

A Guided Journey of Cloud Native, featuring Monzo

Cheryl Hung, Director of Ecosystem, CNCF
Matt Heath, Engineer, Monzo

Agenda

1. What is the Cloud Native Computing Foundation?
2. A journey through cloud native
3. Cloud native in real life at Monzo



About Cheryl

Director of Ecosystem, CNCF

Cloud Native London (tonight!)

StorageOS, Google, Cambridge

@oicheryl



What is the CNCF?

The CNCF's mission

Make cloud native computing **ubiquitous**

... by fostering and sustaining an ecosystem of **open source, vendor-neutral projects**



In practice

- Community
- Documentation
- Translation
- Legal
- Marketing & PR
- Events

Non-profit, part of the Linux Foundation.

6 staff, ~20 shared



350+ Members and Growing

Platinum Members



Gold Members



End User Members

End User Supporters

Academic/Nonprofit



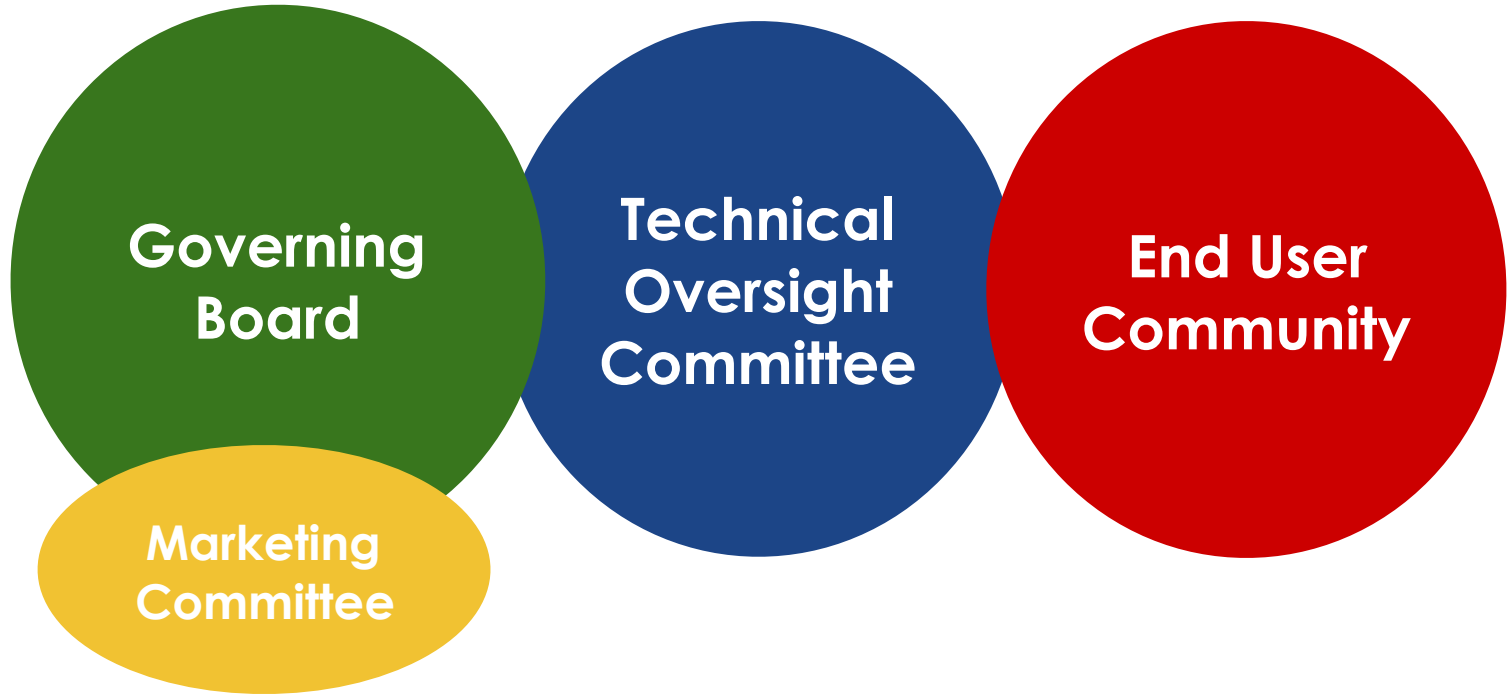
350+ Members and Growing (Silver 1)



350+ Members and Growing (Silver 2)



CNCF Structure



CNCF Projects

Graduated (5)



Incubating (15)



Sandbox (12), not shown





What matters is the *complexity*

House

1-10



Village

10-100



Town

100-500



City

500+

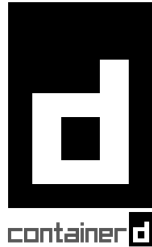




House (1-10 services)



- Source control
- Continuous integration



Village (10-100 services)



- Automation
- Instrumentation



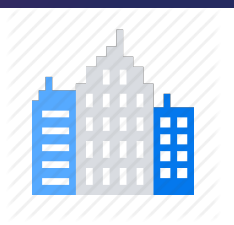
Town (100-500 services)



- Test driven development
- Continuous deployment



City (500+ services)



- High availability
- Storage
- Security





Some more...

- Built-ins
- Specifications



CoreDNS



etcd



OPENTRACING



CNI



TUF



Summary



Source control, continuous integration



Automation, packaging, instrumentation



Test driven development, continuous deployment



High availability, storage, security



KubeCon + CloudNativeCon

- Europe 2019 (sponsorships open)
 - [Barcelona](#): May 20-23, 2019
- China 2019 (sponsorships open)
 - [Shanghai](#): June 24-26, 2019
- North America 2019 (sponsorships open)
 - [San Diego](#): November 18-21, 2019



Slides at oicheryl.com



CLOUD NATIVE
COMPUTING FOUNDATION



Hi, I'm Matt



@mattheath



5354

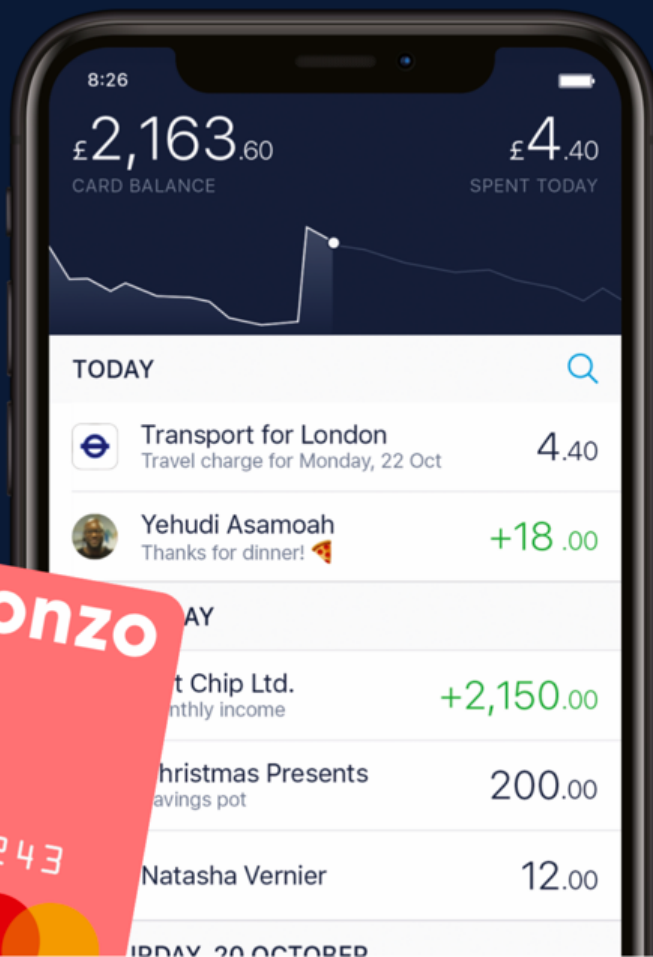


2000

monzo

169-624-882

EXP
END



15:05

Thursday, October 26



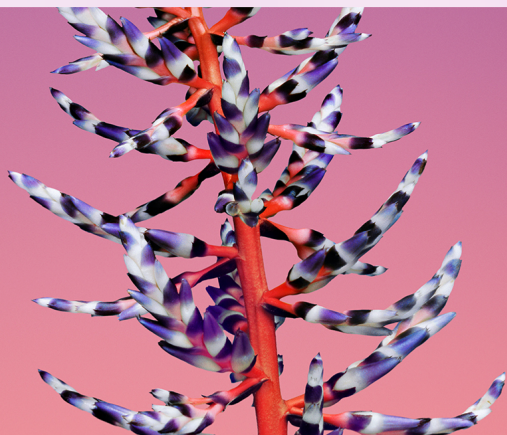
MONZO

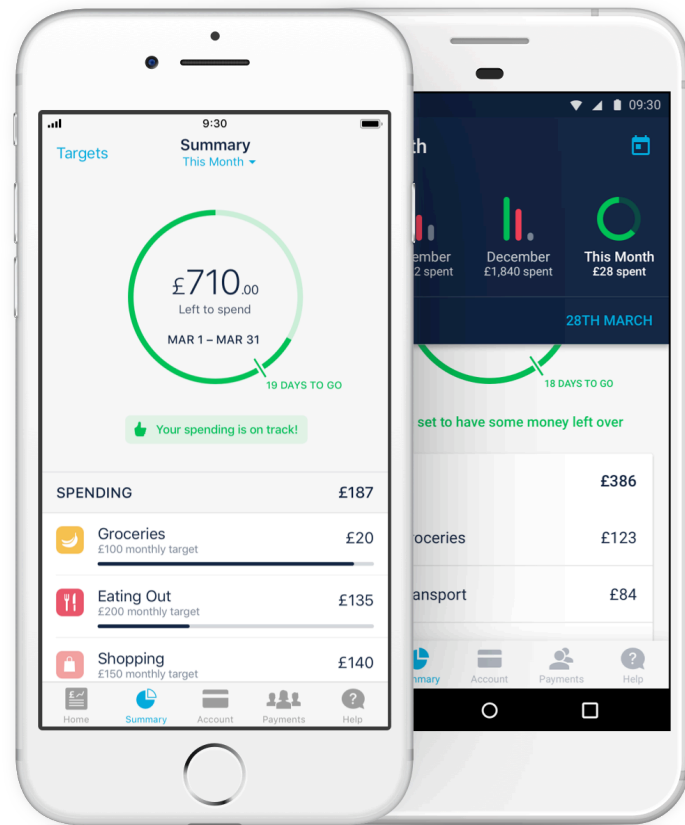
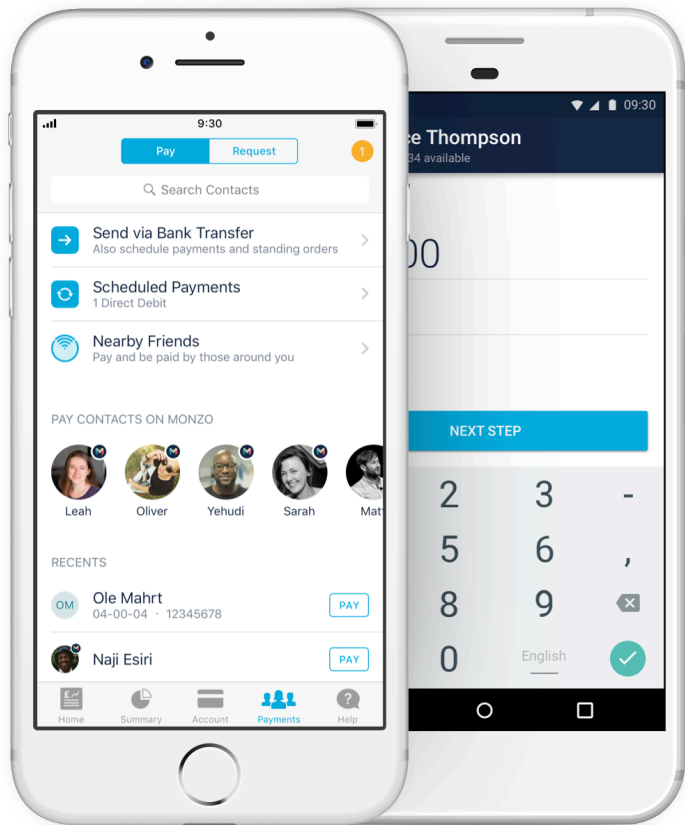
now



£12.80 at Burger Bear

[Press for more](#)







Air France

£256.00

 Tuesday, 11 July, 9:29

 5355-22##-####-1234

**Please approve this
through your Monzo app**



Having trouble?

[Use SMS](#) [I already approved this](#)

[I need help](#) [Cancel this transaction](#)



**When I buy a
coffee, log calories
to iOS Health**

by Monzo 



**Save my receipts
to Dropbox**

by Monzo 



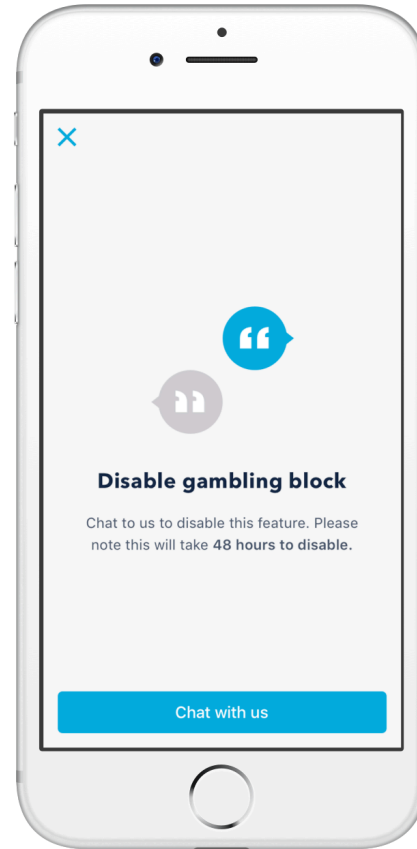
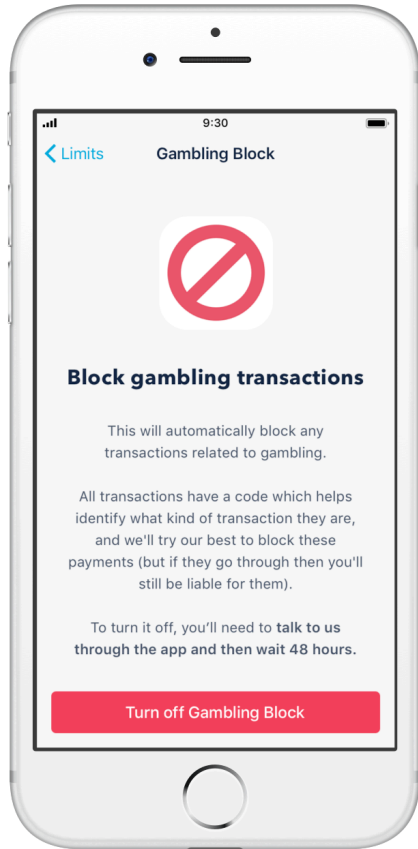
**Reward me every
time I visit the gym**

by Monzo 



**Take on the 1p
Savings Challenge**

by Monzo 



Nov
2015

Mar
2019

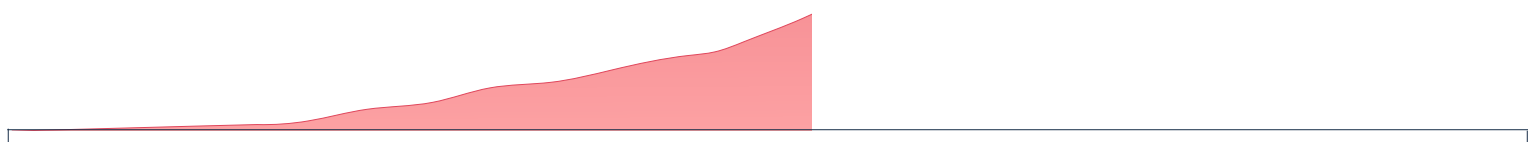
**Nov
2015**

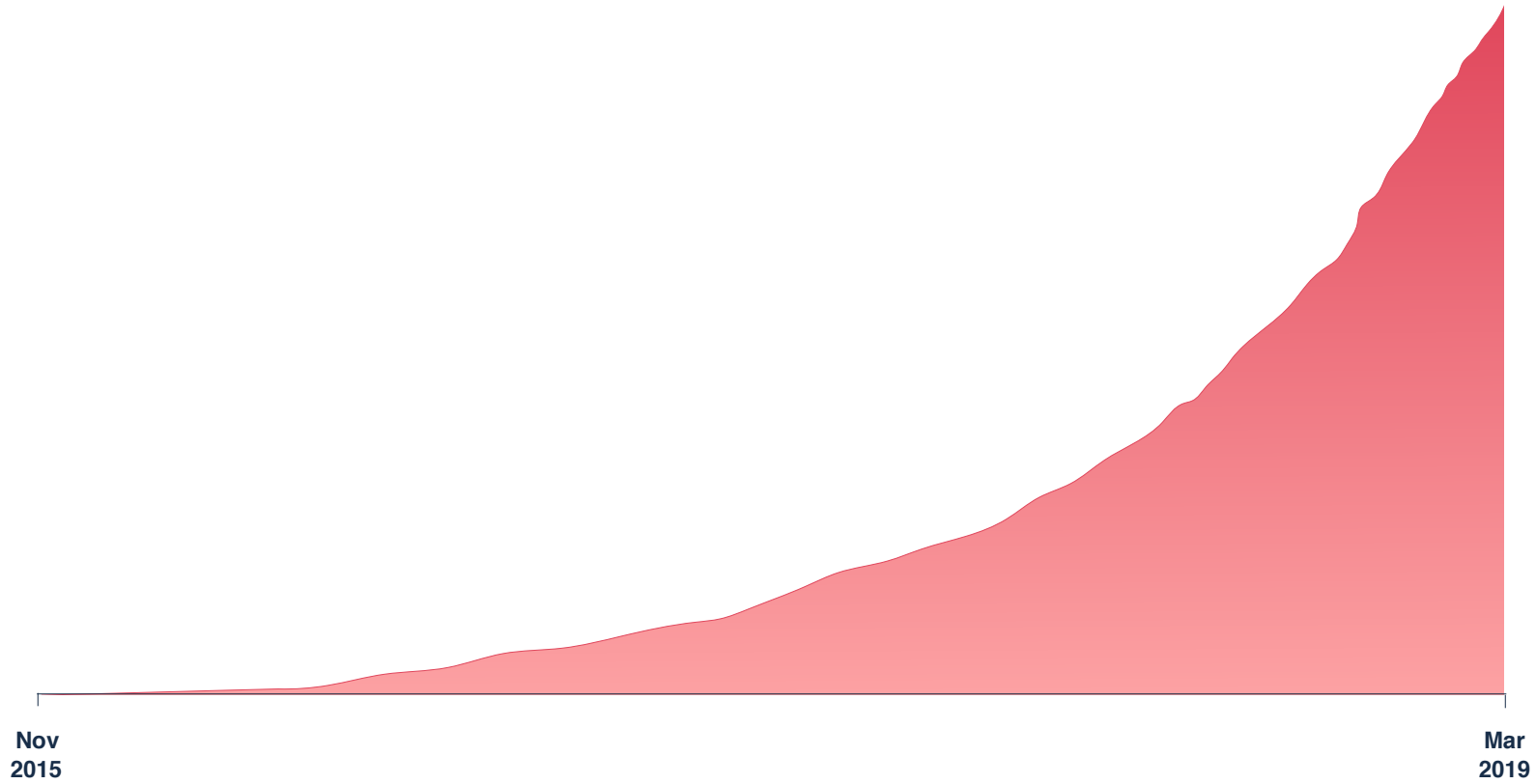
**Mar
2019**



**Nov
2015**

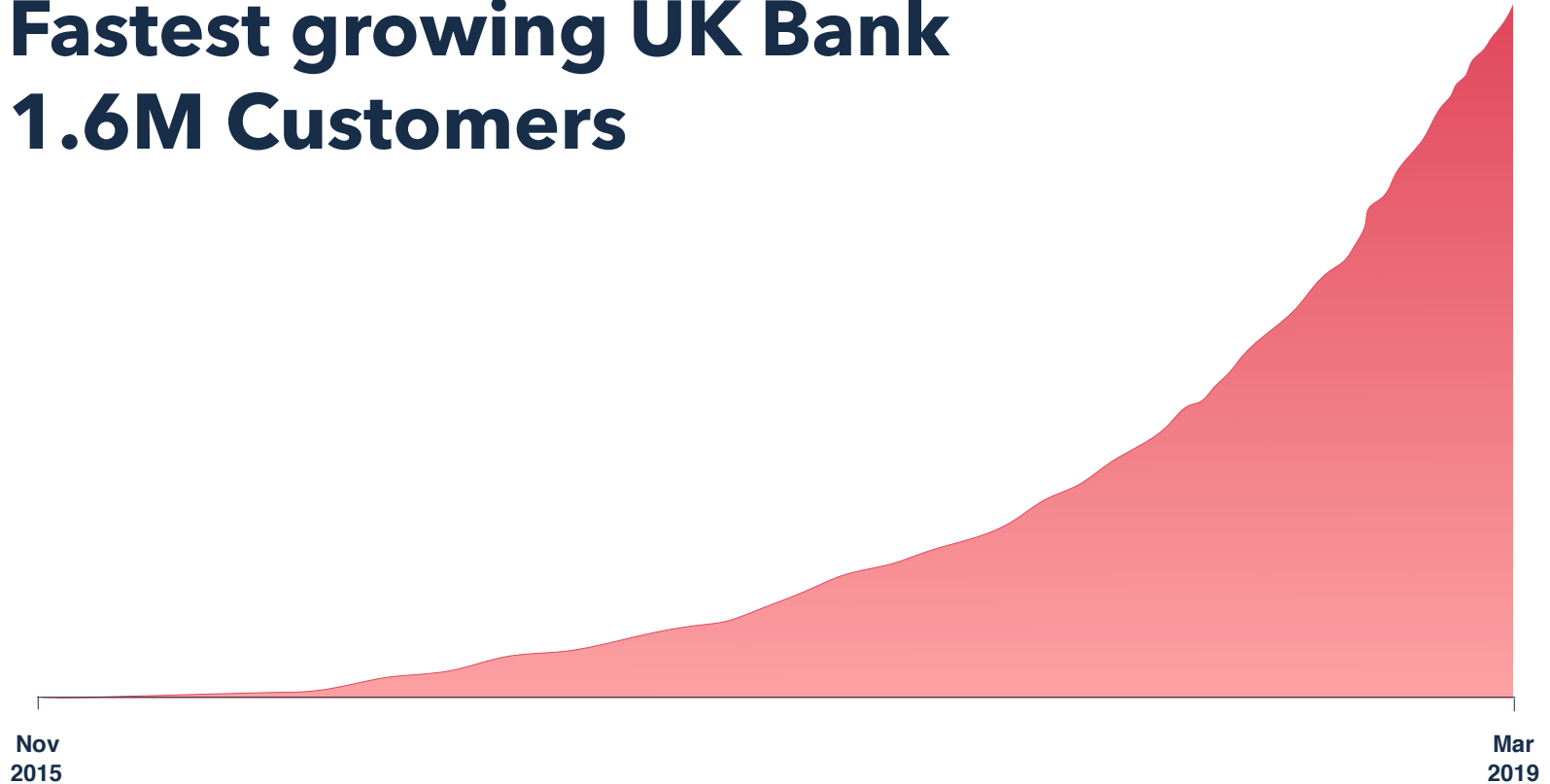
**Mar
2019**





Fastest growing UK Bank

1.6M Customers





“construct a highly agile and highly available service from ephemeral and assumed broken components”

- Adrian Cockcroft

How does Monzo operate?

- **AWS, GCP, and physical data centres**
- **Cloud Native technologies:**
Kubernetes, Docker, Calico, Cassandra, Kafka, NSQ,
Etcd, Prometheus, Jaeger, Envoy, Elasticsearch...
- **Go based micro services**

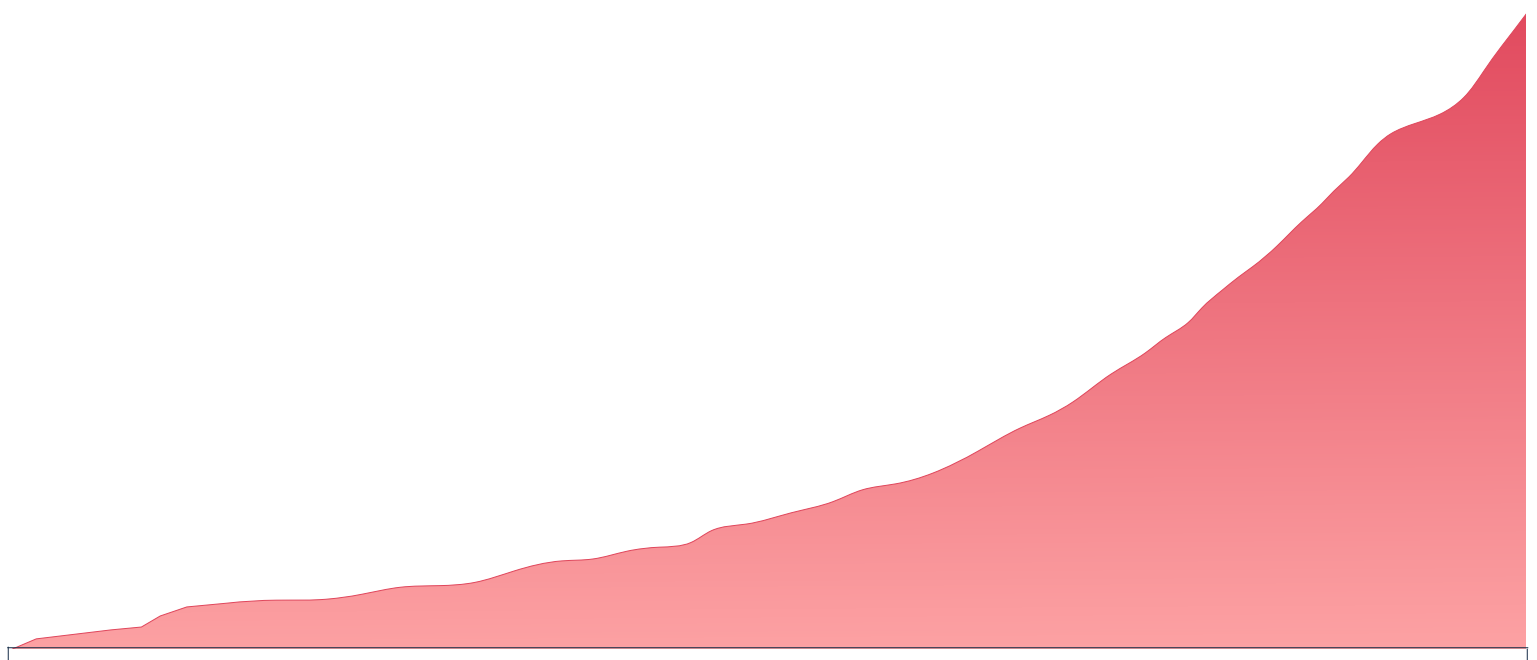


1000

Feb
2015

services

Mar
2019













Starting with a House



CHEESECAKE 🍰🍰🍰
ACCOUNT 282

-2.00 >



😎
ACCOUNT 830

1.00 >



😎
ACCOUNT 830

-1.00 >



☕☕☕☕☕
ACCOUNT 830

-1.00 >



Moop
ACCOUNT 830

-1.00 >



Prufrock ☕
ACCOUNT 282

-2.80 >



MUFFINS!!!
LEAH TEMPLEMAN

-1.00



Chaching! 🛎
HUGO CORNEJO

0.01



I'm rich! 👍
ACCOUNT 438

-0.01



🍺 + 🐛 🏠
TOM BLOMFIELD

-3.50



Ask for Janice 🍸
ACCOUNT 282

-16.57



⬆️ ⬆️ ⬇️ ⬇️ ⬅️ ➡️ ⬅️ ➡️ B A 💥
JASON BATES

-0.01

 monzo / * Private

 Unwatch ▾ 52

 Unstar 15

 Fork 0

 Code

 Pull requests 357

 Actions

 Insights



 64,692 commits

 2,440 branches

 0 releases

 2 environments

 147 contributors











Monzo (early 2015) 🏠

Source Control

CI system to test & build our apps

Artisanally hand-crafted servers on AWS EC2

Monzo (early 2015) 🏠

Source Control

CI system to test & build our apps

Artisanally hand-crafted servers on AWS EC2

Go based micro services

Cassandra as our database?!



●●●●○ O2-UK 3G



8:11

Tuesday, May 12



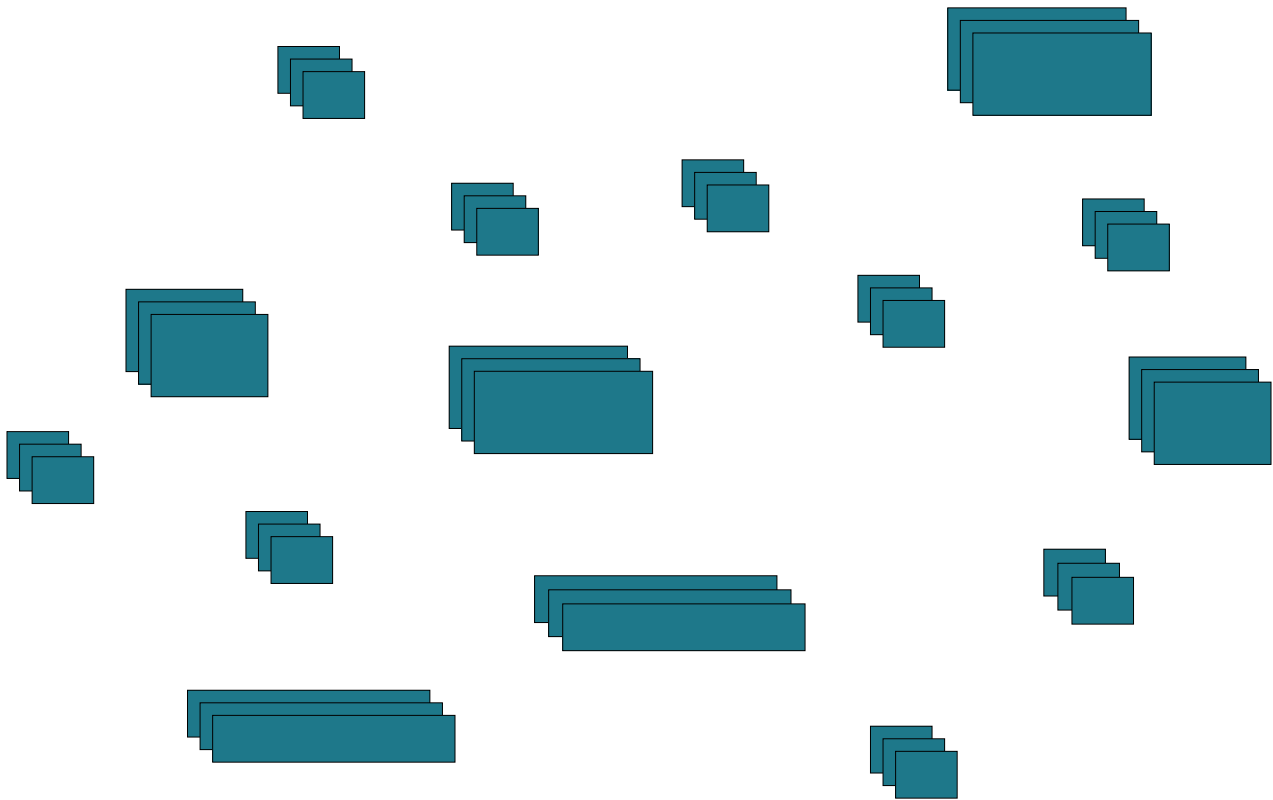
Bank 2m ago

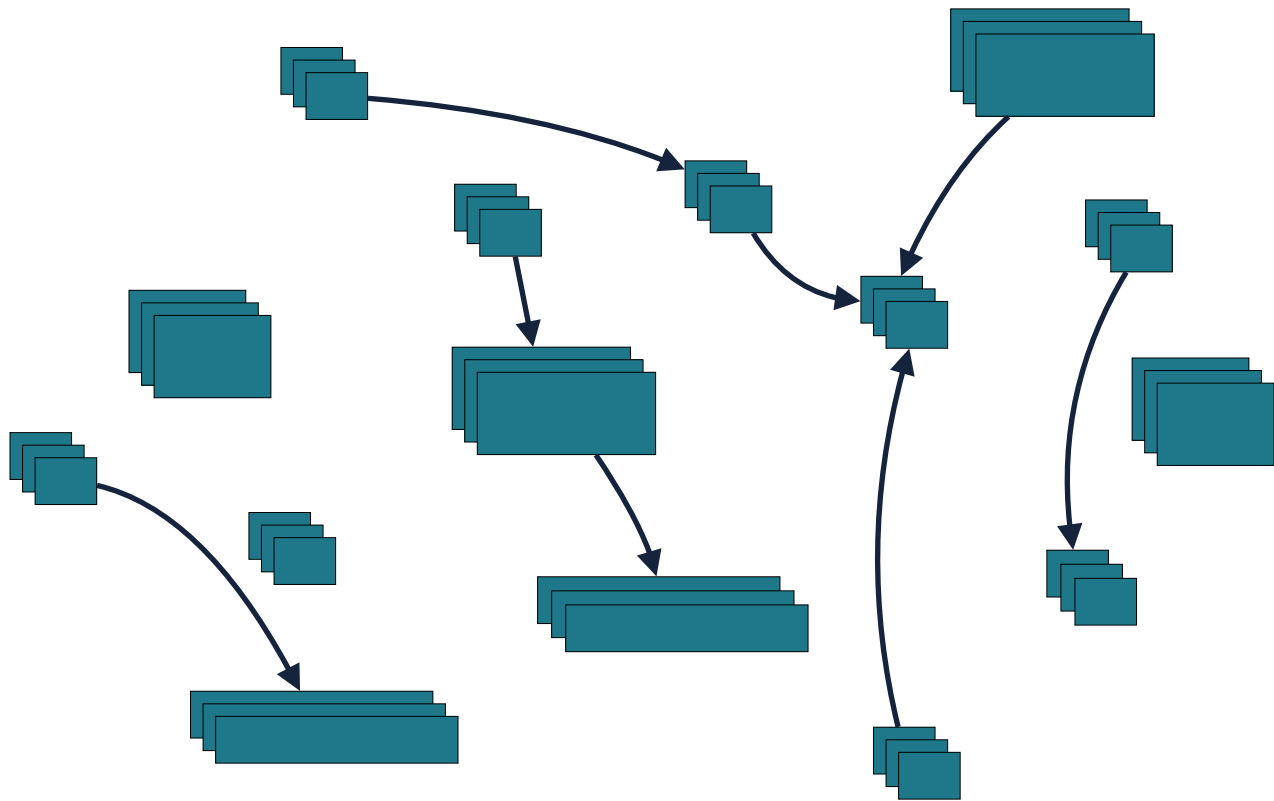
You spent £7.00 at 'SCALA
LONDON N1 9NL GBR' on May 12
at 19:09

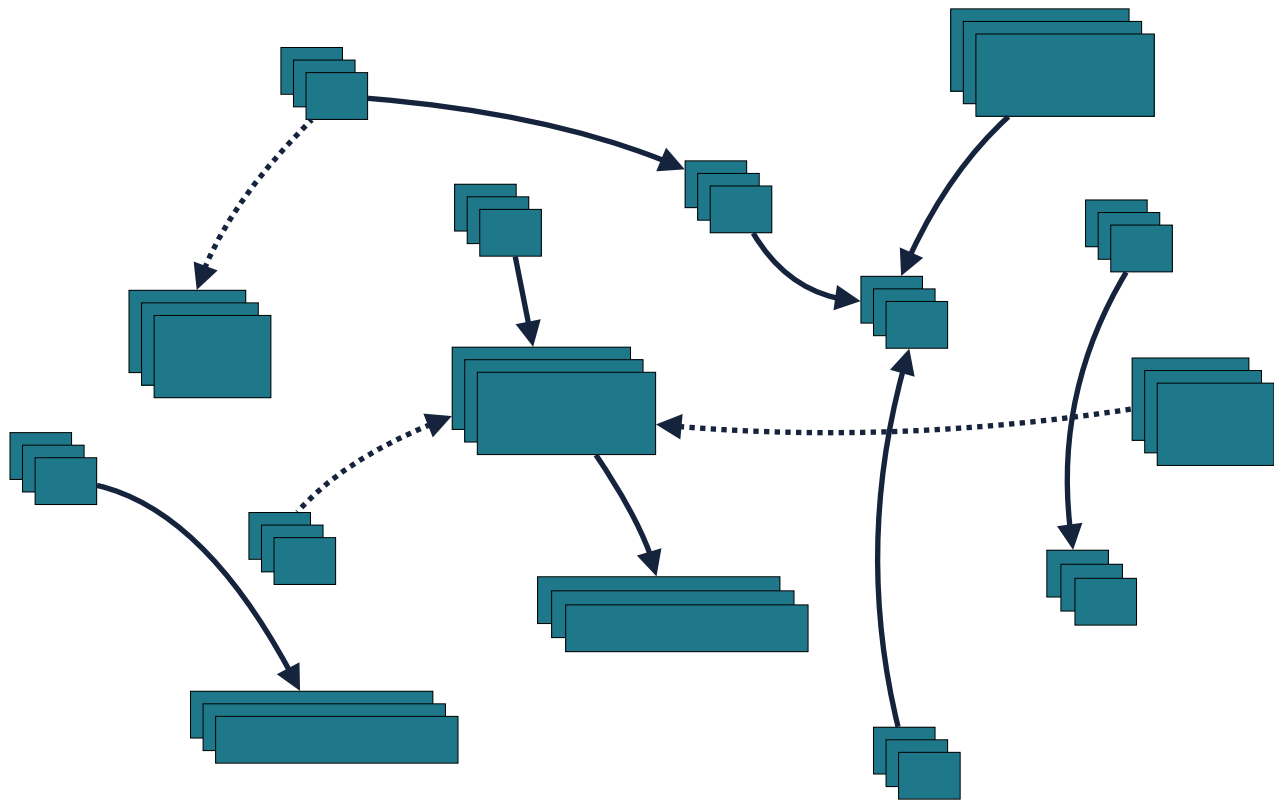
slide to view

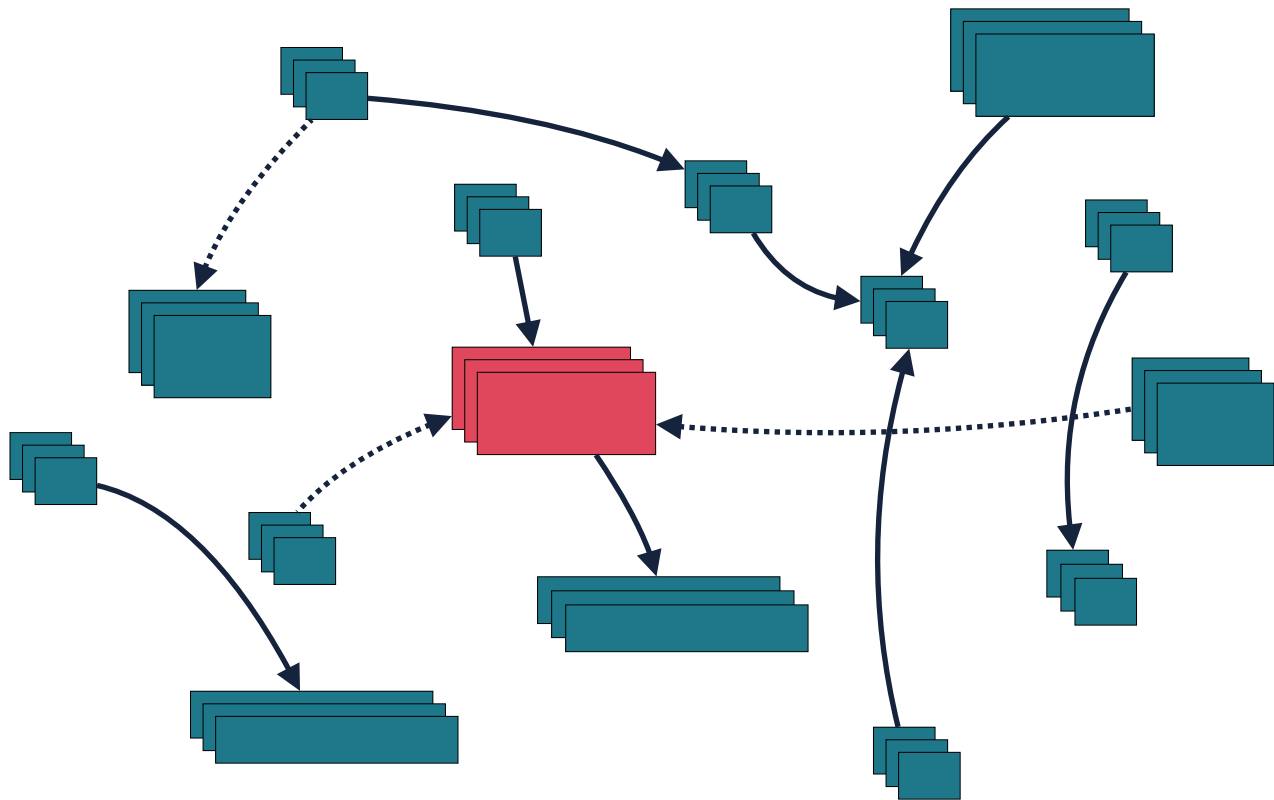


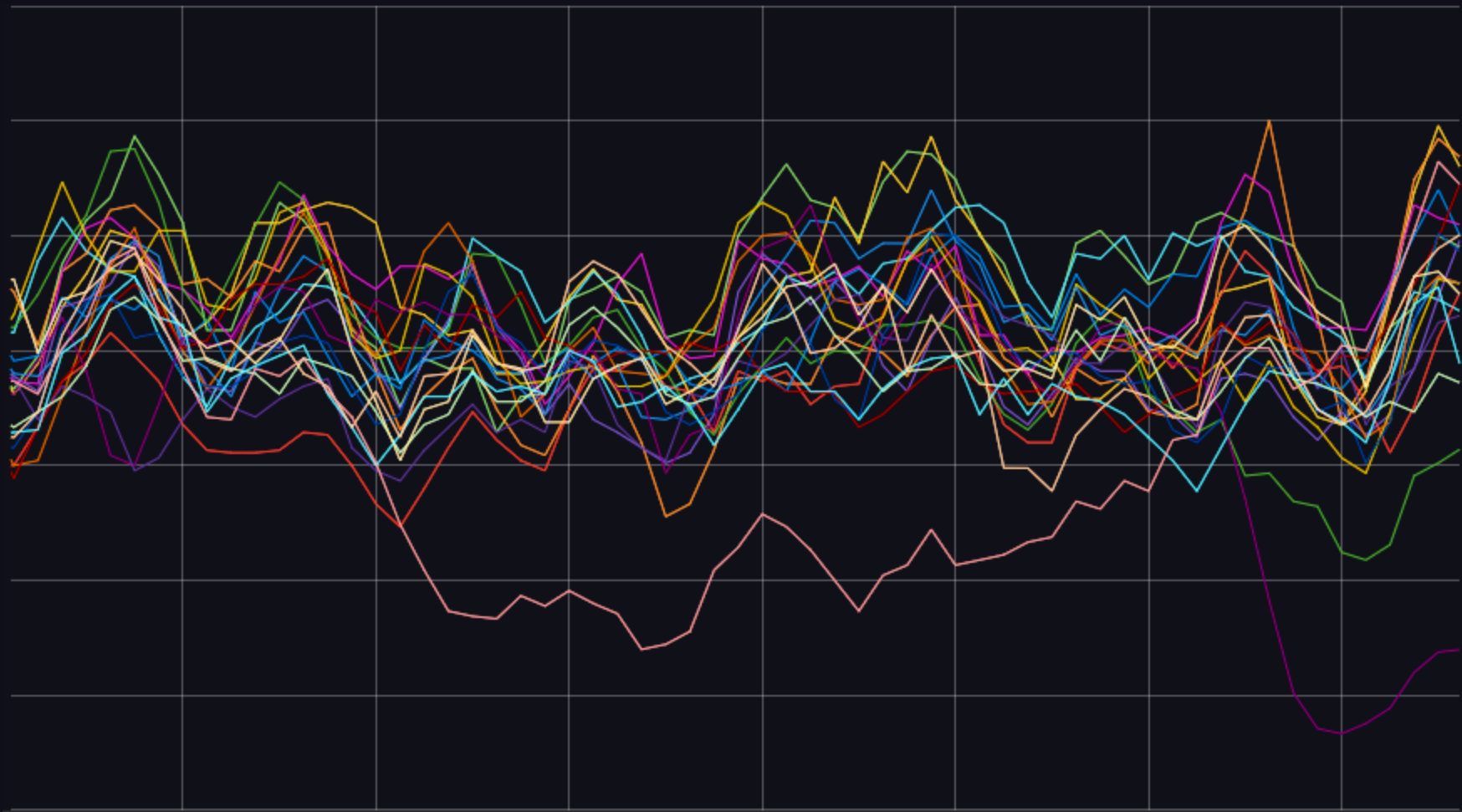
Building a Village

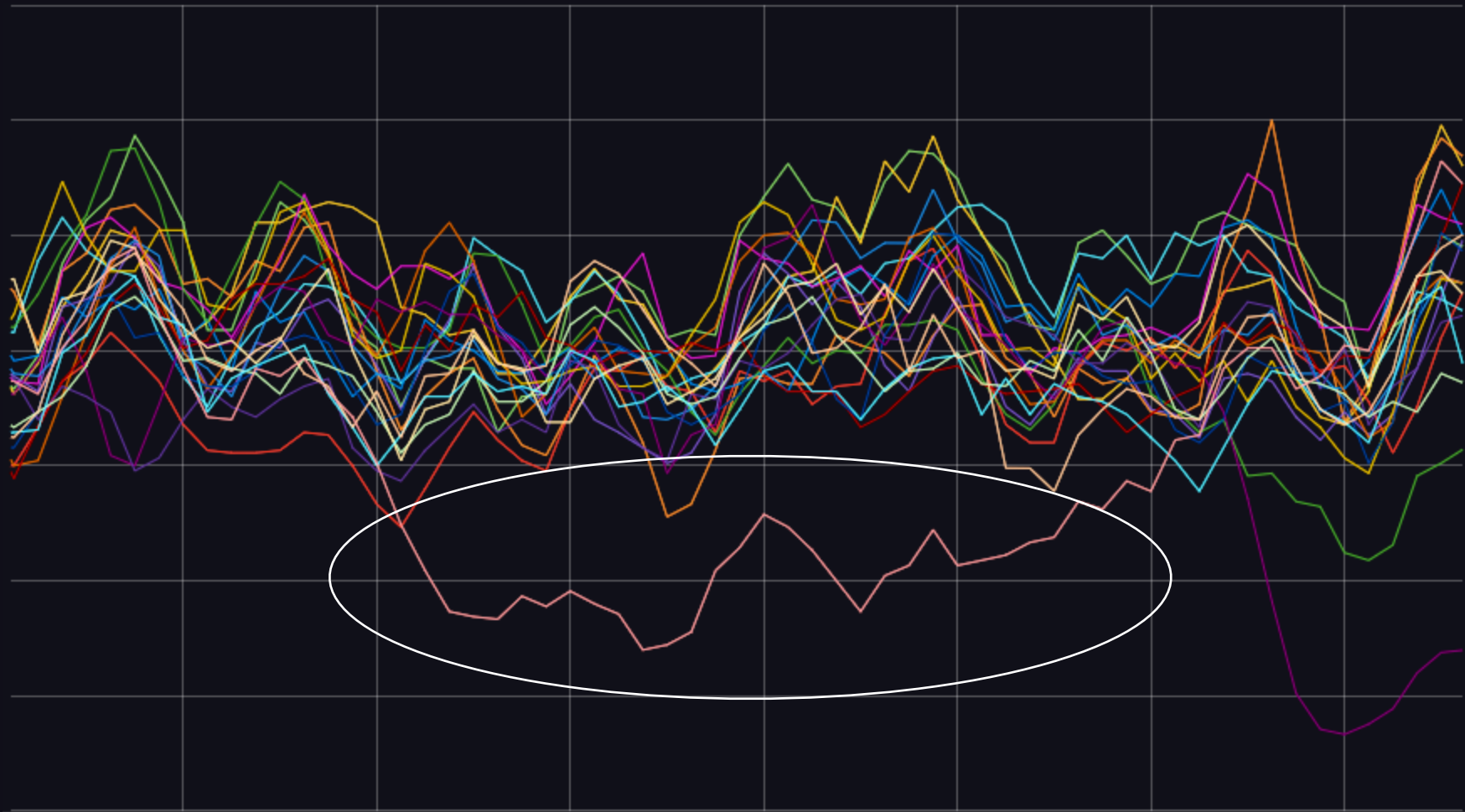


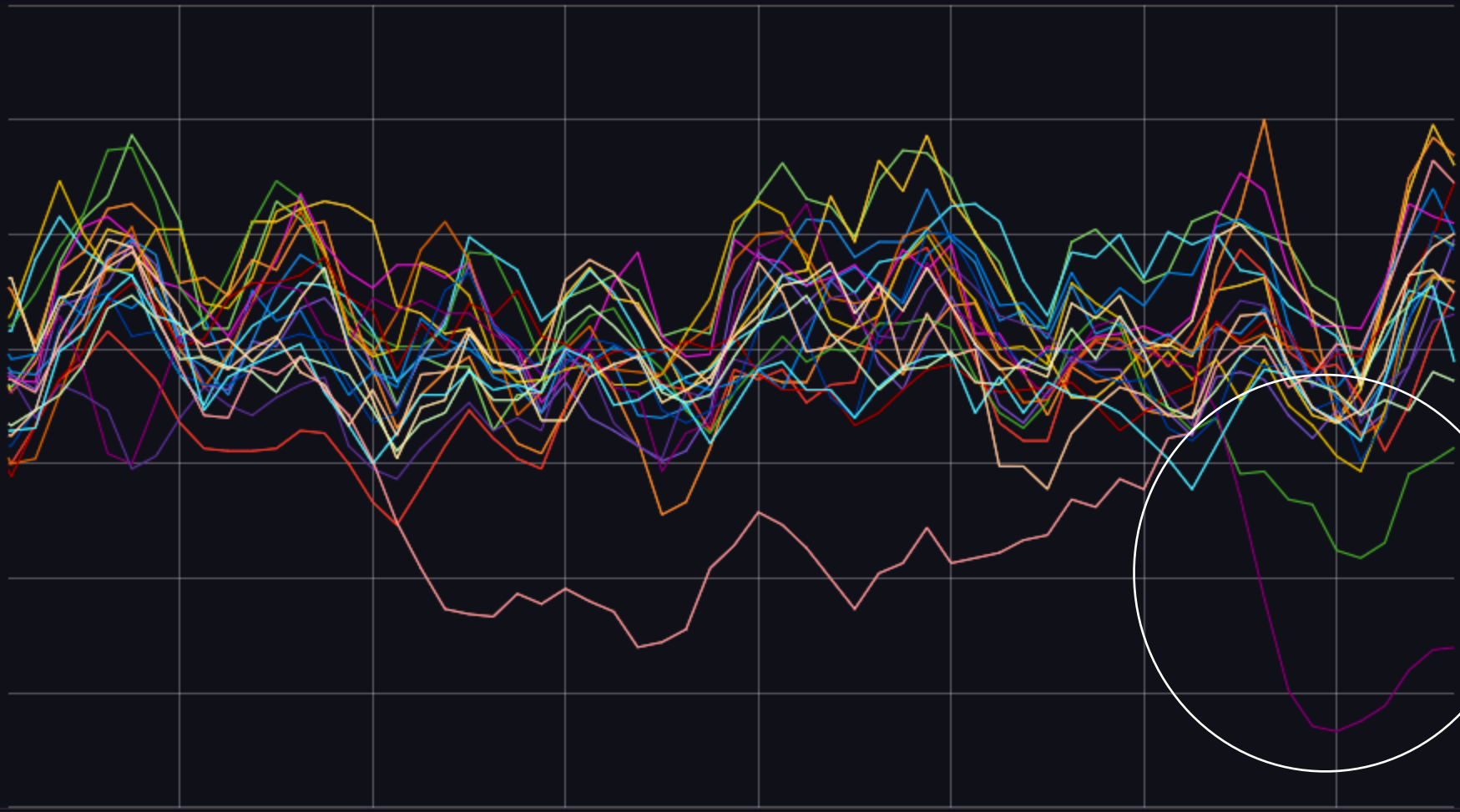


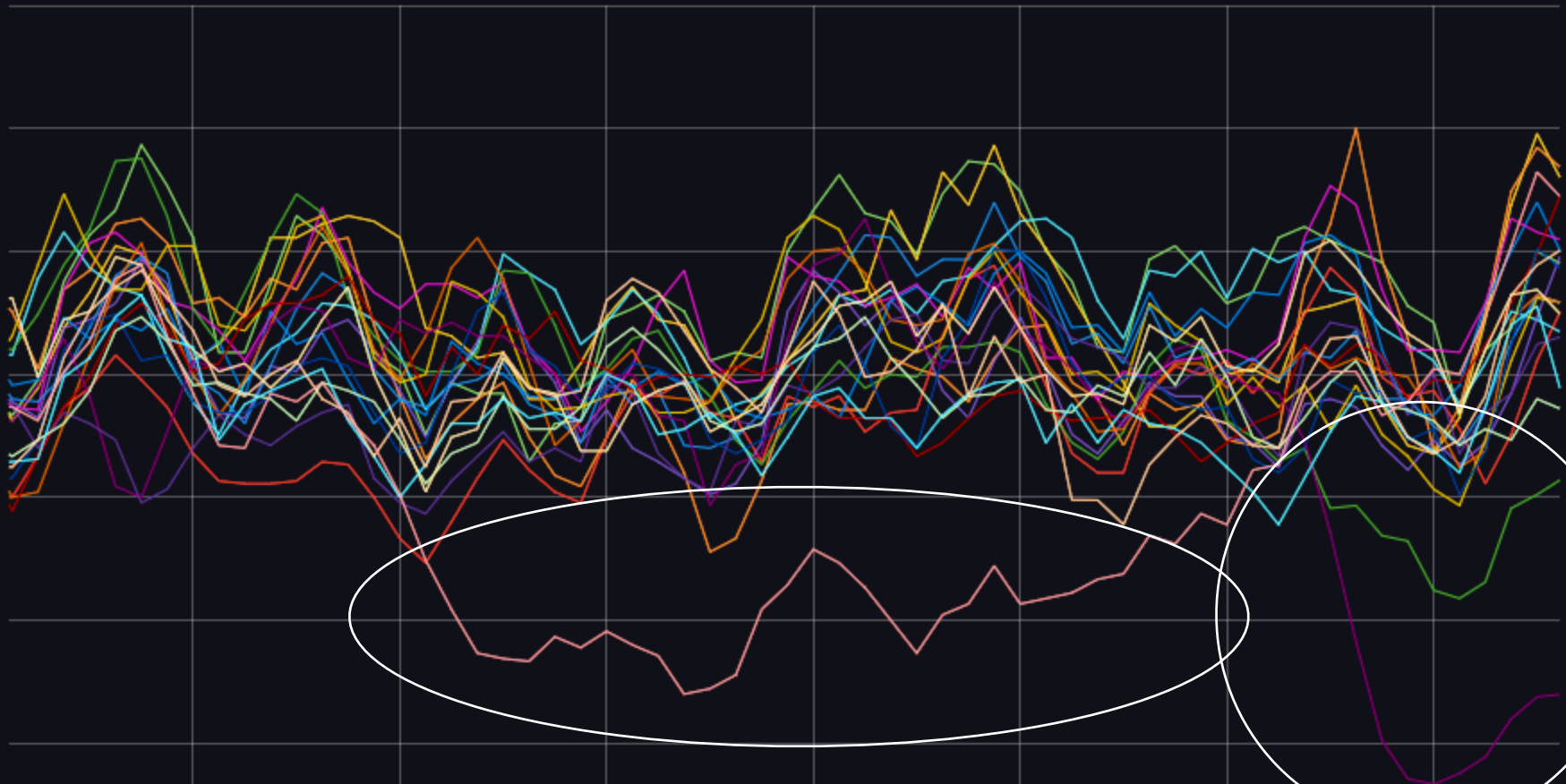








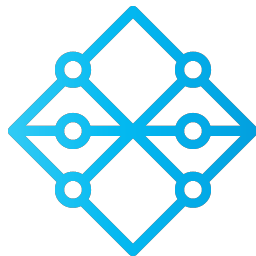




**Network saturation
due to DB backups**

Monzo (late 2015) 🏠

Pub/Sub Messaging – NSQ



Deployment – CI system (Jenkins)

Orchestration – Mesos & Marathon



Error Tracking – Sentry

Metrics – Influx stack

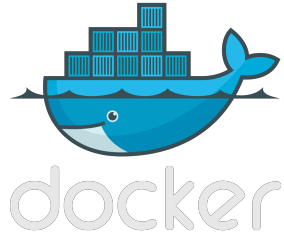
Distributed locking – etcd



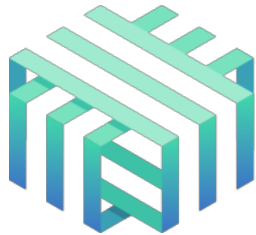


The road to a Town

Reliability & Scalability



Reliability & Scalability



service

service

service

service

service

service

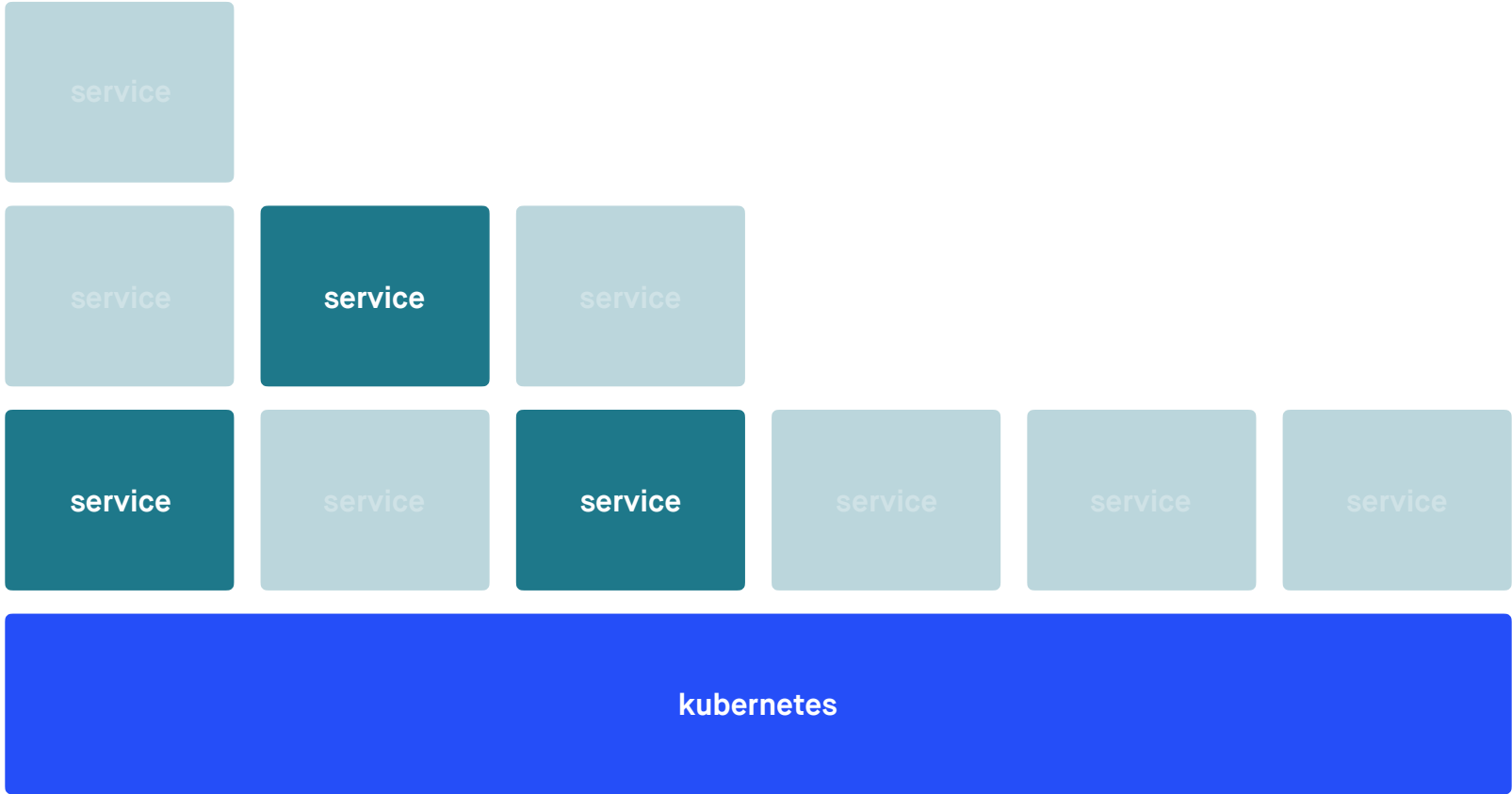
service

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kubernetes



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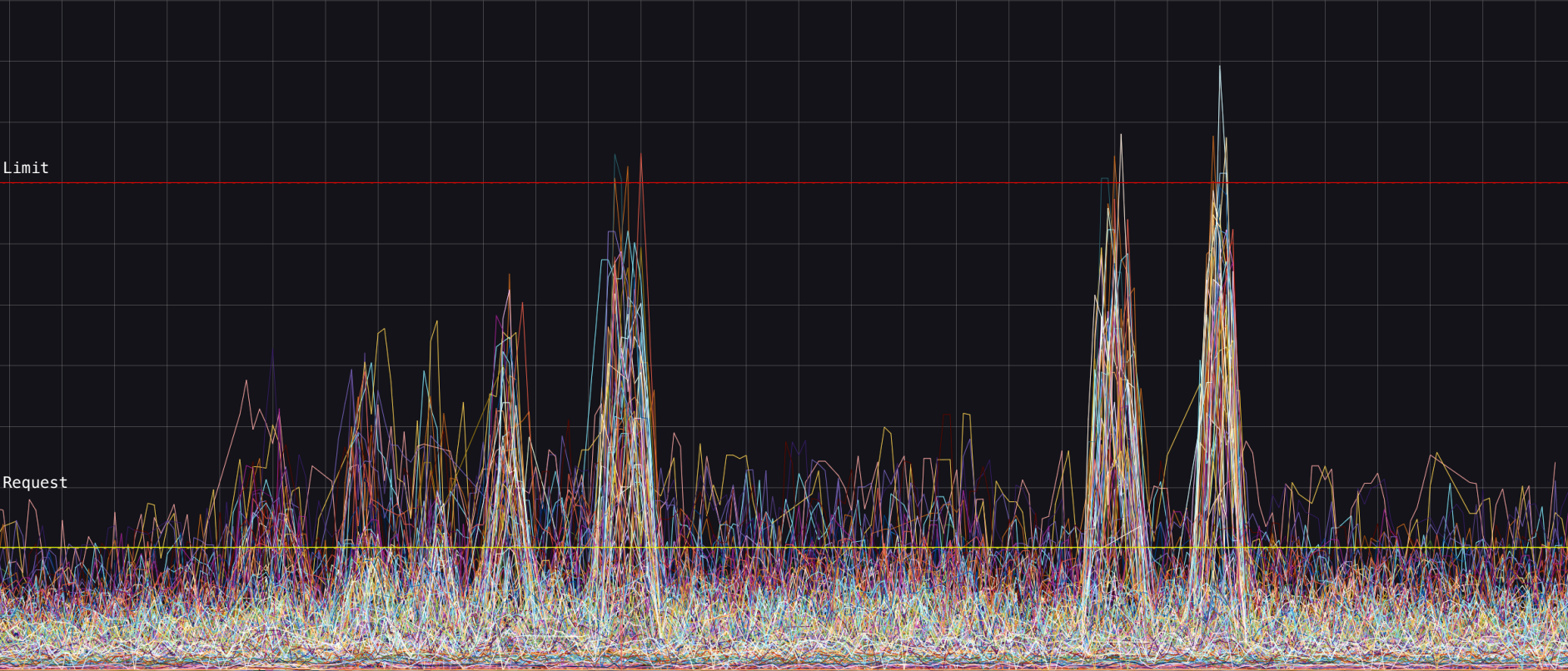
service

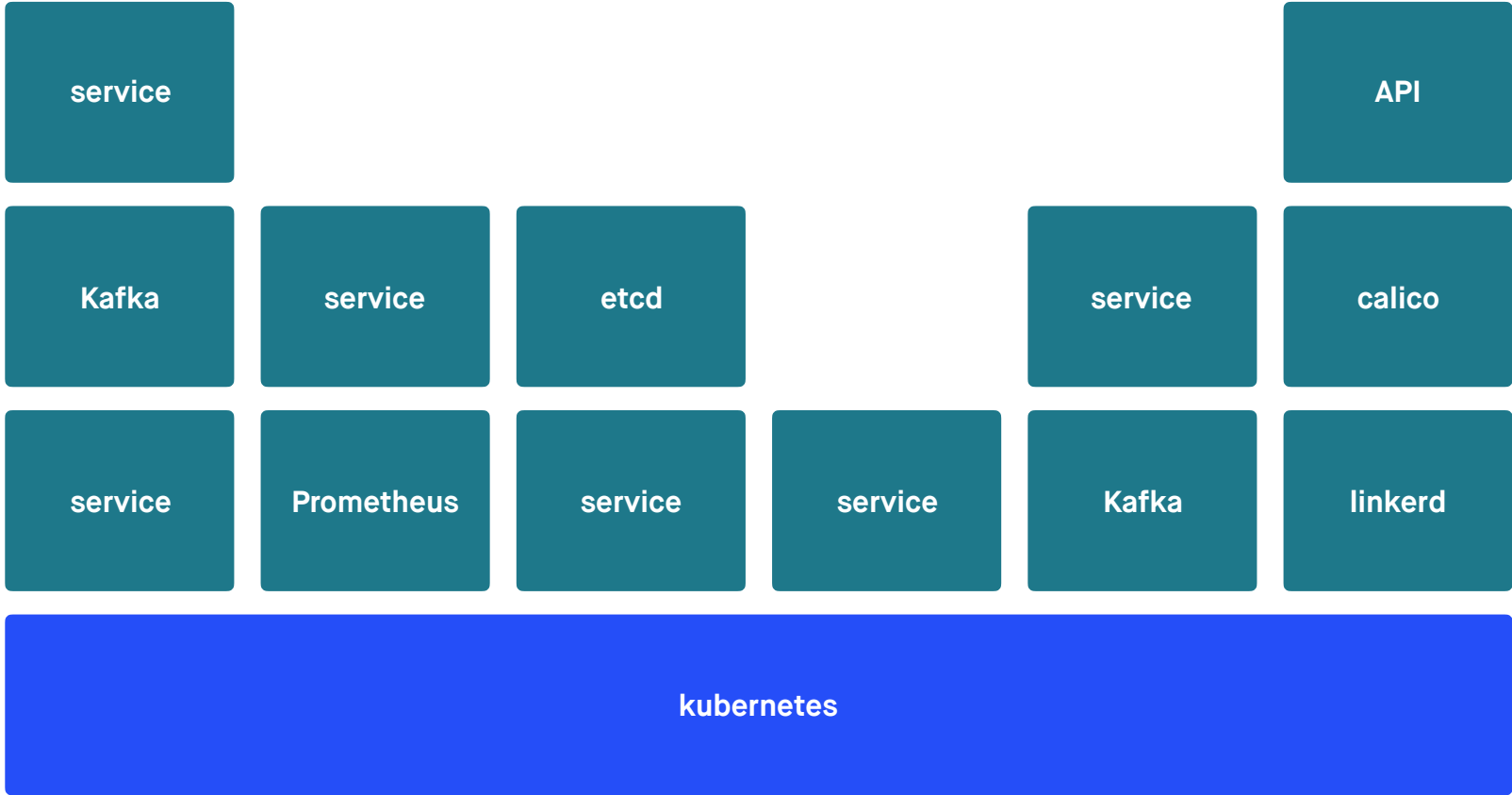
service

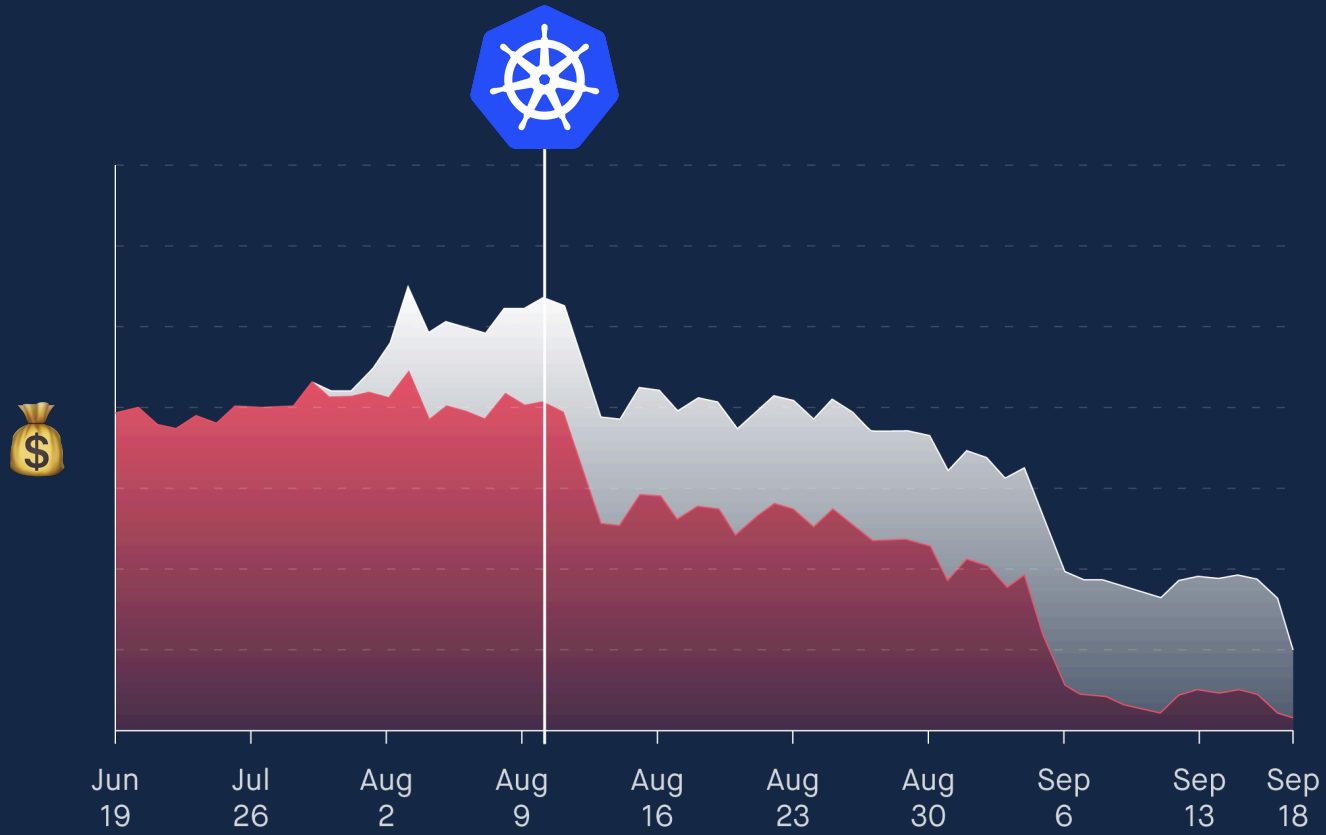
kubernetes

Limit

Request







Monzo (mid 2016) 🏠

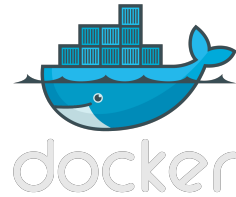
Focus on reliability and scalability

Containerisation – Docker

Orchestration – Kubernetes

Service mesh – linkerd

Resilient messaging – Kafka

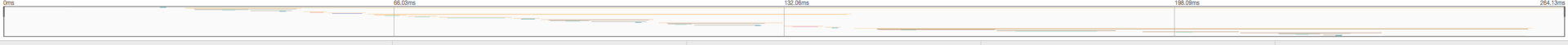




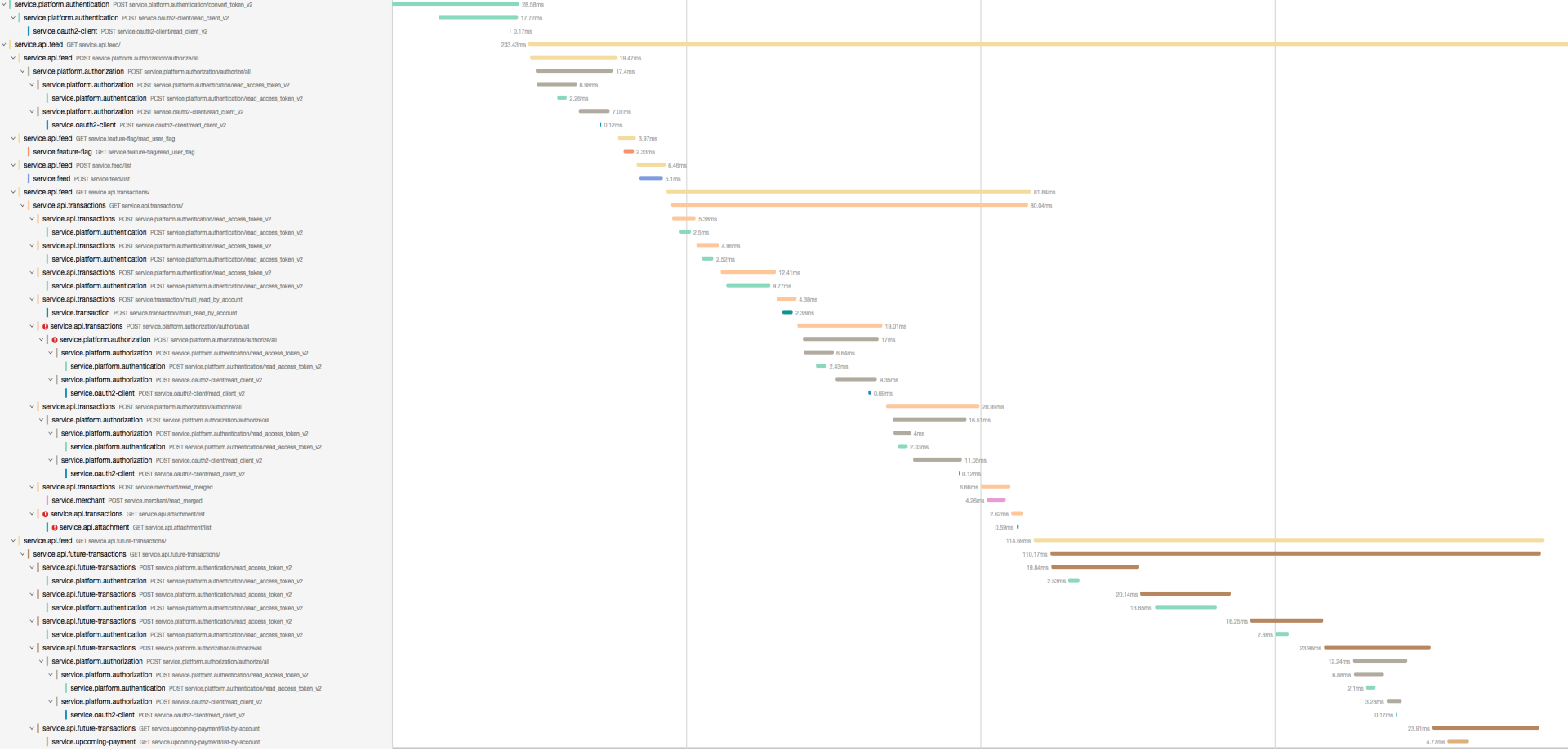
Onwards to a City

<trace-without-root-span>

Trace Start: October 3, 2018 7:00 PM Duration: 264.13ms Services: 12 Depth: 7 Total Spans: 56



Service & Operation



Monzo (2018) 

Scalable metrics – Prometheus

Tracing – Jaeger

Network Isolation – Calico

Service Mesh (sidecar) – Envoy





What's next?



29 JUN 2018

Technology

Engineering Principles at Monzo



The type of customer-focussed bank that we're creating at Monzo has never existed before, and we believe the only way to create it is to have total control over the technology we use. We now have a team of over 70 engineers working on this, with more joining every week. As we continue to grow, it's crucial that we create a shared understanding of what "good" looks like so that existing engineers know how to make decisions and prioritise work and new engineers know what we expect and how we work.



To do that, we've distilled some of the lessons we've learned while building Monzo over the past three years into a common set of engineering principles. These aren't "rules", but we believe they are a useful general guide which will allow us to grow and develop new features quickly while ensuring that we

monzo.com/careers

