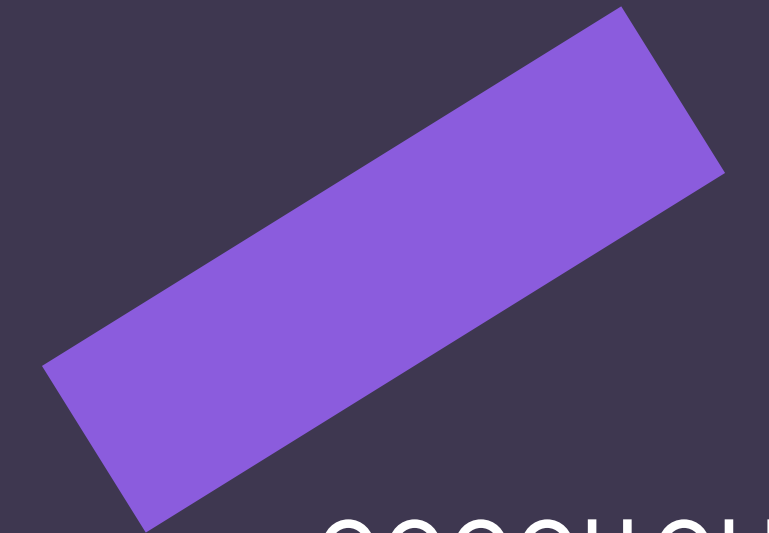
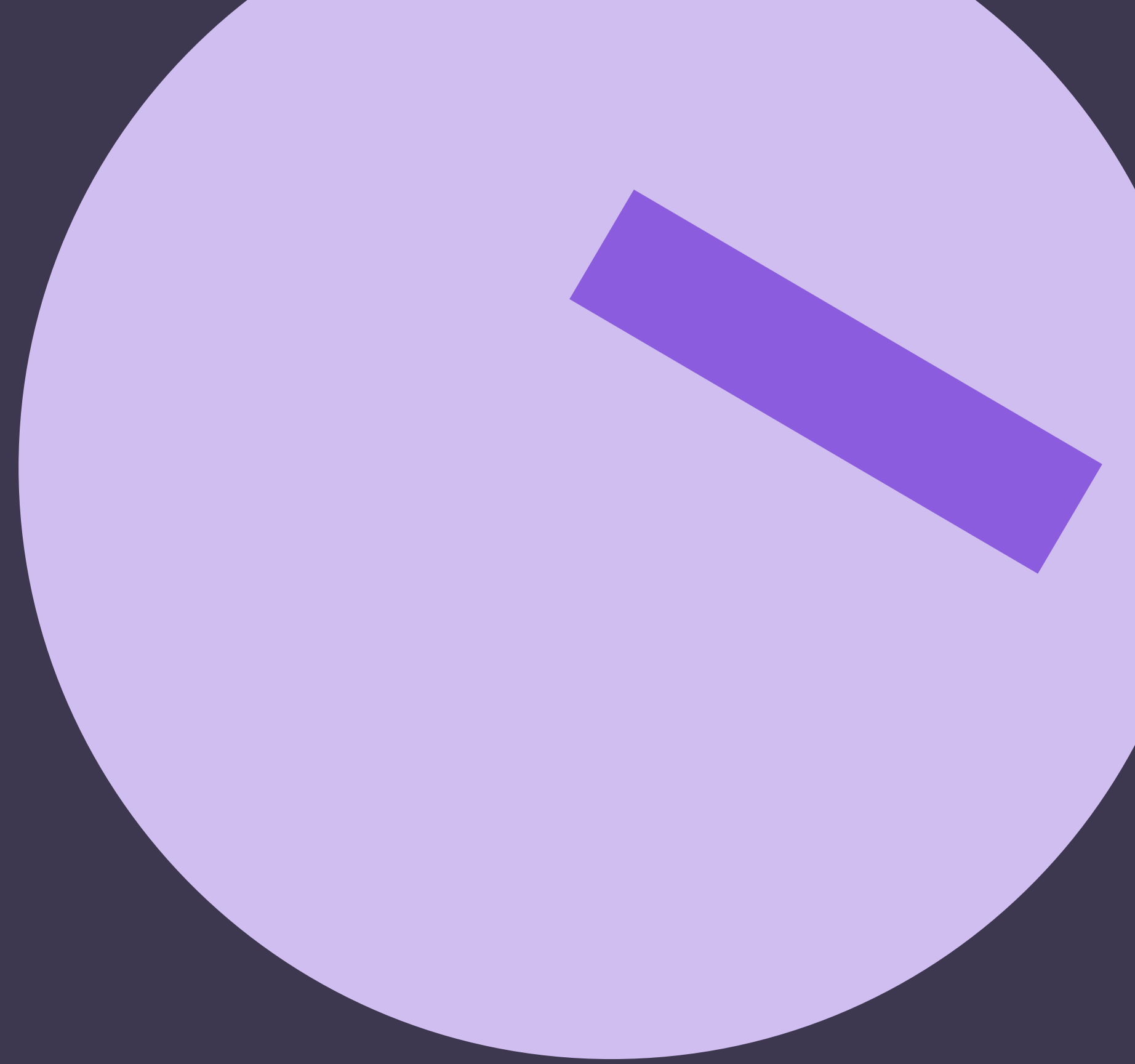
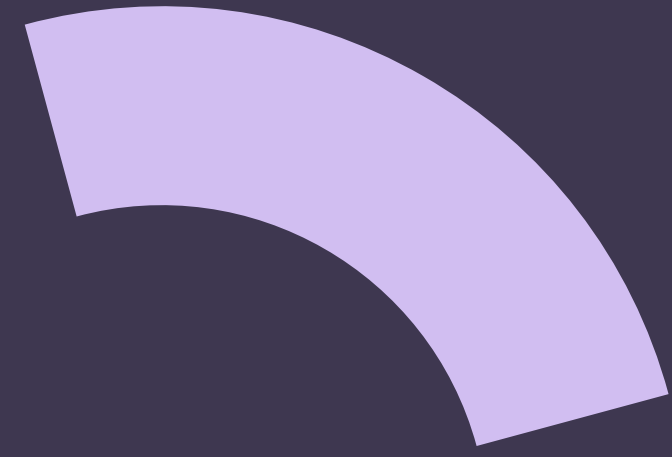


Adventures in JavaScript and the IoT



About the talk

PARALLAX

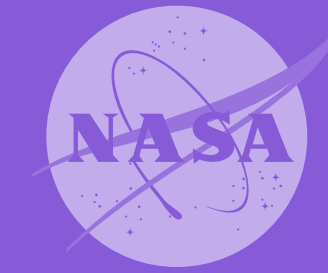


About Parallax

PARALLAX



We work with...



The team

About me

PARALLAX



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James Hall Founder / Director at Parallax

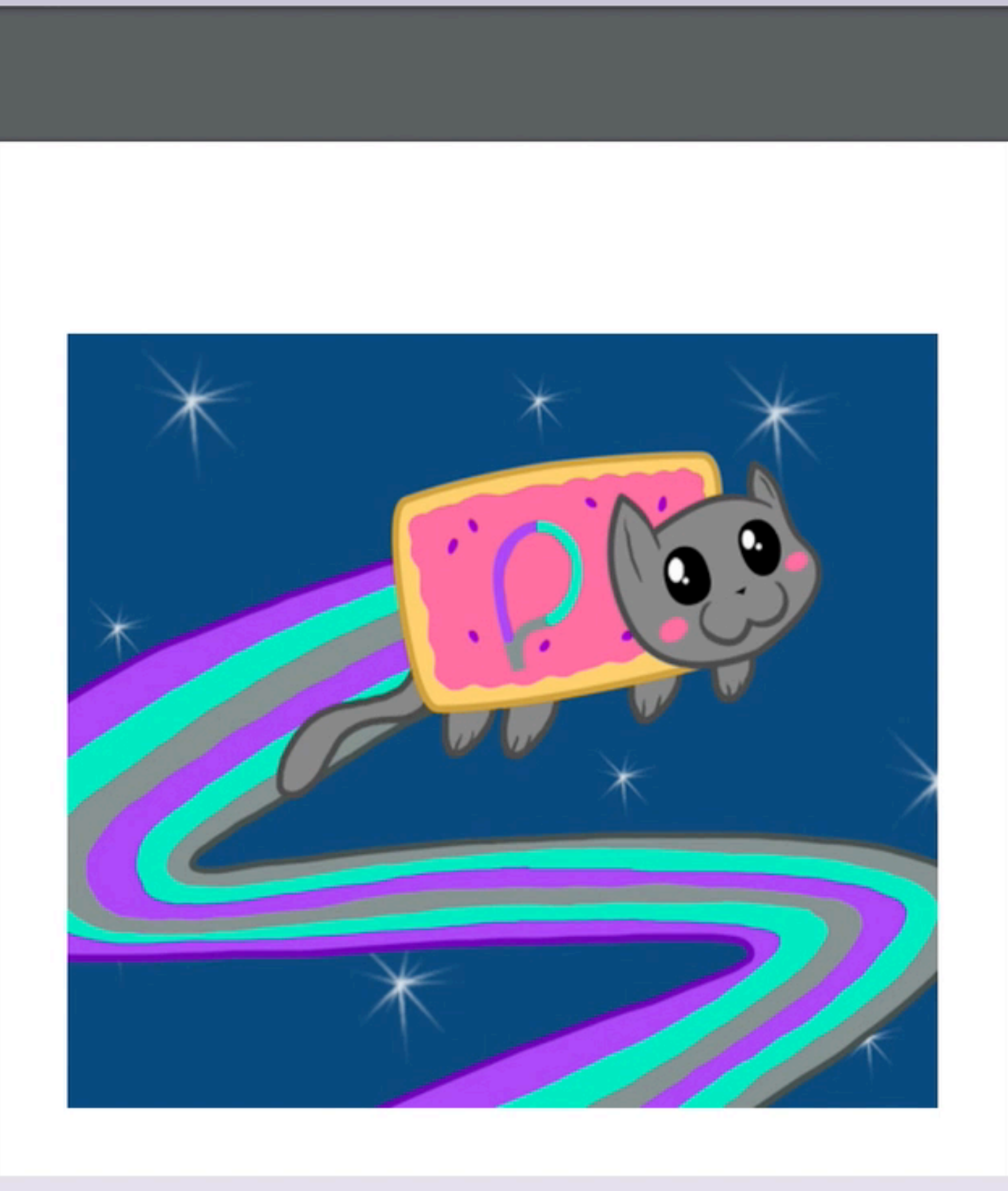


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jsPDF – A client-side solution for generating PDFs




```
Pick an example Images  
1 var imgData = 'data:image/jpeg;base64,/9j/4AAQSk...
```



Generating PDF files with Javascript



144



77

I'm trying to convert XML data into PDF files from a web page and I was hoping I could do this entirely within Javascript. I need to be able to draw text, images and simple shapes. I would love to be able to do this entirely in the browser.

javascript

pdf

pdf-generation

share improve this question

add a comment

asked Apr 12 '09 at 19:27



amoeba

897 ● 2 ● 9 ● 10





253



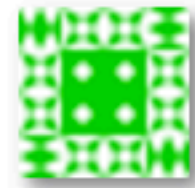
I've just written a library called [jsPDF](#) which generates PDFs using Javascript alone. It's still very young, and I'll be adding features and bug fixes soon. Also got a few ideas for workarounds in browsers that do not support Data URIs. It's licensed under a liberal MIT license.

I came across this question before I started writing it and thought I'd come back and let you know :)

Generate PDFs in Javascript

share improve this answer

edited Jul 28 '14 at 15:45



Joeytje50

10.7k ● 3 ● 32 ● 58

answered Apr 22 '09 at 19:49



James Hall

3,910 ● 1 ● 13 ● 15

-
- 6 Did I partially inspire jsPDF? I learned about jsPDF the day you announced it. Looking great so far. I ended up going with Prawn as it's easily the best PDF generation library out there for my requirements. I would still love to do all of my work in-browser as I'm not positive I'll get Ruby on the system I'm deploying to. I'm watching jsPDF very closely. I would love to help out but my time is very limited. That might change in the future. — [amoeba](#) May 4 '09 at 19:40
-





Windows Vista™



What is
the IoT?



GOOGLE CLOUD SAYS:

“Internet of Things (IoT) is a sprawling set of technologies and use cases that has no clear, single definition.”

We asked 50 people –

When you think of
"Internet of Things" –
what do you think of?

64% of respondents
said “Things” 🤔



“Things” connected
to the internet.



Our first “IoT”
project –
ActionScript, PHP,
Nightclub toilets 🍌

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The brief –



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The final installation



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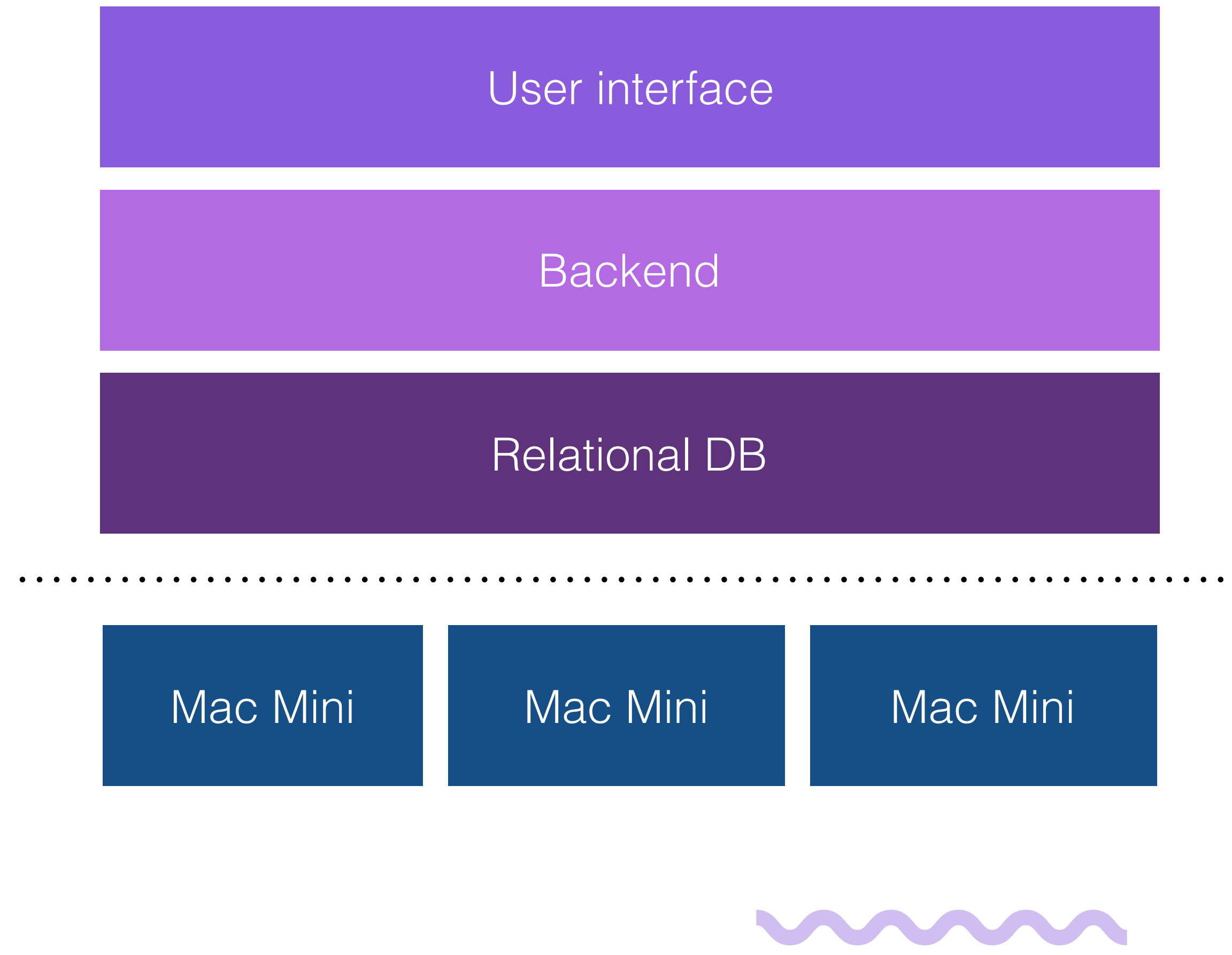


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Implementation



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Leeds Nightclub caught with over 600 litres of fake vodka

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PHP Web Interface and Scheduling



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ActionScript



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Issues




Lesson 1

Don't trust
connections.
VPN it.

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“Can we get a
phone line on
the M5?” 



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The brief –



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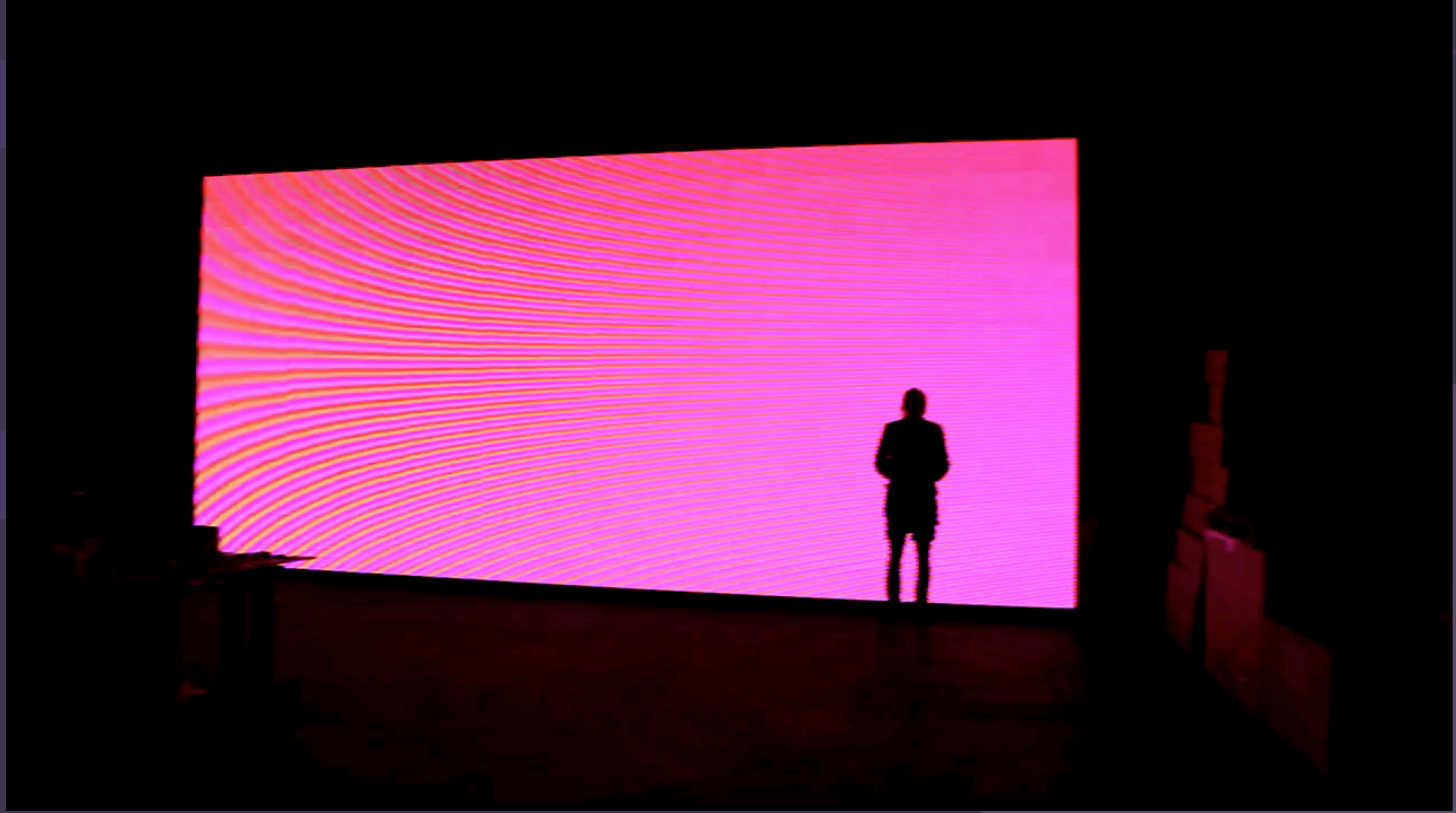


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Hardware implementation



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“Bro you on EE?”





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Software Implementation



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Issues with brightness



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Electrical and Operating Requirements

Line voltage: 100-240V AC

Frequency: 50Hz to 60Hz, single phase

Maximum continuous power: 85W

Operating temperature: 10° to 35° C (50° to 95° F)

Storage temperature: -40° to 47° C (-40° to 116° F)

Relative humidity: 5% to 95% non-condensing

Operating altitude: tested up to 3,000 metres

Typical acoustical performance:

Sound pressure level (operator position): 12dBA at idle³



Lesson 2

Don't trust hardware.
Try it in the fridge? 🤔

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British Airways



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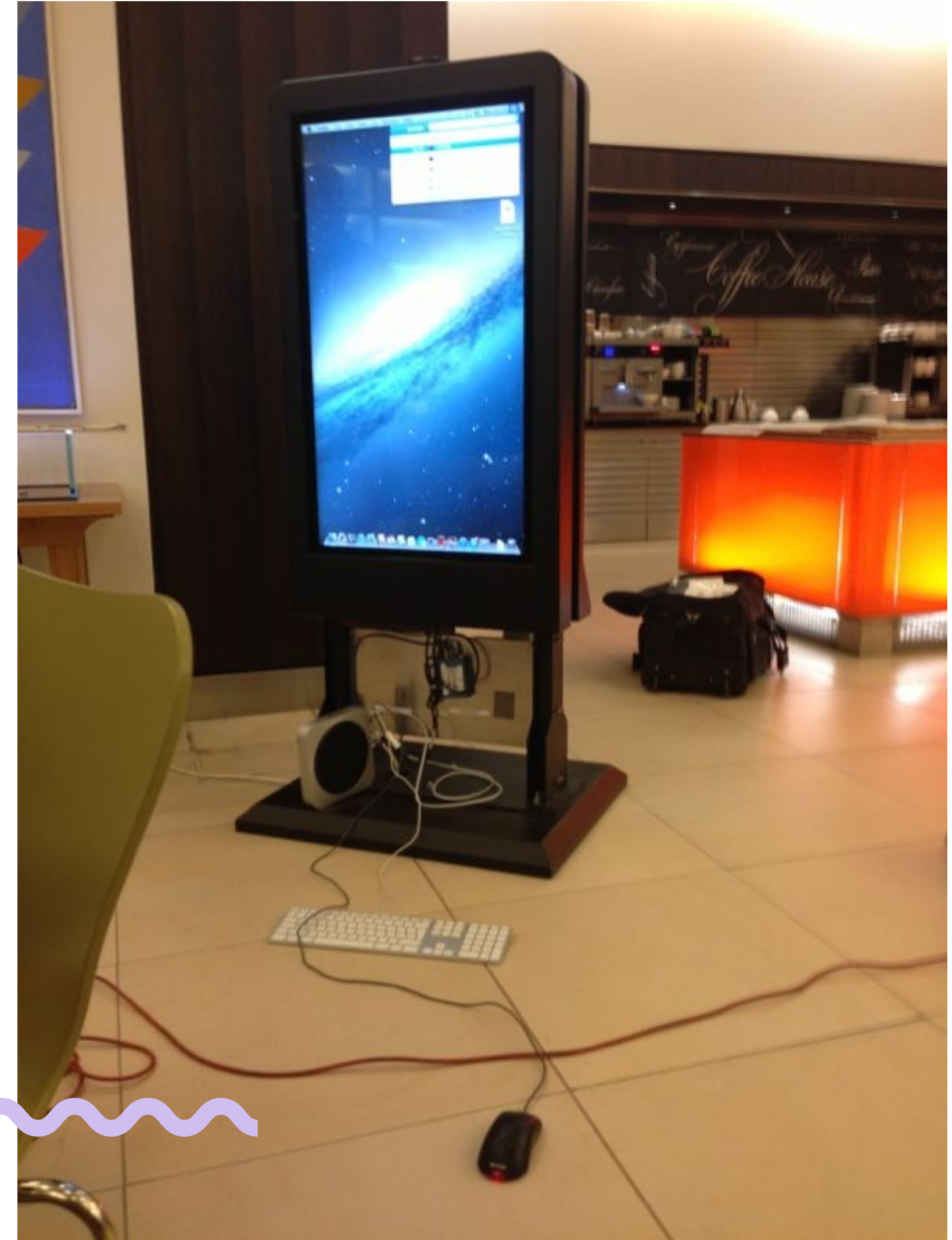


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Why Mac Minis?



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Amalga



ESCORTED

Expires 05/12/2012

ALG 140986

ANDREW FITCH

DIRECTOR

AMALGA LIMITED

Andrew Fitch

Categories below, please delete all categories

A	B	C	D	E	F	G
----------	----------	---	---	---	----------	---

 **BRITISH AIRWAYS**

To invest in
our fleet.
To feel the
difference at
39,000ft.
To Fly. To Serve.



We collected
temperature
sensor data,
and uptime

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BMW GESTURE CONTROL.
THE NEW BMW 7 SERIES.
DRIVING LUXURY.



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Power Issues



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Lesson 3

Don't trust humans.



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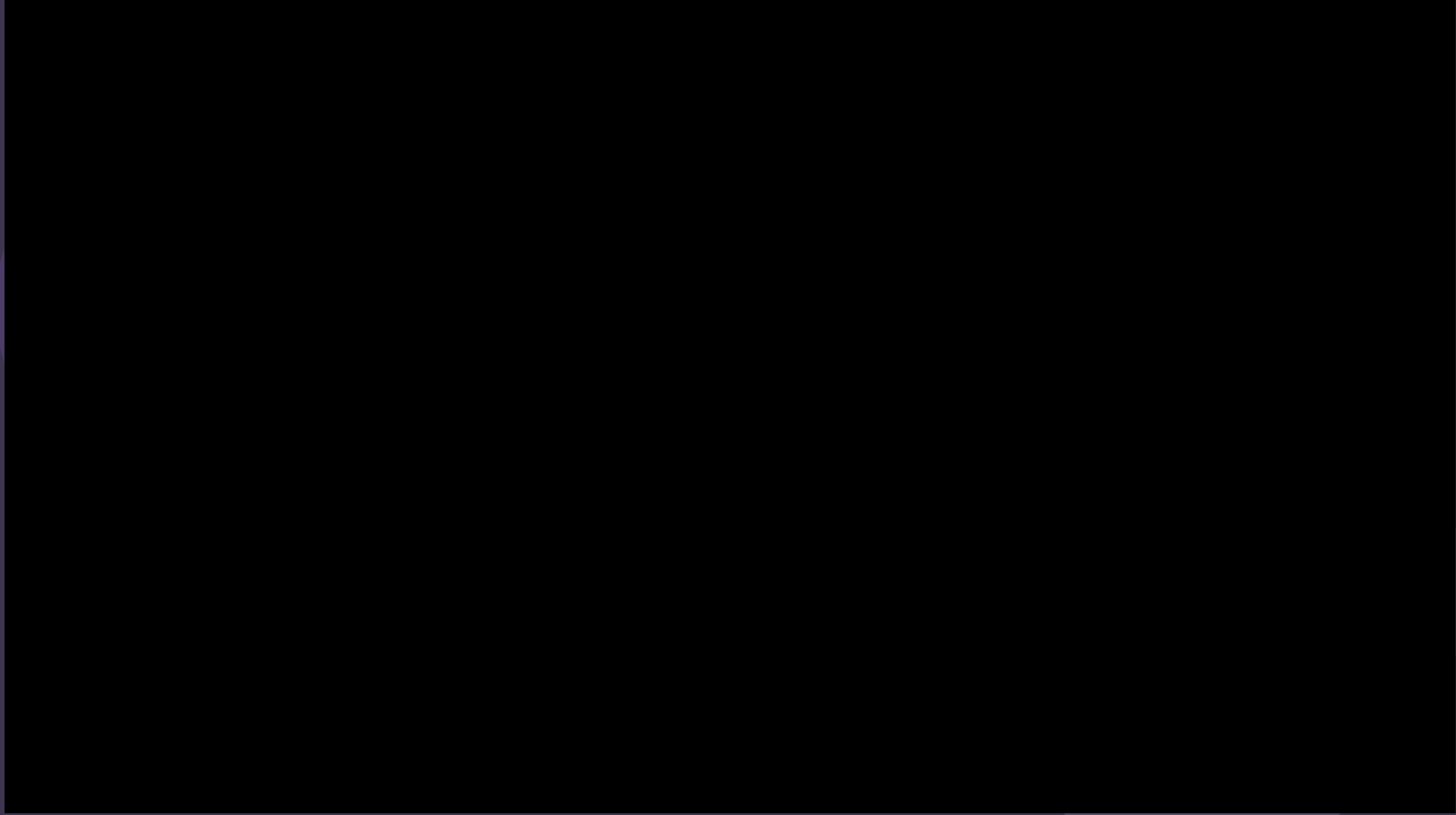


adidas
Pureboost



The brief:

Make energy lava come
out of a shoe.



Using a games engine



Unity Cloud Build

Build Games Faster

Unity Cloud Build makes it simple and easy to create and share builds of your game. It automatically compiles, deploys, and tests your game so you can iterate quickly with your team. Setup takes seconds and works with your existing source control repository.

[Activate for Free](#)[Login](#)

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Touch screen issues



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“when we leave the shoes on the screen for 15 seconds, the touches stop sending” 😞



Hedge our bets.
Buy a new panel,
and get a firmware
update.



23
Foot Locker

21
Foot Locker

adidas

PUREBOOST R
RAW
ENERGY

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footlocker.eu

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adidas Shoe Rollout



The brief:

Stable and secure data
collection for the
campaign

You enter a competition
in order to win the
chance to buy the
shoes.

Fleet of 46 iPads across
12 stores with a custom
form.

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73,000
ENTRIES

Issues

If you give people
quick WiFi, they will
use it...



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adidas
Gazelle



The brief



Hard parts first



The first 90% of the code accounts for the first 90% of the development time. The remaining 10% of the code accounts for the other 90% of the development time.

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adidas

Foot Locker APPROVED.
footlocker.eu

310 322

remember the future.

ADIDAS MEANS ACTION: When your future is spent on the gear you need, equipment that just doesn't last. That's Adidas. The world's best with the 3 stripes.

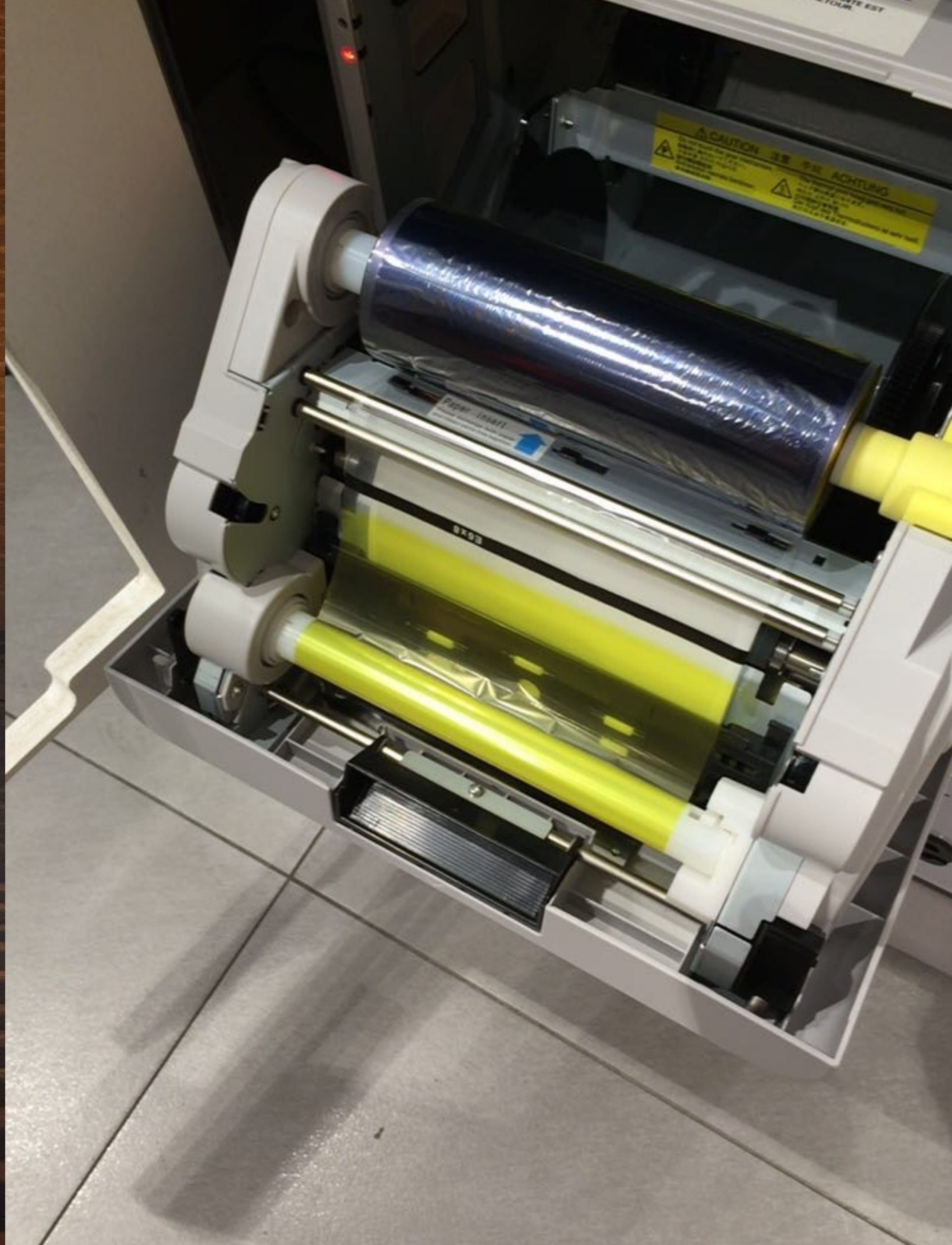
adidas?

adidas

Dismaland
Amusement Park

steal from history.

g a z e l l e



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We created an interactive installation piece that was rolled out across 5 European cities. The aim was to connect and engage with customers in the store. You get your photo taken on an iPad, the image gets sent to a 55" touch table. There you make a photo collage, and print it out.

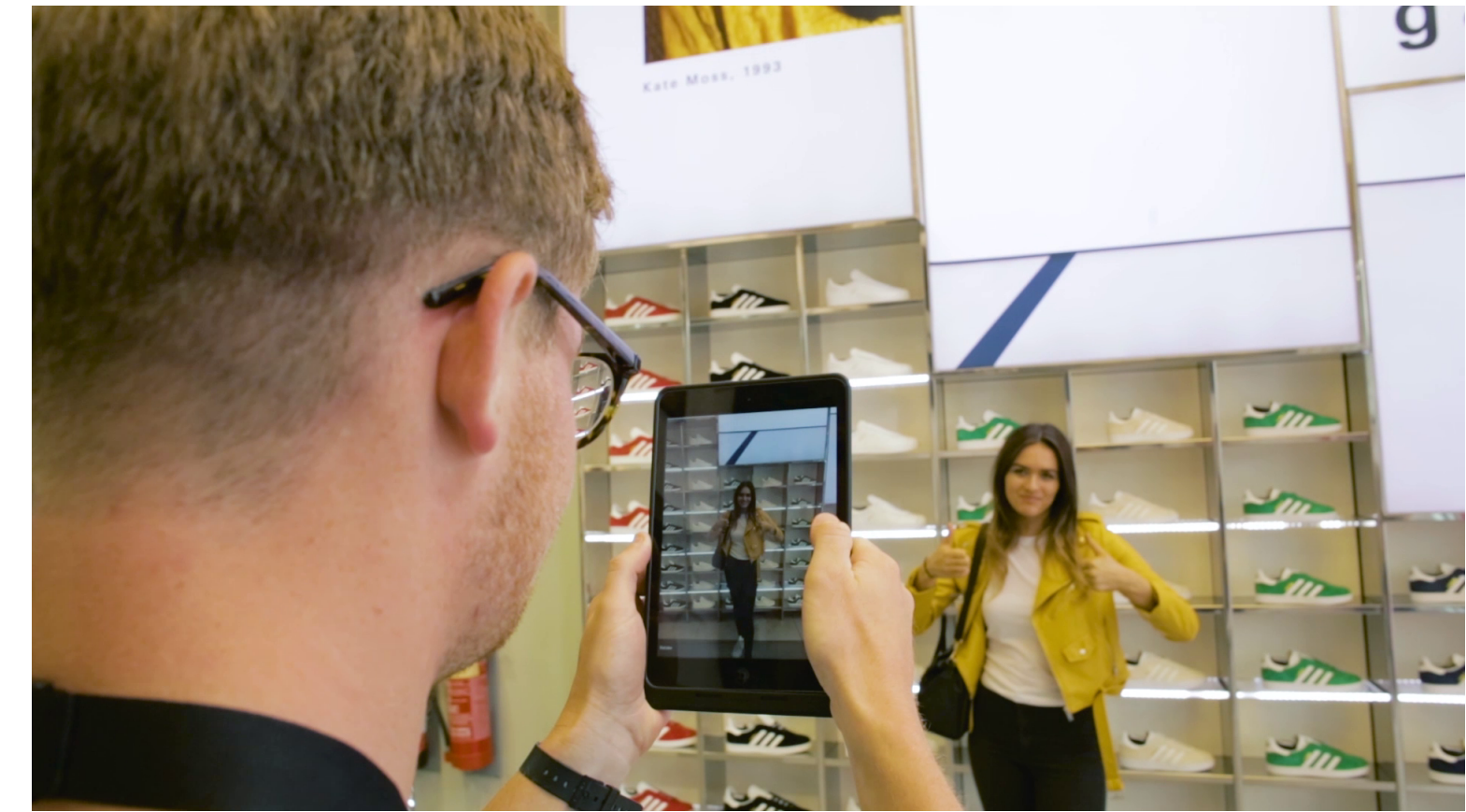
Parallax did everything from design, software development, hardware sourcing, 4G provisioning, and installation.

We used Cisco Jasper to manage SIMs remotely for IoT data connectivity.

Key highlights:

- 4G Connectivity
- Offline capability with online sync
- Full end-to-end build

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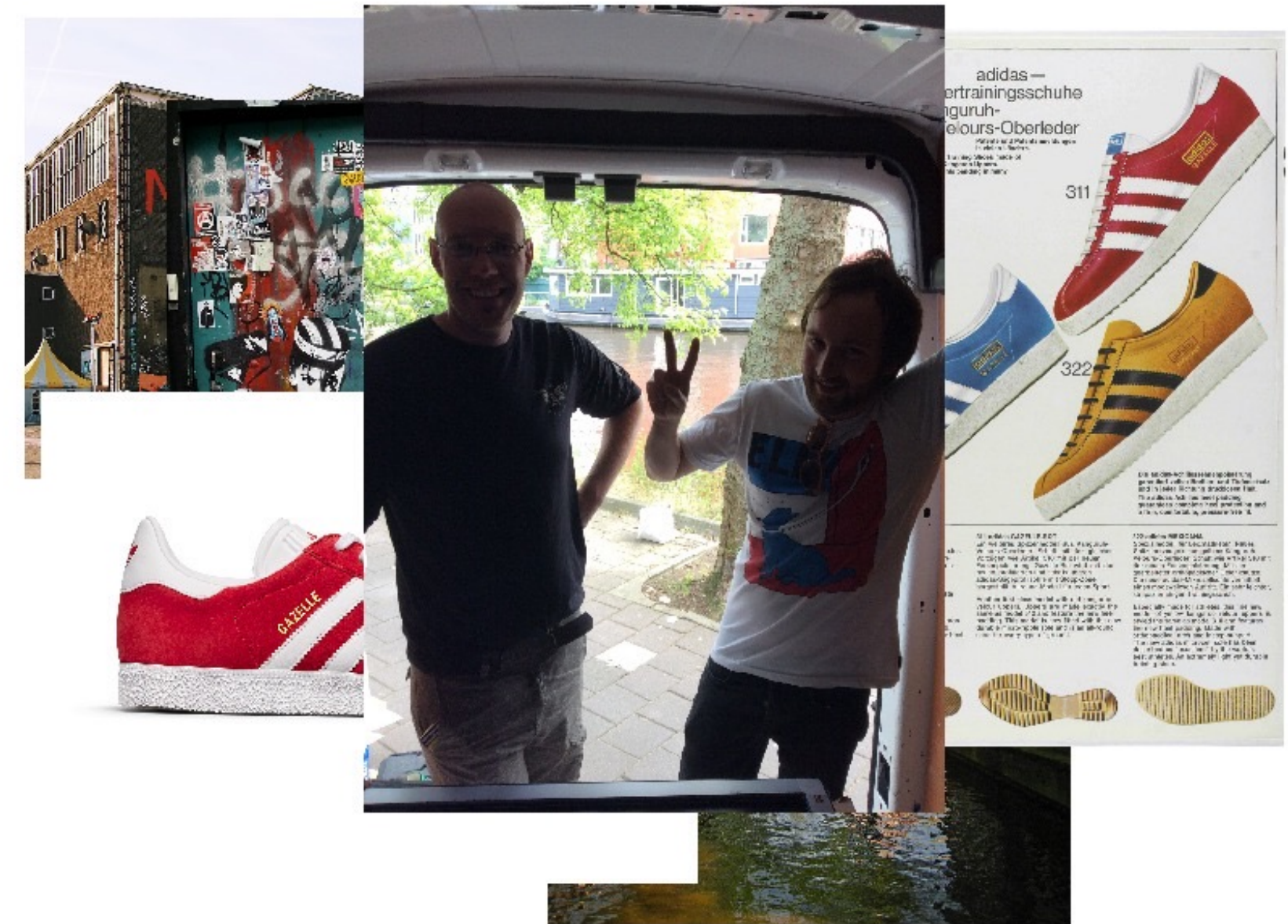
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remember the future.



steal from history.

gazelle

@FootLockerEU
#gazelle

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Electron (Node.js + Webkit)

Kue (offline queue)

Lambda

iPad with WiFi connecting to website on the table

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Issues



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Lost hardware



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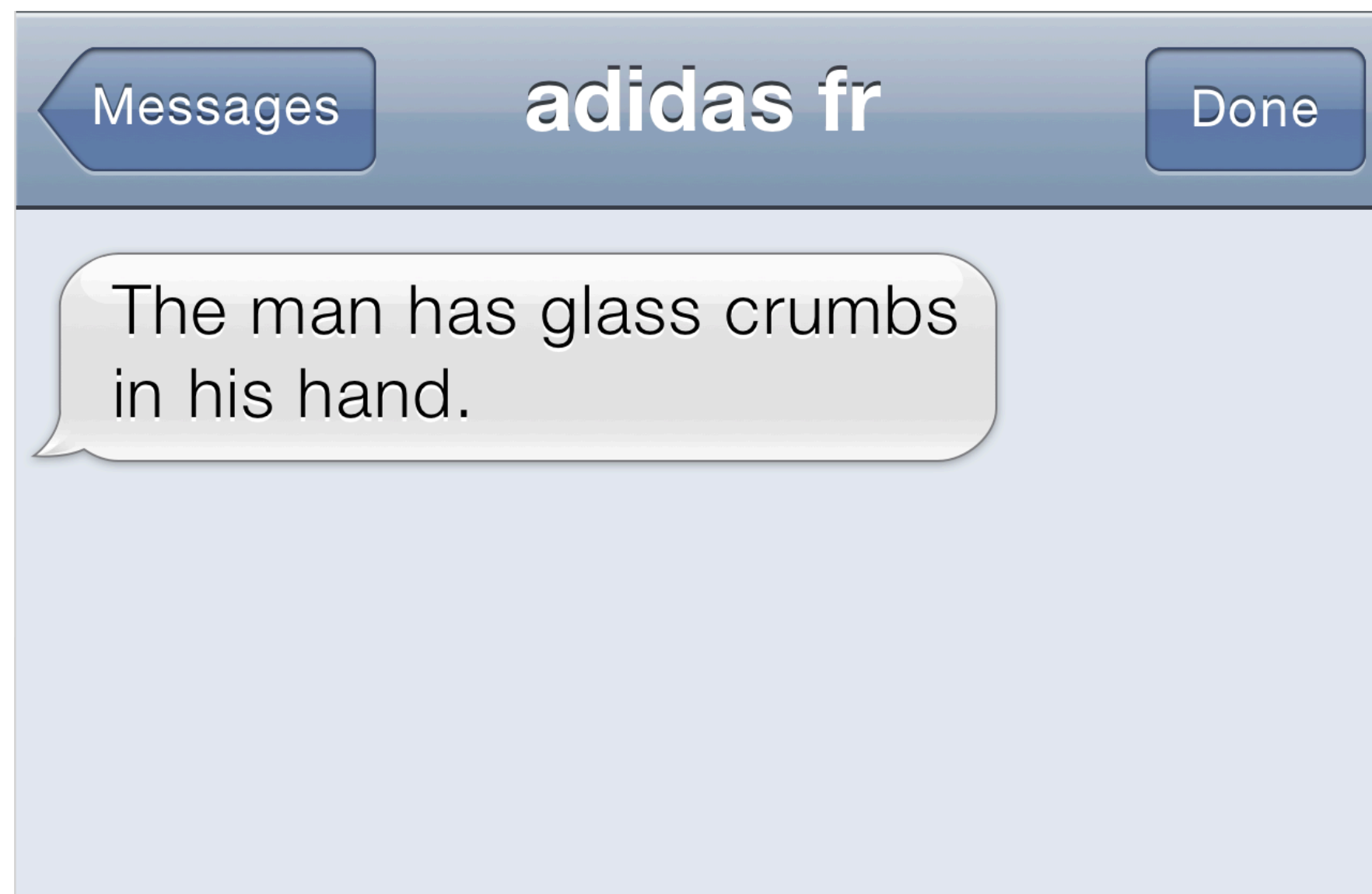
Broken hardware



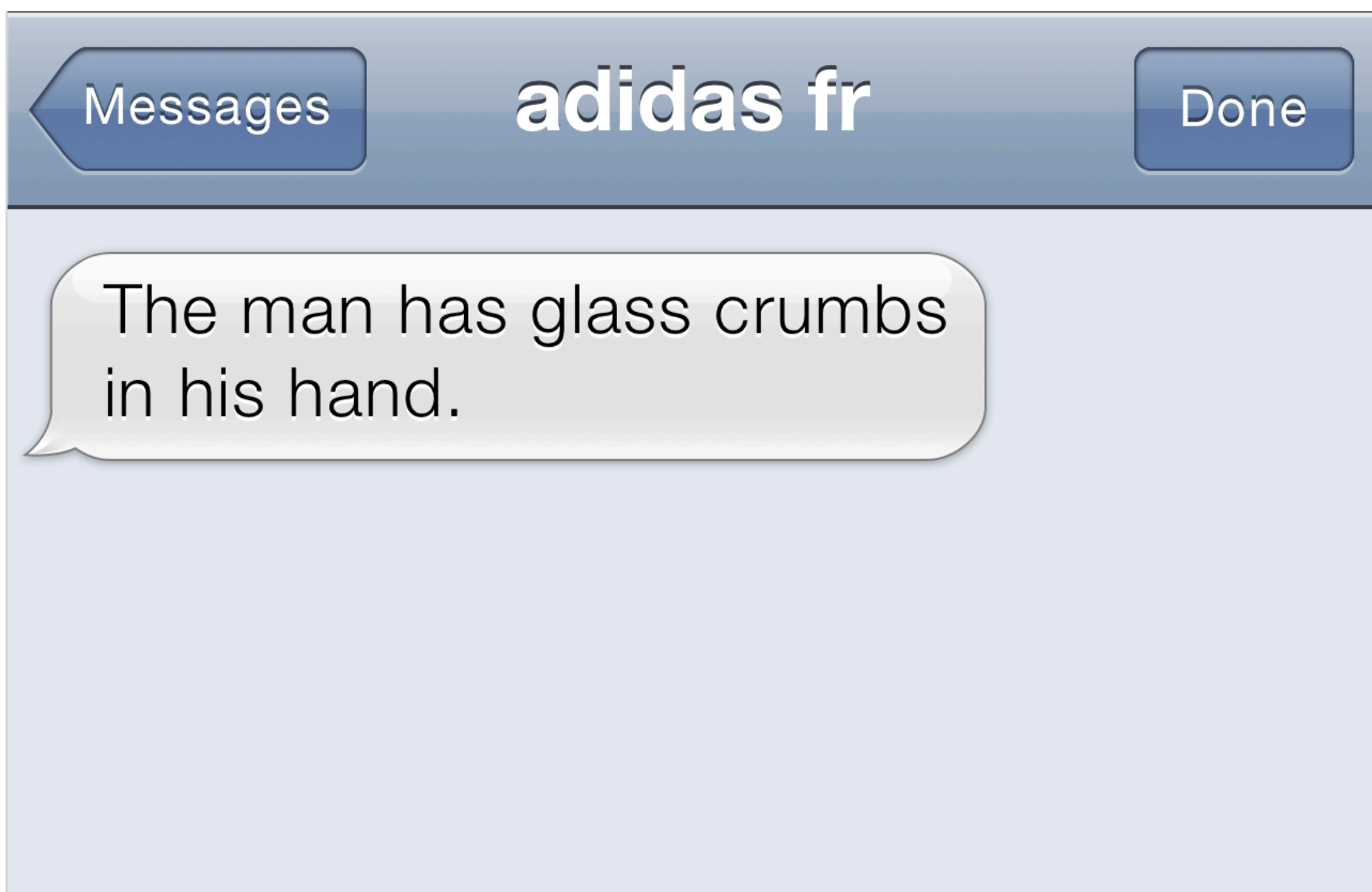
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Then came the support requests

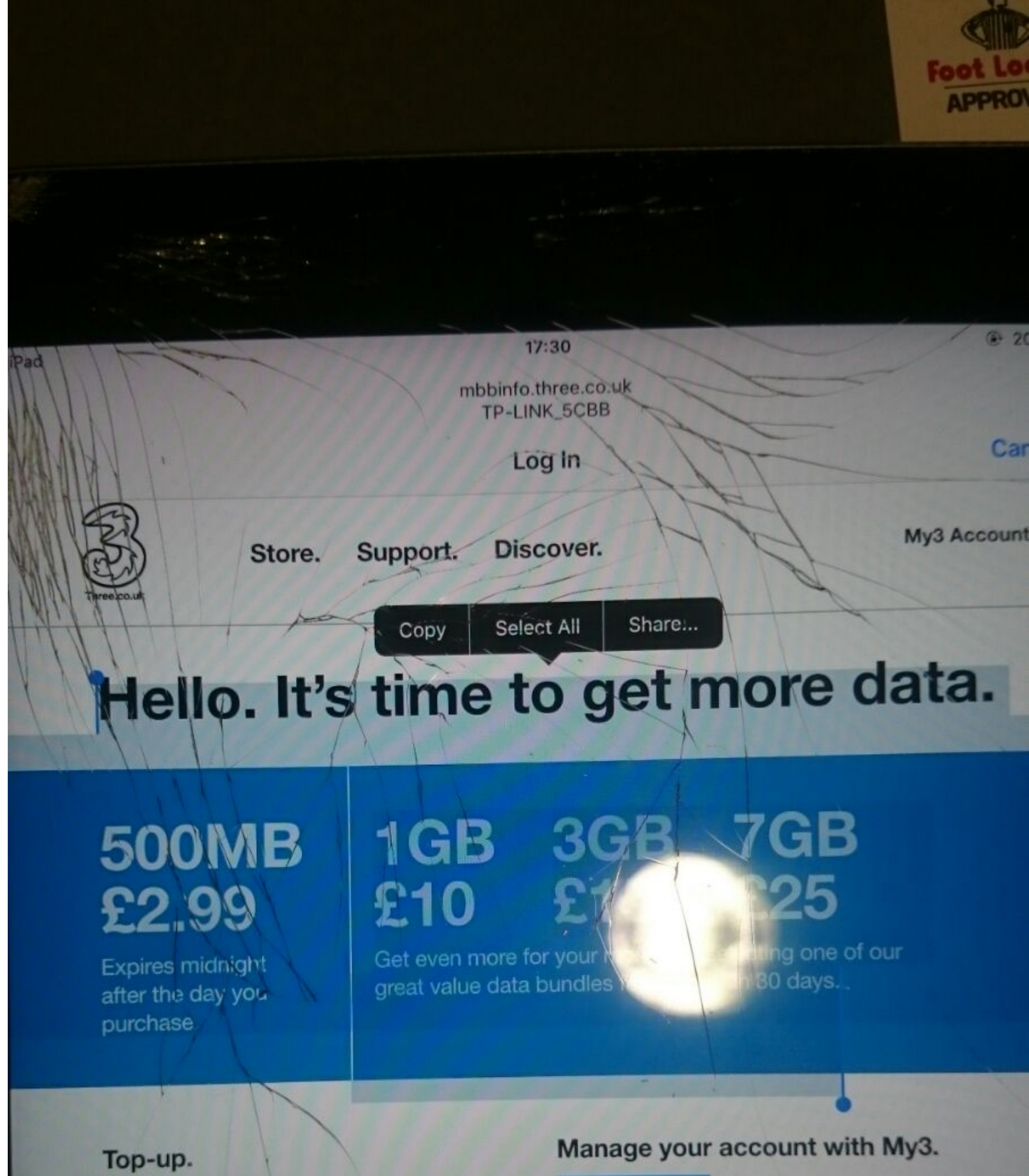
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The crasher bug



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The paths for
node_modules
were too long for
Windows. And it
was sloooowww.



We actually started
writing a faster
npm replacement
called 'fcpm'



fcpm

Fast Cached Package Manager is a shared caching system for teams. It allows you to swap disk space for reduced CPU time. Disk space is cheap.

Node and npm are distributed as full packages for each platform. And so should yours. If they're already built with deps, why build them again?

Installation & Usage

To install globally, simply run:

(@TODO: Replace with precompiled binary option)

```
npm -g install fcpm
```

To install dependencies for you package, just run:

```
f install <packagename>
```

This is going to be the same speed the first time, unless you configure a cached package repo.

Configuring GitHub LFS

fcpm-ruby

fcpm-ruby is a wrapper for bundler which caches precompiled versions of gems. The goal is to provide a faster deployment experience.

Usage

Invoke `bin/fcpm-ruby` as if it were bundler:

```
bin/fcpm-ruby install
```

For even faster installs, tell `fcpm-ruby` to use multiple jobs:

```
bin/fcpm-ruby install --jobs=8
```

Configuration

A `.fcpm-ruby-config` file can be used to tell `fcpm-ruby` not only where to find precompiled gems, but also where to put them if they don't already exist and need to be rebuilt.



The (YAML-formatted) config file supports these keys:

- `source` -- a URI telling where to look for precompiled gems. This currently supports "http://" and "file:" URIs.
- `host` -- a URI telling where gems should be stored if they need to be rebuilt. This supports "scp://" and "file:" URIs. (See also `key`, below.)

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Over 2,500 printouts



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David Guetta, and the train

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The Brief



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The Pitch





They loved it. But
Twilio was going to
be way too
expensive.

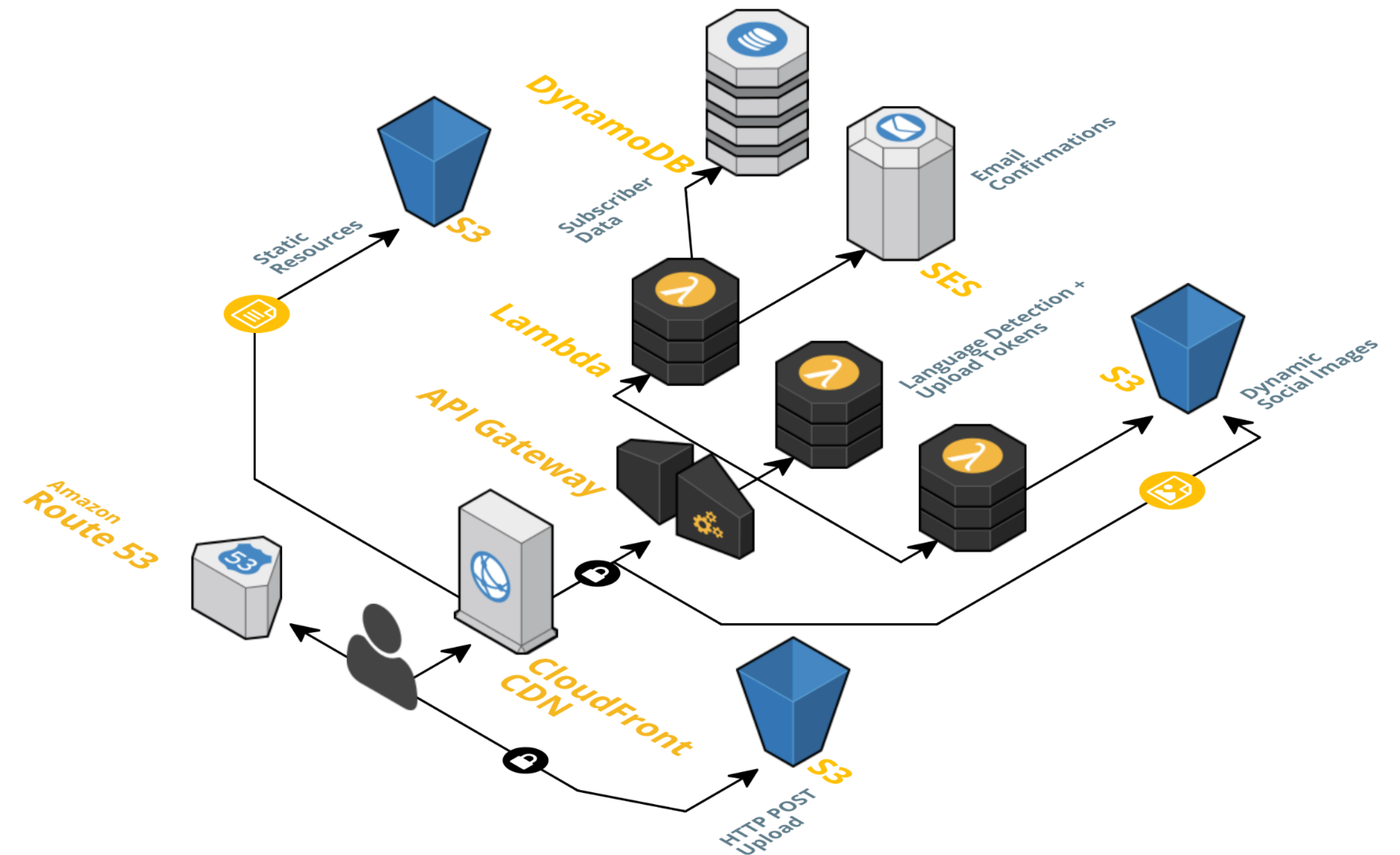
This One's For You

UEFA wanted to do a world first; create a song that everyone can be part of. Parallax worked closely with UEFA's partners to create a unique platform. The goal was to record a chant that would be added to the official anthem. We needed 1 million recordings, and used AWS Lambda to achieve this painlessly without having to scale or manage servers.

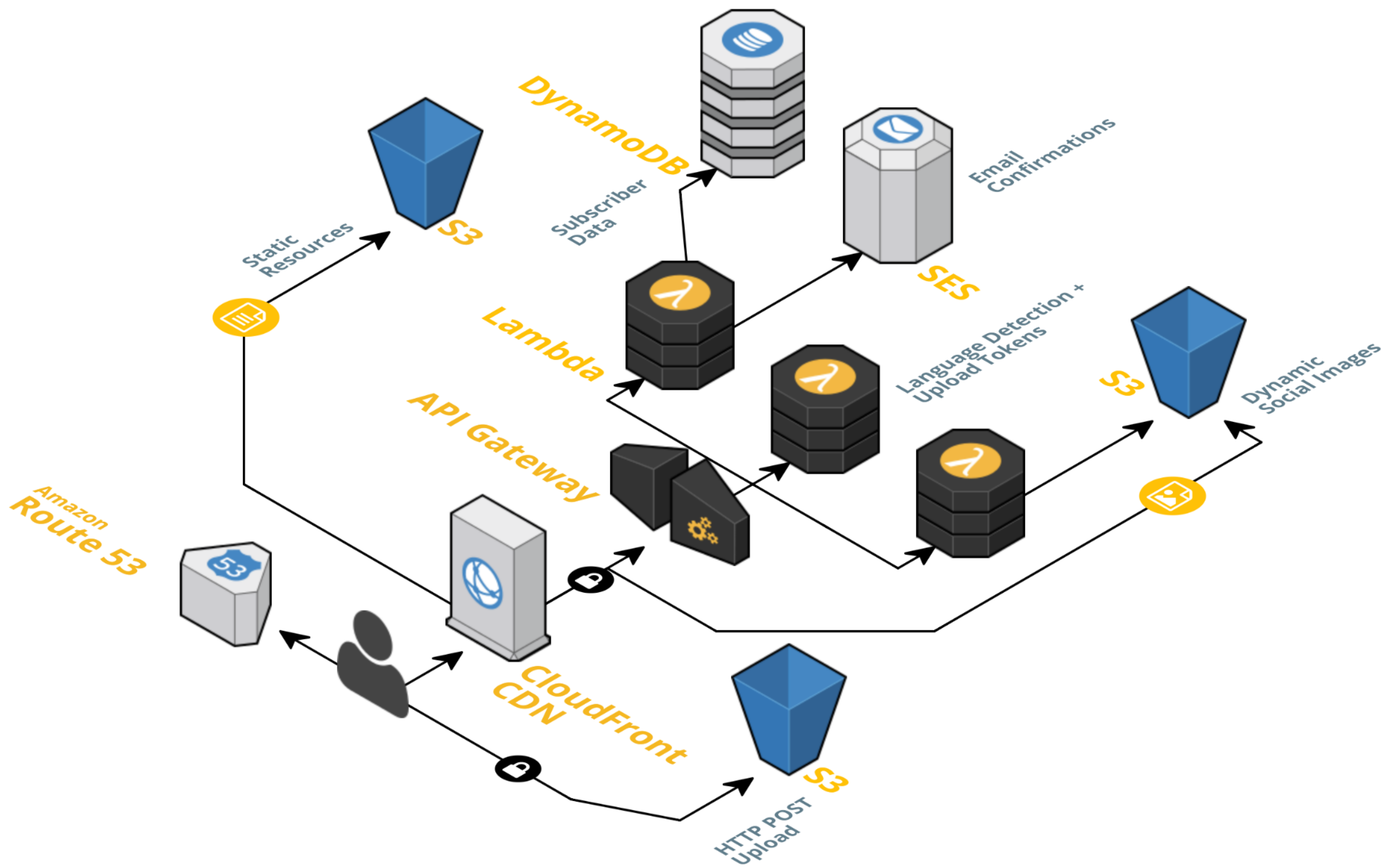
Key highlights:

- 1 million recordings.
- Mobile and Desktop enabled.
- 17 languages.
- Infinitely scalable.

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1 million recordings



DAVID GUETTA NEEDS 1 MILLION PEOPLE TO MAKE HIS NEW SONG

DANIEL CHA * DECEMBER 14, 2015

NEWS

France's **David Guetta** has been recruited to create the official song for the **UEFA Euro 2016** tournament, scheduled to take place in his home country. He's asking fans for help, and requests a astonishing *one million* people to take part in the record.

I'm so excited to be working with UEFA on this project in my home country. UEFA EURO 2016 is all about the fans and I want to put them at the heart of everything, especially the music. So I'm trying

“Everybody loved the idea, some little geniuses created this app where you can record your part.”

David Guetta

I Recorded Guest Vocals For David Guetta's Euro 2016 Anthem

January 21, 2016 / **Angus Harrison**



“The longer I spent watching the intro video, the more it looked like David sort of didn't want to be there. He was shifting around on his chair like a man who'd just nicked a Mars bar.”

– VICE

By participating in this promotion you agree to our [Terms and Conditions](#) and [Privacy Policy](#).

English



DAVID GUETTA

BEATURING YOU

Record with David Guetta below and you could win tickets to UEFA EURO 2016!

This One's For You





Traditional Architecture

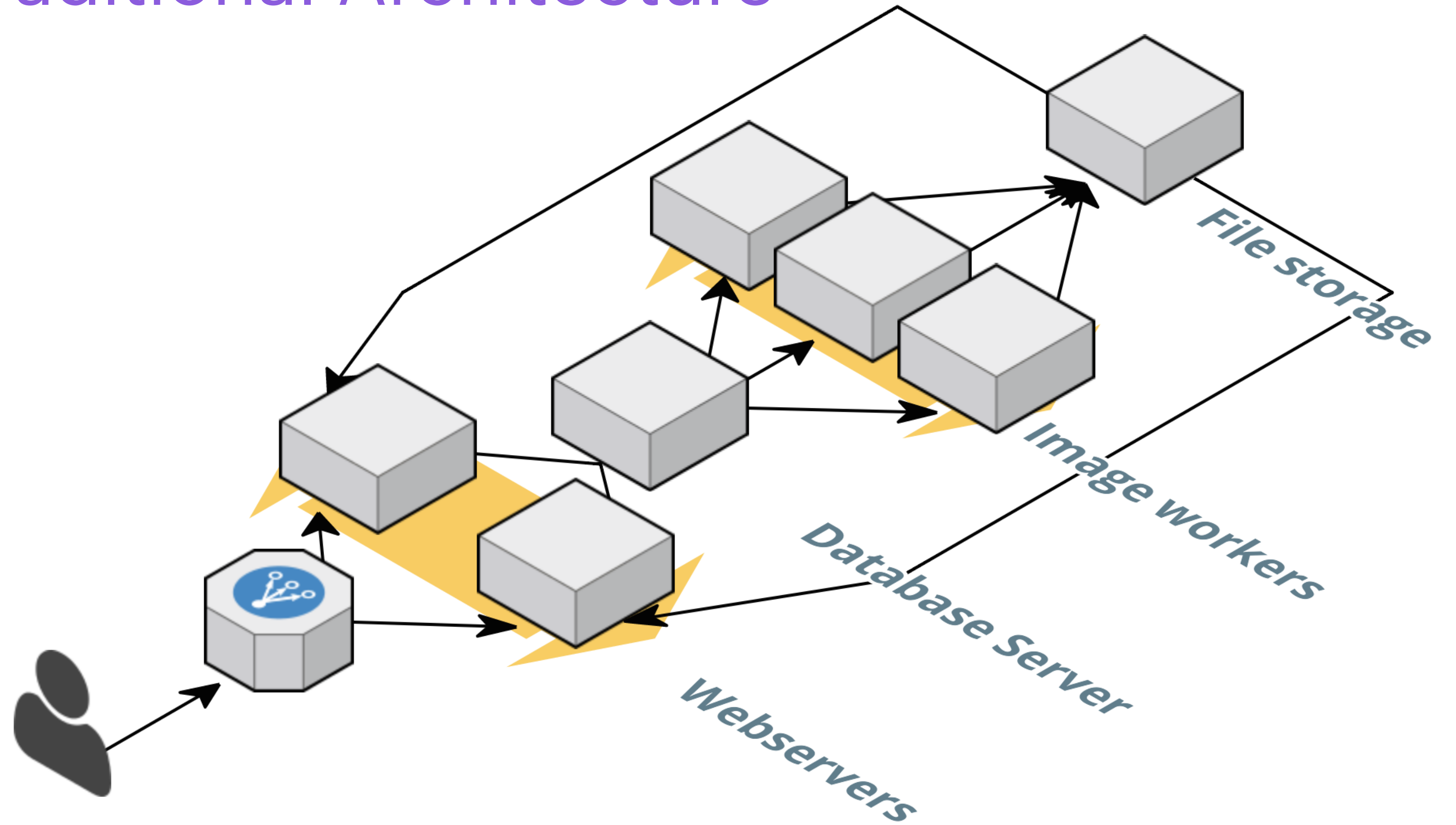


PARALLAX

@parallax



Traditional Architecture



Traditional Architecture





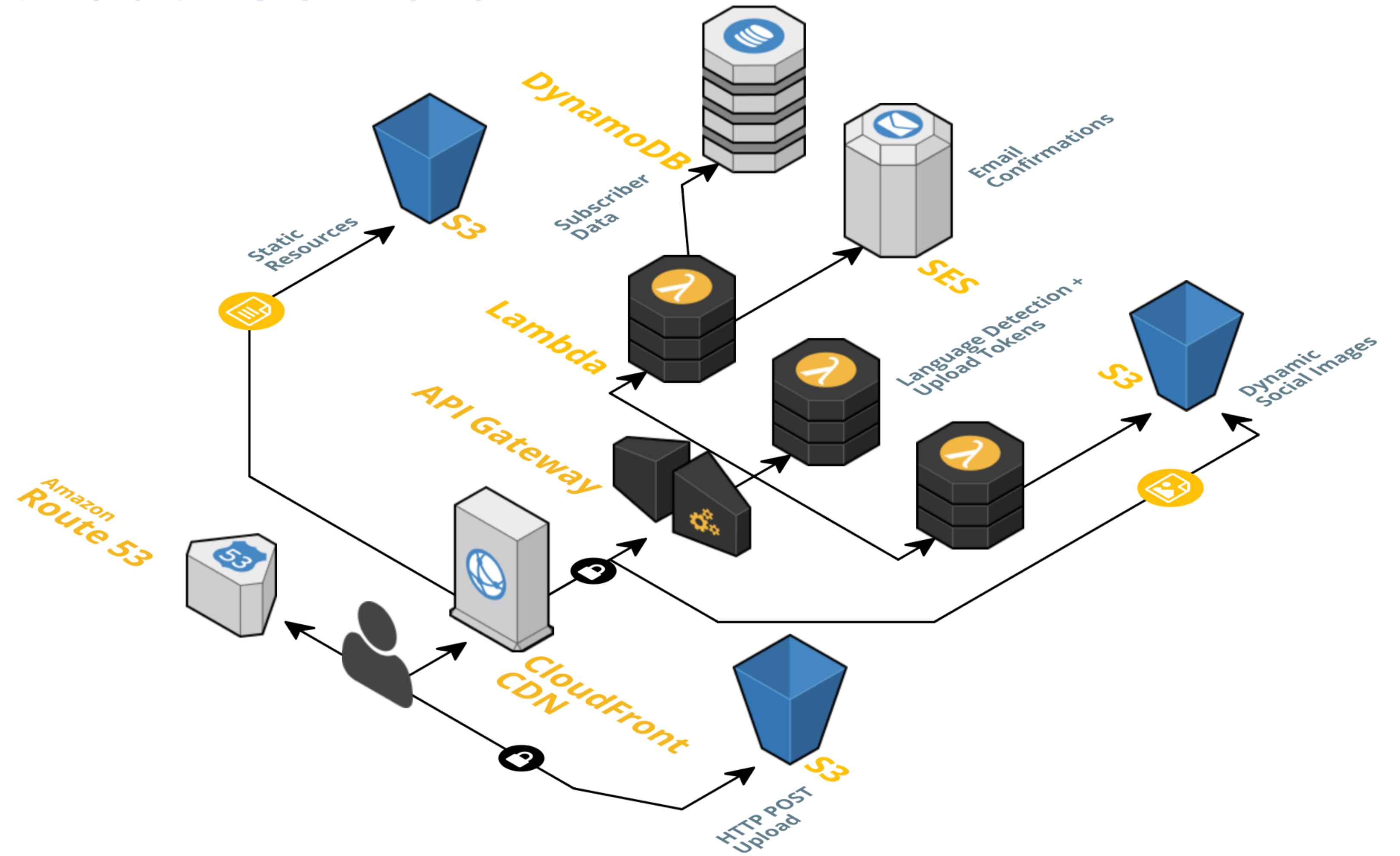
With AWS Serverless



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Serverless Applications on AWS

Without "Servers"



Serverless Framework

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Serverless Applications on AWS

- Pay-per-use Pricing
- No servers to manage
- Run nano/microservices
(or monoliths!)



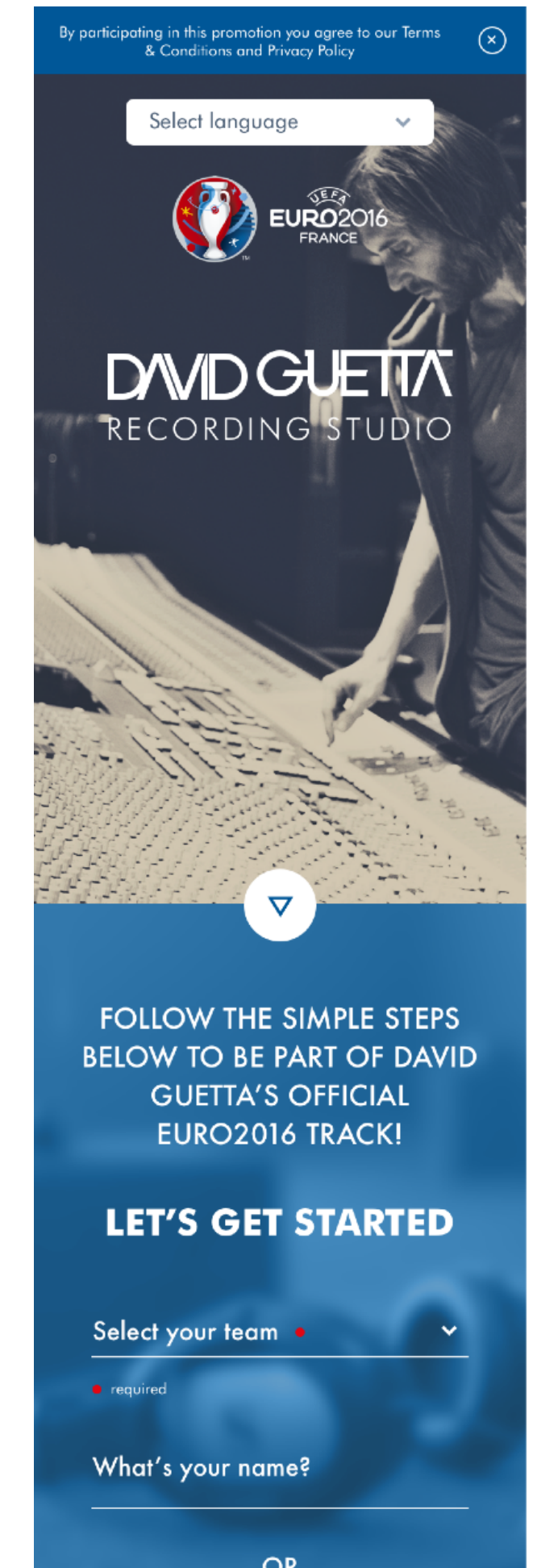
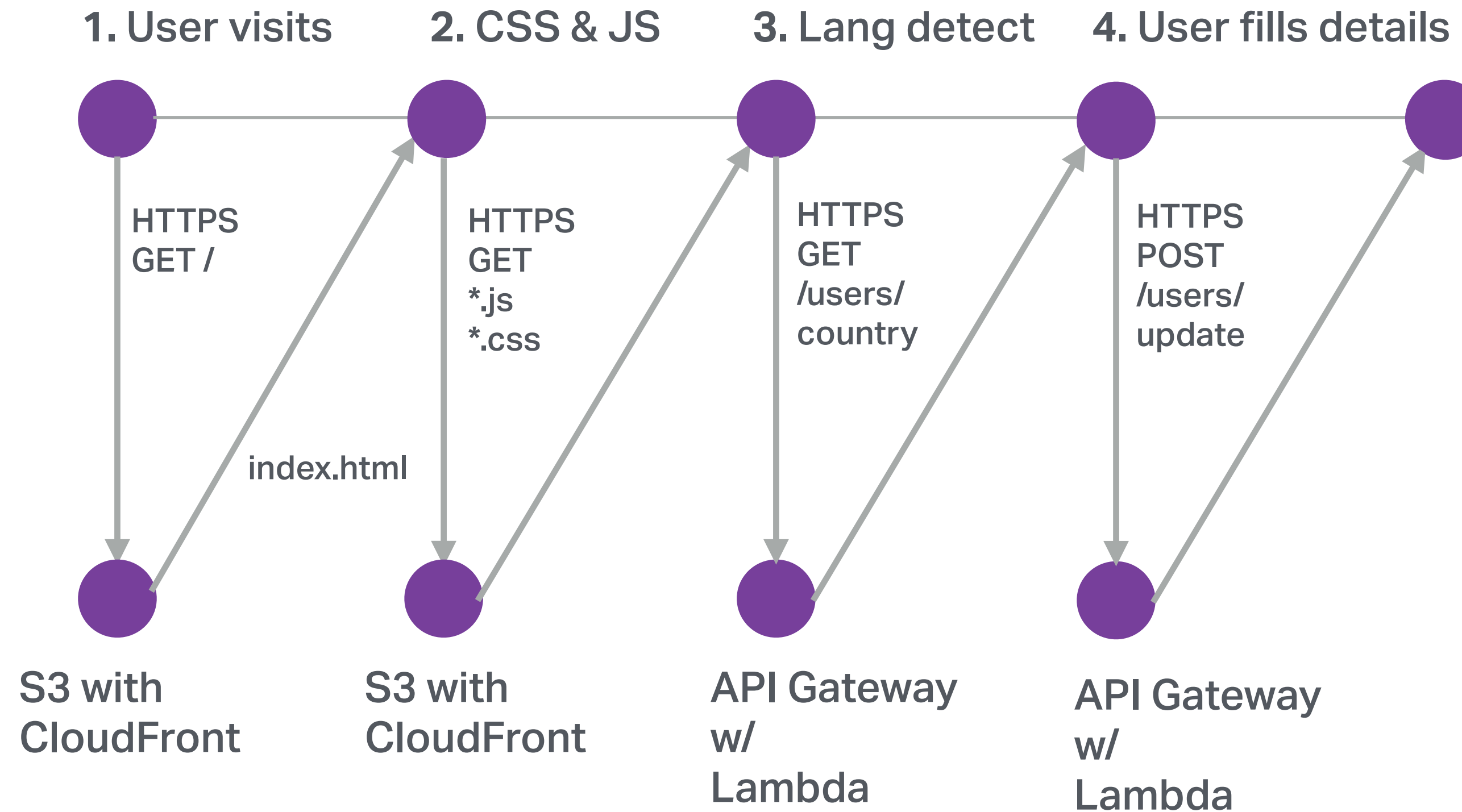
How it works



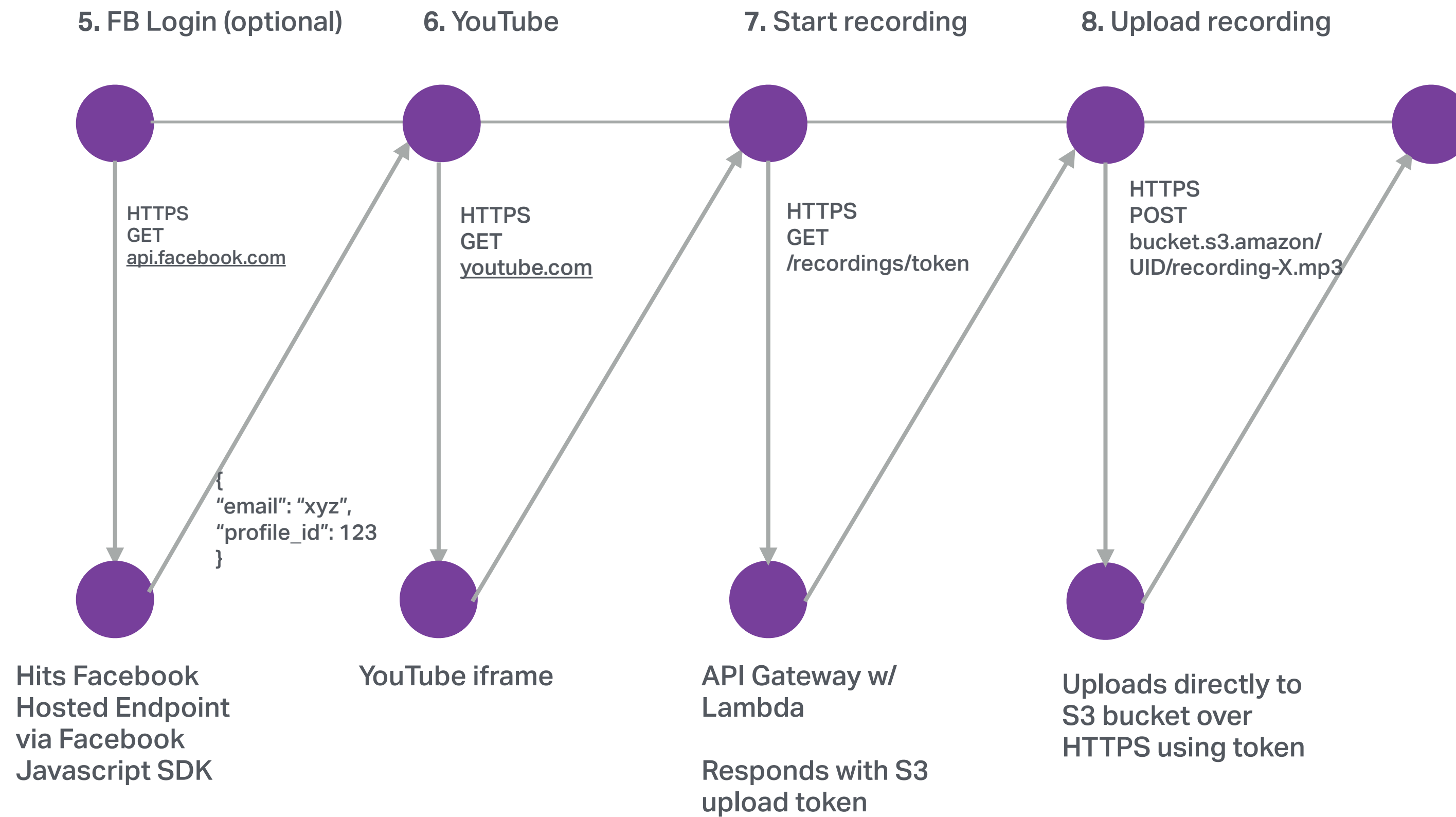
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Serverless Applications on AWS

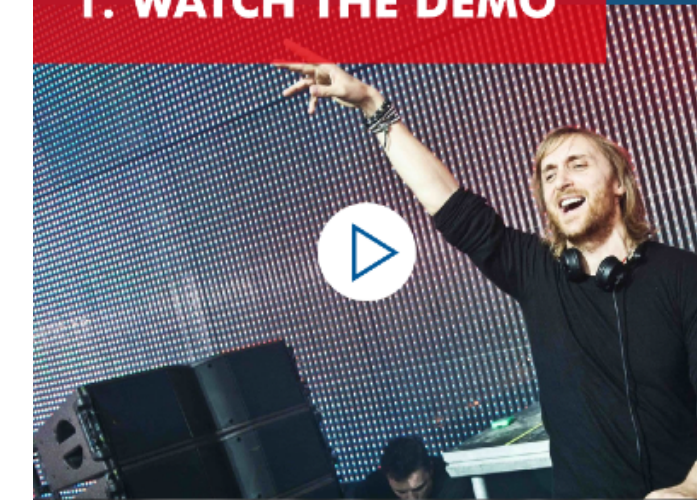
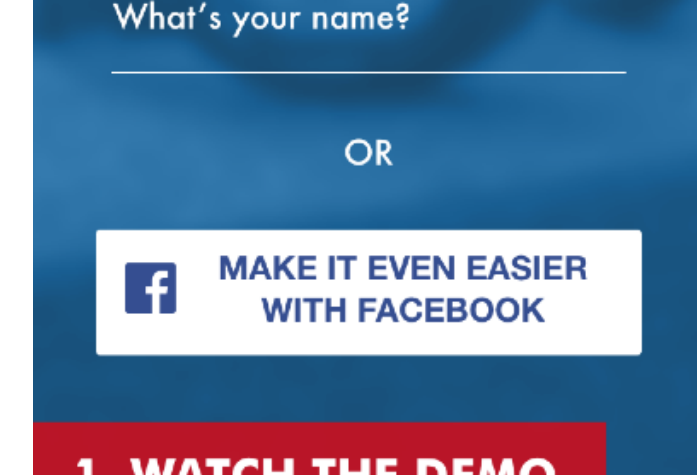
Page lifecycle



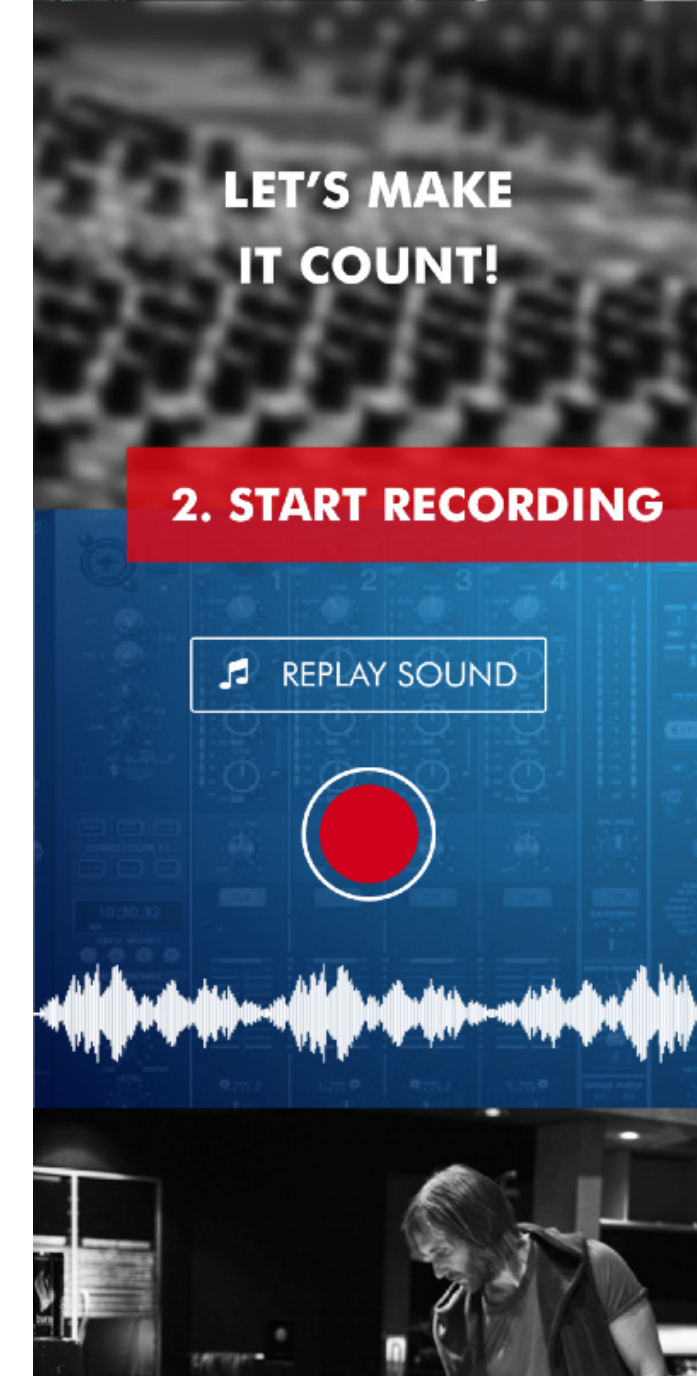
Page lifecycle



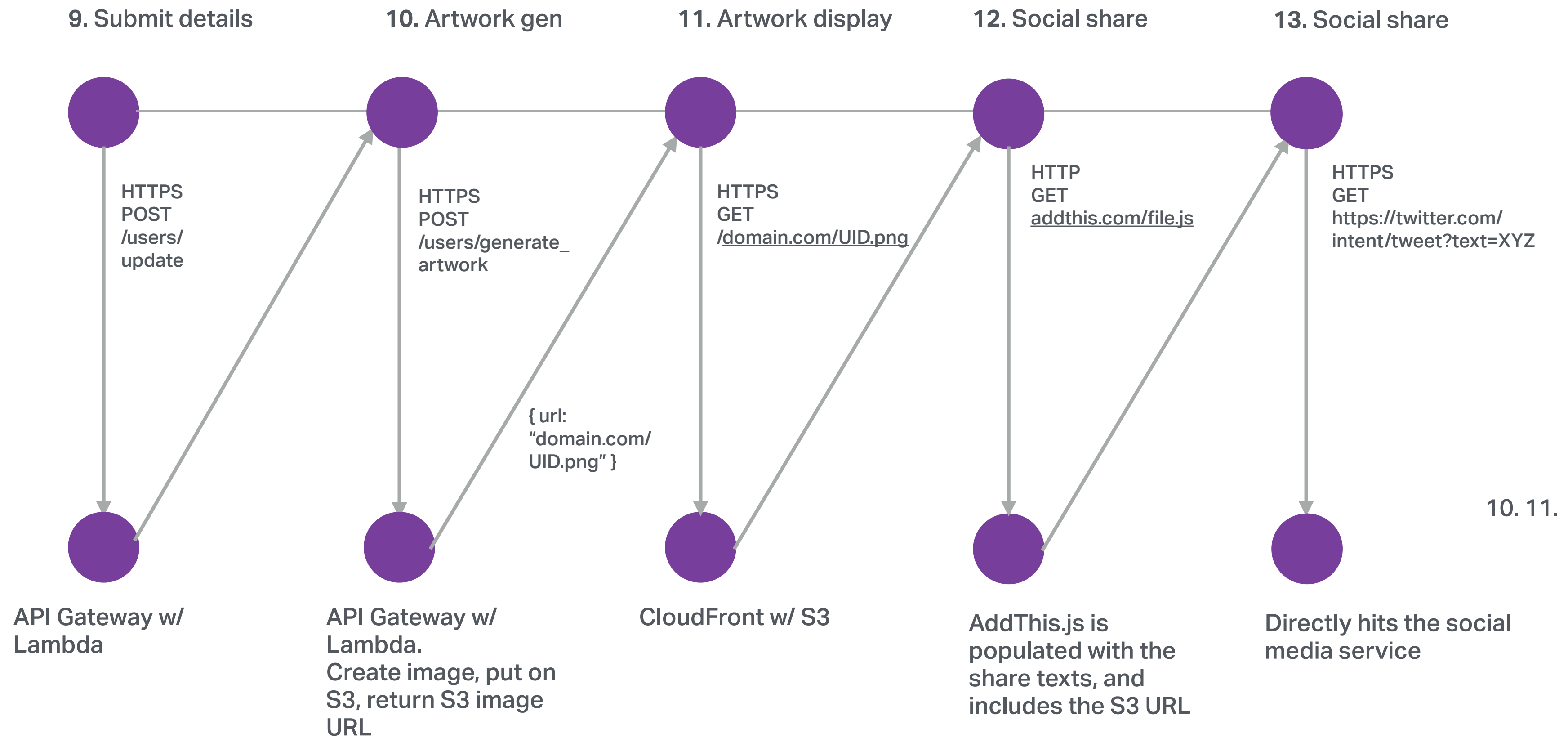
5.
6.



7.8.



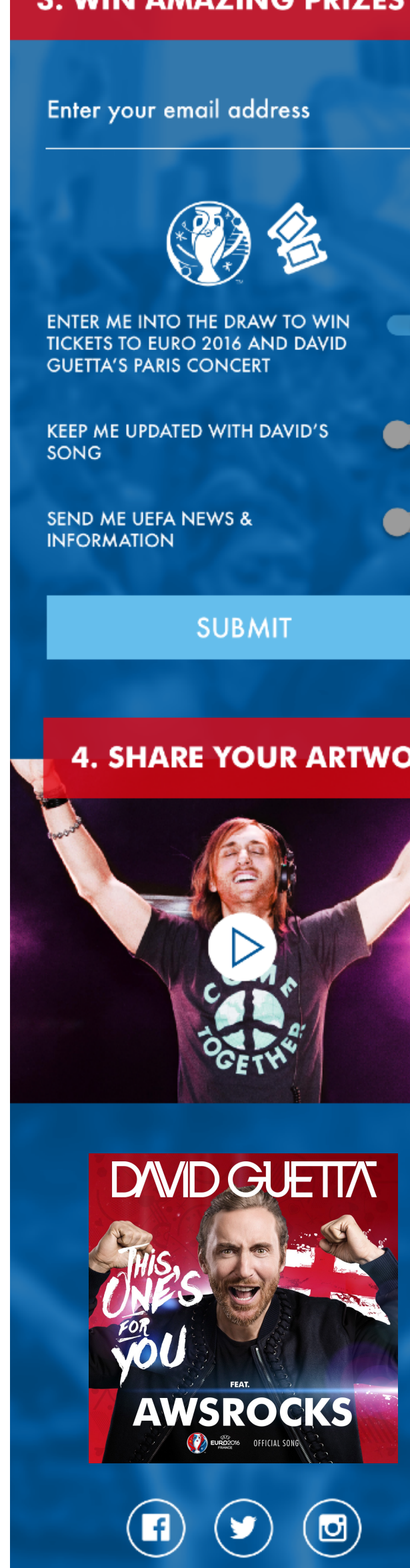
Page lifecycle



PARALLAX

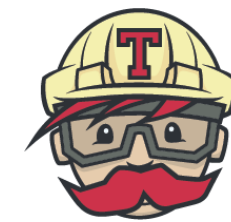
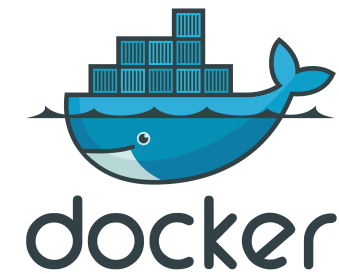
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Serverless Applications on AWS



Stick All Your Vital Files in a Single S3 Region

As Trusted By



Travis CI

GitHub



slack

Quora



Medium

and the rest of the internet...

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▼ Versioning

Versioning allows you to preserve, retrieve, and restore every version of every object stored in this bucket. This provides an additional level of protection by providing a means of recovery for accidental overwrites or expirations. Versioning-enabled buckets store all versions of your objects by default.

You can use Lifecycle rules to manage all versions of your objects as well as their associated costs. Lifecycle rules enable you to automatically archive your objects to the Glacier Storage Class and/or remove them after a specified time period.

Once enabled, Versioning cannot be disabled, only suspended.

Versioning is currently not enabled on this bucket.

[Enable Versioning](#)



Do Not Enable Cross-Region Replication



Enable Cross-Region Replication

Existing objects will not be replicated. Cross-Region Replication replicates every future upload of every object to another bucket.

Source:

This bucket (parallax-replication-demo) ⓘ

A prefix in this bucket ⓘ

Destination Region:

Sao Paulo ▼



Destination Bucket:

parallax-replication-demo-us ▼



Destination Storage Class:

S3 Standard ▼



Create/Select IAM Role



Selected IAM Role: parallax-replication-demo-parallax-replication-demo-us-s3-repl-r

Cross-Region Replication is currently enabled on this bucket

Save

Cancel

The screenshot shows the AWS API Gateway console interface. The top navigation bar includes the AWS logo, 'Services', 'Edit', and user information (James Hall, Ireland, Support). The breadcrumb trail is 'Amazon API Gateway > APIs > davidGuettaChant-dev > Resources'. The main content area is titled '/recordings/start - POST - Method Execution' and includes a 'Delete Method' button. On the left, a 'Resources' sidebar shows a tree view with the following structure:

- /
- GET
- /recordings
 - /recordings/start (selected)
 - POST
 - /recordings/done
 - POST
 - /recordings/outbound
 - POST

The main area displays a flow diagram for the selected method. It starts with a 'Client' box on the left, which sends a 'Method Request' to the API Gateway. The 'Method Request' box contains 'Auth: NONE'. This request is then forwarded to the 'Integration Request' box, which contains 'Type: LAMBDA' and 'Region: eu-west-1'. The 'Integration Request' is processed by the 'Lambda dev-davidGuettaChant-1-RecordingsStart-8...' function. The function returns an 'Integration Response' to the API Gateway, which contains 'Http status pattern: -' and 'Output passthrough: Yes'. Finally, the API Gateway returns a 'Method Response' to the 'Client', which contains 'HTTP status: 200' and 'Models:'.

eu-west-1.console.aws.amazon.com

AWS Lambda CloudWatch Management Console

James Hall Ireland Support

CloudWatch Dashboards NEW Alarms ALARM 0 INSUFFICIENT 0 OK 0 Billing Logs Metrics Selected Metrics Lambda S3 Custom Metrics...

Log Groups > Streams for /aws/lambda/dev-davidGuetta... > Events for 2015/10/14/[\$LATEST]6eb1e03...

Filter: Search for events x Date/Time: 2015/10/13 23 : 42 : 44 UTC (GMT) < >

Event Data

- START RequestId: 660a67d4-720c-11e5-9bcd-4b27e63ab690 Version: \$LATEST
- 2015-10-14T00:42:09.570Z 660a67d4-720c-11e5-9bcd-4b27e63ab690 Success! The SID for this SMS message is:
- 2015-10-14T00:42:09.570Z 660a67d4-720c-11e5-9bcd-4b27e63ab690 SM70fbb14b7b35494f885c4599c627f7af
- 2015-10-14T00:42:09.570Z 660a67d4-720c-11e5-9bcd-4b27e63ab690 Message sent on:
- 2015-10-14T00:42:09.570Z 660a67d4-720c-11e5-9bcd-4b27e63ab690 Wed Oct 14 2015 00:42:09 GMT+0000 (UTC)
- END RequestId: 660a67d4-720c-11e5-9bcd-4b27e63ab690
- REPORT RequestId: 660a67d4-720c-11e5-9bcd-4b27e63ab690 Duration: 984.60 ms Billed Duration: 1000 ms Memory Size: 1024 MB Max Memory Used: 21 MB
- START RequestId: 780fa314-720d-11e5-95fb-69b853baf8ba Version: \$LATEST
- 2015-10-14T00:49:48.959Z 780fa314-720d-11e5-95fb-69b853baf8ba Success! The SID for this SMS message is:
- 2015-10-14T00:49:48.959Z 780fa314-720d-11e5-95fb-69b853baf8ba SMbe65beda90b64f85abf6717e436aac0d
- 2015-10-14T00:49:48.959Z 780fa314-720d-11e5-95fb-69b853baf8ba Message sent on:
- 2015-10-14T00:49:48.959Z 780fa314-720d-11e5-95fb-69b853baf8ba Wed Oct 14 2015 00:49:48 GMT+0000 (UTC)
- END RequestId: 780fa314-720d-11e5-95fb-69b853baf8ba
- REPORT RequestId: 780fa314-720d-11e5-95fb-69b853baf8ba Duration: 991.69 ms Billed Duration: 1000 ms Memory Size: 1024 MB Max Memory Used: 21 MB
- START RequestId: b8c18622-720d-11e5-a34e-1308e961d213 Version: \$LATEST
- 2015-10-14T00:51:37.309Z b8c18622-720d-11e5-a34e-1308e961d213 Success! The SID for this SMS message is:
- 2015-10-14T00:51:37.309Z b8c18622-720d-11e5-a34e-1308e961d213 SMfe4da92f26ed455e9b13925f6778f57b
- 2015-10-14T00:51:37.309Z b8c18622-720d-11e5-a34e-1308e961d213 Message sent on:
- 2015-10-14T00:51:37.309Z b8c18622-720d-11e5-a34e-1308e961d213 Wed Oct 14 2015 00:51:37 GMT+0000 (UTC)
- END RequestId: b8c18622-720d-11e5-a34e-1308e961d213
- REPORT RequestId: b8c18622-720d-11e5-a34e-1308e961d213 Duration: 863.54 ms Billed Duration: 900 ms Memory Size: 1024 MB Max Memory Used: 21 MB

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Load testing from the cloud

Performance testing on websites, web apps and REST APIs with Blitz



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@MrRio

Put CloudFront over
it, point a URL to S3
with

- **UUID file** /mu-53ae2096-74636c48-84ffaaf9-80b625d6.txt

HTTP status code not ok (404); we were searching '42' content in uuid file

Response Times

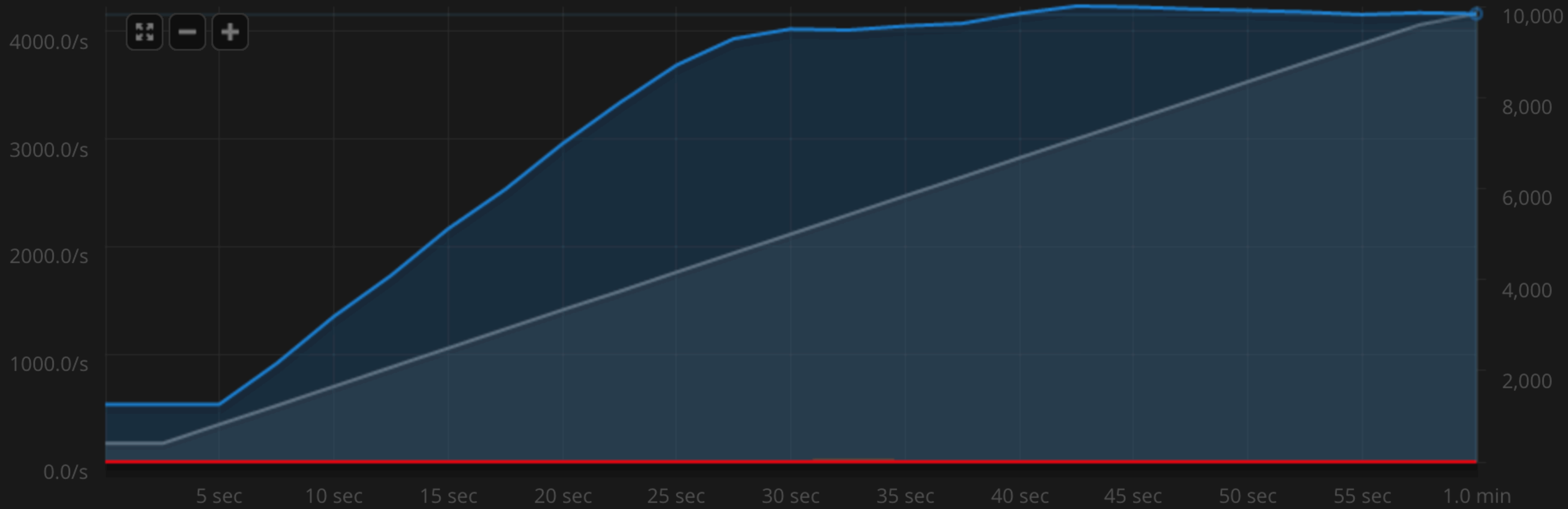
Response Times Users Add Analytics



Hit Rate

4166 hits/sec • 0 errors/sec • 0 timeouts/sec

Hits/sec Hits/sec Errors/sec Timeouts/sec Users



STEP 1

Hits/sec Errors/sec Timeouts/sec

Phase 2: Put it on a train

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LIVE EVENTS: UEFA EURO 2016 TROPHY TOUR

Serverless Applications on AWS



Lesson 4

Don't trust servers.
Scale with the traffic.

Overview

- ✓ Don't trust connections.
- ✓ Don't trust hardware.
- ✓ Don't trust humans.
- ✓ Don't trust servers.

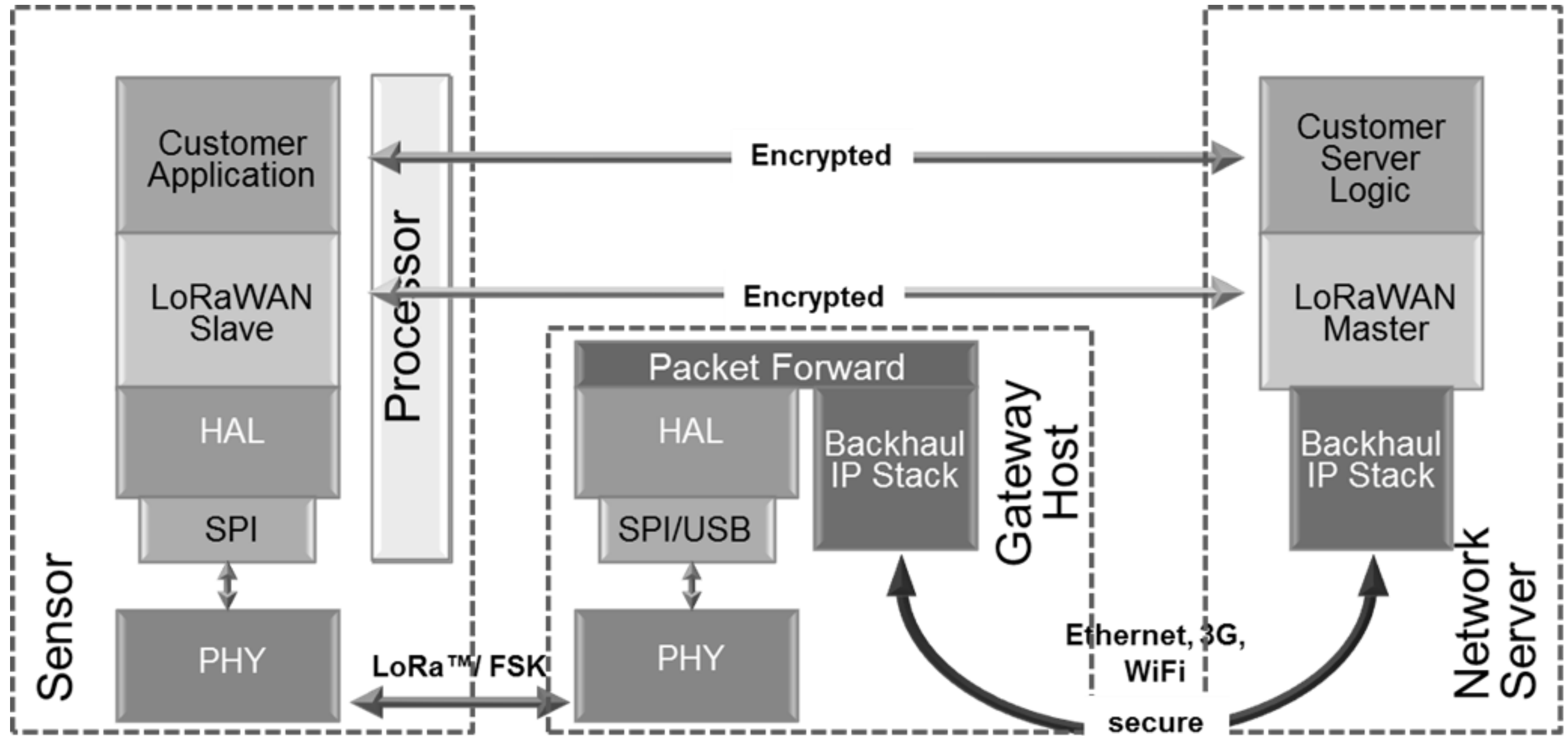
Our current project:
Schedule, control and
take measurements
from 20,000 city-wide

What about 4G?

What is LoRaWAN?

- 5km through dense urban areas
- 15km outside built up areas

- Support for millions of devices
- 0.3-50kbps 😞

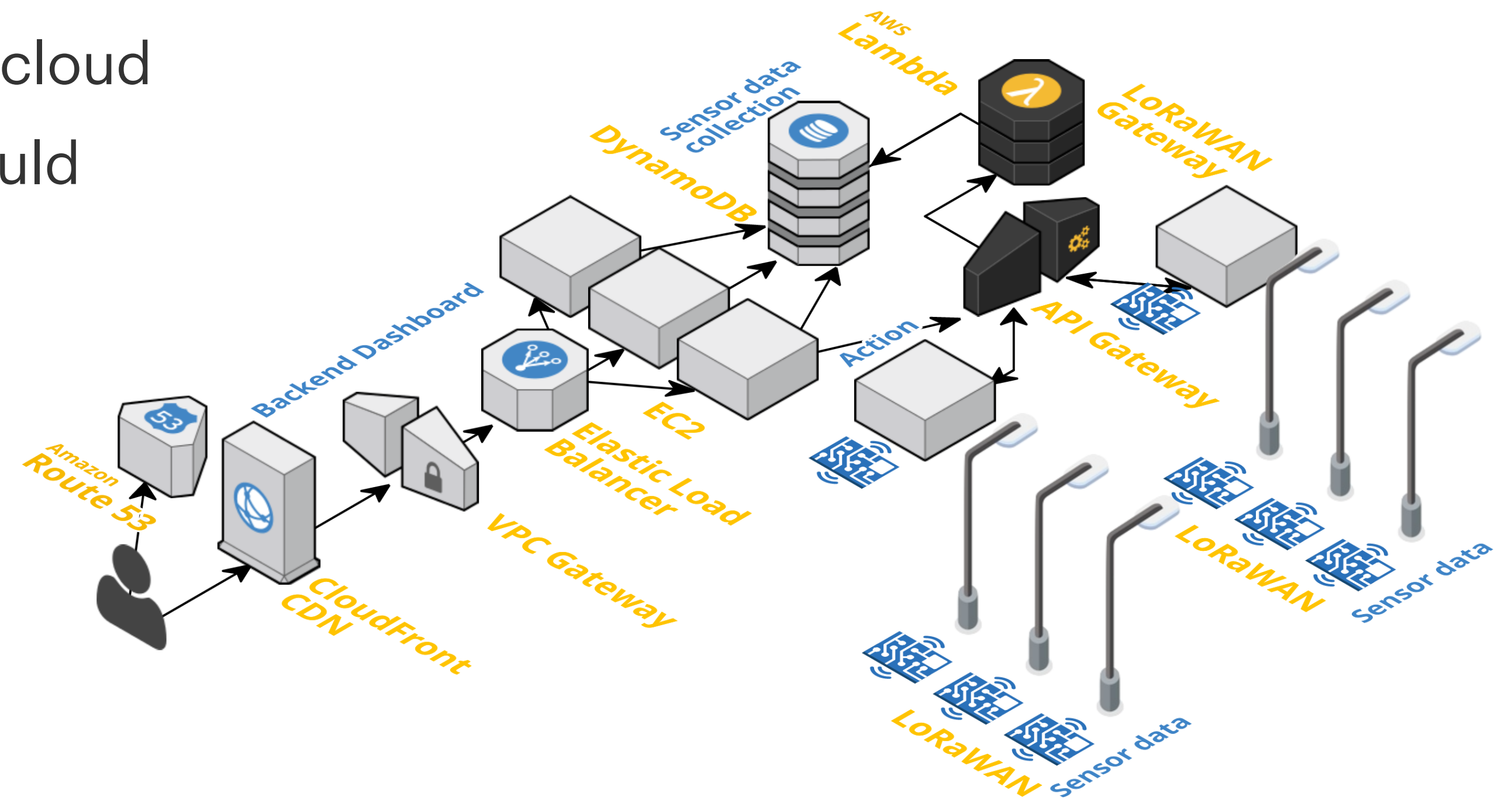




Architecture Design Options

Option 1 – Dumb Node, Dumb Gateway, Smart Cloud

In this model, all logic would live in the cloud. Node sensor readings would be transmitted over LoRaWAN, and the cloud would then schedule when they should change.



Option 1 – Dumb Node, Dumb Gateway, Smart Cloud

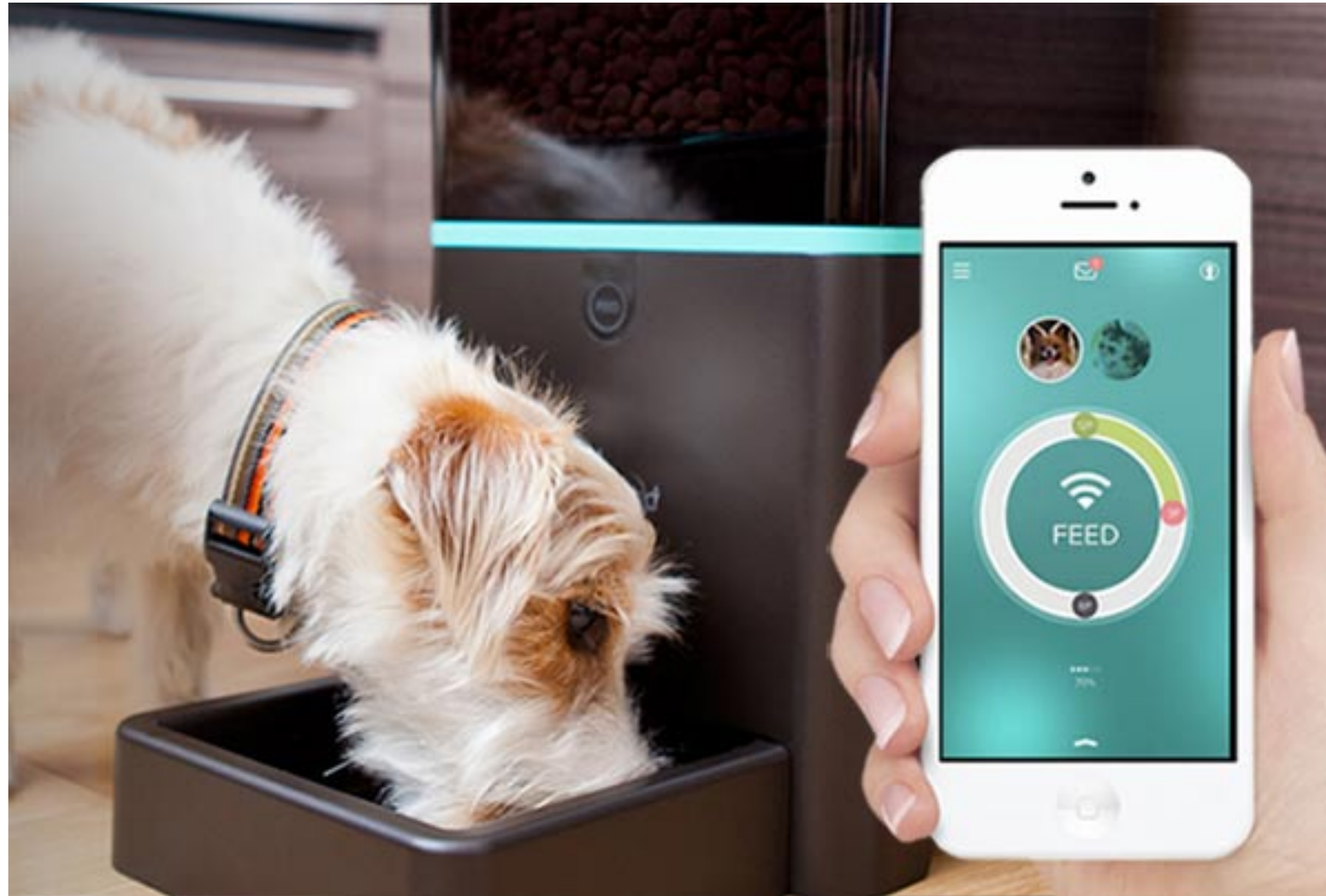
Advantages:

- Easy to write the node firmware. You'd take dumb readings and transmit them to the cloud, you'd then take any instruction to switch on and off at the exact time you need to do it.

Disadvantages:

- Adds a huge failure point. The lights will fail to respond correctly if:
 - There's an issue with 3G/4G connectivity on the gateway.
 - There's an issue with the application in the cloud.
 - The LoRaWAN network has been saturated or a bad 3rd party is doing something we didn't expect.
 - We have hit the duty cycle.

Option 1 – Dumb Node, Dumb Gateway, Smart Cloud



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★☆☆☆☆ **Their servers down = your pet won't get fed!!**

By [B. Nuttin](#) on July 27, 2016

Verified Purchase

★☆☆☆☆ **No backup when their service goes down**

By [James A. Rosen](#) on July 27, 2016

Verified Purchase

Starve Your Cat as a Service



Debugging / auditing





Analyze the network traffic of all your devices.

Debookee is the simplest & most powerful network traffic analyzer for macOS

[Download Now](#)



Network Traffic Interception

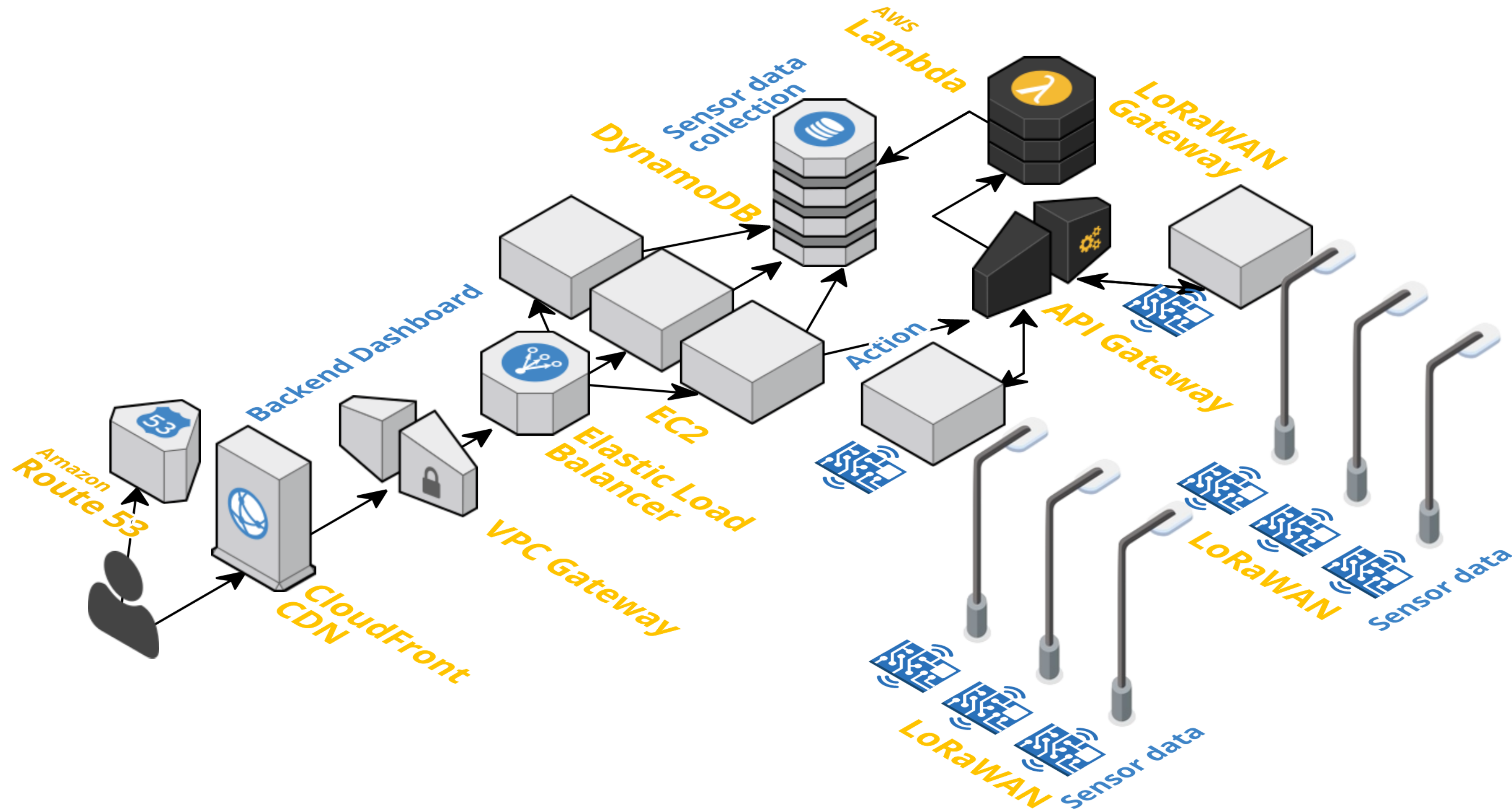
Debookee is able to intercept and monitor the traffic of any device in the same subnet, thanks to a Man-in-the-middle attack (MITM)

It allows you to capture data from mobile devices on your Mac (iPhone, iPad, Android, BlackBerry...) or Printer, TV, Fridge (Internet of



Option 2 – Dumb Node, Smart(ish) Gateway, Smart Cloud

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Option 2 – Dumb Node, Smart(ish) Gateway, Smart Cloud

Advantages:

- Easy to write the node firmware still.
- Defends against issues around 3G/4G connectivity.

Disadvantages:

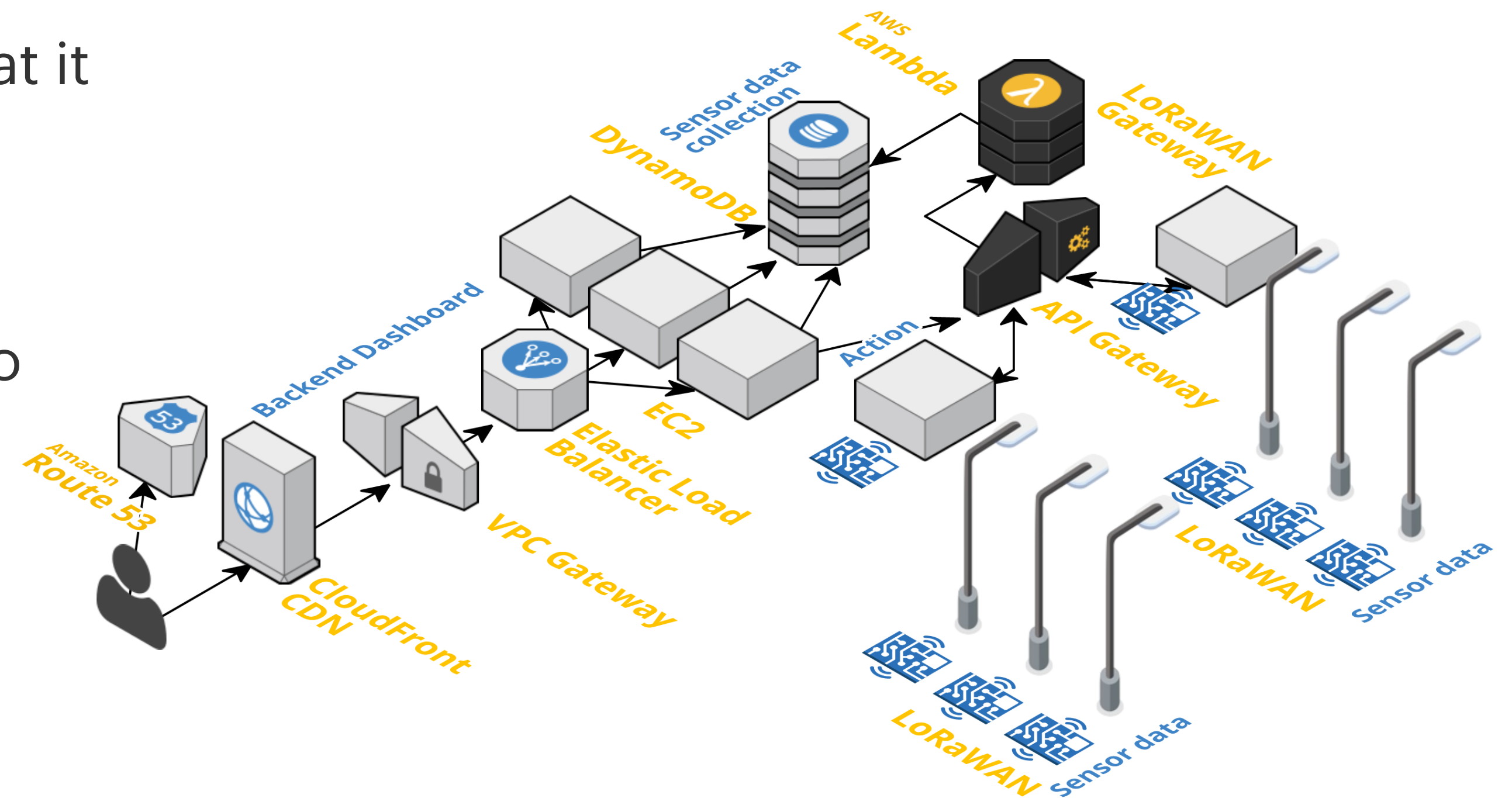
- The nodes will fail to respond correctly if:
 - The LoRaWAN network has been saturated or a bad 3rd party is doing something we didn't expect.
 - We have hit the duty cycle.
- Have to write software for the gateway.
- If the gateway fails/crashes, the nodes will not change.

Option 3 – Smart Node, Dumb Gateway, Smart Cloud

In this model, the schedule data for the nodes are sent and stored on the node. The gateway just parrots exactly what it receives on to the nodes.

The nodes then react and respond to the defined schedule. The cloud keeps track of which nodes have received which schedules.

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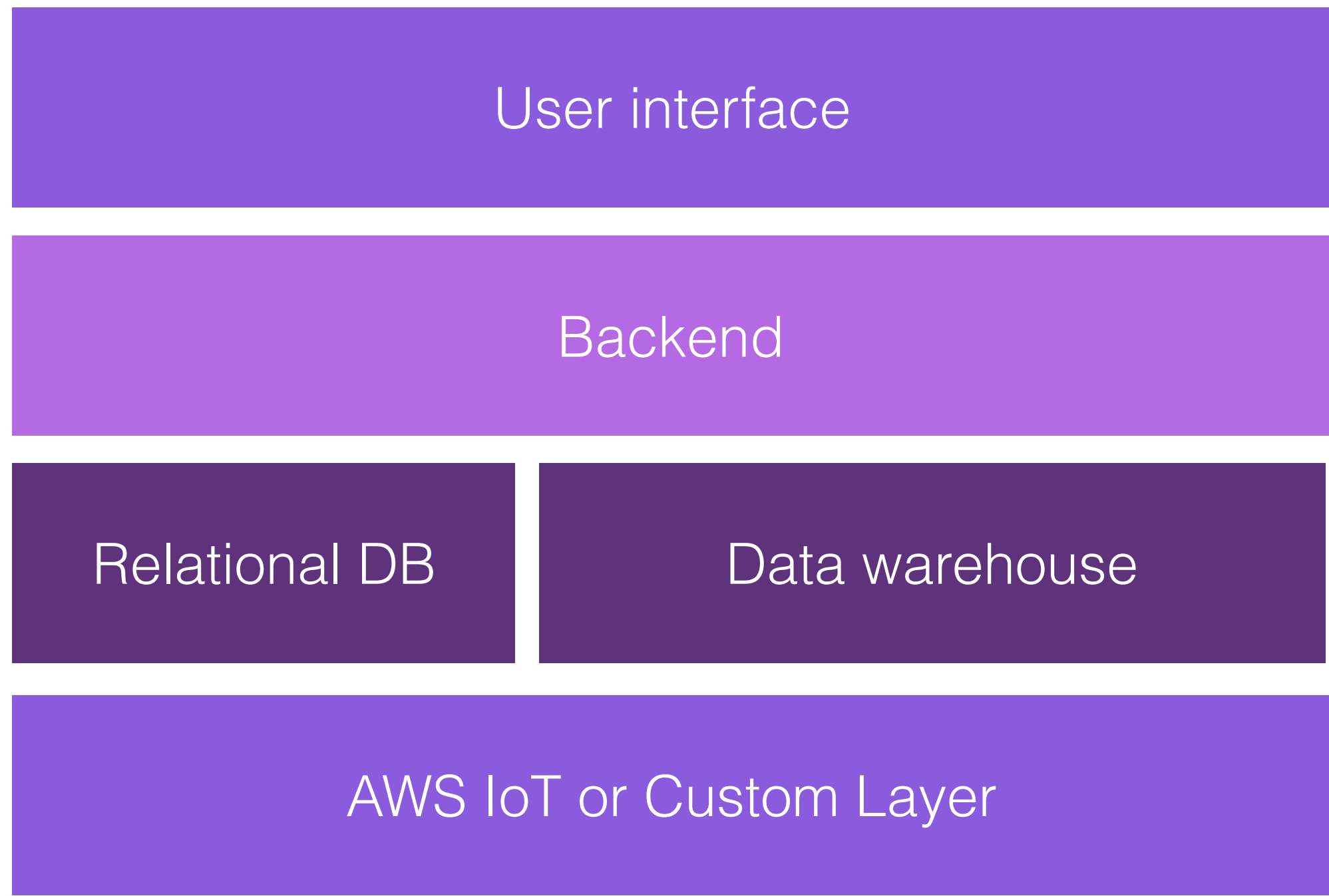
Option 3 – Smart Node, Dumb Gateway, Smart Cloud

Advantages:

- If LoRaWAN is saturated it still works
- If the gateway goes down or needs rebooting, the nodes continue to do what they were scheduled to do.
- If we hit our duty cycle, they will continue on the defined schedule.

Disadvantages:

- Firmware is needs to handle a schedule and will need writing.
- Testing firmware can be more expensive.



3G/4G



LoRaWAN



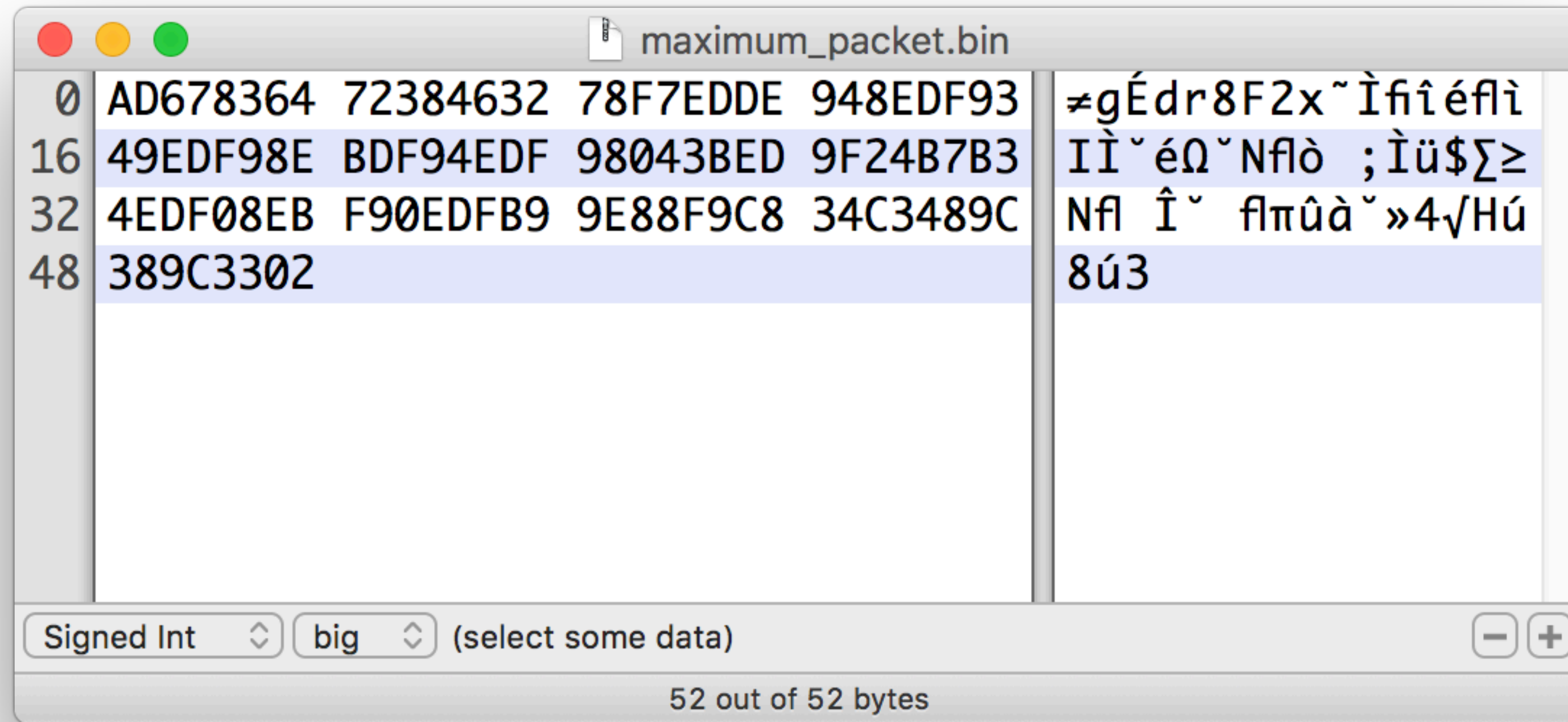
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Serverless Applications on AWS

Packet Size

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Example message:

“do something 20 minutes before sunset”

Example message:

“switch on 20 minutes before sunset”

```
{
  "events": [{
    "action": "on",
    "offset_time": -20,
    "offset_from": "sunset",
    "day": "Monday"
  }]
}
```

```
{  
  "events": [{  
    "action": "on",  
    "offset_time": -20,  
    "offset_from": "sunset",  
    "day": "Monday"  
  }]  
}
```

Minified: 84 bytes Gzipped: 88 bytes


```
{  
  "events": [{  
    "action": "on",  
    "offset_time": -20,  
    "offset_from": "sunset",  
    "day": "Monday"  
  }]  
}
```

What if you could pre-send some of your data?



Protocol Buffers


```
{  
  "events": [{  
    "action": "on",  
    "offset_time": -20,  
    "offset_from": "sunset",  
    "day": "Monday"  
  }]  
}
```

What if you could pre-send some of your data?

```
schedule.proto

1  syntax = "proto3";
2
3  // This is a draft of the spec
4
5  // A schedule update contains many schedule events for that light
6  message ScheduleUpdate {
7      repeated TimeEvent schedule_events = 1;
8  }
9
10 message TimeEvent {
11     // Time in minutes, either positive or negative, away from the event
12     sint32 offset_time = 1;
13
14     // This is the type of offset
15     enum OffsetType {
16         // The offset is from midday
17         MIDDAY = 0;
18         // The offset is pinned to either sunrise or sunset
19         SUNRISE = 1;
20         SUNSET = 2;
21     }
22     OffsetType offset_type = 2;
23
24     int32 brightness = 3;
25 }
```

```
protoc --encode=ScheduleUpdate \  
schedule.proto > output.bin
```

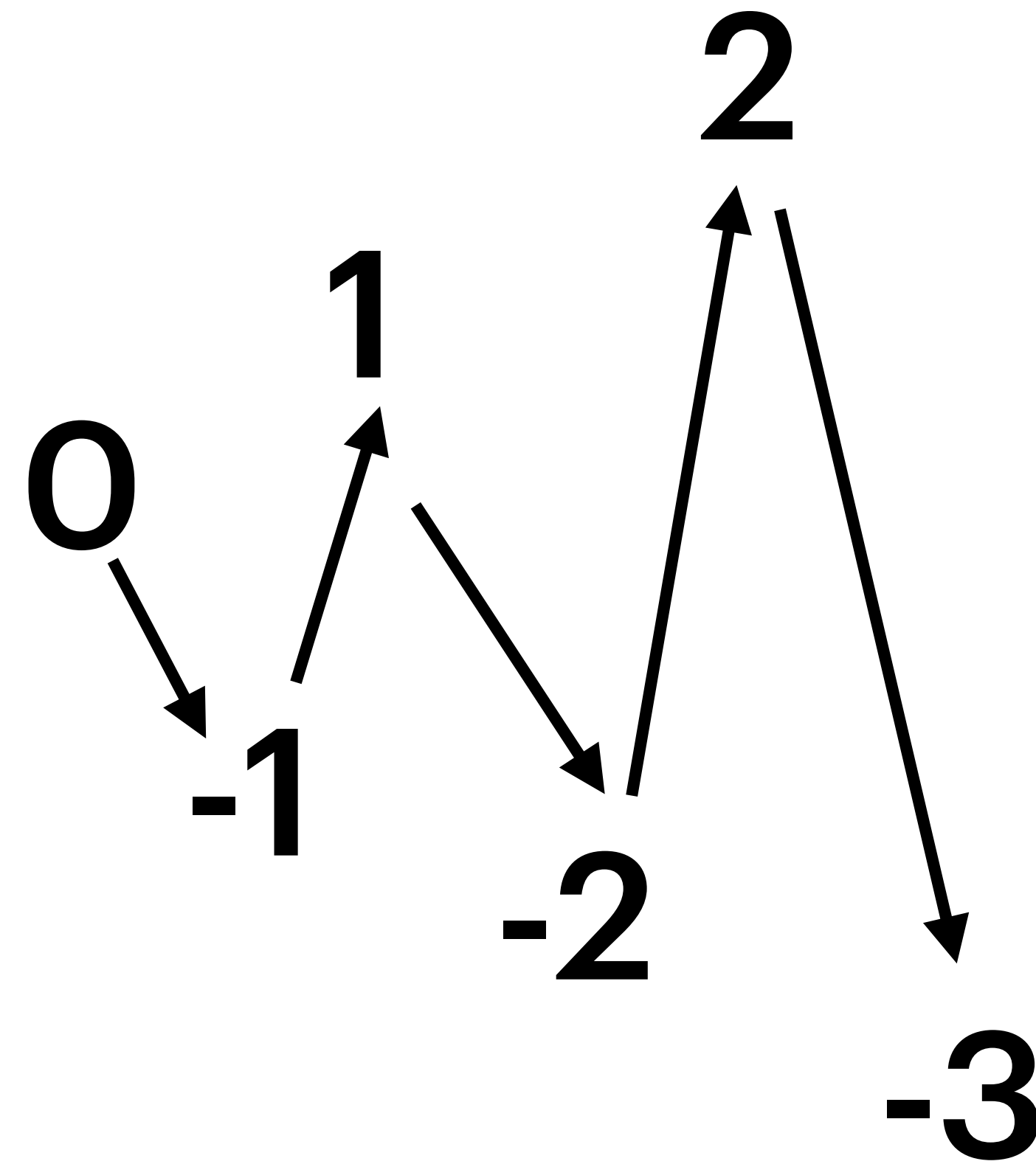


```
{  
  "events": [{  
    "action": "on",  
    "offset_time": -20,  
    "offset_from": "sunset",  
    "day": "Monday"  
  }]  
}
```

Zigzag encoding

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Signed Original	Encoded As
0	0
-1	1
1	2
-2	3
2147483647	4294967294
-2147483648	4294967295



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Variable length 7-bit encoding

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00000000

10000000

10000000

First byte, the high bit is set to 0, subsequent to 1

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Protobuf Size

~8 bytes

JSON Size

~84 bytes

Problems so far



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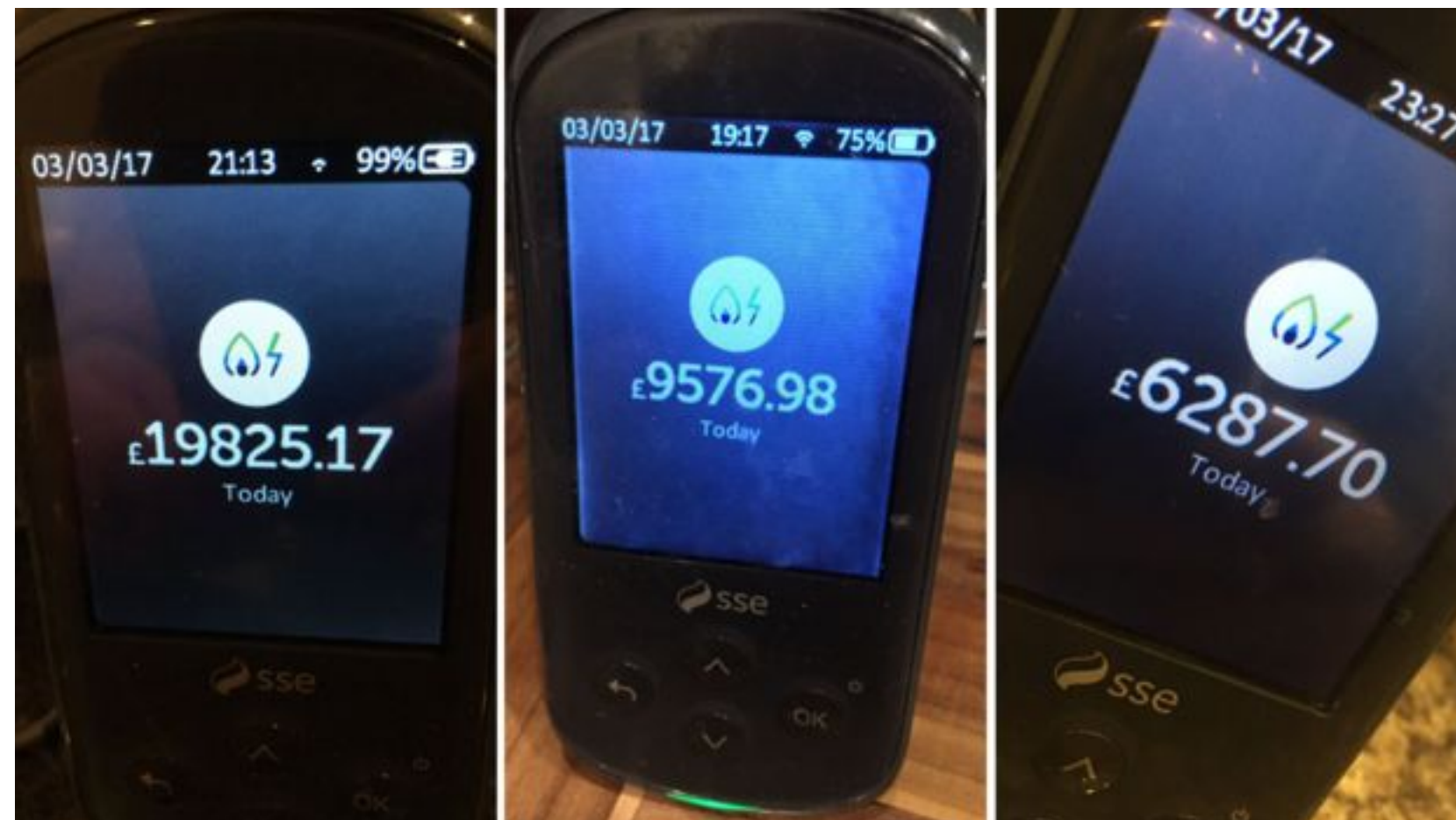
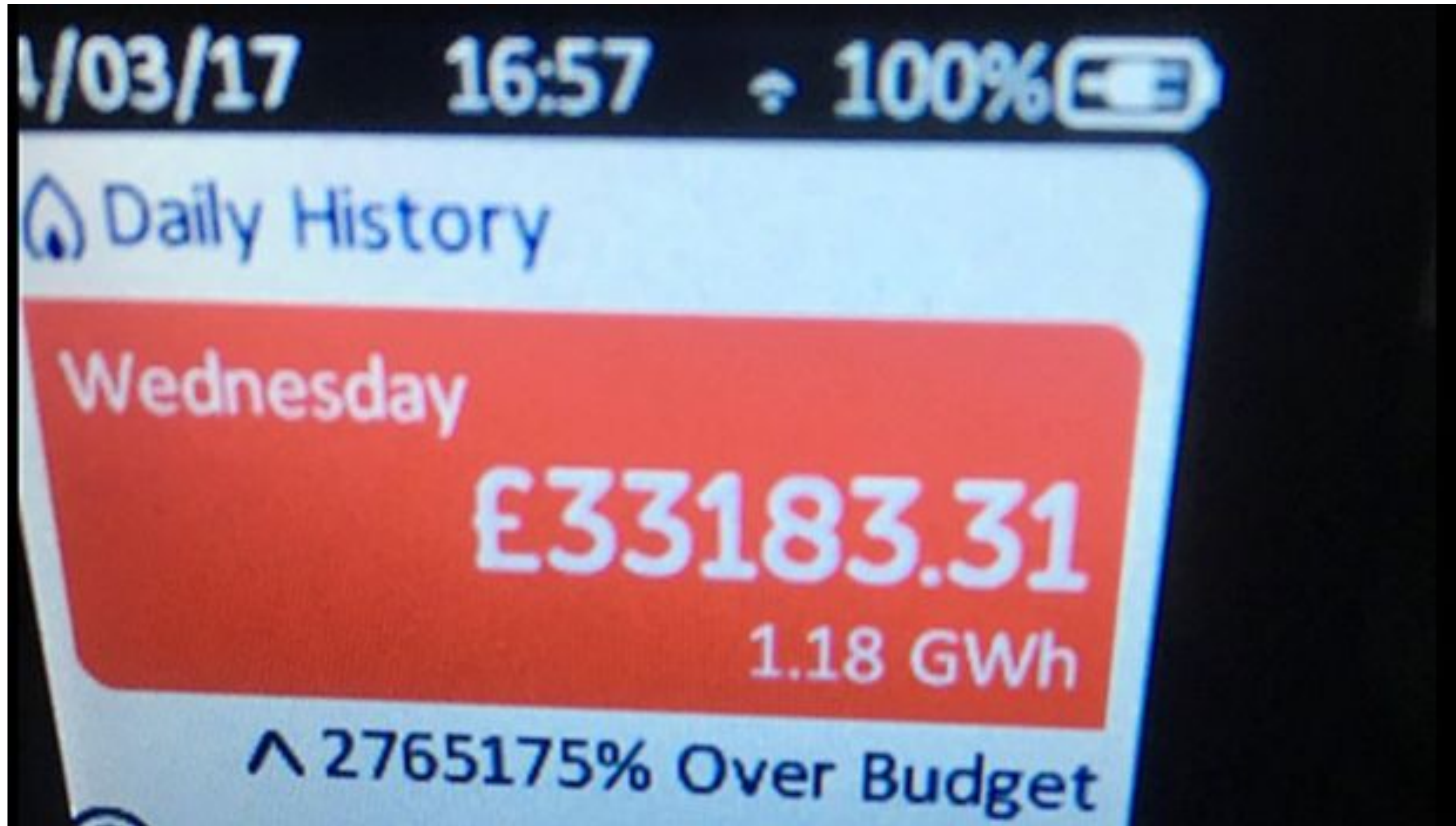
01133 226477

Tell me the model, and
I'll let you know the SSH
password.

The future of IoT?



The government wants every home and business to be offered a smart meter by the end of 2020.



Hotel ransomed by hackers as guests locked out of rooms



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Summary



Thank
you

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