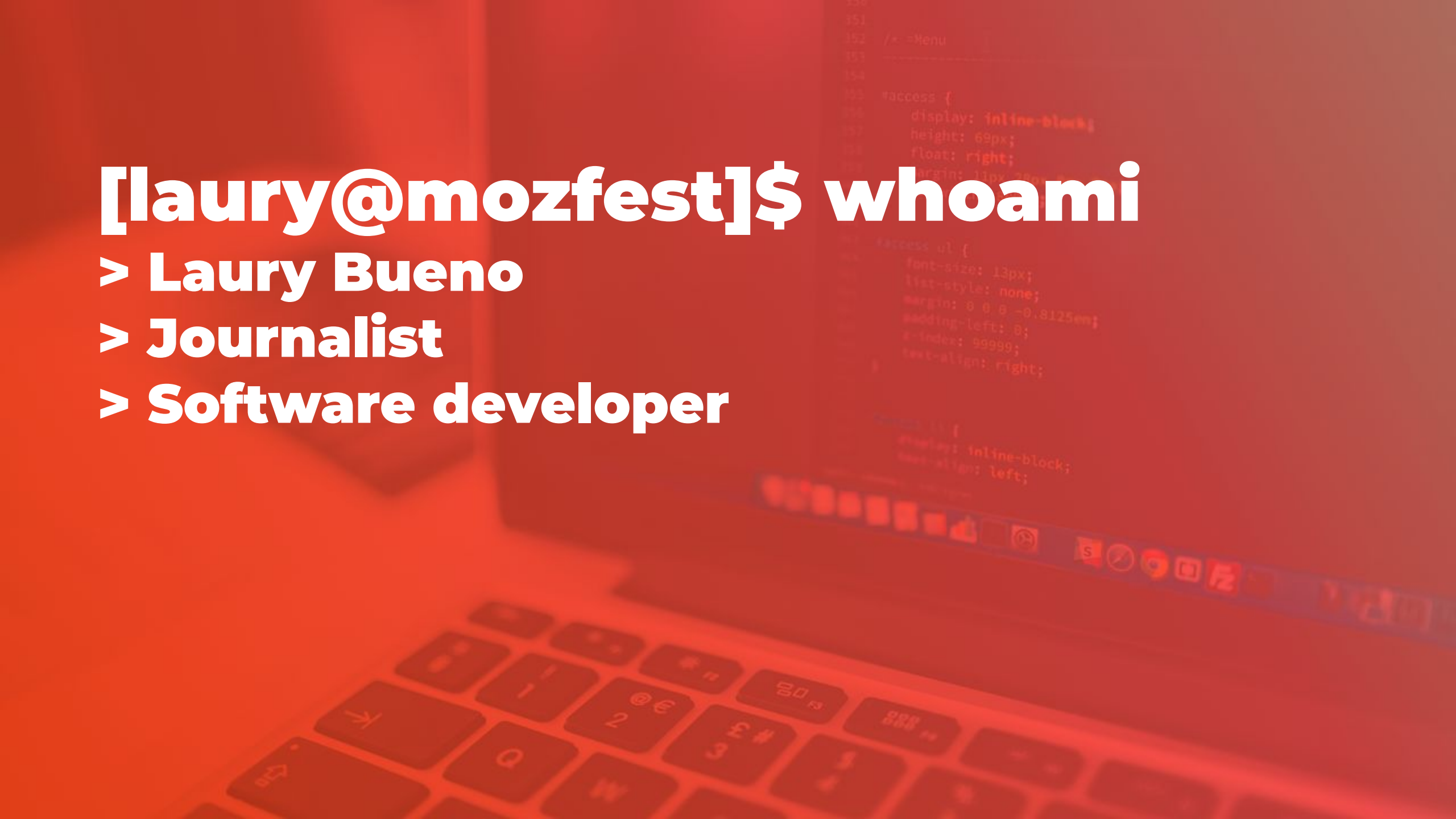
why-fi?

Discovery | Privacy | Tracking | Mapping


[laury@mozfest]$ whoami
> Laury Bueno
> Journalist
> Software developer

Who doesn’t
love Wi-Fi?

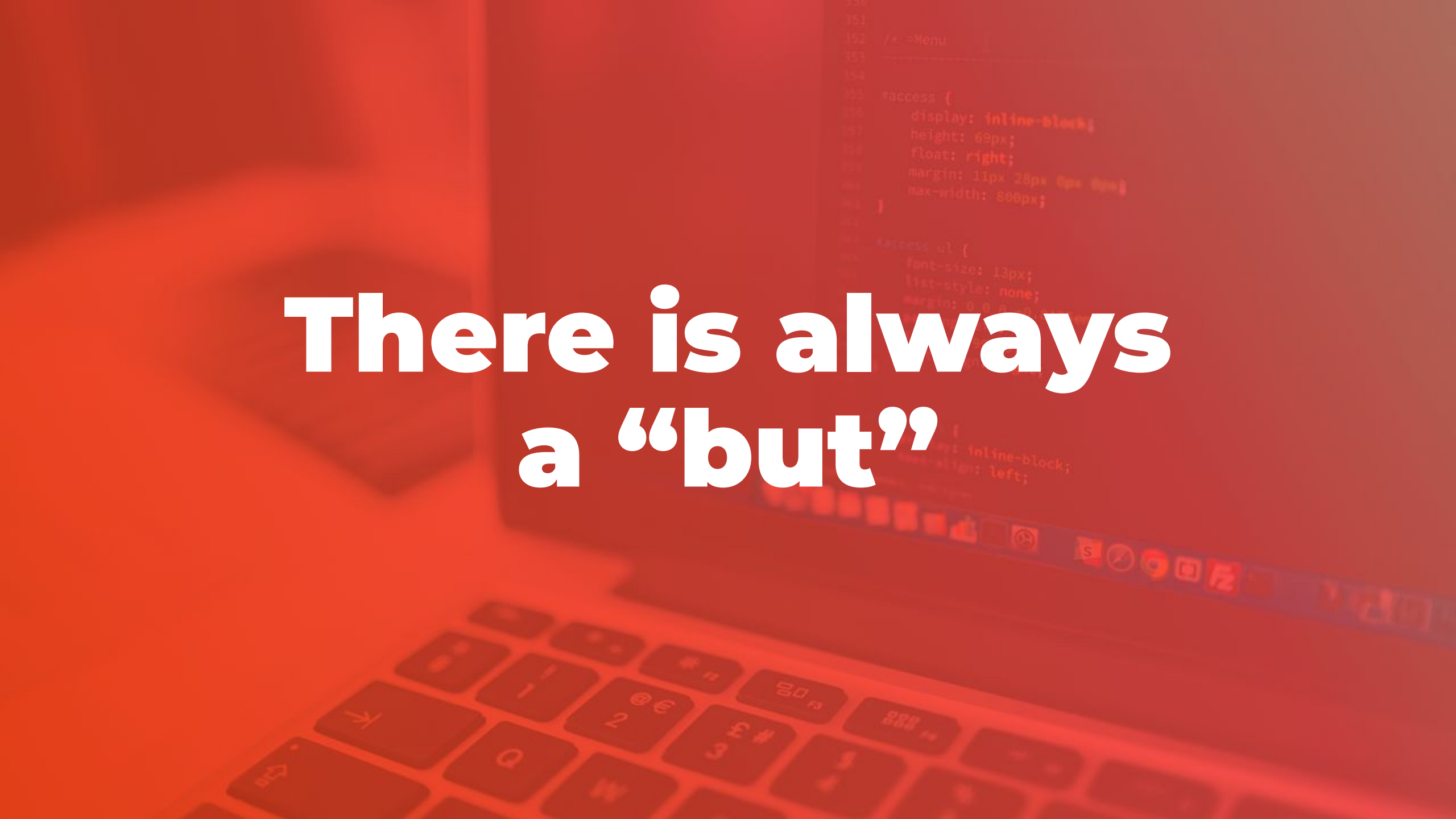
Who doesn’t love Wi-Fi?

Gives us wireless internet access (duh!)

It’s convenient

It’s fast (mostly)

It’s everywhere


There is always
a “but”

There is always a “but”

The constant search for a Wi-Fi signal turn our phones into **beacons** signaling **where we are**, **who we are** and even **where we have been**.

Transport for London

Movement tracking in the Tube

In 2016, between 21st November and 19th December, TfL was actively collecting our Wi-Fi data

The goals:

- **better alerts about overcrowding**
- **help prioritise investment**

Transport for London

WiFi data collection

We are collecting WiFi data at this station to test how it can be used to improve our services, provide better travel information and help prioritise investment.

We will not identify individuals or monitor browsing activity.

We will collect data between Monday 21 November and Monday 19 December.

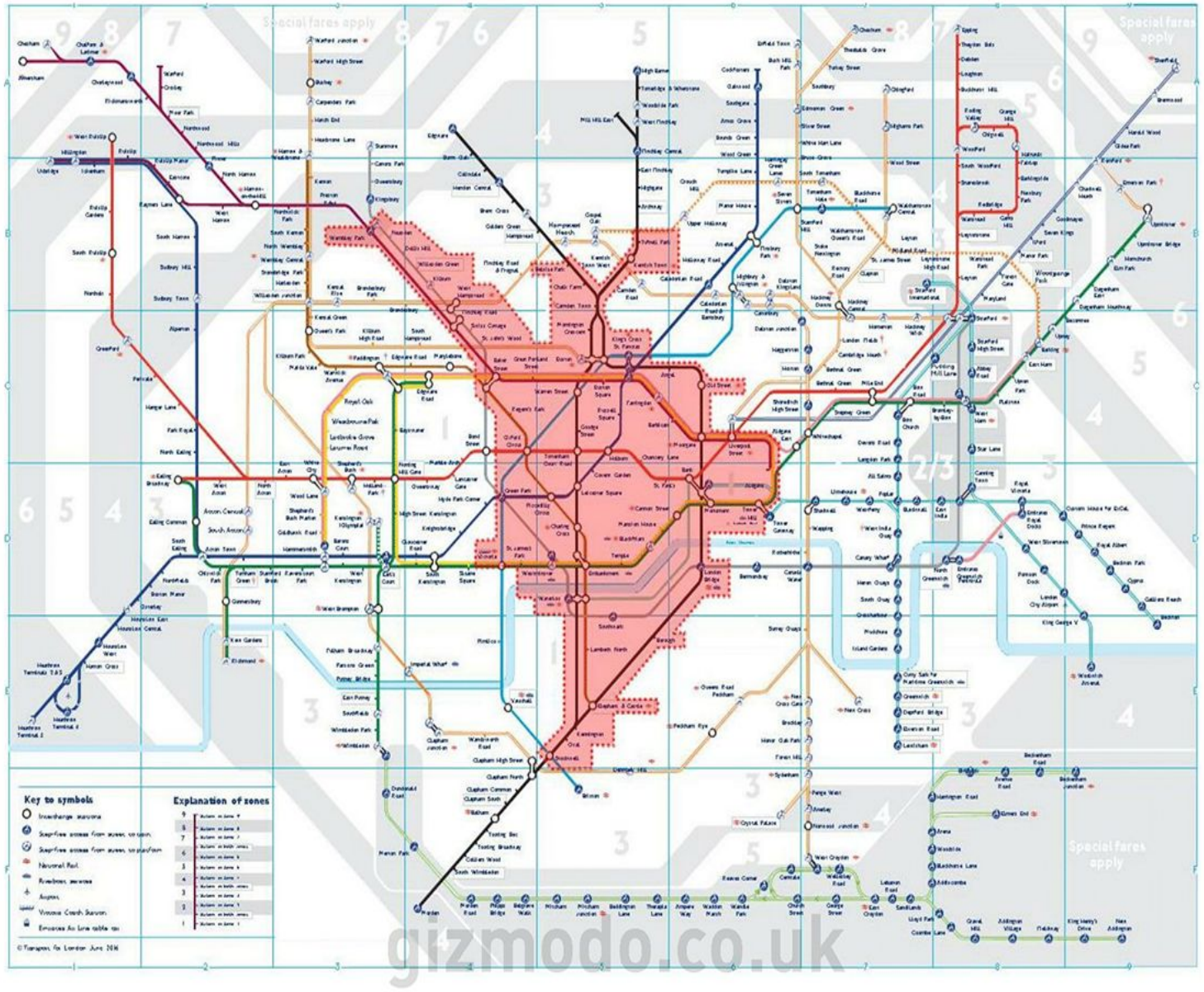
For more information visit: **tfl.gov.uk/privacy**

MAYOR OF LONDON

TRANSPORT FOR LONDON
EVERY JOURNEY MATTERS

Source: gizmodo.co.uk

Stations Included in the Pilot (Not for external distribution)

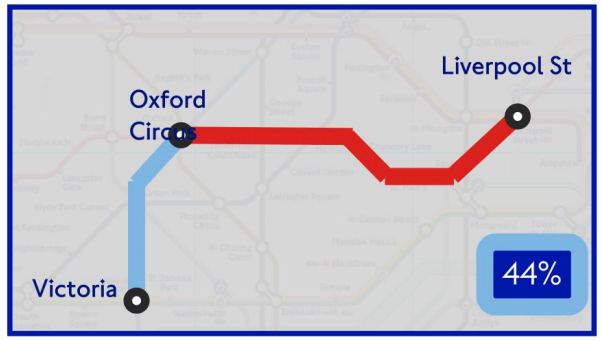


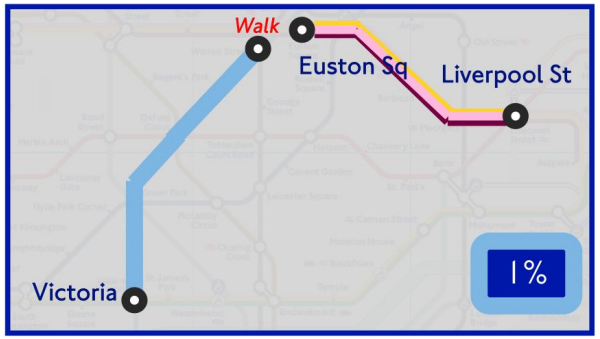
Collect area

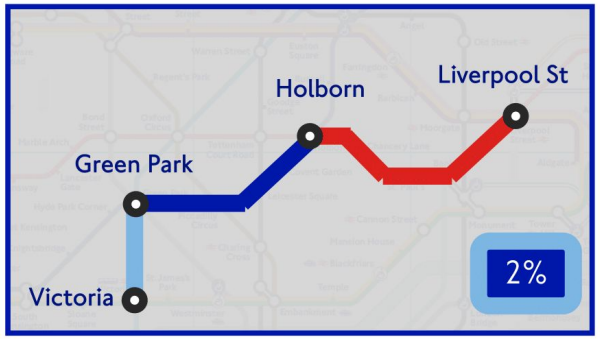
Source: gizmodo.co.uk

Route tracking

Route identified for 75% of Liverpool Street to Victoria devices





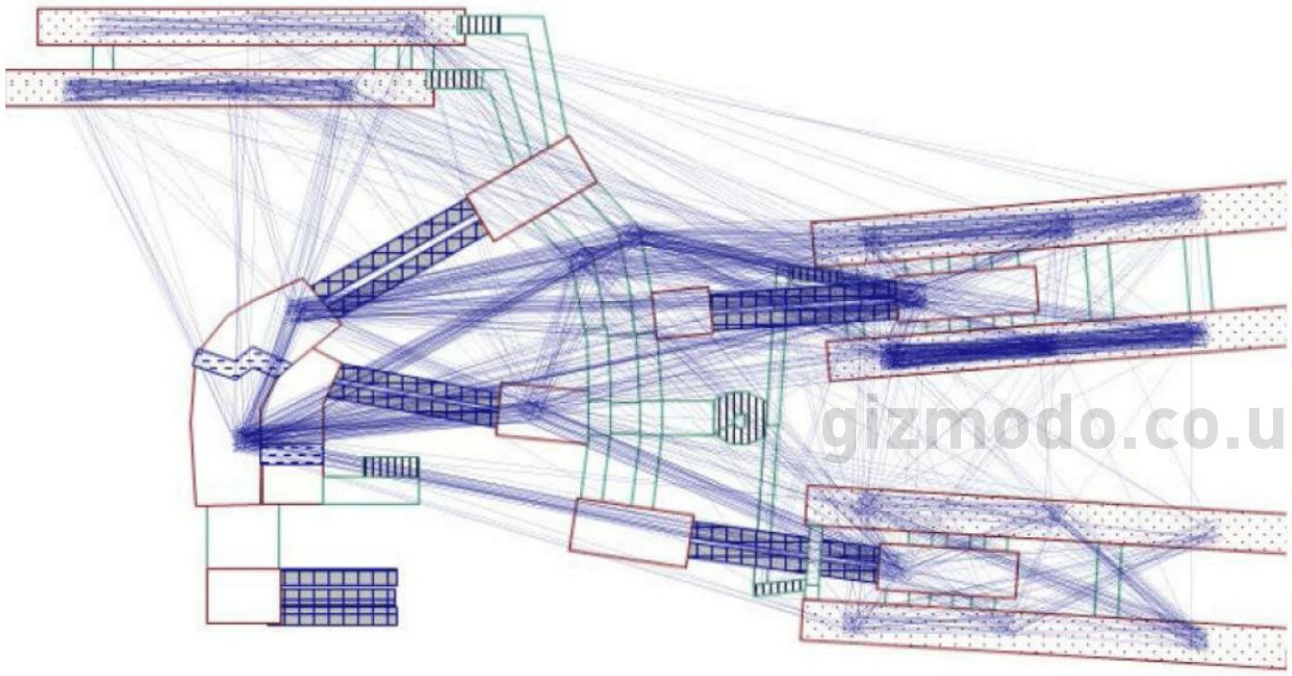


25% no intermediate location

2% other and more complex routes

Source: gizmodo.co.uk

In-station tracking

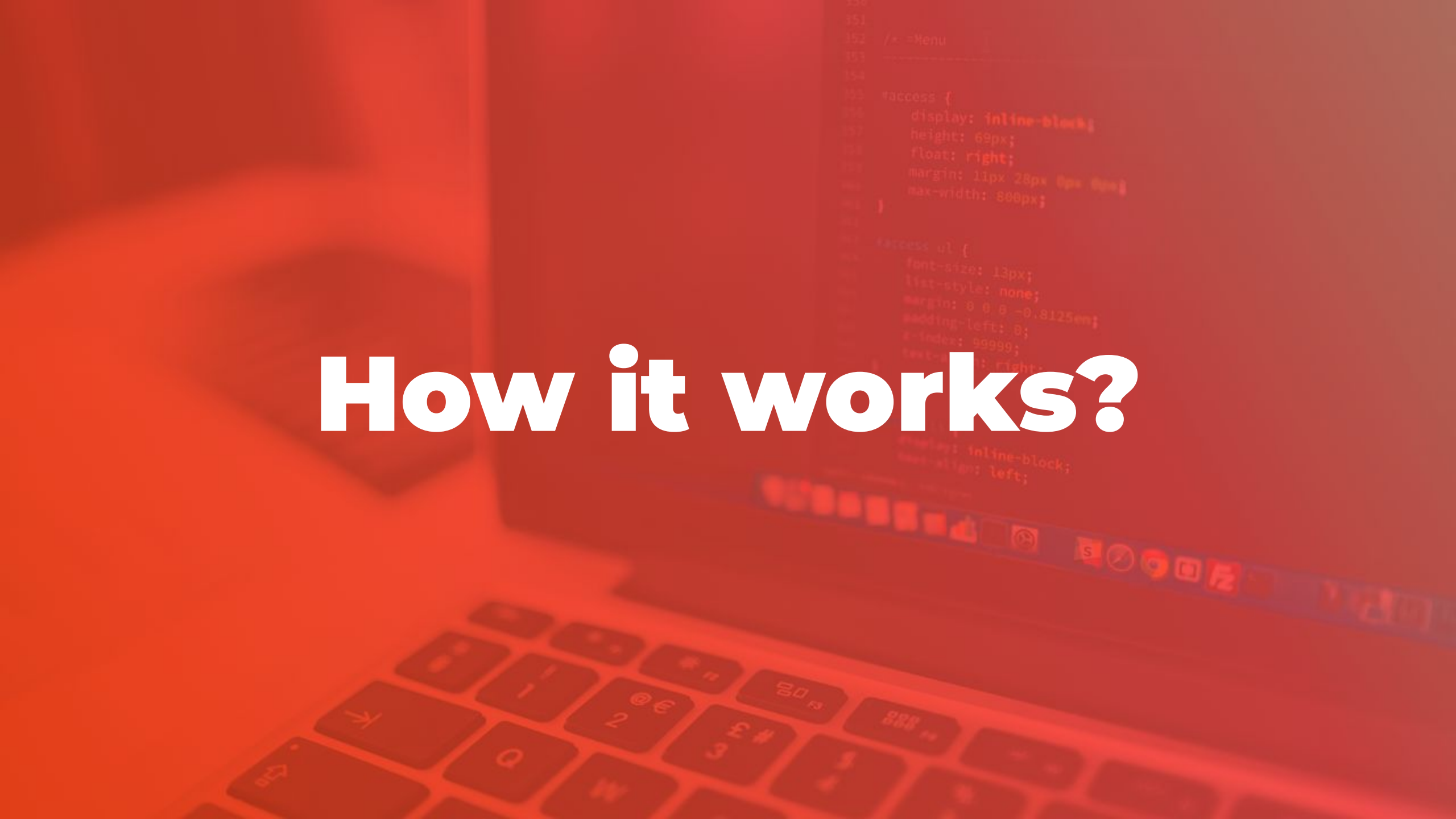


Source: gizmodo.co.uk

Since July, they're doing it again

But, is that a problem?

Surveilling
ON THE CHEAP


How it works?

How it works?

All Wi-Fi devices send probes while trying to find hotspots to connect to.

The **trick is finding these beacons** in the midst of a sea of data packets traveling through the Wi-Fi frequency spectre.

Free software to
the rescue

Free software to the rescue

Kali - a Linux distribution designed for digital forensics and penetration testing

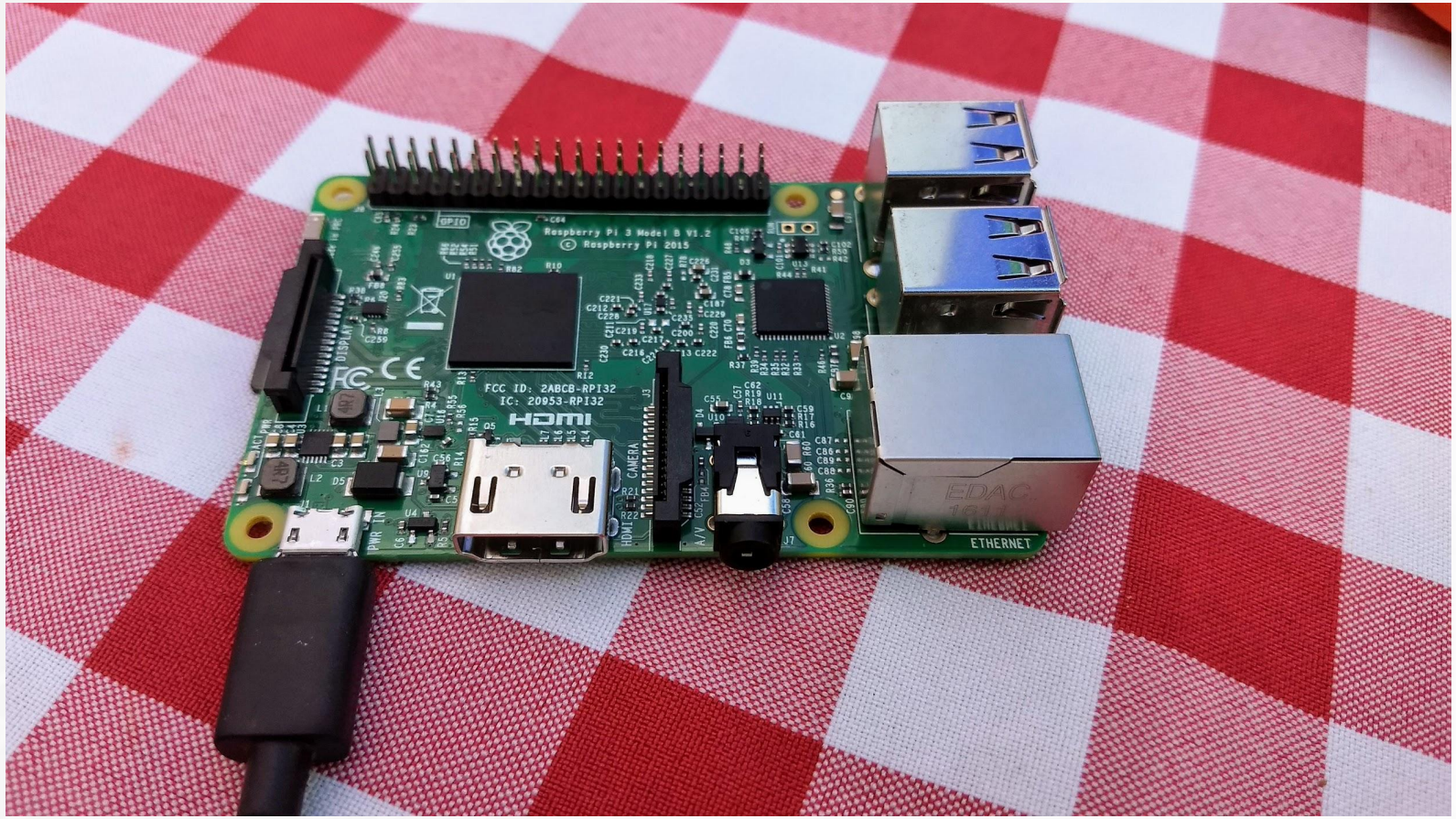
Scapy - Python-based interactive packet manipulation program & library

D3 - a JavaScript library for manipulating documents based on data

Getting the actual data

Getting the actual data

Three **Raspberry Pi 3B** collected data for about 3 hours in a event.

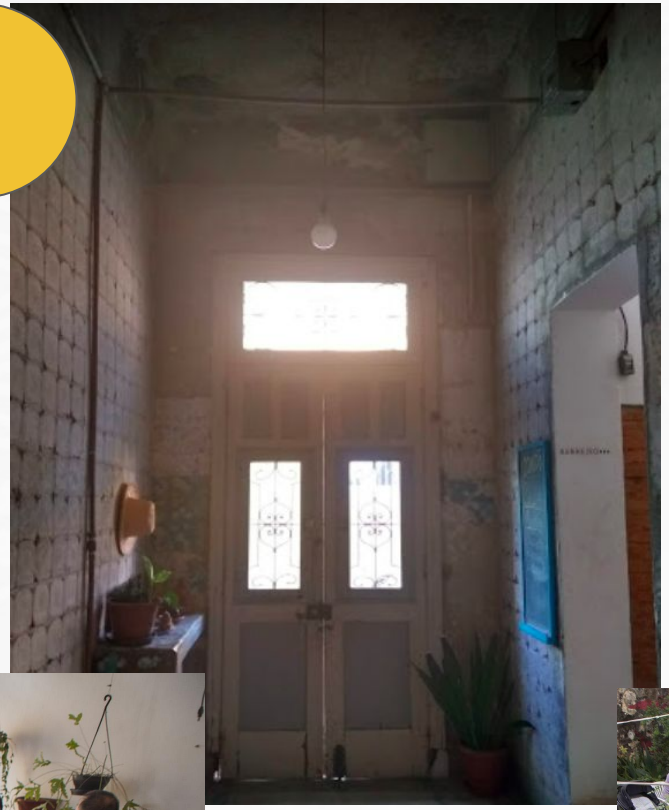


Getting the actual data

Three **Raspberry Pi 3B** collected data for about 3 hours in a event.

Getting the actual data

1

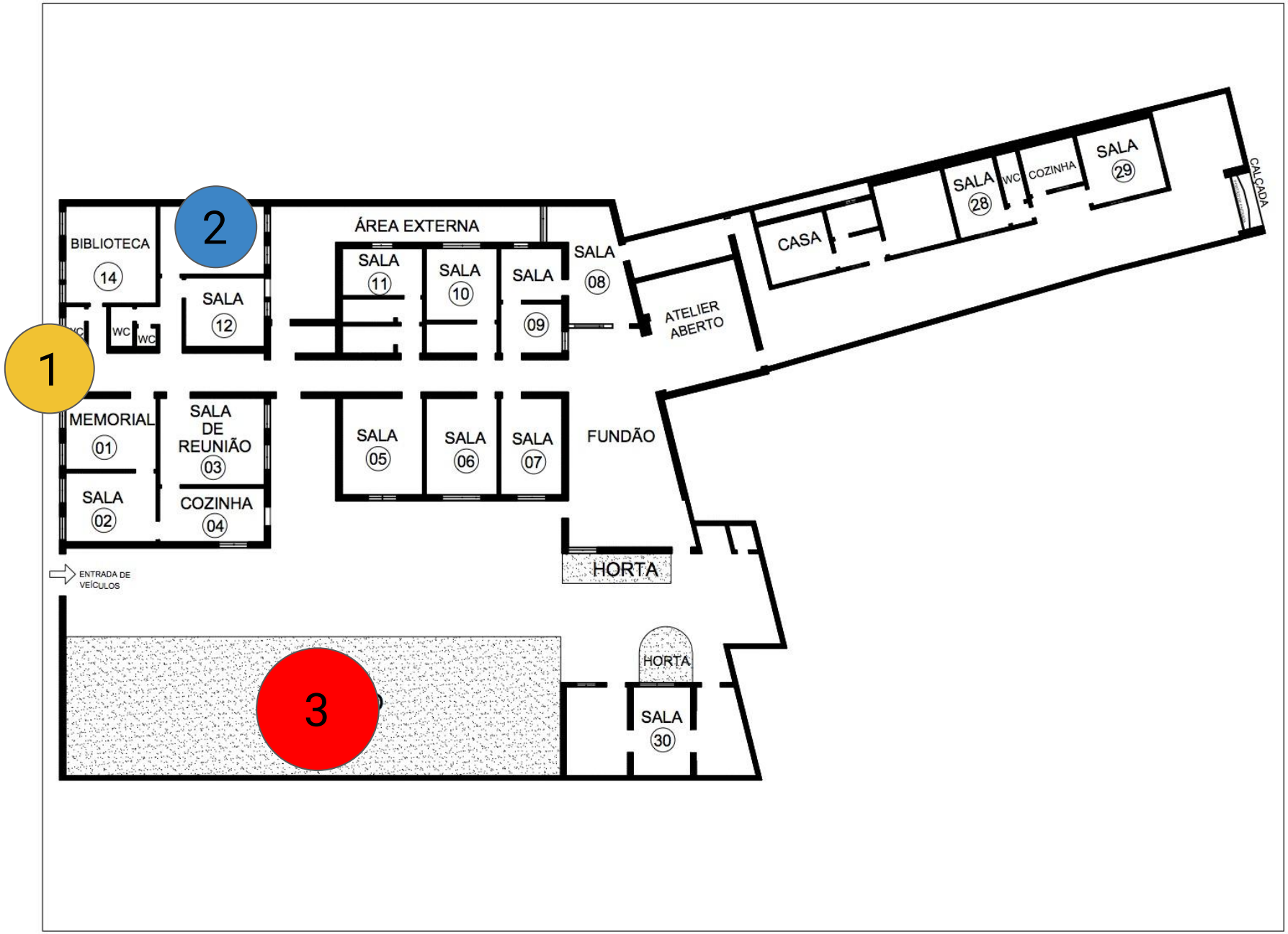


2

3

Brace yourselves
It’s code time

What we found


1
2
3
BIBLIOTECA
14
WC
WC
SALA
12
ÁREA EXTERNA
SALA
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SALA
10
SALA
09
SALA
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ATELIER
ABERTO
CASA
SALA
28
WC
COZINHA
SALA
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CALÇADA
MEMORIAL
01
SALA
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REUNIÃO
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SALA
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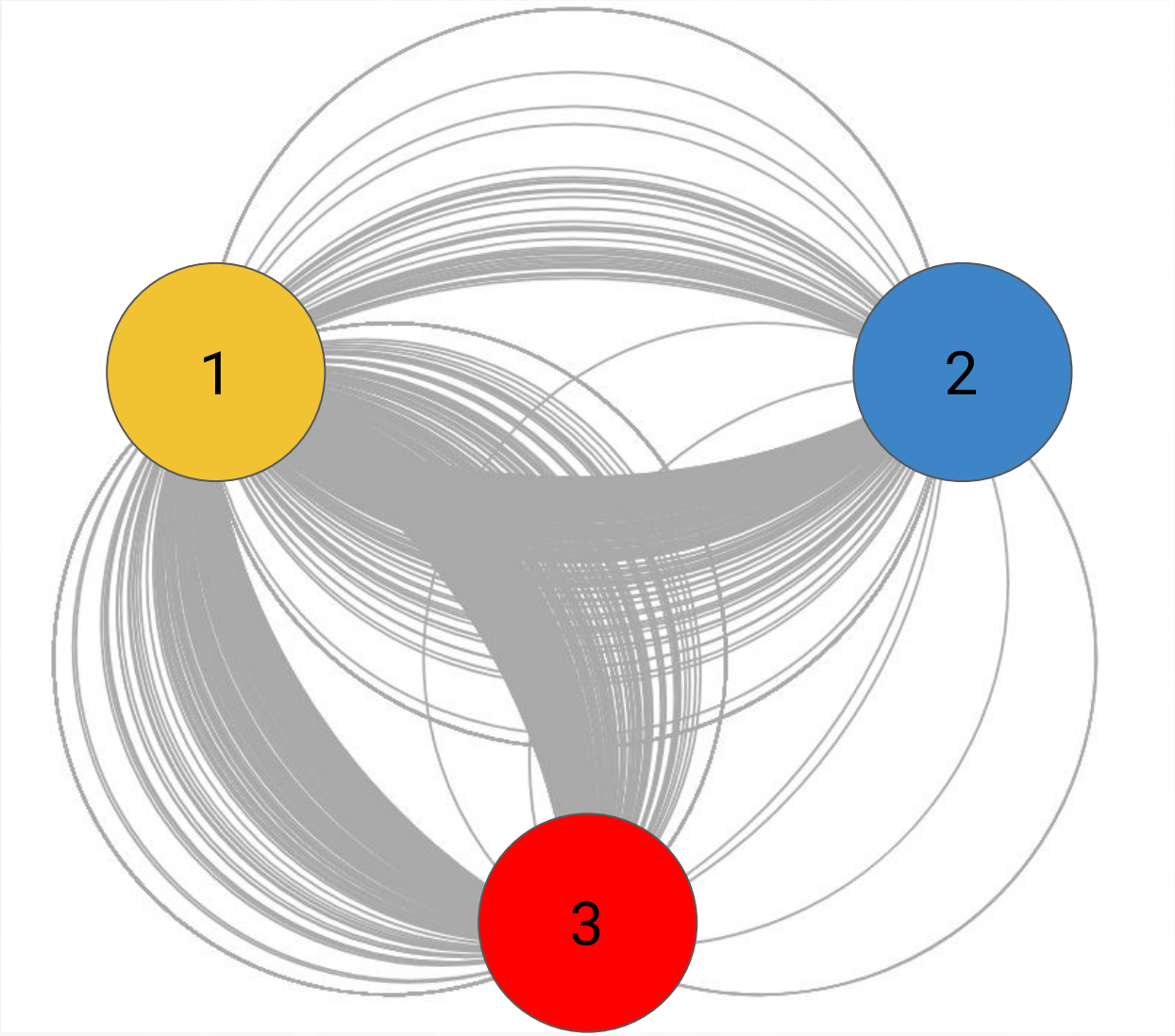
FUNDÃO
HORTA
ENTRADA DE
VEÍCULOS
HORTA
SALA
30

Detected movements



References

Here's What TfL Learned From Tracking Your Phone On the Tube
https://www.gizmodo.co.uk/2017/02/heres-what-tfl-learned-from-tracking-your-phone-on-the-tube/

London Underground to start tracking all phones using Wi-Fi starting in July
https://www.theverge.com/2019/5/22/18635584/london-underground-tube-tfl-wi-fi-tracking-privacy-data-security-transport

What does the GDPR say about WiFi tracking?
https://www.privacycompany.eu/en/what-does-the-gdpr-say-about-wifi-tracking/

TfL to give customers better information about their Tube journeys
https://tfl.gov.uk/info-for/media/press-releases/2019/may/tfl-to-give-customers-better-information-about-their-tube-journeys

why-fi?

Discovery | Privacy | Tracking | Mapping

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