André Duis

Domain Architect Cloud Native Infrastructure

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METRO

Bezoek Makro ook online op www.makro.nl

Deze folder is niet geldig in Den Bosch, Beverwijk, Leeuwarden, Nijmegen, Dordrecht, Barendrecht en Wateringen i.v.m. de geplande verbouwingen.

makro

Let op: deze folder is 4 weken geldig!

Heerlijke Voorjaarswijn

THE BIGGEST SOFTWARE COMPANY YOU NEVER HEARD ABOUT

From Revolution to Evolution – Cloud Native at METRO|NOM

From Revolution to Evolution – Cloud Native at METRO|NOM

1. Journey
2. Status Quo
3. Deep Dives

jul
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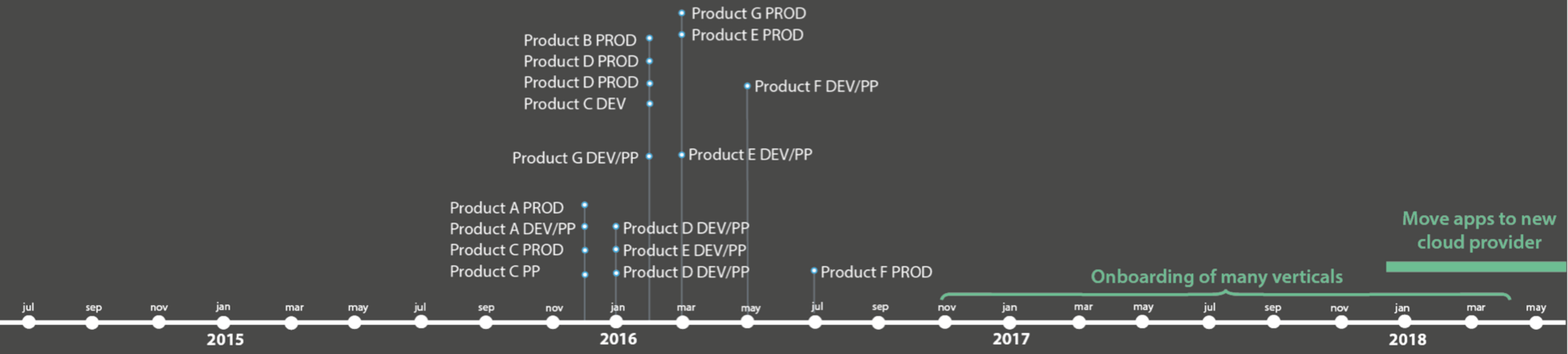
2015
2016
2017
2018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Product D PROD
Product D PROD
Product C DEV
Product F DEV/PP
Product G DEV/PP
Product E DEV/PP
Product A PROD
Product A DEV/PP
Product C PROD
Product C PP
Product D DEV/PP
Product E DEV/PP
Product D DEV/PP
Product F PROD
Onboarding of many verticals
Move apps to new cloud provider
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2015
2016
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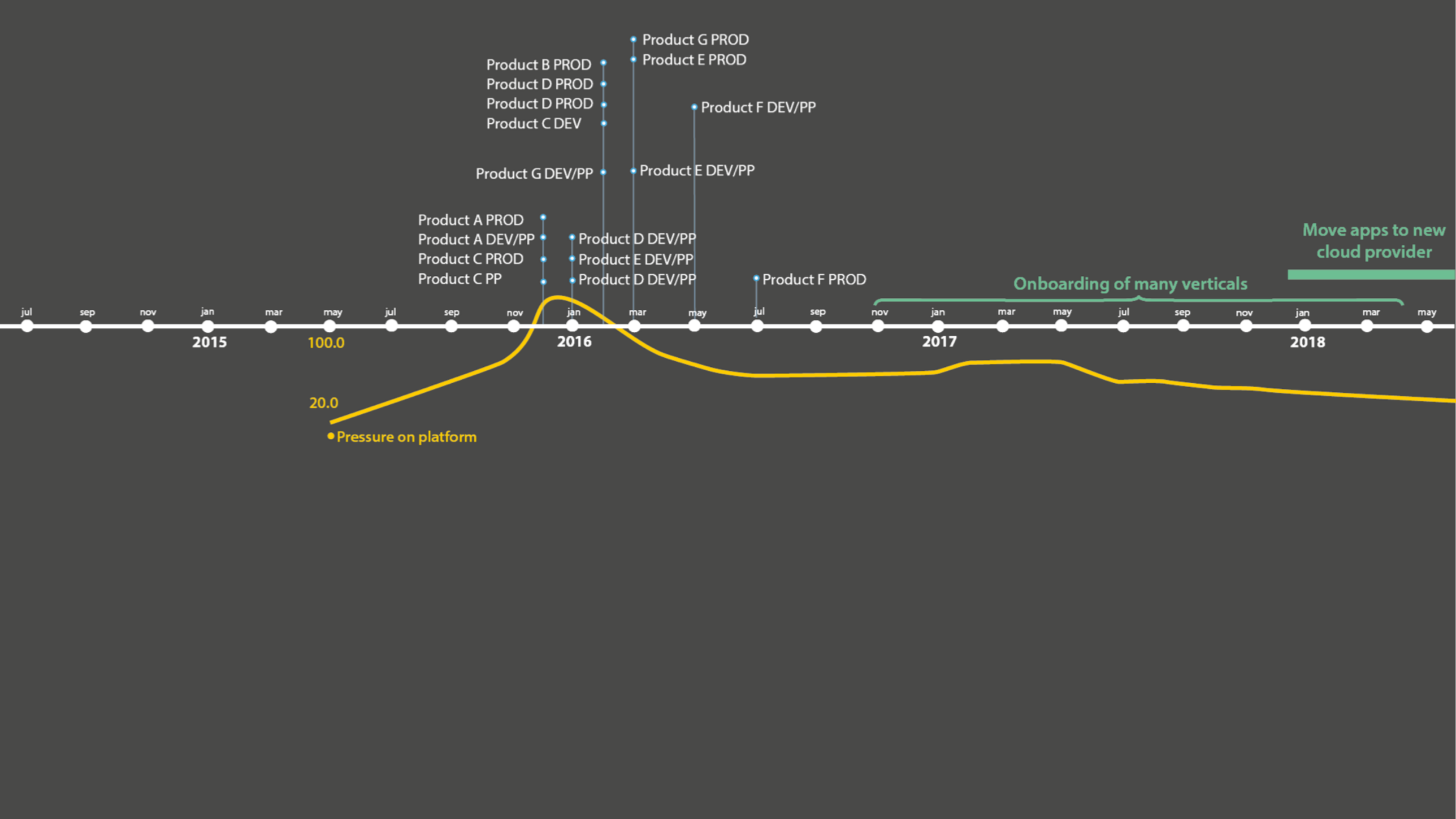
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Product C PROD
Product C PP
Product D DEV/PP
Product E DEV/PP
Product D DEV/PP
Product F PROD
Move apps to new cloud provider
Onboarding of many verticals
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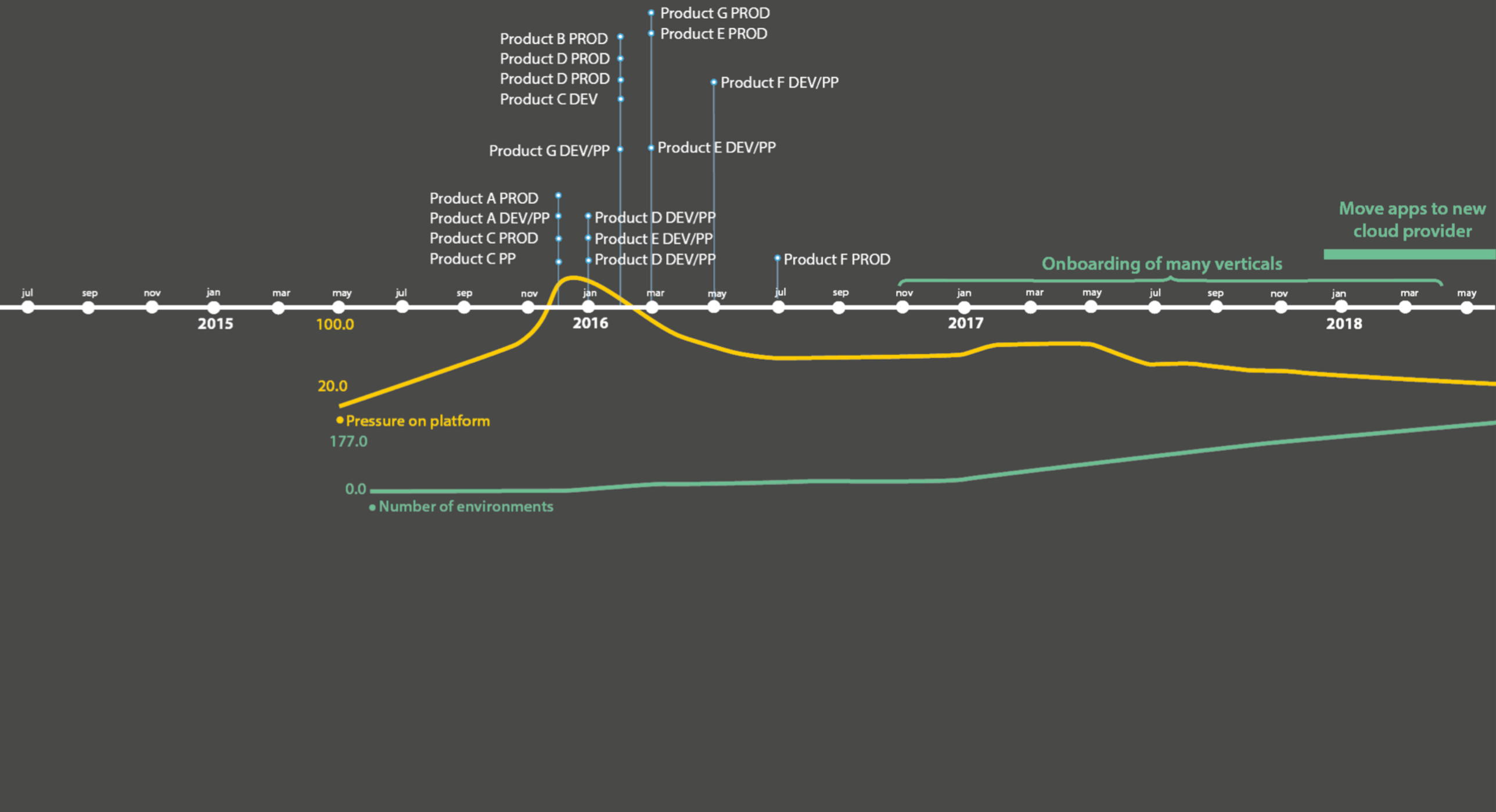
2015
2016
2017
2018
100.0
20.0
Pressure on platform


Product G PROD
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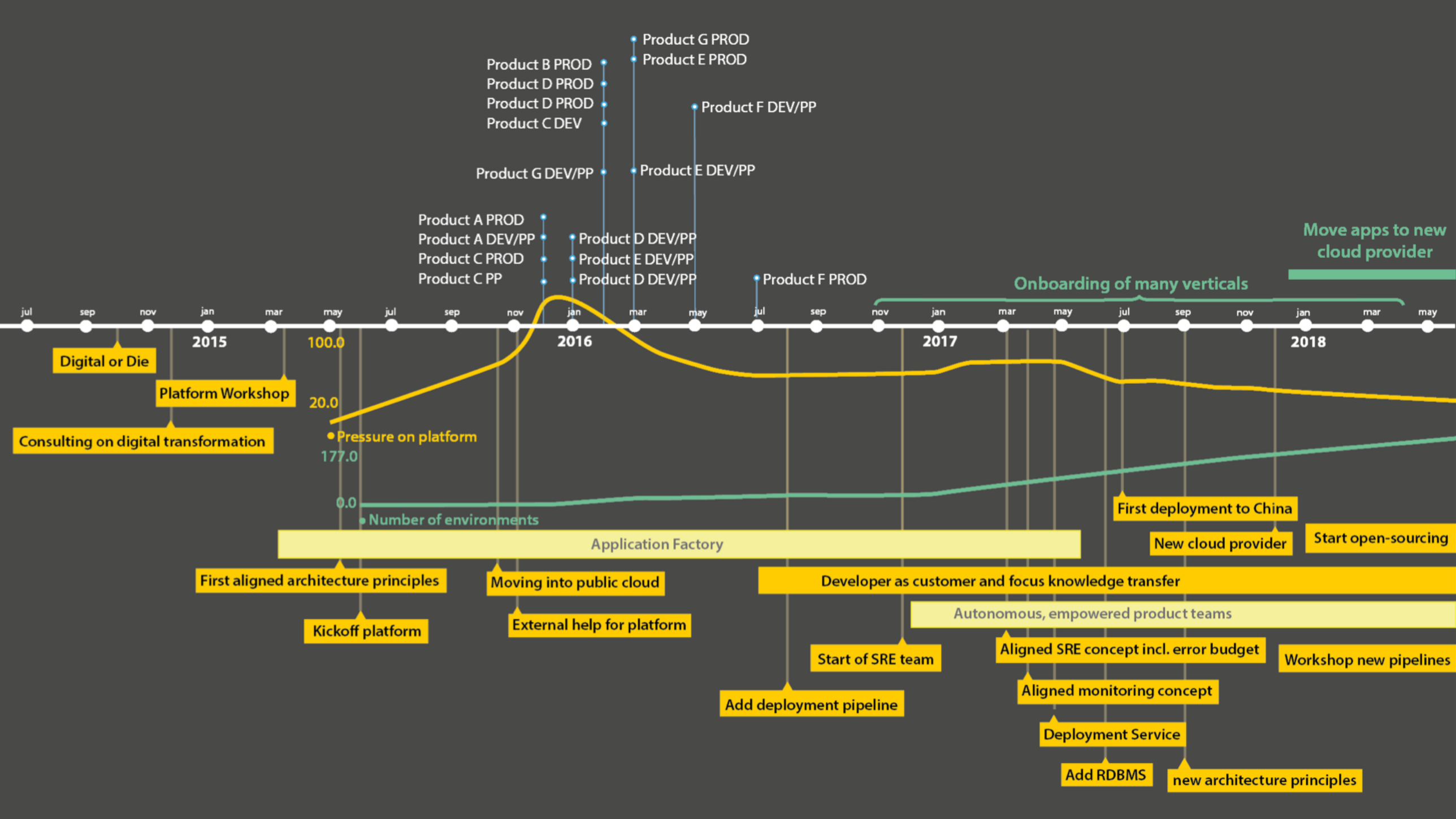
Move apps to new cloud provider
Onboarding of many verticals
jul sep nov jan mar may jul sep nov jan mar may jul sep nov jan mar may jul sep nov jan mar may
2015
2016
2017
2018
100.0
20.0
Pressure on platform
177.0
0.0
Number of environments


Product G PROD
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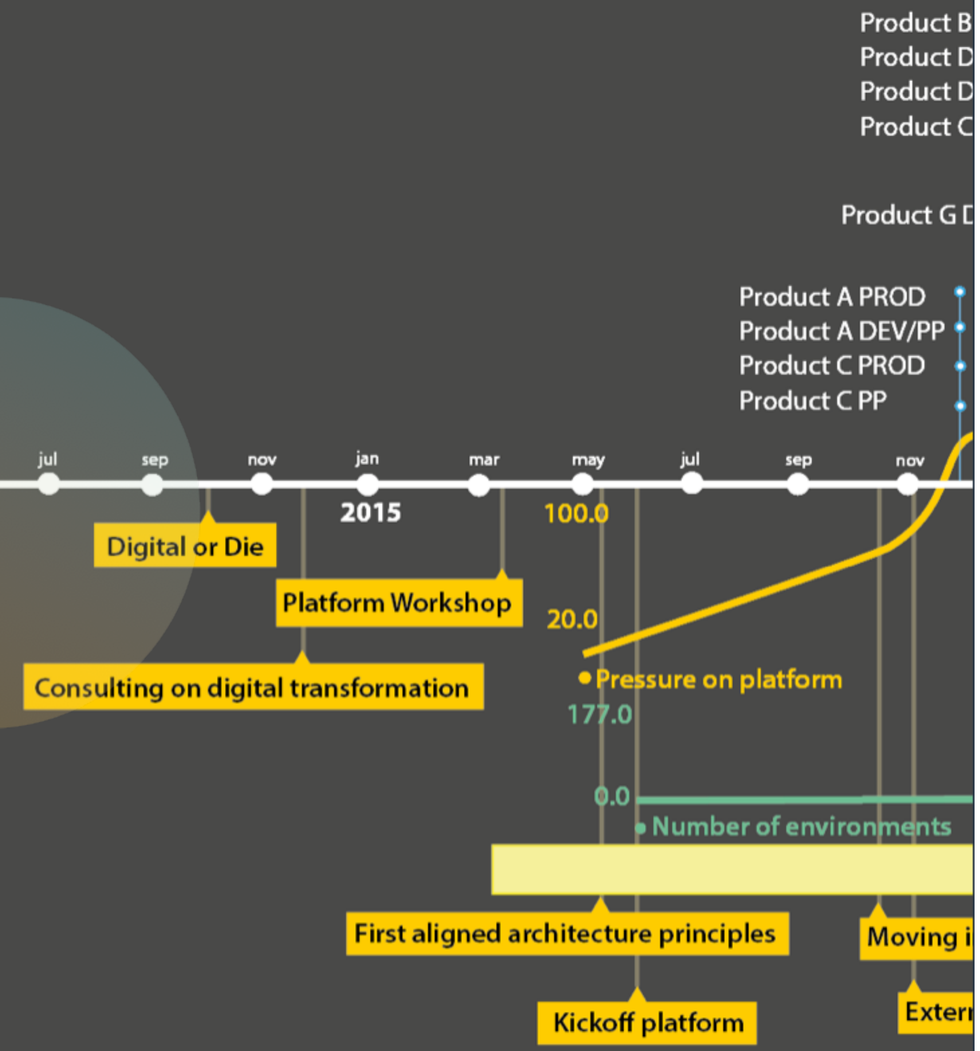
Product F PROD
Move apps to new cloud provider
Onboarding of many verticals
jul sep nov jan mar may jul sep nov jan mar may jul sep nov jan mar may jul sep nov jan mar may
2015
2016
2017
2018
Digital or Die
Platform Workshop
Consulting on digital transformation
100.0
20.0
Pressure on platform
177.0
0.0
Number of environments
First deployment to China
New cloud provider
Start open-sourcing
Application Factory
First aligned architecture principles
Moving into public cloud
Developer as customer and focus knowledge transfer
Autonomous, empowered product teams
Kickoff platform
External help for platform
Start of SRE team
Aligned SRE concept incl. error budget
Workshop new pipelines
Aligned monitoring concept
Add deployment pipeline
Deployment Service
Add RDBMS
new architecture principles



METRO IT in 2014

- Waterfall
- Most development outsourced
- Mostly commercial software (highly customized)
- On-premise infrastructure
- Cost reduction is highest priority

= Not a good start for becoming digital

jul sep nov jan mar

2015

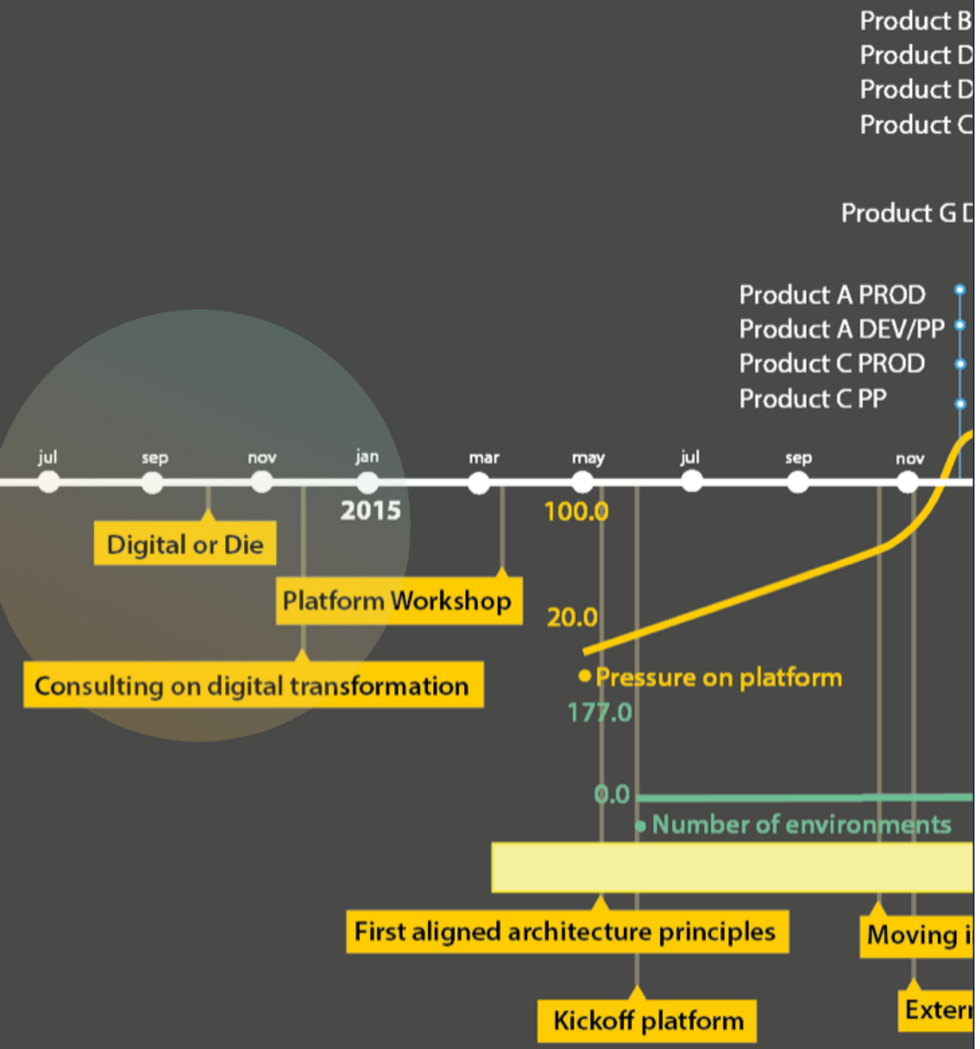
Digital or Die

Platform Workshop

Consulting on digital transformation

First aligned archi

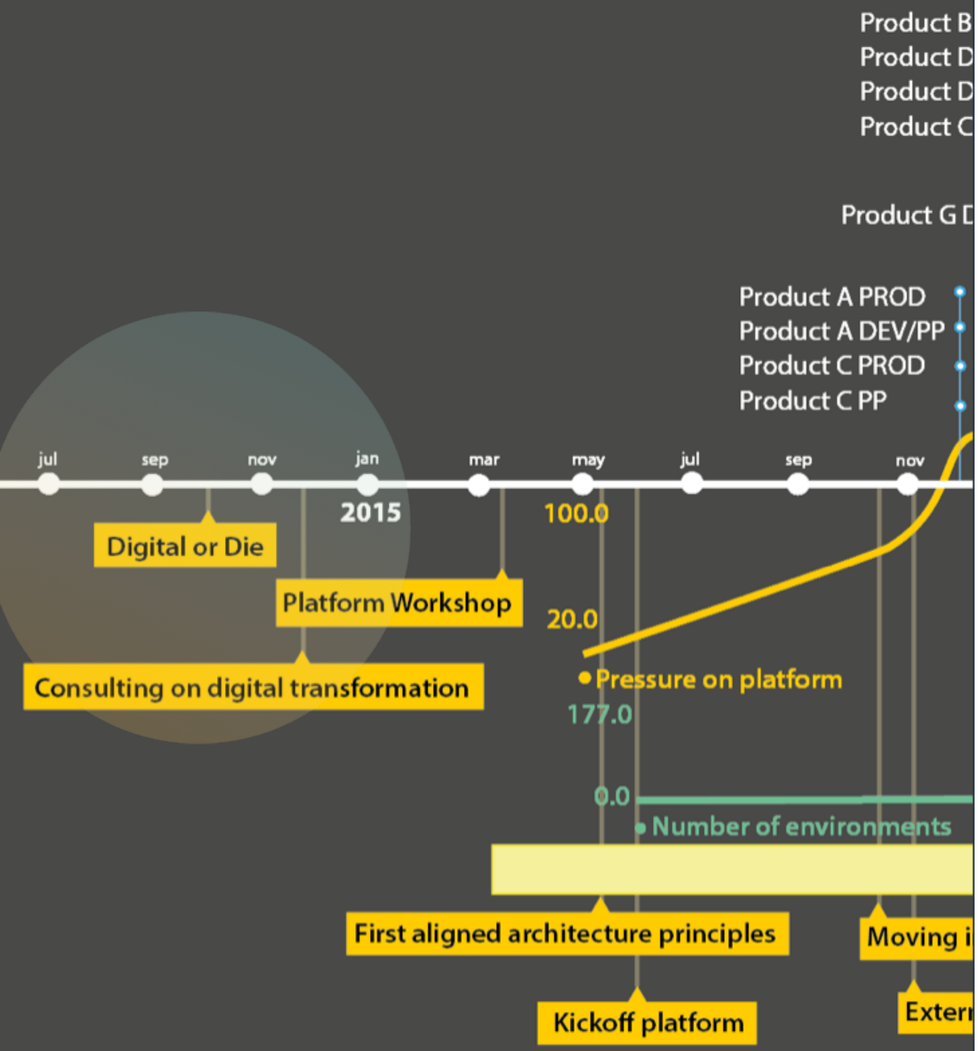
FLEXIBLE TO TAKE ORDERS
ORDER ANYWHERE @ ANYTIME
METRO
EASY
ANY DEVICE
ONE STOP FOOD SHOPPING
BROAD & DEEP
PERSONALIZED OFFERS
SEAMLESS CUSTOMER EXPERIENCE
DELI-VERY
STORE
PICK UP
SPECIAL SUGGESTION
TELL THE STORIES
GREAT PRODUCT!
HoReCa
METRO CARD
TRADERS
SCO's
CUSTOMER
COMMUNITIES
CHAT
IDEAS
SPECIAL HELP
STABILITY IN PRICES
STEADY
LOYALTY / REWARD SYSTEM WITH VALUE ADDING SERVICES
DELIVERY COUPON
GAS DISCOUNT
TRAVEL
LONG-TERM NEEDS ARE MORE COMPLEX
WE STILL MEET THEM!
SALES FORCE
TRANSACTION SERVICES
PAYMENT
VALUE ADDING SERVICES
MAKING THE CUSTOMER LOOK GOOD IN FRONT OF THEIR CUSTOMER
HELP THEM WITH INTERNAL 'BORING' PROCESSES...
HELP TRADERS HOW TO MAKE MORE SALES
FULFILL COMPLEMENTARY NEEDS...
PERONALIZED OFFERS
PIZZA TOPPINGS
TARGETED
JUST WHAT I NEED!
SPECIAL PROMOTIONS
POSTER FOR THEIR CUSTOMERS
ETC.
HELP THEM WITH STORE CONCEPTS
METRO
CARE
CUSTOMER CARE
CONSISTENT OVER ALL CHANNELS
COMMUNICATION



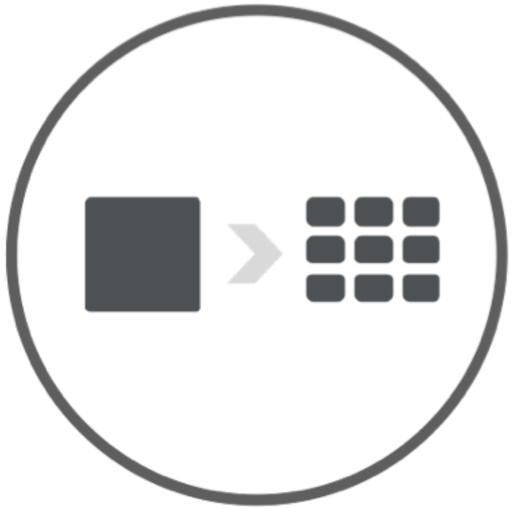
What do we need to change?

Methodology

From Waterfall to Agile

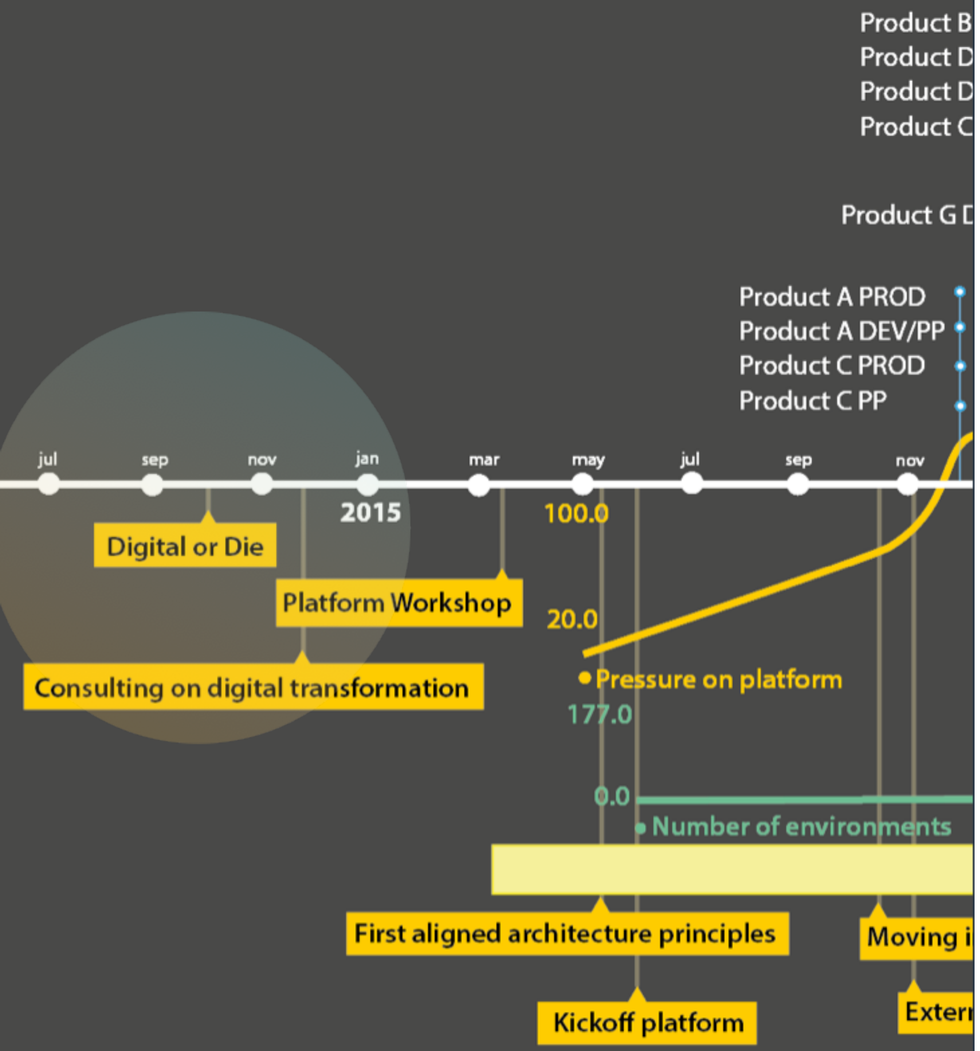


What do we need to change?



Architecture

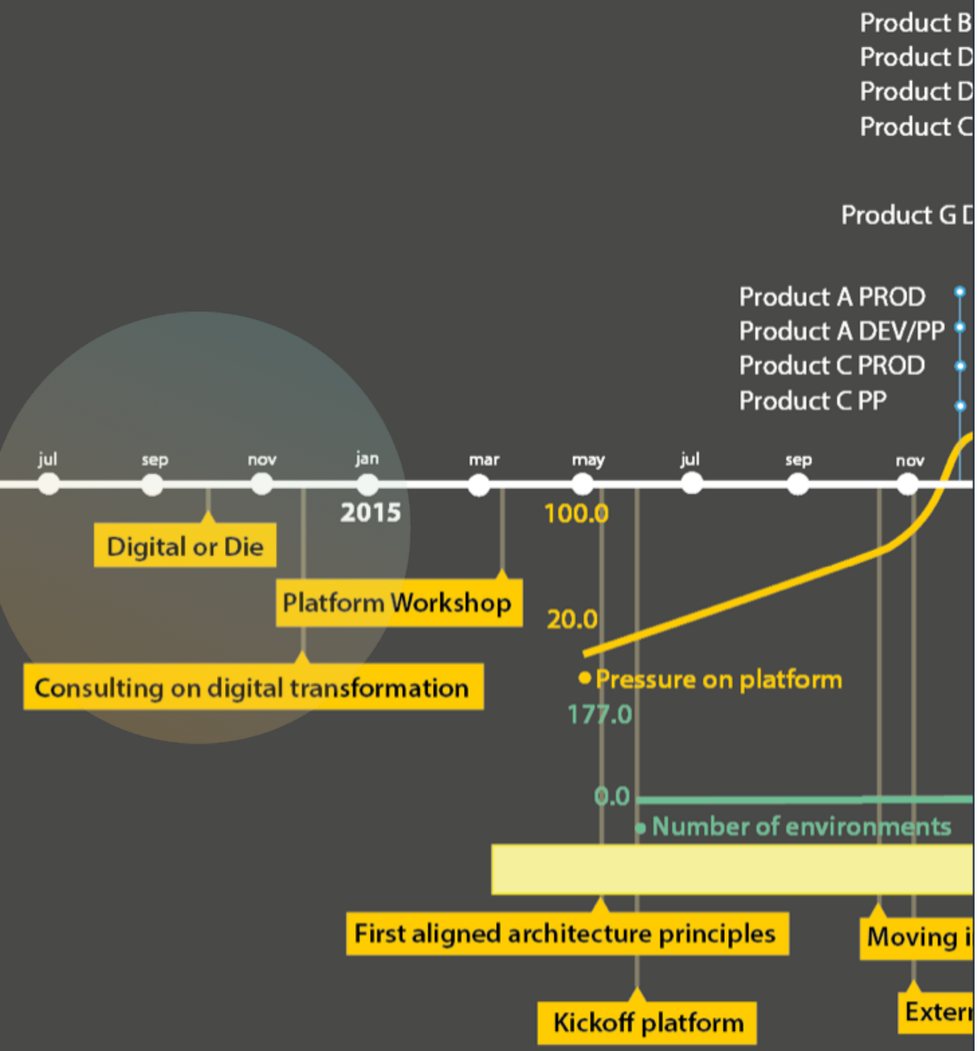
From Monolith to Microservices



What do we need to change?

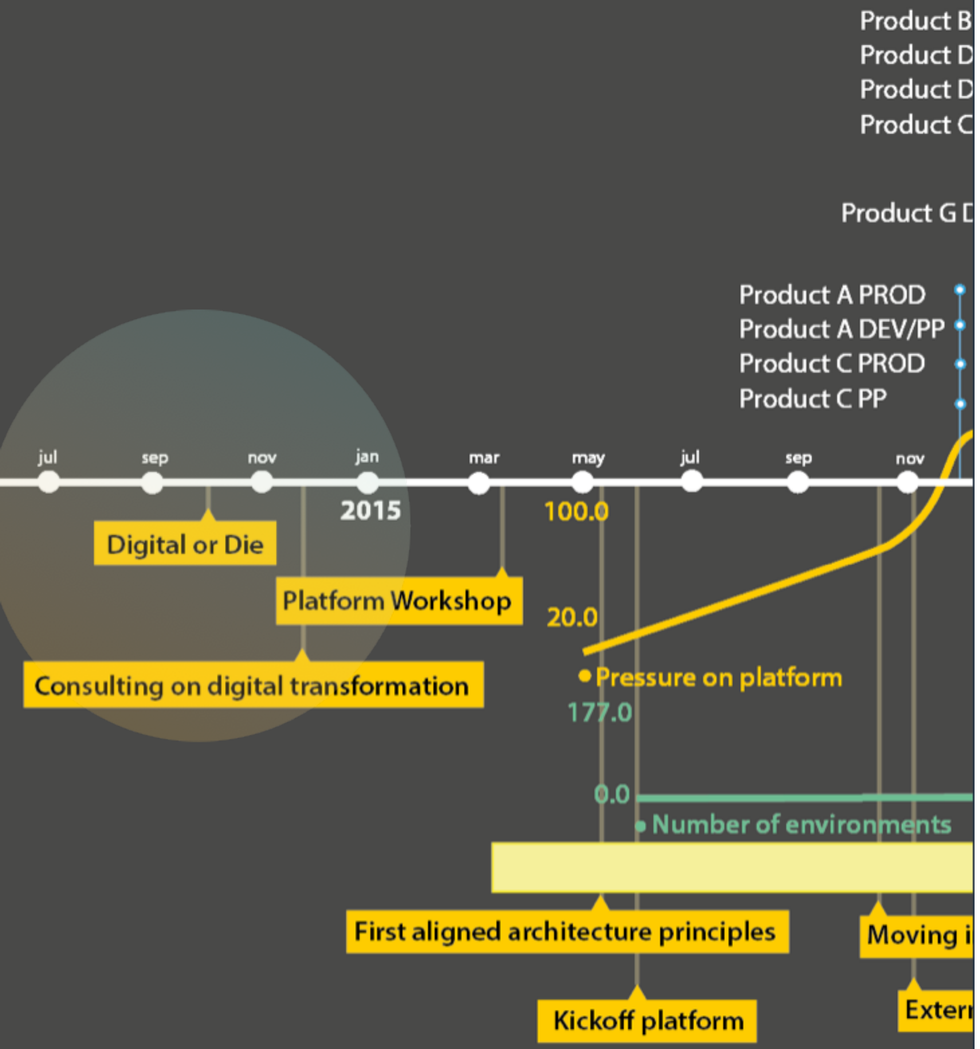
Infrastructure

From On-premise to Cloud hosting

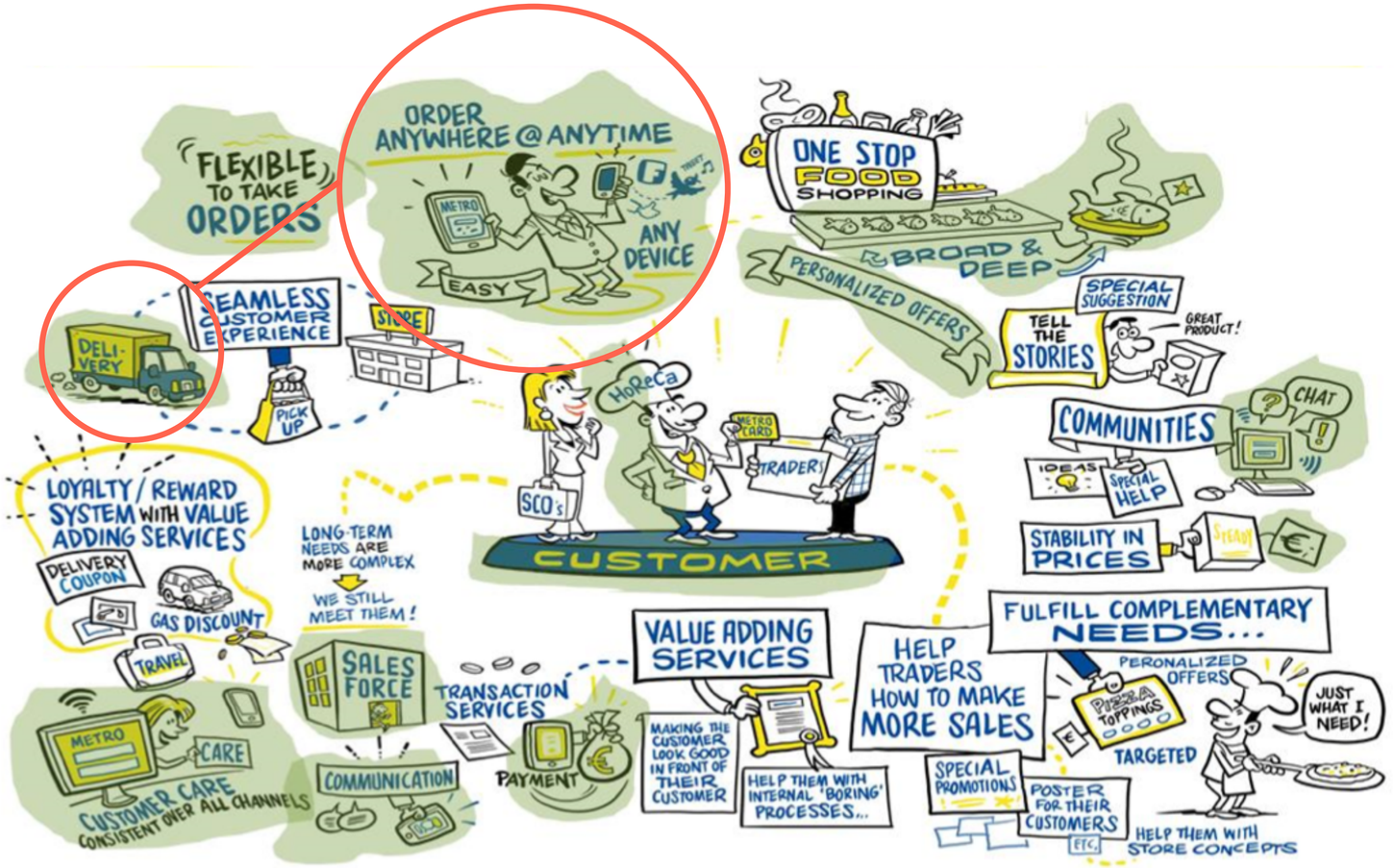


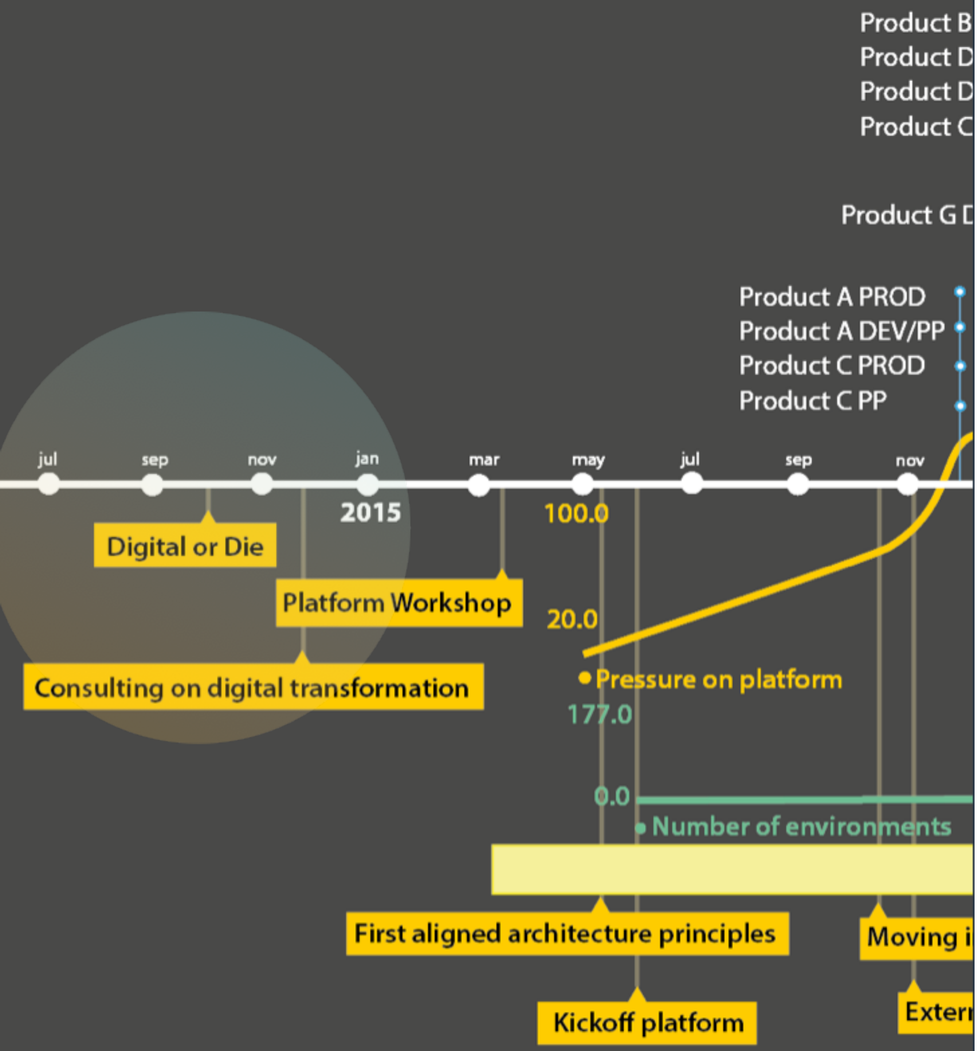
Small effective teams

https://www.fastcompany.com/50661/inside-mind-jeff-bezos

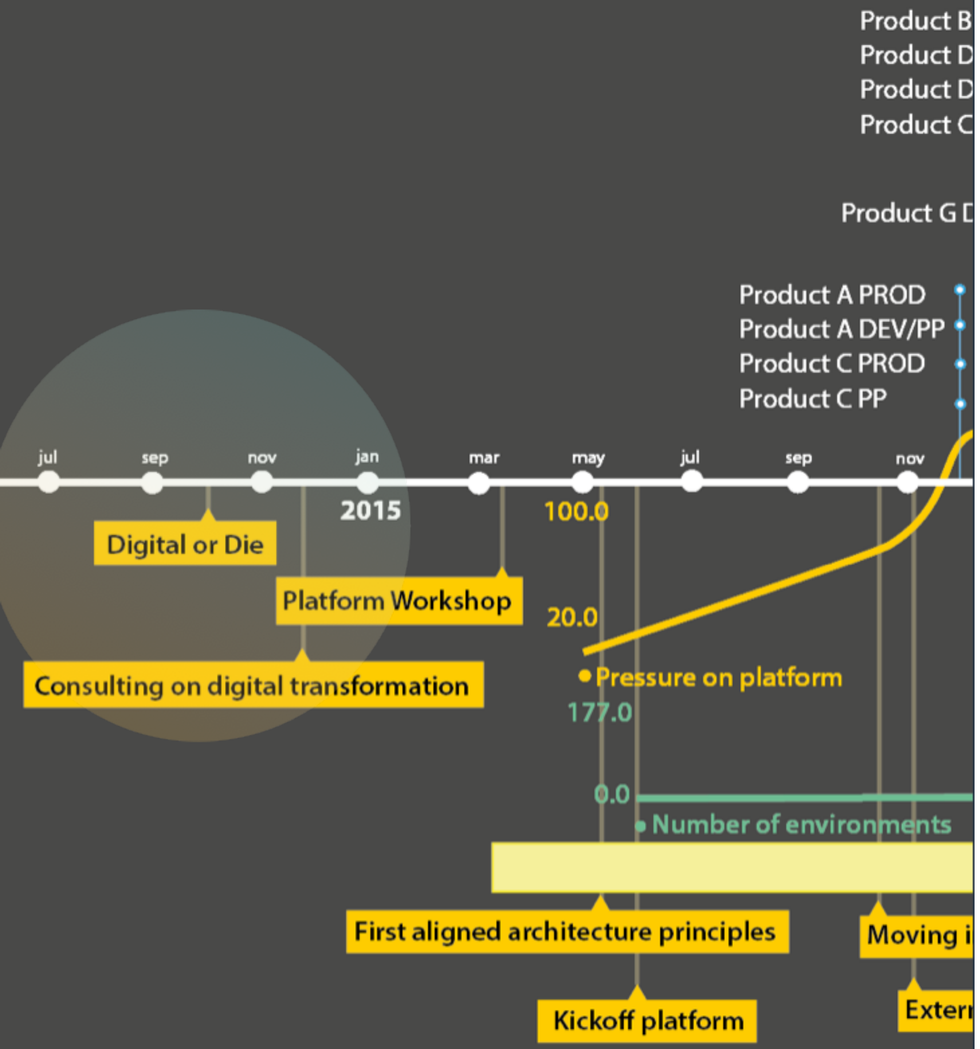


Integrate products



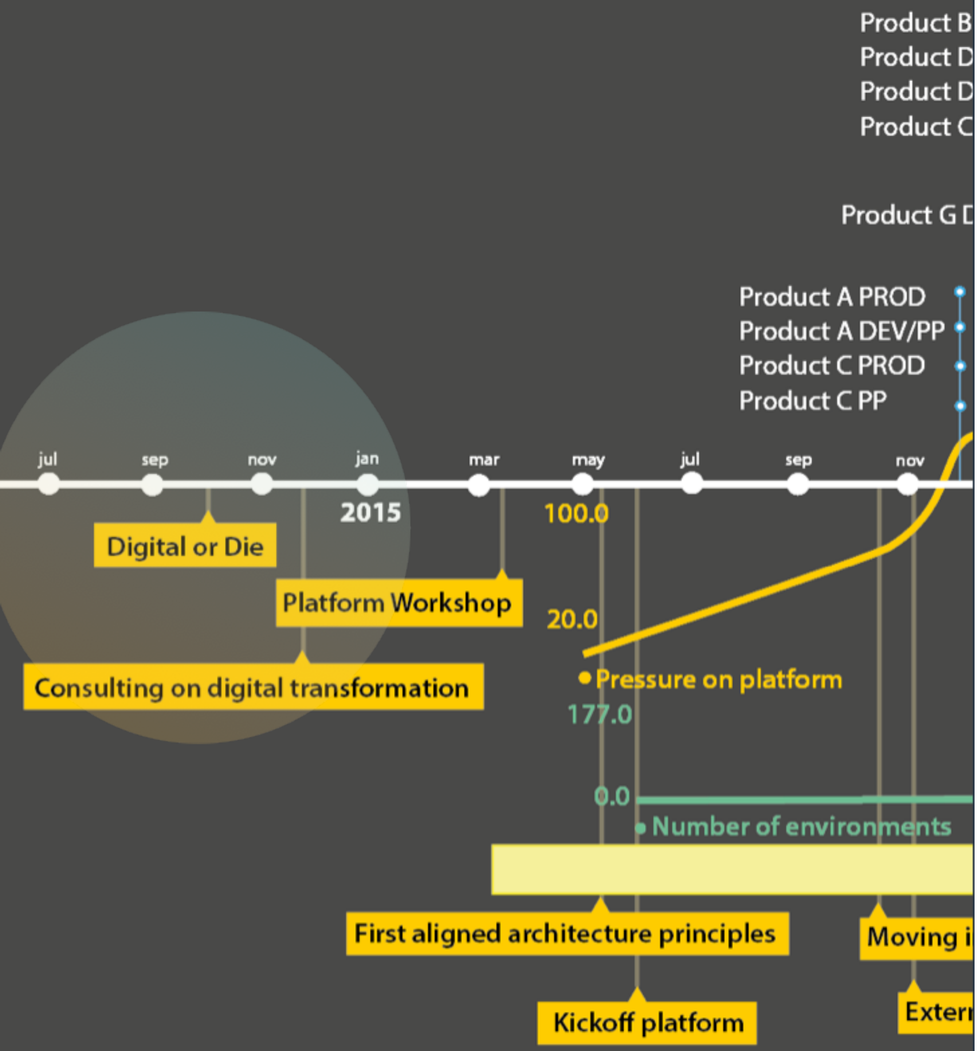


Verticalized, autonomous teams and self-contained systems

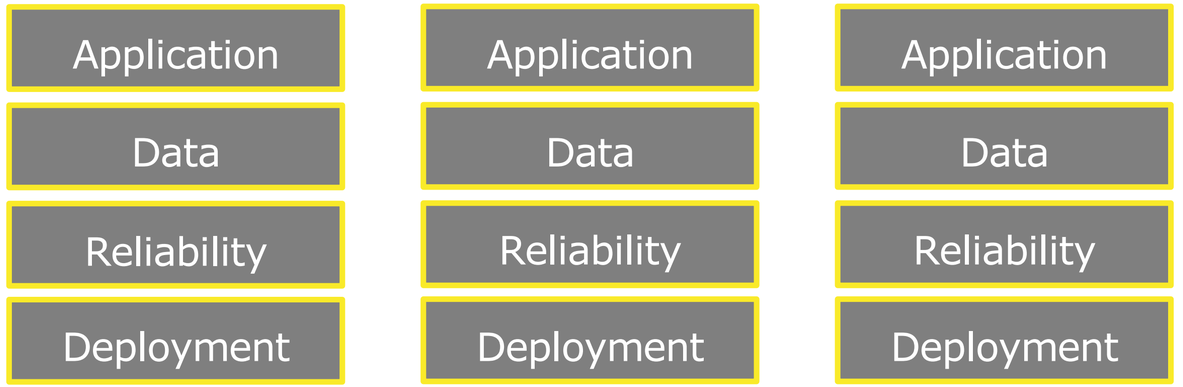


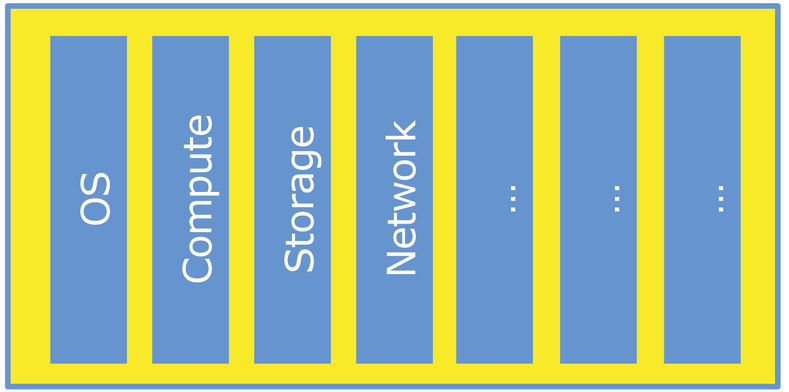
„You build it, you run it.“

Application	Application	Application
Data	Data	Data
Reliability	Reliability	Reliability
Deployment	Deployment	Deployment
OS	OS	OS
Compute	Compute	Compute
Storage	Storage	Storage
Network	Network	Network



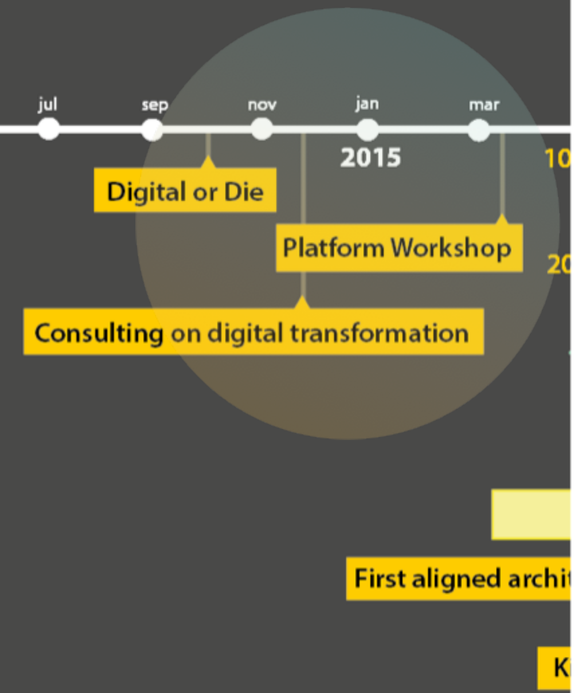
„You build it, you run it.“

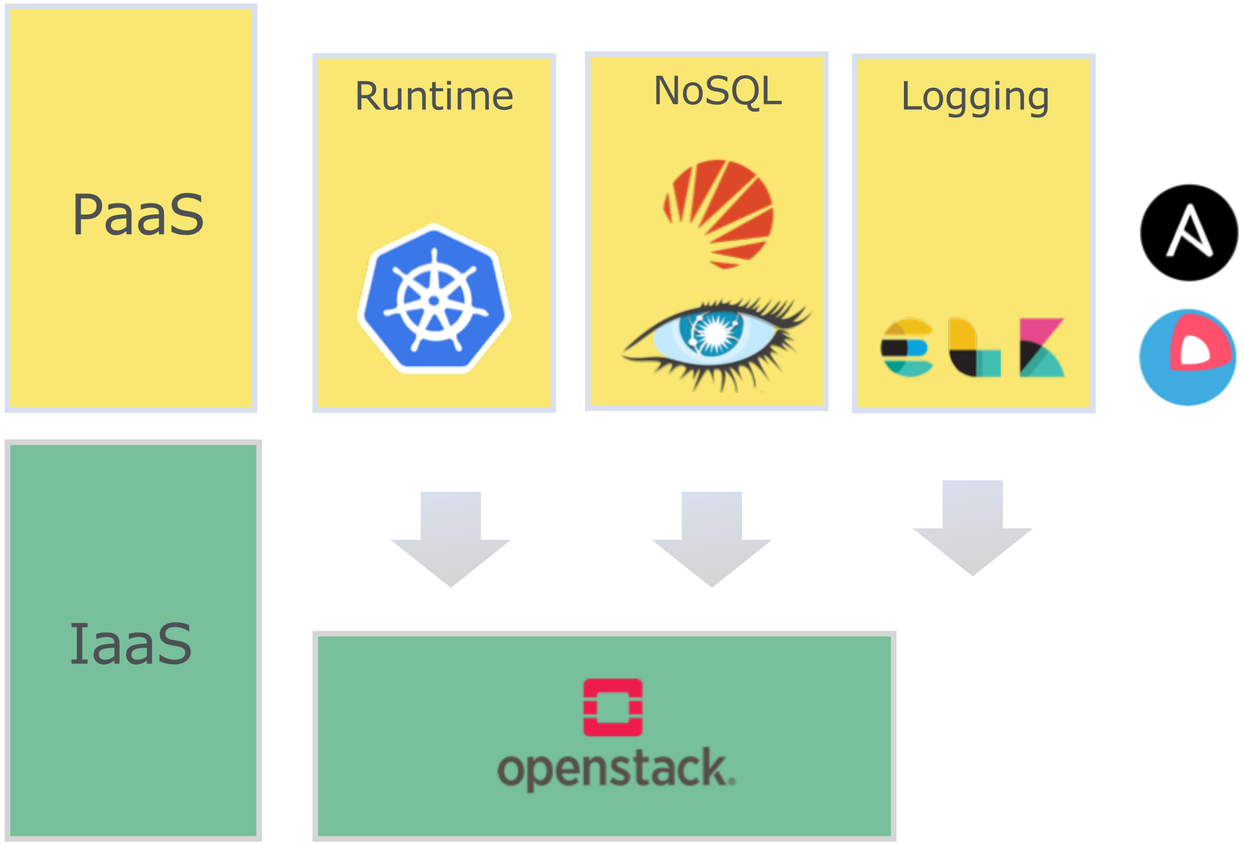




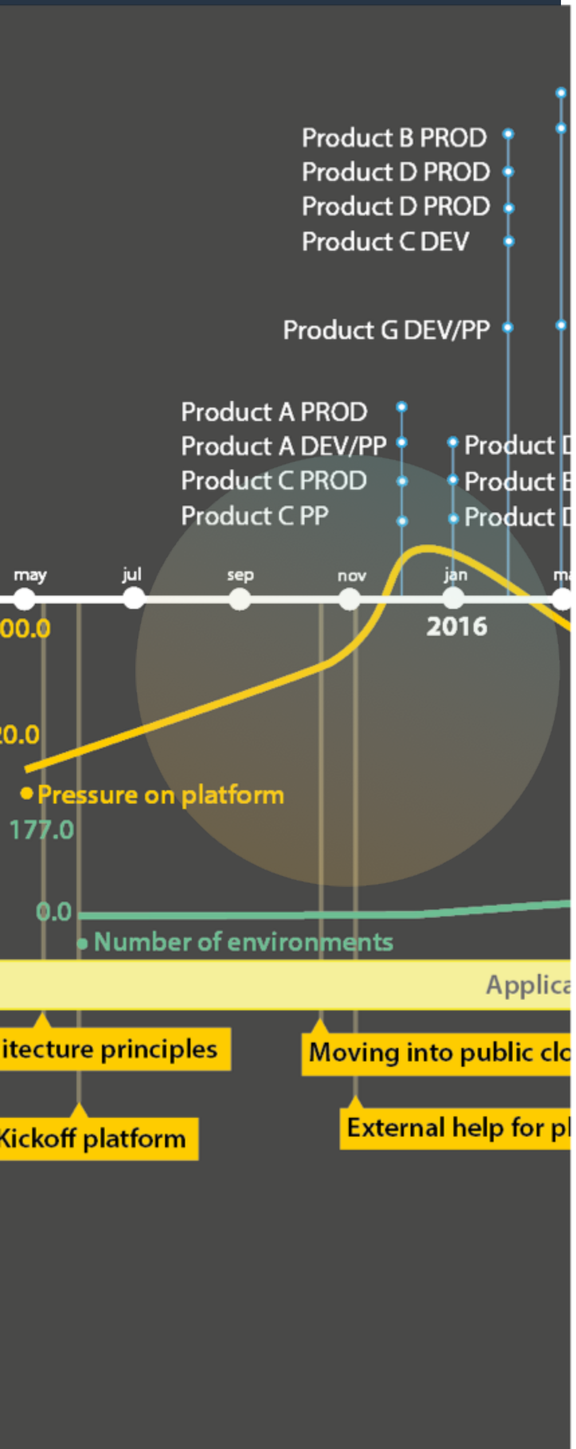
„We need a platform!“

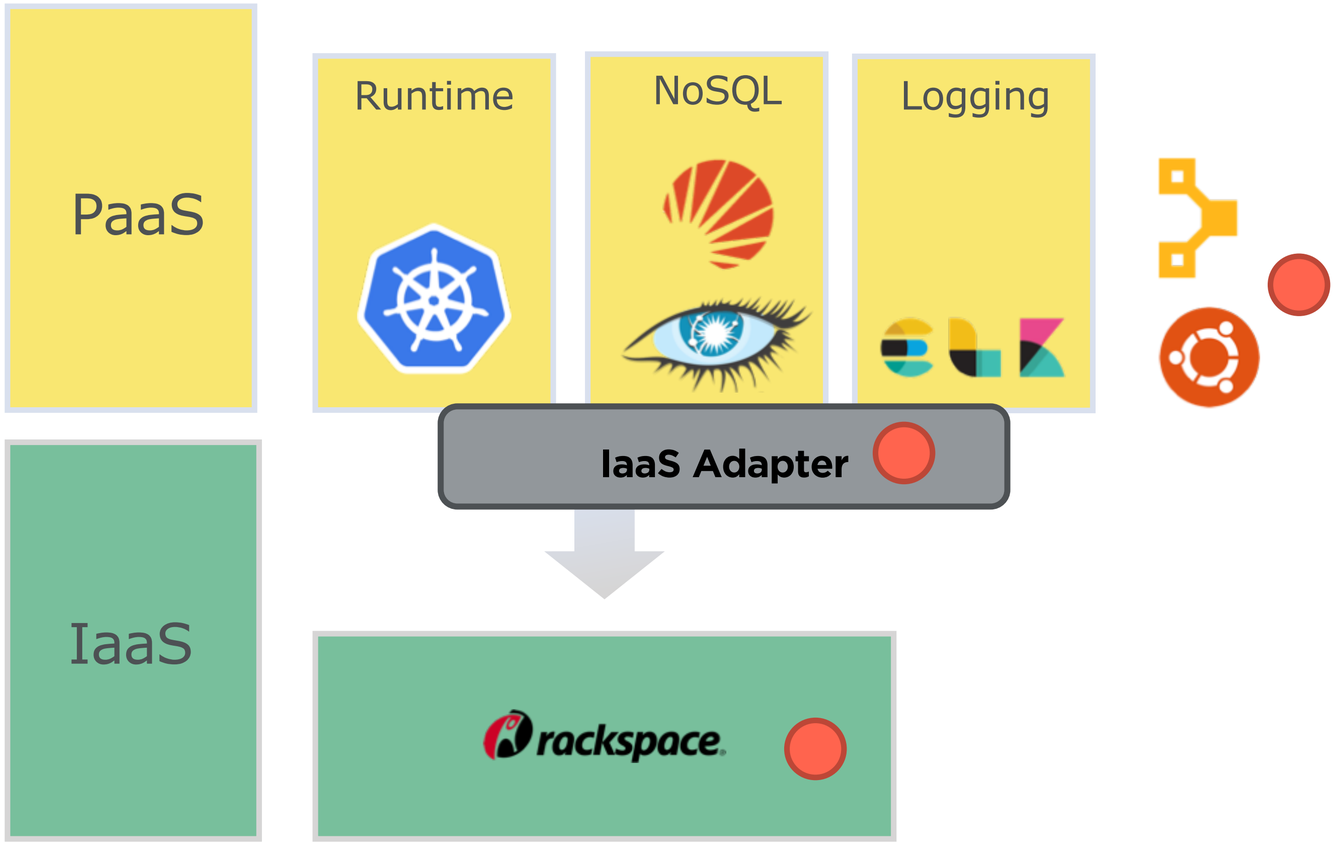
Initial platform setup

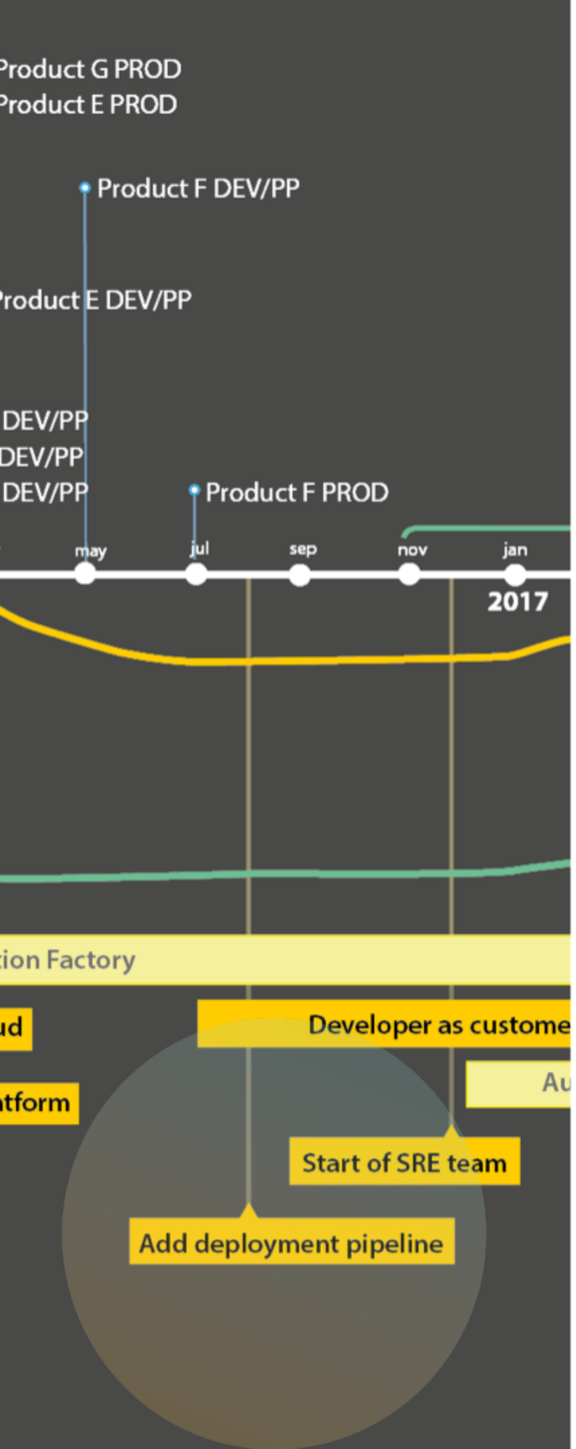




Pressure increases, external help







Add deployment pipeline

CaaS

harmonized CI/CD pipelines

PaaS

Runtime

NoSQL

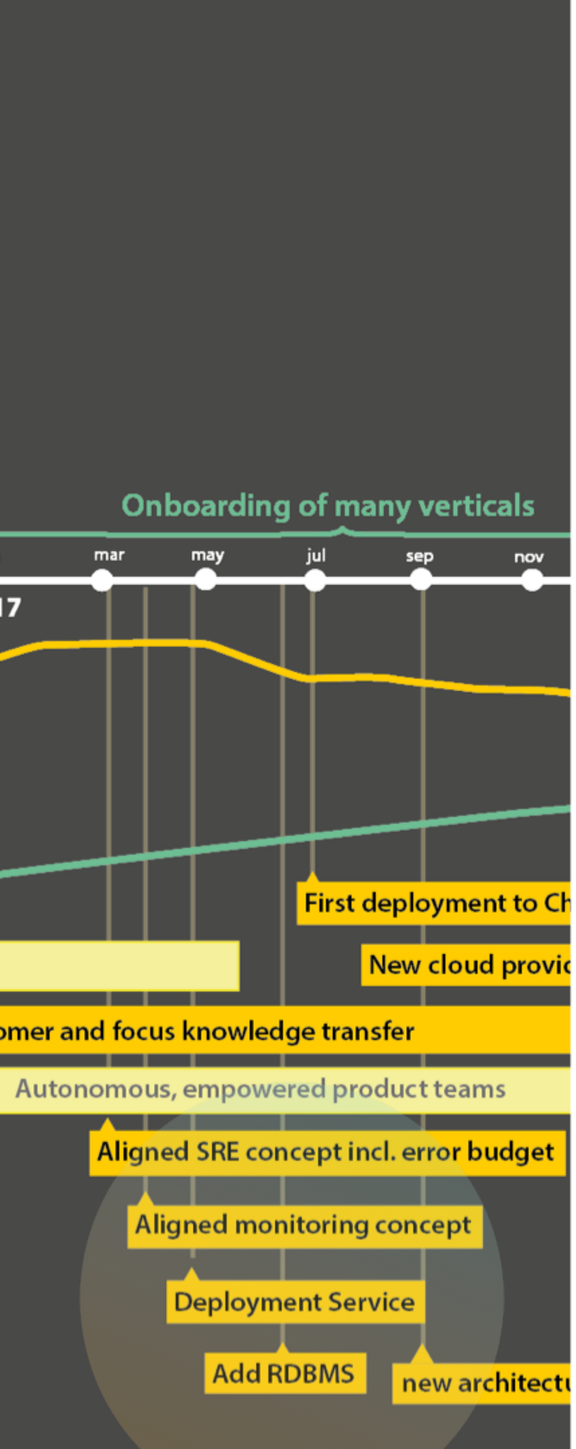
Logging

Pipeline

IaaS Adapter

IaaS

rackspace



Add new products

harmonized CI/CD pipelines

Runtime

NoSQL

Queuing

LogMon

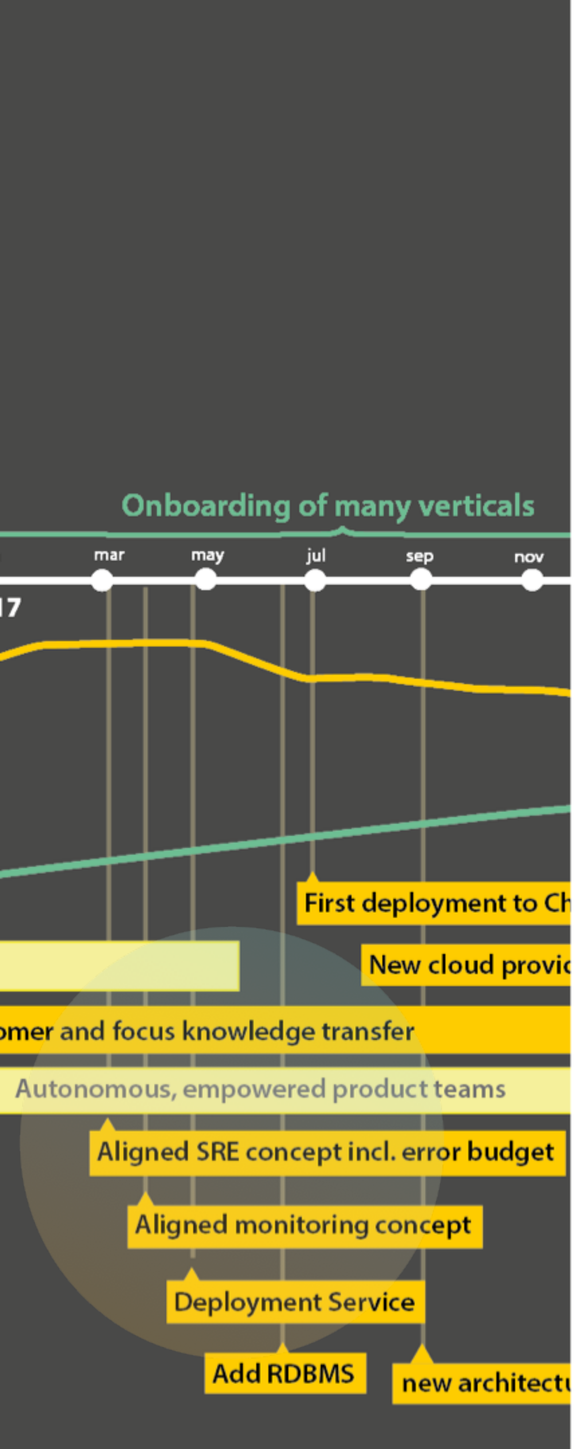
DATADOG

SQL

Pipeline

IaaS Adapter

rackspace



Add SRE team

harmonized CI/CD pipelines

Runtime

NoSQL

Queuing

LogMon

DATADOG

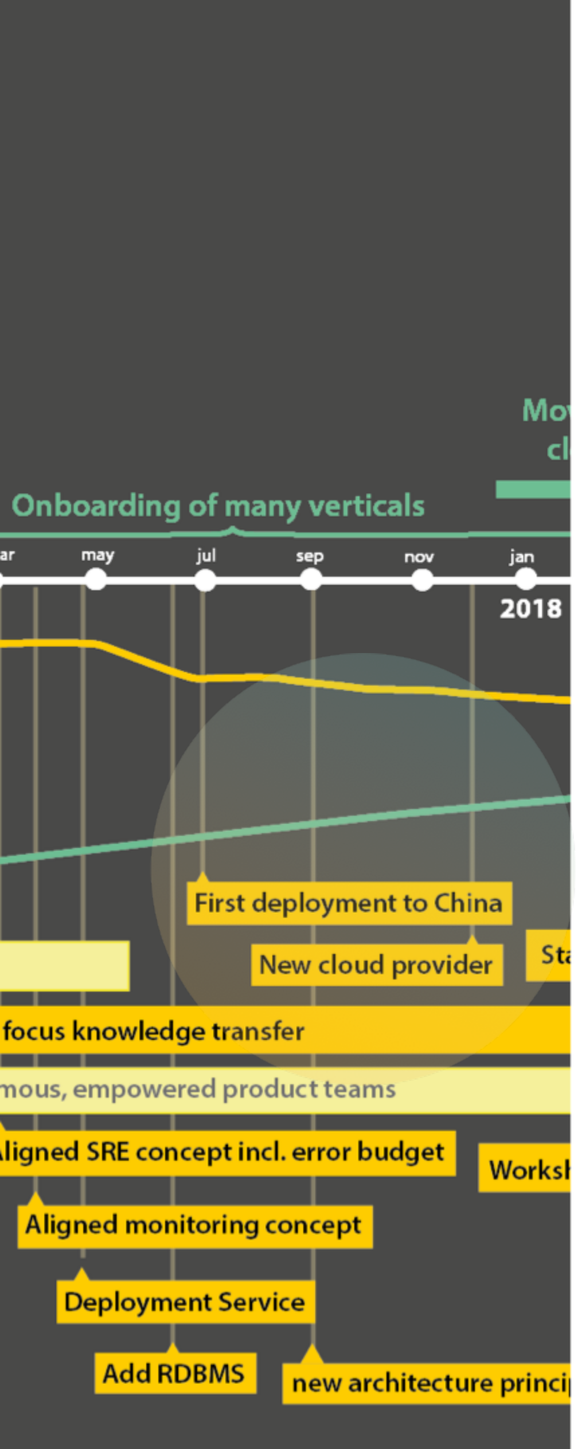
SQL

Pipeline

SRE

IaaS Adapter

rackspace



New datacenter in China

harmonized CI/CD pipelines

Runtime

NoSQL

Queuing

LogMon

DATADOG

SQL

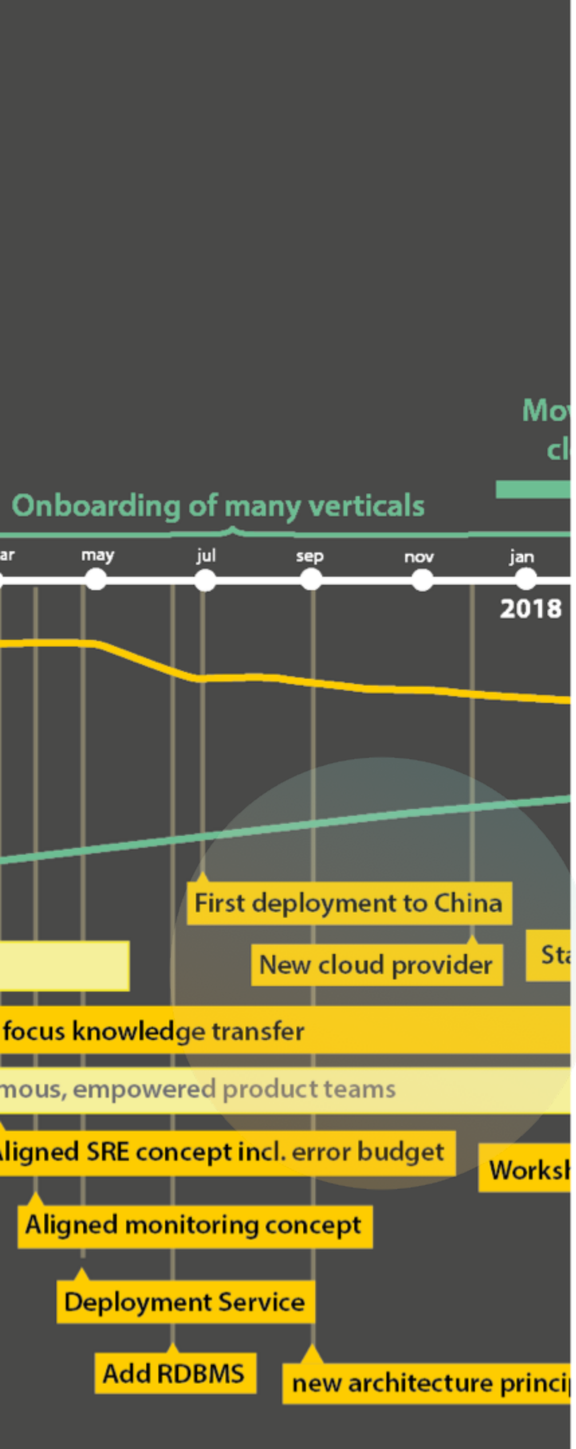
Pipeline

SRE

IaaS Adapter

rackspace

openstack



New cloud provider

harmonized CI/CD pipelines

Runtime

NoSQL

Queuing

LogMon

DATADOG

SQL

Pipeline

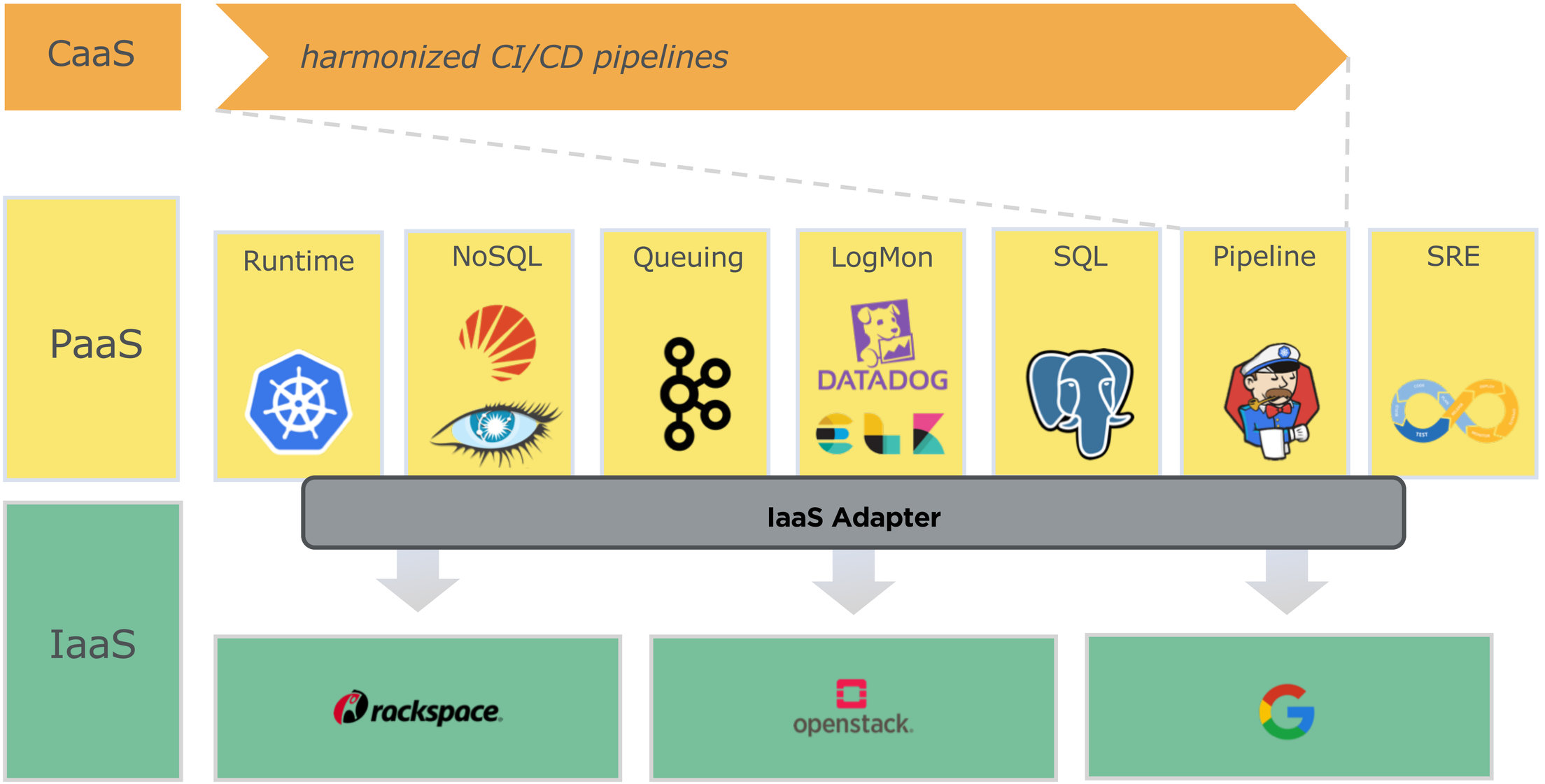
SRE

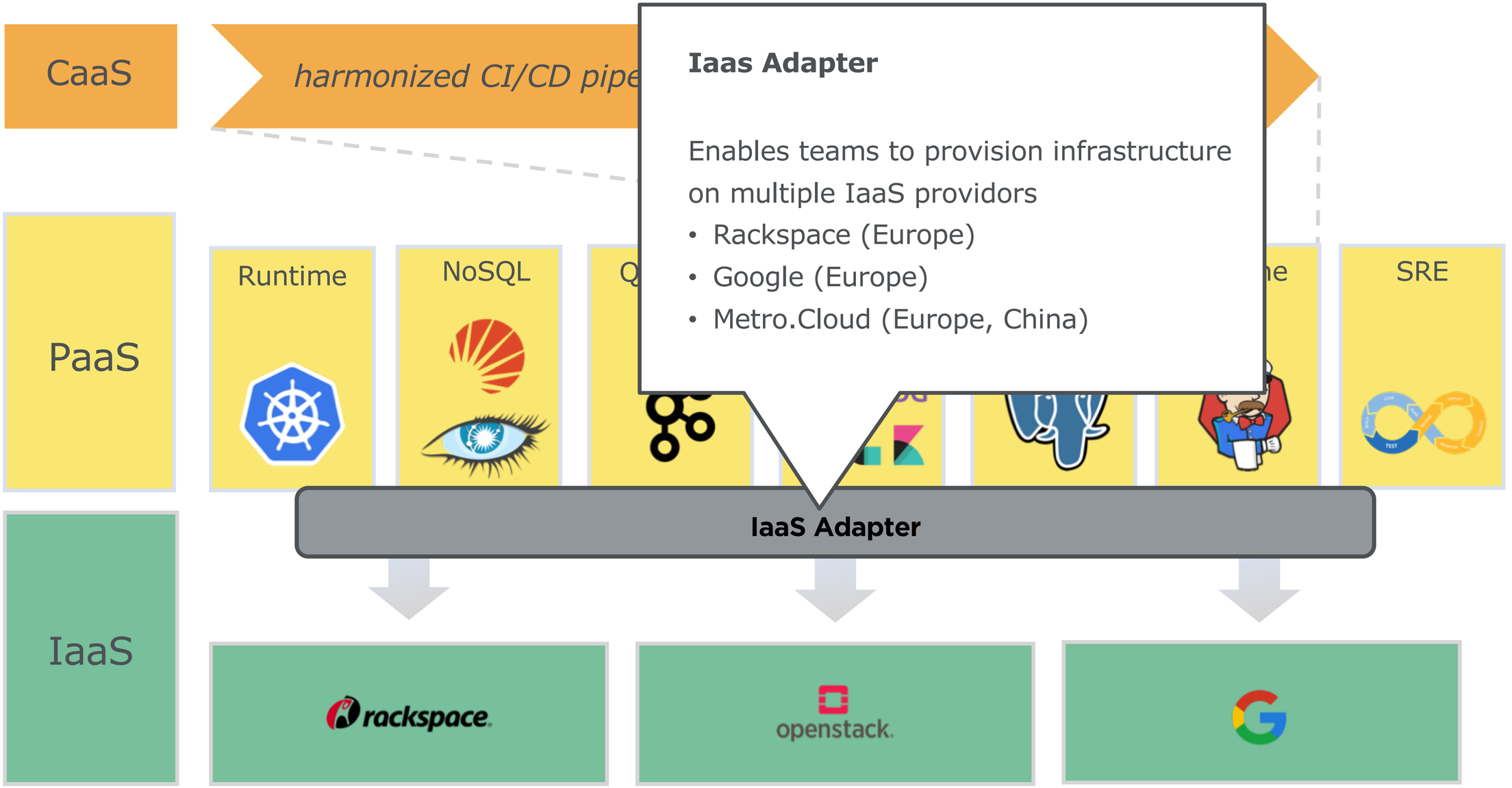
IaaS Adapter

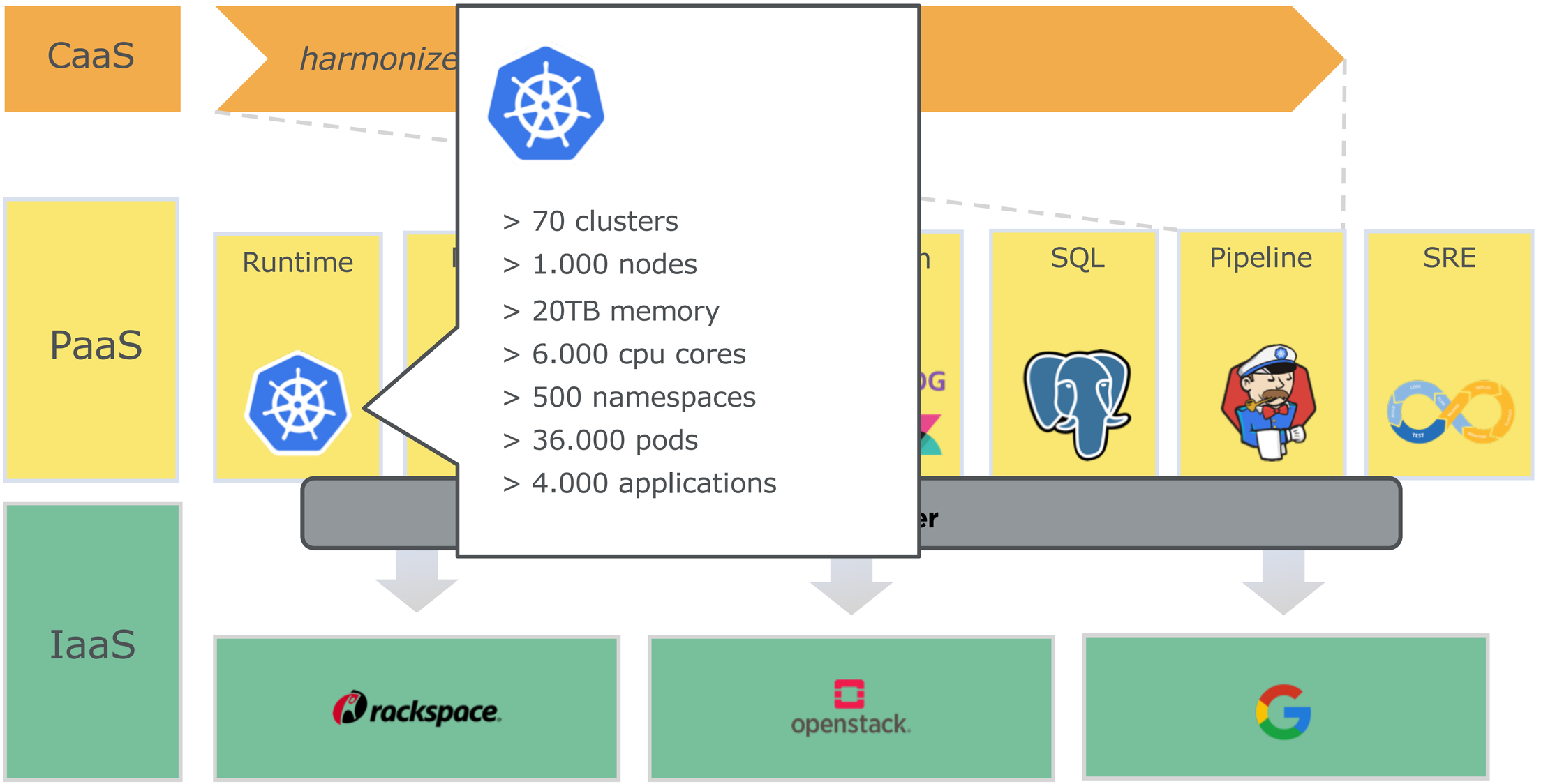
rackspace

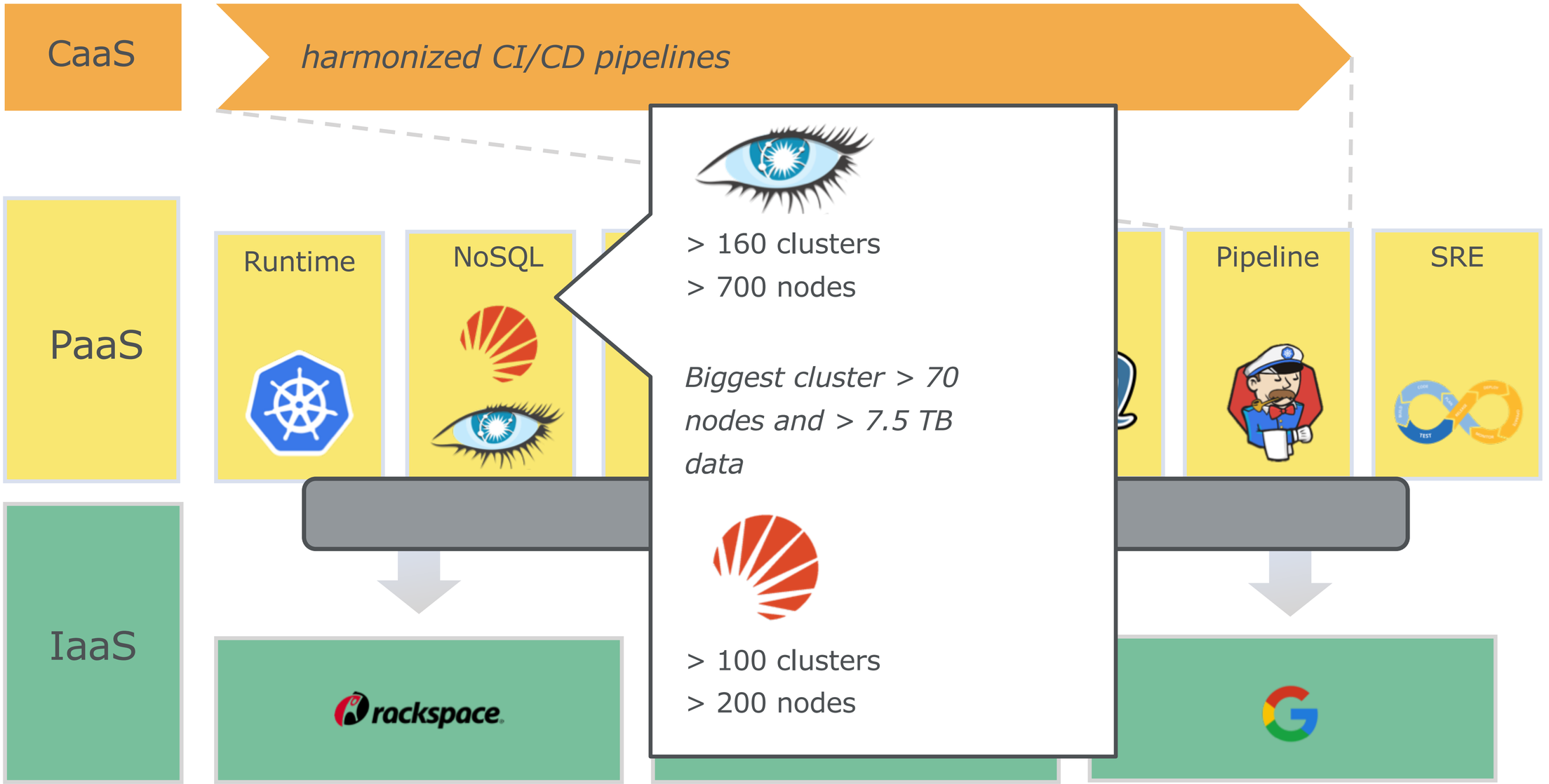
openstack

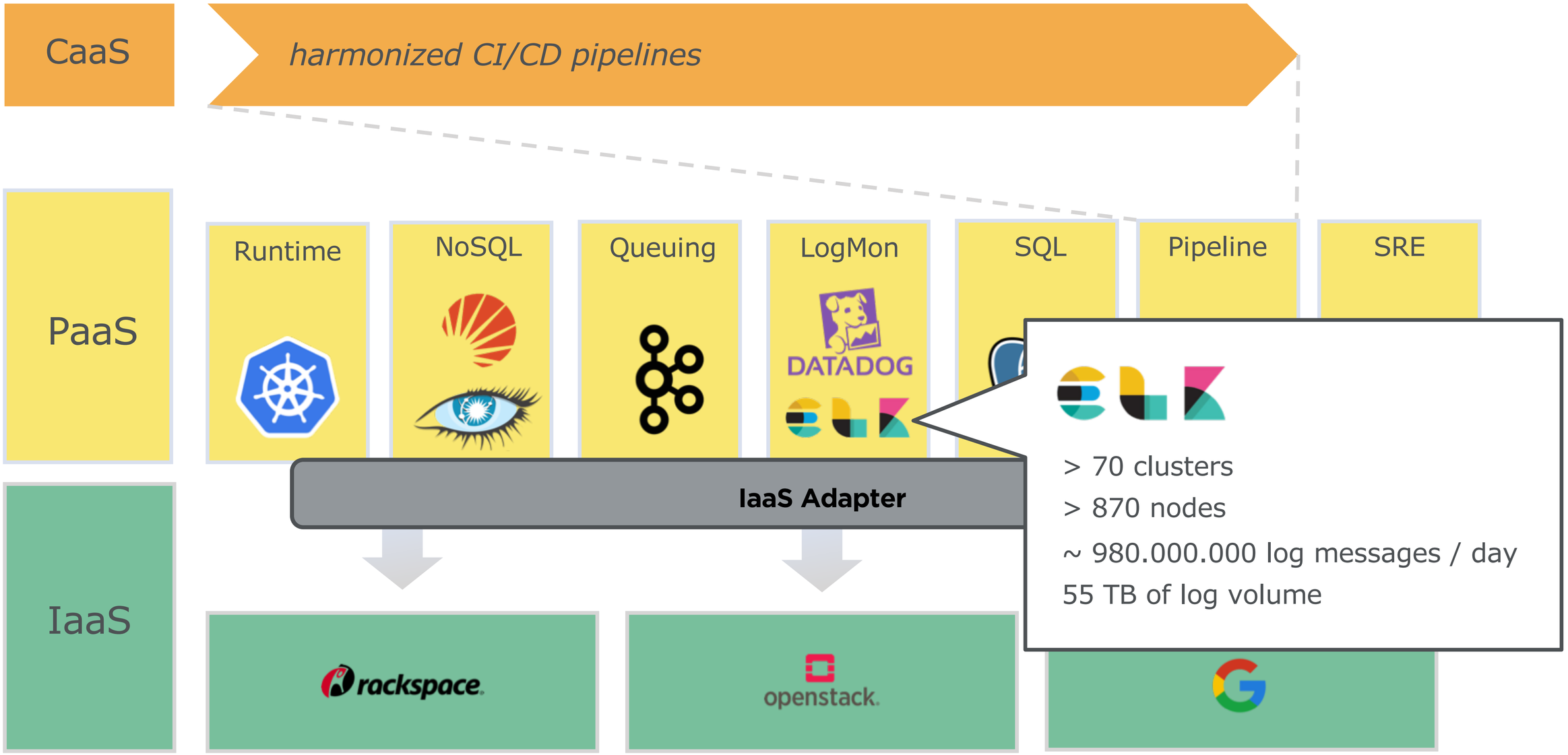
Status Quo


CaaS
harmonized CI/CD pipelines
PaaS
Runtime
NoSQL
Queuing
LogMon
DATADOG
SQL
Pipeline
SRE
IaaS Adapter
IaaS
rackspace
openstack.


CaaS
harmonized CI/CD pipe
Iaas Adapter
Enables teams to provision infrastructure on multiple IaaS providors
• Rackspace (Europe)
• Google (Europe)
• Metro.Cloud (Europe, China)
PaaS
Runtime
NoSQL
SRE
IaaS Adapter
IaaS
rackspace
openstack.


CaaS
harmonize
PaaS
Runtime
SQL
Pipeline
SRE
> 70 clusters
> 1.000 nodes
> 20TB memory
> 6.000 cpu cores
> 500 namespaces
> 36.000 pods
> 4.000 applications
IaaS
rackspace
openstack.


CaaS
harmonized CI/CD pipelines
PaaS
Runtime
NoSQL
Pipeline
SRE
IaaS
rackspace
> 160 clusters
> 700 nodes
Biggest cluster > 70 nodes and > 7.5 TB data
> 100 clusters
> 200 nodes


CaaS
harmonized CI/CD pipelines
PaaS
Runtime
NoSQL
Queuing
LogMon
SQL
Pipeline
SRE
DATADOG
IaaS Adapter
IaaS
rackspace
openstack
> 70 clusters
> 870 nodes
~ 980.000.000 log messages / day
55 TB of log volume

CaaS

harmonized CI/CD pipelines

PaaS

Runtime

NoSQL

Pipeline

SRE

IaaS

> 50 teams
> 600 pipelines
> 800 deployments per day
> 4.000 deployments per week
> 1.000 production deployments per week

CaaS

harmonized CI/CD pipeli

PaaS

Runtime

NoSQL

Pipeline

SRE

IaaS

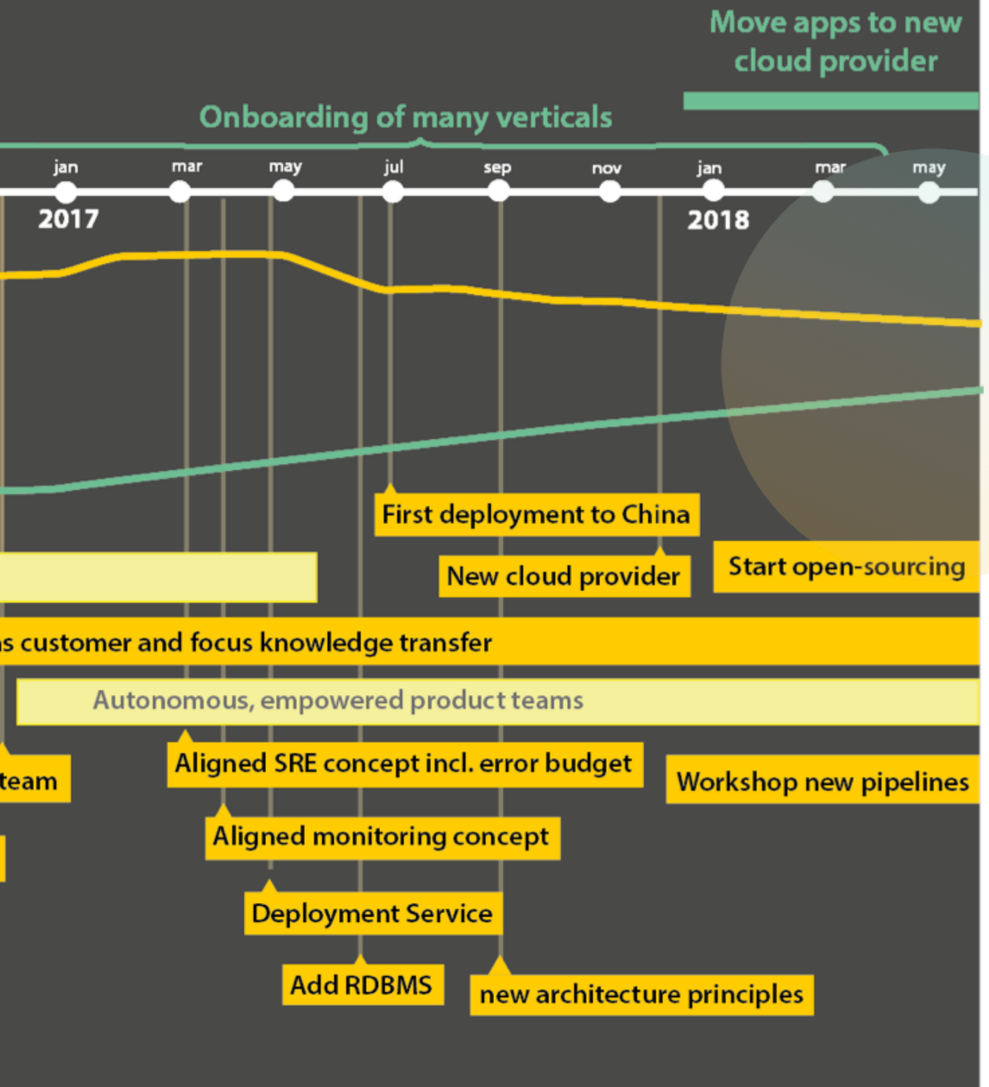
Development teams (verticals)

> 75 teams
> 800 developers
- Internal & external
- Multiple vendors
- Heterogenous maturity in cloud native application development

Platform teams

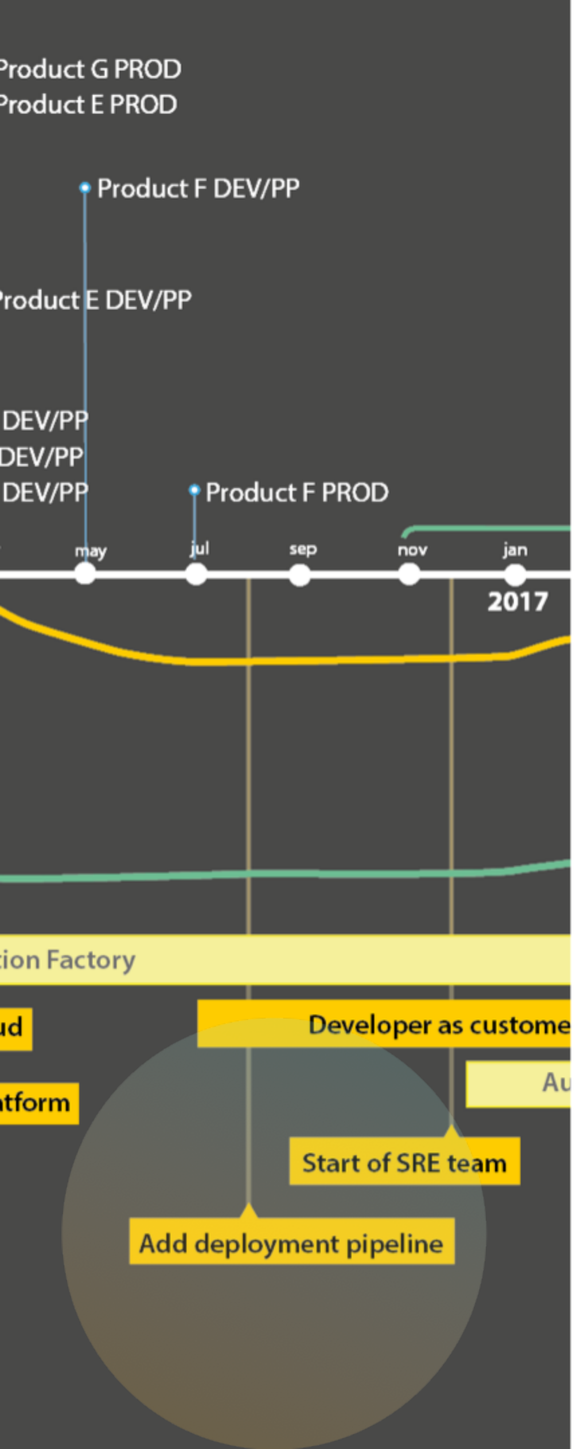
- 10 teams
- < 60 platform engineers

LESSONS LEARNED



Pipeline as architecture police

Story #1



Add deployment pipeline

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harmonized CI/CD pipelines

PaaS

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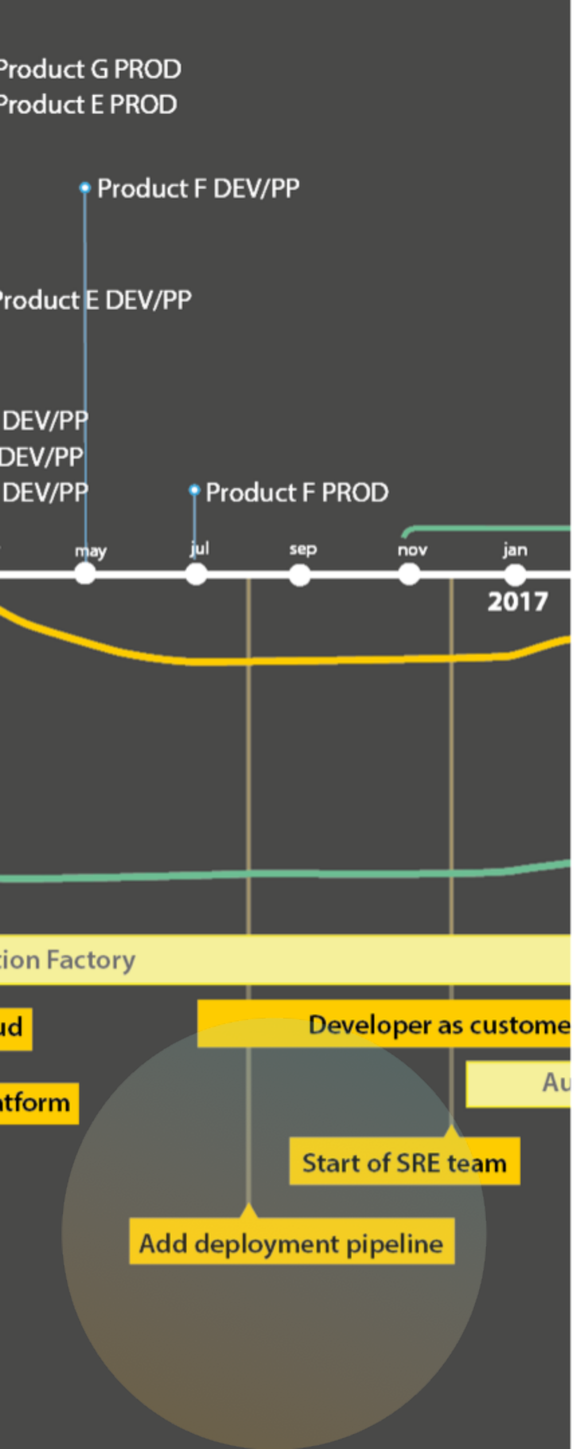
Product G PROD
Product E PROD
Product F DEV/PP
Product E DEV/PP
DEV/PP
DEV/PP
DEV/PP
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may
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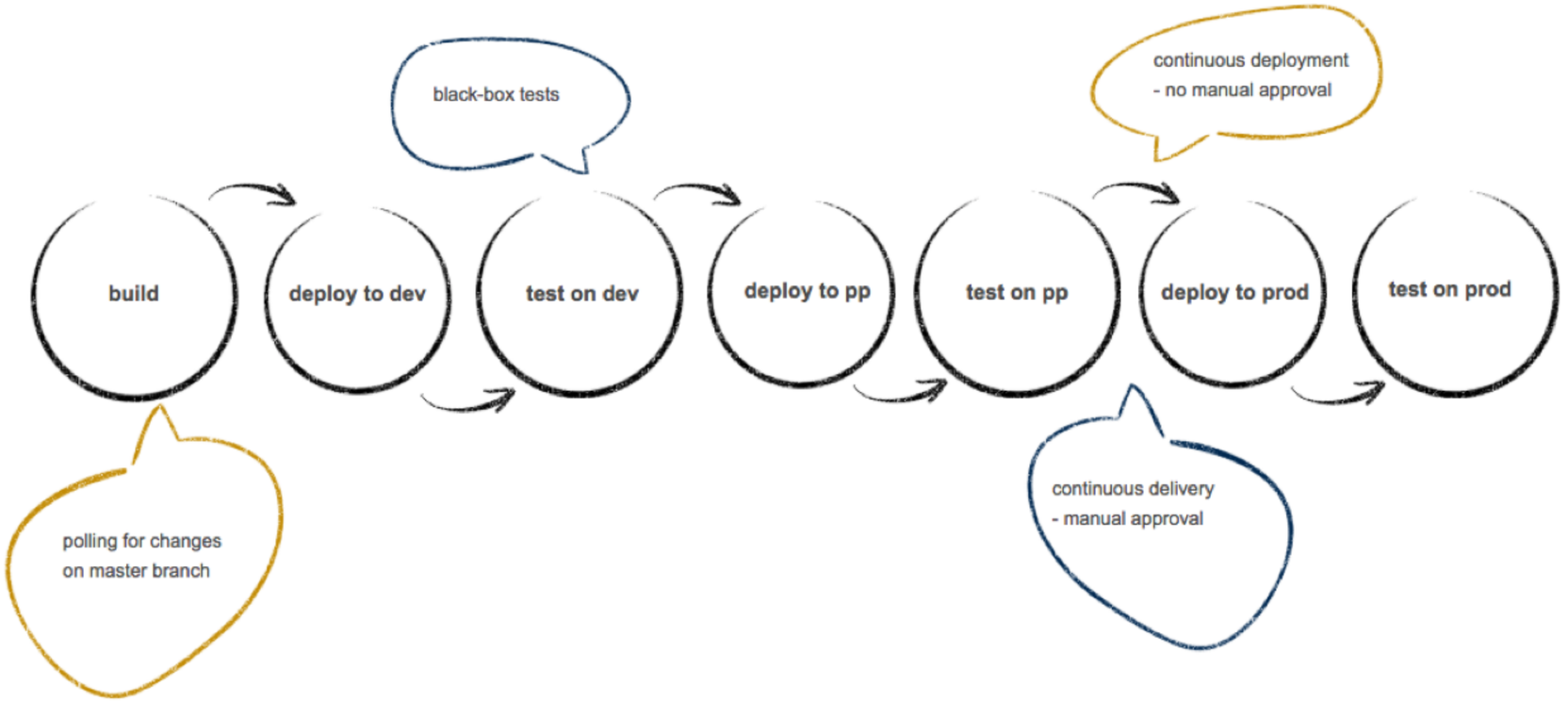
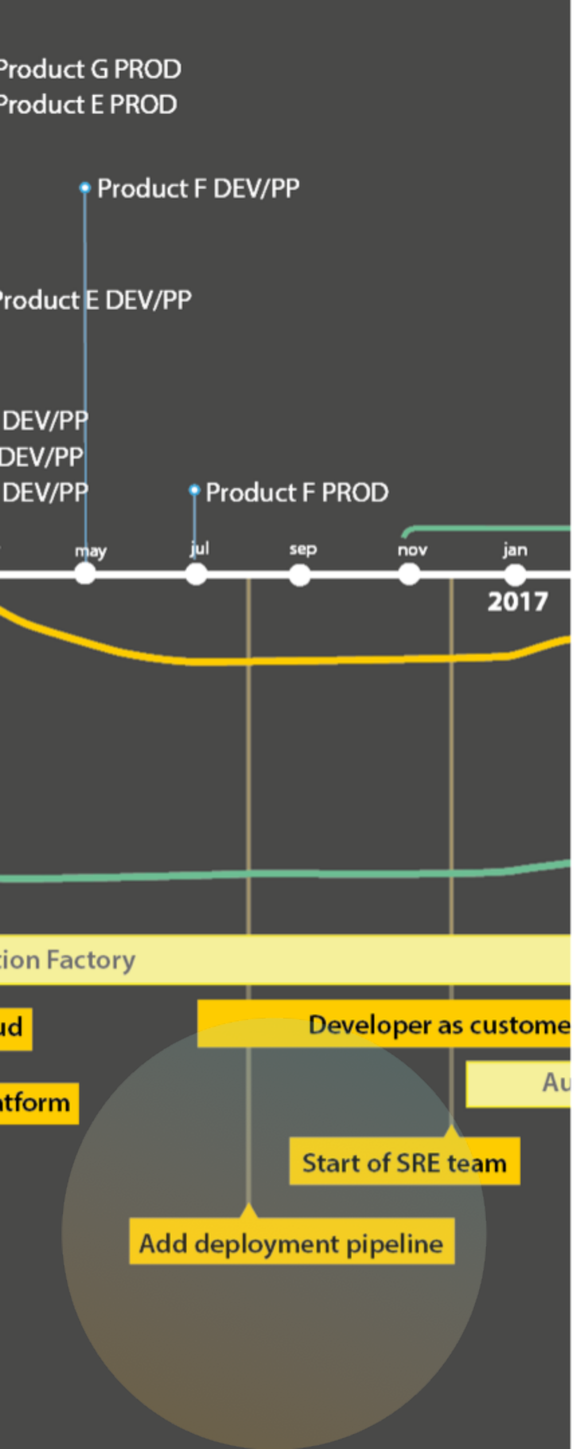
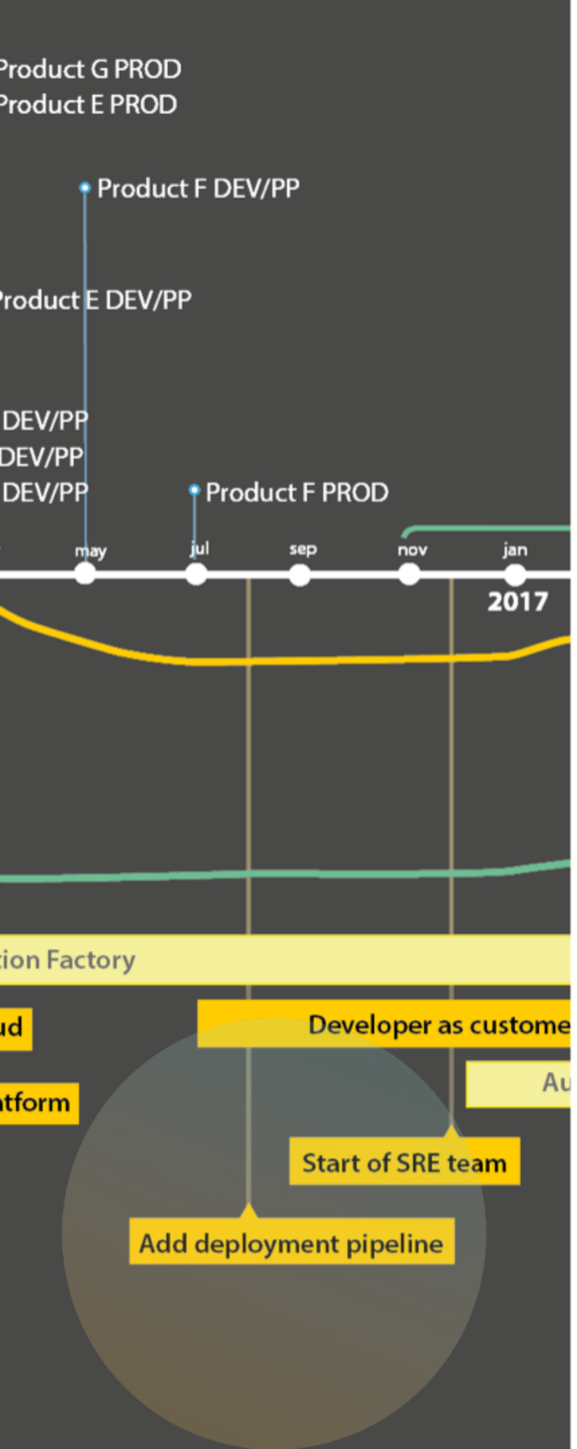
ion Factory
ud
Developer as custome
atform
Au
Start of SRE team
Add deployment pipeline


black-box tests
continuous deployment
- no manual approval
build
deploy to dev
test on dev
deploy to pp
test on pp
deploy to prod
test on prod
polling for changes
on master branch
continuous delivery
- manual approval


Product G PROD
Product E PROD
Product F DEV/PP
Product E DEV/PP
DEV/PP
DEV/PP
DEV/PP
Product F PROD
may
jul
sep
nov
jan
2017
ion Factory
ud
Developer as custome
Au
atform
Start of SRE team
Add deployment pipeline

black-box tests
continuous deployment
- no manual approval
build
deploy to dev
test on dev
deploy to pp
test on pp
deploy to prod
test on prod
polling for changes
on master branch
continuous delivery
- manual approval

https://commons.wikimedia.org/wiki/File:Fire_exit.svg


Product G PROD
Product E PROD
Product F DEV/PP
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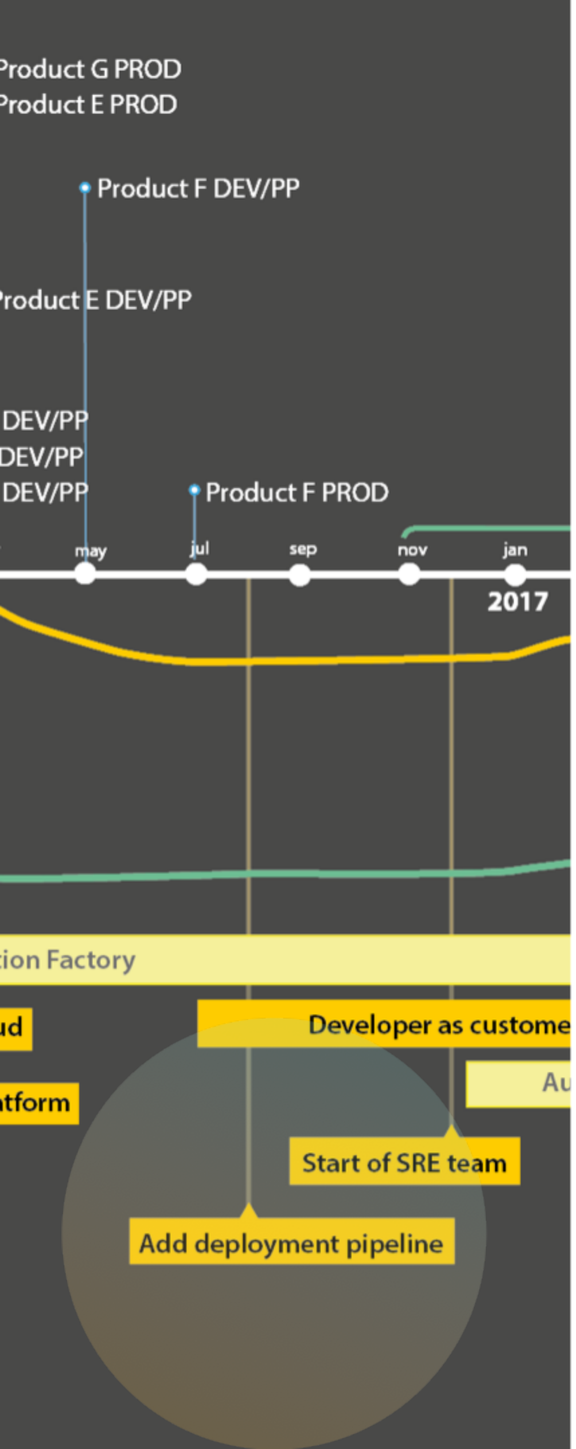
Add deployment pipeline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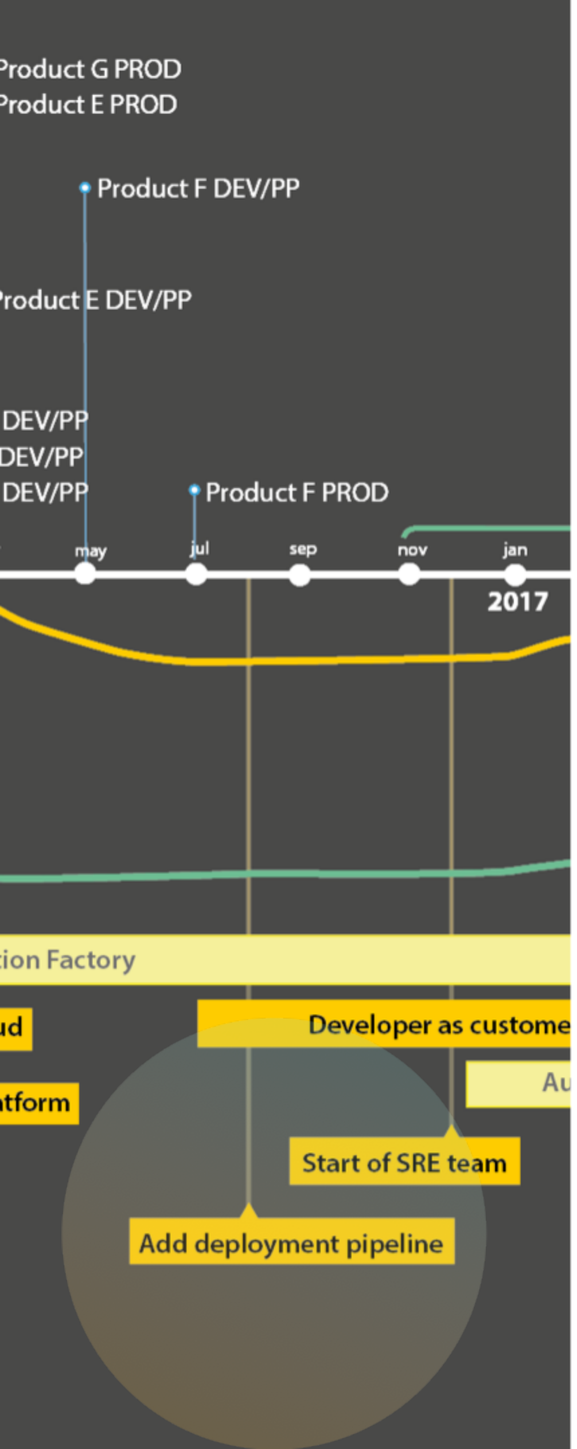
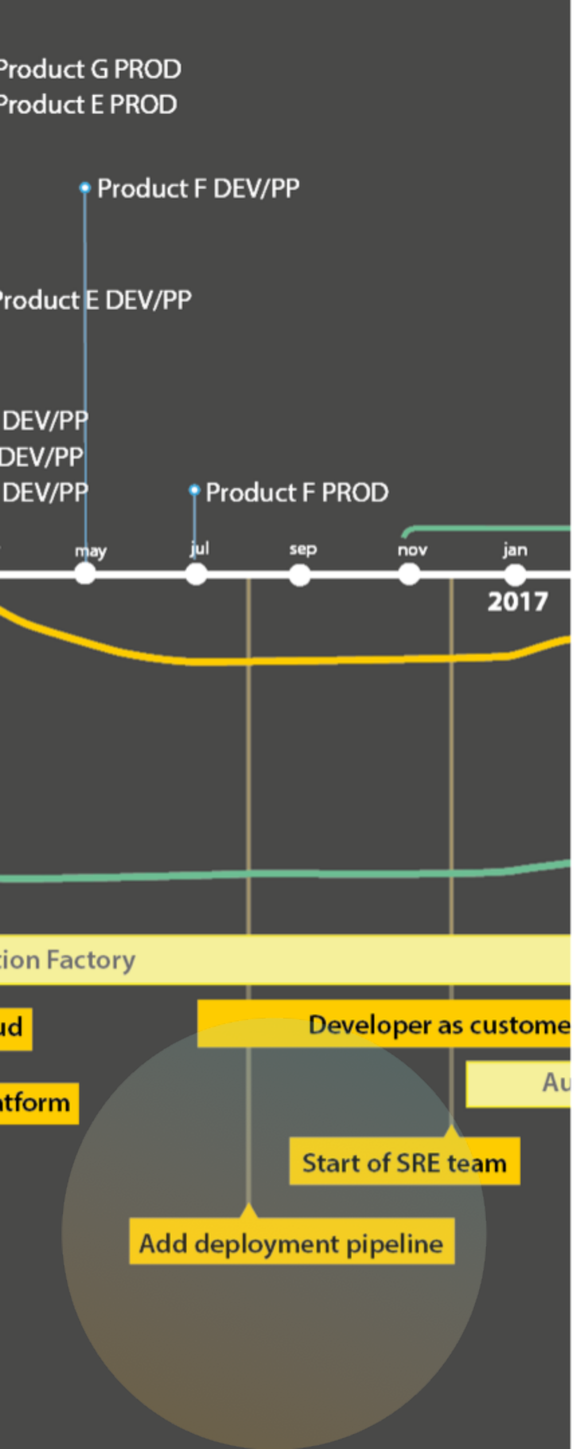
Start of SRE team
Add deployment pipeline

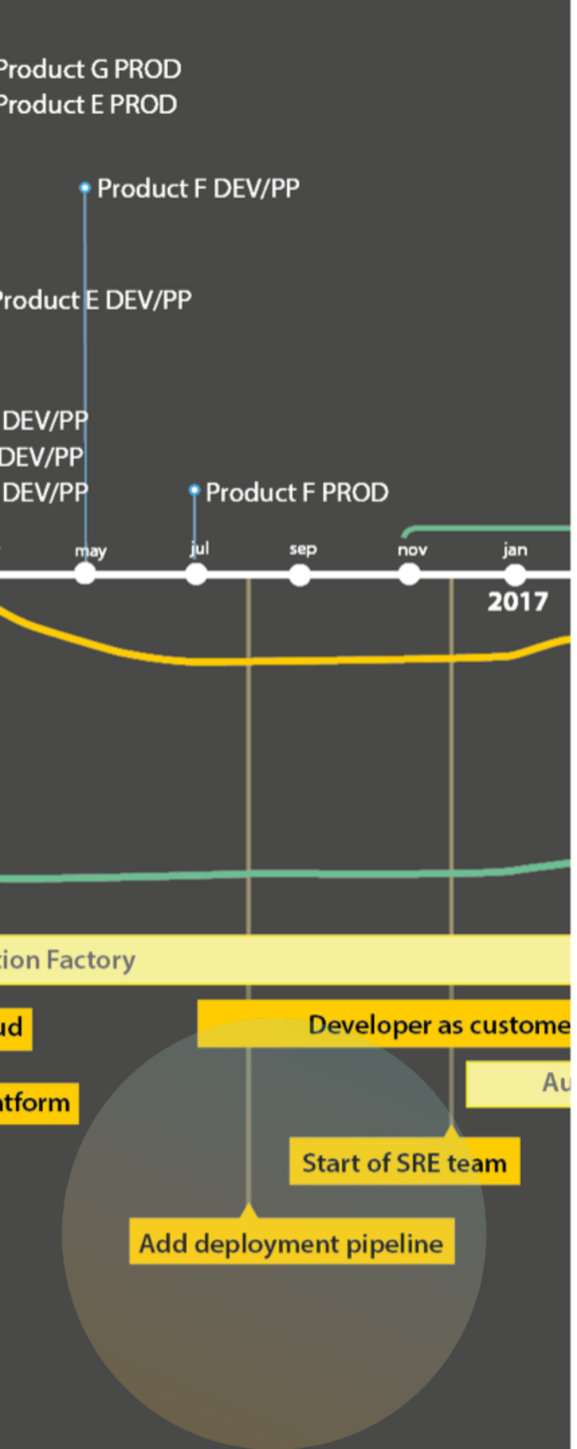


What would we do, if we were outside of METRO?



- **Understand customer needs**
- **Analyze competition**
- **Marketing**

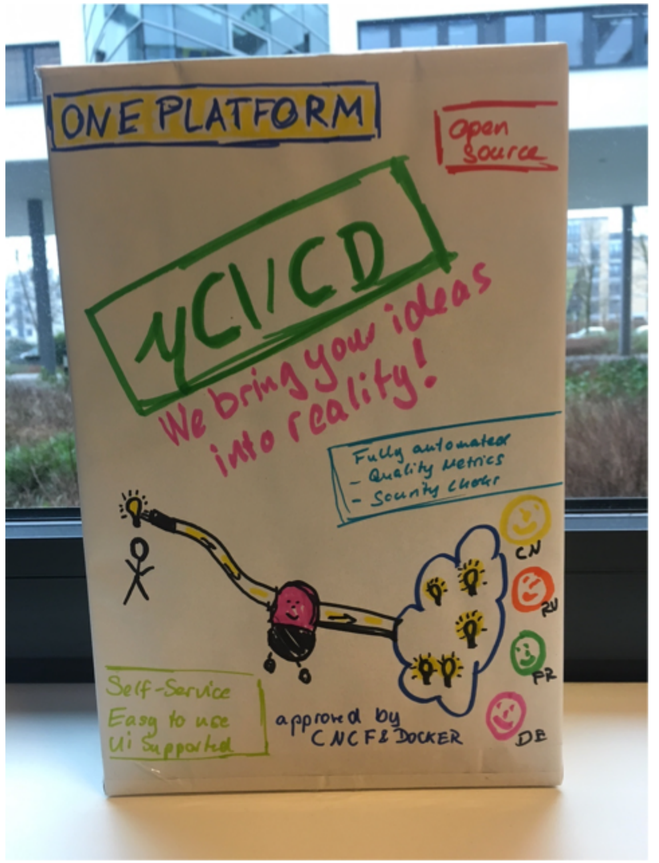
=> Productize

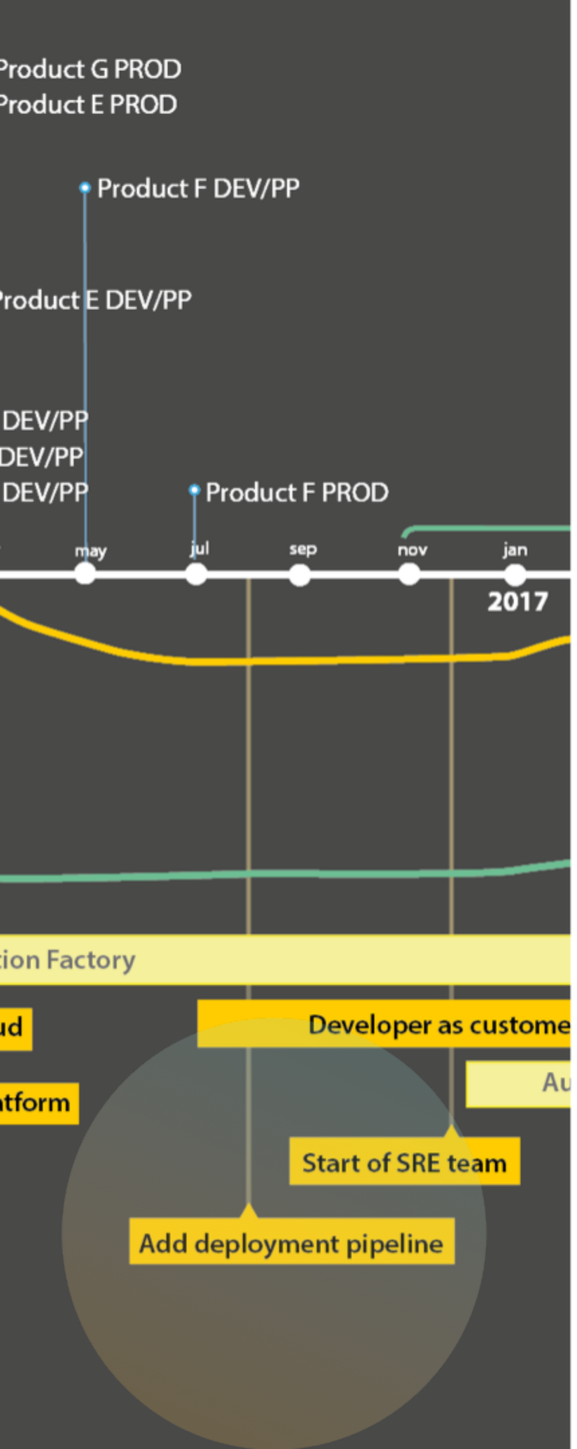


MAKE DEPLOYMENT GREAT AGAIN!

Make development teams' life easier by offering one-click pipeline setup that deploys an application in a cost-efficient, globally distributed, reliable, and secure way.

Reduce time-to-market for teams, allowing them to focus on business value.




Product G PROD
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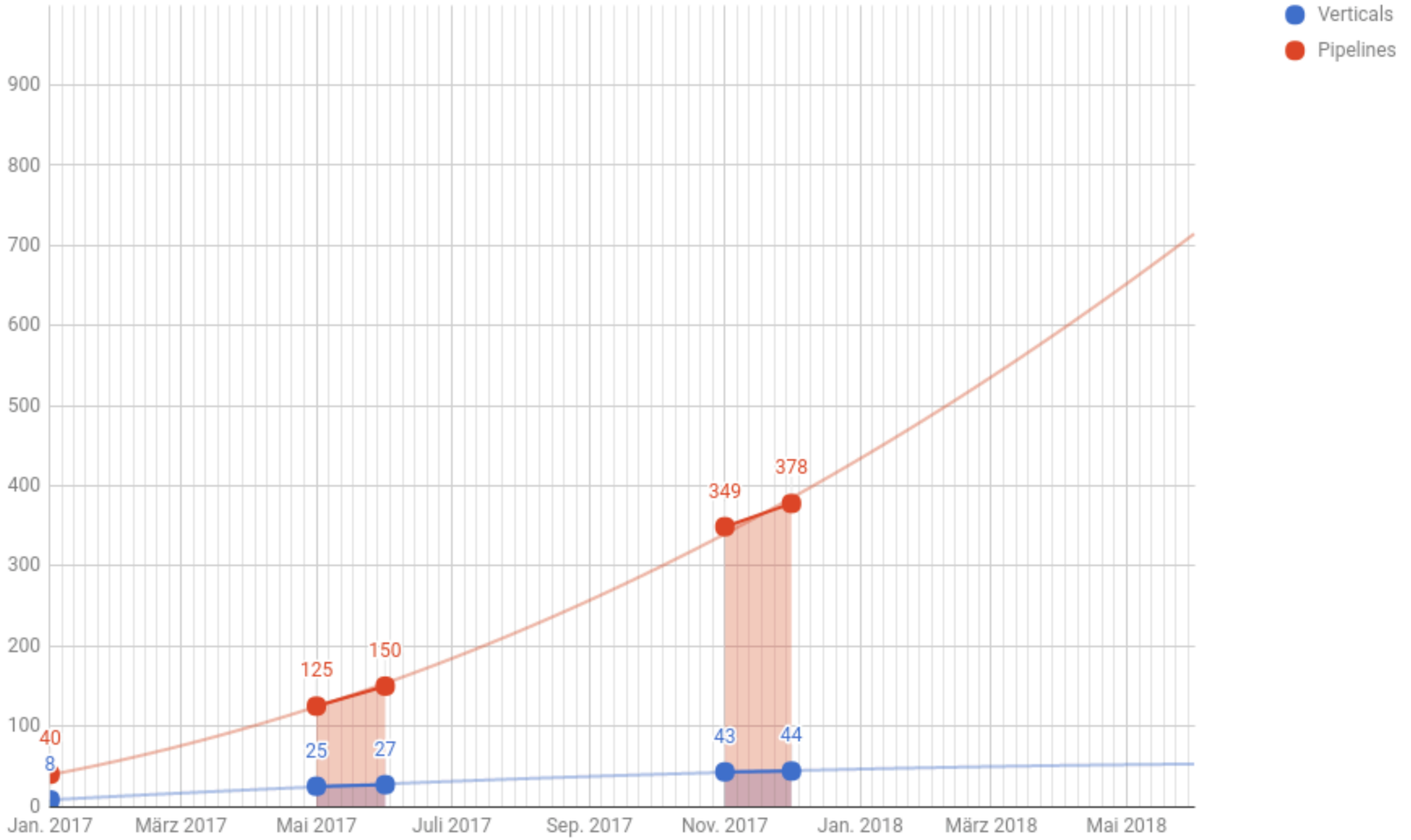
Start of SRE team
Add deployment pipeline

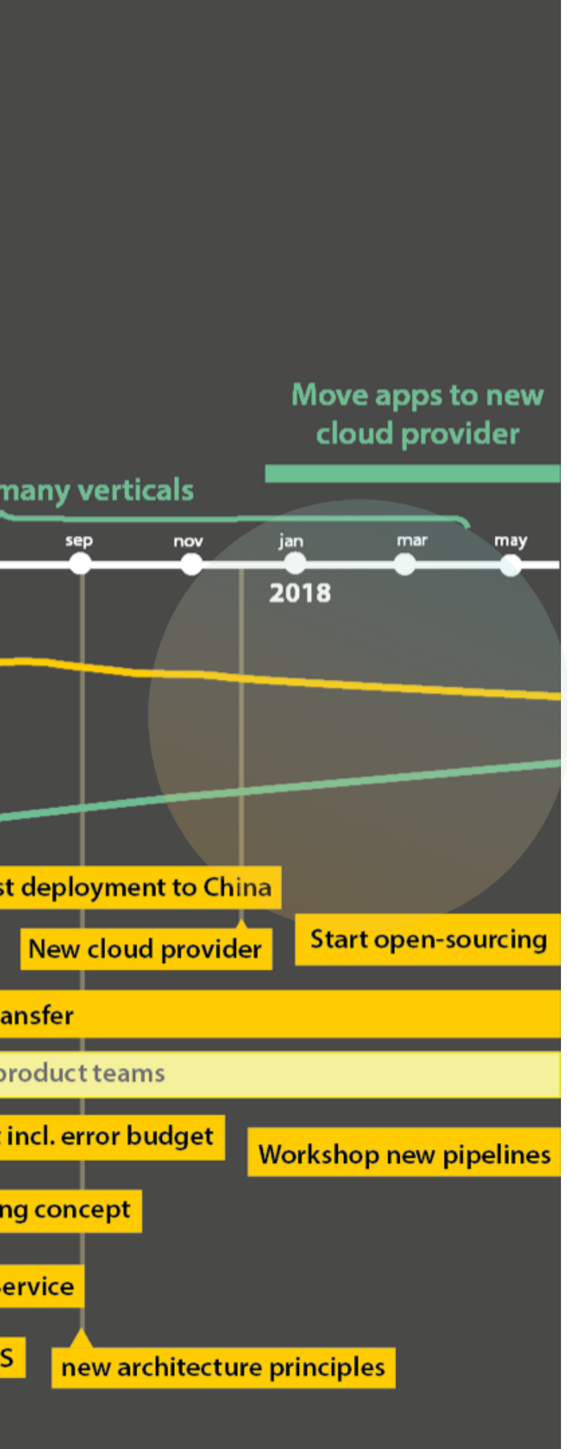

Verticals
Pipelines
900
800
700
600
500
400
300
200
100
0
Jan. 2017
März 2017
Mai 2017
Juli 2017
Sep. 2017
Nov. 2017
Jan. 2018
März 2018
Mai 2018
40
125
150
349
378
8
25
27
43
44

Pipeline as architecture police

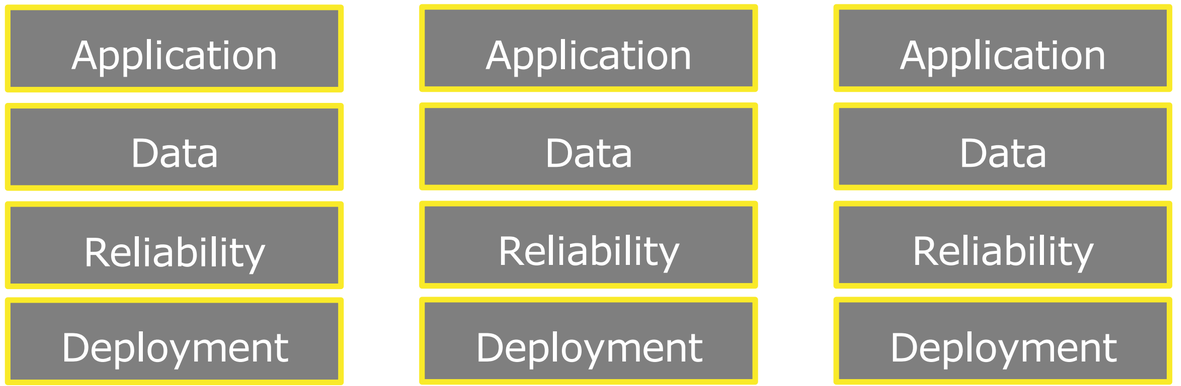
RECAP

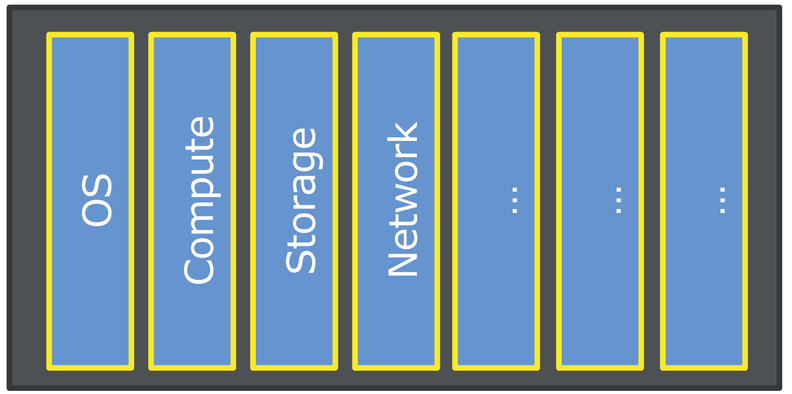
DevOps in an enterprise context

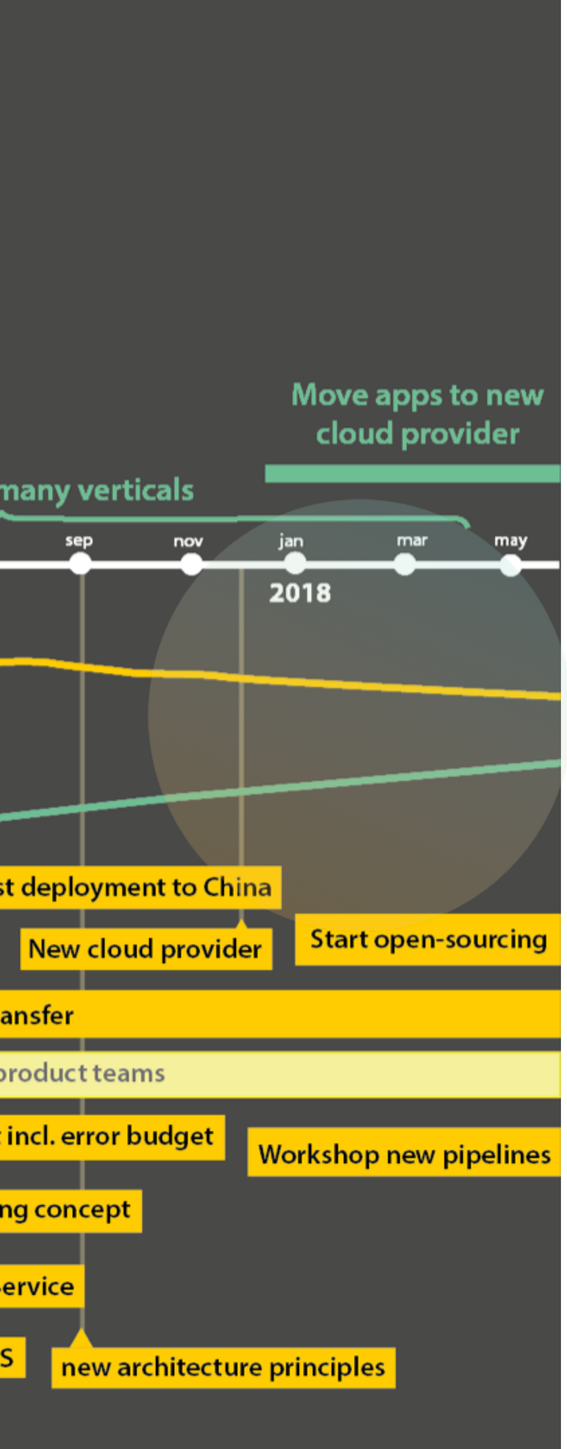
Story #2



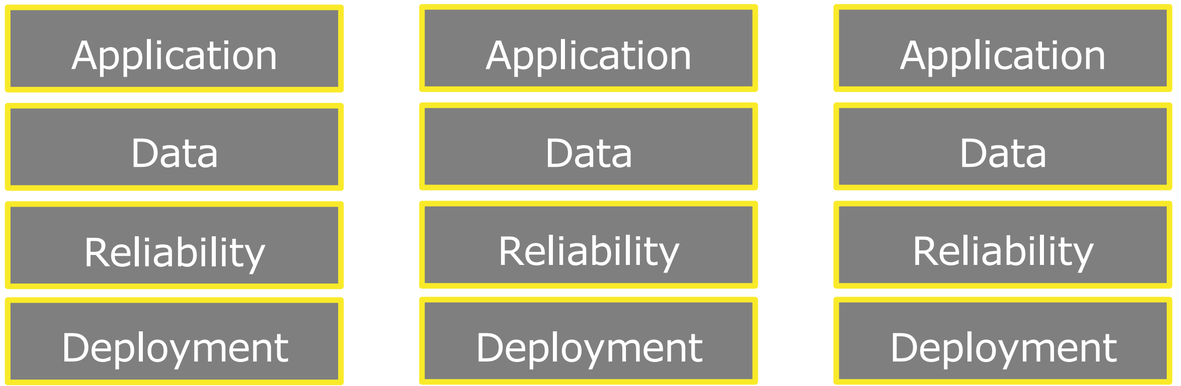
„You build it, you run it.“

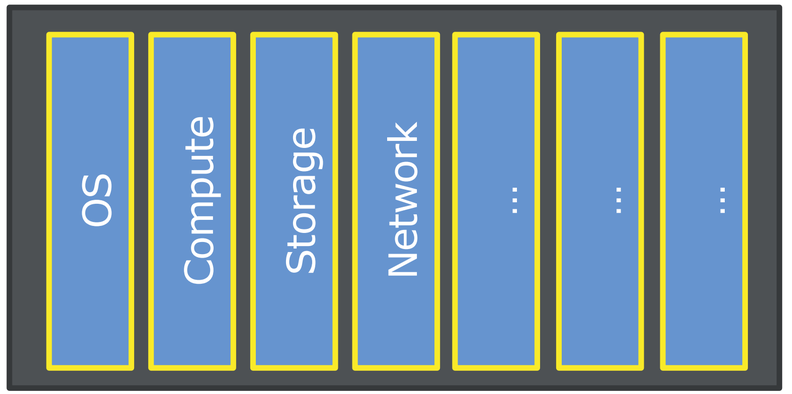


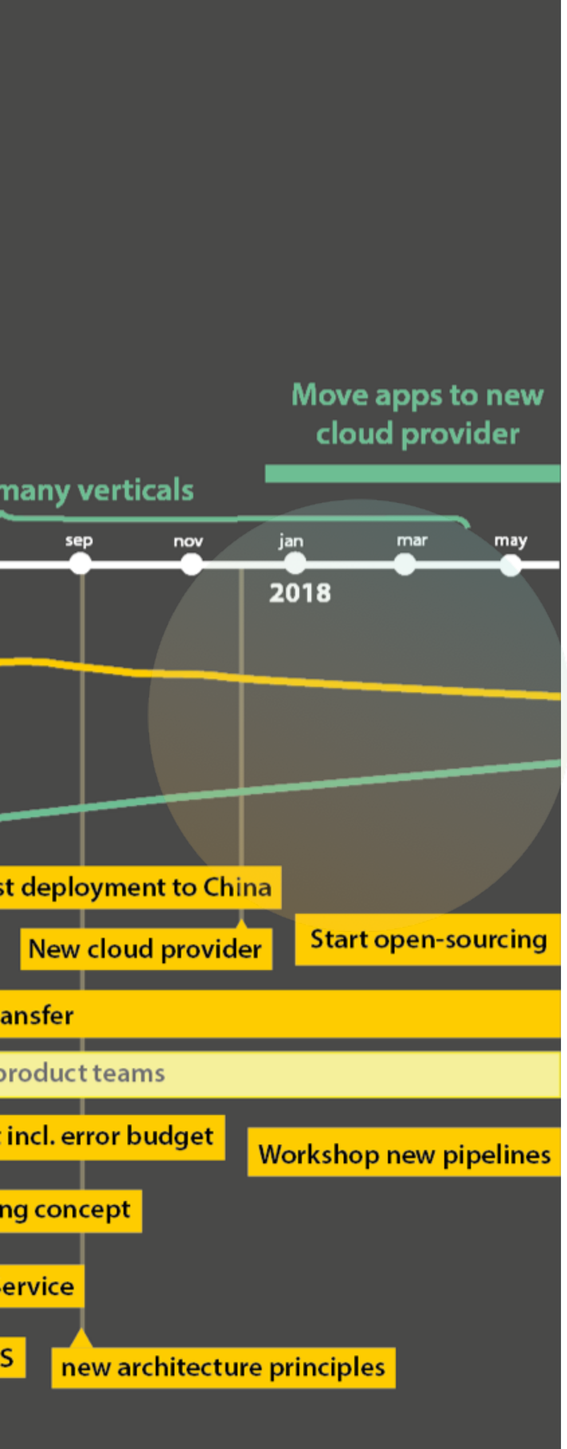




Who is doing on-call?

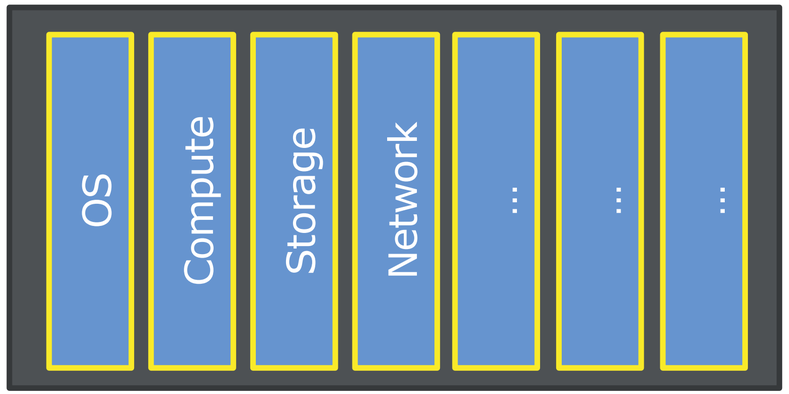






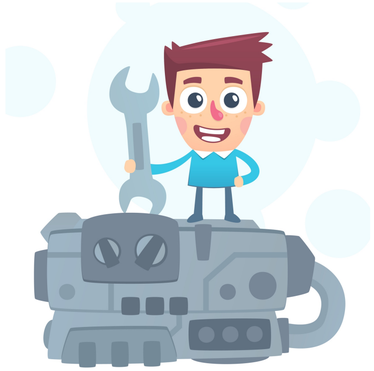
Who is doing on-call?

Vendor A	Vendor B	Vendor C
Application	Application	Application
Data	Data	Data
Reliability	Reliability	Reliability
Deployment	Deployment	Deployment

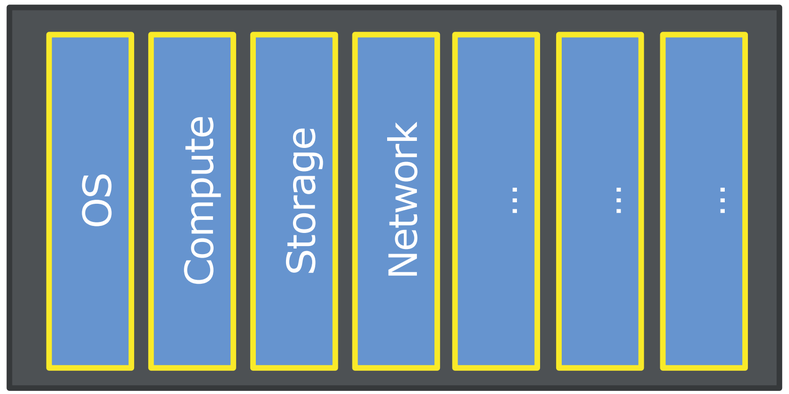


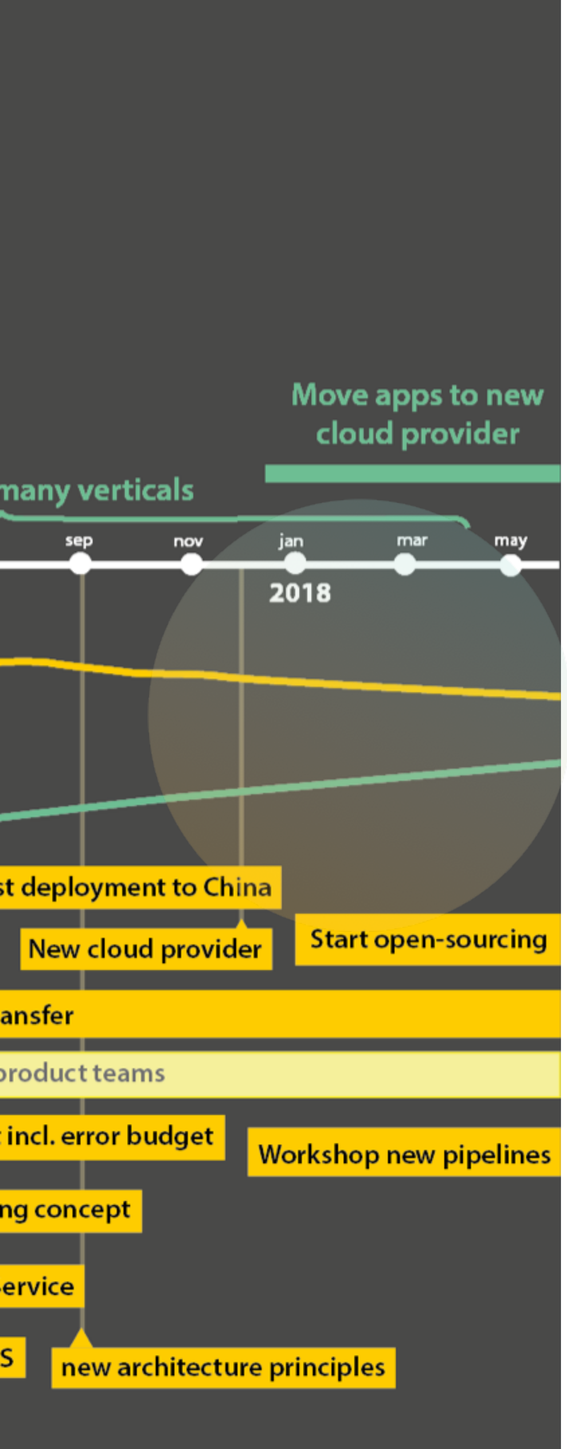
SRE Team

- On-Call



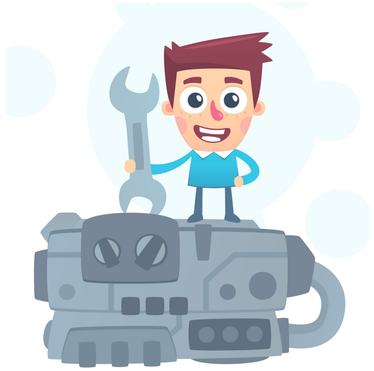
Application	Application	Application
Data	Data	Data
Reliability	Reliability	Reliability
Deployment	Deployment	Deployment



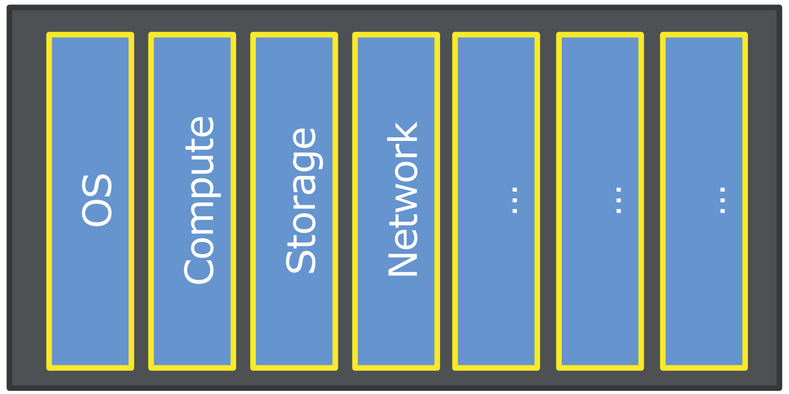


SRE Team

- On-Call
- Reliability
- Experience

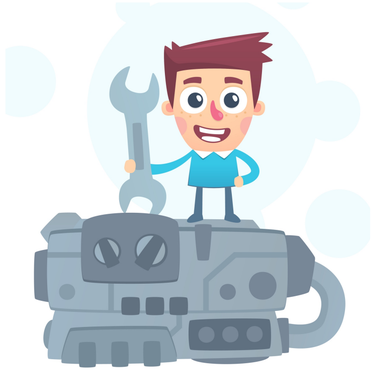


Application	Application	Application
Data	Data	Data
Reliability	Reliability	Reliability
Deployment	Deployment	Deployment



SRE Team

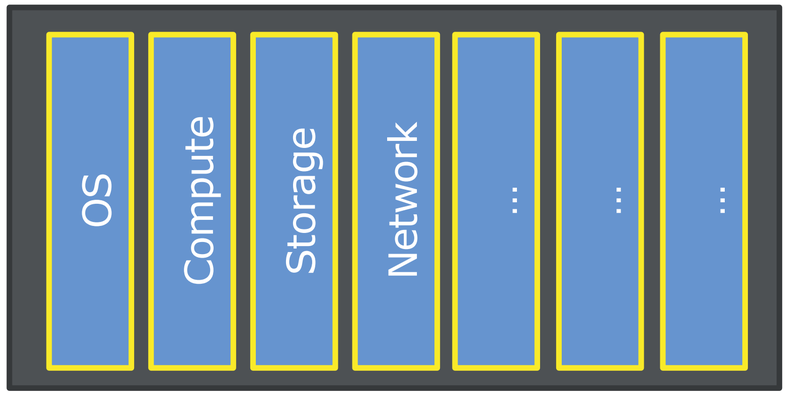
- On-Call
- Reliability Experience



Application Team

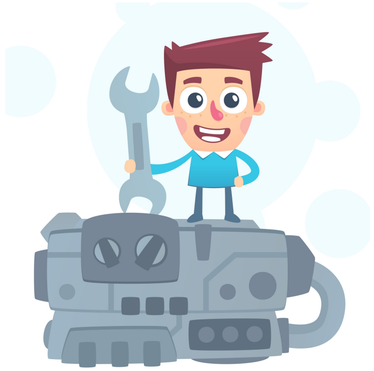
- Close collaboration
- Reliability Assessment

Application	Application	Application
Data	Data	Data
Reliability	Reliability	Reliability
Deployment	Deployment	Deployment



SRE Team

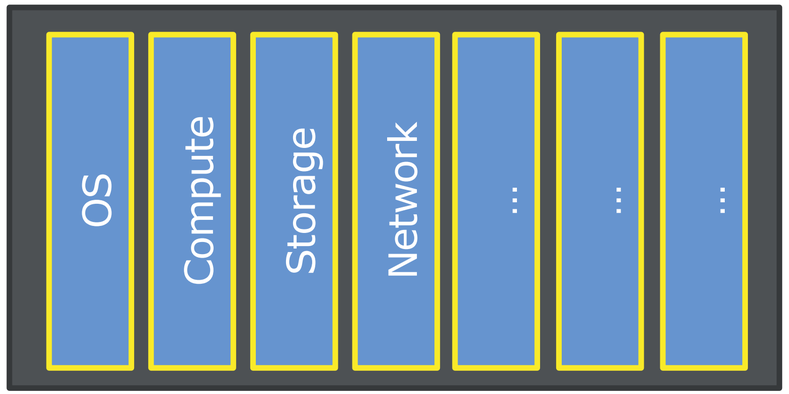
- On-Call
- Reliability Experience
- Opt-out

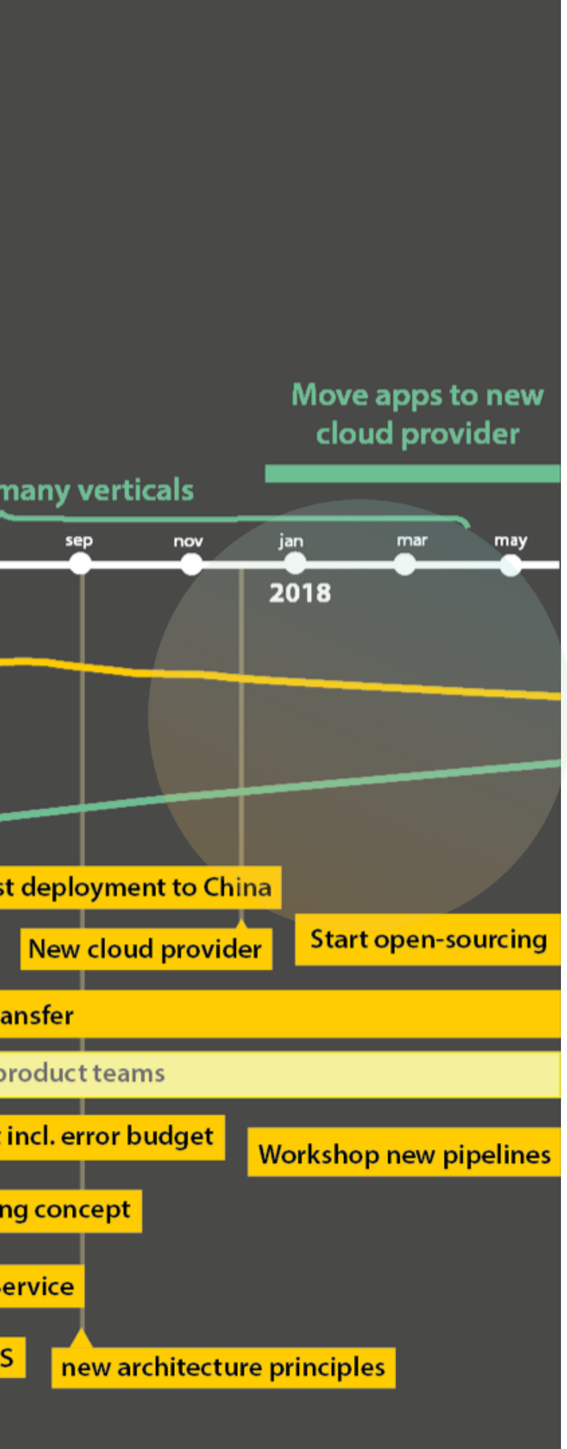


Application Team

- Close collaboration
- Reliability Assessment
- SRE optional

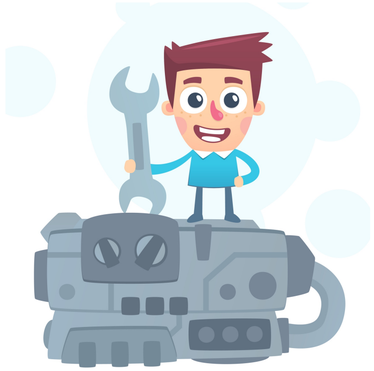
Application	Application	Application
Data	Data	Data
Reliability	Reliability	Reliability
Deployment	Deployment	Deployment





SRE Team

- On-Call
- Reliability Experience
- Opt-out



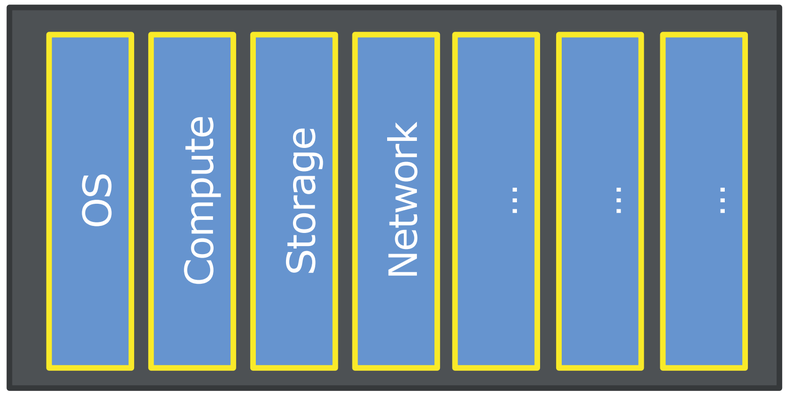
Application Team

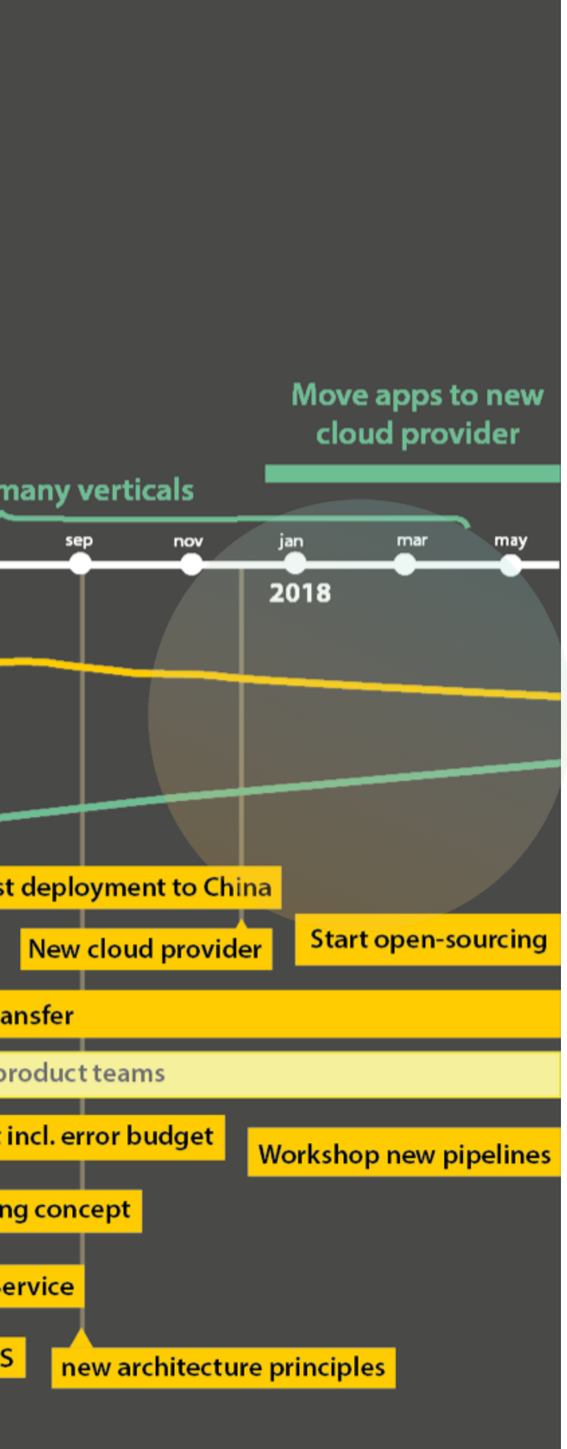
- Close collaboration
- Reliability Assessment
- SRE optional

Application	Application	Application
Data	Data	Data
Reliability	Reliability	Reliability
Deployment	Deployment	Deployment

Platform Team

- self-service




Move apps to new cloud provider
many verticals
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New cloud provider
Start open-sourcing
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product teams
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Workshop new pipelines
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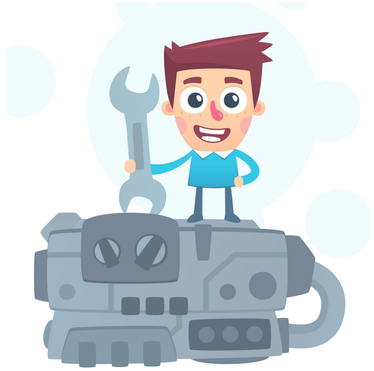
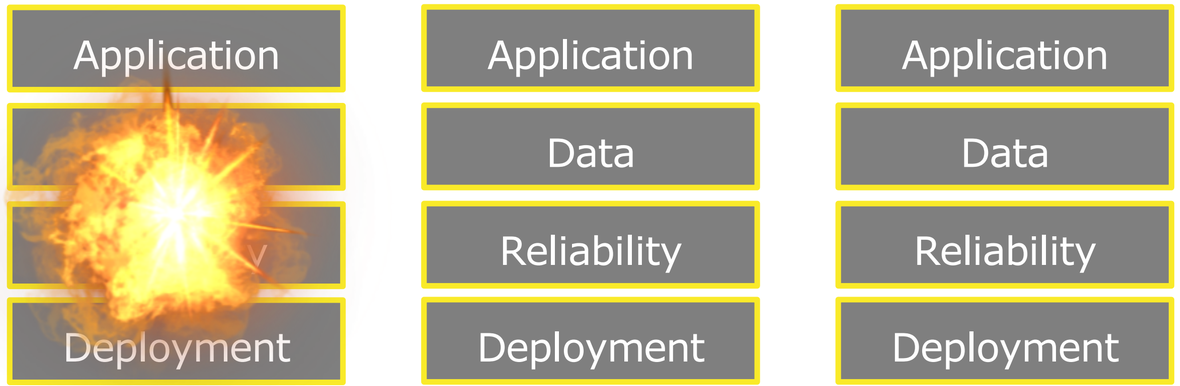
new architecture principles




Application
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Data
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Reliability
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Deployment
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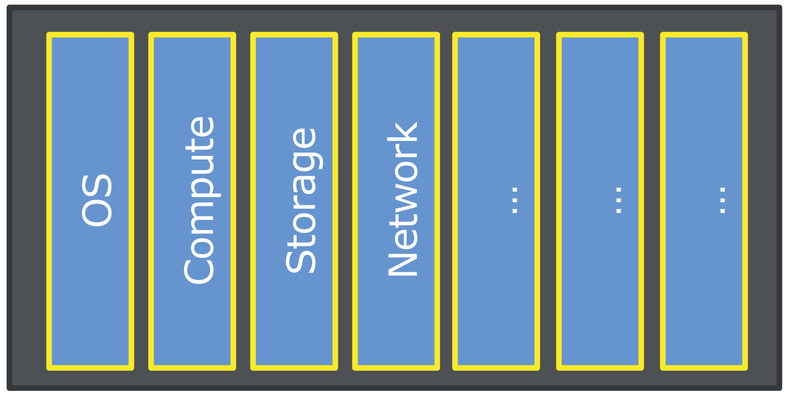
Deployment


OS
Compute
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Network
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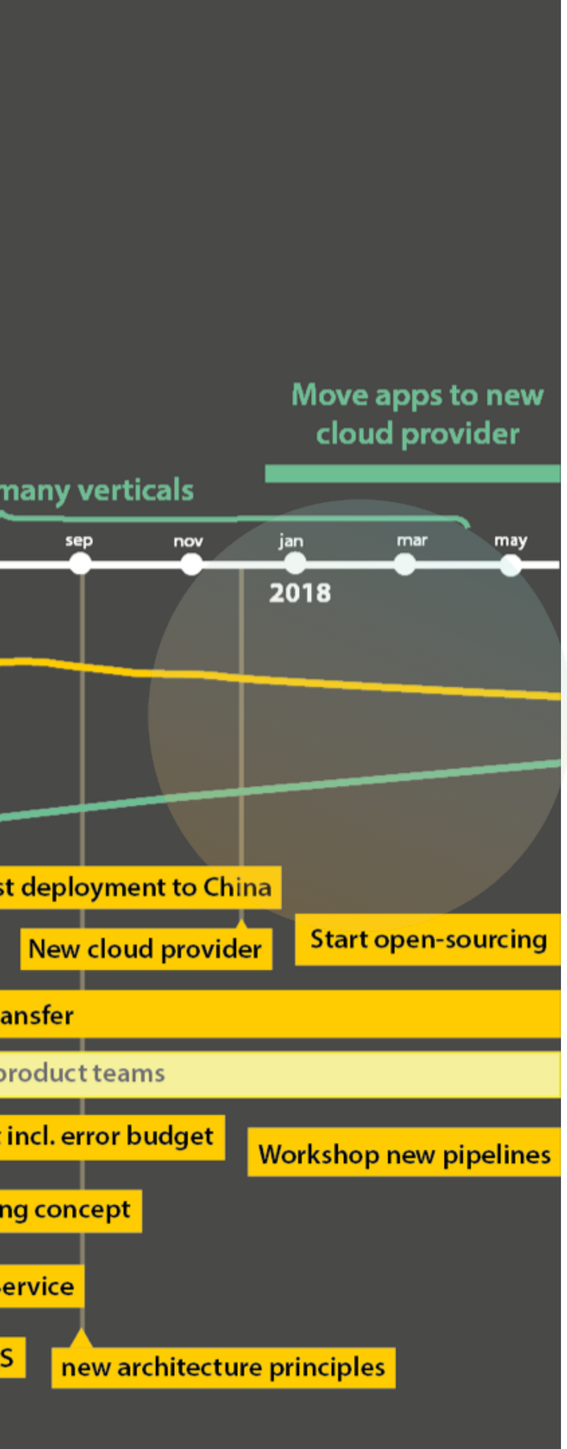
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st deployment to China
New cloud provider
Start open-sourcing
ansfer
product teams
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Workshop new pipelines
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ervice
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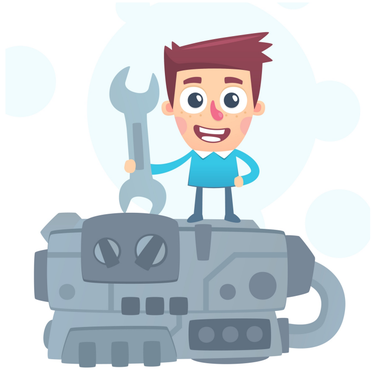
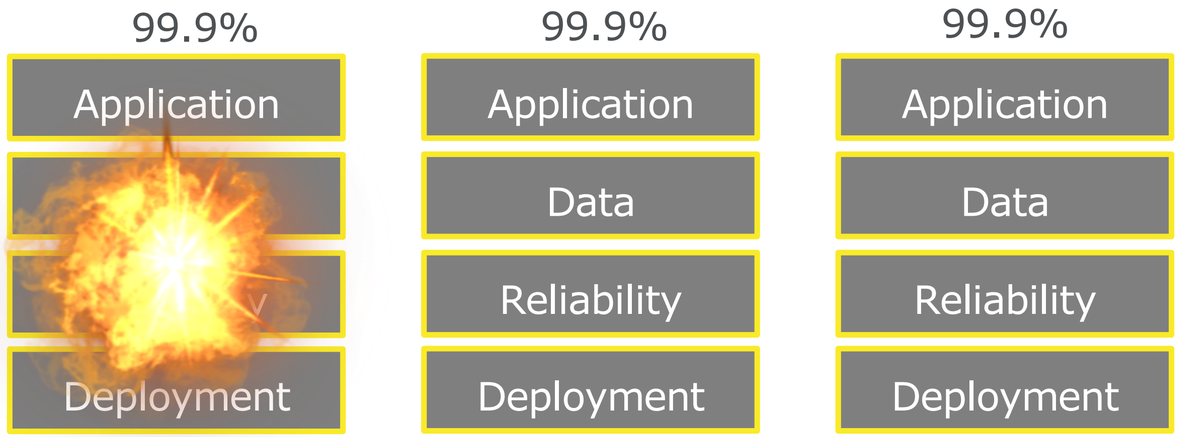
new architecture principles




99.9%
Application
Data
Reliability
Deployment
99.9%
Application
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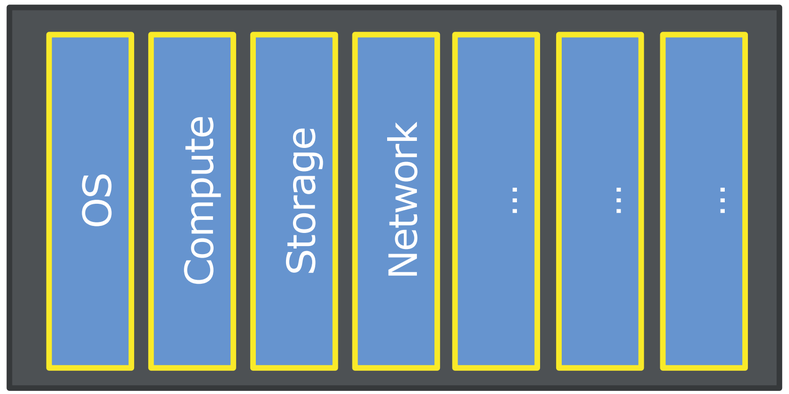
99.9%
Application
Data
Reliability
Deployment


OS
Compute
Storage
Network
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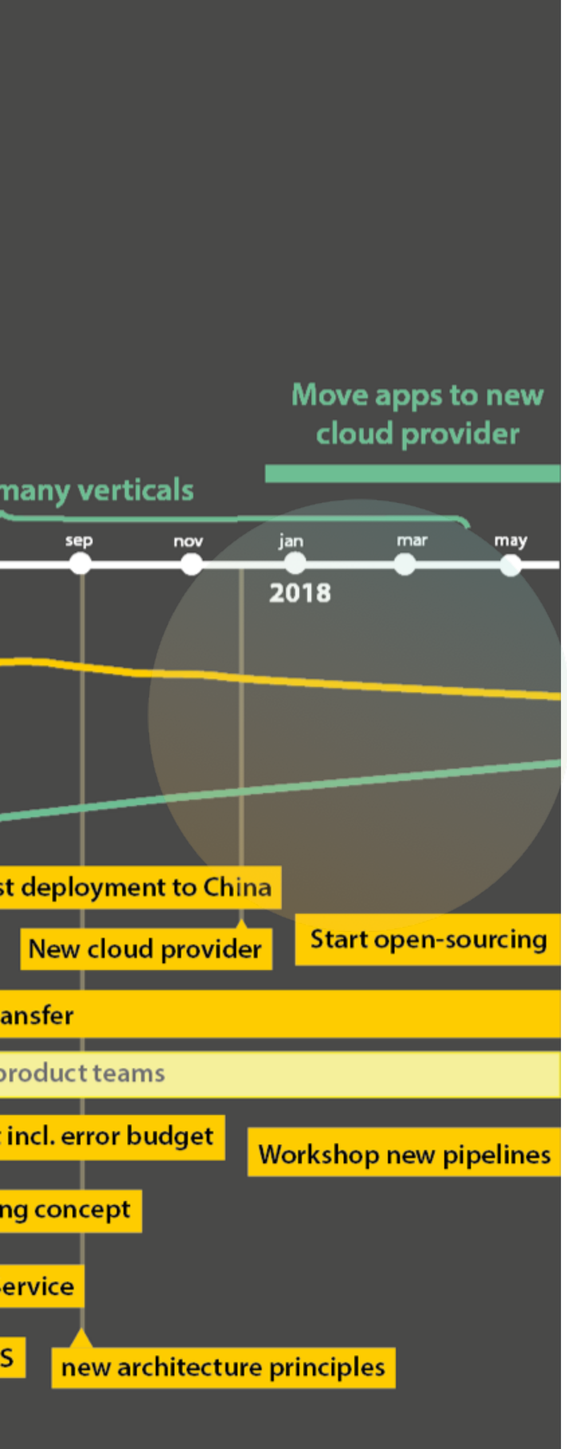

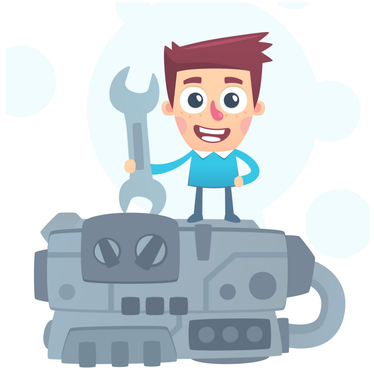

~~99.9%~~ 98%

Application

Data

Reliability

Deployment

99.9%

Application

Data

Reliability

Deployment

~~99.9%~~ 99.99%

Application

Data

Reliability

Deployment

OS

Compute

Storage

Network

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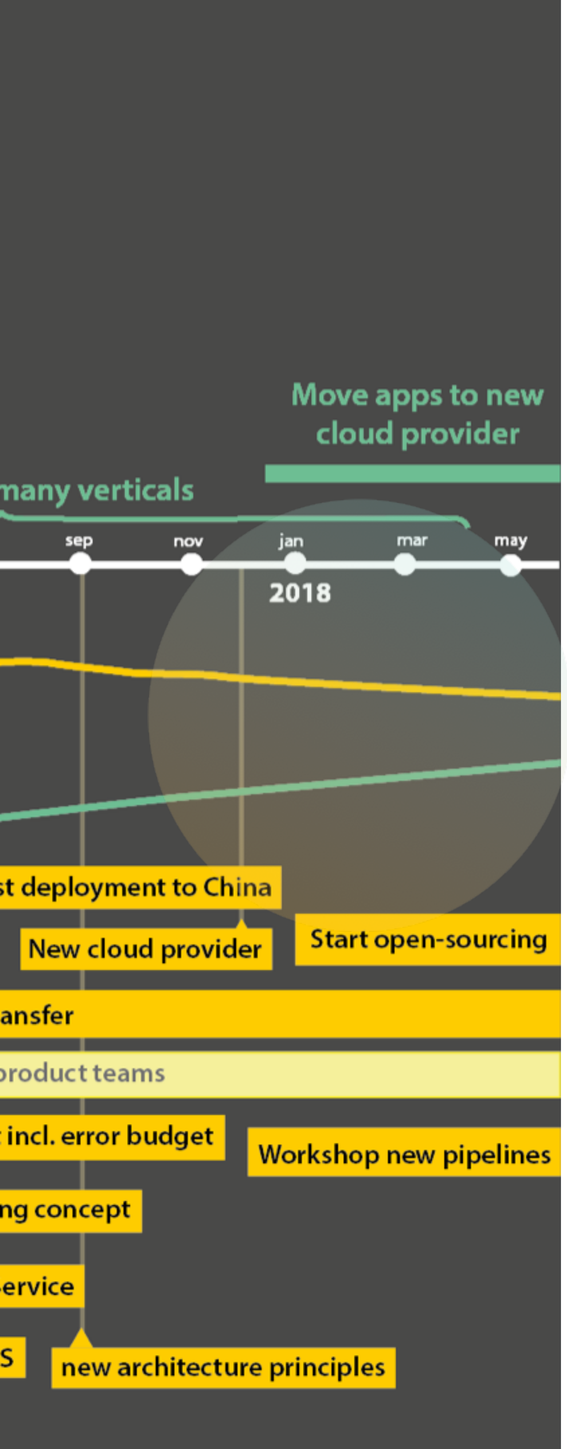
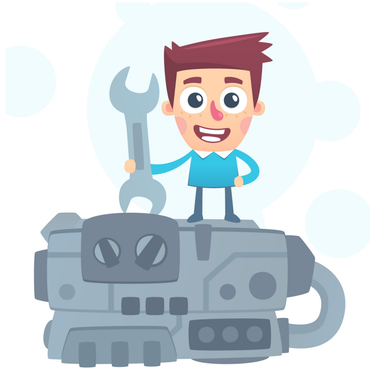
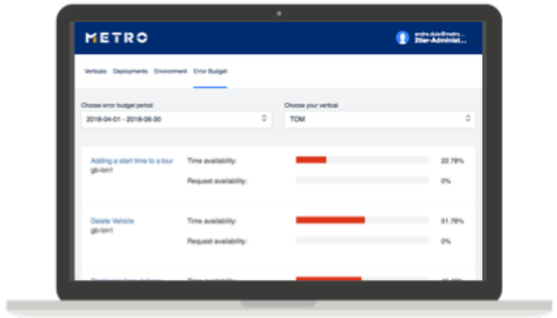






Error Budget Monitoring

- Measure SLOs per Feature

~~99.9%~~ 98%

Application

Data

Reliability

Deployment

99.9%

Application

Data

Reliability

Deployment

~~99.9%~~ 99.99%

Application

Data

Reliability

Deployment

OS

Compute

Storage

Network

...

...

...

METRO

andre.duis@metro...
2tier-Administ...

Verticals | Deployments | Environment | Error Budget

Choose error budget period

2018-06-17 - 2018-09-17

Choose your vertical

custo

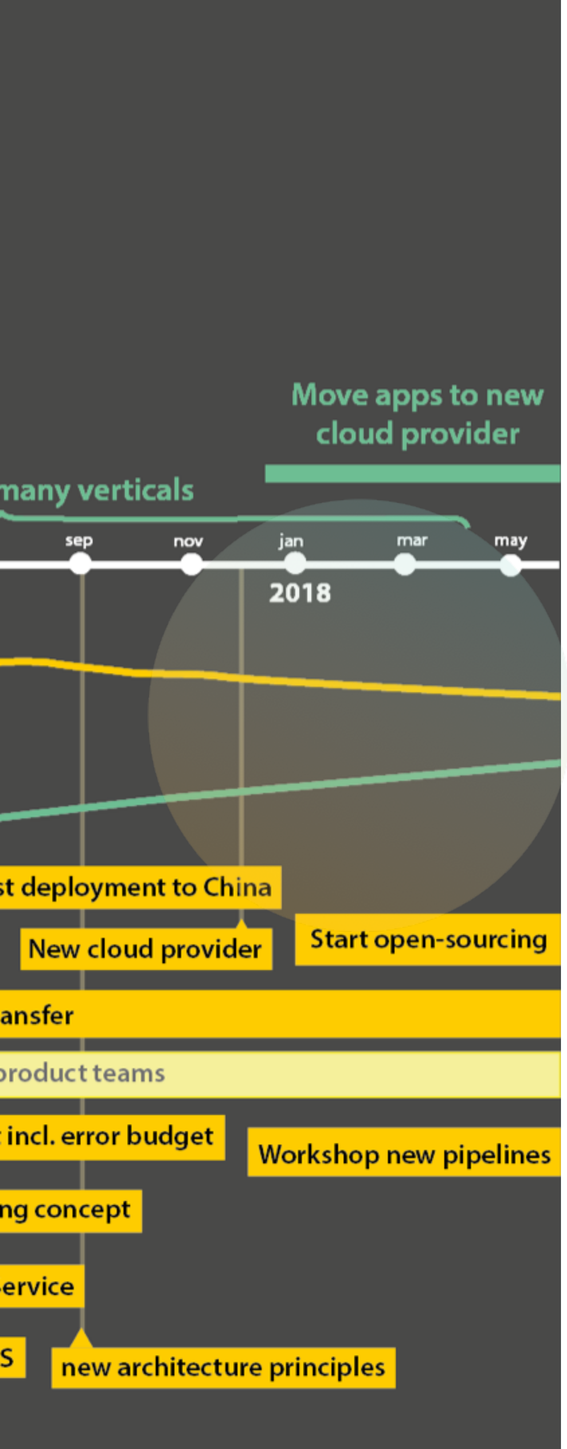
Add new Feature | Add new SLO | Reset Budget

Queue a new deployment
gb-lon1

Time availability: 0.73%

Request availability: 0%

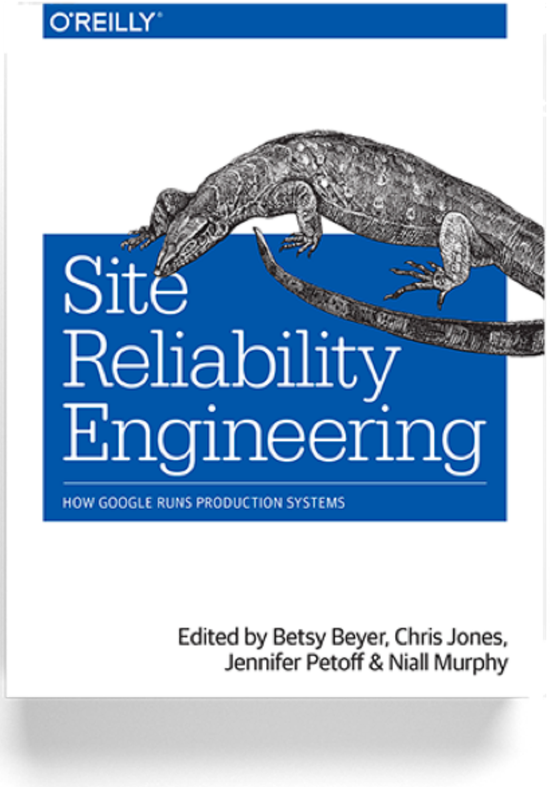
Delete



Goal: „Make your application as available as it needs to be.“

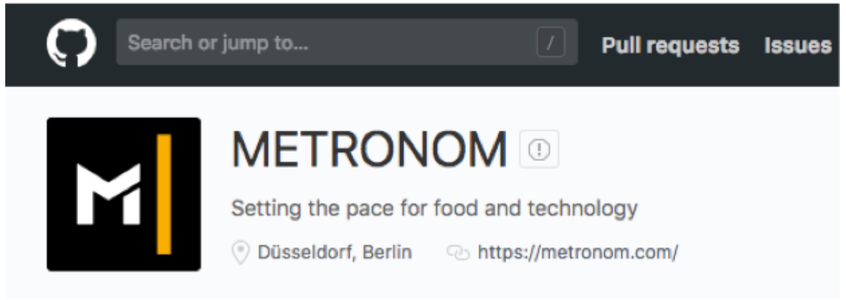
DevOps in an enterprise context

RECAP



https://landing.google.com/sre/book.html

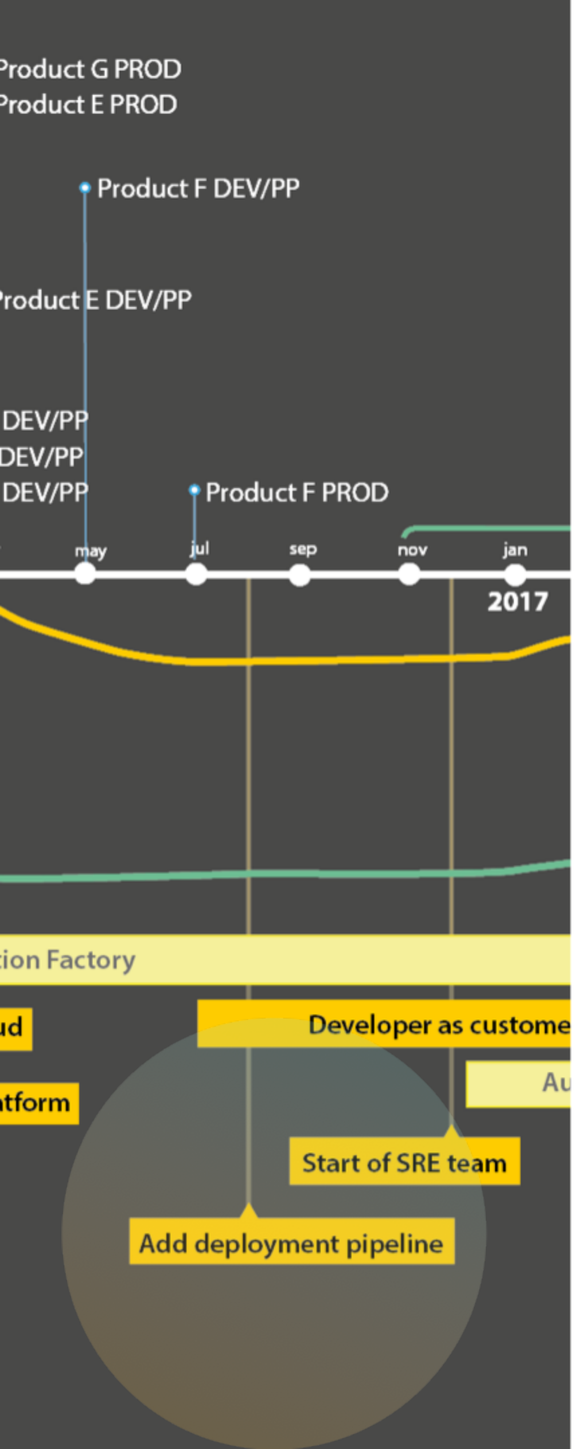
Error Budget Monitoring

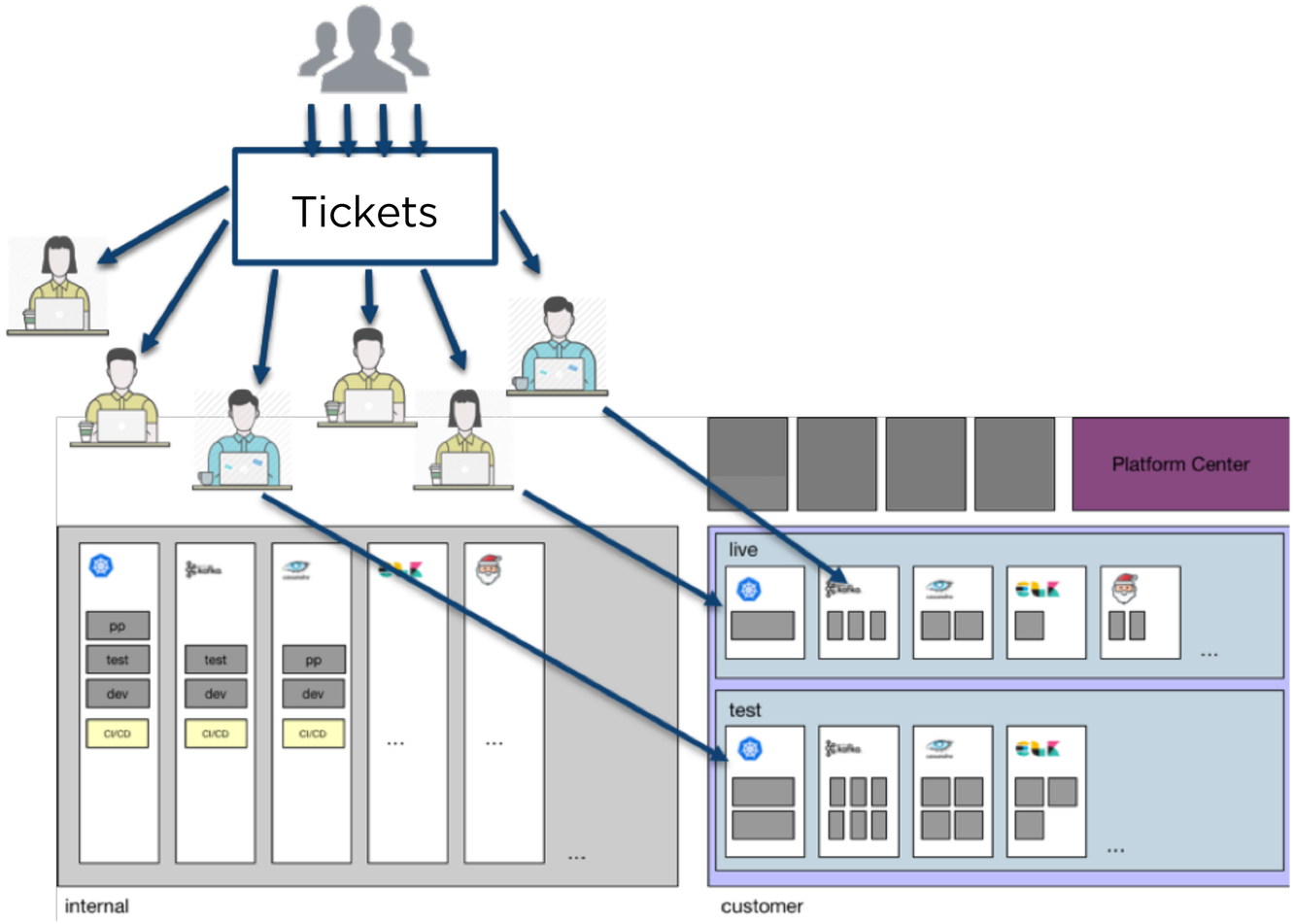


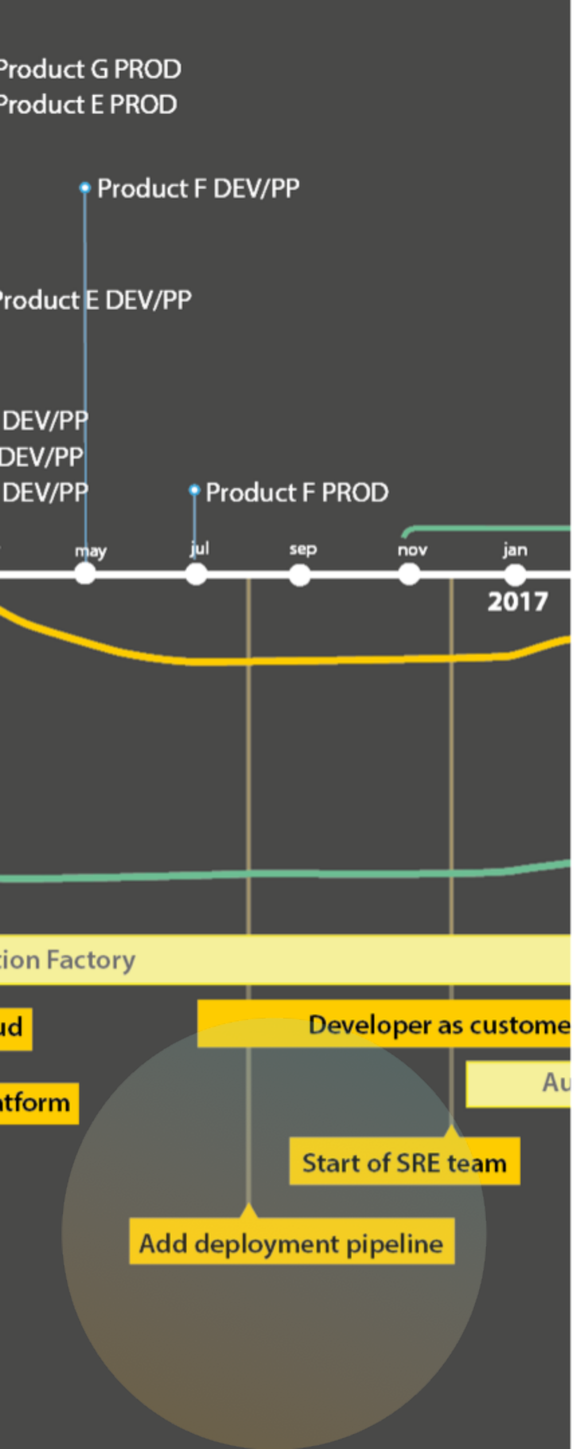
https://github.com/metro-nom

Self-service PaaS

Story #3


Product G PROD
Product E PROD
Product F DEV/PP
Product E DEV/PP
DEV/PP
DEV/PP
DEV/PP
Product F PROD
may
jul
sep
nov
jan
2017
ion Factory
ud
Developer as custome
tform
Au
Start of SRE team
Add deployment pipeline


Tickets
Platform Center
live
test
pp
test
dev
CI/CD
internal
customer


Product G PROD
Product E PROD
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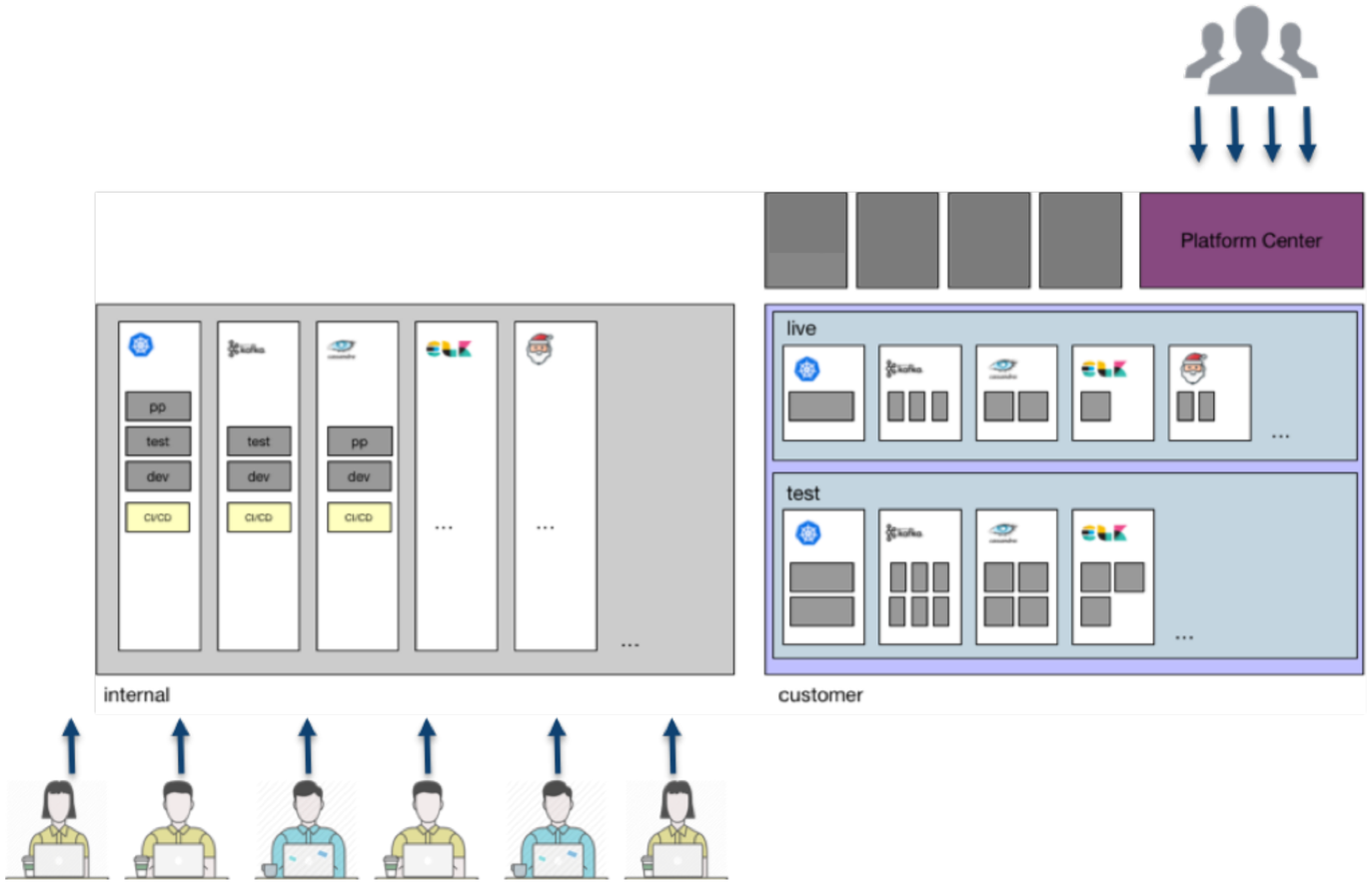
Platform Center
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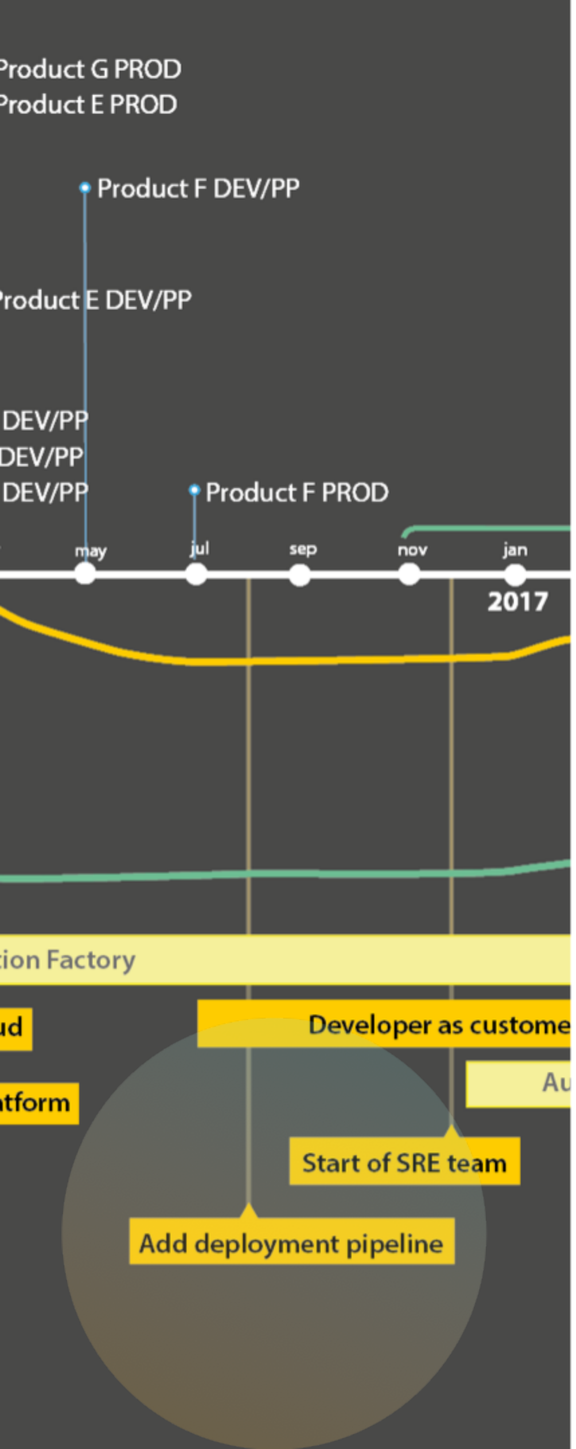
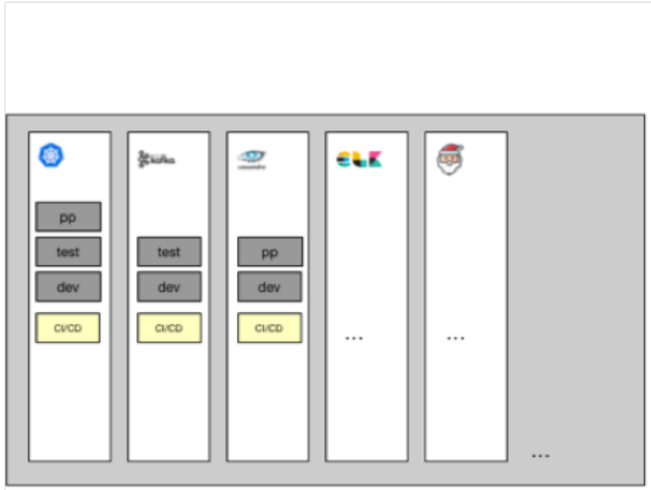
dev
CI/CD
live
test
internal
customer



Self-service without infrastructure



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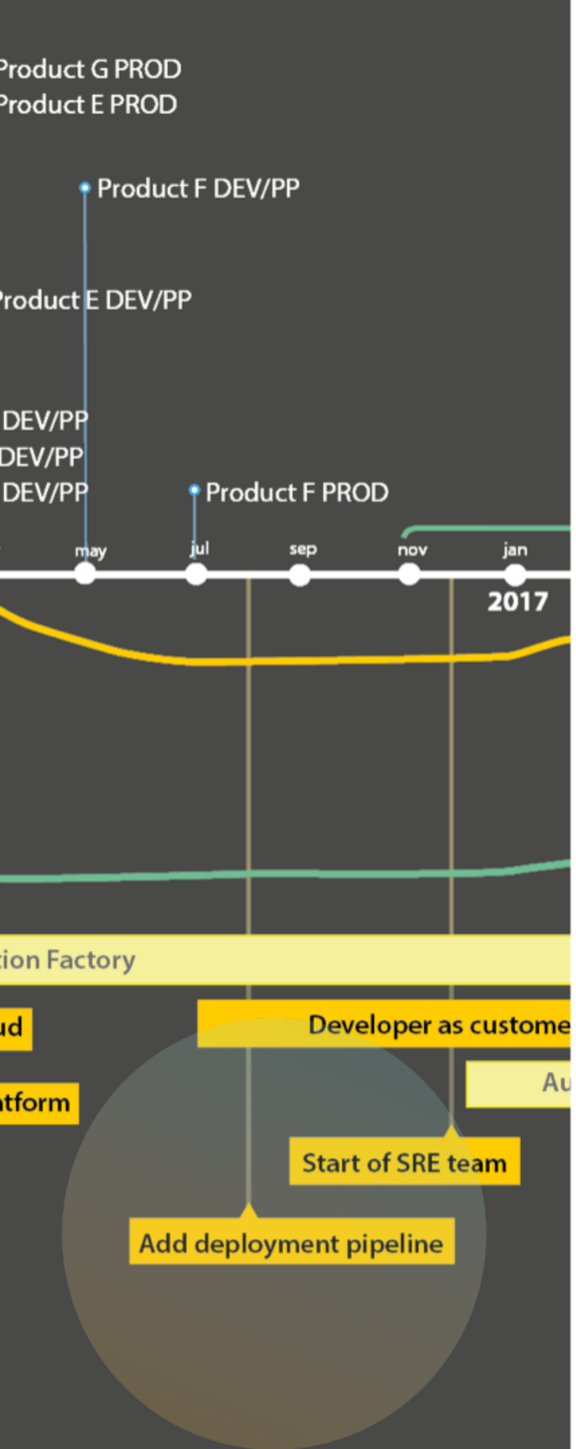
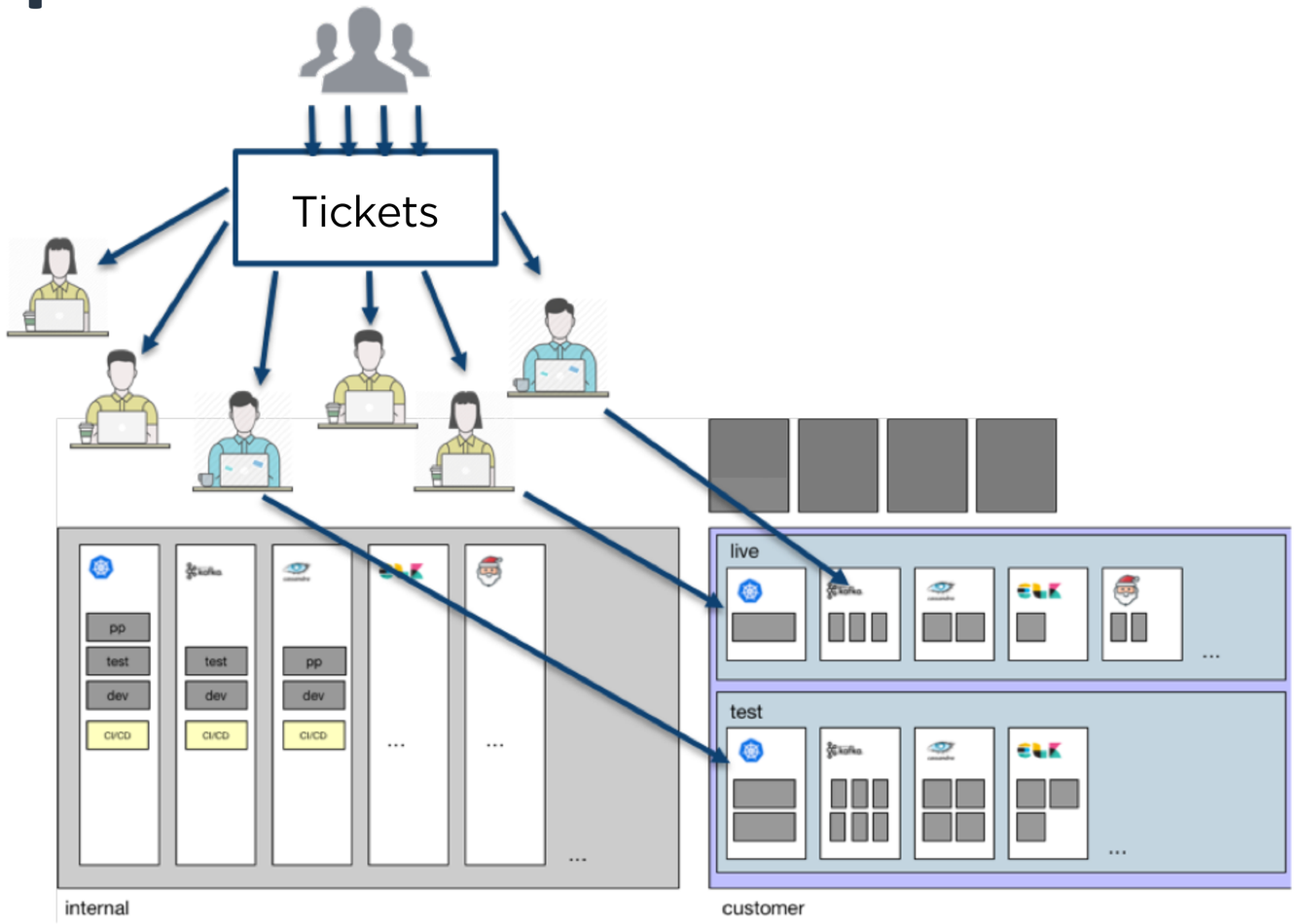
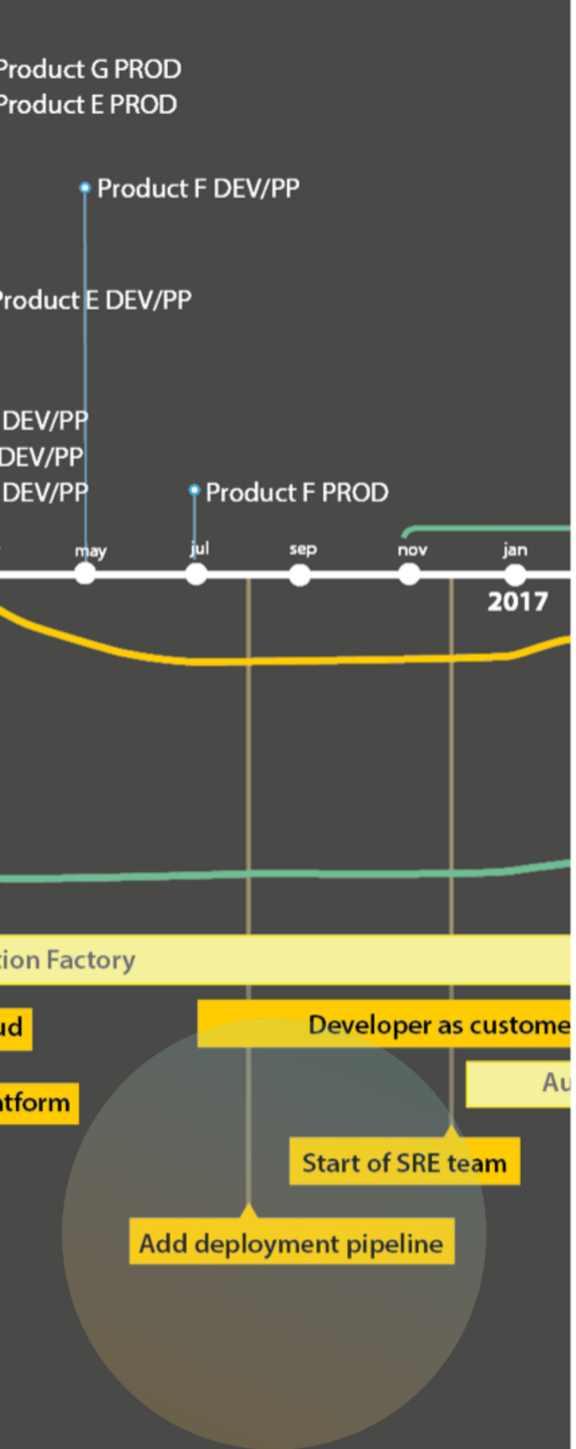
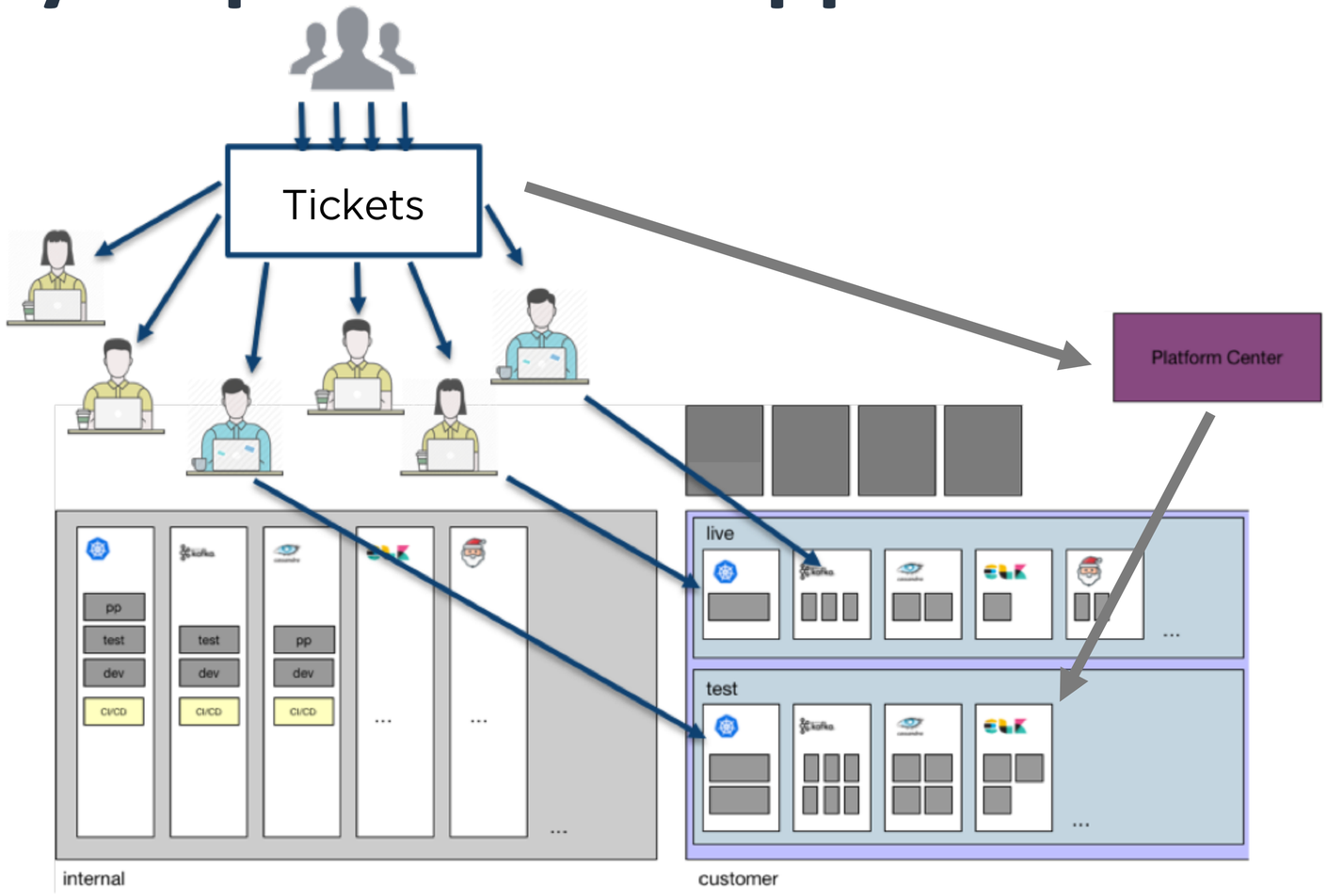


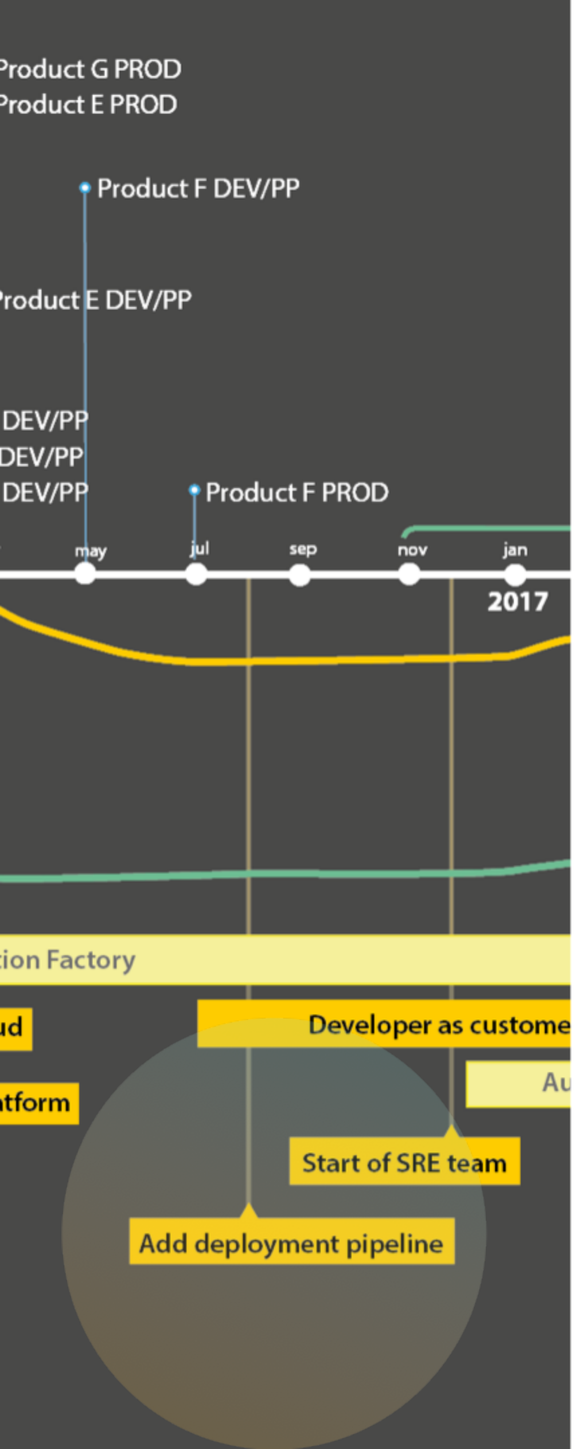
Incompatible architectures





Step-by-step – iterative approach





METRO

andre.duis@metro...
2tier-Administ...

Verticals | Deployments | Environment | Error Budget

Status for deployed service 'meetupslides'

← back to Services

Environment

prod

CURRENTLY DEPLOYED | PAST DEPLOYMENTS

Succesfully deployed on Jun 8 - 13:23

This is the most recent successful delpoyment!

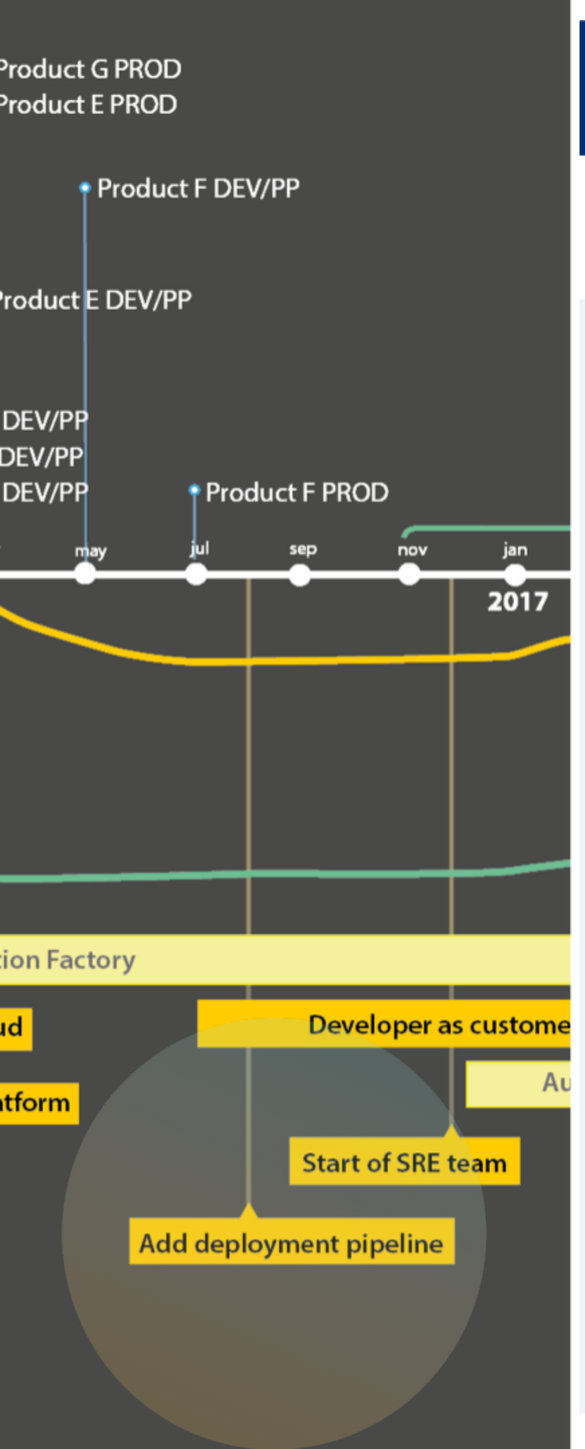
Git Commit Hash: 948f356 (Show)
Deployment ID: 4dea0198-9635-44ce-a699-30f86e287be1

Reload configuration

Succesfully deployed on Jun 6 - 13:34

Git Commit Hash: 948f356 (Show)
Deployment ID: 79234688-17fb-4fb9-994d-ad71be409a65

Rollback to this commit



METRO

andre.duis@metro...
2tier-Administ...

Verticals | Deployments | Environment | Error Budget

Environment Variables

Choose your vertical

custo

Manage Variable

Add New

Environment Variable

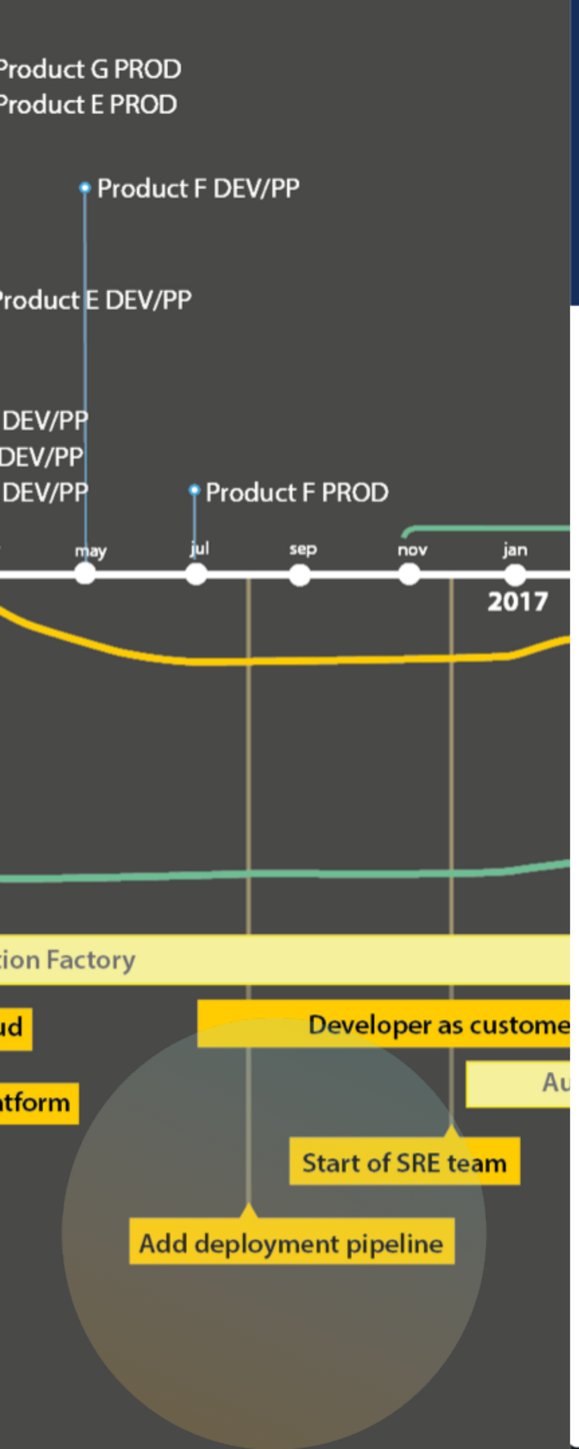
FEATURE_XYZ

Value for pp.gb-lon1

on

Value for prod.gb-lon1

off



jenkins

1.0 - twotier

A jenkins helm chart with an opinionated default configuration from the 2tier team

The 2tier-Jenkins Helm Chart

> Depends on stable/jenkins, but is preconfigured to work with Metro K8s Clusters.

Prerequisites

TBD

Installation

1. Create a ssh key pair and upload it into a Kubernetes secret

In order for your jenkins machine to be able to pull repositories from git, it needs to have a an ssh key. To generate a key and upload it to kubernetes run the following:

../../onboarding/create-customer.sh

By default a jenkins `credentials.xml` will be created referencing the key at the mount point mentioned above. If you want to specify a differnet mount point, you need to overwrite the `credentials.xml` by specifying `jenkins.credentialsXml`. As a basis for overwriting the file, check out the default values.yaml of this chart.

2. Give access to the users of Vertical

Install

One Click installation | Helm CLI

Install jenkins v0.4.3

Chart Versions

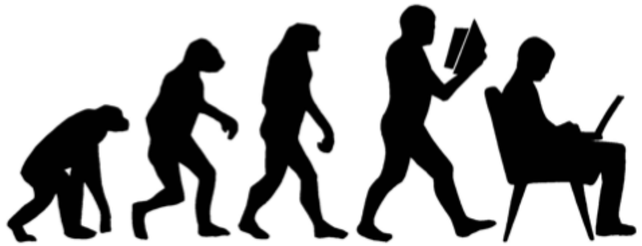
0.4.3 - Jun 13, 2018
0.4.2 - Jun 12, 2018
0.4.1 - Jun 9, 2018
0.4.0 - Jun 9, 2018
0.3.2 - Jun 8, 2018

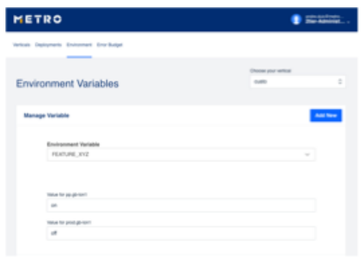
show all...

Application Version

Self-service PaaS

RECAP





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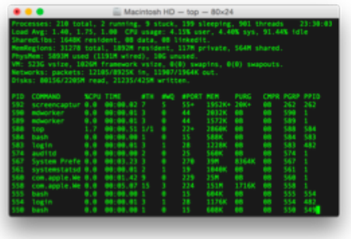
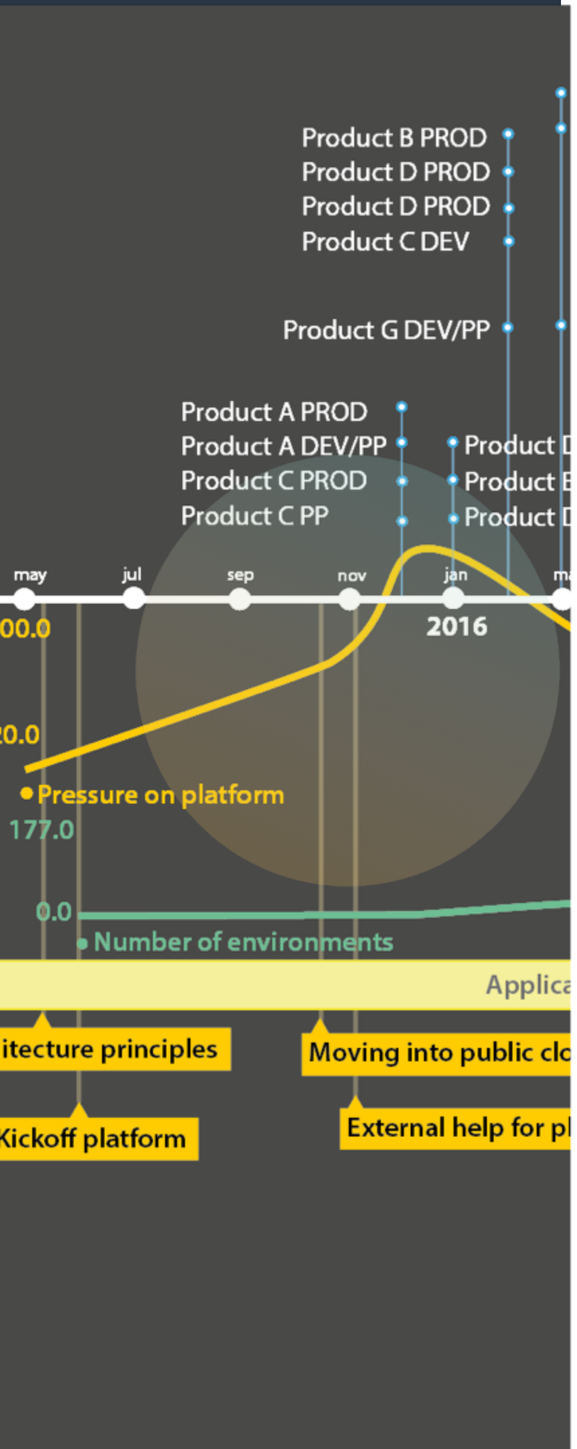
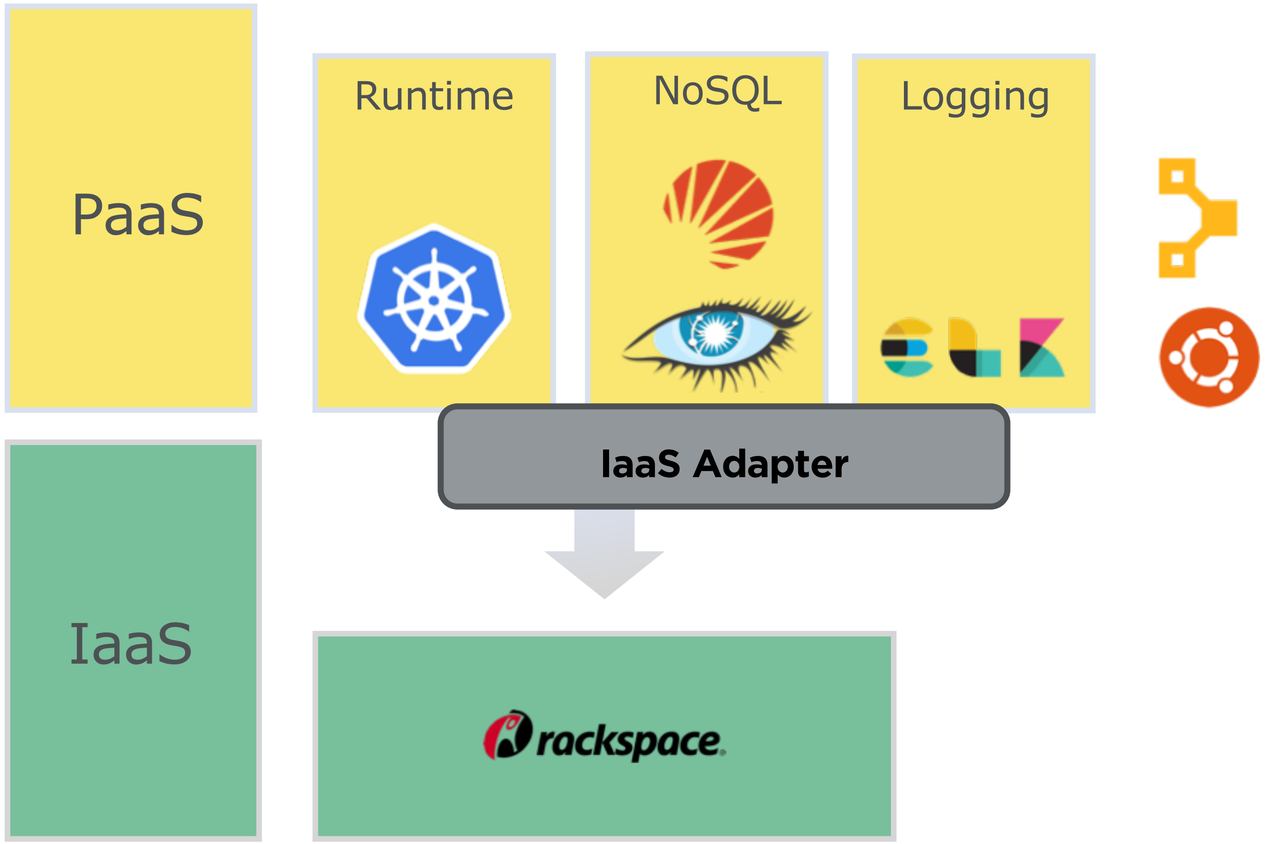


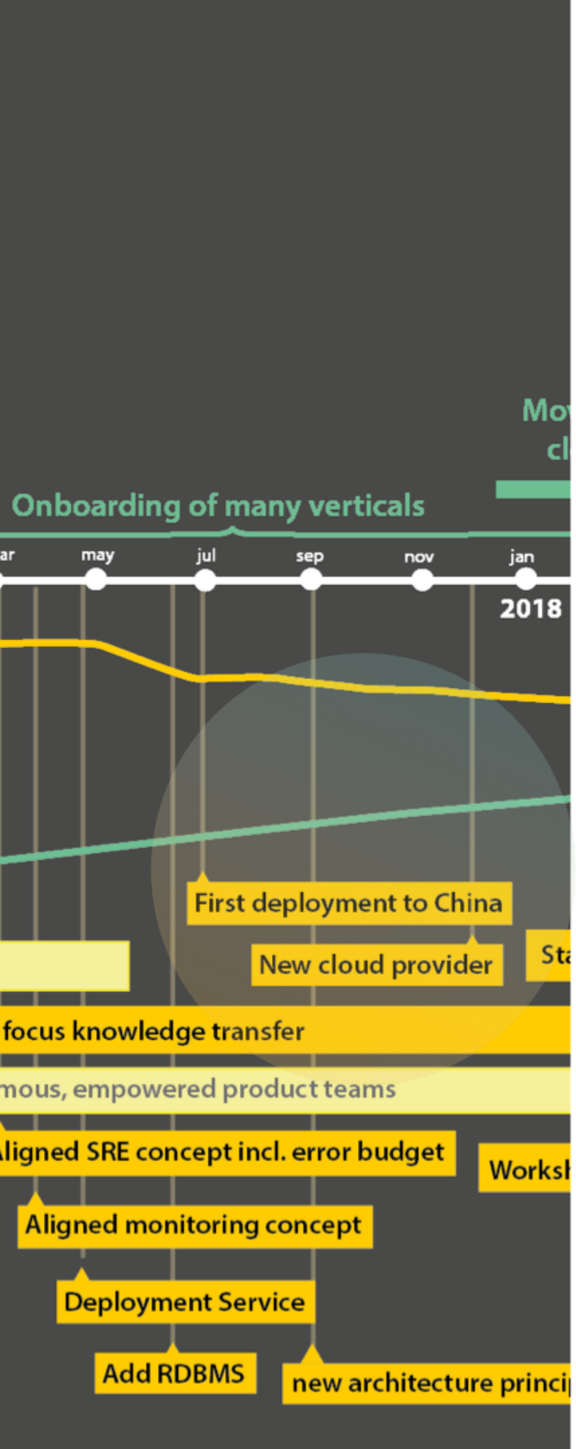
Good and bad abstractions

Story #4

Pressure increases, external help







New datacenter in China

harmonized CI/CD pipelines

Runtime

NoSQL

Queuing

LogMon

DATADOG

SQL

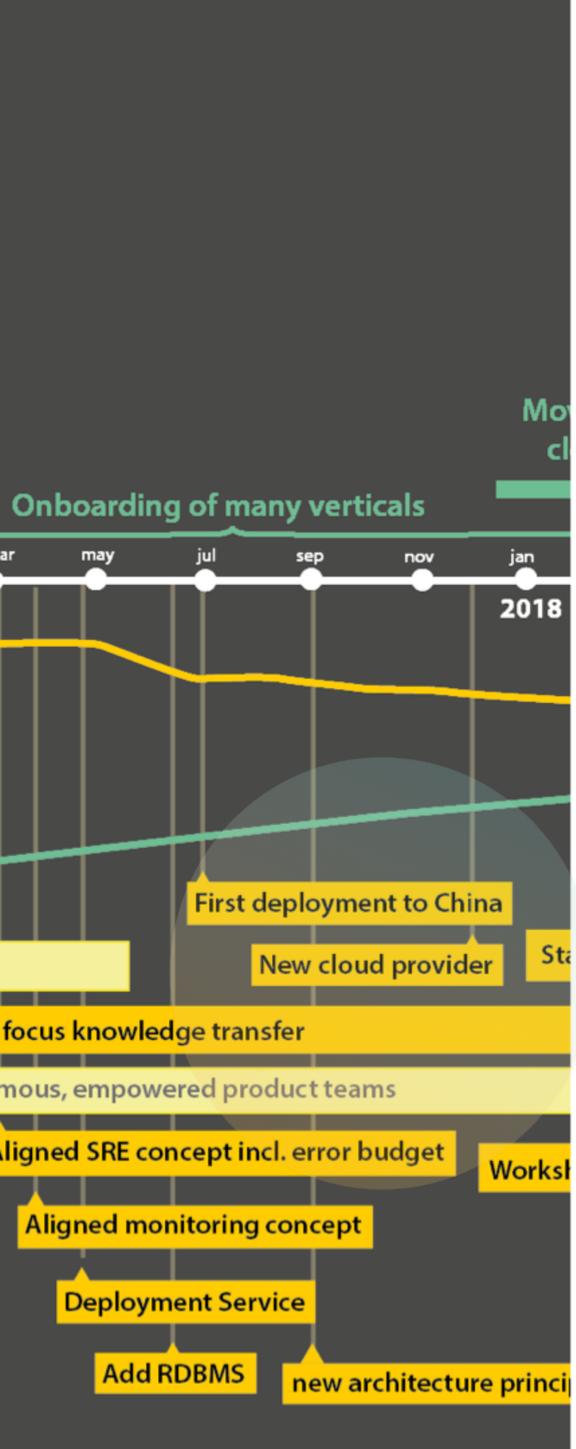
Pipeline

SRE

IaaS Adapter

rackspace

openstack



New cloud provider

harmonized CI/CD pipelines

Runtime

NoSQL

Queuing

LogMon

DATADOG

SQL

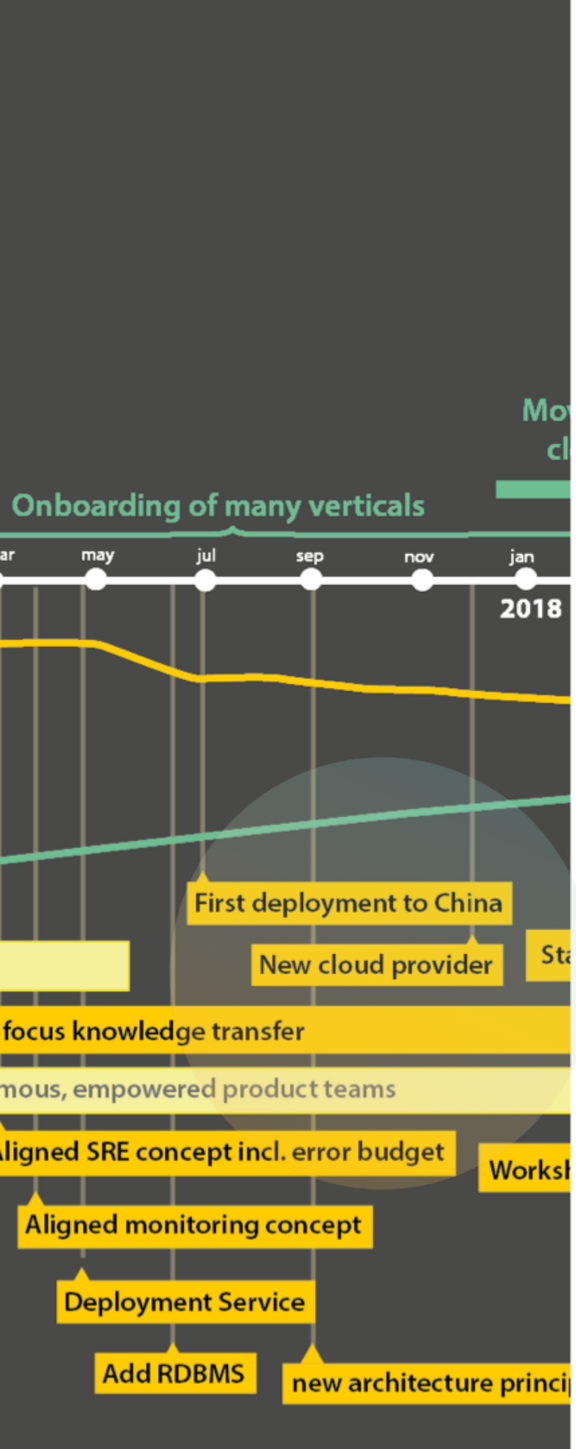
Pipeline

SRE

IaaS Adapter

rackspace

openstack



New cloud provider

harmonized CI/CD pipelines

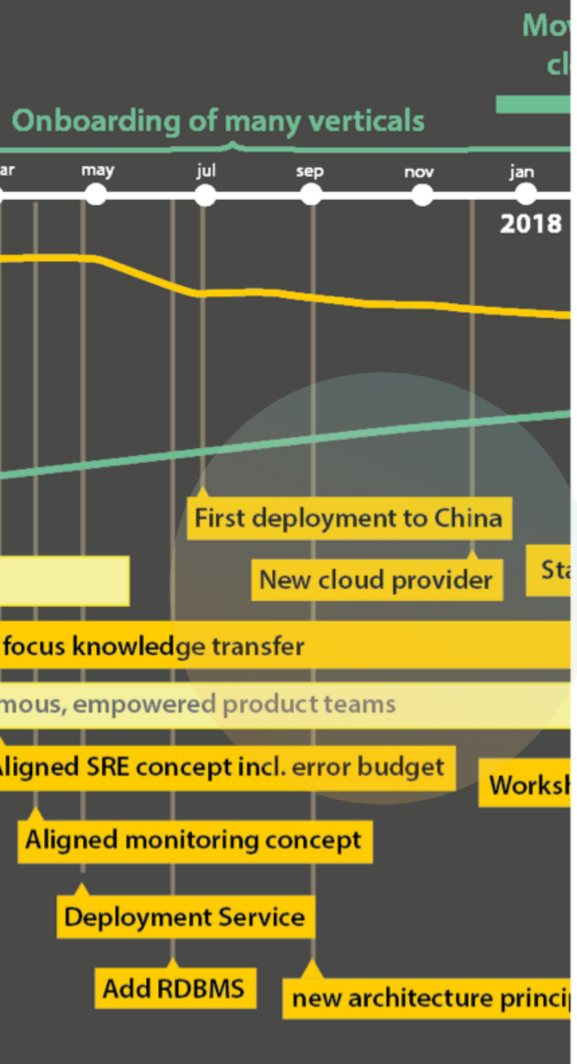
Runtime

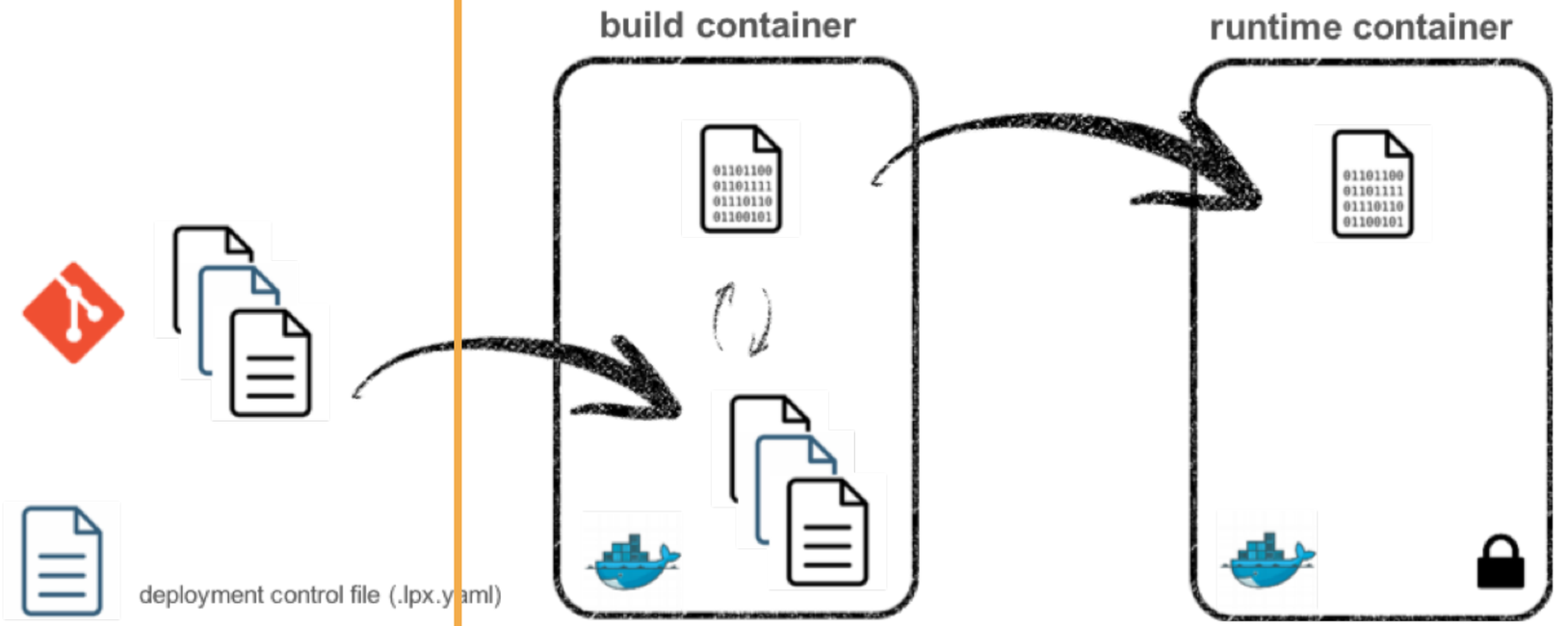
Pipeline

SRE

rackspace

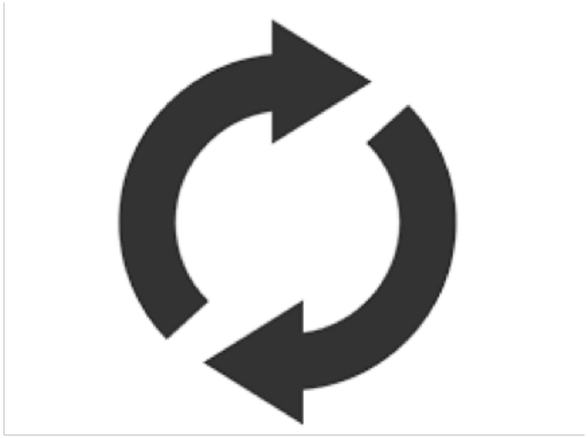
openstack

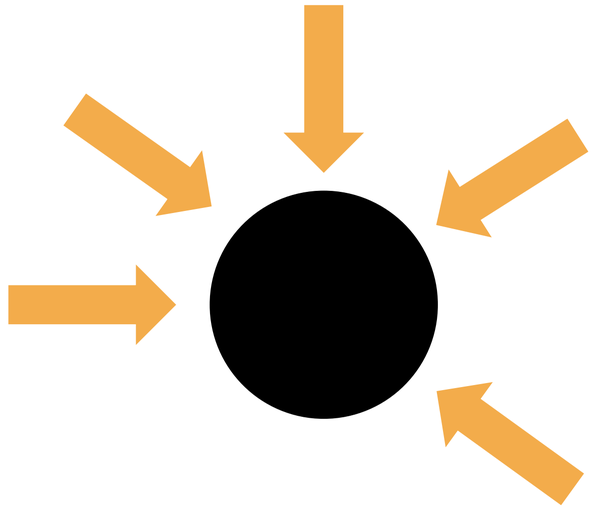

Onboarding of many verticals
may
jul
sep
nov
jan
2018
First deployment to China
New cloud provider
focus knowledge transfer
Aligned SRE concept incl. error budget
Aligned monitoring concept
Deployment Service
Add RDBMS

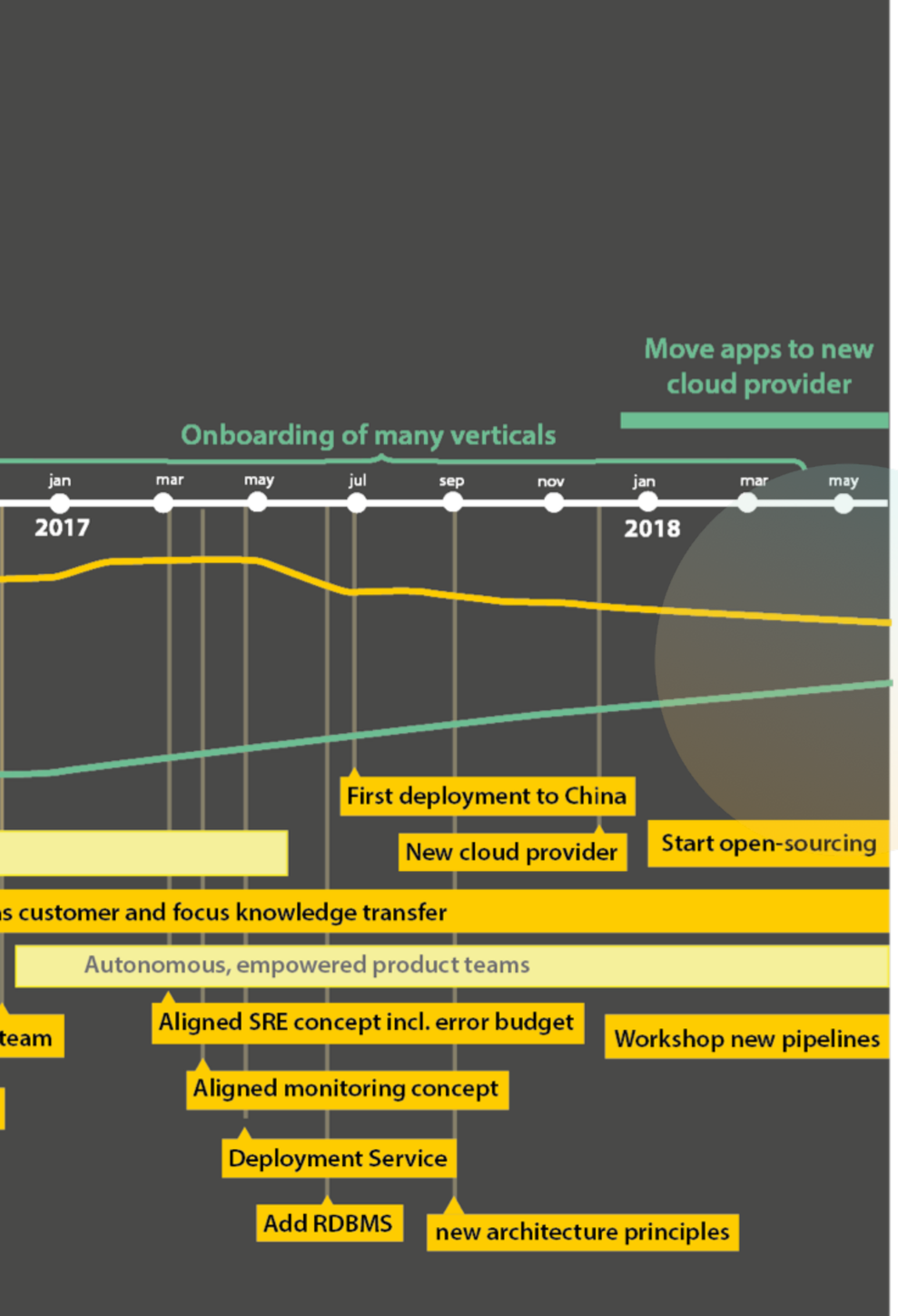

build container
runtime container
deployment control file (.lpx.yaml)

Good and bad abstractions

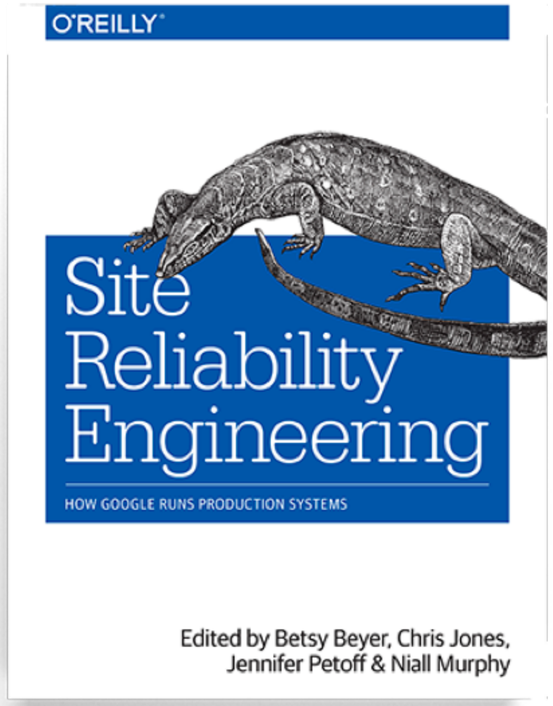
RECAP





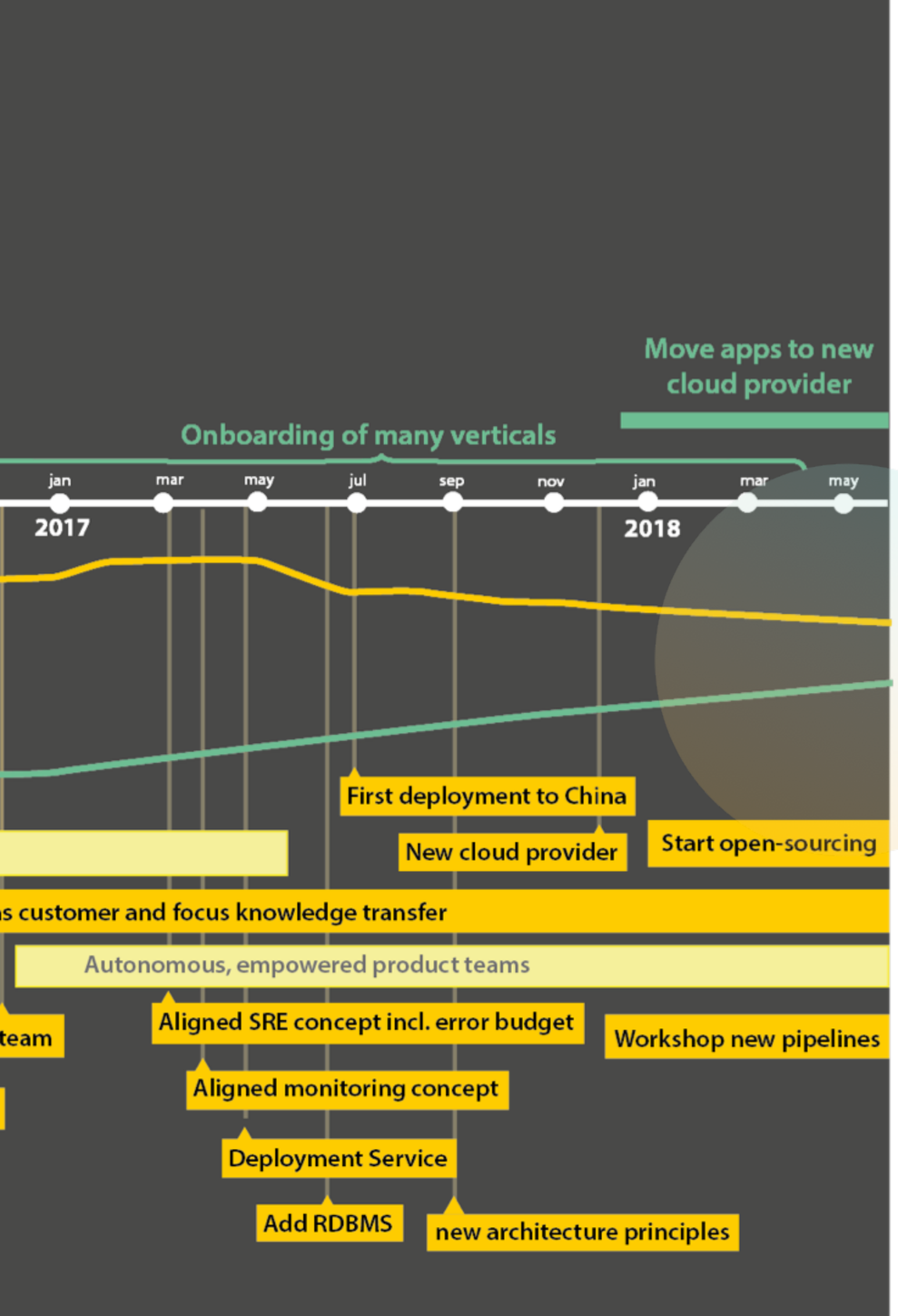


Take aways

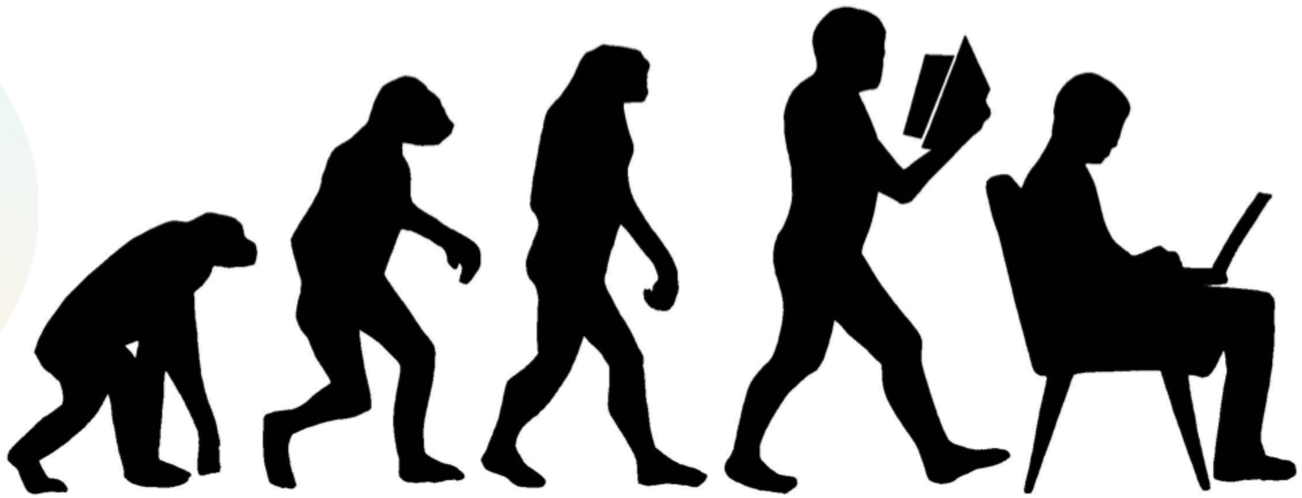


Check out SRE

https://landing.google.com/sre/book.html

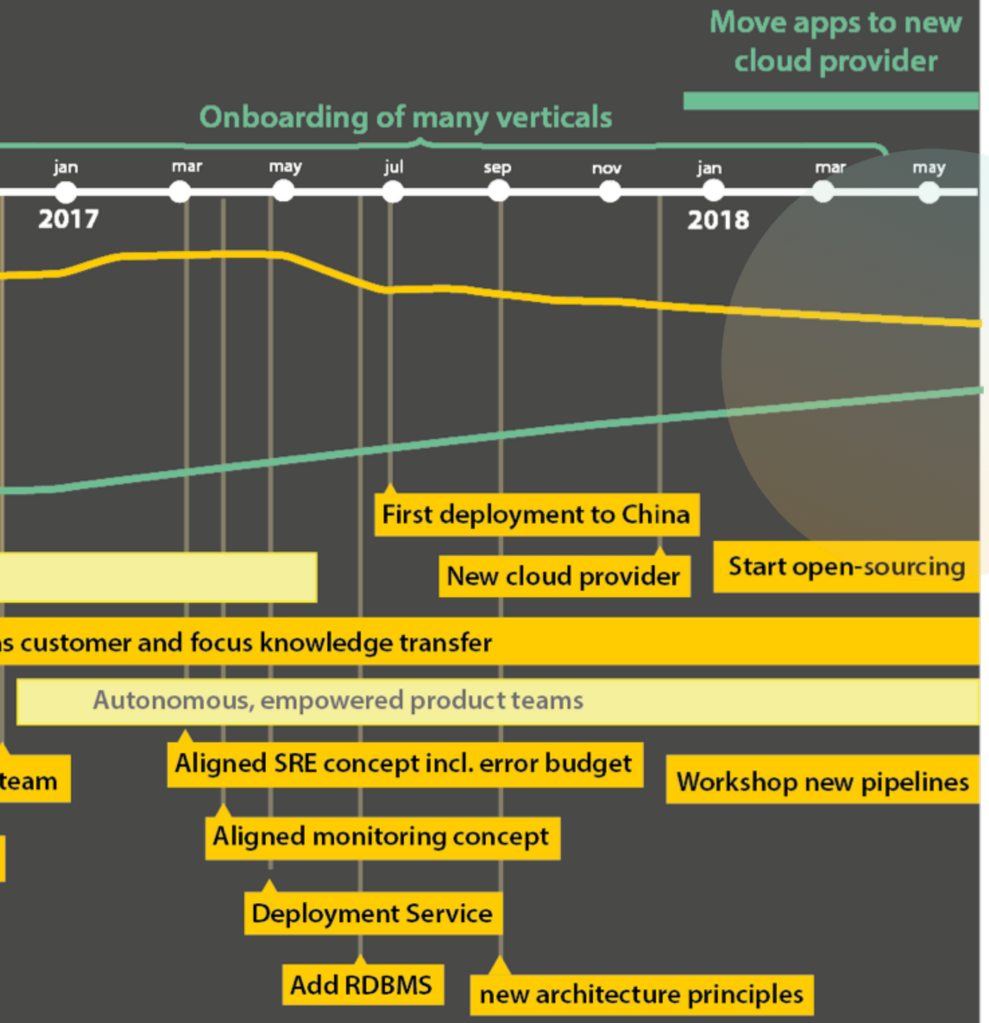


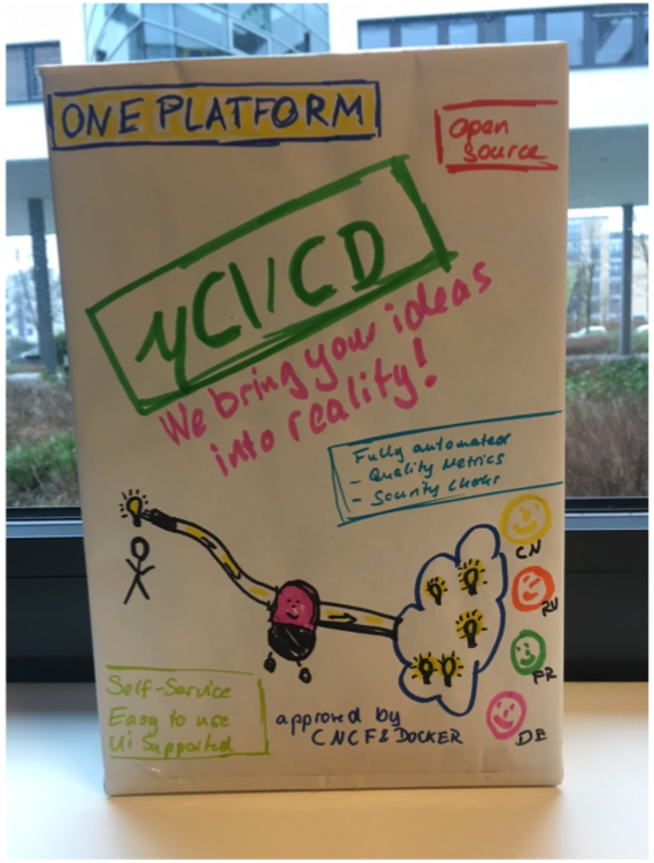
Take aways



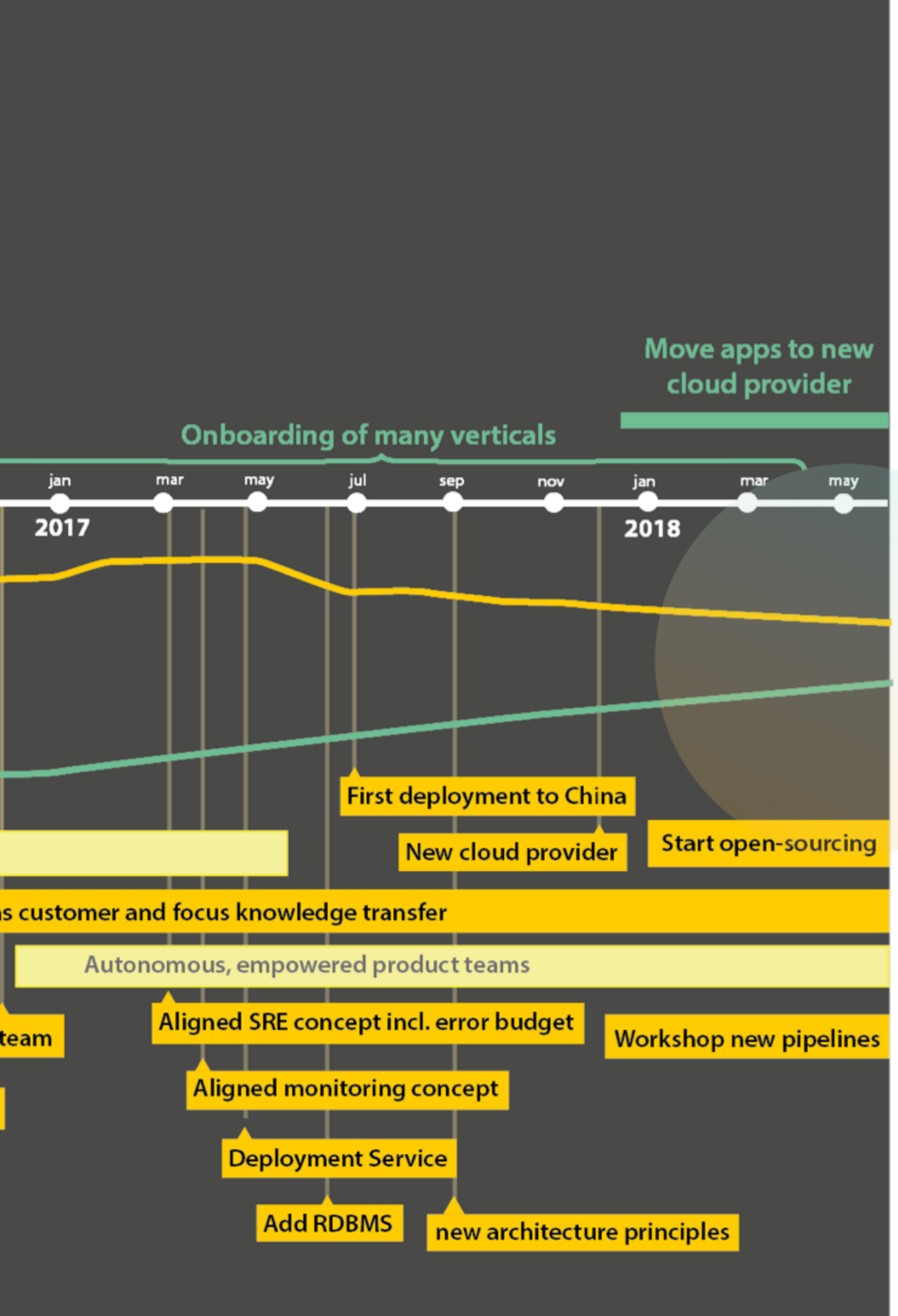
Small, iterative steps

Take aways

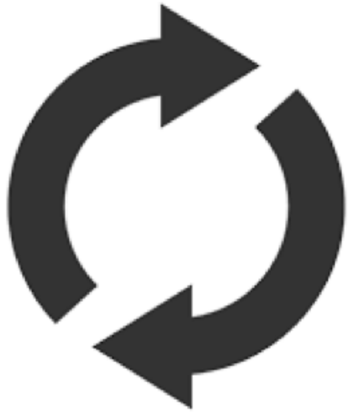


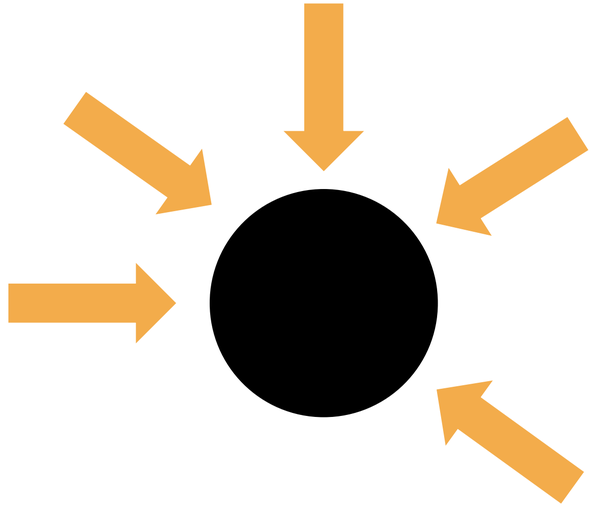


Productize



Take aways





Check your assumptions

Thank you for your attention.

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