



KubeCon



CloudNativeCon

Europe 2018

CNCF Project Updates

Liz Rice



20 CNCF Projects

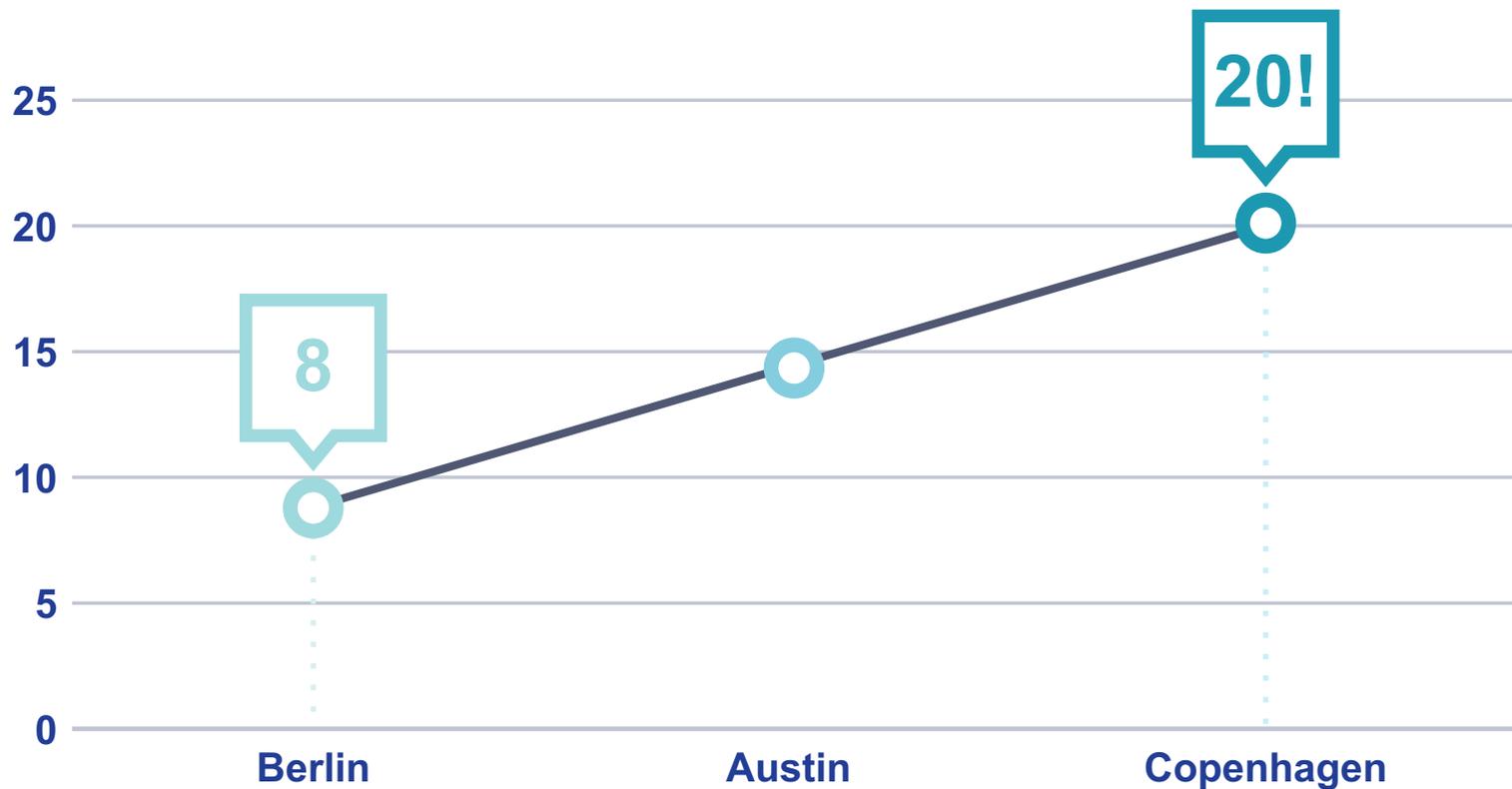


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CNCF Project Stages

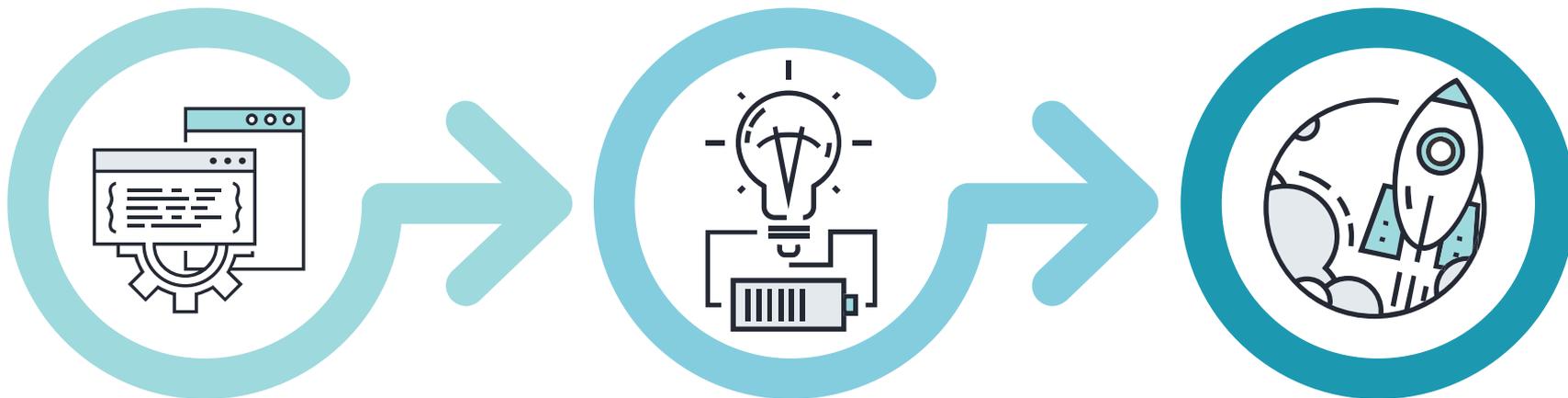


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SANDBOX

INCUBATION

GRADUATED



Sandbox Projects





Rook



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Cloud-native storage orchestrator

Portable abstractions for storage

Integrated with Kubernetes



Open Policy Agent



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GENERAL-PURPOSE POLICY ENGINE

authorization

admission control

rate limiting

and more

**HOW DO
WORKLOADS
IDENTIFY
THEMSELVES
AND EACH
OTHER?**

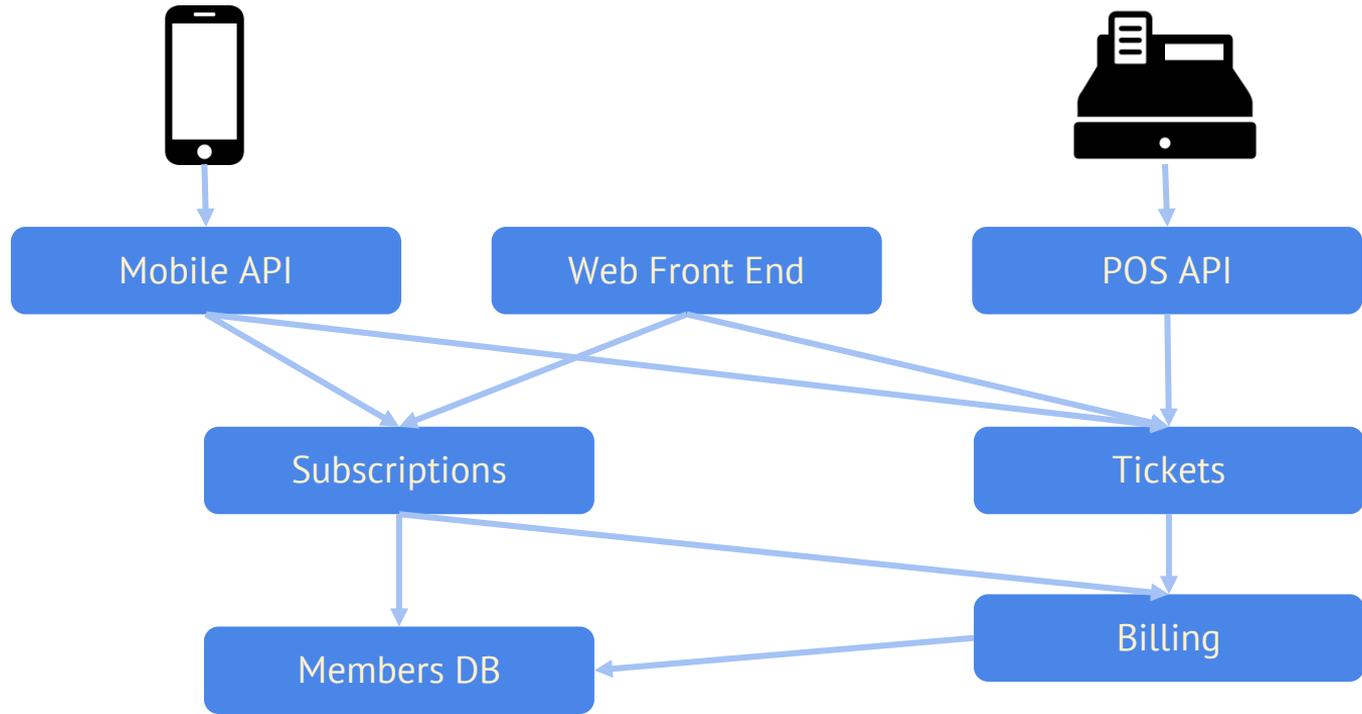


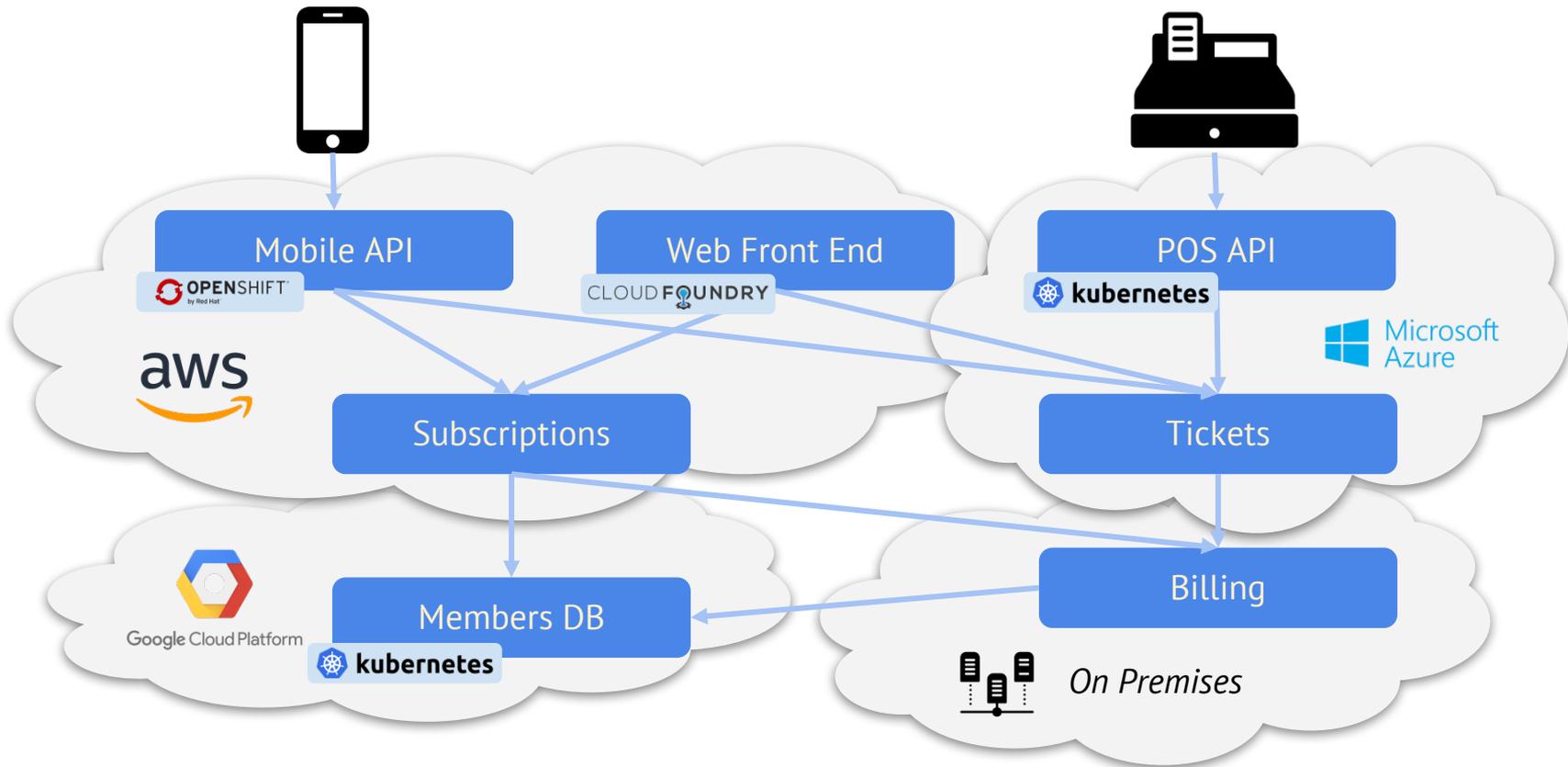
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Our Design Goals

- Be **extensible** and **easily deployed** into a wide range of infrastructure and middleware environments.
- Support workloads that **scale elastically**.
- Support workloads that are **dynamically scheduled**.
- Be **API & policy** driven.
- Be **highly available**, even over heterogeneous infrastructure.



11th USENIX Security Symposium (2002)
Plan9 security design published



GlueCon 2016
Joe Beda proposes SPIFFE



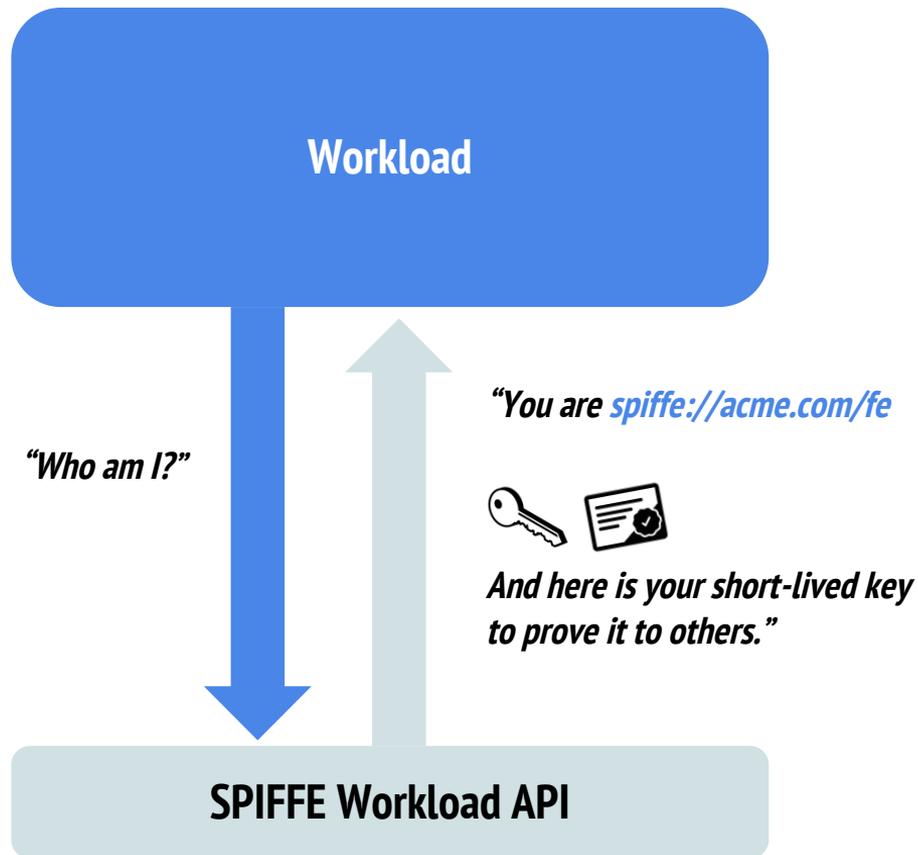
April 2018
CNCF welcomes SPIFFE & SPIRE

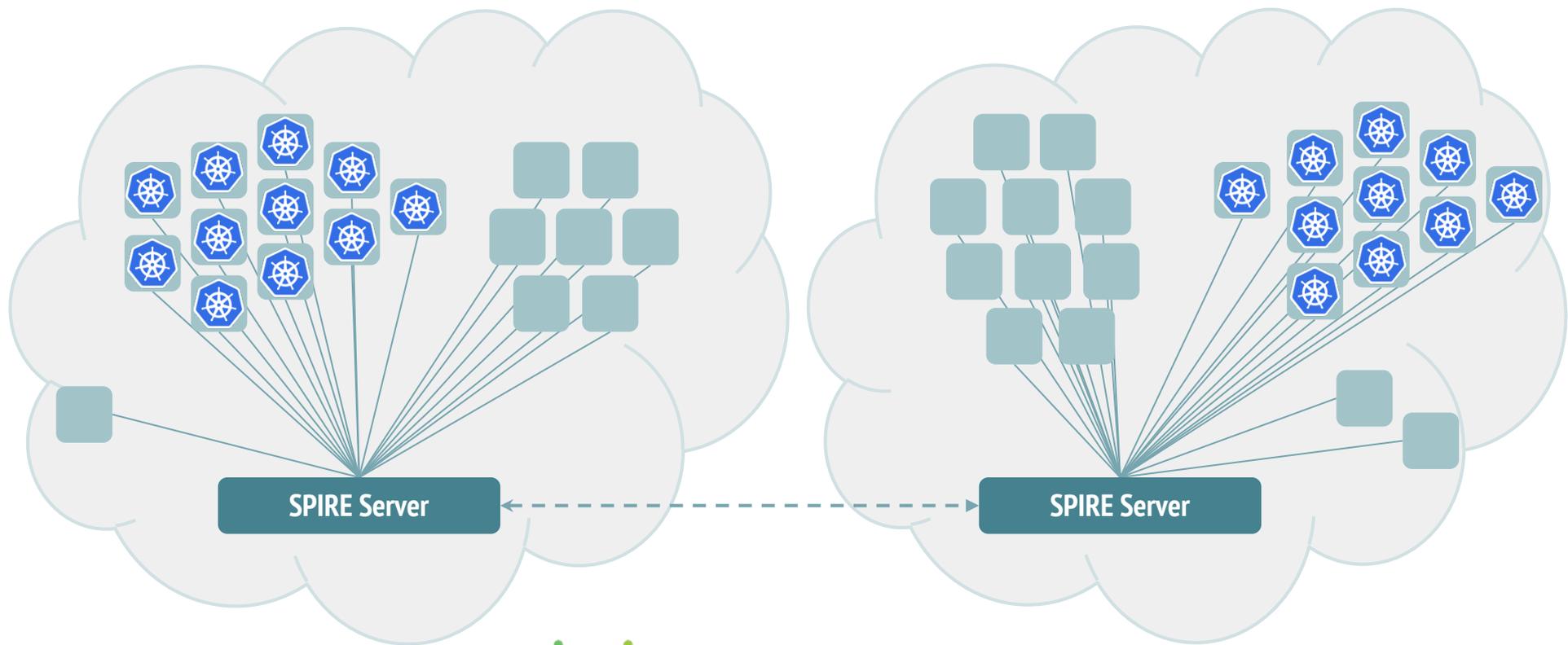
Circa 2005
Google rolls-out LOAS

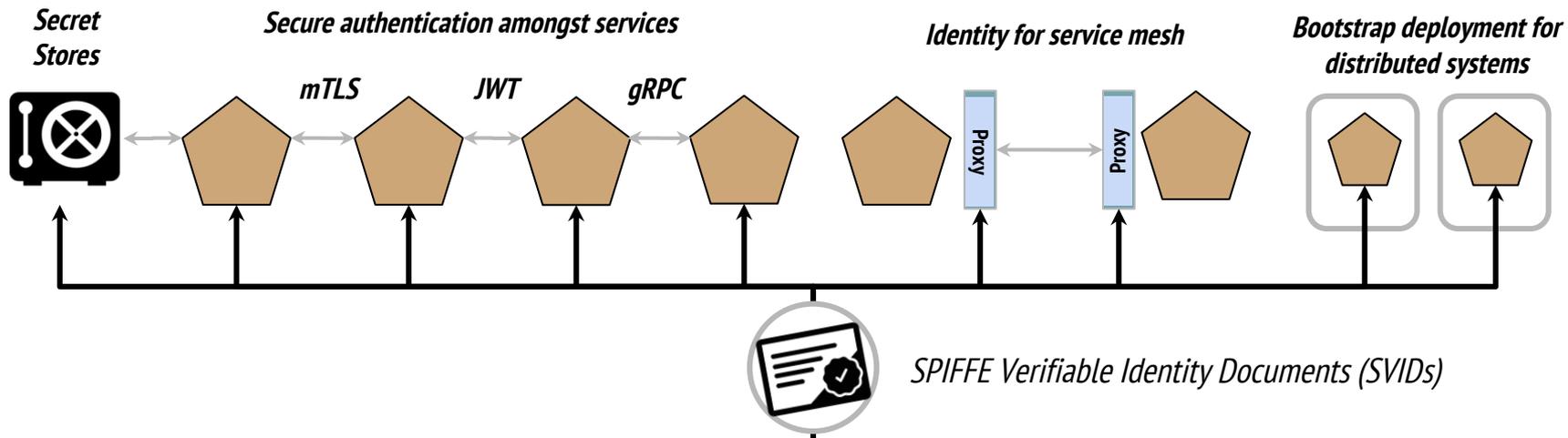


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SPIFFE & SPIRE 0.1 are released









SPIFFE Workload API



Cloud platform attestation plug-ins

OS attestation plug-ins

Scheduler and PaaS attestation plug-ins

HSM, TPM, Kerberos attestation plug-ins

CA and secret store plug-ins



spiffe



SPIRE



May 2 (Today)

Case Study:
“Cloud Native Identity”
(QAware) 2.45pm

SPIFFE Intro Session
(Scytale) 4.25pm

May 3 (Tomorrow)

TheNewStack Pancake Breakfast
talks SPIFFE 7.30am

SPIFFE Deep Dive
(Scytale & VMWare) 2pm

May 4 (Friday)

Panel: App Security Requires
Containers 4.25pm

blog.scytale.io

github.com/spiffe

slack.spiffe.io



Incubation Projects





CoreDNS



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DNS & service discovery

Beta support in Kubernetes 1.10

Security release v1.1.1



Linkerd



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Service Mesh

v1.4.0

10+ Fortune 500 end users



Envoy



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DISTRIBUTED PROXY / SERVICE MESH DATA PLANE

v1.6

New load balancer
& routing options

TCP proxy
enhancements

Better tracing
support



Prometheus



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Metrics collection

Time series database

Querying language

v2.0

Performance
improvements



OpenTracing



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DISTRIBUTED TRACING APIs & LIBRARIES

OpenTracing-
Python 2.0

OpenTracing-
C# 0.12

Dynamic loading in
OpenTracing-C++

Community updates
& examples



Jaeger



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DISTRIBUTED TRACING

v1.3.0

Archive
traces

Elasticsearch
storage
performance

New C#
client

New UI
design

New website
jaegertracing.io



Fluentd



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LOG COLLECTION & AGGREGATION

v1.2

Fluentd-
kubernetes-
daemonset
upgrade

New API
counter &
metrics

Splunk
Enterprise
connector

Better
buffer
mgmt

Fluent Bit
v0.13



NATS



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**MESSAGING FOR
CLOUD NATIVE
SERVICES**



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NATS

Colin Sullivan, Product Manager
Waldemar Quevedo, Developer





What is NATS?



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NATS is a seven year old, production proven, cloud-native messaging system.

- Message oriented middleware, *an infrastructure to send and receive messages between distributed systems.*
- Made for developers and operators who want to spend more time doing their work and less time worrying about how to do messaging.
- Joined CNCF in late March



NATS Features



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- Multiple communication patterns
- Highly performant
- Highly available
- Simple and cloud friendly
- Client support for over 30 programming languages
- Log based streaming with guaranteed delivery
- CNCF project integrations
 - ✓ Prometheus NATS Exporter
 - ✓ Kubernetes Operator (GitHub: @pires)



Use Cases



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NATS supports a range of technical use cases:

- Messaging in the cloud
 - ✓ General messaging
 - ✓ Microservices transport
 - ✓ Control planes
 - ✓ Service discovery
- IoT messaging
- Mobile and big data
- Augment (or replace) legacy messaging



Contribution and Usage Statistics



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- 200+ contributors
- 30 public repos
 - ✓ 50+ releases
 - ✓ 8000+ GitHub stars across repos
- ~25M NATS server Docker Hub pulls
- ~7M NATS streaming server Docker Hub pulls
- 680+ Slack members
- 20+ releases of the NATS server since June 2014, $\approx 5/\text{year}$



Users and Adopters



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Acadian | Apcera | Apporeto | Baidu | Bridgevine | Capital One | Clarifai | Cloud Foundry | Comcast | Ericsson | Faber | Fission |
General Electric | Greta | HTC | Logimethods | Netlify | Pex | Pivotal | Platform9 | Rapidloop | Samsung | Sendify | Sensay |
StorageOS | VMware | Weaveworks | Workiva



Find Out More



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Introduction to NATS: *Thursday, May 3 14:45 - 15:20*

Deep Dive into NATS: *Thursday, May 3 16:35 - 17:10*

Come find us and chat!

- Waldemar Quevedo / wally@nats.io
- Ginger Collison / ginger@nats.io
- Colin Sullivan / colin@nats.io

<https://nats.io>



Demo: NATS in Kubernetes



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We'll demonstrate
NATS performance and
availability using the
NATS **Kubernetes**
operator with metrics
aggregated by
Prometheus and
displayed in Grafana.





Container Network Interface



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Networking spec, libraries & plugins

Working towards spec 0.4.0

Amazon ECS plugins added

CLIENT/SERVER COMMUNICATIONS

v1.11

gRPC-Web

gRPC-Dart



containerd



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CONTAINER RUNTIME

v1.1

Kubernetes
CRI

Working
on

Windows containers
KataContainers



TUF



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SECURE FRAMEWORK FOR SOFTWARE UPDATES

v0.10.2

Targets across
multiple repos

CII Best
Practices

Quickstart
guide & CLI

[theupdate
framework.com](https://theupdateframework.com)



Notary



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SECURE SOFTWARE DISTRIBUTION

v0.6.1

Improved root
key rotations

Support wildcards to allow single root
certificate for multiple repositories



Vitess



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**DATABASE
ORCHESTRATION FOR
MYSQL HORIZONTAL
SCALING**



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Vitess

High performance, scalable, and available MySQL
clustering system for the Cloud

Sugu Sougoumarane
CTO, PlanetScale
@ssougou

Database trends

- Transactional data explosion
- Move to the cloud
- DBAs transitioning to DBEs



Vitess capabilities

- Leverage MySQL
- Take away the pain of sharding (and resharding)
- Cloud-ready
- Observability



The Community

In production



Evaluating



A silver trophy cup is the central focus, set against a blurred background. The cup has text engraved on it, including "MySQL Community Award" and "Application of the Year 2018". The cup is flanked by two vertical yellow bars.

MySQL Community Award

“Application of the year 2018”

Demo

- Bring up single shard vitess on kubernetes
- Generate load
- Bring up 16 new shards for resharding
- Perform resharding
- Scale up load to 16x



 Overview

Cluster

Namespaces

Nodes

Persistent Volumes

Roles

Storage Classes

Namespace

default

Overview

Workloads

Cron Jobs

Daemon Sets

Deployments

Jobs

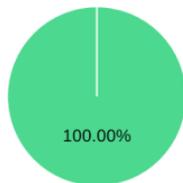
Pods

Replica Sets

Replication Controllers

Workloads

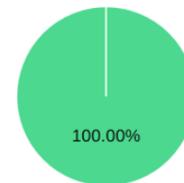
Workloads Statuses



Daemon Sets



Pods



Replication Controllers

Daemon Sets

Name	Labels	Pods	Age	Images
 nginx-ingress-kubernetes	juju-application: nginx-i	22 / 22	41 minutes	k8s.gcr.io/nginx-ingress-t

Pods

Name	Node	Status	Restarts	Age	CPU (cores)	Memory (bytes)
	ip-172-31-45-					



Dashboard

Schema

Topology

Workflows



Serving Shards

0

messagedb

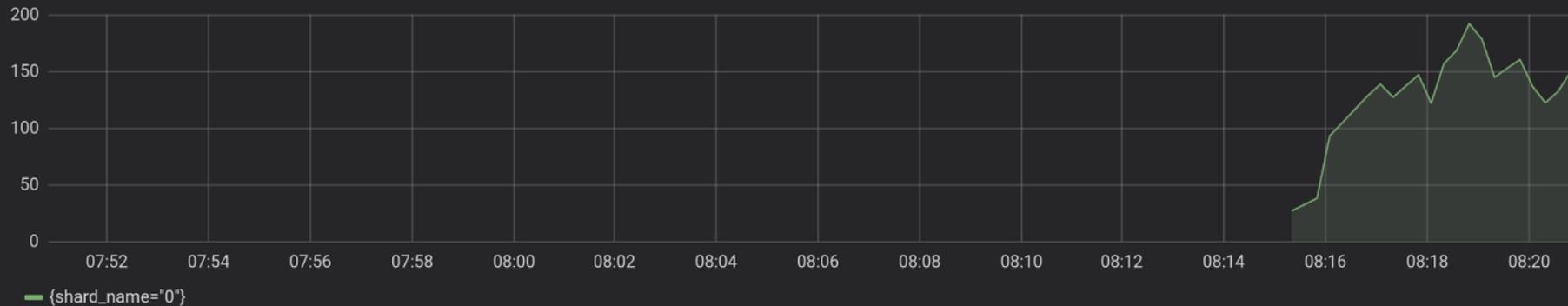




QPS



QPS per shard





Dashboard

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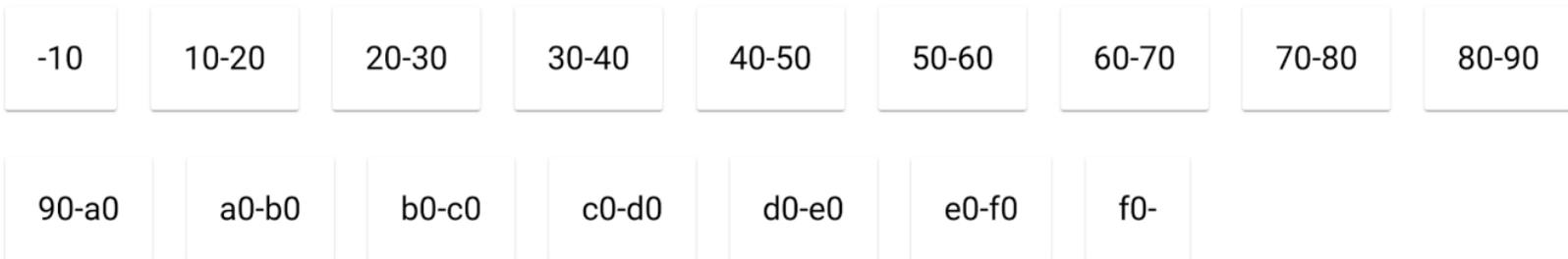
message**db**



Serving Shards

0

Nonserving Shards



```
ip-172-31-31-15: ~/dev/src/vitess.io/vitess/helm/vitess>
```

```
ip-172-31-31-15: ~/dev/src/vitess.io/vitess/helm/vitess> kubectl create -f splitclone.yaml
```

```
job.batch "vtworker" created
```

```
ip-172-31-31-15: ~/dev/src/vitess.io/vitess/helm/vitess> ./lvtctl.sh MigrateServedTypes messagedb/0 ronly
```

```
ip-172-31-31-15: ~/dev/src/vitess.io/vitess/helm/vitess> ./lvtctl.sh MigrateServedTypes messagedb/0 replica
```

```
ip-172-31-31-15: ~/dev/src/vitess.io/vitess/helm/vitess> ./lvtctl.sh MigrateServedTypes messagedb/0 master
```

```
ip-172-31-31-15: ~/dev/src/vitess.io/vitess/helm/vitess>
```



Dashboard

Schema

Topology

Workflows

messagedb



Serving Shards

-10

10-20

20-30

30-40

40-50

50-60

60-70

70-80

80-90

90-a0

a0-b0

b0-c0

c0-d0

d0-e0

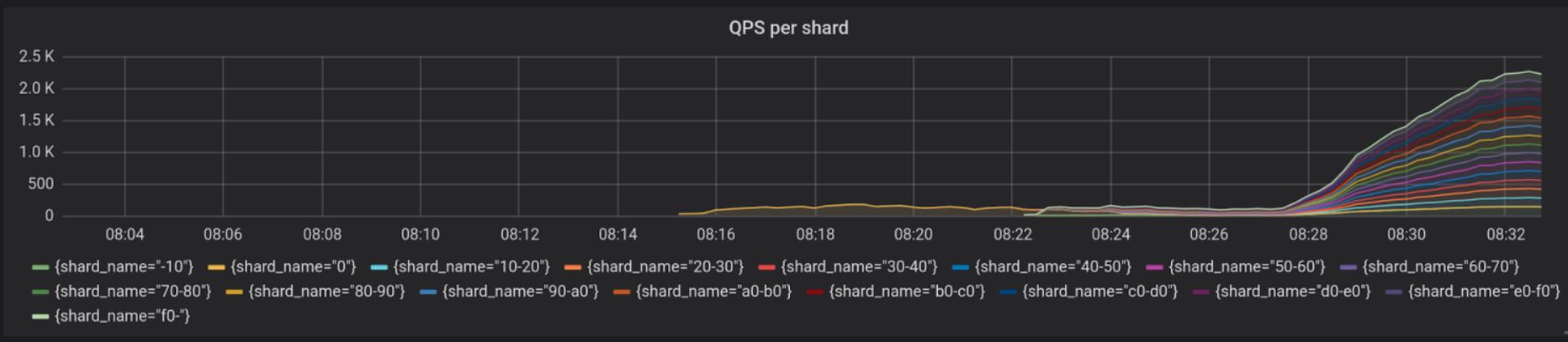
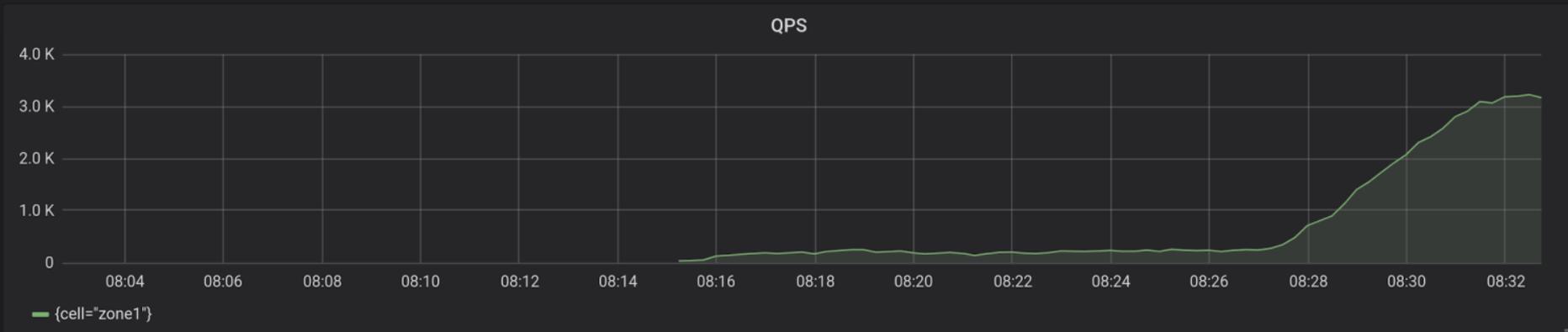
e0-f0

f0-

Nonserving Shards

0

```
ip-172-31-31-15: ~/dev/src/vitess.io/vitess/helm/vitess>
ip-172-31-31-15: ~/dev/src/vitess.io/vitess/helm/vitess> kubectl create -f splitclone.yaml
job.batch "vtworker" created
ip-172-31-31-15: ~/dev/src/vitess.io/vitess/helm/vitess> ./lvtctl.sh MigrateServedTypes messagedb/0 ronly
ip-172-31-31-15: ~/dev/src/vitess.io/vitess/helm/vitess> ./lvtctl.sh MigrateServedTypes messagedb/0 replica
ip-172-31-31-15: ~/dev/src/vitess.io/vitess/helm/vitess> ./lvtctl.sh MigrateServedTypes messagedb/0 master
ip-172-31-31-15: ~/dev/src/vitess.io/vitess/helm/vitess> kubectl scale --replicas=16 deployment/loadgen
deployment.extensions "loadgen" scaled
ip-172-31-31-15: ~/dev/src/vitess.io/vitess/helm/vitess> █
```



What's new

- Prometheus integration
- Helm charts and operators
- Vitess session
 - Vitess and a Kubernetes Operator





Graduated Projects





Kubernetes 1.10

29 SIGs

10 Working Groups





Kubernetes 1.10

29 SIGs

10 Working Groups



Graduated Projects



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Graduated Projects

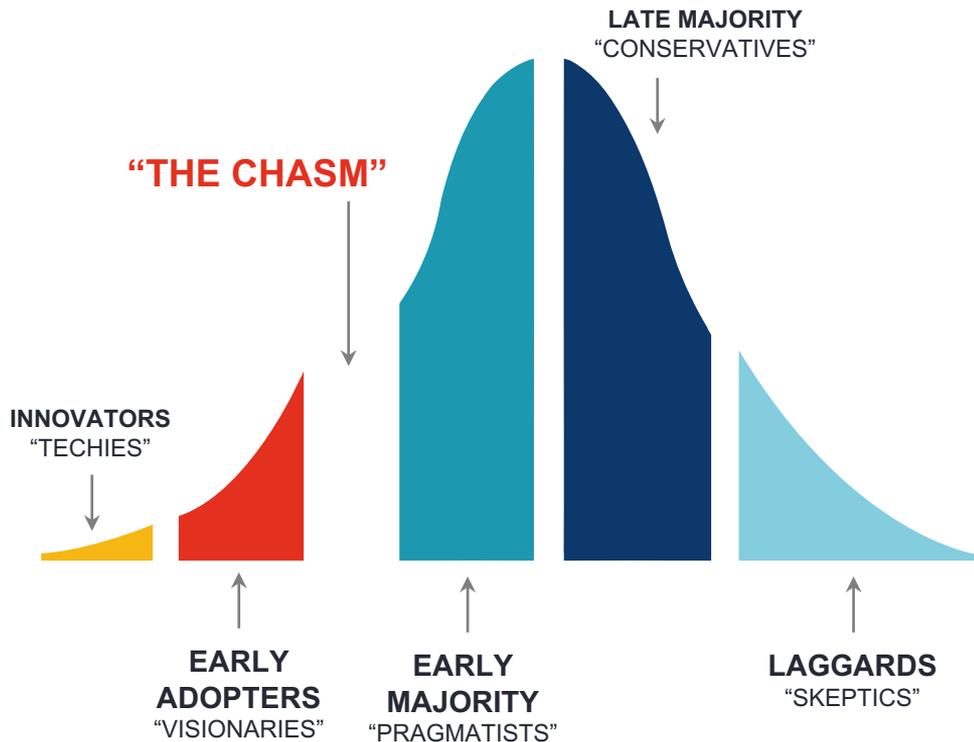
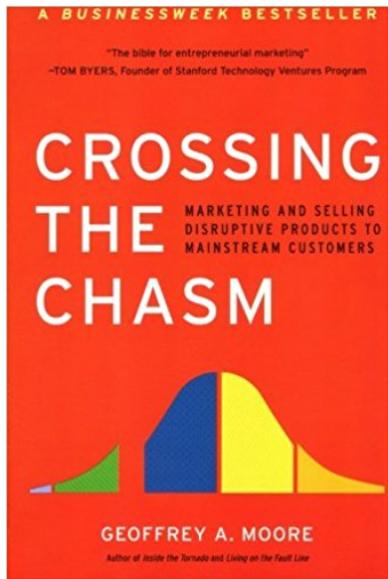


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Graduated Projects

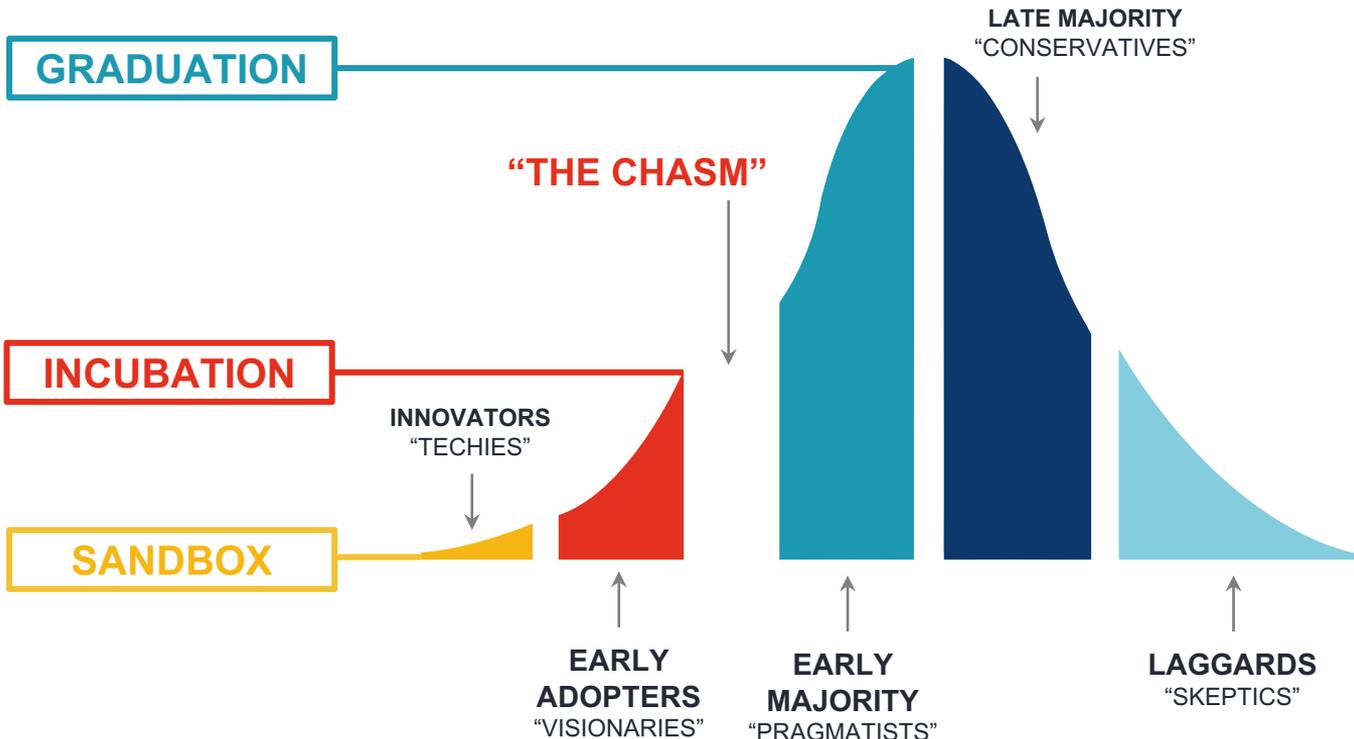
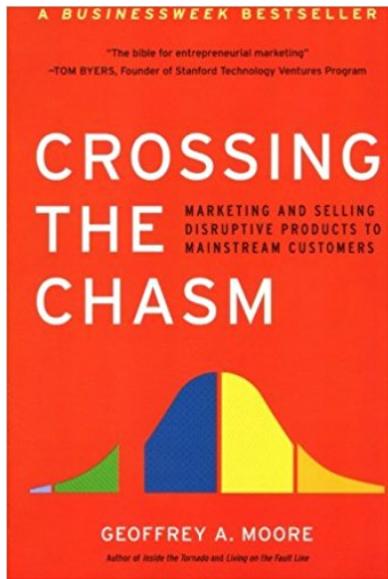


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Getting Involved



Getting Involved



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Sessions



Intros & Deep Dives



Hallway Track

Projects

Kubernetes Special Interest Groups

CNCF Working Groups



**You are the
Community**

