



Connecting Workloads Across OpenShift Clusters

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Agenda

- What is Hybrid Cloud Networking
- Submariner project
- Red Hat and Submariner

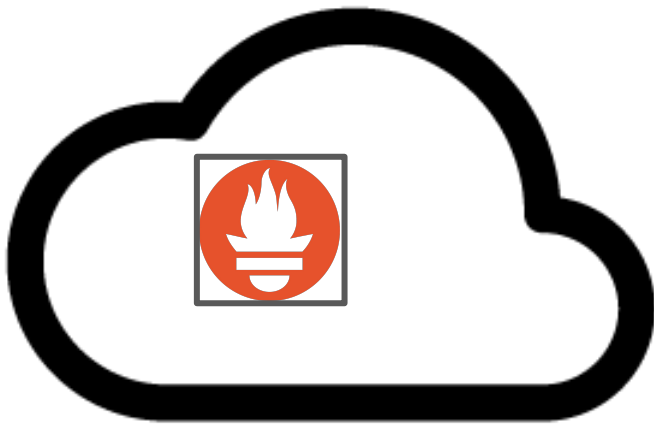
Kubernetes Adoption Leads to Multi-Cluster

*“As Kubernetes gains adoption across the industry, scenarios are arising in which teams are finding **they must deploy and manage multiple clusters**, either in a single region on-premises or in the cloud, or across multiple regions....”*

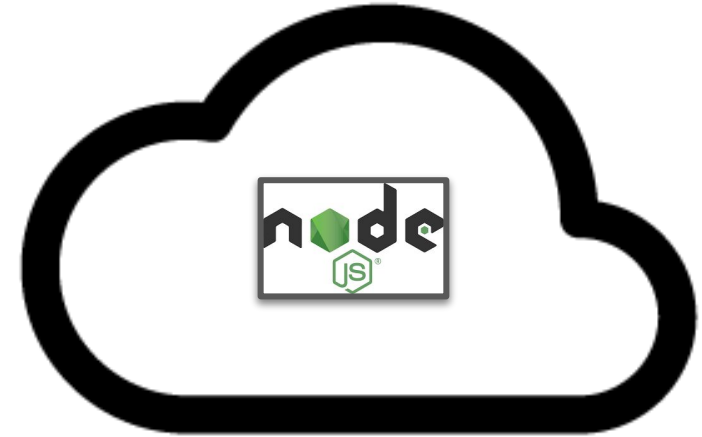
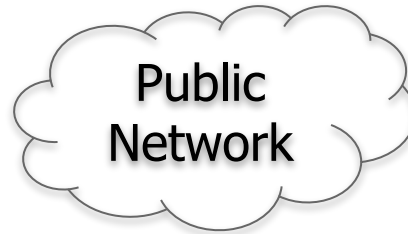
Gartner Inc., March 2020

Allow organizations to **connect** and **scale** workloads
across **multiple clusters** on public and private clouds
in a **secure** and **seamless** manner.

Secured Communication

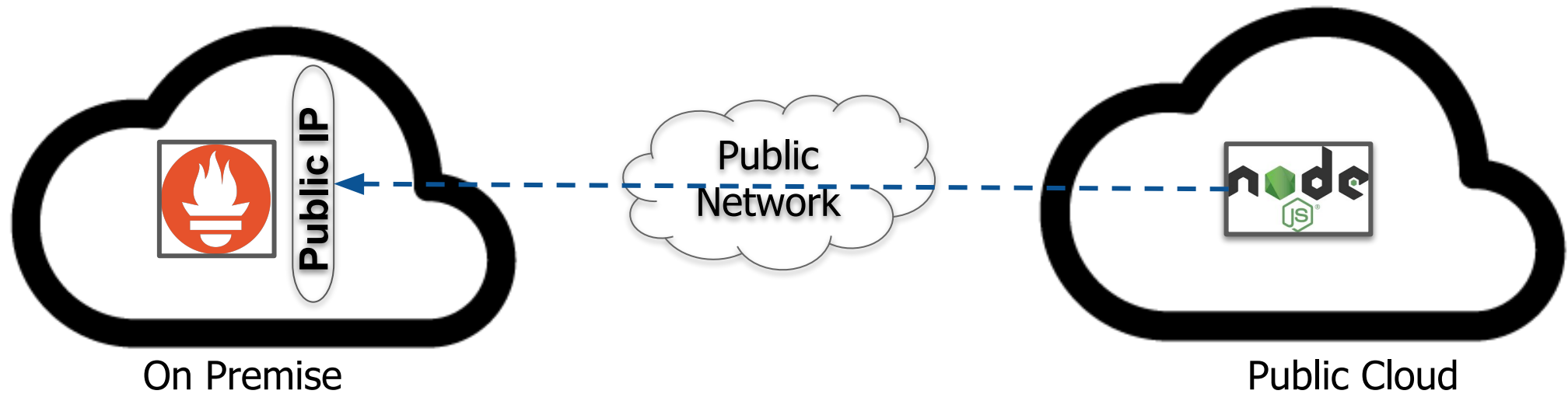


On Premise

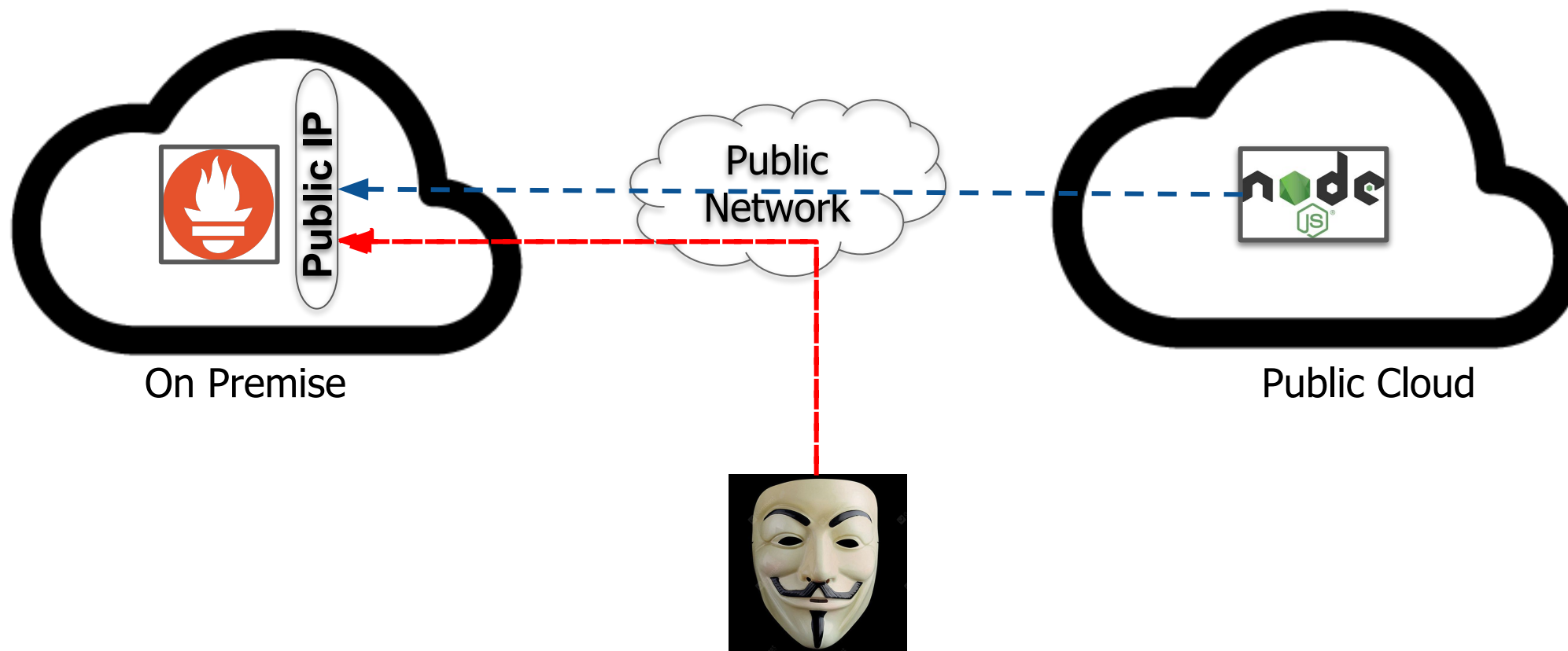


Public Cloud

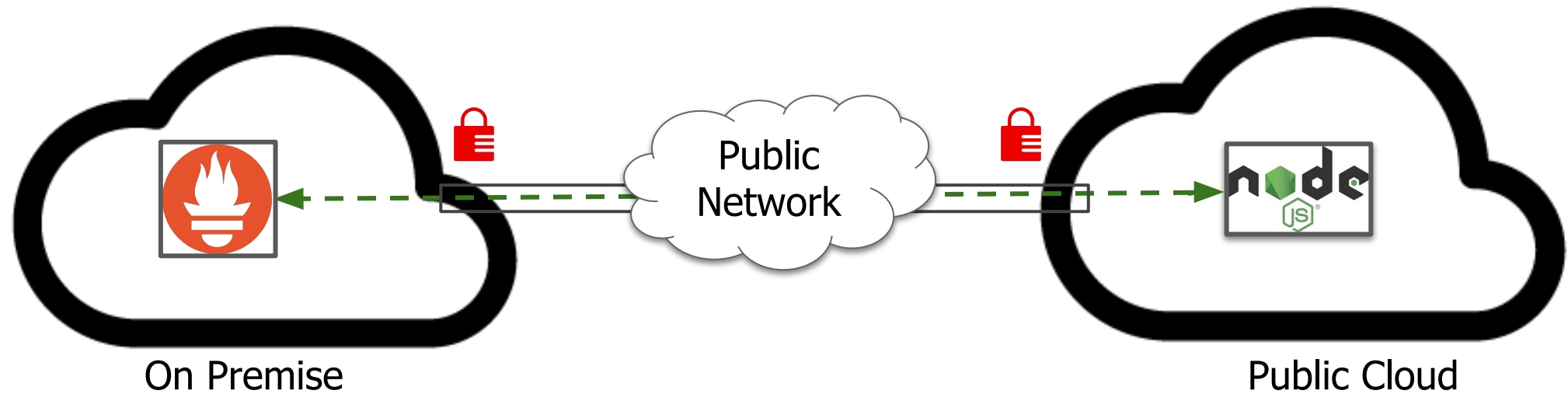
Secured Communication



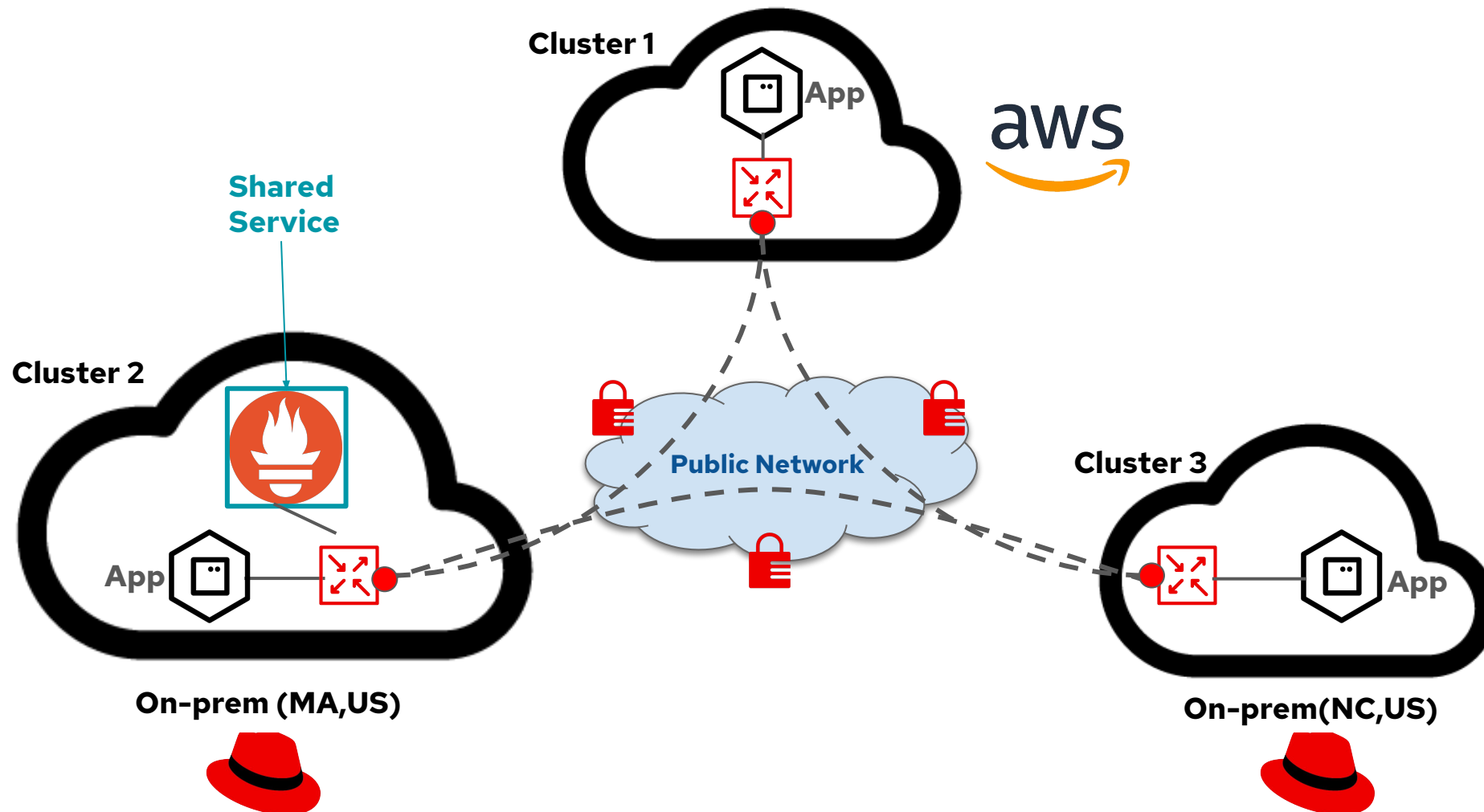
Secured Communication



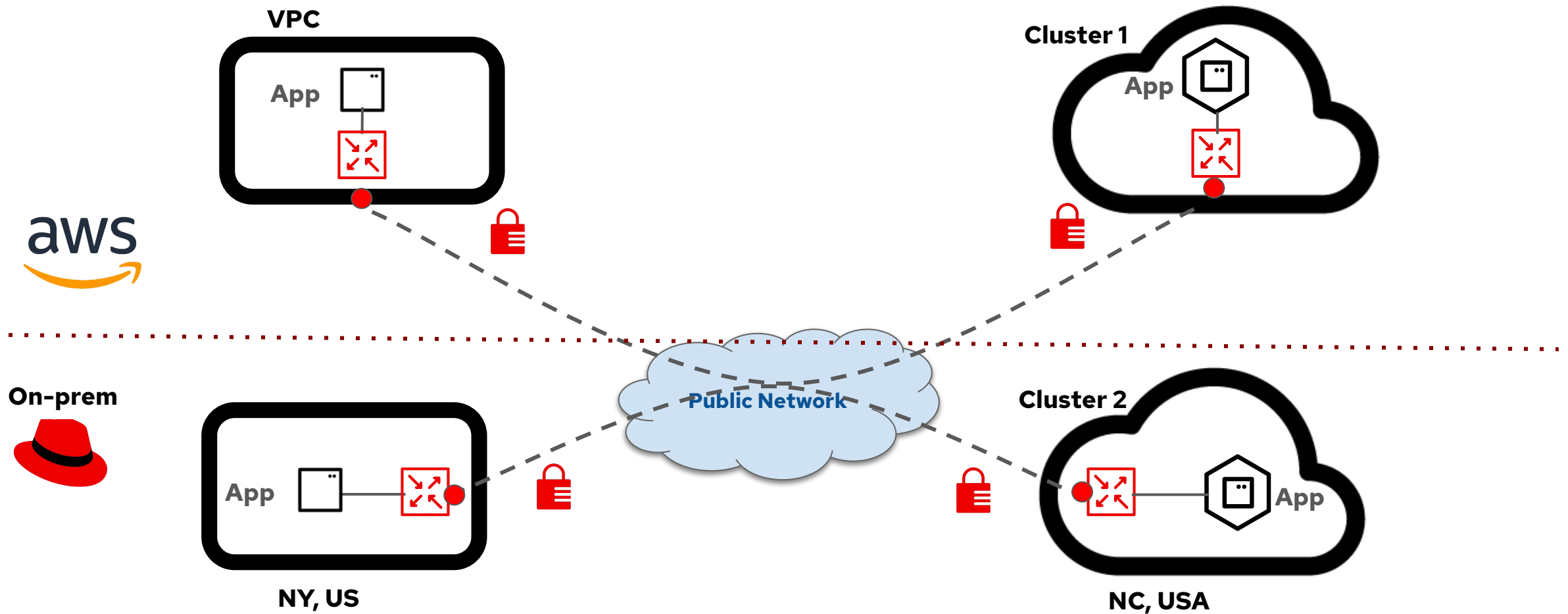
Secured Communication



Shared Service



Connecting non-Kubernetes Workloads



Additional Use Cases

- Disaster Recovery (DR) and storage replication
- Scale out
- Geo-Distribution / User proximity
- Split stateless and stateful apps

Multi-cluster Networking with Submariner

Disclaimer

This is active research and development, with support expected in an upcoming OpenShift release.

Introducing Submariner

- An add-on to OpenShift Container Platform that enables direct network connectivity between multiple clusters
- Exposes a set of new custom resources backed by the Kubernetes datastore
 - clusters.submariner.io, endpoints.submariner.io
- Available as a *Developer Preview* via OperatorHub.io (not officially supported)
- Open source, vendor neutral project: <https://github.com/submariner-io>

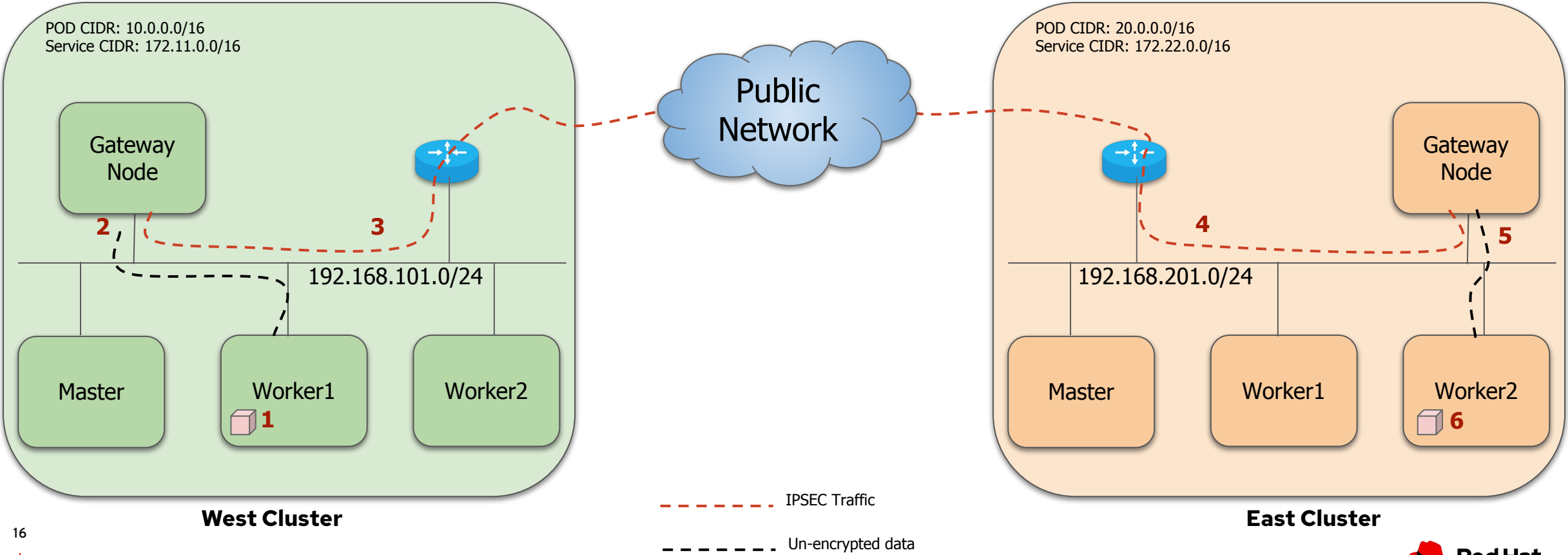


What is Submariner?

- Enable direct pod-to-pod and pod-to-service communication across clusters
 - Provides L3 network reachability to support any application (TCP/UDP) on top
 - Benefits the wider OpenShift ecosystem and other Red Hat platforms
- Traffic flow between clusters is *encrypted* by default
- Extend existing SDN-based OpenShift deployments to other clusters
 - Compatible with different CNI plugins
- Also addresses the challenge of cross-cluster service discovery and network policy
 - Via the Lighthouse and Coastguard (coming soon) sub-projects

Submariner Overview

Connectivity



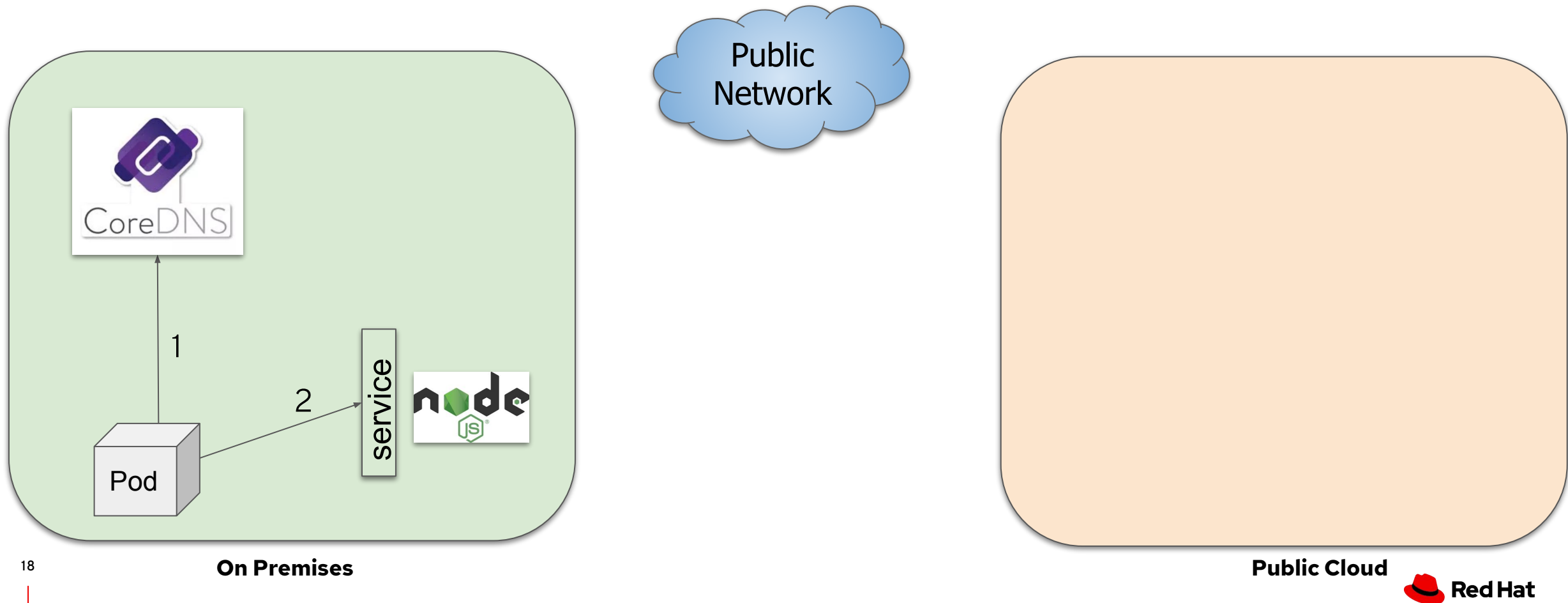
Lighthouse Overview

Service Discovery

- <https://github.com/submariner-io/lighthouse>
- Lighthouse facilitates DNS discovery in multi-cluster connected environments
- An application does not need to know where the service is running -- it accesses local and remote services in the same manner

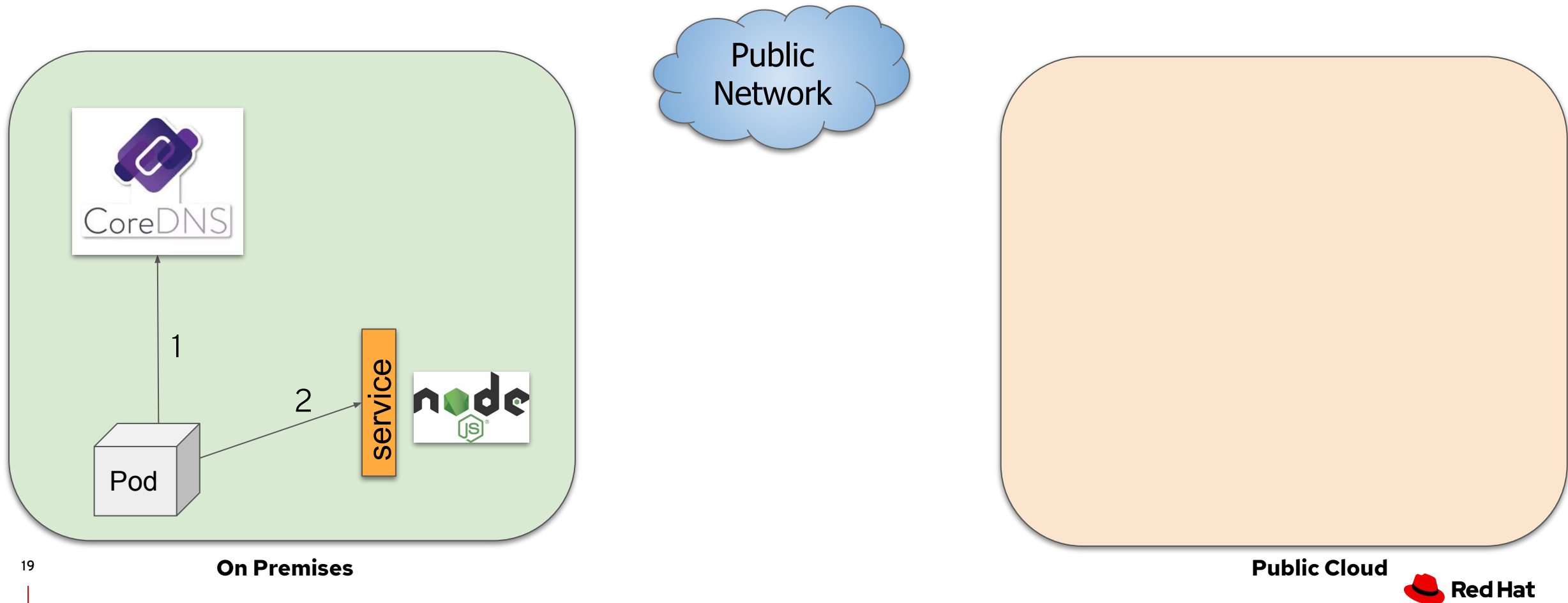
Lighthouse Overview

Service Discovery



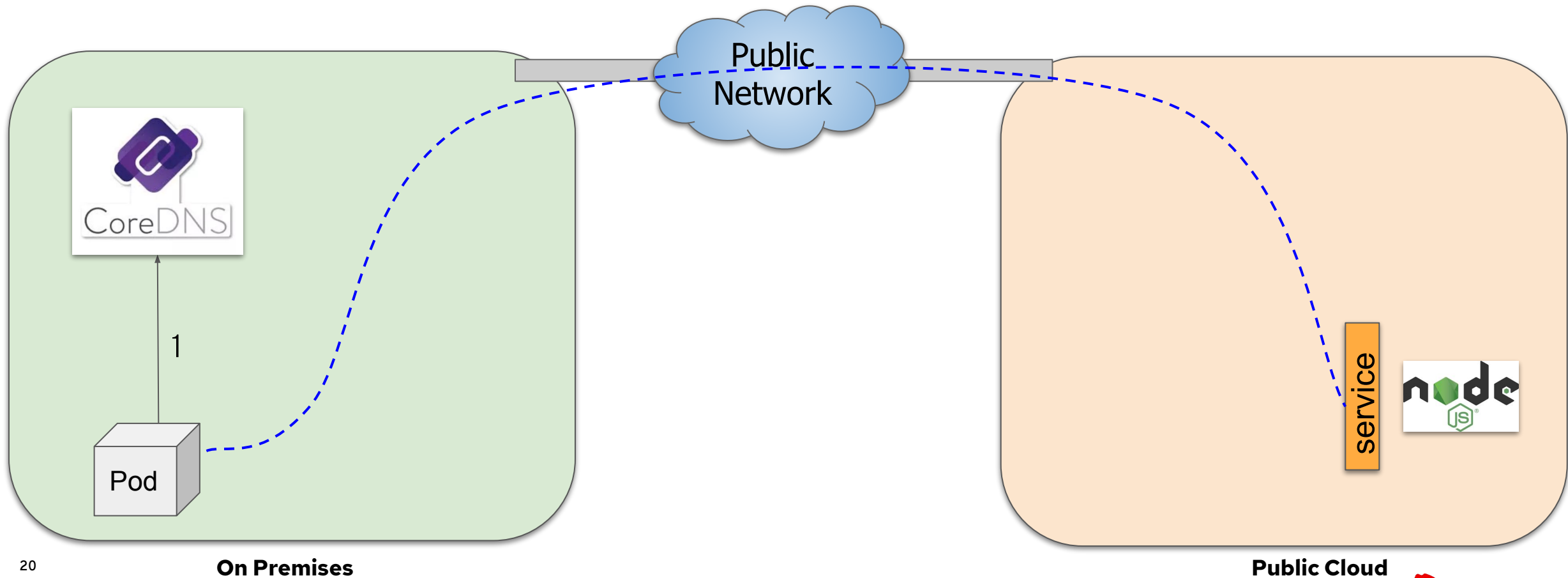
Lighthouse Overview

Service Discovery



Lighthouse Overview

Service Discovery



What is available today?

- Cross-cluster L3 connectivity
 - Using encrypted VPN tunnels | [demo recording](#)
- An operator-based deployment
 - A single line installation process | [demo recording](#)
- Service Discovery across clusters
 - To facilitate multi-cluster DNS | [demo recording](#)
- Support for overlapping IP addresses
 - Can interconnect clusters with overlapping CIDRs | [demo in the works, check our YouTube channel!](#)

What are we looking at next?

- **Support for additional VPN technologies**
 - LibreSwan, WireGuard
- **Support for finer-grained cluster connectivity options**
 - Avoid full-mesh (default) and enable other topologies
- **Gateway node High Availability (HA)**
 - For robustness and scale
- **Monitoring & debuggability**
 - Monitor VPN tunnel status and stats
- **Cross-cluster Network Policy (Coastguard)**
 - Extending network policy beyond a single cluster
- **Connecting non-Kubernetes workloads**
 - Connecting VPC endpoints or OpenStack deployments

Collaborating with Us

- Upstream community
 - Website: <https://submariner-io.github.io/en/>
 - GitHub: <https://github.com/submariner-io>
 - Mailing-list: <https://groups.google.com/forum/#!forum/submariner-dev>
 - YouTube: <https://tinyurl.com/submariner-youtube>
 - Slack (Kubernetes space): #submariner
- Red Hat
 - We are currently seeking design partners and early adopters willing to try out Submariner and give us feedback!

Visit our (virtual) booth!

- We have a booth as part of the virtual Community Central
- Come visit us! People from the Red Hat Submariner team are there to chat with you and answer any questions :)

Red Hat
Summit

Thank you



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