

Self-Hosting

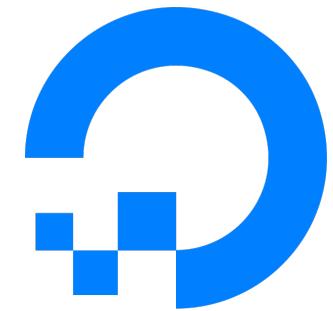
Or, freeing yourself from corporate greed

Austin Rooks

We're going to escape from the shackles of corporate fiefdoms



HEROKU



DigitalOcean

Vercel

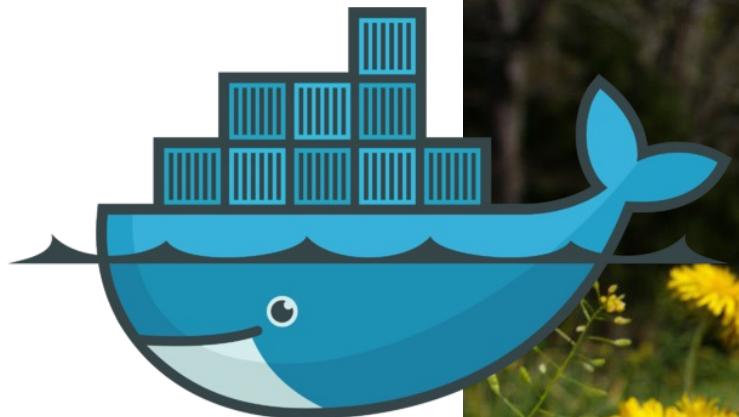


Fly.io



Google Cloud

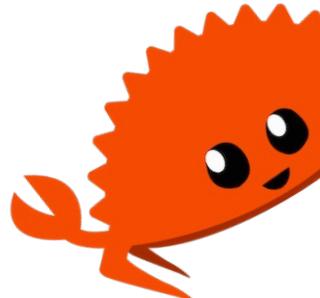
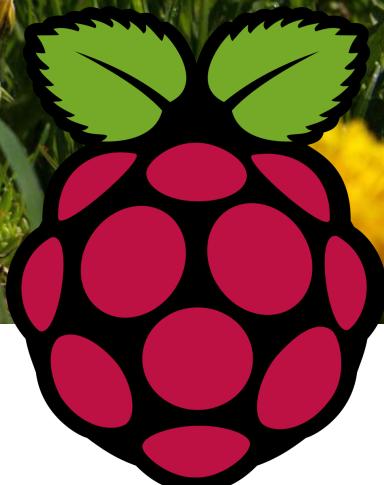
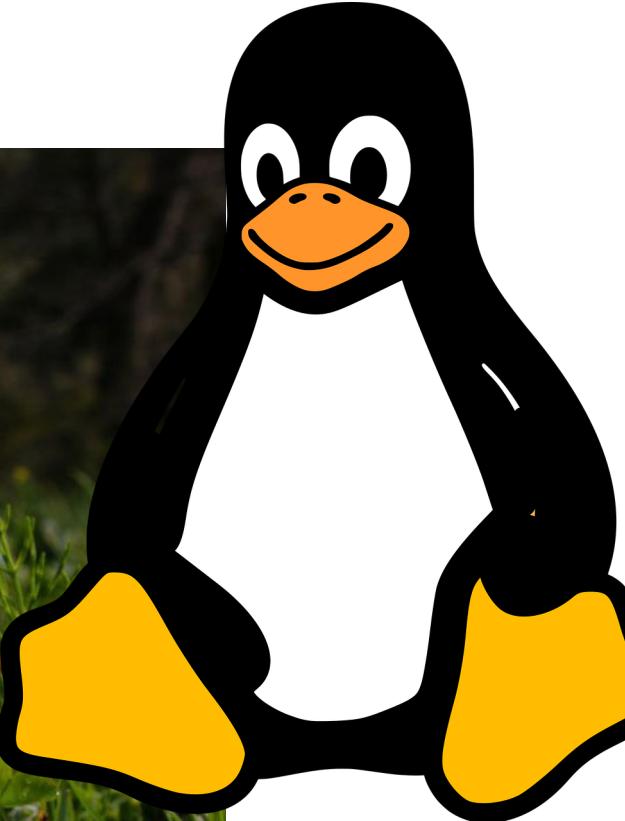
And touch OSS grass



docker



git



Agenda

- Why we should self-host/ Why we don't need tech giants
- Trade offs of leaving tech giants
- How to self-host
- Demo - deploy, update, then scale a new instance of gathering.surf on a Raspberry Pi

A portrait of Jeff Bezos, founder of Amazon, looking slightly upwards and to his right with a thoughtful expression.

So why should I self-host? AWS is priced fairly.



Amazon Web Services
To: austin@r00ks.io >

Saturday

Amazon Web Services Billing Statement Available [Account: 018997102618]

CONFESSiON

I pay AWS \$1.50 every month and have for years and at this point I have no idea why

Greetings from Amazon Web Services,

This e-mail confirms that your latest billing statement, for the account ending in ****2618, is available on the AWS web site. Your account will be charged the following:

Total: \$1.50

The credit card ending in 8283 is currently your default payment method for your AWS charges. We will automatically charge the total amount due shown above to your default credit card unless your bank requires additional verification from you. Please visit the Payment History page in your Billing and Cost Management Console <https://console.aws.amazon.com/billing/home#/paymenthistory> to review the invoice status and complete any required payments to avoid service disruptions.

You can see a complete break down of all charges on the Billing & Cost Management page located here

<https://console.aws.amazon.com/billing/home#/bills?year=2025&month=10>

Have you ever wondered why AWS gives such generous credits for new accounts?

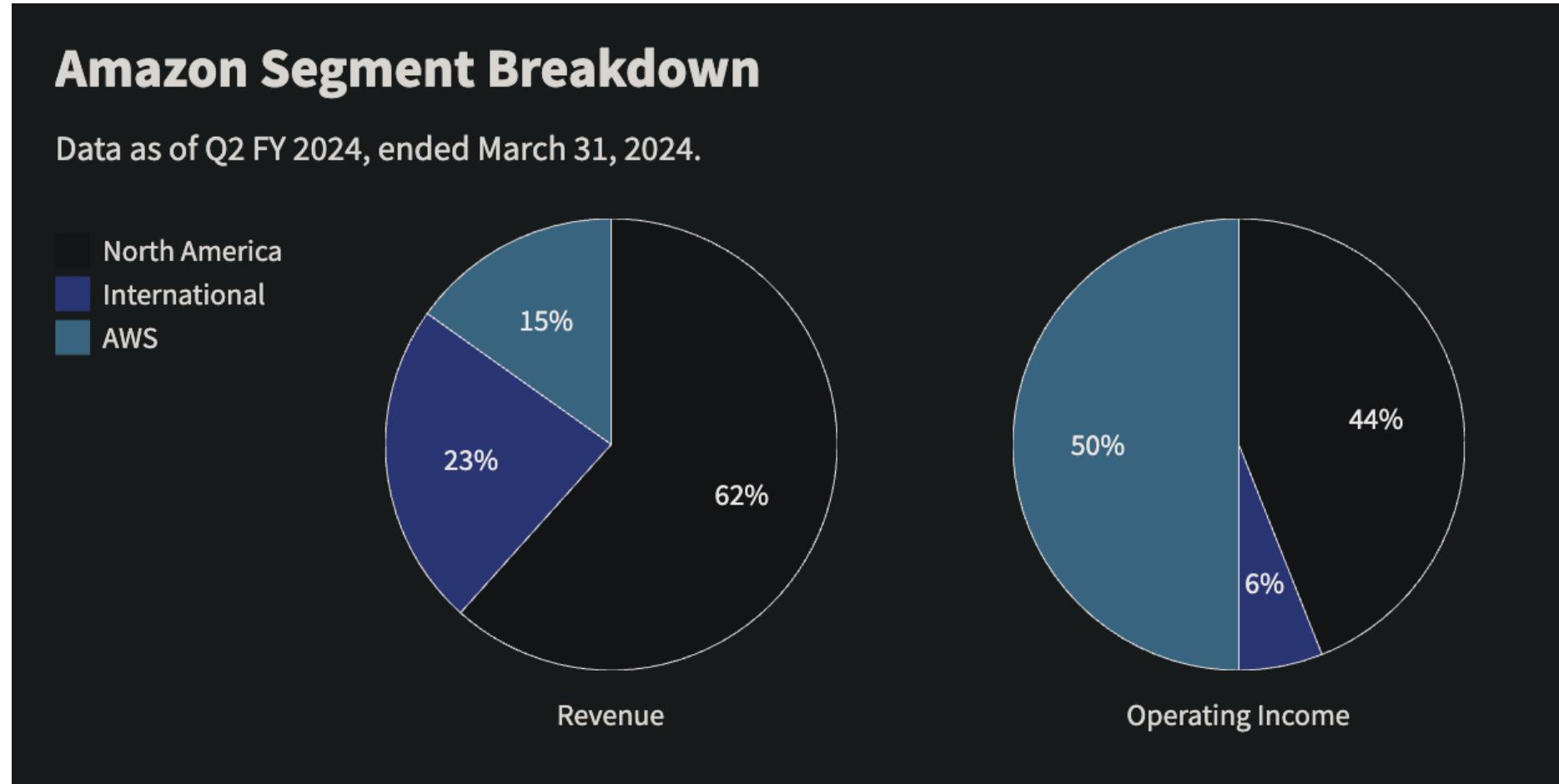
AWS Rapid Ramp Credits

- ✓ \$300 in **AWS credits** valid for 6 months
- ✓ **New customers qualify for AWS Free Tier** when creating a new account.

AWS Activate

- ✓ \$1,000 to \$100,000 in **AWS credits**
- ✓ Access to **80+ exclusive offers** in third-party offers, memberships, and education programs valued at up to \$800,000.
- ✓ **New customers qualify for AWS Free Tier** when creating a new account.

In Q2 last year, AWS accounted for just 15% of Amazon's revenue, but **50%** of its operating income

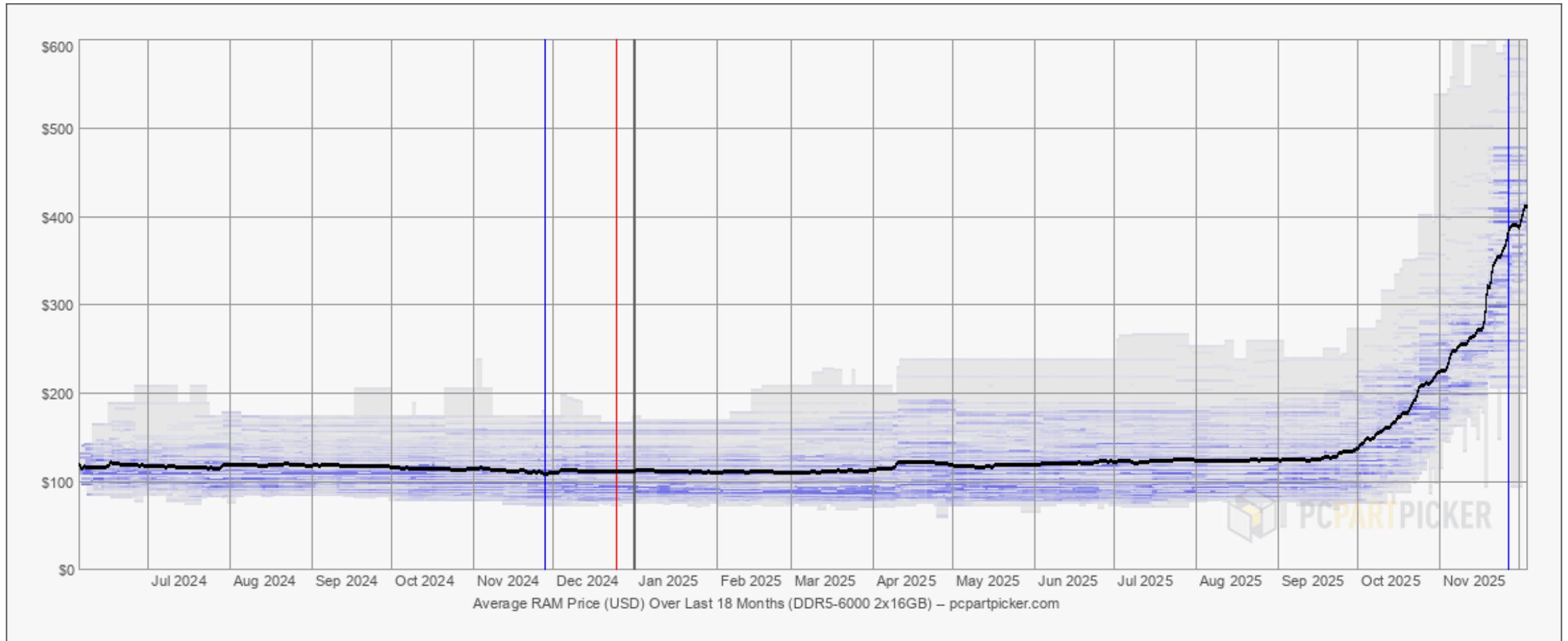


“Operating income is the amount of profit that a company has realized after its operating expenses such as wages, [depreciation](#), and [cost of goods sold](#) (COGS) are deducted.” - [investopedia.com](https://www.investopedia.com)

Hosting
=
profit
=




RAM prices are skyrocketing



Average price of RAM over the last 18 months

Raspberry Pi prices are going up as well

1GB Raspberry Pi 5 now available at \$45,
and memory-driven price rises



1st Dec 2025 Eben Upton 40 co

Product	Density	Old price	New price
Raspberry Pi 4	4GB	\$55	\$60
Raspberry Pi 4	8GB	\$75	\$85
Raspberry Pi 5	1GB	-	\$45
Raspberry Pi 5	2GB	\$50	\$55
Raspberry Pi 5	4GB	\$60	\$70
Raspberry Pi 5	8GB	\$80	\$95
Raspberry Pi 5	16GB	\$120	\$145



Even though there
are seemingly a
lot of options,
many are just
DevEx-focused
wrappers of other
providers.

There's not much
true market
competition.

Over time it's **cheaper**, albeit more work, to host your own products.

Even with the current RAM prices.



Self-host 1, Bezos 0

A portrait of Jeff Bezos, the founder of Amazon, looking slightly upwards and to his right with a thoughtful expression.

But GitHub hosts
static sites for free!
Nothing is cheaper
than free!



Anytime something's free,
you're paying some other way.



Github wants your **DATA**

And not only that...



r/github · 2y ago
LegitimateBoy6042

...

GitHub account suspended and no response from support

I hope you're all doing well. I'm a student and recently encountered a concerning issue with my GitHub account.

I discovered that my account has been suspended without any prior

...

nic projects, and this unexpected suspension is causing significant
re to GitHub's guidelines, and I'm genuinely perplexed about the reason

team, but I thought I'd also seek advice or insights from the
unity. Has anyone else faced a similar situation, and if so, how did you

nces you can share. GitHub is crucial to my academic work, and I'm eager
ort and guidance would be greatly appreciated.

...



Account suspended

Access to your account has been suspended
due to a violation of our [Terms of Service](#).

Please [contact support](#) for more information.



r/github · 2y ago
Single-Passage7550

GitHub Account Suspended?

Went to do daily business and code, etc etc, and was logged out of my GitHub account. Went to log in, and got
the message

" Access to your account has been suspended due to a violation of our [Terms of Service](#).

Please [contact support](#) for more information. "

It's weird because I've had this GitHub account for nearly 4 years at the start of University, been working on code
as per normal, I don't take part in anything that break TOS (as far as I know??) and had 0 issues until today. It's
really weird and I sent a support ticket, but I'm honestly pretty shaken up that my account can get disabled just
like that. I can't access my work or do anything of that matter, anyone else have this issue or ideas for next steps?

Self-hosting means more **control** and **privacy** over your product.

When you host it, you can't arbitrarily lose access.



Self-host 2, Bezos 0



A photograph of Jeff Bezos, founder of Amazon, looking upwards and slightly to his right with a thoughtful expression.

Fine, pay for it
and host
something more
complicated.

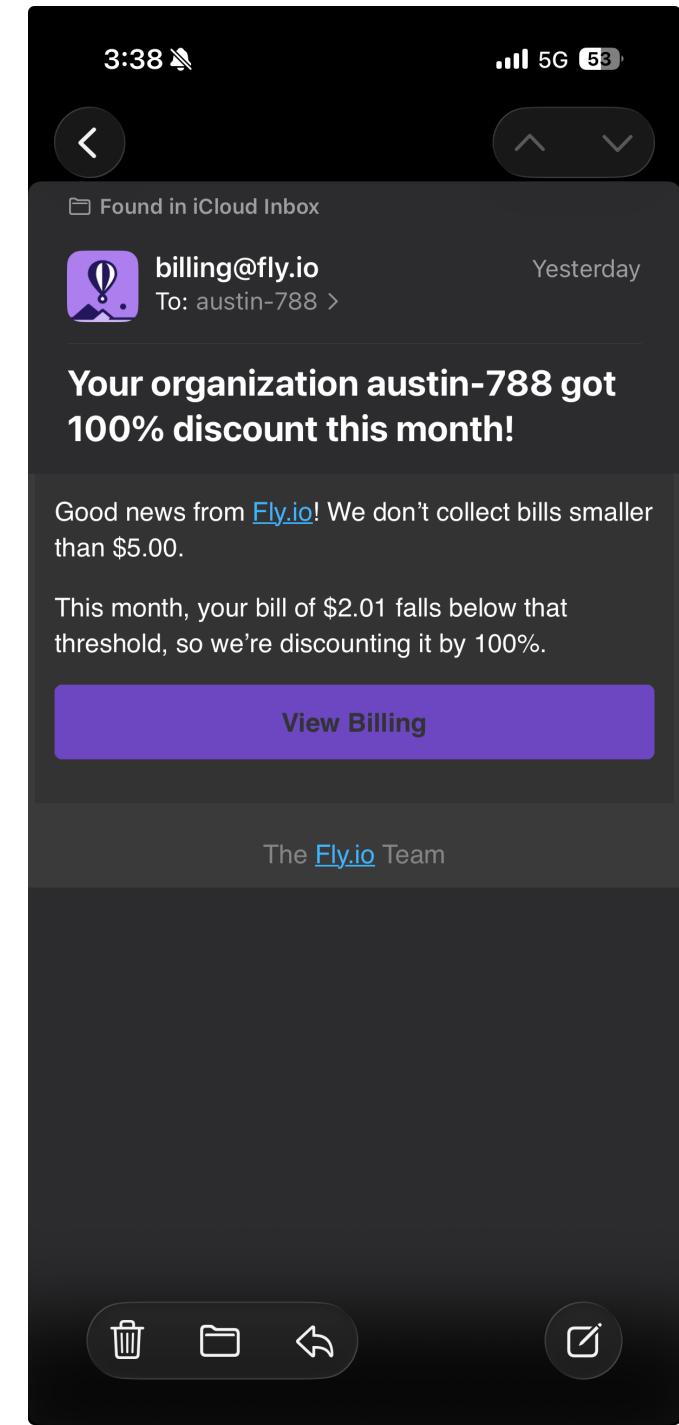


Fly.io

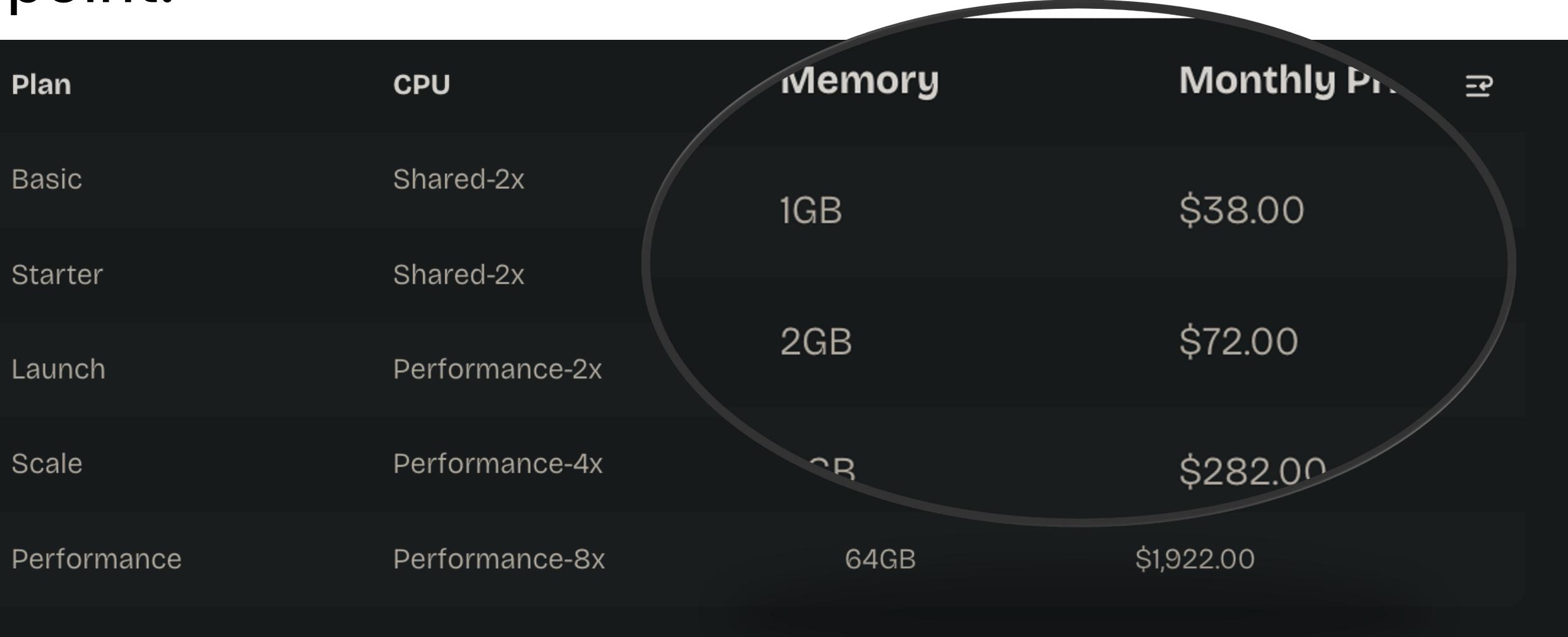
Fly.io doesn't
bill accounts
that don't spend
over \$5 / month.

CONFSSION

I've also for a
few years now
get this monthly
email -->

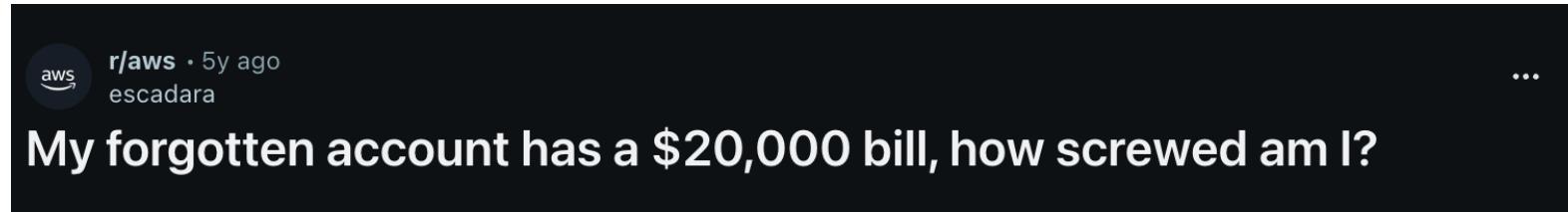


Lots of providers are free and cost effective to a point.



Graph of managed Postgres servers from Fly.io

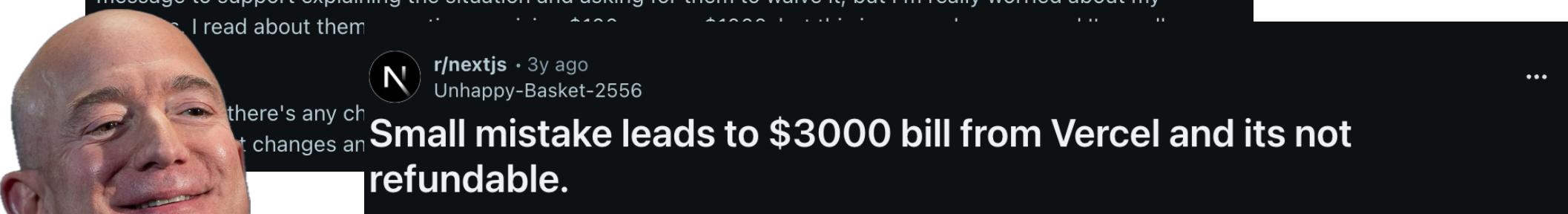
And for any provider, what happens when something blows up or is configured incorrectly?



A screenshot of a Reddit post from the subreddit r/aws. The post was made 5 years ago by user escadara. The title is "My forgotten account has a \$20,000 bill, how screwed am I?". Below the title is a "discussion" button. The post content starts with: "A few years ago I got some free AWS credits from Github's ... free tier. I never ended up using it for anything and completely forgot about it." The post continues with a story about receiving a bill from Amazon for over \$20,000 due to a forgotten account.



A screenshot of a Reddit post from the subreddit r/webdev. The post was made 2 years ago by user liubanghoudai24. The title is "Netlify just sent me a \$104K bill for a simple static site". Below the title is a "Question" button. The post content starts with: "So I received an email from Netlify last weekend saying that I have a \$104,500.00 bill overdue. At first I thought this is a joke or some scam email but after checking my dashboard it seems like I am truly owing them 104K dollars:



A screenshot of a Reddit post from the subreddit r/nextjs. The post was made 3 years ago by user Unhappy-Basket-2556. The title is "Small mistake leads to \$3000 bill from Vercel and its not refundable." Below the title is a "..." button. The post content starts with: "there's any chance that changes an" followed by a large image of Jeff Bezos smiling.

Self-hosting means **freedom** to
run open-source software on
your own terms.



Self-host 3, Bezos 0

I've found things are free if:

- You're willing to sacrifice privacy/control of your data
- You don't need a database
- You're OK with servers/ dbs (not just serverless functions) having cold starts, i.e. shutting down after x amount of time with no requests

To be fair, real benefits from cloud providers

- Uptime/ dependability (mostly)
- Multi-region, edge deployments across the world
- Low overhead maintenance (mostly)



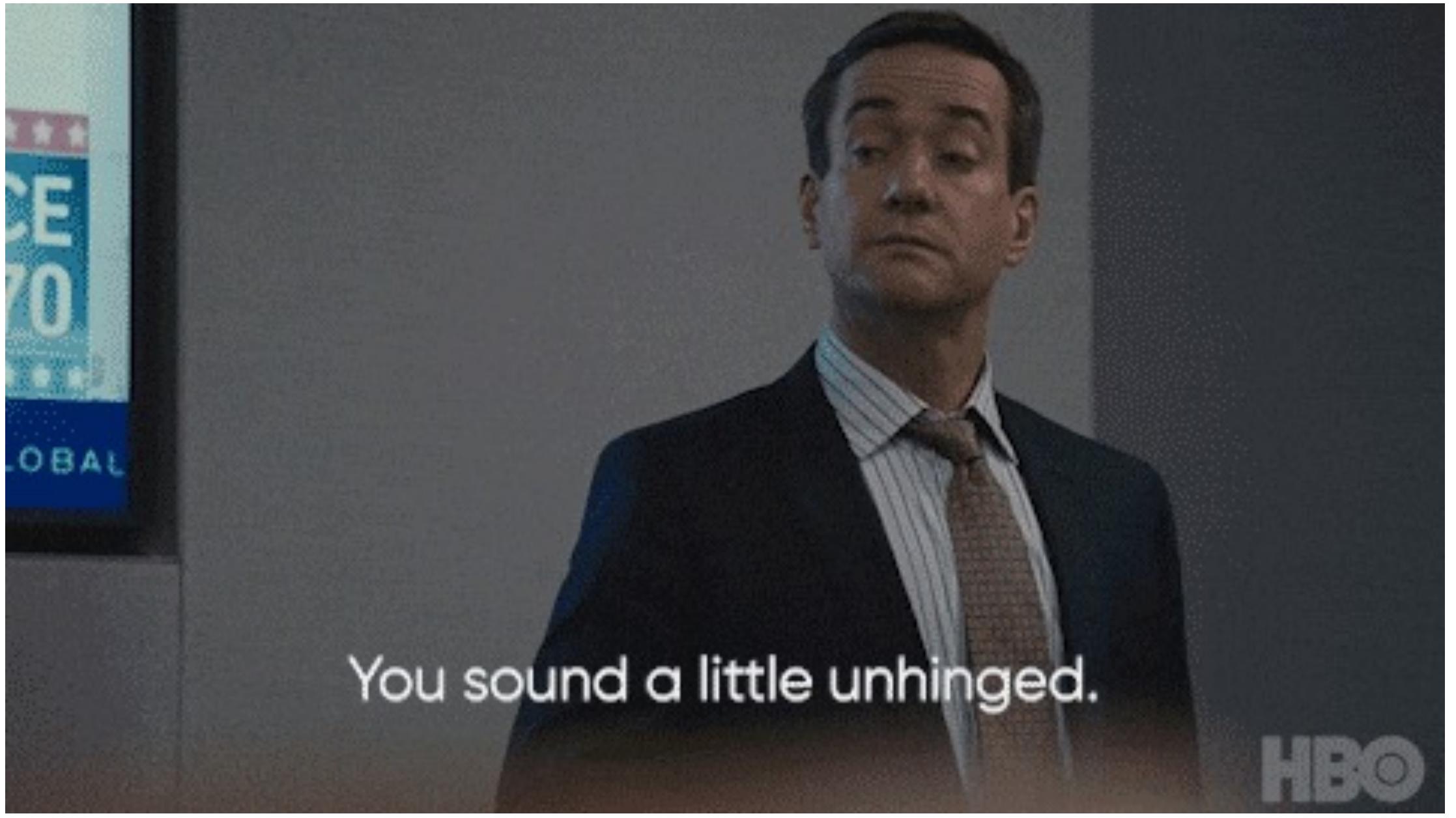
✓ Self-host 3, ● Bezos 1.5

Cloud providers also make it
easy to expose sites publicly

Which brings us to the evil we
can't escape:

INTERNET SERVICE PROVIDERS (ISPs)





You sound a little unhinged.

HBO

To self host a public site you need a static IP for DNS records to point at.

ISPs can charge what they like for IPs as the 32-bit IPv4 standard is essentially all allocated.

IPv4 address exhaustion



r/homelab · 2y ago
Chemical_Ask1958

AT&T Static IP address price increase



r/frontierfios · 1y ago
MrDrMrs

Bill increased only on static ip



r/ATT · 2y ago
vaerchi

Static IP Price doubled for residential internet



We're not going to get a static IP, so we're going to rely on



CLOUDFLARE®

to bridge the gap from public internet to personal server and protect our LAN

Will also cache our static assets

You know that super stable
platform... 😭

Cloudflare outage on December 5, 2025

2025-12-05



Dane Knecht

Cloudflare outage on November 18, 2025

2025-11-18



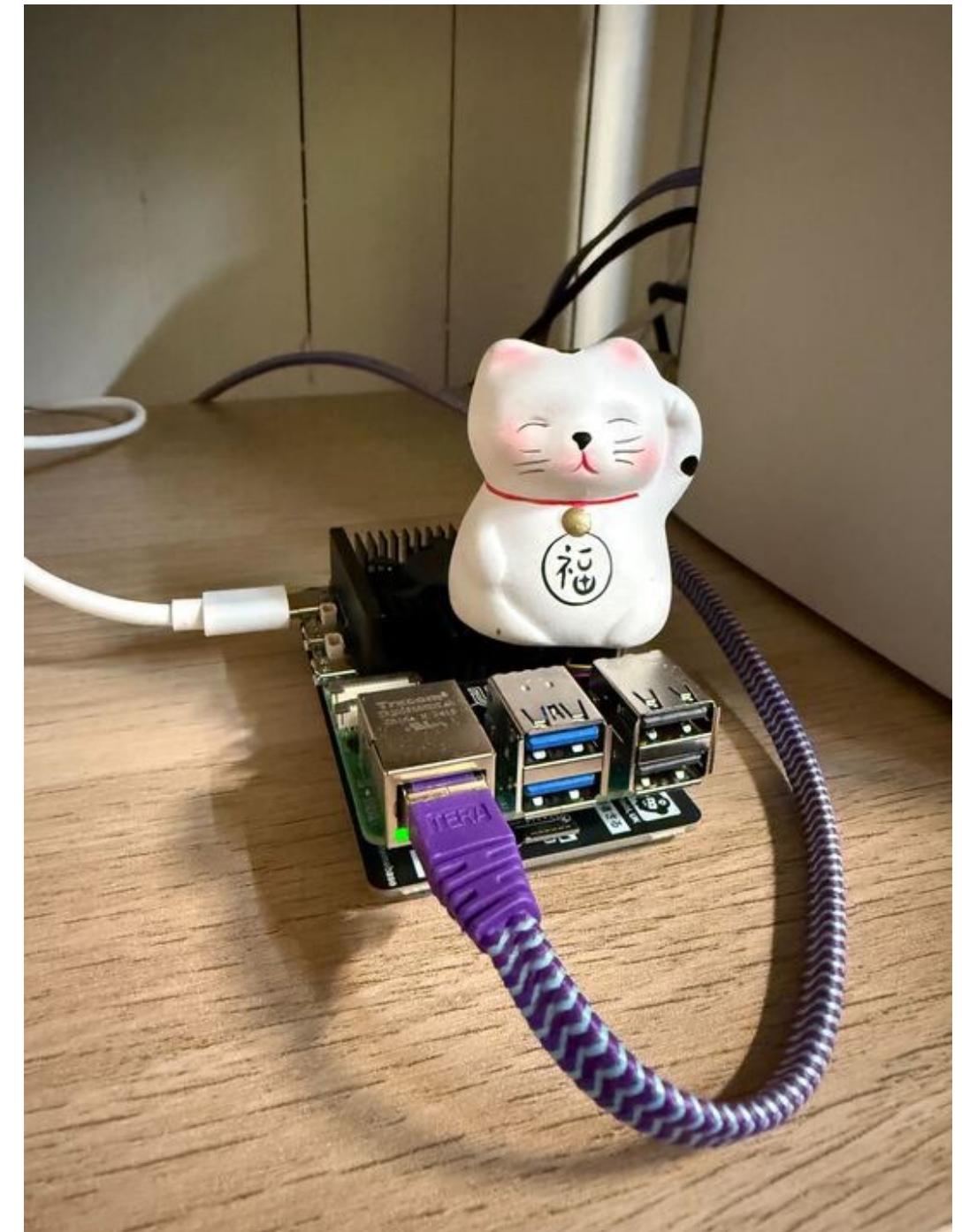
Matthew Prince

⚡ How to self-host ⚡

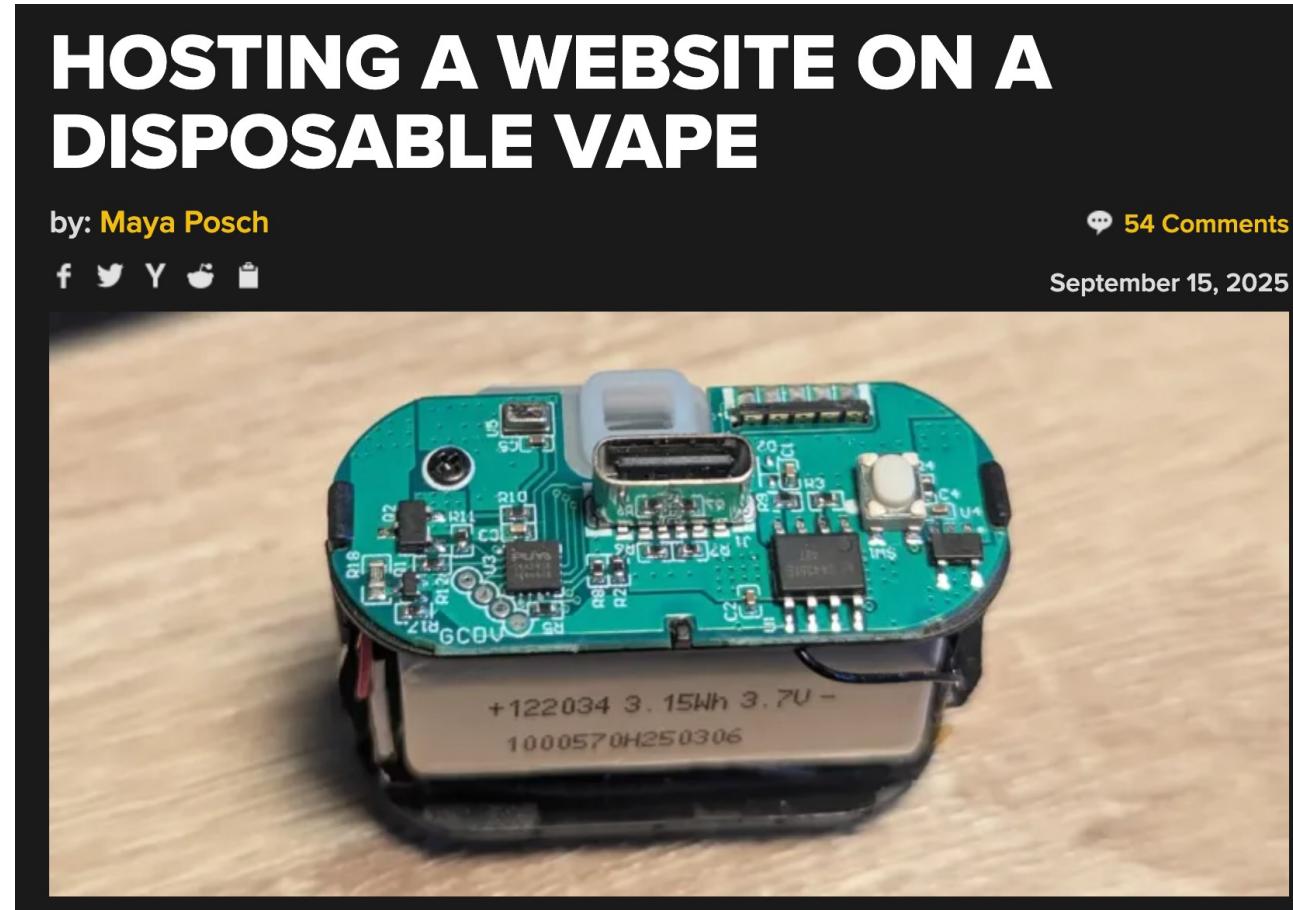
First we'll need a server

Here's mine ->

Raspberry Pi 5
8 gb ram



You don't need a Pi though...



<https://hackaday.com/2025/09/15/hosting-a-website-on-a-disposable-vape/>



Self-hosting is
a slippery slop
toward a
homelab.



Today we're going to stick with a Pi and *like it*

- Configure the Pi with SSH access and Docker
- Containerize our website
- Set up Docker Compose
- Build the image locally and then send it to the Pi
- Expose our Pi to the public internet with Cloudflare tunnels

What we're going to containerize - gathering.surf

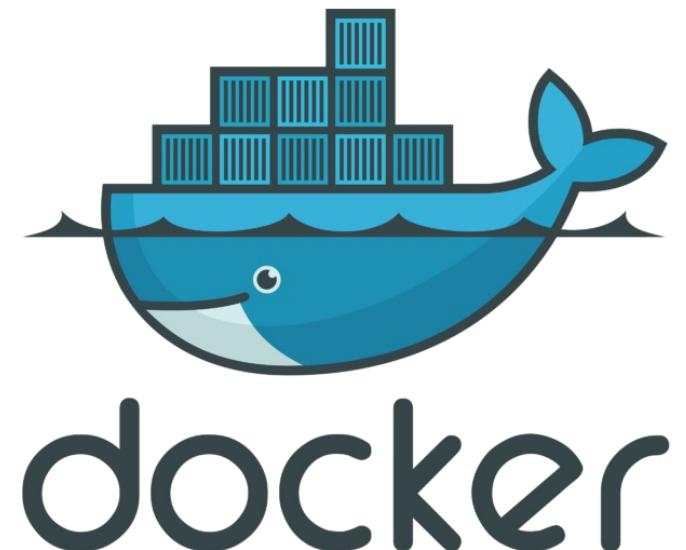
- A Rust server with a Redis cache

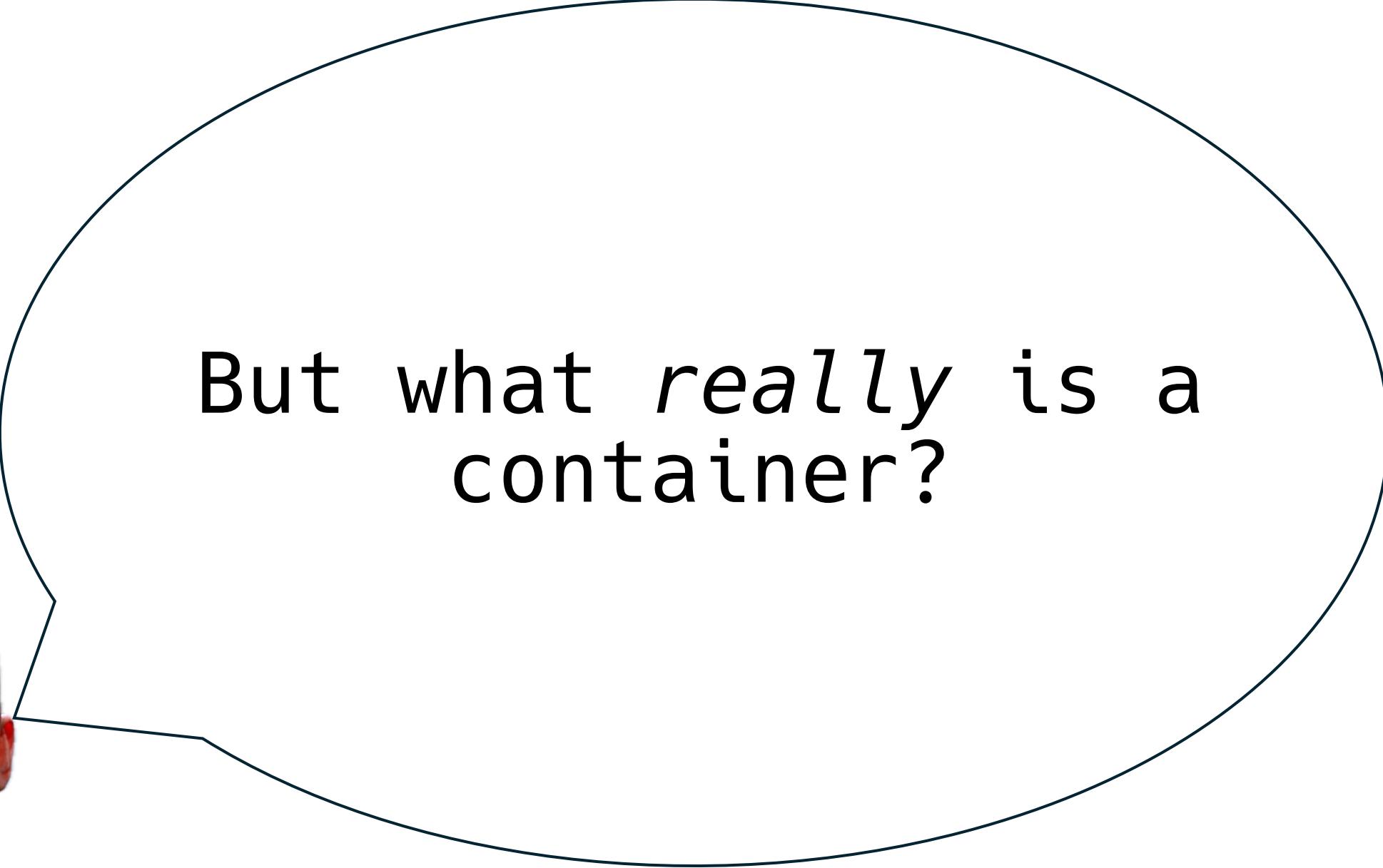
If you can containerize something, you can easily self-host it.



What are Containers?

- Containers are isolated processes that interact with the same system kernel that your server is running. They're not a VM.
- Key properties of a container - process isolation, resource limiting, network isolation.
- Benefits:
 - Easy and fast to spin up and kill.
 - Reproducible
 - Lightweight





But what *really* is a
container?

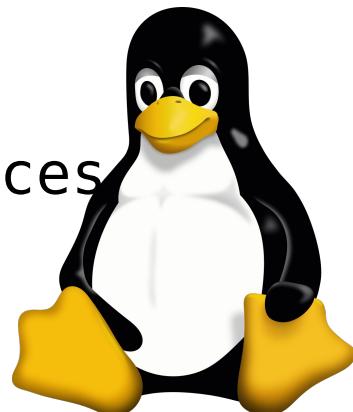




A deep dive on containers is coming

Containers are Linux kernel features tied together

- Chroot
 - Sets the root directory of a new process. The new process can't see out, it only has access to what's available to the root.
- Namespaces
 - Prevent containers from seeing other containers and what's on the host computer
- Control Groups
 - Prevents containers from using all the system resources
- Network namespaces to limit network traffic
 - Manages virtual interfaces



To run a container, you first need an image.

When we containerize something, we're really creating is a bundle of executables and files that are required for your app to run and can then be given to a container runtime to isolate.

Container runtimes:
containerd
CRI-0

When we write a Dockerfile we're creating a recipe for our application environment.

Because the container runtime completely isolates the image, we need specify all the dependencies that our app requires to run. Our app only has access to what's specified in the image.



When we write

```
FROM node:24-alpine
```

That's just getting an image with the node js executable, its system dependencies and the default executables and file system contents that would come with an alpine install, i.e. contents of root dirs, ls, bash

Then commands like:

RUN npm ci

RUN npm run build

collect our app's requirements
to run.

Dockerfile recipe for success

- Perform multiple steps in a single RUN line.
Just about every newline in a Dockerfile is cacheable.
- Don't COPY large files or secrets into an image, they'll be part of the image.
- Don't use ENV to store secrets, they become part of the image's metadata.

When you're ready to run an image as a container, don't forward a port:

```
--publish (-p) 8080:80
```

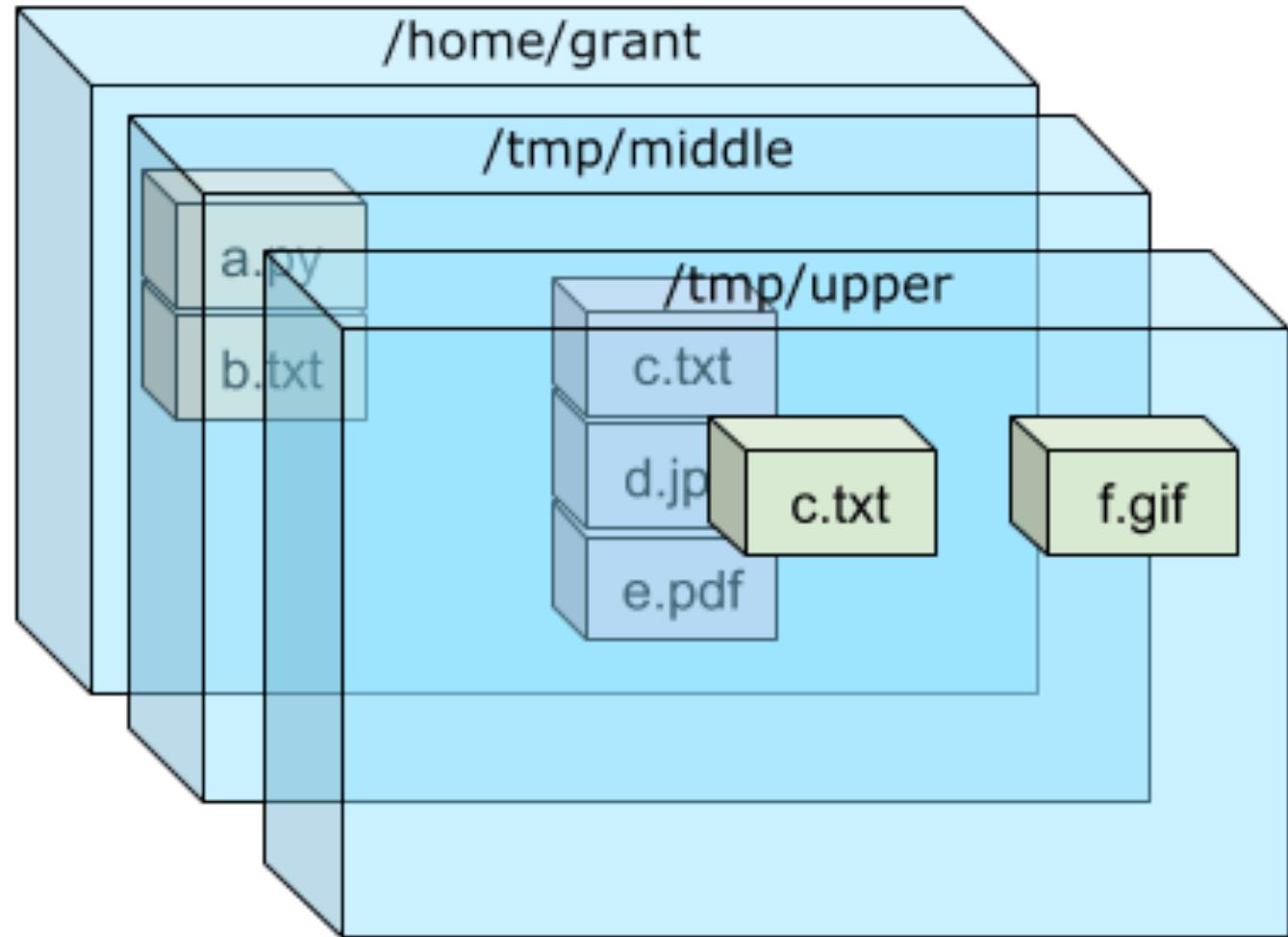
Instructs the container runtime to forward the host port (or the computer that's running the container) 8080 to the port running in the container 80, which has its own isolated network from the host.

File system overlays

Container runtimes use a filesystem overlays to enable fast startups and easily shared layers.

A container doesn't need to copy the existing filesystem and executables from the image, it just creates an overlay - meaning **fast** startups.

```
mount -t overlay -o \
rw,lowerdir=/tmp/..,upperdir=/tmp/.., \
workdir=/tmp/.. overlay /tmp/mount
```

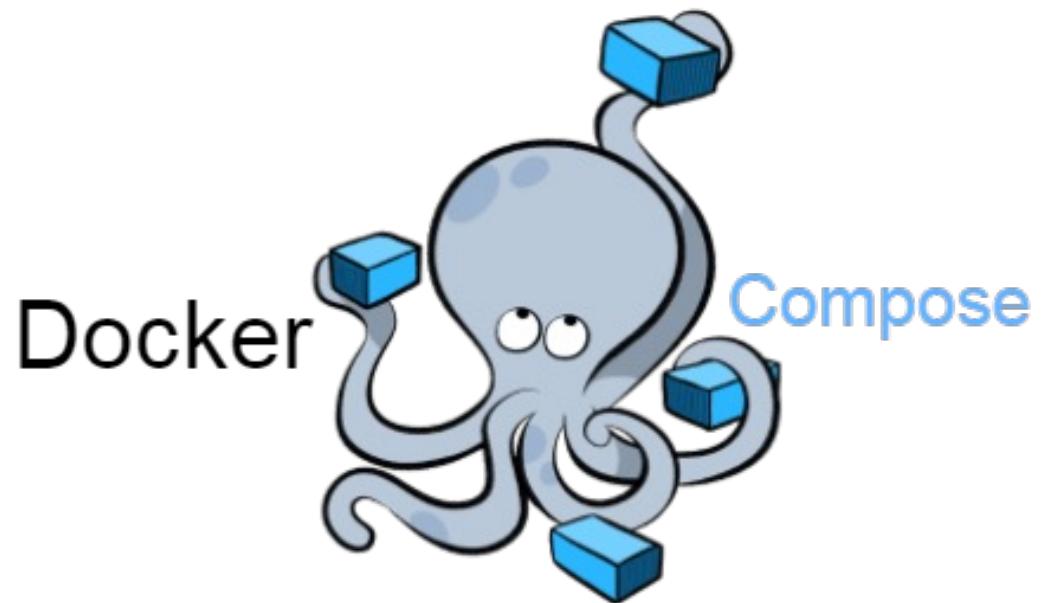


**AND NOW BACK TO
OUR REGULARLY
SCHEDULED
PROGRAMMING**

A portrait of Jeff Bezos, founder of Amazon, looking slightly upwards and to the right with a thoughtful expression.

We're self-hosting,
why should I care
about isolating a
process on my own
hardware?

Containerizing simplifies our build and deploy process and further secures our local network if our Cloudflare connection is breached.



We're going to use Docker Compose to orchestrate our app like a simple kubernetes

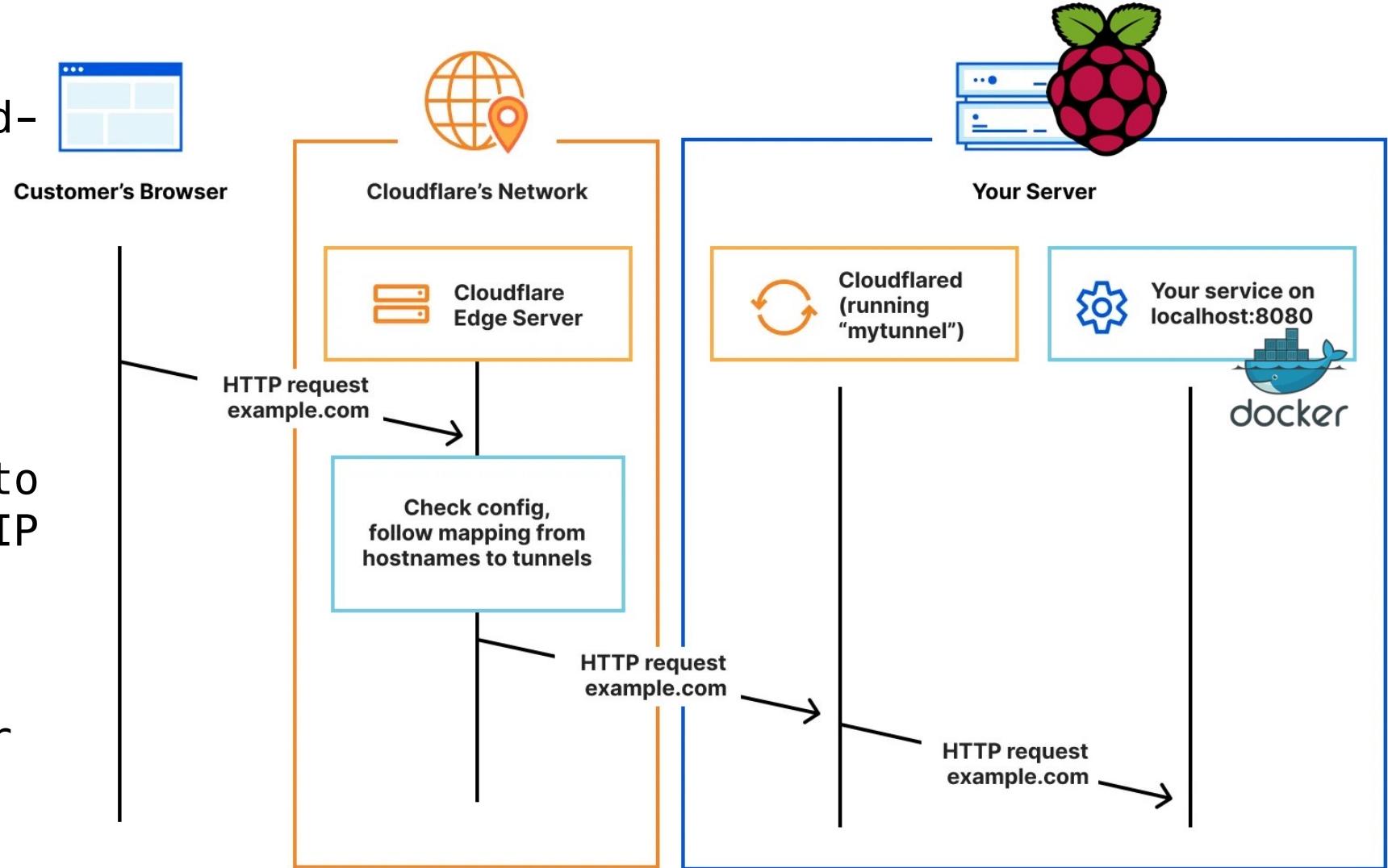
Originally a development tool to easily spin up a local DB or multiple microservices in local development, more recently developed for production use cases for single host deployments.

Docker compose simplifies the
deploy and let's us spin up
dependencies like Redis in tandem
with our web app

Expose containers with Cloudflare tunnels

'Cloudflared establishes outbound-only connections (tunnels) between your resources and Cloudflare's global network'

i.e. we don't have to configure a static IP or expose our local network to the internet to give public access to our Pi



The Cloudflare tunnel OSS
alternative:



PANGOLIN

But you still need a VPS (virtual private server) from a cloud provider like Hetzner or RackNerd to keep your local network isolated or a static IP from your ISP for Pangolin.



A portrait of Jeff Bezos, founder of Amazon, looking slightly upwards and to the right with a thoughtful expression.

This sounds
complicated and
deploying must be a
pain.

I like how Vercel and
Heroku deploy
automatically when I
push a change to
GitHub.

Our deployment will be one command:

just deploy

And we could extend it even:

just deploy-qa

Or even:

just scale

Self-hosting means we can do anything!

- ✓ Self-host ∞ ,
- Bezos 1.5



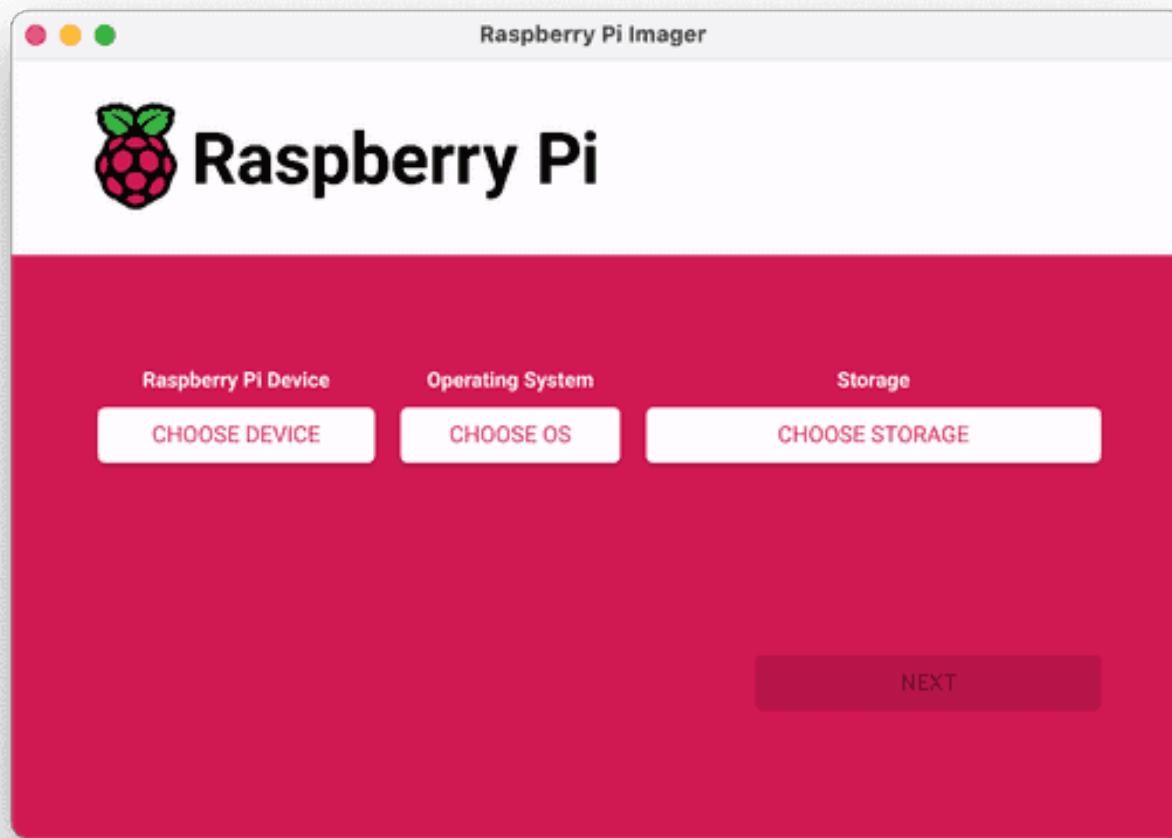
just is a script runner.

Similar to scripts in a package.json, create a justfile to compose shell commands.

Install it on a Mac with:

```
brew install just
```

What else do we need?



We're going to create a new deployment of gathering.surf

qa.gathering.surf



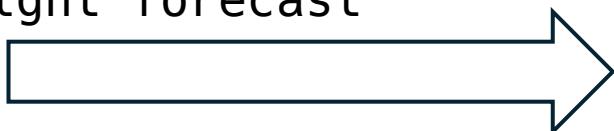
Realtime buoy information



Beach status



Wave height forecast



Temperature forecast



Rain forecast



Right Now

Waves
1.97 ft @ 4s ↗
Good

Wind
↑ 20-22 mph

Water Temp
73 °F

Beach Status

OPEN Open for season

Air Temp
77 °F

This Week

Waves



Fri 08 AM

Flat

0 ft

↑ 9.2 mph

10.35 mph

3 s

Temperature



Fri 08 AM

76 °F

69 °F

Precipitation



Fri 08 AM

2 %

2 %

17 %

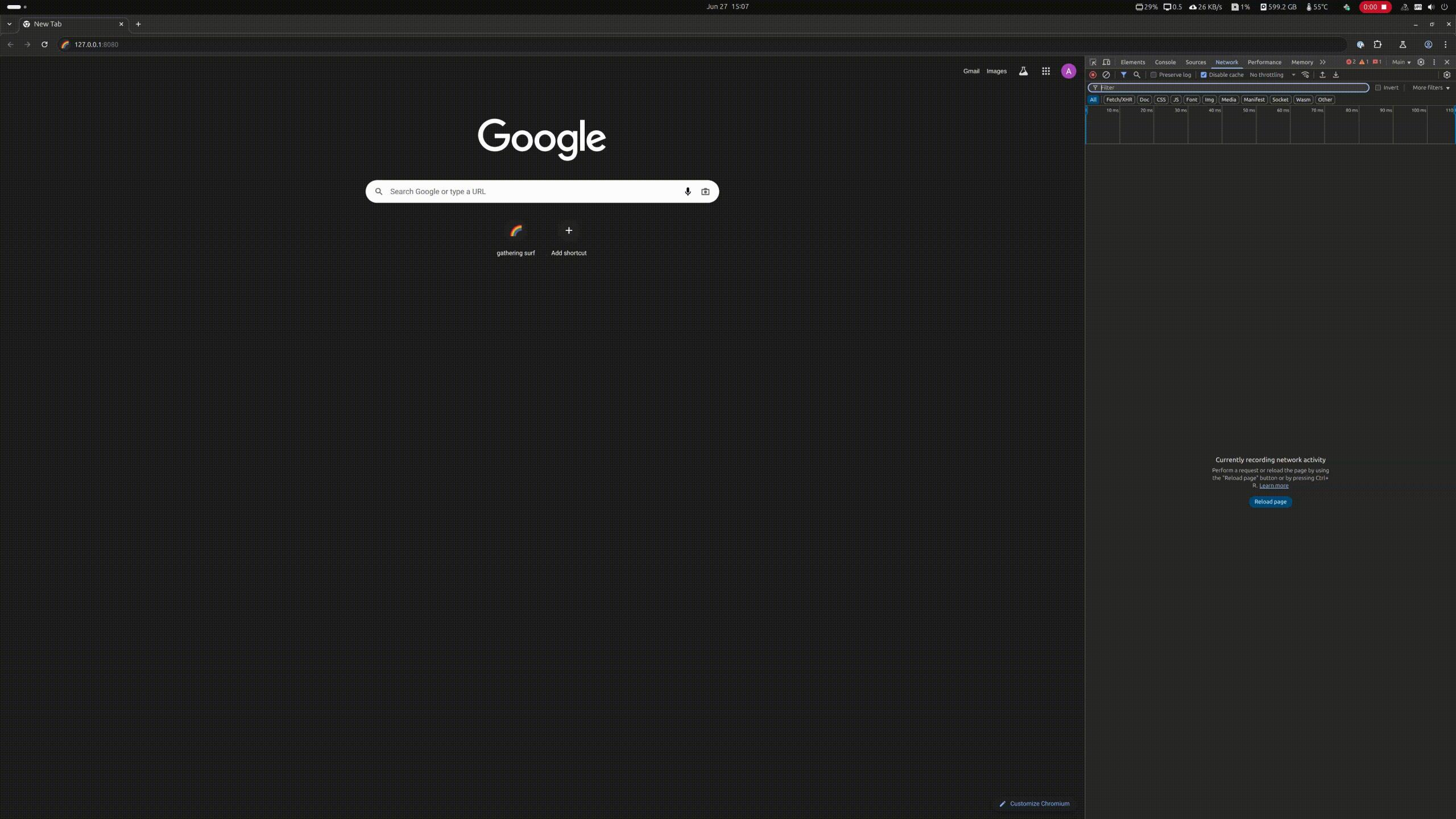
Did I
mention I
surf the
great
lakes?



*Me and a close friend after an epic lake sesh

Some features of gathering.surf

- Streams HTML to the client which has a mutation observer watching for changes to update the DOM with data
- Redis cache to make government APIs feel faster, as all the data displayed on the site is from NOAA and the DNR.



Demo .

Questions?