



Servo Web Rendering Engine Reboot

The **embeddable**, **independent**, **memory-safe**,
modular, **parallel** web rendering engine

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About me

- **Igalia** Web Platform Team
- **Web engines hacker** with experience in Chromium/Blink and Safari/WebKit
- **CSS Working Group** member since 2017
- **Servo** Technical Steering Committee (TSC) chair

About Igalia

- **Open Source Consultancy** founded in 2001
- 140 people, fully remote (25 countries)
- **Flat structure** (cooperative like model)
- Top contributors to **Chromium, WebKit and Gecko**



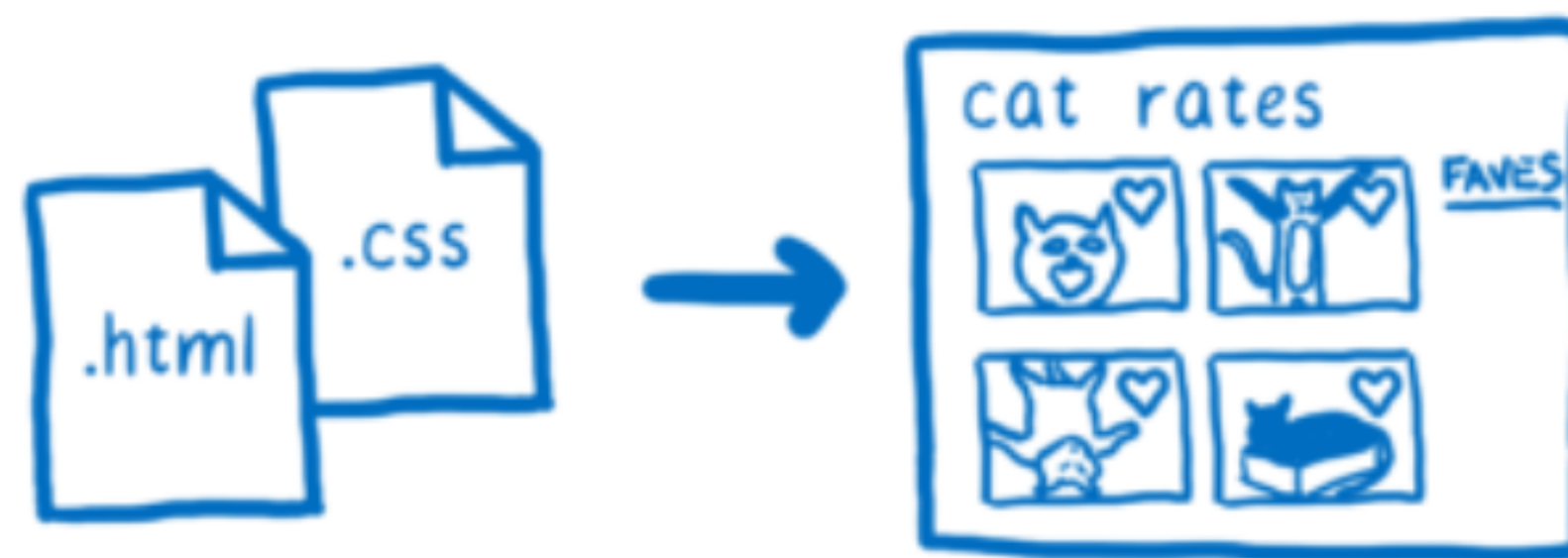
What's Servo?

What's Servo?

Servo is
a **web rendering engine**
written in **Rust**,
with **WebGL** and **WebGPU** support,
and adaptable to **desktop**, **mobile**,
and **embedded** applications.



Web Rendering Engine



Rendering Engine Main Phases

- Parsing: DOM Tree
- Style
- Layout: Layout Tree
- Painting
- Compositing



Rust Programming Language



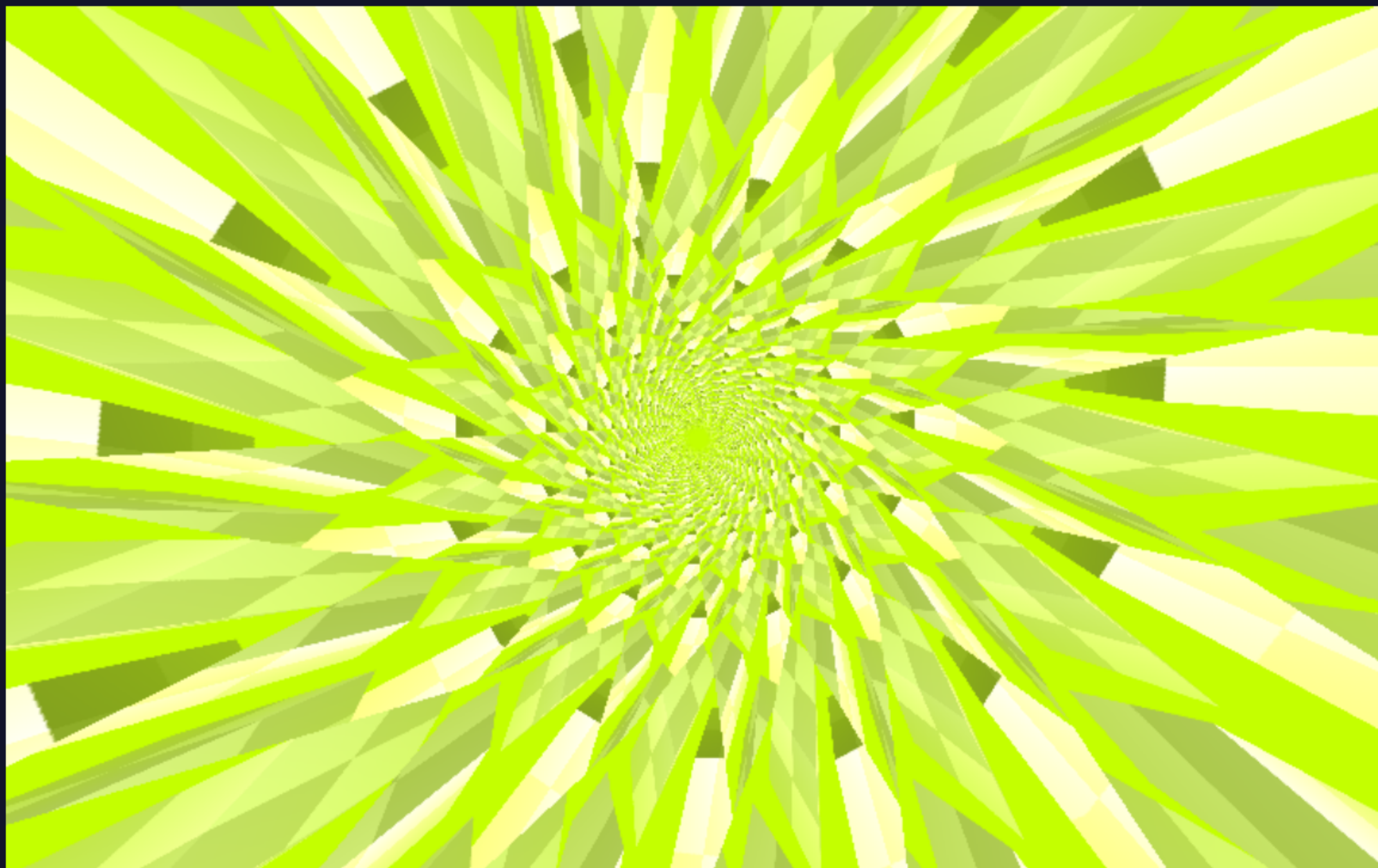
- **Memory safety**: Fewer vulnerabilities
- **Concurrency**: Faster & more energy-efficient

WebGL

WebGL is a JavaScript API for rendering interactive 2D and 3D graphics.



WebGL

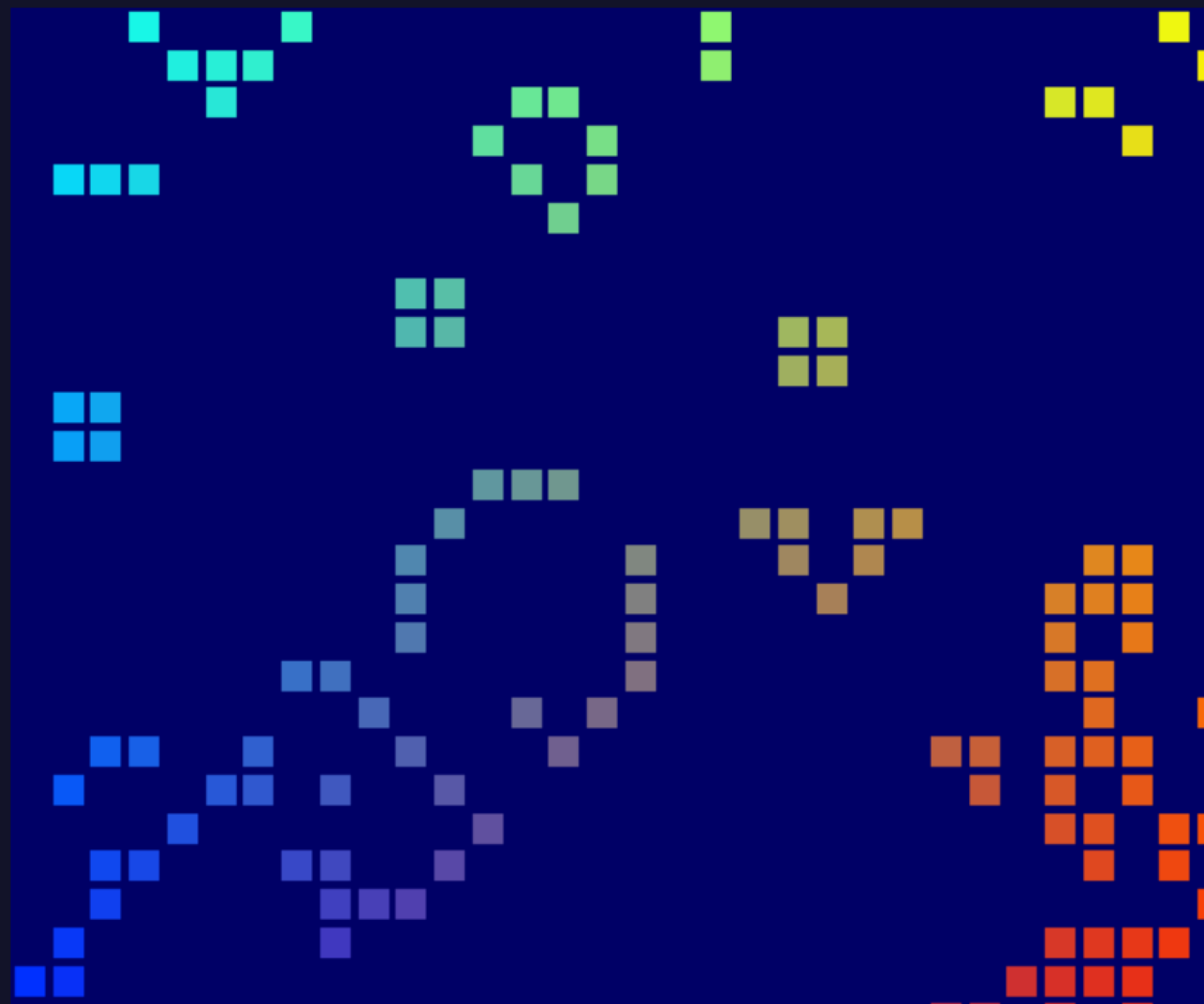


WebGPU

WebGPU is the successor to WebGL providing modern 3D graphics and computation capabilities.

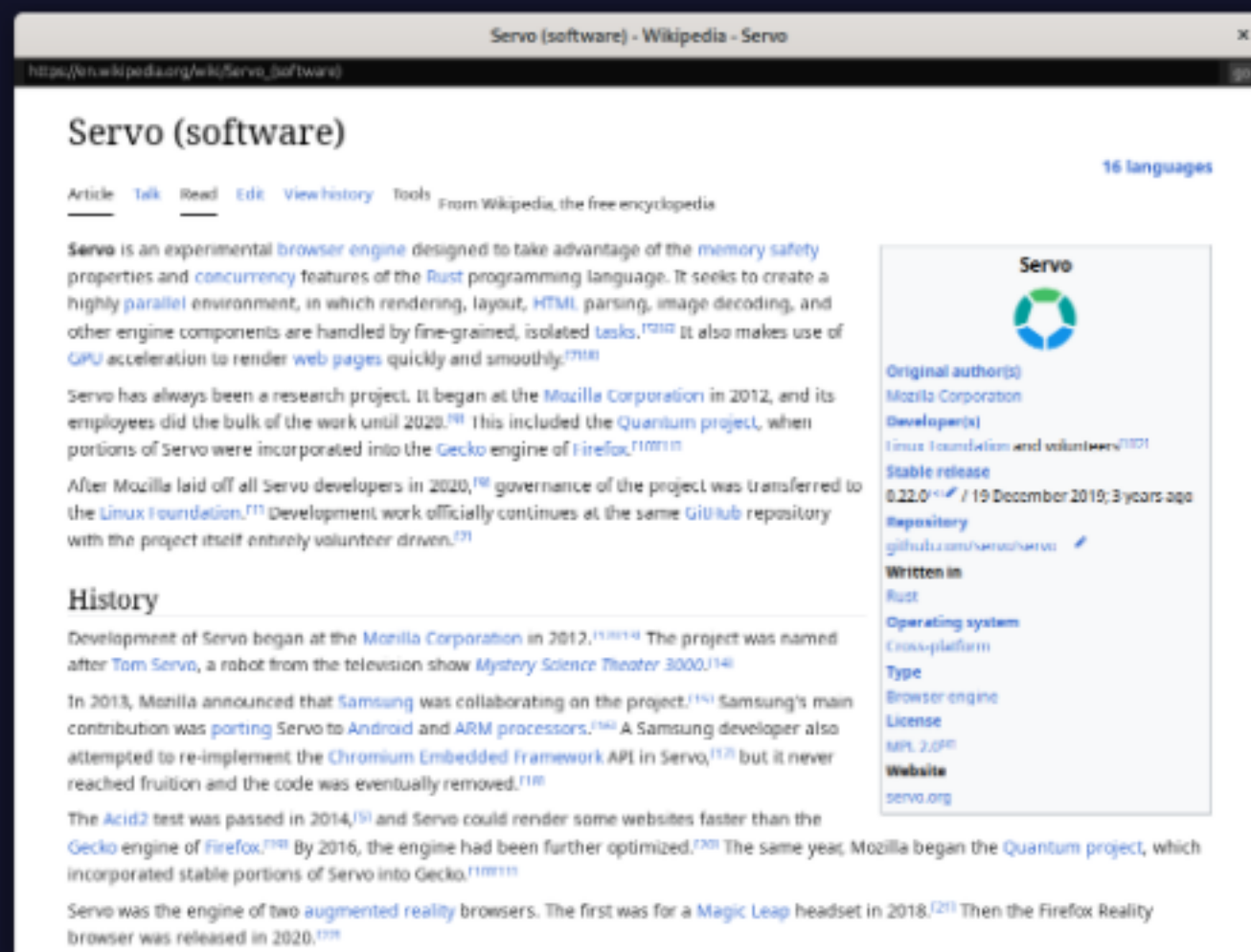


WebGPU

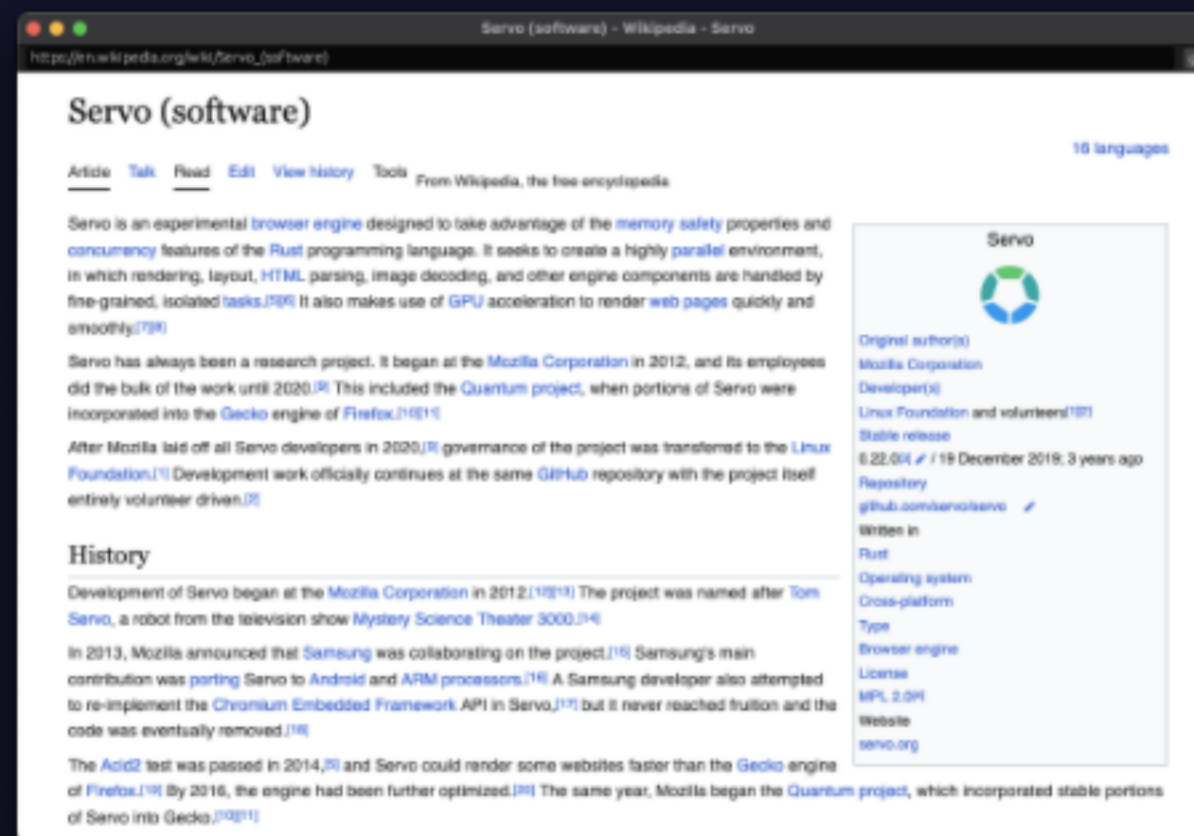


Desktop

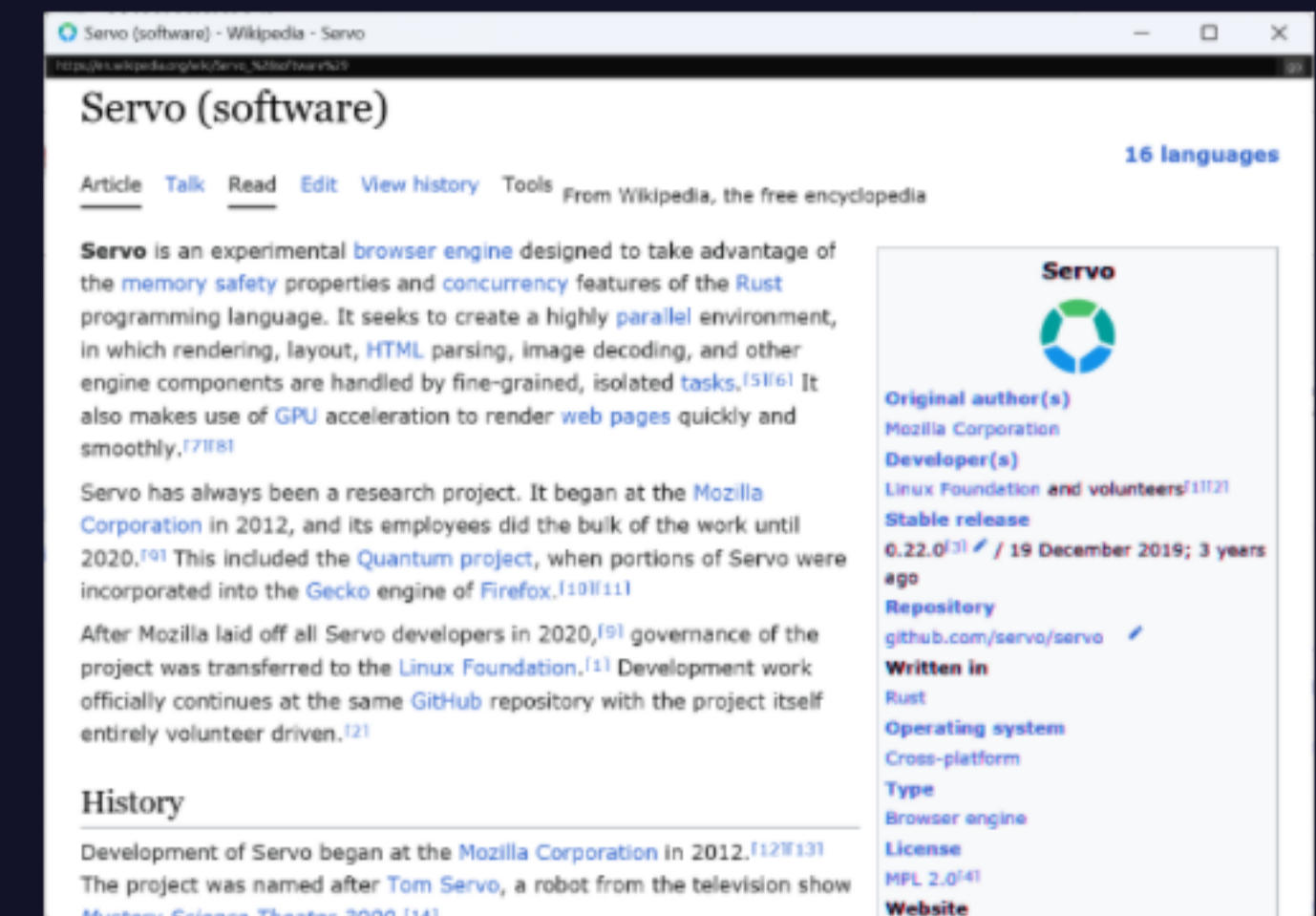
Linux



MacOS

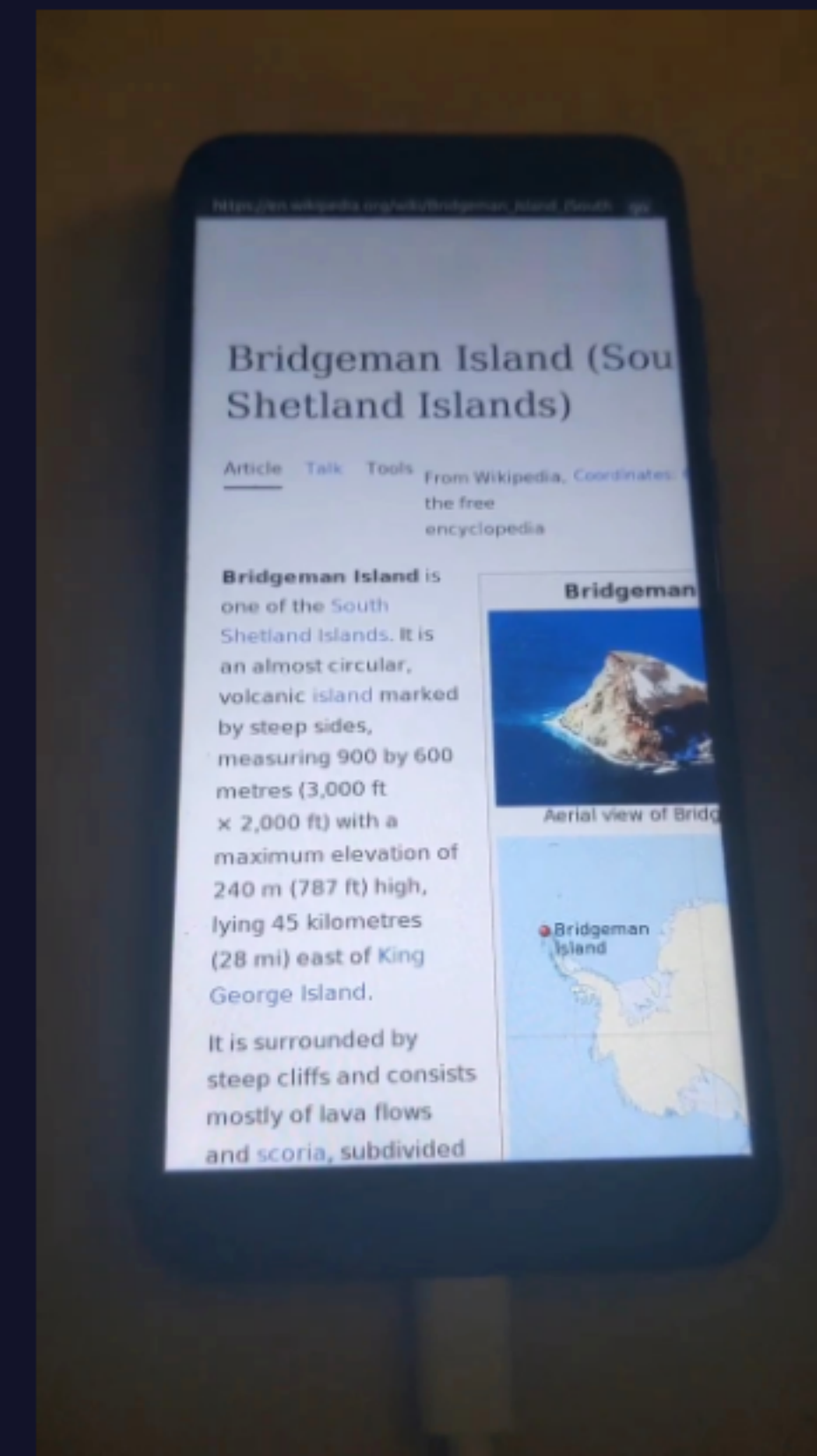
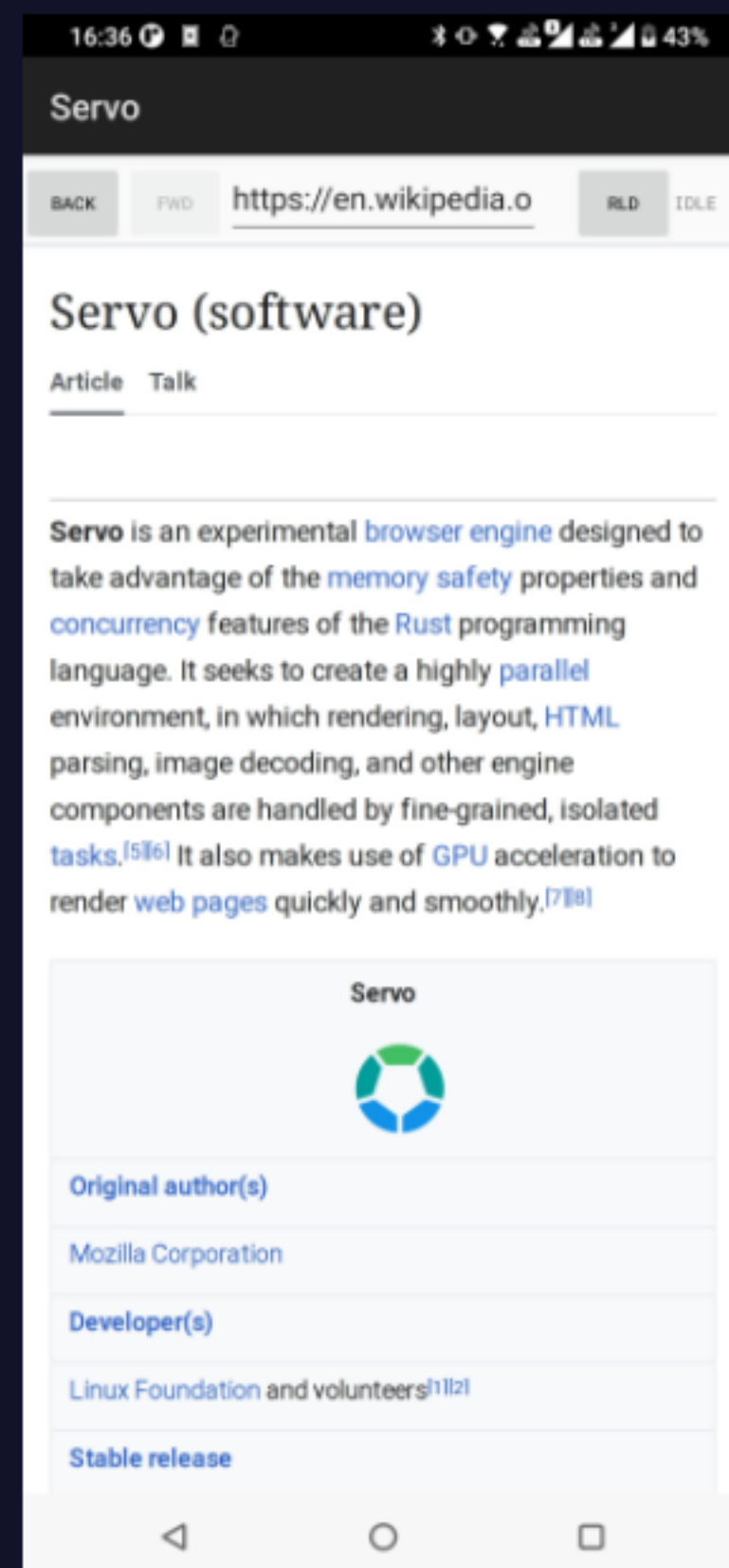


Windows



Mobile

Android & Linux (PinePhone Pro)



Embedded applications

UI frameworks



Other applications



What's not Servo right now?

- A production ready rendering engine.
Servo is **experimental**
- An engine to browse the general web.
Servo can render a **controlled environment**



Features

- **Embeddable**
- **Independent**
- **Memory-safe**
- **Modular**
- **Parallel**

Embeddable

- Applications can use Servo to render **web content**
- Servo is working on providing a good **API for embedders** (a webview library)
- Servo works on **embedded devices** (e.g. Raspberry Pi)



Independent

- 2012-2020: Mozilla Research
- 2020-2023: Linux Foundation
- 2023-: **Linux Foundation Europe**



Memory-safe

- **Rust** programming language
- Borrow checker and ownership system
- Built-in safe concurrent data structures
- **Eliminate vulnerabilities** related to **memory** (e.g. *use-after-free*) and **concurrency** (e.g. data races)



Modular



- Several Servo modules have become popular in the **Rust ecosystem**
- **Firefox** uses some modules (e.g. html5ever, rust-cssparser, Stylo, WebRender)



Parallel

- Devices have **multiple cores** in both CPU and GPU
- Servo uses parallelism to provide **faster and more energy-efficient** rendering
- **Rust** programming language makes easier to implement concurrency



Status

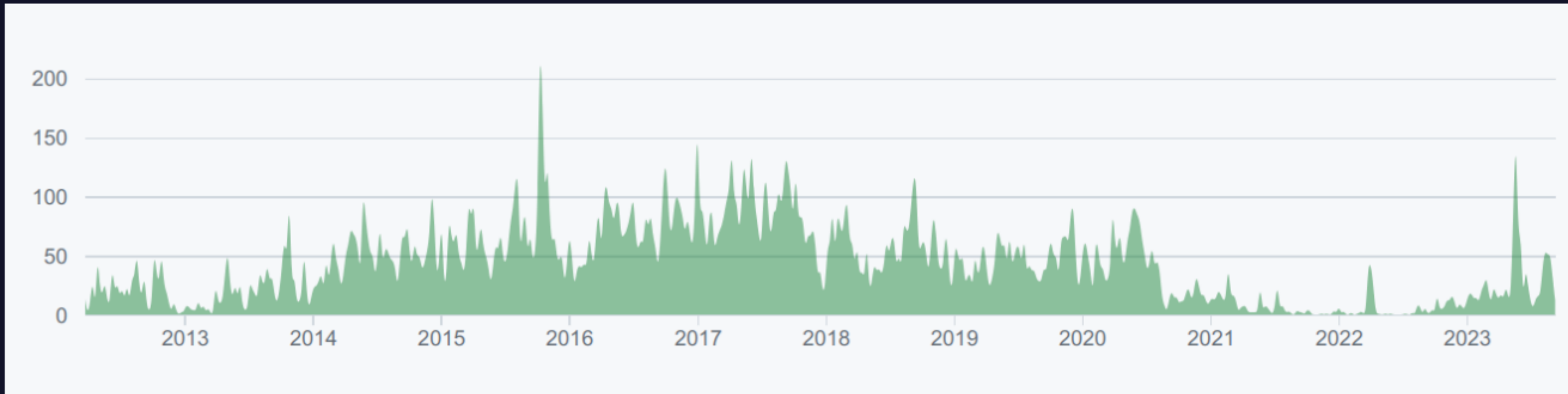


2023 Roadmap

Q1	Q2	Q3	Q4
Project reactivation			
Project outreach			
Main dependencies upgrade			
Layout engine selection			
		Progress towards basic CSS2 support	
		Explore Android support	
			Embeddable web engine experiments



Project reactivation



- 1682 commits (523 in 2022)
- 77 committers (22 in 2022)
- Monthly TSC meetings

Project outreach

- **Blog posts** with updates around the project:
<https://servo.org/blog/>
- **Events:** RustNL, Web Engines Hackfest, Embedded Open Source Summit, W3C TPAC, Linux Foundation Europe Member Summit, Open Source Summit Europe, GOSIM



Main dependencies upgrade

- **WebRender** has been upgraded to mid 2021
- **Stylo** upgrade is at ~50% (landing in batches)
- **SpiderMonkey** hasn't been upgraded yet

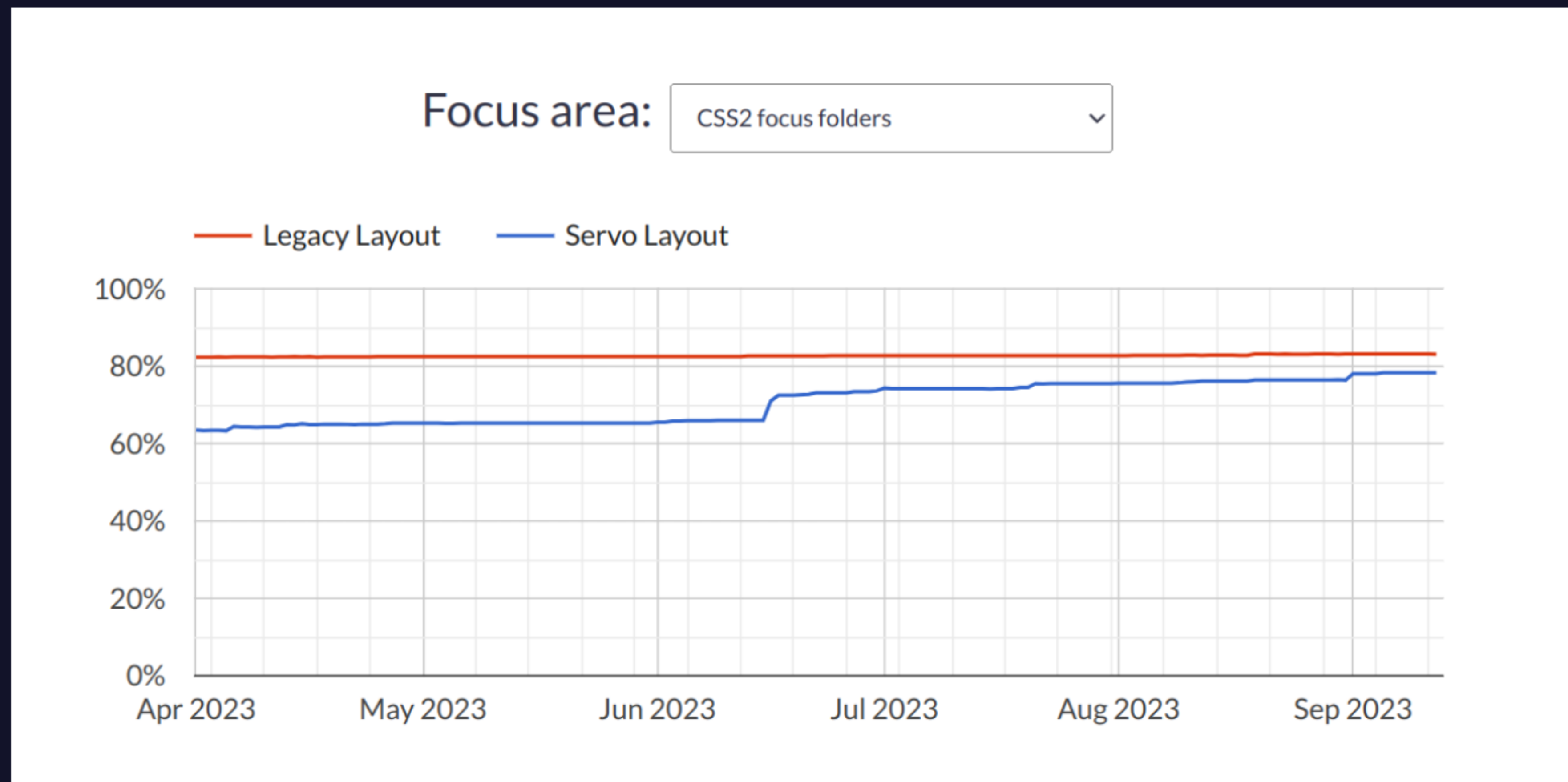


Layout engine selection

- Servo has **two layout engines**, the original one (called legacy) and the new one (started in 2020)
- **Servo Layout Engines Report**
- Proposal to move forward with the **new layout engine**

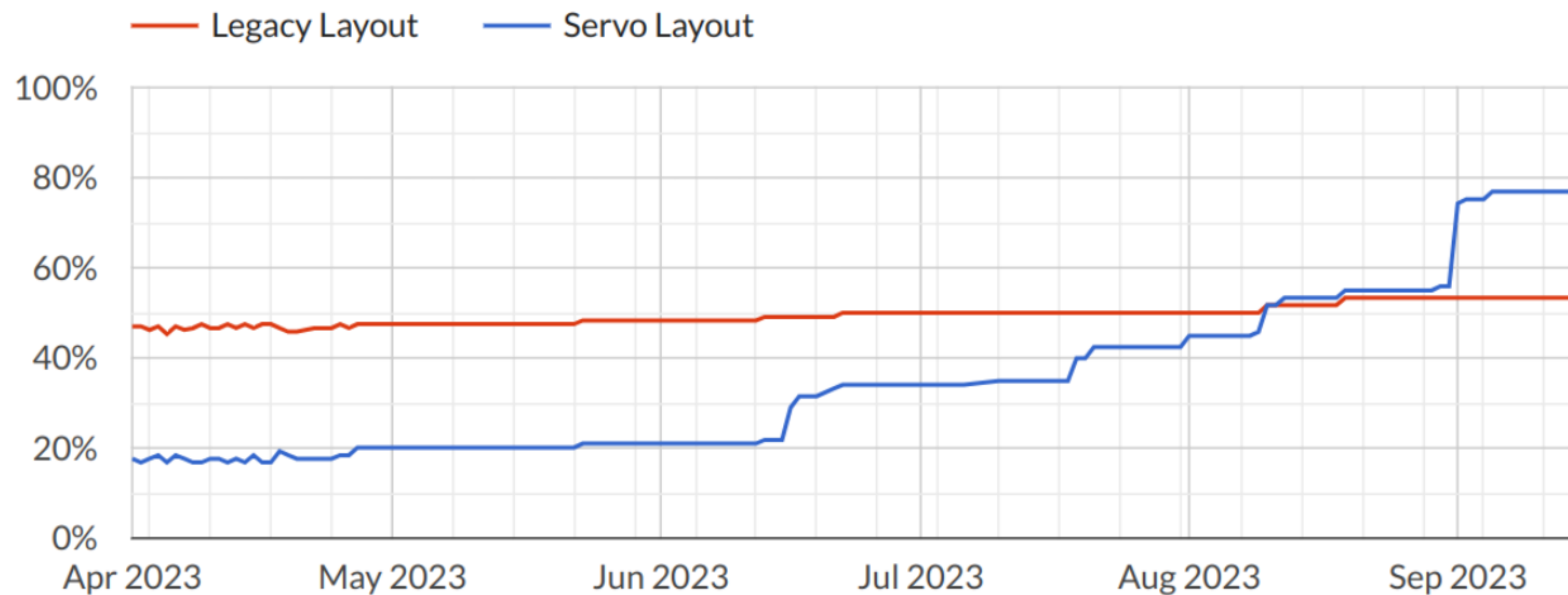


Progress towards basic CSS2 support

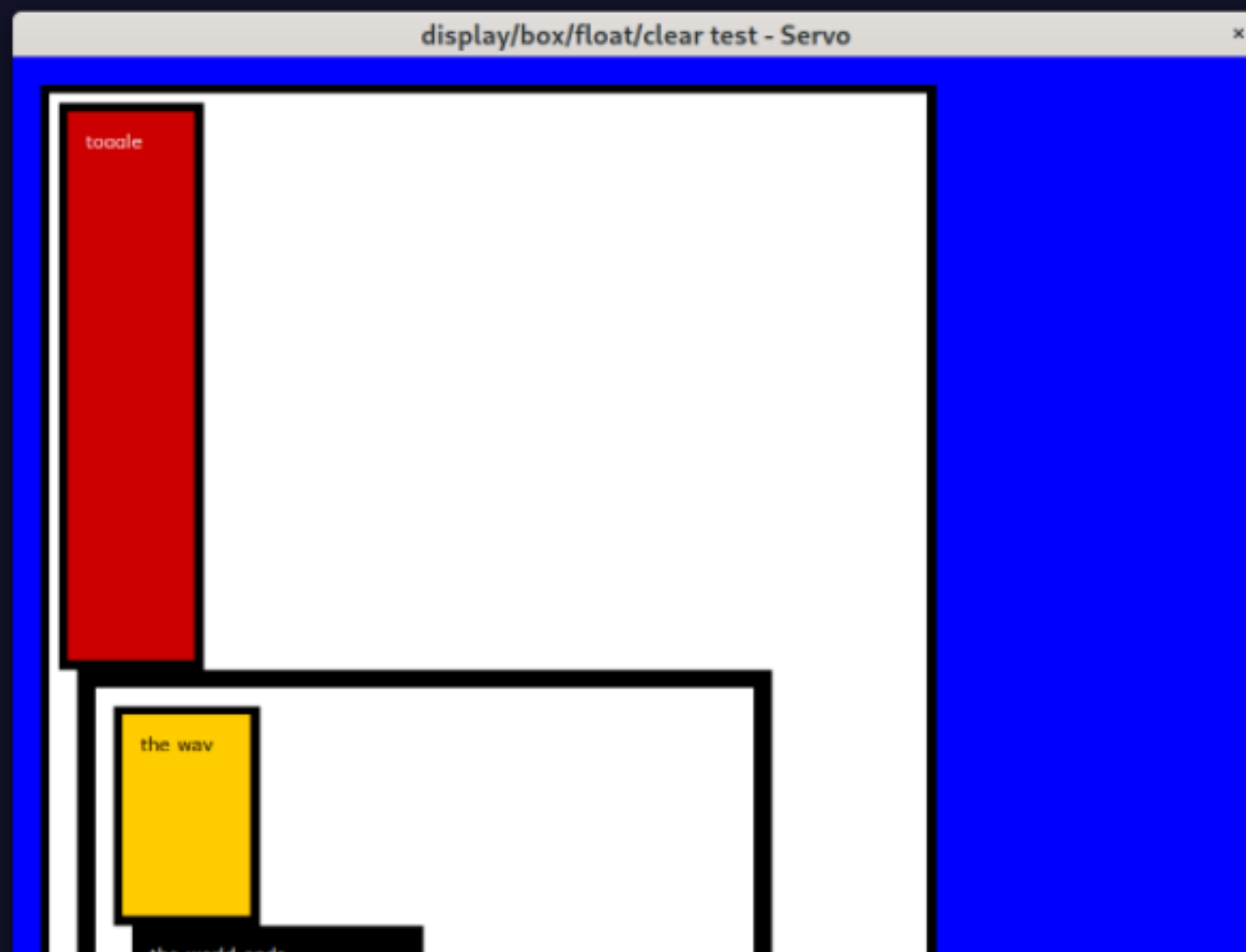


CSS floats

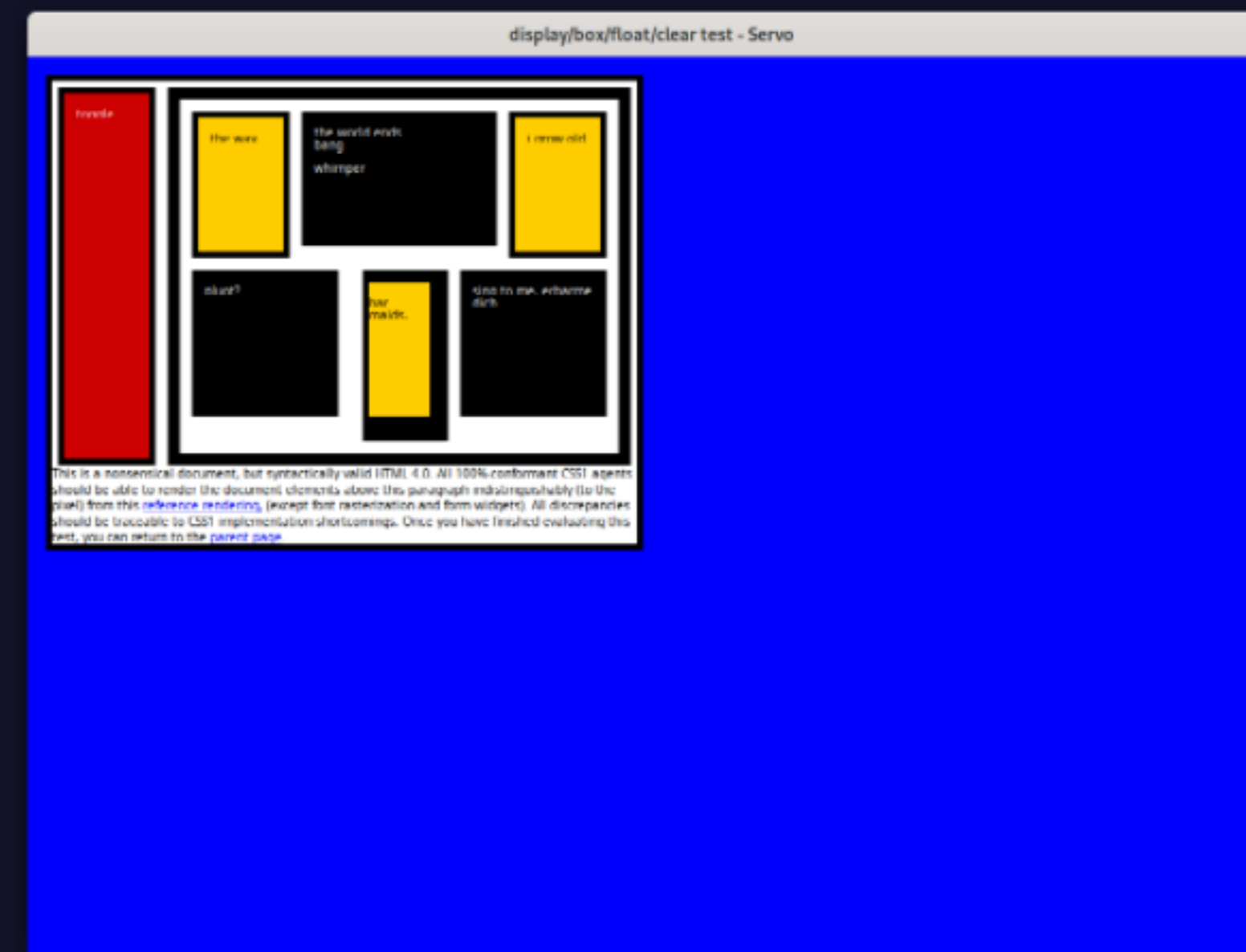
Focus area:



Acid1 test



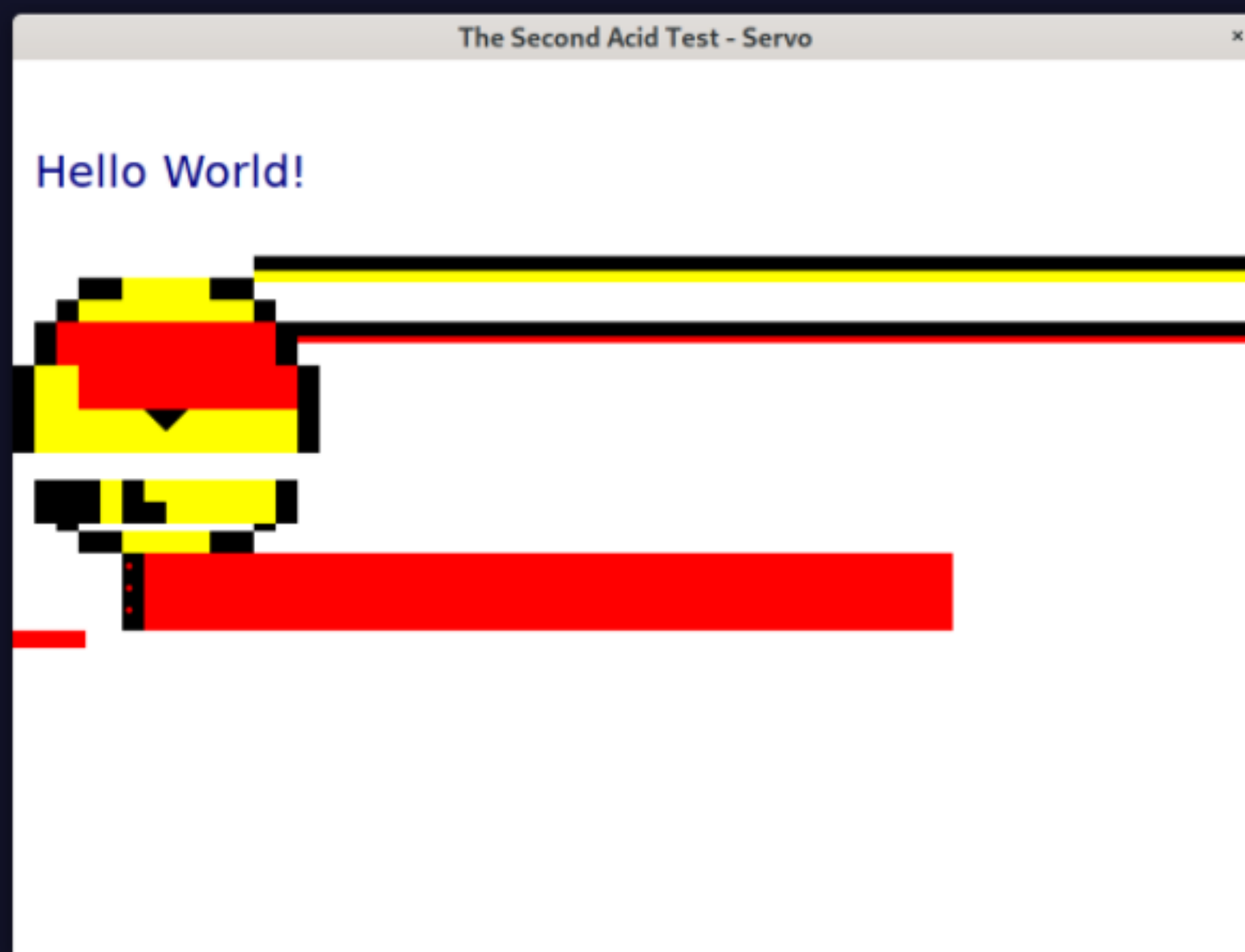
January 2023



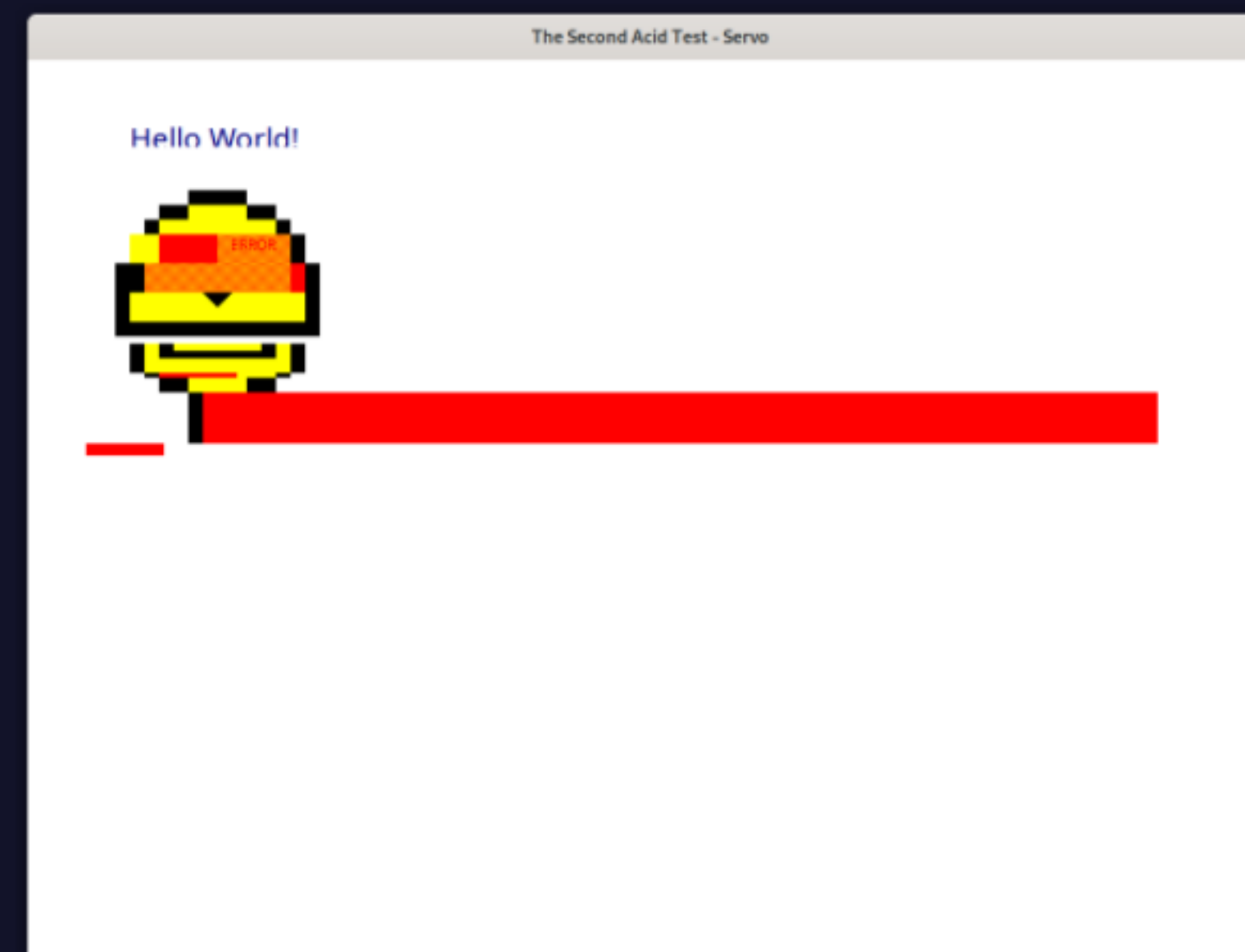
September 2023



Acid2 test



January 2023

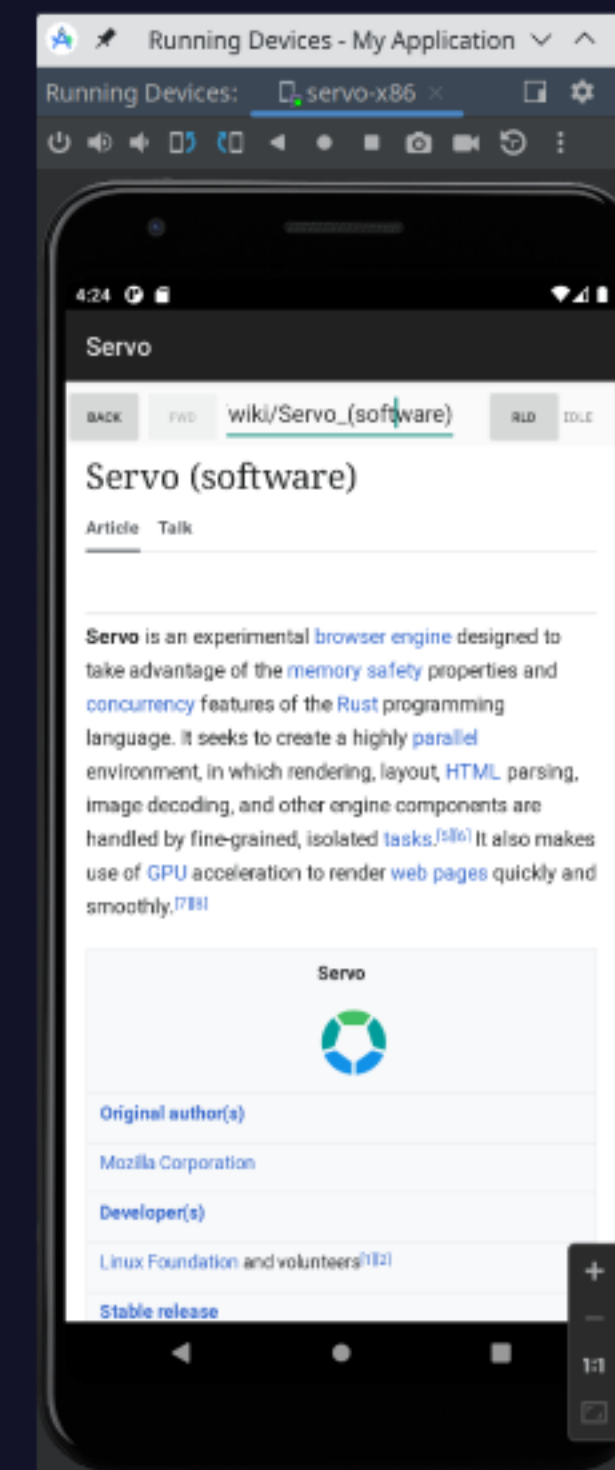
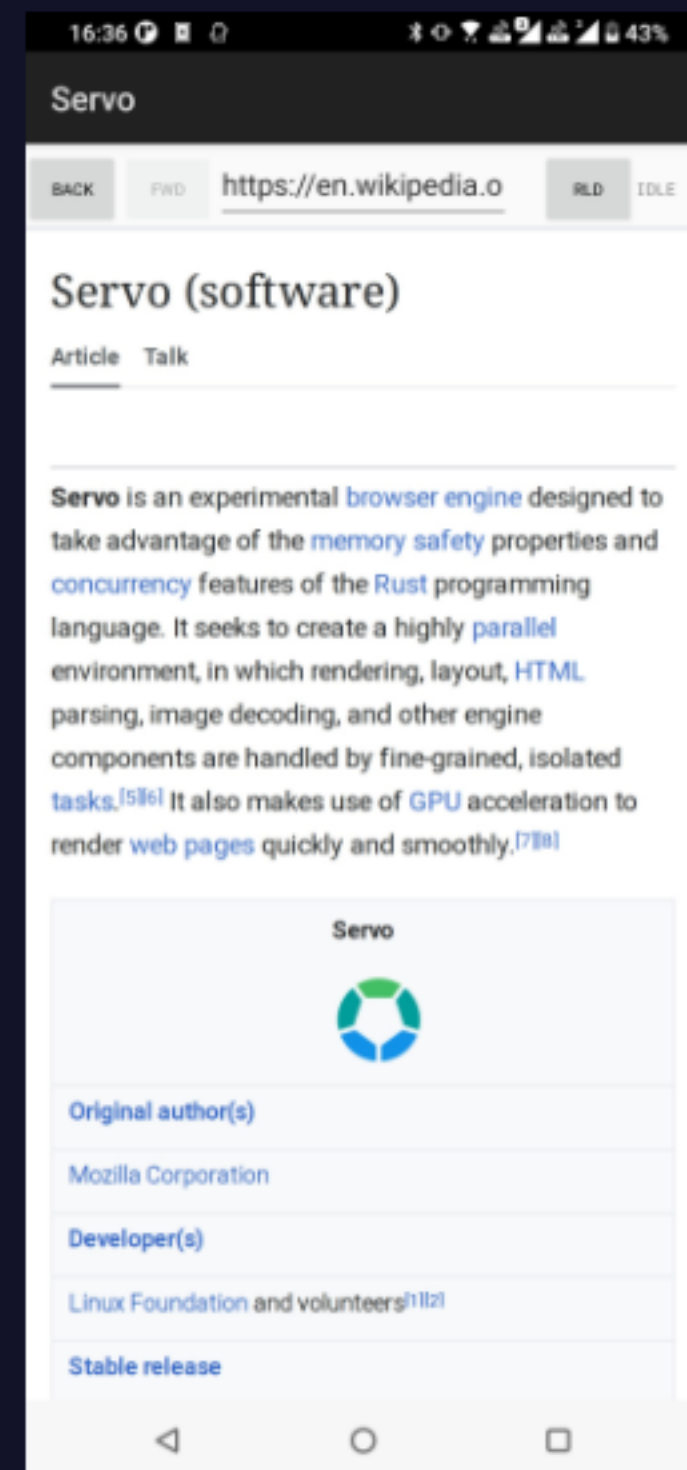


September 2023



Explore Android support

- Experimental **prototype** running in Android



Embeddable web engine experiments

- Servo running on **Raspberry Pi** and **PinePhone Pro**
- Discussions about the **embedding API** design
- More work on the API to come soon



Other

- **Make easier to contribute to Servo** by simplifying the build, reducing build and CI times, etc.
- Servo **minibrowser** to test it easily (URL bar)
- Bring **WebGPU** support back to life
- **Servo experiments:** <https://demo.servo.org/>
- ...

Plans



Embedding API

- Very important task to **start getting applications using Servo**
- **Design** has been agreed in the TSC calls
- Plan to start working on this in **Q4**
- Goal: create some prototype applications using the new API



More CSS improvements

- Carry on with floats, inline layout, ...
- More to come: line-height, vertical-align, tables, writing modes, ...
- Identify main **areas of work** to focus **layout efforts in 2024**



Complete Android support

- So far we have a **first experimental prototype**
- Look into having **proper Android support**
- Applications could also **use Servo in Android**



And more

- Carry on **maintenance and project outreach**
- **Lots of things to work on**
- Plans to experiment with Servo in **more platforms and boards**
- ...

Conclusion

Servo is looking great

- **Renewed project activity** has been successful
- **Great progress** during 2023 in many areas
- **New layout engine** is paving the path for more features support and better interoperability
- **Servo is still an experimental** and big project with lots of work everywhere



Use cases

- **Embedded applications** with web technologies
- Applications that use **WebGL, WebGPU or CSS-based ones**
- Basis for Rust-based **native UI frameworks**



Join the project

- GitHub: <https://github.com/servo>
- Chat: servo.zulipchat.com
- Email: join@servo.org

Looking into **growing the community around the project.**

<https://servo.org>

<https://floss.social/@servo>

<https://twitter.com/ServoDev>



servo

