

Multicloud Vitess Over Network Service Mesh

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Network Service Mesh

Who we are...



Tim Swanson - Senior Tech Leader

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

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Vitess + NSM virtual L3

Use-Cases

NSM vL3
Interdomain

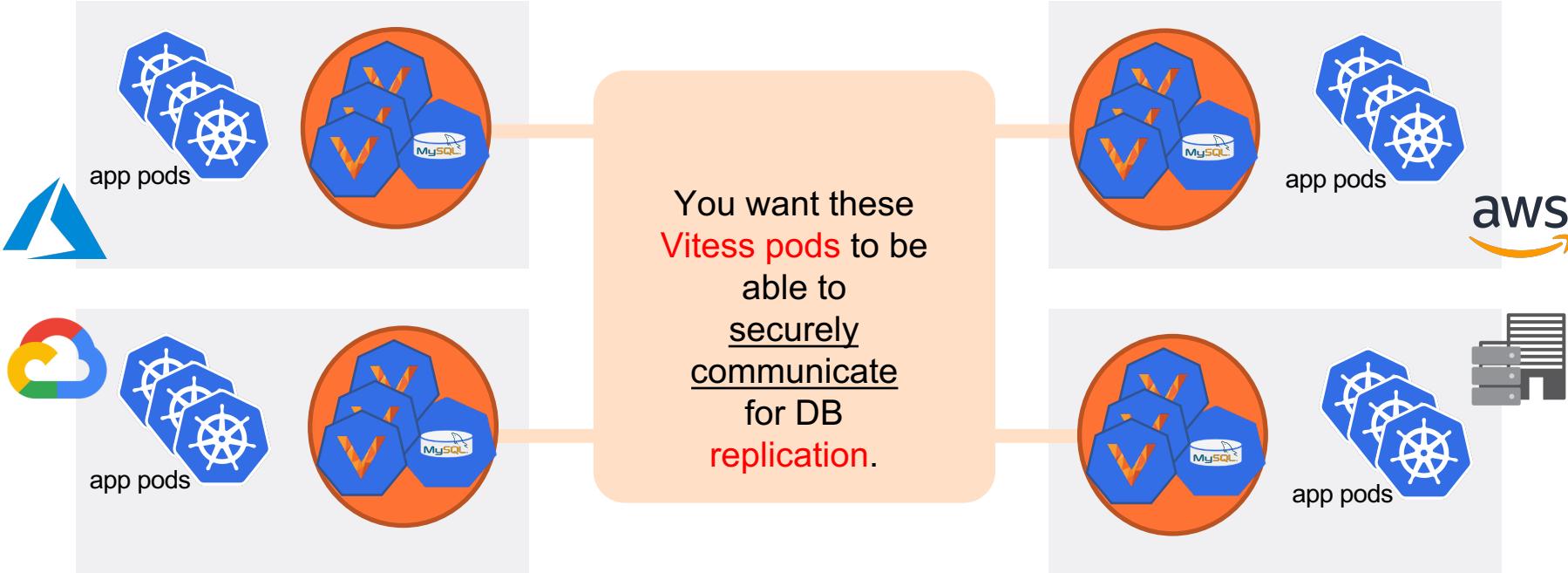
Vitess
Architecture

Integration
& Demo



Use-Cases Vitess multicloud

Data Replication

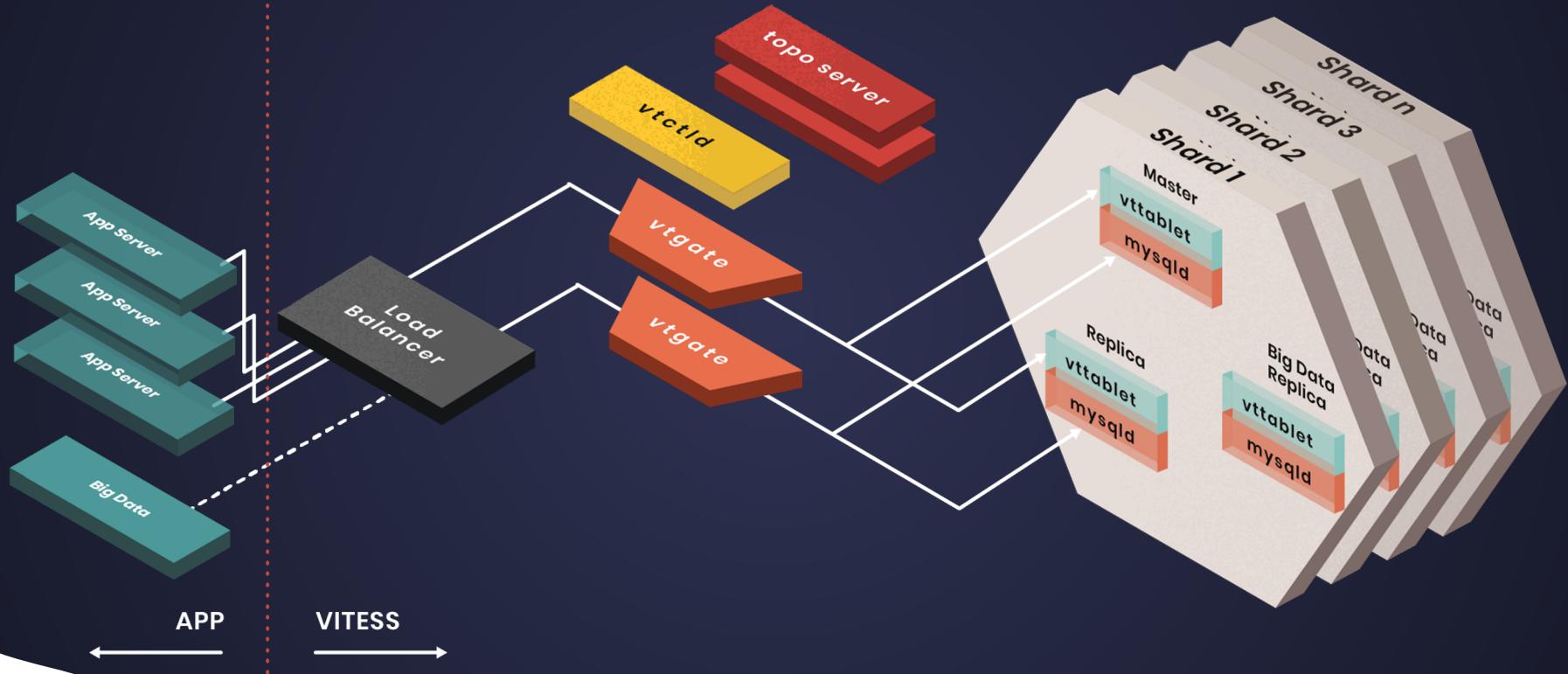


Data Location

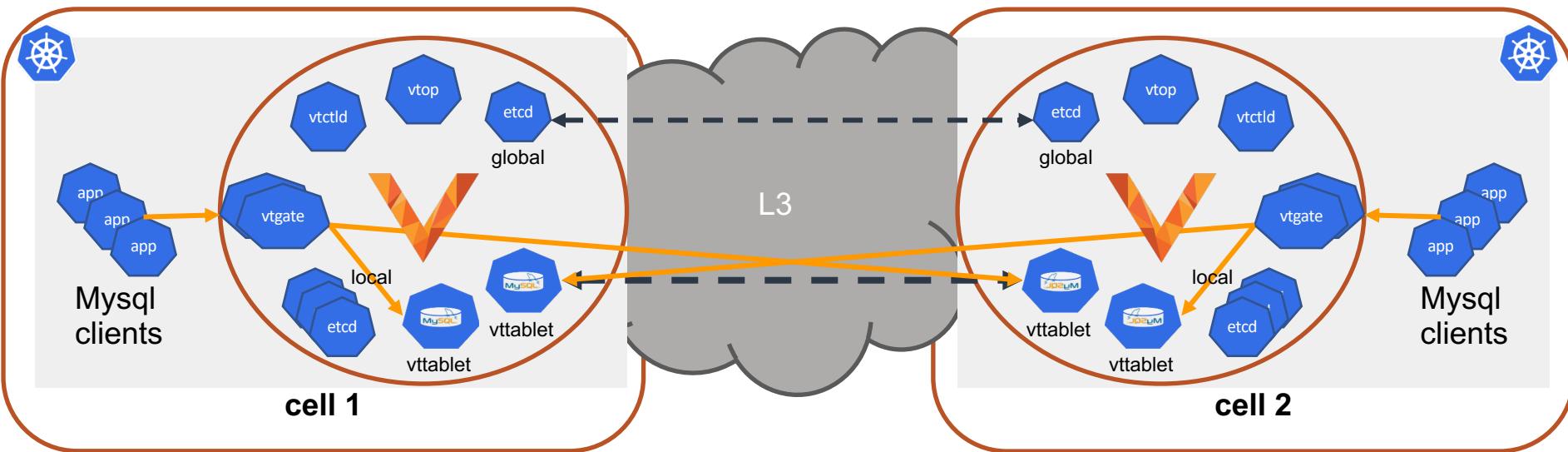


Architecture Vitess multicloud

Vitess Cell



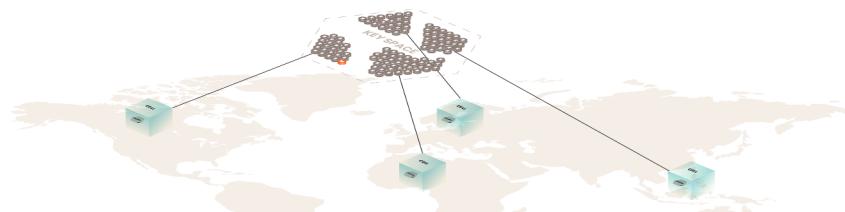
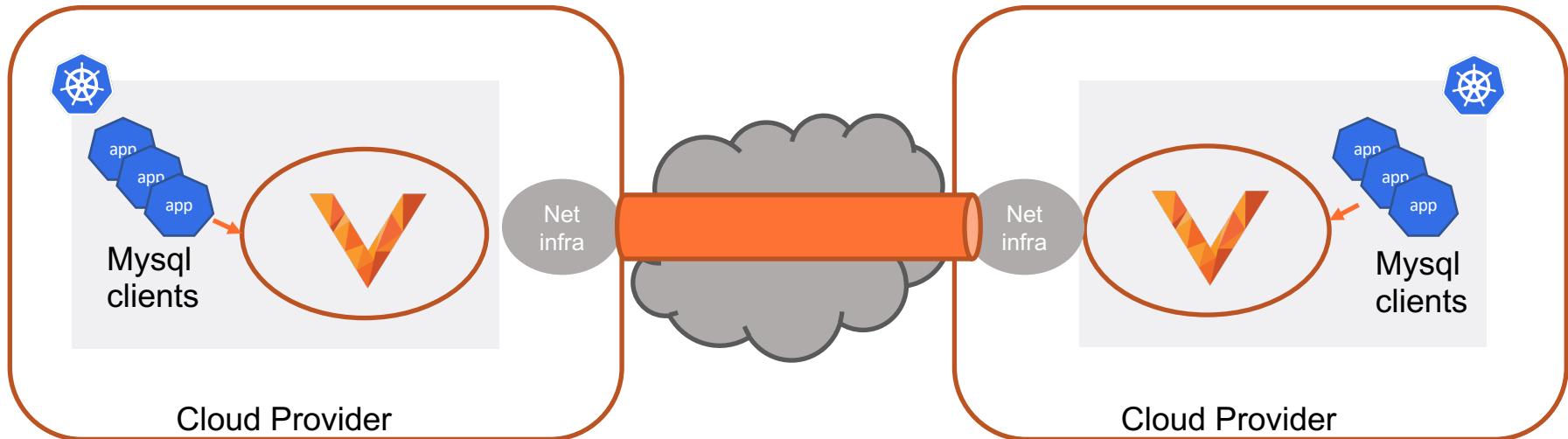
Vitess Multi-cell



Vitess multicloud deployments



Virtual

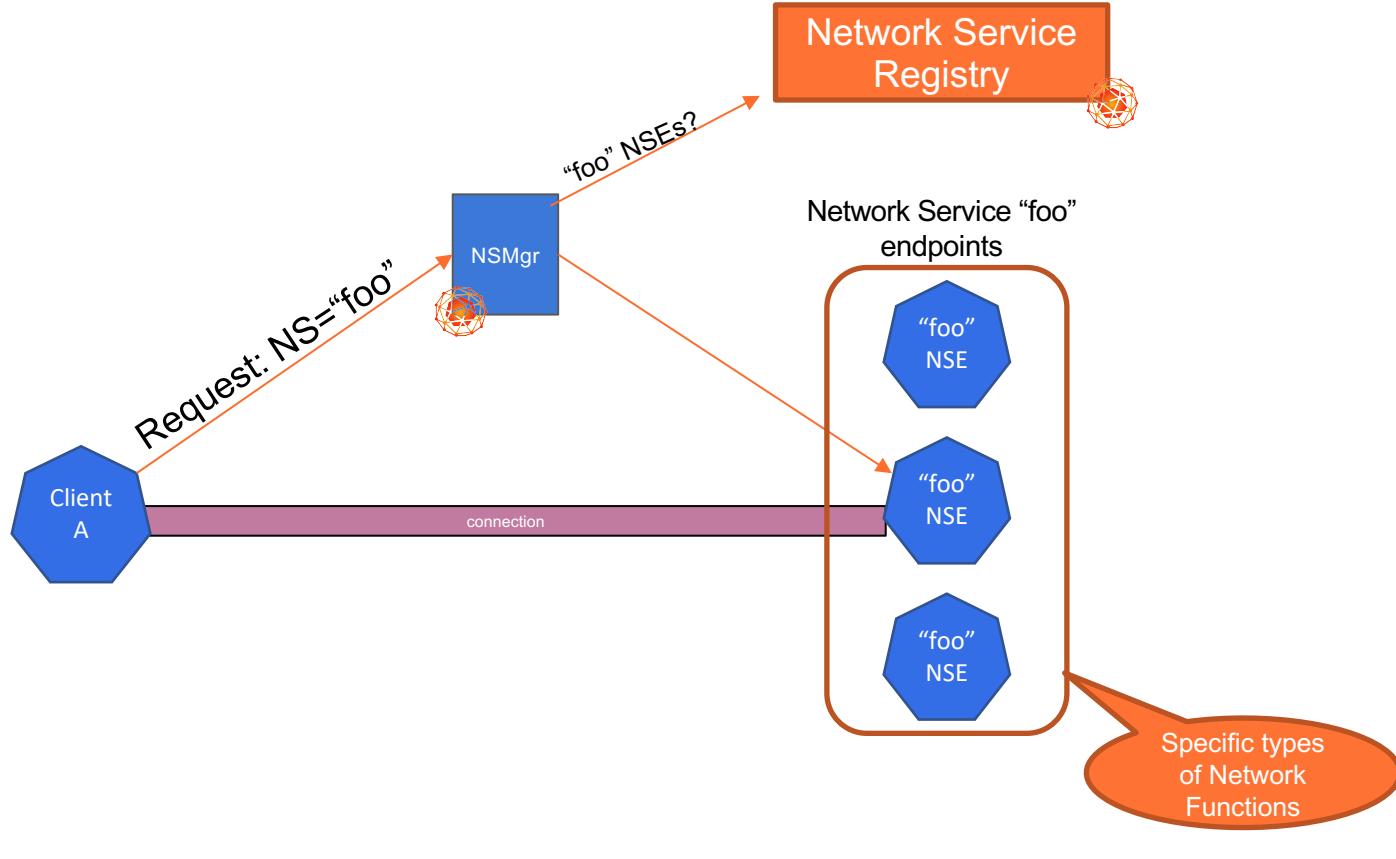


Take-aways

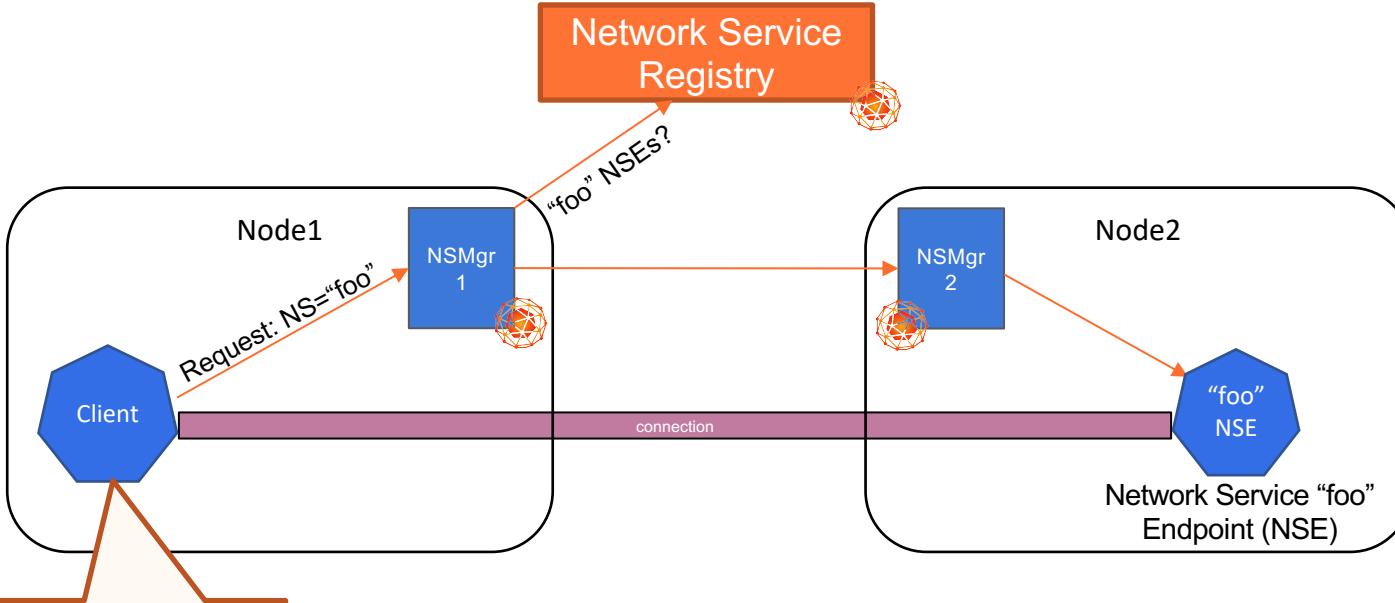
- Vitess relies on networking provided to the Kubernetes pods
- Multicloud networking:
 - Organizations' networking and security requirements must be implemented for each Kubernetes cluster
 - Most solutions require linking entire clusters' networks to infra and using cloud-specific & K8s network policy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

NSM + vL3 Interdomain private network

NSM in a nutshell



NSM on K8s (single domain)

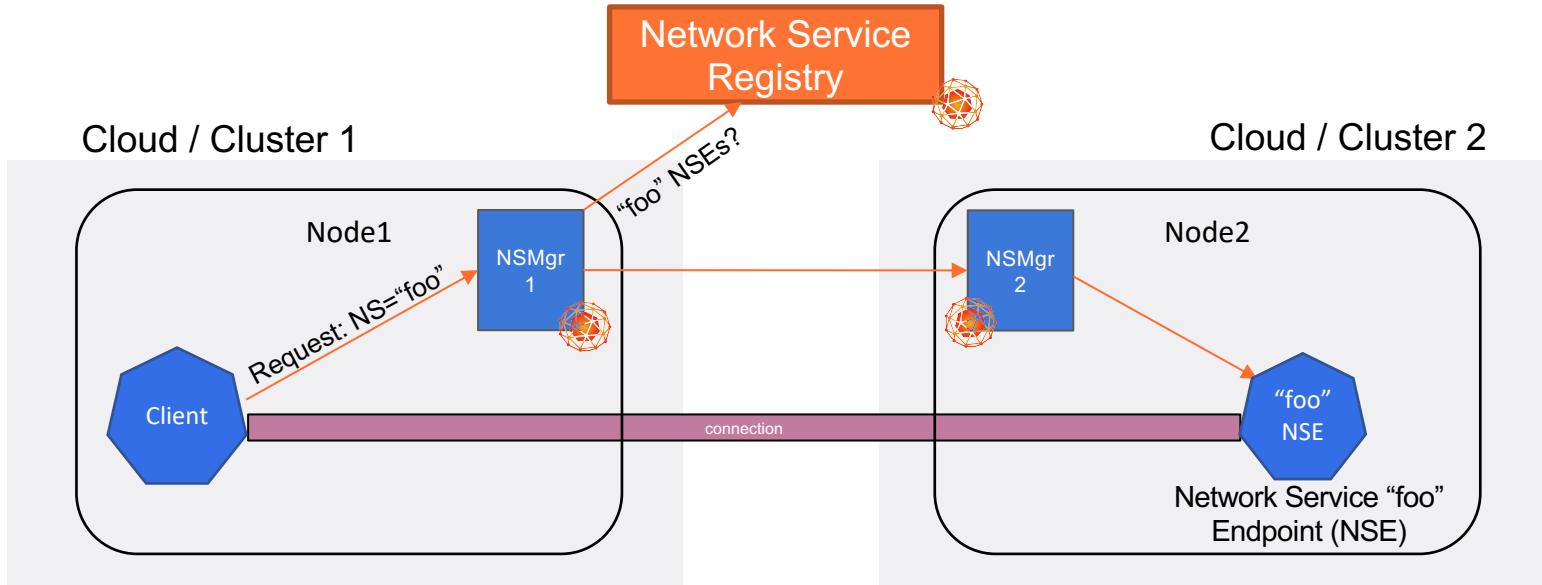


```
apiVersion: v1
kind: Deployment
metadata:
  name: client-workload
  annotations:
    ns.networkservicemesh.io: foo
```

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

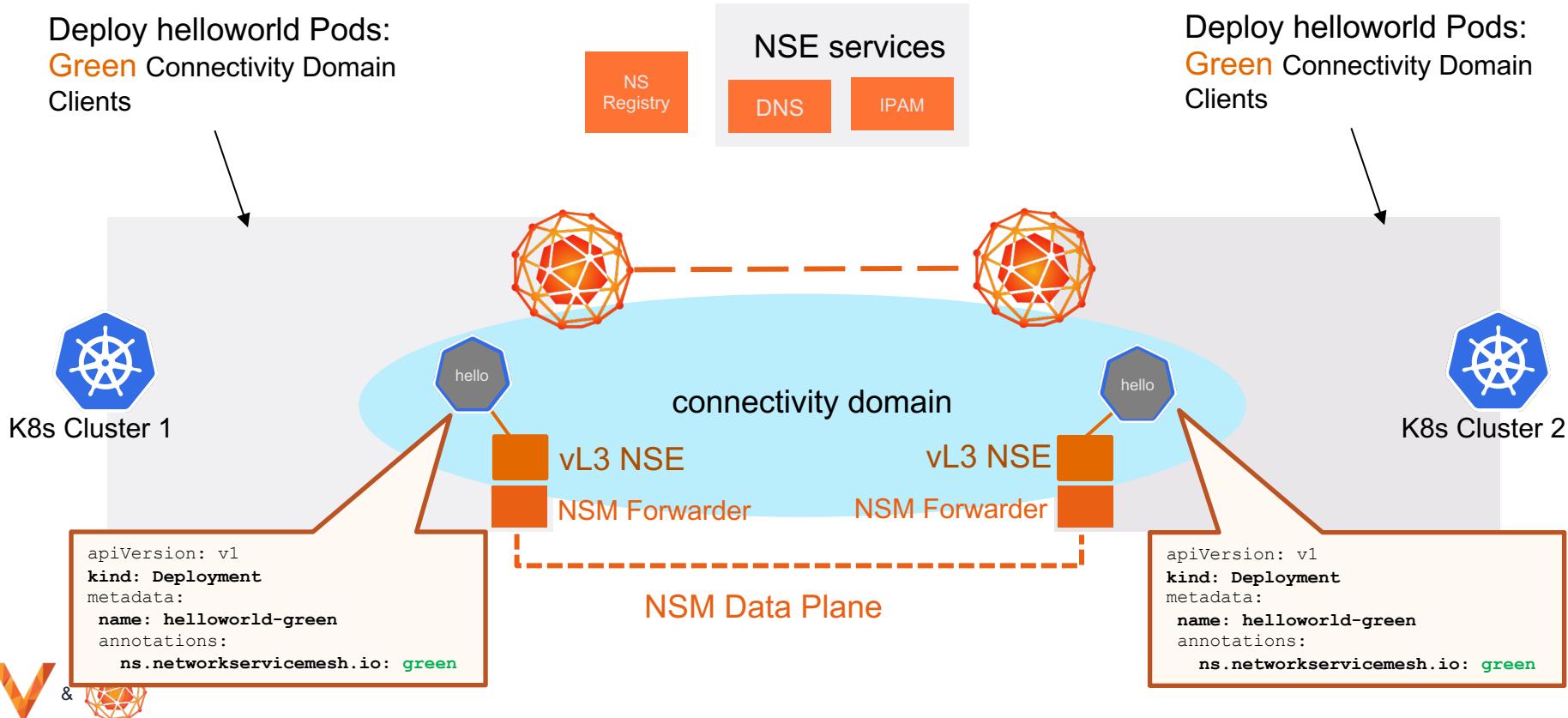
Network Service Registry has interdomain view

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

Deploy helloworld Pods:
Green Connectivity Domain
Clients



vL3 connectivity domains

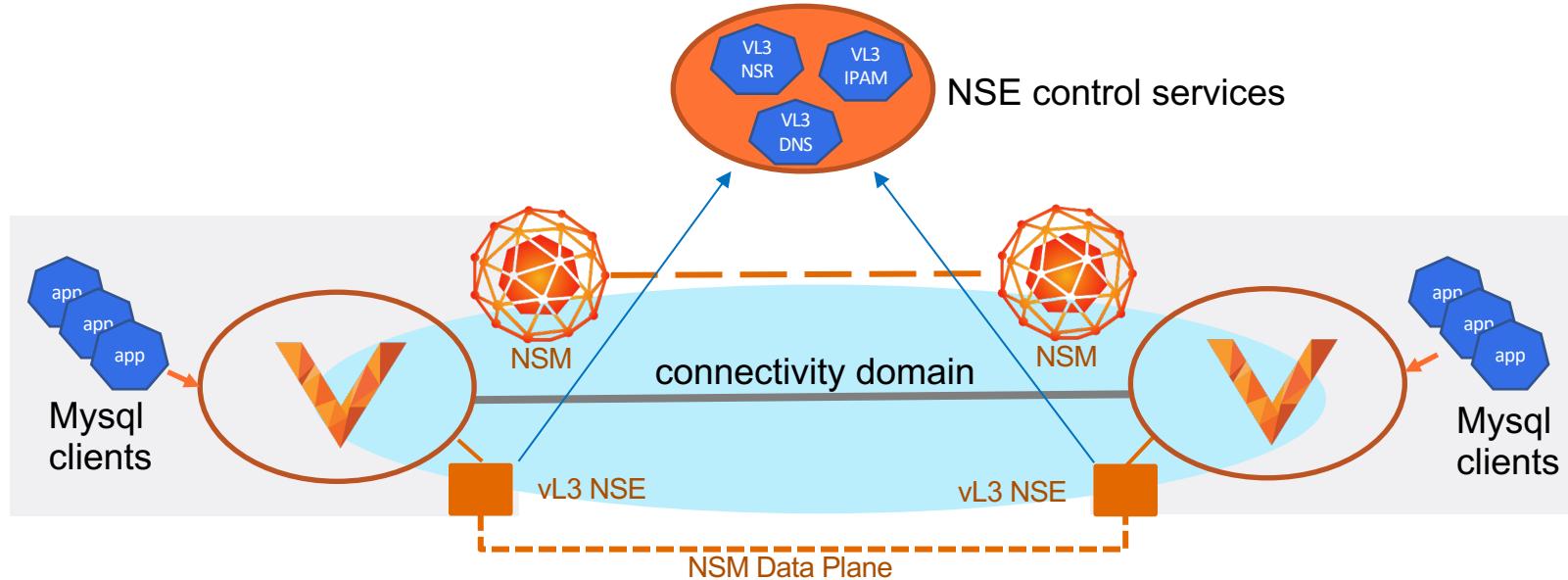
- Workload clients “**opt-in**” to join connectivity domain
- Non-connectivity domain workloads can only access connectivity domain workloads via local cluster K8s networking (CNI path)
 - They cannot access workloads via the connectivity domain (NSM) path
 - No need for network policy for inter-cluster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

Integration

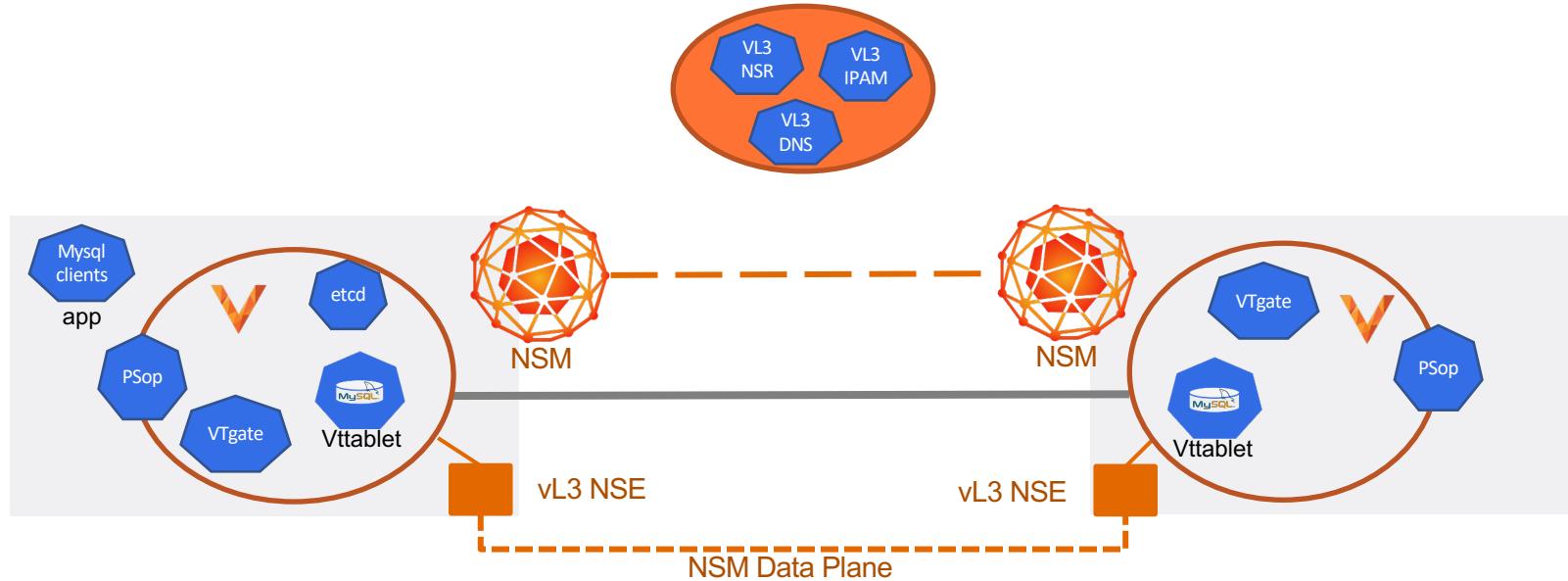
Vitess + NSM

vL3

Vitess + vL3 deployments arch



Vitess + vL3 deployments arch



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 “**vitess**”
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



Virtual

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



Virtual

NSMcon EU: <https://nsm.dev/events/nsmconeurope2020>

#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

 **slack** dctrwatson

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 **planetscale**

 **Vitess**

About Tim Swanson

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 @tiswanso

 **CISCO**

 Network Service Mesh



KubeCon



CloudNativeCon

Europe 2020

Virtual

Thank you!