



Connect

Conecta tus aplicaciones y microservicios a escala en múltiples clouds y regiones de forma segura y sencilla

Roberto Carratalá

Cloud Services Black Belt

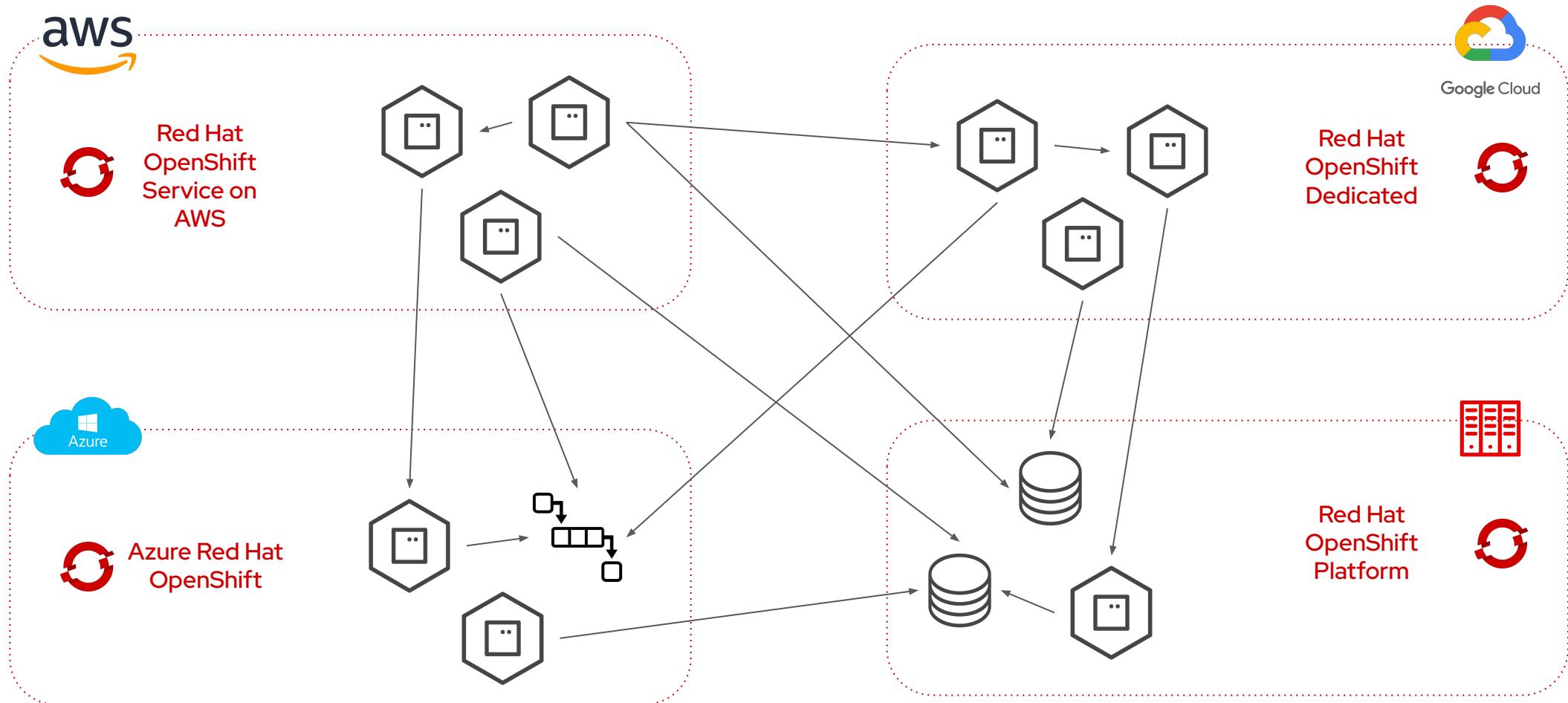
Carlos López

Account Solution Architect

Objetivo

Conectar mis apps desplegadas en Multi-Cloud

Scenario





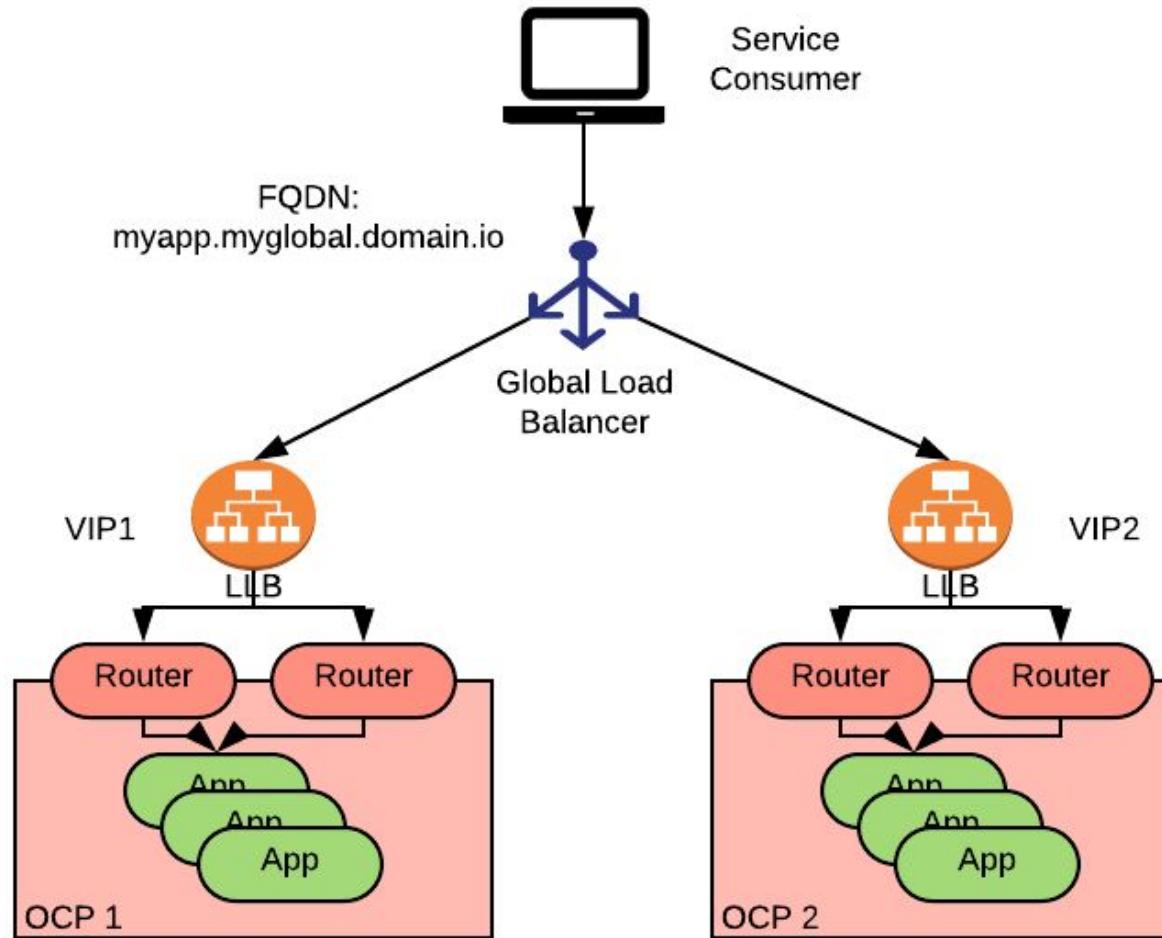


Cómo podemos conectar nuestras apps en multi-clustering/region/cloud?



[GitHub Repo](#)

1st option – Connect using OpenShift Routes



1st option - Possible Issues



Required deploy and maintenance of the Load Balancers and DNS



Developer / devops team needs to adjust the Routes of the application

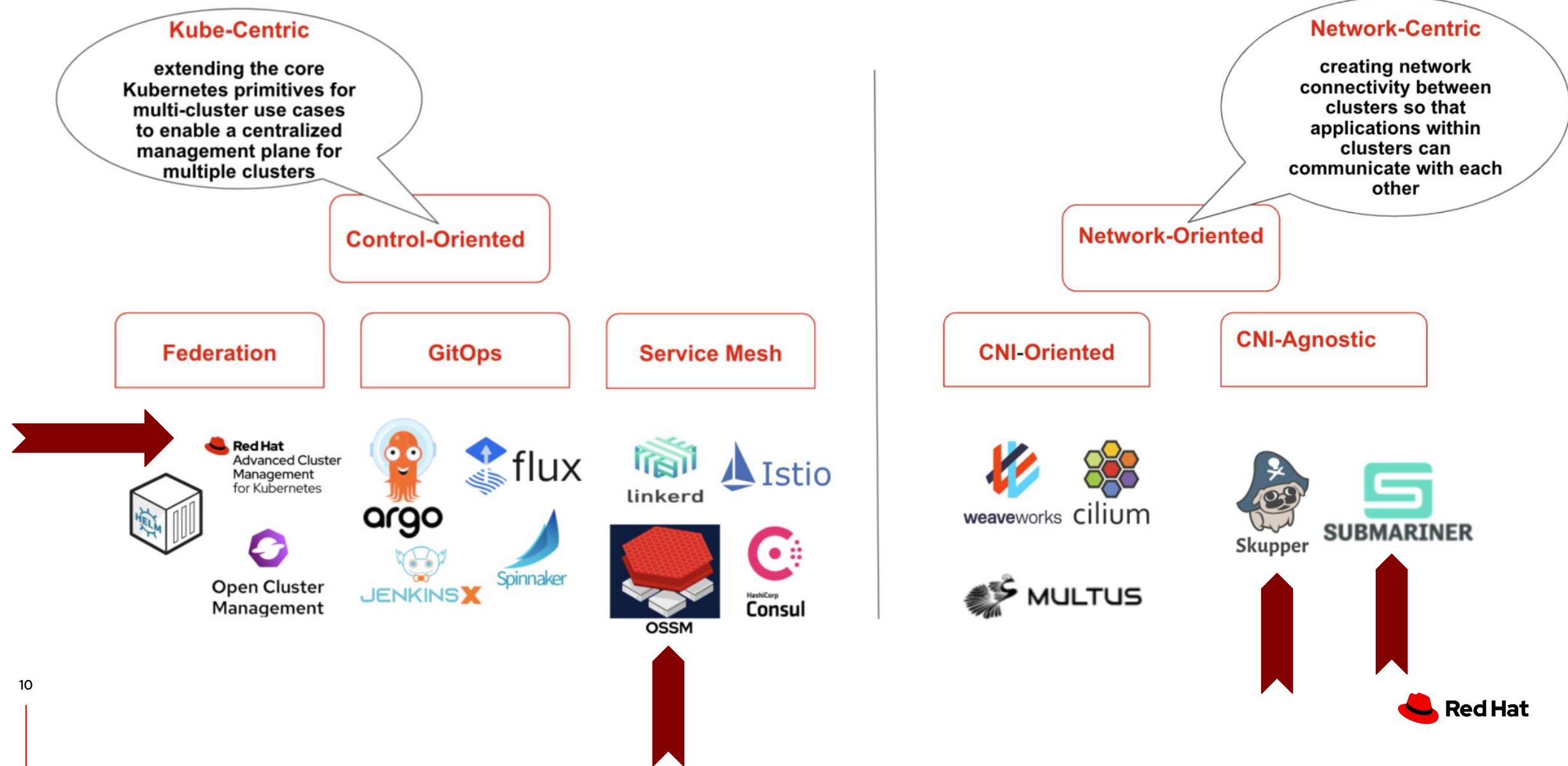


All the traffic will be using Internet (with TLS)



A misconfiguration or an issue in any LB will break all communication between apps

Multi-cluster Connection Strategies



Possible Strategies



GitHub Repo



Red Hat ACM - Submariner

Submariner



Red Hat Service Interconnect

Skupper

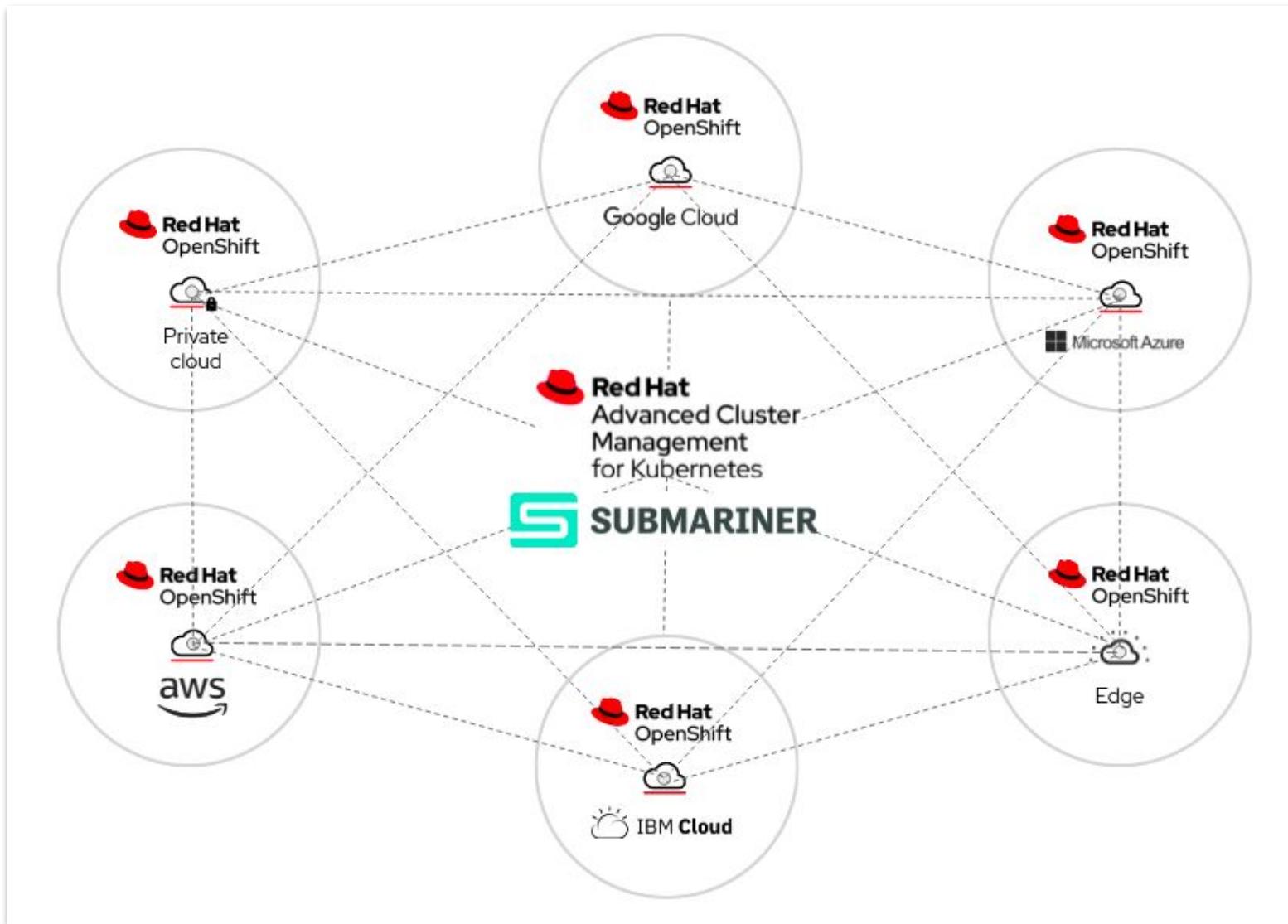


Red Hat Service Mesh Federation

Istio Federation

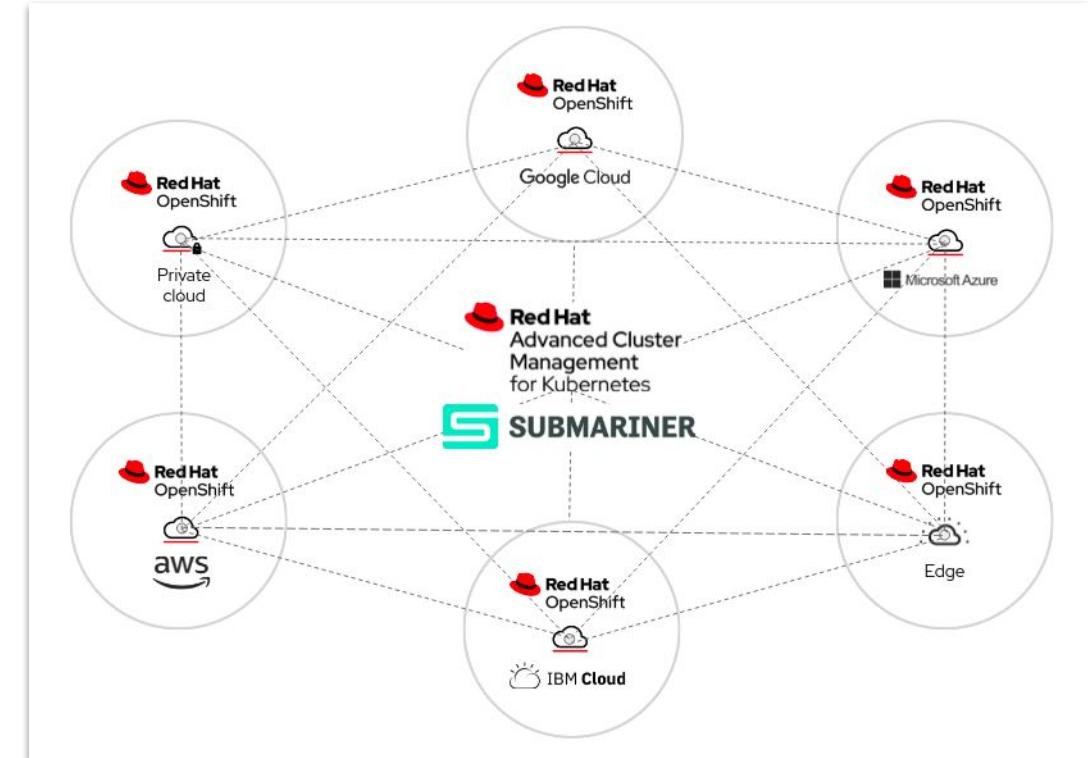
Option 2 - RHACM Submariner

What is RHACM Submariner?



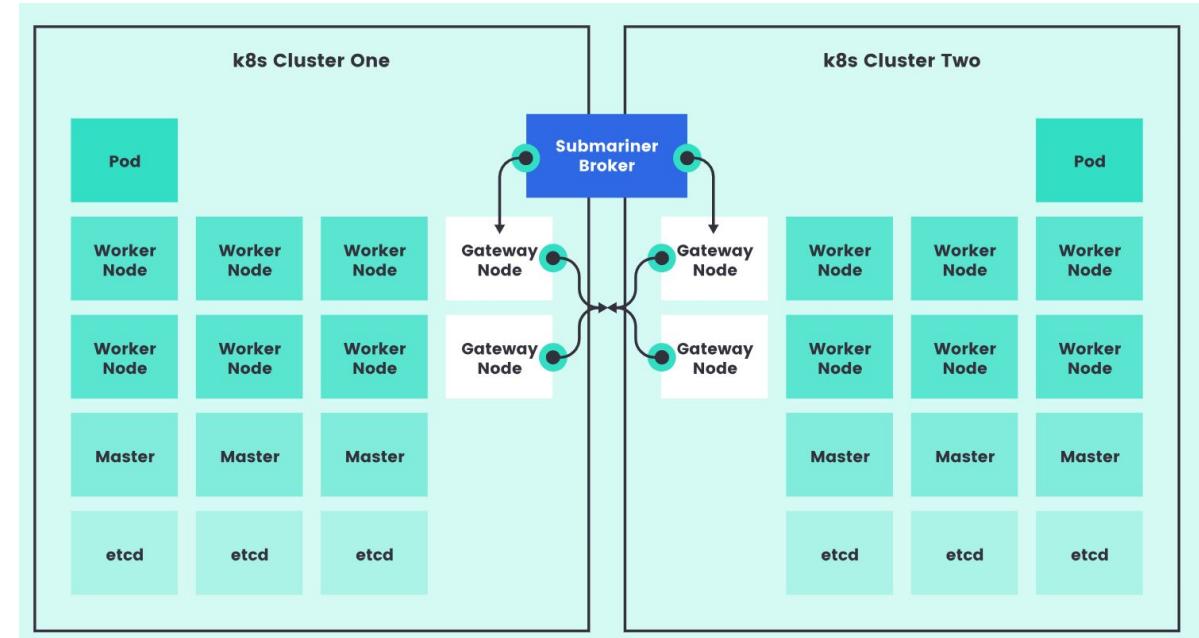
What is RHACM Submariner?

- With Submariner, your applications and services **can span multiple cloud providers, data centers, and regions.**
- Enable **direct networking** between Pods in different Kubernetes clusters as well as **Service Discovery**, either on-premises or in the cloud
- CNCF open source project in the form of an **add-on** for RHACM, now generally available

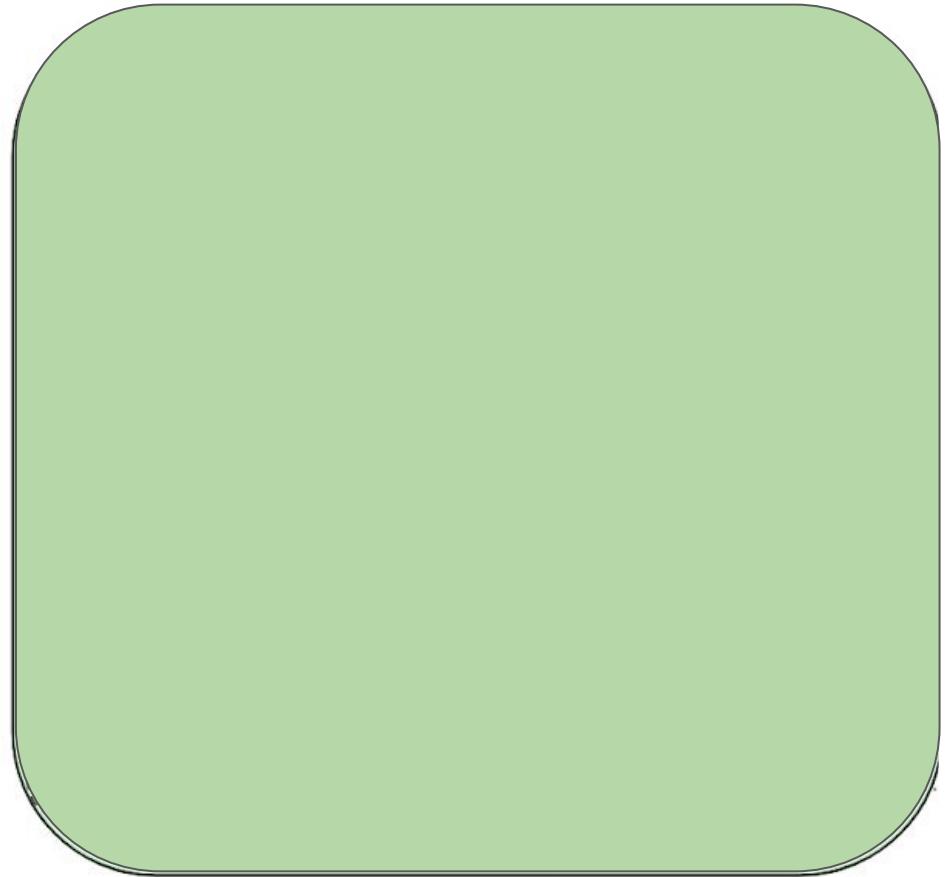


RHACM Submariner Features

- Completely open source, and designed to be **network plugin (CNI) agnostic**.
- **Cross-cluster L3 connectivity** using encrypted or unencrypted connections
- **Service Discovery** across clusters
- Support for interconnecting clusters with **overlapping CIDRs** (GlobalNet)



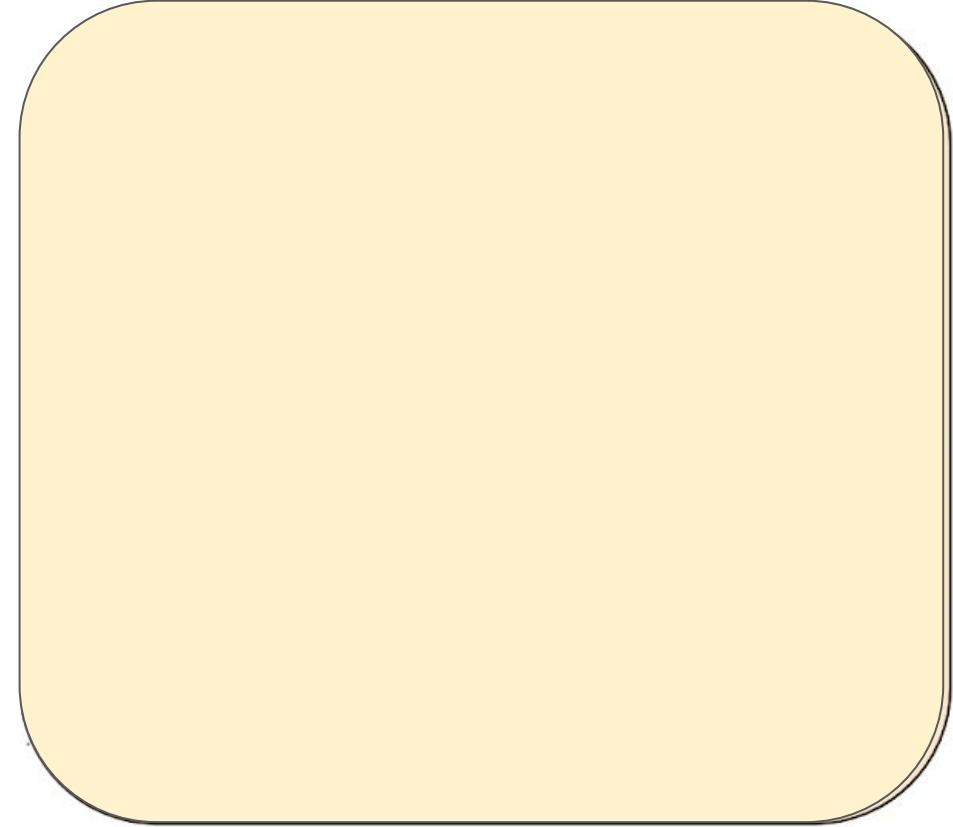
Demo 1 - Two Clusters Isolated



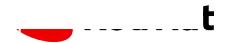
Red Hat OpenShift
Service on AWS



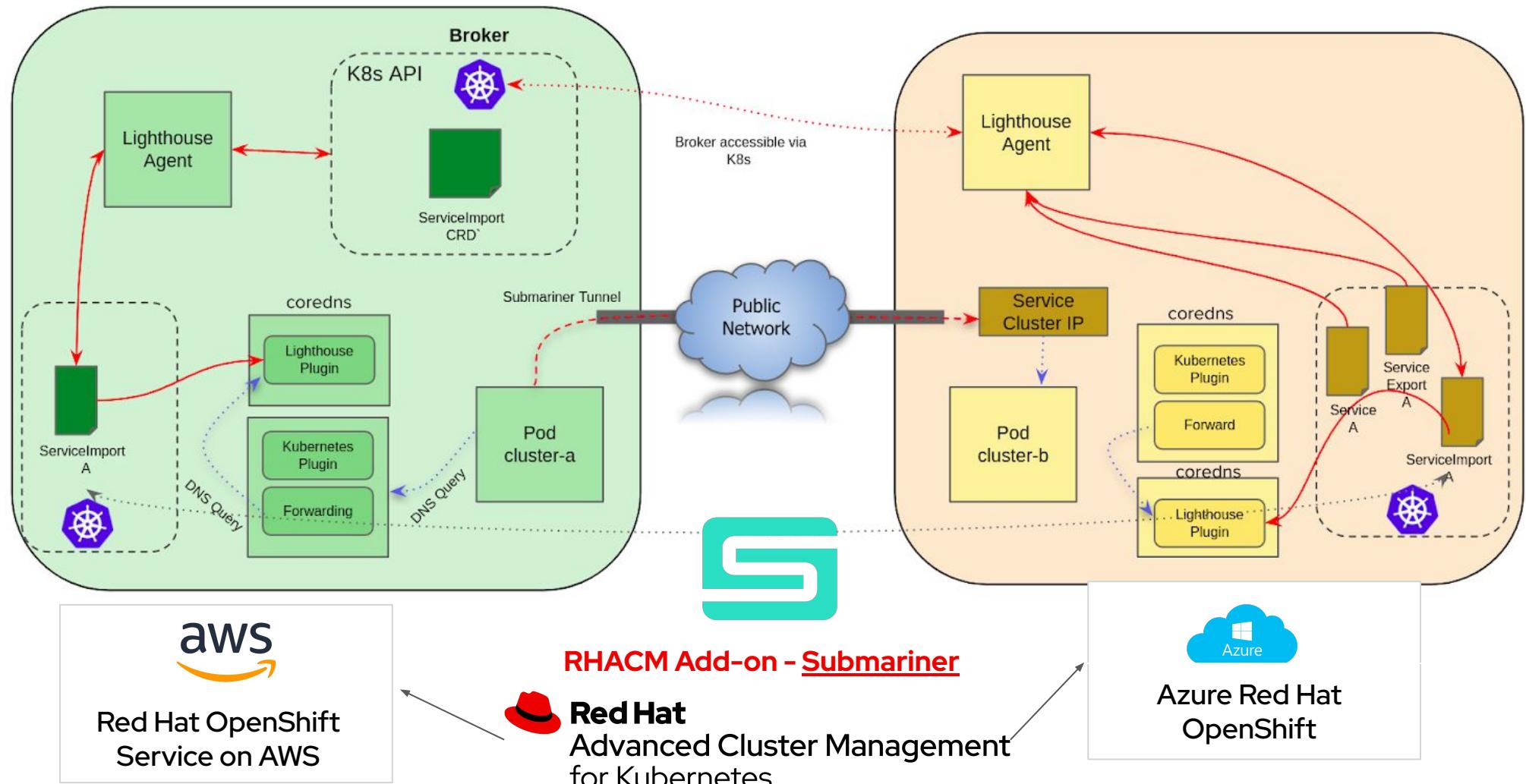
GitHub
Demo Repo



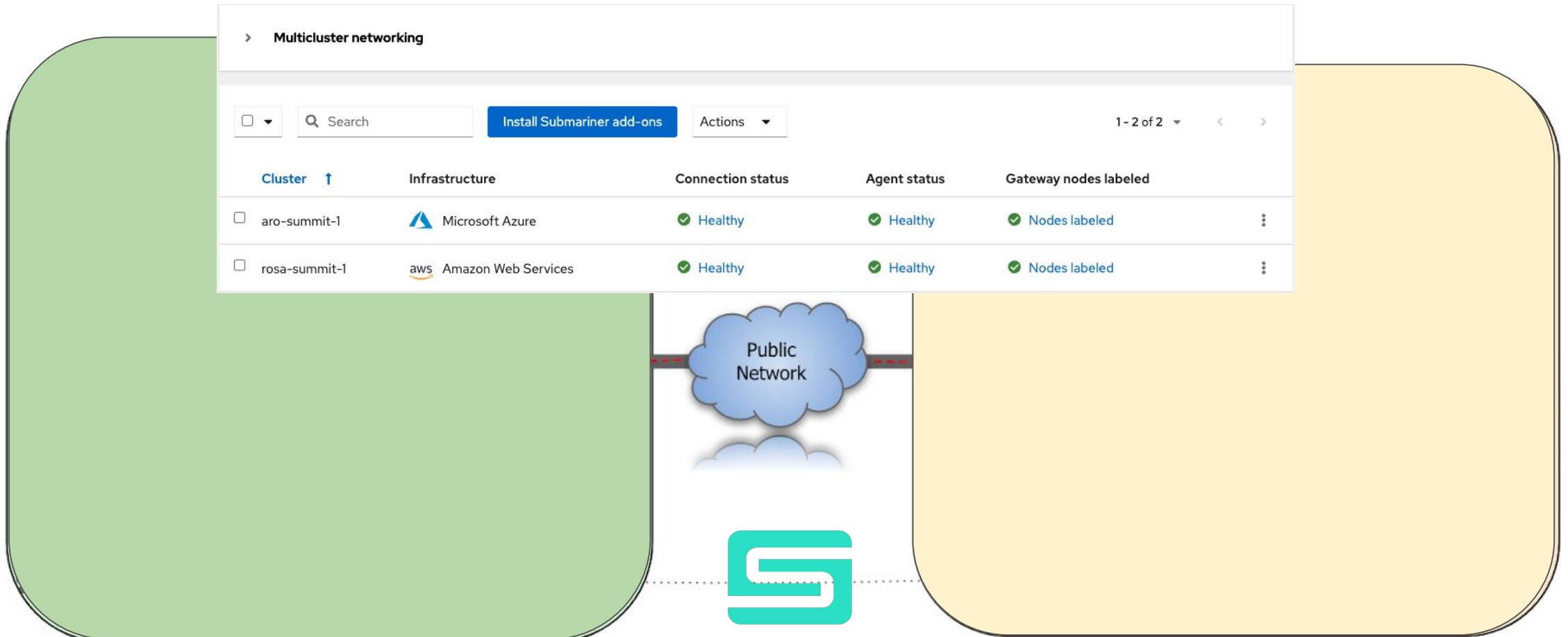
Azure Red Hat
OpenShift



Demo 1 - Connecting Two Clusters with Submariner



Demo 1 - Clusters Connected

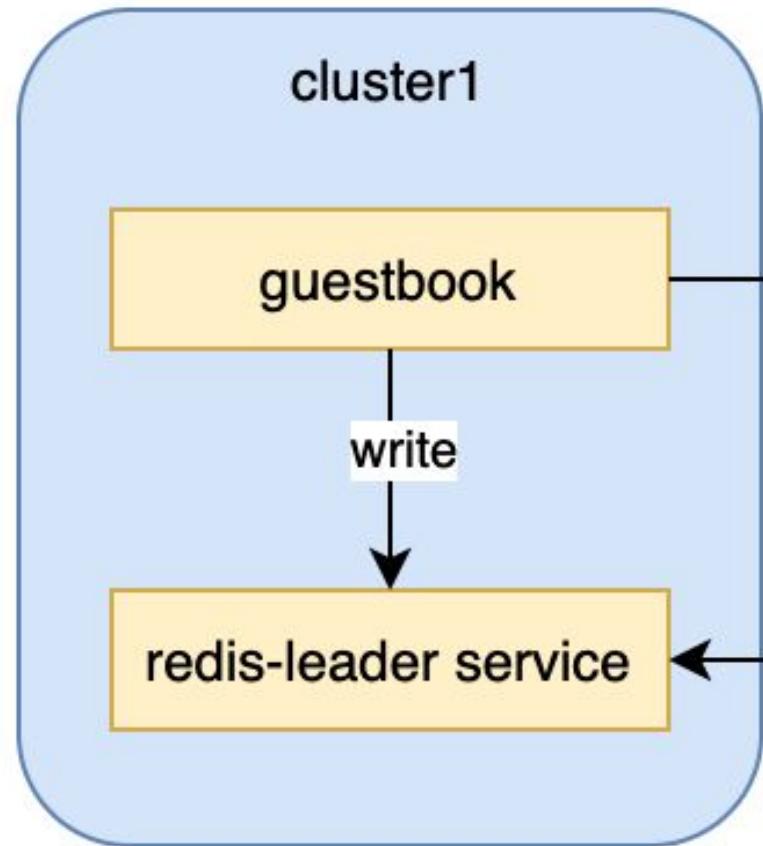



Red Hat OpenShift
Service on AWS

 **RHACM Add-on - Submariner**
Red Hat
Advanced Cluster Management
for Kubernetes

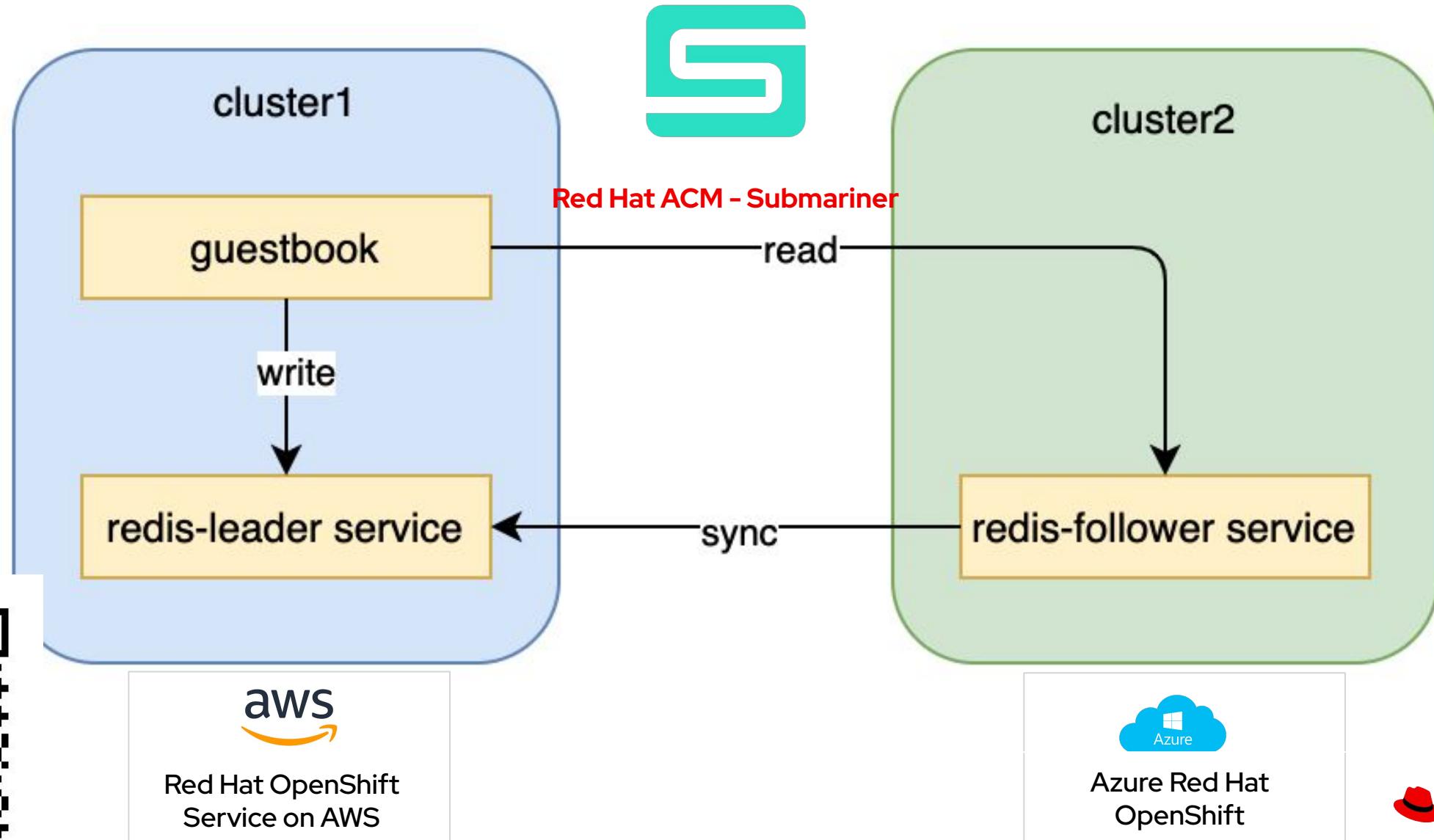

Azure Red Hat
OpenShift

Demo 1 - Connecting Two Clusters with Submariner

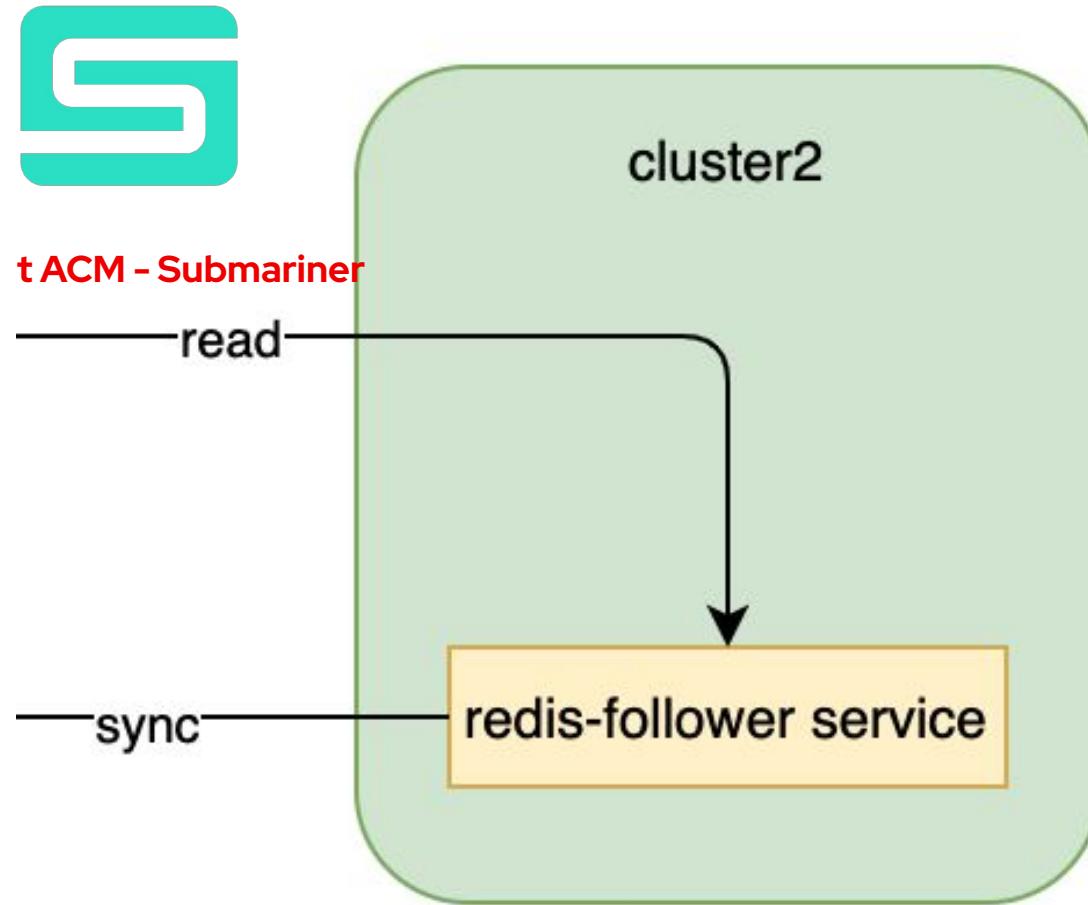


FrontEnd App

Demo 1 - Connecting Two Clusters with Submariner



Demo 1 - Connecting Two Clusters with Submariner



Red Hat OpenShift
Service on AWS

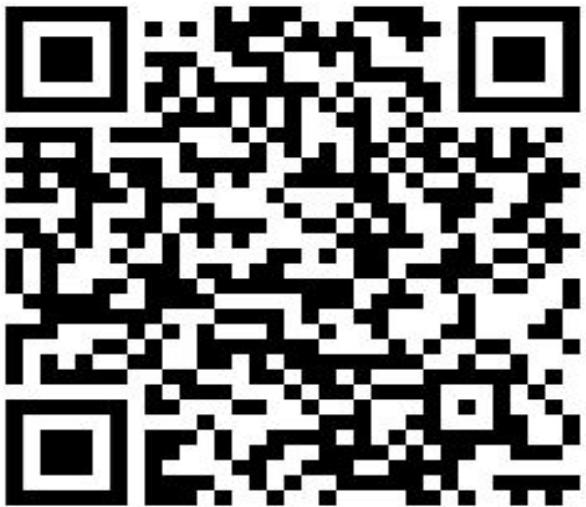


Azure Red Hat
OpenShift



Demo 1 - Connecting Two Clusters with ACM Submariner

DEMO TIME!



Option 3 – RH Service Interconnect

Applications reside in a diverse mix of environments

Either On-Premises, in the Public Cloud, or at the Edge



**Red Hat
OpenShift**

Multiple versions of OpenShift

OpenShift 3.x, OpenShift 4.x,
ARO, ROSA, OSD

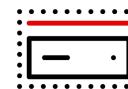


Microsoft
Azure

Google Cloud

Other Kubernetes Offerings

Kubernetes from hyperscalers
(Amazon EKS, Azure AKS,
Google GKE) Vanilla
Kubernetes



Bare metal and VMs

Variety of bare metal and VM
environments running existing
existing services



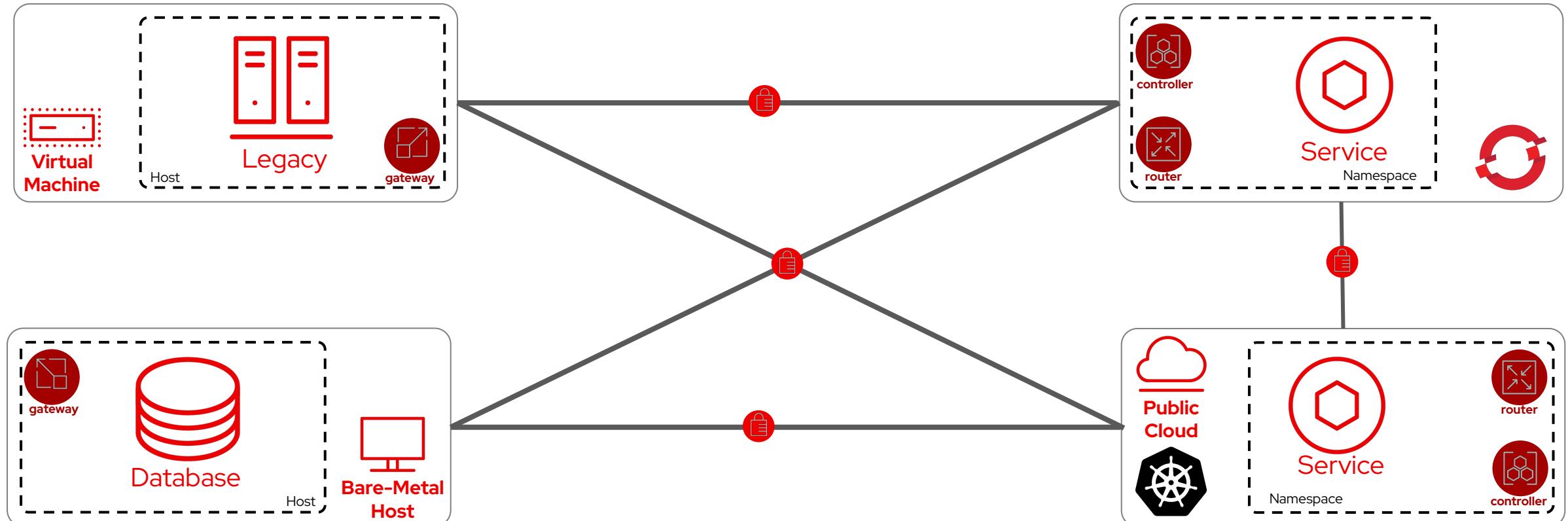
Legacy Systems

Old unixes, Mainframes



Hybrid interconnections

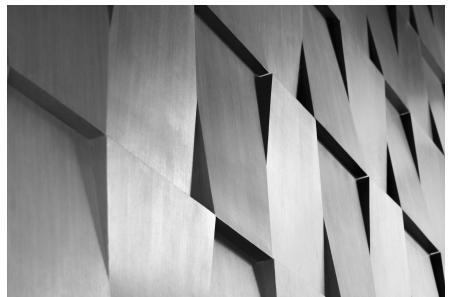
Linking different applications and services across different environments





Red Hat Service Interconnect

Simple and secure application connectivity across platforms, clusters, and clouds



Application Focused Integration

Individual Apps running on virtually any platform can make native TCP calls locally to any other app running on any other platform securely without special VPNs.



Mutual TLS Encryption

Interconnections use Mutual TLS in order to prevent unauthorized interconnections.



Application Layer Abstraction

Agnostic of the environment and IP versions (such as IPv4 and IPv6) Enables portability for both applications and its associated networking. Migrations can be easily done without recreating the networking.

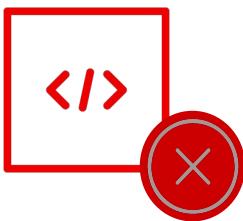


Layer 7 Addressing

Instead of routing IP packets between network endpoints, Layer 7 application routers route messages between application addresses

Eliminates Time Taking Complex Configurations

An application-layer solution can significantly reduce complexity and coordination delay



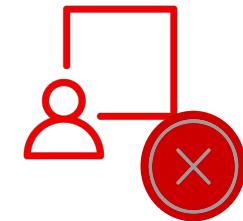
No code changes

You don't have to change your application code. Services communicate transparently as though they were deployed together in one location.



No network changes

You don't need new firewall rules, and you don't need your infra team to install a gateway. If you can connect (either way), you can create a service network.



No admin privileges

It requires no elevated privileges to set up. Operates with the same privileges as your application.

Powered by open source

Apache Qpid™

Apache Qpid develops tools for AMQP 1.0 messaging under the Apache Foundation

Apache Qpid Dispatch is an AMQP 1.0 message router for wide-area messaging

Started: 2014

Releases: 27

Committers: 51

qpid.apache.org

github.com/apache/qpid-dispatch



Skupper is a cloud service interconnect. It enables secure communication across clusters.

Skupper uses Apache Qpid Dispatch for its communication backbone

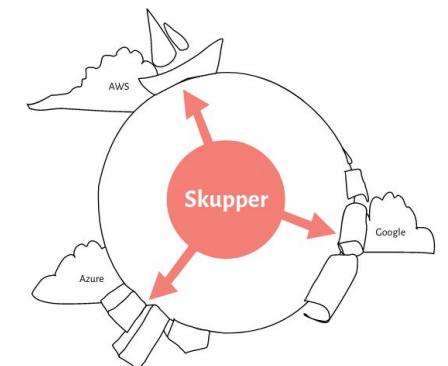
Started: June 2019

Releases: 13

Committers: 17

skupper.io

github.com/skupperproject



Service Interconnect Operator

Supported on Red Hat OpenShift

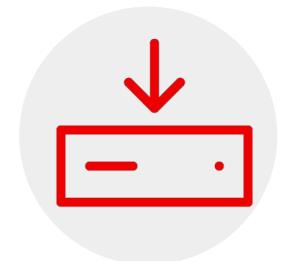
The screenshot shows the Red Hat OperatorHub interface. On the left, there's a sidebar with a search bar and a list of categories like AI/Machine Learning, Application Runtime, Big Data, etc. The main area displays the 'Skupper' operator details:

- Latest version:** 1.2.2
- Capability level:** Basic Install, Seamless Upgrades (selected), Full Lifecycle, Deep Insights, Auto Pilot.
- Source:** Red Hat
- Provider:** Red Hat
- Valid Subscriptions:** Red Hat Application Interconnect
- Repository:** <https://github.com/redhat-apps/skupper-operator>
- Container Image:** registry.redhat.io/application-interconnect/skupper-site-controller-rhel8@sha256:e0ee005b0090e2a9e931a5ce62e26fb53051d

A large blue 'Install' button is prominently displayed at the top left of the operator card.



Simplified Deployment and Management



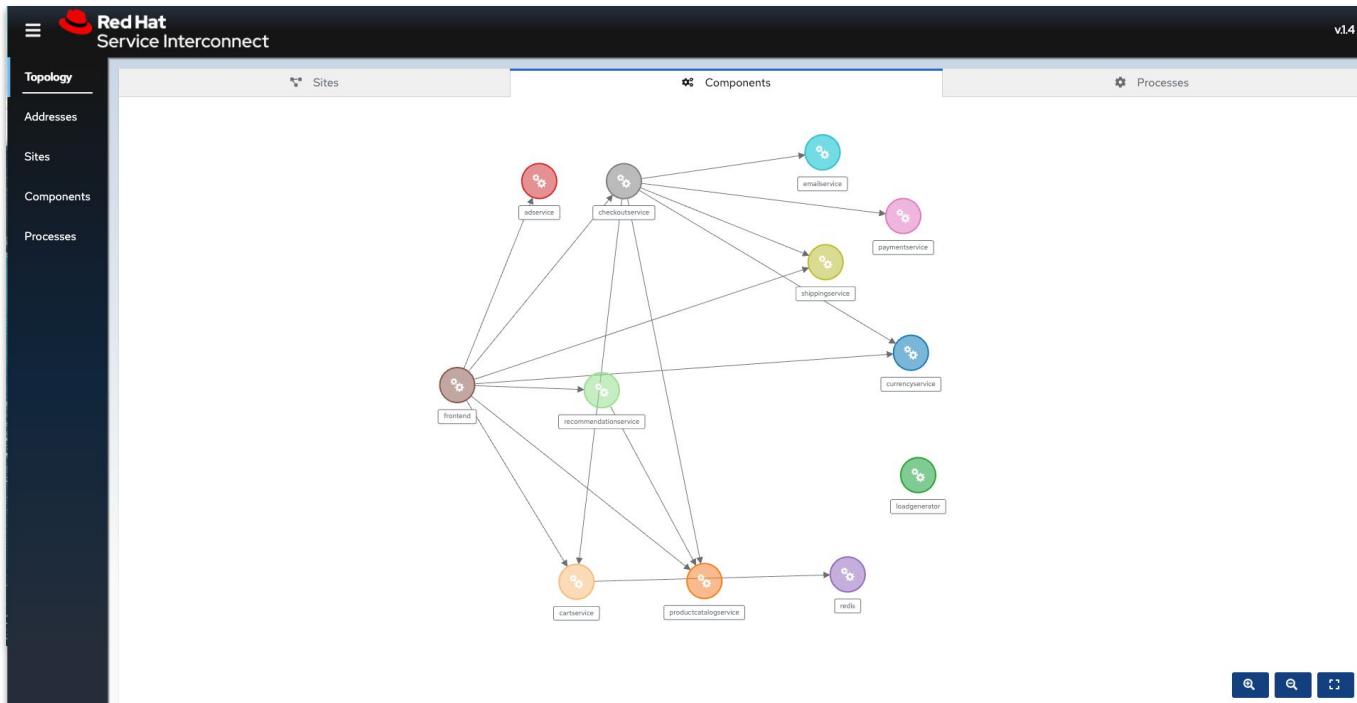
Easy to install for the whole cluster



Configuration and tuning on Day #2

Console

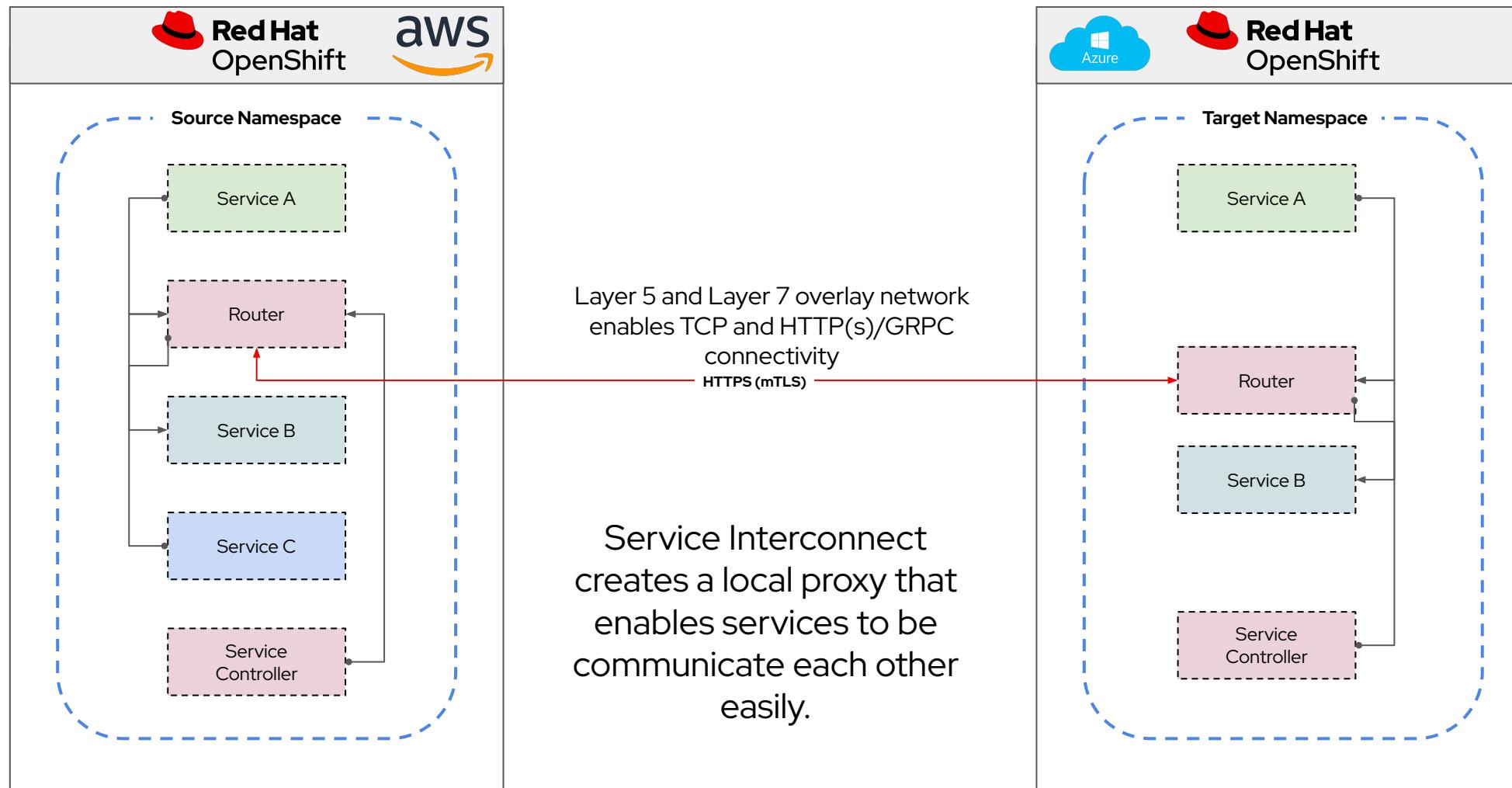
Visualize your connections



- **Topology:** Graphical representation of all the connections
- **Components:** Services that are exposed on the service network, both local and remote.
- **Sites:** Application Interconnect installations on the current service network.
- **Throughput Bytes:** Charts providing traffic related information

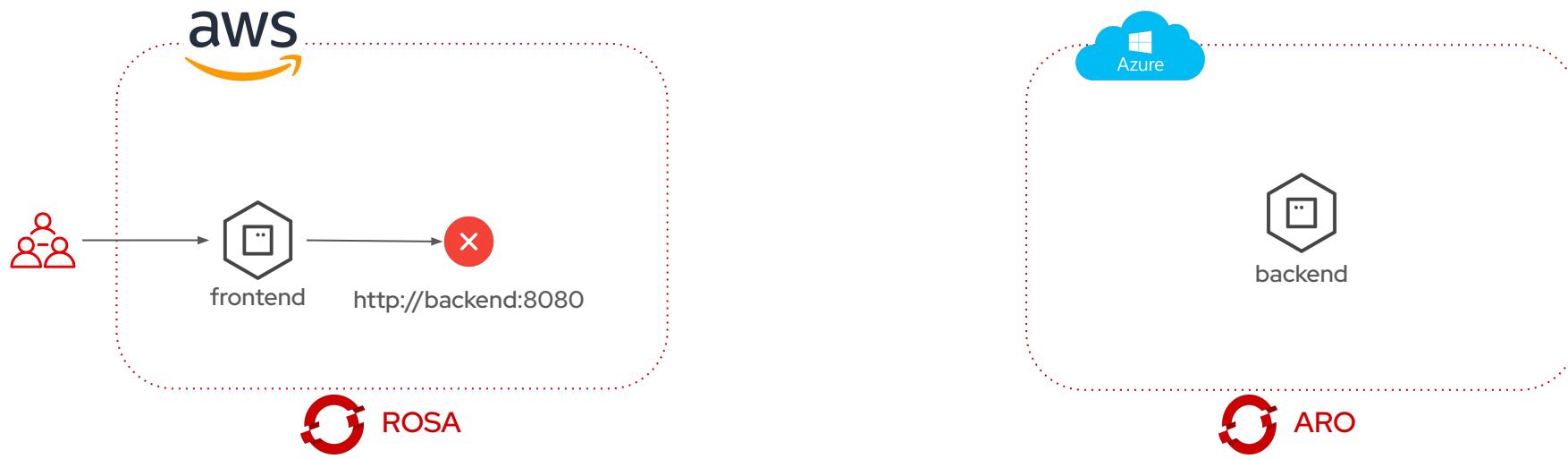


Demo 2 - Connect clusters with RH Service Interconnect

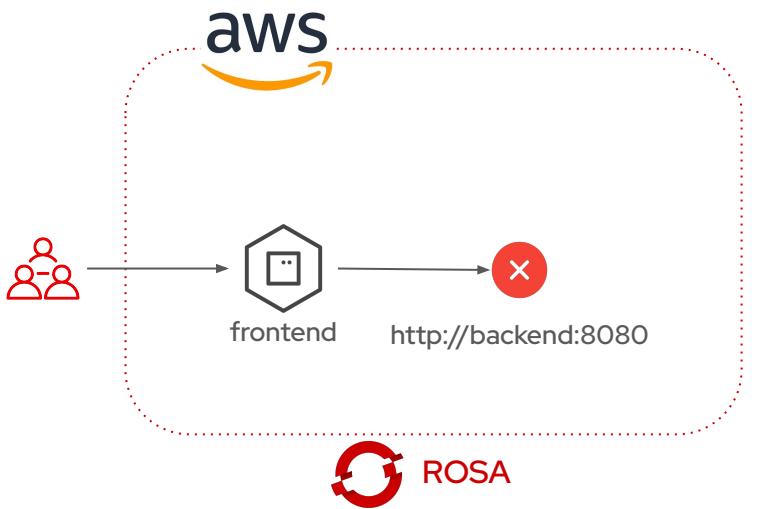


Note: This is a logical network flow. All RHSI network flows ride on top of already endorsed network flows and ingress/egress the cluster via routes on the RHSI Router.

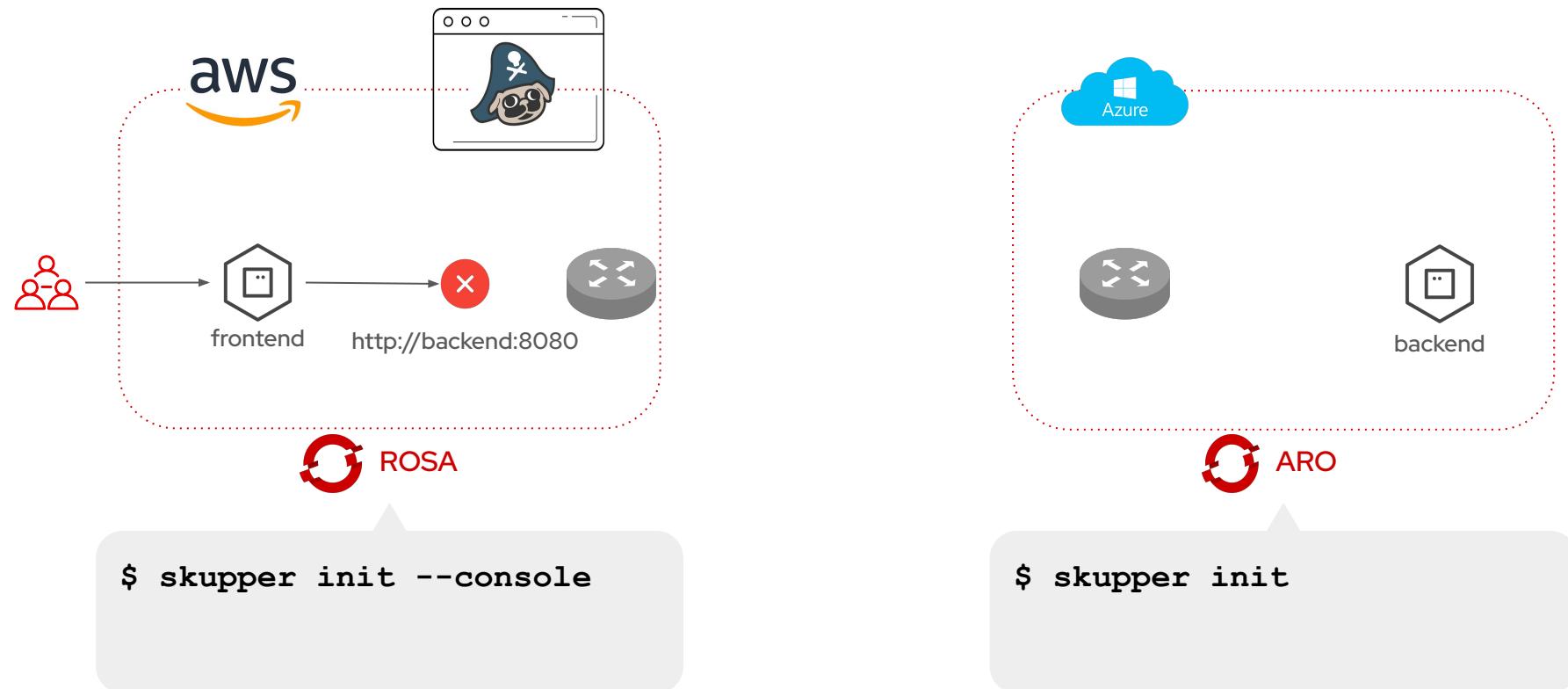
Demo 2 - Initial Status



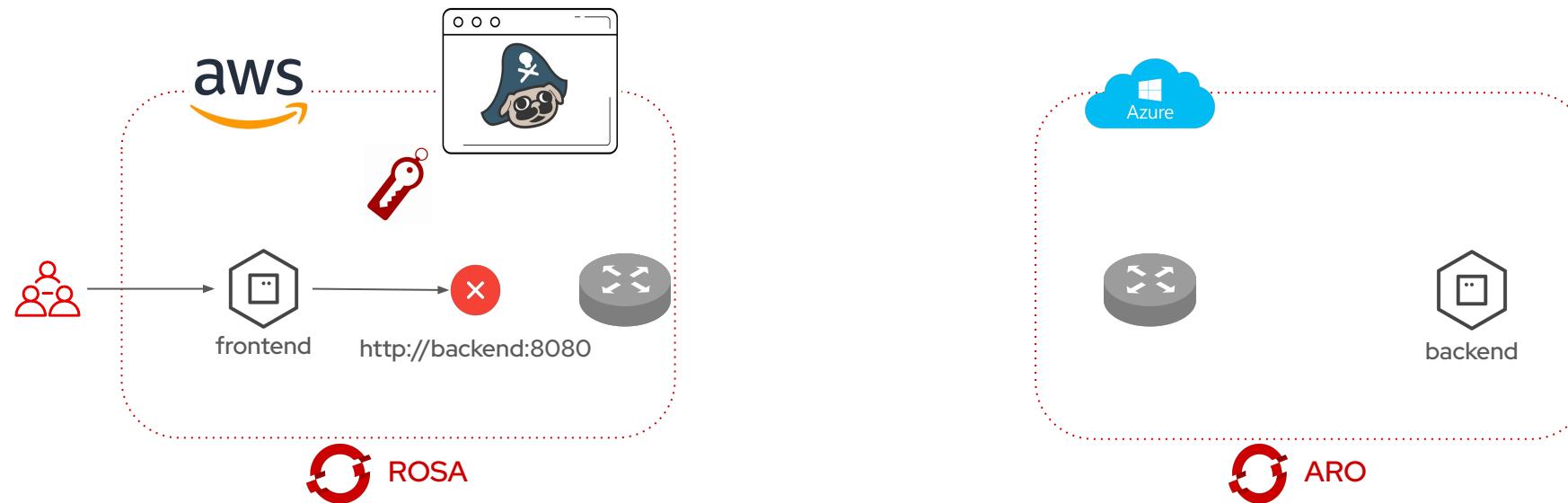
Demo 2 - App QR



Demo 2 - Initialize the Routers

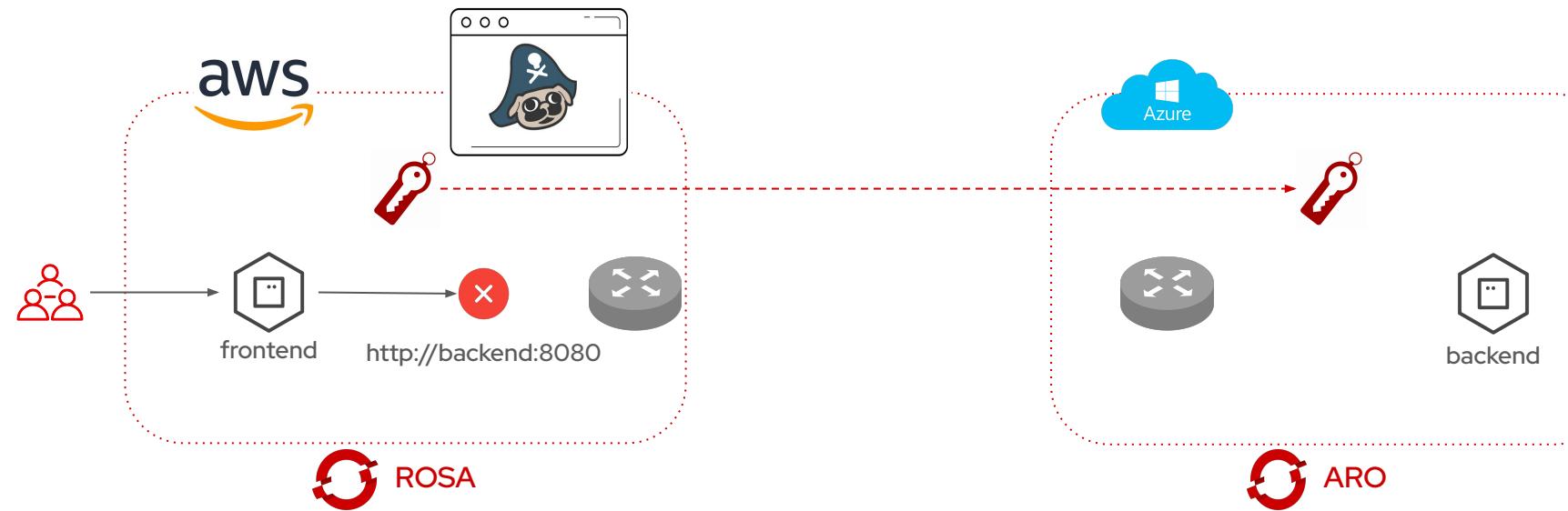


Demo 2 - Create a Secure Token



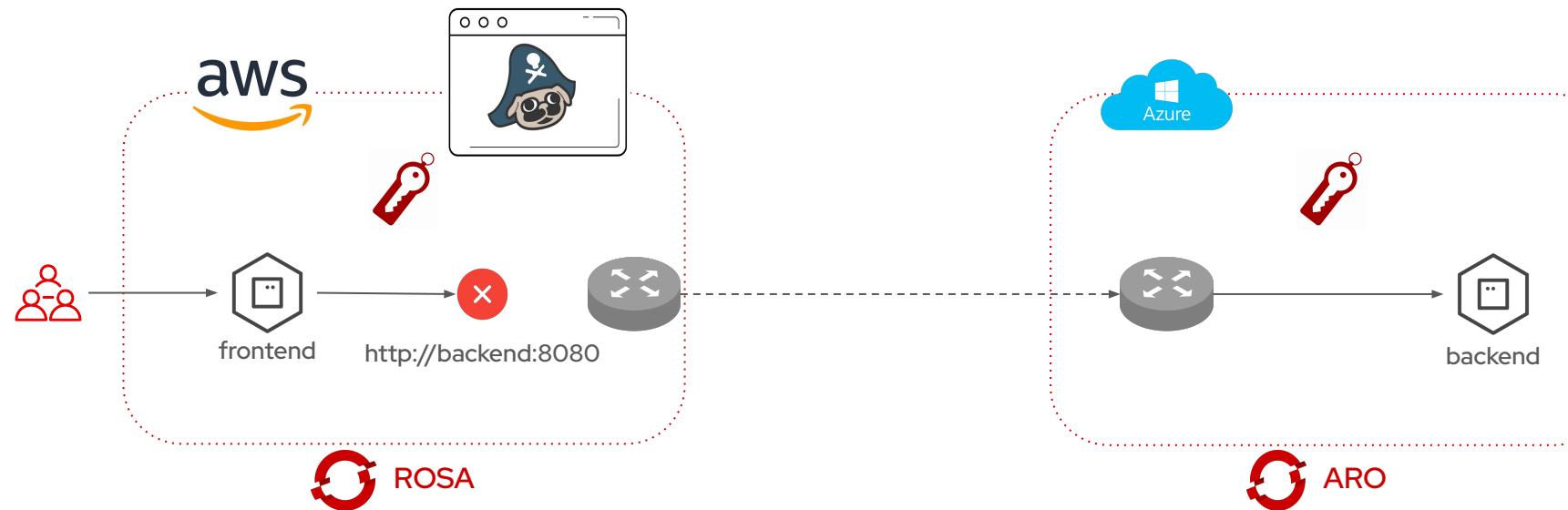
```
$ skupper token create ~/secret.token
```

Demo 2 - Transfer the Token and Link the Sites (Clusters)



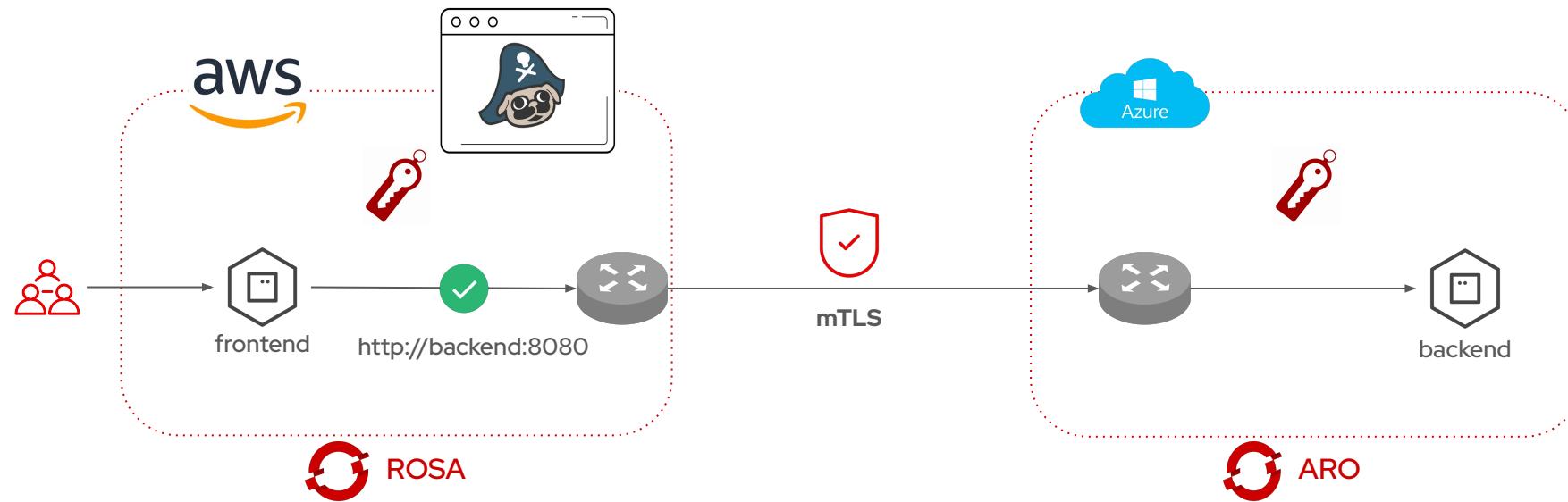
```
$ skupper link create ~/secret.token
```

Demo 2 - Expose only the Required Services



```
$ skupper expose deployment/backend
```

Demo 2 - Secure Connectivity Established between Frontend & Backend



Demo 2 - Connect clusters with RH Service Interconnect

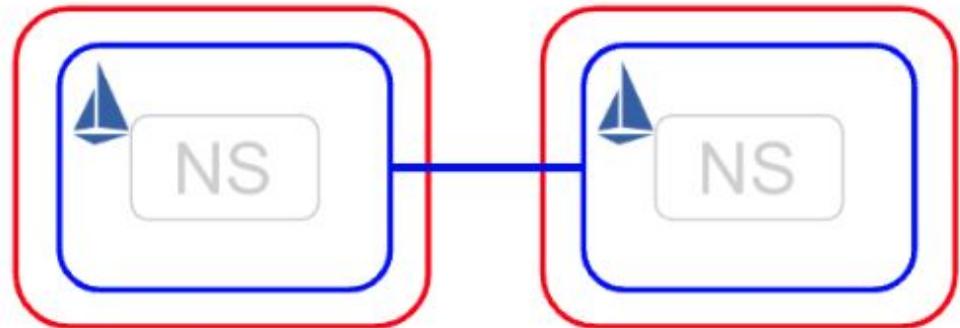
DEMO TIME!

Option 4 - OpenShift Service Mesh Federation

What is OpenShift Service Mesh Federation?

- Federation allows a mesh to provide access to
 - services to other meshes (export services),
 - to use services made available by other meshes (import services).
- Interaction between meshes **through ingress and egress gateways**

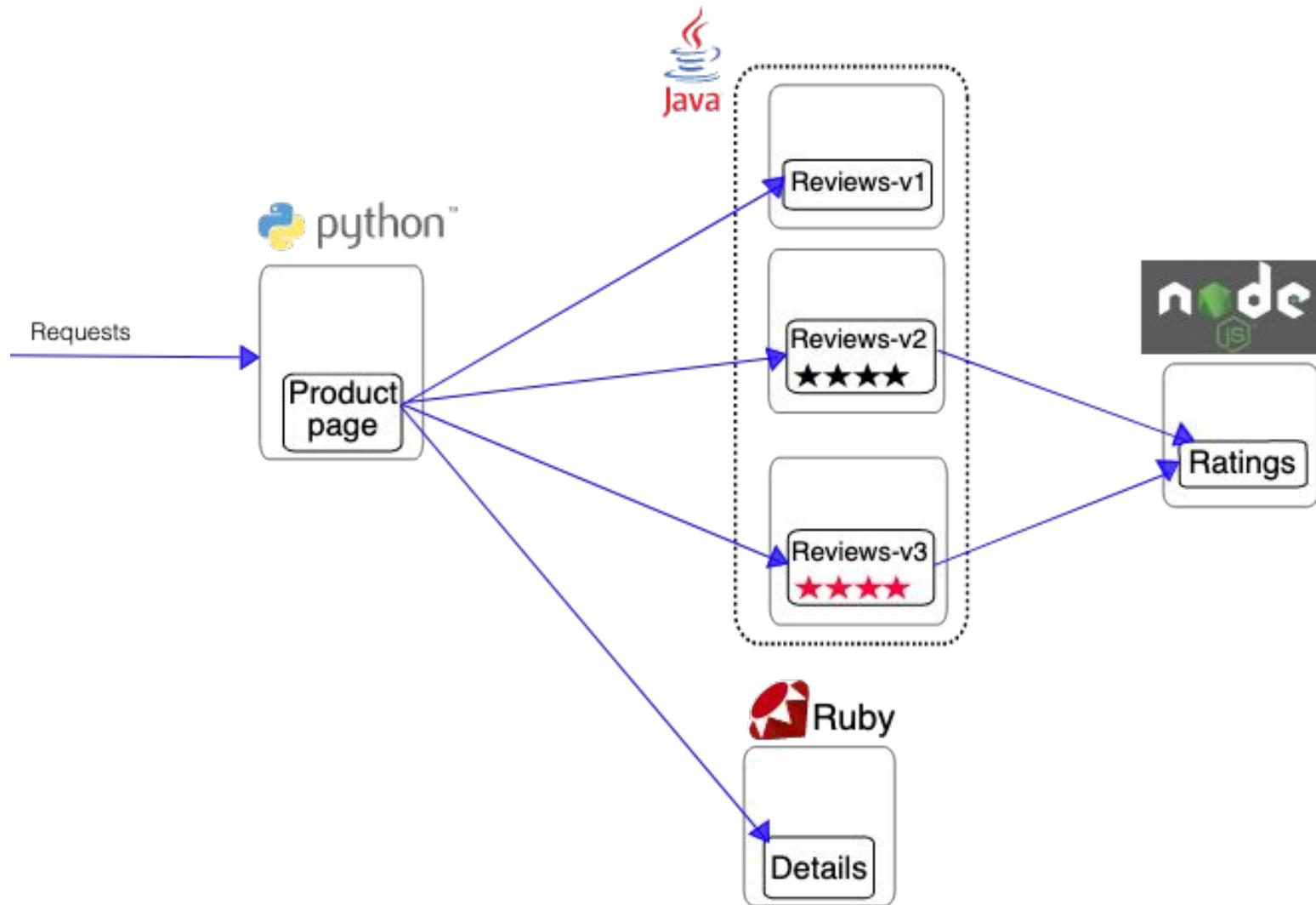
Meshes federated across clusters



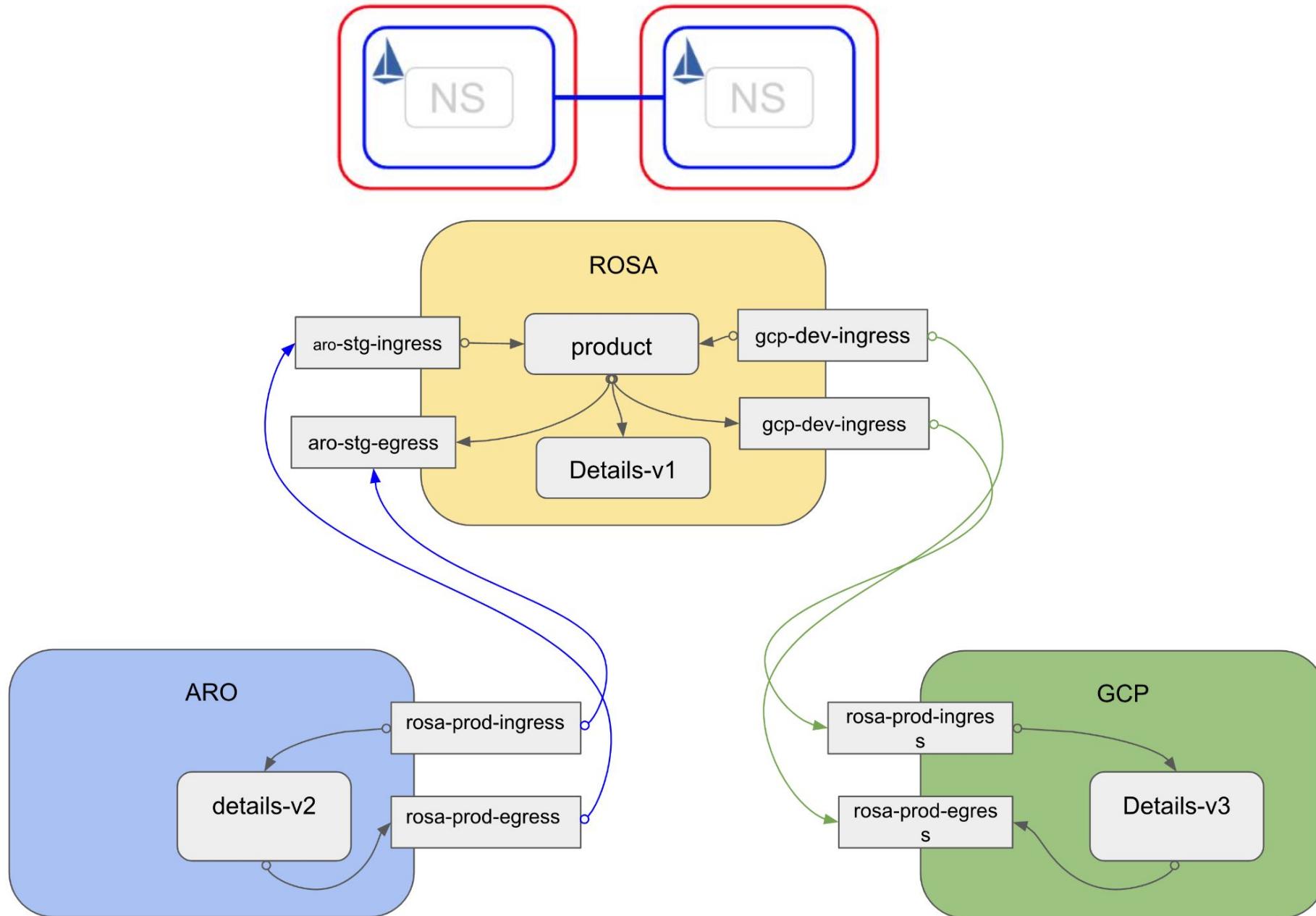
Multiple meshes in a cluster



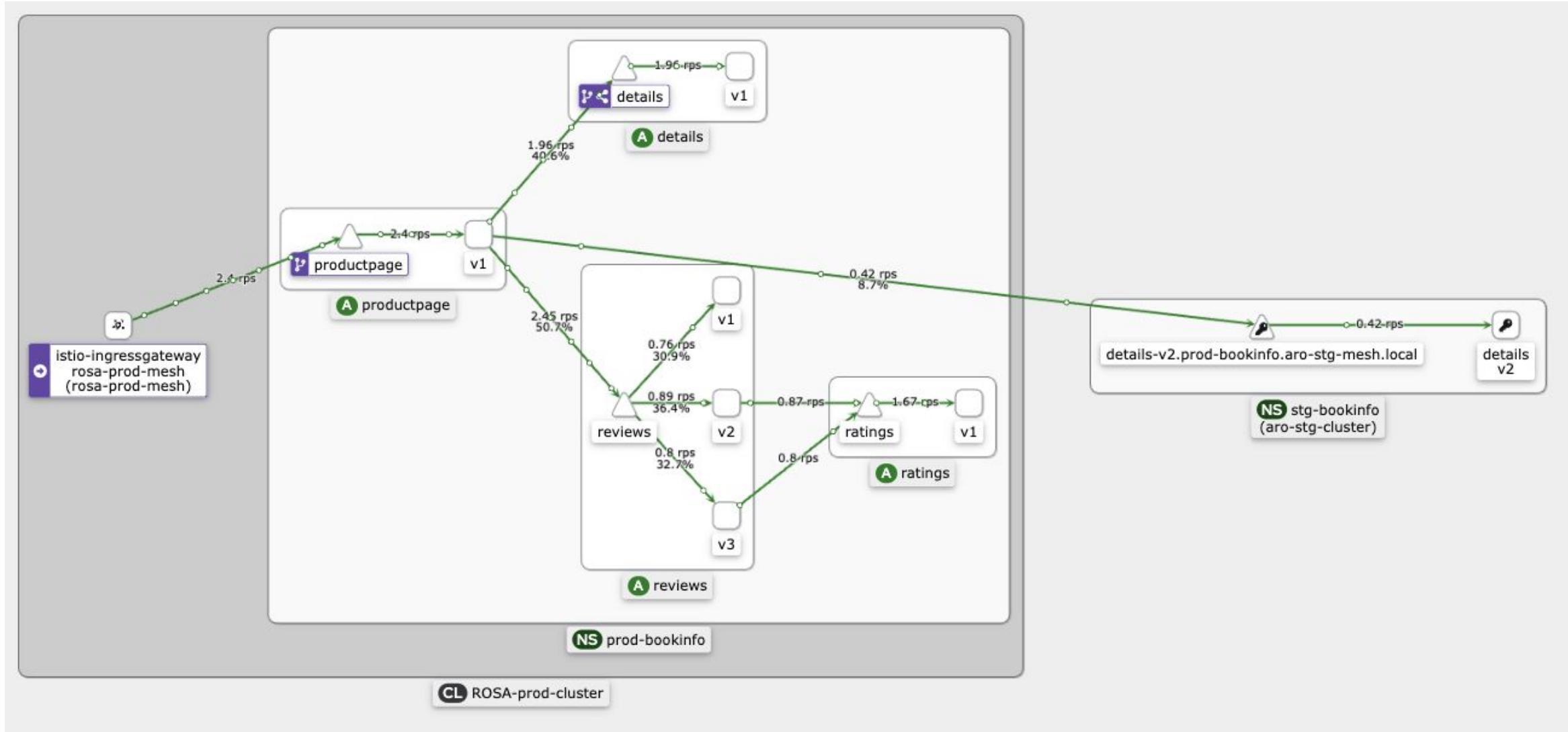
Bookinfo Microservice App in Service Mesh



Meshes federated across clusters



Deploying Service Mesh Federation



Q&A

Recap - When to use what?

Interconnecting different environments



Red Hat ACM - Submariner



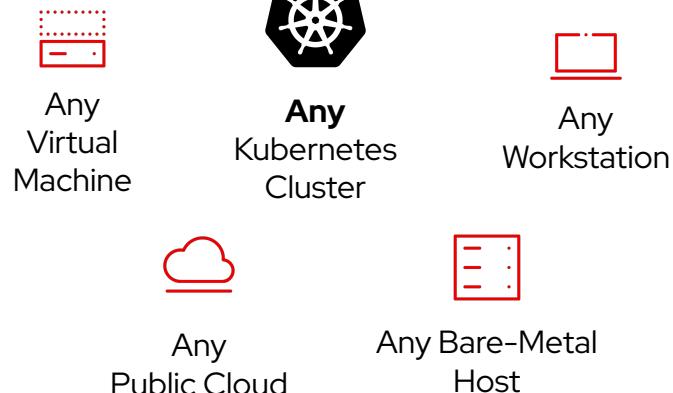
Red Hat Service Interconnect



Red Hat Service Mesh Federation



Some
Kubernetes
Cluster

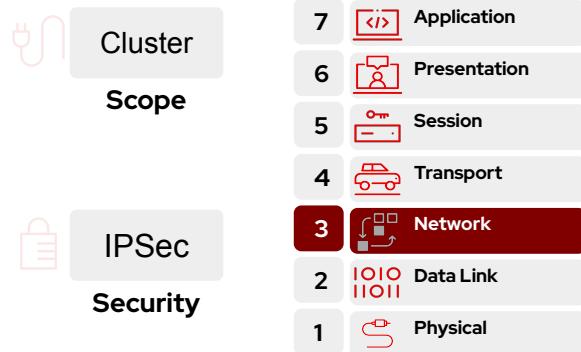


Recap - When to use what?

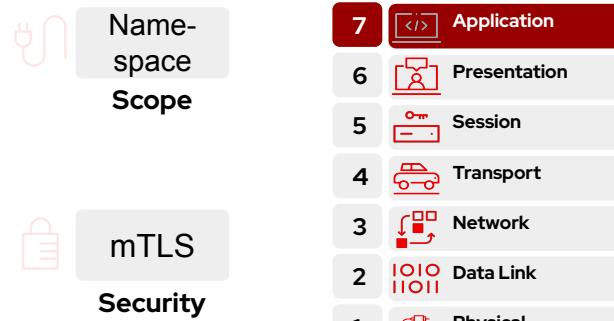
Technical differences



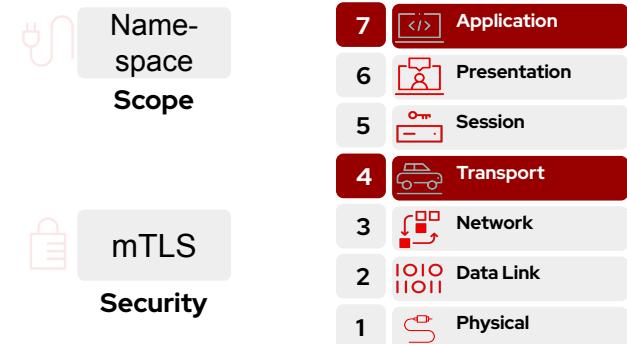
Red Hat ACM - Submariner



Red Hat Service Interconnect



Red Hat Service Mesh Federation



Recap – When to use what?

Important to Who?



Red Hat ACM - Submariner



Red Hat Service Interconnect



Red Hat Service Mesh Federation



Cluster Administrator



Platform Engineer



Application Developer



Cluster Administrator



Application Developer



Connect

Thank you



linkedin.com/company/red-hat



facebook.com/redhatinc



youtube.com/user/RedHatVideos



twitter.com/RedHat