CONFERENCE
MILAN 2022

Lorenzo Pieri

Greta is not happy with your website, and she’s right.

It's just a website, right? :)

Well, turns out **it's not**.

Your website is one of the beautiful snowflakes that is part of a bigger picture.

Let's go find out why!

Hello Codemotion

My name is **Lorenzo Pieri** and I'll have the pleasure to take you on this ***environtechnical journey*** :)

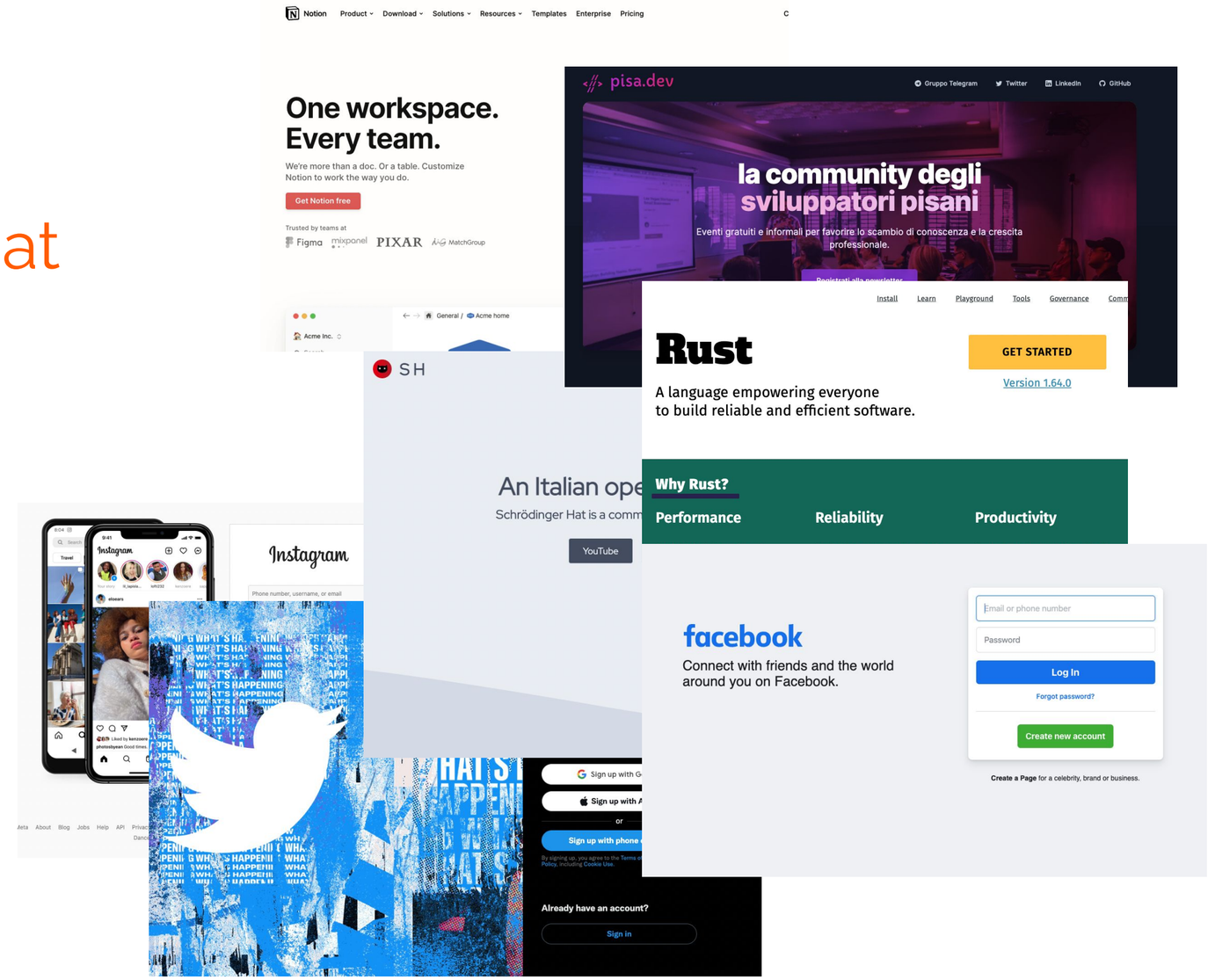
I'm a Senior Software Engineer @ Antidote Technologies Inc. and you can find me online as

- 404answernotfound
- 404answnotfound

Let's start small

Are websites and webapps that much environtechnically eco unfriendly?

Recent research points out to the elephant in the room. We are **not** taking care of it as we should.



Some numbers

- **4 billion+ people** use internet every day [1]
- **up to 4%** greenhouse emissions to double by 2025 [1]
- **3rd on the podium** for electricity demand [1]
- **X3 internet traffic** in less than a decade [1]
- **1% global electricity use** just in data centers [1]
- **356% growth** in webpage weight [2]
- **196%** growth in internet speed [3]

1. https://www.climateimpact.com/news-insights/insights/infographic-carbon-footprint-internet/
2. https://almanac.httparchive.org/en/2021/page-weight
3. https://www.ookla.com/articles/world-internet-speeds-july-2021

Websitemania[4]

404answernotfound.eu

my personal/technical blog

- **36kg** (80 pounds) **CO2 produced** per year based on 120,000 page views
- **-81% CO2 emitted** compared to other websites
- **Same as 127 km** (78 miles) traveled on an airplane
- **Same as 272 km** (170 miles) traveled by car
- **306kb** total page size
- **58ms** time to first byte

4. Carbon footprint metrics measured with https://karmametrix.com/ and https://www.trycarbonapi.com/
5. Performance metrics measured with https://gtmetrix.com/

Websitemania[4]

twitter.com

our beloved social platform

- **206** (450 pounds) **CO2 produced** per year based on 120,000 page views
- **+8% CO2 emitted** compared to other websites
- **Same as 723 km** (450 miles) traveled on an airplane
- **Same as 1550 km** (963 miles) traveled by car
- **1.9MB** total page size
- **419ms** time to first byte

4. Carbon footprint metrics measured with https://karmametrix.com/ and https://www.trycarbonapi.com/
5. Performance metrics measured with https://gtmetrix.com/

Websitemania[4]

fridaysforfuture.org

an important mission

- **316kg** (700 pounds) **CO2 produced** per year based on 120,000 page views
- **+65% CO2 emitted** compared to other websites
- **Same as 1109 km** (700 miles) traveled on an airplane
- **Same as 2377 km** (1470 miles) traveled by car
- **3.17MB** total page size
- **760ms** time to first byte

4. Carbon footprint metrics measured with https://karmametrix.com/ and https://www.trycarbonapi.com/
5. Performance metrics measured with https://gtmetrix.com/

How to check our tech footprint

Websites like **karmametrix.com** can help you find the values we read just a bit before

If you care about performance **gtmetrix.com** is useful to measure your websites metrics

There's an API for measuring your carbon footprint!
trycarbonapi.com

And of course, an NPM package for your apps, because why not.

npmjs.com/package/carbon-footprint

Environmental friendliness is a win/win. You get better metrics and SEO, the environment feels better :)

It's not about better

Different websites require different assets. A private blog, as performant as it can be, is still a text wall most of the times.

Let's not compare for judgement but rather learn an important lesson. We can all participate in this cultural shift.

Let's start :)

Let's change the world

One byte at a time

Dark themes are not just cooler (c'mon), they also allow to save energy and cut on consumption. Dimming a little the light on our monitors also doesn't hurt!

Most newer frameworks allow for easy theming and addition of light/dark themes so that could be a first simple implementation

Let's change the world

Javascript is the infamous Damocles' sword

- A thoughtful bundle size can go a long way
- Responsive images and diverse formats
- Variable fonts
- Cache, cache, cache
- Edge computing

Special mention

- Async communication

Bundle size matters

You don't really need the entire Lodash fam

Are you minifying your files?
What about gzipping?
Tree-shaking?!

Lots of this is done directly by module bundlers but they are as good as we configure them!

6. When smaller is better (https://dunhamweb.com/blog/when-smaller-is-better)
7. Read the tea leaves (https://nolanlawson.com/2021/02/23/javascript-performance-beyond-bundle-size/)

Bundle size matters

The power of compounding

You might think that 20kb of deleted unused code from your **lib** won't matter that much. Think again. That's what happened with the plugin Mailchimp for Wordpress.

1kb in a file that is being loaded on 1 million websites reduces CO_2 emissions by an estimated 1475 kg per month. Now do that times 20. For one library.

8. Mailchimp for Wordpress carbon footprint (https://dannyvankooten.com/website-carbon-emissions/)
9 Evaluating consumption for mobile data transfer (https://www.mdpi.com/2071-1050/10/7/2494)

Bundle size matters

Use the tools, Luke!

Tools like **Bundlephobia** and **Webpack Bundle Analyzer** can help you better understand how your app is served to the users :)

Rollup or esbuild users? No problem, the internet got you covered!

Images can be smaller

8K profile pictures are kind of too much, aren't they?

I'm not saying that good quality images are bad, just that we should be more caring about size and load times, for many reasons:

- performance (load times)
- user experience
- SEO metrics
- bandwidth usage
- carbon footprint! That's pretty much the entire CTA!

Images can be smaller

Responsive images are the new black

There are amazing services for optimization and image responsiveness.

Just like the Image tag in `*nextjs*`, you can use images through these services.

A few names:

- cloudinary
- imgix
- akamai

Images can be smaller

Responsive images are the new black

Images make up for +20% weight on webpages and considering we are mostly visual learners, this is increasing!

Remember that srcset is your friend and that thumbnails should have smaller images :)

Also, webp caniuse is 94% as of this moment. Unless you need to support IE11, just go for webp.

10. Optimize your images for the web (https://kinsta.com/blog/optimize-images-for-web/)

Variable fonts

Thin 200 is cool, but are you using it?

95% global usage if you don't need to support IE. Just drop IE unless you strictly need it.

@fontface can also help you support older browsers in case you need a different set of fonts :)

Cache

Do you have a minute to talk about our lord, CDN?

There is no magic wand for carbon footprint, but there are nice and handy things that we can do to significantly enhance performance, SEO scores and drop our website and webapp carbon footprint

CDNs and caches in general can revolutionize your environtech game

11. Climate and Cloudflare (https://blog.cloudflare.com/the-climate-and-cloudflare/)

Edge Computing

Your friendly neighborhood servers

Edge Computing is the best environtechnical choice you can make.

Serve content as close to your users and win in speed, performance and again, carbon footprint!

This could reduce latency and power consumption by 60%

12. The environmental case for edge computing (https://impakter.com/the-environmental-case-for-edge-computing/)
13. On global electricity usage of ICT trends (https://www.researchgate.net/publication/275653947_On_Global_Electricity_Usage_of_Communication_Technology_Trends_to_2030)

🍪 Async Communication

Not everything needs to happen in sync. Libuv your professional life!

The last cookie. We live in an ever connected world of real time data and communication, FOMO and urgency. **Let's drop this**.

Not only will our minds be in a better and more relaxed place but we will also become considerably more aware of **time**, **space** and **value**.

(Not su much) fun numbers

The real expense

- 17g, median carbon footprint for each email written in corporate jargon
- 1.1kg, median carbon footprint for a zoom meeting with 2 people in 1h
- +1000kg, carbon footprint/year if you own 2 computers and a screen
- +200kg, carbon footprint/year for a 19” monitor

What can I do

It's the little things

- **Dim** your monitor!
- **Turn off** the computer if you don't need it :)
- Sure, jargon is cool but **less CO_2 is better.** Less emails and zoom calls can save the planet!
- **Less time on your phone**
- Read a little more about it! **Plenty of small things to help the planet**

Resources

There are so many nice resources and encouraging ones to share that one slide wouldn't be enough!

So I bought a domain

https://environtechnical.eu

I will share all the resources I found on the subject and keep it updated with more researches and great articles on the subject! Bookmark it for later use :)

Shout out!

Environmental issues are all over the news, almost every single day but I didn't realize how much the Internet is a big part of it until I read my good friend Amilkare's blog

https://amilkare.it/siti-web-sostenibili/

Go and have a read! It's a great article :)

Contacts

Let's keep in touch

https://404answernotfound.eu

Github 404answernotfound
Twitter @404answnotfound

Open Source Community
Schrodinger's Hat - Join us :)

https://www.schrodinger-hat.it

Thank you!

Have a great Codemotion experience