

Renewal of OSS: Why, When and How to Rewrite

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What is a Rewrite?

- Replacing (most of) a legacy system
- Following a potential grace period, the old system or codebase will be retired



„[...] the single worst strategic mistake that any software company can make:

They decided to rewrite the code from scratch.“

Joel Spolsky (JoelOnSoftware), 2000 [1]

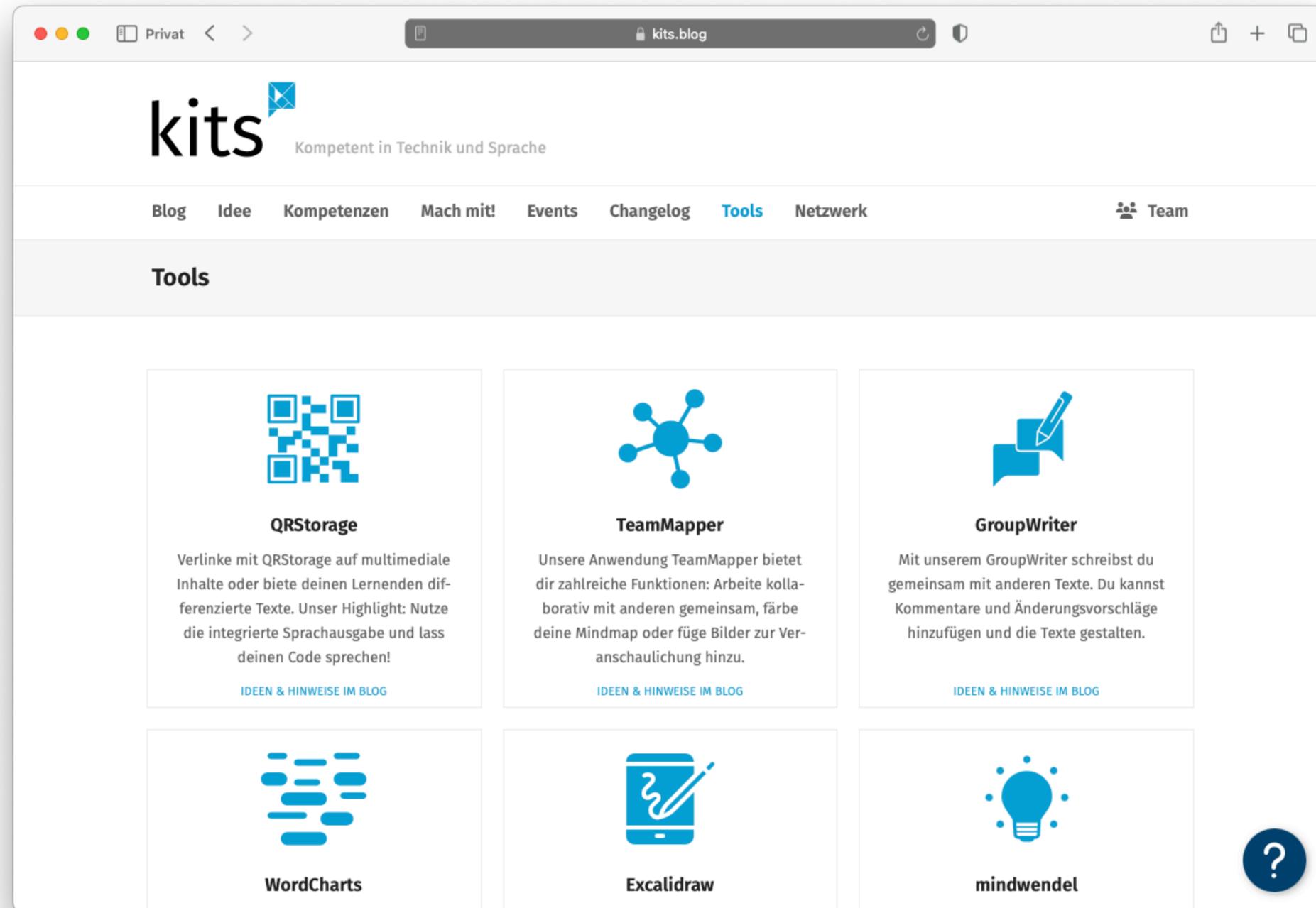
OSS vs. Closed Source

Some differences:

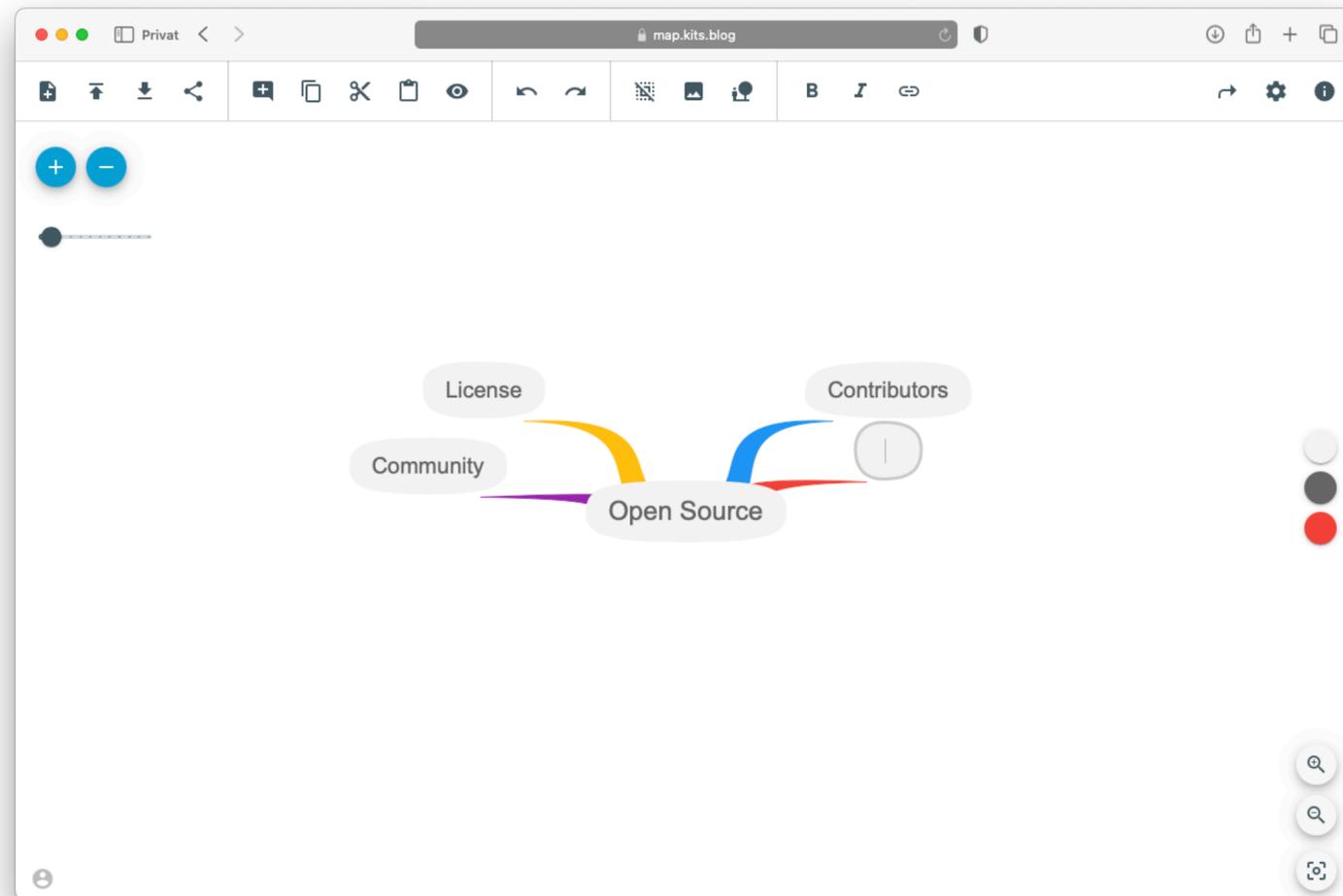
- Maintainers might leave ... and you don't realize that they have left!
- Diverse opinions in project goals and no higher instance available to resolve issues



About Us: Maintaining and Hosting OSS Apps for a State Institute in Lower Saxony

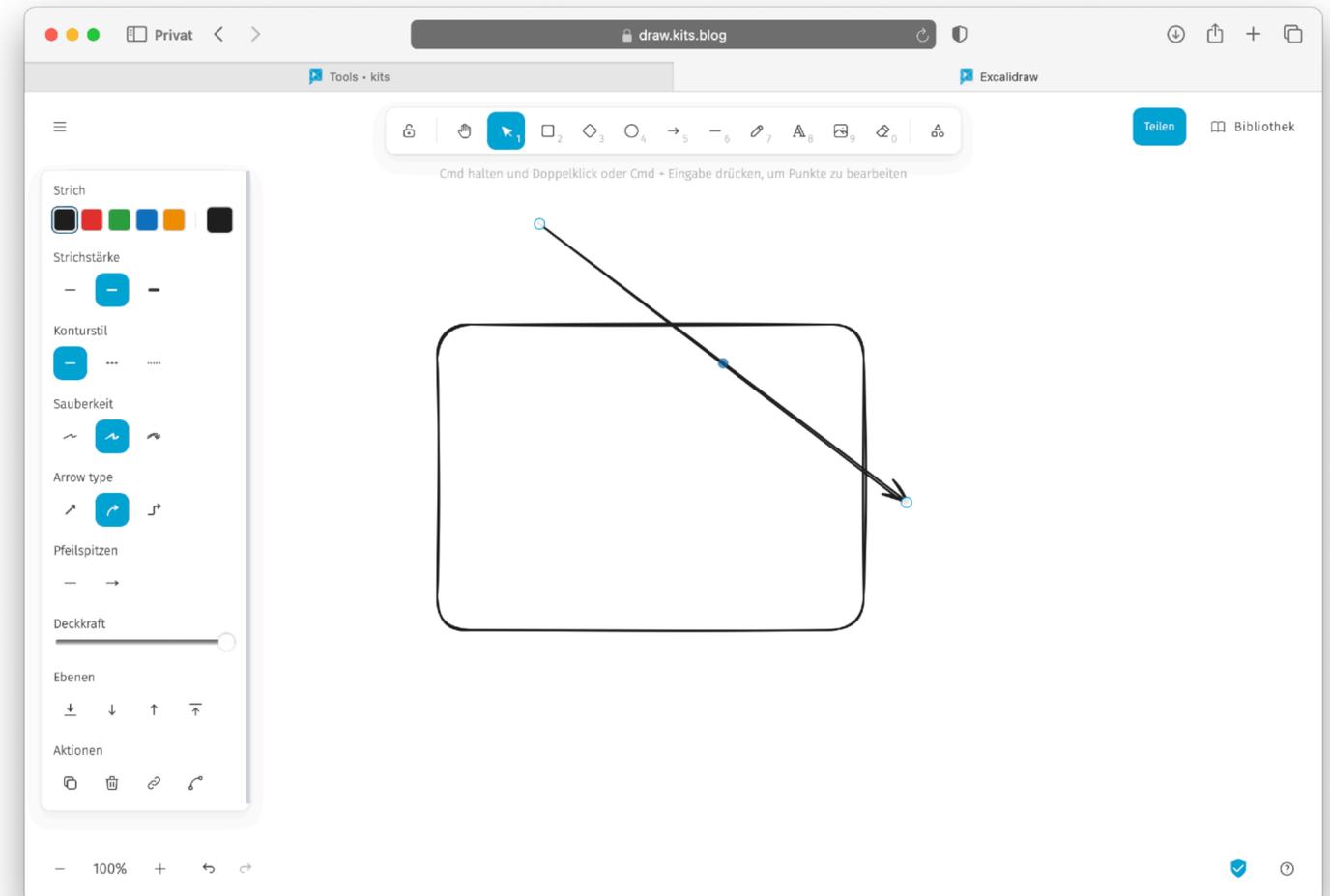


Apps: Mixture of Originals and Forks



TeamMapper:

Extended the unmaintained project „Mindmapp“ with collaborative features



Excalidraw: Fork without Firebase



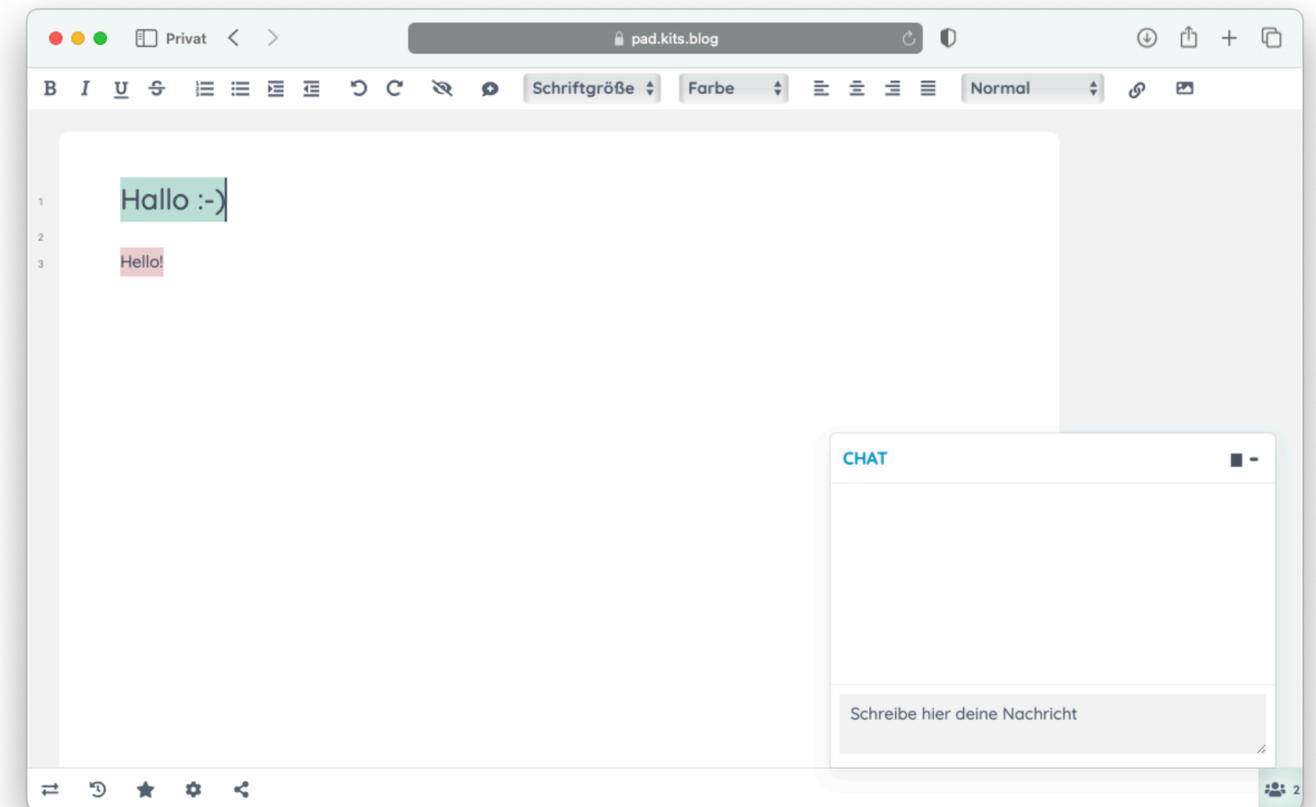
Case Study: Etherpad (Lite)

History [2]

- 2008: Etherpad Release (Scala, Java, Javascript)
- 2009: Acquired by Google and open sourced shortly after
- 2011: Official Release of Etherpad Lite, a rewrite in Javascript

Technology of Etherpad Lite

- Rewrite in Node.js
- Mixture of versioned libraries and npm packages
- Synchronization: Changeset Library [3] (easysync protocol), based on OT
- In this presentation referred to as „Etherpad“



01

Why



Active Maintenance

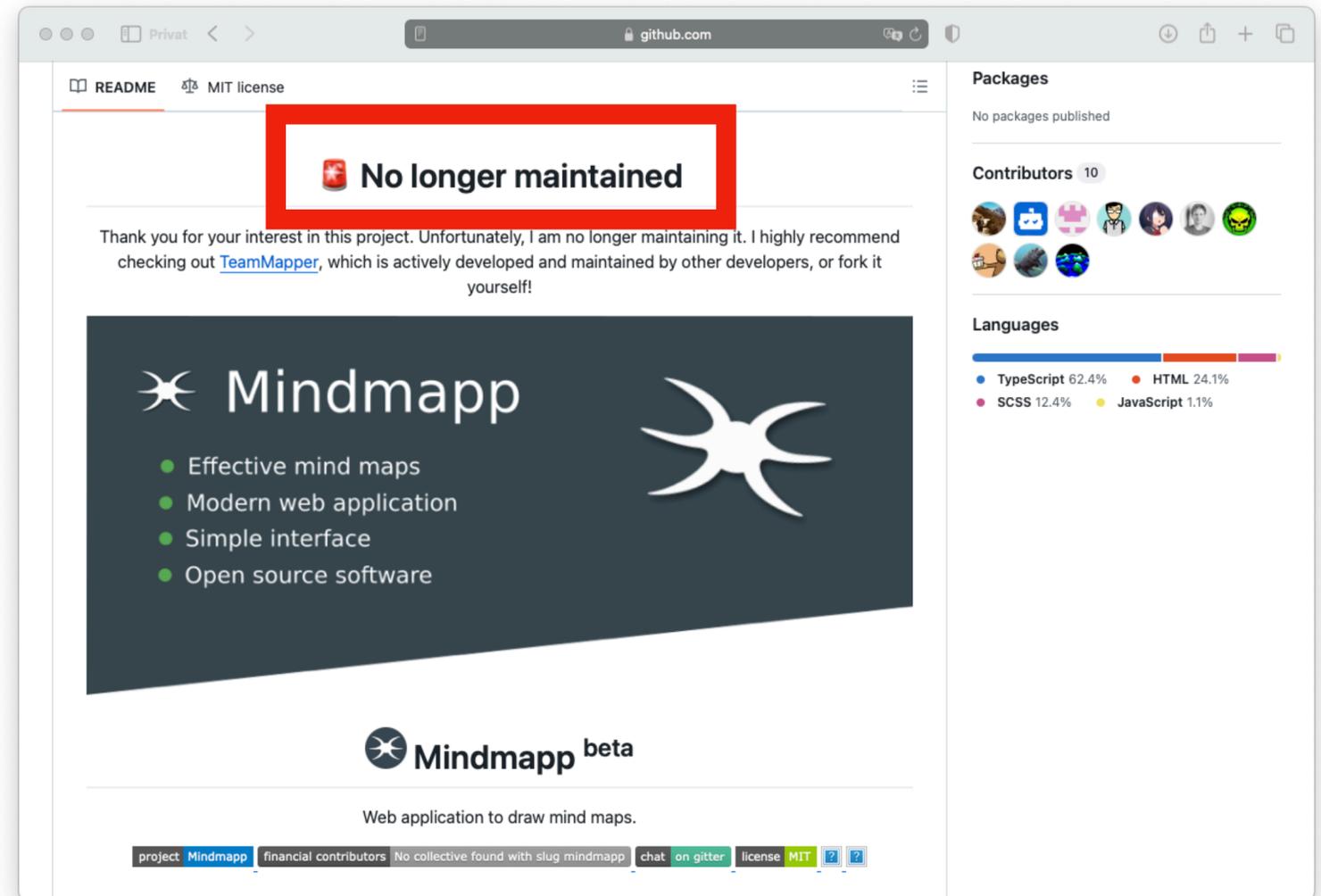
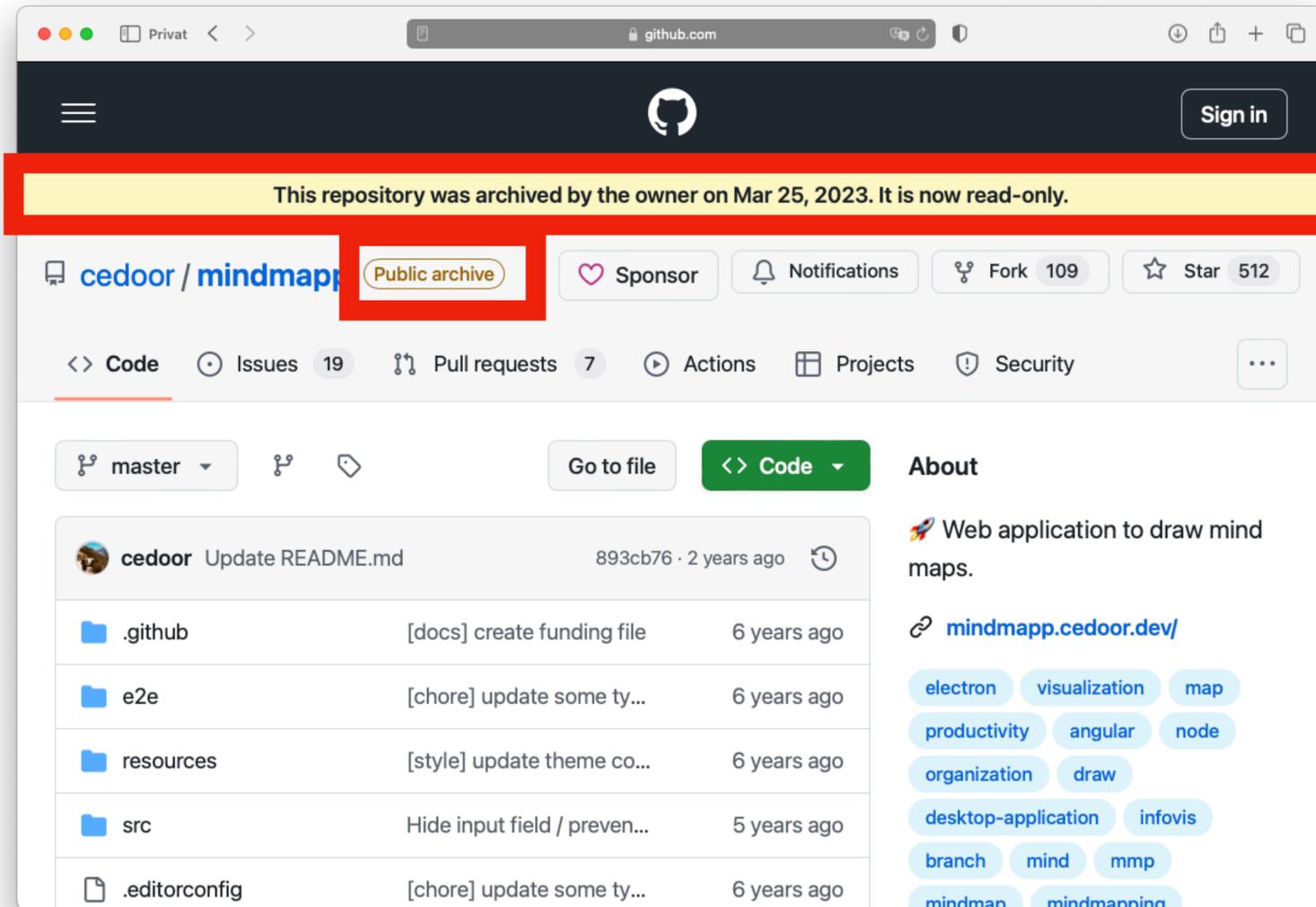
„Only 11% of OSS projects are actively maintained“

9th Annual State of the Software Supply Chain, sonatype, 2023 [4]

Understanding + upgrading unmaintained OSS might be challenging



Learning 1: Unmaintained? Make It Transparent!



Learning 2: Fork It & Tell the Old Maintainer

The screenshot shows the GitHub repository page for 'Mindmapp'. At the top, there is a red banner that says 'No longer maintained'. Below this, a message from the maintainer is visible, which is highlighted with a red box. The message reads: 'Thank you for your interest in this project. Unfortunately, I am no longer maintaining it. I highly recommend checking out [TeamMapper](#), which is actively developed and maintained by other developers, or fork it yourself!'. Below the message is a large dark banner for 'Mindmapp' with a white logo and a list of features: 'Effective mind maps', 'Modern web application', 'Simple interface', and 'Open source software'. At the bottom, there is a 'Mindmapp beta' logo and the text 'Web application to draw mind maps.'.

No longer maintained

Thank you for your interest in this project. Unfortunately, I am no longer maintaining it. I highly recommend checking out [TeamMapper](#), which is actively developed and maintained by other developers, or fork it yourself!

Mindmapp

- Effective mind maps
- Modern web application
- Simple interface
- Open source software

Mindmapp beta

Web application to draw mind maps.

The screenshot shows the GitHub repository page for 'TeamMapper'. The main heading is 'TeamMapper' with a colorful tree logo. Below the logo, there is a red box highlighting a paragraph of text. The text reads: 'Mindmapping made simple: Host and create your own mindmaps. Share your mindmap sessions with your team and collaborate on mindmaps. TeamMapper is based on mindmapp (<https://github.com/cedoor/mindmapp>, discontinued). In contrast to mindmapp, TeamMapper features shared mindmapping sessions for your team based on websockets. Try it: [TeamMapper.org](#)'. To the right of the main content, there is a sidebar with 'Contributors' (18) and 'Languages' (TypeScript 87.4%, HTML 7.7%, SCSS 3.1%, JavaScript 1.3%, Other 0.5%).

TeamMapper

Mindmapping made simple: Host and create your own mindmaps. Share your mindmap sessions with your team and collaborate on mindmaps.

TeamMapper is based on mindmapp (<https://github.com/cedoor/mindmapp>, discontinued). In contrast to mindmapp, TeamMapper features shared mindmapping sessions for your team based on websockets. Try it: [TeamMapper.org](#)

Contributors 18

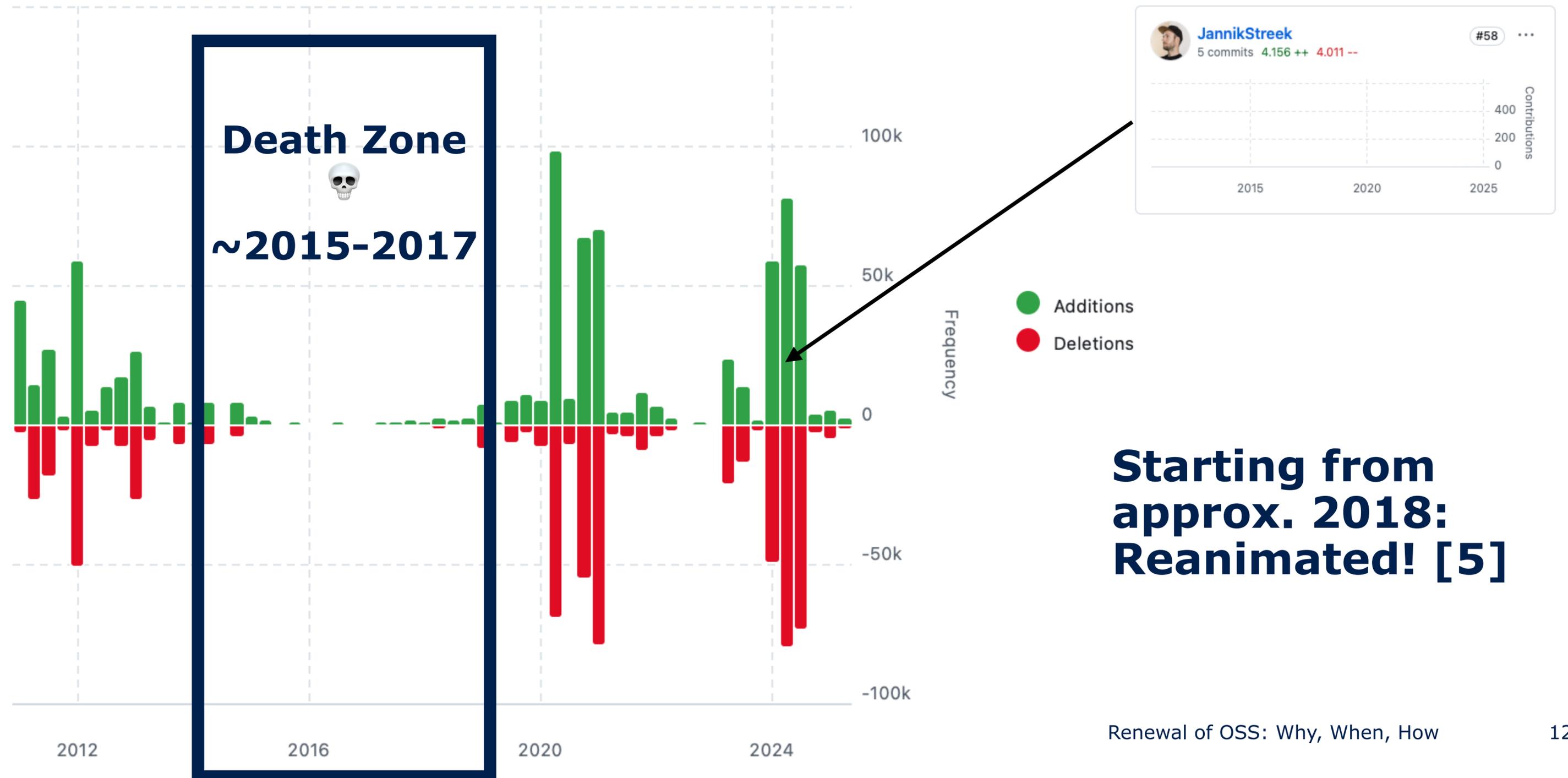
Languages

- TypeScript 87.4%
- HTML 7.7%
- SCSS 3.1%
- JavaScript 1.3%
- Other 0.5%

Case Study Etherpad: Maintenance

Code frequency

Additions and deletions per week



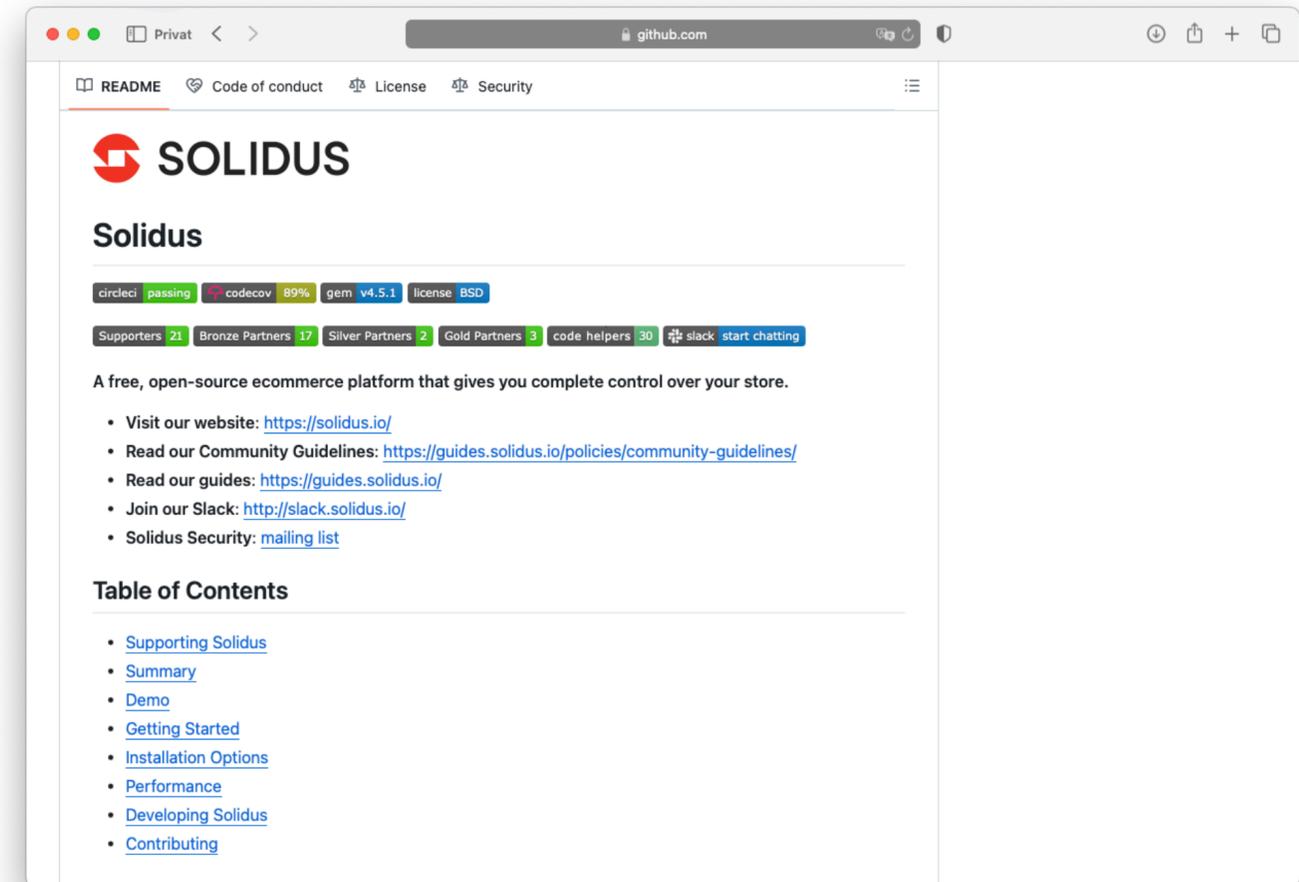
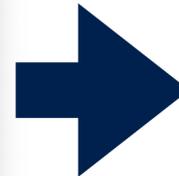
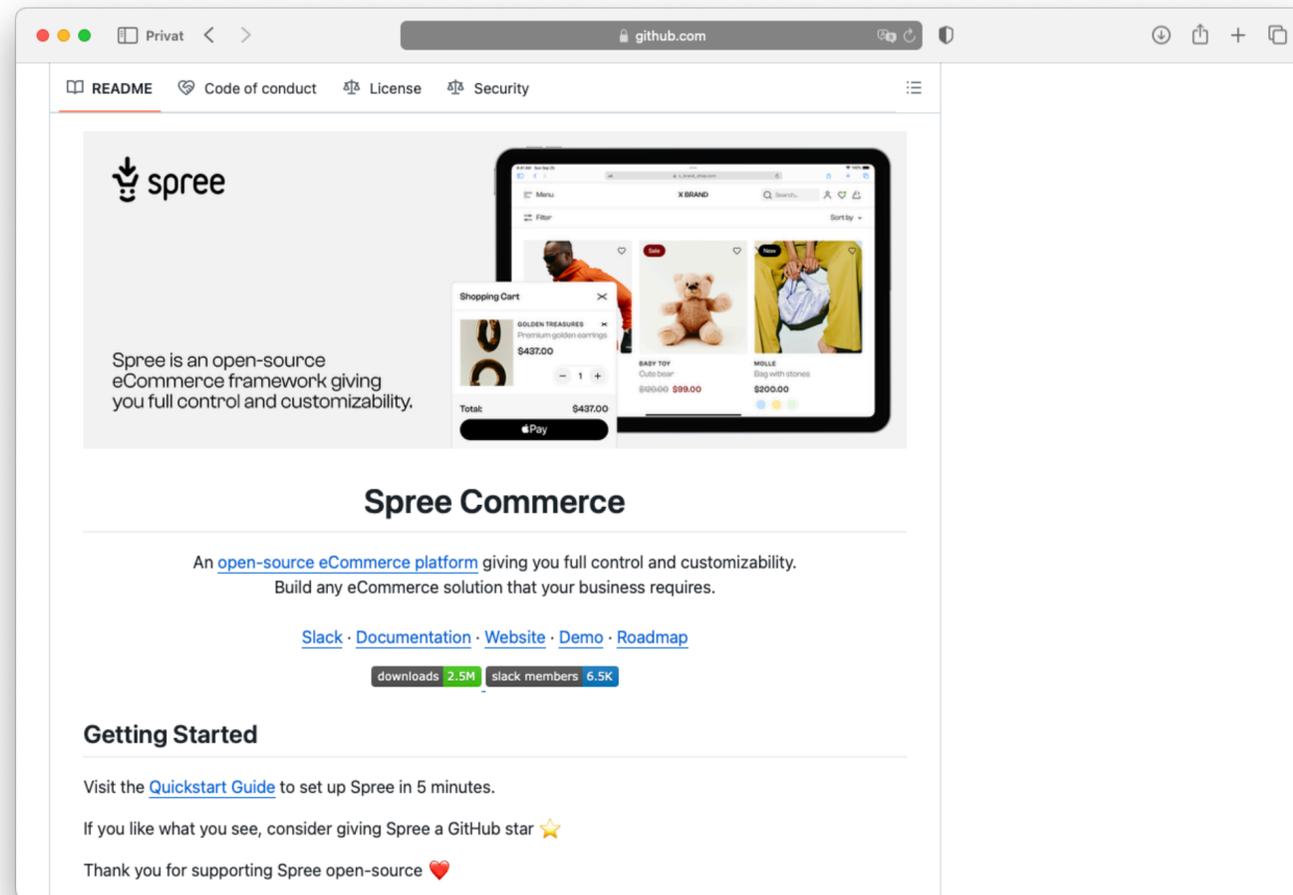
Diverging Project Goals

Pain to remove new features > gain of new improvements

Unstable releases and backward compatibility



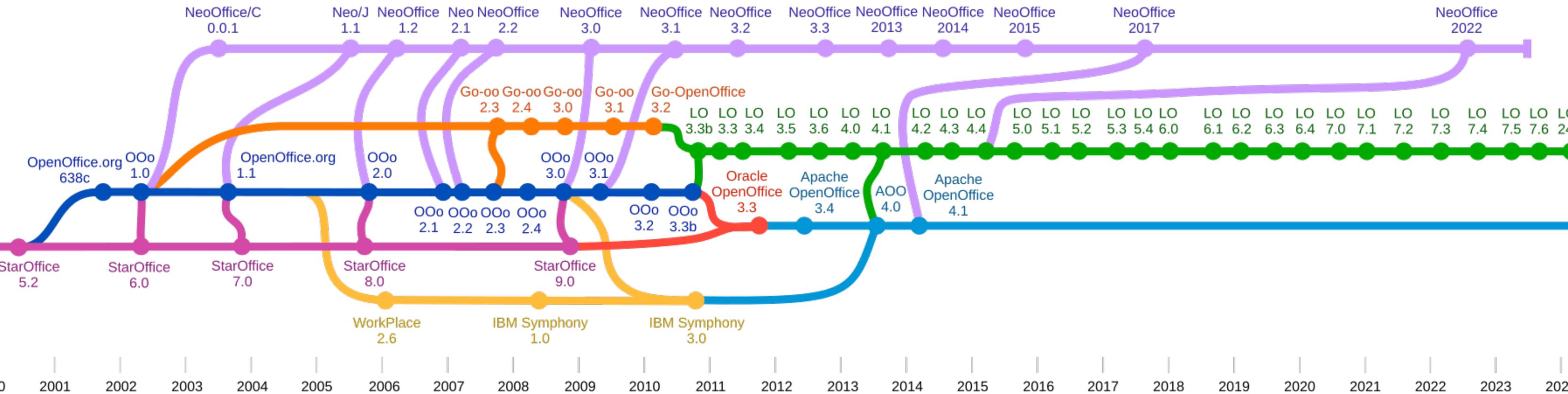
Learning 3: Consider Joining or Forking Before



"Spree Commerce [...] has announced that it will stop investing in the open source project and that there currently is no core team. We [...] forked Spree and called it Solidus." [6]



Learning 4: Be Aware of Fork Complexity



StarOffice Derivatives [7]



Case Study Etherpad: Project Goals

- At first: Fork with minor changes, still easy to consolidate
- Joined the effort, e.g. docker setup
- Plugin-Mechanism in Etherpad used for additional features
- More and more work required to remove unwanted new features



Refactoring & Modernization

New technologies can make parts of older projects obsolete

Changing best practices, dead code, bad code, ...

License!



Case Study Etherpad: Refactoring & Modernization

- Ongoing efforts to upgrade the project, e.g. pnpm, docker, TypeScript ...
- A lot of unmaintained and undocumented legacy code



Performance, Scalability and Security

Identifying and resolving performance / scalability issues, aligned with business needs [8]

Debugging



Learning 5: Making Clever Use of Technology Improvements

Porting can be an alternative to rewriting!



A 10x Faster TypeScript [9]



Case Study Etherpad: Performance, Scalability and Security

- Poor performance
- Crashes
- Security concerns (admin area, plugin mechanism, binary file import)
- Hard to debug



02

When



Reality Check

Get in touch with the maintainers

Research project alternatives



Case Study Etherpad: Reality Check

- No better alternatives found during the time of research
- Friendly maintainers, discussions around how to cooperate
- Problem: Different viewpoints on scope
- Fear of user confusion with a differently scoped app under the same name (based on experience with old Etherpad Lite rewrite)



Feasibility

Complexity of the project

Existing user-base



Learning 6: Be Realistic About the Effort When You Want to Rewrite

- Netscape Example [10]
 - Release of Netscape 4, June 1997
 - Release of Netscape 5, Abandoned
 - Release of Netscape 6, November 2000 (Rewrite from scratch)



Case Study Etherpad: Feasibility

- Rewriting a real-time text merging algorithm from scratch out of time and budget
- But: Availability of new technologies (algorithms, libraries, ...)
- Control over our existing user base



03

How



Scope Management

Clear objective and goals

Minimum Viable Product
Mindset vs. Scope Creep



Case Study Etherpad: Scope Management

- Clear idea about the scope
- Features that were added via plugins can now be baked in
- Superfluous features can be removed (e.g. chat)
- Side note: Etherpad Lite reduced scope, but added it back over time



Research

Technology that provides a smarter, more elegant solution

Modern programming stacks better suited for the problem



Case Study Etherpad: Research

- Researched possible technologies
 - Y.js [11] for synchronizing data structures (e.g. text), based on CRDT
 - ProseMirror [12] / TipTap Editor [13]
 - Hocuspocus Server [14]
- Result: Integrating & customizing existing OSS tools as replacement



Follow Engineering Best Practices

Breaking up the problem
[16]

Gradual process of replacement „Strangler Fig“ [16]

Usage of patterns, e.g. Transitional Architecture
[15]

...



Learning 7: Be Aware of the Challenges a Rewrite Poses

- Expensive, often takes a long time
- Undocumented requirements, unclear need of legacy features
- Feature freeze of an old system might be a strategic mistake in case of delay or being stuck

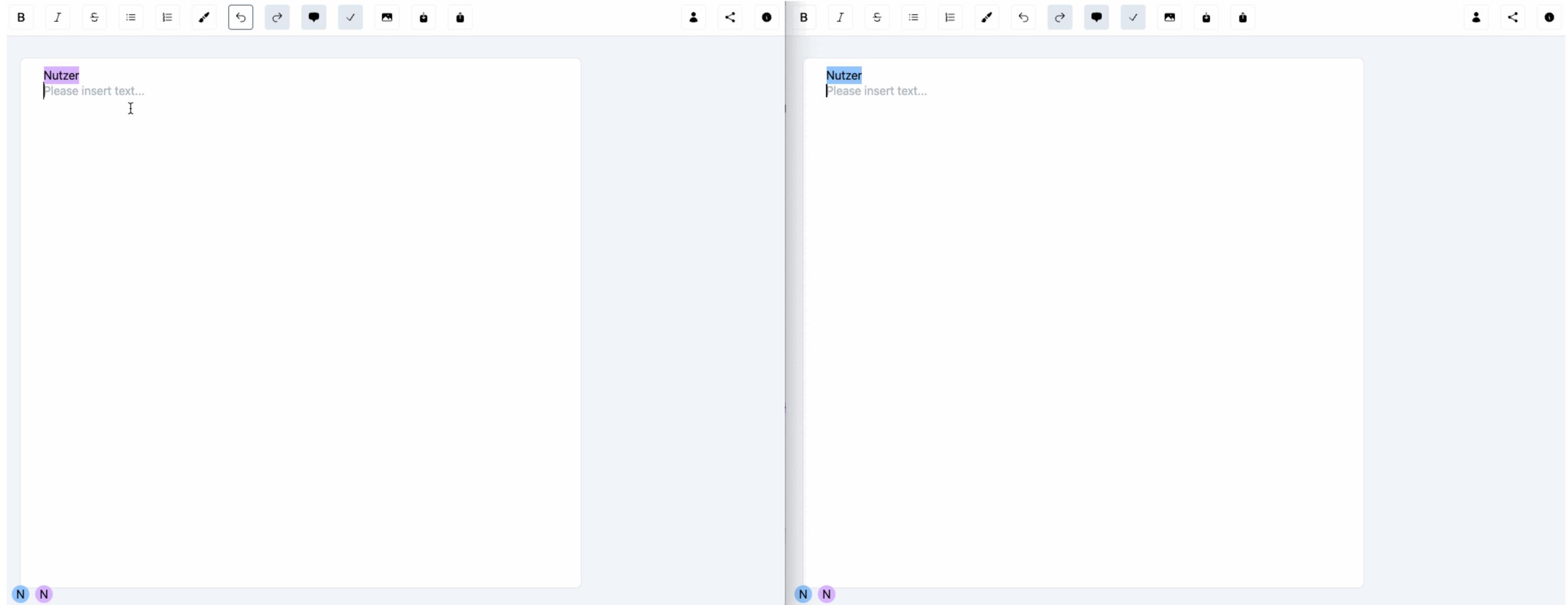


04

GroupWriter



GroupWriter



write.kits.blog

github.com/b310-digital/groupwriter-frontend

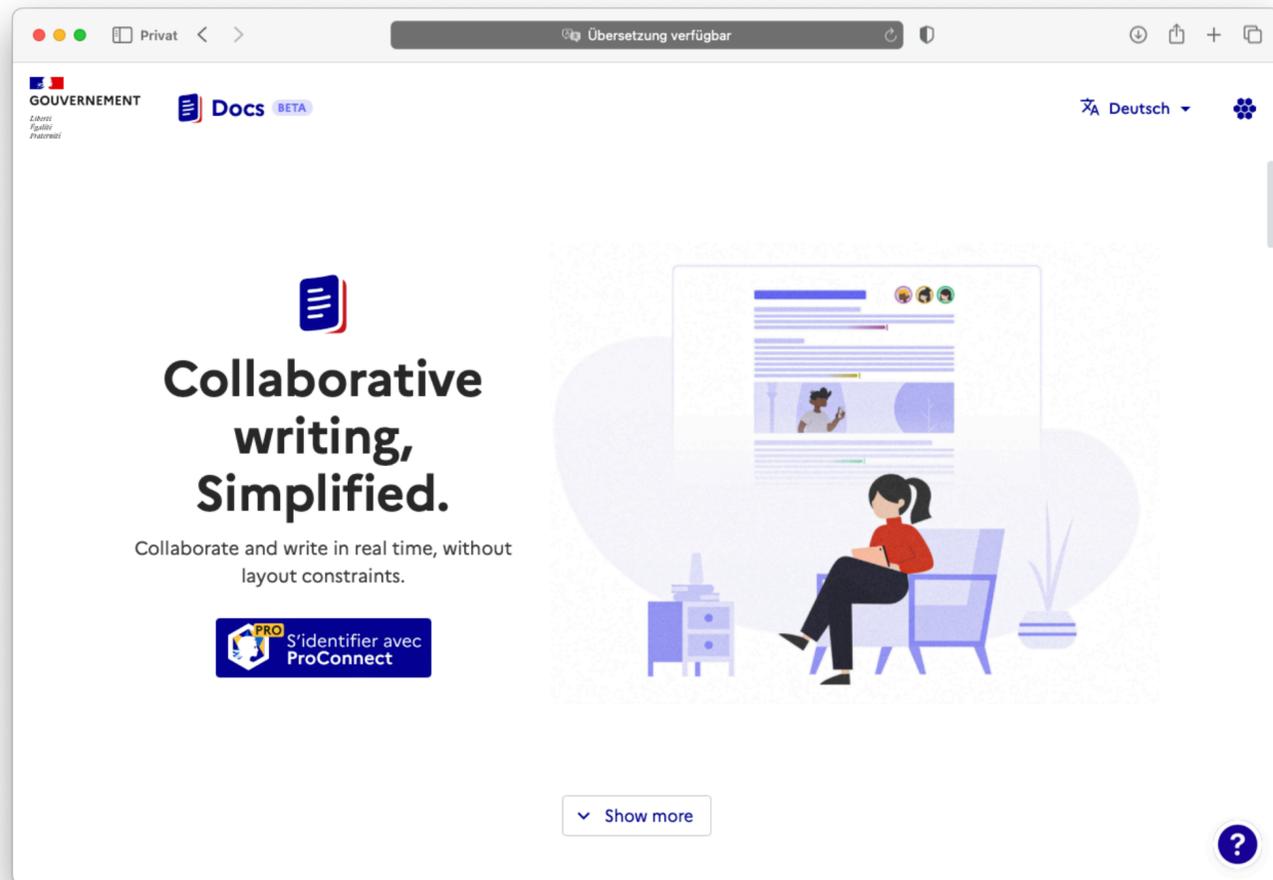
Renewal of OSS: Why, When, How

A Full Rewrite?

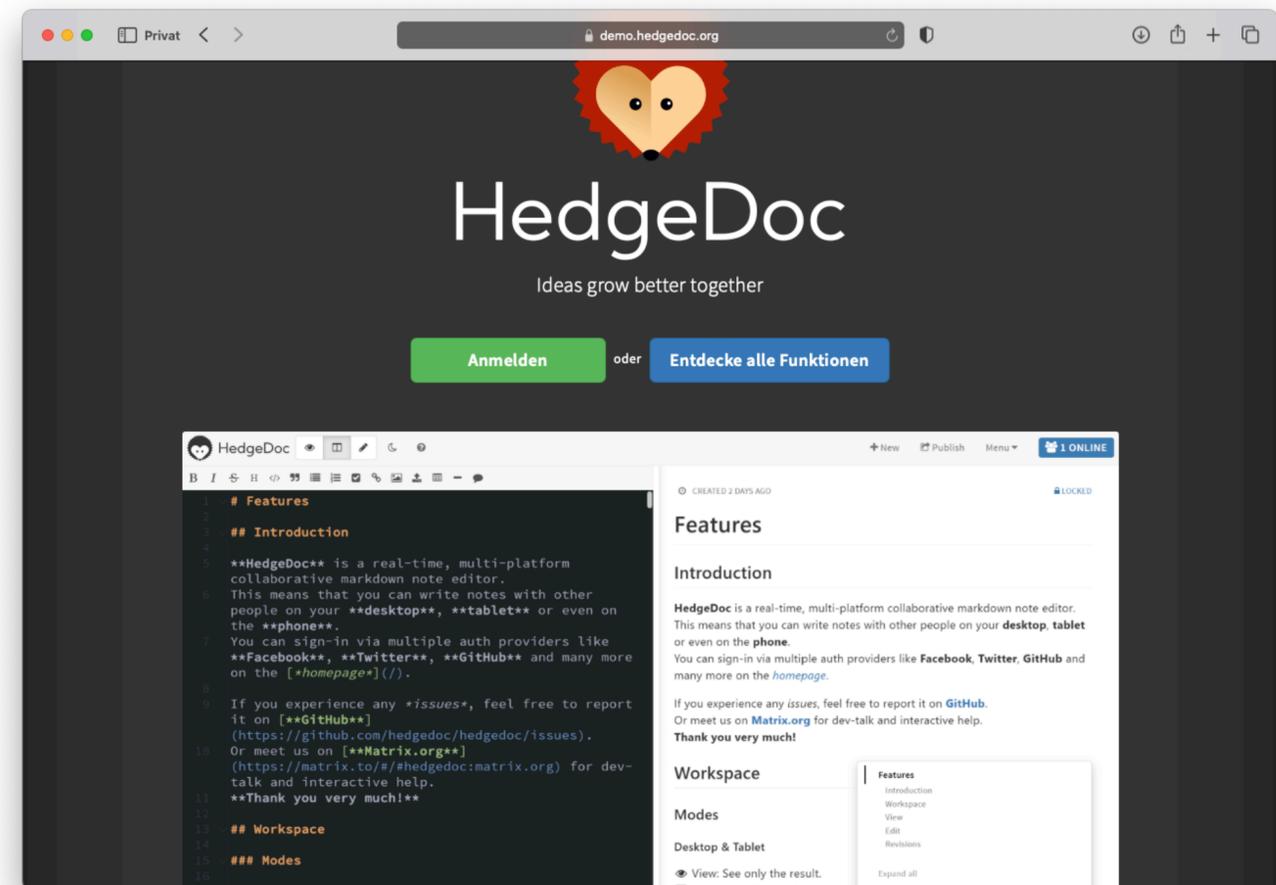
- Retirement of our own Etherpad Lite fork, currently in a grace period
- Feasible effort, mainly integration and customization
- New features: Comments and encrypted image upload
- However: Lost potential to achieve more „good“ for the Etherpad Community by contributing to the project



Alternatives



Numerique [17]



HedgeDoc [18]



Food for Thought

„We’re programmers. Programmers are, in their hearts, architects, and the first thing they want to do when they get to a site is to bulldoze the place flat and build something grand.“

Joel Spolsky (JoelOnSoftware), 2000 [1]



Thank you.

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