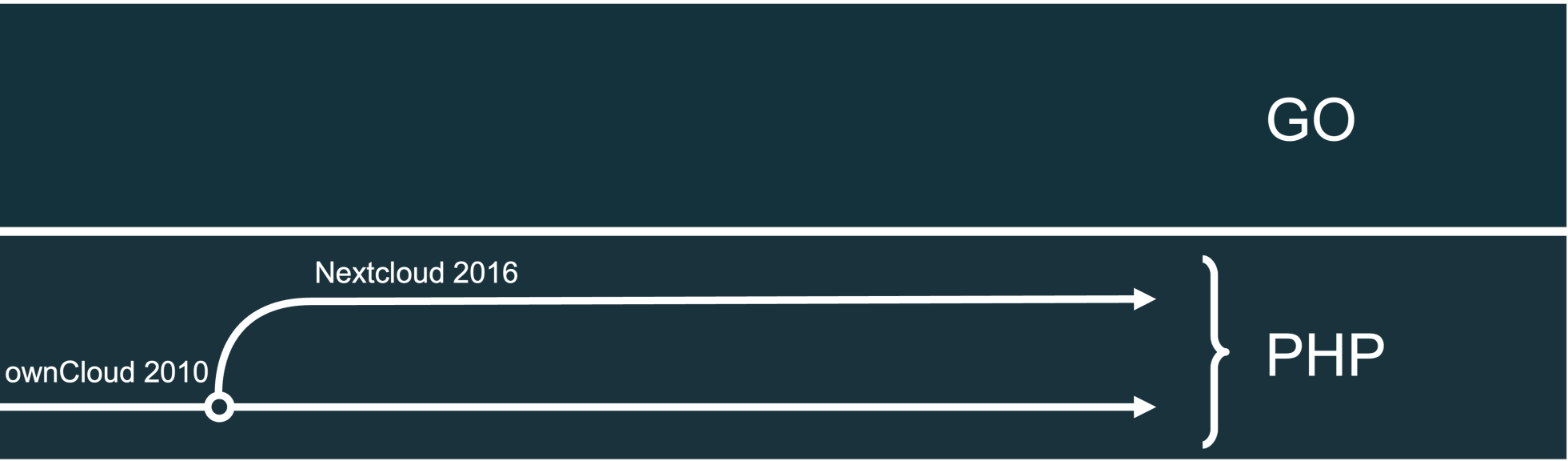
OpenCloud

Standing on the Shoulders of Giants

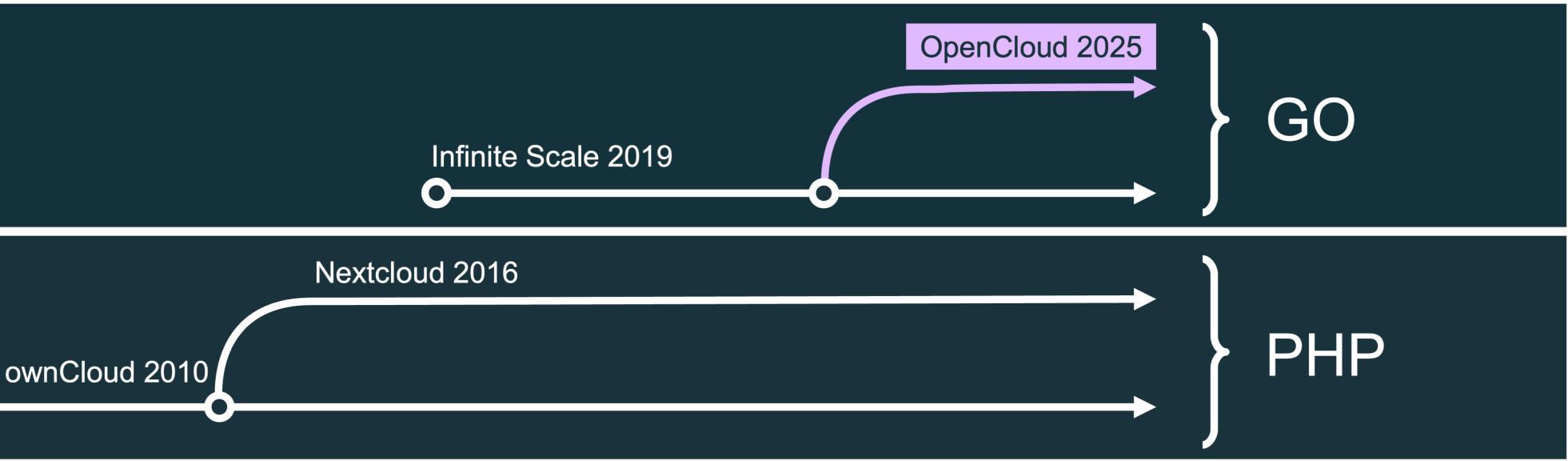
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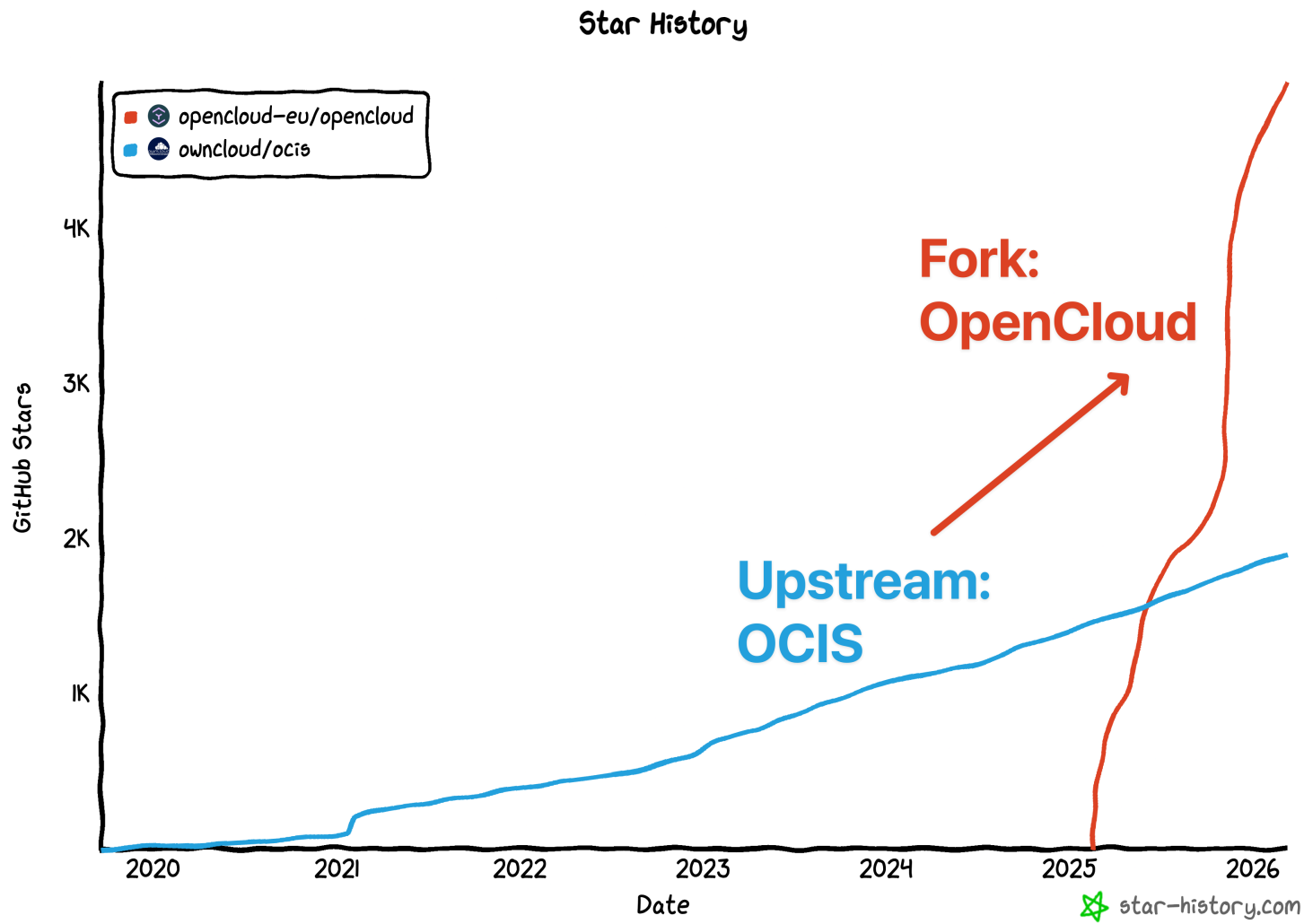


Standing on the Shoulders of Giants



OpenCloud

How is it going?


Star History
opencloud-eu/opencloud
owncloud/ocis
4K
3K
2K
1K
GitHub Stars
Fork:
OpenCloud
Upstream:
OCIS
2020
2021
2022
2023
2024
2025
2026
Date
star-history.com

OpenCloud

Learning #1

Clearly Communicate the Business Model

Open Source:

🍻 Free Application

100% OSI licenced,
licence can’t be changed, no CLA

- Server: Apache2
- Web UI: AGPLv3
- Desktop: GPL-2.0
- Android: GPL-2.0
- iOS: GPL-3.0

→ **Free as in beer**

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Monetization via:

💶 Deployment Services

Charged per user

- Service and Support
- High Availability (k8s)
- Branding
- Mass Rollouts
- Compliance Kit
- Early Security Advisories

→ **Money to drive development**

OpenCloud

Avoid Tech-Narcissism

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If E-Mail were
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Narcissus, Caravaggio. Photo by Carole Raddato (CC-BY-SA-2.0)

Avoid Tech-Narcissism

If E-Mail were
invented today...

...services could only talk to their equals

- gmail -> gmail
- outlook -> outlook
- yahoo -> yahoo

Luckily, reality is different - E-Mail is a federated system - and that is not by accident!

Narcissus, Caravaggio. Photo by Carole Raddato (CC-BY-SA-2.0)



Avoid Tech-Narcissism

OCM Federation is more important than most people think!

- authoritarian regimes
- concentrated platform power
- tech oligarchs

OpenCloud fully supports the standardization of OCM and we sincerely thank Giuseppe Lo Presti and all contributors for their outstanding efforts!

Next steps at OpenCloud

- Position OCM as a strategic advantage for the public sector. The **challenge is communication**, not technology
- **Seamless experience is non-negotiable** sharing across clouds must feel as **simple as within one platform**. User acceptance is crucial!

OpenCloud

Learning #3

Self-Hosting Must Be as Simple as SaaS

Which Component Caused the Most Incidents?

The winner is:

Which Component Caused the Most Incidents?

The winner is:

The database 🥳

The Split-Brain Problem

After the upload, metadata and the file blob are stored separately.



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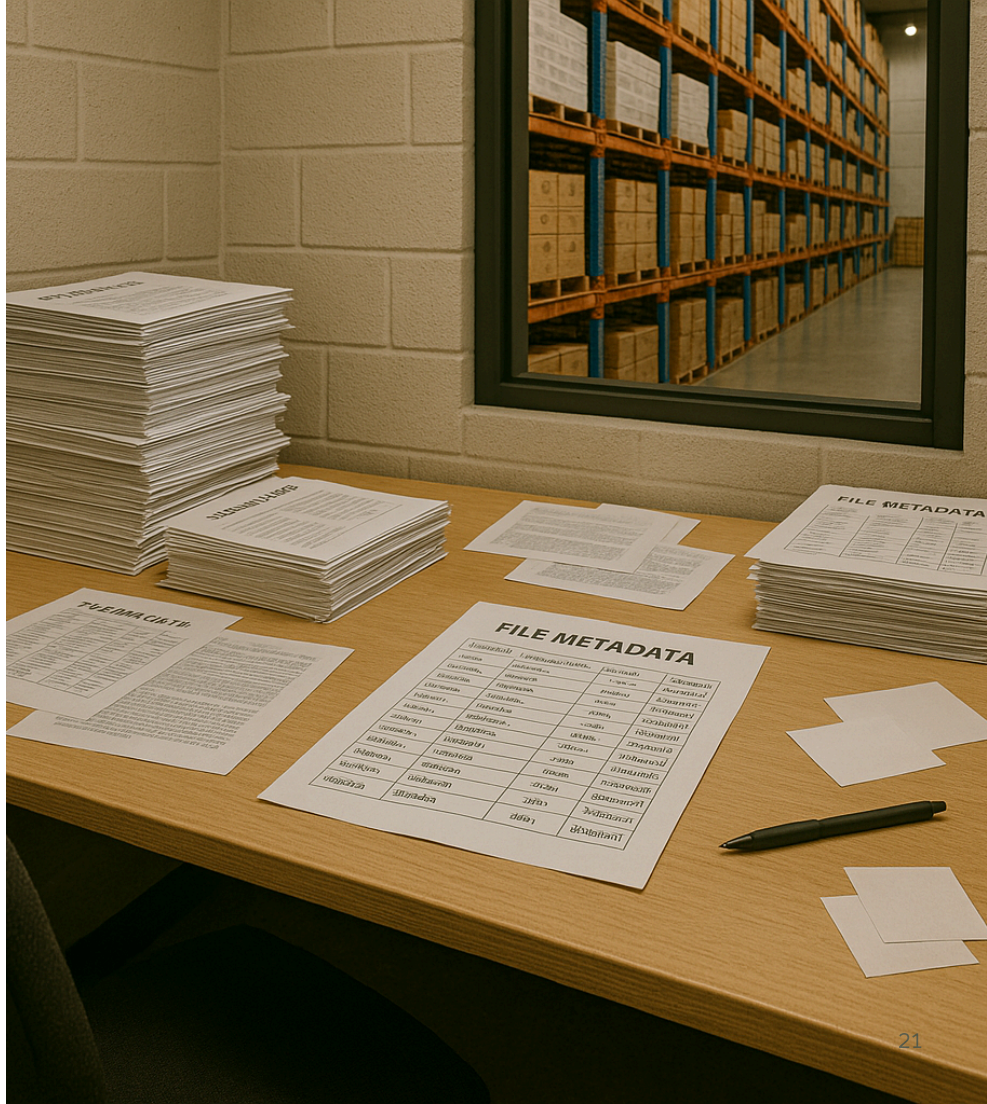
- 📋 Metadata → **Database** (~"Office")
- 📦 File blobs → **Storage**



The Split-Brain Problem

Problem:
Metadata and file blobs must be **in sync**, or **data is lost**.

(📋 sync 📦)



OpenCloud

Solution

Saving Metadata on Storage

Metadata on Storage

Architectural solution:

- ❌ No more database *
- 🗂️ Metadata lives on storage

Advantages

* No DB for longterm data persistance. NATS is used as **cache for performance**, but not as persistance layer.



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- ✅ Scales **with your storage**
- ✅ **Single source of truth**

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What This Unlocks

- **Migration** simply via eg. rclone
- **Native backup & snapshots** at filesystem level
- **Simple, direct device access** via POSIX filetree (microscopes, photocopiers, scanners, ,...)



Before:

DecomposedFS

Storage layout that works efficiently with object storage and distributed storage backends.

```
nodes
├── 8c
│   ├── 9f
│   │   ├── 9f12a7c4
│   │   │   ├── 1a3d92b1
│   │   │   └── 7b8e33d2
│   └── 91
│       ├── 91f2aa12
│       │   ├── 3e77a1c4
│       │   └── a9c2d1e7
└── 7b
    ├── 44
    │   ├── 44a3c991
```

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│   │       │   ├── 3e77a1c4
│   │       │   └── a9c2d1e7
└── 7b
    ├── 44
    │   ├── 44a3c991
```

New:

PosixFS

Human readable filetree.

Read/write directly on the filesystem, changes instantly appear in all clients!

```
physics-project
├── experiments
│   ├── collider
│   │   ├── run
│   │   │   ├── detector.csv
│   │   │   └── events.parquet
│   │   └── run
│   │       ├── detector.csv
│   │       └── collision.parquet
│   └── cryogenics
│       ├── chamber
│       │   ├── temperature.csv
```

Natural fit:
LeilFS as Backend

EFSS on Distributed Storage: LeilFS as the **robust** distributed POSIX file systems offering **efficiency**, **security** and **redundancy**.

🤝 **Thanks to the LeilFS maintainers!**



Resources

- 📖 **Docs:** docs.opencloud.eu
- 🛠️ **GitHub:** github.com/opencloud-eu
- 🐳 **Docker / Compose:** github.com/opencloud-eu
- 💬 **Chat:** #opencloud:matrix.org
- 🧭 **Roadmap:** opencloud.eu/roadmap

OpenCloud

Have Fun! 🎉

OpenCloud

Q & A

OpenCloud

Let’s stay in touch

Peer Heinlein
CEO
p.heinlein@opencloud.eu
opencloud.eu

OpenCloud GmbH
A Company of Heinlein Group
https://heinlein.group