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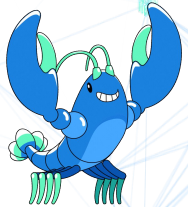
Creators of LINKERD

Federated Services

Flynn, Technical Evangelist for Linkerd



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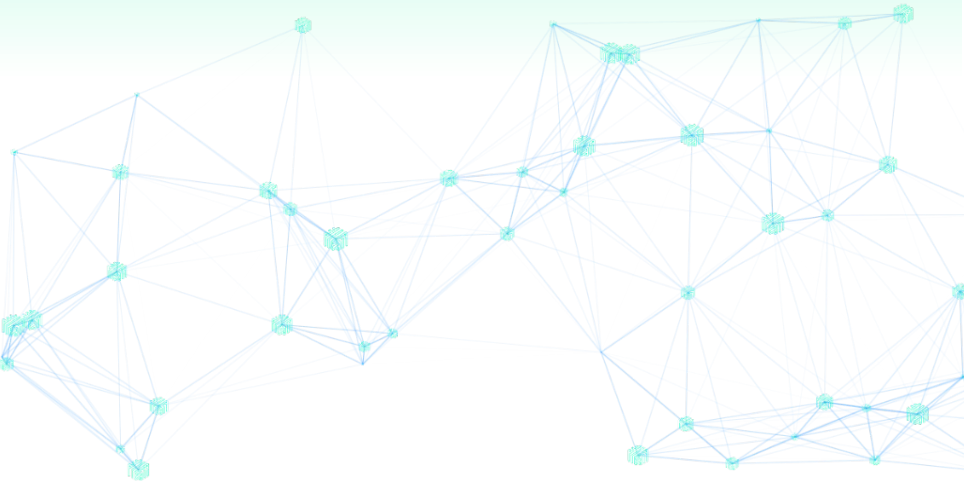
What's on the agenda?



- **Kubernetes Services**
- **Federated Services**
  - and why should you care 🙂
- **DEMO!**
- **Gotchas**

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How do you follow along?

- https://github.com/BuoyantIO/service-mesh-academy/tree/main/federated-services
- **For this demo, I'll be using need Buoyant Enterprise for Linkerd 2.18.2!**
  - Linkerd edge-25.4.4 or later will work too
- I'll be using a pair of `kind` clusters, but the main requirement here is direct pod-to-pod networking between your clusters.

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How do you follow along?

- **kind**
  https://kind.sigs.k8s.io/
- **kubectl**
  https://kubernetes.io/docs/tasks/tools/
- **linkerd CLI**
  https://linkerd.io/2/getting-started
- **bat**
  https://github.com/sharkdp/bat
- **jq**
  https://github.com/jqlang/jq
- **yq**
  https://github.com/mikefarah/yq

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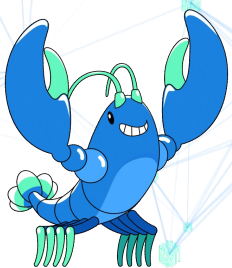
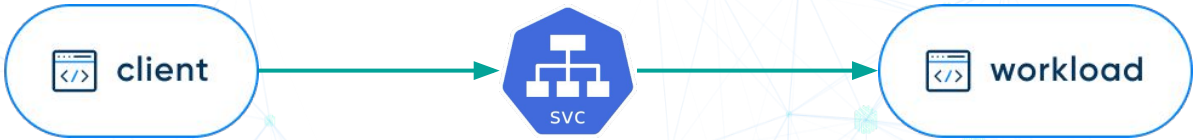
Kubernetes Services



What is a Service?

A Kubernetes Service is a rendezvous point between a workload that offers functionality and clients that want to use that functionality.



What is a Service?

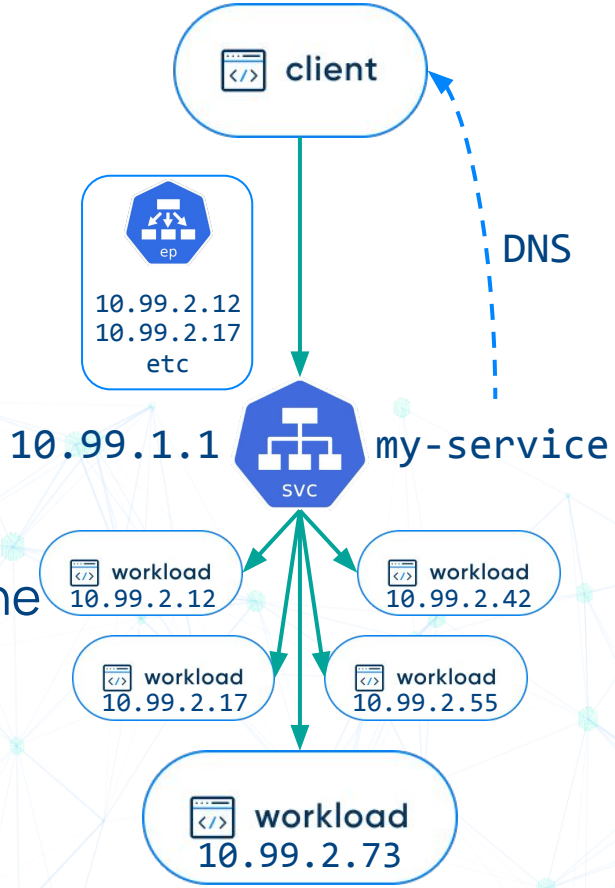
A Kubernetes Service is a rendezvous point between a workload that offers functionality and clients that want to use that functionality.

Service is also arguably the worst, most overloaded, most confusing API in Kubernetes. 😞

What's so bad about Service?

Services have at least *five* different functions.

- They give us a name to refer to our rendezvous point.
- The name of the Service appears in the cluster's DNS.
- The Service itself gets an IP address.
- The Service collects all the IP addresses of the workload replicas (*endpoints*).
- The Service IP and its endpoints are used to configure `kube-proxy`.



What's so bad about Service?

These functions span many different areas.

- They give us a name to refer to our rendezvous point. ⇐ Normal resource stuff
- The name of the Service appears in the cluster's DNS. ⇐ DNS
- The Service itself gets an IP address. ⇐ IPAM
- The Service collects all the IP addresses of the workload replicas (*endpoints*). ⇐ IPAM / resource stuff
- The Service IP and its endpoints are used to configure `kube-proxy`. ⇐ CNI

What is a Service?

In other words, our “simple” rendezvous concept is anything but simple to implement!

Fortunately, application developers *usually* don’t have to worry about all of this.

- Basically everyone implementing Kubernetes networking stuff does, though.
  - Meshes
  - Gateway API
  - Ingress controllers
  - etc.

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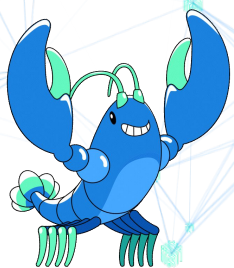
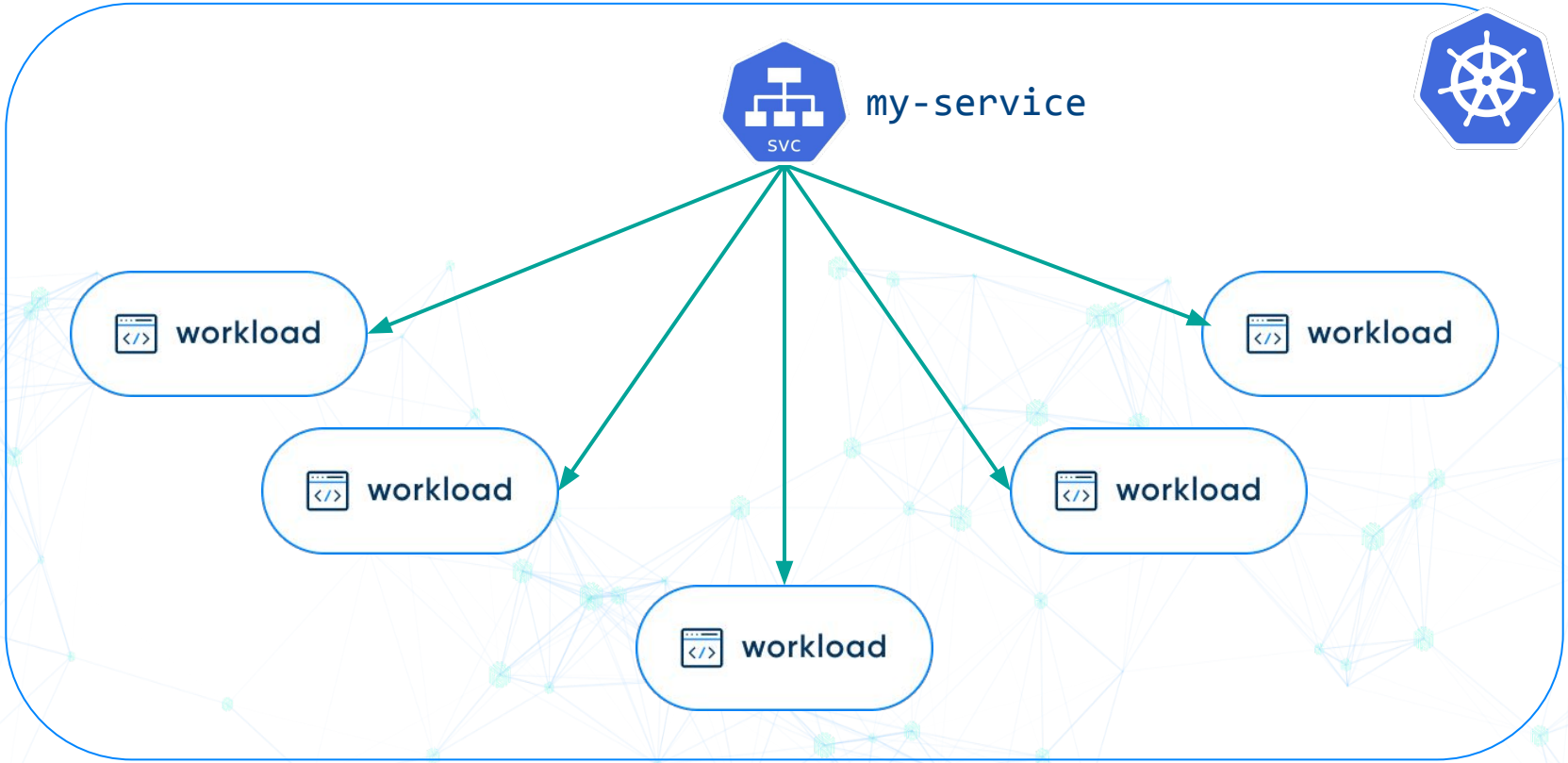
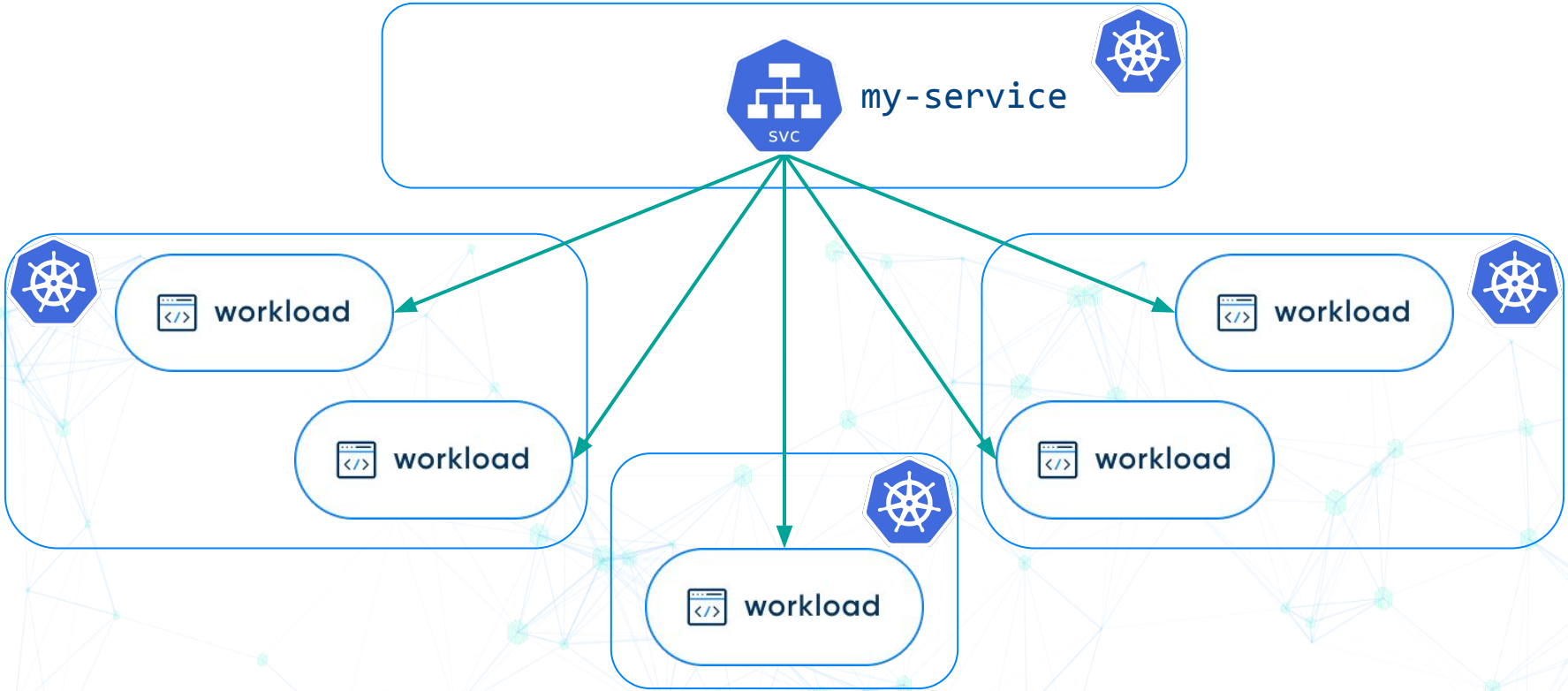
Federated Services



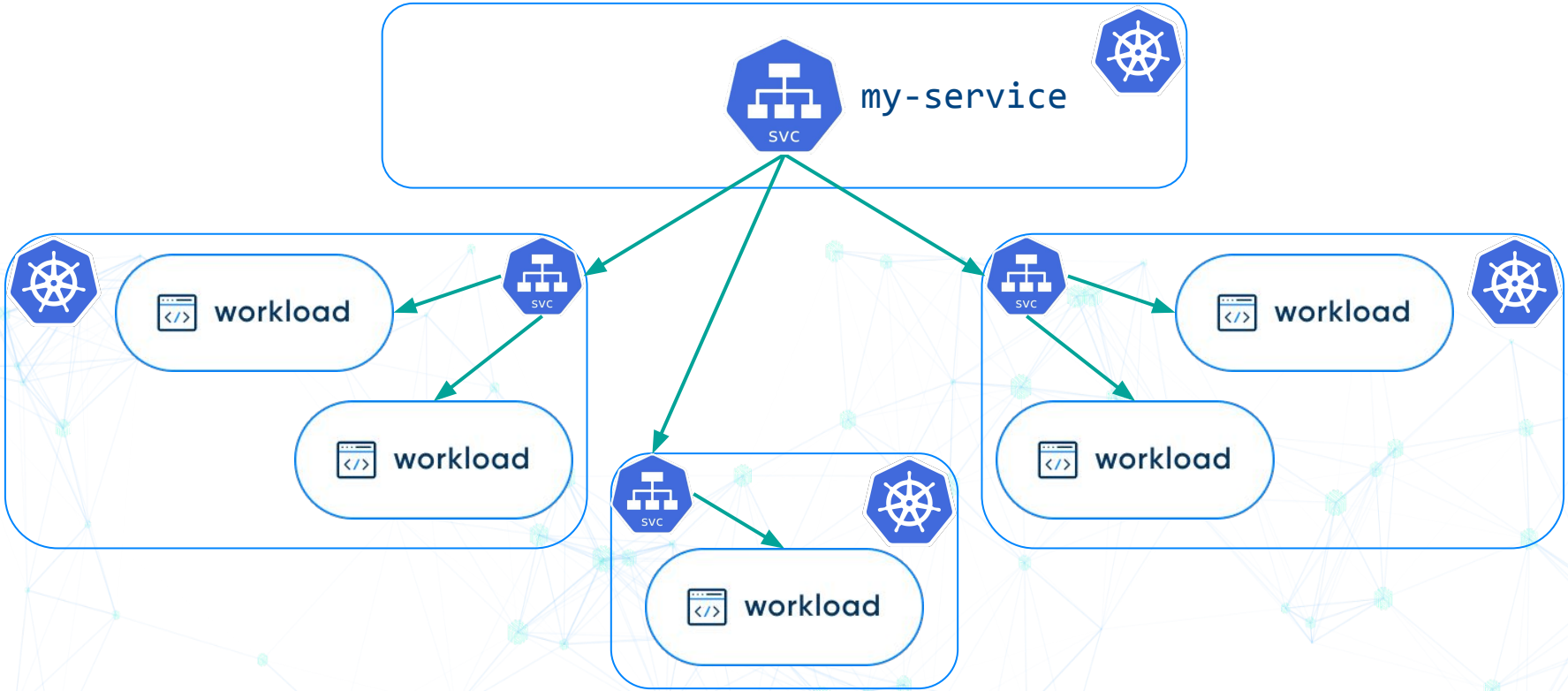
Federated Services



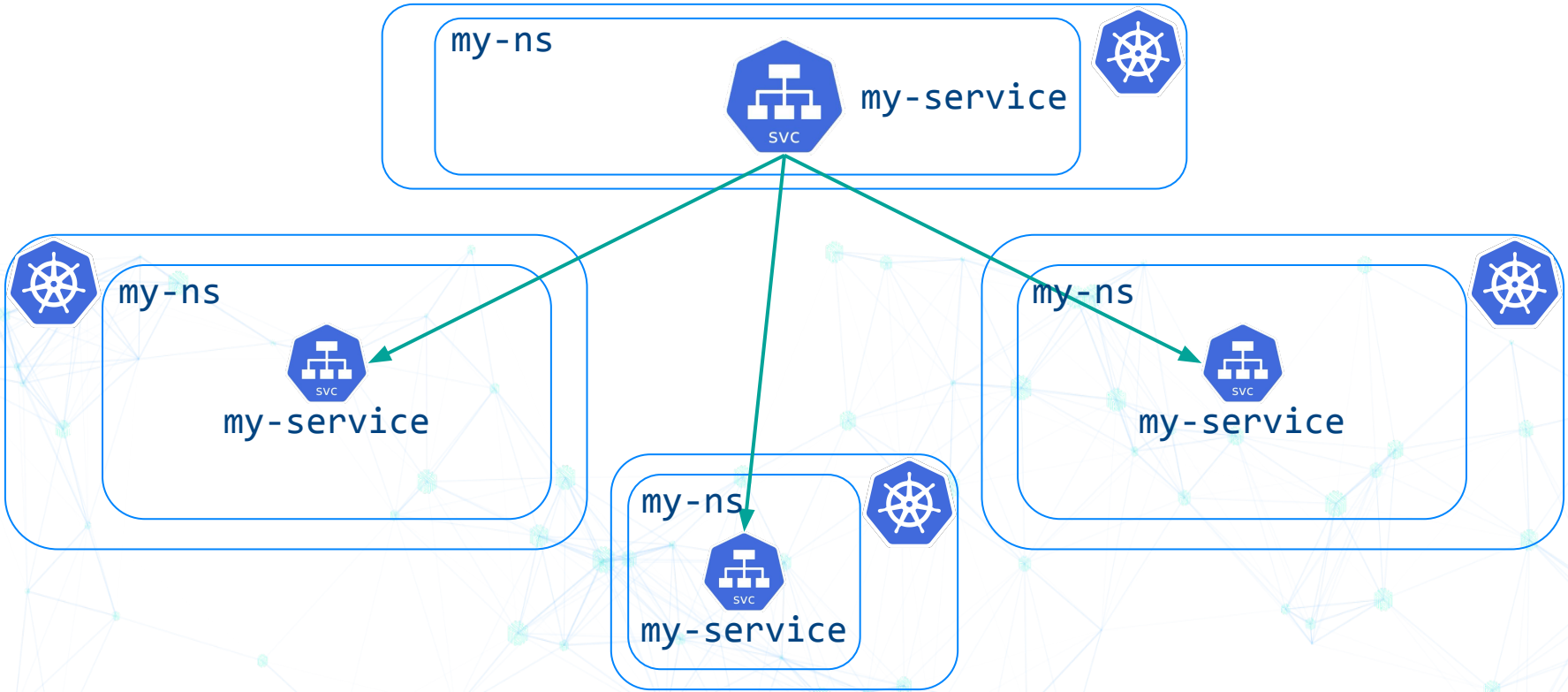
Federated Services



Federated Services: Discovery



Federated Services: Namespace Sameness



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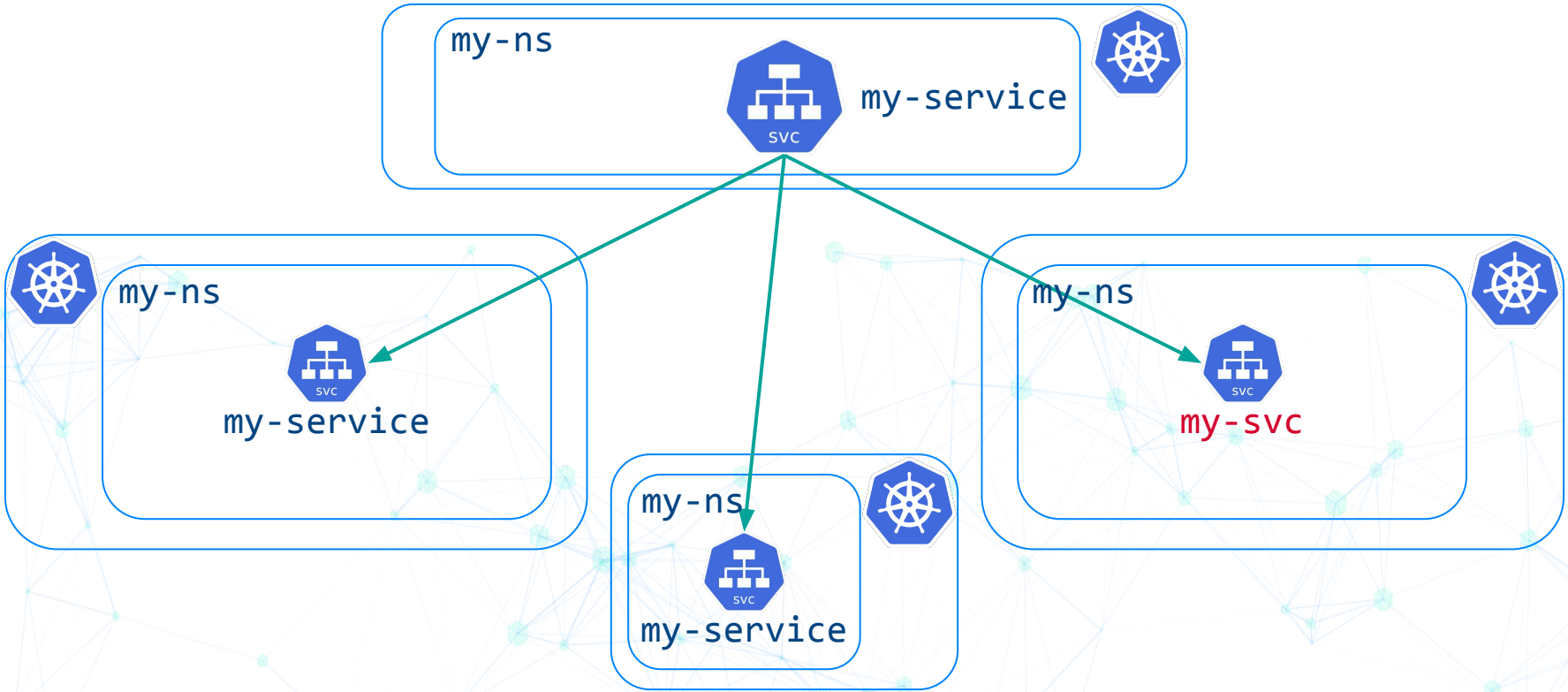

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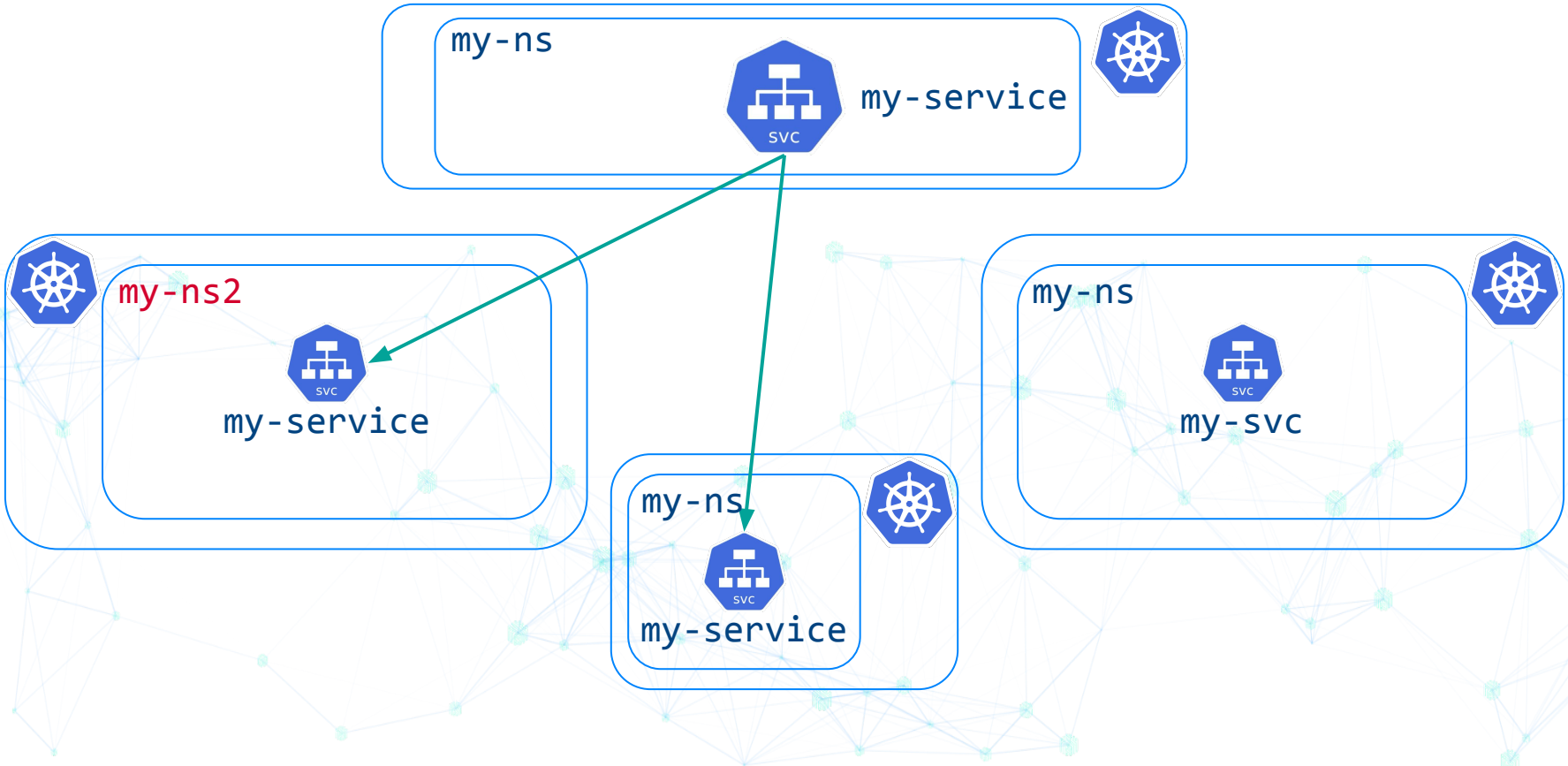
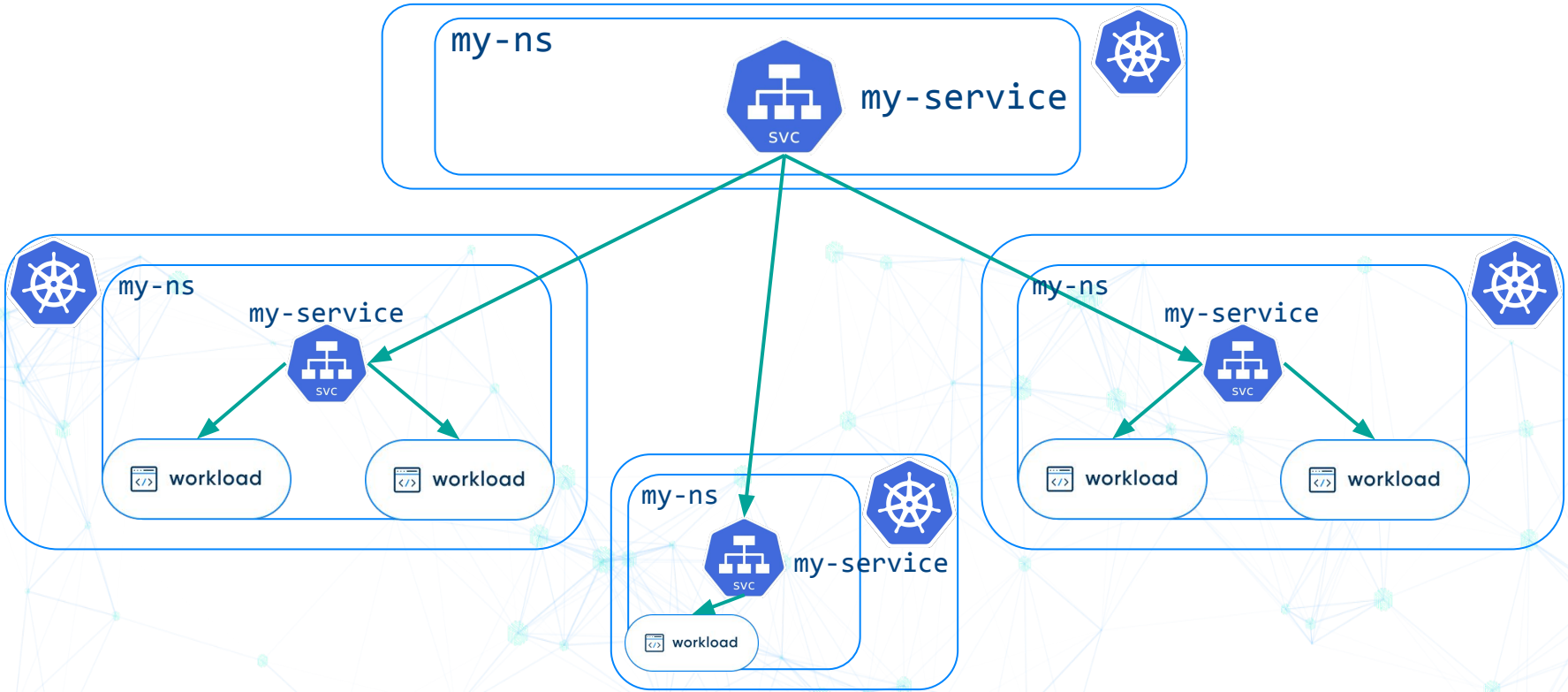
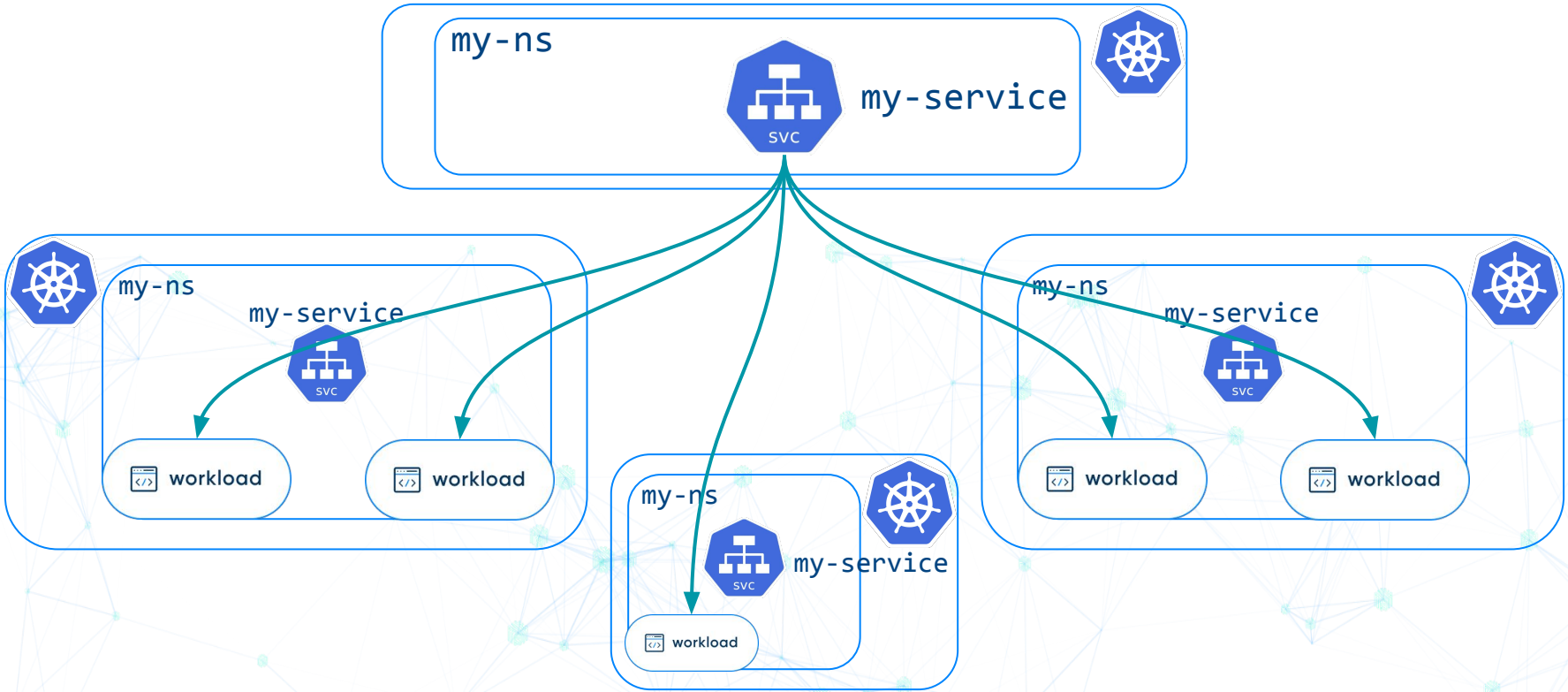


Federated Services: Discovery vs Routing



Federated Services: Discovery vs Routing



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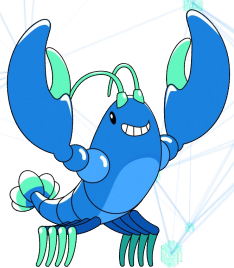
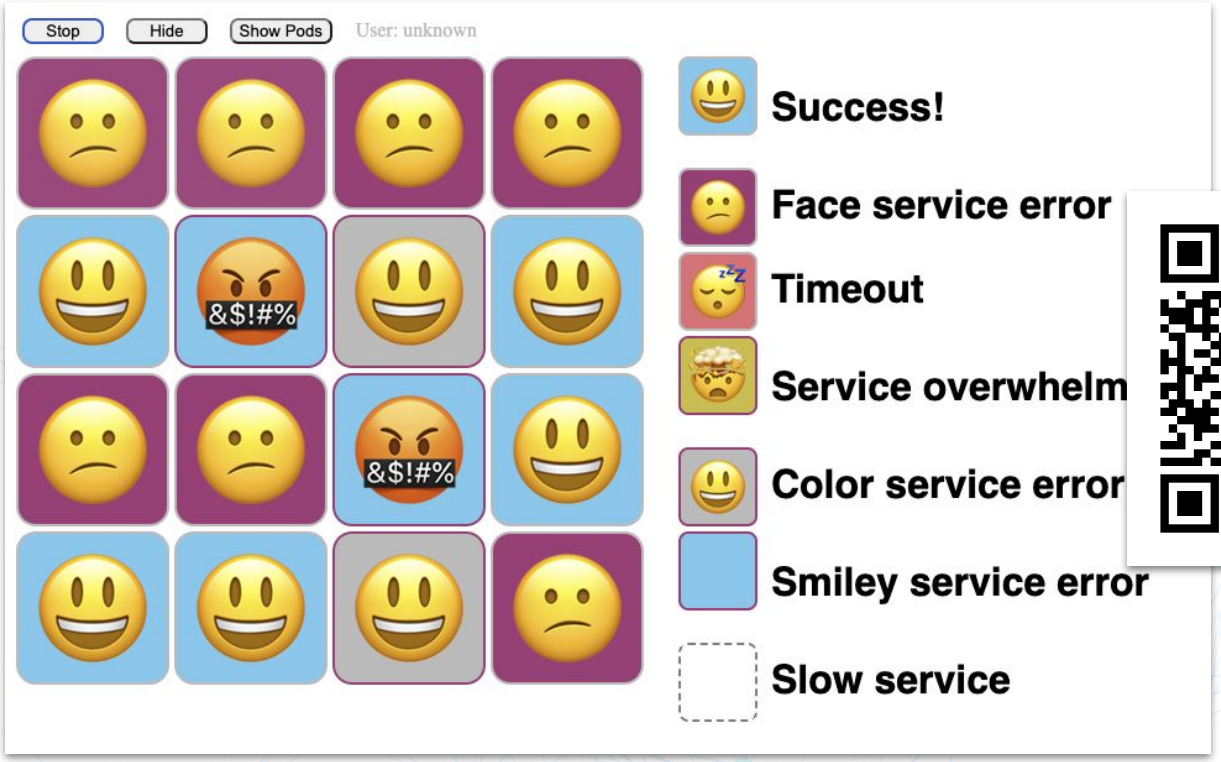
Demo Architecture



Faces (http://github.com/BuoyantIO/faces-demo)



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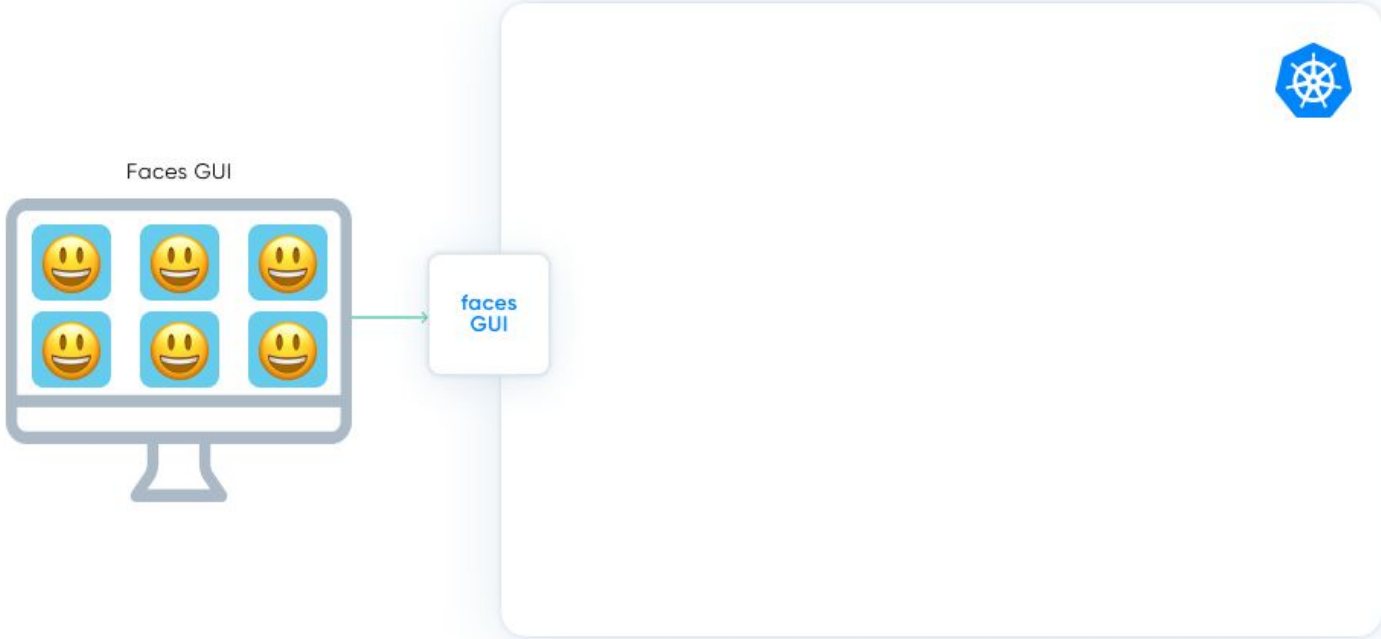

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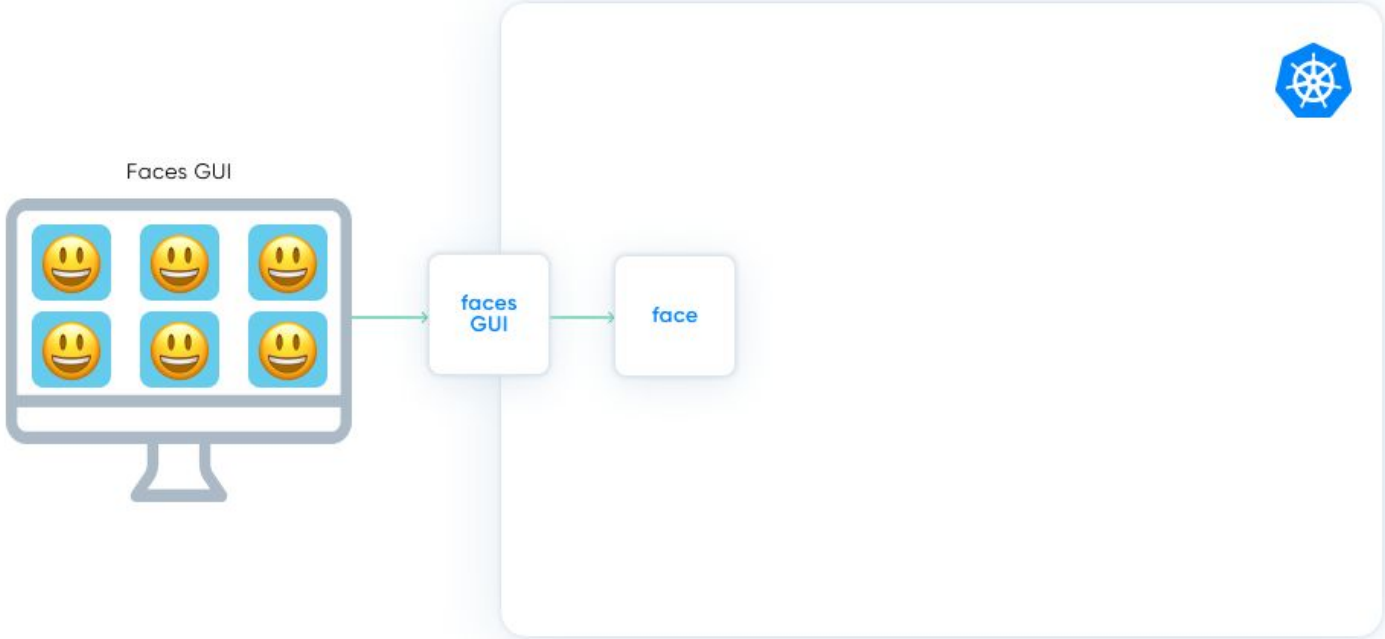

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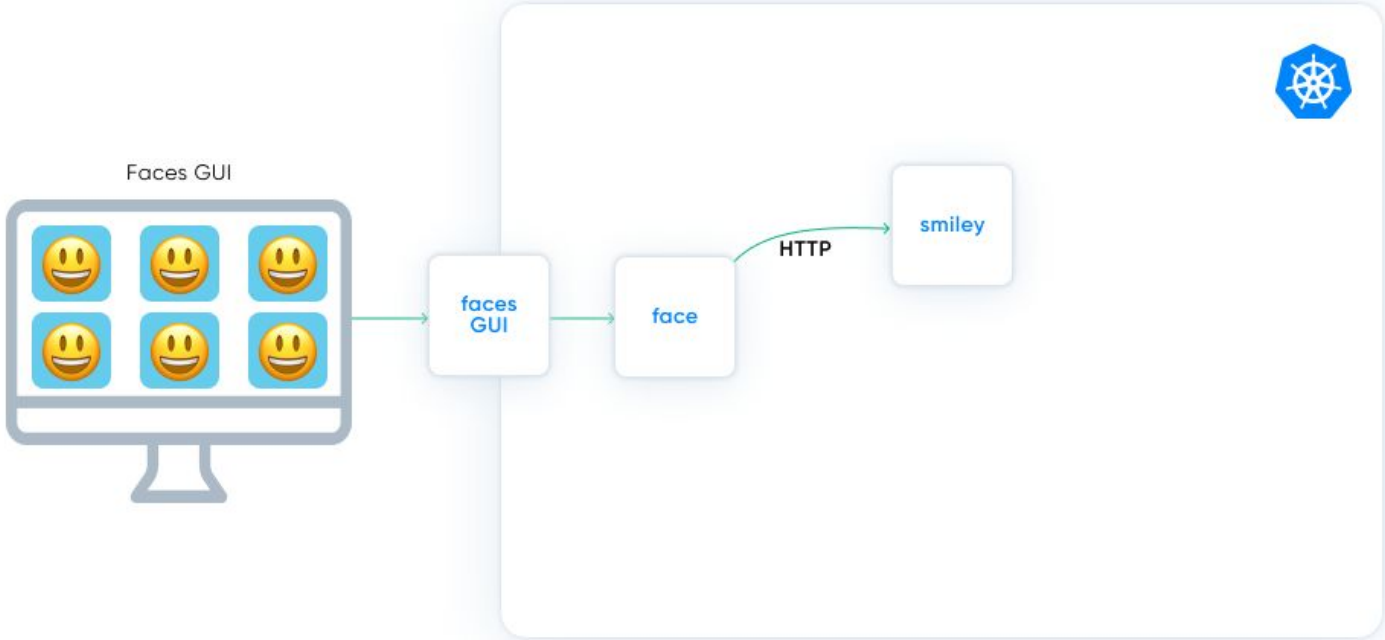

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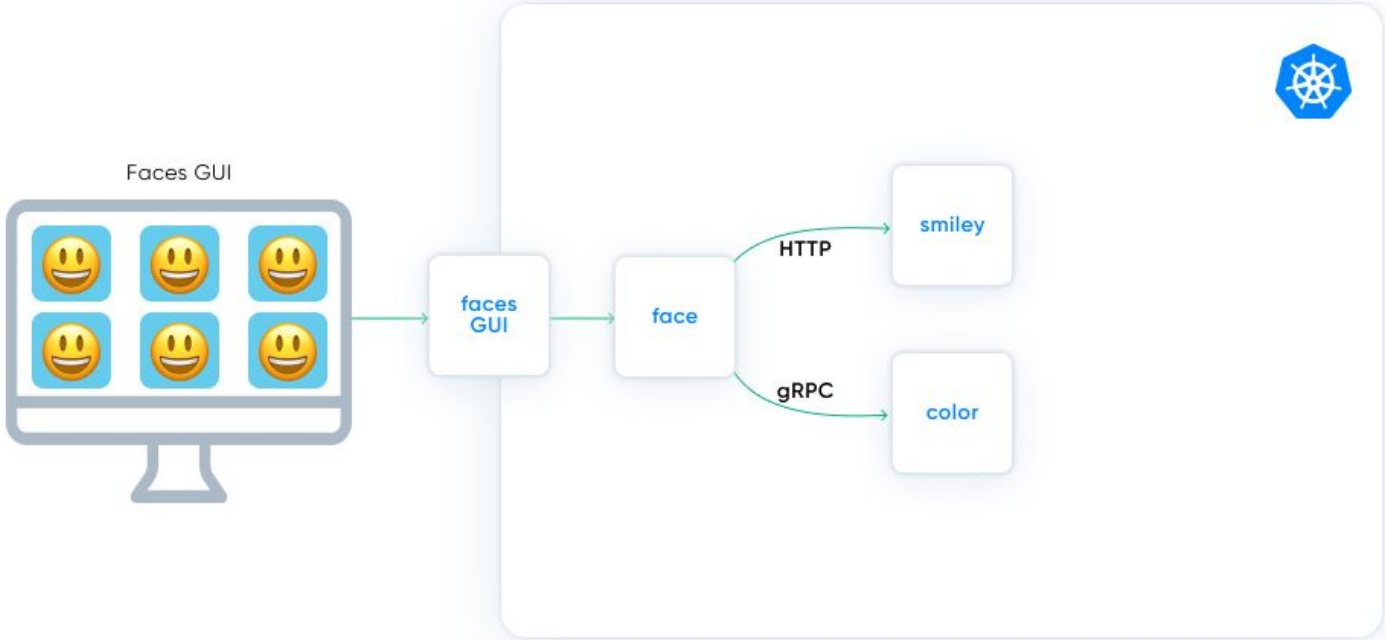

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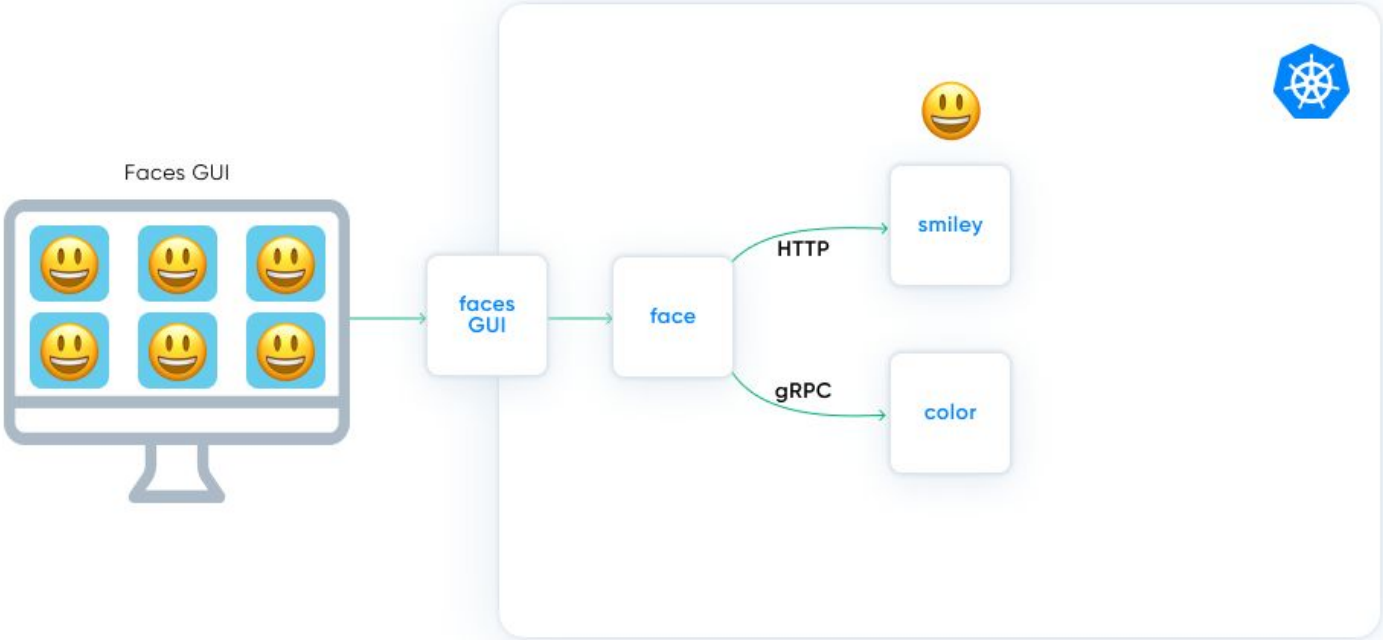

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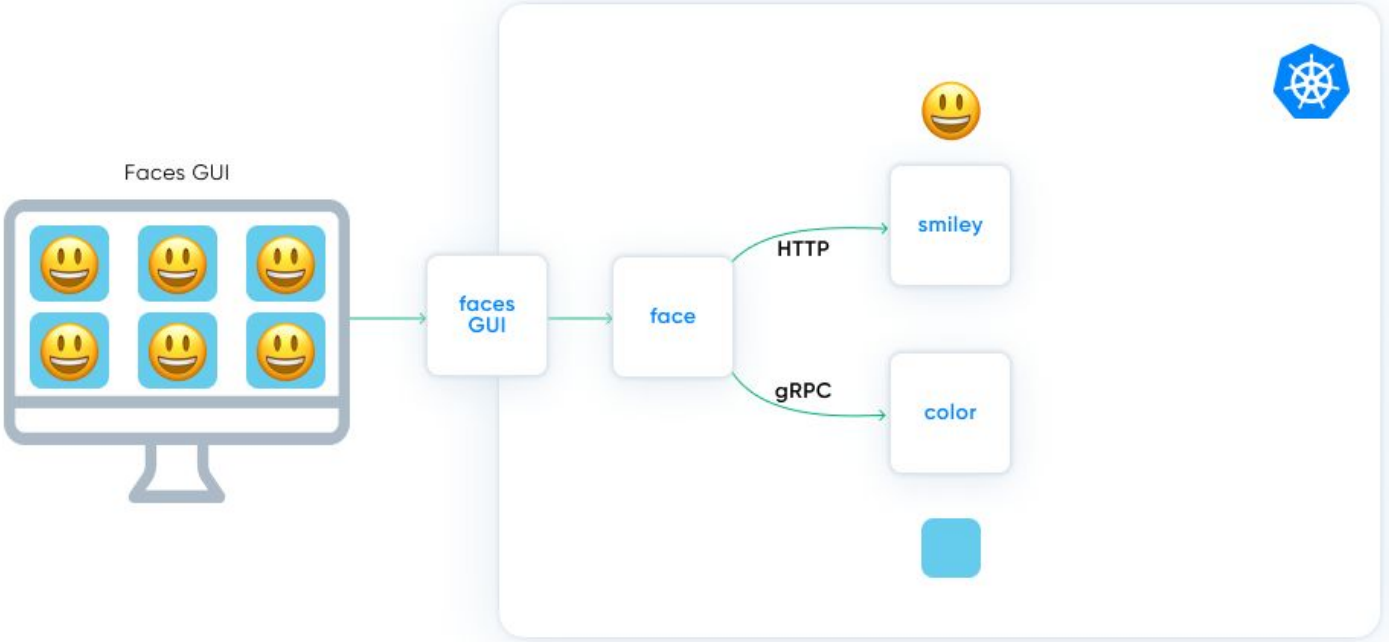

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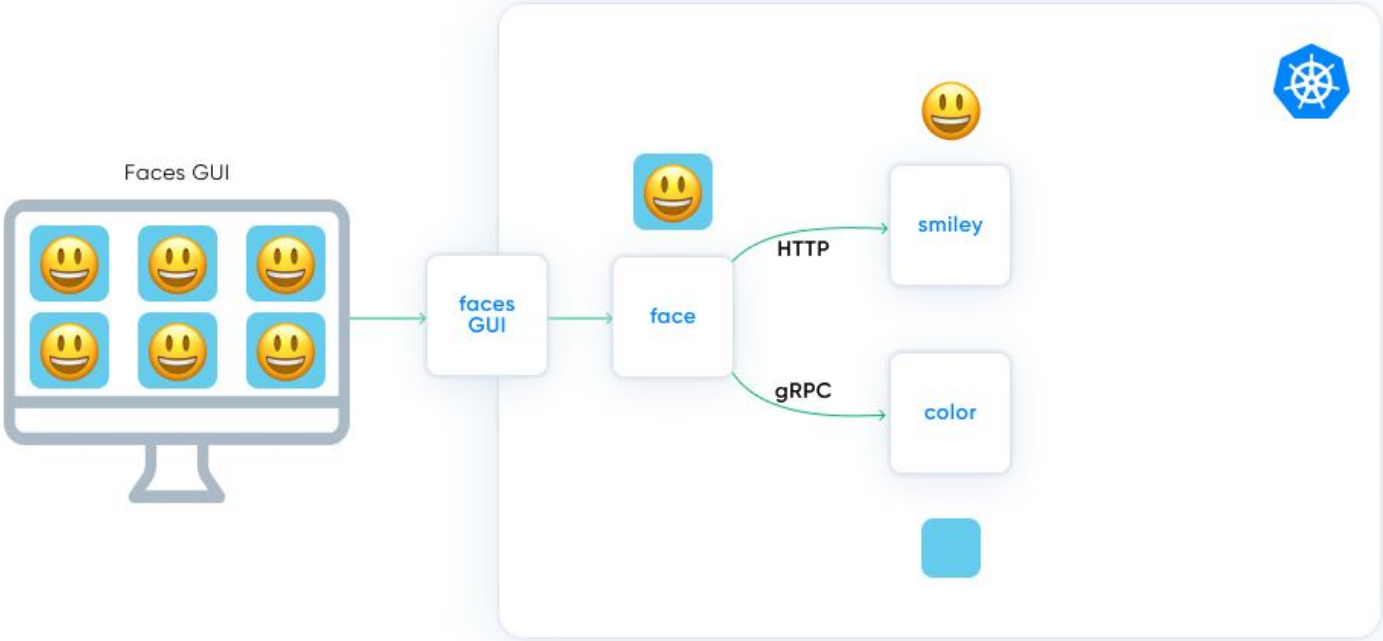

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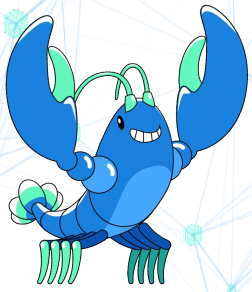
DEMO 🤞



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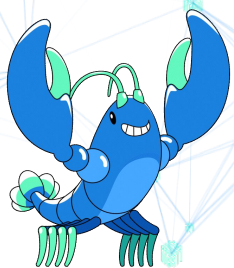
Gotchas



Gotchas

- Routing happens **where the request is made**
  - Exactly one routing decision happens for the whole request
  - Example of *outbound policy* being made by the *outbound proxy*
- Authorization happens **where the request is received**
  - Example of *inbound policy* being made by the *inbound proxy*

Tell us how we can improve!

Your feedback matters!

(We promise it won't take more than a few minutes, and it will help us tremendously — thank you! 🙂)

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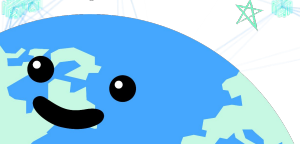

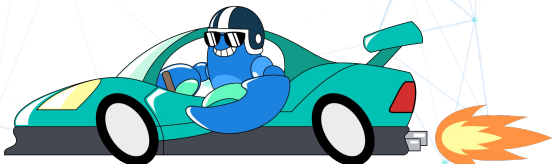

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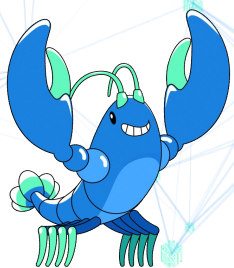
Q&A



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Thanks much!

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