

Blitz

A lightweight, modular, extensible web renderer



Dioxus Labs

What is Dioxus

- “React” but in Rust
- Renders to
 - Web (WASM)
 - Webview (IPC)
- Until now there has been no “native” rendering

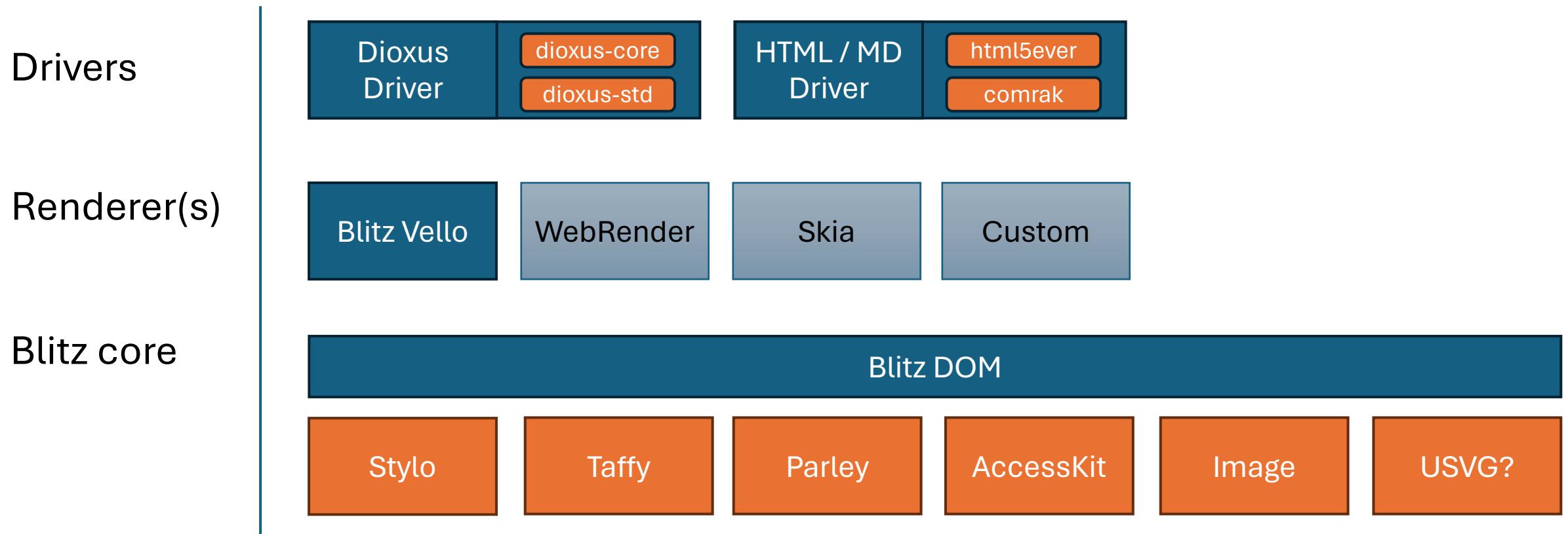
```
pub fn App() -> Element {  
    // count will be initialized to 0 the first time the component is rendered  
    let mut count = use_signal(|| 0);  
  
    rsx! {  
        h1 { "High-Five counter: {count}" }  
        button { onclick: move |_| count += 1, "Up high!" }  
        button { onclick: move |_| count -= 1, "Down low!" }  
    }  
}
```

```
rsx! {  
    div {  
        padding: "0.5rem",  
        position: "relative",  
        onmouseenter: move |_| {},  
        div { font_size: "1.5rem",  
            a { href: url, onfocus: move |_event| {}, "{title}" }  
            a {  
                color: "gray",  
                href: "https://news.ycombinator.com/from?site={hostname}",  
                text_decoration: "none",  
                " ({hostname})"  
            }  
        }  
        div { display: "flex", flex_direction: "row", color: "gray",  
            div { "{score}" }  
            div { padding_left: "0.5rem", "by {by}" }  
            div { padding_left: "0.5rem", "{time}" }  
            div { padding_left: "0.5rem", "{comments}" }  
        }  
    }  
}
```

What is Blitz

- An HTML/CSS renderer
 - Think: webview without JavaScript
- Similar: Electron, Tauri, Sciter, Ultralight, Litehtml
- Built on Servo and Rust UI ecosystem components
 - stylo, html5ever, taffy, parley, accesskit, vello, wgpu
- Targeting Application UI (+ Embedding) use cases
- Lightweight (~12mb binary size)
- Modular

Architecture



Ecosystem-first Modularity

- Using existing solutions from the ecosystem
- Contributing back to those solutions
- Making first-party code usable standalone
- Ecosystem compatible licensing (MIT/Apache2.0)
- Build only what you need:
 - Video support, Image formats (incl. SVG), Layout algorithms, CSS property support
- Extend with own implementations
- Bring your own renderer

Binary size

(stripped release build on macos)

Servo (98 MB)

File	.text	Size	Crate
8.3%	20.3%	10.2MiB	script
6.6%	16.2%	8.1MiB	mozjs_sys
3.0%	7.3%	3.6MiB	std
2.5%	6.0%	3.0MiB	webrender
2.2%	5.3%	2.6MiB	style
1.7%	4.2%	2.1MiB	[Unknown]
1.0%	2.4%	1.2MiB	net
0.8%	2.0%	1.0MiB	webgpu
0.8%	2.0%	1019.1KiB	naga
0.8%	1.9%	980.1KiB	webdriver_server
0.6%	1.5%	792.0KiB	servoshell
0.6%	1.5%	781.0KiB	layout_thread_2013
0.6%	1.5%	758.7KiB	canvas
0.6%	1.5%	755.8KiB	mozangle
0.6%	1.4%	709.1KiB	layout_thread_2020
0.5%	1.3%	655.8KiB	layout_2013
0.5%	1.3%	648.3KiB	servo
0.5%	1.2%	593.5KiB	image
0.5%	1.1%	569.0KiB	layout_2020
0.4%	1.1%	539.1KiB	wgpu_core
0.3%	0.8%	388.7KiB	servo_config
0.3%	0.7%	369.4KiB	devtools

Blitz (12 MB)

File	.text	Size	Crate
12.0%	24.5%	1.9MiB	style
5.7%	11.7%	917.4KiB	std
4.5%	9.2%	718.1KiB	wgpu
4.3%	8.8%	686.7KiB	blitz_dom
3.9%	7.9%	622.0KiB	naga
1.7%	3.6%	278.3KiB	rustls
1.2%	2.5%	195.6KiB	wgpu_core
1.0%	2.0%	160.5KiB	vello
0.9%	1.8%	144.4KiB	ureq
0.9%	1.8%	140.8KiB	dioxus_blitz
0.9%	1.8%	138.6KiB	tao
0.8%	1.6%	123.4KiB	ring
0.7%	1.4%	110.3KiB	image
0.6%	1.3%	101.9KiB	tokio
0.6%	1.2%	97.3KiB	taffy
0.5%	1.1%	86.4KiB	wgpu_hal
0.5%	1.1%	83.7KiB	exr
0.5%	1.0%	78.0KiB	image_webp
0.5%	1.0%	77.1KiB	html5ever
0.5%	0.9%	73.5KiB	vello_encoding
0.4%	0.8%	61.7KiB	cssparser
0.4%	0.8%	60.9KiB	jpeg_decoder

Electron: ~130mb Ultralight: ~22mb Sciter: ~34mb

CSS Support (Stylo)

- Huge feature set:
 - Parsing, selector resolution, inheritance, media queries
- Very fast + reliable (but heavy)
- Neat trait-based API

BUT:

- Poor documentation
- Features not in servo disabled

Rendering (Vello + WGPU)

- Built on WGPU
- Innovative: compute shaders
- High performance (120fps)
- Immature (crashes, features)

Renderers are pluggable

-> Webrender, Skia, BYO (e.g. Bevy)



Text Support (Parley)

- Pure rust stack
 - Skrifa, Fontique, Swash (RustyBuzz?), Parley
- System font enumeration
- Shaping, bidi aware layout
- Selection/Editing (Soon!)
- Inline-block

Not yet integrated into Blitz.
(inline-block, tree lowering)

Lots to add: wrapping modes, padding/border/margin support, floats.

Some text here. Let's make it
a bit long [REDACTED] so that
[REDACTED] line wrapping kicks in
😊. And also some arabic text.

AListApart.com (Blitz vs Servo)

This screenshot shows a portion of the AListApart.com website using the Blitz rendering engine. The page includes a sidebar with navigation links like Home, Articles, Events, Topics, Write for Us, and Language (English). The main content area features two articles: "User Research Is Storytelling" by Gerry Duffy and "To Ignite a Personalization Practice, Run this Prepersonalization Workshop" by Colin Eagan and Jeffrey MacIntyre. Both articles have a "New" badge and a publication date. Below the articles is a "More from A List Apart" section with links to other articles and a sidebar for "A Book Apart".

This screenshot shows the same portion of the AListApart.com website using the Servo rendering engine. The layout is identical to the Blitz version, featuring the same sidebar, articles, and sidebar for "A Book Apart". The "User Research Is Storytelling" article has a "NEW!" badge and a publication date of May 30, 2024. The "To Ignite a Personalization Practice, Run this Prepersonalization Workshop" article also has a "NEW!" badge and a publication date of April 16, 2024.

Layout (Taffy)

- Flexbox + CSS Grid (+ Block)
- Trait based API
- Coded “to the spec”
- 1000+ tests (but no WPT)

The sky is the limit:

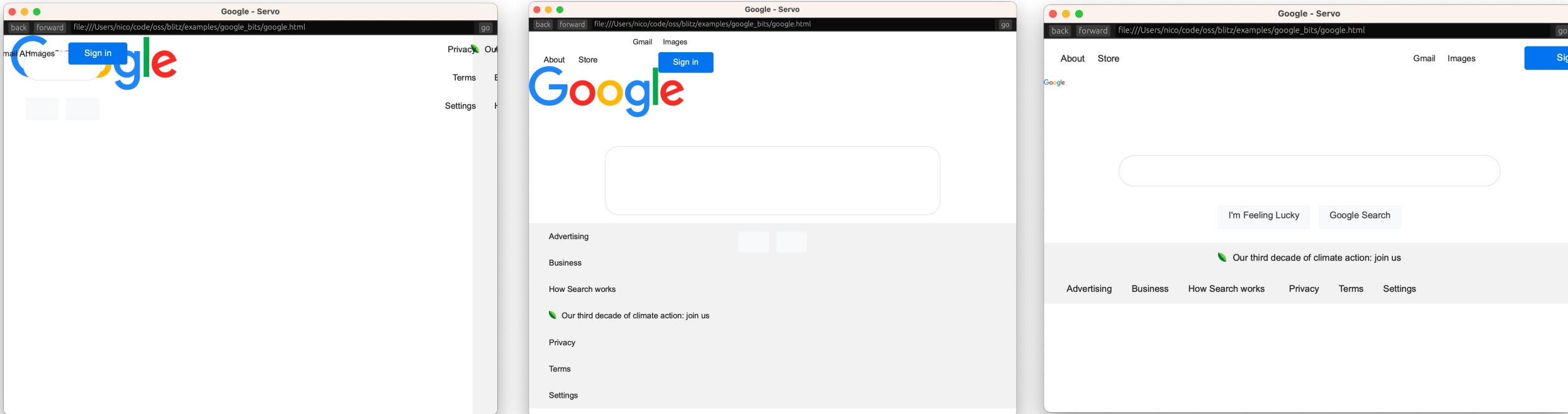
- Tables, Subgrid, Masonry, “Stretch”
- Parallel layout

WPT:

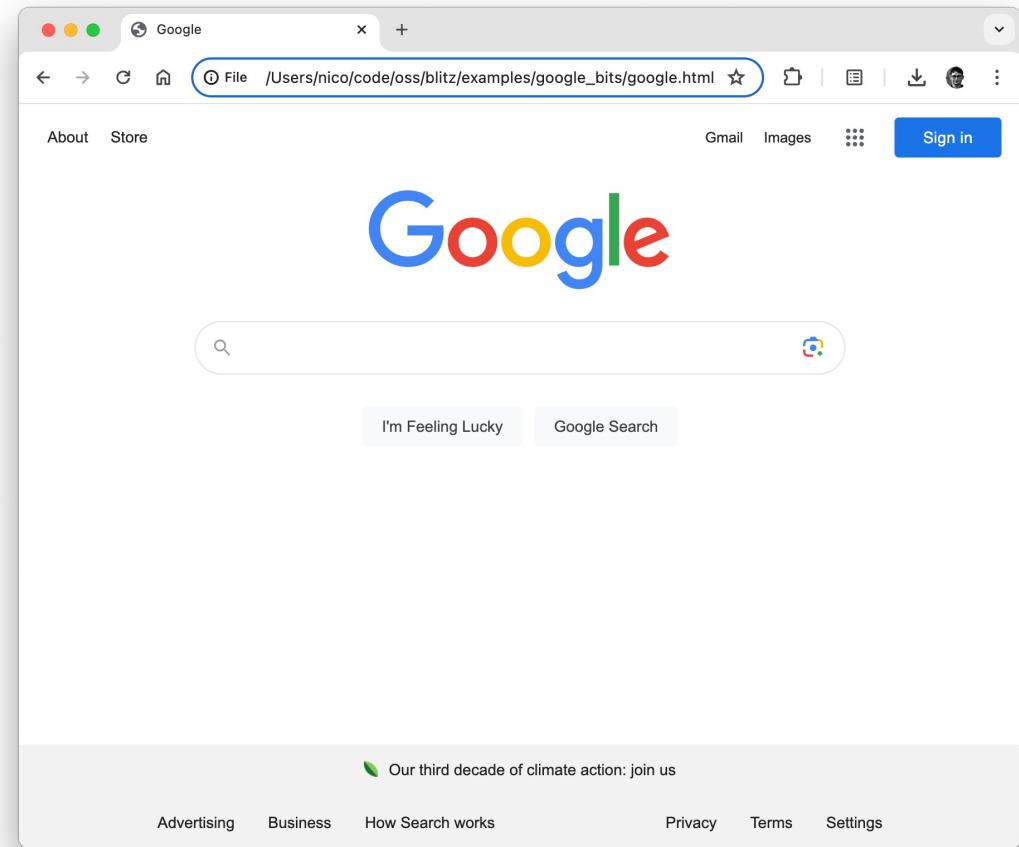
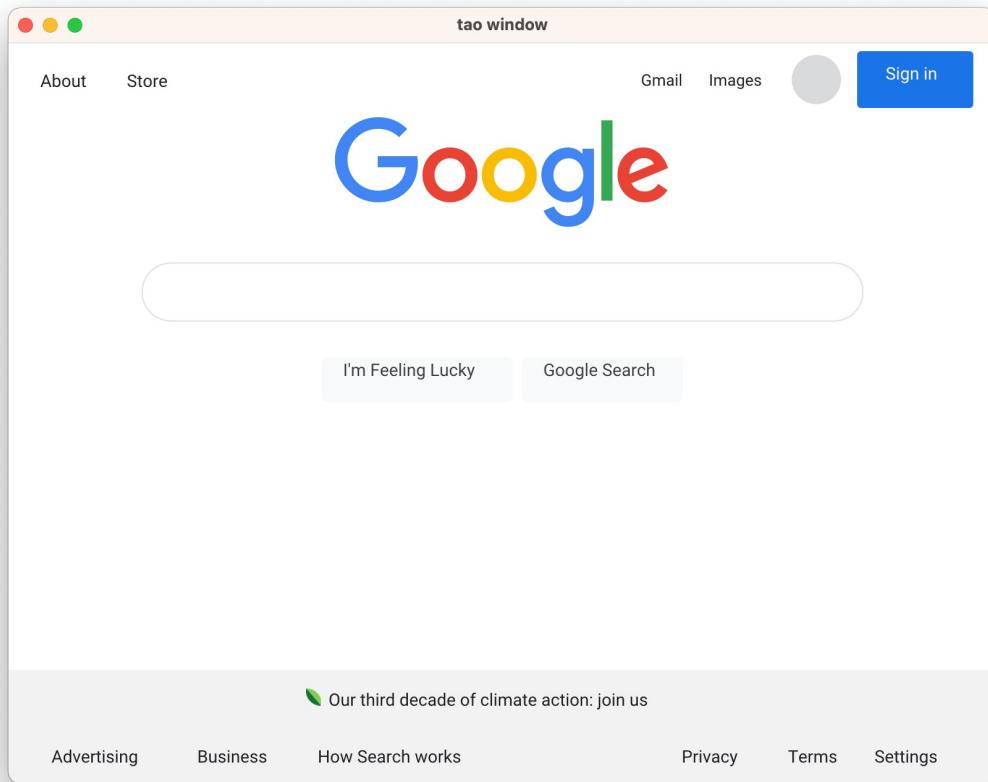
- Cannot run WPT due to lack of scripting support
- Want to introduce new “layout ref” test type (+ make layout tests script-free)

```
<div id="test-root" style="flex-direction: row; width: 100px;">
  <div style="flex-basis: 60px; flex-grow: 1; flex-direction: column;">
    <div style="width: 70px; height: 100px;"></div>
  </div>
  <div style="flex-basis: 0px; flex-grow: 1; flex-direction: column;">
    <div style="width: 20px; height: 100px;"></div>
  </div>
</div>
```

Google.com (Servo)



Google.com (Blitz vs Chrome)



**Integration with Servo?
Gecko?**

Let's chat

Roadmap

- Text / Inline layout / text input (parley)
- Font loading (system & web)
- Event handling & Interactivity
- SVG support
- calc(), content-box, static position
- Custom widgets
- Performance and Robustness
- Devtools

Get in touch

GitHub:

[DioxusLabs/blitz](#)

Dioxus Discord:

[https://discord.gg/U4TYsKdN](#)

Servo Zulip:

[https://servo.zulipchat.com](#)

Linebender Zulip:

[https://xi.zulipchat.com](#)

Social media:

@nicoburns (Github, Reddit, Twitter)

Email:

hackfest@nicoburns.com

Blitz



Dioxus Labs