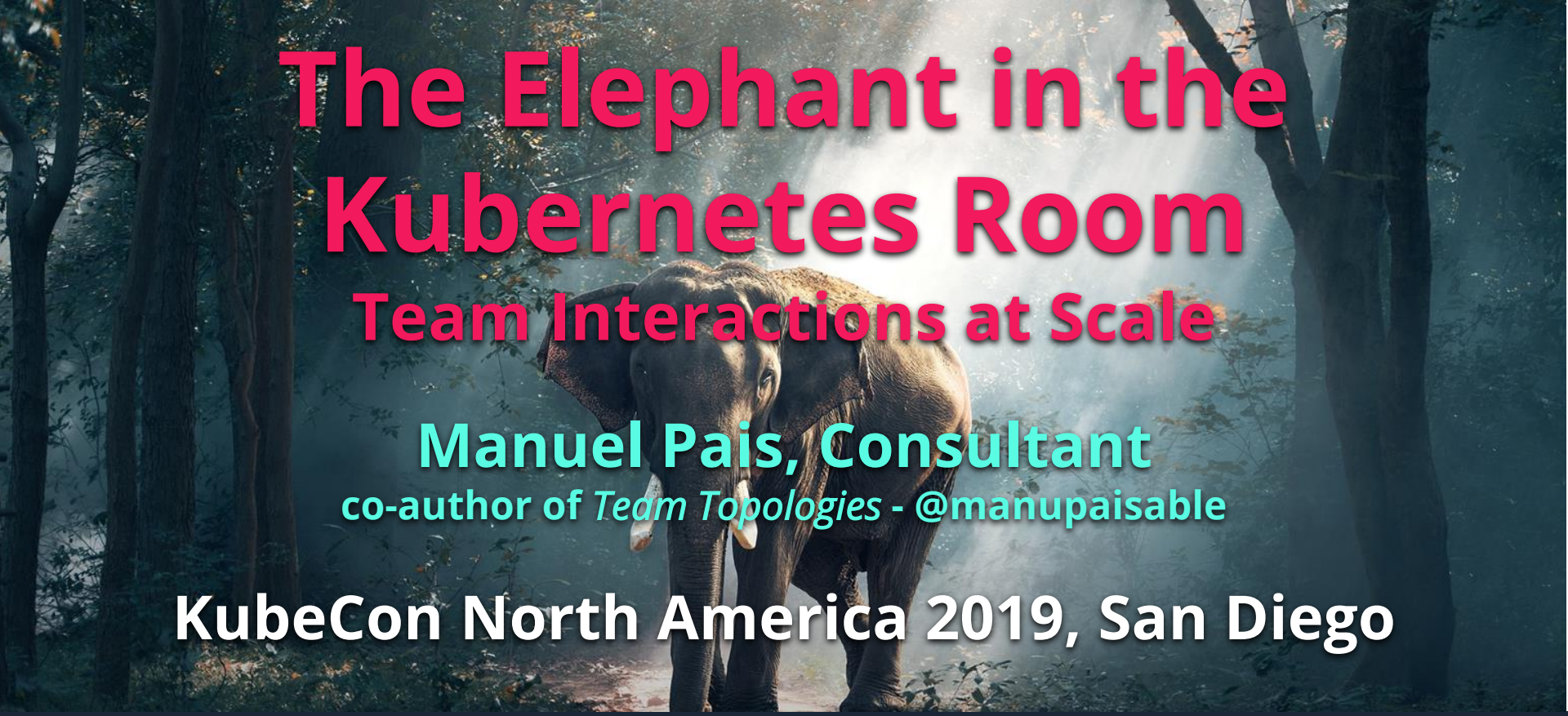


The Elephant in the Kubernetes Room

Team Interactions at Scale

Manuel Pais, Consultant

co-author of *Team Topologies* - @manupaisable

KubeCon North America 2019, San Diego

Team Topologies

#KubeCon

TeamTopologies.com
@TeamTopologies

Is Kubernetes a Platform?

Dev and Ops Equilibrium

Team Cognitive Load

Team Interactions

Zeb Palmer at #Kubecon
@zebpalmer

Replying to @manupaisable

I mean... I love kubernetes / #kubecon...
But it can all be replaced by something better next week.
See openstack.
pretty sure the last openstack conference I was at had 9k people & every tech org pimping it is here*
Now?

...
*except @Rackspace

5:14 PM · Nov 19, 2019 · Twitter Web App

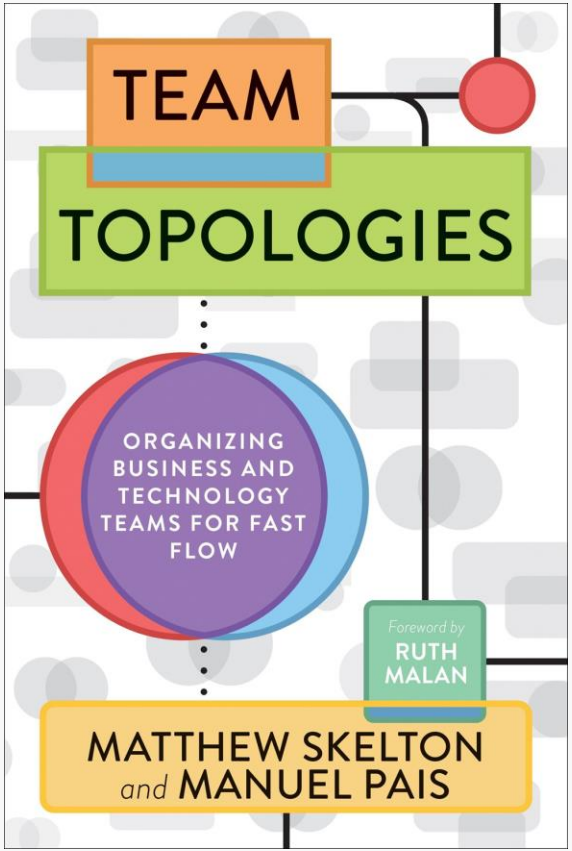
Team Topologies

Organizing business and technology teams for fast flow

Matthew Skelton & Manuel Pais

IT Revolution Press (2019)

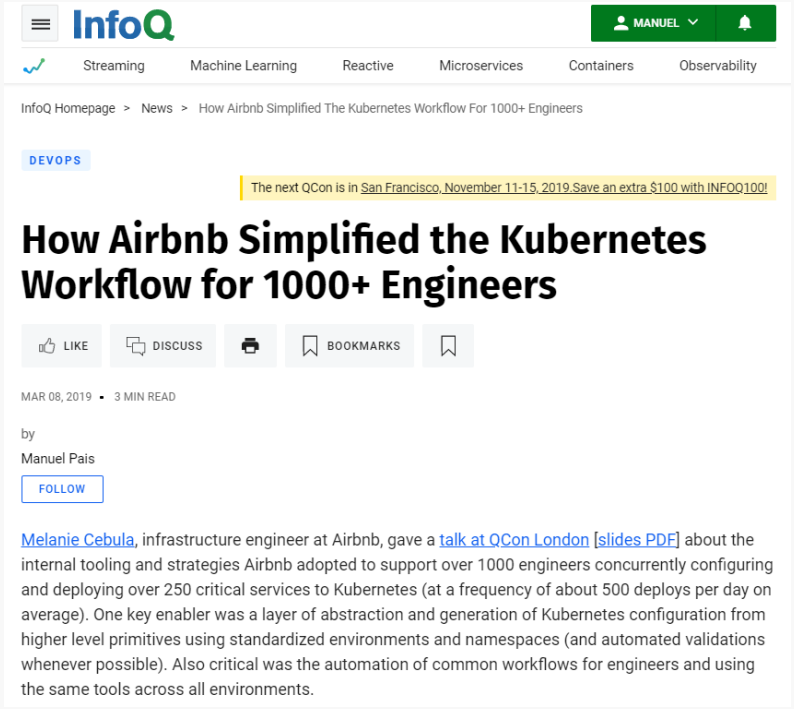
https://teamtopologies.com



Team Topologies

IT REVOLUTION

Is Kubernetes a Platform?



InfoQ

MANUEL

Streaming Machine Learning Reactive Microservices Containers Observability

InfoQ Homepage > News > How Airbnb Simplified The Kubernetes Workflow For 1000+ Engineers

DEVOPS

The next QCon is in San Francisco, November 11-15, 2019.Save an extra $100 with INFOQ100!

How Airbnb Simplified the Kubernetes Workflow for 1000+ Engineers

LIKE DISCUSS BOOKMARKS

MAR 08, 2019 • 3 MIN READ

by

Manuel Pais

FOLLOW

Melanie Cebula, infrastructure engineer at Airbnb, gave a talk at QCon London [slides PDF] about the internal tooling and strategies Airbnb adopted to support over 1000 engineers concurrently configuring and deploying over 250 critical services to Kubernetes (at a frequency of about 500 deploys per day on average). One key enabler was a layer of abstraction and generation of Kubernetes configuration from higher level primitives using standardized environments and namespaces (and automated validations whenever possible). Also critical was the automation of common workflows for engineers and using the same tools across all environments.

Source: https://www.infoq.com/news/2019/03/airbnb-kubernetes-workflow
Melanie's talk: https://www.infoq.com/presentations/airbnb-kubernetes-services

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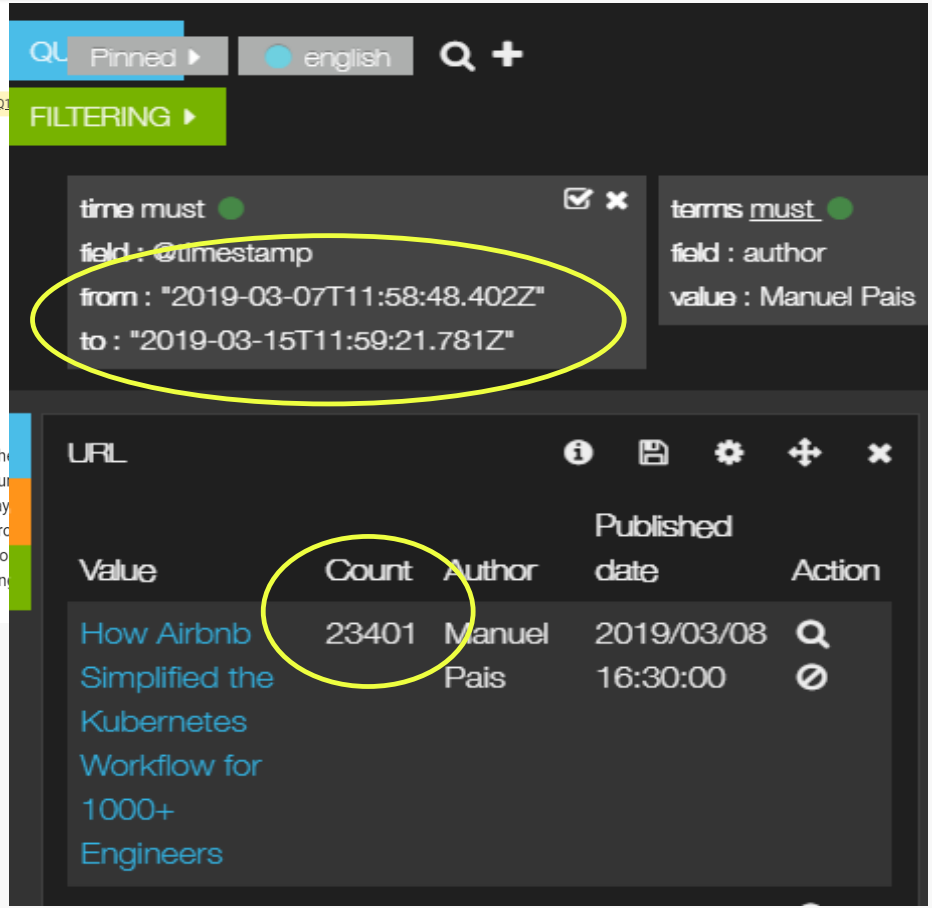
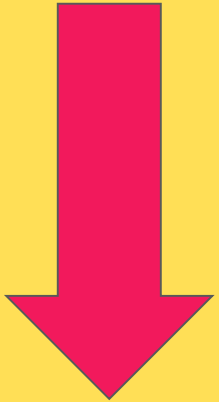


Kubernetes “platform”



microservices ops complexity

Team Topologies

Kubernetes “platform”

deploy & run abstractions

Team Topologies

Still need to...

... set up hosts

... create/destroy clusters

... update to new K8s versions

... decide on namespaces vs clusters

<insert your fav chore here>

Team Topologies

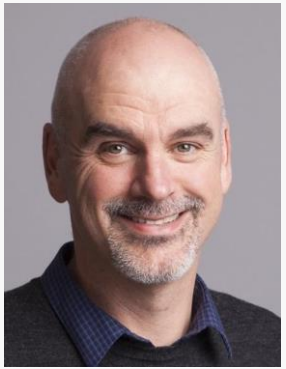
Who is responsible ?

Who is responsible ?

Who is impacted ?

“A digital platform is a foundation of self-service APIs, tools, services, knowledge and support which are arranged as a compelling internal product.”

– Evan Bottcher, 2018



Kubernetes is not your platform. It's the foundation.

Team Topologies

Kelsey Hightower ✓
@kelseyhightower

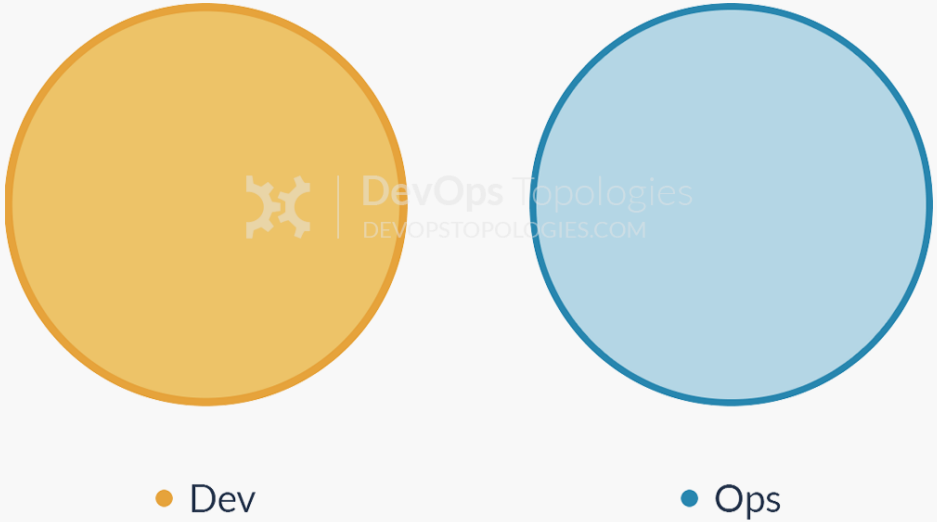
If I had to do it all over again, I might leverage something like Kubernetes, but it would be hidden underneath some change management system, and would be considered an implementation detail.

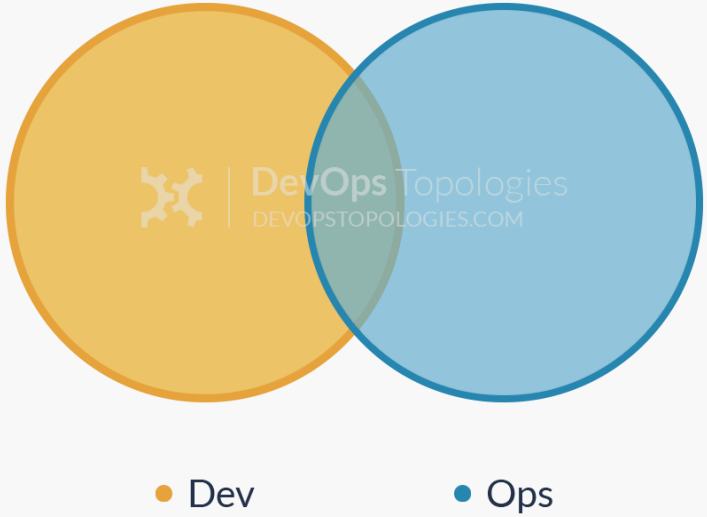
> **Kelsey Hightower** ✓ @kelseyhightower · Oct 1
>
> Thinking back, I was able to do 95% of what we call Cloud Native with a bunch of VMs, an application server, and configuration management tools.
>
> Once I integrated with the change management process so could the rest of the organization.

2:01 AM · Oct 1, 2019

https://twitter.com/kelseyhightower/status/1178822088481636353

Dev and Ops: a fragile equilibrium


DevOps Topologies
DEVOPSTOPOLOGIES.COM
Dev
Ops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Dev
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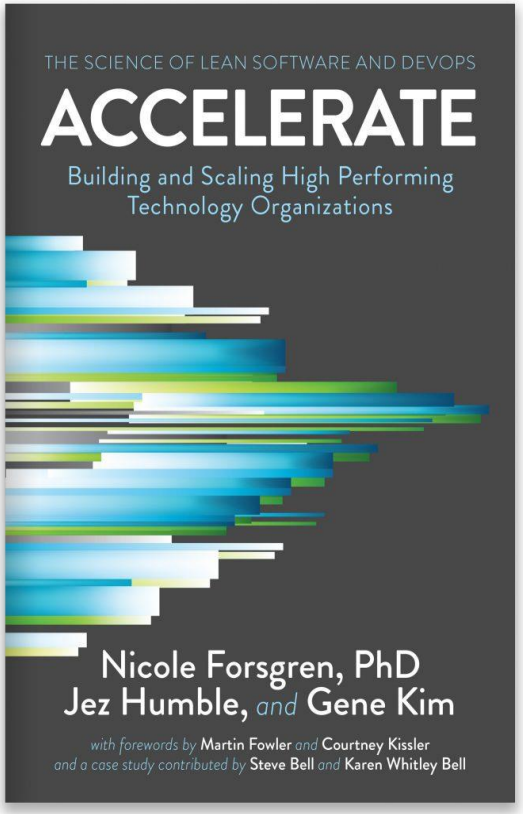

https://cloud.google.com/blog/products/devops-sre/the-2019-accelerate-state-of- devops-elite-performance-productivity-and-scaling

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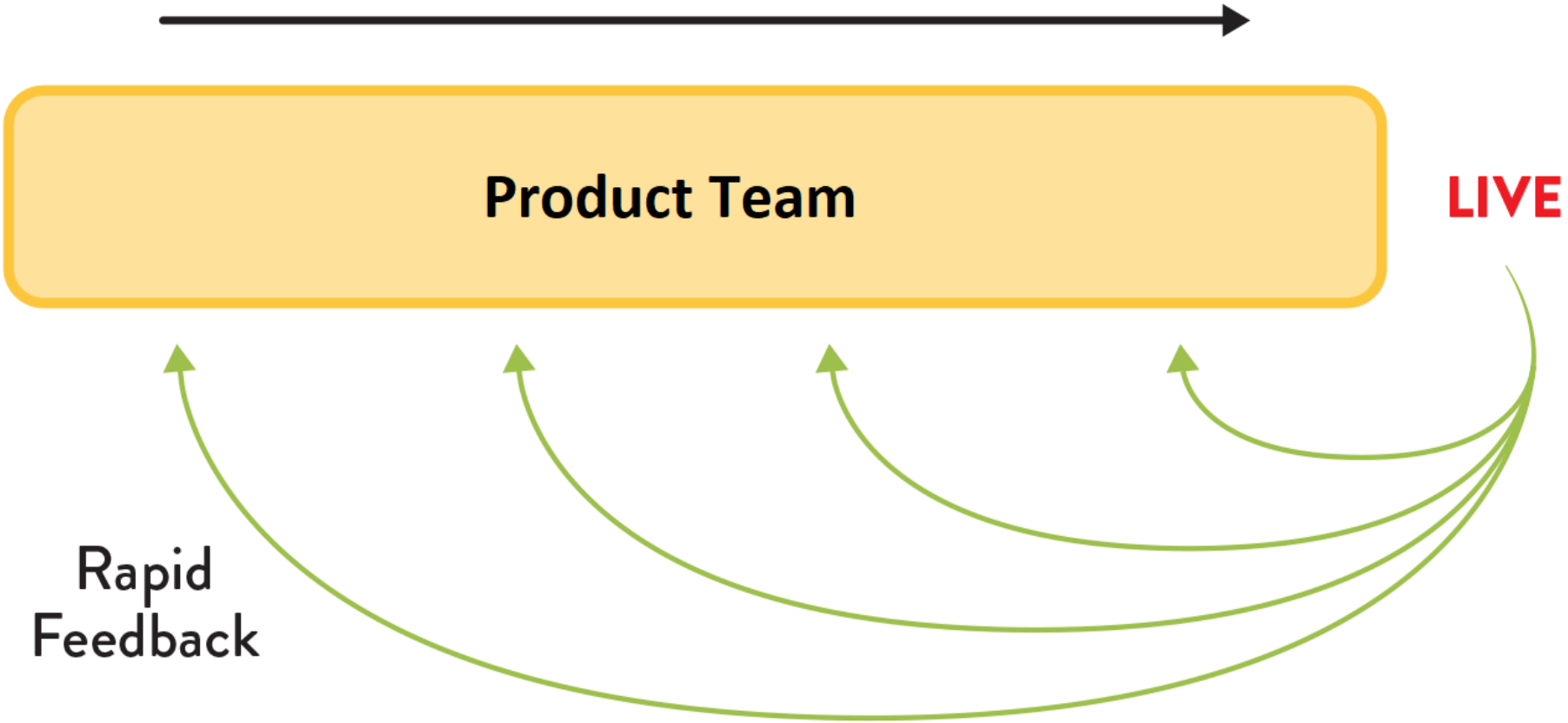
Ops



Team Topologies

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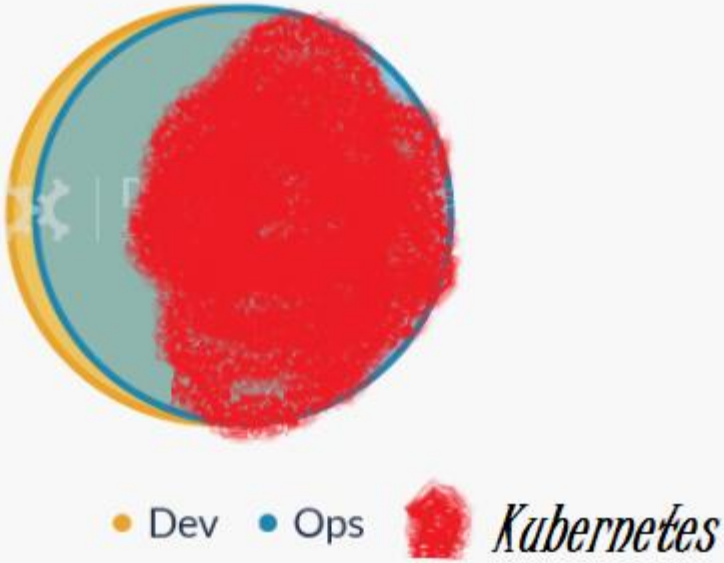
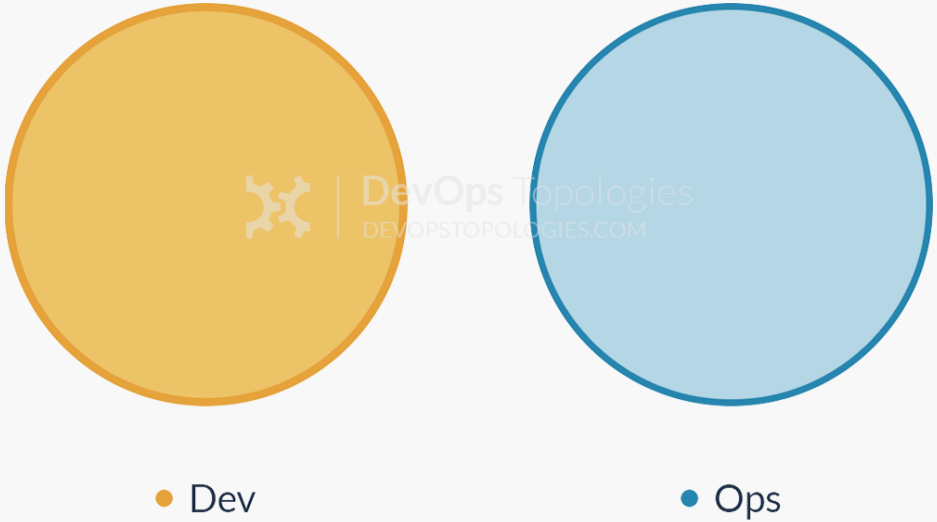
Dev
Ops


Dev
Ops
Kubernetes


DevOps Topologies
DEVOPSTOPOLOGIES.COM
Dev
Ops

Dev
Ops
Kubernetes

Team Cognitive Load

“Cognitive load is the total amount of mental effort being used in the working memory”

- John Sweller

Cognitive load

Intrinsic (skills)

Extraneous (mechanics)

Germane (business focus)

Cognitive load

Intrinsic (skills)

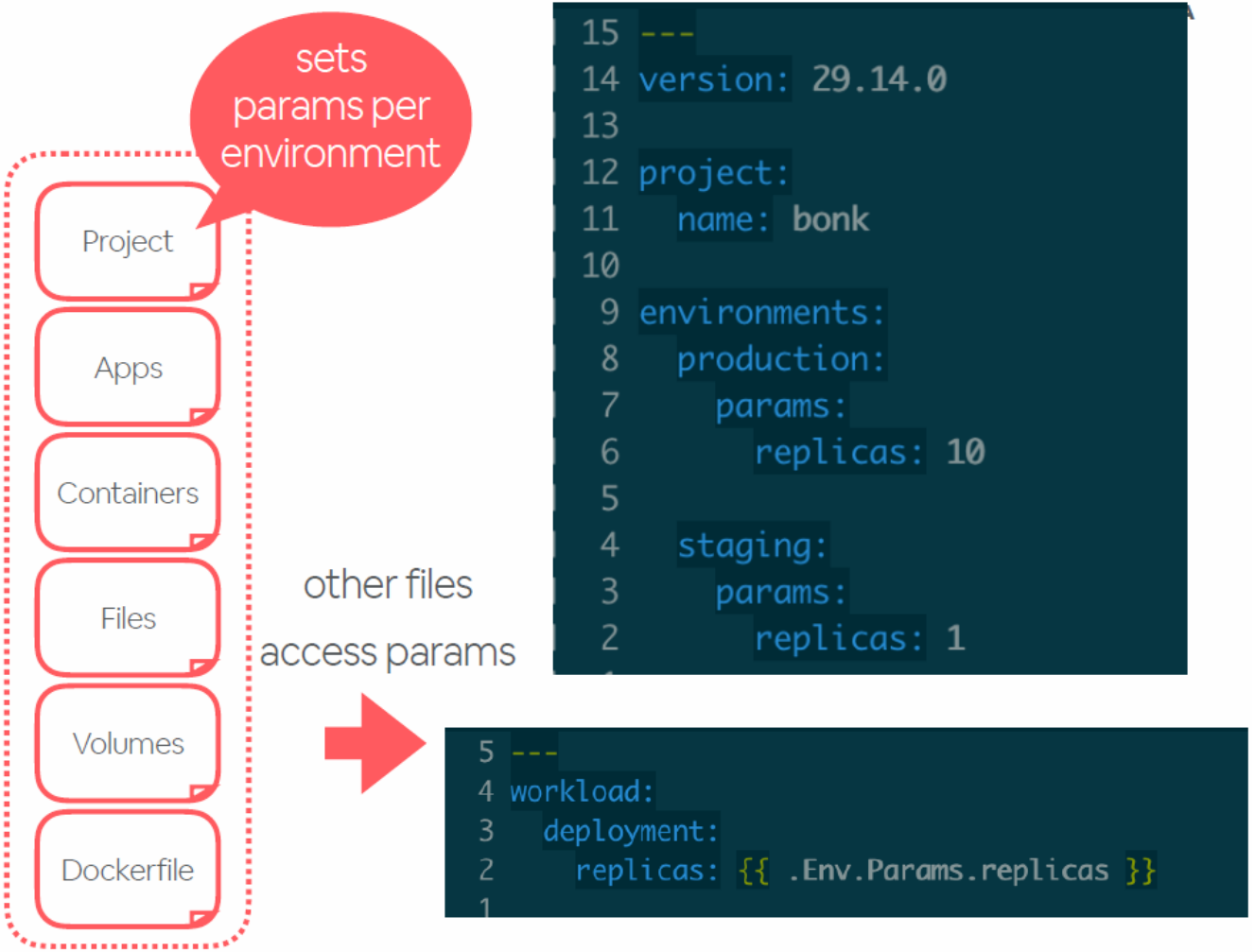
Extraneous (mechanics)

Germane (business focus)

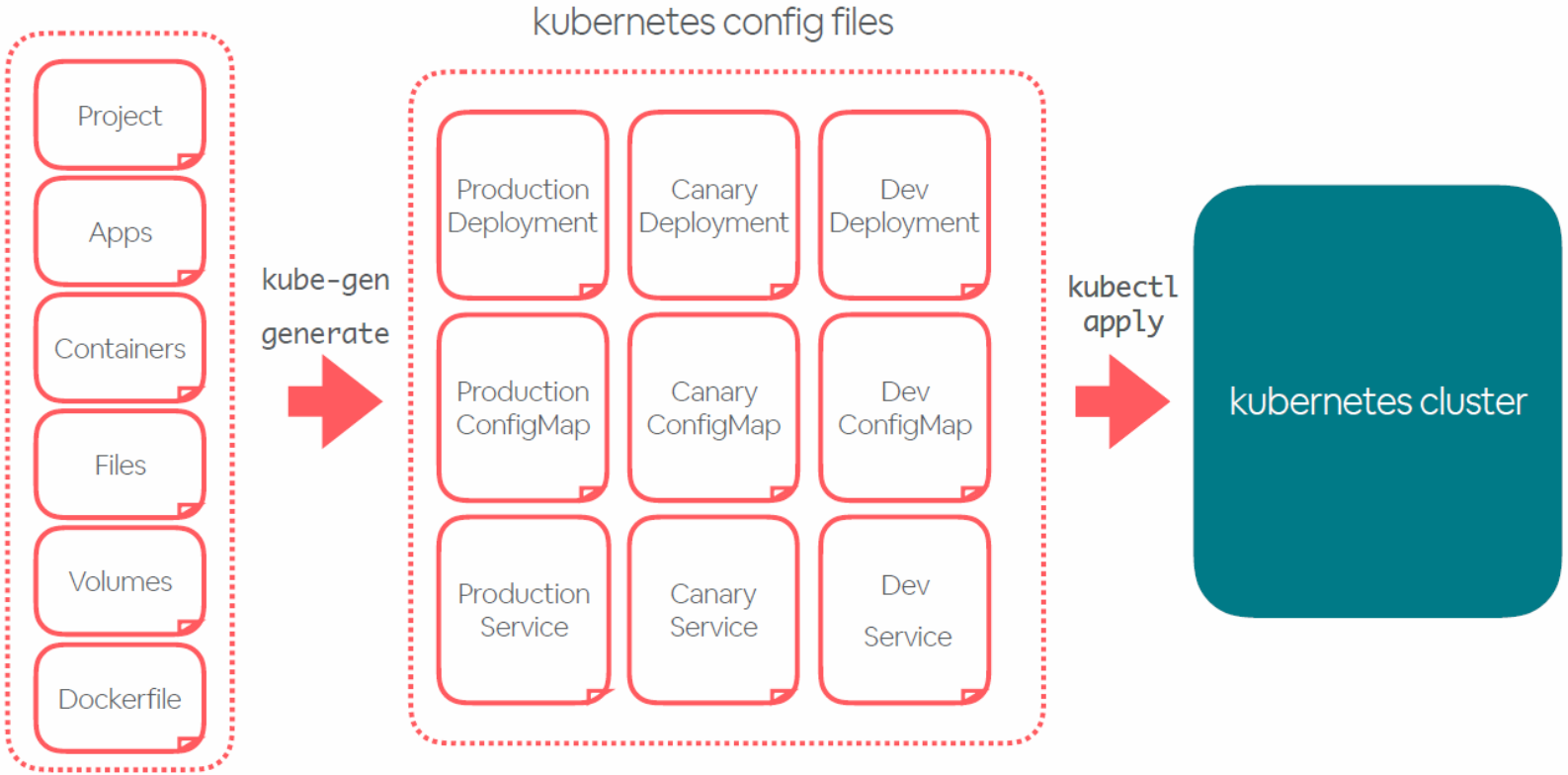
“The best part of my day is when I update 10 different YAML files to deploy a one-line code change.”

“The best part of my day is when I update 10 different YAML files to deploy a one-line code change.”

– No One, Ever


sets params per environment
Project
Apps
Containers
Files
Volumes
Dockerfile
other files
access params
15 ---
14 version: 29.14.0
13
12 project:
11 name: bonk
10
9 environments:
8 production:
7 params:
6 replicas: 10
5
4 staging:
3 params:
2 replicas: 1
5 ---
4 workload:
3 deployment:
2 replicas: {{ .Env.Params.replicas }}
1

generating k8s configs



Clarify (platform) service boundaries and provide abstractions to reduce the cognitive load on teams.

Team Topologies

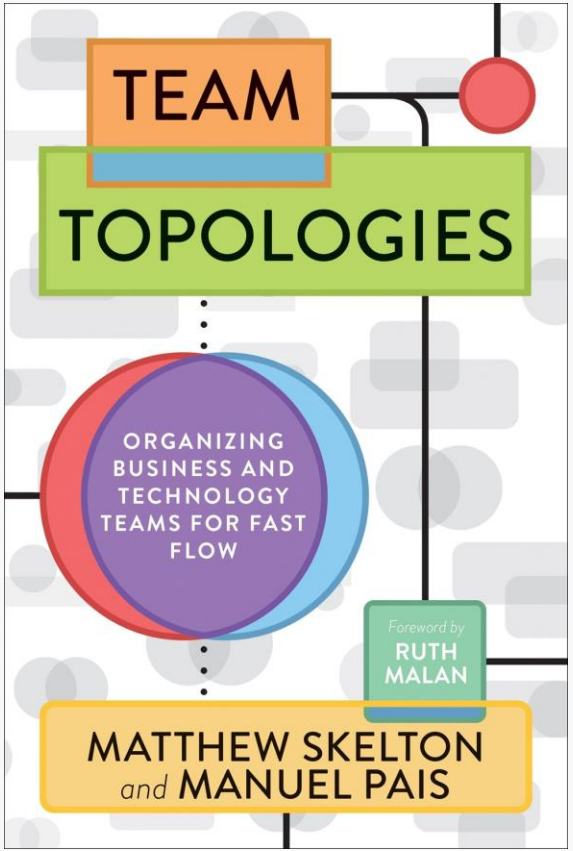
Team Topologies

Organizing business and technology teams for fast flow

Matthew Skelton & Manuel Pais

IT Revolution Press (2019)

https://teamtopologies.com



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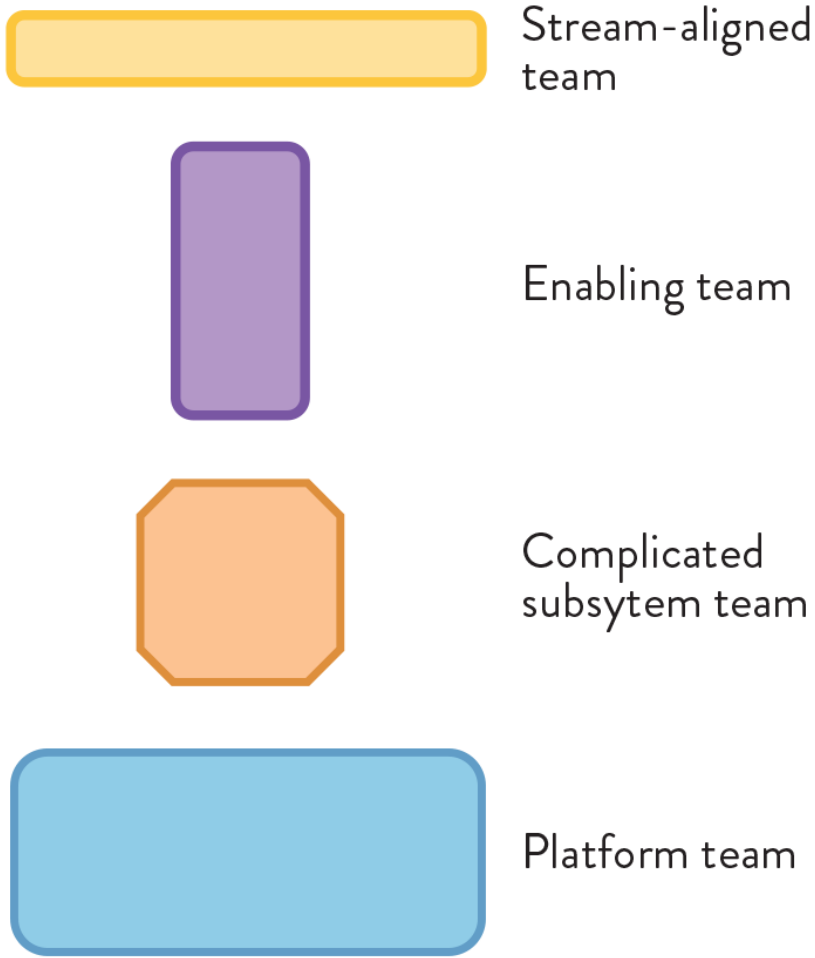


Team Topologies

Stream-aligned team

Platform team

Team Topologies

Platform Purpose

enable stream-aligned teams to deliver work autonomously with self-service capabilities ...

Team Topologies

Platform Purpose

… in order to reduce
extraneous cognitive load
on stream-aligned teams

Team Topologies

Treat the platform as a product

Team Topologies

Reliable
Fit for Purpose
Focused on DevEx

Team Topologies

Reliable Platform

on-call support
service status pages
suitable comms channels
response time for incidents
downtime planned & announced

Team Topologies

Fit for Purpose Platform

prototyping
fast, regular feedback
agile, iterative practices
few(er) services, high(er) quality
skilled product management

Team Topologies

#DevEx Focused Platform

speak the same language
right level of abstractions
simplify, simplify, simplify

Team Topologies

Adam Jacob
@adamhjk

Docker was a transformational user experience, one that remains unmatched today. Ask anyone running k8s if they wished it worked like that first 'docker run'. The answer is yes.

9:23 AM · Nov 13, 2019 · Twitter for iPhone

AGREE OR DISAGREE

BUILD

I can effectively build my software.

I have the tools to validate my software.

DELIVER

I can reliably deliver my software to dev, stage, and prod.

I can efficiently manage my cloud infrastructure.

RUN

I can measure the operational metrics of my services.

In understand the cost of running my service.

COMPELLING

I feel platform tools are consistently improving.

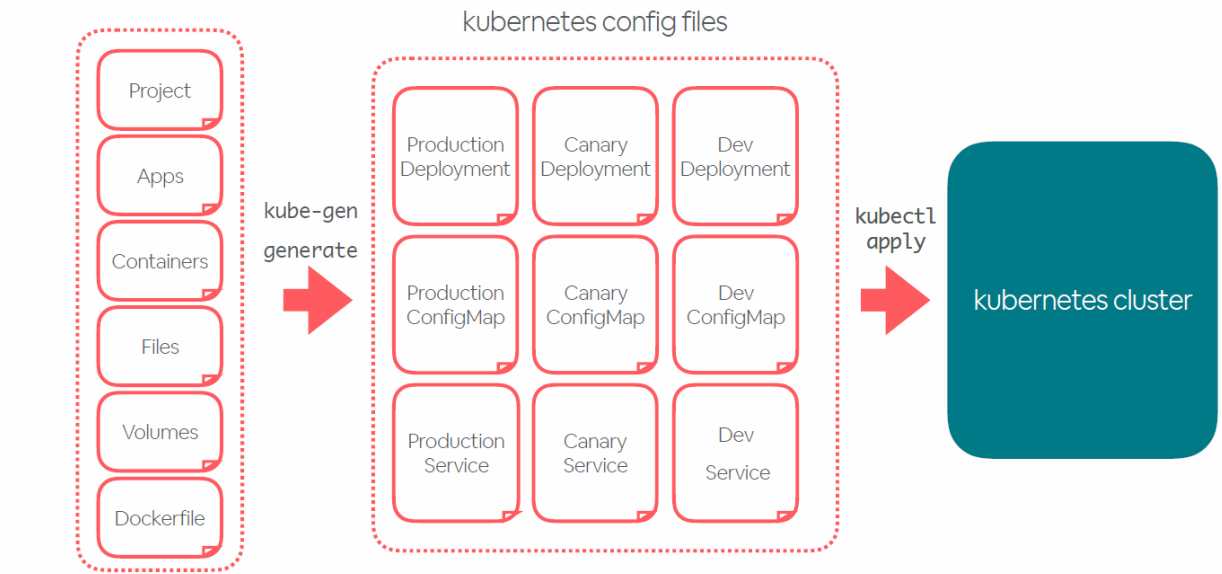
I can voice problems that result in improvements.

My tools are best in class.

Team Interactions

generating k8s configs

@MELANIECEBULA



generating k8s configs

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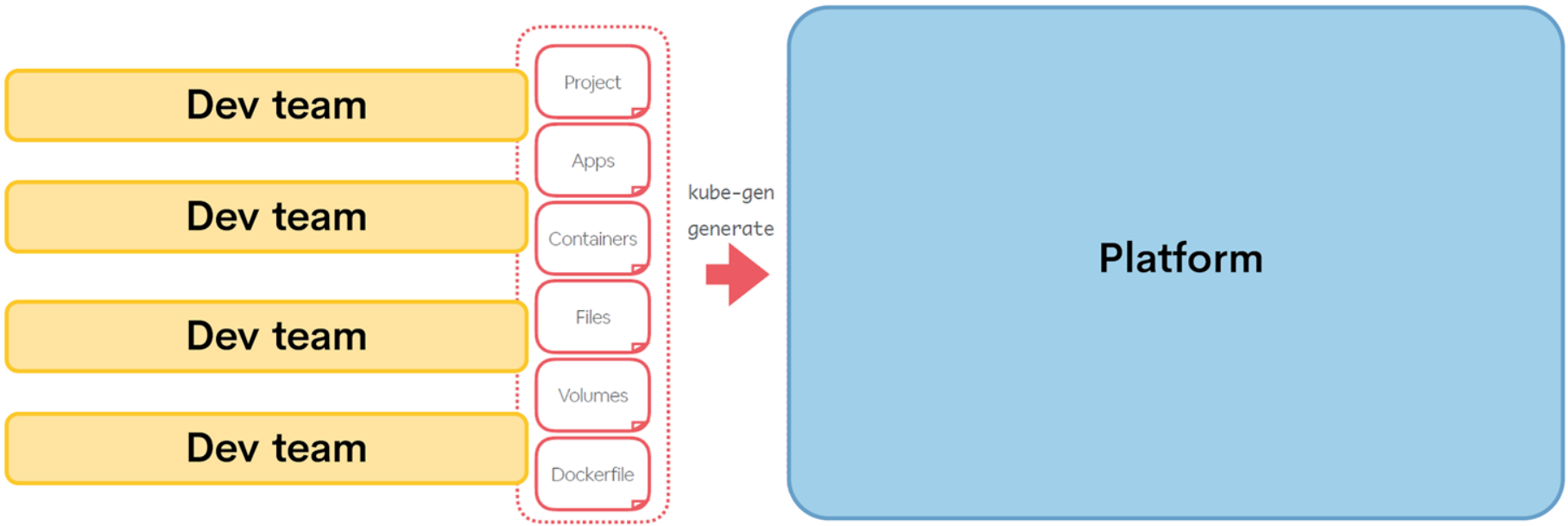
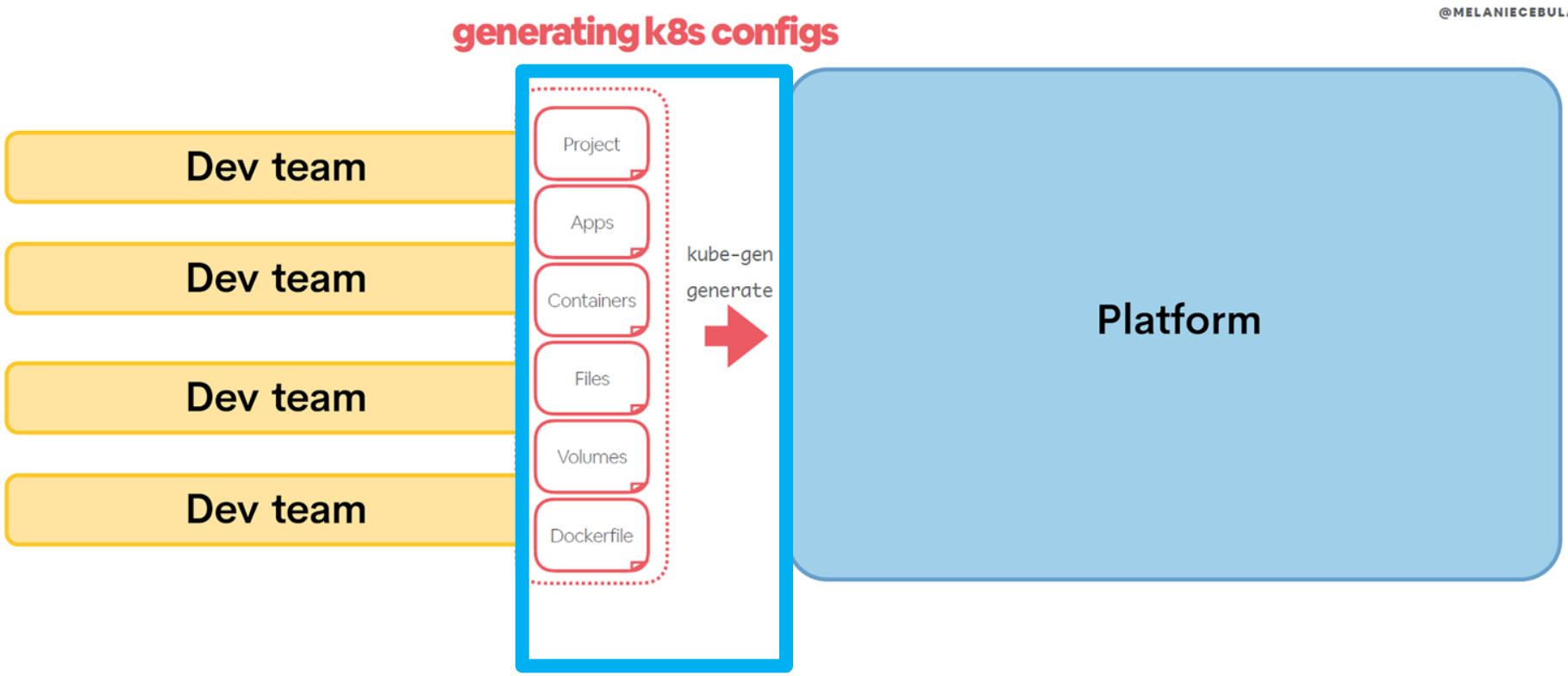
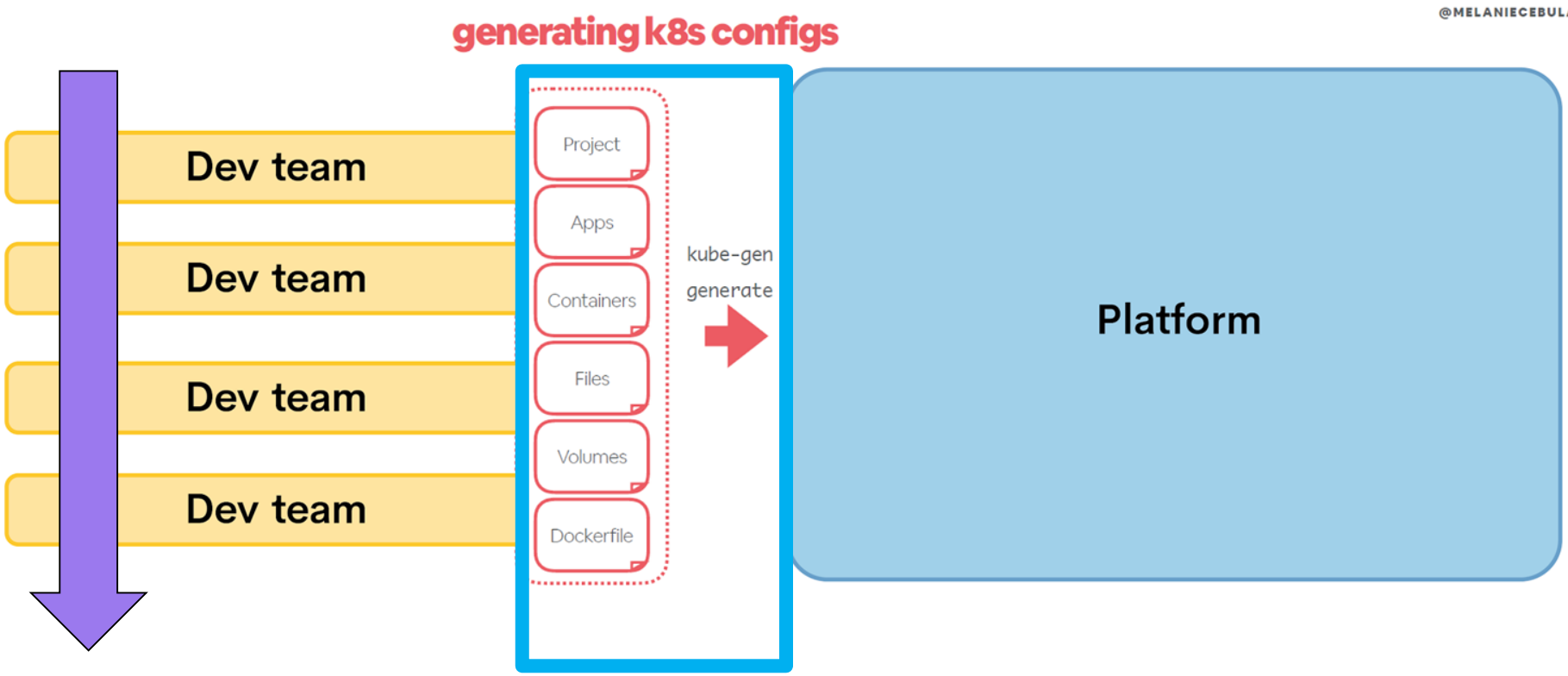



generating k8s configs
@MELANIECEBULA
Dev team
Dev team
Dev team
Dev team
Project
Apps
Containers
Files
Volumes
Dockerfile
kube-gen
generate
Platform
service boundary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generating k8s configs
Dev team
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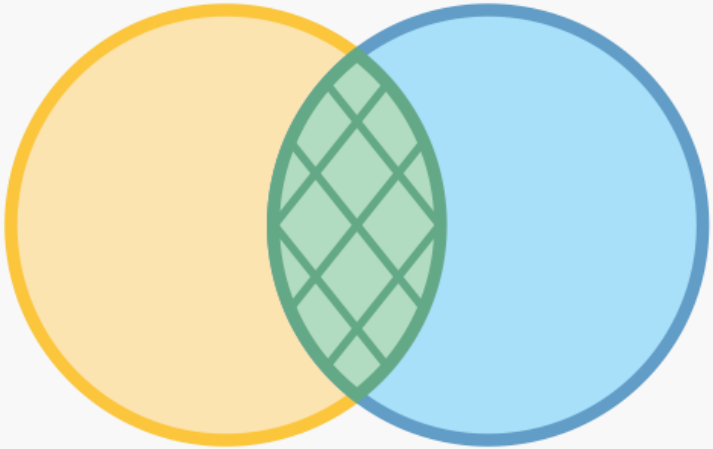
Dev team
Dev team
Project
Apps
Containers
Files
Volumes
Dockerfile
kube-gen
generate
Platform
cognitive load
service boundary

Platform Behaviors

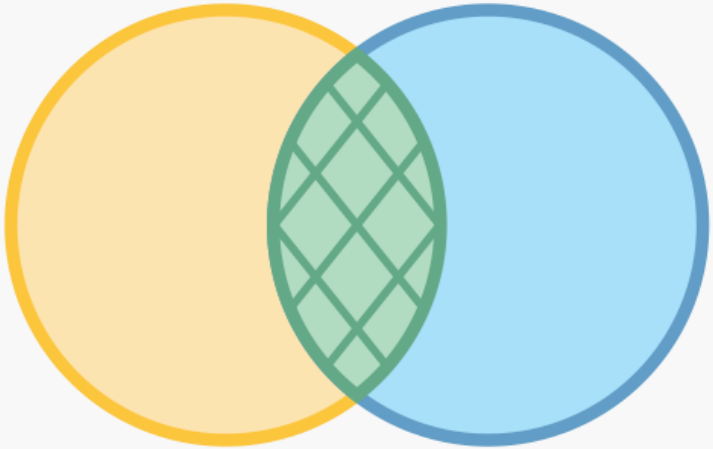
strong collaboration with stream-aligned teams for any new service or evolution



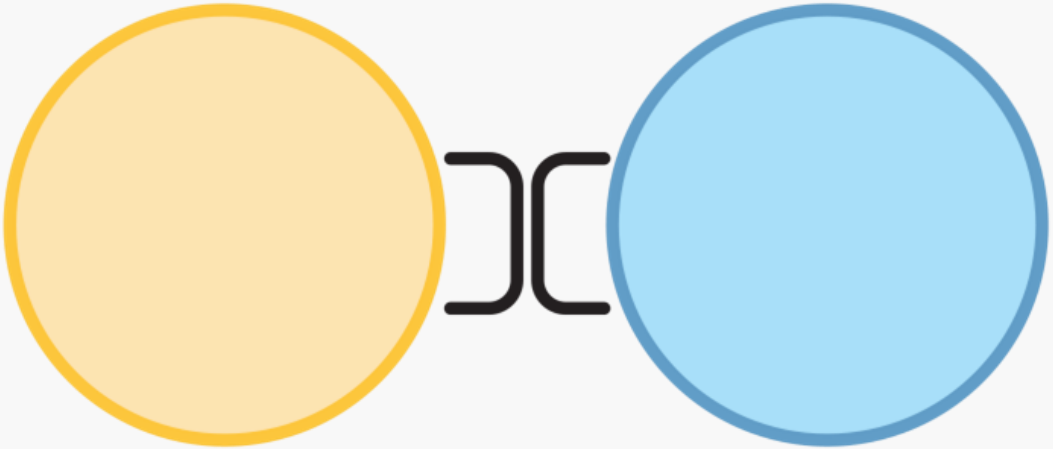
Collaboration

Platform Behaviors

provide support and great documentation for stable services



Collaboration



X-as-a-service

generating k8s configs

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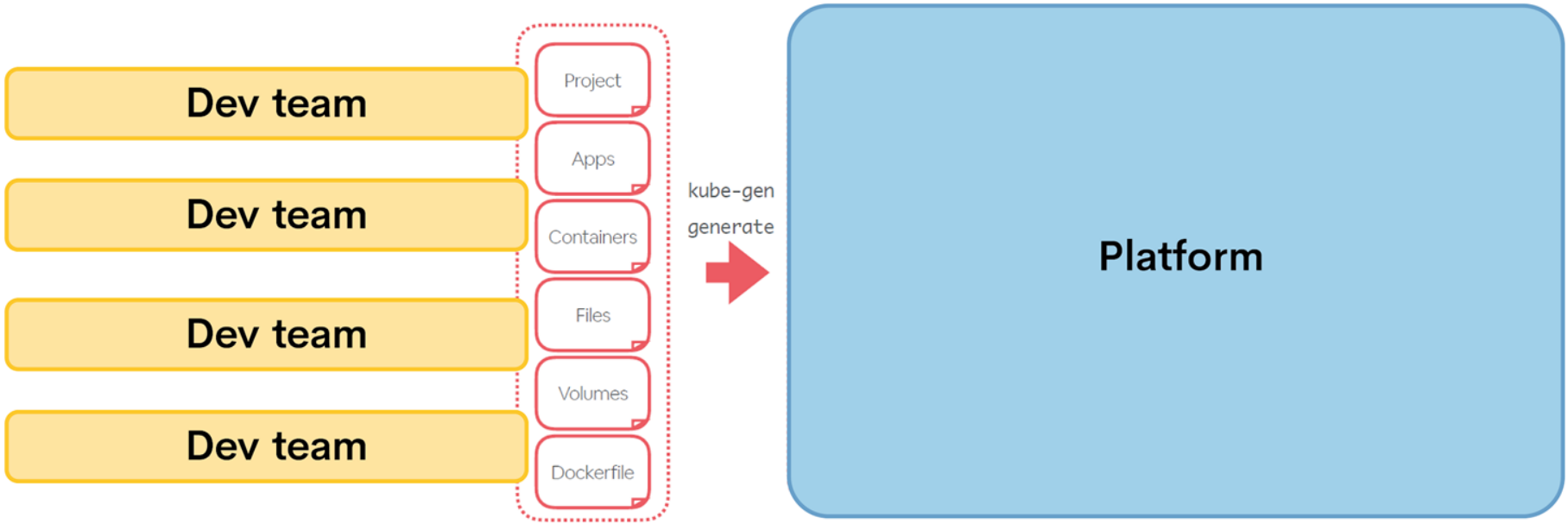

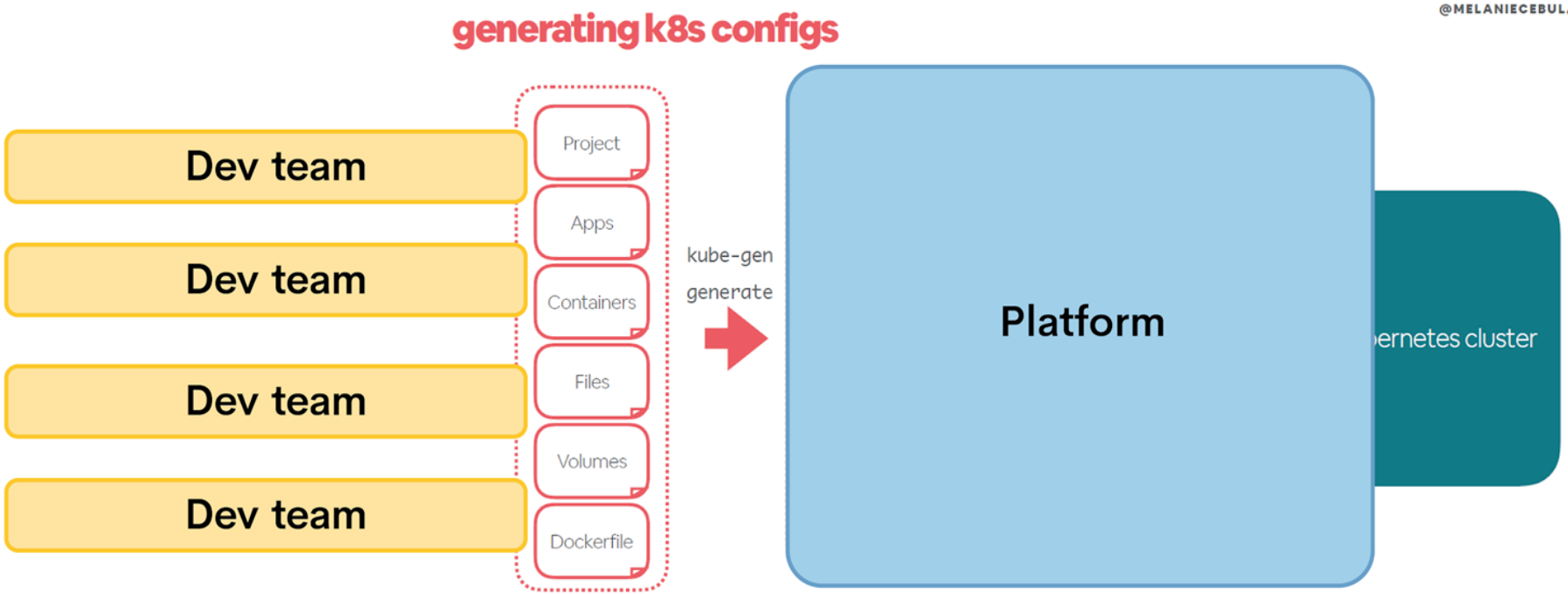
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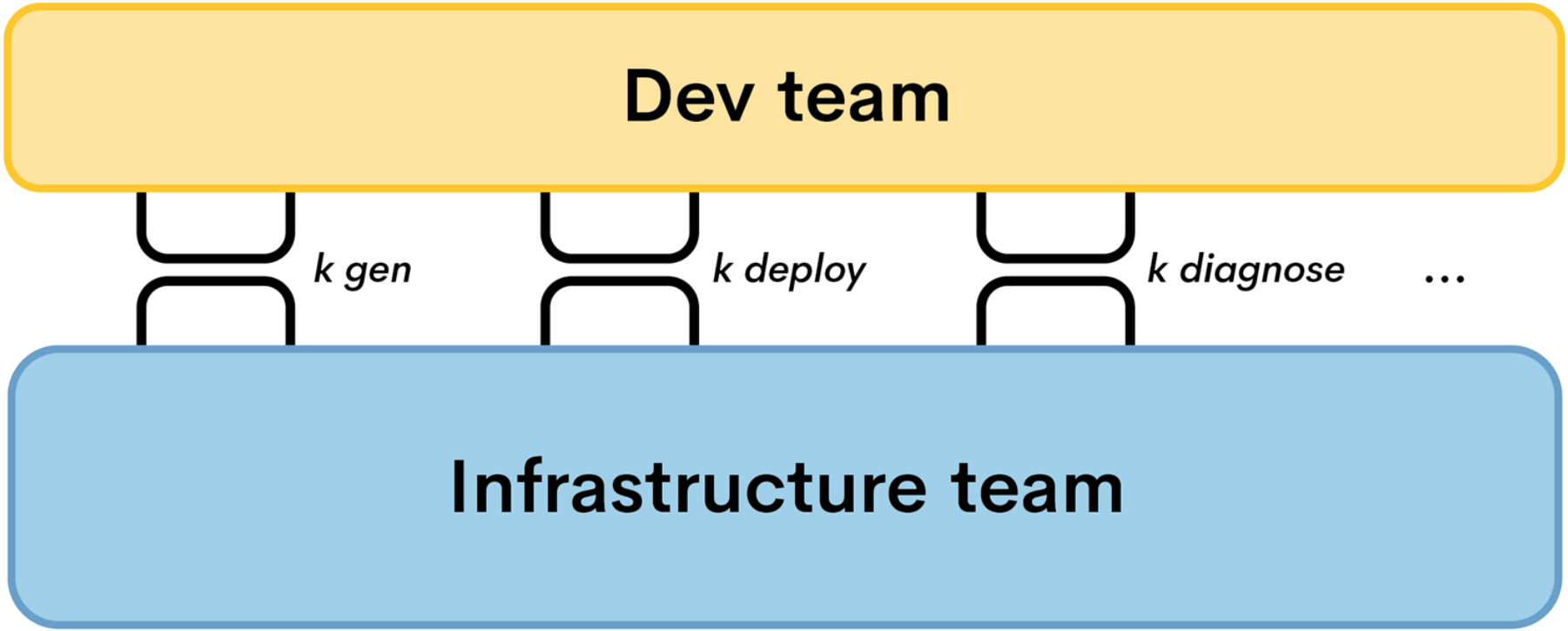
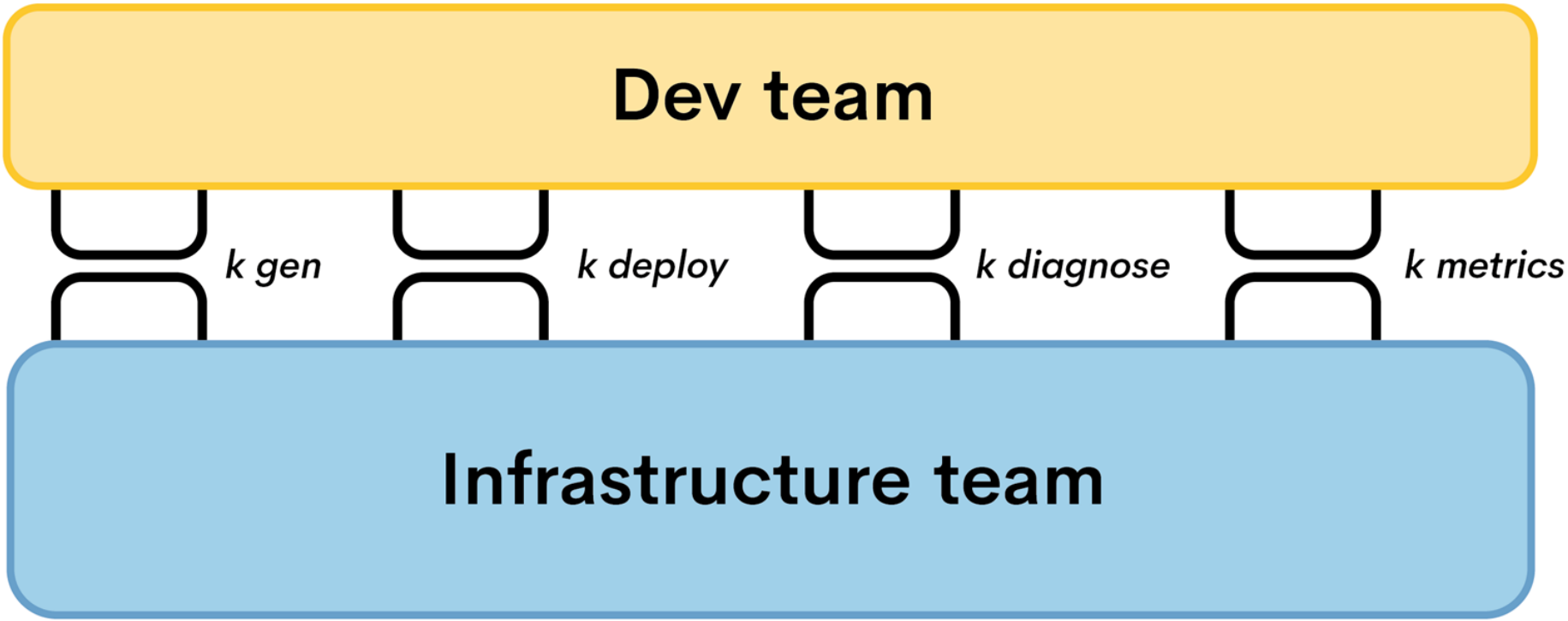


Team Topologies

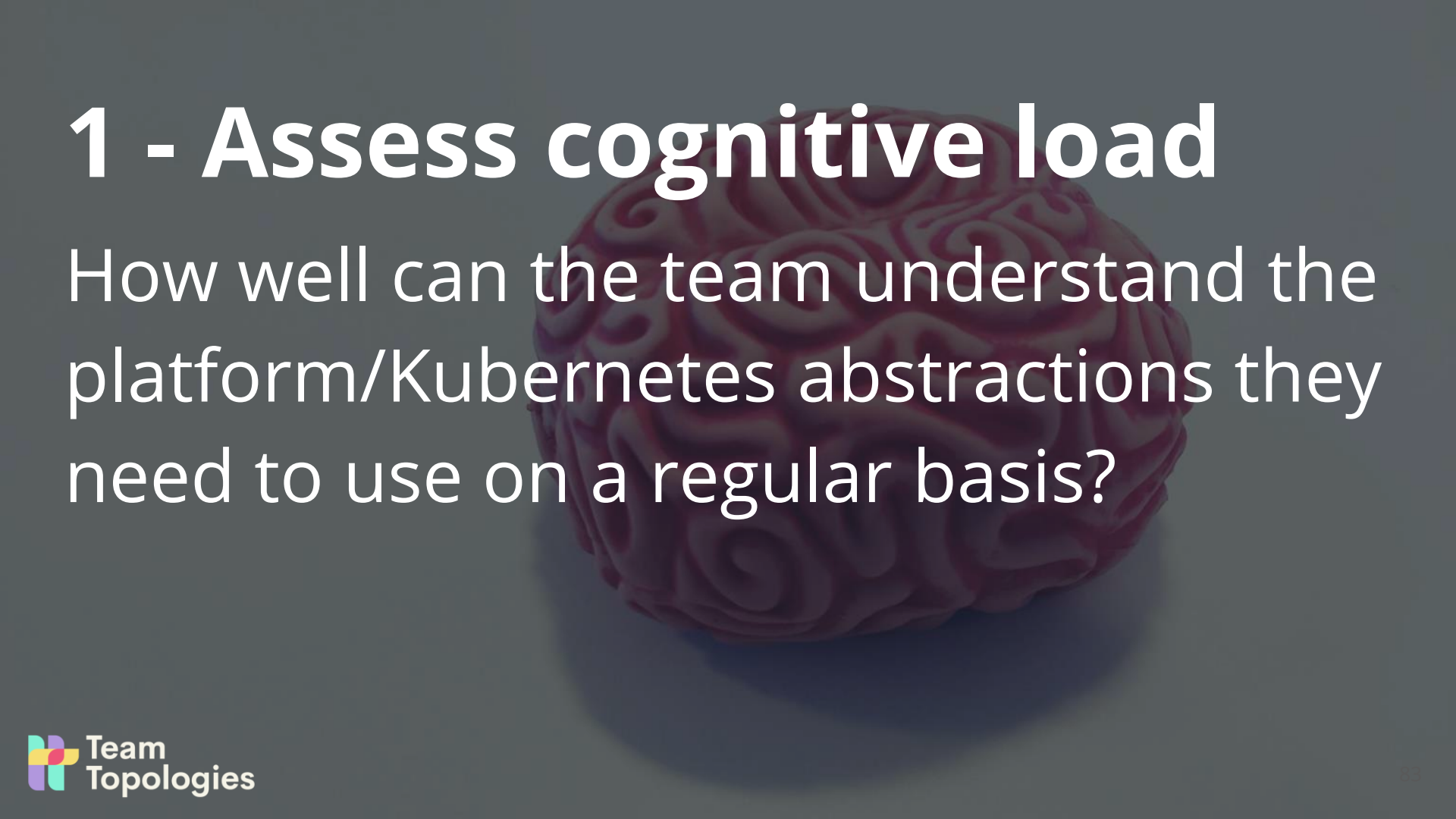
Discover
Establish


Dev team
k gen
k deploy
k diagnose
k metrics
Infrastructure team

Getting started with team-centric Kubernetes adoption

1 - Assess cognitive load

How well can the team understand the platform/Kubernetes abstractions they need to use on a regular basis?



Team Topologies

2 - Define your platform

What's the gap between your Kubernetes implementation and an internal digital platform?

Team Topologies

3 - Team Interactions

Who is responsible for what? Who is impacted? How do you collaborate on new platform internal services?

Collaboration vs X-as-a-Service

More platform examples

Zalando Kubernetes at Zalando

Mercedes DevOps Adoption at Mercedes-Benz.io

Twilio Platforms at Twilio: Unlocking Developer Effectiveness

Adidas Where Cloud Native Meets the Sporting Goods Industry

ITV ITV's Common Platform v2 Better, Faster, Cheaper, Happier

MAN Truck & Bus How to Manage Cloud Infrastructure at MAN Truck & Bus

Farfetch UX I DevOps - The Trojan Horse for Implementing a DevOps Culture

https://techbeacon.com/enterprise-it/why-teams-fail-kubernetes-what-do-about-it

Why teams fail with Kubernetes—and what to do about it

There are major implications to how teams must interact when you're using Kubernetes—especially as you scale. Here are key approaches to ...

techbeacon.com

Team Topologies

Thank you!

teamtopologies.com

Matthew Skelton, Conflux
@matthewpskelton

Manuel Pais, Independent
@manupaisable

Team Topologies

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2019.11.21 KubeCon North America Manuel Pais The Elephant In The Kubernetes Room Team Interactions At Scale

PDF

Thursday November 21, 2019 3:20pm - 3:55pm
Room 6F - San Diego Convention Center *Upper Level*
Operations
Experience Level Beginner (Very basic information)

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Please share details here.

Submit Feedback