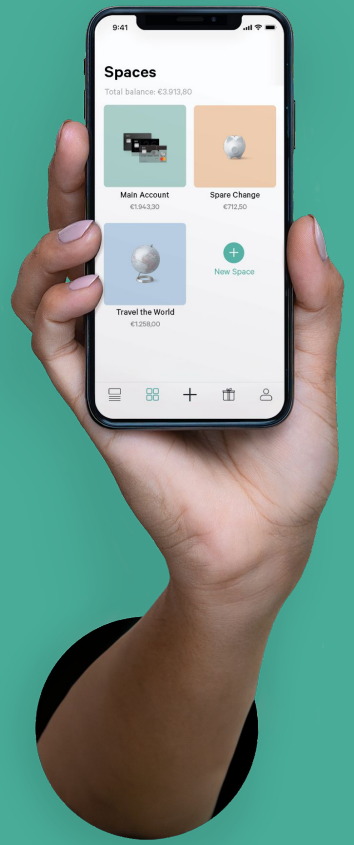
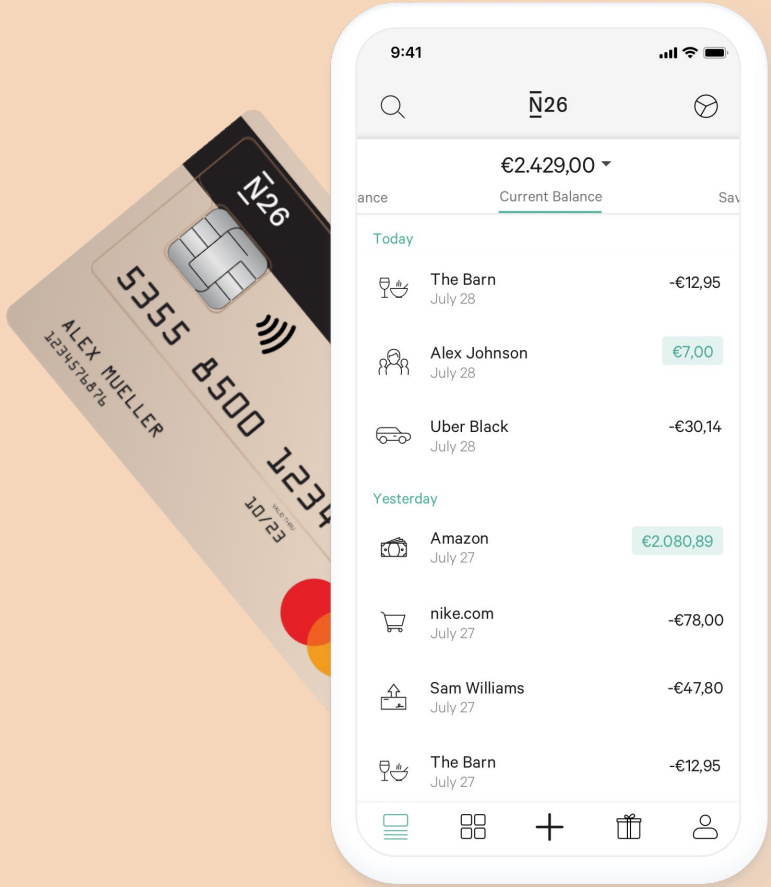
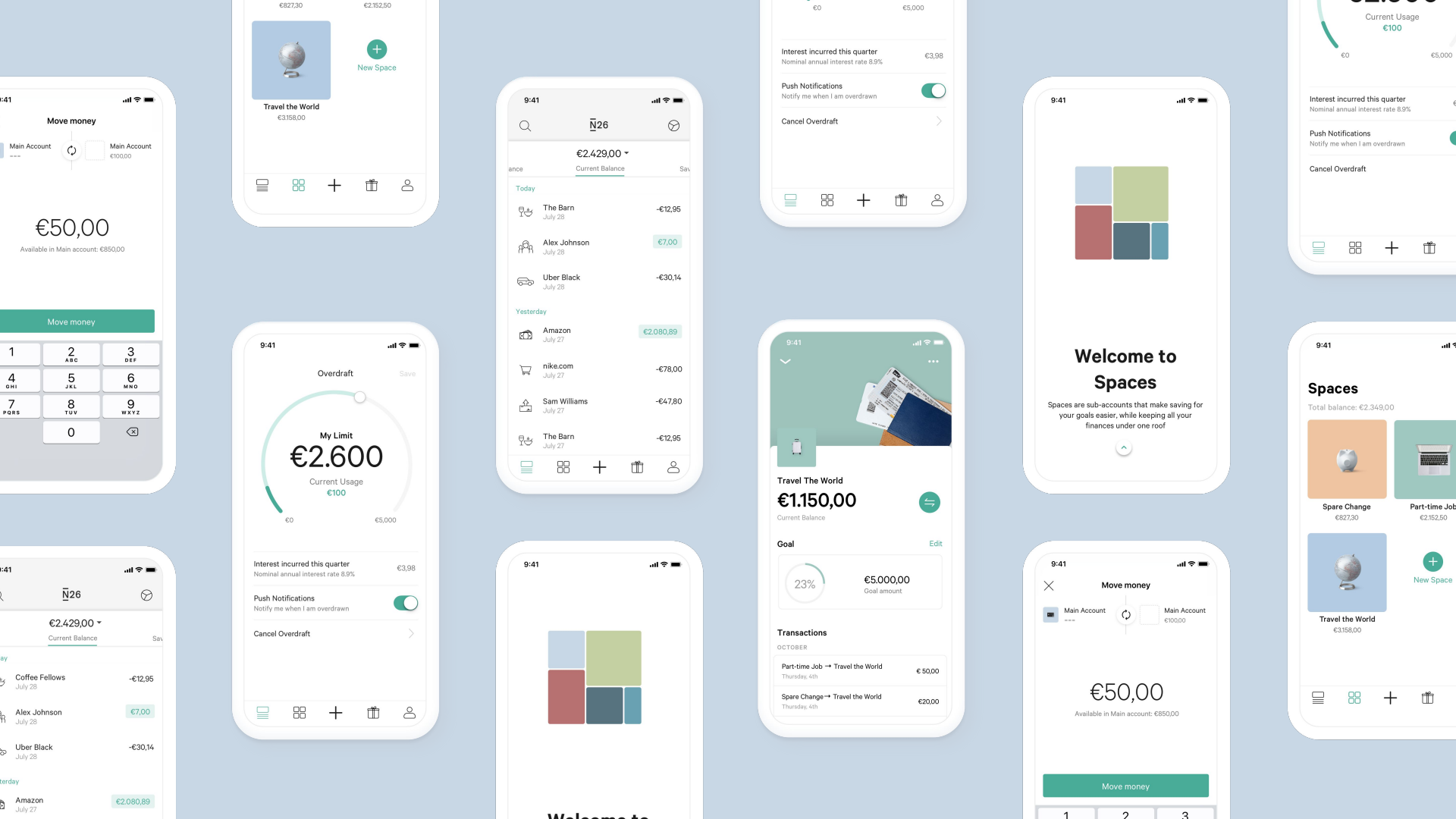
N26

Scaling N26 Technology Through Hypergrowth



@folgerfonseca —— QCon London —— 03.2020


9:41
N26
€2.429,00
Current Balance
Today
The Barn
July 28
-€12,95
Alex Johnson
July 28
€7,00
Uber Black
July 28
-€30,14
Yesterday
Amazon
July 27
€2.080,89
nike.com
July 27
-€78,00
Sam Williams
July 27
-€47,80
The Barn
July 27
-€12,95
N26
5355 8500 1234
ALEX MUELLER
10/23


Move money
Main Account
Main Account
€100,00
€50,00
Available in Main account: €850,00
Move money
1
2 ABC
3 DEF
4 GHI
5 JKL
6 MNO
7 PQRS
8 TUV
9 WXYZ
0
€827,30
€2.152,50
Travel the World
€3.158,00
New Space
9:41
Ñ26
€2.429,00
Current Balance
Today
The Barn
July 28
-€12,95
Alex Johnson
July 28
€7,00
Uber Black
July 28
-€30,14
Yesterday
Amazon
July 27
€2.080,89
nike.com
July 27
-€78,00
Sam Williams
July 27
-€47,80
The Barn
July 27
-€12,95
€0
€5,000
Interest incurred this quarter
Nominal annual interest rate 8.9%
€3,98
Push Notifications
Notify me when I am overdrawn
Cancel Overdraft
Overdraft
Save
My Limit
€2.600
Current Usage
€100
Travel The World
€1.150,00
Current Balance
Goal
Edit
23%
€5.000,00
Goal amount
Transactions
OCTOBER
Part-time Job → Travel the World
Thursday, 4th
€ 50,00
Spare Change → Travel the World
Thursday, 4th
€20,00
Welcome to Spaces
Spaces are sub-accounts that make saving for your goals easier, while keeping all your finances under one roof
Spaces
Total balance: €2.349,00
Spare Change
€827,30
Part-time Job
€2.152,50
Travel the World
€3.158,00
New Space

Building the bank world loves to use

A new approach to banking

Best digital user experience

A better price

+5M
Customers

+$1.66Bn
Monthly transaction volume

26
Markets

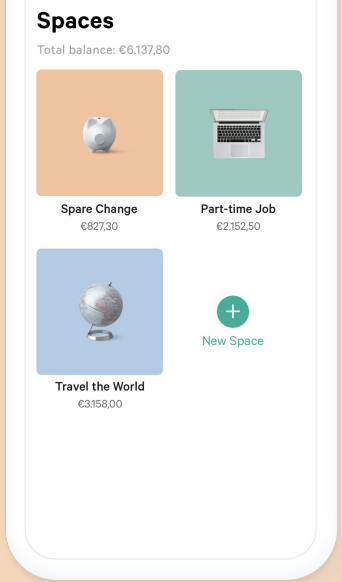
4
Locations

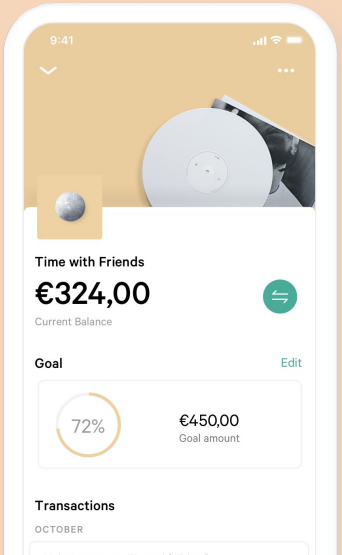
+$680M
Funding

+1500
Employees

SPACES

Organise your finances.





Tax Return
€2.429,00

Time with Friends
€1.230,00

N26 tech

+180
Microservices

+60
Cross-functional teams

100%
In the cloud

+500
Deployments per week

but

How?

BACKGROUND

3 Years ago

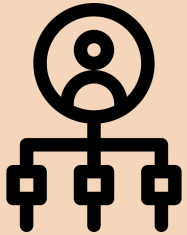
+100K
Customers

6
Markets

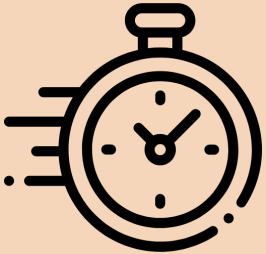
+40M
Funding

+100
P&T Employees

Our challenges



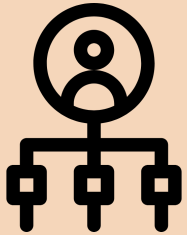
Small team



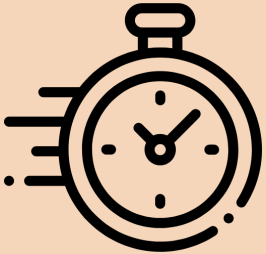
Time critical

Relatively young

Our challenges



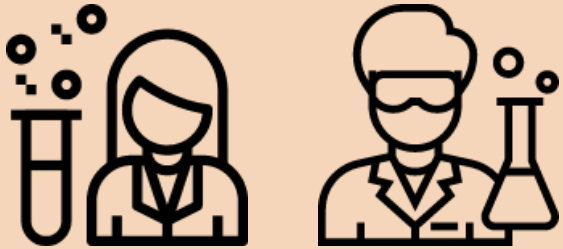
Small team



Time critical

Relatively young

Experimentation & Knowledge sharing

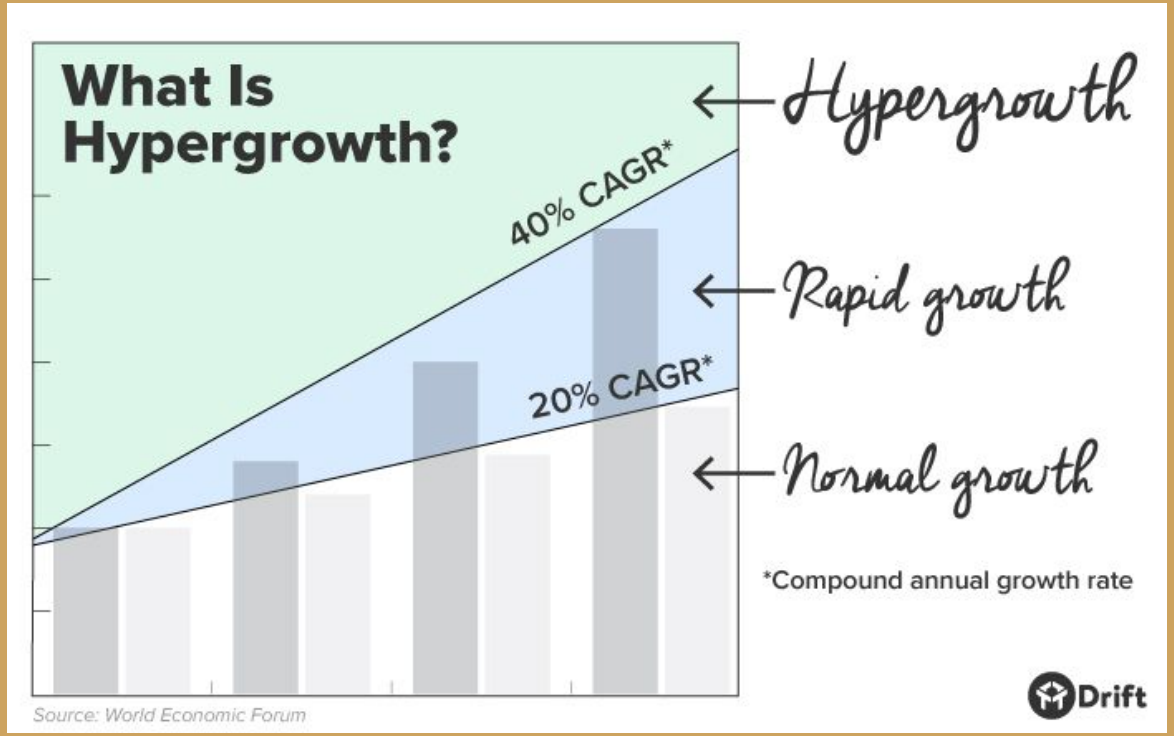


2 Days GSDD
1x every 6 weeks

Lightning talks
1x Week

HYPERGROWTH

Hypergrowth



Our challenges

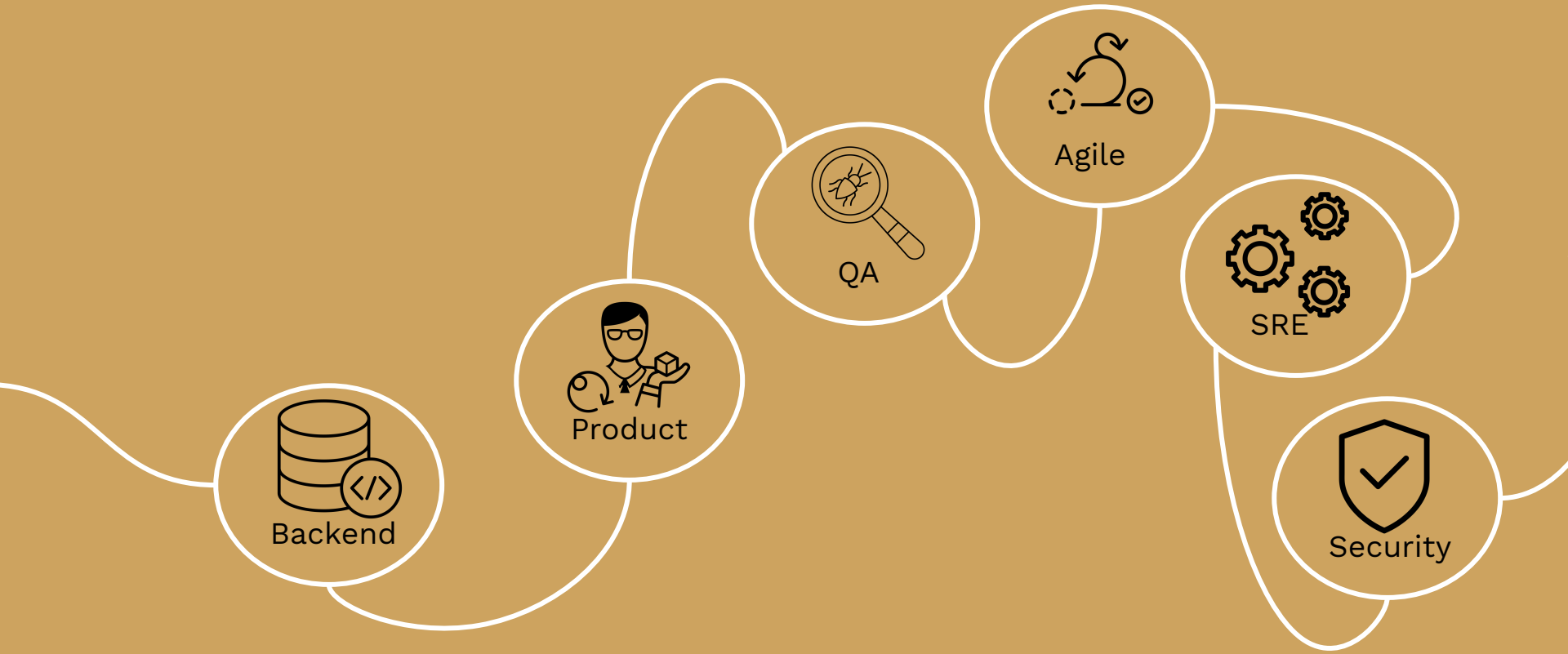
- → More User
- → More Markets
- → More Tech Hubs
- → More People
- → More Security
- → More Stability

PEOPLE
SERVICES
RELEASES
RELIABILITY

Our Goal

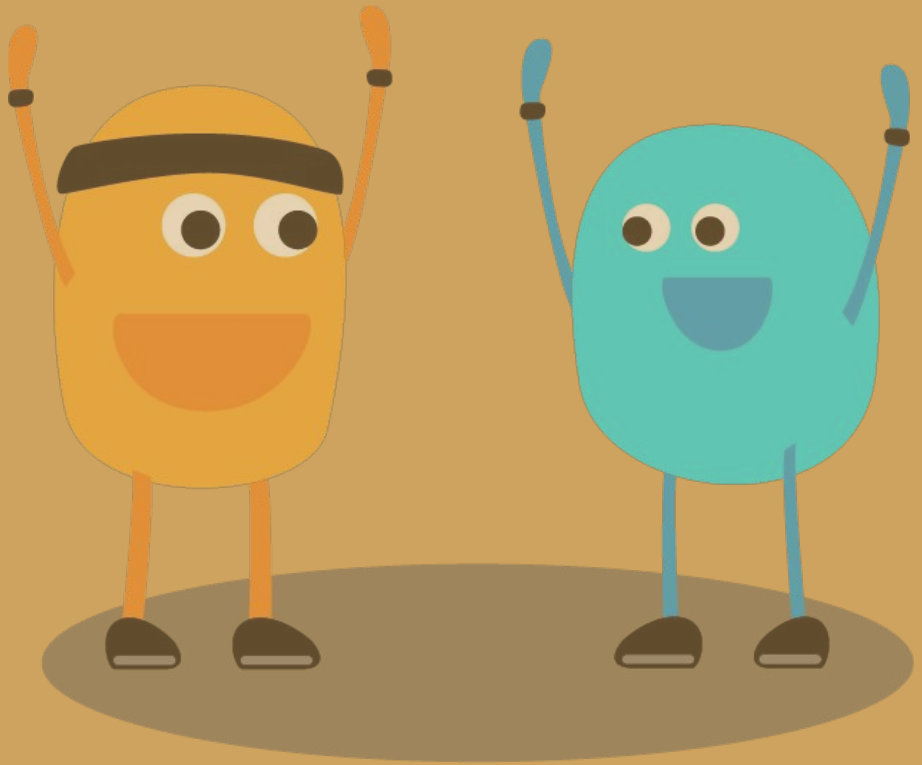
Bring in more teams to enable us to get more users and release the in new markets

Company onboarding

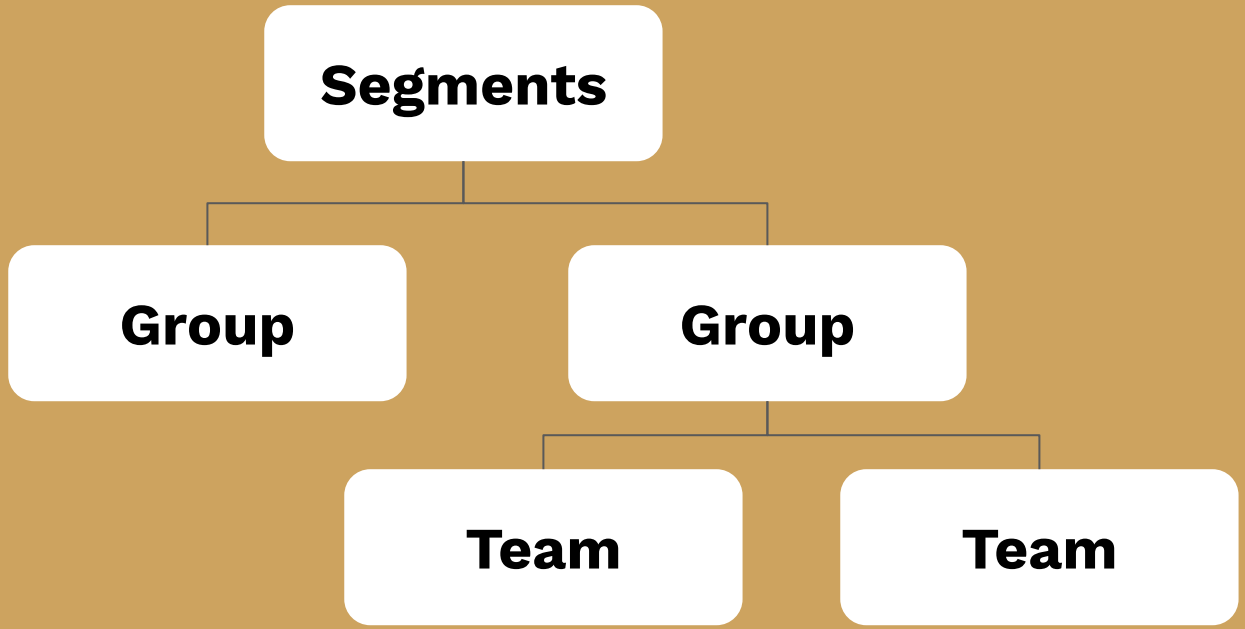


Team onboarding

Buddy system



Target operating model



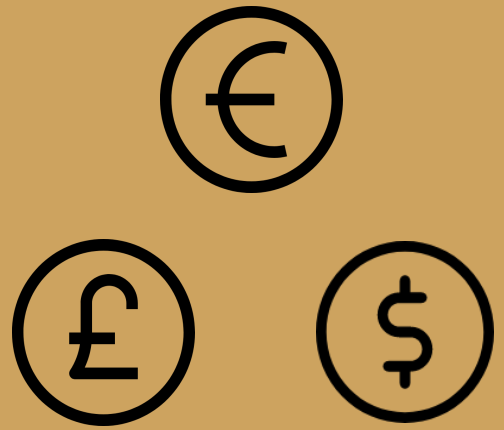
Target operating model

3 Different currencies

3 Different banking regulations

+10 Payment schemes

4 Different locations

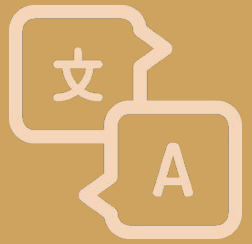


Our Goal

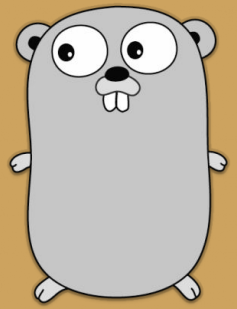
Have consistency in technology in order to build up knowledge, enable team mobility

N26

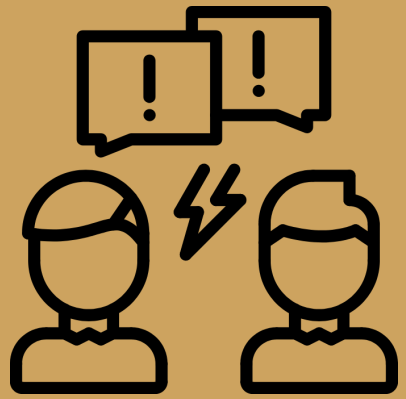
Microservices allows you to write each new service in a different language.

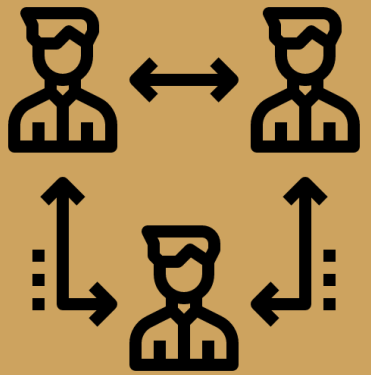


Languages



Scala



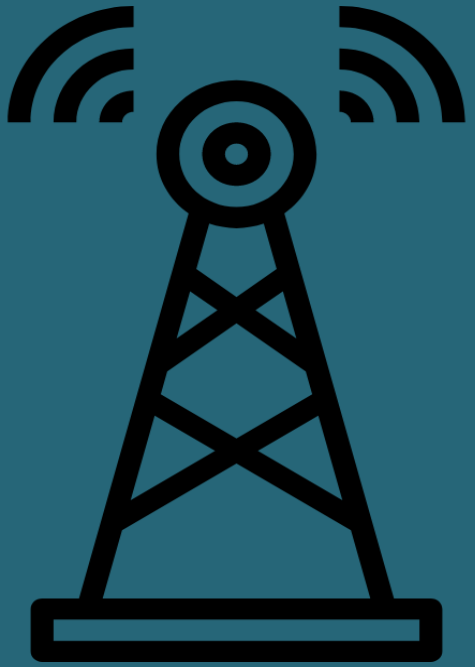


Decisions & Alignment

- Based on Thoughtworks
- Safe way to try things
- Favor Consistency
- Alignment across teams

N26

Tech Radar



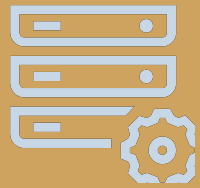
PEOPLE
SERVICES
RELEASES
RELIABILITY

Problem

How to avoid micro-monoliths

IaC

Infrastructure as Code



Infrastructure as code

Infra as Code Benefits

- **Strong separation**
  AWS organisations enables very fine-grained segregation of services
- **Scalable**
  Small number of people-to-server ratio
- **Agile**
  Supporting change or new services easy
- **Reduced human error**
  Automation prevents deviation
- **Source controlled**
  4 eyes principle plus audit

Example

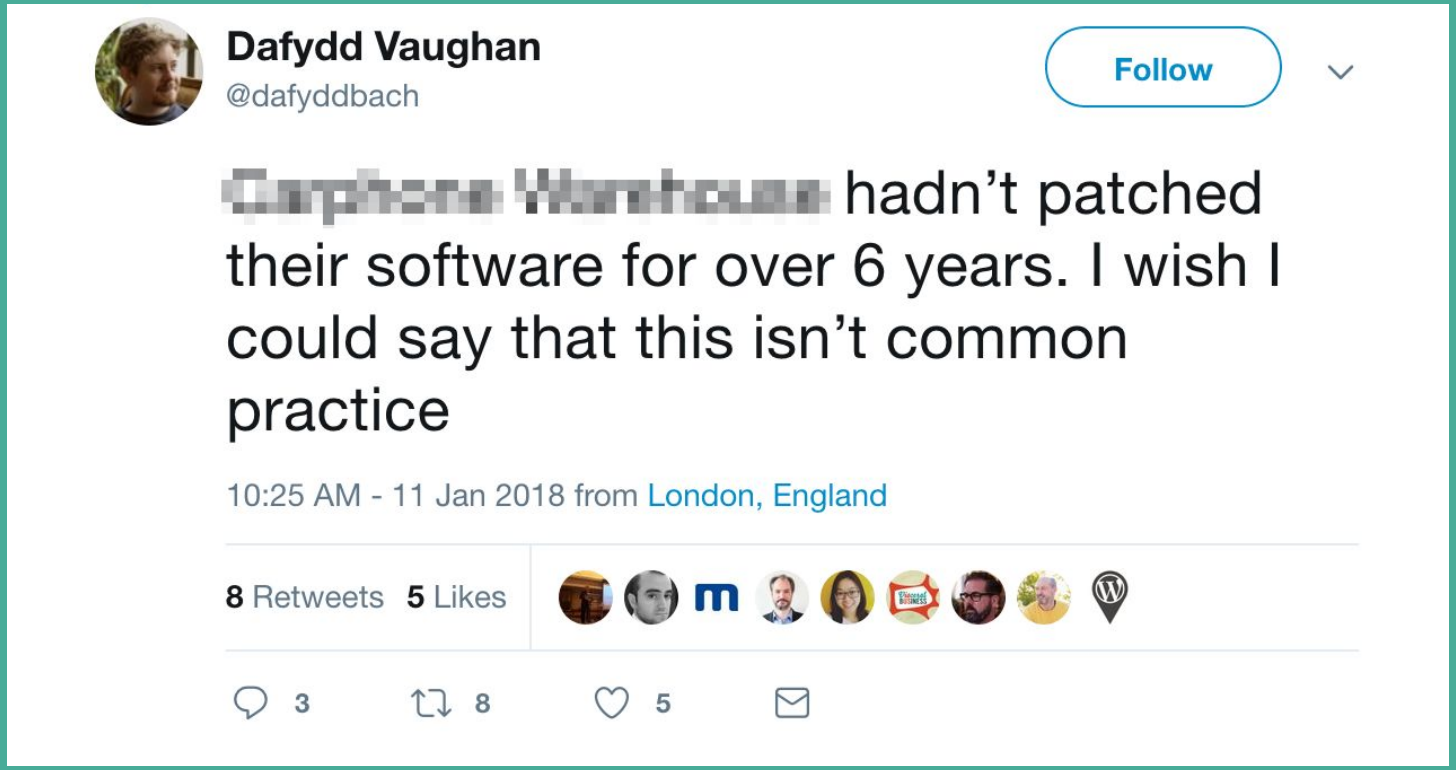
Remember meltdown and spectre?

Meltdown

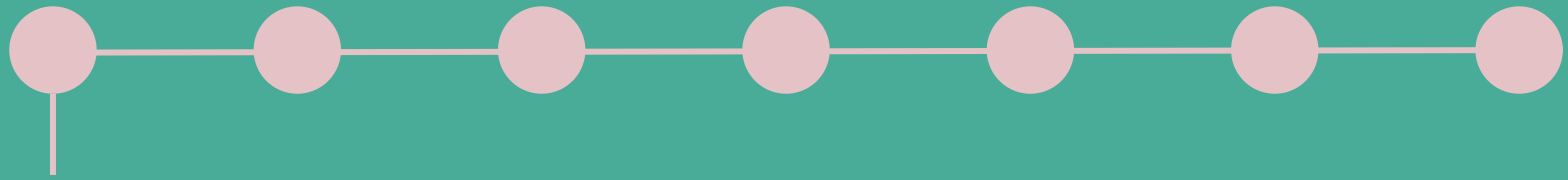
Spectre

“

Affected **billions** of systems **globally**

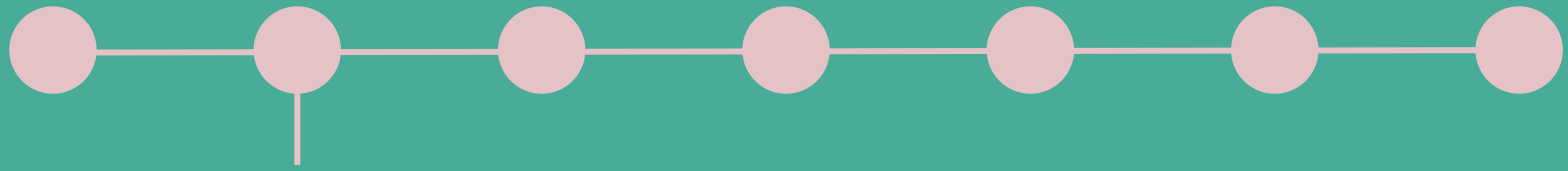

Dafydd Vaughan
@dafyddbach
Follow
[redacted] hadn't patched their software for over 6 years. I wish I could say that this isn't common practice
10:25 AM - 11 Jan 2018 from London, England
8 Retweets 5 Likes
3
8
5

N26

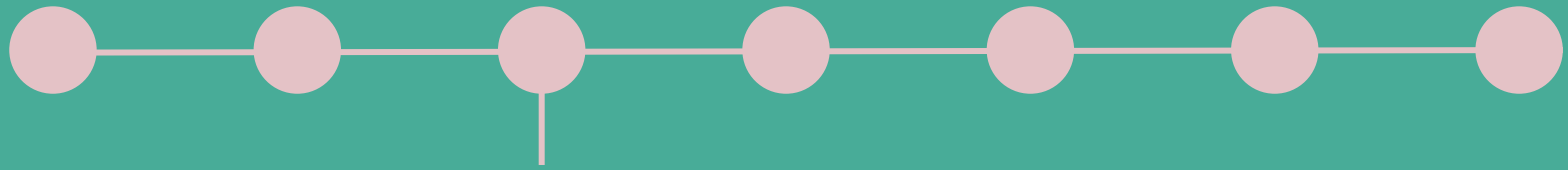


Vulnerabilities

publicly announced

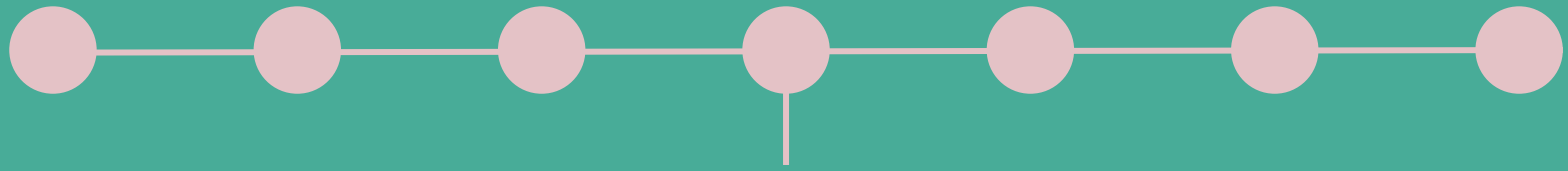


Intel responds with initial statement

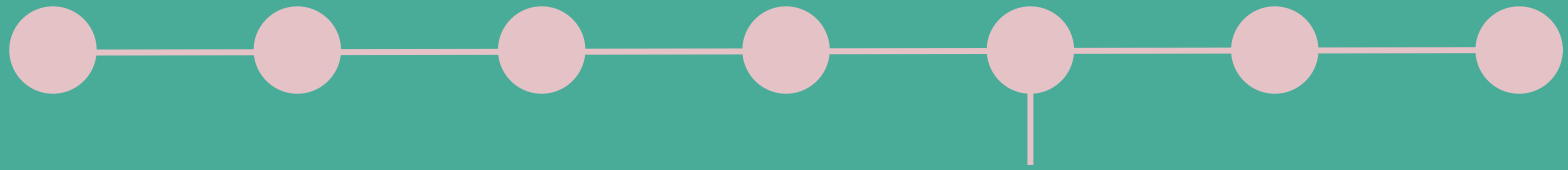


Intel announces a fix

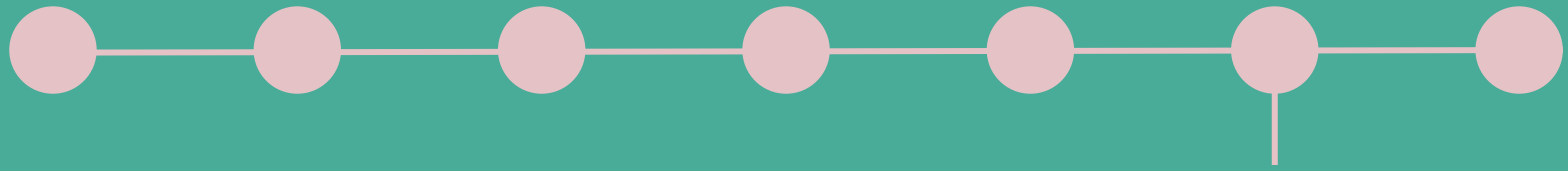
“for the majority”



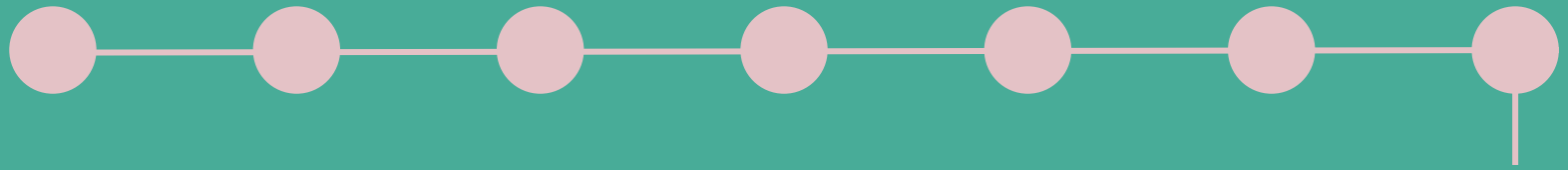
Amazon announces updated Kernel



Base image updated and tested



Deployments with new image incrementally tested and rolled out



Result? Done!

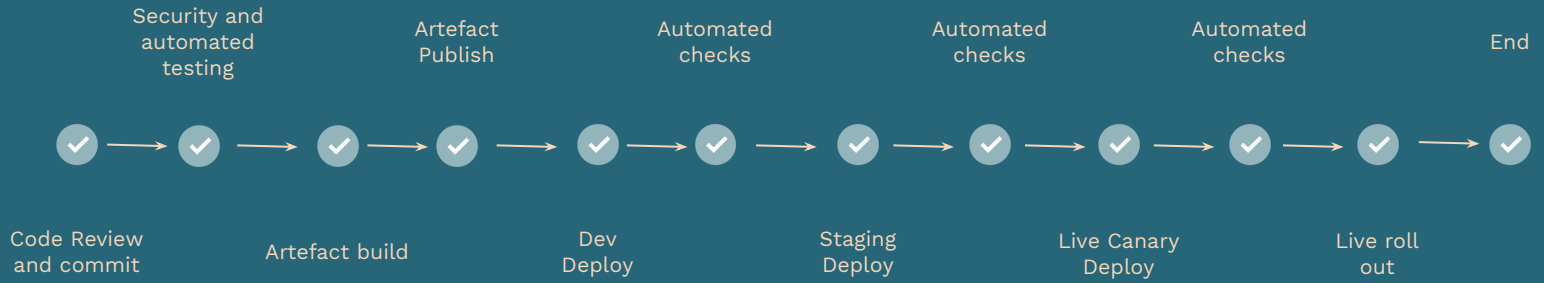
the **speed**
of a startup and
the **security** of a bank

PEOPLE
SERVICES
RELEASES
RELIABILITY

Continuous Delivery

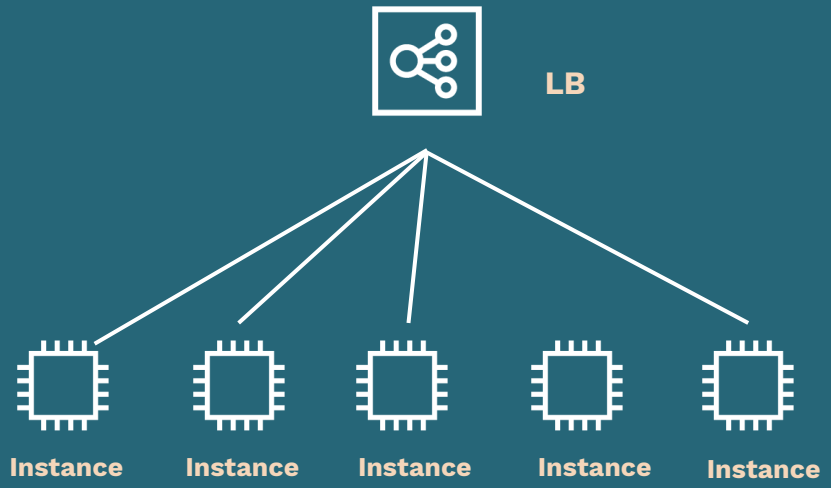
CD

Continuous Delivery



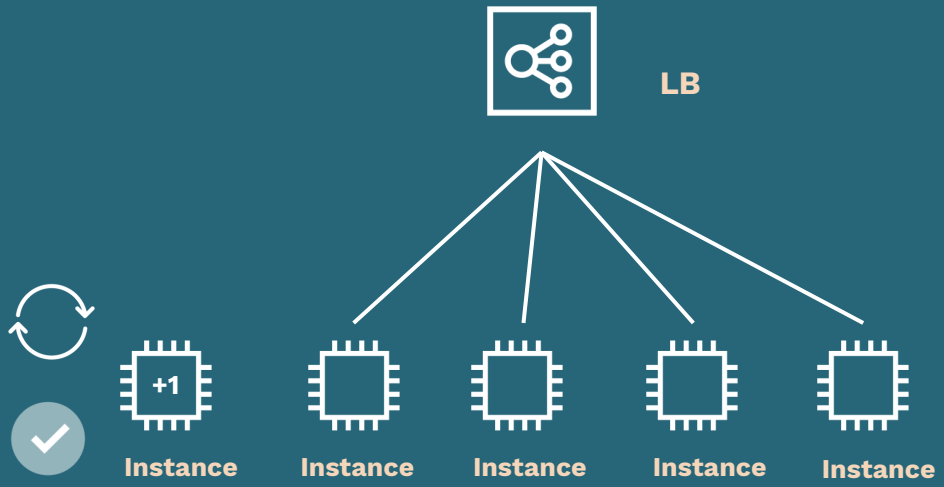
Continuous Delivery - Live Blue Green

N26



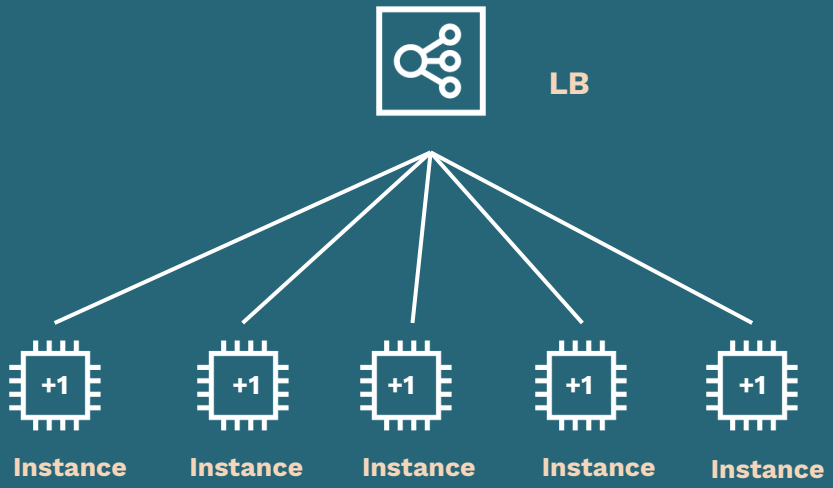
Continuous Delivery - Live Blue Green

N26



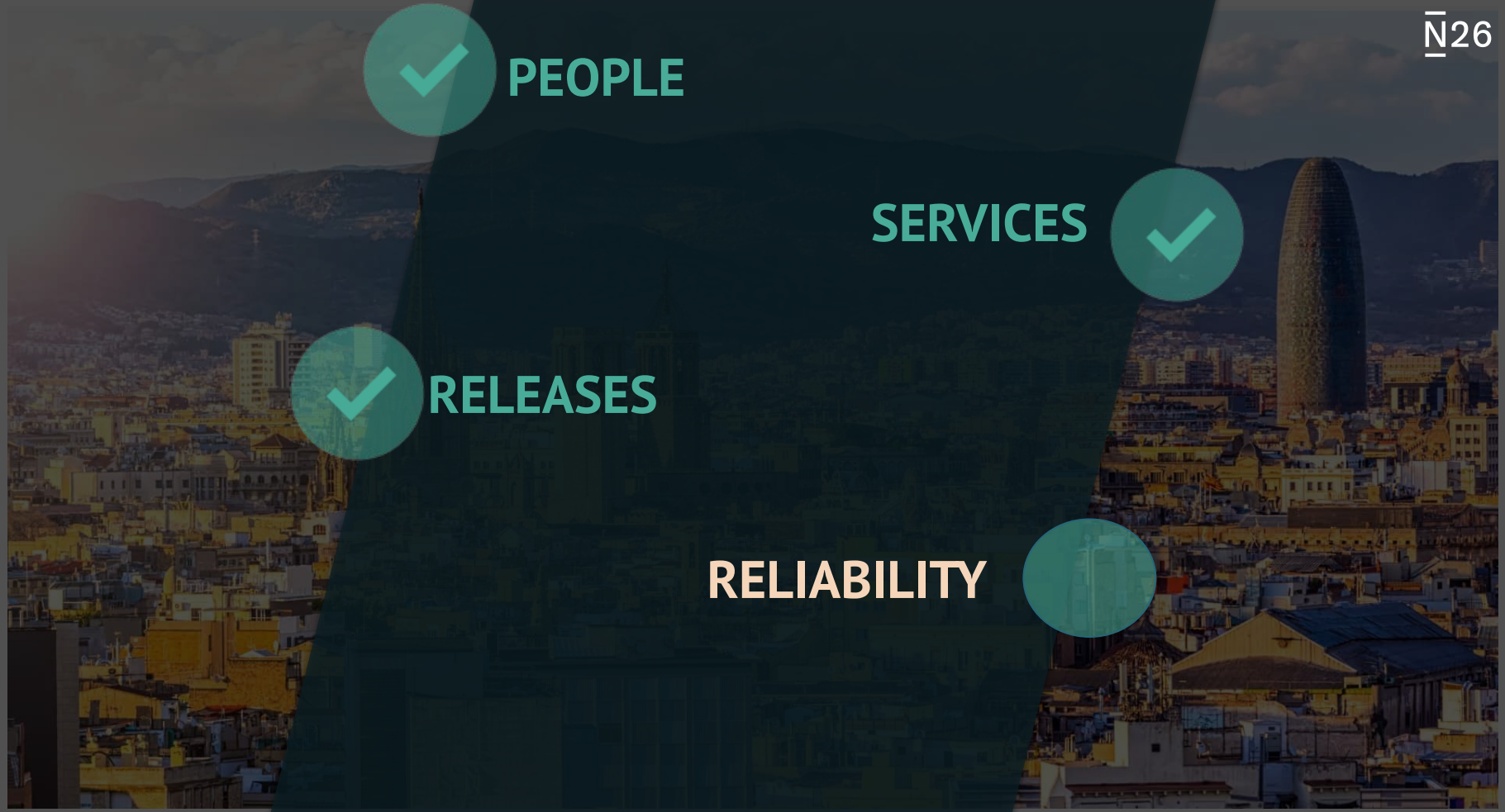
Continuous Delivery - Live Blue Green

N26



CD Benefits

- **Immutable infrastructure**
  No snowflakes in our infrastructure
- **Rollbacks are easy**
  Historical AMIs enable rollback
- **Scalable**
  Multiple instances enable scaling control
- **Fine-grained control**
  Implement fine-grained security and compliance controls
- **Customisable**
  Good machine selection for types of services


PEOPLE
SERVICES
RELEASES
RELIABILITY

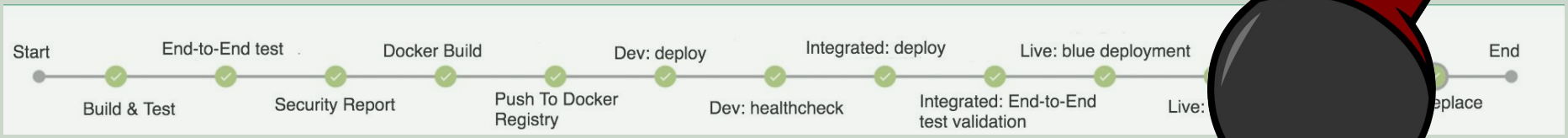
Problem

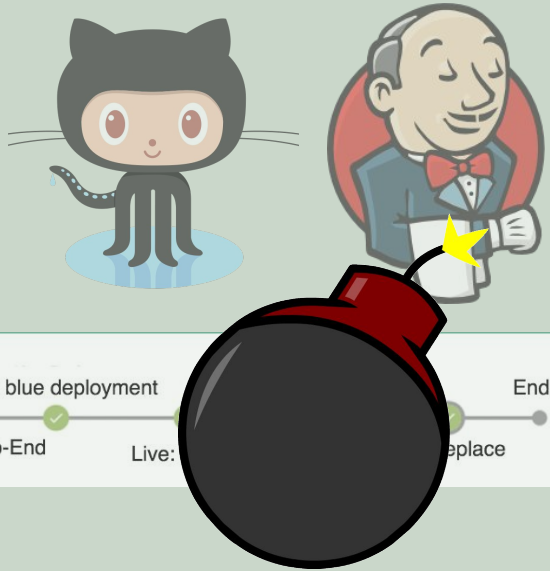
While having a high release rate, keep high availability and Minimize risks.

High Availability

>500 deployments per week

Incidents



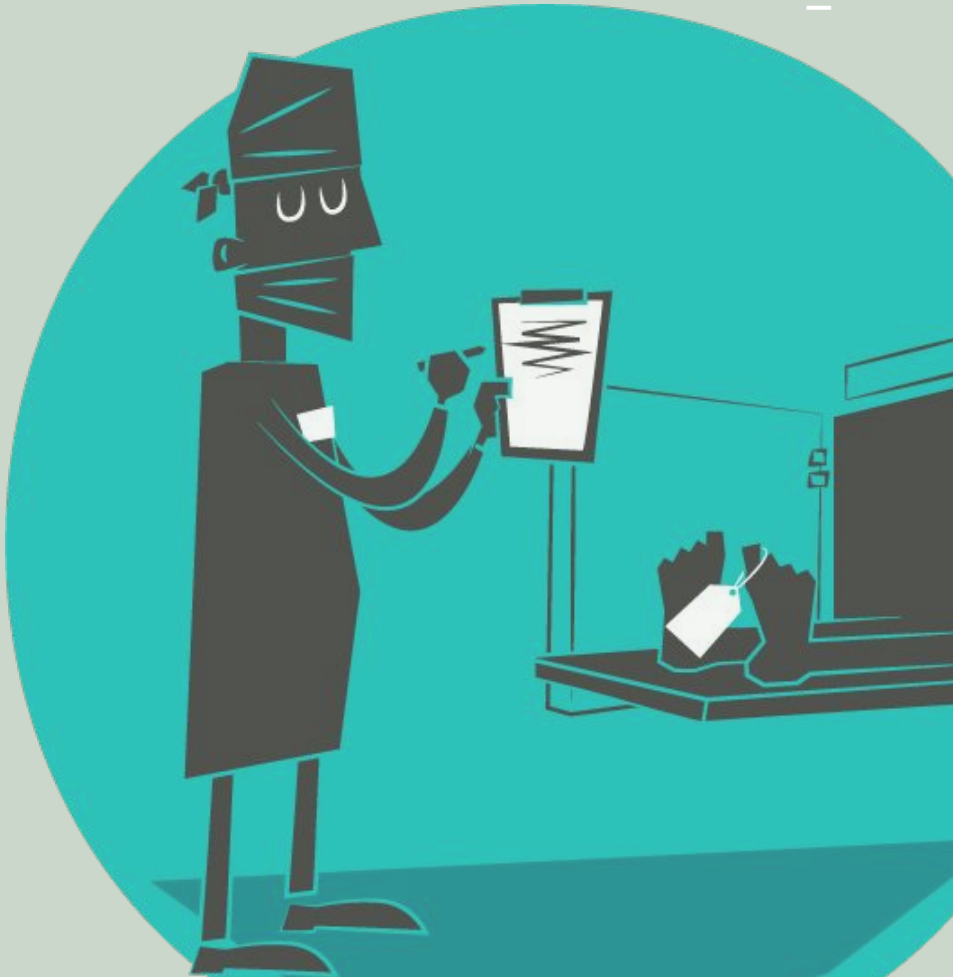


The best way to avoid **incidents** is by avoiding **changes**

Minimize time

High Availability

Blameless Postmortem culture



N26

What includes **post mortem?**

PEOPLE
SERVICES
RELEASES
RELIABILITY

Lessons learned

Adjust to your journey conditions
Trade off analysis

Continuous Delivery
Is enable trouble healthy automation

Infra-as-code
AWS makes it easy to implement

Keep a availability in mind
Keep a close eye on service objectives

Scaling N26 Technology Through Hypergrowth

Thank you!
Any questions?

@folgerfonseca