



Benvinguts! Keep Cloud Native.

JUNE 2019 - KUBERNETES USER GROUP

KubeCon Europe 2019



## KubeCon Europe 2019 it was ...

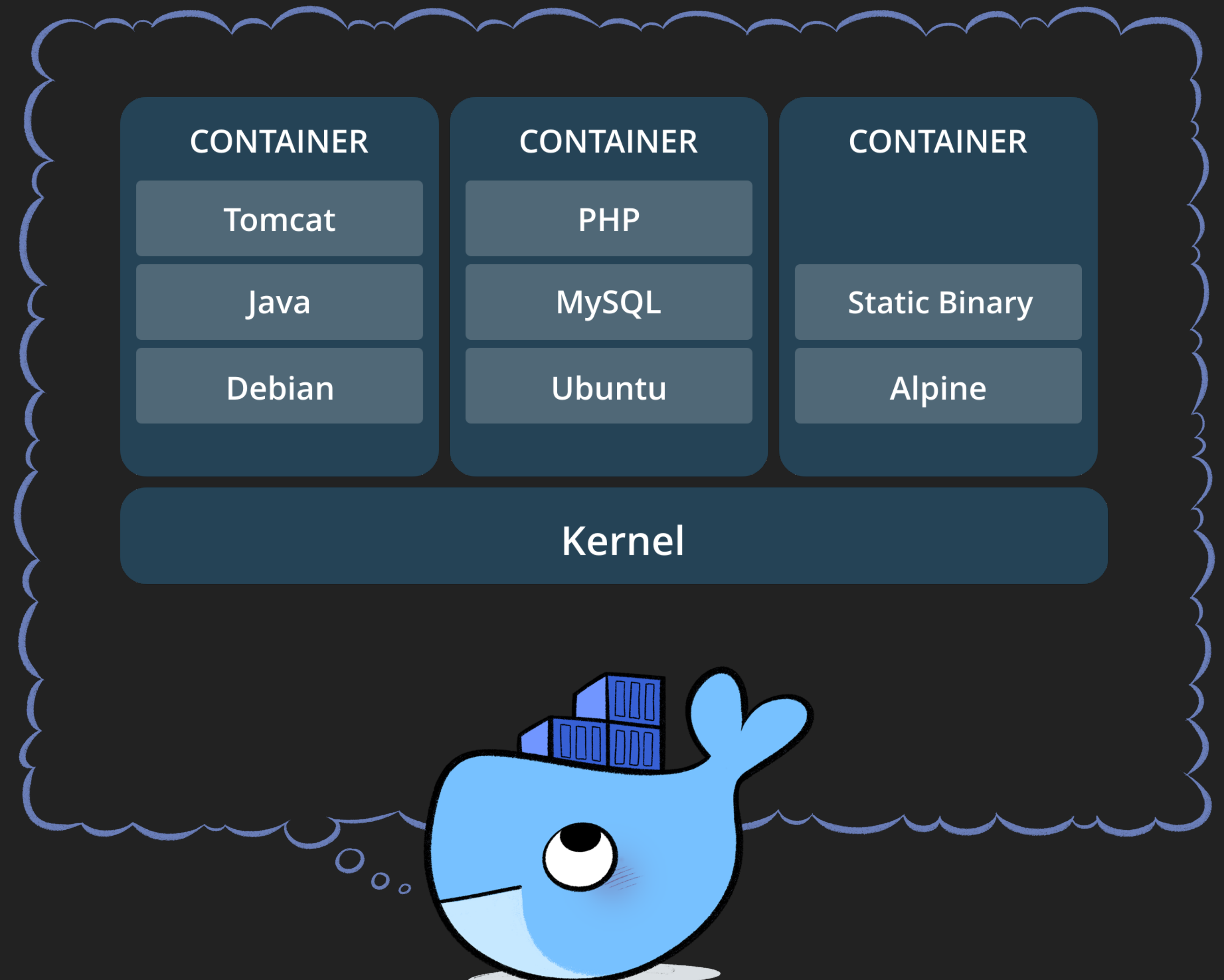
- ▶ 7700 attendees
- ▶ 331 talks
- ▶ 150 sponsors showcase
- ▶ 49 viewed talks
- ▶ 7 beers
- ▶ 3 days







The result from adopting container, is that application can be deployed or undeployed faster, start and stop faster, change to another “image” faster, process and do many things faster.





## Alibaba Sigma





## Amazon Apollo





# Apache Mesos



Apache  
**MESOS**<sup>TM</sup>



## Baidu Matrix





# Cloud Foundry Garden & Diego



CLOUD **FOUNDRY**

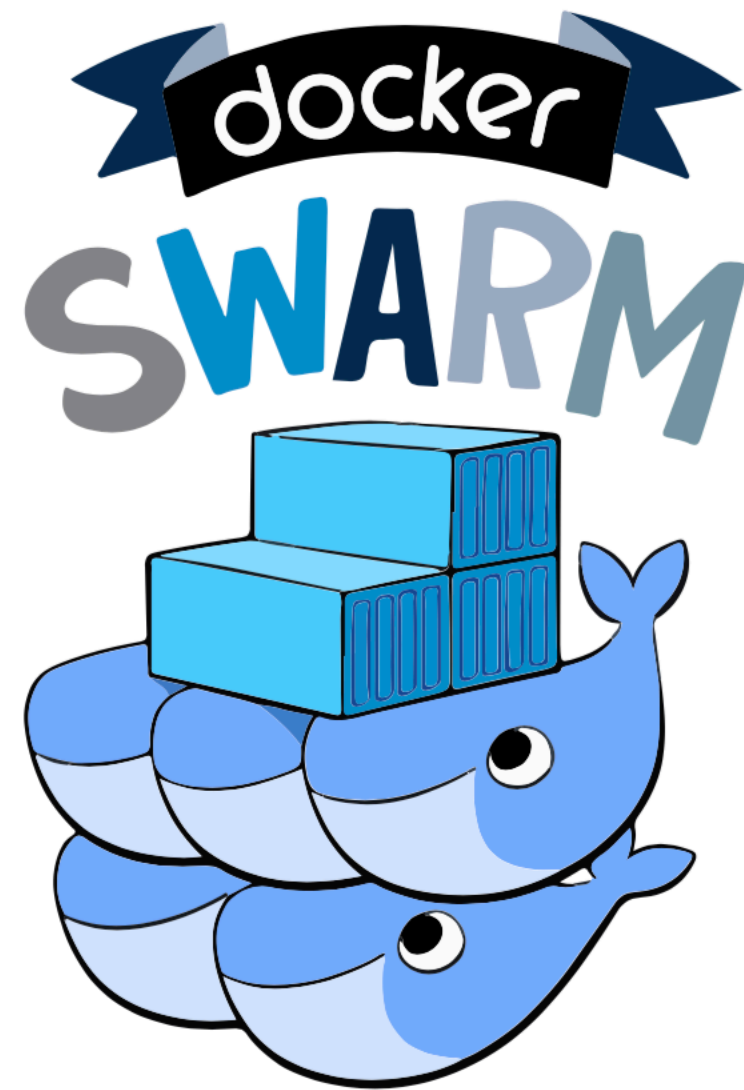


## CoreOS Fleet





# Docker Swarm



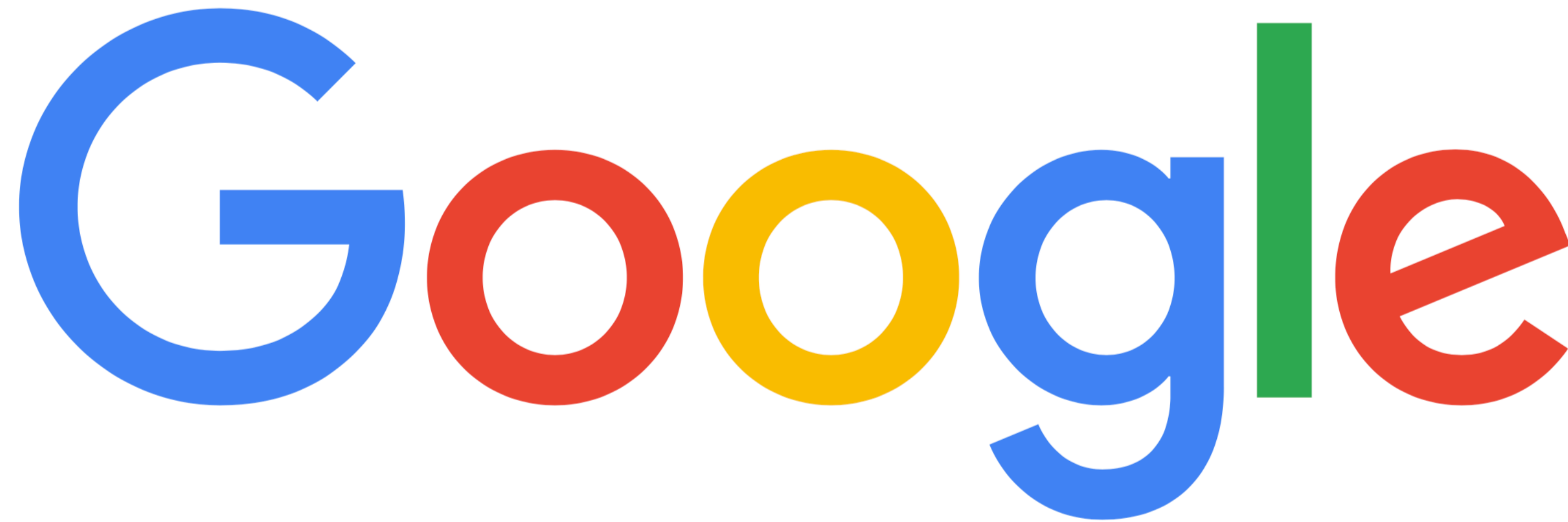


# Facebook Tupperware





## Google Borg & Omega

The Google logo is displayed in its standard multi-colored font (blue, red, yellow, blue, green, red) on a white rectangular background.

## HashiCorp Nomad

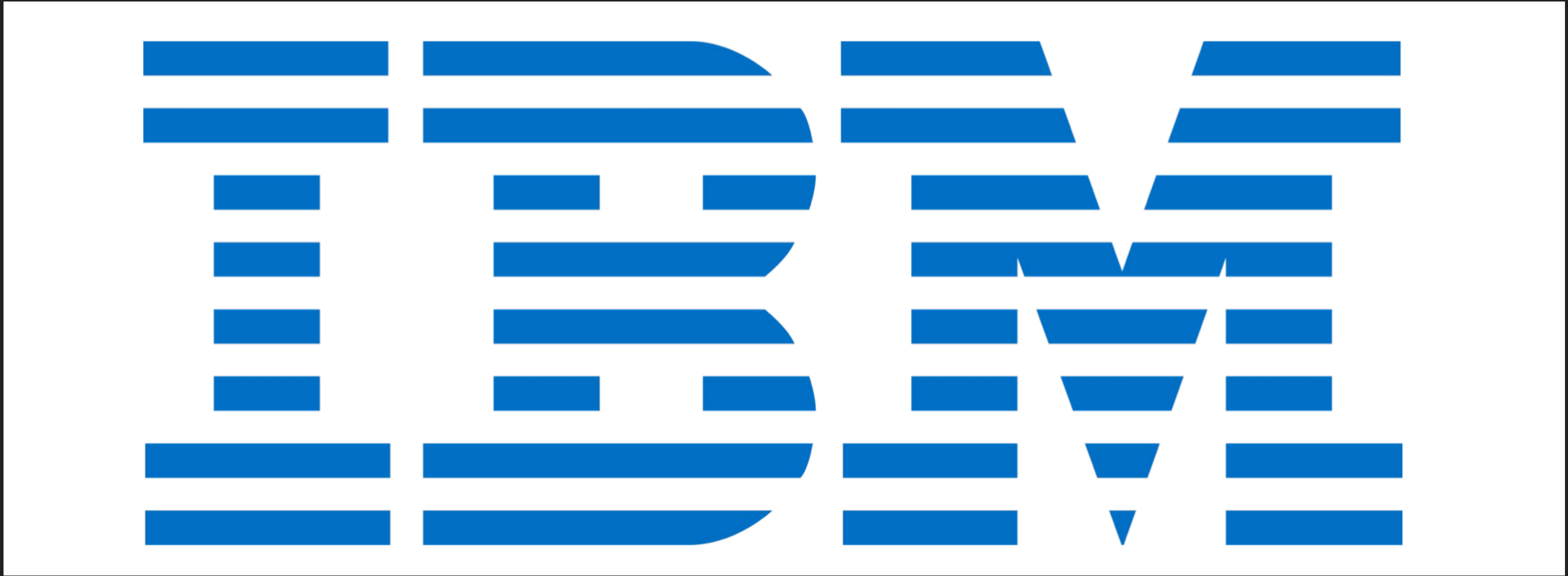


HashiCorp

**Nomad**



# IBM Platform Symphony



## Joyent Triton





## Lyft v3 Infra



## Microsoft Service Fabric



Microsoft



## Netflix Titus

The Netflix logo, consisting of the word "NETFLIX" in a bold, red, sans-serif font, is centered within a white rectangular box. The box is set against a dark gray background.

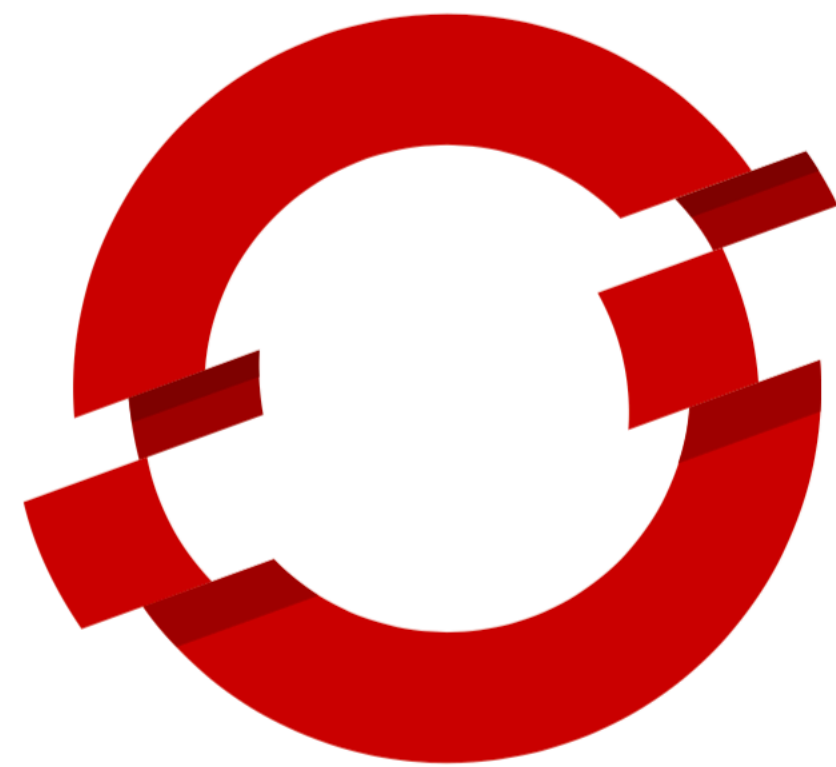
**NETFLIX**

## Rancher Cattle





## Red Hat OpenShift v2 Broker



**RED HAT<sup>®</sup>**  
**OPENSIFT**

## Spotify Helios

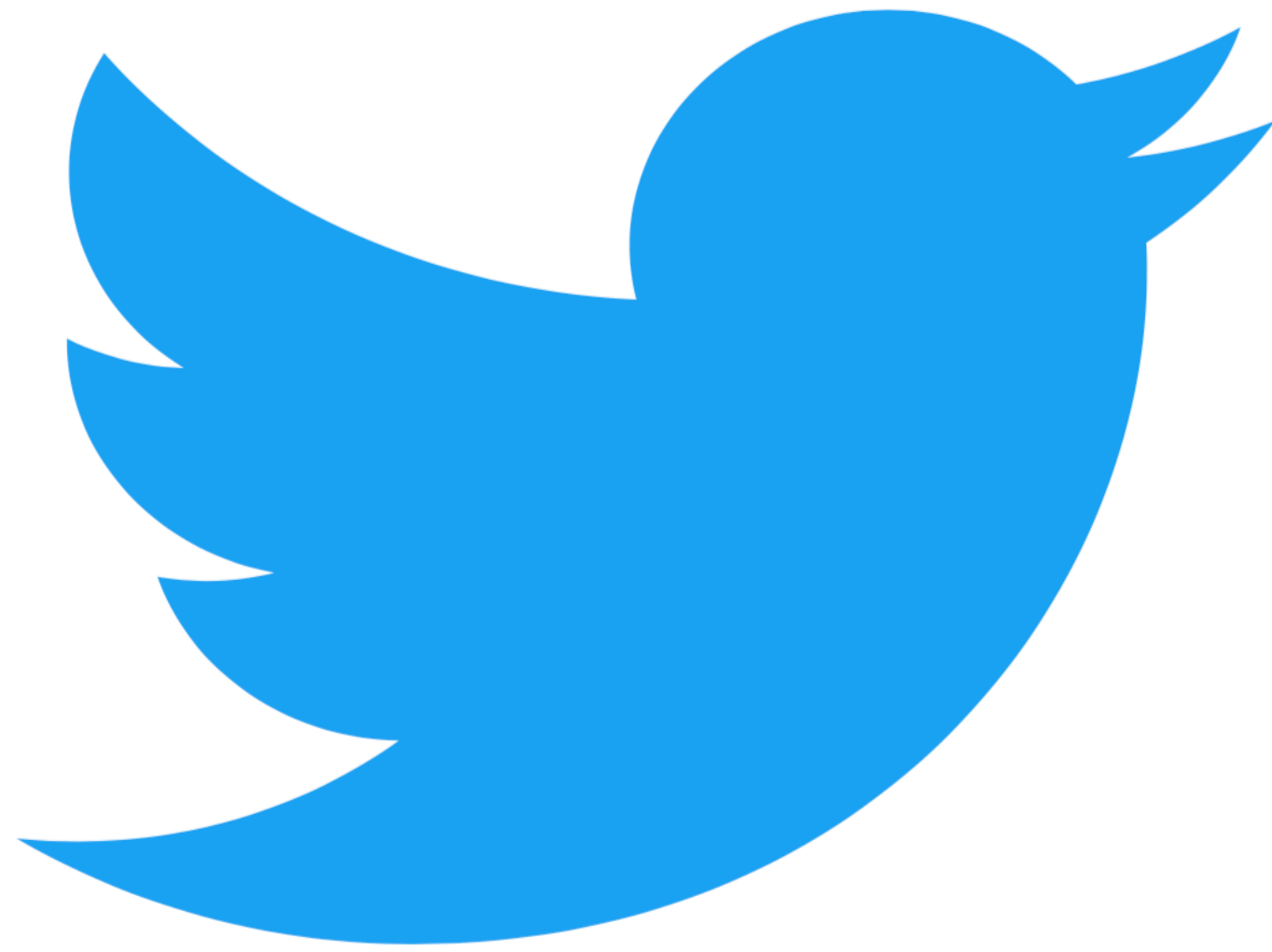




## Tencent Gaia

*Tencent* 腾讯

# Twitter Aurora



## Uber Peloton

The Uber logo, consisting of the word "Uber" in a bold, black, sans-serif font, centered within a white rectangular box.

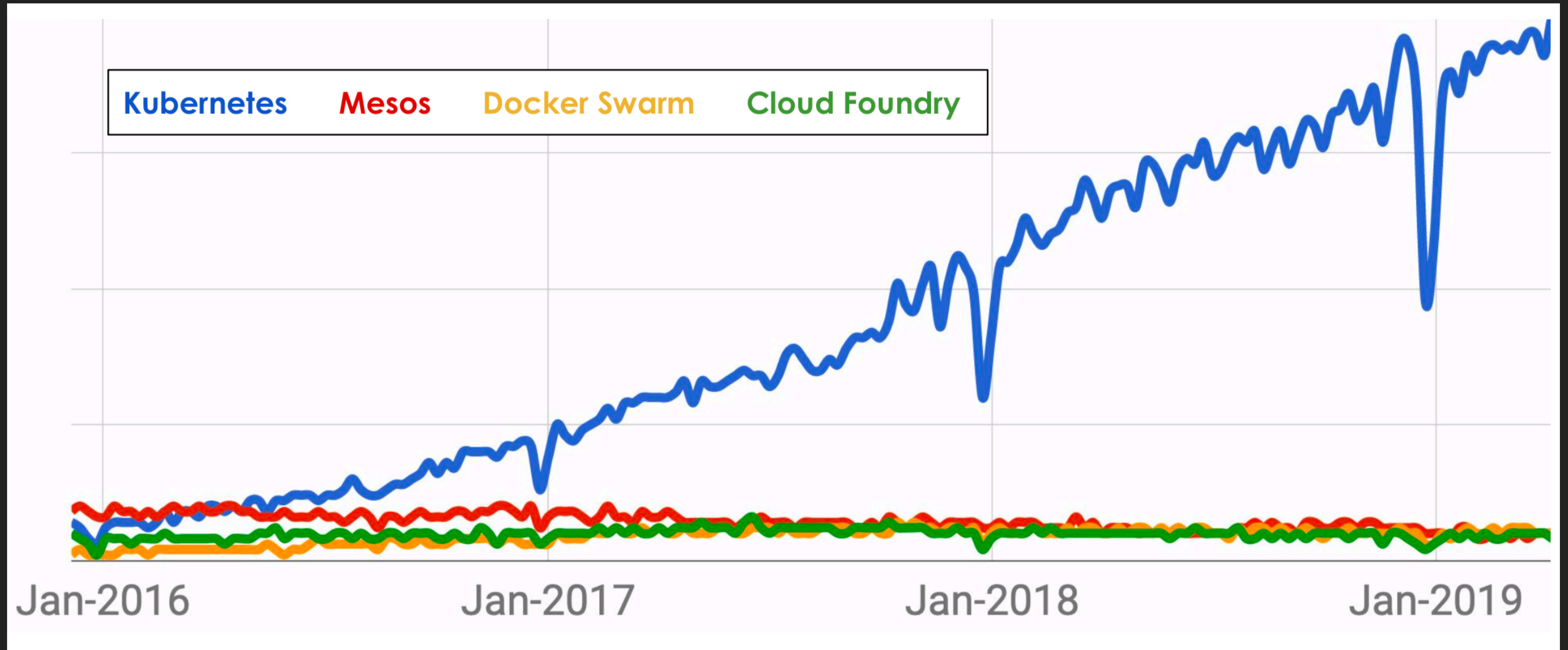
Uber



- ▶ 2014: Google Introduces Kubernetes
- ▶ mid-2014: Google introduced Kubernetes as an open source version of Borg
- ▶ June 7: Initial release - first github commit for Kubernetes
- ▶ July 10: Microsoft, RedHat, IBM, Docker joins the Kubernetes community.

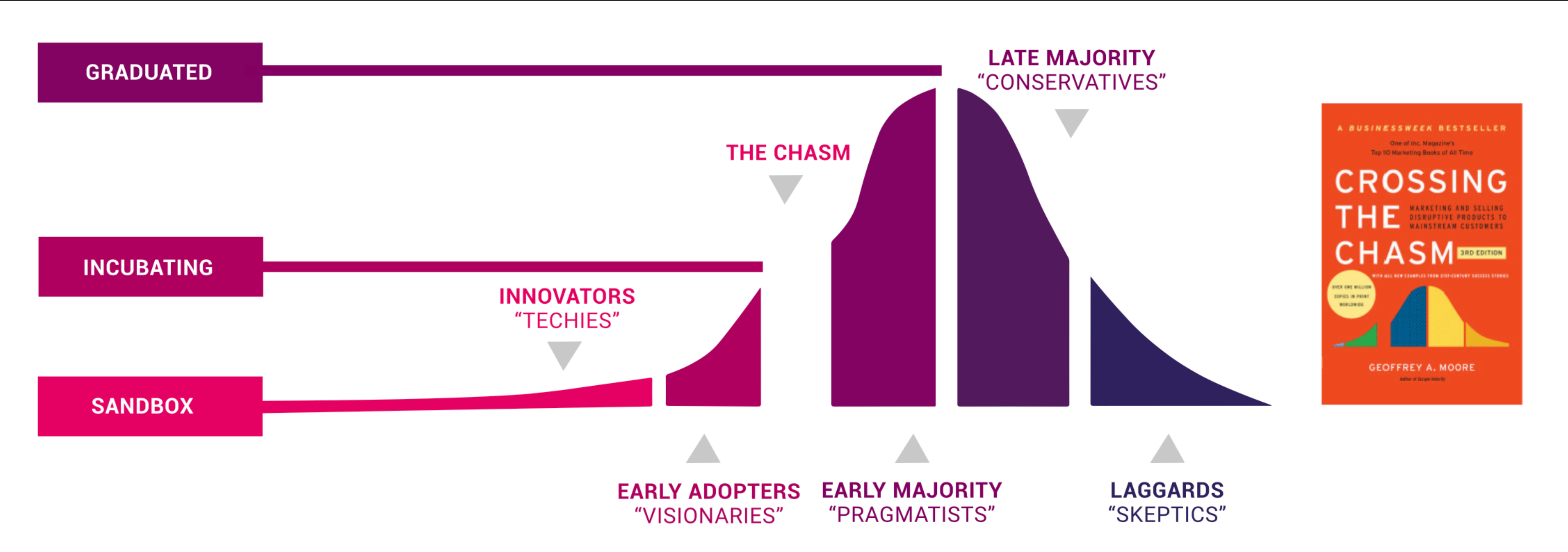
- ▶ 2015: The year of Kube v1.0 & CNCF
- ▶ July 21: Kubernetes v1.0 gets released. Along with the release, Google partnered with the Linux Foundation to form the Cloud Native Computing Foundation (CNCF). The CNFC aims to build sustainable ecosystems and to foster a community around a constellation of high-quality projects that orchestrate containers as part of a microservices architecture.
- ▶ November 3: The Kubernetes ecosystem continues to grow! Companies who joined: Deis, OpenShift, Huawei, and Gondor.
- ▶ November 9: Kubernetes 1.1 brings major performance upgrades, improved tooling, and new features that make applications even easier to build and deploy.
- ▶ November 9-11: KubeCon 2015 is the first inaugural community Kubernetes conference in San Fransisco. Its goal was to deliver expert technical talks designed to spark creativity and promote Kubernetes education.

## K8S USER GROUP





# CNCF : Project Services and Maturity Levels



## CNCF Hosted Projects



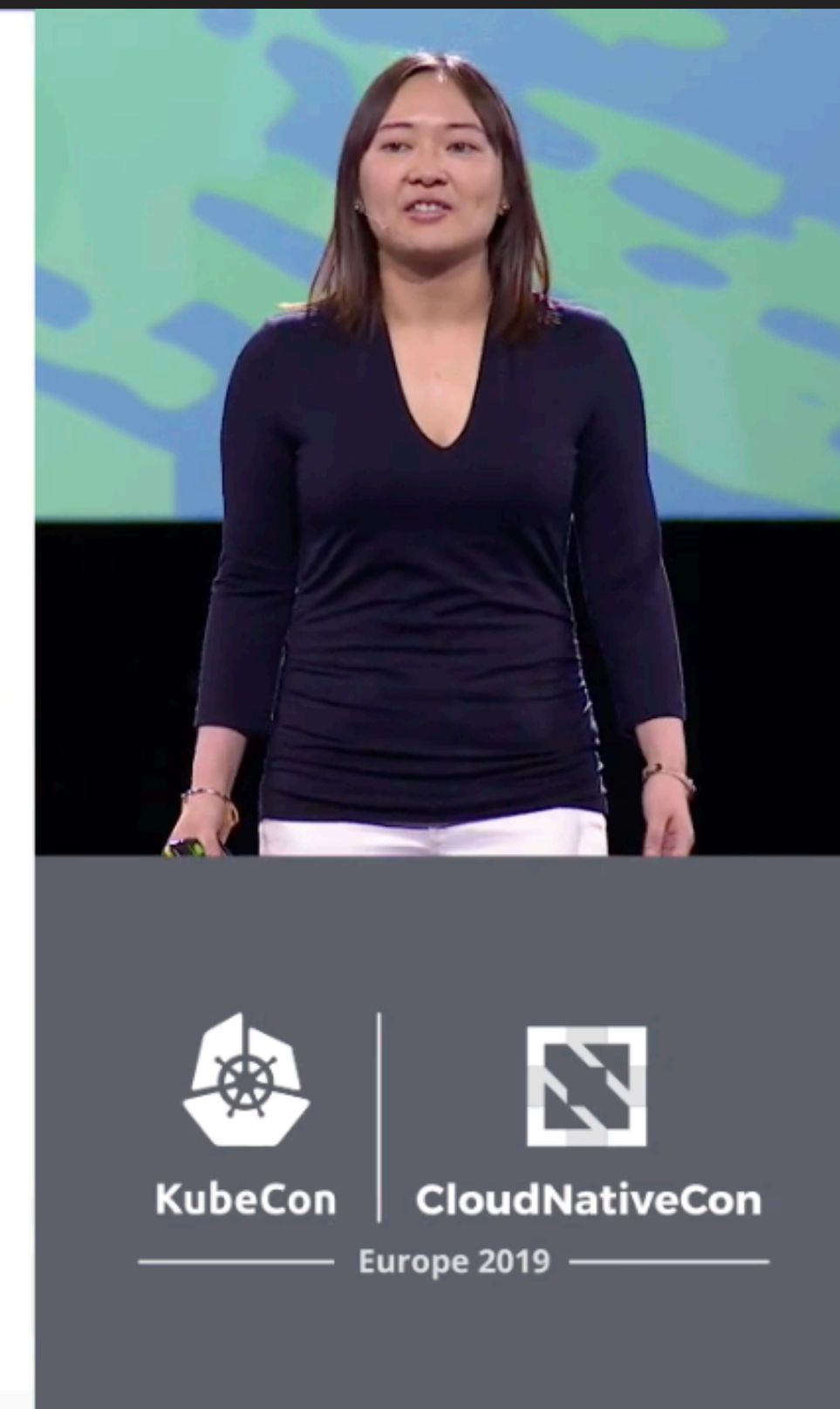
# KubeCon Europe 2019

- ▶ Kubernetes
- ▶ Service Mesh
- ▶ Storage
- ▶ Monitoring + Tracing
- ▶ Machine Learning + Data



## 2.66 Million – Cheryl Hung, Director of Ecosystem, Cloud Native Computing Foundation

2.66 million contributions  
56,214 contributors



► <https://www.youtube.com/watch?v=w62T1SN4g6Y>

# CNCF Project Update – Bryan Liles, Senior Staff Engineer, VMware



The image is a screenshot of a presentation slide. The slide has a header with a gradient background and the text "Sandbox: OpenEBS". Below the header, on the left, is a cartoon donkey logo. To the right of the logo, the text reads: "OpenEBS enables Container Attached Storage using Kubernetes itself as the substrate for storage management". In the top right corner of the slide, there are logos for "KubeCon" and "CloudNativeCon" with "Europe 2019" underneath. On the right side of the slide, there is a video inset showing a man, Bryan Liles, speaking on stage. He is wearing a checkered shirt and glasses. At the bottom of the slide, there are again the "KubeCon" and "CloudNativeCon" logos with "Europe 2019" underneath.

Sandbox: OpenEBS



OpenEBS enables Container Attached Storage using Kubernetes itself as the substrate for storage management

KubeCon | CloudNativeCon  
Europe 2019


KubeCon | CloudNativeCon  
Europe 2019

► <https://www.youtube.com/watch?v=vdxcaR3I2ic>







# CNCF Project Update – Bryan Liles, Senior Staff Engineer, VMware


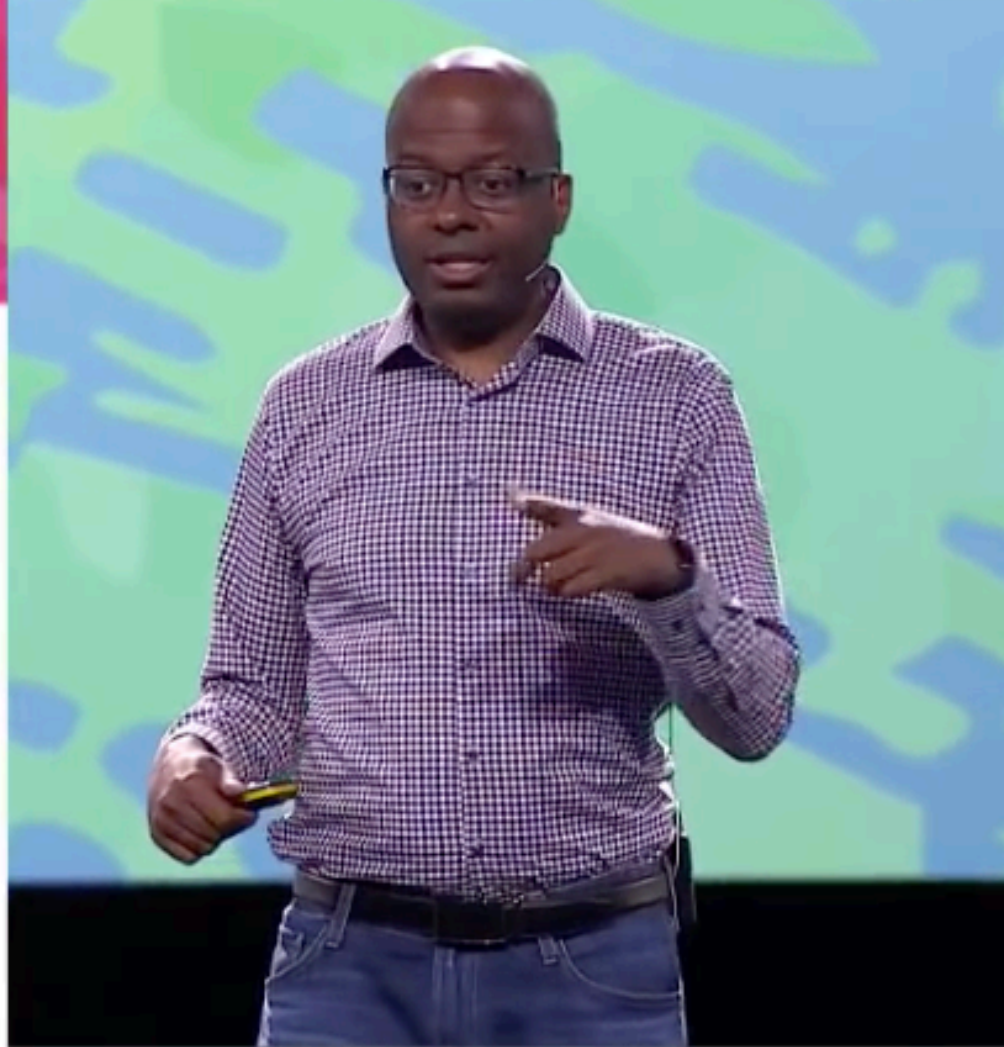
Incubating: Linkerd



Linkerd is a lightweight service mesh that enhances your application's observability, reliability, and security...

... without code changes!






► <https://www.youtube.com/watch?v=vdxcaR3I2ic>





# CNCF Project Update – Bryan Liles, Senior Staff Engineer, VMware

Incubating: Helm



Helm v3.0.0-alpha.1

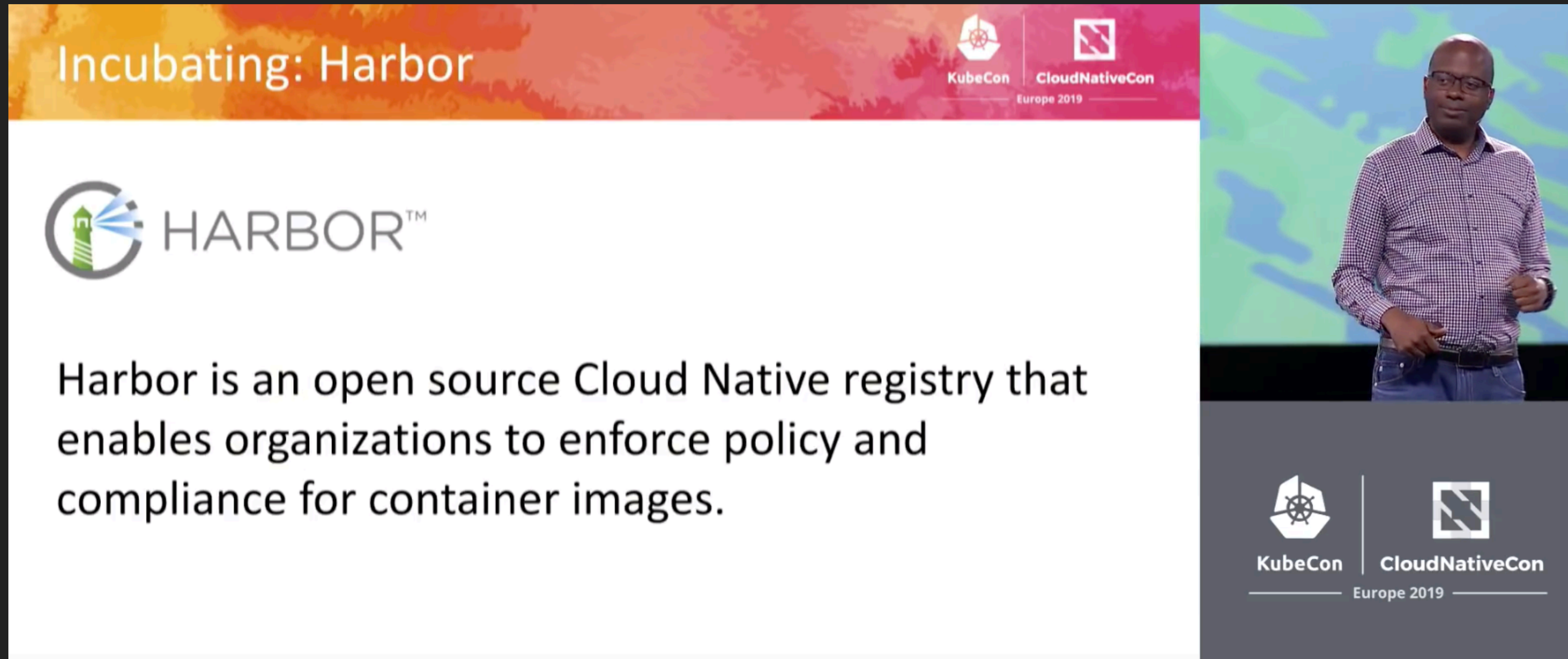
- Tiller removal
- Release names are scoped to a namespace
- Validate chart values
- Library charts




► <https://www.youtube.com/watch?v=vdxcaR3I2ic>



# CNCF Project Update – Bryan Liles, Senior Staff Engineer, VMware



Incubating: Harbor

 HARBOR™

Harbor is an open source Cloud Native registry that enables organizations to enforce policy and compliance for container images.

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Europe 2019


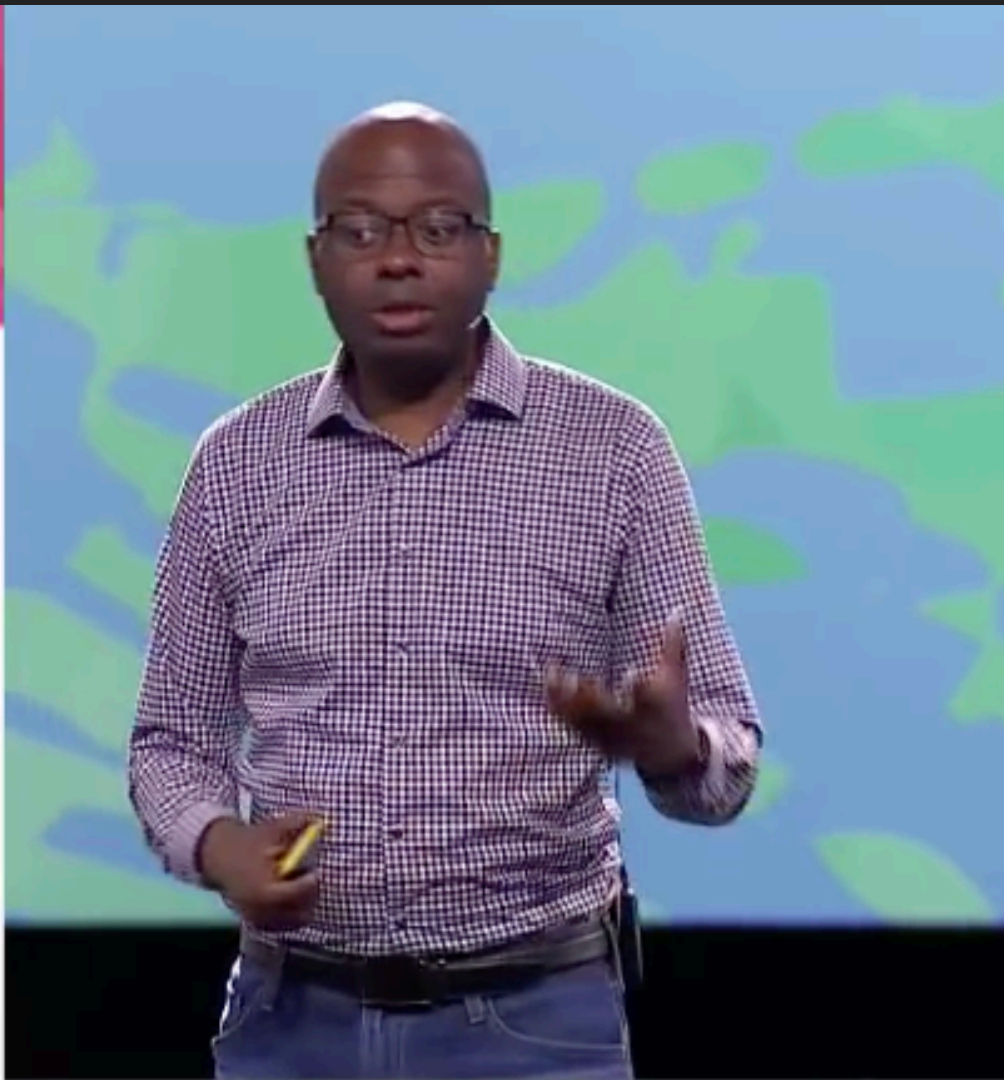

KubeCon | CloudNativeCon  
Europe 2019


► <https://www.youtube.com/watch?v=vdxcaR3I2ic>



# CNCF Project Update – Bryan Liles, Senior Staff Engineer, VMware

Incubating: Rook





## ROOK

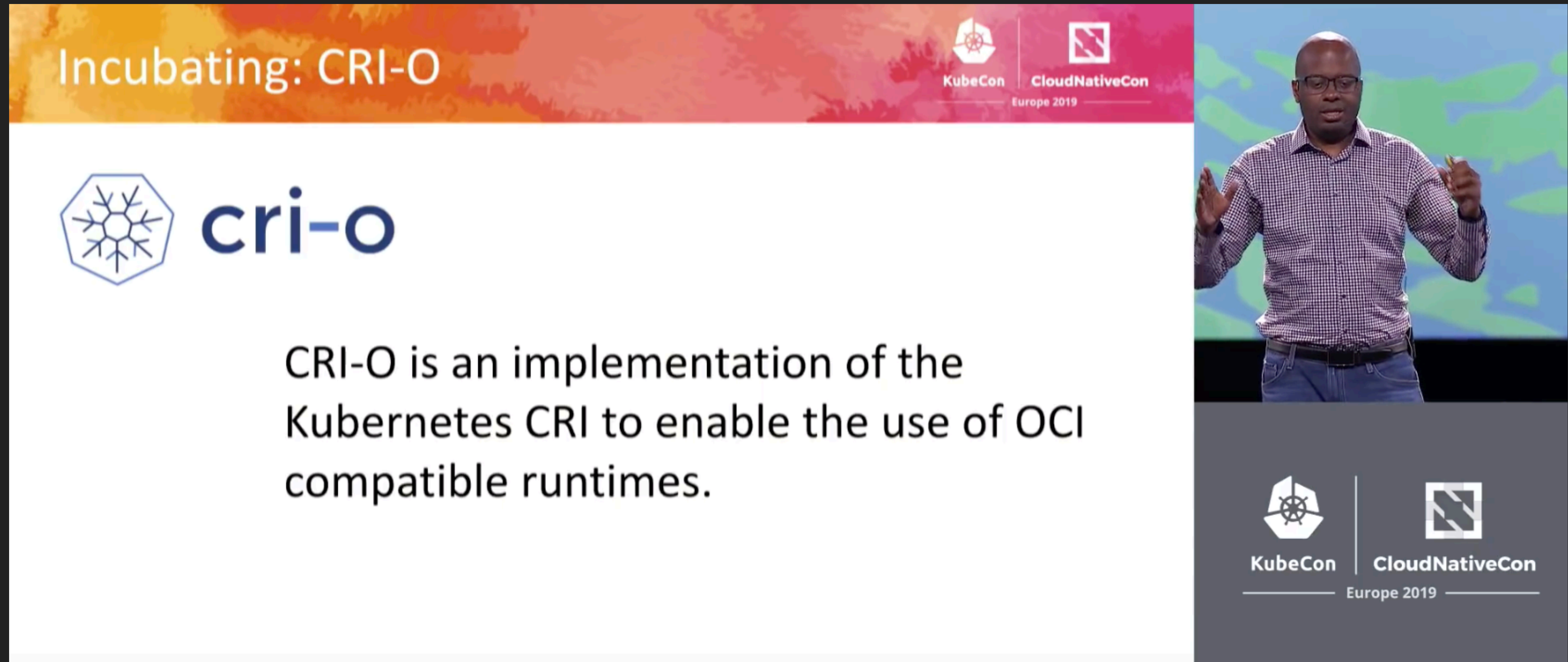
- Rook 1.0
- New features in Ceph, EdgeFS, and Minio operators
- CSI support
- And more...

<https://blog.rook.io/rook-v1-0-a-major-milestone-689ca4c75508>


► <https://www.youtube.com/watch?v=vdxcaR3I2ic>



# CNCF Project Update – Bryan Liles, Senior Staff Engineer, VMware



Incubating: CRI-O



**cri-o**

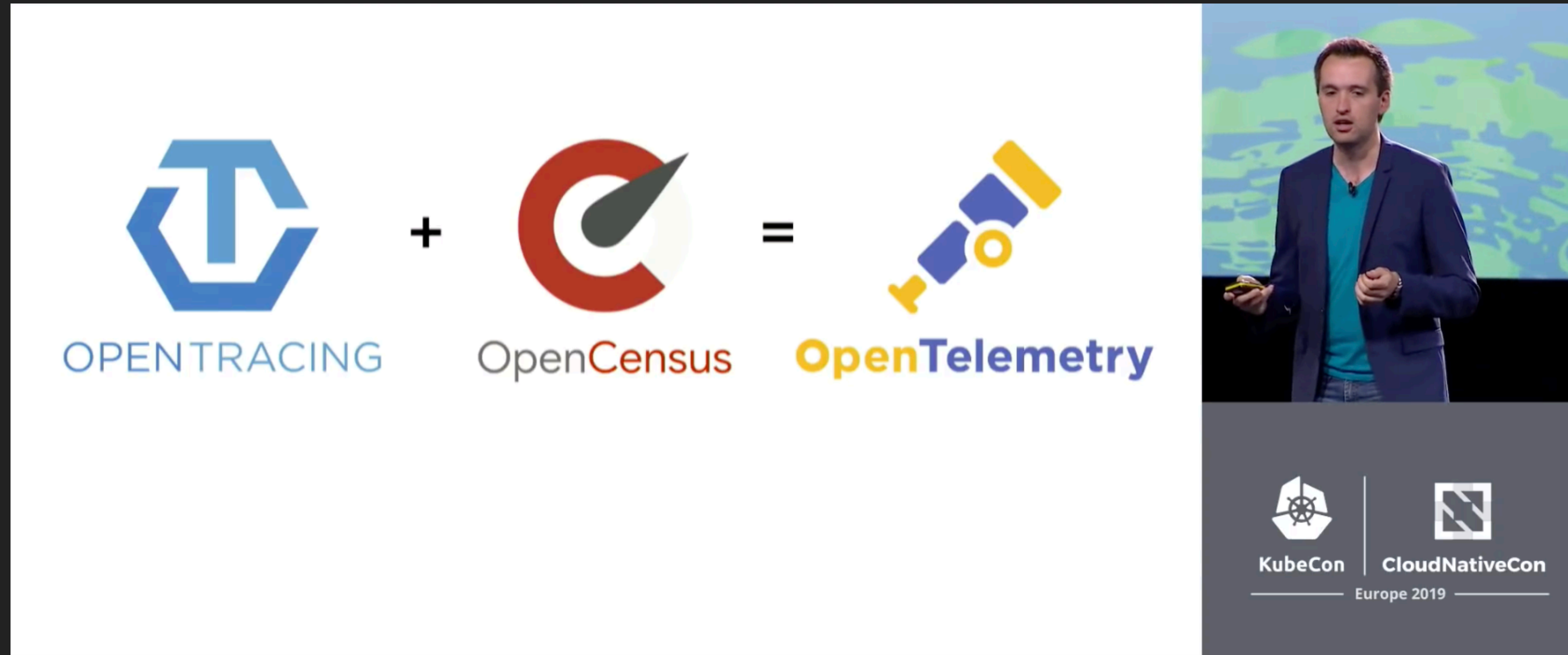
CRI-O is an implementation of the Kubernetes CRI to enable the use of OCI compatible runtimes.

KubeCon | CloudNativeCon  
Europe 2019

KubeCon | CloudNativeCon  
Europe 2019

► <https://www.youtube.com/watch?v=vdxcaR3I2ic>

## CNCF Project Update – Bryan Liles, Senior Staff Engineer, VMware



The diagram illustrates the formation of OpenTelemetry from two existing CNCF projects. On the left, the OpenTracing logo (a blue hexagon with a white 'T') is shown above the text 'OPENTRACING'. In the center, a plus sign (+) is followed by the OpenCensus logo (a red circle with a white 'C' and a grey arrow) above the text 'OpenCensus'. To the right of the plus sign is an equals sign (=), followed by the OpenTelemetry logo (a yellow and blue stylized 'O' with a yellow arrow) above the text 'OpenTelemetry'.

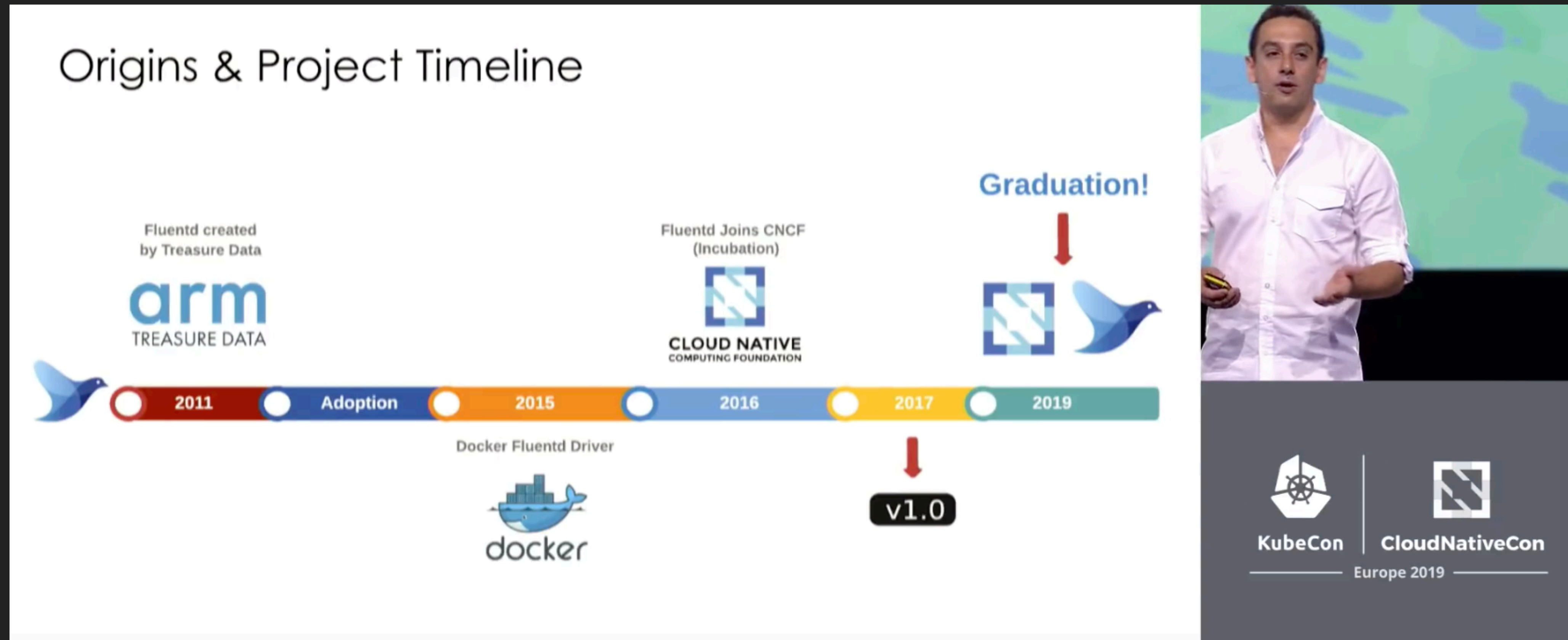
Below the diagram, a photograph of Bryan Liles, Senior Staff Engineer at VMware, is shown. He is standing on a stage, wearing a dark blue blazer over a teal shirt, and holding a small yellow object in his right hand. The background of the photo shows a green and blue abstract pattern.

At the bottom of the slide, there are two logos: KubeCon and CloudNativeCon, both with the text 'Europe 2019' below them.

► <https://www.youtube.com/watch?v=vdxcaR3I2ic>



# CNCF Project Update – Bryan Liles, Senior Staff Engineer, VMware



► <https://www.youtube.com/watch?v=vdxcaR3I2ic>

# Getting Started in the Kubernetes Community – Lucas Käldeström & Nikhita Raghunath

The image is a composite of four parts. On the left is a screenshot of the Kubernetes GitHub repository page, showing the repository name 'kubernetes / kubernetes', statistics (2,970 watches, 52,018 stars, 17,959 forks), and a list of merged pull requests. In the center is a diagram titled 'Contributor Roles' showing a progression from 'Non-member Contributors' to 'Owner'. The roles and their descriptions are: Owner (Set priorities and approve proposals for subproject; Responsibility and leadership for entire repository), Approver (Approve contributions for acceptance; Highly experienced reviewer and contributor in subproject), Reviewer (History of reviewing; reviews frequently; Authorship in subproject), and Member (Active contributor to the project; Sponsored by two Reviewers). On the right is a photo of a man with glasses, wearing a 'CLOUD NATIVE NOOBS' t-shirt, speaking on a stage. At the bottom right are the logos for 'KubeCon' and 'CloudNativeCon Europe 2019'. At the bottom center is a Twitter handle: '@kubernetesonarm & @TheNikhita'.

**Contributor Roles**

- Owner**  
Set priorities and approve proposals for subproject  
Responsibility and leadership for entire repository
- Approver**  
Approve contributions for acceptance  
Highly experienced reviewer and contributor in subproject
- Reviewer**  
History of reviewing; reviews frequently  
Authorship in subproject
- Member**  
Active contributor to the project  
Sponsored by two Reviewers
- Non-member Contributors**

**KubeCon** | **CloudNativeCon**  
Europe 2019

@kubernetesonarm & @TheNikhita

► <https://www.youtube.com/watch?v=Bho4miiByP0>



## Kubernetes Project Update – Janet Kuo, Software Engineer, Google

Extensibility  
Platforms & frameworks.  
CRD still beta.



KubeCon




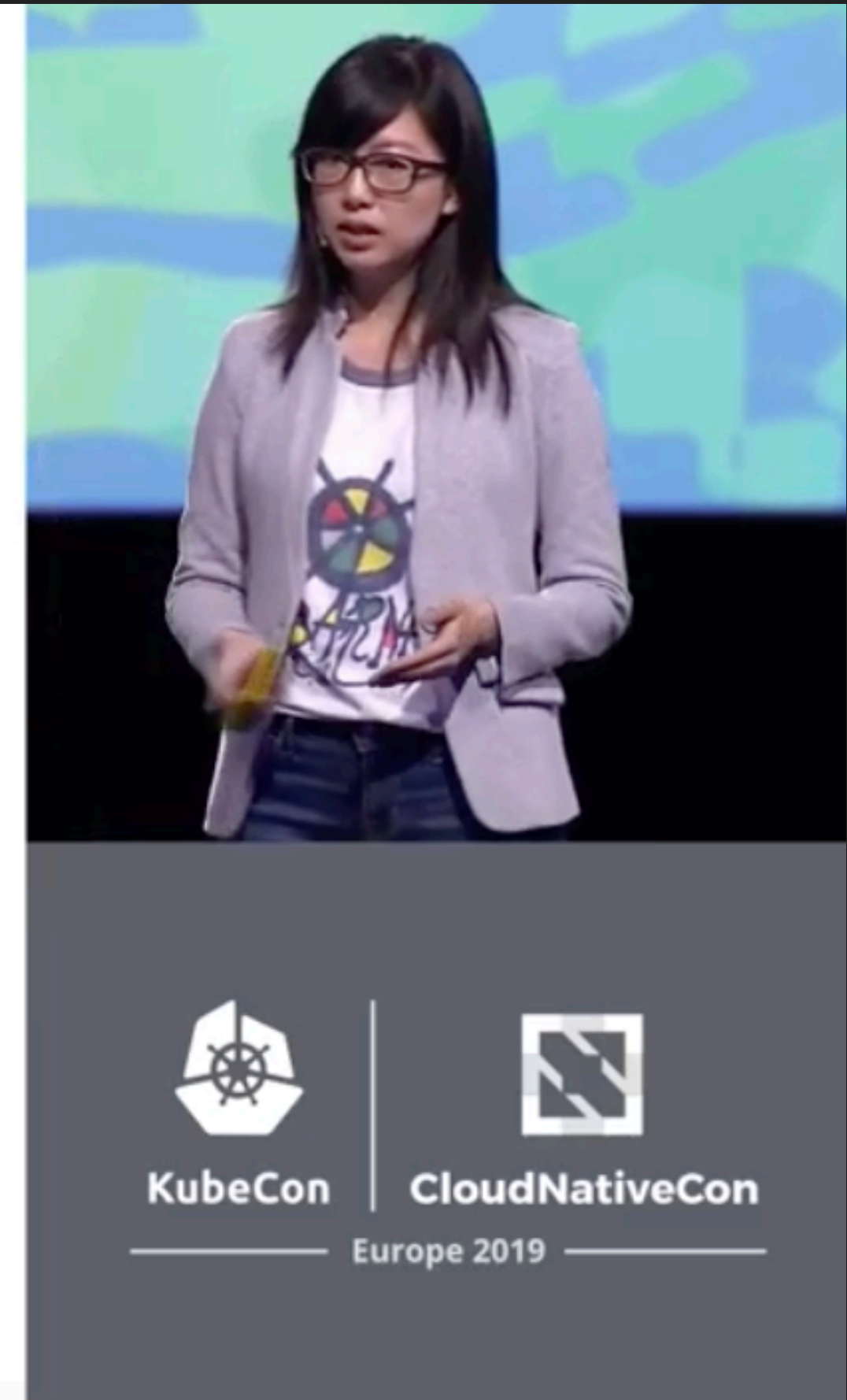
CloudNativeCon

Europe 2019

► <https://www.youtube.com/watch?v=jISu86XmkHE>

## Kubernetes Project Update – Janet Kuo, Software Engineer, Google


 Scalability Case Study:  
Node Status.  
300-600MB/min (5K nodes)  
Solution: NodeLease



► <https://www.youtube.com/watch?v=jISu86XmkHE>



## Kubernetes Project Update – Janet Kuo, Software Engineer, Google



**Reliability** Case Study:  
Cascading failures.  
Bad Pods kill Nodes.  
Eventually kill the cluster.



KubeCon

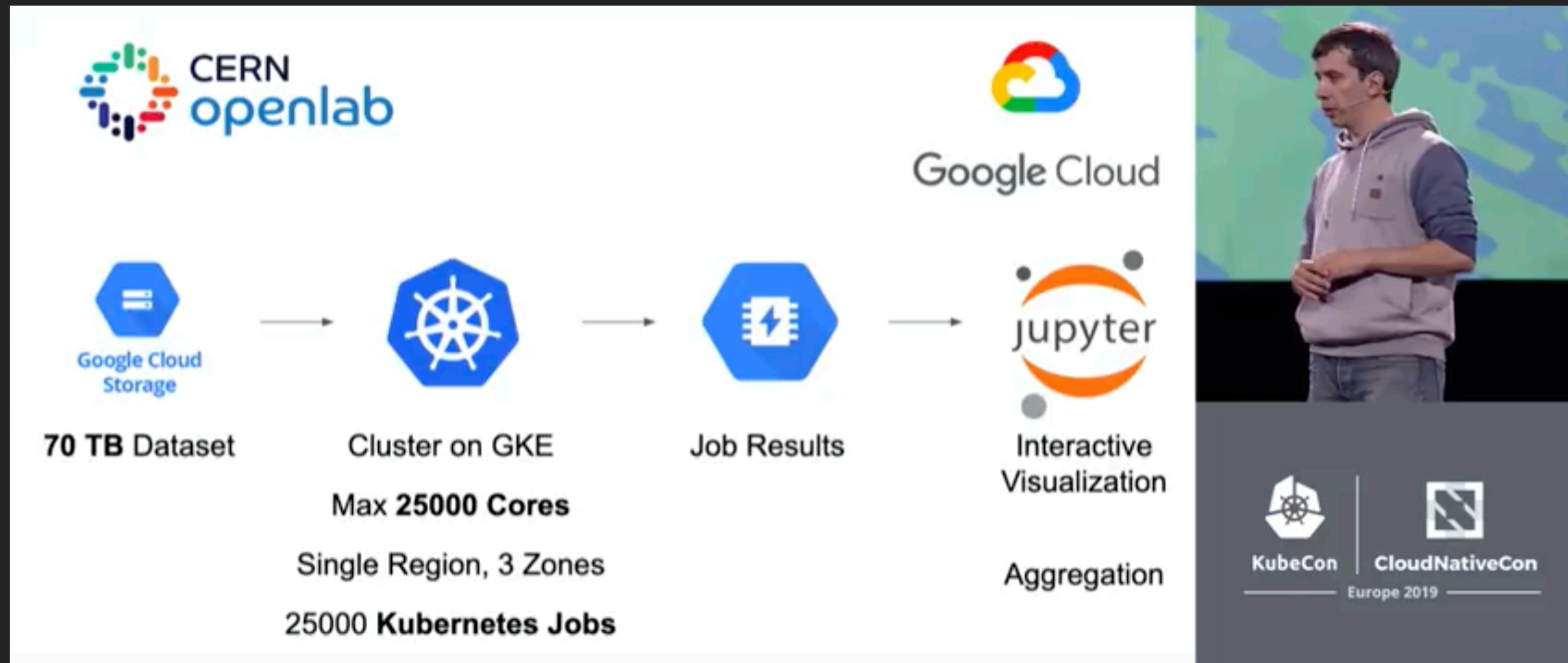


CloudNativeCon

Europe 2019

► <https://www.youtube.com/watch?v=jISu86XmkHE>

# Reperforming a Nobel Prize Discovery on Kubernetes – Ricardo Rocha & Lukas Heinrich



► <https://www.youtube.com/watch?v=CTfp2woVEkA>



# Expanding the Kubernetes Operator Community – Rob Szumski

Operators run your complex apps

```
graph LR; A((Embed ops knowledge from the experts)) --> B((Operator v1.1.2)); B <--> C((Deployments, StatefulSets, Autoscalers, Secrets, Config maps));
```

The diagram illustrates the process of running complex applications using Kubernetes Operators. It starts with 'Embed ops knowledge from the experts' (represented by a person icon with a lightbulb), which leads to 'Operator v1.1.2' (represented by a lightning bolt icon). This operator then manages various Kubernetes resources (represented by a ship's wheel icon), including Deployments, StatefulSets, Autoscalers, Secrets, and Config maps. The resources are shown in a circular flow with the operator.

Embed ops knowledge from the experts

Operator v1.1.2

Deployments  
StatefulSets  
Autoscalers  
Secrets  
Config maps

3


Red Hat

KubeCon | CloudNativeCon  
Europe 2019

A photograph of Rob Szumski, a man in a blue and white checkered shirt, standing on a stage and gesturing with his hands while presenting. He is holding a yellow object in his right hand.


► <https://www.youtube.com/watch?v=KPOEnFwspiY>

# Expanding the Kubernetes Operator Community – Rob Szumski



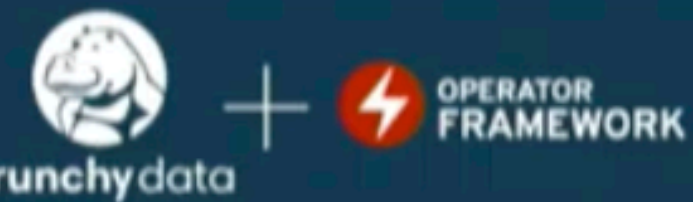
docker + PostgreSQL

- Containerized



Cloud Database

- Containerized
- Cloud storage ready
- Replicated
- Backup
- Automated updates





crunchydata + OPERATOR FRAMEWORK

- Containerized
- Container storage ready
- Replicated
- Backup
- Automated updates
- Enhanced observability
- Customization
- Local development
- Fully Open Source
- Any Kubernetes
- Certified on OpenShift

Operators are  
hybrid and more powerful

5

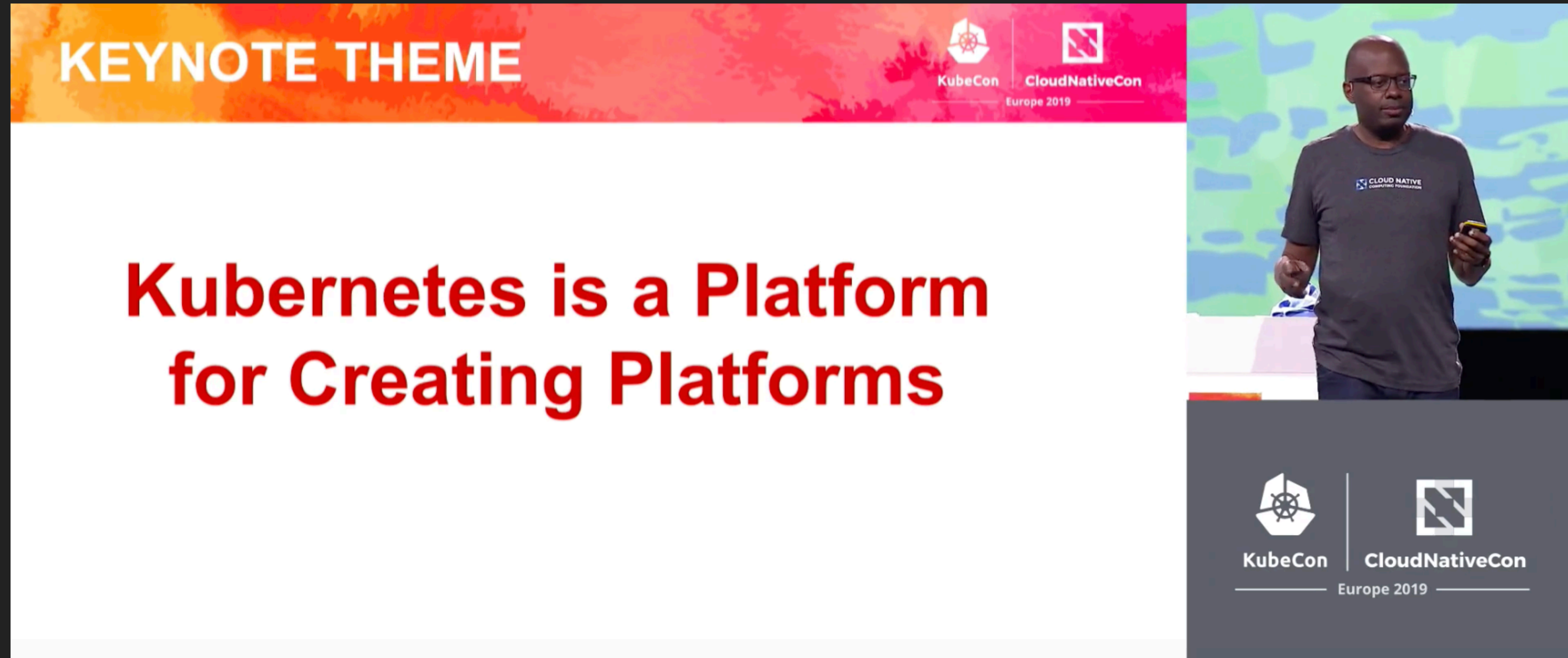
Red Hat



► <https://www.youtube.com/watch?v=KPOEnFwspiY>



## Opening Remarks – Bryan Liles, Senior Staff Engineer, VMware



► <https://www.youtube.com/watch?v=5lvT80d8YVU>

# How Spotify Accidentally Deleted All its Kube Clusters with No User Impact



Spotify

KubeCon Europe 2019 2019-05-22

 Spotify

**How Spotify Accidentally Deleted All Its Kube Clusters with No User Impact**

David Xia @davidxia\_

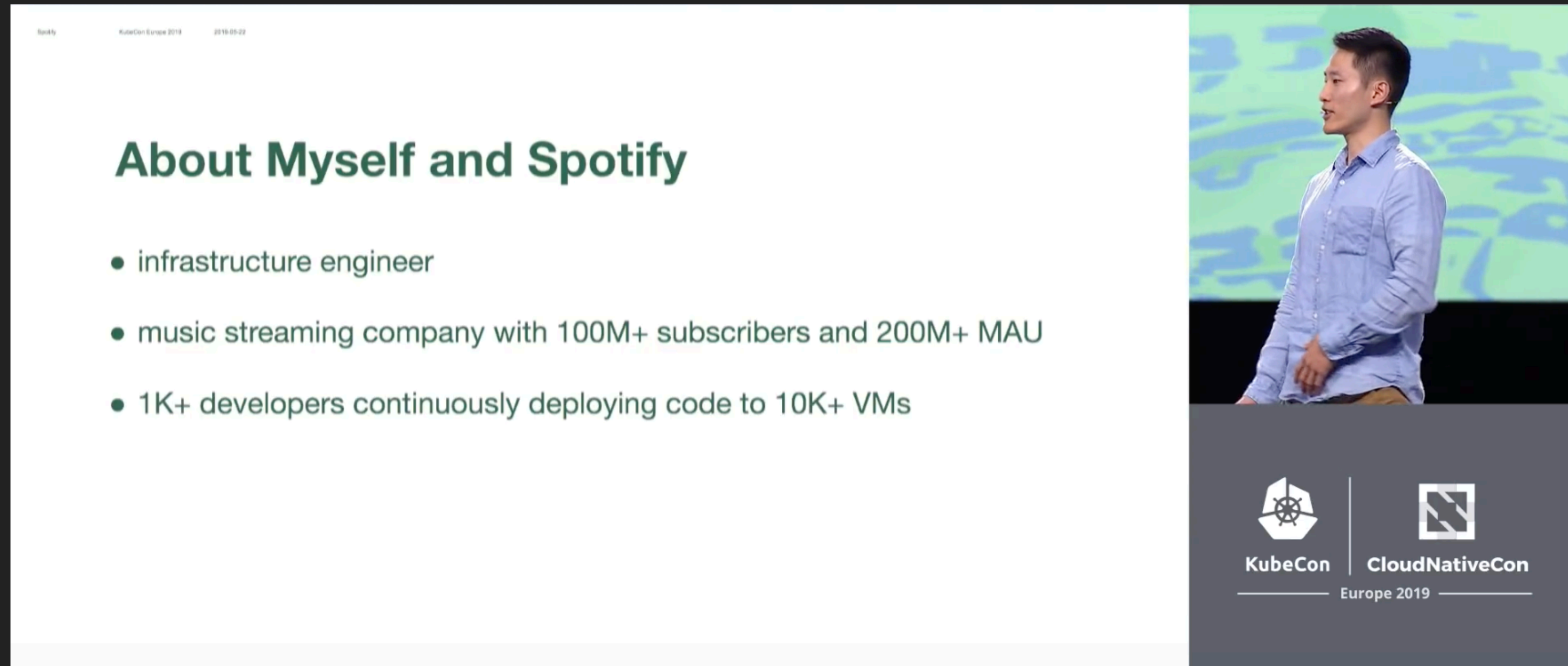
 KubeCon |  CloudNativeCon

Europe 2019

► <https://www.youtube.com/watch?v=ix0Tw8uinWs>



# How Spotify Accidentally Deleted All its Kube Clusters with No User Impact



Rocky KubeCon Europe 2019 2019-09-22

## About Myself and Spotify

- infrastructure engineer
- music streaming company with 100M+ subscribers and 200M+ MAU
- 1K+ developers continuously deploying code to 10K+ VMs

KubeCon CloudNativeCon  
Europe 2019

► <https://www.youtube.com/watch?v=ix0Tw8uinWs>



# How Spotify Accidentally Deleted All its Kube Clusters with No User Impact

The slide, titled "Context on Spotify's Compute Environment", illustrates the architecture of Spotify's compute environment. It features a horizontal flow diagram: a Google Cloud logo on the left, followed by a dashed line, then a Kubernetes logo, another dashed line, and finally three blue hexagonal icons representing "3 production clusters". The slide is part of a presentation at KubeCon Europe 2019, as indicated by the logos and text at the bottom right. A speaker, a man in a blue shirt, is visible on the right side of the slide, gesturing with his hands.

Spotify KubeCon Europe 2019 2019-05-22

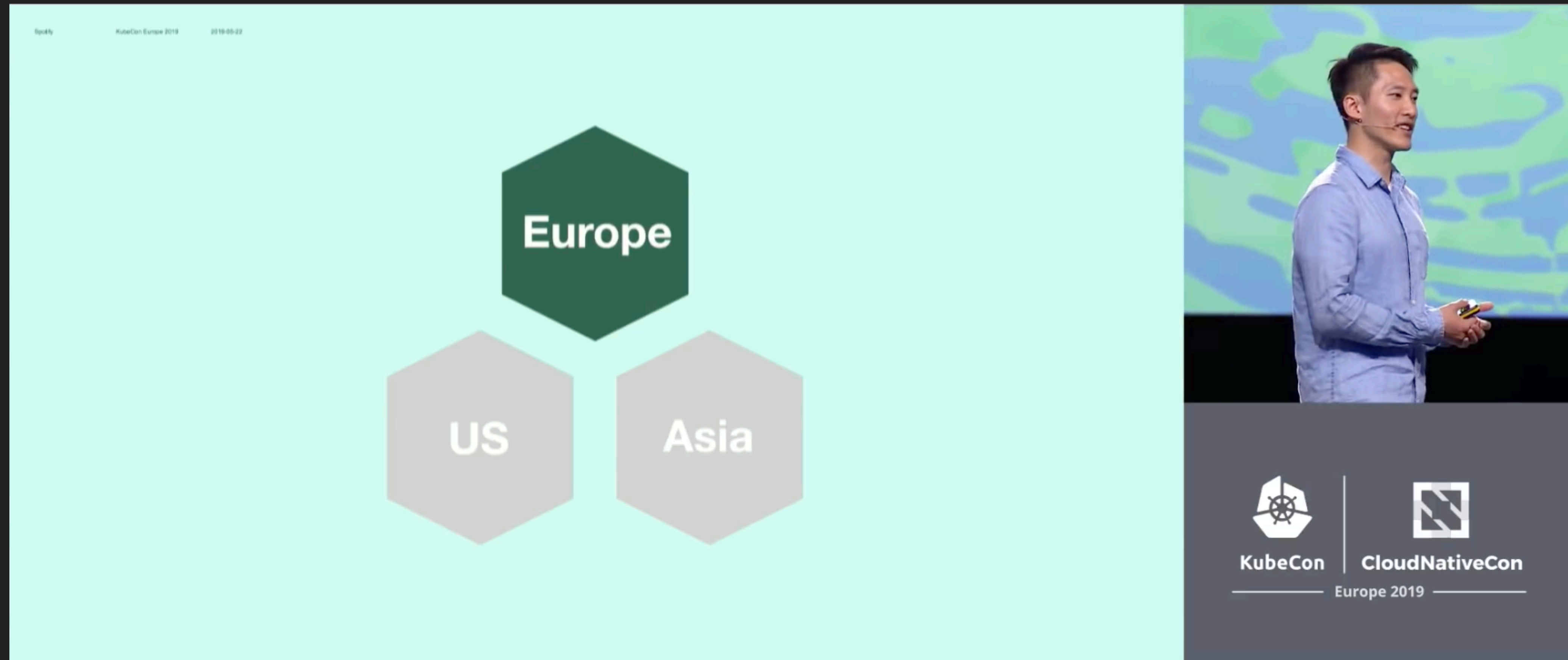
## Context on Spotify's Compute Environment

3 production clusters

KubeCon | CloudNativeCon  
Europe 2019

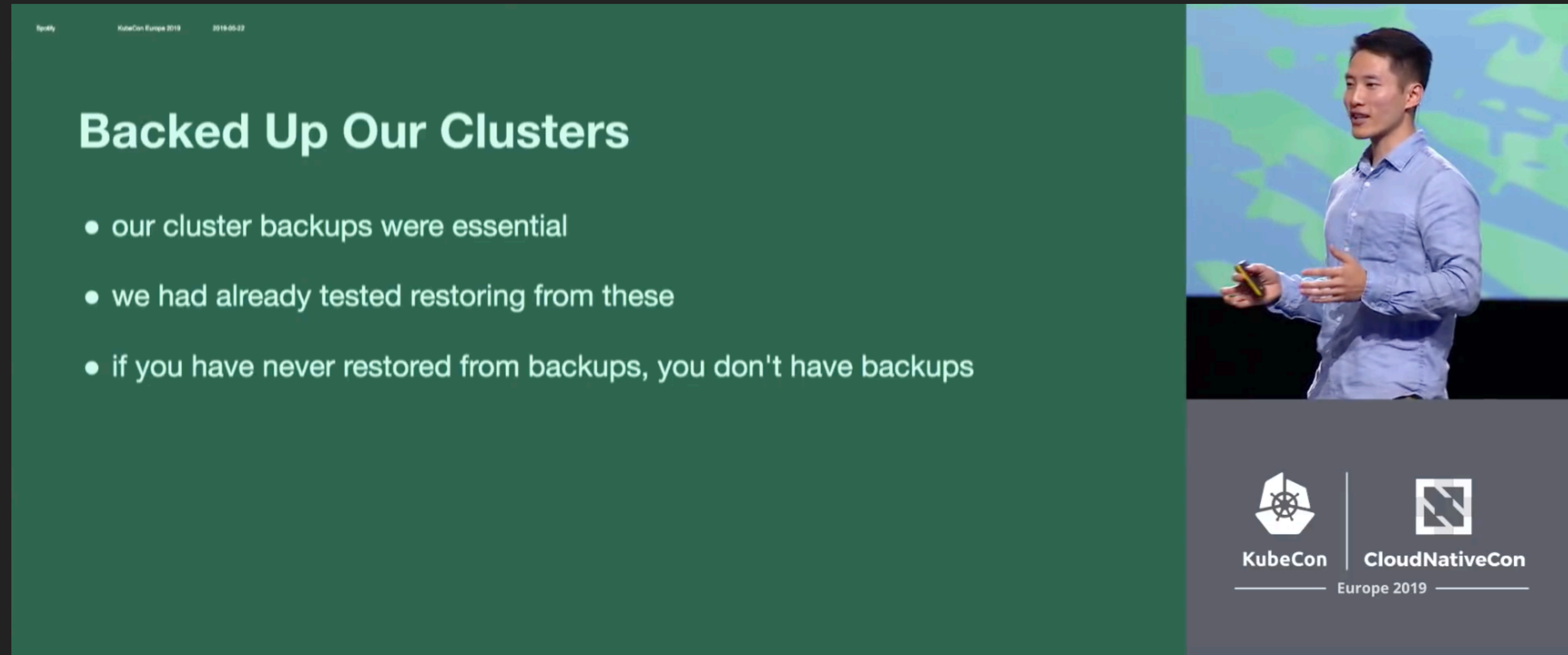
► <https://www.youtube.com/watch?v=ix0Tw8uinWs>

# How Spotify Accidentally Deleted All its Kube Clusters with No User Impact



► <https://www.youtube.com/watch?v=ix0Tw8uinWs>

# How Spotify Accidentally Deleted All its Kube Clusters with No User Impact



Spotify KubeCon Europe 2019 2019-05-22

## Backed Up Our Clusters

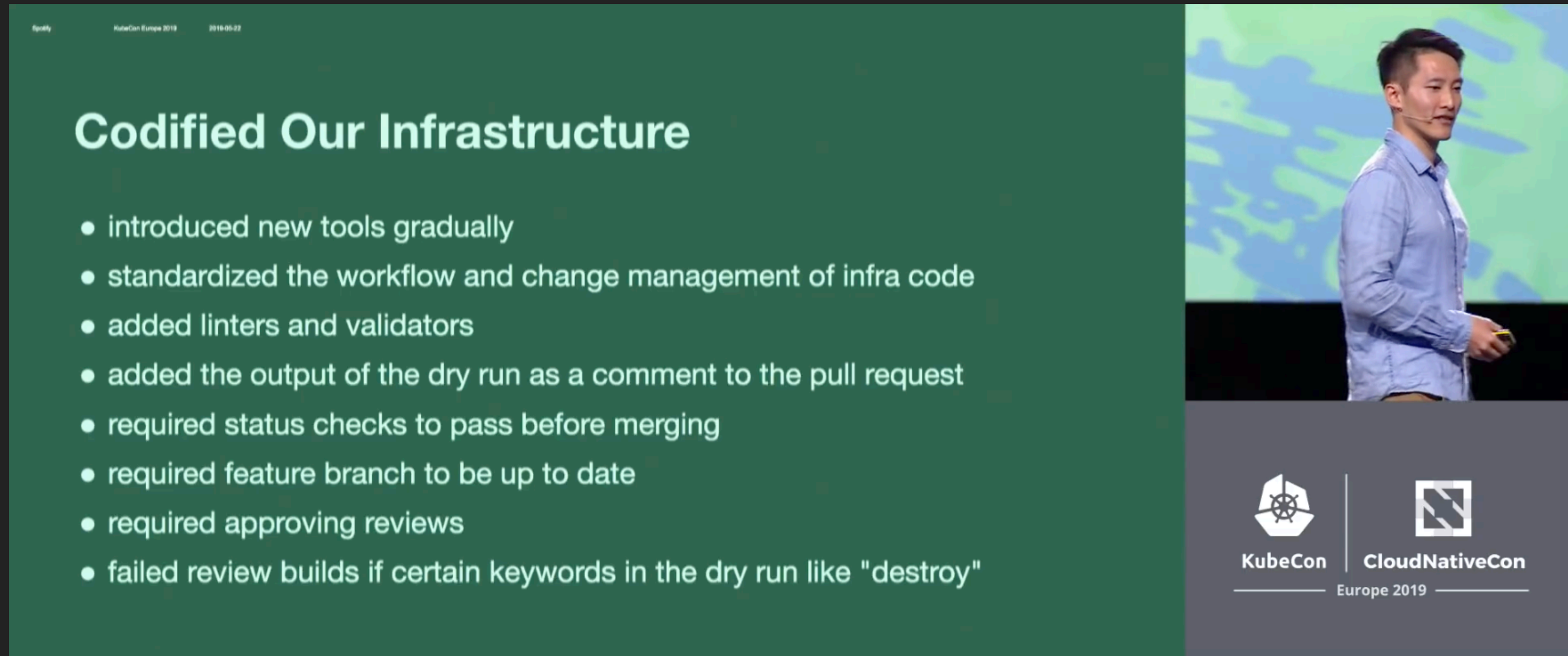
- our cluster backups were essential
- we had already tested restoring from these
- if you have never restored from backups, you don't have backups

KubeCon | CloudNativeCon  
Europe 2019

► <https://www.youtube.com/watch?v=ix0Tw8uinWs>



# How Spotify Accidentally Deleted All its Kube Clusters with No User Impact



Spotify KubeCon Europe 2019 2019-06-22

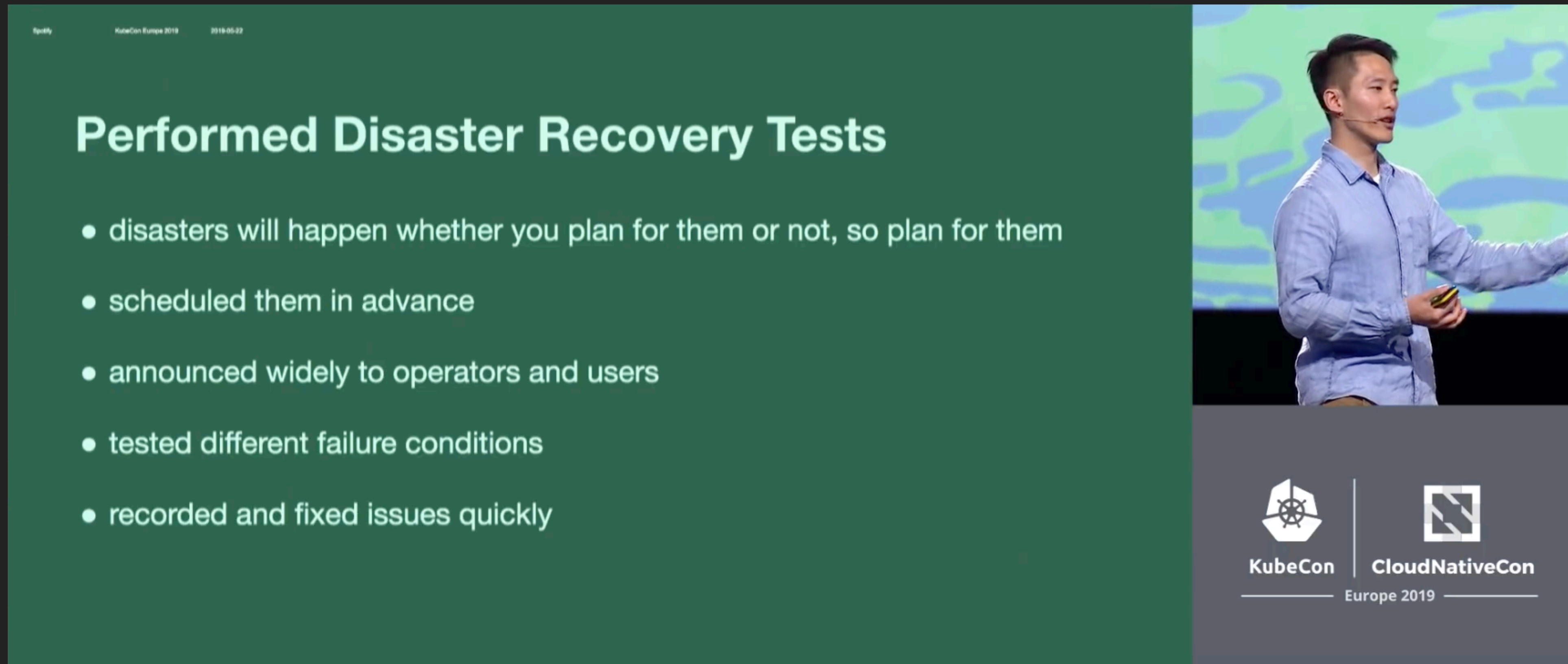
## Codified Our Infrastructure

- introduced new tools gradually
- standardized the workflow and change management of infra code
- added linters and validators
- added the output of the dry run as a comment to the pull request
- required status checks to pass before merging
- required feature branch to be up to date
- required approving reviews
- failed review builds if certain keywords in the dry run like "destroy"

KubeCon CloudNativeCon  
Europe 2019

► <https://www.youtube.com/watch?v=ix0Tw8uinWs>

# How Spotify Accidentally Deleted All its Kube Clusters with No User Impact



Spotify KubeCon Europe 2019 2019-06-22

## Performed Disaster Recovery Tests

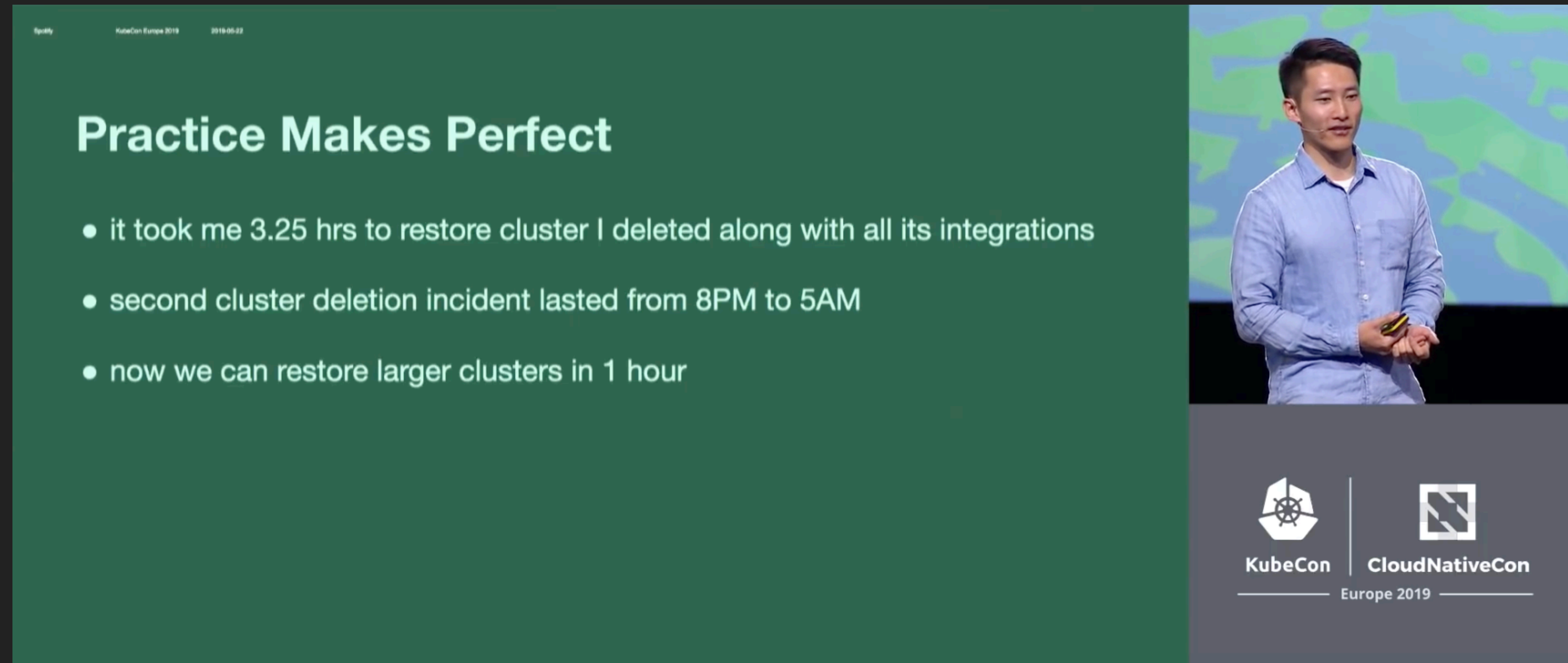
- disasters will happen whether you plan for them or not, so plan for them
- scheduled them in advance
- announced widely to operators and users
- tested different failure conditions
- recorded and fixed issues quickly

KubeCon CloudNativeCon  
Europe 2019

► <https://www.youtube.com/watch?v=ix0Tw8uinWs>



# How Spotify Accidentally Deleted All its Kube Clusters with No User Impact



The image shows a presentation slide from Spotify at KubeCon Europe 2019. The slide has a dark green background with white text. The title is 'Practice Makes Perfect'. Below it are three bullet points: 'it took me 3.25 hrs to restore cluster I deleted along with all its integrations', 'second cluster deletion incident lasted from 8PM to 5AM', and 'now we can restore larger clusters in 1 hour'. To the right of the slide, a man in a blue shirt is standing on a stage, holding a small object. At the bottom right, there are logos for KubeCon and CloudNativeCon, with 'Europe 2019' written below them.

Spotify KubeCon Europe 2019 2019-05-22

## Practice Makes Perfect

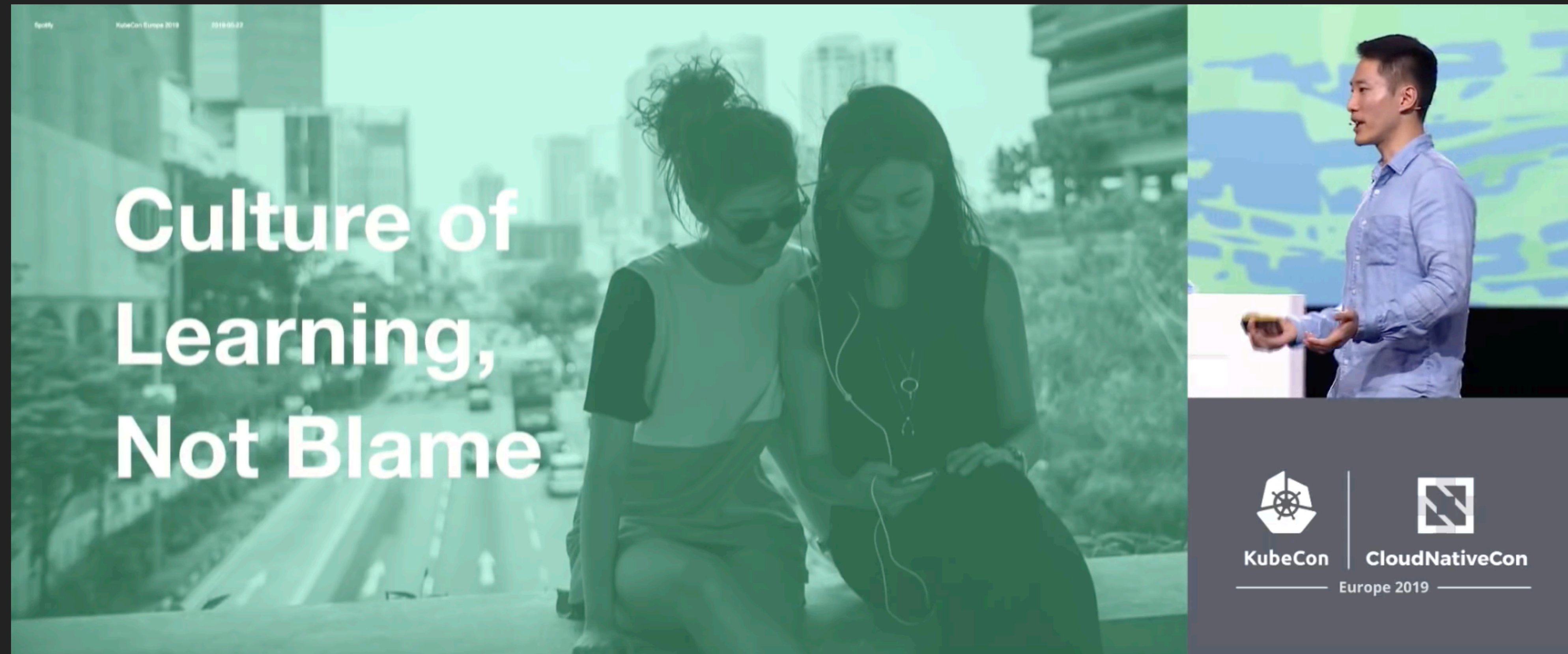
- it took me 3.25 hrs to restore cluster I deleted along with all its integrations
- second cluster deletion incident lasted from 8PM to 5AM
- now we can restore larger clusters in 1 hour

KubeCon CloudNativeCon  
Europe 2019

► <https://www.youtube.com/watch?v=ix0Tw8uinWs>



# How Spotify Accidentally Deleted All its Kube Clusters with No User Impact



► <https://www.youtube.com/watch?v=ix0Tw8uinWs>

# How Spotify Accidentally Deleted All its Kube Clusters with No User Impact



Spotify KubeCon Europe 2019 2019-05-22

## What We Did Right

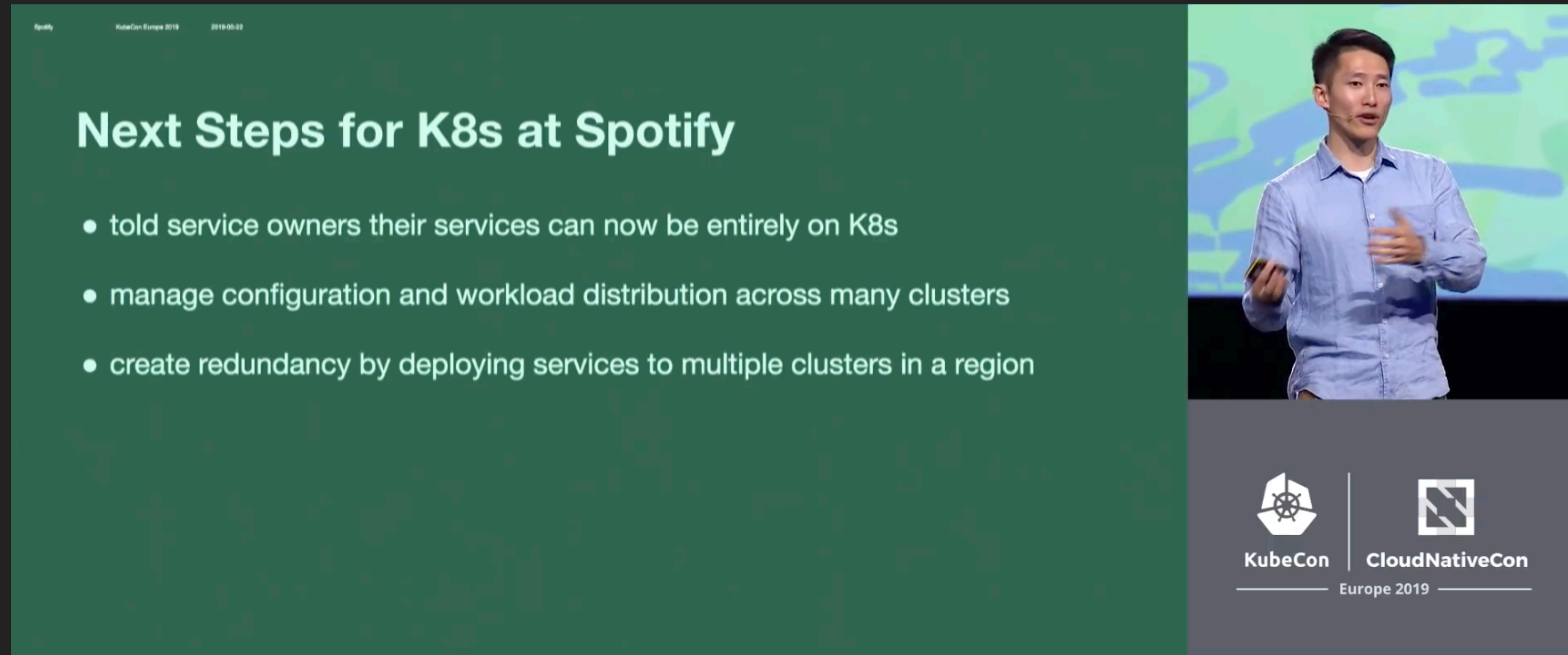
- we planned for failure
- we are migrating large scale, complex infrastructure **gradually**
- we have a culture of learning

KubeCon | CloudNativeCon  
Europe 2019

► <https://www.youtube.com/watch?v=ix0Tw8uinWs>



# How Spotify Accidentally Deleted All its Kube Clusters with No User Impact



The image shows a presentation slide from Spotify at KubeCon Europe 2019. The slide is titled "Next Steps for K8s at Spotify" and lists three bullet points: "told service owners their services can now be entirely on K8s", "manage configuration and workload distribution across many clusters", and "create redundancy by deploying services to multiple clusters in a region". To the right of the slide is a photo of a man in a blue shirt speaking on stage. At the bottom right, there are logos for KubeCon and CloudNativeCon Europe 2019.

Spotify KubeCon Europe 2019 2019-06-22

## Next Steps for K8s at Spotify

- told service owners their services can now be entirely on K8s
- manage configuration and workload distribution across many clusters
- create redundancy by deploying services to multiple clusters in a region

KubeCon CloudNativeCon Europe 2019

► <https://www.youtube.com/watch?v=ix0Tw8uinWs>



# A Journey to a Centralized, Globally Distributed Platform – Katie Gamanji

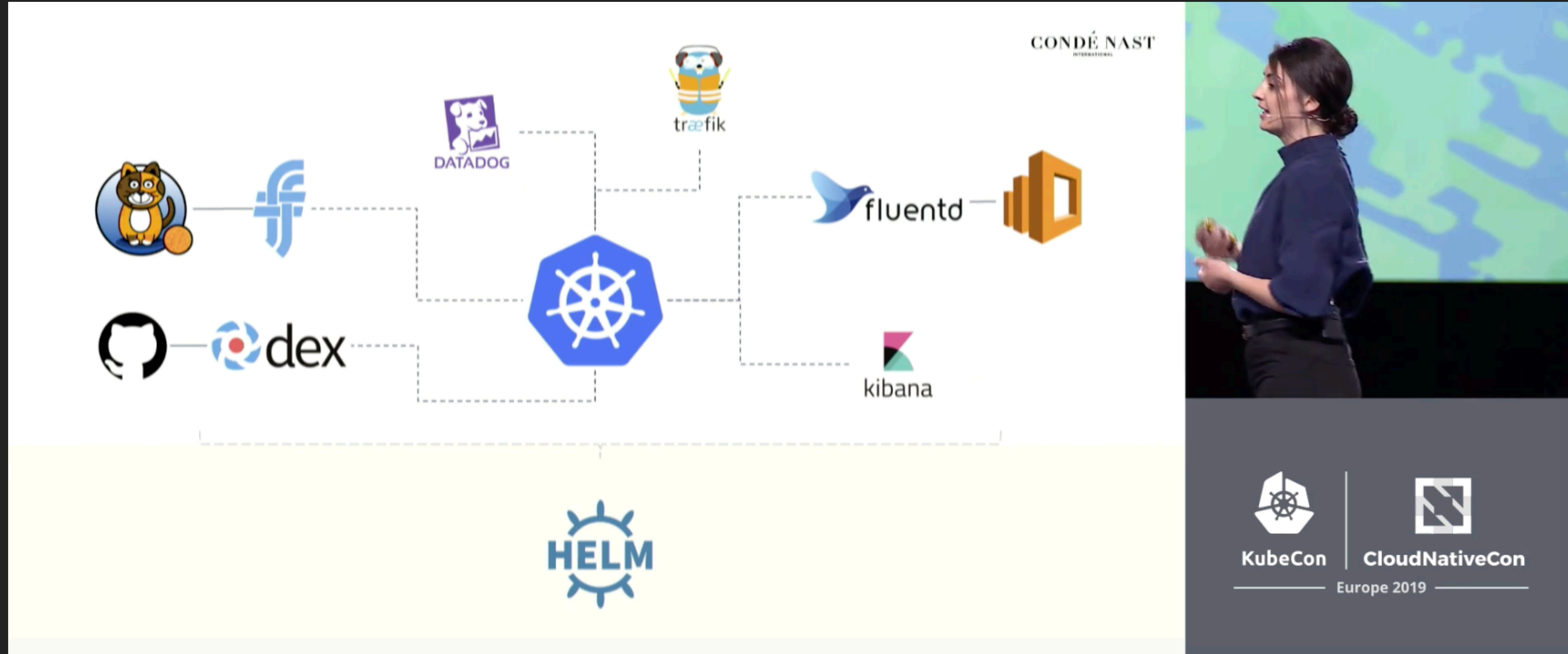
The slide features the Condé Nast International logo in the top right corner. It displays four key metrics in a row, each with an icon, a large number, and a label:

Icon	Value	Label
Location pin	11	Markets
Globe	62	Websites
Group of people	301.5m	Unique users
Globe with person	1.5bn	Digital readership

On the right side of the slide, a woman (Katie Gamanji) is shown speaking on a stage with a blue and green abstract background. At the bottom right, there are logos for KubeCon and CloudNativeCon, with the text "Europe 2019" below them.

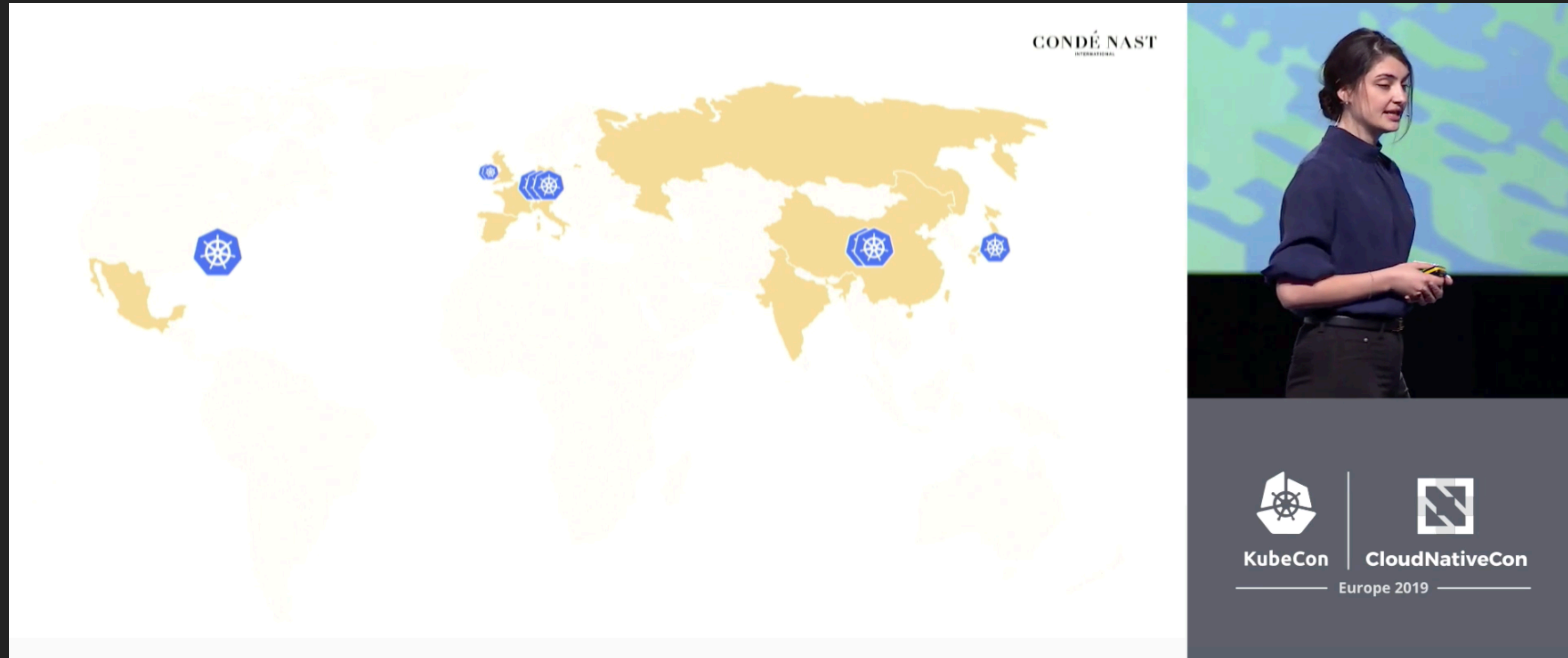
► <https://www.youtube.com/watch?v=D7pbISekc8g>

# A Journey to a Centralized, Globally Distributed Platform – Katie Gamanji



► <https://www.youtube.com/watch?v=D7pbISekc8g>


# A Journey to a Centralized, Globally Distributed Platform – Katie Gamanji



► <https://www.youtube.com/watch?v=D7pblSekc8g>




# What I Learned Running 10,000+ Kubernetes Clusters – Jason McGee, IBM




**IBM Cloud  
Kubernetes Service**


## Scaling to Thousands of Clusters



- **100,000+** clusters created
- **10,000+** active clusters under management
- **6 regions and 35 data centers**
- Using Kubernetes to run Kubernetes
  - 1000s clusters managed per control plane cluster
- **Running diverse workloads**
  - Web and API workloads
  - Databases and Data warehouses
  - Machine learning and AI (including Watson)
  - Identity, Key Management and Security
  - Blockchain and IoT
  - High volume web properties (such as [weather.com](https://www.weather.com), airlines, and rental car companies)



**KubeCon**



**CloudNativeCon**

Europe 2019

► <https://www.youtube.com/watch?v=HXF0QzxUBTw>



# What I Learned Running 10,000+ Kubernetes Clusters – Jason McGee, IBM

## How can we manage this much?

We have a ~25 person SRE team on the front line of this service

No team growth as the service scaled

Needed a way to enable them to survive the growth curve



KubeCon



CloudNativeCon


Europe 2019

► <https://www.youtube.com/watch?v=HXF0QzxUBTw>

# What I Learned Running 10,000+ Kubernetes Clusters – Jason McGee, IBM


**Adapt the system...**


**...not the team**


The team lives on  **slack**

To help them manage at scale, **we made slack the center of the entire operations approach** so the team **doesn't have to context switch** to run the system

**ChatOps** and **Bots** integrated into Slack handle change, incidents, status, access, compliance and everything else needed to operate the system



  
KubeCon

  
CloudNativeCon

Europe 2019

5

► <https://www.youtube.com/watch?v=HXF0QzxUBTw>



## KEYNOTE THEME



KubeCon



CloudNativeCon

Europe 2019

# Cloud Native / Kubernetes is a Journey and Not a Destination



KubeCon



CloudNativeCon

Europe 2019

# From COBOL to Kubernetes: A 250 Year Old Bank's Cloud-Native Journey – Laura Rehorst

**ABN AMRO BANK**

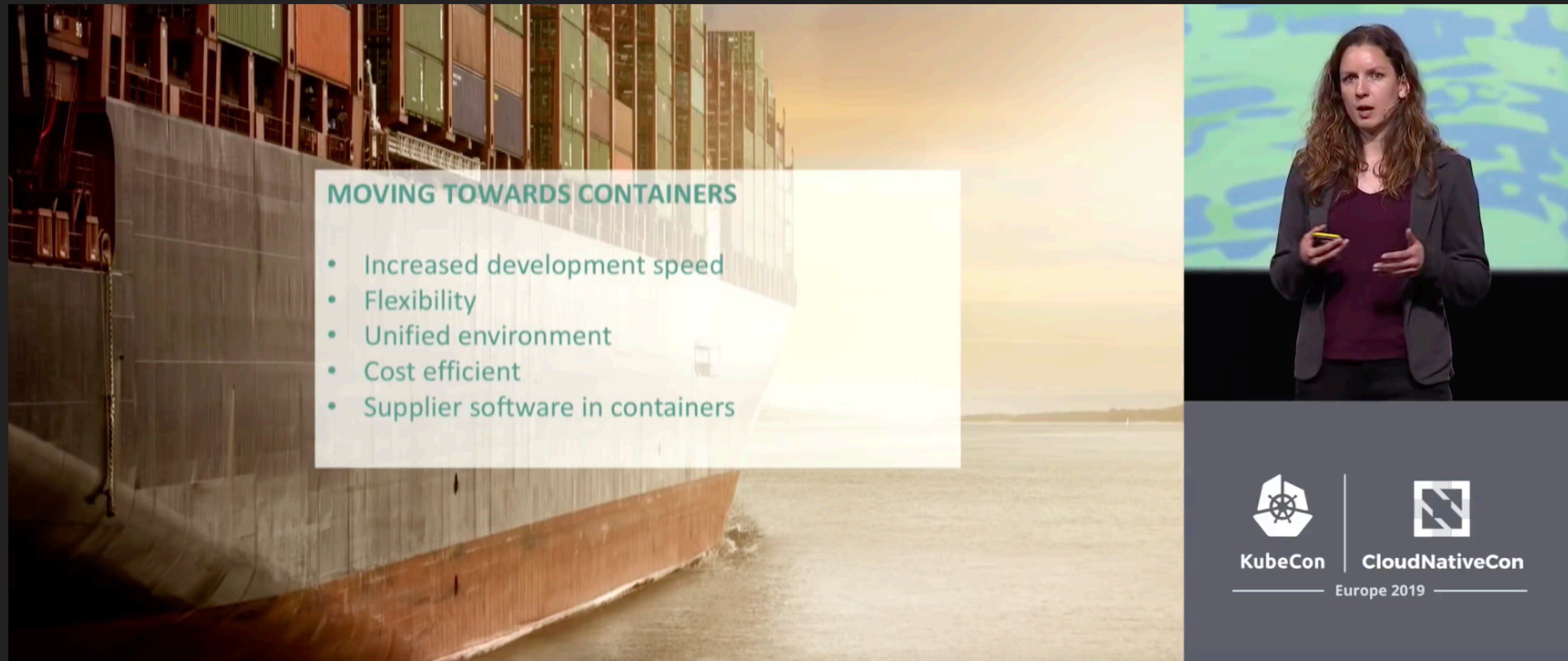
<b>Financial sector</b> Enterprising bank	<b>20,000</b> Total number of employees
<b>Amsterdam</b> Headquarter	<b>400+</b> Development Teams
<b>Agile organization</b> DevOps / Hybrid cloud	<b>3,000+</b> Applications

   
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Europe 2019

► [https://www.youtube.com/watch?v=uRvKGZ\\_fDPU](https://www.youtube.com/watch?v=uRvKGZ_fDPU)





# From COBOL to Kubernetes: A 250 Year Old Bank's Cloud-Native Journey – Laura Rehorst



**MOVING TOWARDS CONTAINERS**

- Increased development speed
- Flexibility
- Unified environment
- Cost efficient
- Supplier software in containers

   
KubeCon | CloudNativeCon  
Europe 2019


► [https://www.youtube.com/watch?v=uRvKGZ\\_fDPU](https://www.youtube.com/watch?v=uRvKGZ_fDPU)




# From COBOL to Kubernetes: A 250 Year Old Bank's Cloud-Native Journey – Laura Rehorst

## STRATUS' MISSION


to enable development teams to quickly deliver secure and high quality software by providing them with:




Easy-to-use  
Platforms




Security





Portability across  
clouds on  
enterprise level




Re-usable  
software  
components

 ABN-AMRO





KubeCon



CloudNativeCon


Europe 2019

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# From COBOL to Kubernetes: A 250 Year Old Bank's Cloud-Native Journey – Laura Rehorst

PLATFORM

Level	APPLICATION	App definition & Image build HELM	CI/CD cloudbees, Azure DevOps		Scanning Twistlock, splunk, Prometheus
	ORCHESTRATION	Amazon EKS, Azure AKS			Secrets Management Vault
	RUNTIME	Persistent storage To be determined	Container runtime docker	Network CNI	MONITOR & LOGGING
		Automation & Config Terraform		Docker Registry Nexus	
	PROVISIONING				
INFRA	amazon web services, Microsoft Azure				



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# From COBOL to Kubernetes: A 250 Year Old Bank's Cloud-Native Journey – Laura Rehorst

**ROADMAP**

The roadmap illustrates the progression of ABN-AMRO's cloud-native journey through three key milestones:

- Q4 2018:** Stratus team created. Define mission & vision. Define capabilities of platform.
- Q1 2019:** Minimum Viable Product #1.
  - ✓ Managed Container Platform on AWS (EKS)
  - ✓ Twistlock build implementation
  - ✓ Docker Image Pipeline
  - ✓ Hardened and secure base images
- Q2 2019:** Minimum Viable Product #2.
  - ✓ Improve platform governance
  - ✓ Training & Education
  - ✓ Positioning Infrastructure as Code
  - ✓ Positioning Compliance as Code
  - ✓ Metrics / Telemetry
  - ✓ Twistlock runtime implementation

**ABN-AMRO**

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► [https://www.youtube.com/watch?v=uRvKGZ\\_fDPU](https://www.youtube.com/watch?v=uRvKGZ_fDPU)

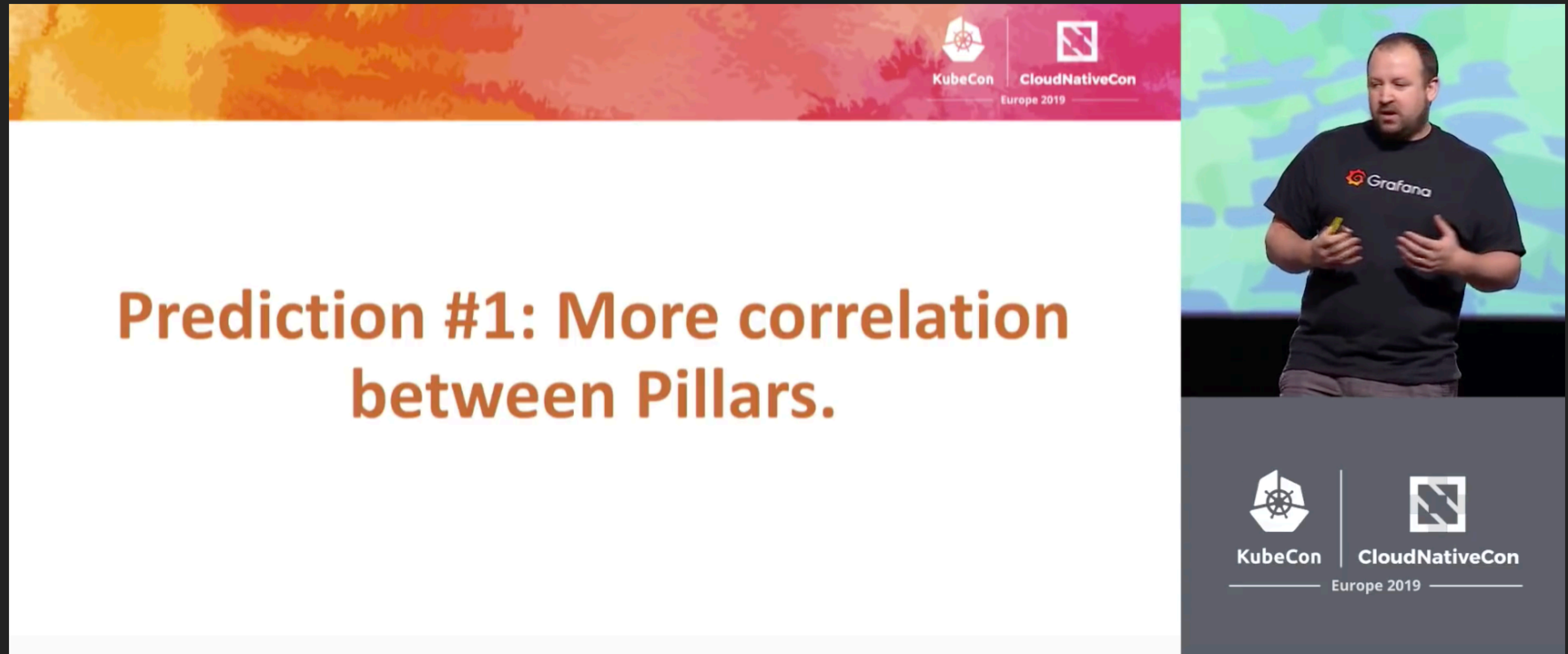


# Metrics, Logs & Traces; What Does the Future Hold for Observability? – Tom Wilkie

The slide is titled "The Three Pillars" and features three main circular icons representing the pillars of observability: Metrics (orange circle with a line graph), Logs (green circle with a list of log entries), and Traces (blue circle with a flow diagram). Below these icons are five smaller logos: a red 'M' in a circle, an orange flame, a blue bird, a blue hexagon with a 'T', and a blue cartoon character. The slide also includes the KubeCon and CloudNativeCon Europe 2019 logos in the top right and bottom right corners. A photo of Tom Wilkie, wearing a black Grafana t-shirt, is shown on the right side of the slide.

► <https://www.youtube.com/watch?v=MkSdvPdS1oA>

# Metrics, Logs & Traces; What Does the Future Hold for Observability? – Tom Wilkie



**Prediction #1: More correlation between Pillars.**

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Europe 2019

Grafana

KubeCon | CloudNativeCon  
Europe 2019

► <https://www.youtube.com/watch?v=MkSdvPdS1oA>



# Metrics, Logs & Traces; What Does the Future Hold for Observability? – Tom Wilkie

**Prediction #1: Correlation**

The diagram illustrates a cyclical relationship between three observability data types: Metrics, Logs, and Traces. Metrics is represented by an orange circle with a line graph icon. Traces is represented by a blue circle with a bar chart icon. Logs is represented by a green circle with a text document icon. Arrows indicate a flow from Metrics to Traces, Traces to Logs, and Logs back to Metrics, suggesting how these different data sources can be correlated to gain insights.

**KubeCon | CloudNativeCon Europe 2019**

**Grafana**

**KubeCon | CloudNativeCon Europe 2019**

► <https://www.youtube.com/watch?v=MkSdvPdS1oA>



# Metrics, Logs & Traces; What Does the Future Hold for Observability? – Tom Wilkie

**Prediction #2: New Signals & New Analysis**

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Europe 2019

► <https://www.youtube.com/watch?v=MkSdvPdS1oA>

# Metrics, Logs & Traces; What Does the Future Hold for Observability? – Tom Wilkie

## Prediction #3: Index-free Logs



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**bletchley punk**  
@alicegoldfuss

Follow

just give me log files and grep, I am dying

6:32 PM - 5 Apr 2018

<https://twitter.com/alicegoldfuss/status/98194777256079360>




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► <https://www.youtube.com/watch?v=MkSdvPdS1oA>




# Metrics, Logs & Traces; What Does the Future Hold for Observability? – Tom Wilkie


## Prediction #3: Index free logs




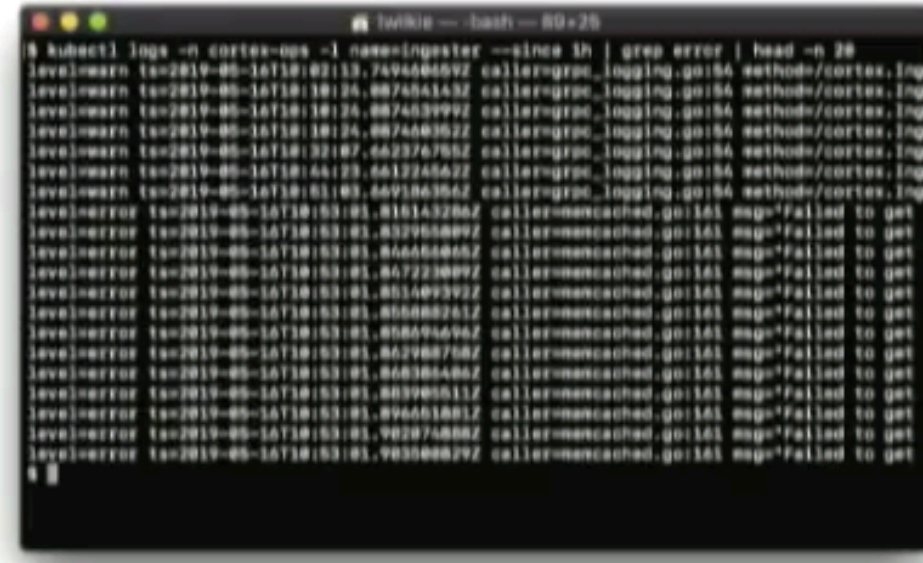

**OK Log**  
<https://github.com/oklog/oklog>




**kubect1 logs**



**Grafana loki**  
<https://github.com/grafana/loki>





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► <https://www.youtube.com/watch?v=MkSdvPdS1oA>





# FAILURE STORIES



# Kubernetes Failure Stories and How to Crash Your Clusters – Henning Jacobs, Zalando SE

The image consists of two parts. The left part is a presentation slide with a white background. At the top, the word "SCALE" is written in black. Below it, the number "380" is displayed in large black font, followed by the word "Accounts" in a smaller black font. To the right of this is the AWS logo, which includes the word "aws" in a dark blue sans-serif font and a yellow curved arrow underneath. Below the "380 Accounts" text is the Kubernetes logo, a blue hexagon with a white ship's wheel inside. To the right of the Kubernetes logo is the number "118" in large black font, followed by the word "Clusters" in a smaller black font. In the bottom left corner of the slide is a small black number "5". In the bottom right corner is the Zalando logo, which is an orange circle followed by the word "zalando" in black. The right part of the image is a video frame showing a man standing on a stage. He is wearing a dark blue and white striped long-sleeved shirt and dark trousers. He is holding a small object in his hands. Behind him is a red podium with two microphones. The podium has logos for "KubeCon" and "CloudNativeCon" on it. The background is a plain wall.

SCALE

380 Accounts

aws

Kubernetes logo

118 Clusters

5

zalando

KubeCon CloudNativeCon Europe 2019

► <https://www.youtube.com/watch?v=6sDTB4eV4F8>

# Kubernetes Failure Stories and How to Crash Your Clusters – Henning Jacobs, Zalando SE

## INCIDENT #8: CPU THROTTLING

	min	max	avg	memory
CPU	0	1.000 K	230	490
MEM	0.000 K	0.000 K	471	2.000 K
Pod	0%	1.000 K	1.000 K	1.000 K
Resolving request	0%	1.000 K	1.000 K	1.000 K

71

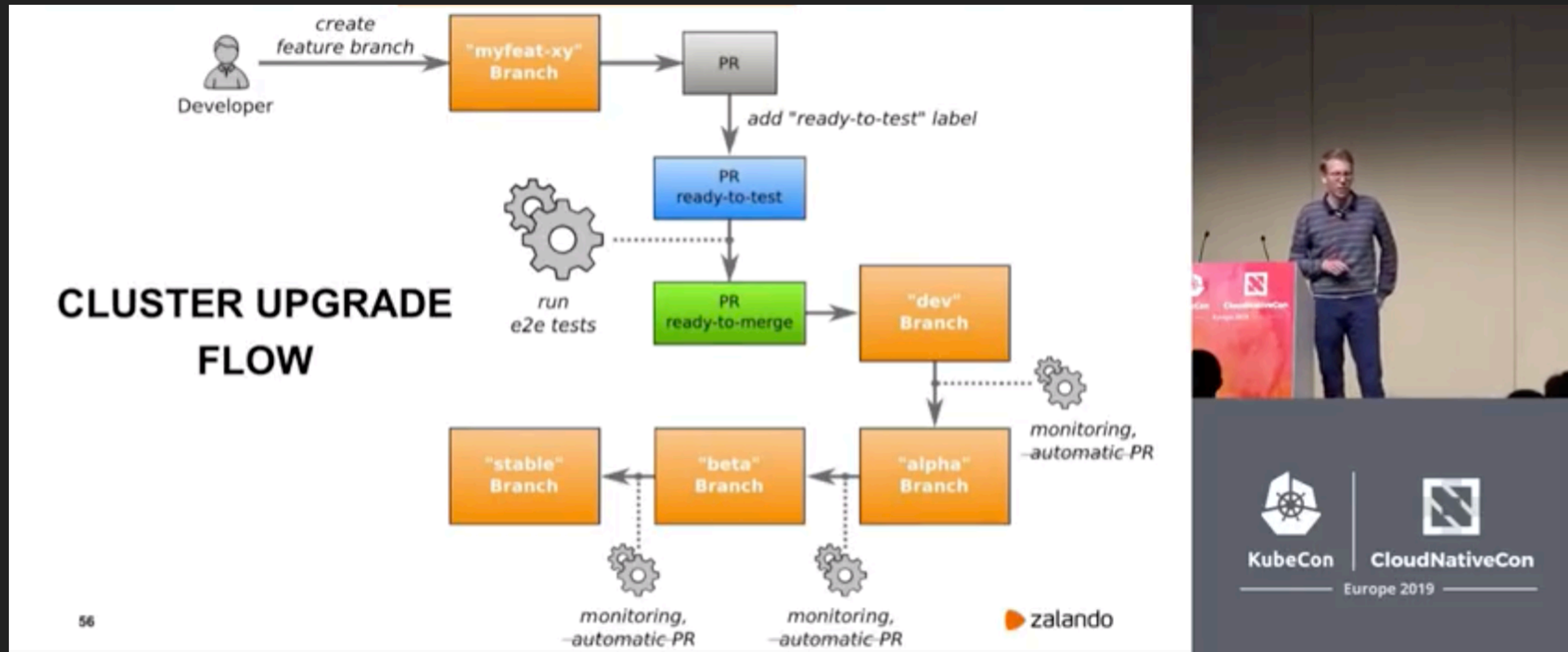
zalando

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► <https://www.youtube.com/watch?v=6sDTB4eV4F8>



# Kubernetes Failure Stories and How to Crash Your Clusters – Henning Jacobs, Zalando SE



► <https://www.youtube.com/watch?v=6sDTB4eV4F8>

# Kubernetes Failure Stories and How to Crash Your Clusters – Henning Jacobs, Zalando SE

## WILL MANAGED K8S SAVE US?

### Amazon EKS Announces 99.9% Service Level Agreement

Posted On: Jan 16, 2019

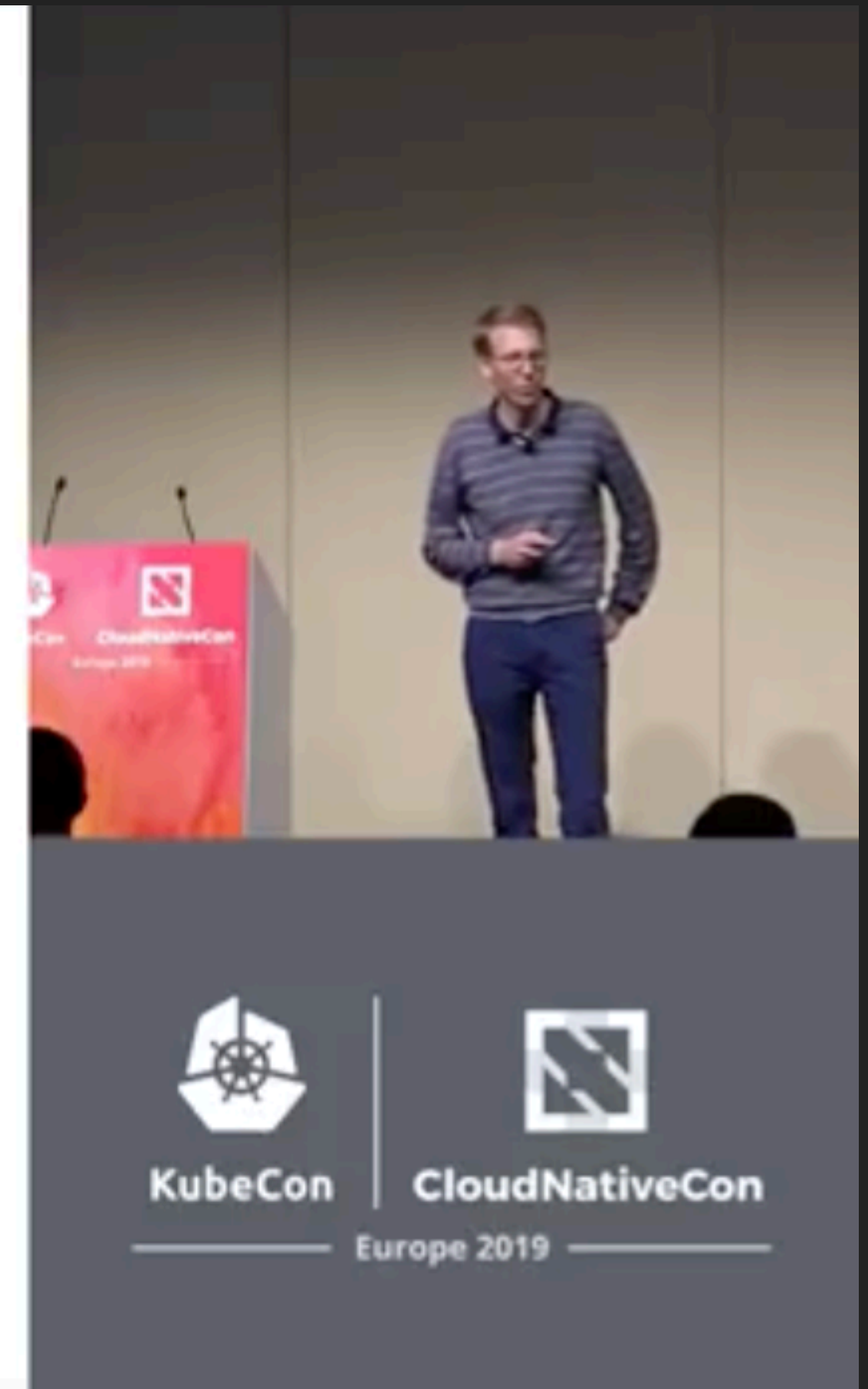
AWS has published a service level agreement (SLA) for Amazon Elastic Container Service for Kubernetes (EKS), which provides availability guarantees for Amazon EKS.

---

GKE: monthly uptime percentage at 99.95% for regional clusters

80

 zalando



► <https://www.youtube.com/watch?v=6sDTB4eV4F8>



# Kubernetes Failure Stories and How to Crash Your Clusters – Henning Jacobs, Zalando SE

The image is a composite of two parts. On the left is a presentation slide with a white background. At the top, it asks 'WILL MANAGED K8S SAVE US?' in black capital letters. Below this, the word 'NO' is written in large, bold, red capital letters. Underneath 'NO', the text '(not really)' is written in a smaller, grey font. Further down, an example is given: 'e.g. AWS EKS uptime SLA is only for API server'. In the bottom left corner of the slide is the number '81', and in the bottom right corner is the Zalando logo. On the right side of the composite image is a photograph of a man, Henning Jacobs, standing on a stage. He is wearing a blue and white striped long-sleeved shirt and dark trousers. Behind him is a red podium with the CloudNativeCon logo. The background of the stage is a plain, light-colored wall. At the bottom of the photograph, there is a dark grey banner with the KubeCon and CloudNativeCon logos, and the text 'Europe 2019'.

WILL MANAGED K8S SAVE US?

**NO**

(not really)

e.g. AWS EKS uptime SLA is only for API server

81

zalando

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► <https://www.youtube.com/watch?v=6sDTB4eV4F8>







# STORAGE





# Debunking the Myth: Kubernetes Storage is Hard – Saad Ali, Senior Software Engineer, Google



## Benefits of Kubernetes

Self Healing	Intelligent Scheduling	Auto Scaling	App Portability
Service Discovery	Load Balancing	Safer Deployment	Magic of Containers





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► <https://www.youtube.com/watch?v=169w6QlWhmo>

# Debunking the Myth: Kubernetes Storage is Hard – Saad Ali, Senior Software Engineer, Google

**Kubernetes Storage Myths**

**It's hard!**  
Storage on Kubernetes is hard.

**Don't do it!**  
Don't run stateful workloads on Kubernetes.

**Why Is Storage On Kubernetes So Hard?**  
By Gokhan Simsek  
Article | Friday, January 11 2019

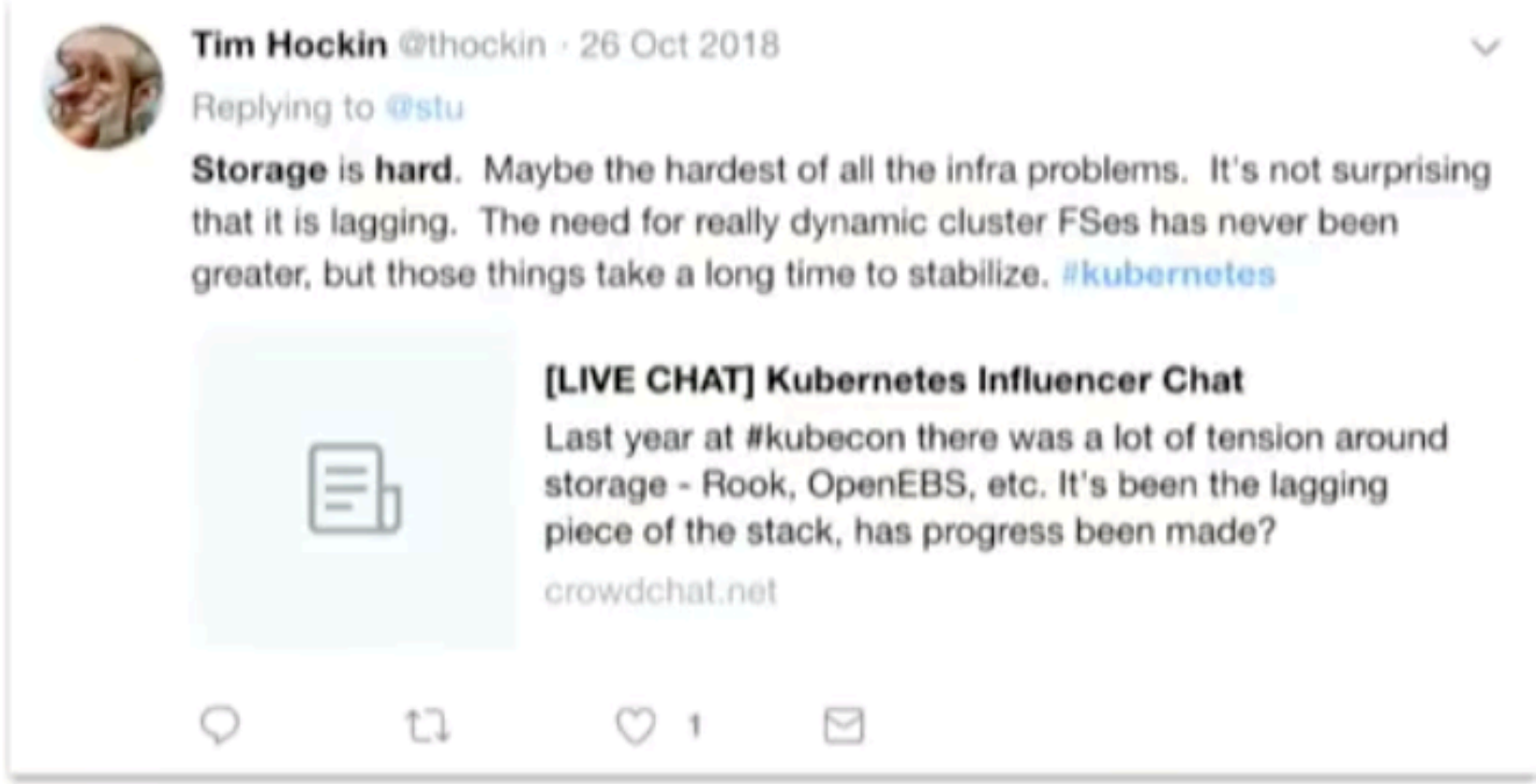
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**KubeCon** | **CloudNativeCon**  
Europe 2019


► <https://www.youtube.com/watch?v=169w6QlWhmo>



# Debunking the Myth: Kubernetes Storage is Hard – Saad Ali, Senior Software Engineer, Google



**Reality: Storage is complicated**





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► <https://www.youtube.com/watch?v=169w6QlWhmo>

# Debunking the Myth: Kubernetes Storage is Hard – Saad Ali, Senior Software Engineer, Google

**Seperate Storage Problems**

<b>01</b>	<b>02</b>	<b>03</b>	<b>04</b>
<b>Select</b>	<b>Deploy</b>	<b>Integrate</b>	<b>Consume</b>
What storage should I use?	How do I deploy and manage my storage?	How do I make my deployed storage available in my cluster?	How does my stateful app provision and use available storage?

   
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Europe 2019



► <https://www.youtube.com/watch?v=169w6QlWhmo>







# Debunking the Myth: Kubernetes Storage is Hard – Saad Ali, Senior Software Engineer, Google

## Data Services vs Block/File

<b>Object Stores</b> Amazon S3 Google Cloud Storage (GCS) MinIO	<b>SQL Databases</b> MySQL PostgreSQL SQL Server	<b>NoSQL Databases</b> Key-value or document based MongoDB Redis Cassandra
	<b>Time series Databases</b> InfluxDB Prometheus Graphite	<b>Message Queues</b> Apache Kafka RabbitMQ Google Cloud Pub/Sub Amazon SQS
	<b>File Storage</b> NFS SMB GlusterFS CephFS	<b>Block Storage</b> iSCSI Fibre Channel GCE Persistent Disks Amazon EBS Local Disks

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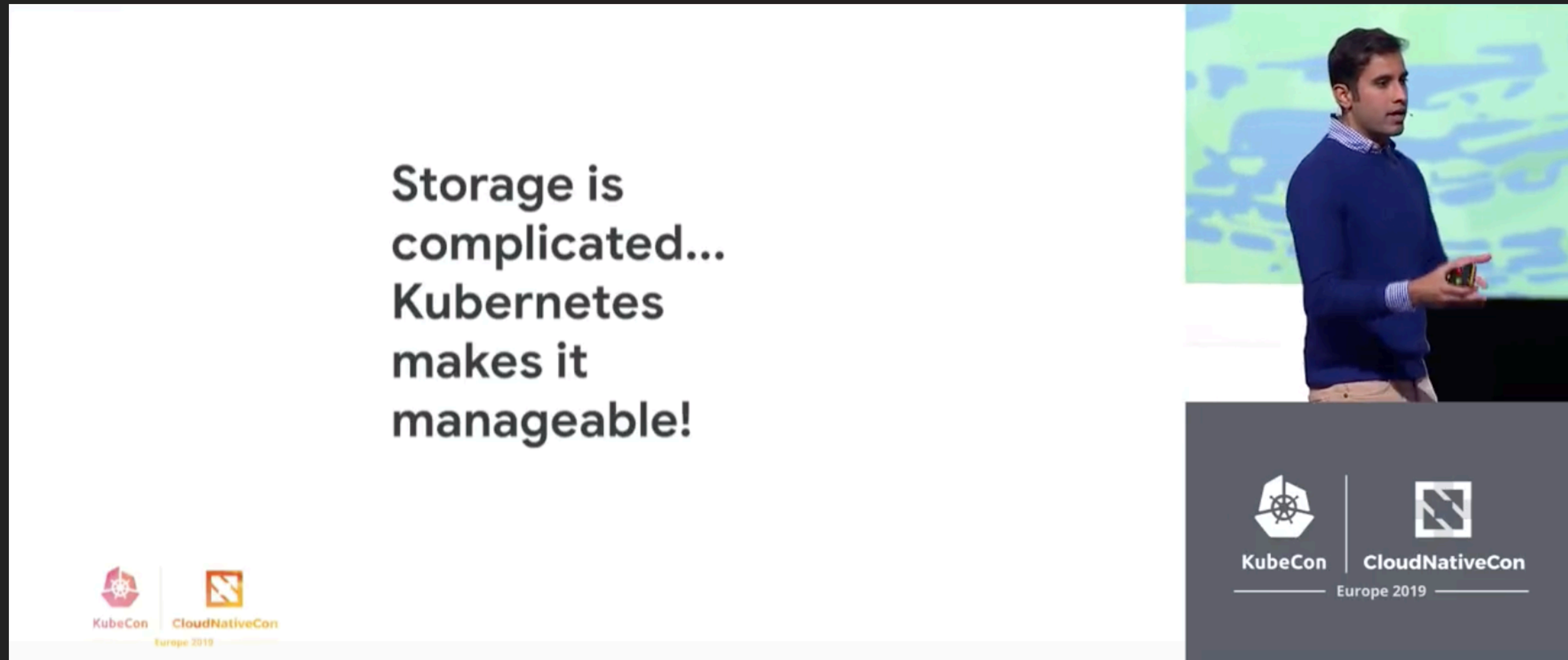


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► <https://www.youtube.com/watch?v=169w6QlWhmo>



## Debunking the Myth: Kubernetes Storage is Hard – Saad Ali, Senior Software Engineer, Google



Storage is complicated...  
Kubernetes makes it manageable!

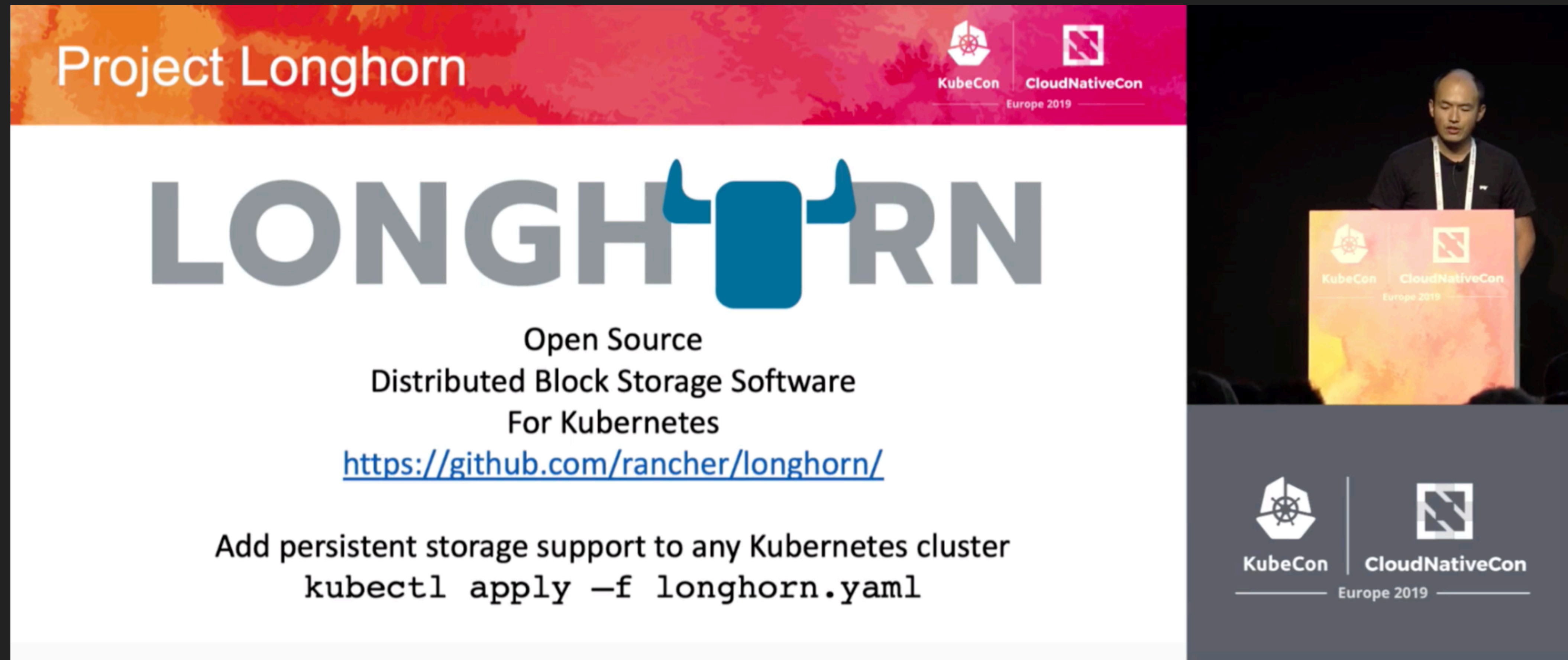
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Europe 2019

► <https://www.youtube.com/watch?v=169w6QlWhmo>



## Build a Kubernetes Based Cloud Native Storage Solution From Scratch – Sheng Yang, Rancher Labs



The image shows a presentation slide for Project Longhorn and a photograph of the speaker, Sheng Yang, at a podium. The slide has a red and orange header with the text "Project Longhorn" and logos for KubeCon and CloudNativeCon Europe 2019. The main body of the slide is white and features the "LONGHORN" logo, where the "O" is replaced by a blue bull head icon. Below the logo, the text reads "Open Source Distributed Block Storage Software For Kubernetes" followed by the GitHub link <https://github.com/rancher/longhorn/>. At the bottom, it says "Add persistent storage support to any Kubernetes cluster" and shows the command `kubectl apply -f longhorn.yaml`. The speaker photo on the right shows a man at a podium with a similar header and logos.

Project Longhorn

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# LONGHORN

Open Source  
Distributed Block Storage Software  
For Kubernetes

<https://github.com/rancher/longhorn/>

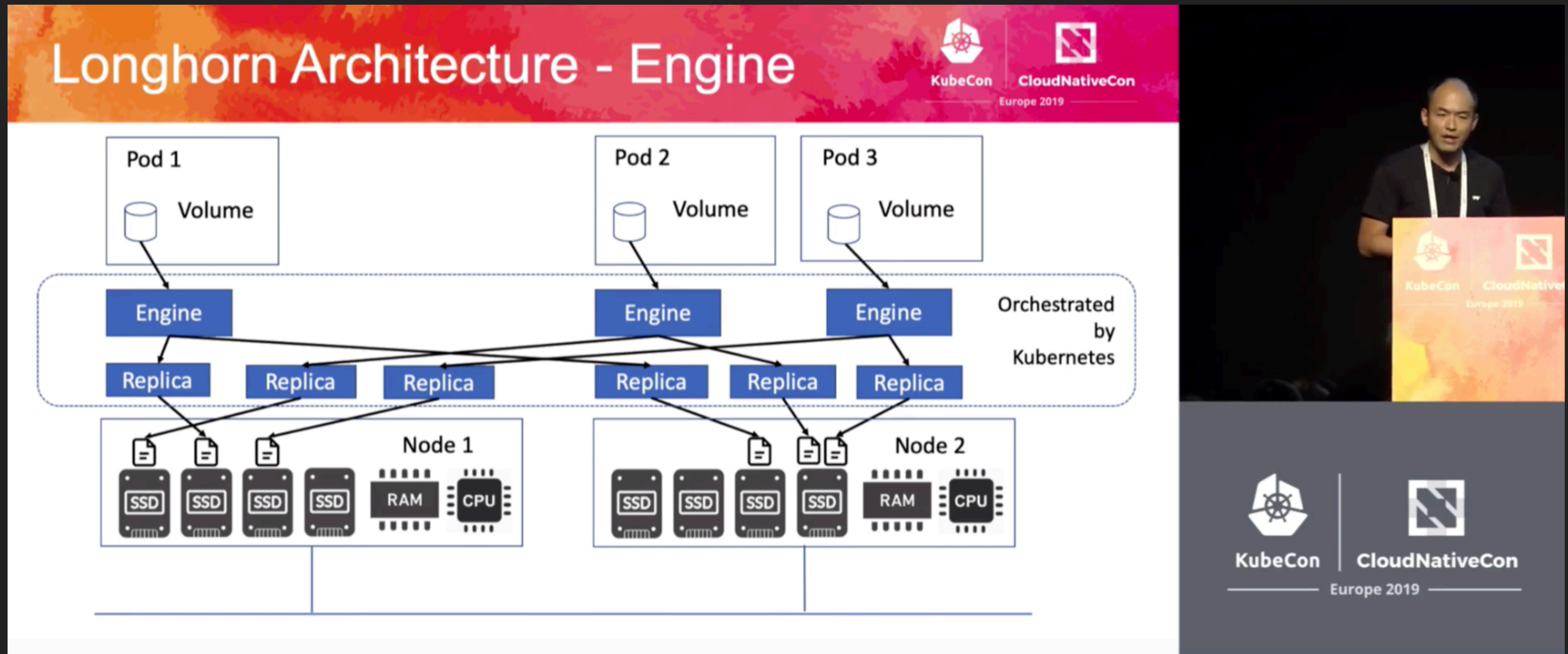
Add persistent storage support to any Kubernetes cluster

```
kubectl apply -f longhorn.yaml
```

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► [https://www.youtube.com/watch?v=XVAZ1BM\\_hpM](https://www.youtube.com/watch?v=XVAZ1BM_hpM)

# Build a Kubernetes Based Cloud Native Storage Solution From Scratch – Sheng Yang, Rancher Labs



► [https://www.youtube.com/watch?v=XVAZ1BM\\_hpM](https://www.youtube.com/watch?v=XVAZ1BM_hpM)

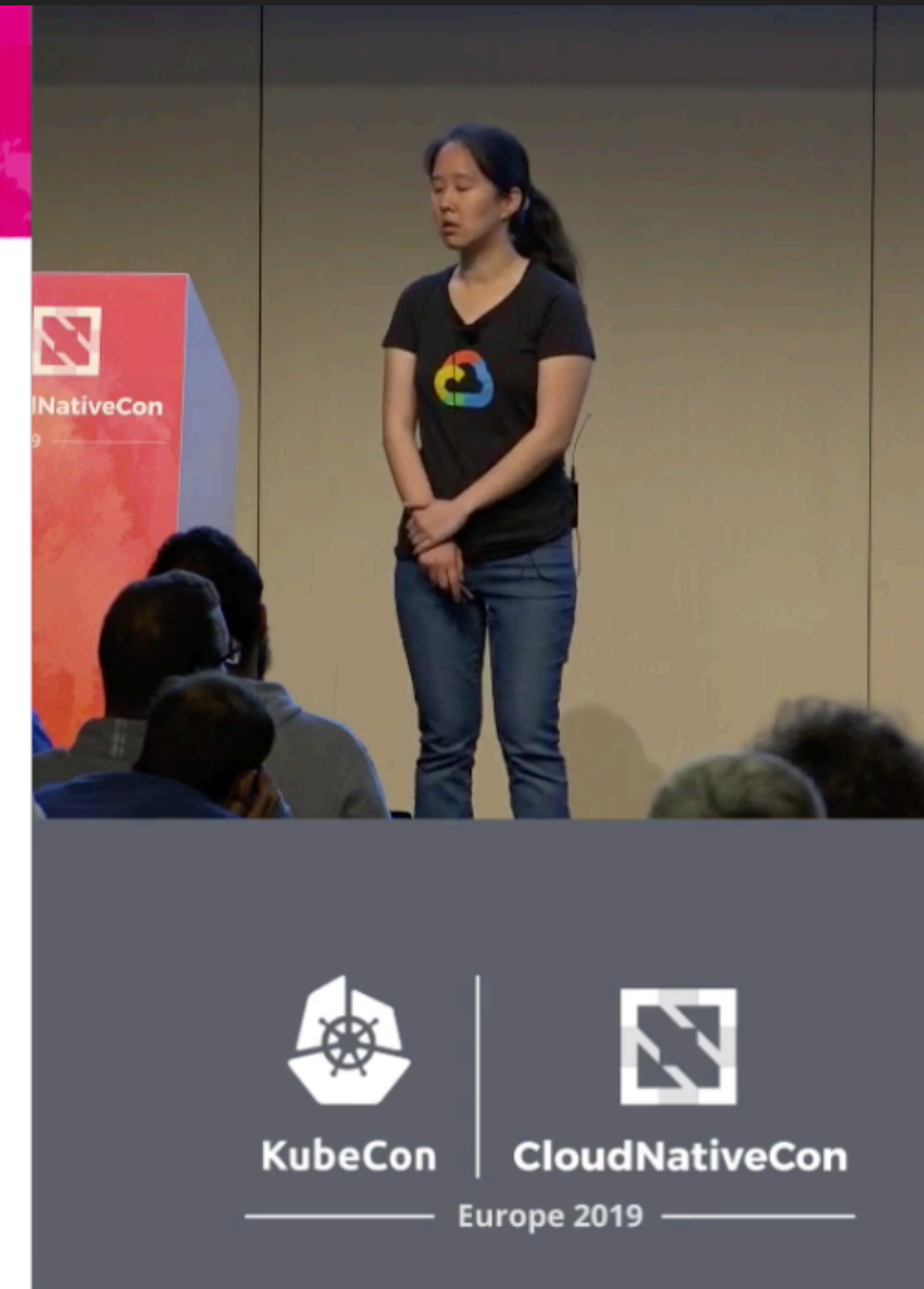


# Improving Availability for Stateful Applications in Kubernetes – Michelle Au, Google

## Examples

Example	Accessibility	Availability	Durability	Access Mode	Performance	Cost
Local disk	Single node	Single node	Single disk*	Single node	Best	\$
Cloud disk	Single zone	Single zone	3x	Single node	Better	\$\$
Replicated cloud disk	Multi zone	Multi zone	3x	Single node	Good	\$\$\$
Single NFS	Global	Single server	Varies	Multi node	Good	\$\$\$
Scaleout/HA Filer	Global	Global	Varies	Multi node	Varies	\$\$\$\$

\* Most cloud local disks are not durable beyond VM



► <https://www.youtube.com/watch?v=Cd7aJiQLIpM>

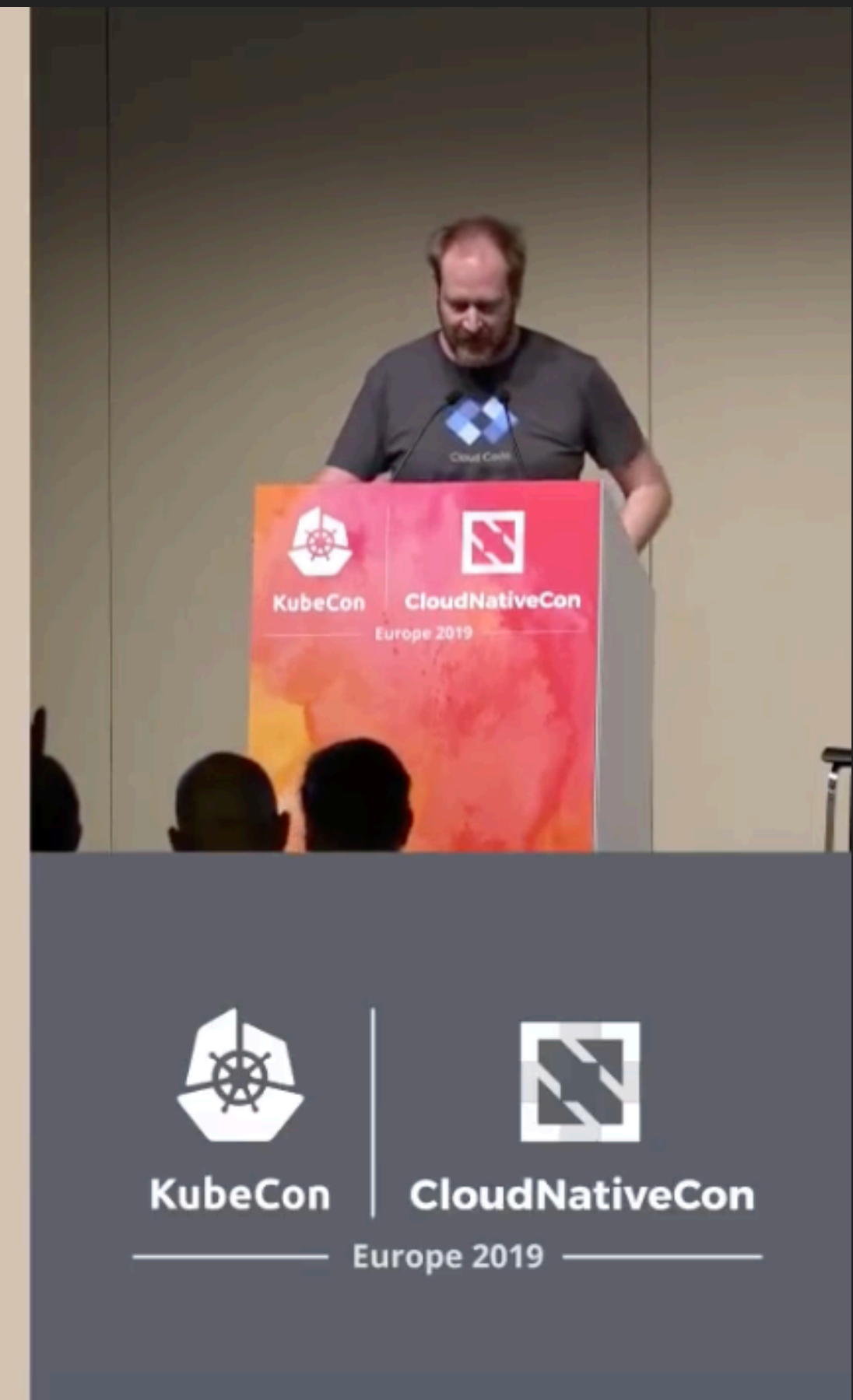
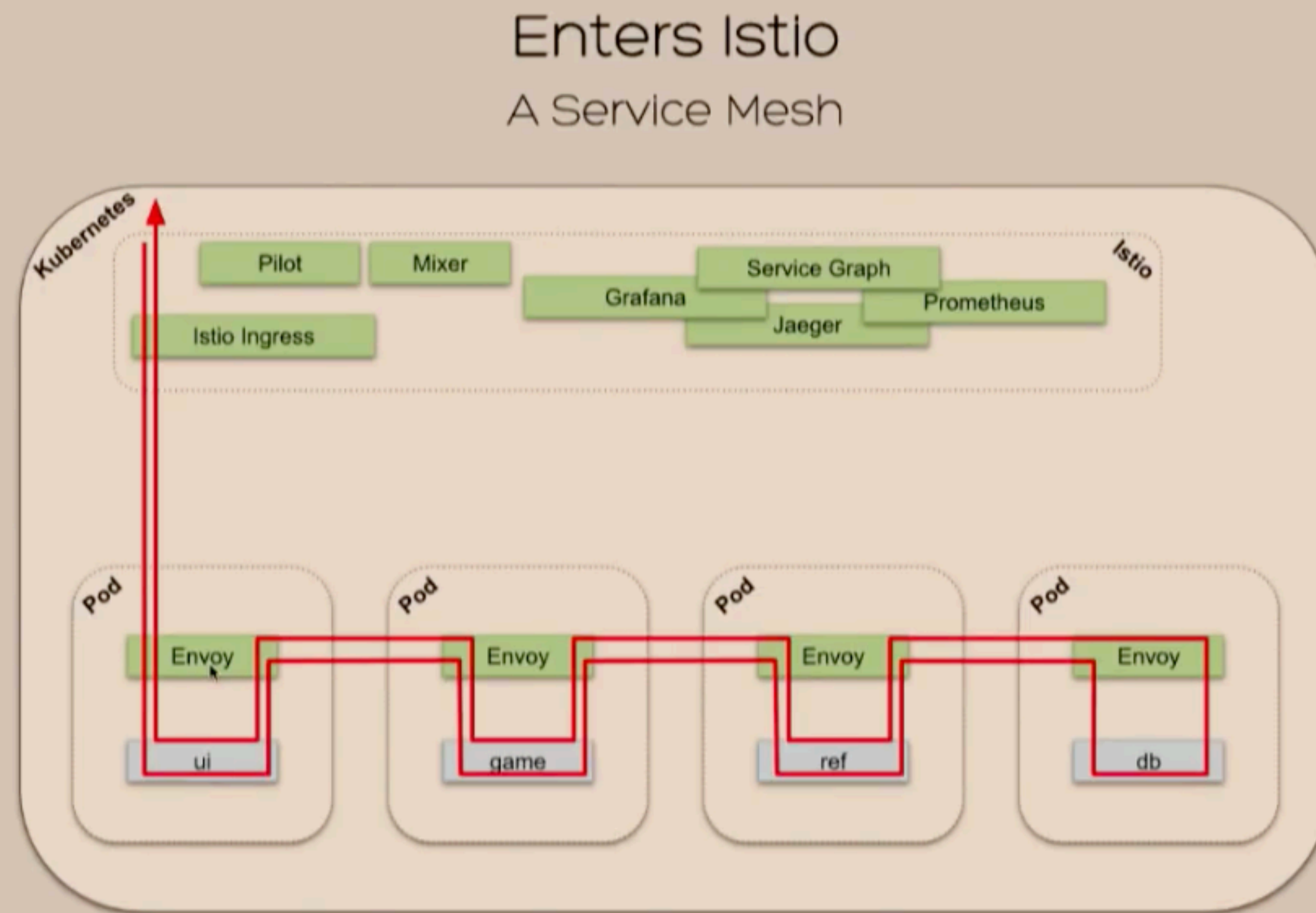




# SERVICE MESH

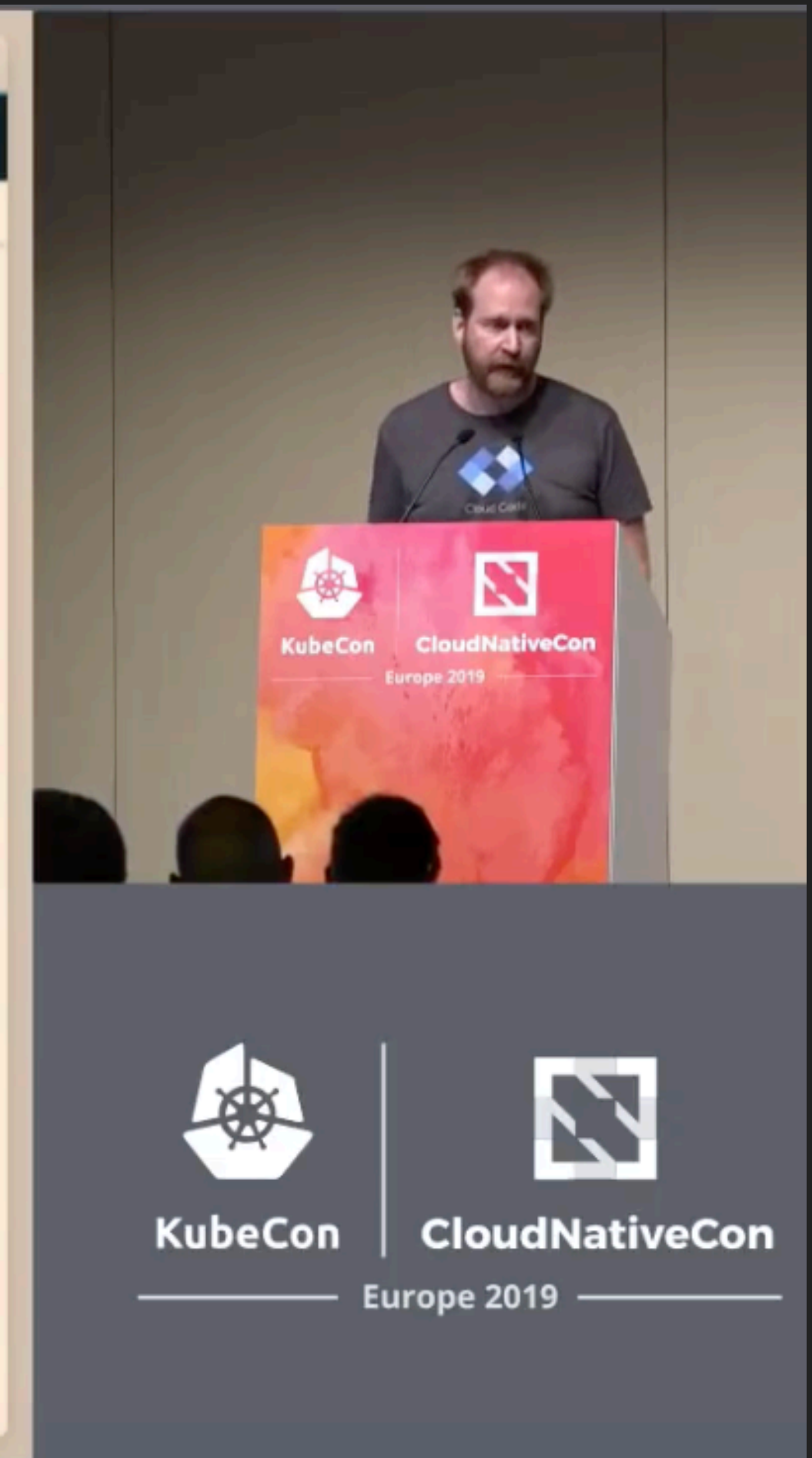
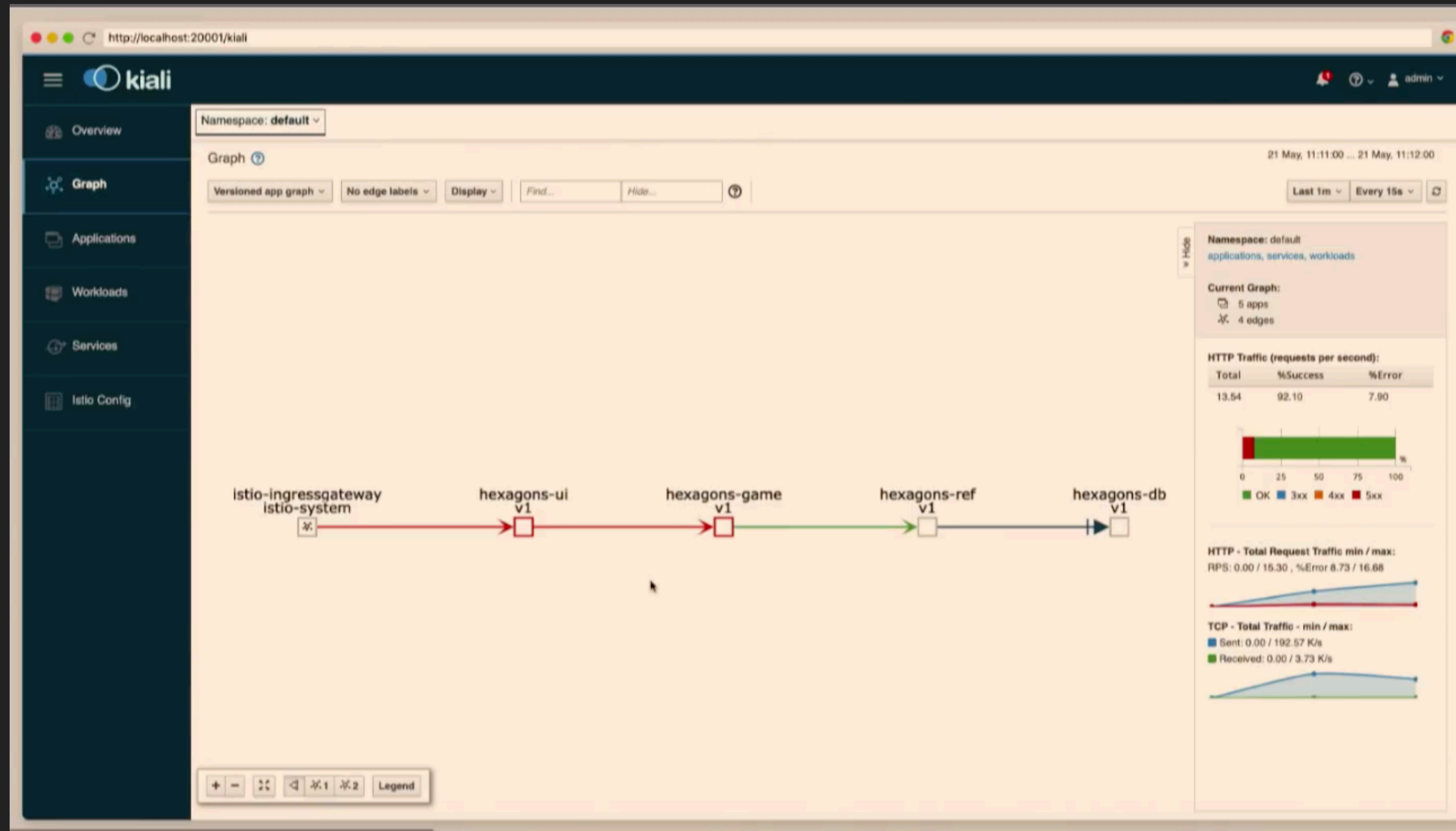


# Istio, We Have a Problem! Understanding and Fixing Bugs with a Service-Mesh – David Gageot, Google



► <https://www.youtube.com/watch?v=9CQ0PMiOGhg>

## Istio, We Have a Problem! Understanding and Fixing Bugs with a Service-Mesh – David Gageot, Google



► <https://www.youtube.com/watch?v=9CQ0PMiOGhg>



# Istio, We Have a Problem! Understanding and Fixing Bugs with a Service-Mesh – David Gageot, Google

Distributed Traces  
Using Istio's Jaeger component

```
bash ~.  
~/src/istio/hexagons master  
$ kubectl -n istio-system port-forward svc/kiali 20001  
Forwarding from 127.0.0.1:20001 -> 20001  
Forwarding from [::1]:20001 -> 20001  
^C  
~/src/istio/hexagons master  
$ kubectl -n istio-system port-forward svc/jaeger-query 16686  
Forwarding from 127.0.0.1:16686 -> 16686  
Forwarding from [::1]:16686 -> 16686  
Handling connection for 16686  
Handling connection for 16686  
Handling connection for 16686
```

Jaeger UI  
Lookup by Trace ID... Search Compare About Jaeger

istio-ingressgateway:  
hexagons-ui.  
default.svc.  
cluster.local:  
8080/\* c9e73aa

Service... 0ms 14.91ms 29.83ms 44.74ms 59.65ms

hexagons... 47.23ms

hexag... 8.63ms

he... 7.64ms

hexag... 8.43ms

he... 7.72ms

hexag... 6.92ms

he... 6.18ms

hexagons- Service: hexagons-ref.default

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► <https://www.youtube.com/watch?v=9CQ0PMiOGhg>

## Istio, We Have a Problem! Understanding and Fixing Bugs with a Service-Mesh – David Gageot, Google

Canary deployment  
Deploy the fix only to one user

```
graph LR; AnyUser[Any user] -- red arrow --> ref[ref v1]; UserDavid[User: david] -- green arrow --> game_v1[game v1]; UserDavid -- green arrow --> game_fix[game fix]; game_v1 -- green arrow --> ref; ref -- green arrow --> db[db v1];
```

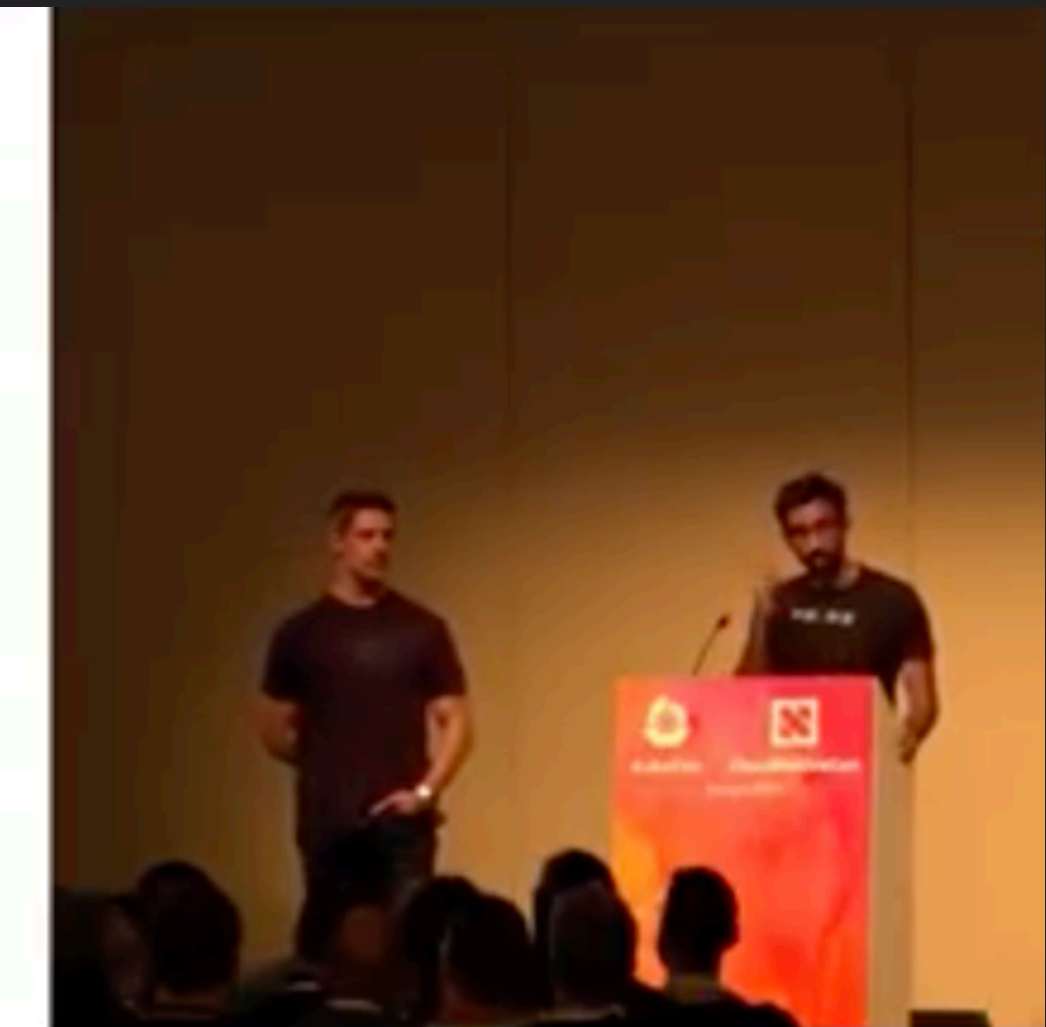
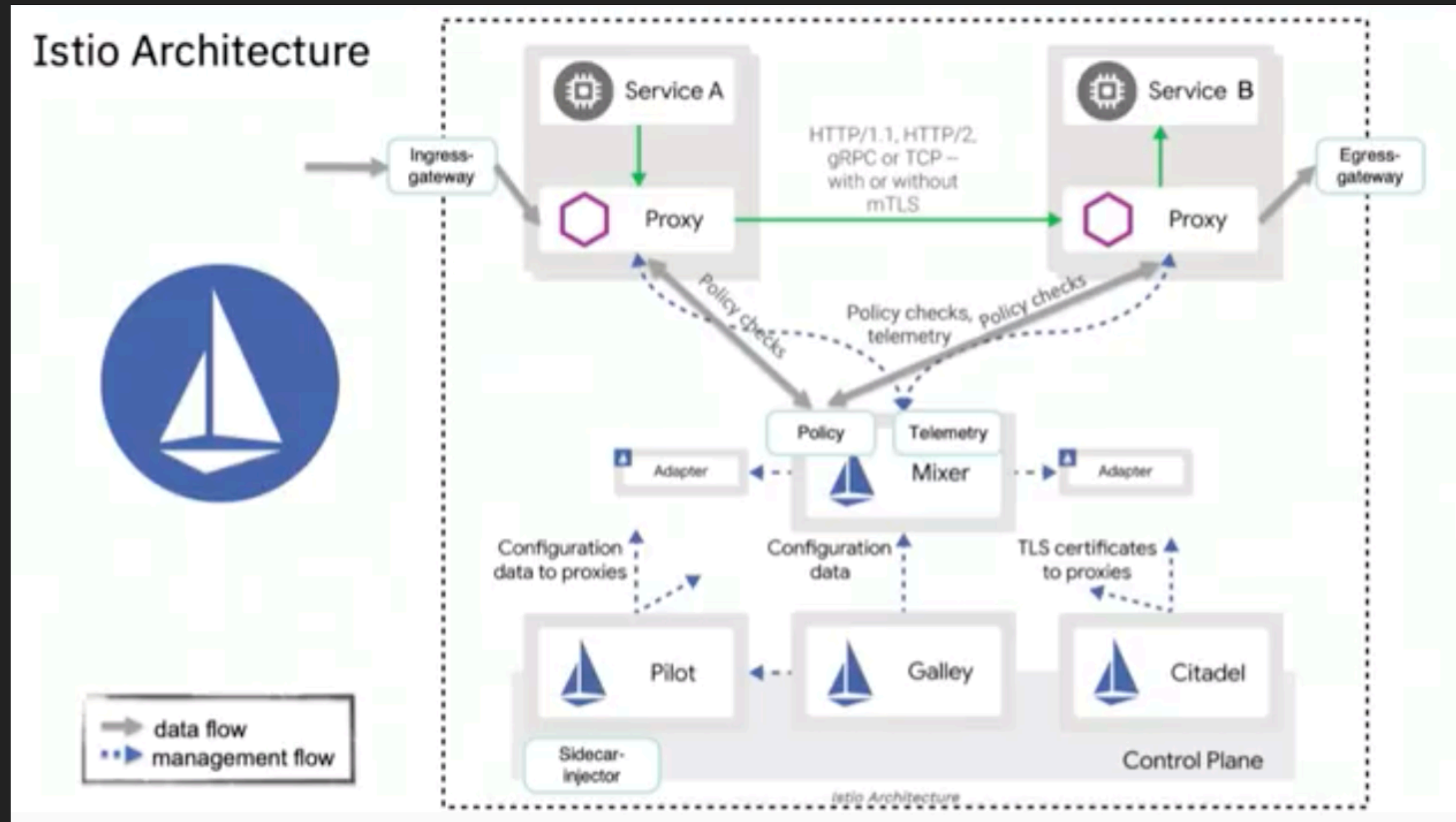
The diagram illustrates a canary deployment strategy. It shows a flow from 'Any user' to 'User: david' and then to a 'game' service. The 'game' service has two versions: 'v1' and 'fix'. The 'fix' version is only deployed to 'User: david'. The flow continues from 'game v1' to 'ref v1' and then to 'db v1'.

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► <https://www.youtube.com/watch?v=9CQ0PMiOGhg>



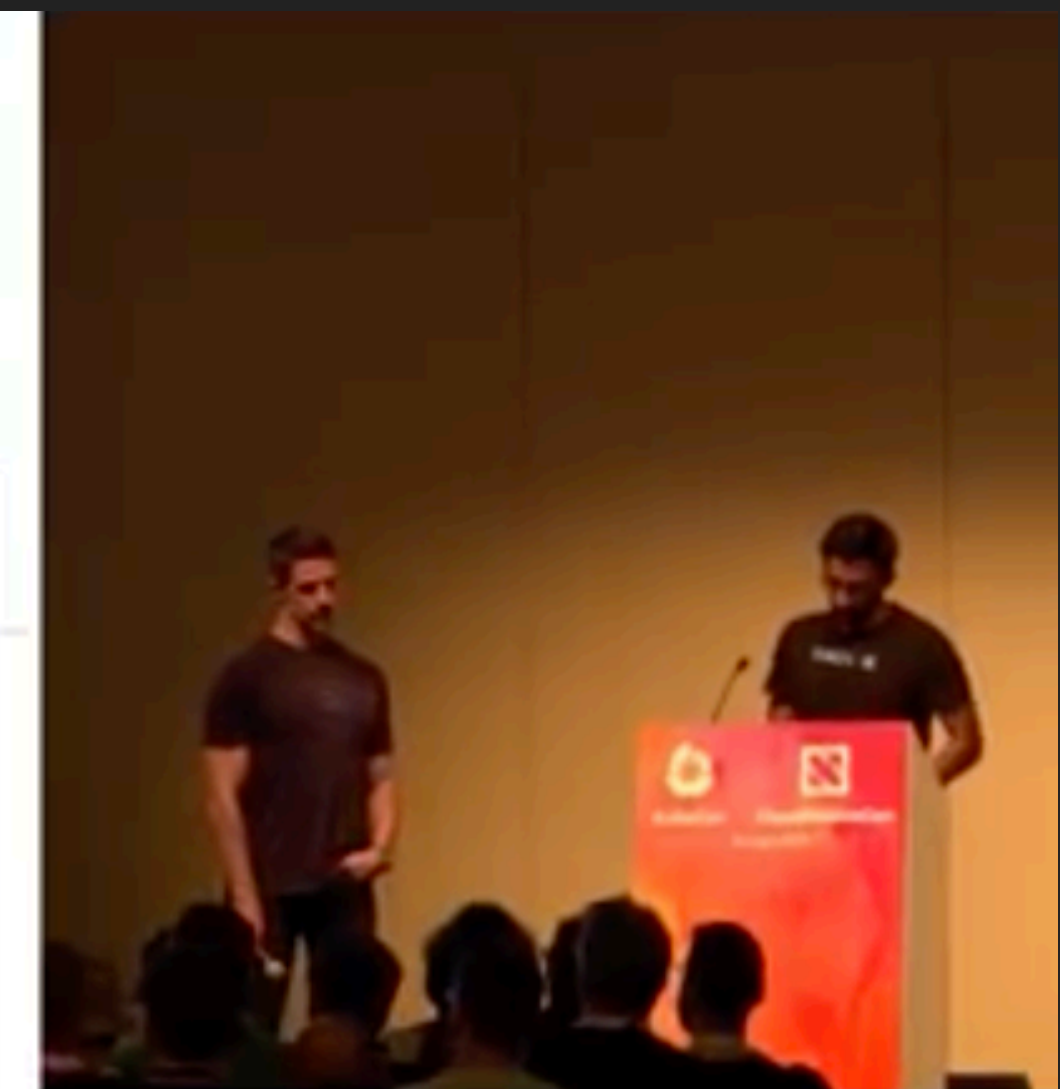
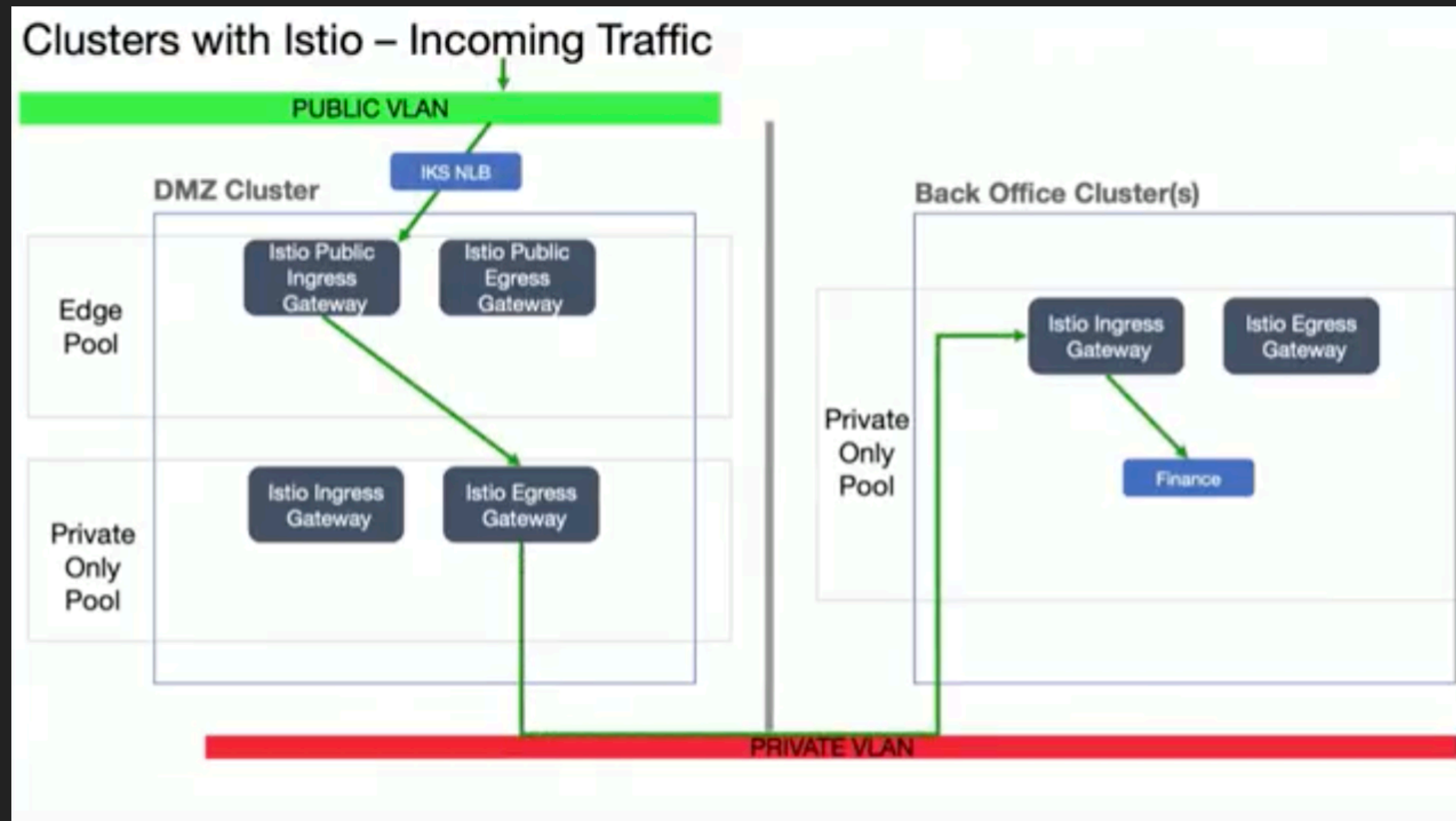
# Istio Multi-Cluster Service Mesh Patterns Explained – Daniel Berg & Ram Vennam, IBM



Europe 2019

► <https://www.youtube.com/watch?v=-zsThiLvYos>

# Istio Multi-Cluster Service Mesh Patterns Explained – Daniel Berg & Ram Vennam, IBM



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Europe 2019

► <https://www.youtube.com/watch?v=-zsThiLvYos>



# Istio Multi-Cluster Service Mesh Patterns Explained – Daniel Berg & Ram Vennam, IBM

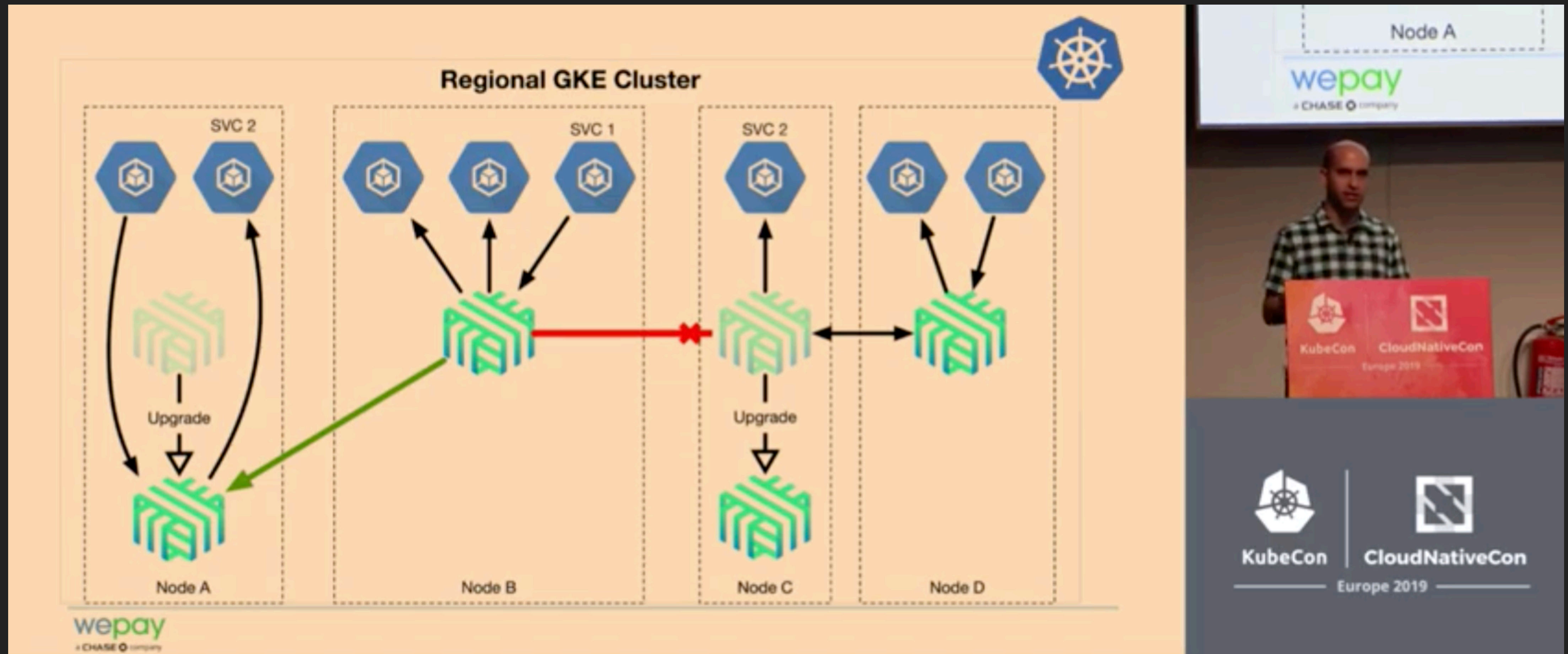
The image is a composite of four elements related to Istio multi-cluster service mesh patterns:

- Left Panel:** A screenshot of an IBM Cloud Blog post titled "Istio Multicluster Patterns Coming in 1.1". The post is dated February 7, 2019, and written by Etai Lev Ran. It discusses the growing interest in running workloads across clusters and how Istio v1.1 builds on and enhances the Istio 1.0 multicluster support. The post includes a "Terminology" section.
- Middle Panel:** A screenshot of a "Multicluster Istio Questionnaire" form. The form is titled "Multicluster Istio Questionnaire" and contains text explaining the growing community interest in running workloads on multiple clusters. It lists two patterns for configuration: 1. Multiple synchronized Istio control planes that have replicated service and routing configurations, and 2. A single Istio control plane that can access and configure all the services in the mesh. The form also includes a section for "Are you currently running or planning to run workloads across multiple clusters?" and provides links to a YouTube video and the blog post.
- Top Right:** A QR code that likely links to the questionnaire or the blog post.
- Right Panel:** A photograph of two men, Daniel Berg and Ram Vennam, standing on a stage during a presentation. They are in front of a backdrop that features the KubeCon and CloudNativeCon logos.

► <https://www.youtube.com/watch?v=-zsThiLvYos>



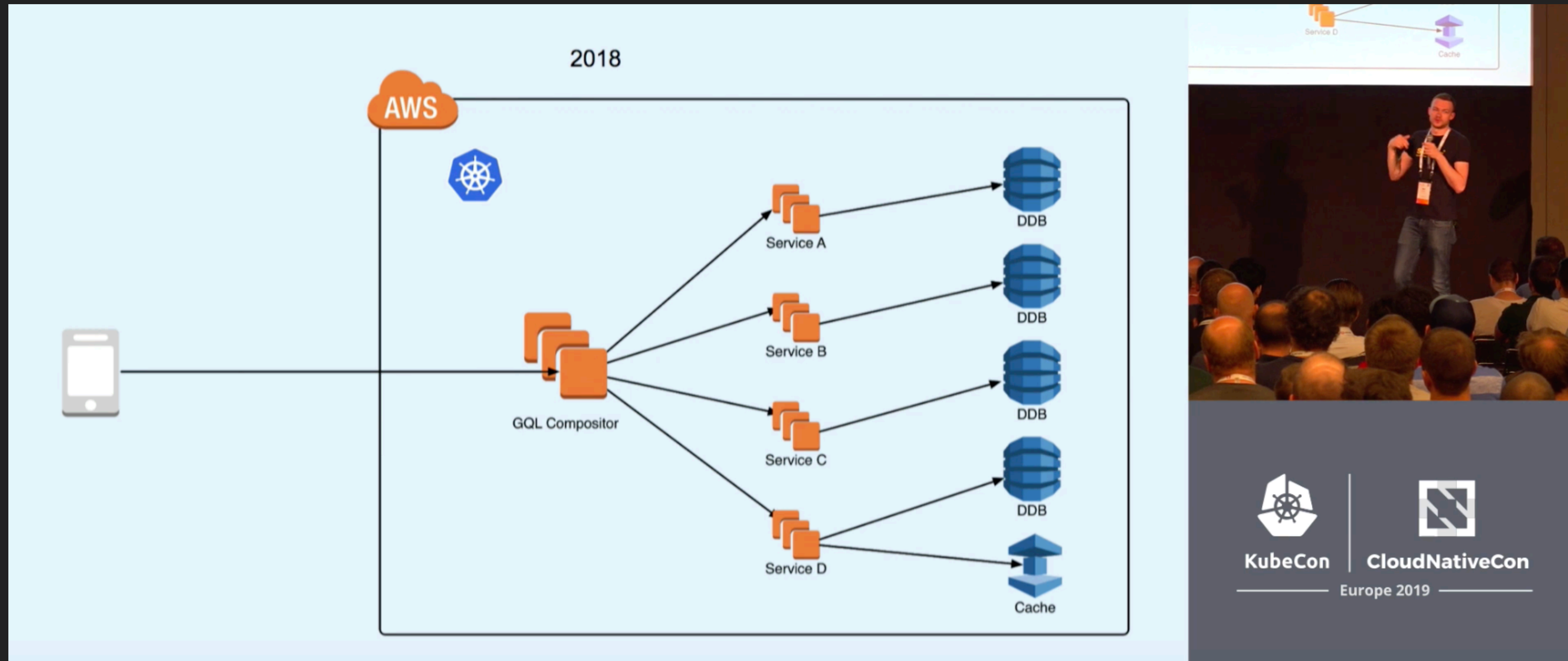
## What WePay Learned From Processing Billions of Dollars on GKE Using Linkerd – Mohsen Rezaei, WePay



► [https://www.youtube.com/watch?v=ph\\_NqGNHdhM](https://www.youtube.com/watch?v=ph_NqGNHdhM)



# JustFootball's Journey to gRPC + Linkerd in Production – Ben Lambert, & Kevin Lingerfelt

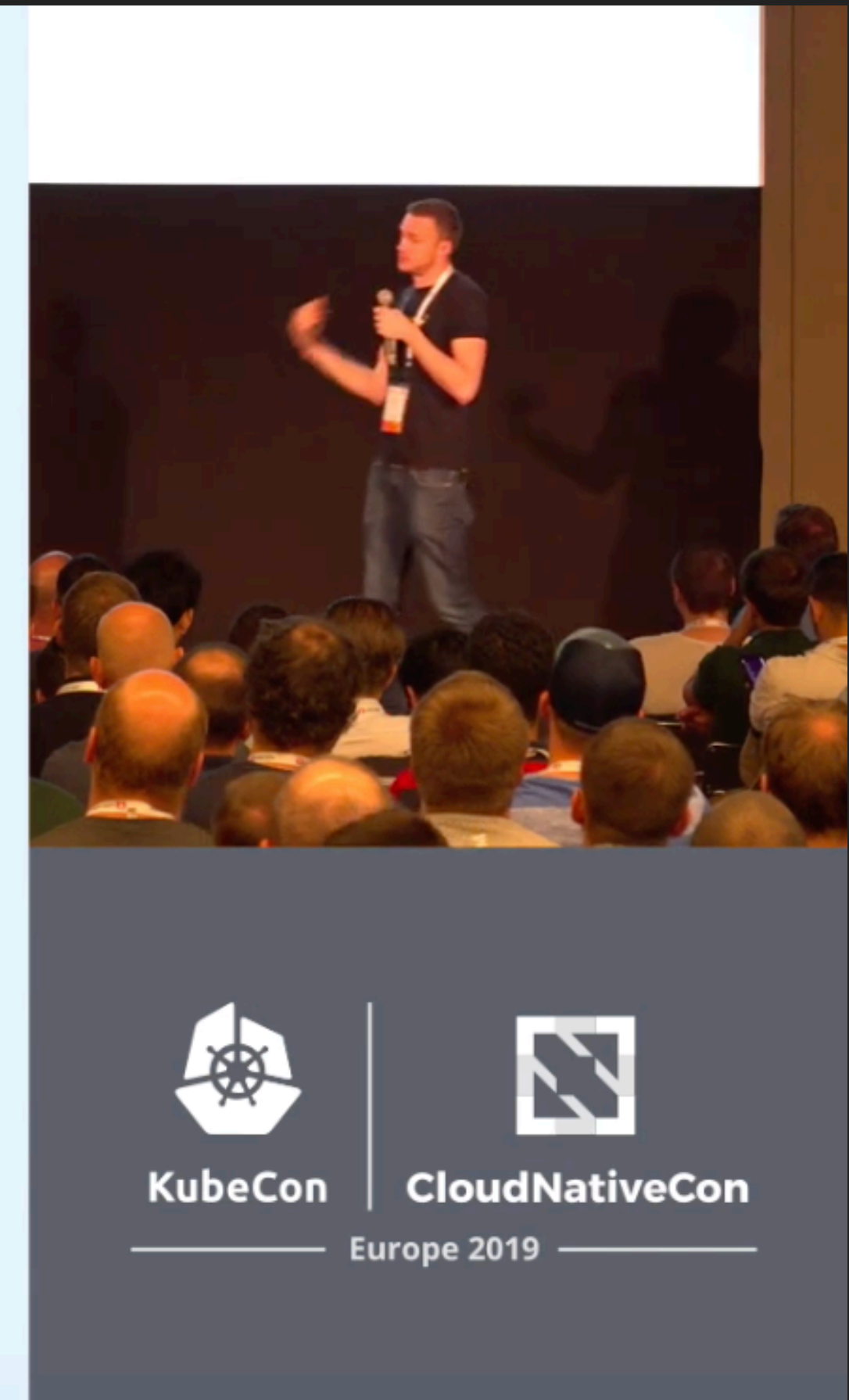


► [https://www.youtube.com/watch?v=AxPfa7Mp\\_WY](https://www.youtube.com/watch?v=AxPfa7Mp_WY)

# JustFootball's Journey to gRPC + Linkerd in Production – Ben Lambert, & Kevin Lingerfelt



- HTTP/2
- **One connection** per service
- Multiplexing
- **Protobuf Schema** for request/response

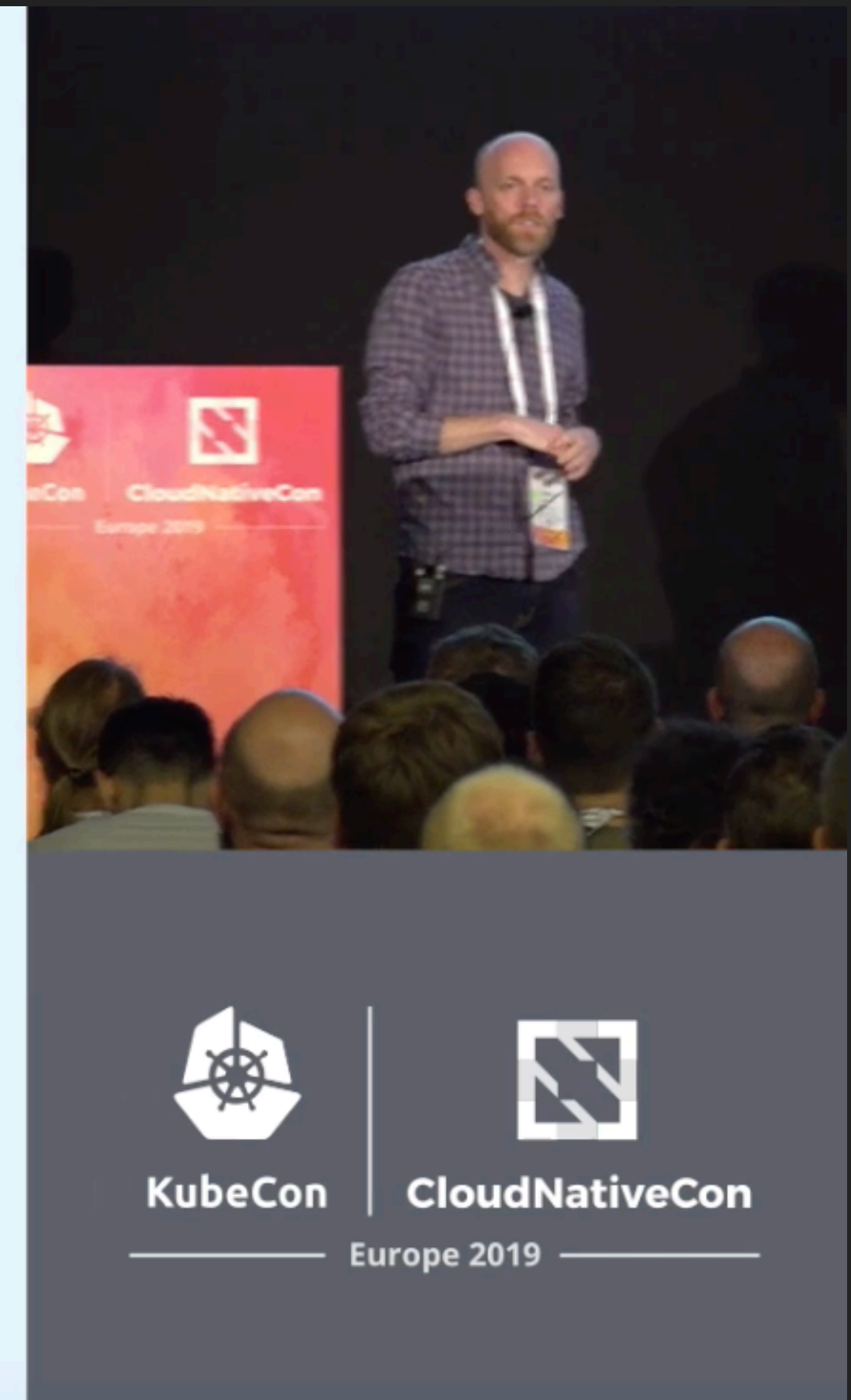
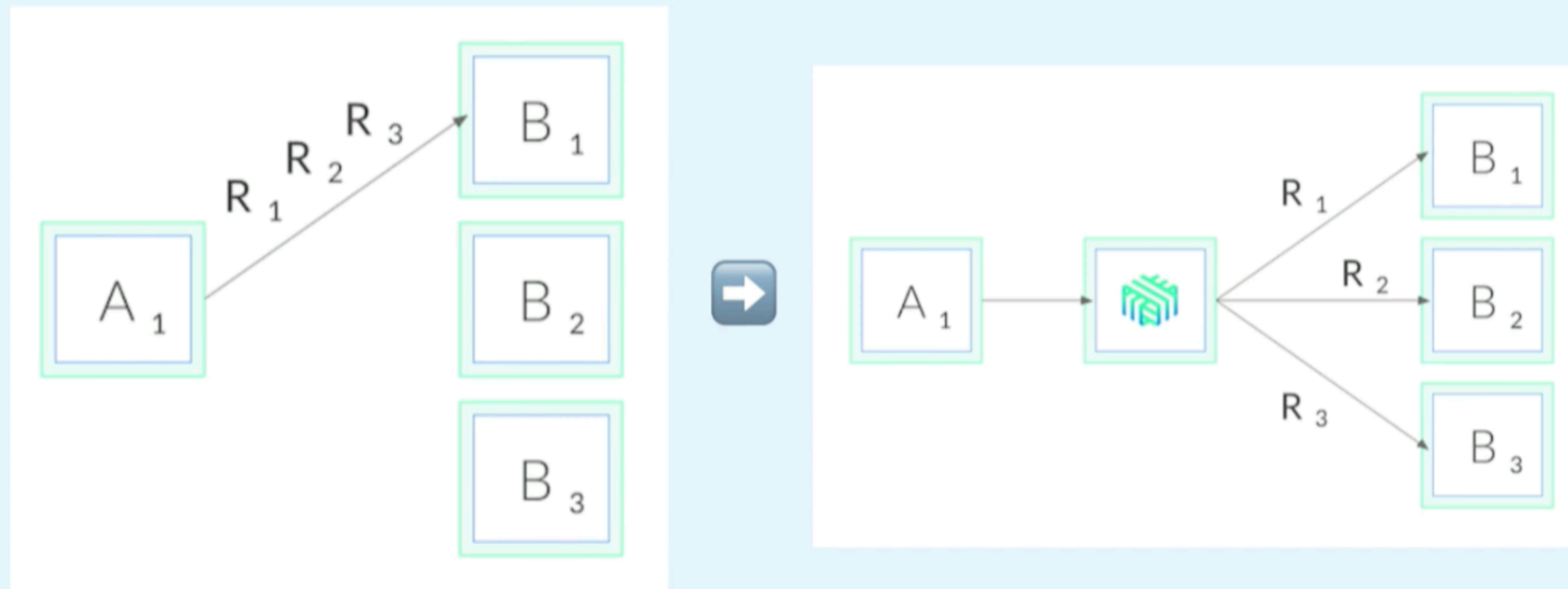


► [https://www.youtube.com/watch?v=AxPfa7Mp\\_WY](https://www.youtube.com/watch?v=AxPfa7Mp_WY)



# JustFootball's Journey to gRPC + Linkerd in Production – Ben Lambert, & Kevin Lingerfelt

⚖ Request level load-balancing




► [https://www.youtube.com/watch?v=AxPfa7Mp\\_WY](https://www.youtube.com/watch?v=AxPfa7Mp_WY)

# Benefits of a Service Mesh When Integrating Kubernetes with Legacy Services – Stephan Fudeus


1&1


## Container Strategy

- Kubernetes as centrally provided orchestration platform
  - Fast deployment cycles
  - Focus on soft multi-tenancy
    - Friendly users, but with security in mind
  - Focus on microservices
- Multiple clusters decoupled on network dimensions
  - fe/be/infrastructure, data center, live/non-live
  - bare-metal on-premise
  - non-routable podCIDR and serviceCIDR (RFC 6598 / CGNAT / 100.64.0.0/10)




kubernetes





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► <https://www.youtube.com/watch?v=vQ2IktsMlgQ>



# Benefits of a Service Mesh When Integrating Kubernetes with Legacy Services – Stephan Fudeus

1&1

## Mesh Expansion: Example

The diagram illustrates the expansion of a service mesh. On the left, 'Cluster A' is shown as a rounded rectangle containing 'Pod 1' (a smaller rounded rectangle) and the 'Istio Control Plane' (a blue rounded rectangle). 'Pod 1' contains 'Service A' (a blue rounded rectangle) and 'envoy' (a black rounded rectangle with a pink logo). 'Host A' and 'Host B' are shown as rounded rectangles on the right. Each host contains 'App A' (a blue rounded rectangle) and 'envoy' (a black rounded rectangle with a pink logo). Arrows indicate connections: from 'Service A' to 'envoy' on Host A and Host B; from 'envoy' on Host A and Host B to the 'Istio Control Plane'; and from the 'Istio Control Plane' to 'envoy' on Host A and Host B.

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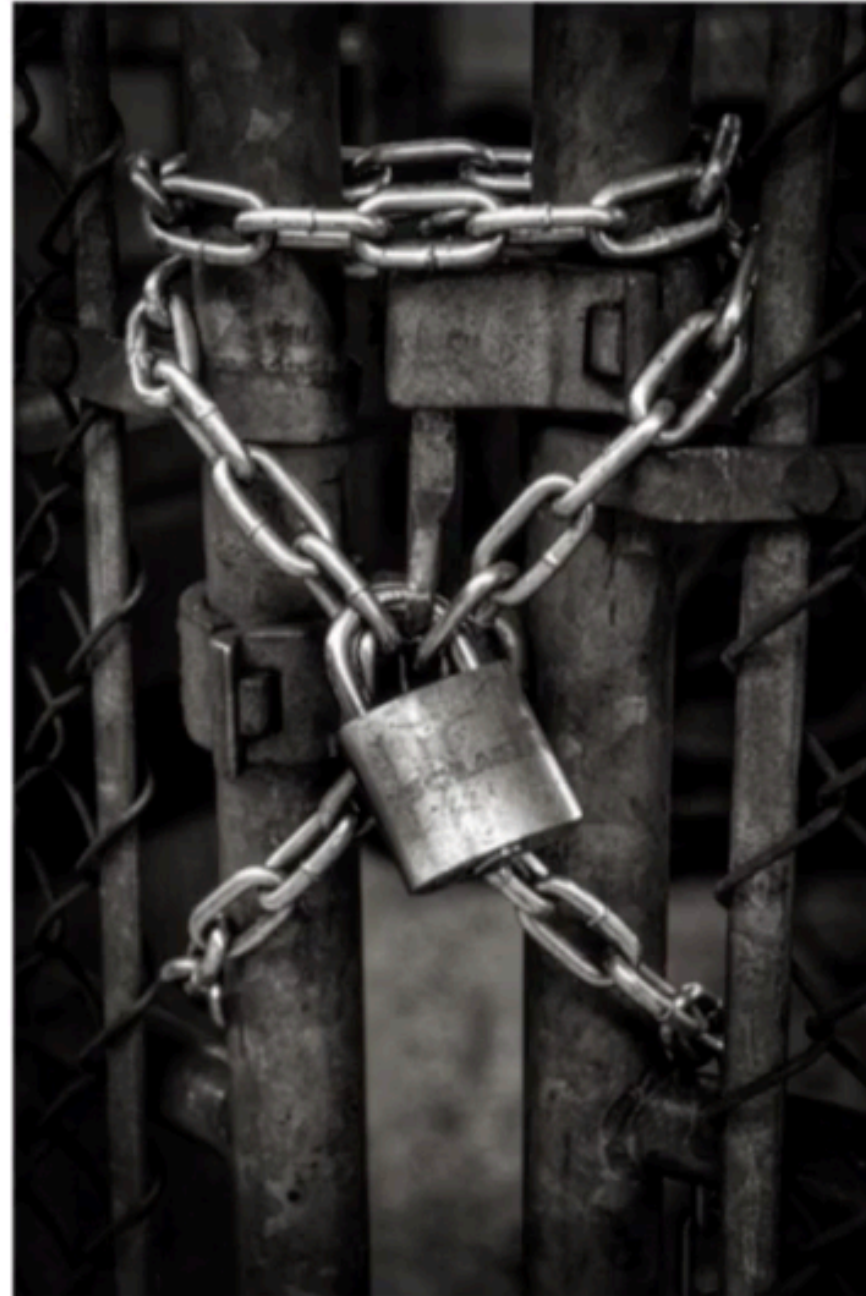
► <https://www.youtube.com/watch?v=vQ2IktsMlgQ>


# Benefits of a Service Mesh When Integrating Kubernetes with Legacy Services – Stephan Fudeus


1&1

## Problems with Operating Istio

- Security concerns
  - High privileges for control plane components
    - run as root
    - writable root filesystem
  - High privileges for admins and serviceaccount
    - net\_admin capabilities
    - run as root
  - Same problem with bookinfo sample application
- Sidecar injection
  - Problematic order of automatic sidecar injection vs. PSP evaluation



  
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# Benefits of a Service Mesh When Integrating Kubernetes with Legacy Services – Stephan Fudeus

1&1



## Result for Istio 1.0


- Not suitable for production in our setup
  - Too many unstable tweaks necessary
  - Too much interference on expansion nodes
- Blocked migration of services to Kubernetes
  - Need for intermediate short term solution







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# Benefits of a Service Mesh When Integrating Kubernetes with Legacy Services – Stephan Fudeus

1&1


## Istio 1.1 to the Rescue?

- Control plane connection ✓
- Outbound expansion ✓
- mTLS setup ✓
- Istio-CNI / Security concerns ✓

But:

- Inbound expansion ✗
- Automatic sidecar injection ✗
- Documentation complex
- Documentation partially inconsistent
- Multi-tenancy unclear





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# Benefits of a Service Mesh When Integrating Kubernetes with Legacy Services – Stephan Fudeus


1&1

## Summary

- Istio ( $\geq 1.1$ ) fits our needs
  - Feature set and K8s integration look fine
  - Not yet fully covering our requirements
- Hard to set up the right way
- Organisational questions need to be solved
- Direction of development is promising



Stephan Fudeus is a man with glasses, wearing a black t-shirt with a graphic and dark trousers, standing on a stage and speaking into a microphone. He is facing an audience whose heads are visible in the foreground.



The logos for KubeCon and CloudNativeCon Europe 2019 are displayed side-by-side. KubeCon features a white ship's wheel icon on a dark background. CloudNativeCon features a white square icon with a diagonal line on a dark background. Below the logos, the text "Europe 2019" is centered.

23

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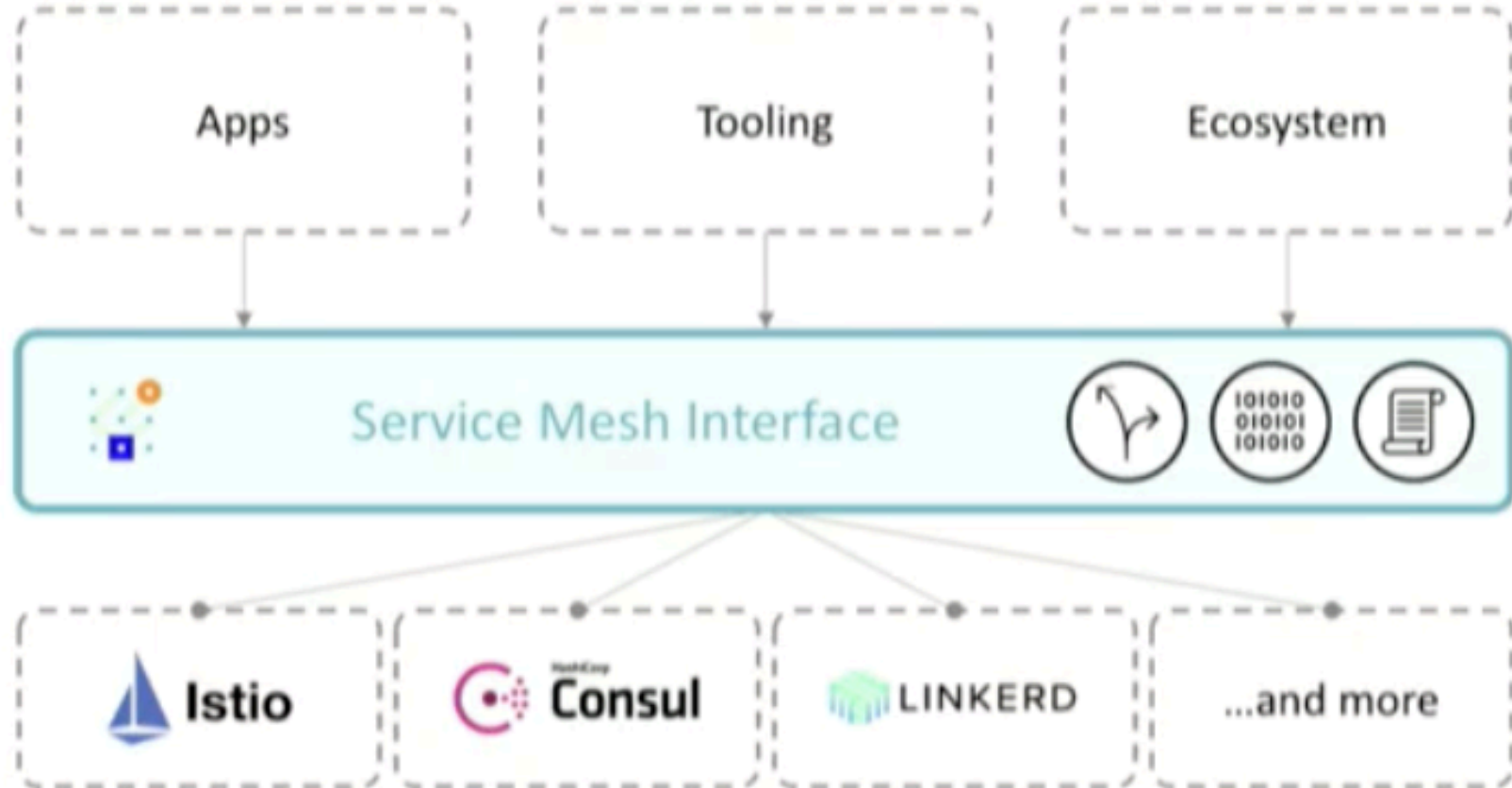
► <https://www.youtube.com/watch?v=vQ2IktsMIgQ>

# Democratizing Service Mesh on Kubernetes – Gabe Monroy, Microsoft & CNCF Board Member


## Service Mesh Interface (SMI)

A Kubernetes interface that provides traffic routing, traffic telemetry, and traffic policy

-  **Standardized**  
Standard interface for service mesh on Kubernetes
-  **Simplified**  
Basic feature set to address most common scenarios
-  **Extensible**  
Support for new features as they become widely available



The diagram illustrates the Service Mesh Interface (SMI) architecture. At the top, three dashed boxes labeled 'Apps', 'Tooling', and 'Ecosystem' have arrows pointing down to a central light blue box labeled 'Service Mesh Interface'. This central box contains three icons: a multi-colored dot matrix, a circular arrow, and a document with binary code. Below the central box, four dashed boxes labeled 'Istio', 'Consul', 'LINKERD', and '...and more' have arrows pointing up to the central box. The Microsoft Azure logo is in the bottom right corner.



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► <https://www.youtube.com/watch?v=gDLD8gyd7J8>



# Learn how to Leverage Kubernetes to Support 12 Factor for Enterprise Apps

## **I. Codebase**

One codebase tracked in revision control, many deploys

## **II. Dependencies**

Explicitly declare and isolate dependencies

## **III. Config**

Store config in the environment

## **IV. Backing services**

Treat backing services as attached resources

## **V. Build, release, run**

Strictly separate build and run stages

## **VI. Processes**

Execute the app as one or more stateless processes

## **VII. Port binding**

Export services via port binding

## **VIII. Concurrency**

Scale out via the process model

## **IX. Disposability**

Maximize robustness with fast startup and graceful shutdown

## **X. Dev/prod parity**

Keep development, staging, and production as similar as possible

## **XI. Logs**

Treat logs as event streams

## **XII. Admin processes**

Run admin/management tasks as one-off processes

# Why 12 factor apps?

- **Make it easier to run, scale, and deploy applications**
- **Keep parity between development and production**
- **Provide strict separation between build, release, and run stages**

5

► [https://static.sched.com/hosted\\_files/kccnceu19/6c/](https://static.sched.com/hosted_files/kccnceu19/6c/)

[Learn%20how%20to%20Leverage%20Kubernetes%20to%20Support%2012%20Factor%20for%20Enterprise%20Apps.pdf](#)

A black and white photograph of three wind turbines against a dramatic, cloudy sky. The turbines are white and positioned diagonally from the bottom left towards the top right. The largest turbine is in the foreground, and two smaller ones are visible in the background.

# MACHINE LEARNING + DATA



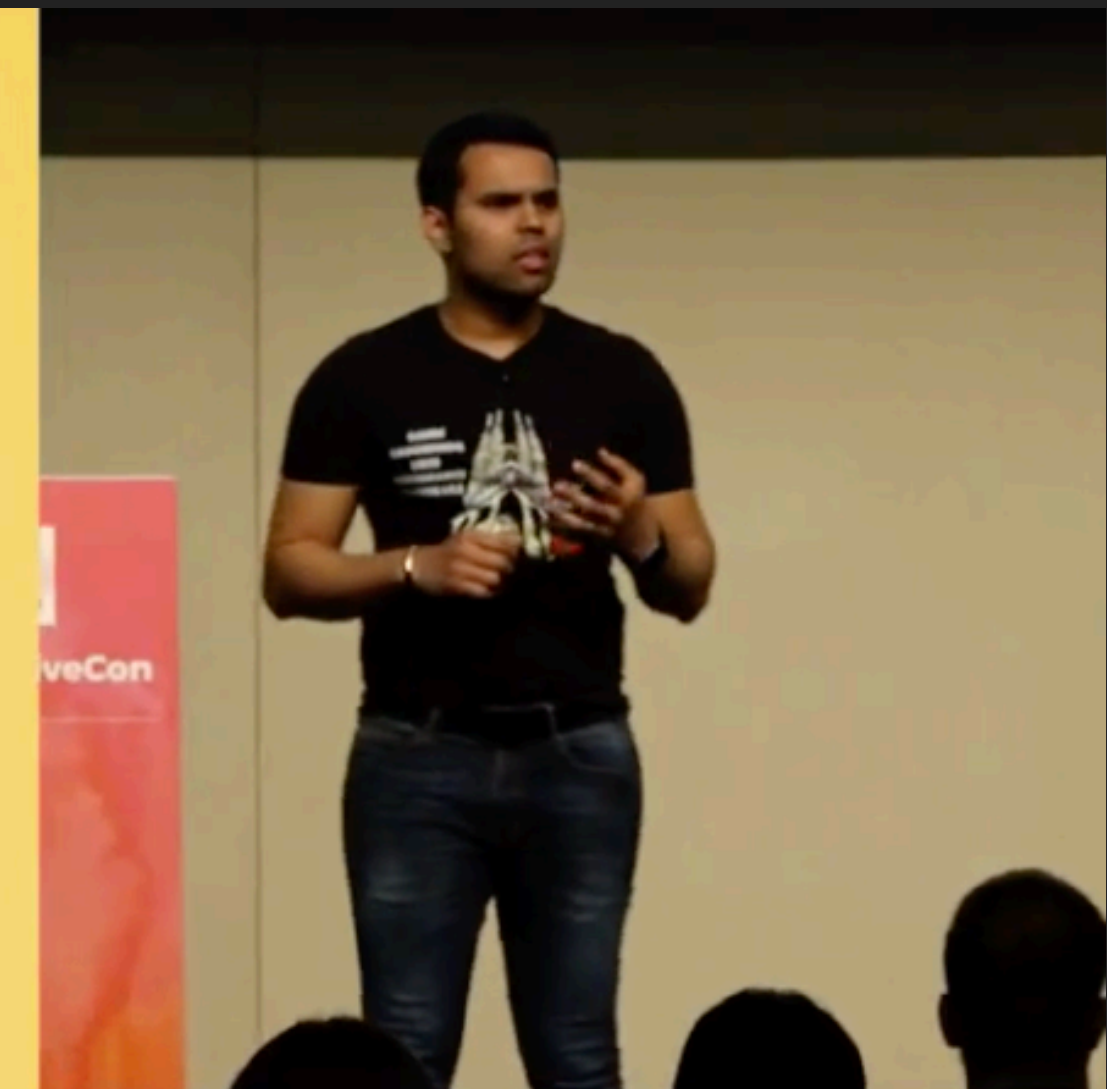
# Protecting the Data Lake – Ash Narkar, Styra, Inc

Data is King !

- Pervasive
- Abundant
- Customer Experience
- Revenue Growth



- Cyber Attacks
- Breaches
- Fines
- Loss of Customer Trust



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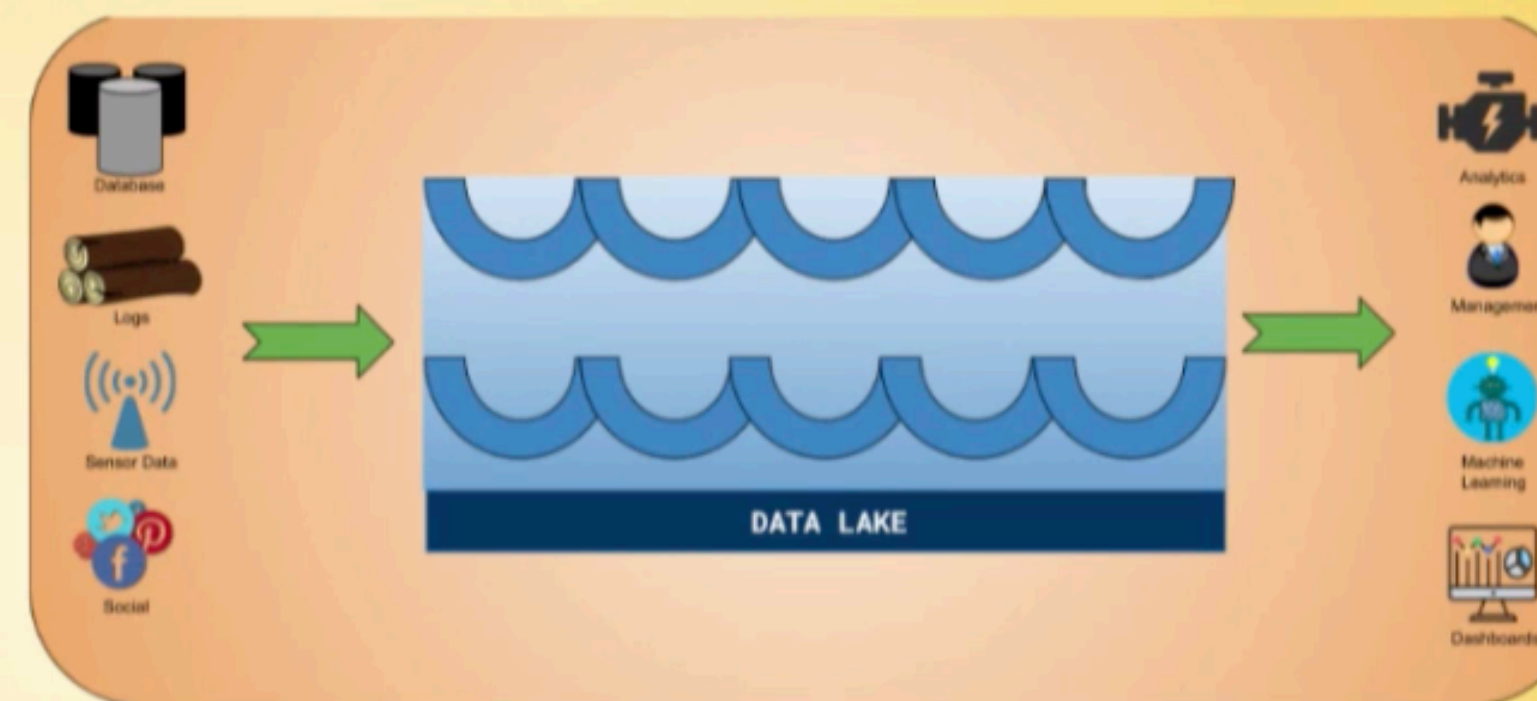
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# Protecting the Data Lake – Ash Narkar, Styra, Inc

## Data Lake Features

- Centralized Content
- Scalability
- Multiple data type support
- Resource optimization



KubeCon



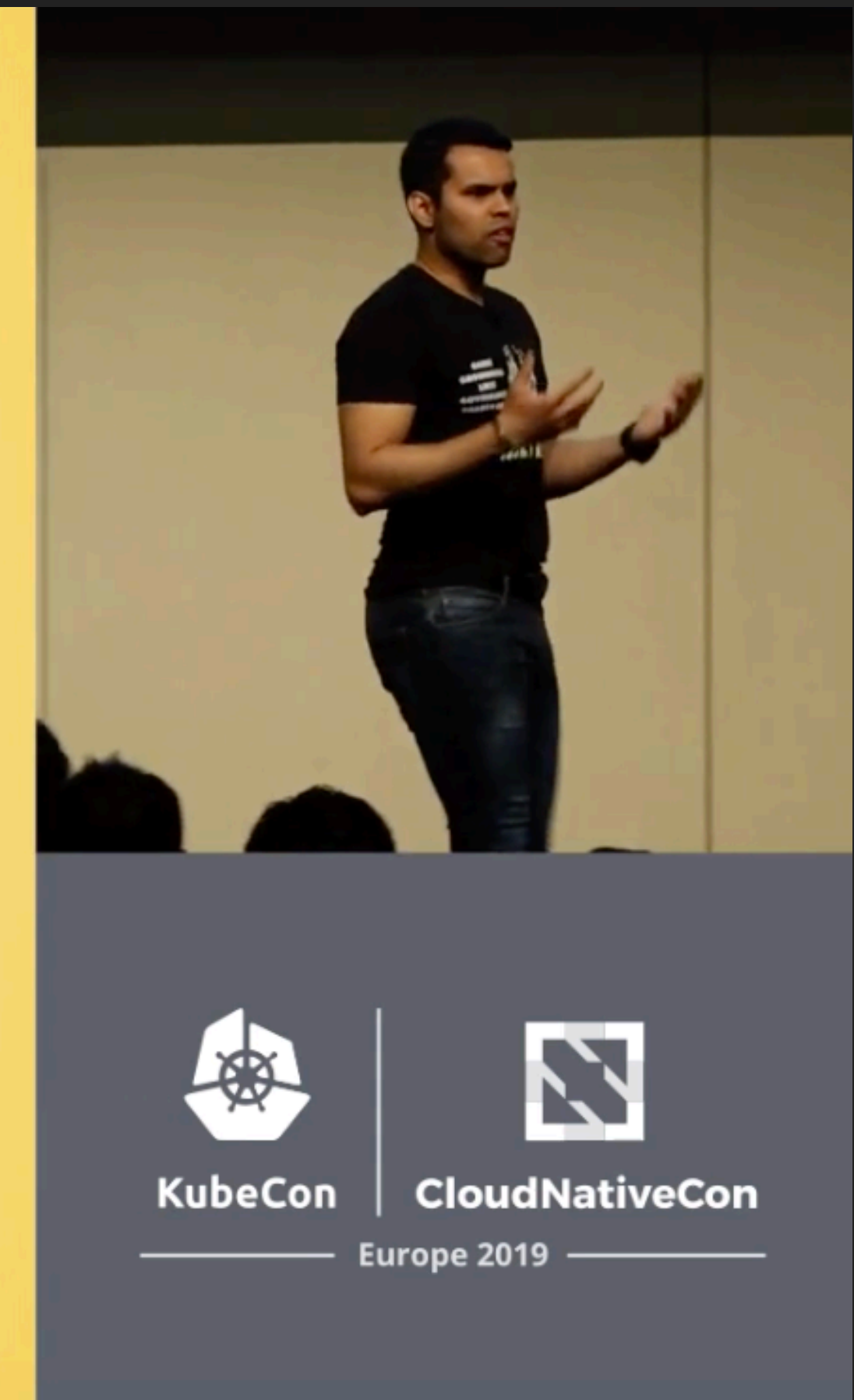
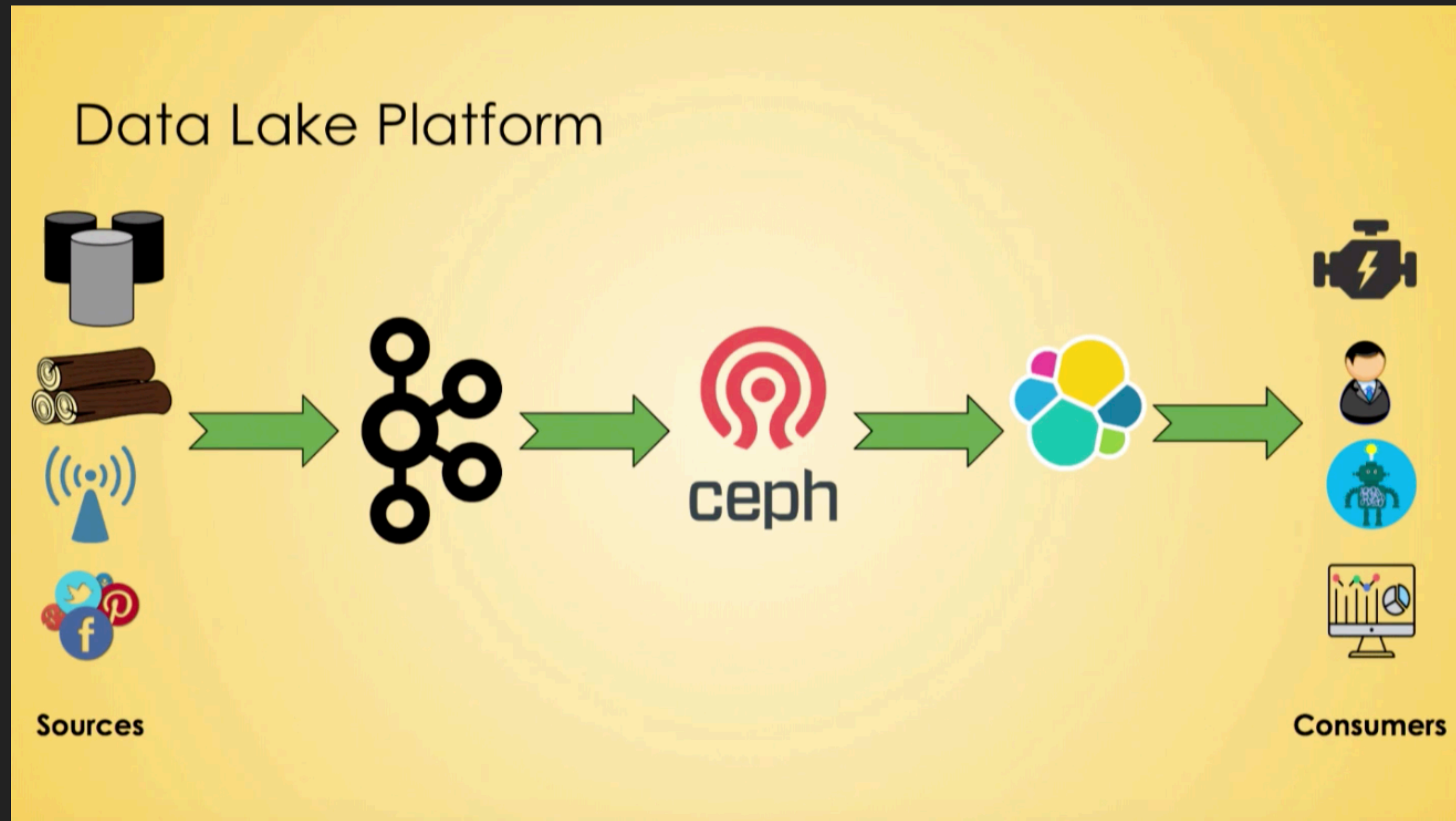
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# Protecting the Data Lake – Ash Narkar, Styra, Inc



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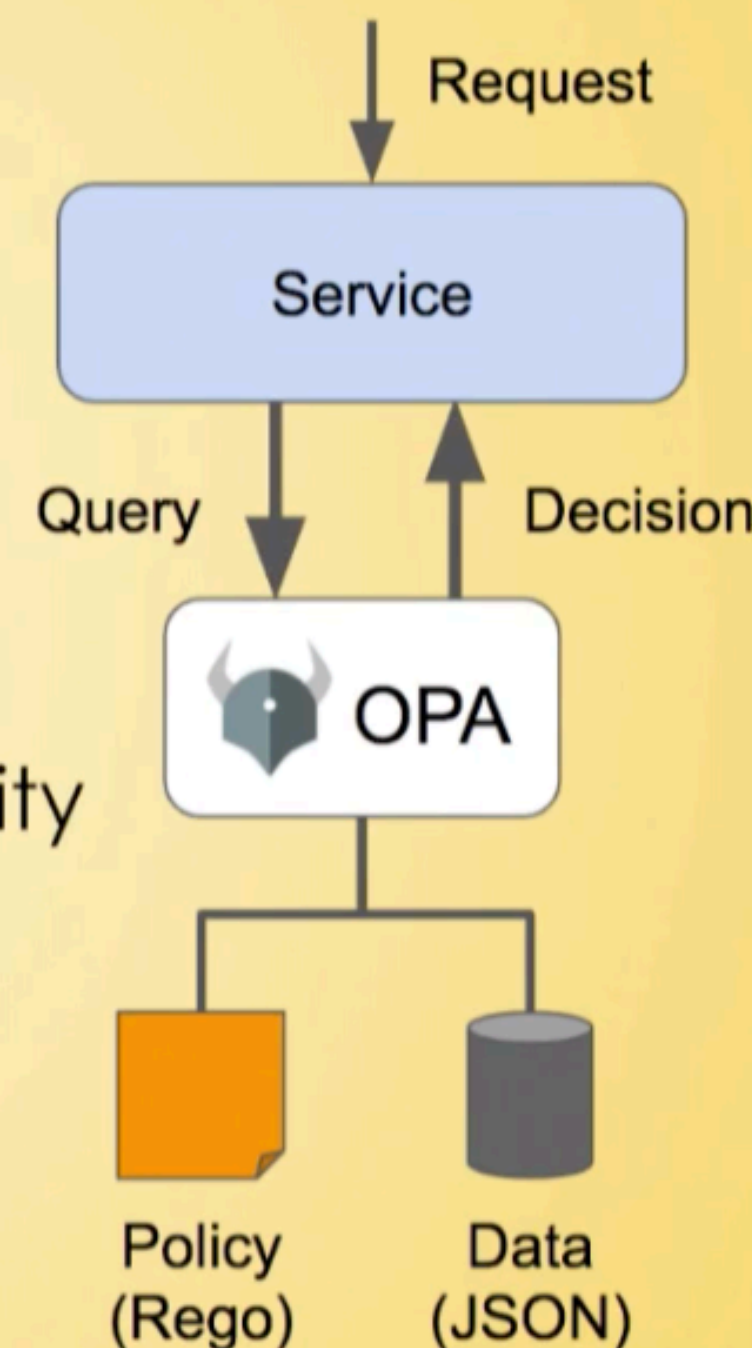
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# Protecting the Data Lake – Ash Narkar, Styra, Inc

## OPA: Features

- Declarative Policy Language (Rego)
  - Can user X do operation Y on resource Z?
  - What invariants does workload W violate?
  - Which records should bob be allowed to see?
- Library, sidecar, host-level daemon
  - Policy and data are kept in-memory
  - Zero decision-time dependencies
- Management APIs for control & observability
  - Bundle service API for sending policy & data to OPA
  - Status service API for receiving status from OPA
  - Log service API for receiving audit log from OPA
- Tooling to build, test, and debug policy
  - opa run, opa test, opa fmt, opa deps, opa check, etc.
  - VS Code plugin, Tracing, Profiling, etc.



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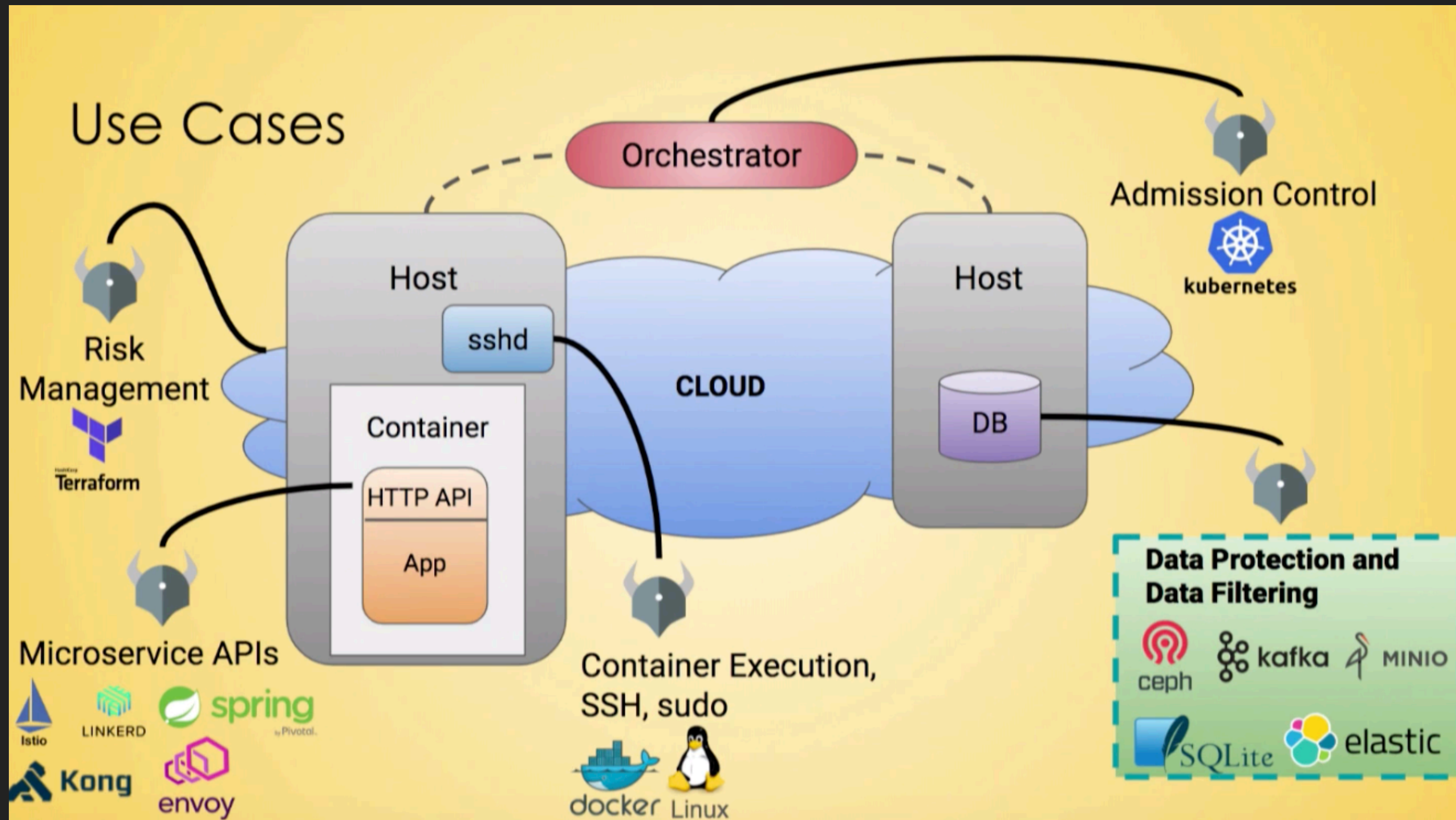
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# Protecting the Data Lake – Ash Narkar, Styra, Inc



# The Data Analytics Platform or How to Make Data Science in a Box Possible – Krzysztof Adamski



**The Data Analytics Platform**

Rob Keevil & Krzysztof Adamski

Barcelona 22/05/2019

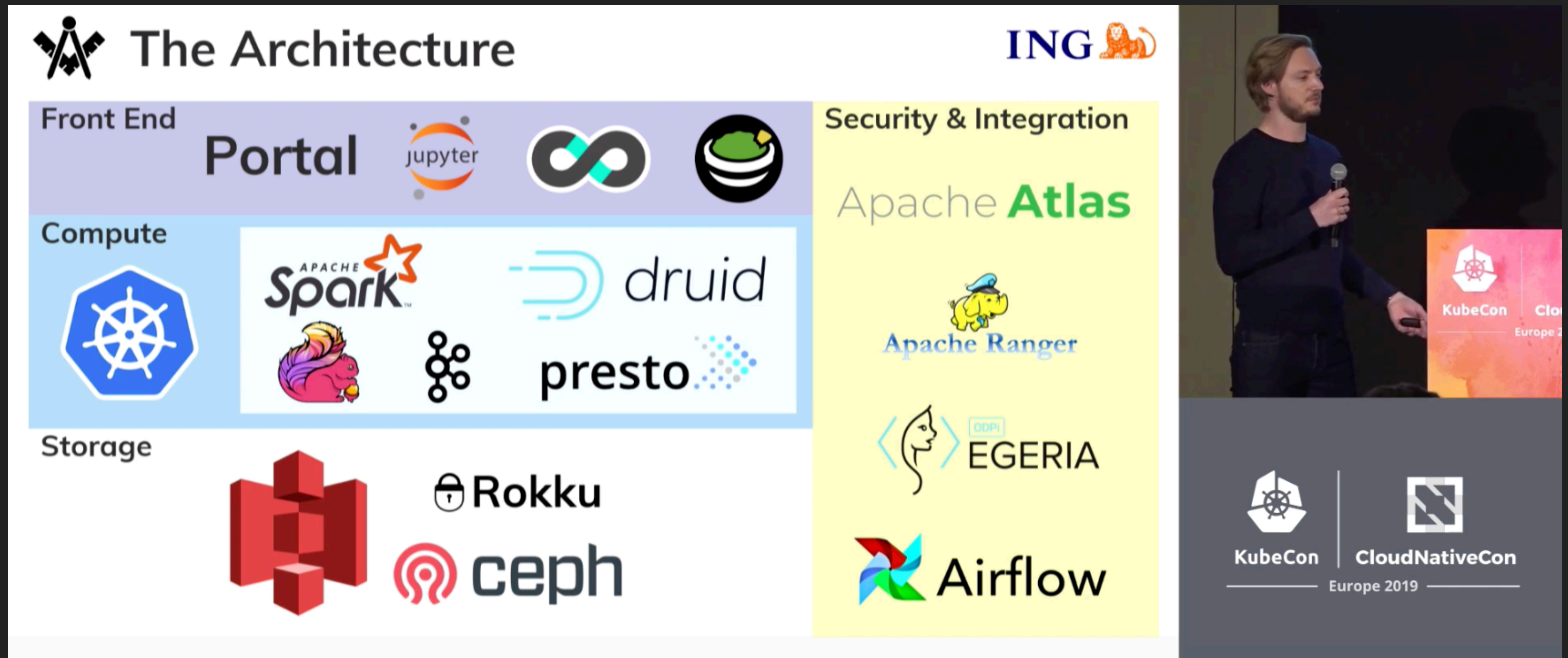
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# The Data Analytics Platform or How to Make Data Science in a Box Possible – Krzysztof Adamski



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# The Data Analytics Platform or How to Make Data Science in a Box Possible – Krzysztof Adamski

DAP Portal

ING

Portal

Rob Keevil

Service Catalog

DATA

Data Discovery

STORAGE

Buckets

ENVIRONMENTS

Data Science in a Box

UTILITIES

Create HDFS Home

XRDP

GRID

GRID contains company data for ING customers. It contains information about the business clients of ING, such as name, risk rating, sector, industry

Basic Information

Access Policies

DATA PR

Contact Person(s)

Anabel @ing.com

Created

01 January 2018 0:01 AM

Exploration

True

Last Modified

10/27/2018 2:53 AM

Lineage

atlas

Location

hdfs://datalab/apps/hive/warehouse/data\_pii/grid.db/x\_grid

Records

12757010

Size

410.51 MB

Frequent Users

Data Quality

Usage Frequency

Request Access

Follow

Table Information (grid.x\_grid)

Column Name	Type	Description
grid_id	int	Local ID in GRID of company
grid_leg_parent_id	int	Legal parent entity id
grid_leg_up_id	int	Legal ultimate parent entity id
grid_ecg_parent_id	int	Economic parent entity id
grid_ecg_up_id	int	Economic ultimate parent entity id

Tags

grid companies company data customers clients

ing customers ing clients name country town

net sales ing risk rating naics code naics desc website

customer type desc customer segment desc postcode

is exchange listed

► <https://www.youtube.com/watch?v=8cE9ppbnDPs>



## AMUNDSEN

- ▶ Amundsen is a metadata driven application for improving the productivity of data analysts, data scientists and engineers when interacting with data.
- ▶ <https://github.com/lyft/amundsen>



# The Data Analytics Platform or How to Make Data Science in a Box Possible – Krzysztof Adamski



## Data Science in a Box







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► <https://www.youtube.com/watch?v=8cE9ppbnDPs>



# Scaling and Securing Spark on Kubernetes at Bloomberg – Ilan Filonenko, Bloomberg

## Data Science Platform

Bloomberg has developed a unified, multi-tenant compute environment which allows our engineers to orchestrate, manage, and pipeline their data science workflows.

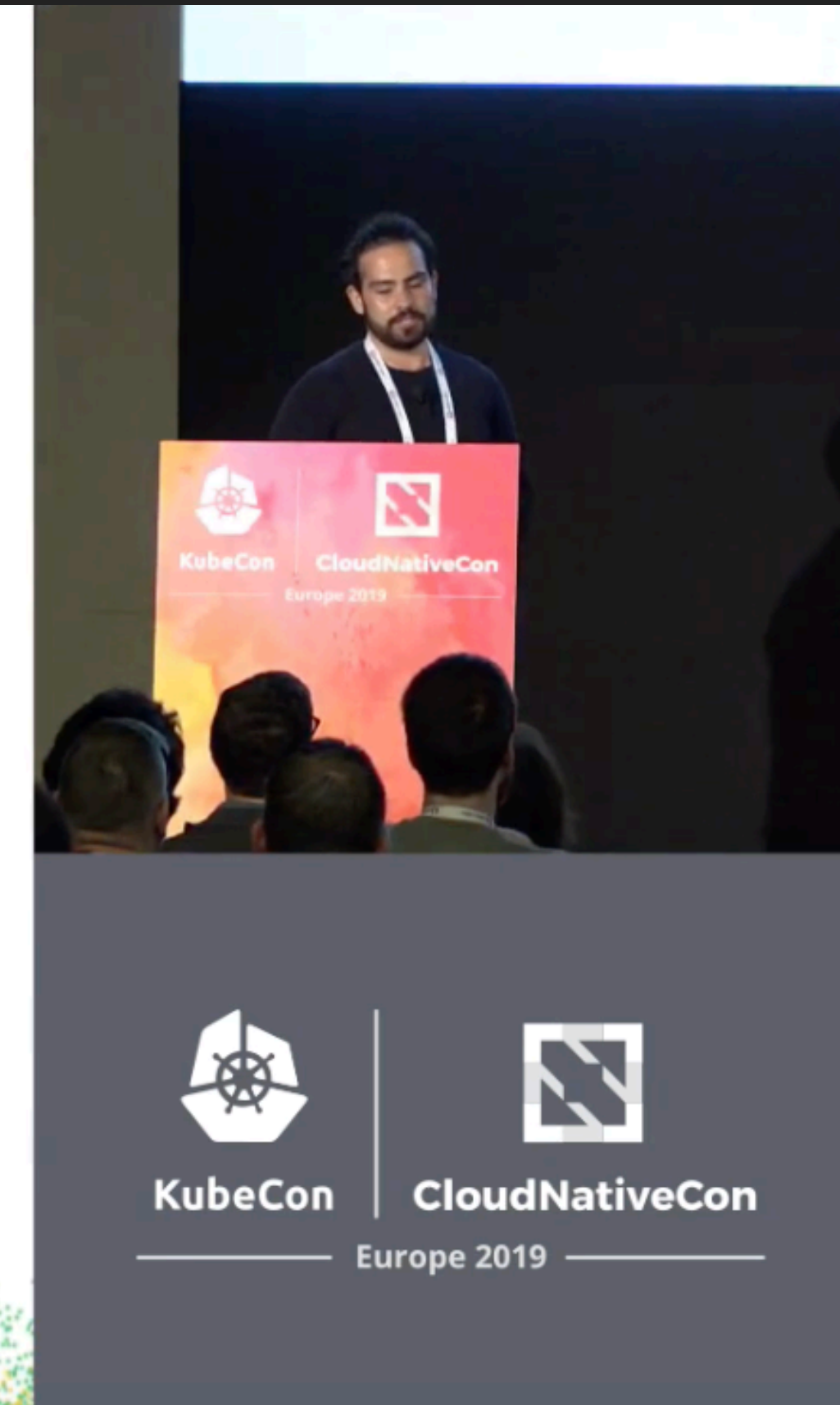
- Variety of ETL and training jobs: Tensorflow, **Spark**, Hypertuning, ...
- Identity management: **Kerberized HDFS**, **S3**, Git
- Resource governance: Shared workspaces, resource quotas
- Lambda Inference: Knative service (FAAS) for model inference

TechAtBloomberg.com

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Bloomberg

Engineering



► <https://www.youtube.com/watch?v=GbpMOaSIMJ4>

## LINKS

- ▶ [Barcelona '19: KubeCon + CloudNativeCon](#)
- ▶ [Helm 3: Navigating To Distant Shores - Bridget Kromhout & Jessica Deen, Microsoft](#)
- ▶ [APIs, Microservices, and the Service Mesh \(Cloud Next '19\)](#)
- ▶ [M3 and Prometheus, Monitoring at Planet Scale for Everyone - Rob Skillington, Uber](#)





**THANK YOU !**