

KubeCon Europe 2019

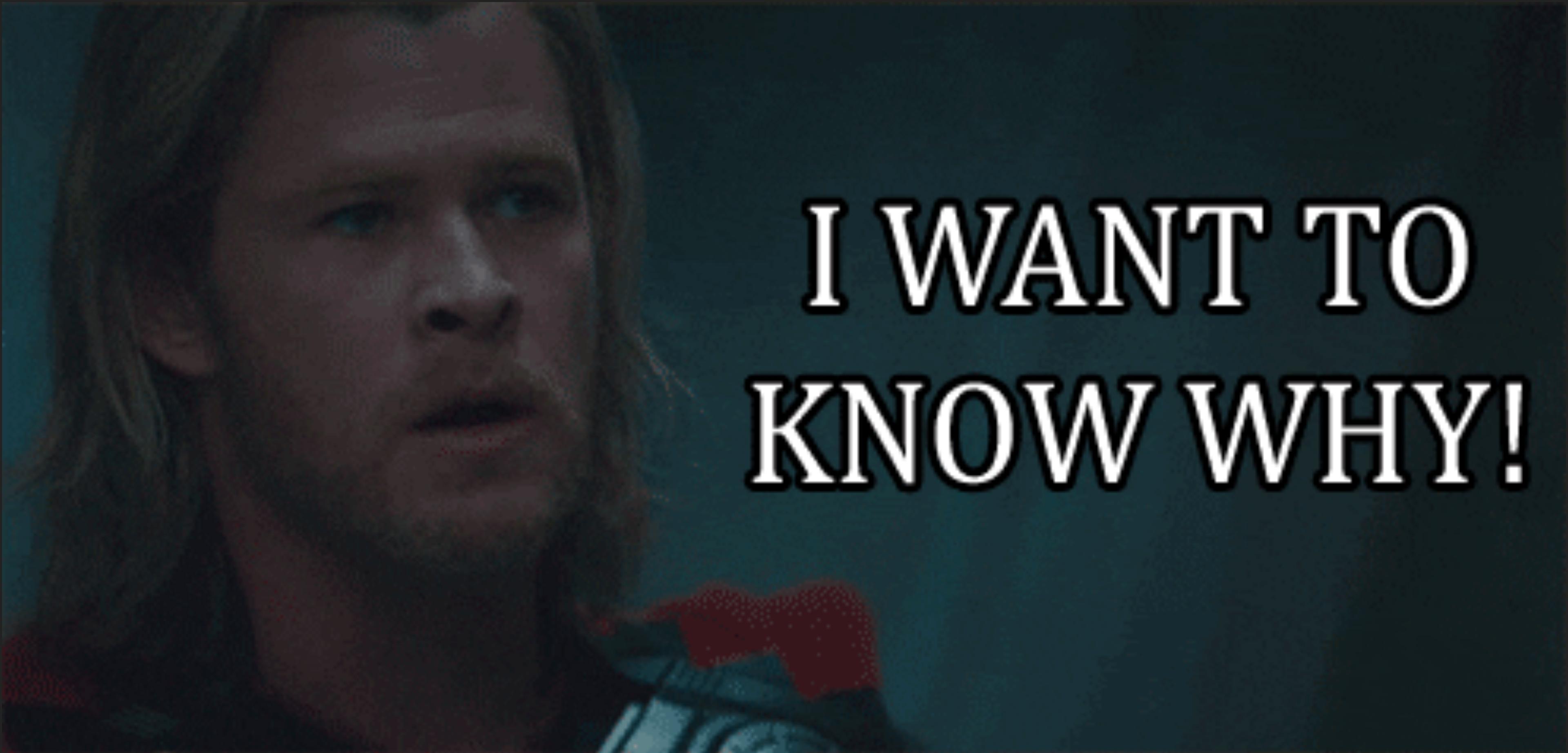
JUNE 2019 - KUBERNETES USER GROUP

Benvinguts! Keep Cloud Native

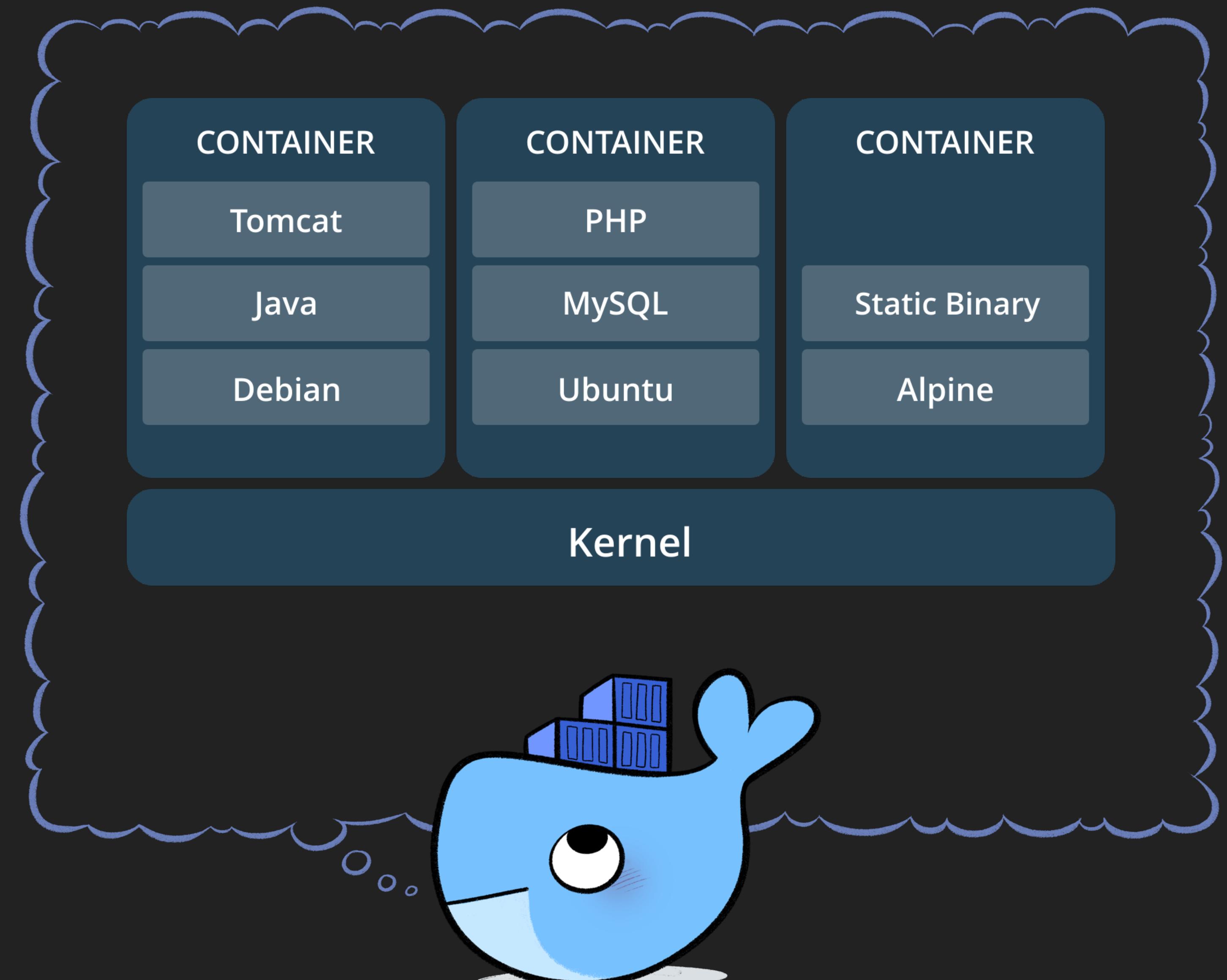


KubeCon Europe 2019 it was ...

- ▶ 7700 attendees
- ▶ 331 talks
- ▶ 150 sponsore 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



Baidu Matrix

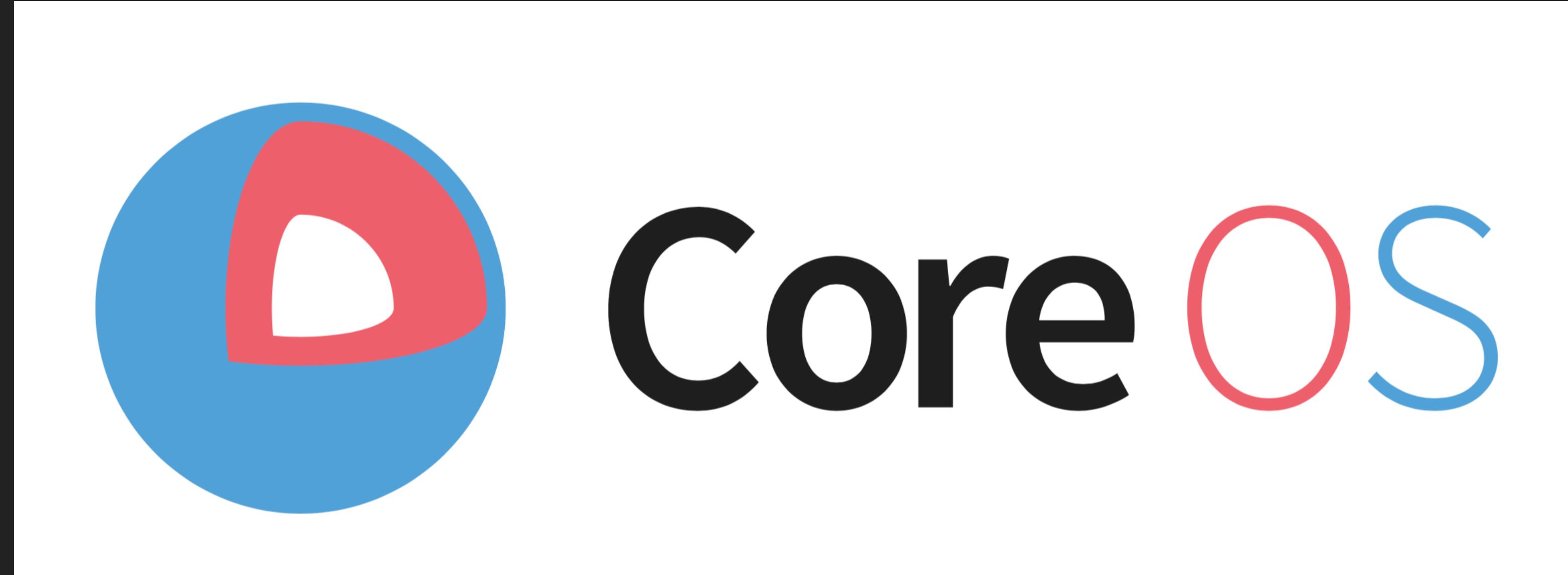


Cloud Foundry Garden & Diego

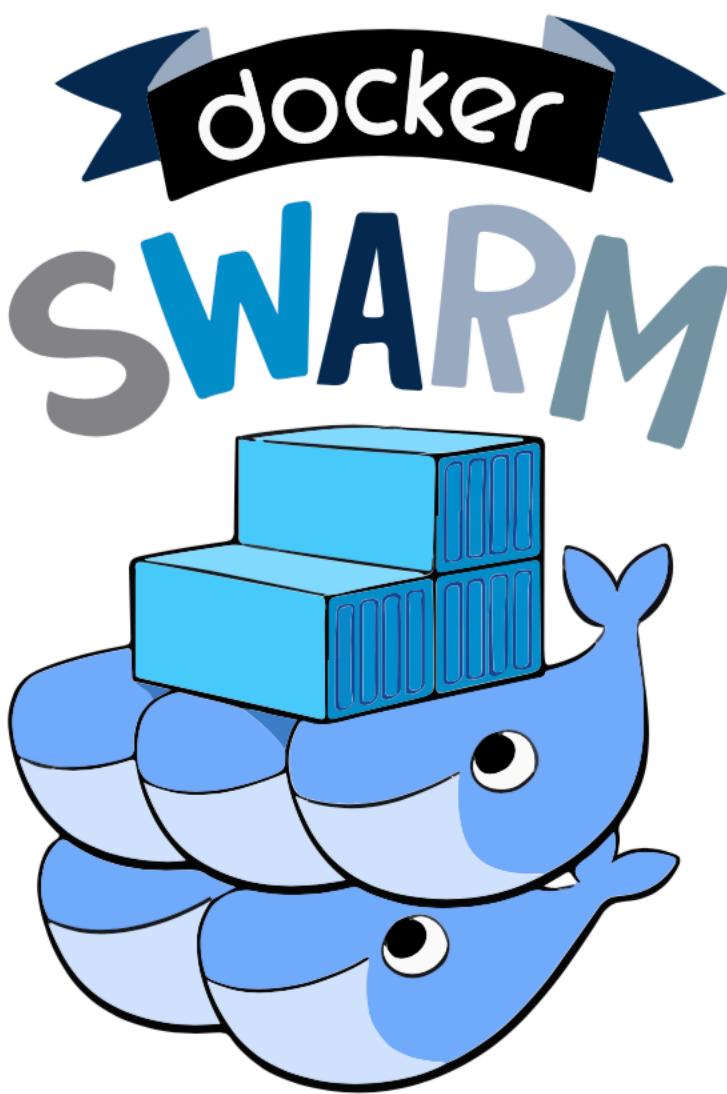


CLOUD **FOUNDRY**

CoreOS Fleet



Docker Swarm



Facebook Tupperware



Google Borg & Omega



HashiCorp Nomad



IBM Platform Symphony



Joyent Triton



Lyft v3 Infra



Microsoft Service Fabric



Netflix Titus

A large, bold, red "NETFLIX" logo centered on a white rectangular background. The letters are slightly slanted to the right.

Rancher Cattle



Red Hat OpenShift v2 Broker



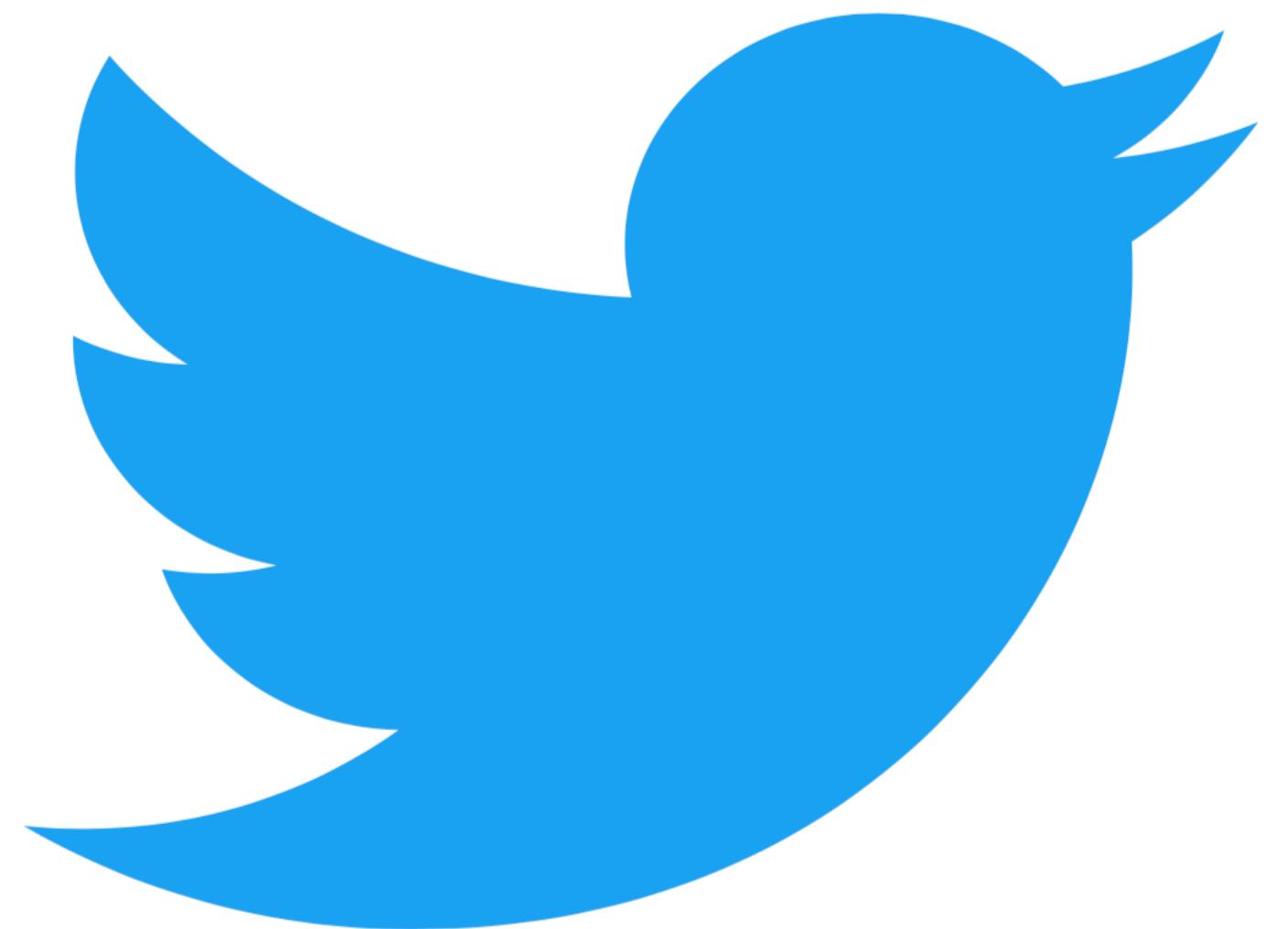
Spotify Helios



Tencent Gaia



Twitter Aurora



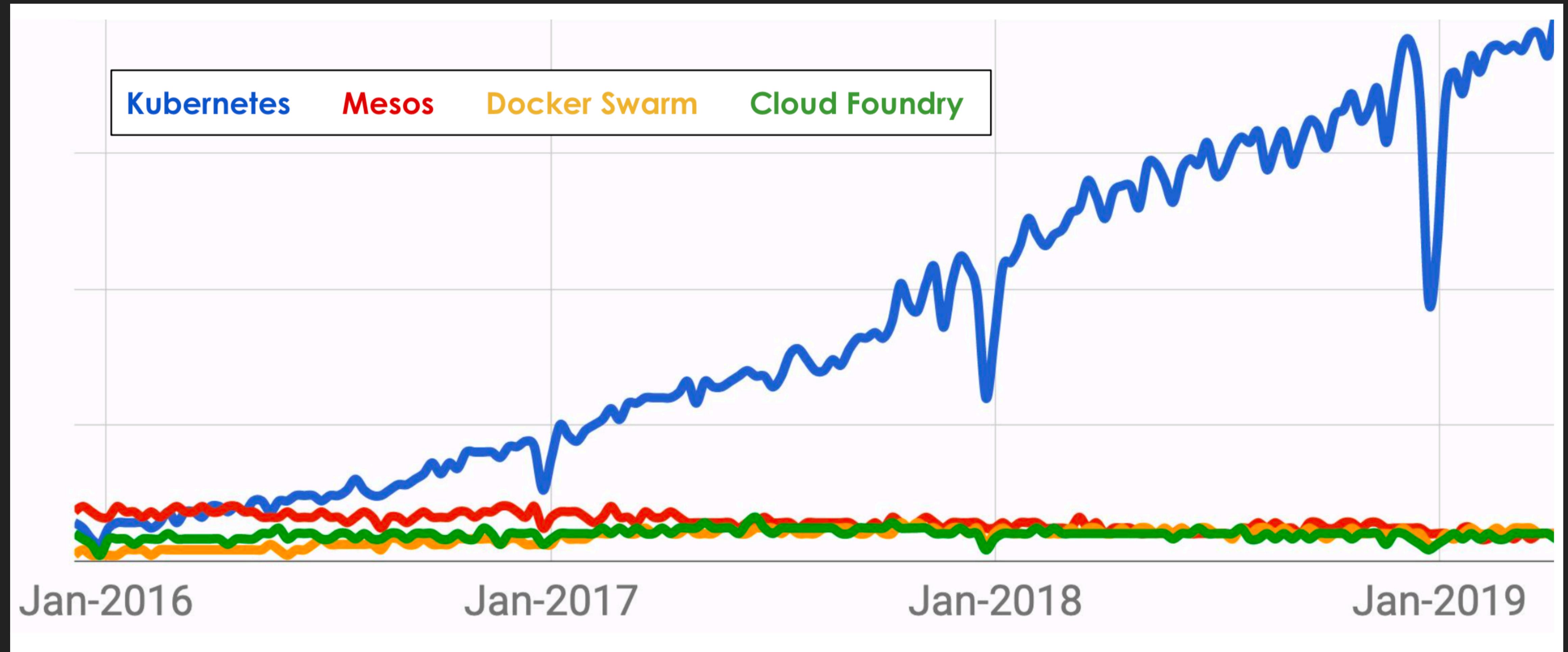
Uber Peloton

The Uber logo, consisting of the word "uber" in a lowercase, sans-serif font. The letters are black, set against a white rectangular background which is itself centered on a dark gray background.

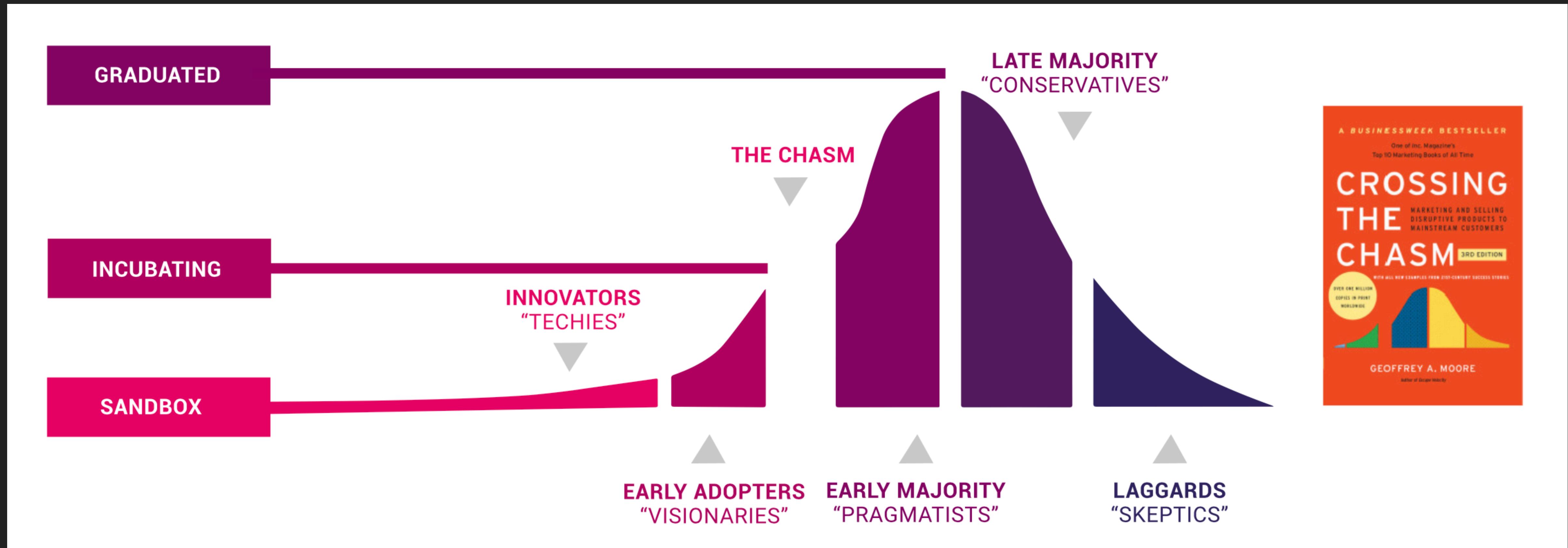
- ▶ 2014: Google Introduces Kubernetes
- ▶ mid-2014: Google introduced Kubernetes as an open source version of Borg
- ▶ June 7: Initial release - first github commit for Kubernetes
- ▶ July 10: Microsoft, RedHat, IBM, Docker joins the Kubernetes community.

- ▶ 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 CNCF 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 Francisco. Its goal was to deliver expert technical talks designed to spark creativity and promote Kubernetes education.

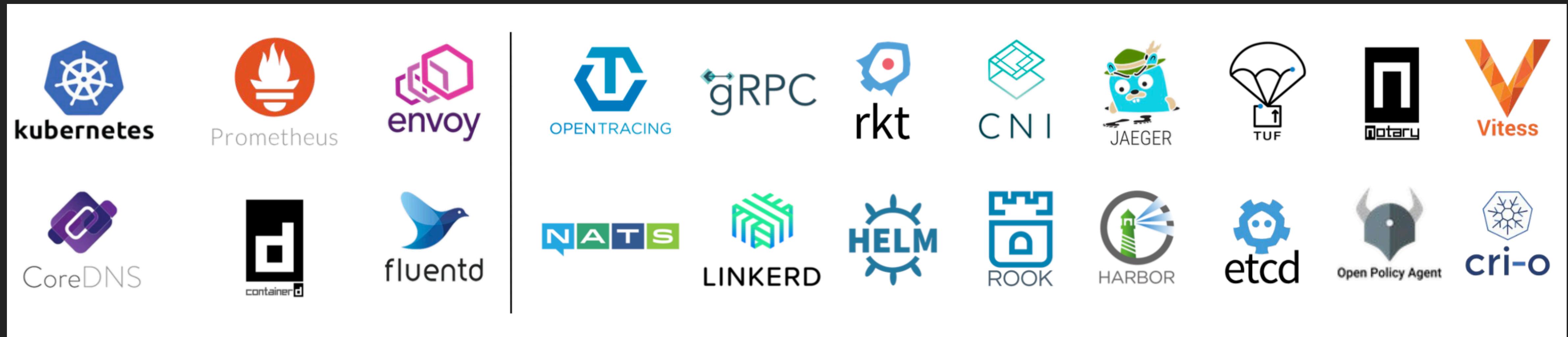
K8S USER GROUP



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

4 | © 2019 Cloud Native Computing Foundation

@oicheryl

KubeCon | CloudNativeCon
Europe 2019

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

CNCF Project Update - Bryan Liles, Senior Staff Engineer, VMware

Sandbox: OpenEBS

KubeCon CloudNativeCon
Europe 2019

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

Bryan Liles, Senior Staff Engineer, VMware

KubeCon CloudNativeCon
Europe 2019

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

CNCF Project Update - Bryan Liles, Senior Staff Engineer, VMware

The image consists of two main parts. On the left is a white presentation slide with a yellow-to-red gradient header. The header text reads "Incubating: Linkerd". In the top right corner of the slide are the logos for KubeCon and CloudNativeCon Europe 2019. Below the header, there is a green and blue stylized logo of a mesh or grid. To its right, text reads: "Linkerd is a lightweight service mesh that enhances your application's observability, reliability, and security... ... without code changes!" Below this text are four small circular icons: a blue hexagon with a white ship wheel, an orange hexagon with a white flame, a black circle with a white letter "R", and a light blue hexagon with a white owl. On the right side of the image is a video frame showing a man with glasses and a purple shirt speaking on stage. He is gesturing with his hands. The background of the video frame is a green and blue abstract pattern. At the bottom of the slide and video frame, there is a dark grey footer bar with the same KubeCon and CloudNativeCon logos and the text "Europe 2019".

Incubating: Linkerd

KubeCon | CloudNativeCon
Europe 2019

Linkerd is a lightweight service mesh that enhances your application's observability, reliability, and security...
... without code changes!

KubeCon | CloudNativeCon
Europe 2019

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

CNCF Project Update - Bryan Liles, Senior Staff Engineer, VMware

Incubating: Helm

HELM

Helm v3.0.0-alpha.1

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

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 slide has a decorative background with orange and red foliage at the top. In the top right corner, there are logos for KubeCon and CloudNativeCon Europe 2019. On the left side, the Harbor logo (a lighthouse icon) and the word "HARBOR™" are displayed. Below the logo, a text block describes Harbor as an open source Cloud Native registry. On the right side, there is a photograph of Bryan Liles, a Black man wearing glasses and a purple checkered shirt, standing on stage. At the bottom right, the same KubeCon and CloudNativeCon logos are present.

Incubating: Harbor

HARBOR™

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

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: Rook

KubeCon CloudNativeCon
Europe 2019

ROOK

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

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

KubeCon CloudNativeCon
Europe 2019

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

CNCF Project Update - Bryan Liles, Senior Staff Engineer, VMware

The image consists of two main parts. On the left is a white presentation slide with a red and orange gradient background at the top. The text "Incubating: CRI-O" is displayed in white. Below this is the cri-o logo, which features a blue hexagonal icon with a white snowflake-like pattern next to the word "cri-o" in blue lowercase letters. To the right of the slide is a video frame showing a man with glasses and a purple shirt speaking on stage. He is gesturing with his hands. The background of the video frame shows a green and blue abstract design. The video frame has the same red and orange gradient header as the slide. Both the slide and the video frame have the KubeCon and CloudNativeCon logos at the bottom, along with the text "Europe 2019".

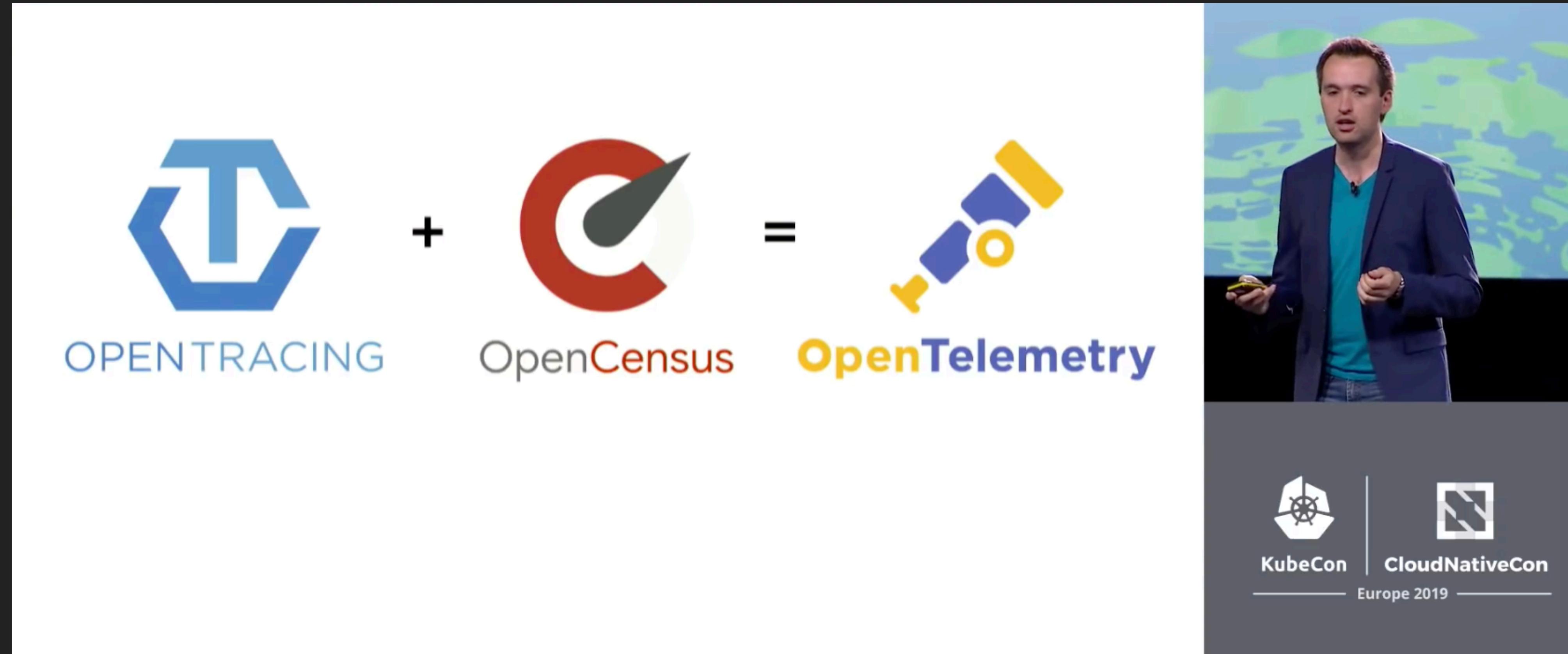
Incubating: CRI-O

 cri-o

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

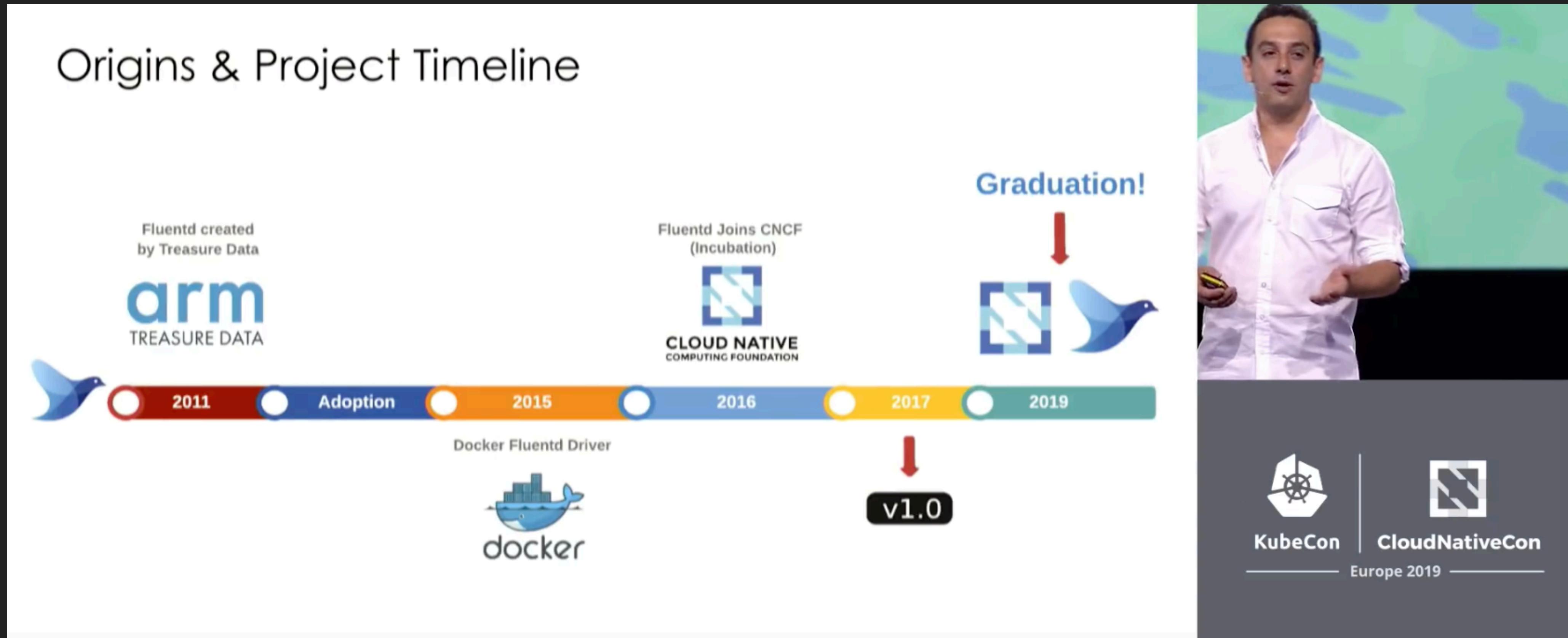
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CNCF Project Update - Bryan Liles, Senior Staff Engineer, VMware



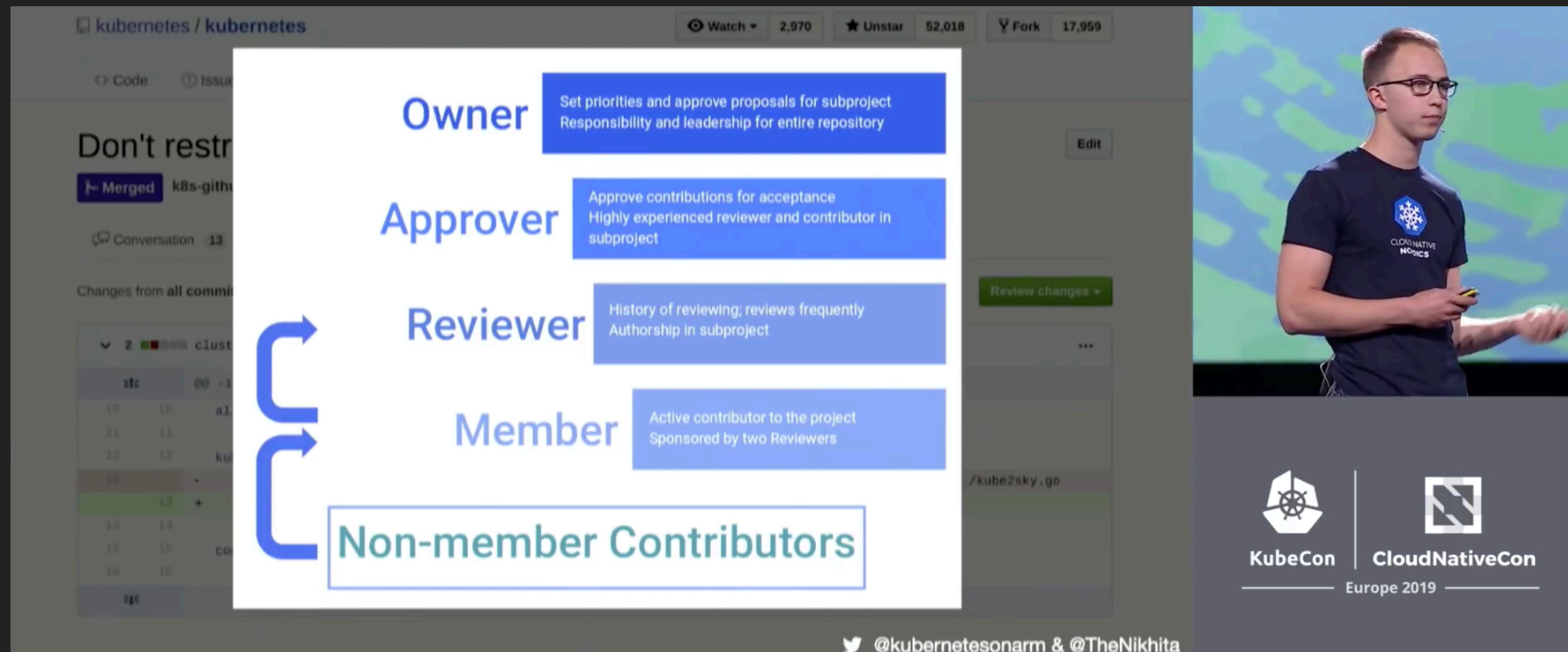
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CNCF Project Update - Bryan Liles, Senior Staff Engineer, VMware



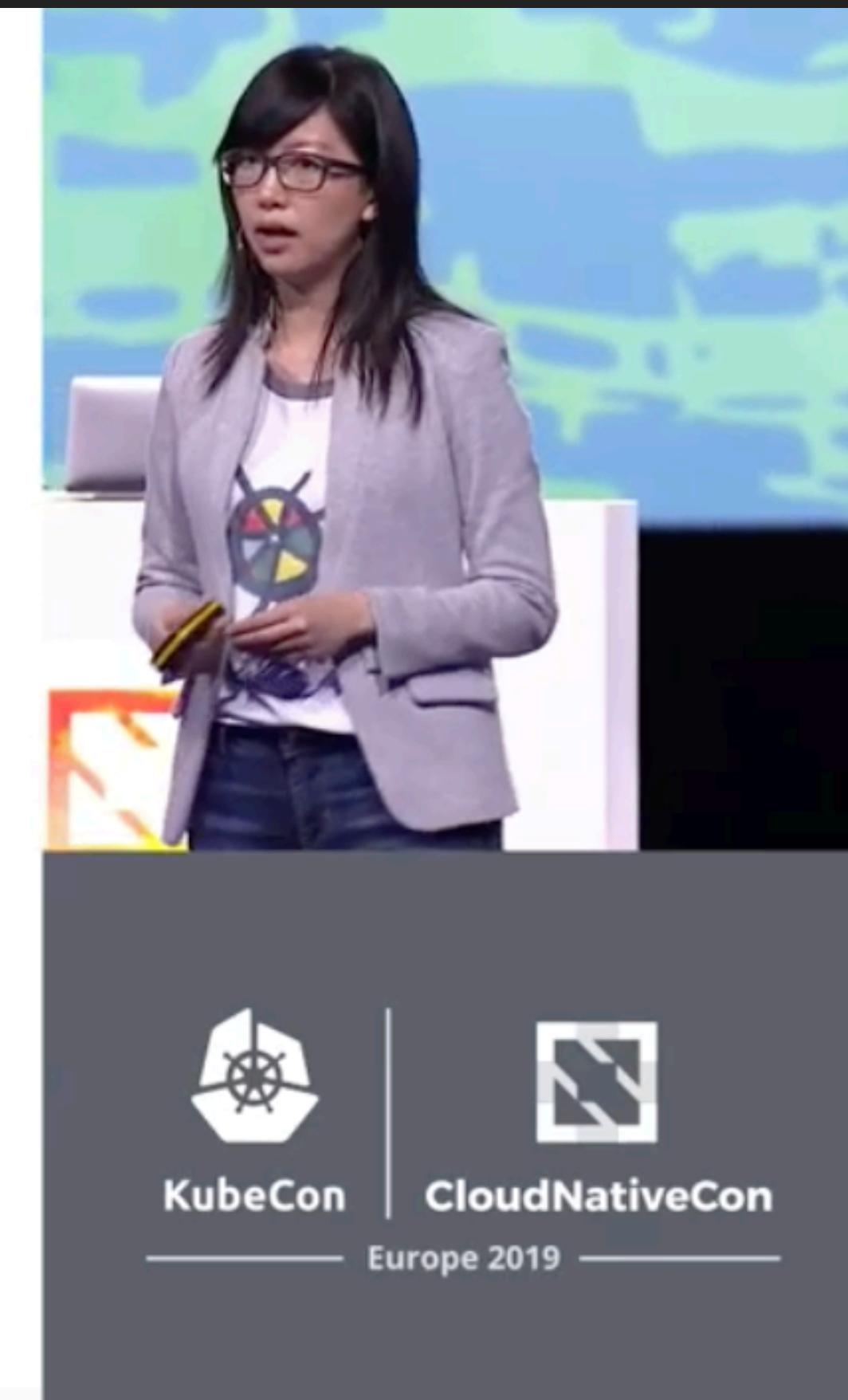
► <https://www.youtube.com/watch?v=vdxcaR3I2ic>

Getting Started in the Kubernetes Community - Lucas Käldström & Nikhita Raghunath



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

Kubernetes Project Update - Janet Kuo, Software Engineer, Google



The image shows a woman with glasses and dark hair, wearing a purple blazer over a white t-shirt with a colorful logo, standing on a stage and speaking. She is holding a small yellow object in her hands. Behind her is a large screen displaying a blue hexagonal logo with a white steering wheel icon. The stage has a dark grey floor and a white wall. In the bottom right corner of the stage area, there is a dark grey graphic with the KubeCon and CloudNativeCon logos, along with the text "Europe 2019".

Extensibility
Platforms & frameworks.
CRD still beta.

► <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



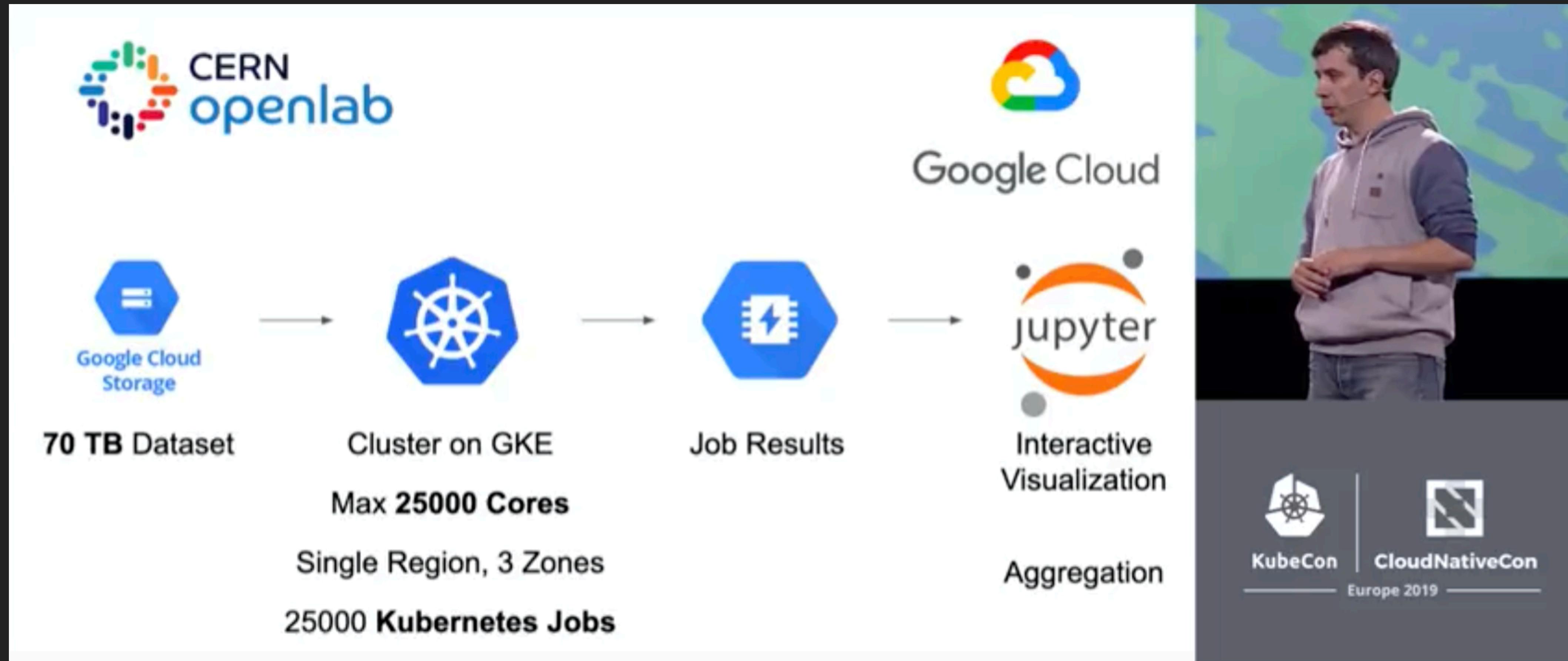
The image shows a woman with dark hair and glasses, wearing a light purple blazer over a white t-shirt with a colorful logo, standing on a stage and speaking. She is holding a small object in her hands. The background is a blue and green abstract pattern. In the top left corner of the slide, there is a small blue hexagonal icon with a white steering wheel symbol.

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

Embed ops knowledge from the experts → Operator v1.1.2 → Deployments
StatefulSets
Autoscalers
Secrets
Config maps

Red Hat

3

Operator v1.1.2

Deployments
StatefulSets
Autoscalers
Secrets
Config maps

Red Hat

KubeCon | CloudNativeCon
Europe 2019

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

Expanding the Kubernetes Operator Community - Rob Szumski

The slide is divided into three main sections, each featuring a logo and a list of features:

- Docker + PostgreSQL**: Features "Containerized".
- Cloud Database**: Features "Containerized", "Cloud storage ready", "Replicated", "Backup", and "Automated updates".
- crunchydata + Operator Framework**: Features "Containerized", "Container storage ready", "Replicated", "Backup", "Automated updates", "Enhanced observability", "Customization", "Local development", "Fully Open Source", "Any Kubernetes", and "Certified on OpenShift".

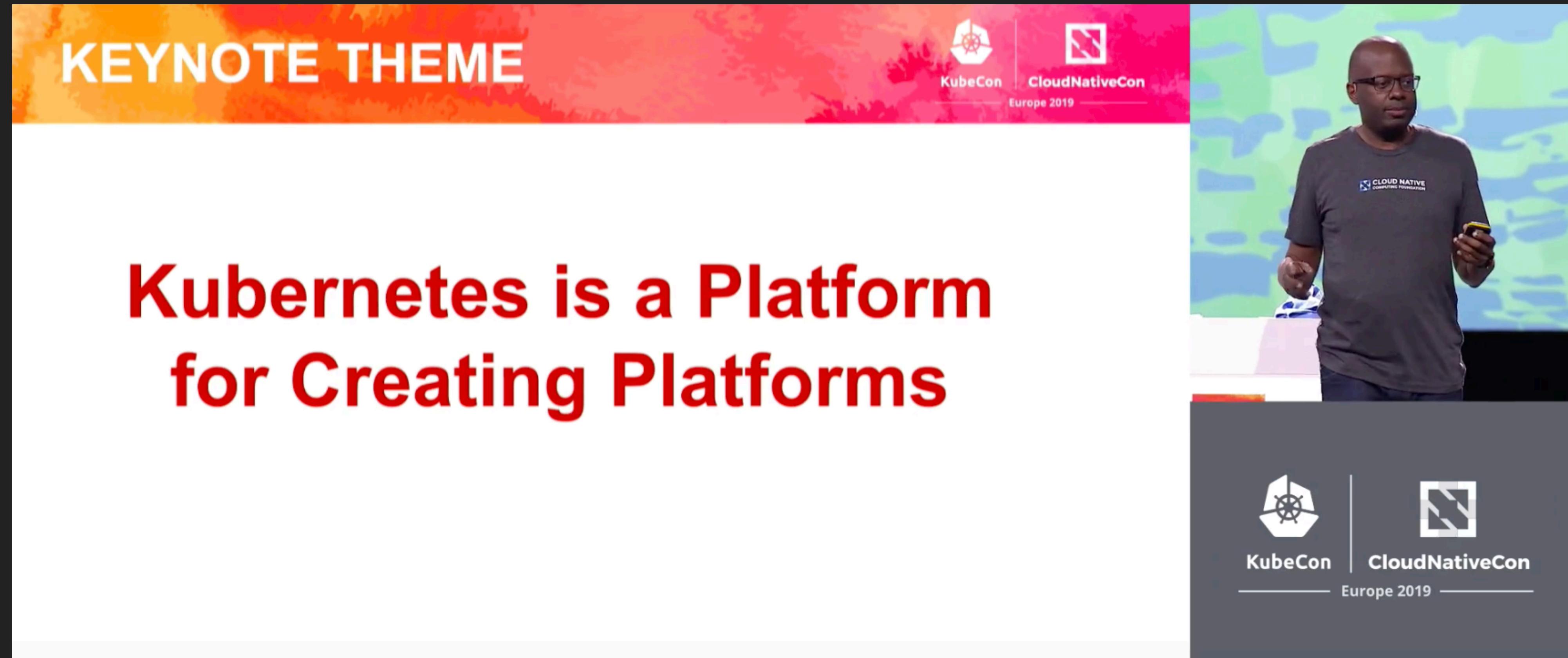
Operators are hybrid and more powerful

Red Hat

KubeCon | CloudNativeCon Europe 2019

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

Opening Remarks - Bryan Liles, Senior Staff Engineer, VMware



- ▶ <https://www.youtube.com/watch?v=5IvT80d8YVU>

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



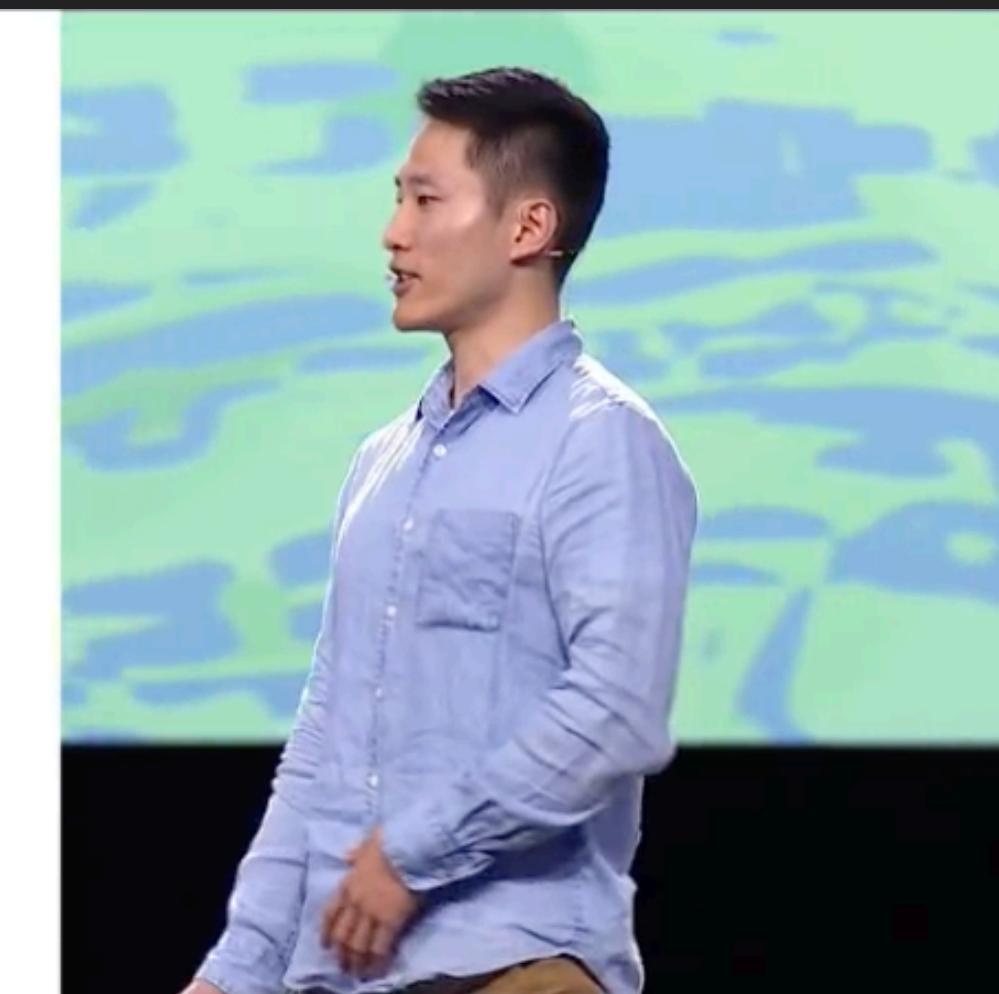
► <https://www.youtube.com/watch?v=ix0Tw8uinWs>

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

Spotify KubeCon Europe 2019 2019-05-22

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 image is a composite of two parts. On the left is a presentation slide titled "Context on Spotify's Compute Environment". The slide features three icons representing different cluster types: a multi-colored hexagon (Google Cloud), a blue hexagon with a white cube (Kubernetes), and a blue hexagon divided into three smaller hexagons. Below these icons is the text "3 production clusters". The slide has a dark background with light text and icons. On the right is a photograph of a man with short dark hair, wearing a light blue button-down shirt, standing on a stage and gesturing with his hands while speaking. He is positioned in front of a large screen displaying a green abstract pattern. At the bottom of the slide is a footer with the logos for KubeCon and CloudNativeCon Europe 2019.

Spotify KubeCon Europe 2019 2019-05-22

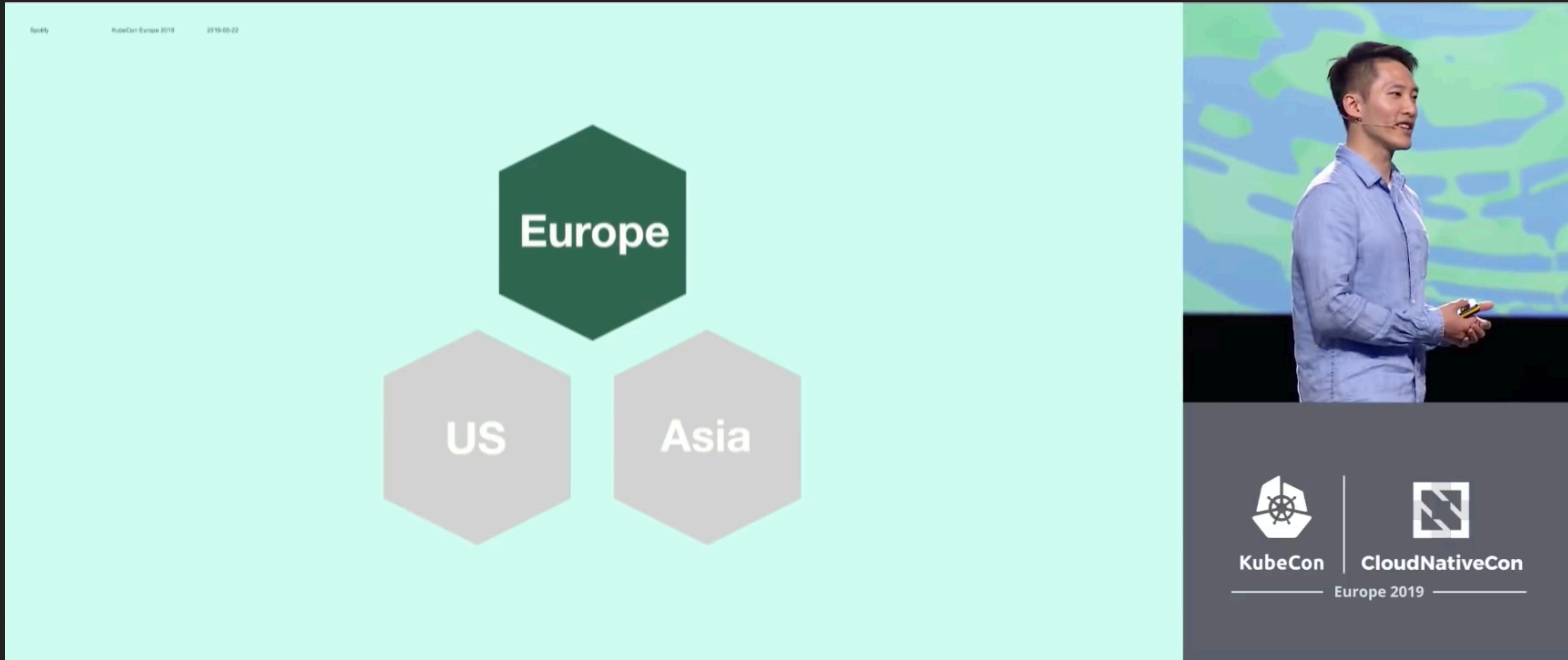
Context on Spotify's Compute Environment

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 2019-05-22

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

The image is a composite of two parts. On the left, there is a presentation slide with a dark green background. At the top, it says "Spotify" and "KubeCon Europe 2019". The date "2019-05-32" is also present. The main title "Performed Disaster Recovery Tests" is in large white font. Below it is a bulleted list of five items, all in white. On the right, there is a video frame showing a man in a blue shirt standing on a stage, gesturing with his hands while speaking. The background is a blurred image of the audience or a screen. At the bottom right of the slide, there is a footer with the "KubeCon" logo and the text "CloudNativeCon Europe 2019".

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

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

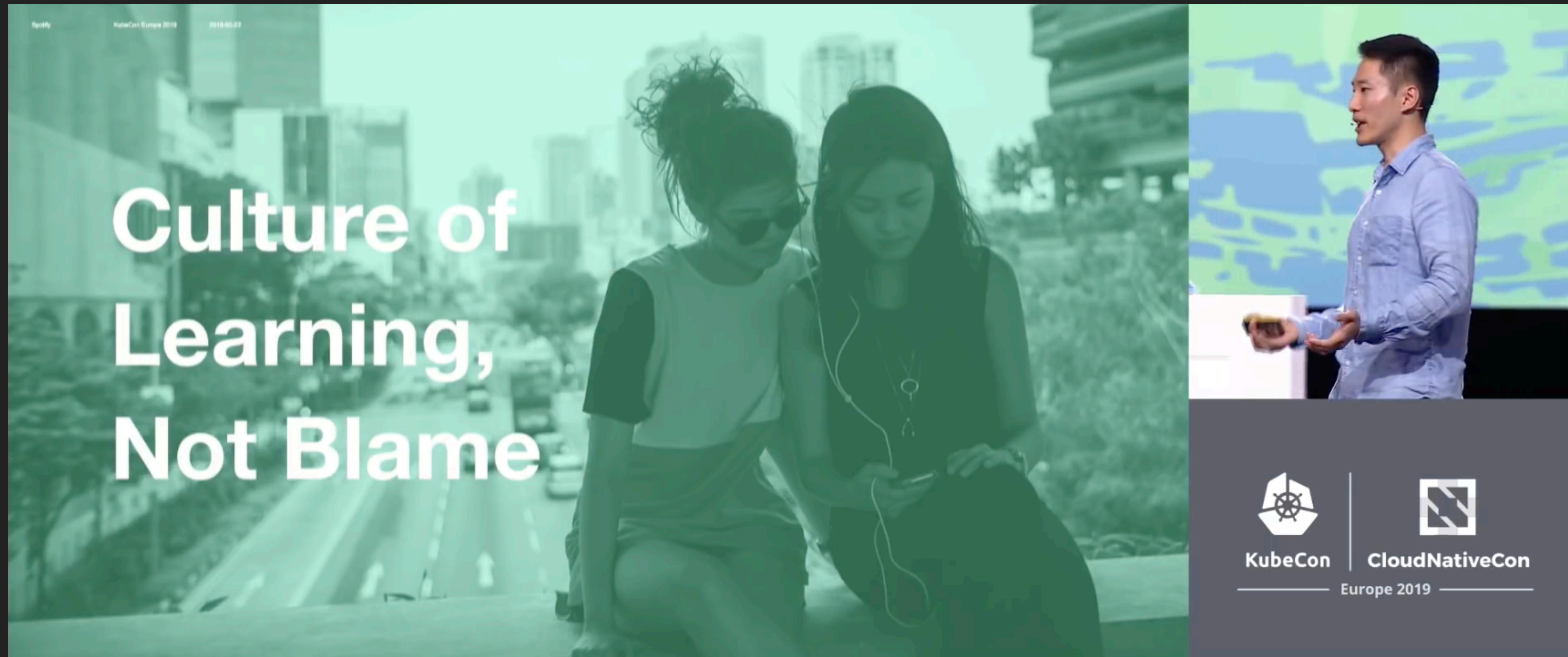
The image is a composite of two parts. On the left is a presentation slide with a green background. At the top, it says "Spotify" and "KubeCon Europe 2019" with the date "2019-05-22". Below this, the title "Practice Makes Perfect" is displayed in large white font. Underneath the title is a bulleted list of three items in white font:

- 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

On the right is a video frame showing a man with dark hair, wearing a light blue button-down shirt, standing on a stage and speaking. He is holding a small black remote or device in his right hand. The background behind him is a blurred image of a map or globe. At the bottom right of the slide, there is a grey footer bar containing the logos and names for "KubeCon" and "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

The image is a composite of two parts. On the left, there is a presentation slide with a green header containing the Spotify logo, the date '2018-05-22', and the text 'KubeCon Europe 2018'. The main title of the slide is 'What We Did Right' in large white font. Below it is a bulleted list of three items: '• we planned for failure', '• we are migrating large scale, complex infrastructure **gradually**', and '• we have a culture of learning'. On the right, there is a video frame showing a man in a blue shirt standing on a stage, facing left as if speaking to an audience. He is holding a small device in his hands. The background is a blurred green and blue patterned screen. At the bottom right of the image, there is a dark grey footer bar with the 'KubeCon' and 'CloudNativeCon' logos, separated by a vertical line, with the text 'Europe 2019' below them.

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

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

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

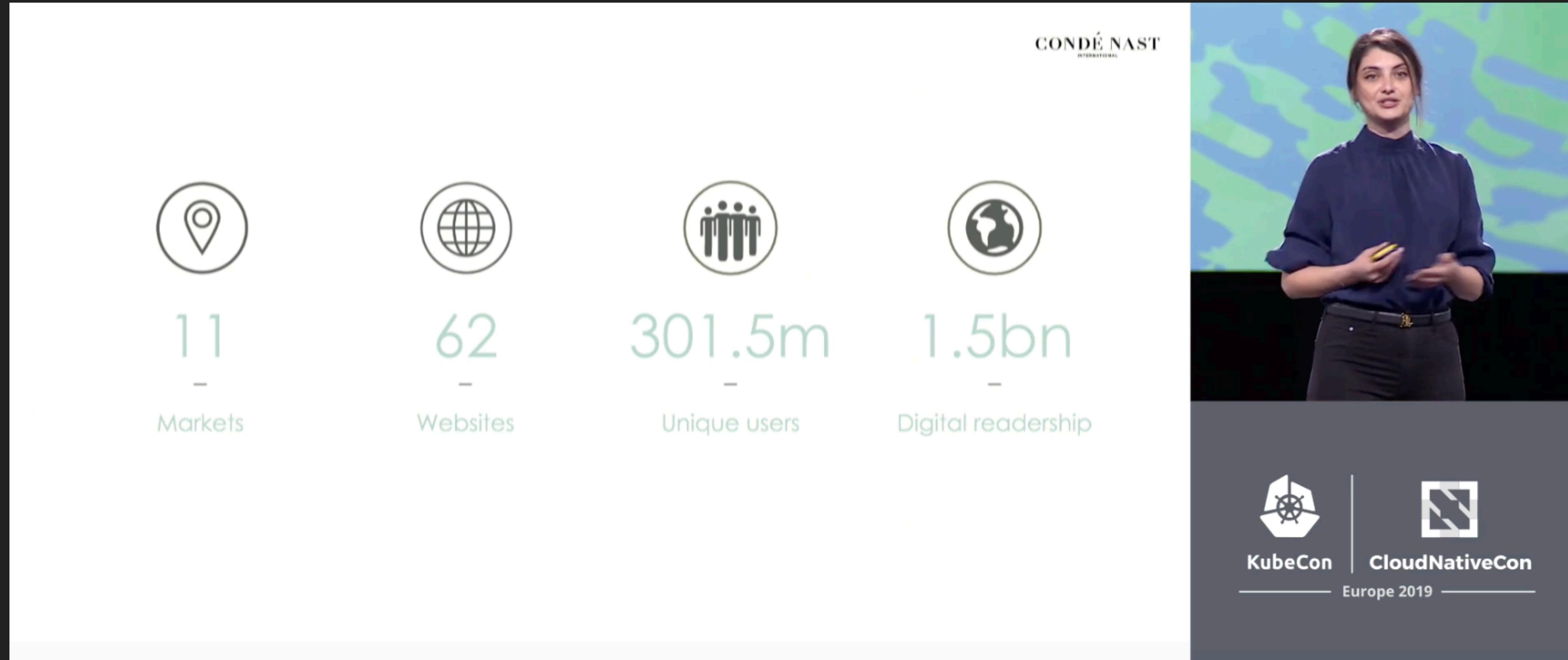
The image is a composite of two parts. On the left, there is a presentation slide with a green background featuring a pixelated pattern. At the top, it says 'Spotify' and 'KubeCon Europe 2019 2019-05-22'. Below that, the title 'Next Steps for K8s at Spotify' is displayed in large white font. Underneath the title is a bulleted list of three items:

- 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

On the right, there is a video frame showing a man with dark hair, wearing a light blue button-down shirt, standing on a stage and speaking. He is gesturing with his hands. The background is a blurred green and blue abstract design. At the bottom right of the video frame, there is a grey footer bar with the text 'KubeCon' next to a logo, 'CloudNativeCon' next to another logo, and 'Europe 2019' below them.

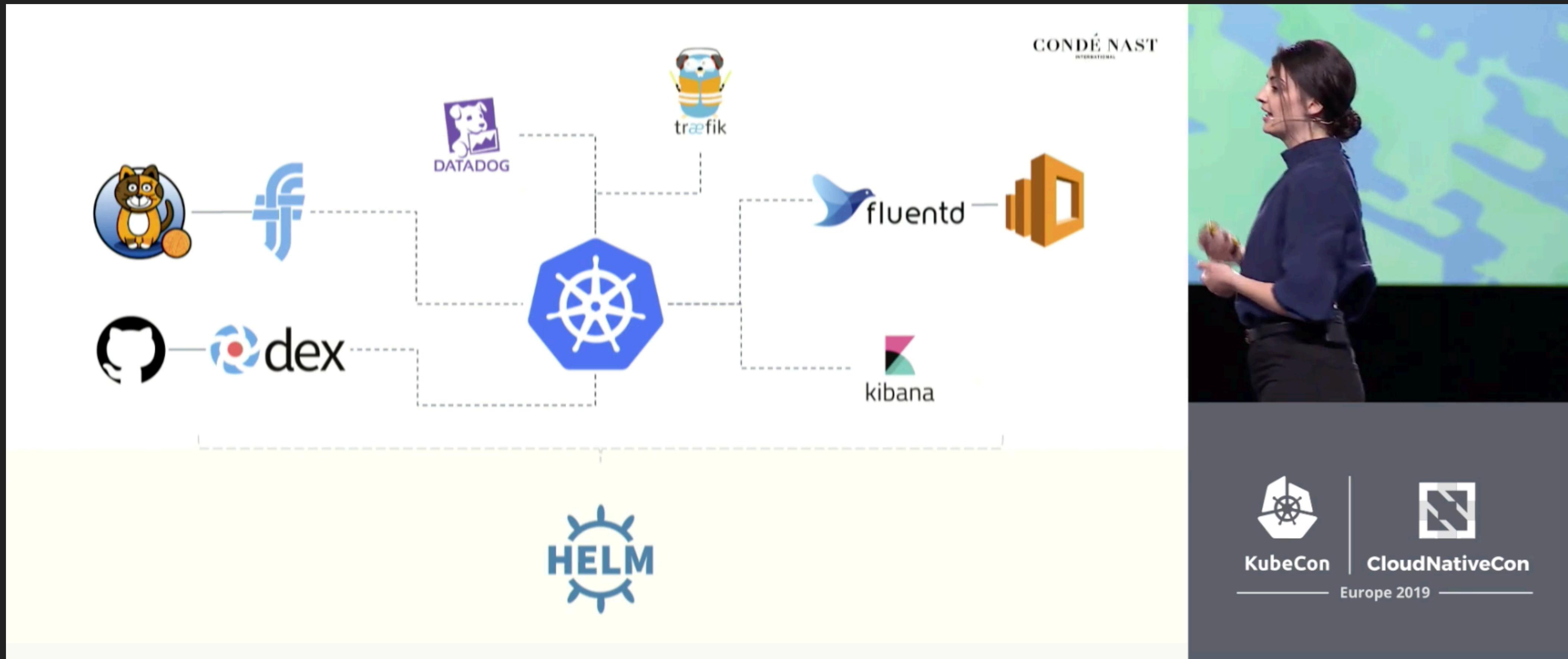
► <https://www.youtube.com/watch?v=ix0Tw8uinWs>

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



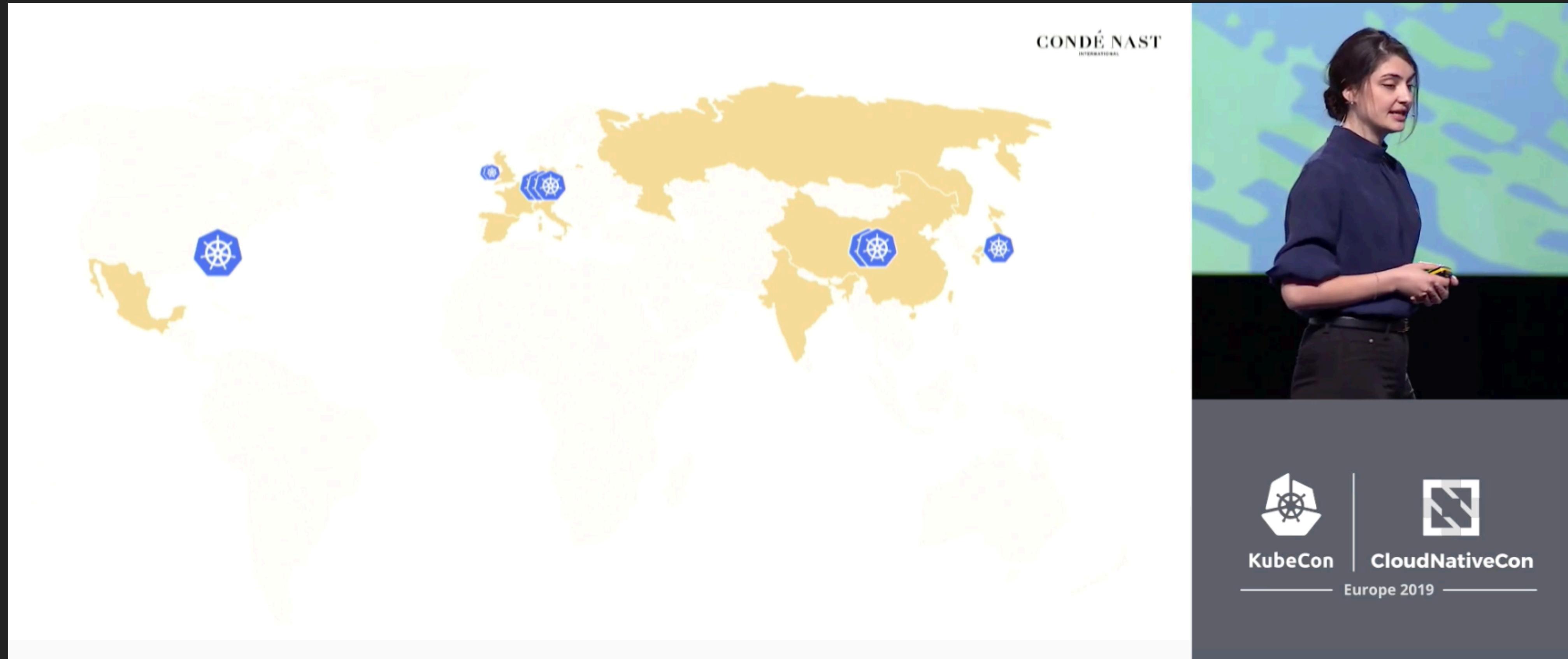
► <https://www.youtube.com/watch?v=D7pbISekc8g>

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



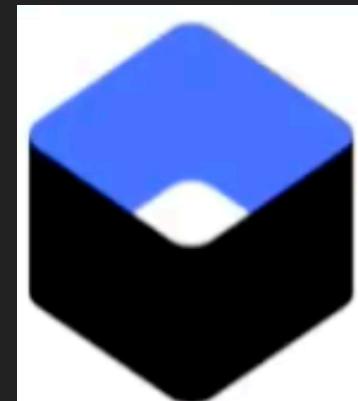
► <https://www.youtube.com/watch?v=D7pbISekc8g>

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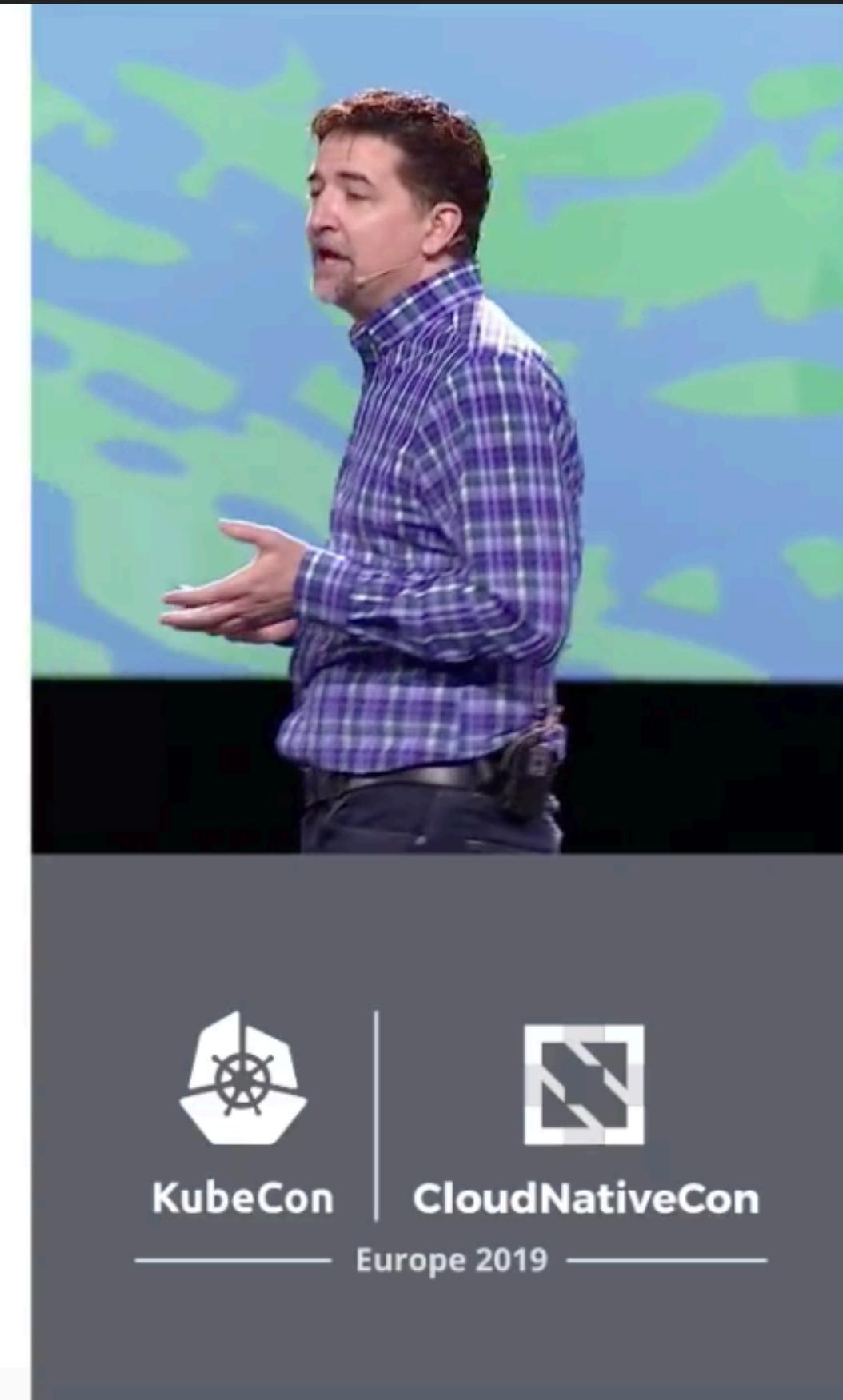
What I Learned Running 10,000+ Kubernetes Clusters – Jason McGee, IBM



IBM Cloud
Kubernetes Service

- **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](#), airlines, and rental car companies)

Scaling to Thousands of Clusters



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

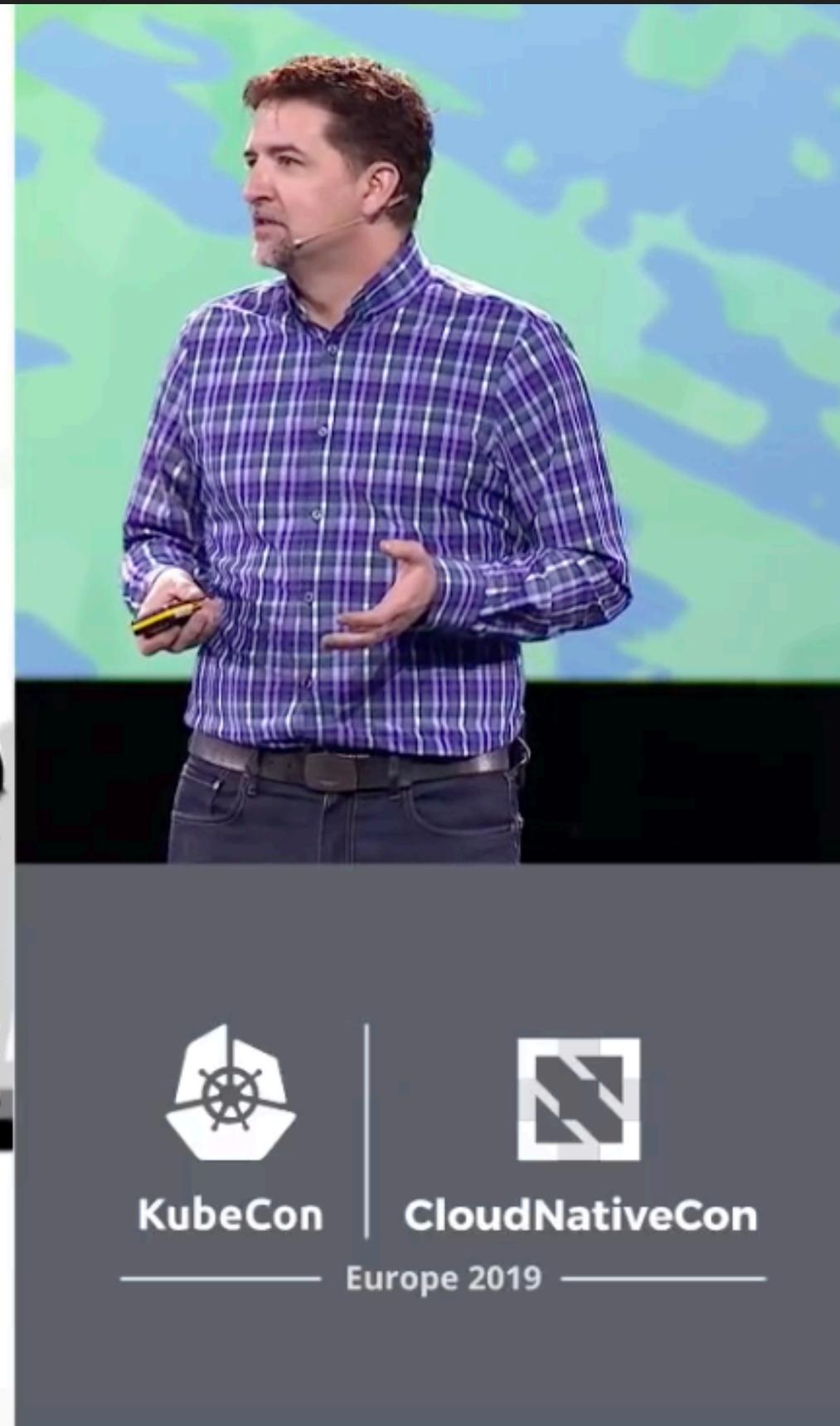
What I Learned Running 10,000+ Kubernetes Clusters – Jason McGee, IBM

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



► <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



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

The image is a composite of three parts. The top left is a slide with a colorful background featuring orange and red foliage. The text 'KEYNOTE THEME' is displayed in large white capital letters. The top right shows a woman with glasses and dark hair, wearing a grey blazer over a black t-shirt with a red Kubernetes logo, speaking on a stage with a green abstract background. The bottom part is a dark grey footer section containing the KubeCon and CloudNativeCon logos, the text 'Europe 2019', and a horizontal line.

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

Financial sector
Enterprising bank

Amsterdam
Headquarter

Agile organization
DevOps / Hybrid cloud

20,000
Total number of employees

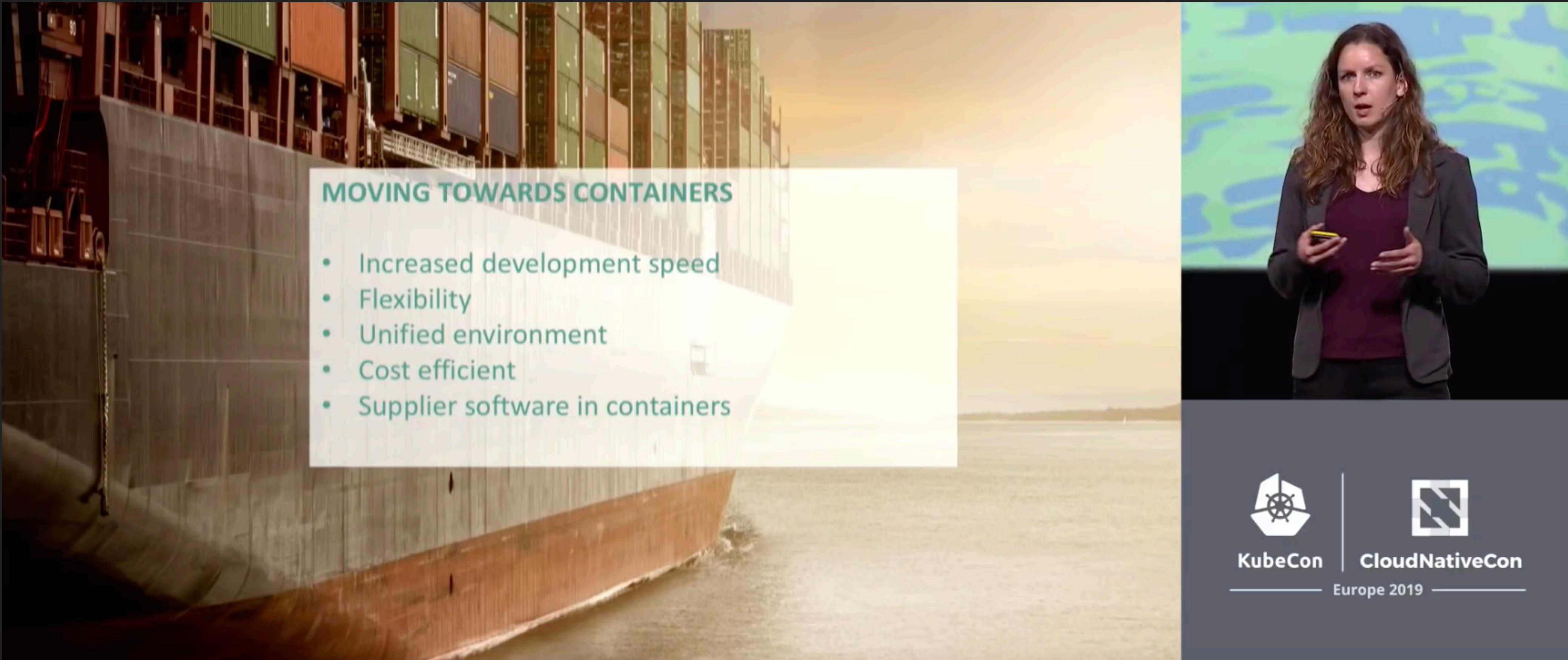
400+
Development Teams

3,000+
Applications



► https://www.youtube.com/watch?v=uRvKGZ_fDPU

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



► 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

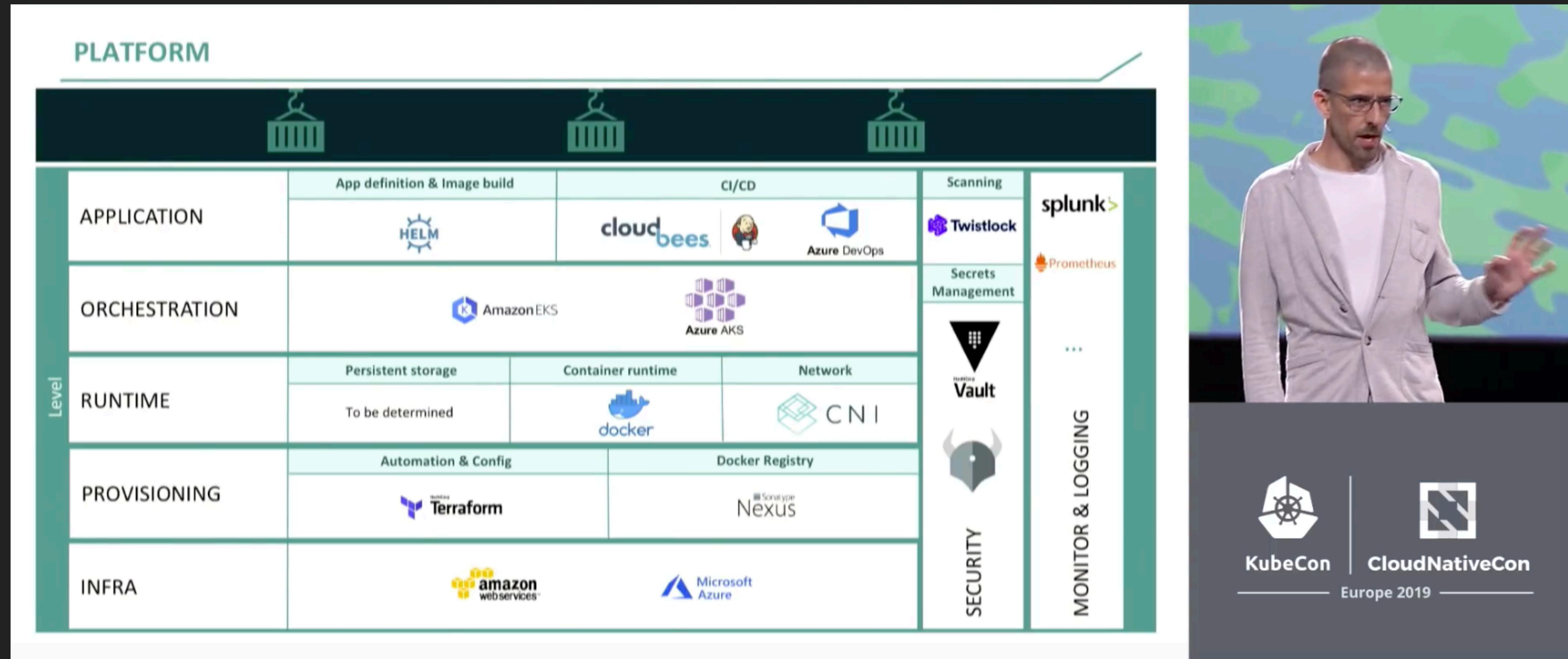
 ABN AMRO



KubeCon | **CloudNativeCon**
Europe 2019

► https://www.youtube.com/watch?v=uRvKGZ_fDPU

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



► https://www.youtube.com/watch?v=uRvKGZ_fDPU

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

The image is a composite of two parts. On the left is a slide titled 'ROADMAP' showing a timeline from Q4 2018 to Q2 2019. On the right is a video frame of Laura Rehorst speaking at a conference.

ROADMAP

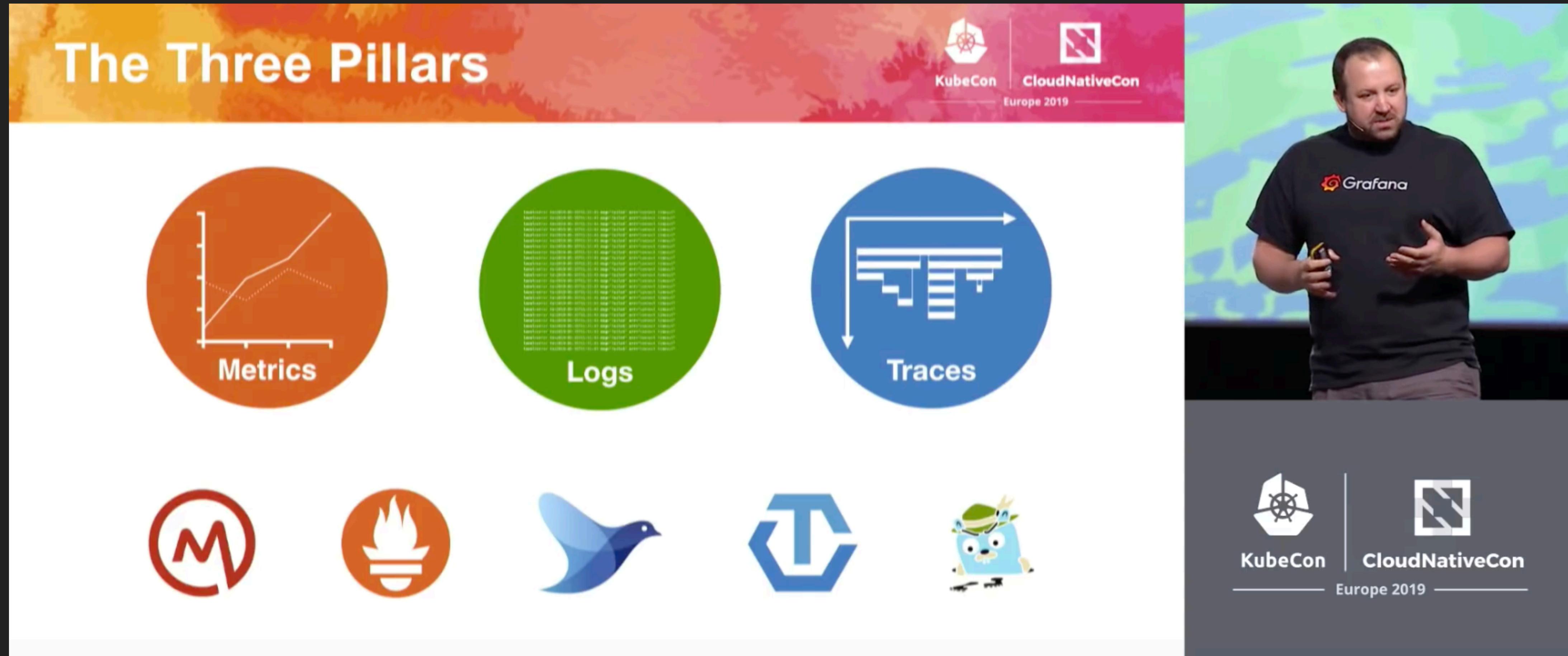
- Q4 2018:** Stratus team created. Define mission & vision, Define capabilities of platform.
- Q1 2019:** Minimum Viable Product #1
 - ✓ Managed Container Platform on AWS (EKS)
 - ✓ Twistlock build implementation
 - ✓ Docker Image Pipeline
 - ✓ Hardened and secure base images
- Q2 2019:** Minimum Viable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

ABN AMRO

Laura Rehorst speaking at KubeCon + CloudNativeCon Europe 2019

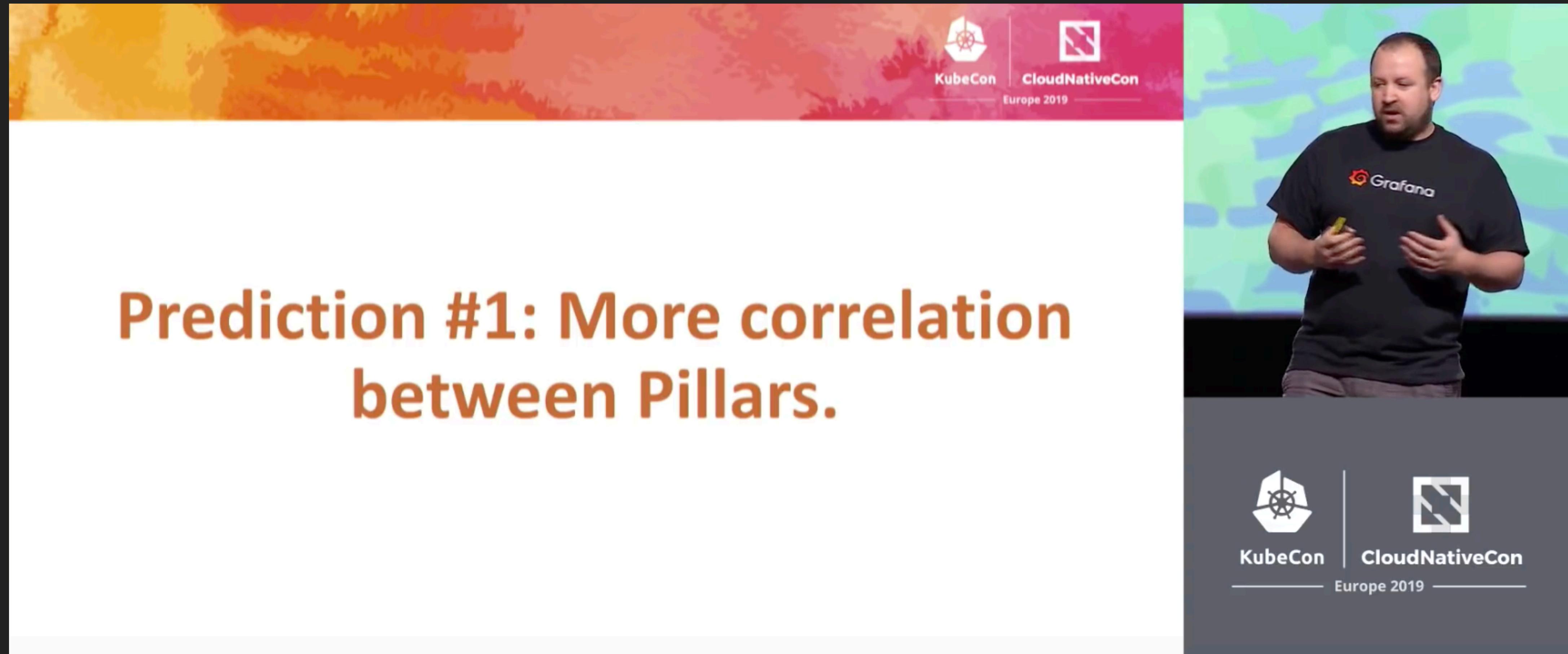
▶ https://www.youtube.com/watch?v=uRvKGZ_fDPU

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



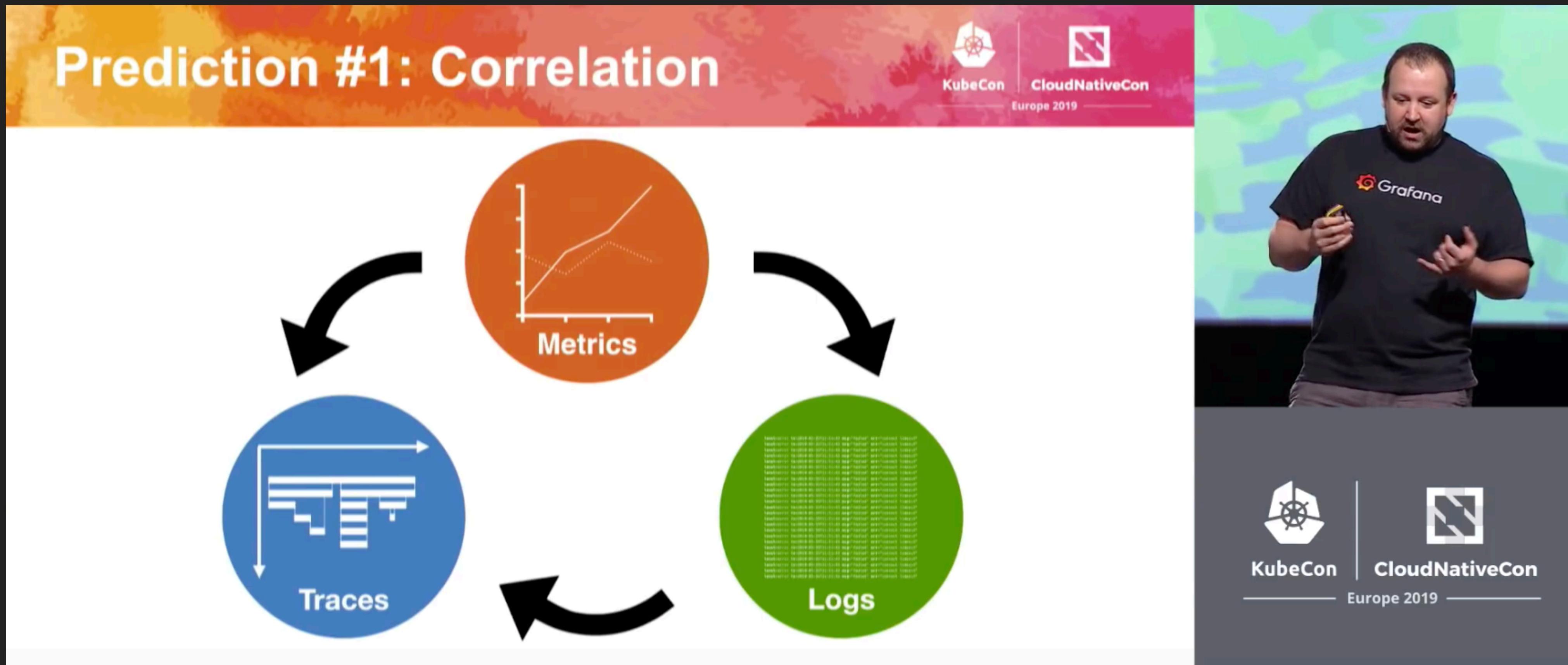
► <https://www.youtube.com/watch?v=MkSdvPdS1oA>

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



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

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



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

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

The slide is from a presentation at KubeCon + CloudNativeCon Europe 2019. It features a male speaker in a blue shirt standing on a stage with a colorful abstract background. The slide has a white header bar with the conference logos and "Europe 2019". The main content area contains the text "Prediction #2: New Signals & New Analysis" in green, accompanied by a network graph icon and a magnifying glass over a pie chart icon. The footer bar is dark grey with the conference logos and "Europe 2019".

Prediction #2: New Signals & New Analysis

Diagram: A network graph with four blue circular nodes connected by black lines.

Icon: A magnifying glass focusing on a pie chart divided into four colored segments (green, blue, orange, yellow).

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

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

The image is a composite of two screenshots. The left side shows a tweet from a user named 'bletchley punk' (@alicegoldfuss). The tweet reads: "just give me log files and grep, I am dying". It was posted at 6:32 PM - 5 Apr 2018. The right side shows a video frame of a man, Tom Wilkie, speaking on stage. He is wearing a dark t-shirt with a logo on it. The background is a green screen with some abstract patterns. The video frame has the same 'KubeCon + CloudNativeCon Europe 2019' branding as the tweet.

Prediction #3: Index-free Logs

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Europe 2019

Follow

bletchley punk
@alicegoldfuss

just give me log files and grep, I am dying

6:32 PM - 5 Apr 2018

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

KubeCon | CloudNativeCon
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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OK Log
<https://github.com/oklog/oklog>

kubectl logs

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

A screenshot of a terminal window showing log output from kubectl logs. The command run was: `kubectl logs -n cortex-ops -l name=ingester --since 1h | grep error | head -n 20`. The output shows multiple entries of errors related to failed get operations on the 'namecache' key.

A screenshot of a browser displaying the Grafana Loki interface. It shows a list of log entries with timestamp, source, and log content. The log content includes error messages similar to those seen in the kubectl logs output.

A photograph of Tom Wilkie, a man with a beard, wearing a black t-shirt with the Grafana logo, standing on a stage and speaking to an audience. He is holding a small device in his right hand.

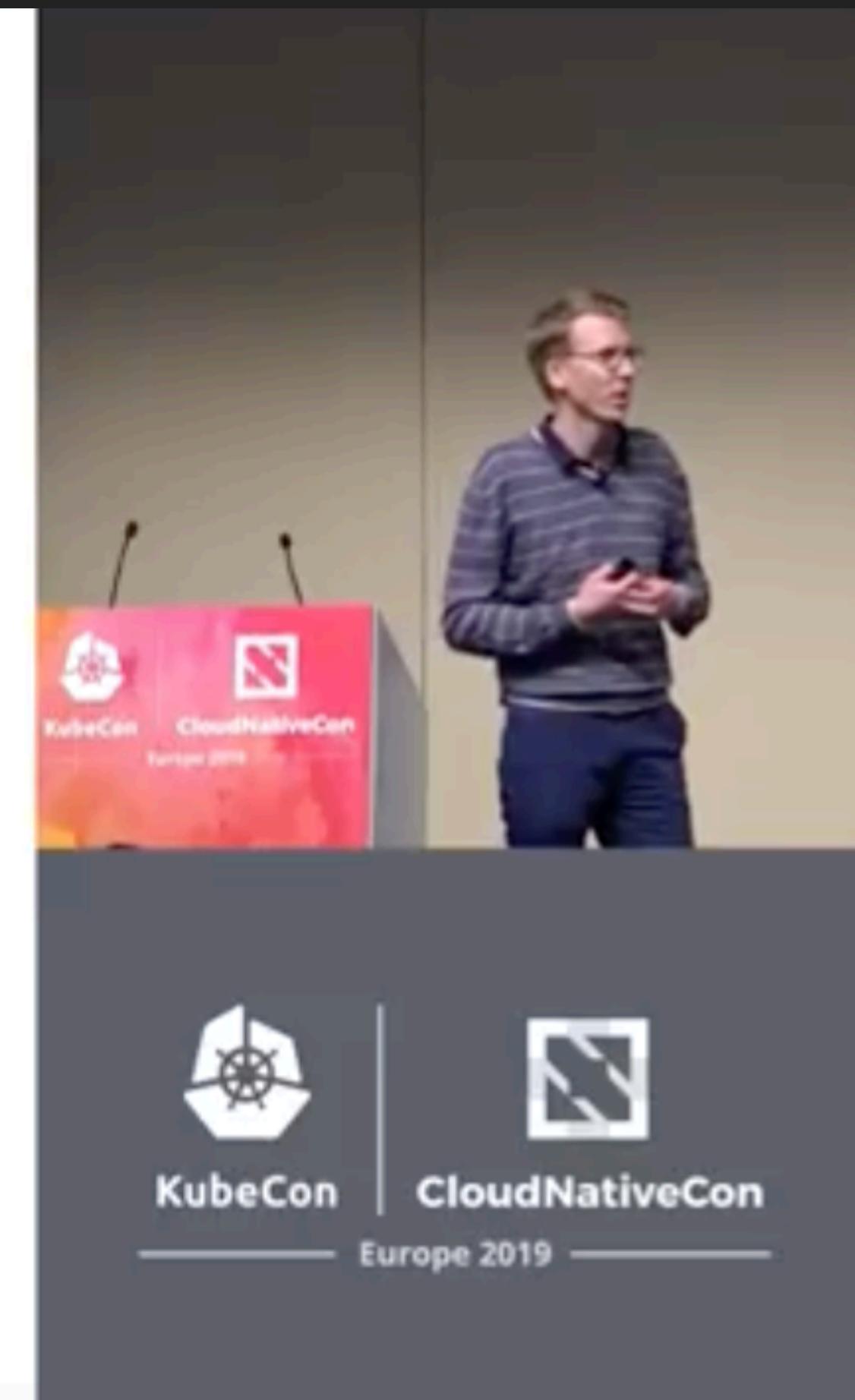
KubeCon | CloudNativeCon
Europe 2019

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

FAILURE STORIES



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



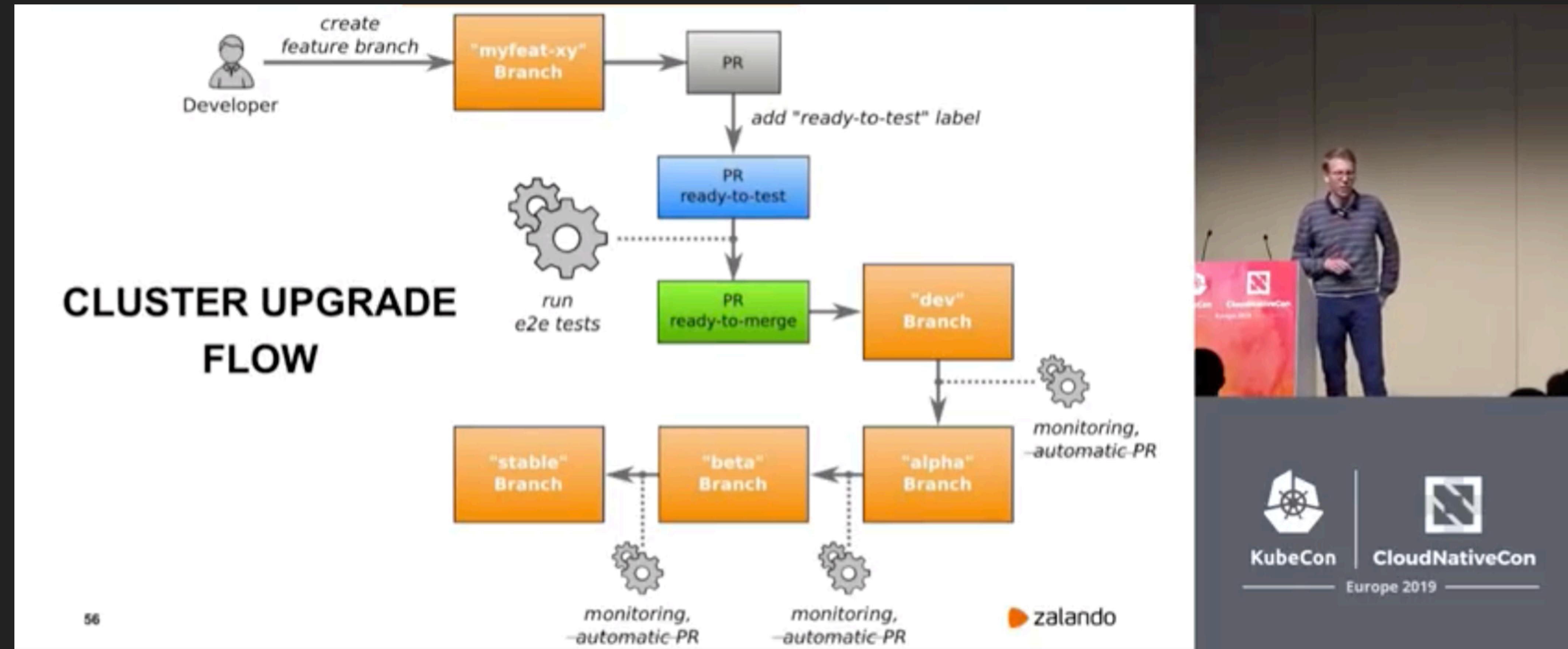
► <https://www.youtube.com/watch?v=6sDTB4eV4F8>

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

The image is a composite of several elements. On the left, there is a large screenshot of a monitoring interface titled "INCIDENT #8: CPU THROTTLING". The interface shows a CPU usage chart with multiple cores over time. A significant spike in usage is visible, with a large portion of the chart turning red. A yellow flame icon is overlaid on the red area. Below the chart, there is a legend and some numerical data. In the bottom right corner of this screenshot, there is a small "zalando" logo. To the right of the screenshot, a man in a striped shirt is standing behind a podium, speaking. The podium has a pink cloth with the "KubeCon + CloudNativeCon Europe 2019" logo on it. In the bottom right corner of the entire image, there is a dark grey box containing the "KubeCon" and "CloudNativeCon" logos, along with the text "Europe 2019".

► <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

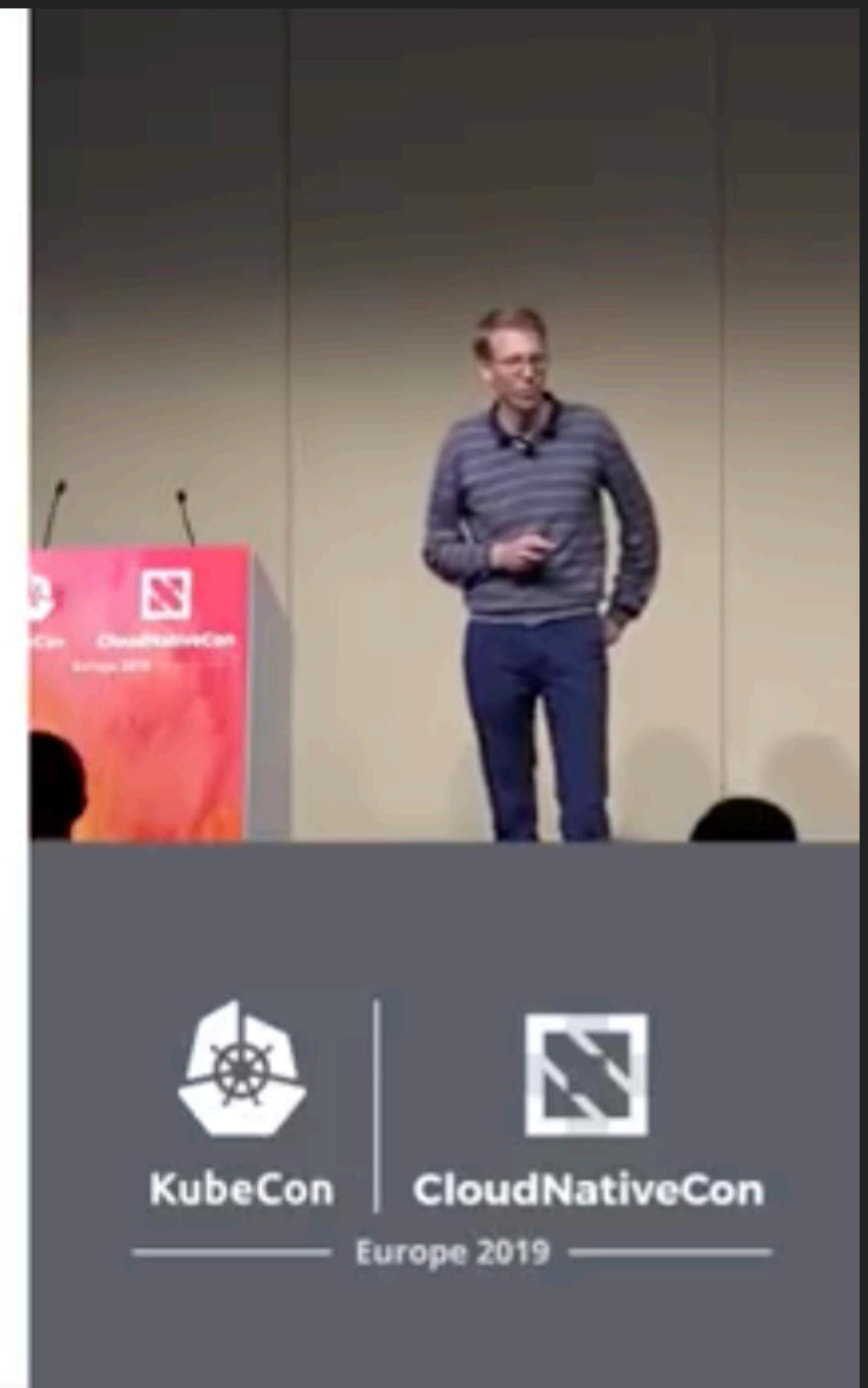
Posted On: Jan 16, 2019

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





► <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?

NO

(not really)

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

81

zalando

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Europe 2019

A man in a striped shirt stands on a stage, speaking to an audience. A red banner with the Zalando logo is visible behind him.

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



STORAGE

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

The image is a composite of two parts. On the left is a white presentation slide titled "Benefits of Kubernetes". It lists eight features in a 2x4 grid: Self Healing, Intelligent Scheduling, Auto Scaling, App Portability; Service Discovery, Load Balancing, Safer Deployment, and Magic of Containers. To the right of the text is a large blue hexagonal logo with a white steering wheel icon. At the bottom of the slide are the logos for KubeCon and CloudNativeCon Europe 2019. On the right is a video frame showing Saad Ali, a man with dark hair wearing a blue sweater over a light shirt, standing on a stage and speaking. Below the video frame is a grey footer bar with the KubeCon and CloudNativeCon logos and the text "Europe 2019".

Benefits of Kubernetes

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

The Kubernetes logo is a blue hexagon containing a white steering wheel icon.

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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

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

KubeCon **CloudNativeCon**
Europe 2019

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

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

Tim Hockin @thockin · 26 Oct 2018
Replying to @stu

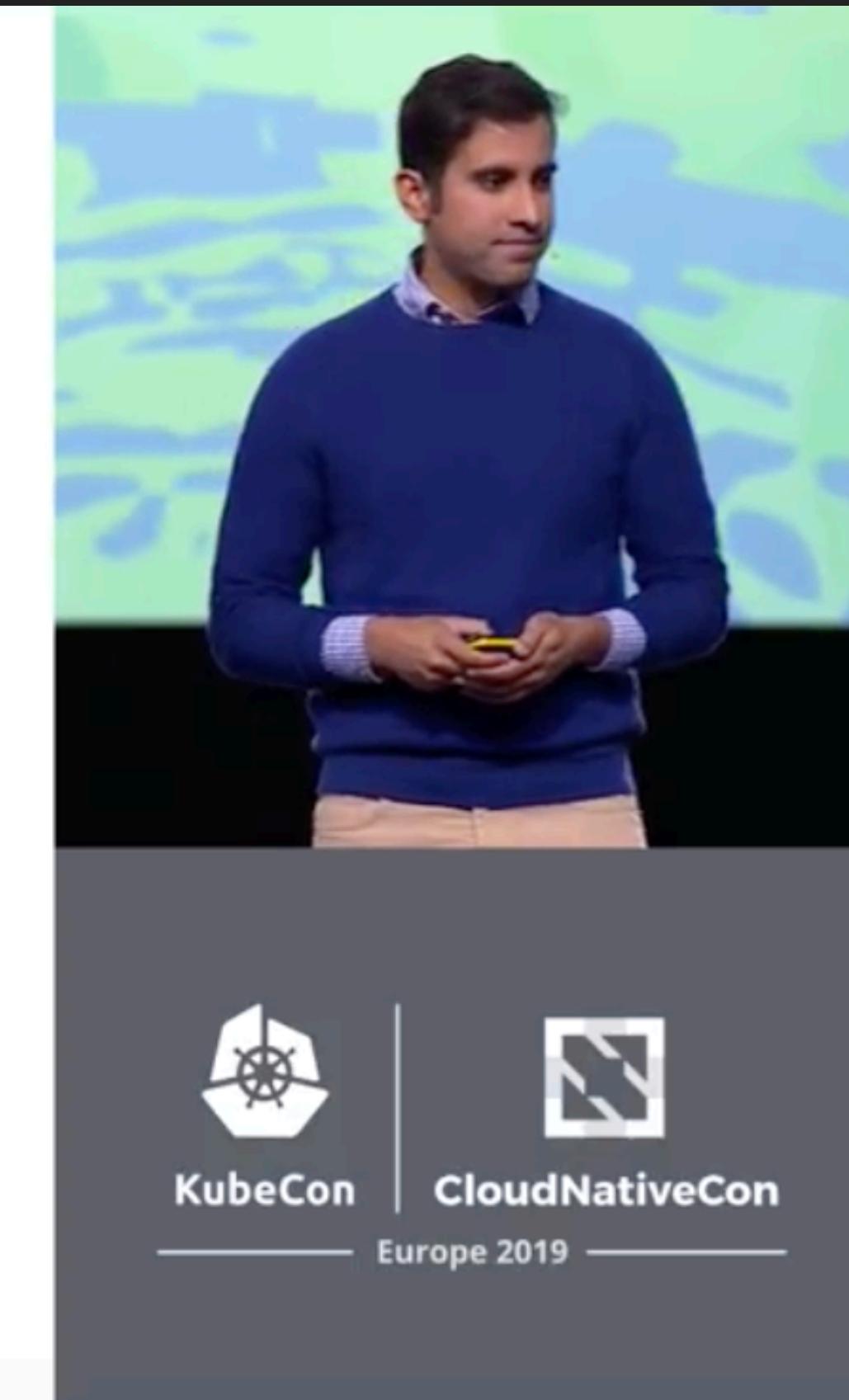
Storage is hard. Maybe the hardest of all the infra problems. It's not surprising that it is lagging. The need for really dynamic cluster FSes has never been greater, but those things take a long time to stabilize. [#kubernetes](#)

[LIVE CHAT] Kubernetes Influencer Chat
Last year at #kubecon there was a lot of tension around storage - Rook, OpenEBS, etc. It's been the lagging piece of the stack, has progress been made?
[crowdchat.net](#)

0 1 1 1

KubeCon CloudNativeCon Europe 2019

**Reality: Storage
is complicated**



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

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

Seperate Storage Problems

01	02	03	04
Select	Deploy	Integrate	Consume
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

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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

Object Stores

- Amazon S3
- Google Cloud Storage (GCS)
- MinIO

SQL Databases

- MySQL
- PostgreSQL
- SQL Server

NoSQL Databases

- Key-value or document based
- MongoDB
- Redis
- Cassandra

Time series Databases

- InfluxDB
- Prometheus
- Graphite

Message Queues

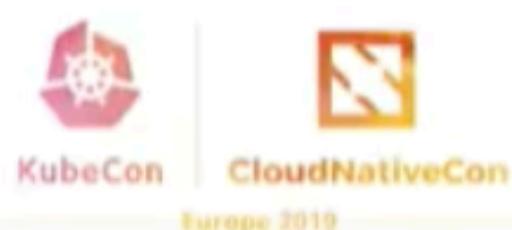
- Apache Kafka
- RabbitMQ
- Google Cloud Pub/Sub
- Amazon SQS

File Storage

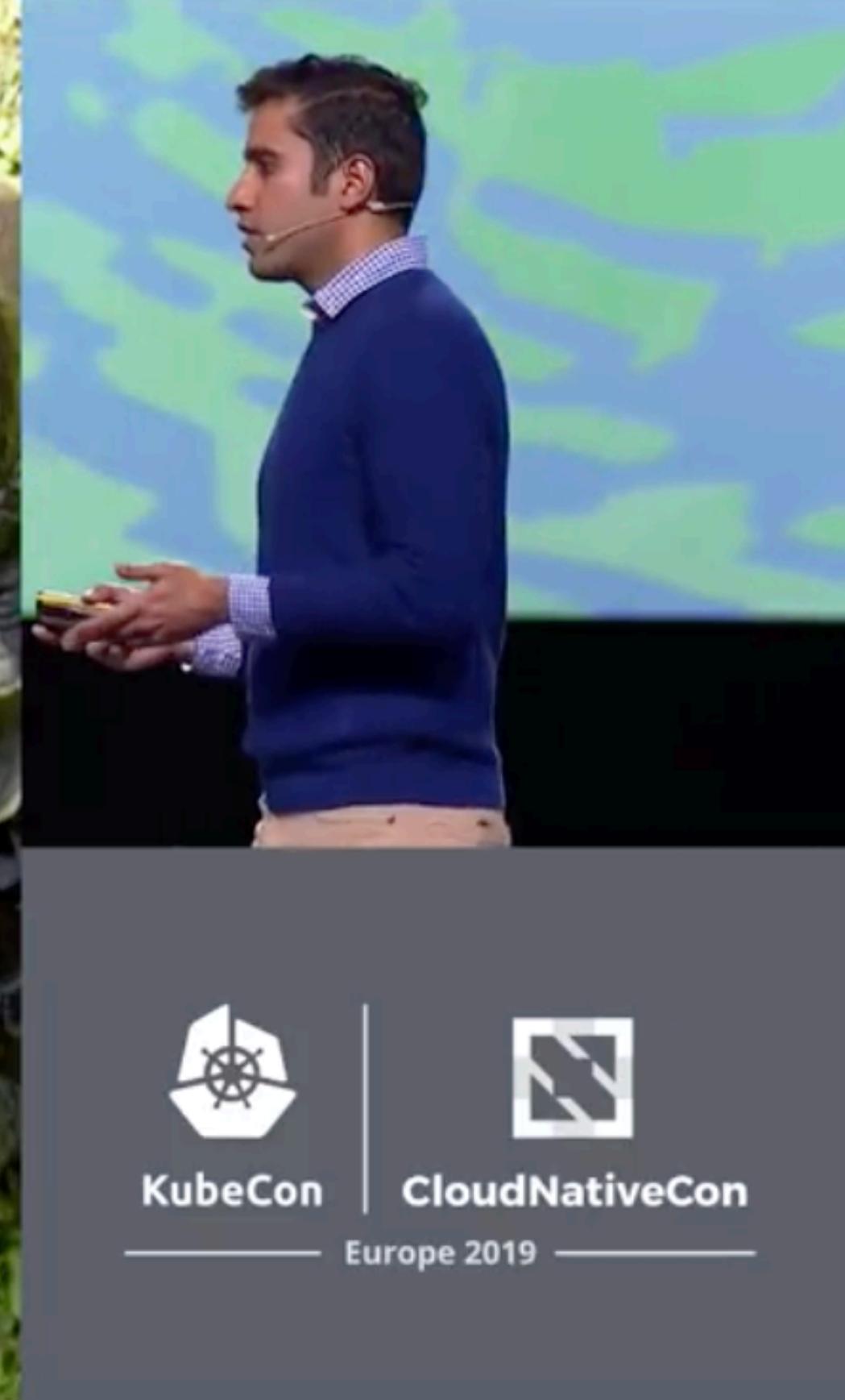
- NFS
- SMB
- GlusterFS
- CephFS

Block Storage

- iSCSI
- Fibre Channel
- GCE Persistent Disks
- Amazon EBS
- Local Disks



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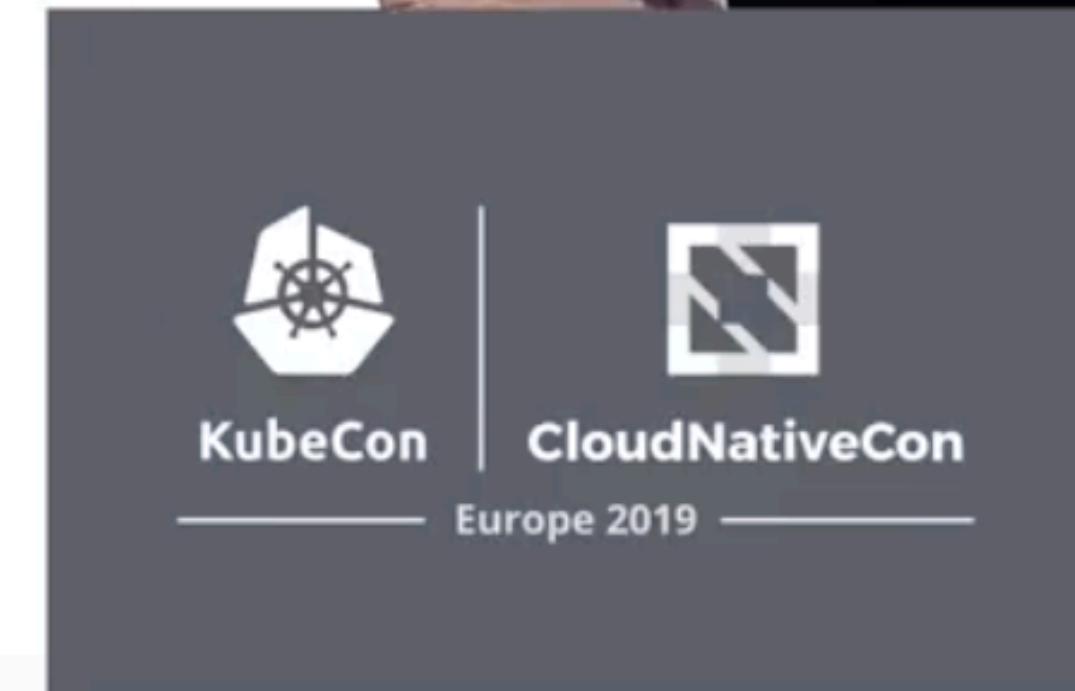


A photograph of Saad Ali, a Senior Software Engineer at Google, speaking on stage at the KubeCon + CloudNativeCon Europe 2019 conference. He is wearing a blue sweater over a white shirt and is gesturing with his hands while speaking. The background features a green and blue abstract pattern. In the bottom right corner of the slide, there is a dark grey footer bar with the KubeCon and CloudNativeCon logos and the text "Europe 2019".

► <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!



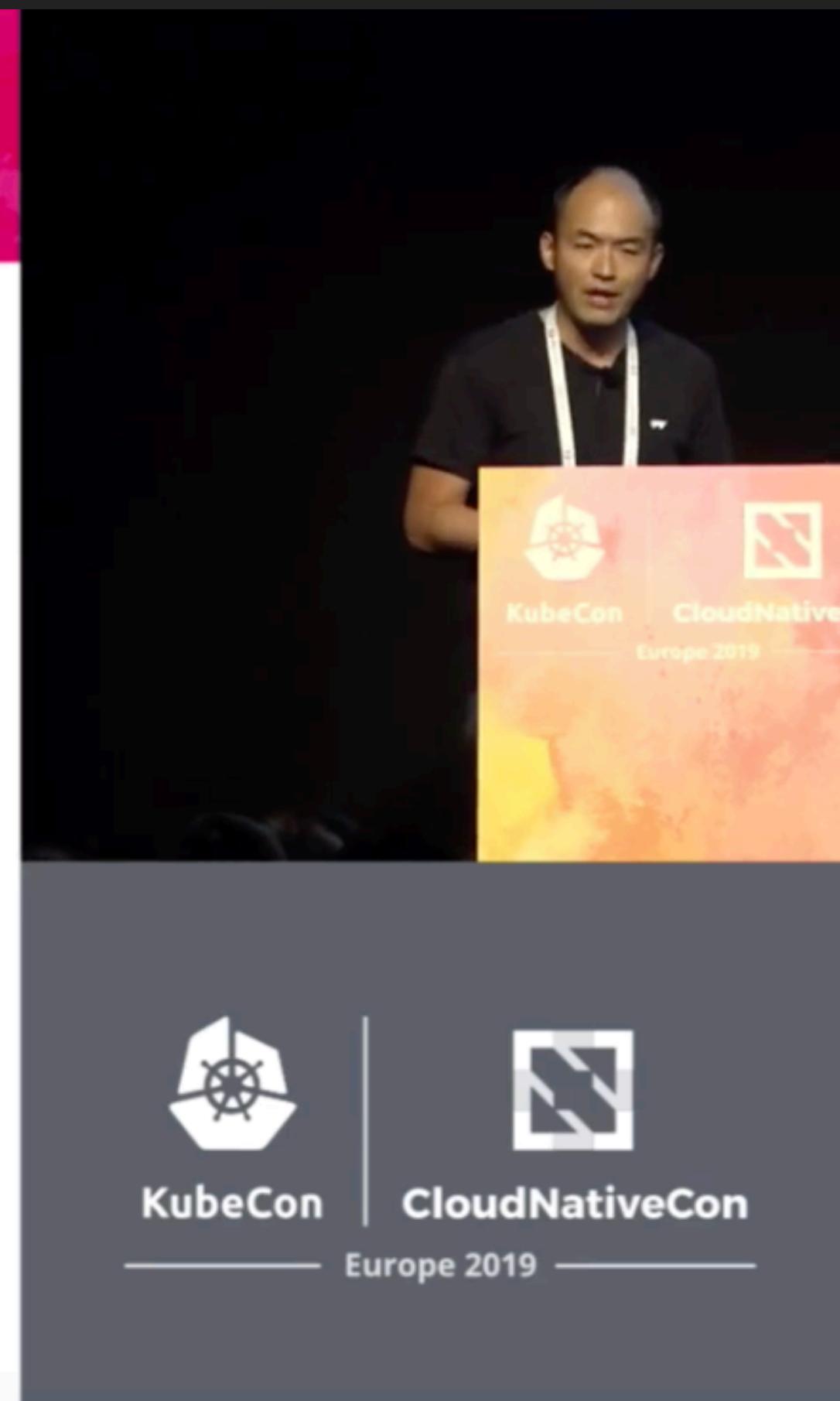
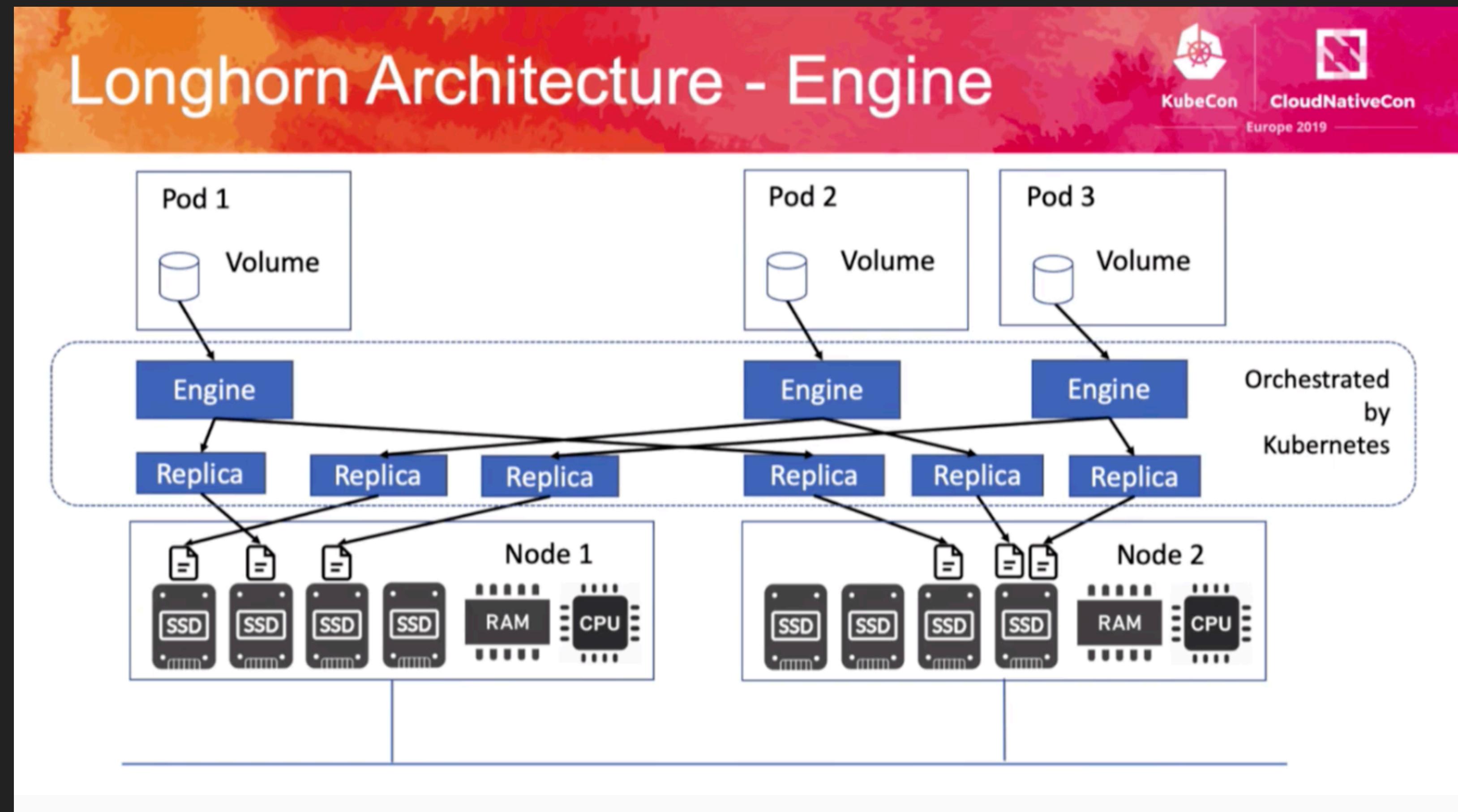
- ▶ <https://www.youtube.com/watch?v=169w6QlWhmo>

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

The image consists of two main parts. On the left is a presentation slide for 'Project Longhorn'. The slide has a red and orange gradient background. At the top left, it says 'Project Longhorn'. In the top right corner are the logos for 'KubeCon' and 'CloudNativeCon Europe 2019'. Below the title is a large, stylized logo for 'LONGHORN' where the 'O' is replaced by a blue shape. Underneath the logo, the text reads: 'Open Source Distributed Block Storage Software For Kubernetes'. Below this, there is a link: <https://github.com/rancher/longhorn/>. At the bottom, it says: 'Add persistent storage support to any Kubernetes cluster' followed by the command: 'kubectl apply -f longhorn.yaml'. On the right side of the image is a video frame showing a man, Sheng Yang, standing at a podium and speaking. He is wearing a dark t-shirt and a lanyard. Behind him is a screen displaying the same 'Project Longhorn' slide. The video frame is set against a dark background.

► 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

Improving Availability for Stateful Applications in Kubernetes - Michelle Au, Google

The image consists of two parts. On the left is a presentation slide titled "Examples" with a colorful autumn leaf background. It features a table comparing five storage solutions based on accessibility, availability, durability, access mode, performance, and cost. On the right is a photograph of Michelle Au, a woman with long dark hair, standing on a stage and speaking to an audience.

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

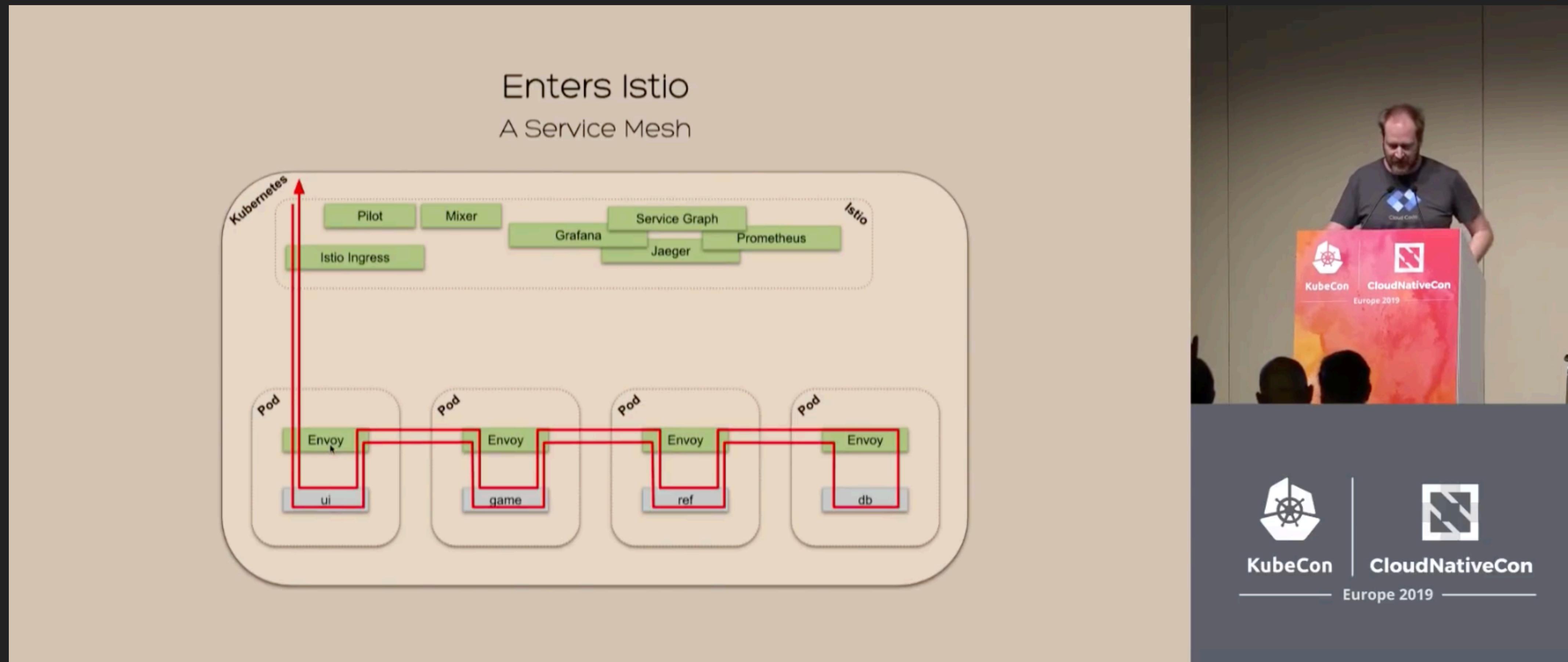


► <https://www.youtube.com/watch?v=Cd7aJiQLIpM>



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

The image is a composite of two parts. On the left is a screenshot of the Kiali UI, a service mesh observability tool. The title bar says "http://localhost:20001/kiali". The main area shows a "Graph" of a service mesh topology. Nodes include "istio-ingressgateway istio-system", "hexagons-ui v1", "hexagons-game v1", "hexagons-ref v1", and "hexagons-db v1". Edges show traffic flow between these services. To the right of the graph are several monitoring charts: "HTTP Traffic (requests per second)" with a total of 13.54 RPS, 92.10% success, and 7.90% error; "HTTP - Total Request Traffic min / max" with RPS ranging from 0.00 to 15.30; and "TCP - Total Traffic - min / max" for both sent and received traffic. On the right side of the image, a man with a beard is speaking at a podium. The podium has the "KubeCon CloudNativeCon Europe 2019" logo. The background is a blurred conference hall.

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

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

The image is a composite of three parts. On the left, a terminal window shows two commands being run: `kubectl -n istio-system port-forward svc/kiali 20001` and `kubectl -n istio-system port-forward svc/jaeger-query 16686`. The Kiali port-forwarding command outputs that forwarding is from 127.0.0.1:20001 to 20001, and the Jaeger port-forwarding command outputs that forwarding is from 127.0.0.1:16686 to 16686. In the center, a screenshot of the Jaeger UI shows a trace for the service mesh. The trace path is: istio-ingressgateway->hexagons-ui.default.svc.cluster.local:8080/* c9e73aa. Below the path, a timeline visualization shows several colored bars representing different service components. On the right, a man with a beard, wearing a dark t-shirt with 'Cloud Core' on it, is speaking at a podium. The podium has the 'KubeCon' and 'CloudNativeCon Europe 2019' logos. The background behind the speaker is a large screen showing the same KubeCon/CloudNativeCon Europe 2019 branding.

► <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

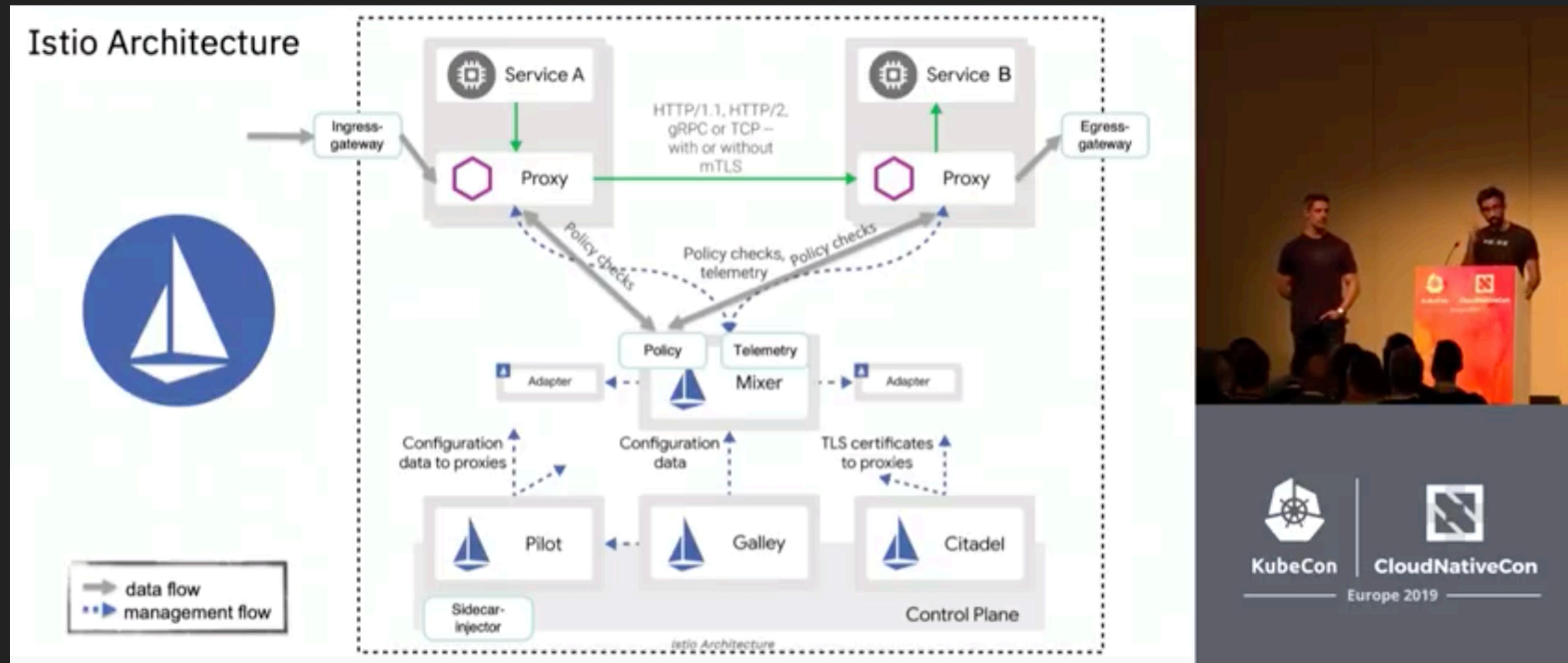
```
graph LR; ui((ui v1)) -- "Any user" --> db((db v1)); ui -- "User: david" --> game_fix((game fix)); game_fix --> game((game v1))
```

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Europe 2019

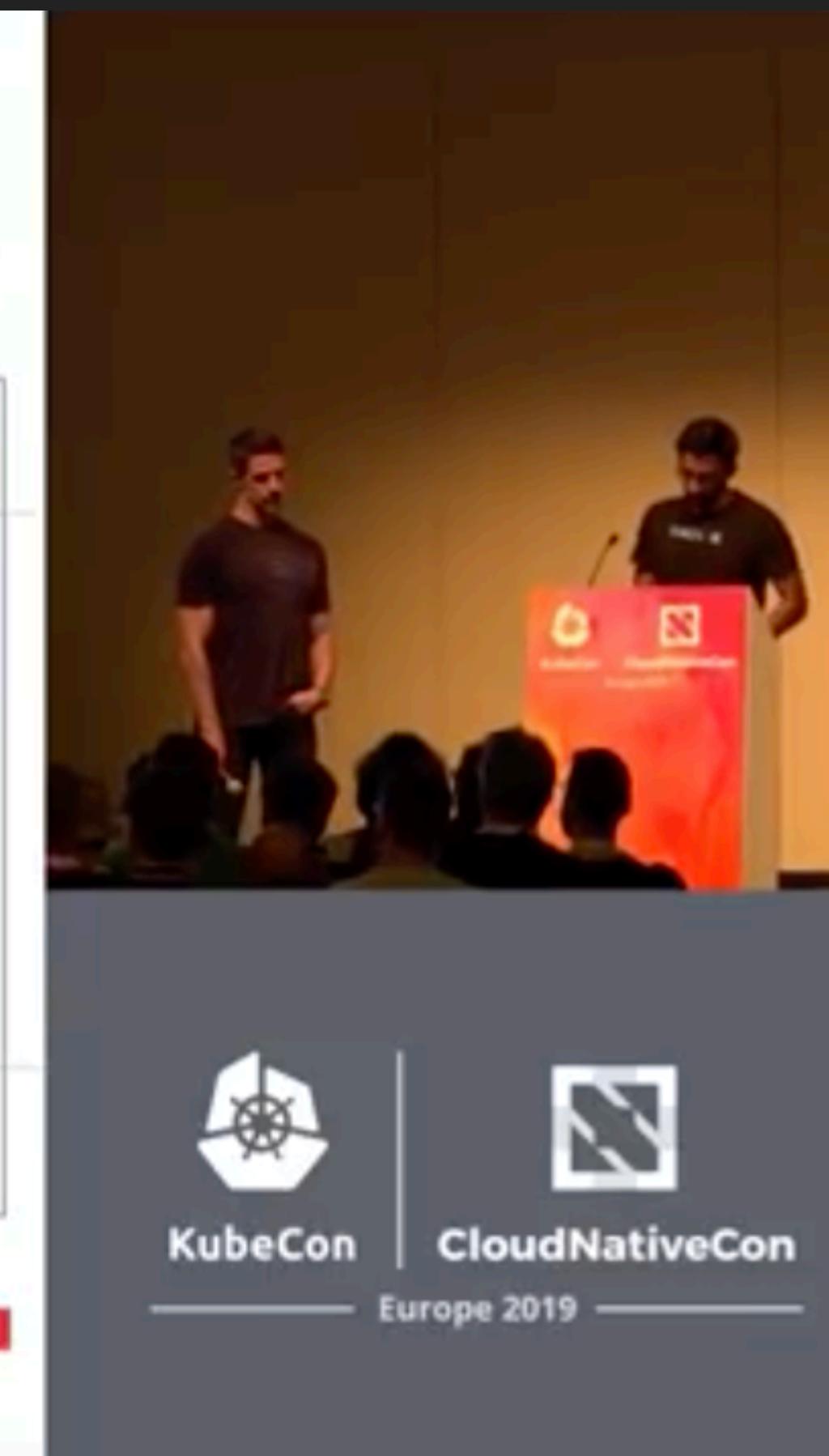
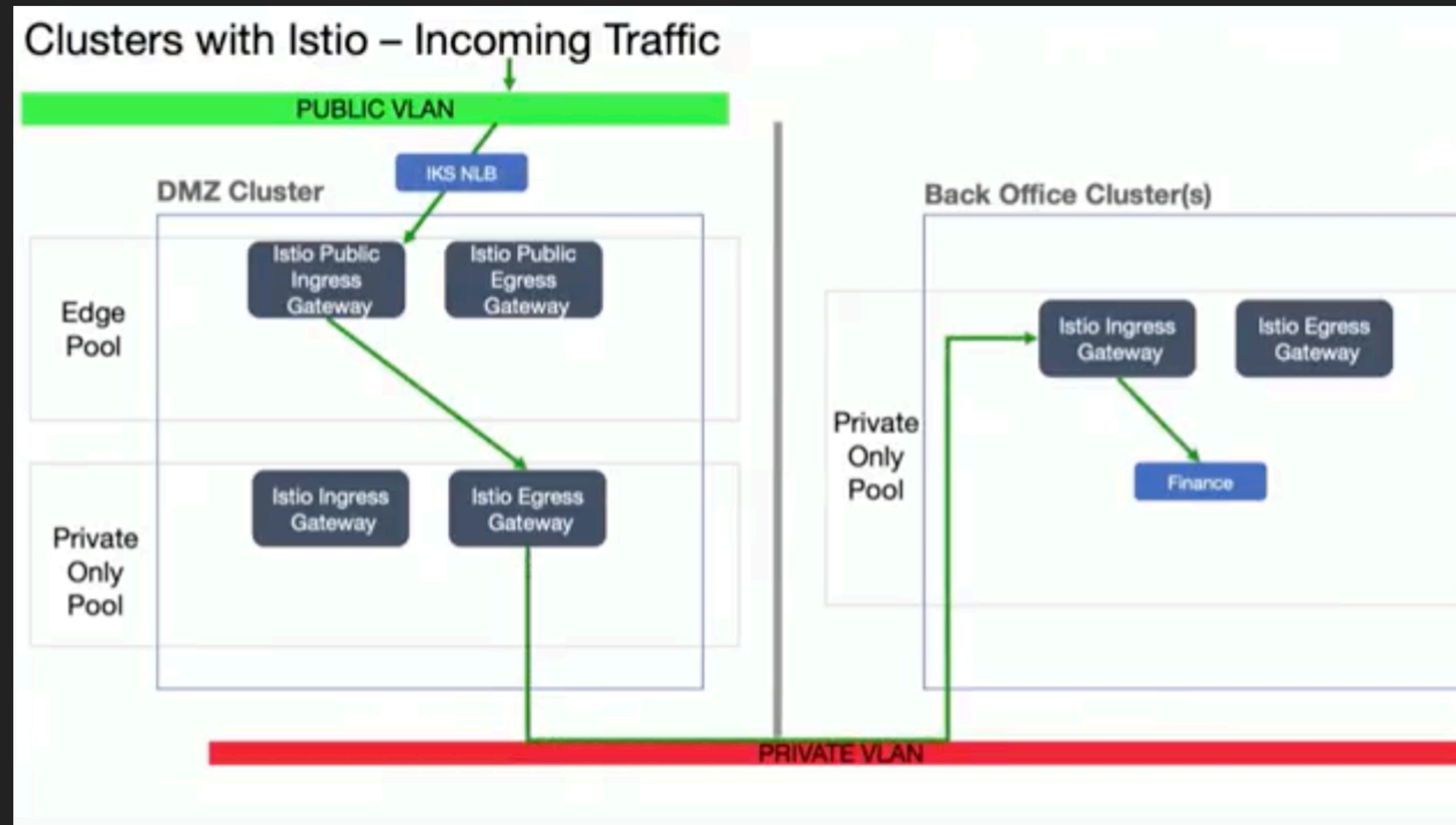
► <https://www.youtube.com/watch?v=9CQ0PMiOGhg>

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



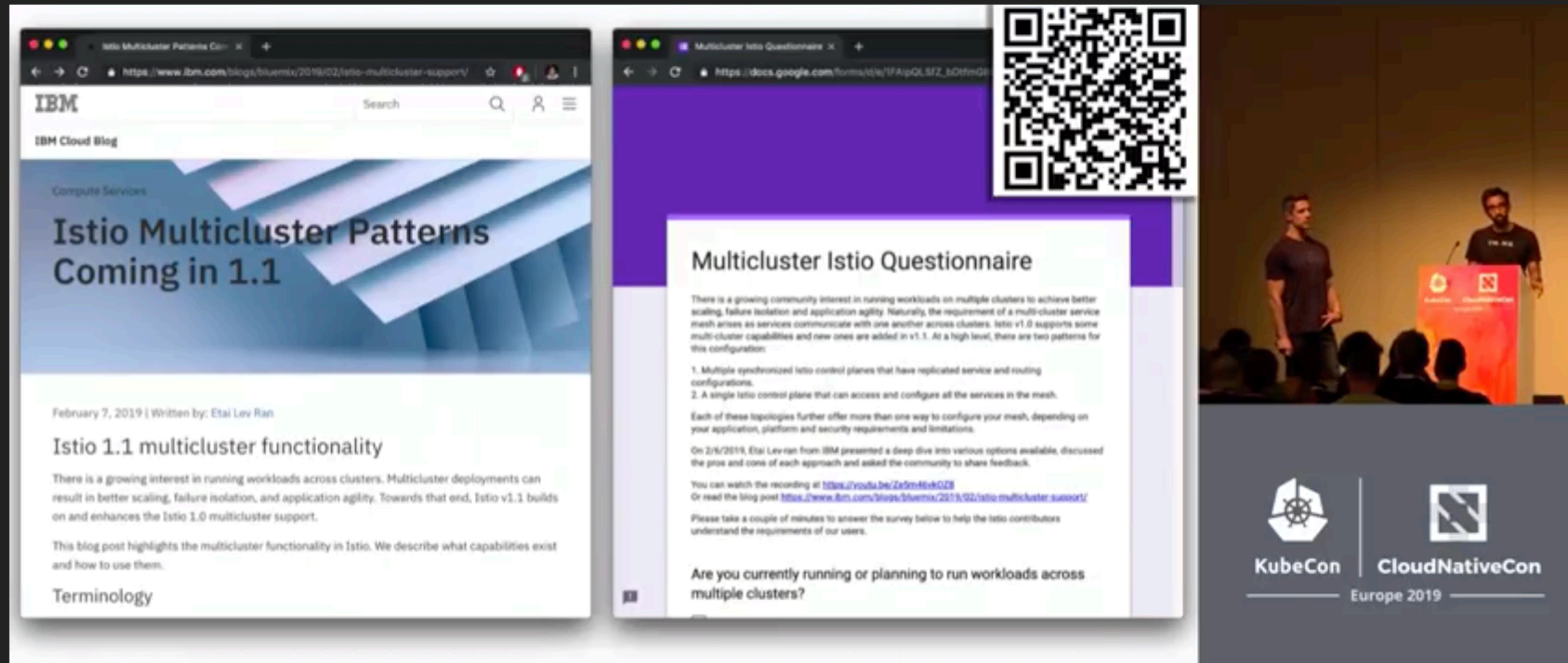
► <https://www.youtube.com/watch?v=-zsThiLvYos>

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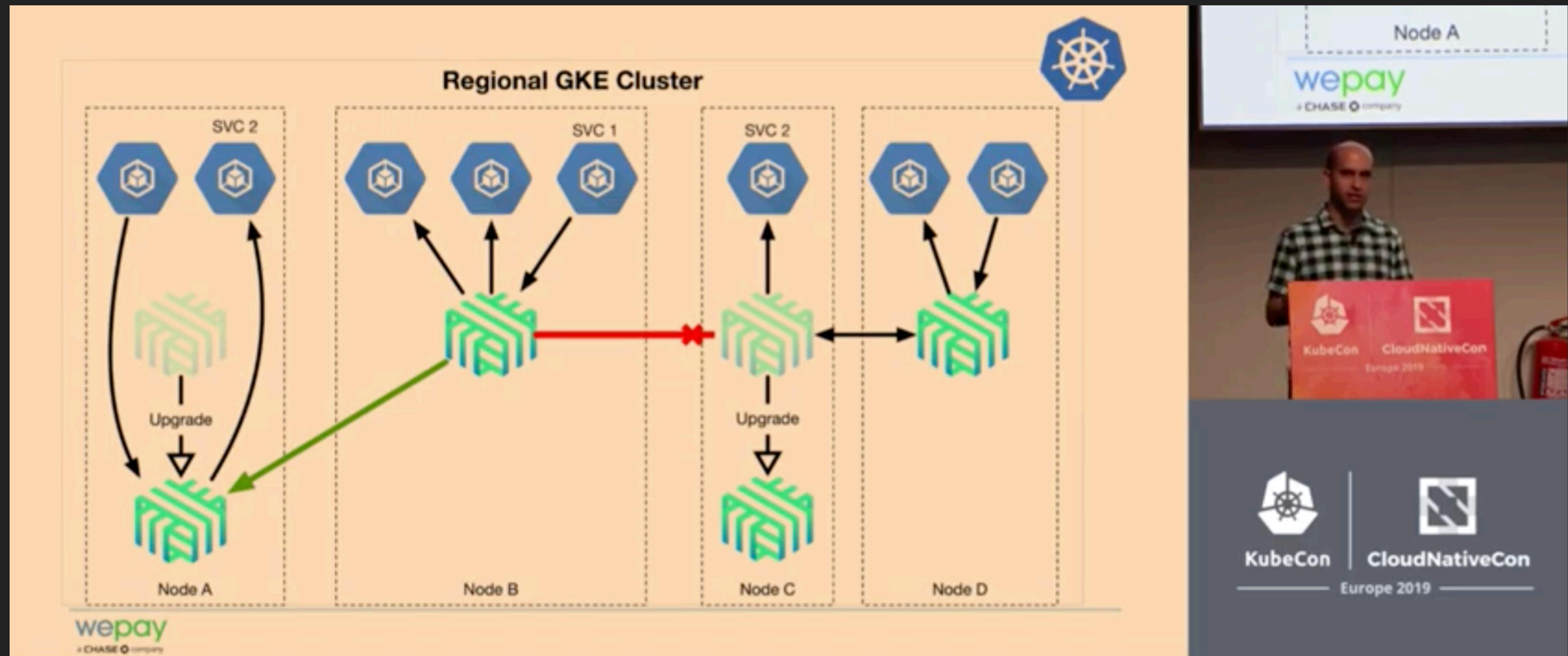
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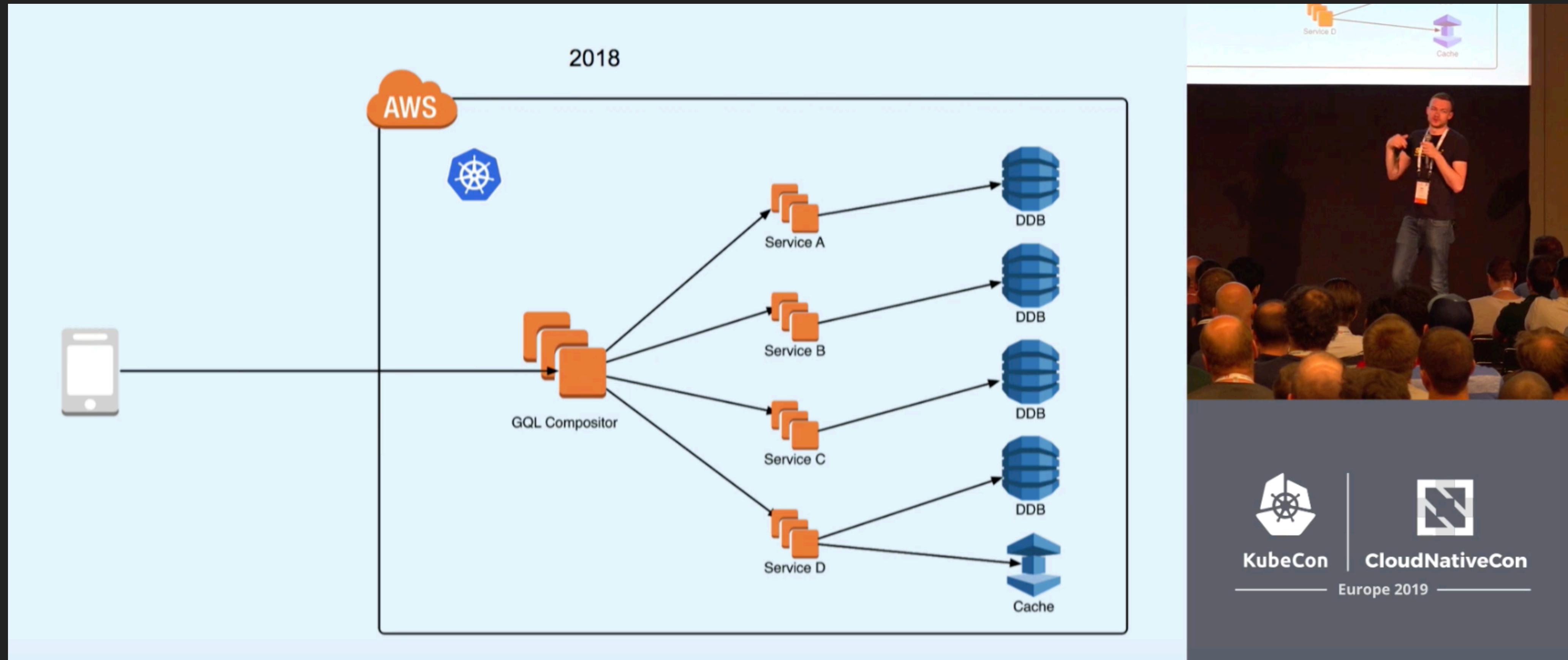
► <https://www.youtube.com/watch?v=-zsThiLvYos>

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



► https://www.youtube.com/watch?v=ph_NqGNHdhM

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

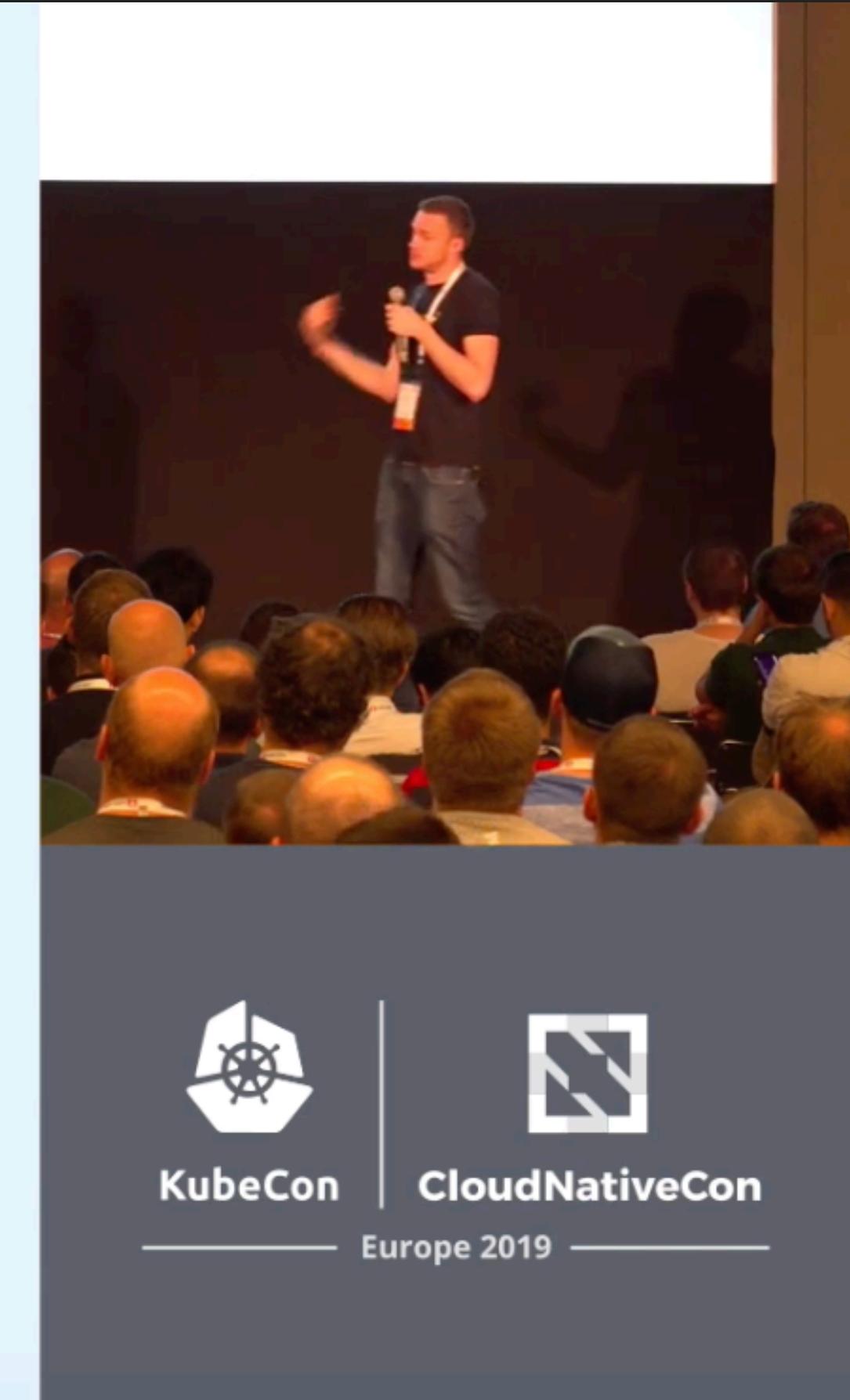


► https://www.youtube.com/watch?v=AxPfa7Mp_WY

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

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

⚖️ Request level load-balancing

The diagram illustrates the evolution of a system architecture for request-level load-balancing. On the left, a client labeled A_1 sends three separate requests, R_1 , R_2 , and R_3 , directly to three individual servers labeled B_1 , B_2 , and B_3 . An arrow indicates a transition to a more centralized architecture. In the middle, the client A_1 sends a single request to a central proxy or gateway, which then distributes the request to the three servers B_1 , B_2 , and B_3 using request-level load-balancing.

KubeCon CloudNativeCon Europe 2019

► https://www.youtube.com/watch?v=AxPfa7Mp_WY

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

The image is a composite of two parts. On the left is a white slide with a blue header containing the 1&1 logo. The slide has a title 'Container Strategy' and two main bullet points under it. The first point discusses Kubernetes as a centrally provided orchestration platform with sub-points about fast deployment cycles, soft multi-tenancy, and microservices. The second point discusses multiple clusters decoupled on network dimensions, mentioning fe/be/infrastructure, data center, live/non-live environments, bare-metal on-premise, and non-routable podCIDR and serviceCIDR ranges. To the right of the slide is a video frame showing a man with glasses and a dark t-shirt standing on a stage, speaking to an audience. Below the slide and video frame is a dark banner with the logos for KubeCon and CloudNativeCon Europe 2019, and the GMX logo.

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



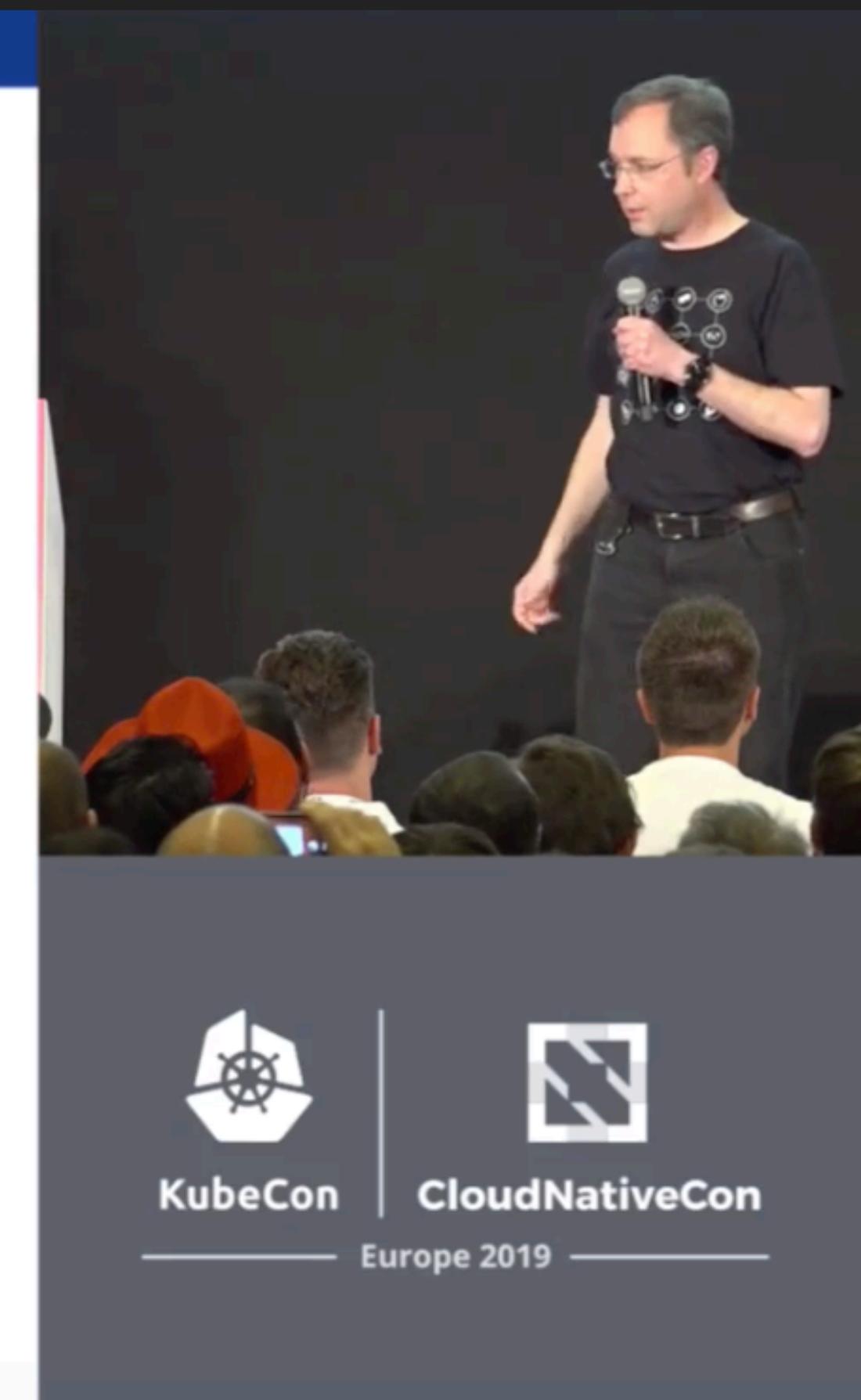
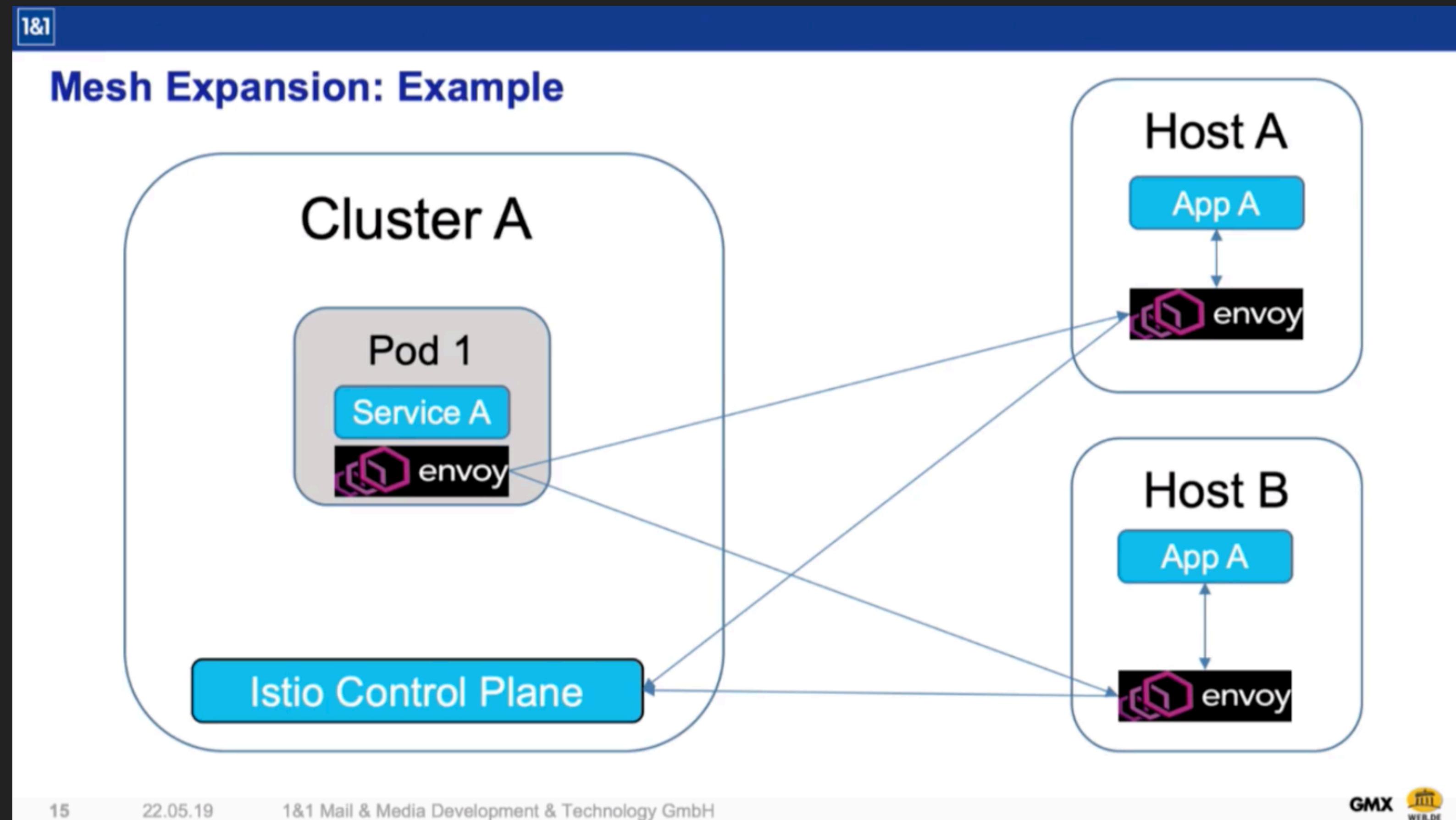
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Europe 2019

GMX

6 22.05.19 1&1 Mail & Media Development & Technology GmbH

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

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



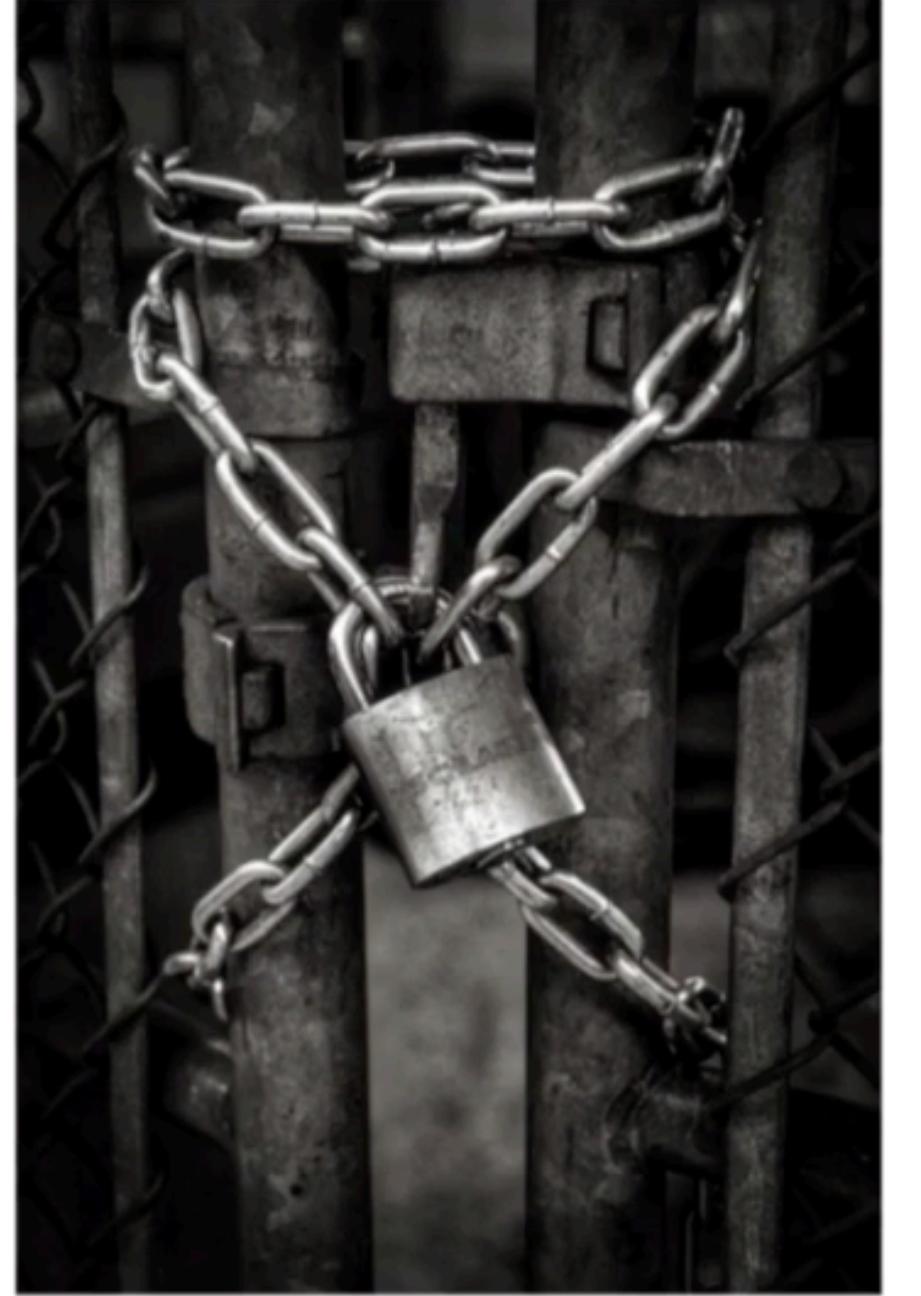
► <https://www.youtube.com/watch?v=vQ2IktsMlgQ>

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

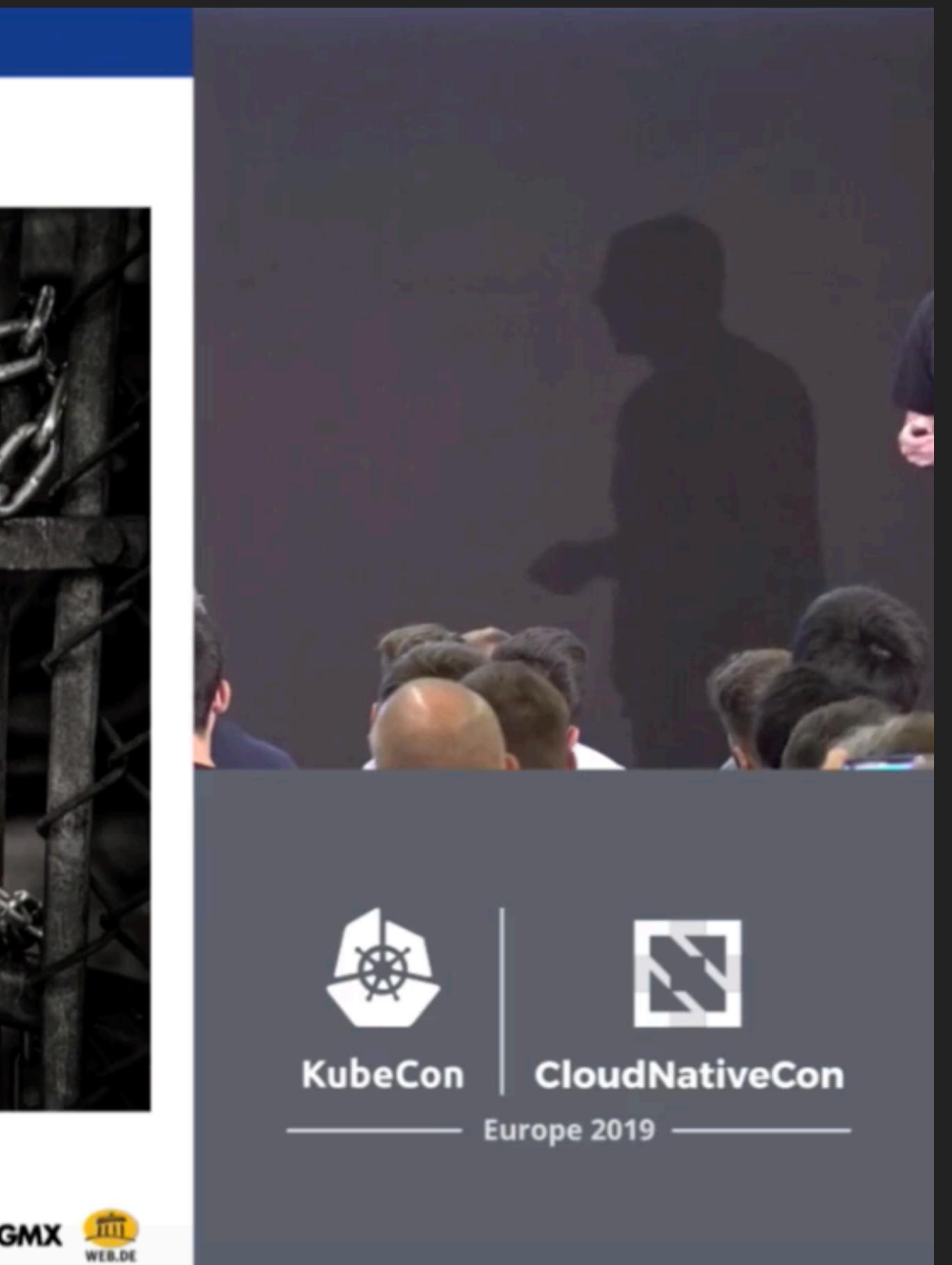
1&1

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



16 22.05.19 1&1 Mail & Media Development & Technology GmbH



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

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

The image is a composite of three parts. On the left is a slide titled 'Result for Istio 1.0' with a bulleted list of issues. In the center is a yellow diamond-shaped road sign with 'DEAD END' written on it. On the right is a video frame showing Stephan Fudeus speaking on stage at KubeCon + CloudNativeCon Europe 2019.

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

Istio v1.0

18 22.05.19 1&1 Mail & Media Development & Technology GmbH

GMX WEB.DE

KubeCon CloudNativeCon Europe 2019

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

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

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

Istio v1.1

KubeCon | **CloudNativeCon**
Europe 2019

GMX WEB.DE

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

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

1&1

Summary

- Istio (>= 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



The slide features a dark blue header with the '1&1' logo. The main content area has a white background with a blue header bar. At the bottom left, there is footer text: '23 22.05.19 1&1 Mail & Media Development & Technology GmbH'. At the bottom right, there is a logo for 'GMX WEB.DE'.

KubeCon | **CloudNativeCon**
Europe 2019

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

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

 
KubeCon | CloudNativeCon
Europe 2019

► <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/

Learn%20how%20to%20Leverage%20Kubernetes%20to%20Support%2012%20Factor%20for%20Enterprise%20Apps.pdf

A black and white photograph showing two wind turbines against a backdrop of a dramatic, cloudy sky. The turbines are white and stand tall against the dark clouds.

MACHINE LEARNING + DATA

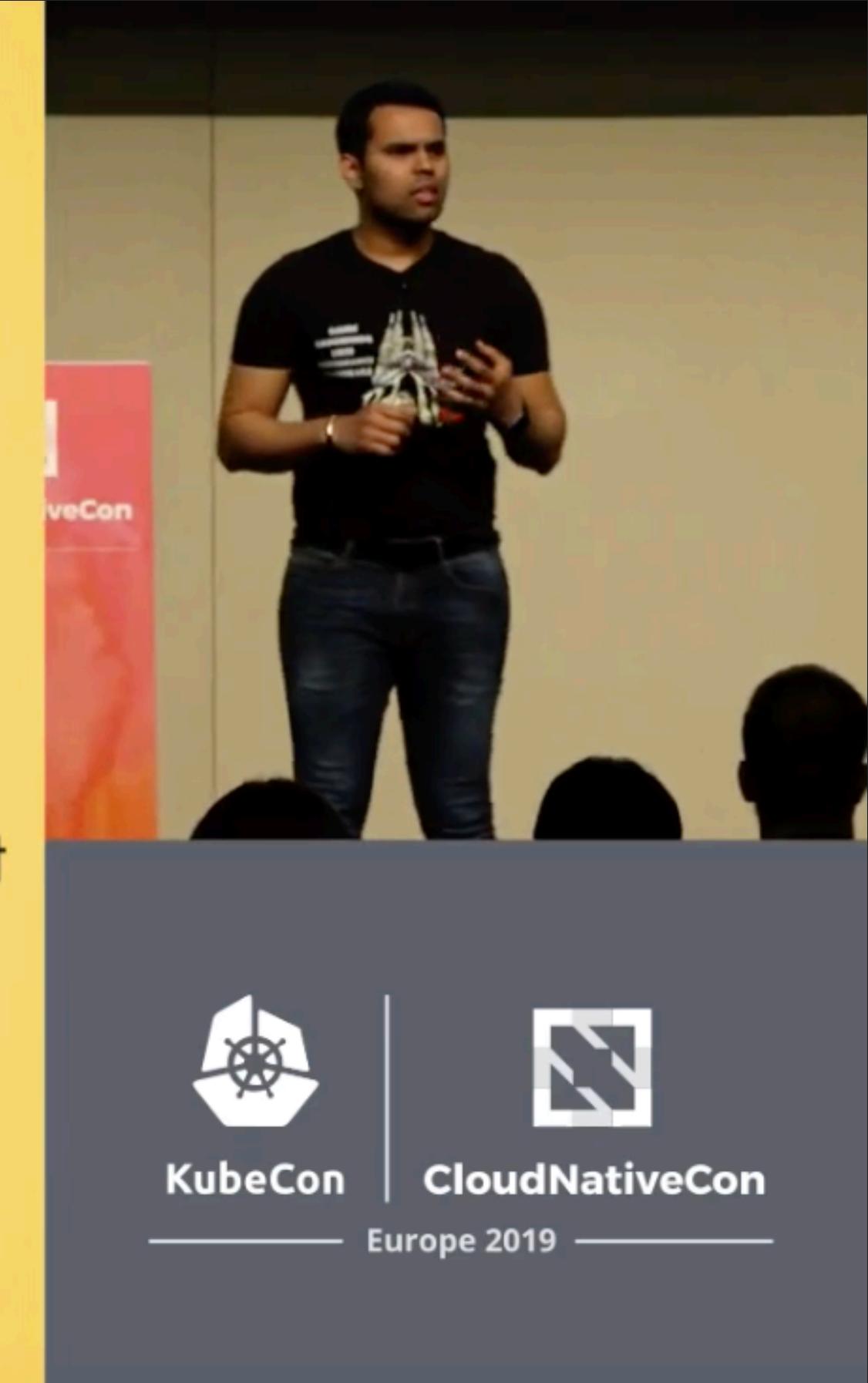
Protecting the Data Lake - Ash Narkar, Styra, Inc

Data is King !

- Pervasive
- Abundant
- Customer Experience
- Revenue Growth



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

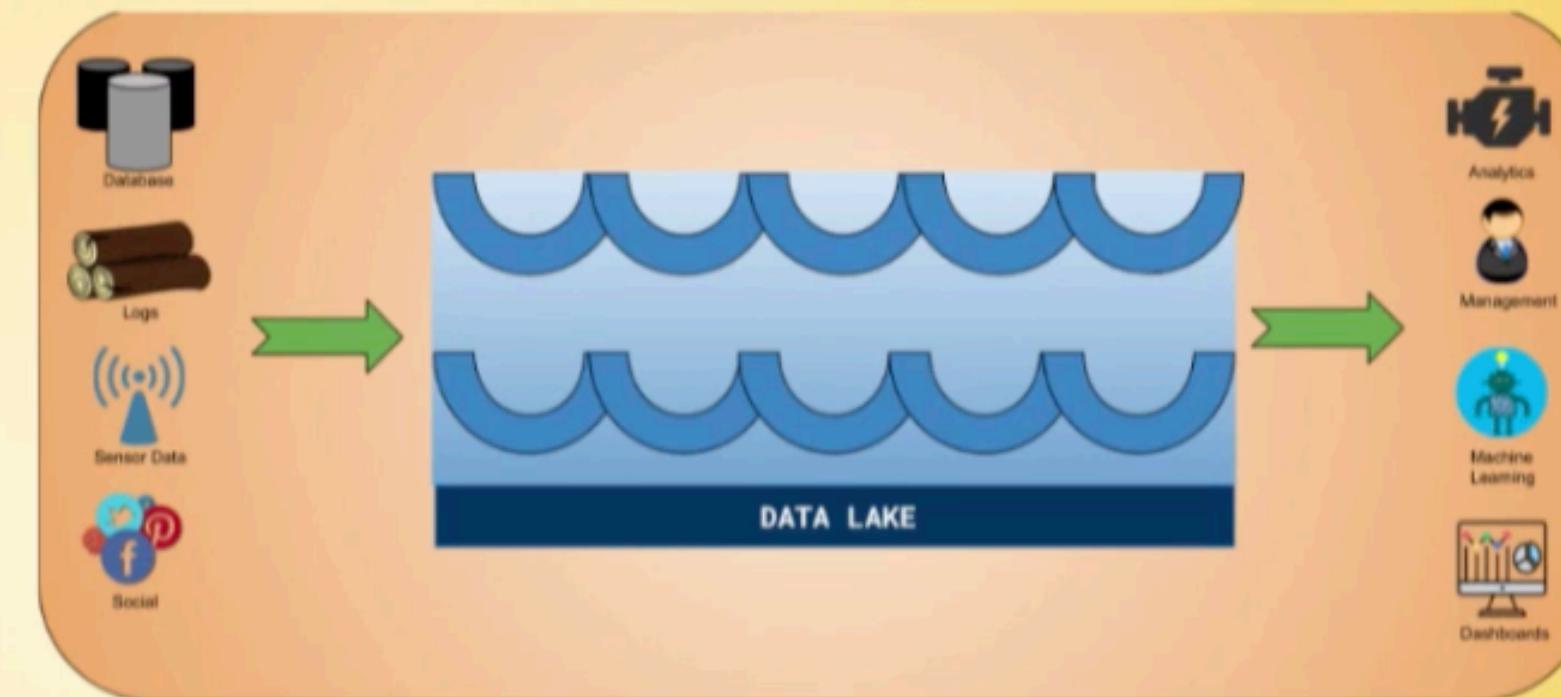


► <https://www.youtube.com/watch?v=9m4FymEvOqM>

Protecting the Data Lake - Ash Narkar, Styra, Inc

Data Lake Features

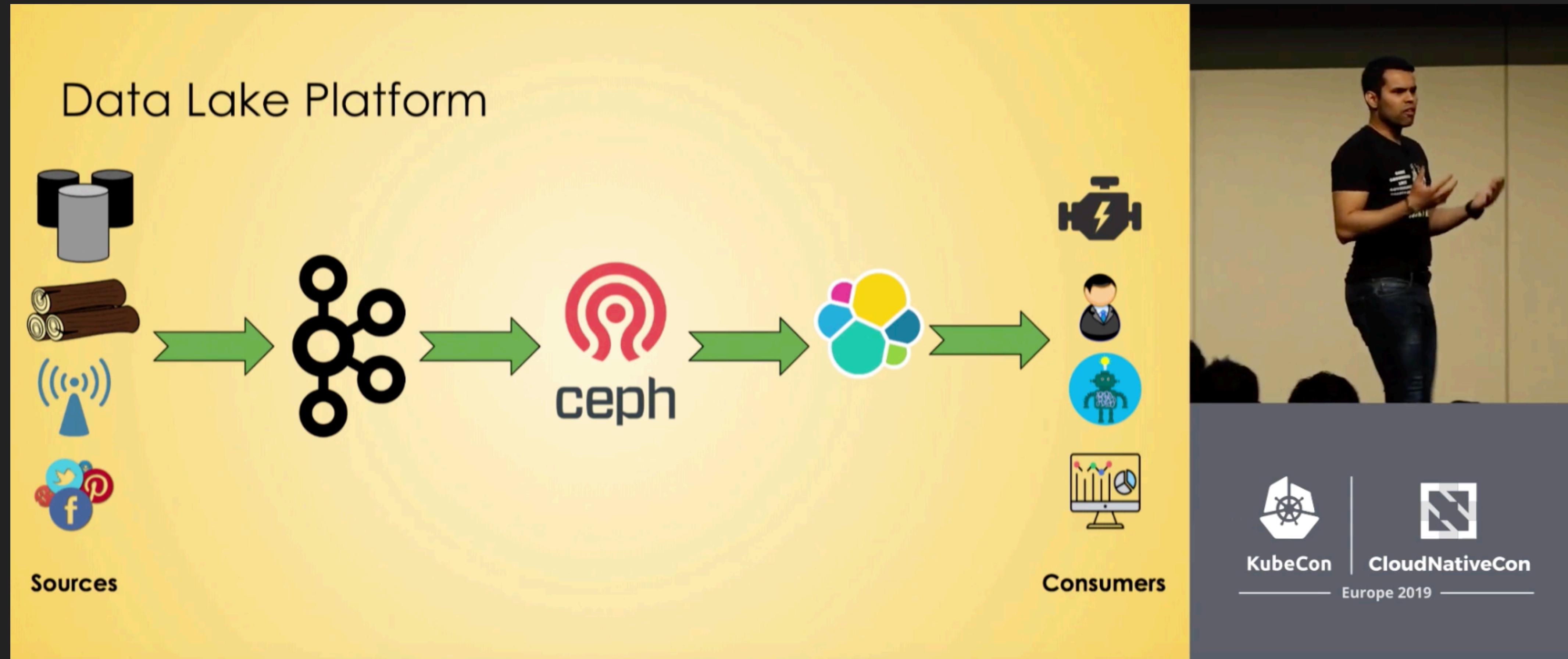
- Centralized Content
- Scalability
- Multiple data type support
- Resource optimization



 KubeCon |  CloudNativeCon
Europe 2019

► <https://www.youtube.com/watch?v=9m4FymEvOqM>

Protecting the Data Lake - Ash Narkar, Styra, Inc

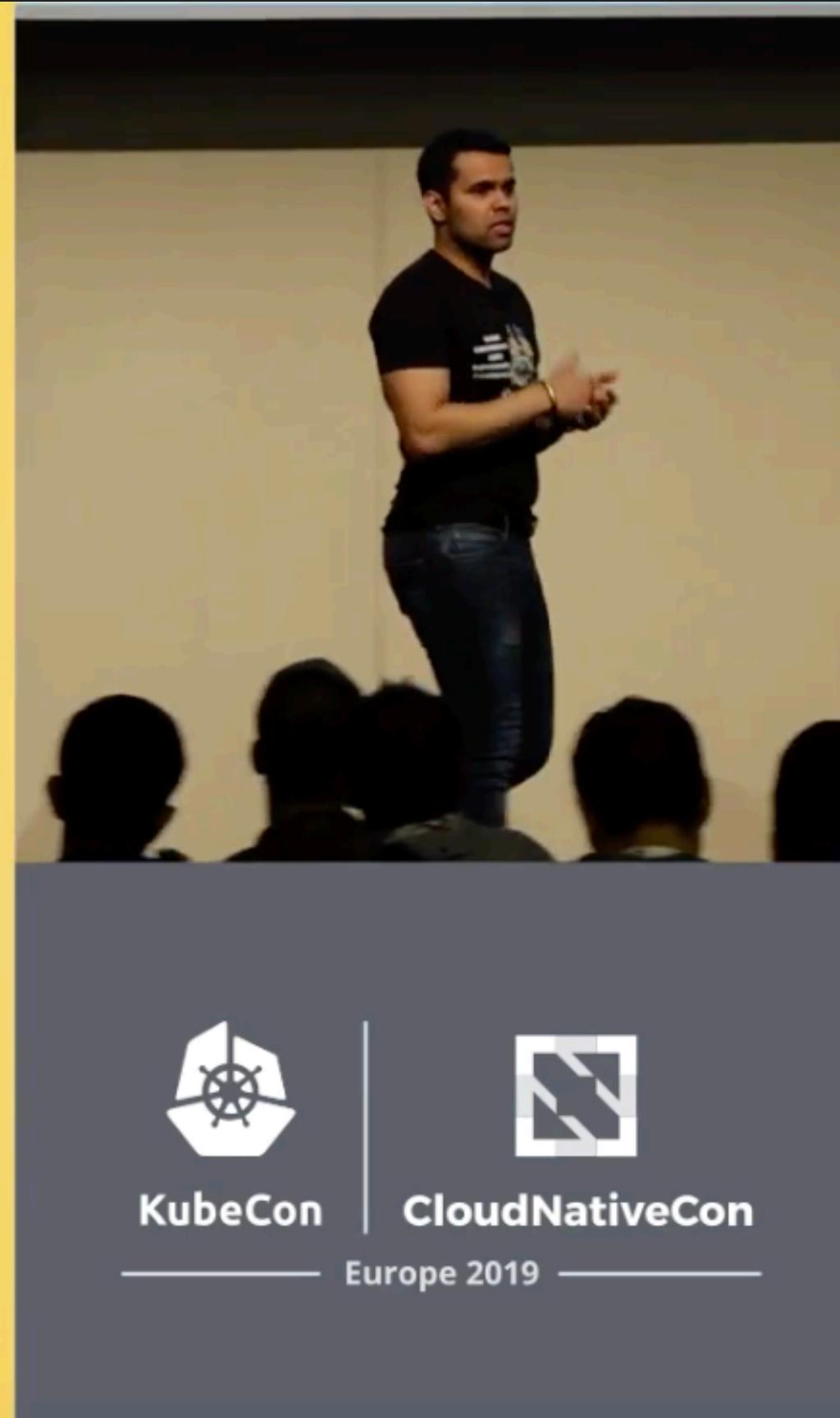
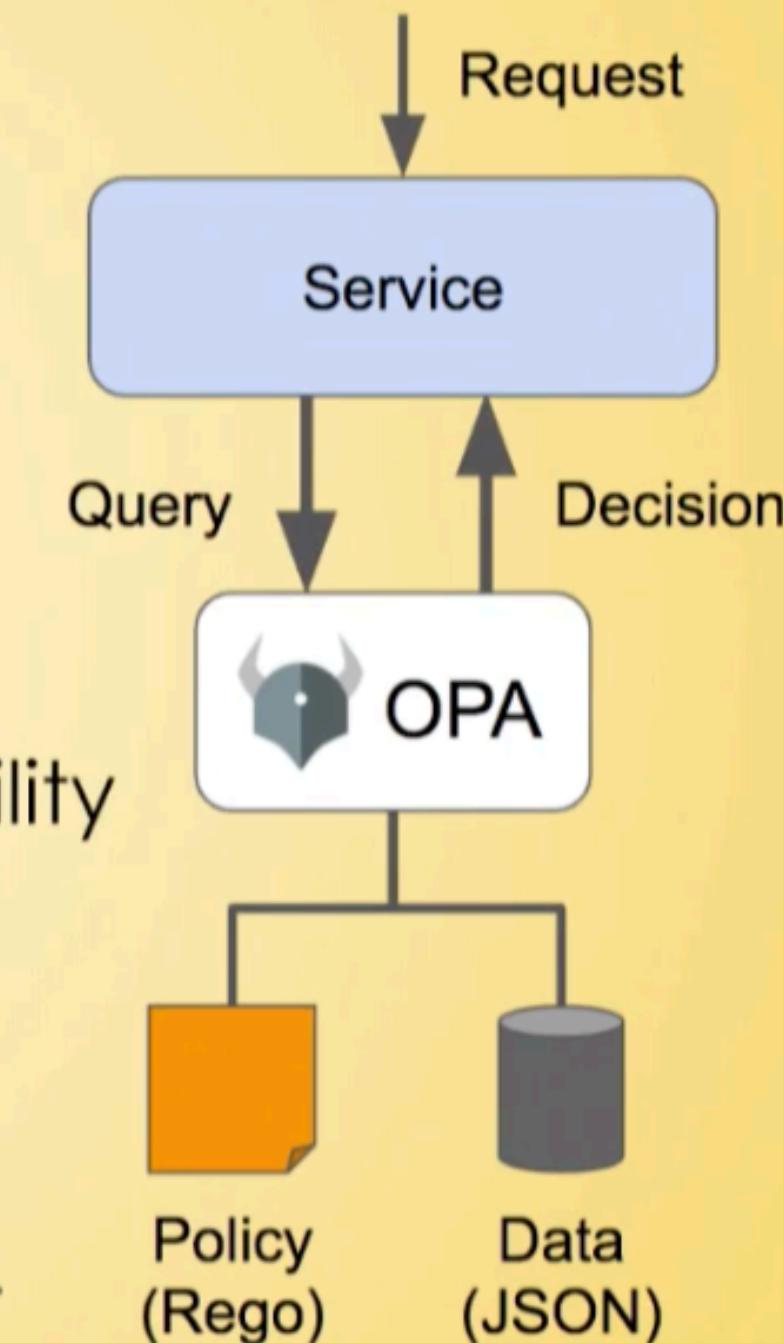


► <https://www.youtube.com/watch?v=9m4FymEvOqM>

Protecting the Data Lake - Ash Narkar, Styra, Inc

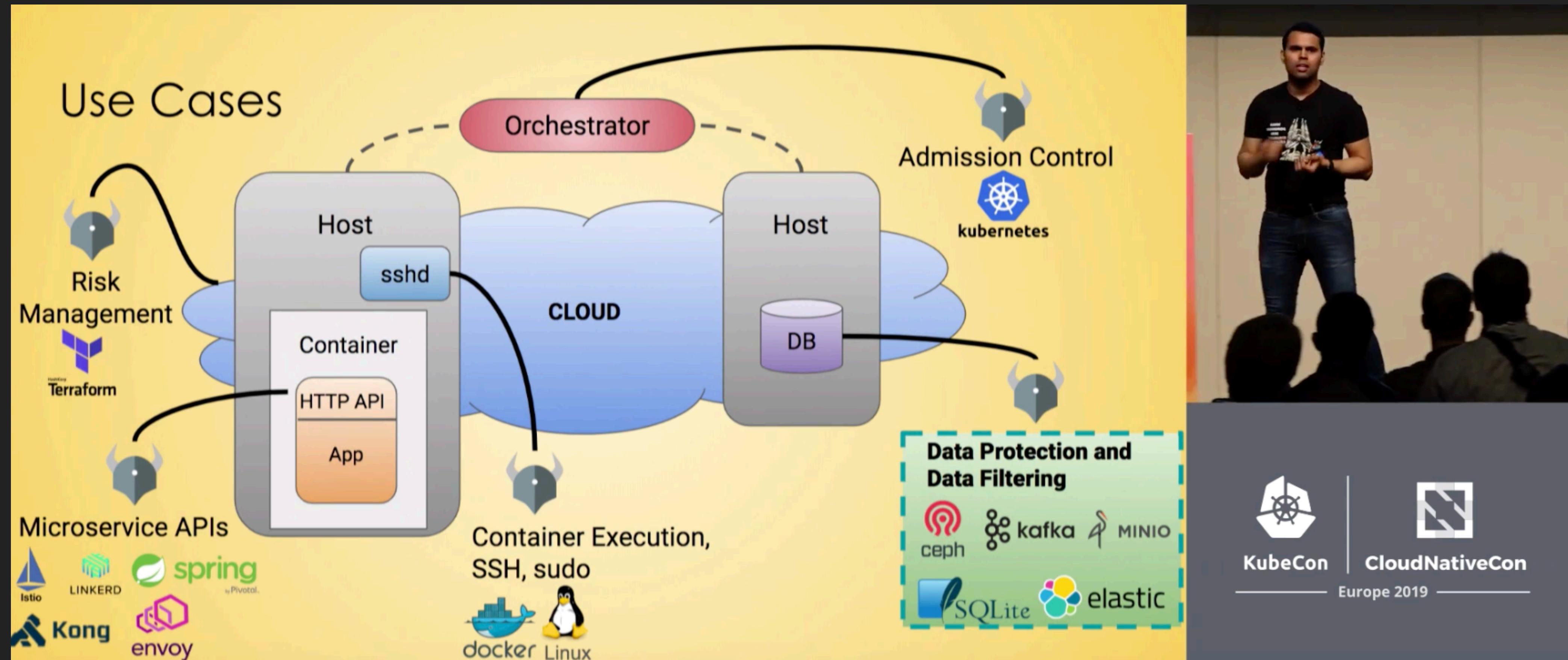
OPA: Features

- 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.



► <https://www.youtube.com/watch?v=9m4FymEvOqM>

Protecting the Data Lake - Ash Narkar, Styra, Inc



► <https://www.youtube.com/watch?v=9m4FymEvOqM>

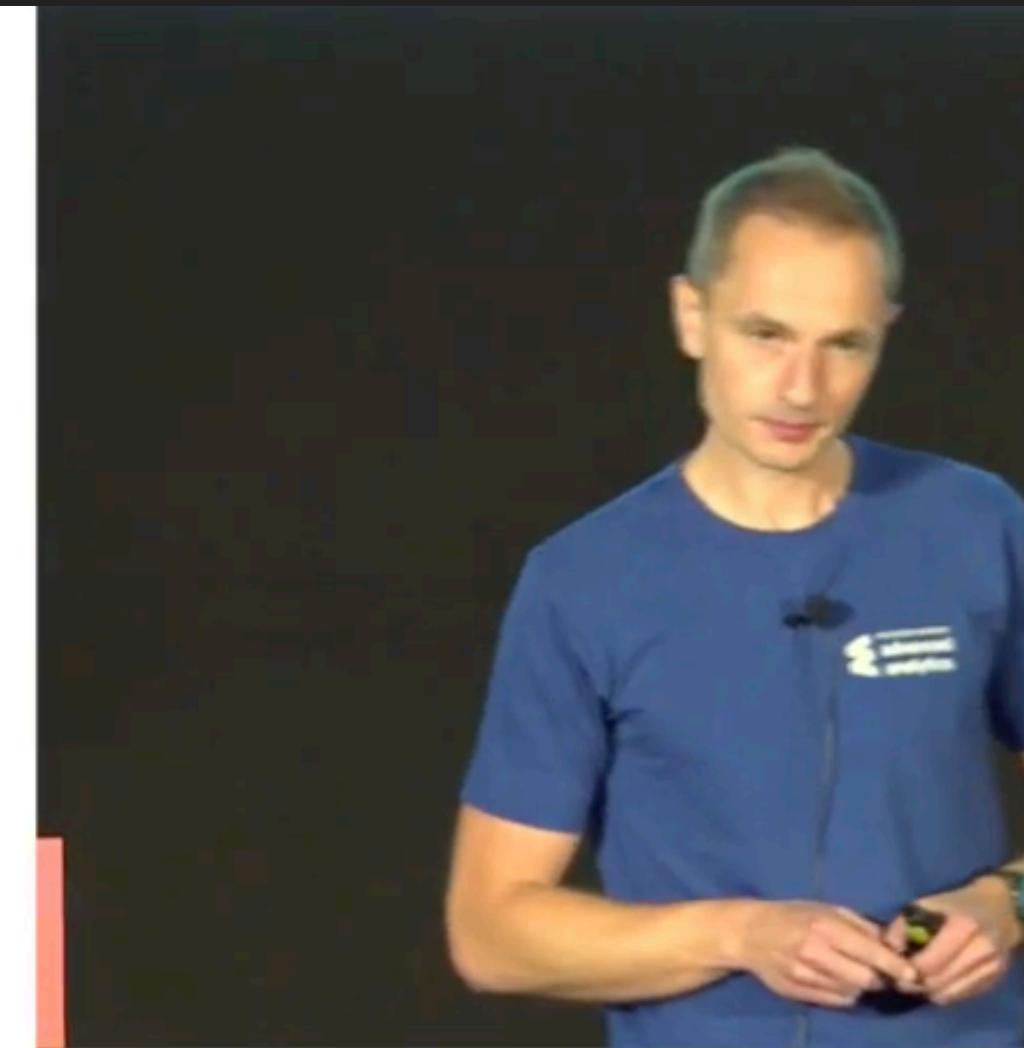
The Data Analytics Platform or How to Make Data Science in a Box Possible - Krzysztof Adamski

The Data Analytics Platform

Rob Keevil & Krzysztof Adamski

Barcelona 22/05/2019

ING



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

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

The collage consists of three main parts:

- The Architecture:** A diagram showing the layers of a data analytics platform. It includes a "Front End" layer with a "Portal" icon, a "Compute" layer with "Apache Spark", "druid", and "presto" icons, and a "Storage" layer with "Rokku" and "ceph" icons.
- Security & Integration:** A yellow section featuring "Apache Atlas", "Apache Ranger", "ODPI EGERIA", and "Airflow". It also includes the ING logo.
- Speaker:** A photo of Krzysztof Adamski speaking at a podium. Behind him is a screen displaying the KubeCon + CloudNativeCon Europe 2019 logo.

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

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

The image is a composite of three parts. On the left, there's a screenshot of the DAP Portal interface. The top navigation bar has a logo with two stylized figures, followed by "DAP Portal". Below it is a dark header with "Service Catalog", "DATA" (with "Data Discovery" highlighted in blue), "STORAGE", "ENVIRONMENTS", "UTILITIES", and "XRDP". The main content area has a title "GRID" and a sub-section "Basic Information" with details like "Access Policies", "Contact Person(s)" (Anabel), "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), and "Size" (410.51 MB). To the right of this are sections for "Frequent Users" (with four user icons), "Data Quality" (4 stars), and "Usage Frequency" (a heatmap grid). At the bottom are "Request Access" and "Follow" buttons. On the right, there's a video frame of a man with a beard, Rob Keevil, speaking on stage at KubeCon Europe 2019. He is holding a microphone and looking down at some notes. In the background, there's a screen with the KubeCon logo and the text "KubeCon CloudNativeCon Europe 2019". At the very bottom, there's a dark footer with the KubeCon and CloudNativeCon logos side-by-side.

► <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



► <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

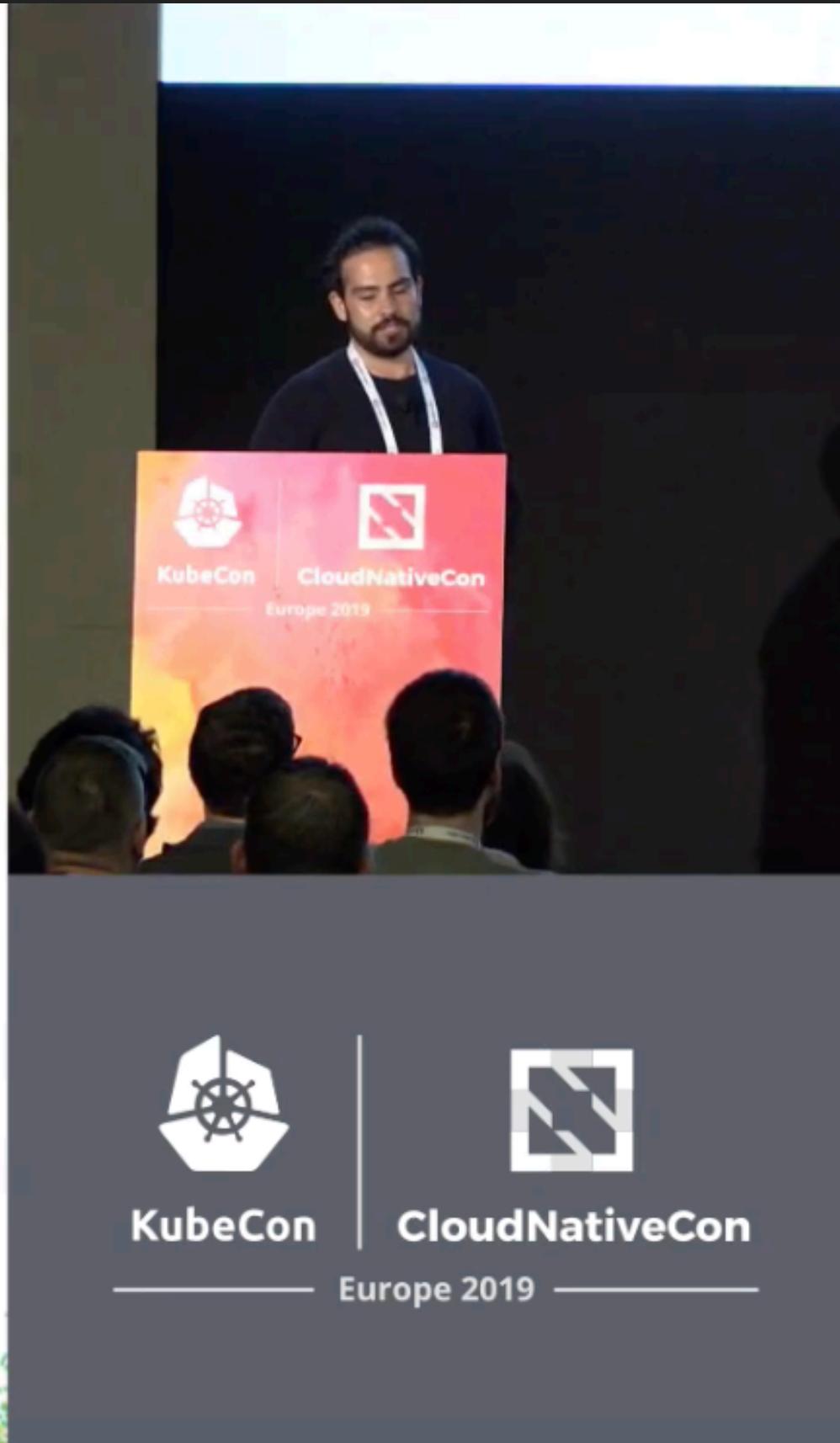
TechAtBloomberg.com

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Bloomberg

Engineering

KubeCon + CloudNativeCon Europe 2019



► <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 !