



Virtual

Multicloud Vitesse Over Network Service Mesh

John Watson

Site Reliability Engineer



&

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Senior Tech Leader



Network Service Mesh

Who we are...



Tim Swanson - Senior Tech Leader

- Emerging Technologies & Innovation @Cisco
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John Watson - Site Reliability Engineer

- SRE for PlanetScaleDB
- @wizputer, cncf slack: dctrwatson

Vitess + NSM virtual L3

Use-Cases

NSM vL3
Interdomain

Vitess
Architecture

Integration
& Demo



Europe 2020

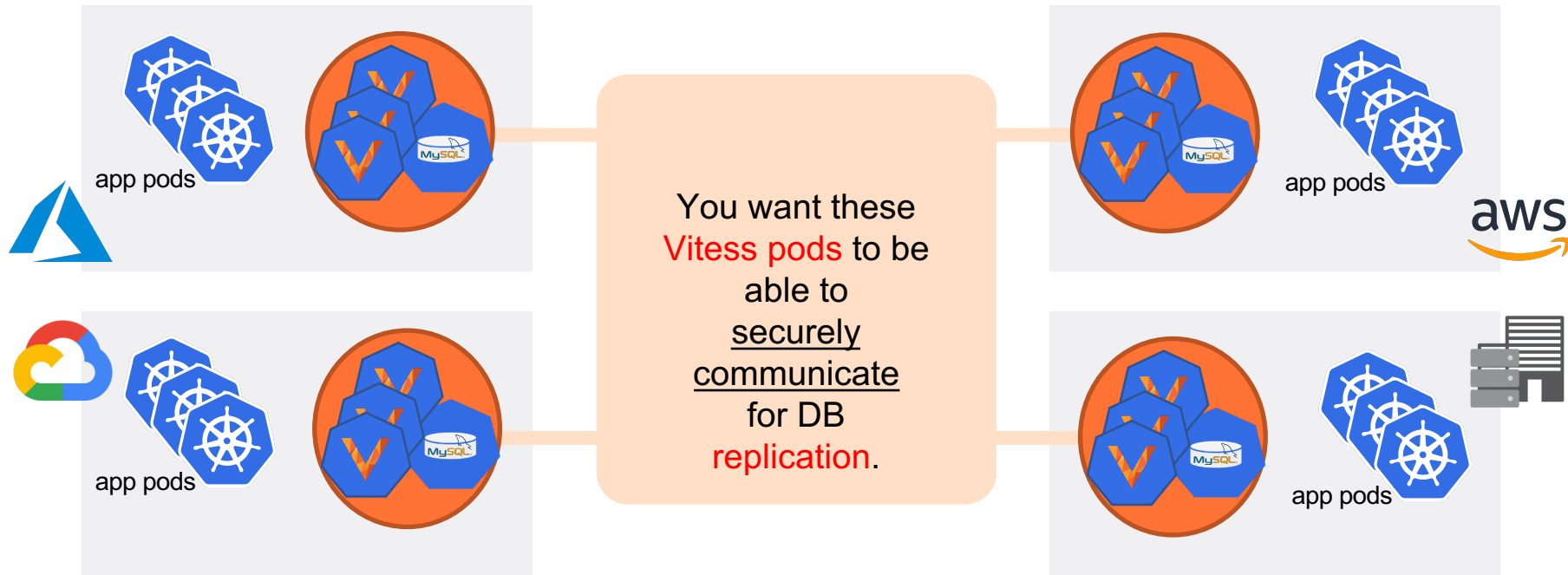
Virtual

Use-Cases

Vitess

multicloud

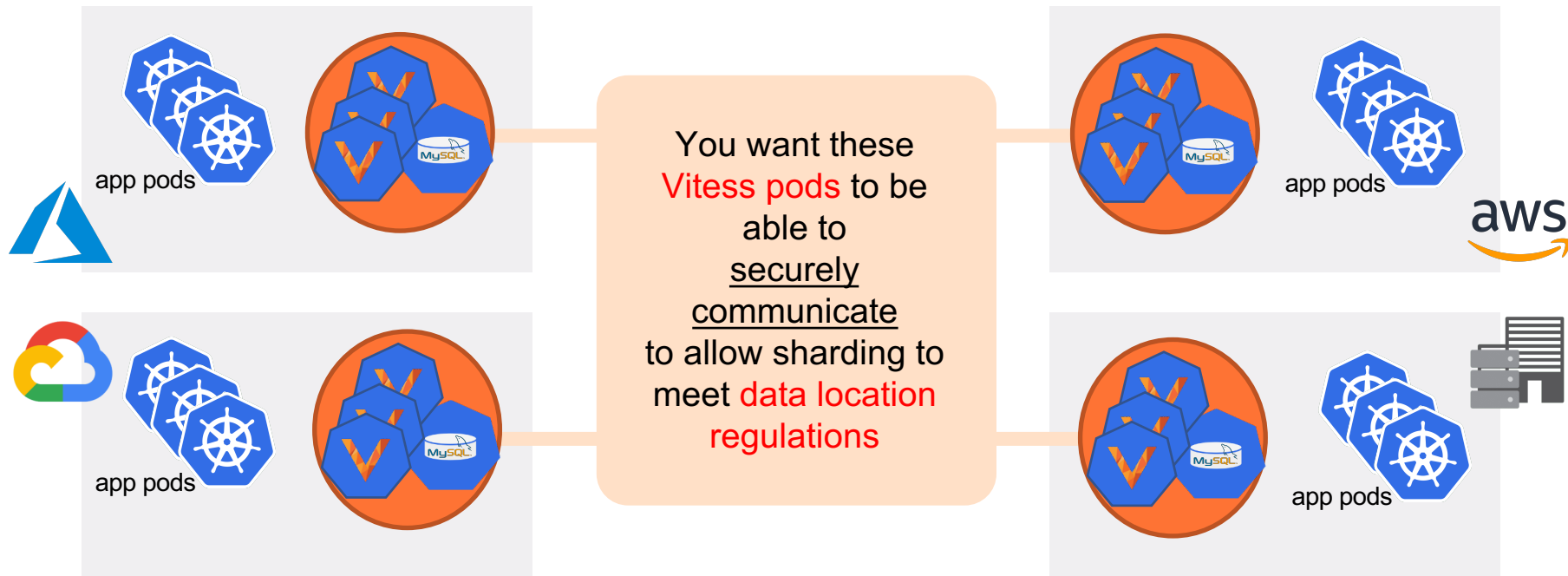
Data Replication



Data Location



Virtual





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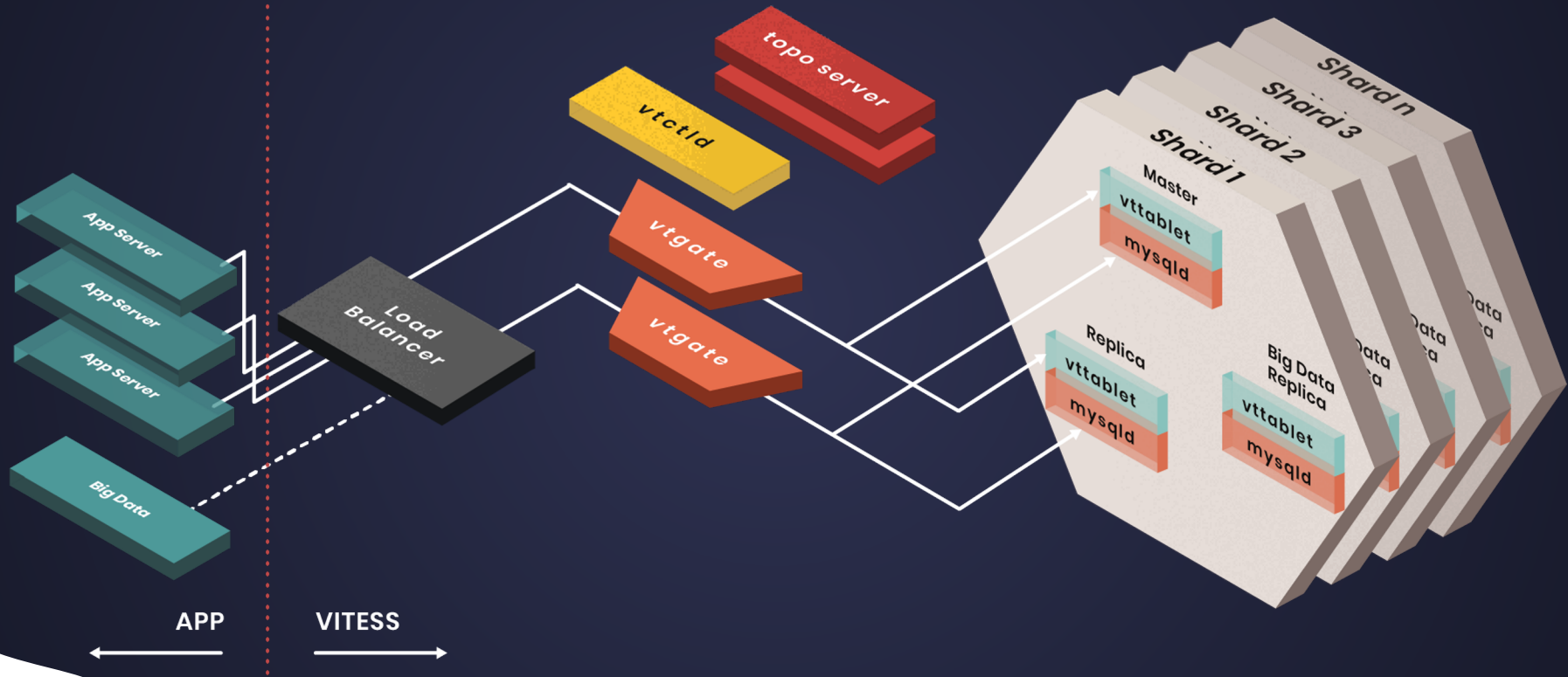
Europe 2020

Architecture

Vitess

multicloud

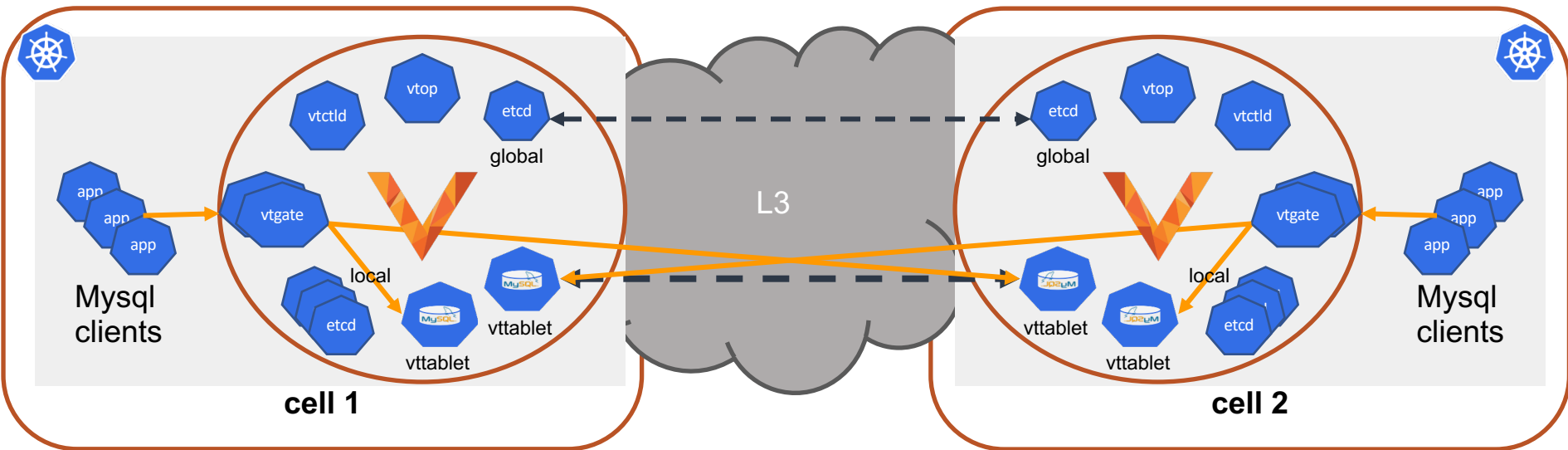
Vitess Cell



APP

VITESS

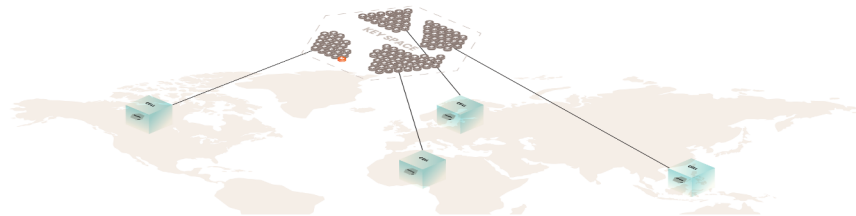
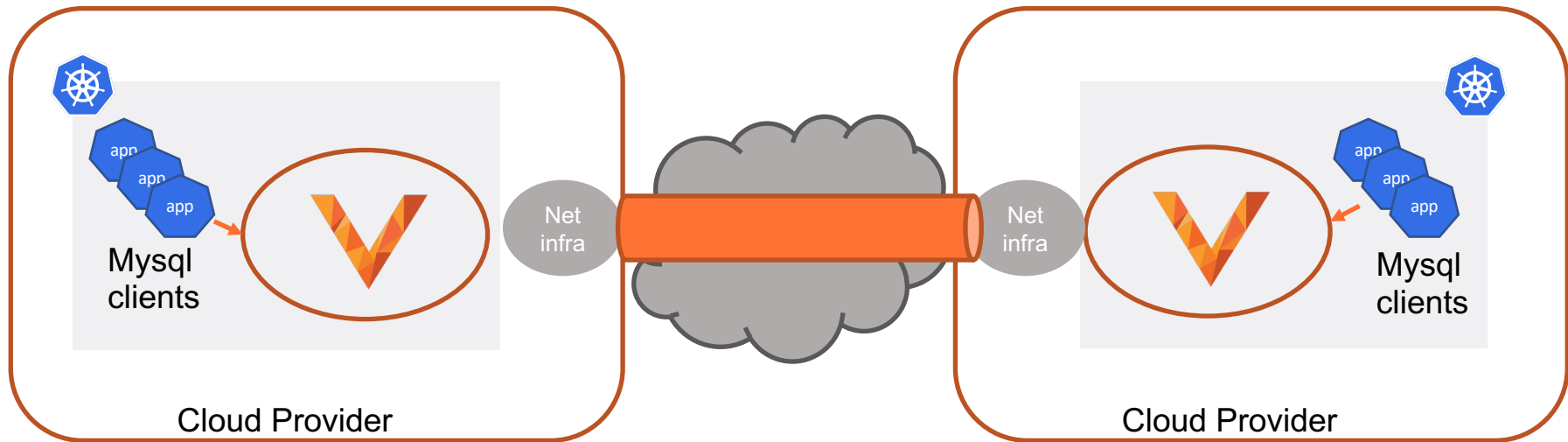
Vitess Multi-cell



Vitess multcloud deployments



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Take-aways

- Vitess relies on networking provided to the Kubernetes pods
- Multicloud networking:
 - Organizations' networking and security requirements must be implemented for each Kubernetes cluster
 - Most solutions require linking entire clusters' networks to infra and using cloud-specific & K8s network policy to allow access to only specific workloads
 - Administrative coordination toil





KubeCon



CloudNativeCon

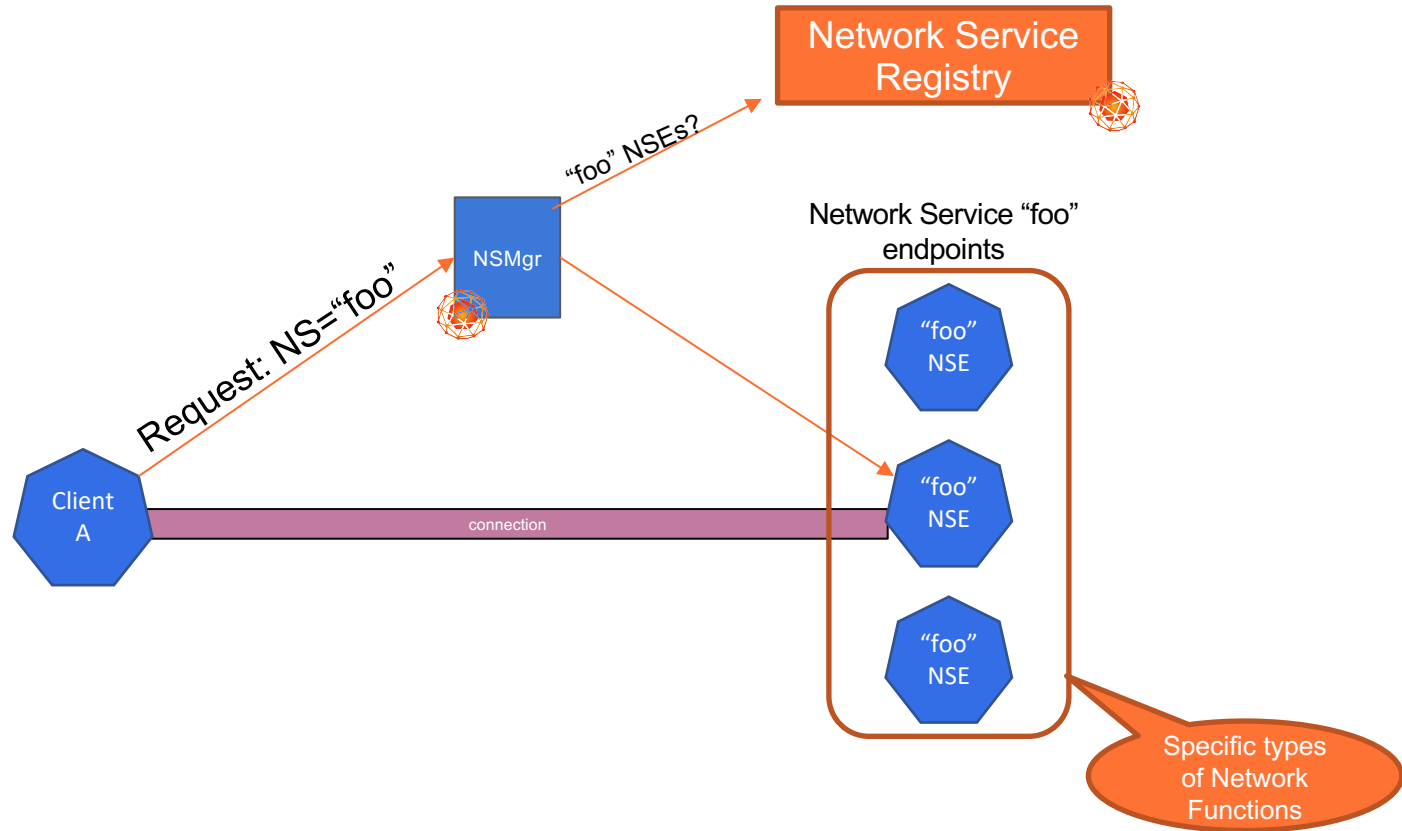
Europe 2020

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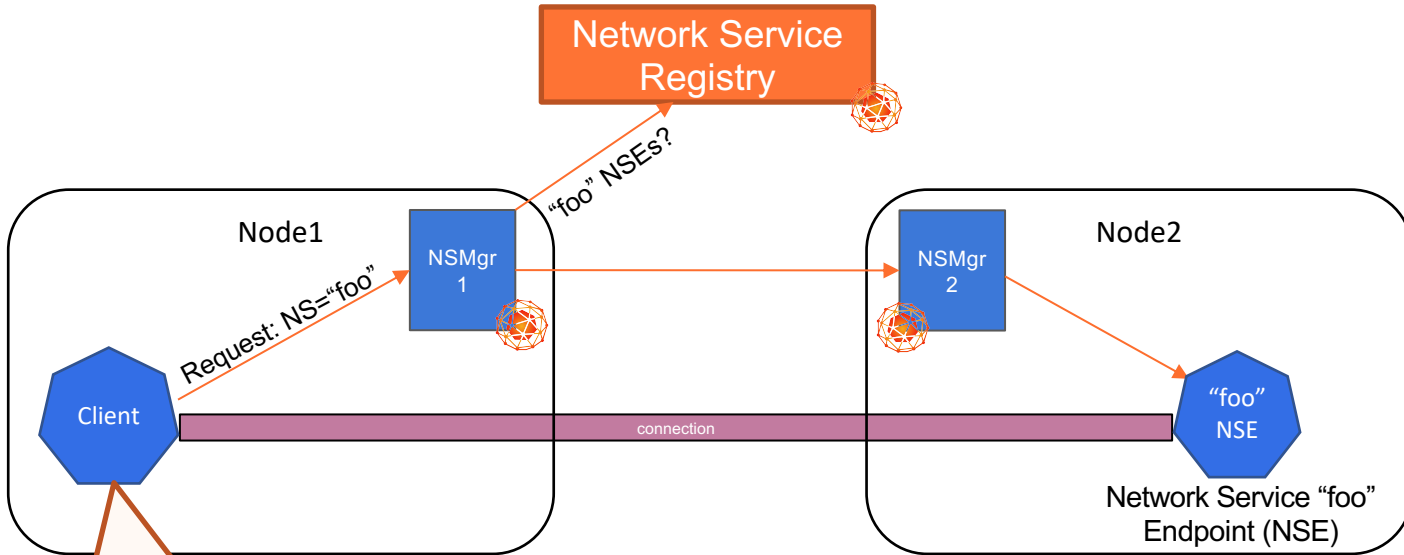
NSM + vL3

Interdomain private network

NSM in a nutshell



NSM on K8s (single domain)

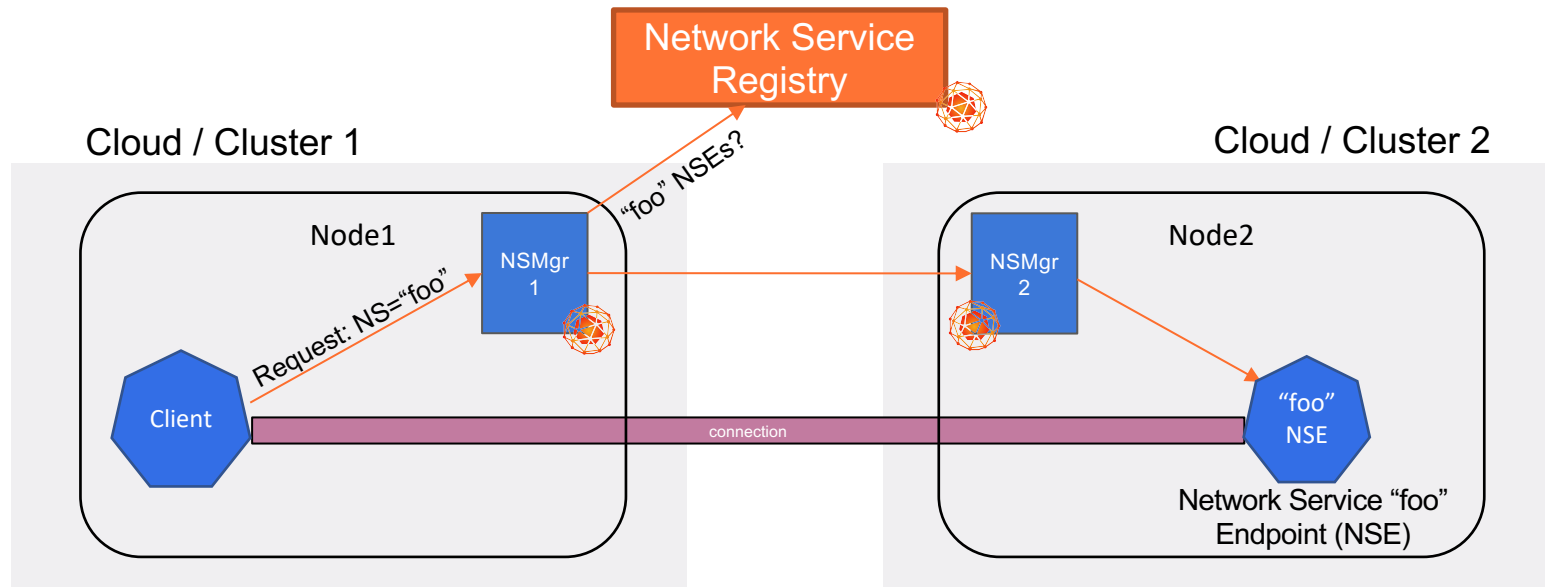


```
apiVersion: v1
kind: Deployment
metadata:
  name: client-workload
  annotations:
    ns.networkservicemesh.io: foo
```

- NSMgr's per Node:
- Find NSEs from NSR & choose
 - Help negotiate connection parameters
 - Manage local NSM Forwarder (handles cross connects)



NSM Interdomain



Same control-plane message flow as single domain

Network Service Registry has interdomain view

NSM virtual L3 NSE

- Acts as **L3 GW router** between client pods and other peer **NSEs**
- **connectivity domain** = Peered vL3 NSEs and client workloads
- Acts as both a NS client and NS endpoint for NSM connections
- Uses NSM interdomain to find and request connections to other NSEs
- Exchanges L3 IP and route information via Network Service request message flow



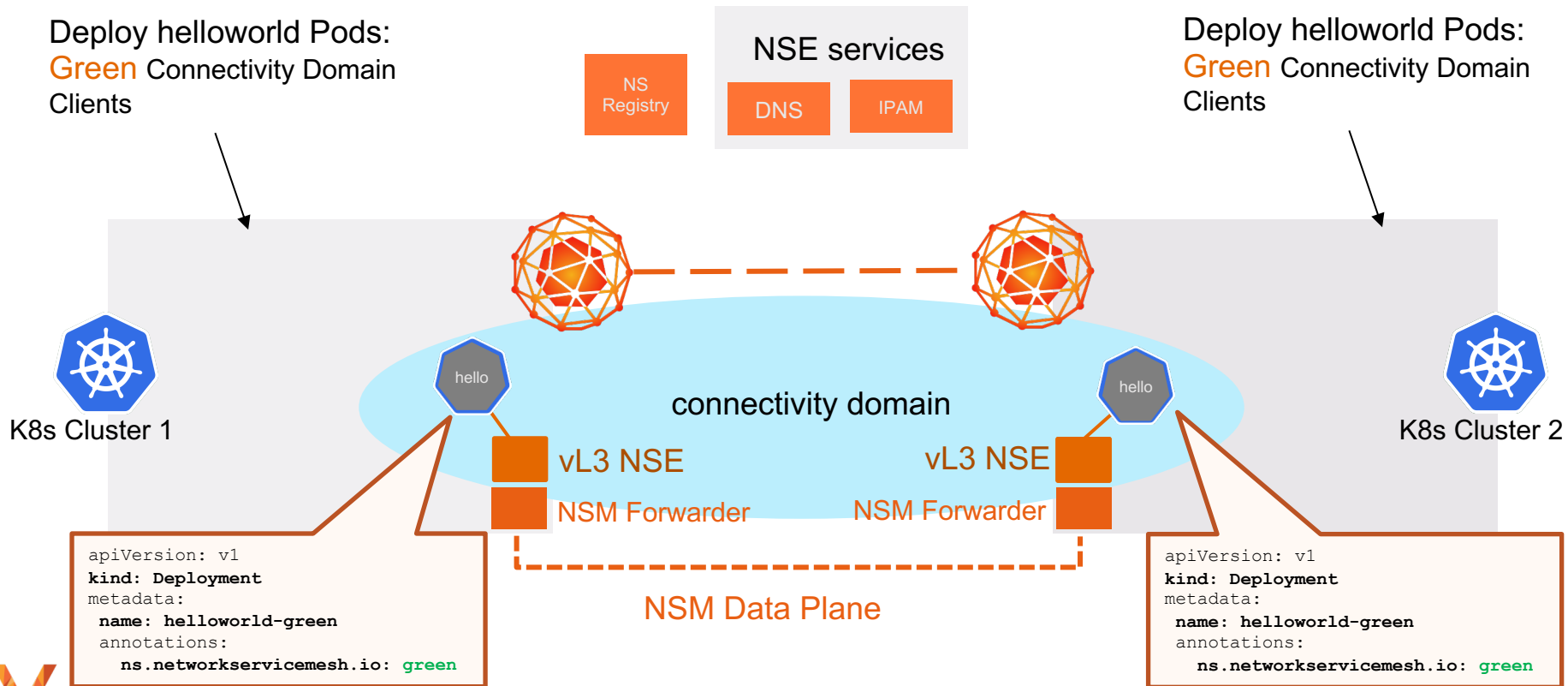
NSM vL3



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Deploy helloworld Pods:
Green Connectivity Domain
Clients

Deploy helloworld Pods:
Green Connectivity Domain
Clients



```
apiVersion: v1
kind: Deployment
metadata:
  name: helloworld-green
  annotations:
    ns.networkservicemesh.io: green
```

```
apiVersion: v1
kind: Deployment
metadata:
  name: helloworld-green
  annotations:
    ns.networkservicemesh.io: green
```



vL3 connectivity domains

- Workload clients **”opt-in”** to join connectivity domain
- Non-connectivity domain workloads can only access connectivity domain workloads via local cluster K8s networking (CNI path)
 - They cannot access workloads via the connectivity domain (NSM) path
 - No need for network policy for inter-cluster service access





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Integration

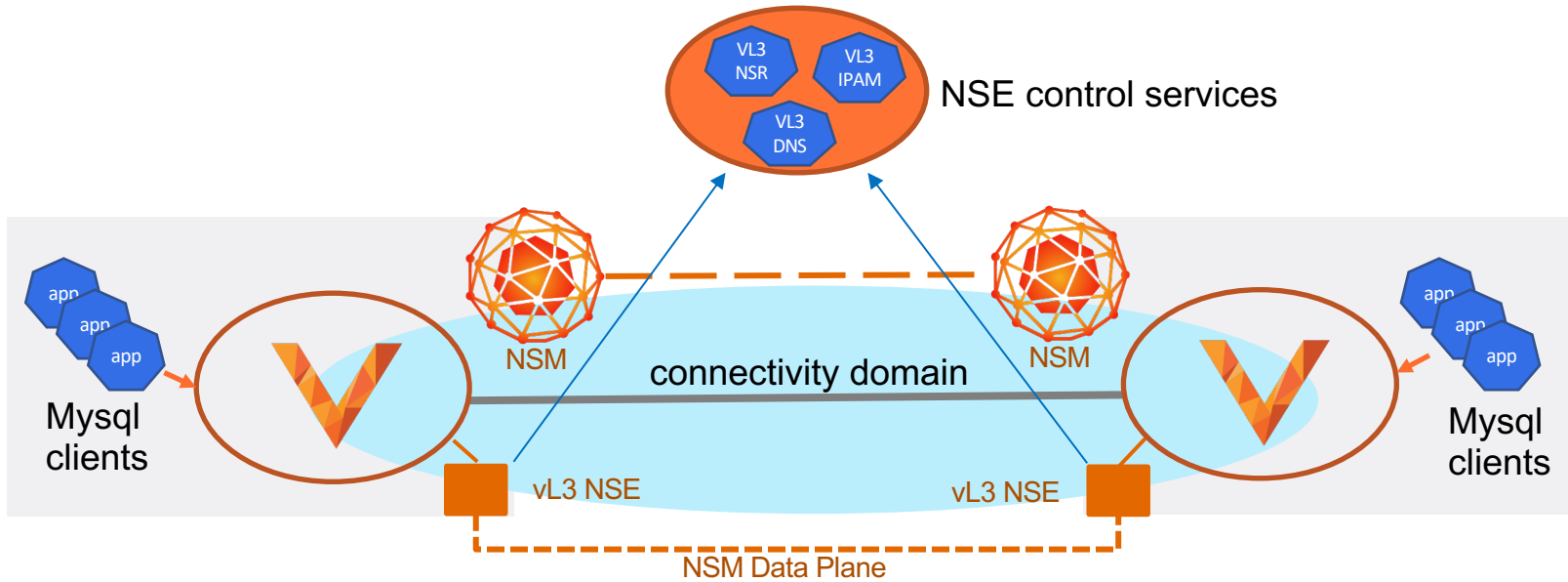
Vitess + NSM

vL3

Vitess + vL3 deployments arch



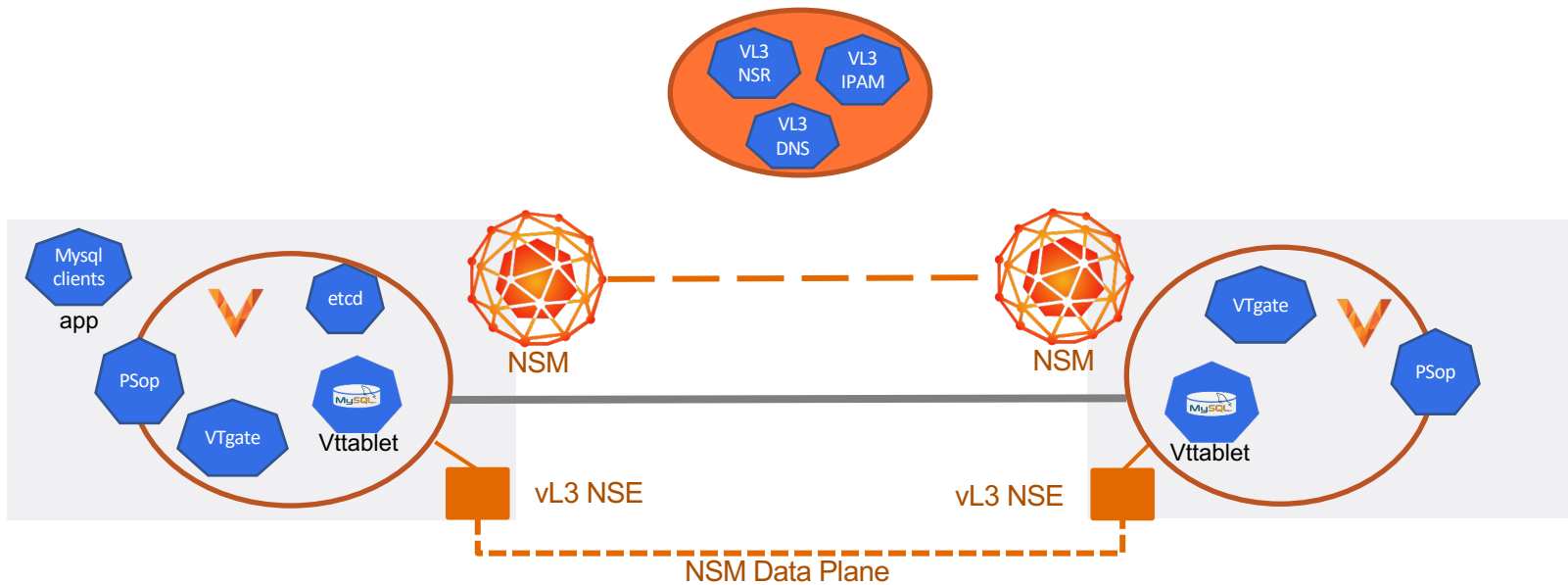
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Vitess + vL3 deployments arch



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Integration Demo

Demo Details

Pre-setup:

2 K8s clusters with NSM installed

NSE control services setup in 3rd cluster with DNS zone

Demo Flow

1. Deploy virtual L3 Network Service Endpoints (NSEs) in each cluster configured for connectivity domain named “**vites**s”
2. Deploy Vitess pods to both clusters as virtual L3 NS clients
3. Use Vitess to create database table and shard config
4. Show how shards are split between clusters (cells)
5. Show replication across clusters via fail-over
 1. Intercluster network provided via connectivity domain



References

NSM + vL3

- **NSM:** <https://networkservicemesh.io/>
- **vL3 NSE:** <https://github.com/cisco-app-networking/nsm-nse>

Vitess

- **Vitess** <https://vitess.io/>
- **PlanetScale operator** <https://docs.planetscale.com/vitess-operator/overview>

The Vitess Schedule



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Tuesday, 18 August

- **14:30 CEST**
 - Vitess Intro: How to Migrate a MySQL Database to Vitess - Sugu Sougoumarane & Morgan Tocker, PlanetScale
- **16:21 CEST**
 - Sponsored Keynote: Network, Please Evolve: Chapter 3, Stretching Out – Vijoy Pandey, Vice President and CTO of Cloud, Cisco

Wednesday, 19 August

- **14:30 CEST**
 - Zero Downtime Data Relocation with Vitess - Liz van Dijk & Deepthi Sigireddi, PlanetScale
- **16:55 CEST**
 - Vitess Deep Dive: Deployment Design - Dan Kozlowski & Andres Taylor, PlanetScale
 - Multicloud Vitess over Network Service Mesh - Tim Swanson, Cisco & John Watson, PlanetScale



NSM Talks



Network Service Mesh



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NSMcon EU: <https://nsm.dev/events/nsmconeueu2020>

#nsm-interdomain-functional-walkthrough-use-cases-and-demo

#using-dns-to-smooth-your-nsm-adoption

Thursday, 20 August

- **13:45 CEST**
 - Episode IV: A New Network Service Mesh – Fredrick Kautz, Doc.ai & Nikolay Nikolaev, VMware

About John Watson

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 @wizputer

 planetscale

 Vitess

About Tim Swanson

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CISCO

 Network Service Mesh



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Thank you!