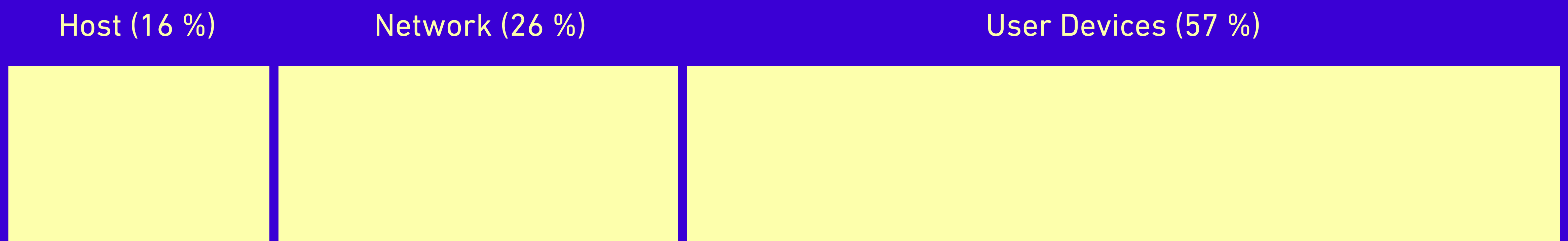
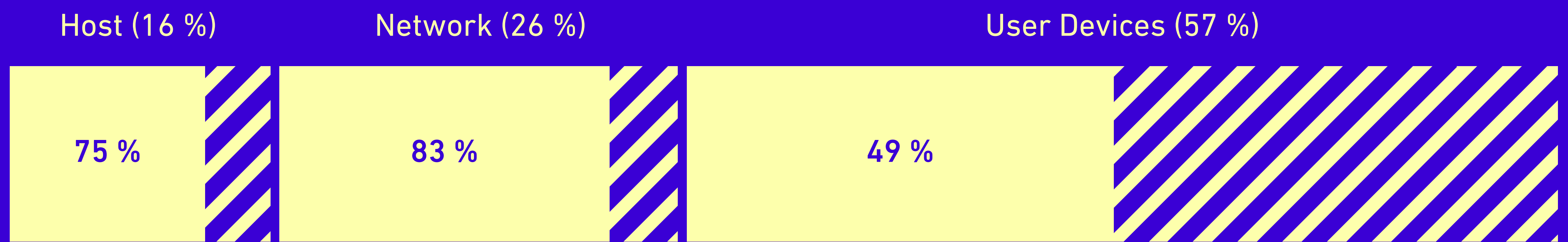


Fighting Hardware Obsolescence With Greener Frontend Code

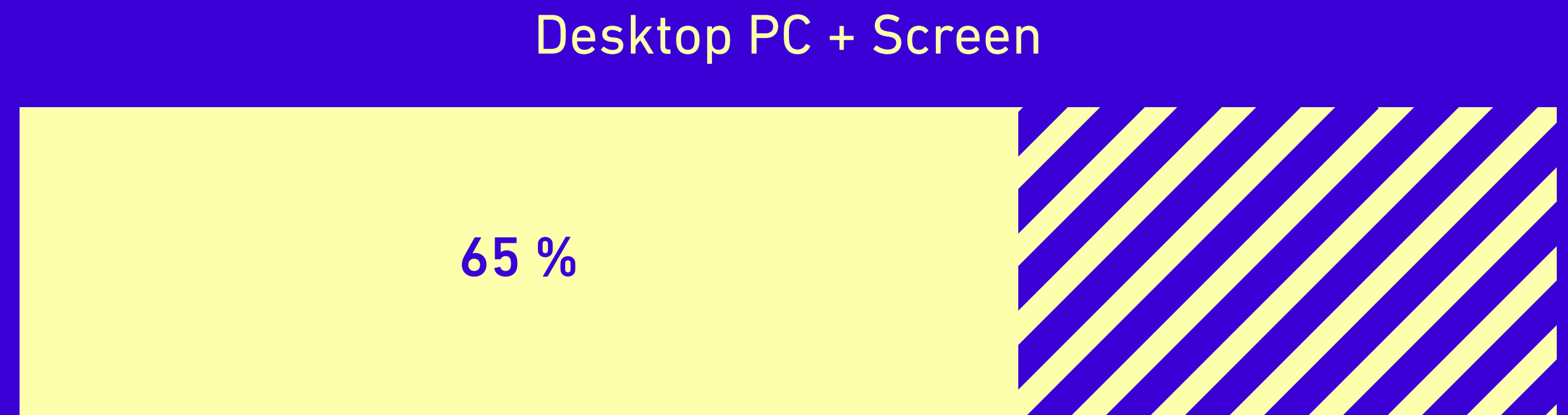
Dr. Björn Ganslandt

**Every Sustainability Talk
Starts With Statistics**





■ Use Stage
▨ Embodied



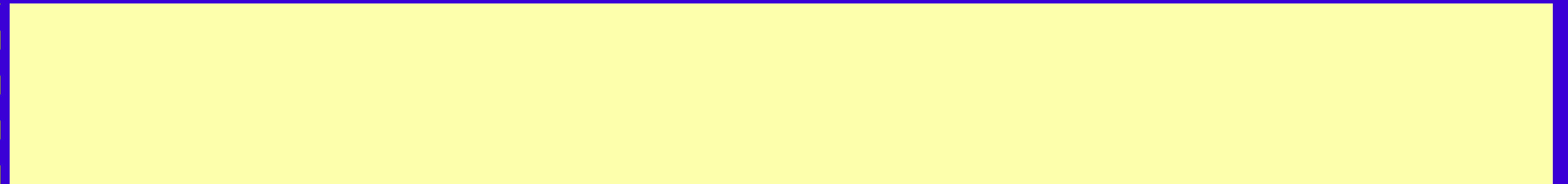




**Every Discussion About
Device/Browser Support
Starts With Statistics**

Older Devices

Modern Devices



Humanize Users on Older Devices With Support Tickets

**Make Testing and Development
Dirt Cheap**

**Don't Test Every Feature,
But Test Regularly**

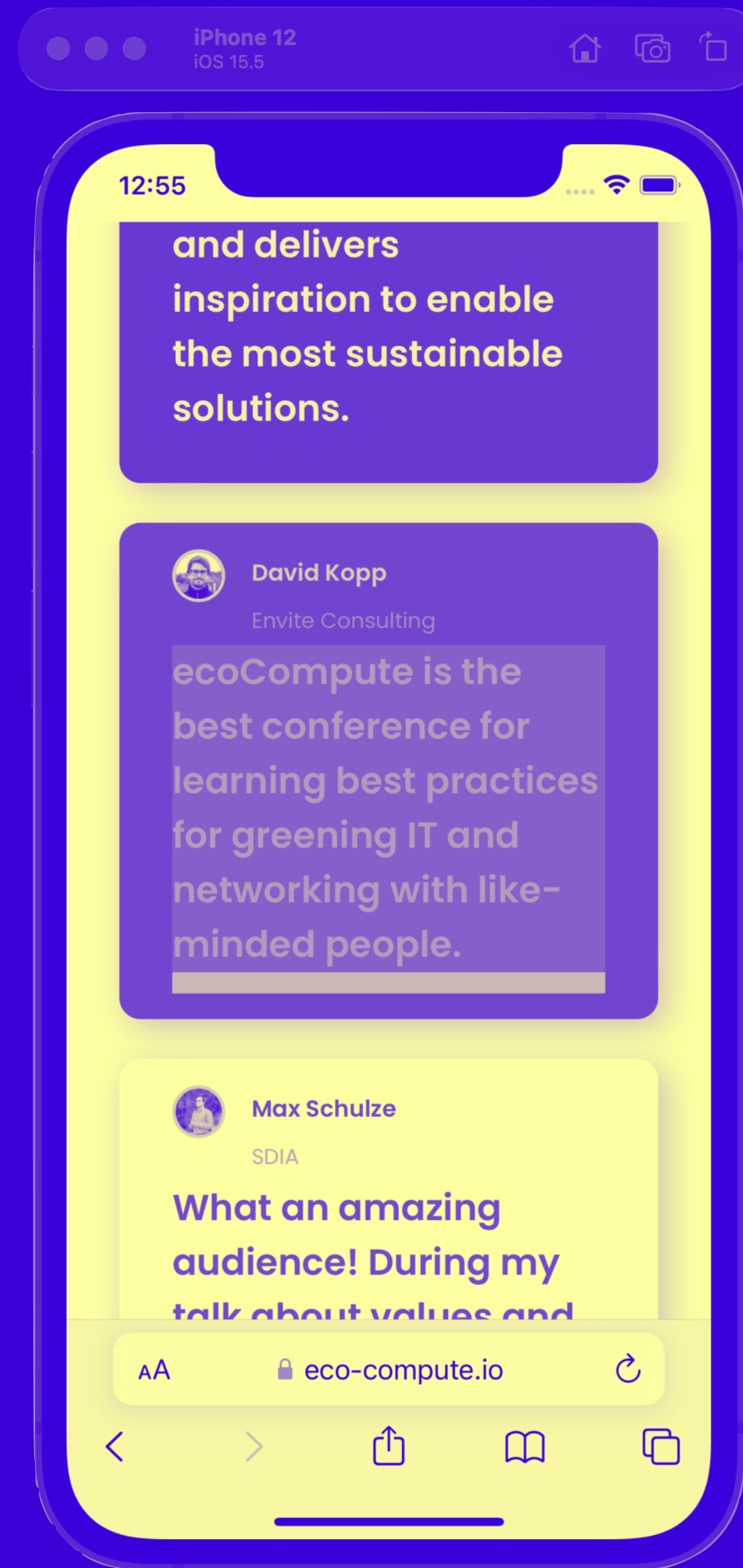
**Make It Work,
Don't Make It Perfect**

How To Test Old Hardware

Emulation

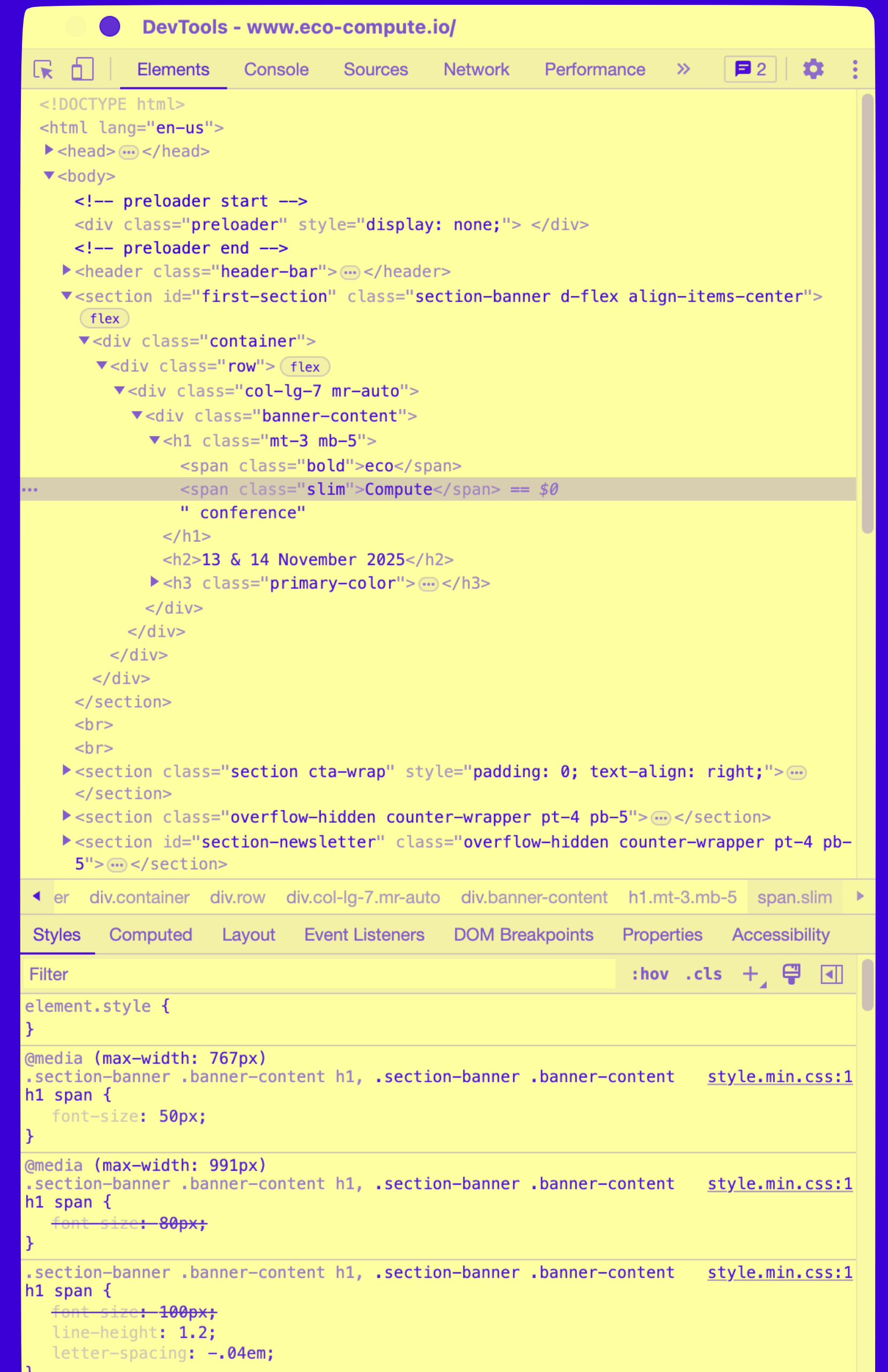
**iOS Simulator Comes Free
With Macs
(Which Are Decisively Not Free)**

Safari



**Android Simulator Is Free
Everywhere**

Emulator



Browserstack

★ Favourites (11/12)

🕒 Recent Tests New

🍏 iOS

🤖 Android

🪟 Windows

- 11
- 10
- 8.1
- 8
- 7
- XP

🍏 Mac

+

Real Devices (39)

Iphone ▾

No SIM

With SIM

★ iPhone 15	17	☆ iPhone 16 Plus	18	☆ iPhone 13 Pro Max	15
☆ iPhone 14	16	☆ iPhone 16 Pro Max	18	☆ iPhone 14 Pro Max	16
☆ iPhone 13	15	☆ iPhone 12 Pro	18	☆ iPhone 12 Pro Max	16
iPhone 12	14	☆ iPhone 14	18	☆ iPhone 15 Pro	17
☆ iPhone 11	13	☆ iPhone 13 Pro Max	18	☆ iPhone 12 Pro	14
☆ iPhone 16	18	☆ iPhone 13	18	☆ iPhone SE 2022	15
☆ iPhone Air	26	☆ iPhone 15 Pro Max	17	☆ iPhone SE 2020	16
☆ iPhone 17	26	☆ iPhone 14 Plus	16	Show 5 More Devices	
☆ iPhone 17 Pro	26	☆ iPhone 13 Pro	15		
☆ iPhone 17 Pro Max	26	☆ iPhone 14 Pro	16		
☆ iPhone 14 Pro	26	☆ iPhone 15 Plus	17		
☆ iPhone 15	26	☆ iPhone 13	17		
☆ iPhone 14	26	☆ iPhone 12	17		
☆ iPhone 15 Pro Max	26	☆ iPhone 12 Pro	17		
☆ iPhone 16e	18	★ iPhone 13	16		
☆ iPhone 16 Pro	18	☆ iPhone 13 Mini	15		

🗨️ Talk to an Expert

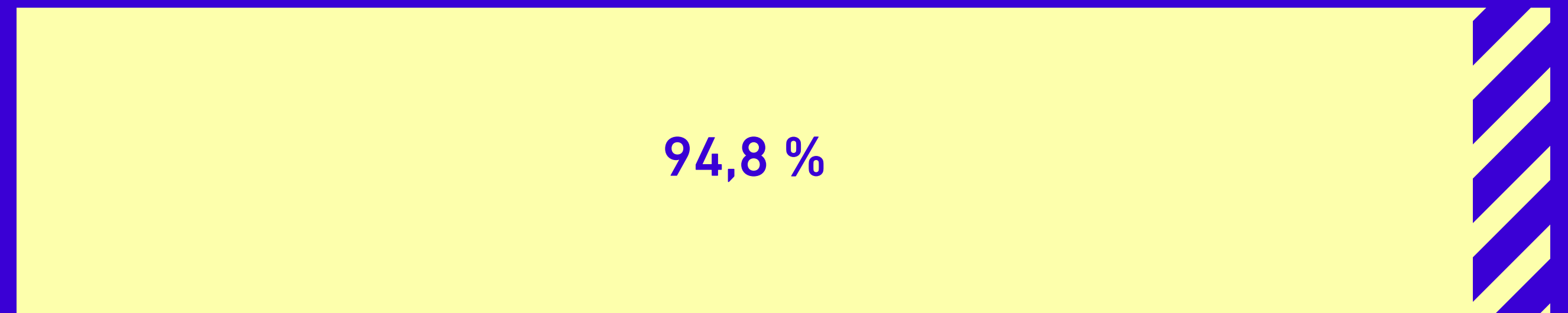
**Go Buy Old Hardware
(It's Not That Expensive)**

It's Broken – Now What?

Check Your Browserlist

package.json

```
"browserlist": [  
  "defaults, last 5 years, not dead",  
]
```



Global Coverage

<https://browsersl.ist/#q=defaults%2C+last+5+years%2C+not+dead>

Progressive Enhancement in CSS

Overloading

```
.selector {  
  height: 100vh; /* Ignored by new browsers */  
  height: 100dvh; /* Ignored by old browsers */  
}
```

@supports

```
.selector {  
  @supports (animation-timeline: scroll()) {  
    animation: bounce linear both;  
    animation-timeline: scroll(x);  
  }  
}
```

Progressive Enhancement in JS

Fallbacks

```
const uuid = crypto.randomUUID?.() ||  
  Date.now().toString() +  
  Math.random().toString(16);
```

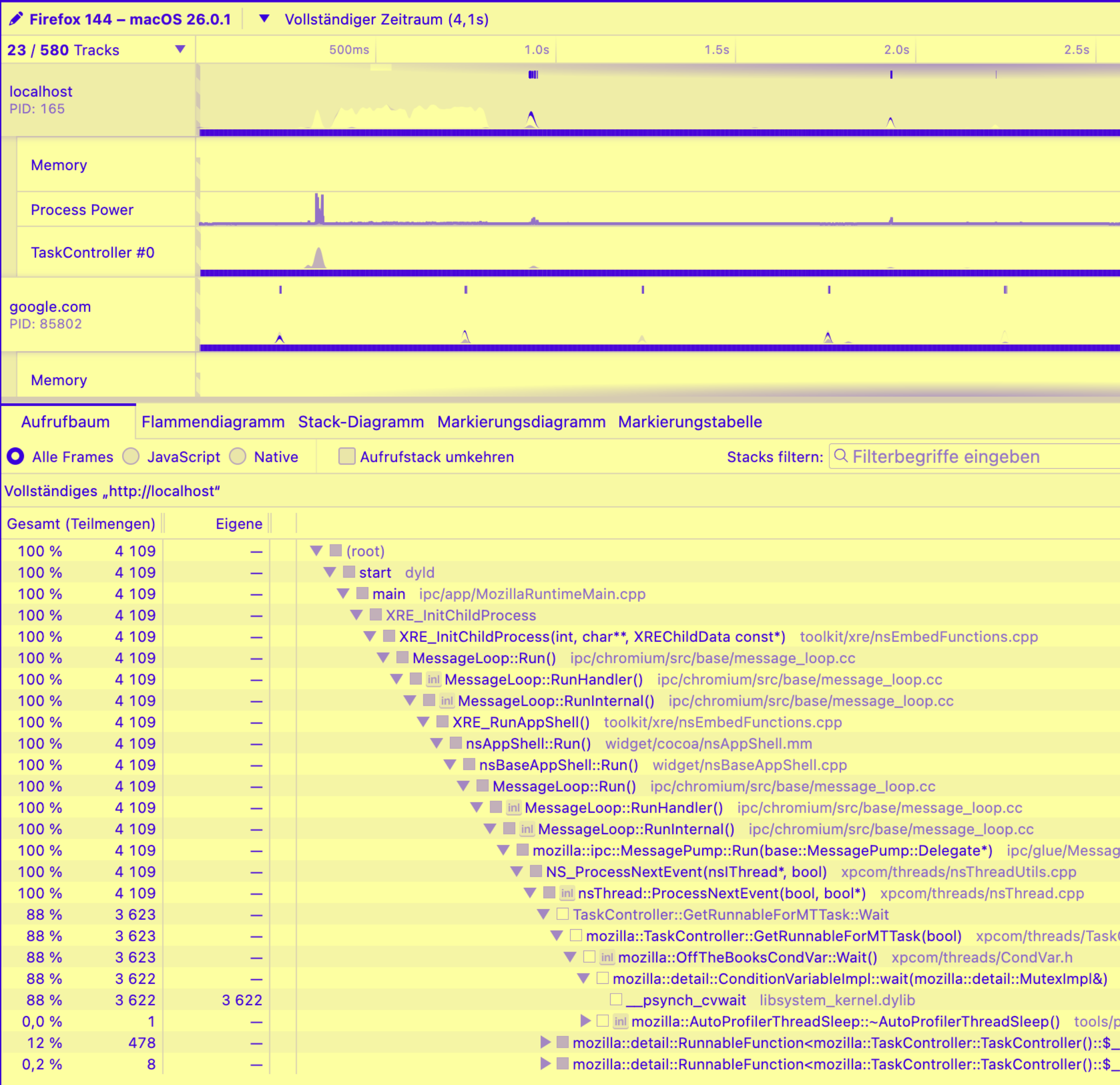
Cutting the (Mini-) Mustard

```
const isModernBrowser =  
  typeof Array.fromAsync === "function";
```

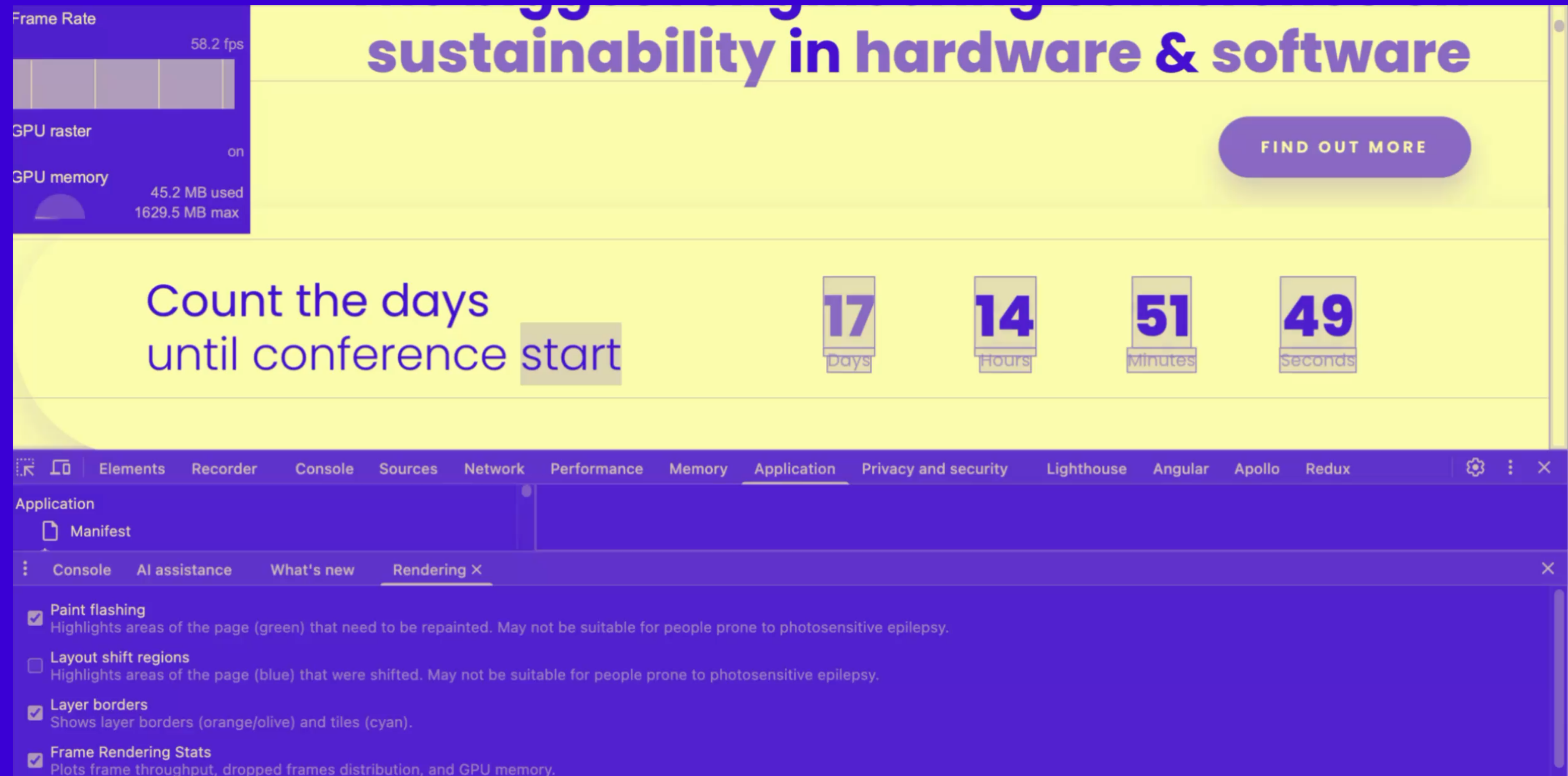
It's Slow – Now What?

Optimize for Runtime Behaviour

Devtools



Devtools



Frame Rate 58.2 fps

GPU raster on

GPU memory 45.2 MB used 1629.5 MB max

sustainability in hardware & software

FIND OUT MORE

Count the days until conference start

17 Days 14 Hours 51 minutes 49 seconds

Application

Manifest

Console AI assistance What's new Rendering X

- ☒ **Paint flashing**
Highlights areas of the page (green) that need to be repainted. May not be suitable for people prone to photosensitive epilepsy.
- ☐ **Layout shift regions**
Highlights areas of the page (blue) that were shifted. May not be suitable for people prone to photosensitive epilepsy.
- ☒ **Layer borders**
Shows layer borders (orange/olive) and tiles (cyan).
- ☒ **Frame Rendering Stats**
Plots frame throughput, dropped frames distribution, and GPU memory.

Disable Some Features for Older Devices

```
> navigator.deviceMemory
```

```
8
```

```
> navigator.hardwareConcurrency
```

```
8
```

```
> navigator.connection.saveData
```

```
true
```

```
> const battery = await navigator.getBattery()
```

```
{  
  charging: false  
  chargingTime: Infinity  
  dischargingTime: 14400  
  level: 0.73  
}
```

Thank You!
Any Questions?

Sources

Malmodin, J., Lövehagen, N., Bergmark, P. and Lundén, D. (2024).

ICT sector electricity consumption and greenhouse gas emissions – 2020 outcome. Telecommunications Policy, [online] 48(3), p.102701. doi:<https://doi.org/10.1016/j.telpol.2023.102701>.