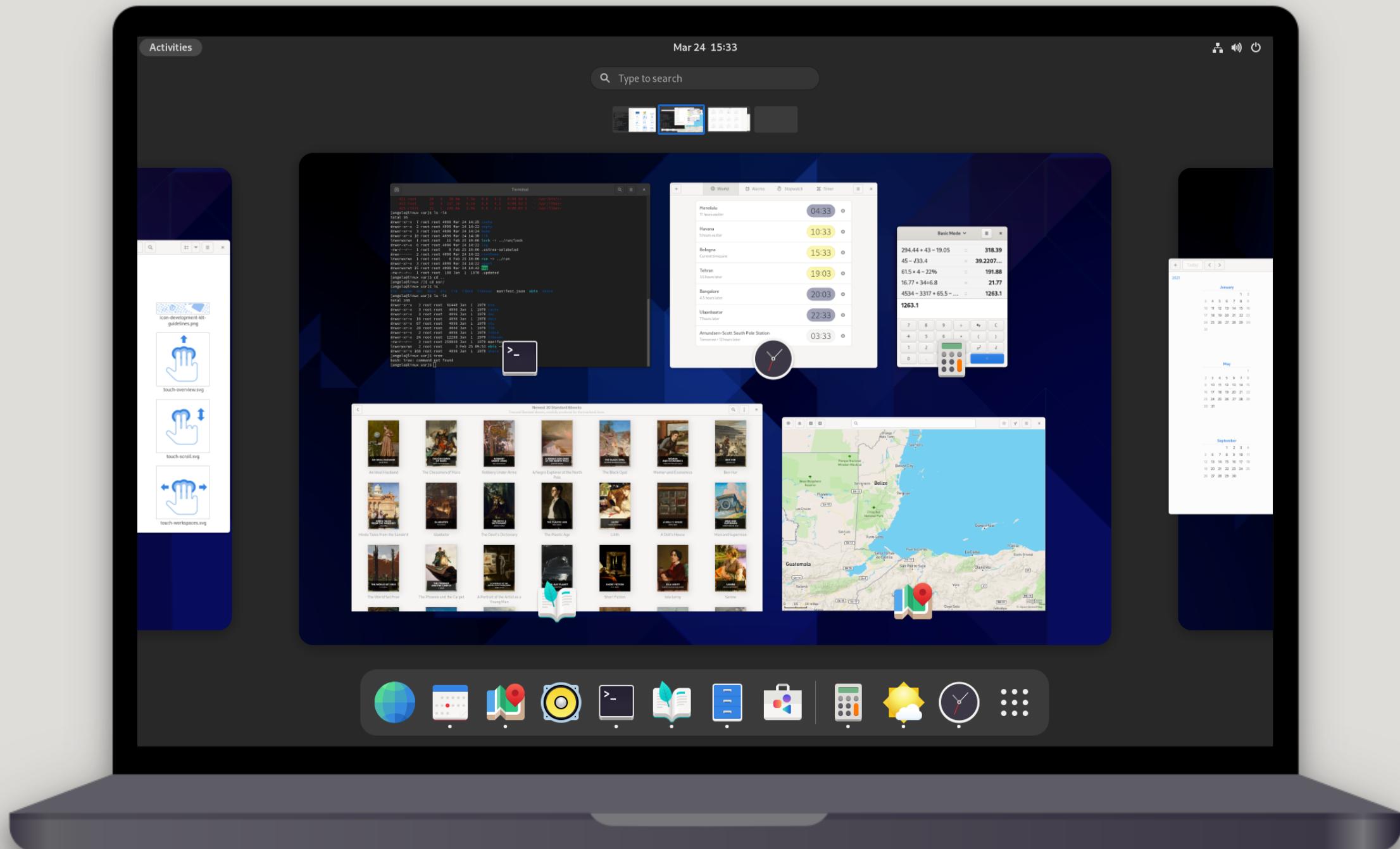


Post-Collapse Computing

Tobias Bernard







CM 214

BAR RW 75

ÖFFEN DROHNE

Trigger Warning

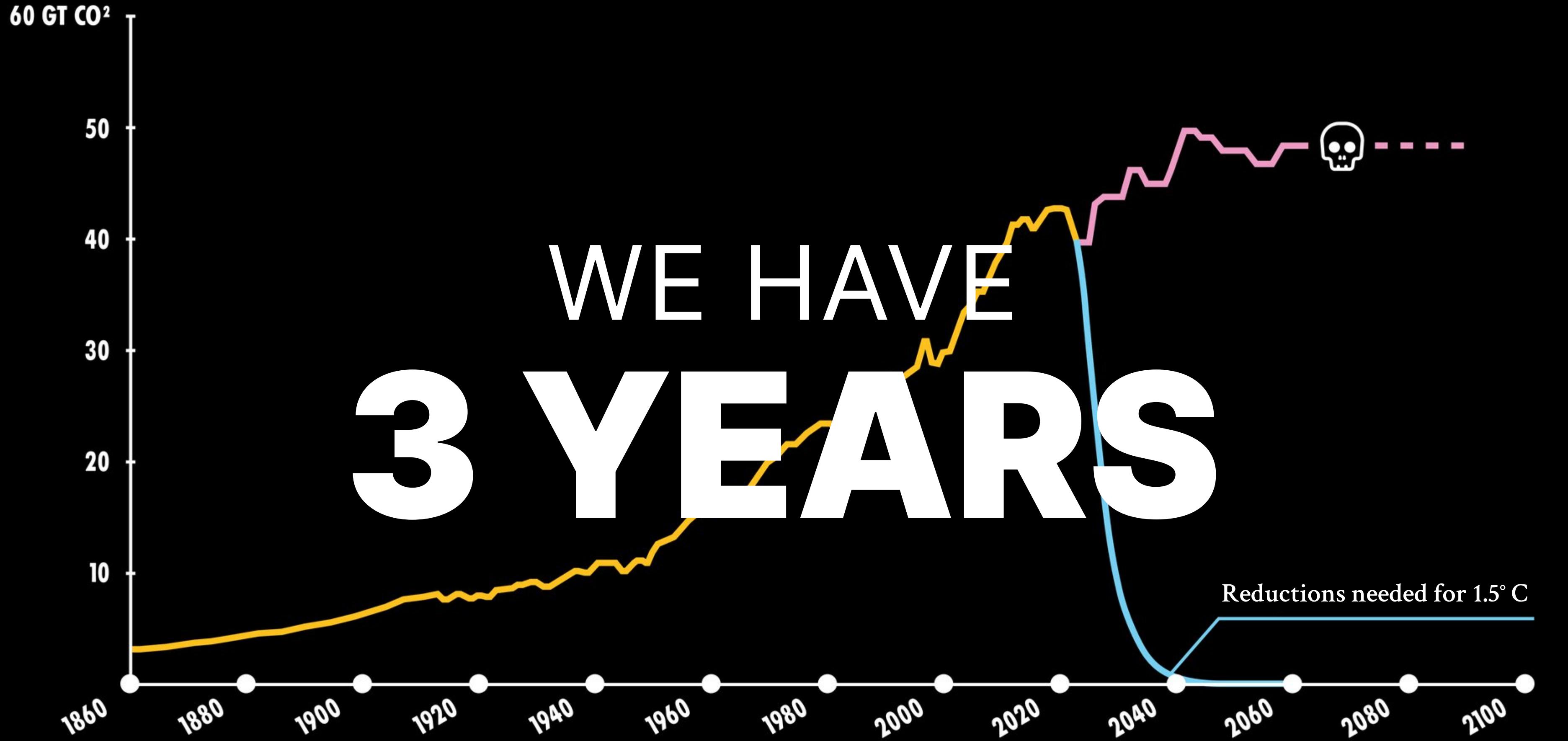
Very depressing climate facts



PART 1

THE CLIMATE CRISIS
IS HERE





~~Technical innovations~~

~~Lifestyle choices~~

System change

**Our political systems are
incapable of action**

Mass mobilization

Mass civil resistance

Block the economy

Citizens' assemblies



Join the rebellion.
It's our best hope.

The background of the image is a photograph of a suspension bridge, likely the Golden Gate Bridge, at night. The bridge's towers and cables are silhouetted against a dark sky, while the water below reflects the warm, golden lights of the bridge and surrounding city. The overall atmosphere is dramatic and contemplative.

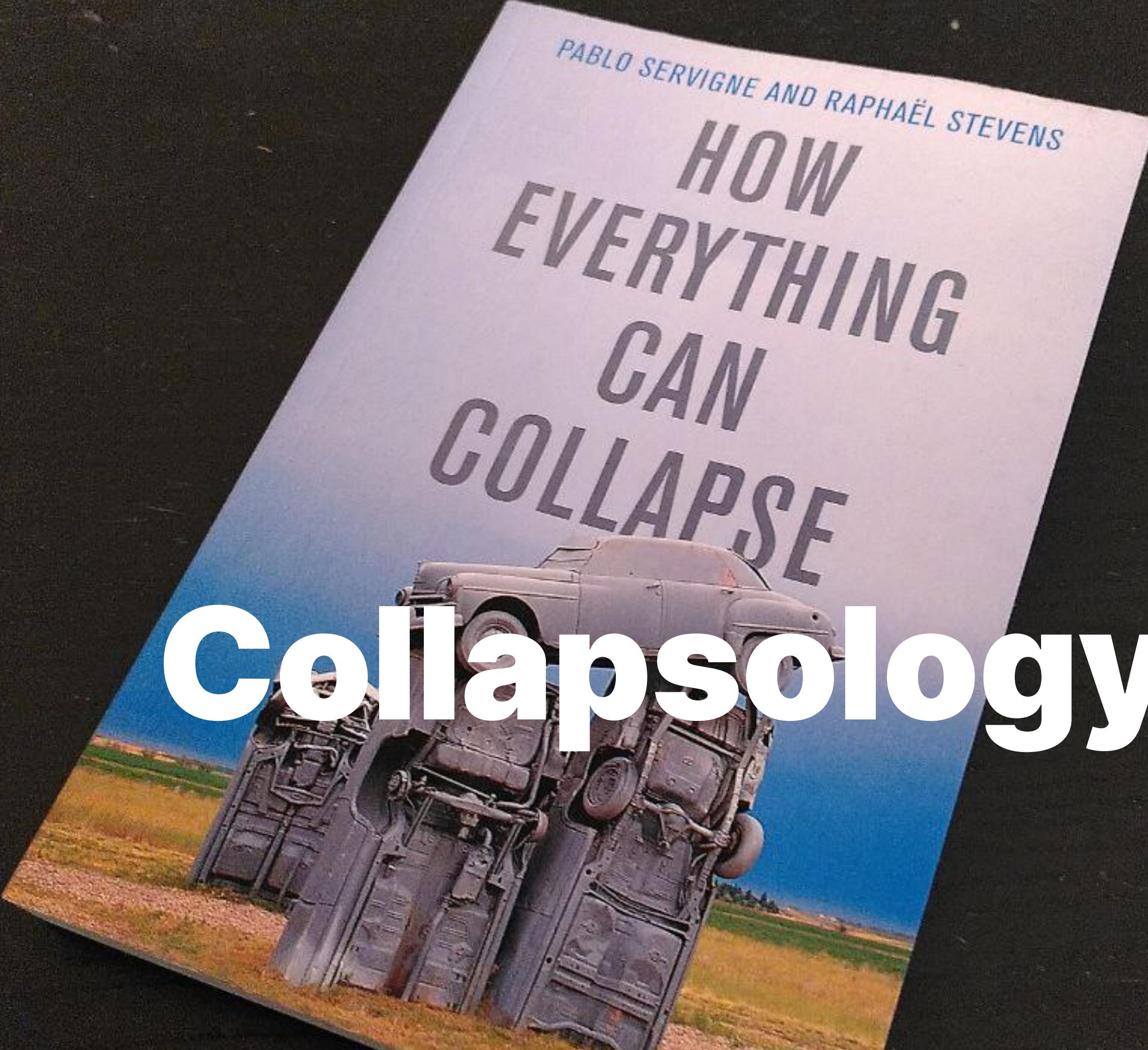
PART 2

**WHAT IF WE
FAIL?**

PABLO SERVIGNE AND RAPHAËL STEVENS

HOW
EVERYTHING
CAN
COLLAPSE

Collapsology



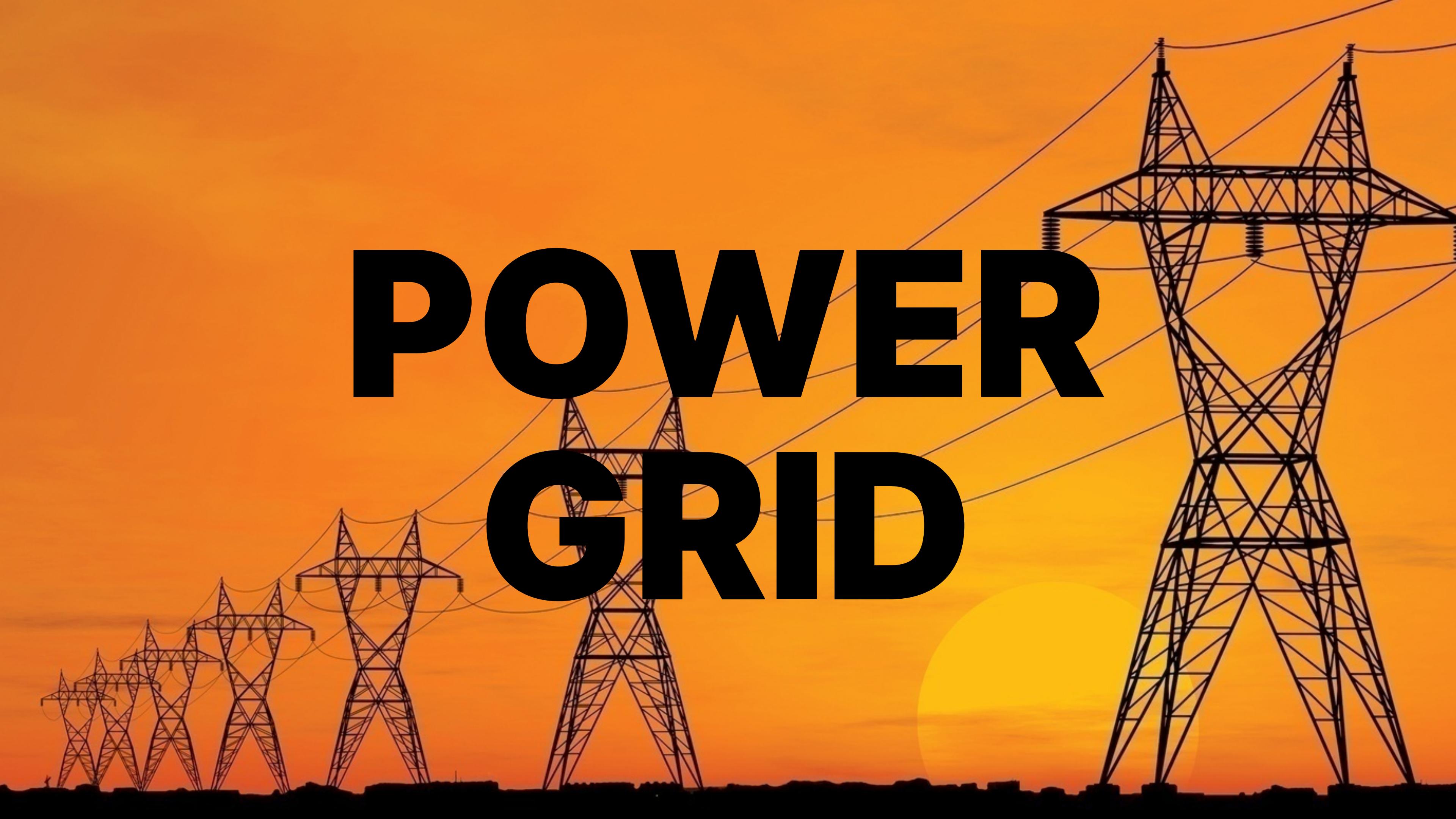
**Complex, centralized,
interdependent systems**

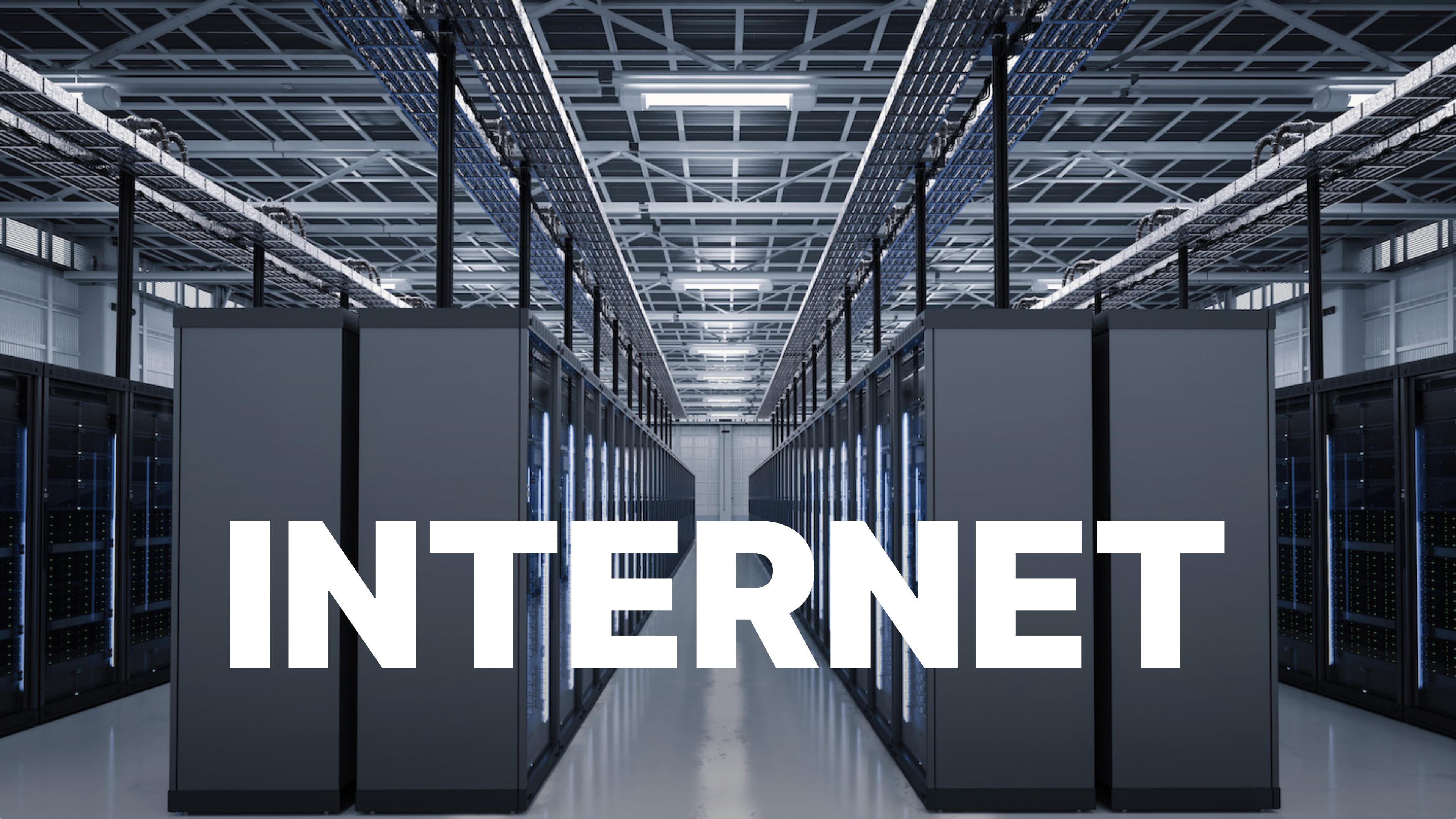
**What would that
mean for free software?**



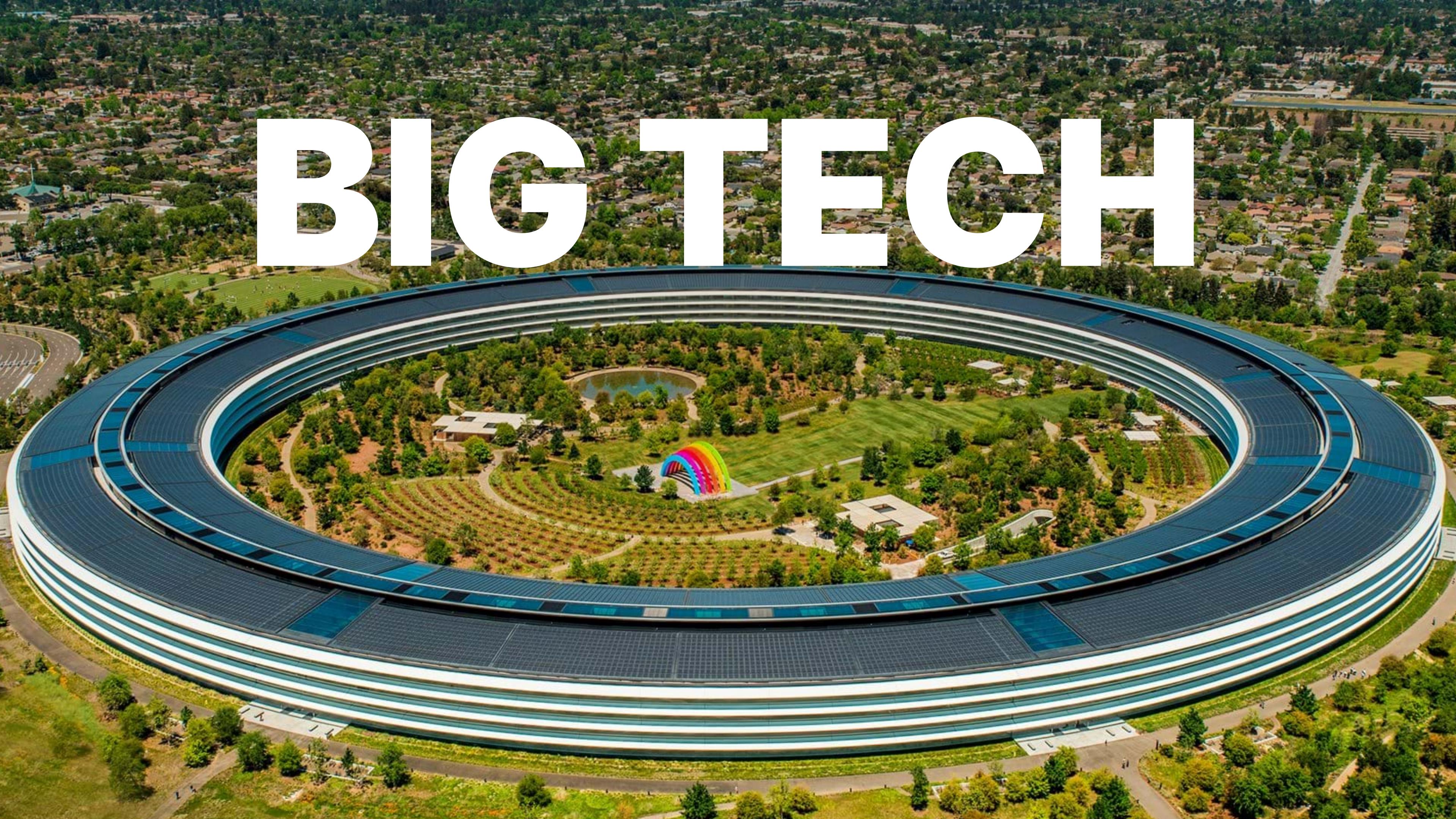
SUPPLY CHAINS

POWER GRID

A silhouette of a power grid against a sunset sky. The sky transitions from a warm orange at the horizon to a lighter yellow and then white at the top. In the foreground, several tall, triangular lattice-style electricity pylons stand in a row. They are interconnected by a network of thin black lines representing power transmission lines. The perspective of the pylons creates a sense of depth, leading towards the horizon.



INTERNET



BIG TECH

No new hardware

Limited power

Limited connectivity

No cloud services

No App Stores

No Figma, Notion, etc.

No Github

No npm, cargo, etc.

**How to do computing
will not be our most
pressing problem**

**But it may be part of
some important
solutions**

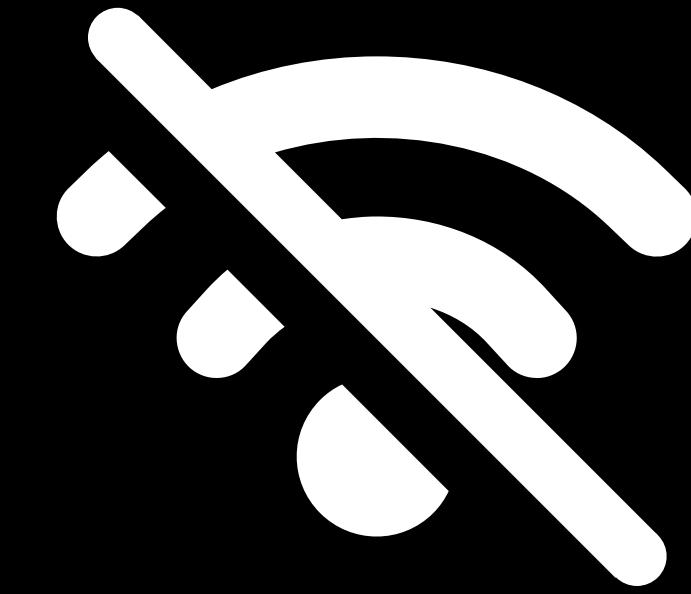
**Free software may
have a critical role to
play in this future**



PART 3

BUILDING

RESILIENCE



Local-First

Local-First Software: You Own Your Data, in spite of the Cloud

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Abstract

Cloud apps like Google Docs and Trello are popular because they enable real-time collaboration with colleagues, and they make it easy for us to access our work from all of our devices. However, by centralizing data storage on servers, cloud apps also take away ownership and agency from users. If a service shuts down, the software stops functioning, and data created with that software is lost.

In this article we propose *local-first software*, a set of principles for software that enables both collaboration *and* ownership for users. Local-first ideals include the ability to work offline and collaborate across multiple devices, while also improving the security, privacy, long-term preservation, and user control of data.

We survey existing approaches to data storage and sharing, ranging from email attachments to web apps to Firebase-backed mobile apps, and we examine the trade-offs of each. We look at Conflict-free Replicated Data Types (CRDTs): data structures that are multi-user from the ground up while also being fundamentally local and private. CRDTs have the potential to be a foundational technology for realizing local-first software.

We share some of our findings from developing local-first

challenges for this new data model. Lastly, we suggest some next steps for moving towards local-first software: for researchers, for app developers, and a startup opportunity for entrepreneurs.

CCS Concepts • Human-centered computing → Collaborative content creation; Ubiquitous and mobile computing systems and tools; • Computer systems organization → Peer-to-peer architectures; • Software and its engineering → Peer-to-peer architectures; Organizing principles for web applications.

Keywords collaboration software, mobile computing, data ownership, CRDTs, peer-to-peer communication

ACM Reference Format:

Martin Kleppmann, Adam Wiggins, Peter van Hardenberg, and Mark McGranaghan. 2019. Local-First Software: You Own Your Data, in spite of the Cloud. In *Proceedings of the 2019 ACM SIGPLAN International Symposium on New Ideas, New Paradigms, and Reflections on Programming and Software (Onward! '19), October 23–24, 2019, Athens, Greece*. ACM, New York, NY, USA, 25 pages. <https://doi.org/10.1145/3359591.3359737>

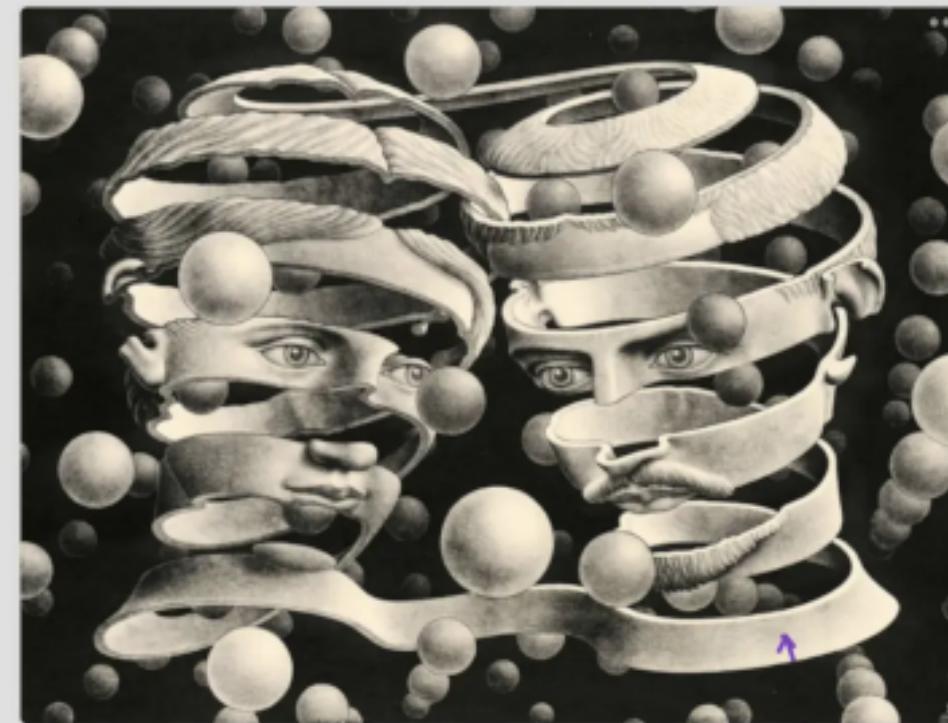
Illustrations of the mind



I think most people's minds look more like **these** when we are in the moment. A collage of mixed imagery; confusing or unclear or unrelated to some, but perfectly clear to the individual in the act of creating or ideating.



one of my favorite albums from the late 1960's. Artwork and linework that blends together

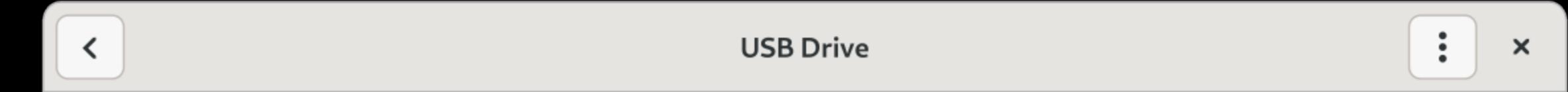


I LIKE THE RIBBON

What is the iconographic or visual representation of this for music? for Muse boards?

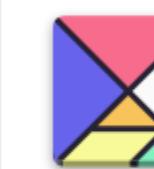
Q
A
•
•
•

Fall back to USB



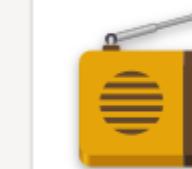
Apps

Install these apps offline from the drive



Tangram

Web apps, on your desktop



Shortwave

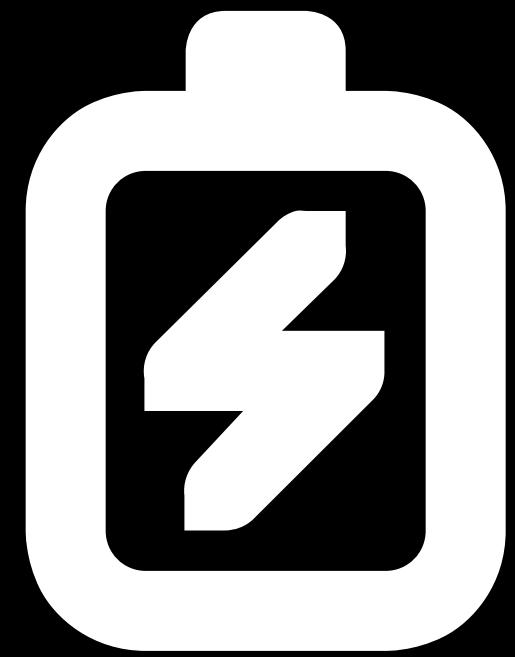
Listen to internet radio



Tootle



Apostrophe



**Use fewer
resources**

Avoid browsers, use GTK

The screenshot shows a dark-themed desktop environment. On the left, there's a vertical dock with several icons: a blue folder, a green leaf, a purple flask, an orange gear, and a red briefcase. To the right of the dock is a file manager window titled "Test" with a search bar and a sidebar containing three items: "Post-Collapse Comp...", "GUADEC 2022", and "Get a worse computer". The "Post-Collapse Comp..." item is highlighted with an orange background. The main pane of the file manager shows a large image of a terminal window. The terminal window has a title bar "Post-Collapse Computing" and contains the text "Post-Collapse Computing" in a large, bold, dark font. Below this, there is a smaller paragraph of text: "The climate crisis is here. This year's IPCC report pretty bluntly states that unless we take drastic action in the next 2-3 years, civilization as we know it will collapse in our lifetimes." At the bottom of the terminal window, there is some very small, partially visible text.

Test

Post-Collapse Computing

H1

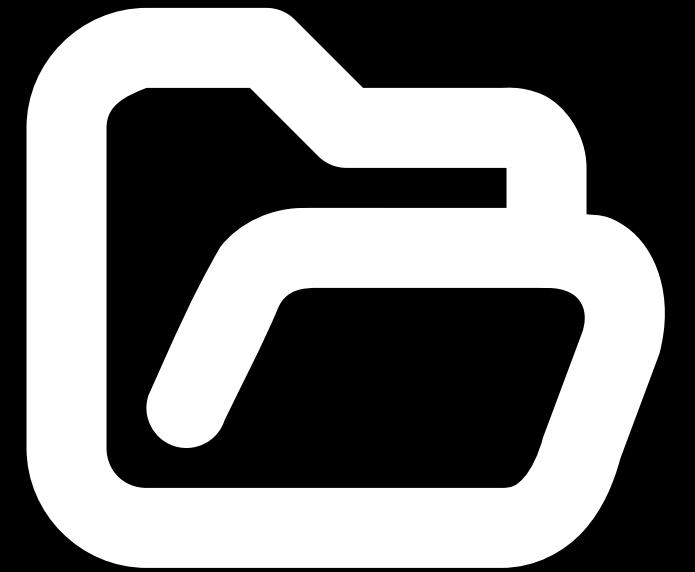
Post-Collapse Comp...
10 Nov, 18:32

GUADEC 2022
10 Nov, 18:31

Get a worse computer
10 Nov, 18:31

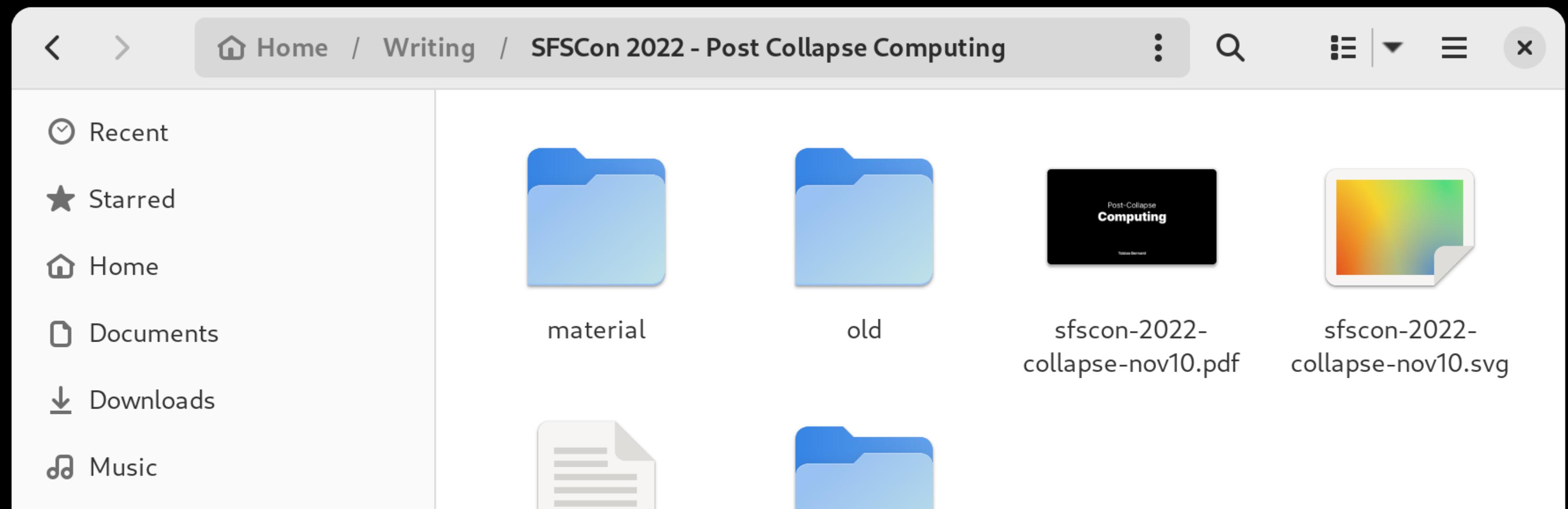
Post-Collapse Computing

The climate crisis is here. This year's IPCC report pretty bluntly states that unless we take drastic action in the next 2-3 years, civilization as we know it will collapse in our lifetimes.



**Data
resilience**

The file system is good, actually



Simple, standardized, plain text formats

TextBundle.org

[Home](#) [Specification](#) [Changelog](#)

TextBundle Specification

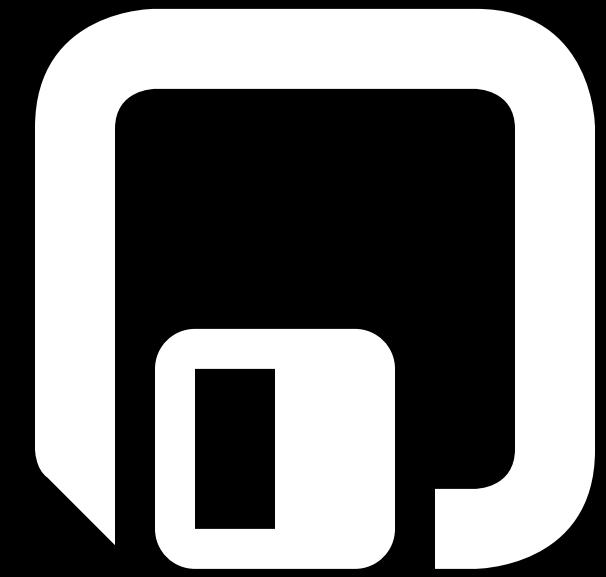
The purpose of the TextBundle file format is to simplify the exchange of various plain text files together with additional images between sandboxed applications. By using a single package file, applications do not need to acquire additional sandbox extensions to access files referenced by a plain text document. It can be used as container for various plain text formats, like Markdown or Fountain.

File Type

There are two variants of the TextBundle format: The *package format* and the *compressed format*.

Package Format

The **package** format is designed to simplify exchange between applications: For example, it can be used to pass a Markdown file together with its assets from an editor to an export tool.



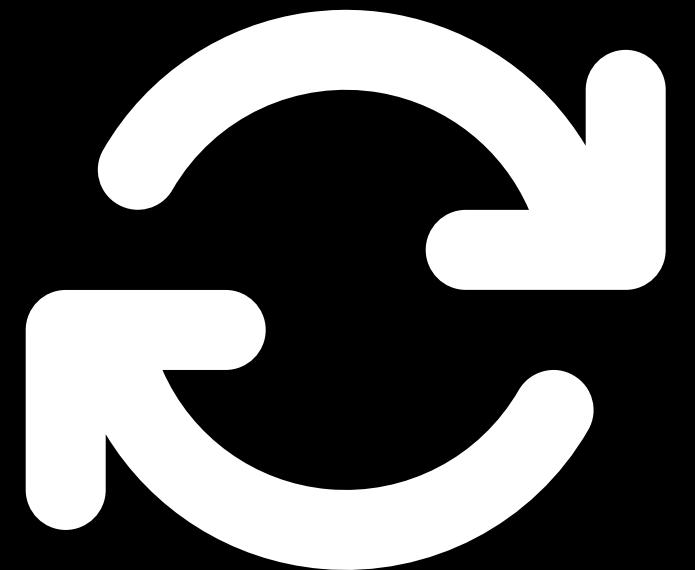
**Keep old hardware
running**

Use older hardware for development



Hardware enablement

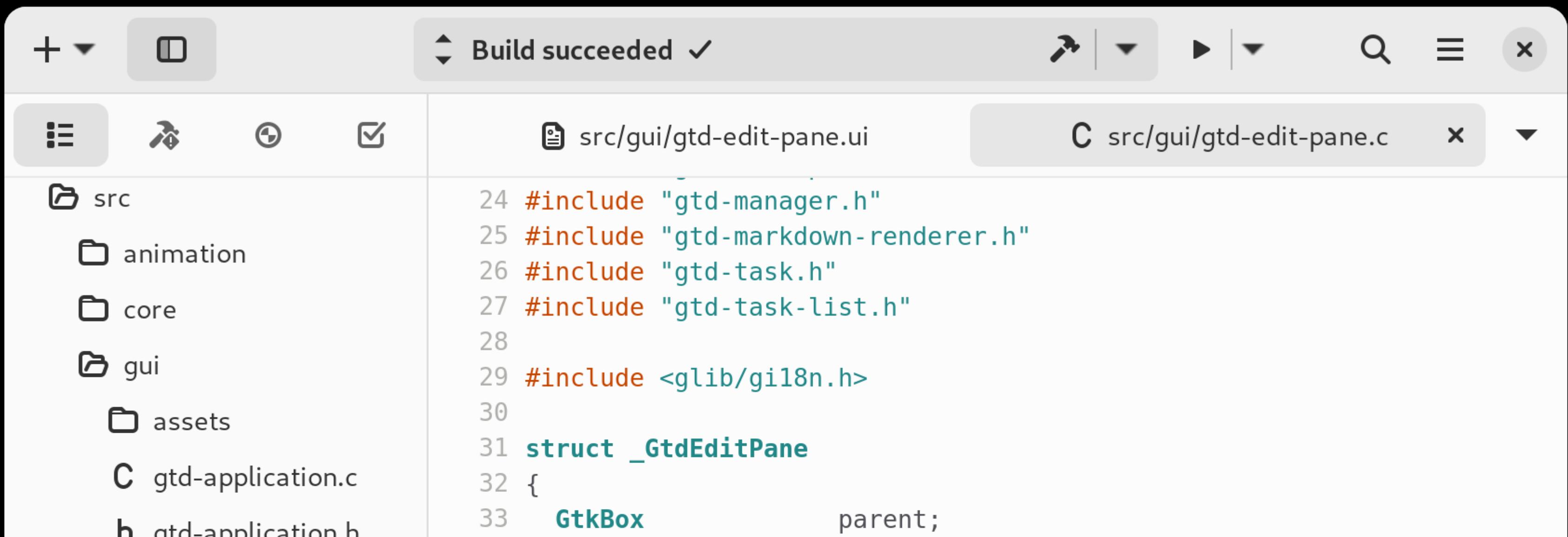




**Build for
repair**

**Use well-understood,
accessible technology**

Fully offline development



The image shows a screenshot of a software interface, likely a developer's environment. At the top, there is a toolbar with various icons. Below the toolbar, a message bar displays "Build succeeded ✓". The main area has two tabs: "src/gui/gtd-edit-pane.ui" and "src/gui/gtd-edit-pane.c". The "src/gui/gtd-edit-pane.ui" tab is currently active, showing a list of files under the "src" directory: "src", "animation", "core", "gui", "assets", "gtd-application.c", and "gtd-application.h". The "src/gui/gtd-edit-pane.c" tab shows the content of the C source file:

```
24 #include "gtd-manager.h"
25 #include "gtd-markdown-renderer.h"
26 #include "gtd-task.h"
27 #include "gtd-task-list.h"
28
29 #include <glib/gi18n.h>
30
31 struct _GtdEditPane
32 {
33   GtkWidget
34   parent;
```

Takeaways

Business as usual isn't an option

Civil resistance is our best hope

Let's make our tech resilient

See you in action o/

Thanks!