

It's 10pm, do you know what your proxy is doing?

Understanding the xDS protocol!

Hello!

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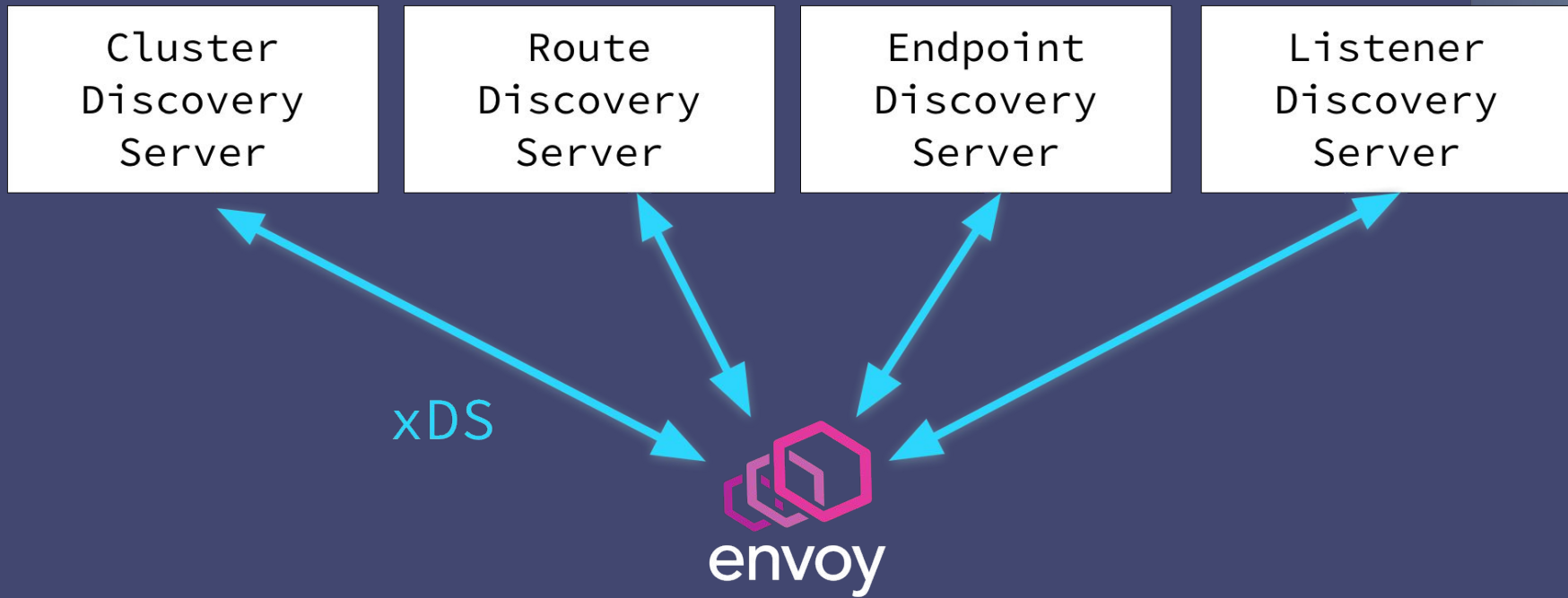
- We 🍷 Envoy for mTLS
- Several thousand nodes
- Custom management server (5k Lines of Go)
- We're hiring!



stripe

Bit of terminology!

- Envoy has listeners
 - Address and port where Envoy listens for connections
- Listeners have routes
 - Mapping of request metadata to an outbound cluster
- Routes map to clusters
 - Logical grouping of locations Envoy can proxy to
- Clusters have endpoints
 - Individual host Envoy can proxy to



- {CDS, RDS, EDS, LDS} are modular
- Push based gRPC/Protocol Buffer protocol (schemas!!)
- Acknowledgement mechanism

Cluster Discovery



Management
Server

Version=13

Cluster Discovery Initial Request



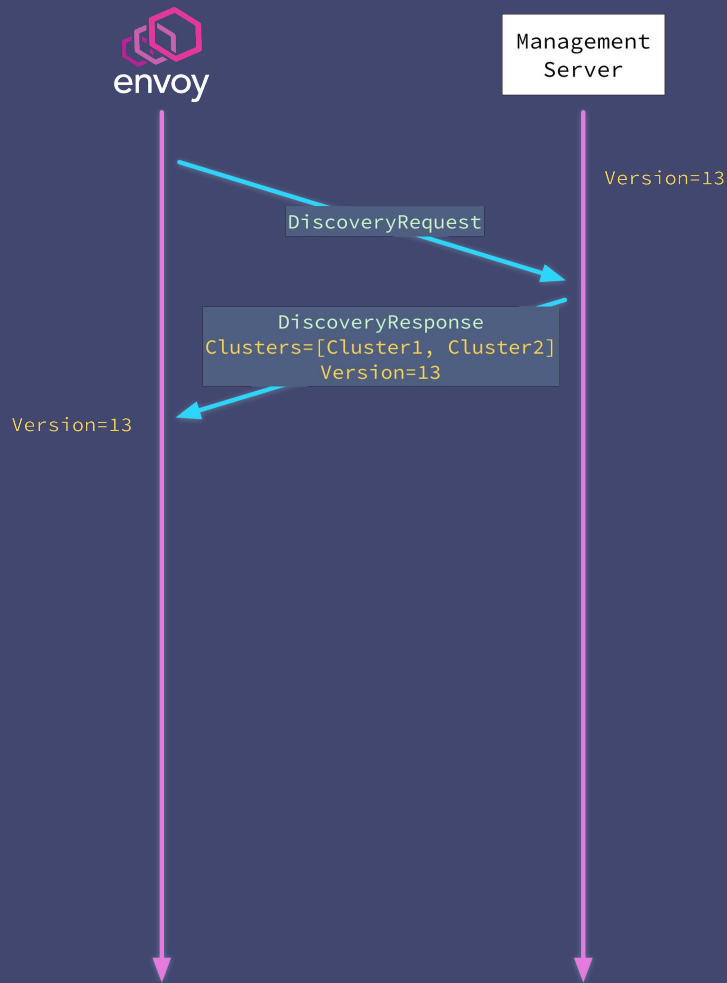
Management
Server

DiscoveryRequest

Version=13

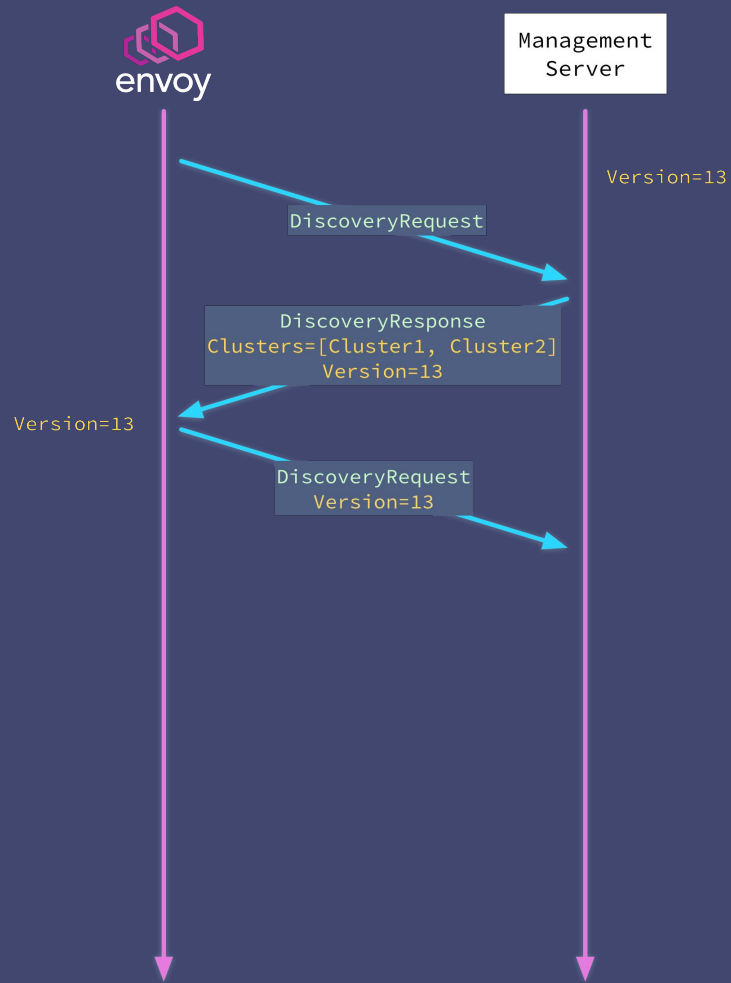
Cluster Discovery

Initial Response



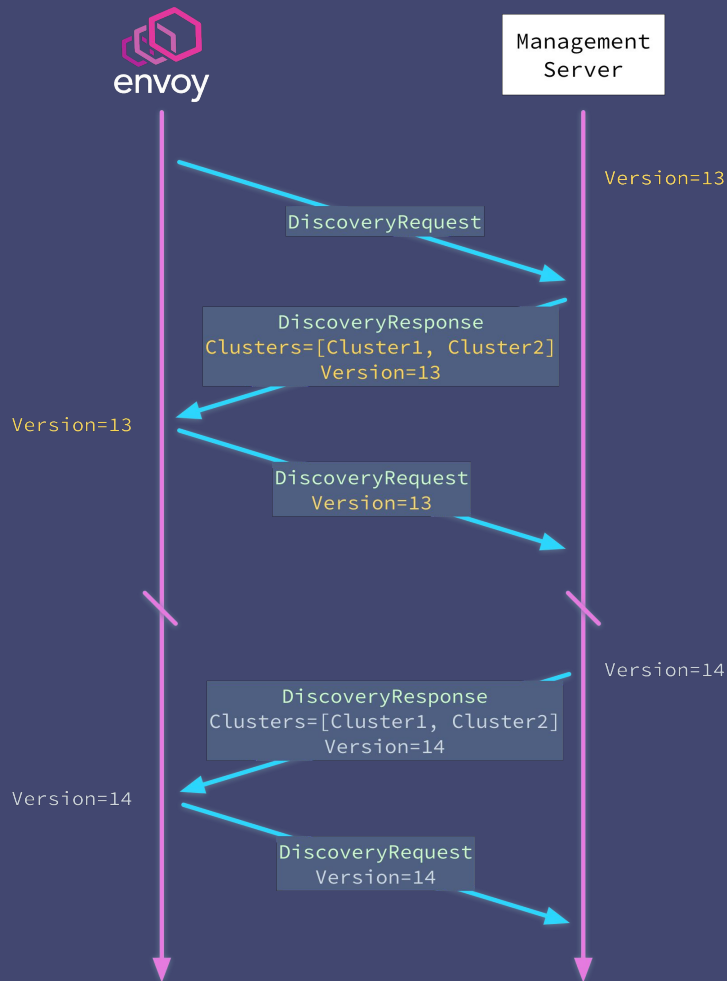
Cluster Discovery

Initial ACK



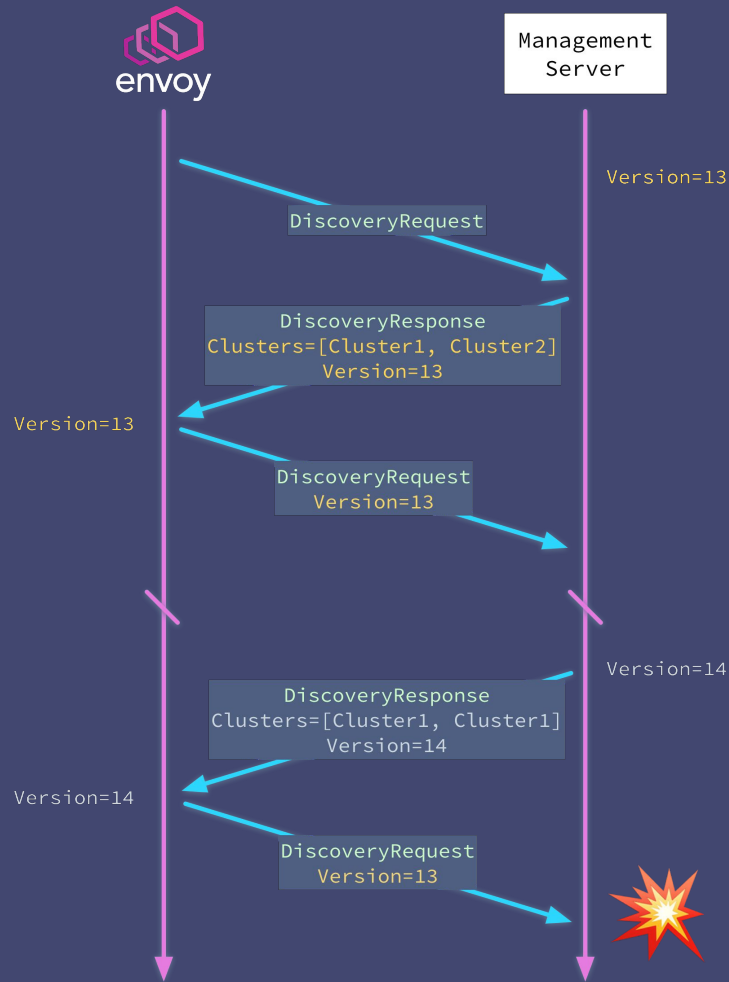
Cluster Discovery

Spontaneous Update version=14

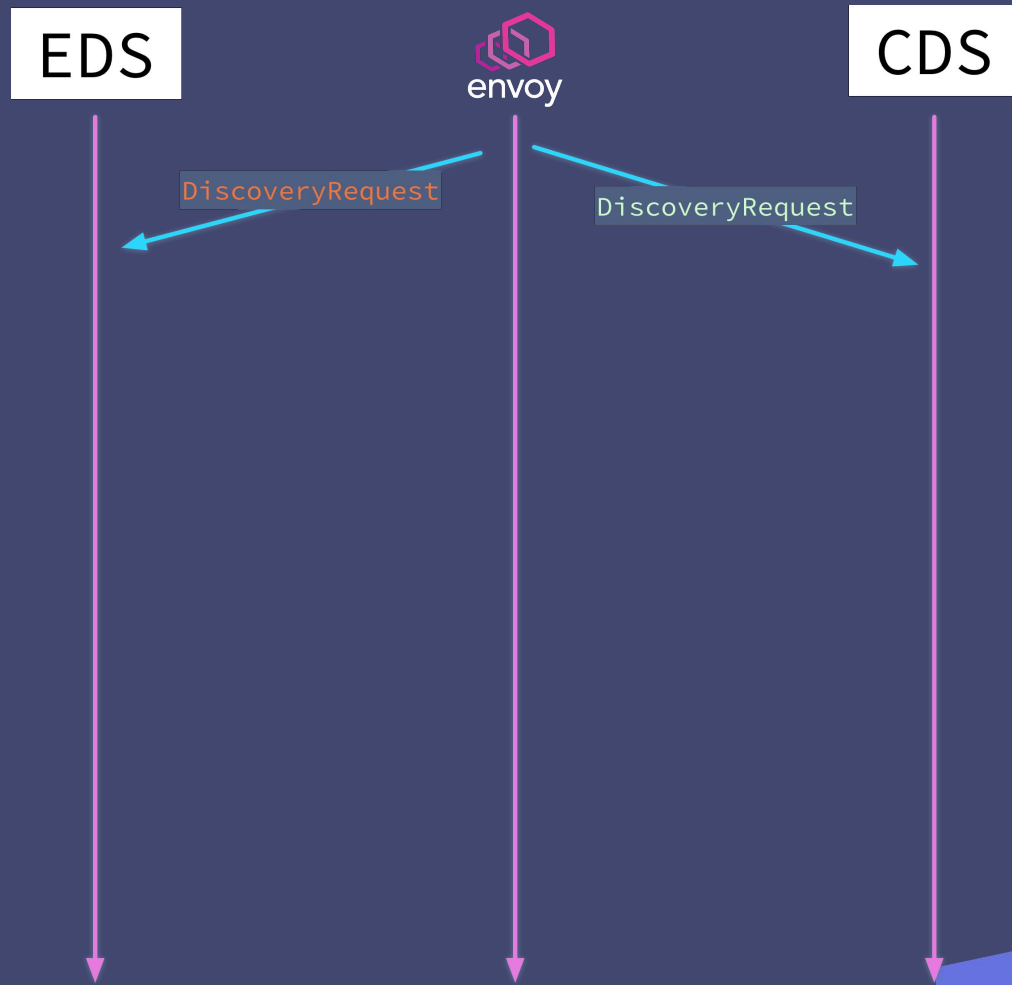


Cluster Discovery

Spontaneous Update version=13 Rejection

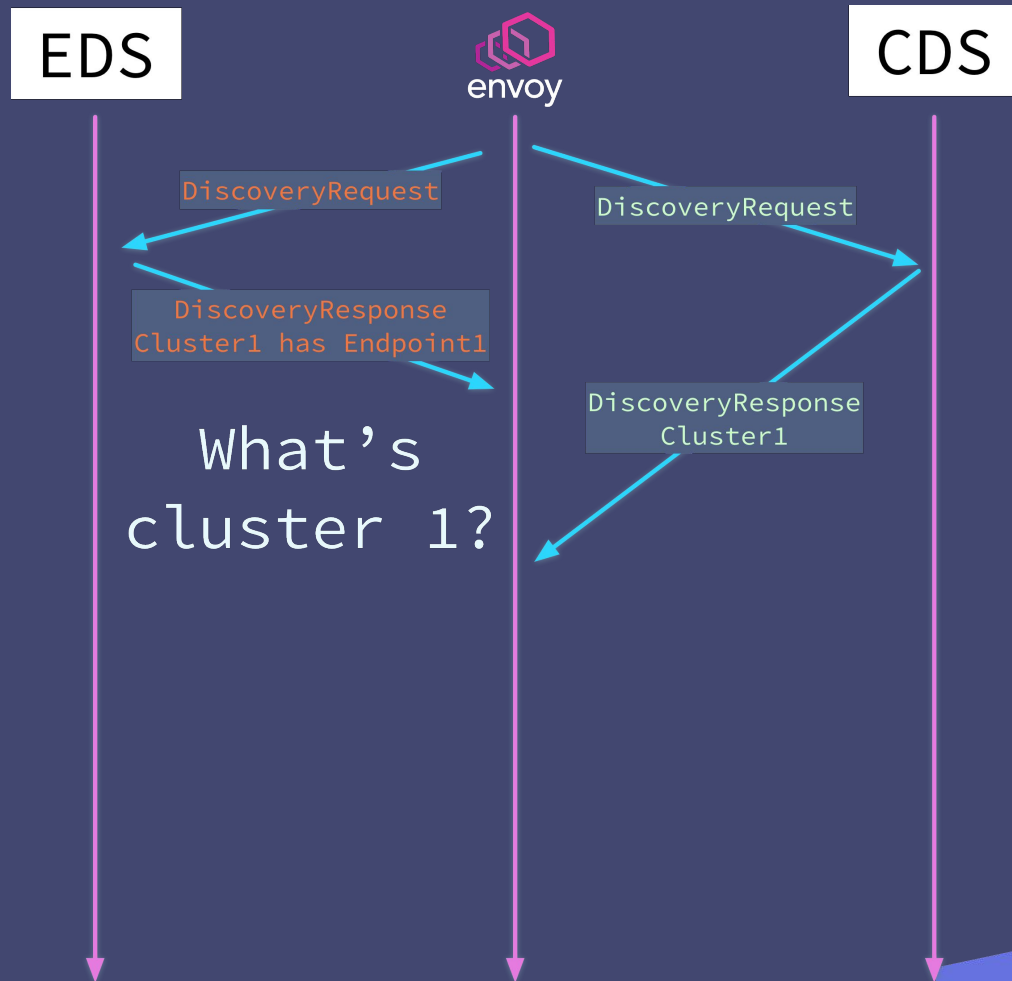


Possible Race Conditions



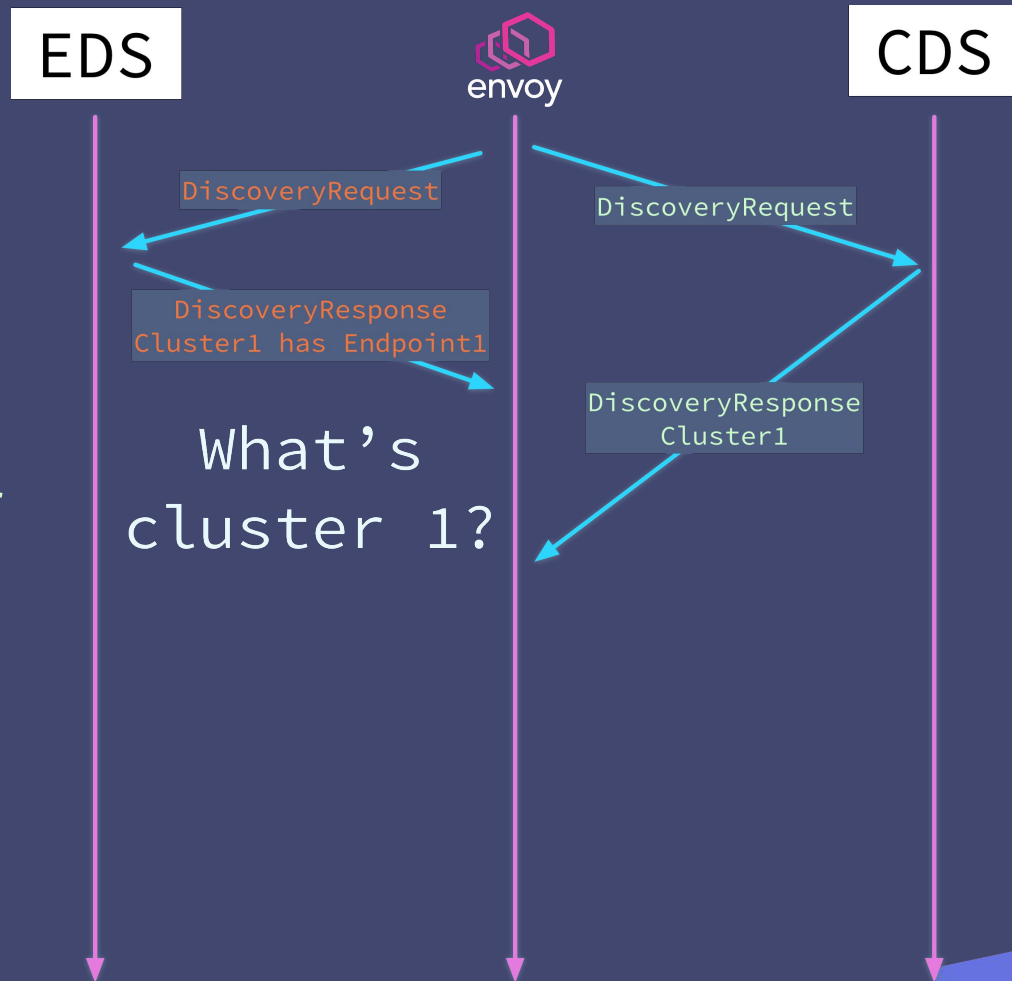
Possible Race Conditions

Endpoints arrive before clusters



Possible Race Conditions

Tradeoff between possible traffic drops or expensive coordination



Aggregated Discovery (ADS)

Multiple configuration types over a single gRPC stream

Precisely ordered config updates without traffic drops



envoy

ADS

DiscoveryRequest

DiscoveryRequest

DiscoveryResponse

DiscoveryResponse

- Dynamic Config is AWESOME!
- The xDS Protocol lets you:
 - Push updates at will
 - Monitor for malformed configuration
 - Sequence updates precisely (even better with ADS!)

Thanks!

Protobufs + gRPC specs - <https://github.com/envoyproxy/data-plane-api>

Protocol reference doc - https://github.com/envoyproxy/data-plane-api/blob/master/XDS_PROTOCOL.md

Reference Implementation - <https://github.com/envoyproxy/go-control-plane>

Cilium's high quality xDS implementation - <https://godoc.org/github.com/cilium/cilium/pkg/envoy/xds>

Consul's high quality xDS implementation - <https://godoc.org/github.com/hashicorp/consul/agent/xds>

Istio - <https://istio.io>