

BUILDING A SCALABLE, COMPLIANT, MULTI-CLOUD BANK WITH A SERVICE MESH

Kasper Borg Nissen - Lead Platform Architect @lunarmoney
@phennex



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WHO?

KASPER BORG NISSEN

LEAD PLATFORM ARCHITECT

@phennex

Cloud Native Computing Foundation Ambassador

Community lead at Cloud Native Nordics

Cloud Native Aarhus Organizer

Community Advocate at Ambassador Labs

Linkerd Ambassador

Occasional speaker at Meetups, Conferences



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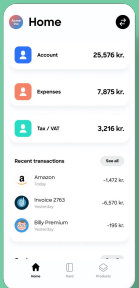
Kubernetes
Removing failing pod

23
slave2
slave3
slave4

LUNAR, WHO?



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15,000

Total number of Business Customers



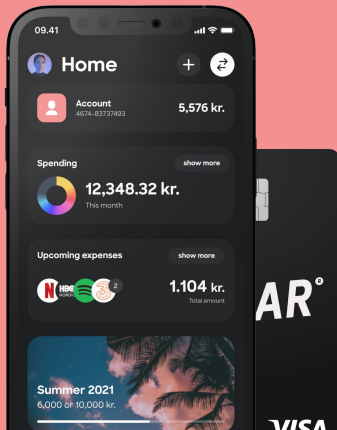
Company founded in 2015

+650

Employees



European Banking License issued in Denmark



+550,000

Customers in total

€280m

Series-D total

Series D ✓

Recently closed our Series D-2 of €70m

We have offices in these locations



LUNAR TECH AT A GLANCE

On average more than
40

Deployments to production per day

150
FTE's in Tech

Multi-cloud
#3
AWS, Azure, GCP

26
Squads across 4 hubs

More than
400
µServices

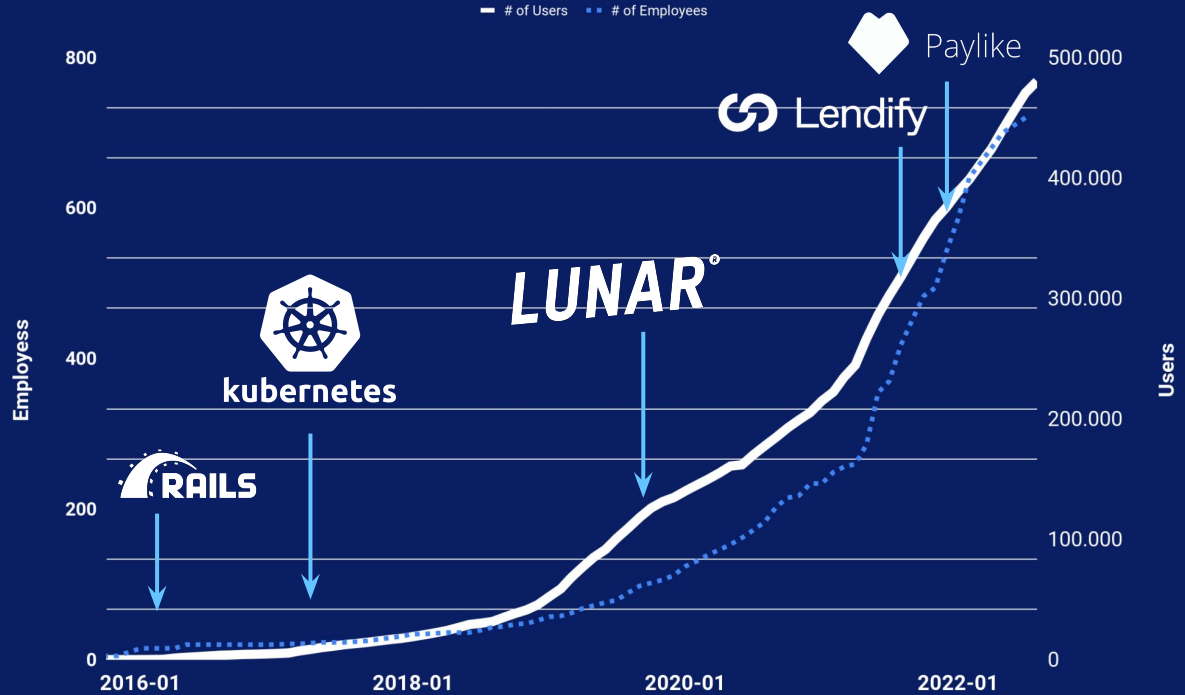
100+
Releases per day

1300+
Containers in prod

8
k8s clusters

HYPER

SCALE & GROWTH HISTORY



lunar
way®

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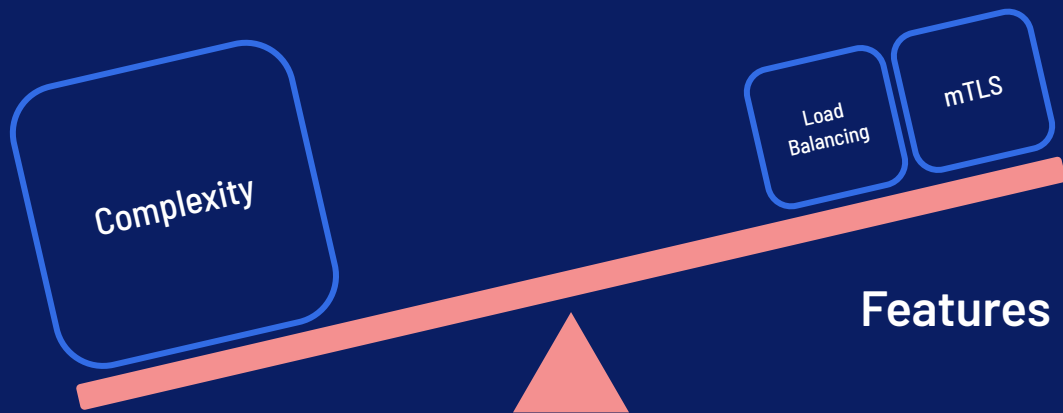
OUR SERVICE-MESH EVALUATION STORY



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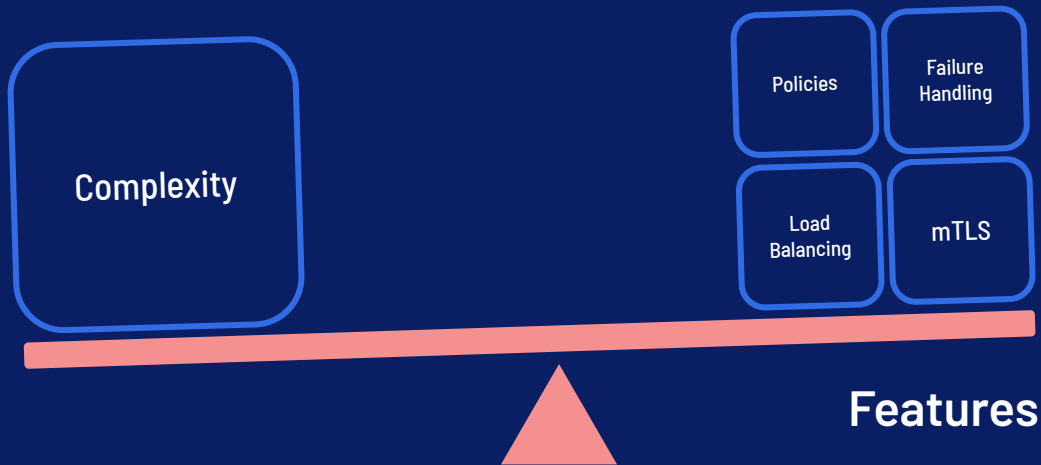
EVALUATING

Complexity vs value?



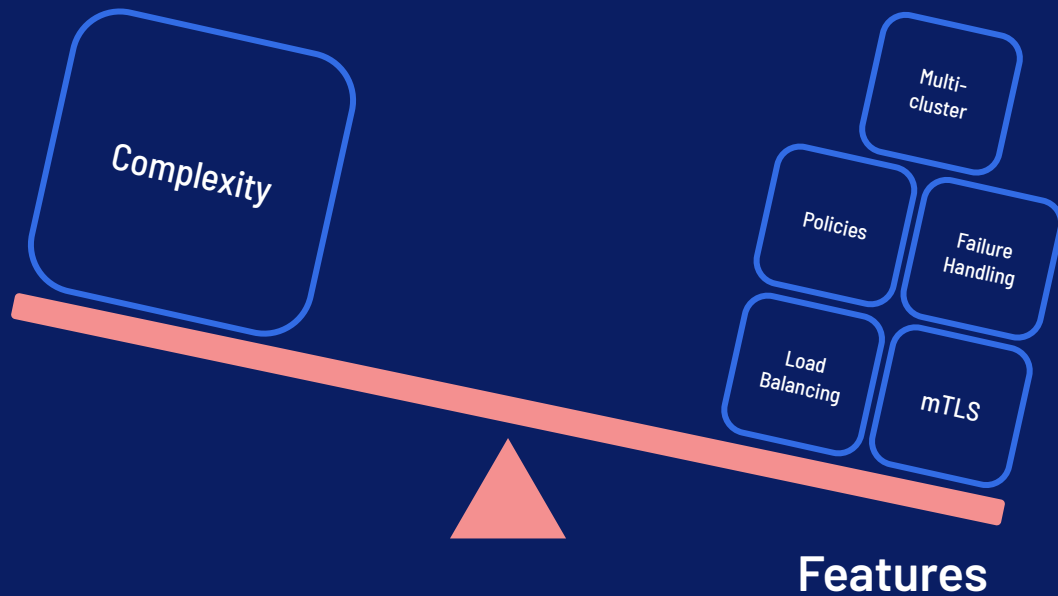
EVALUATING

Complexity vs value?



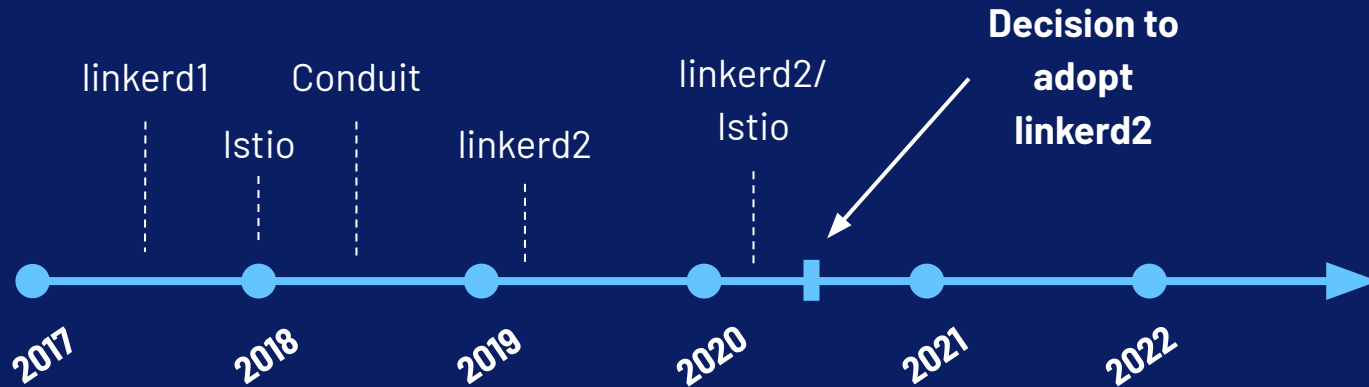
EVALUATING

Tipping the scale...



EVALUATING

Our service mesh evaluation story



Platform
Engineers

1,5

2

3

4,5

15

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EVALUATING

Which one to choose?



VS



MULTI-CLUSTER?



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BEFORE

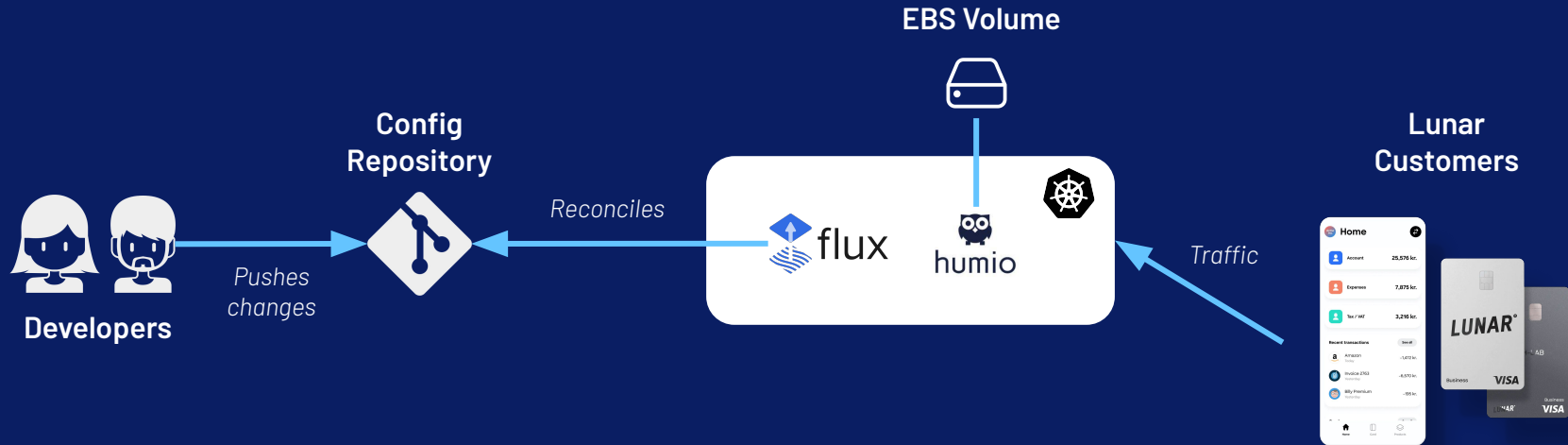
Replicated Observability Stack



Replicated complex stateful services for each environment.

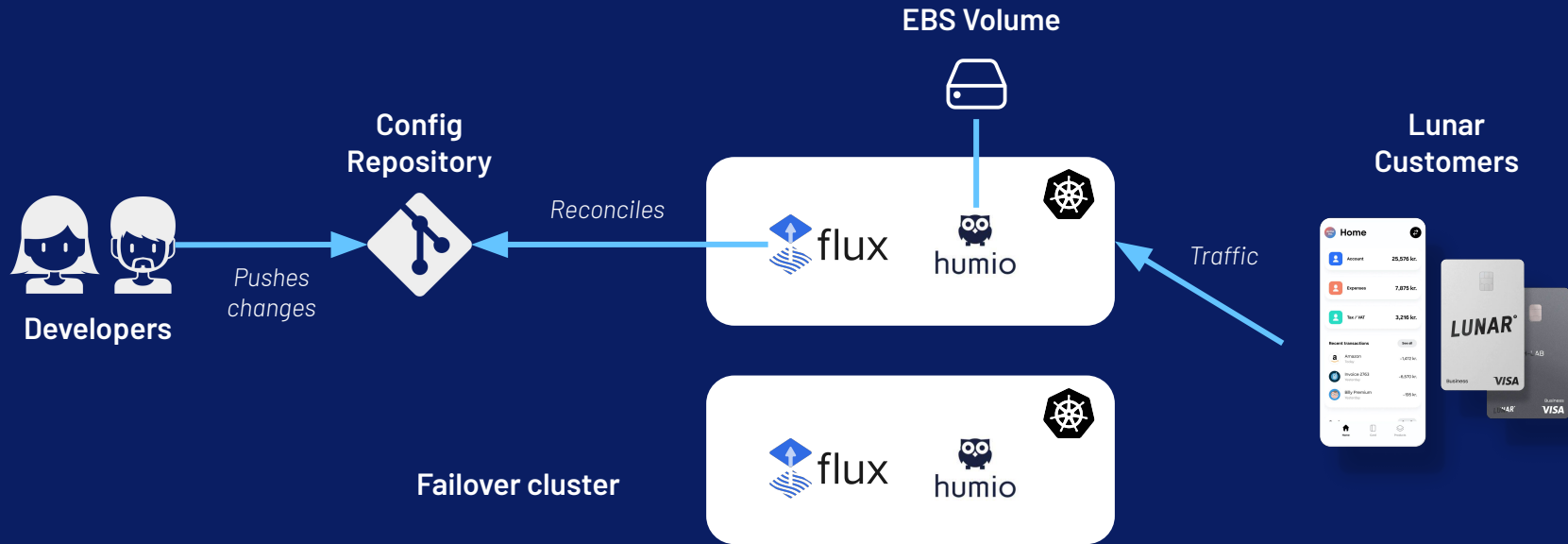
GOAL

Treating clusters as cattle...



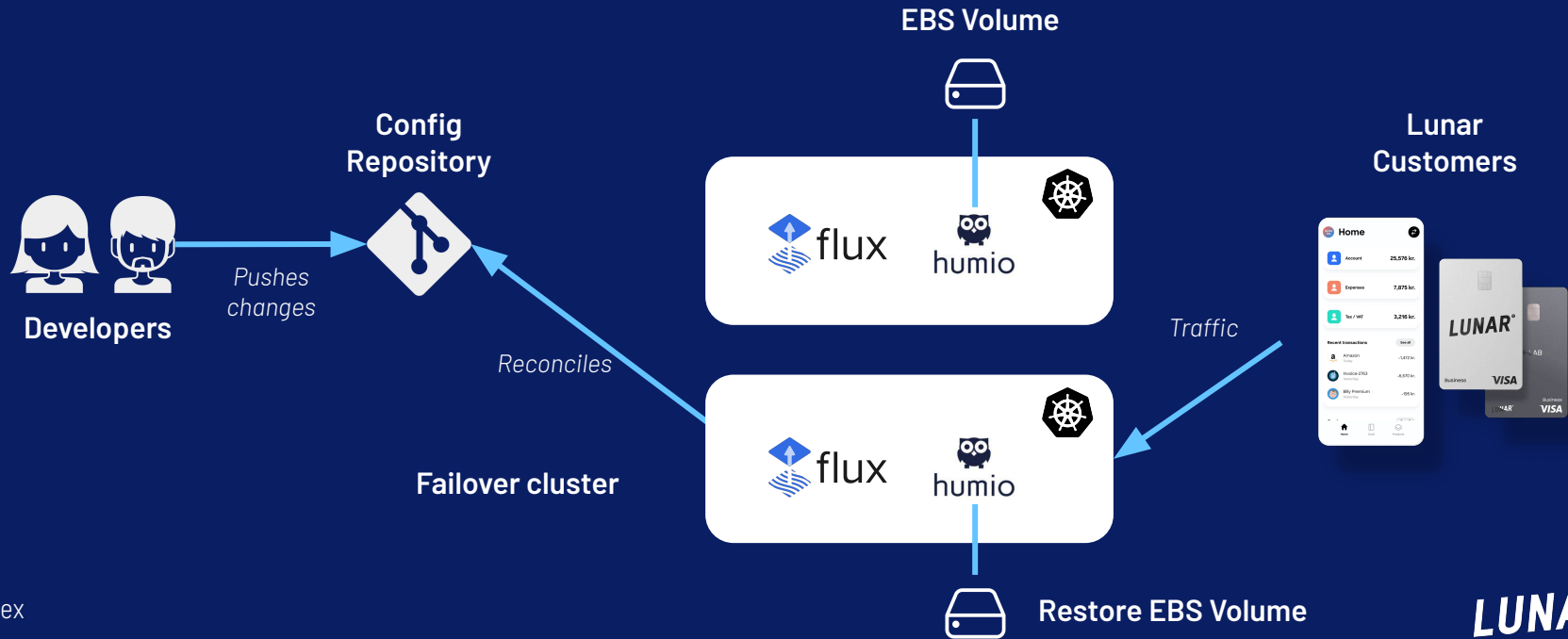
GOAL

Treating clusters as cattle...



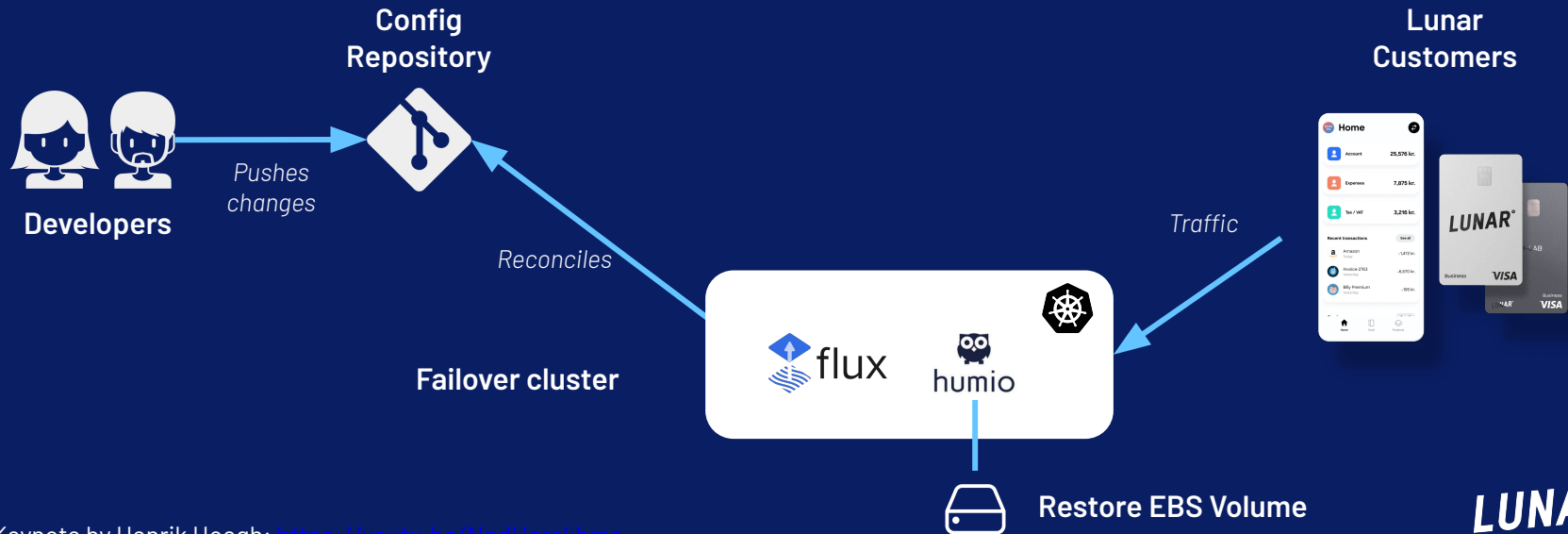
GOAL

Treating clusters as cattle...



GOAL

Treating clusters as cattle...



Keynote by Henrik Hoegh: <https://youtu.be/NpdHcrakhmo>

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NOW

Centralized Platform Tooling

Log
Management



Continuous
Integration



Developer
Portal



Developer
Productivity



Monitoring



Prometheus

Tracing



JAEGER

Cluster
Management

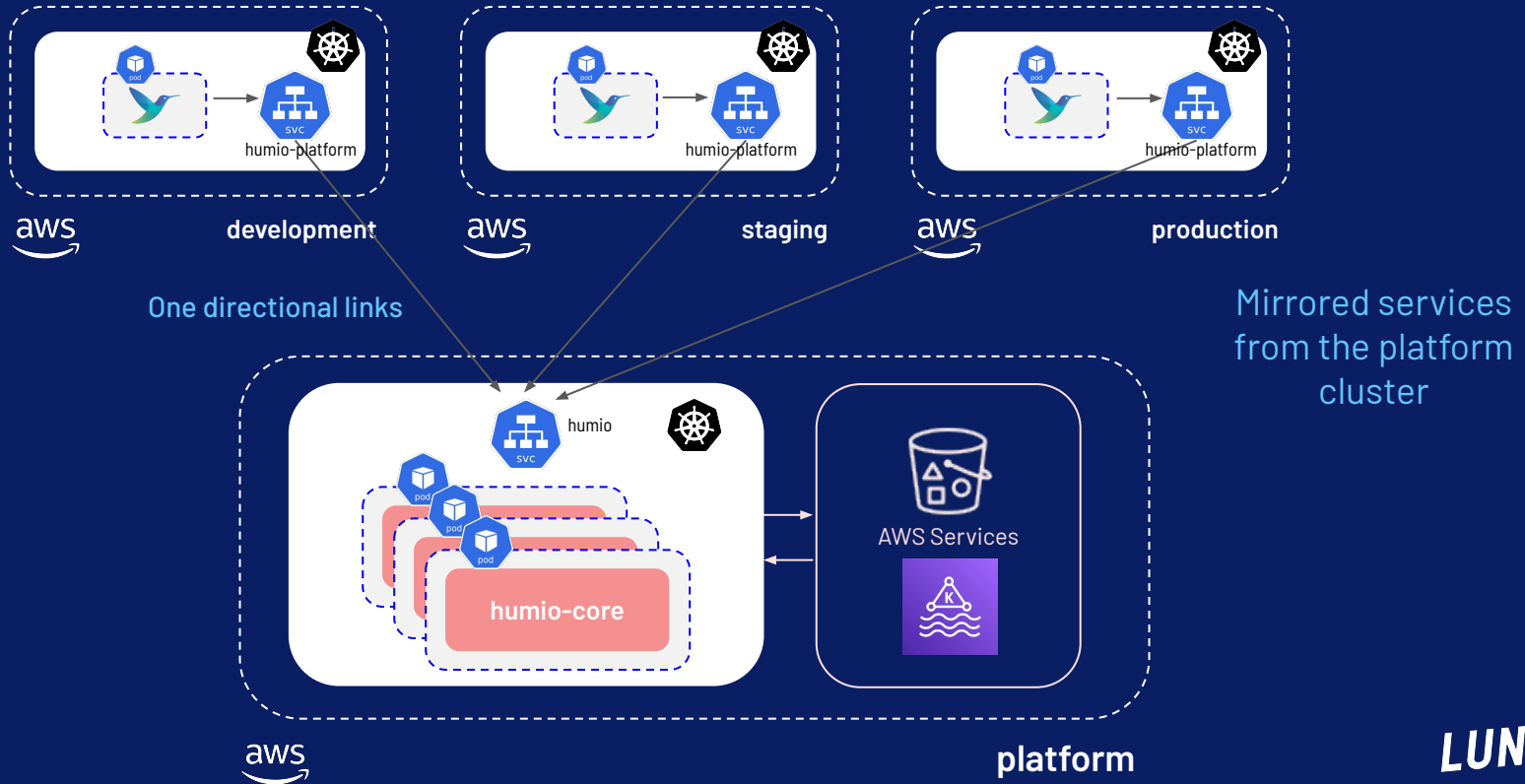


Release
Management



NOW

Centralized Log Management



PLATFORM ENGINEERING



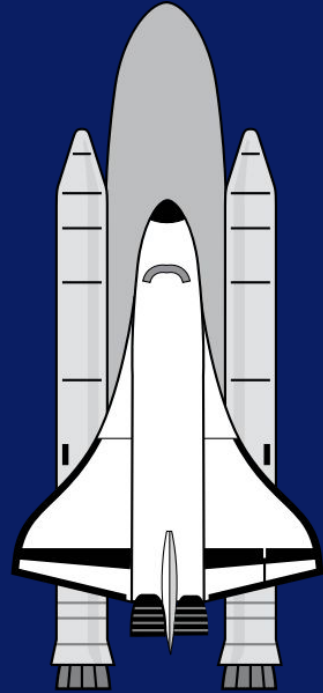
LUNAR[®]

THE

Lunar Platform Mission

Continuously accelerating our ability to deliver value to our customers with technology.

We do this by building and maintaining a trusted self-service platform that empowers Lunar developers to move fast, easy, efficiently, compliant, and secure focusing on high quality, self-service access to enabling technology.



HOW

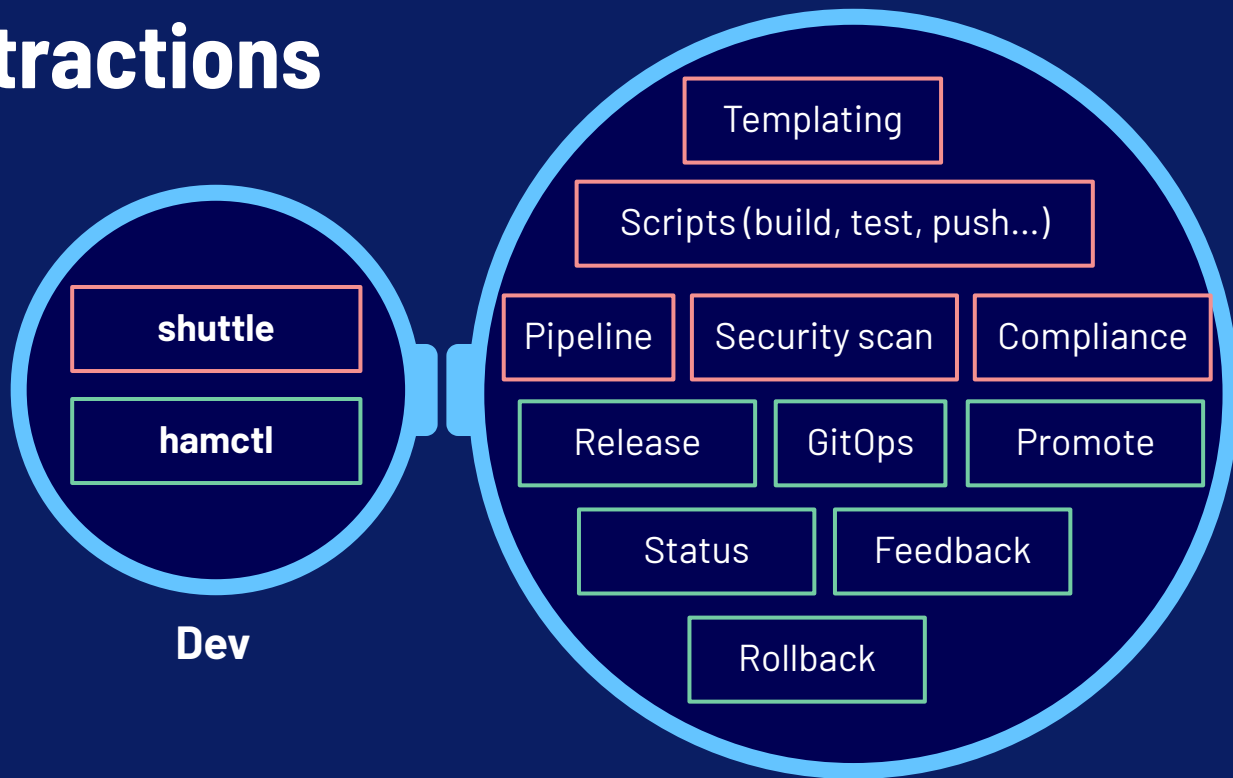
Building abstractions



shuttle



Release Manager



Dev

Platform

LUNAR[®]

HOW

Building abstractions

shuttle.yaml

```
plan: git://.../lw-shuttle-go-plan.git
vars:
  service: prometheus
  squad: odyssey
  domain: observability

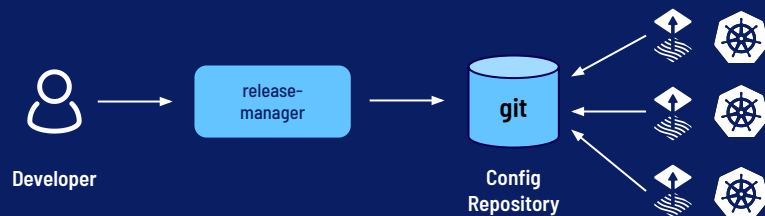
  ingress: true
  db: true

  k8s:
    dev:
      env:
        log.level: debug
```



shuttle

```
$ shuttle run build
$ shuttle run push
$ shuttle run generate_config
...
```



```
$ hamctl release -b main -e dev
$ hamctl status --service prometheus
```



Release Manager

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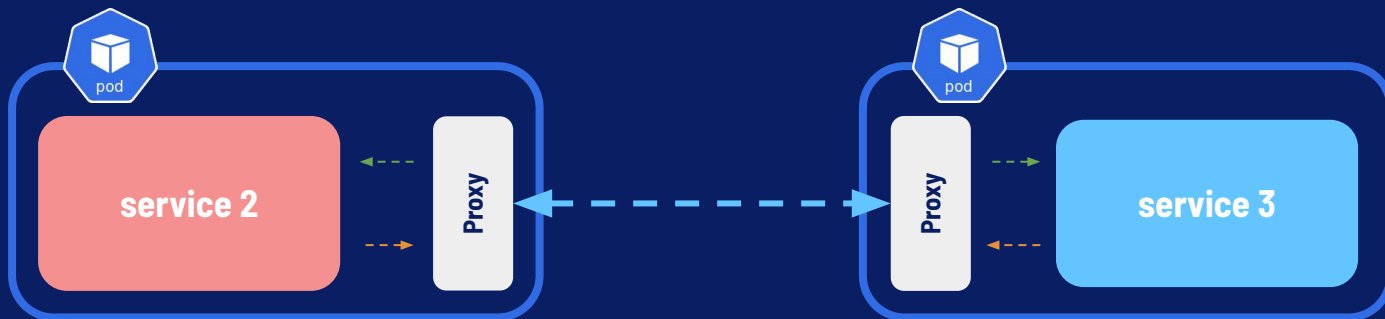
HOW DOES A
SERVICE MESH
HELP US AS A
BANK?



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FEATURE

Mutual TLS (mTLS)



**All communication is transparently
mutually encrypted (mTLS)**

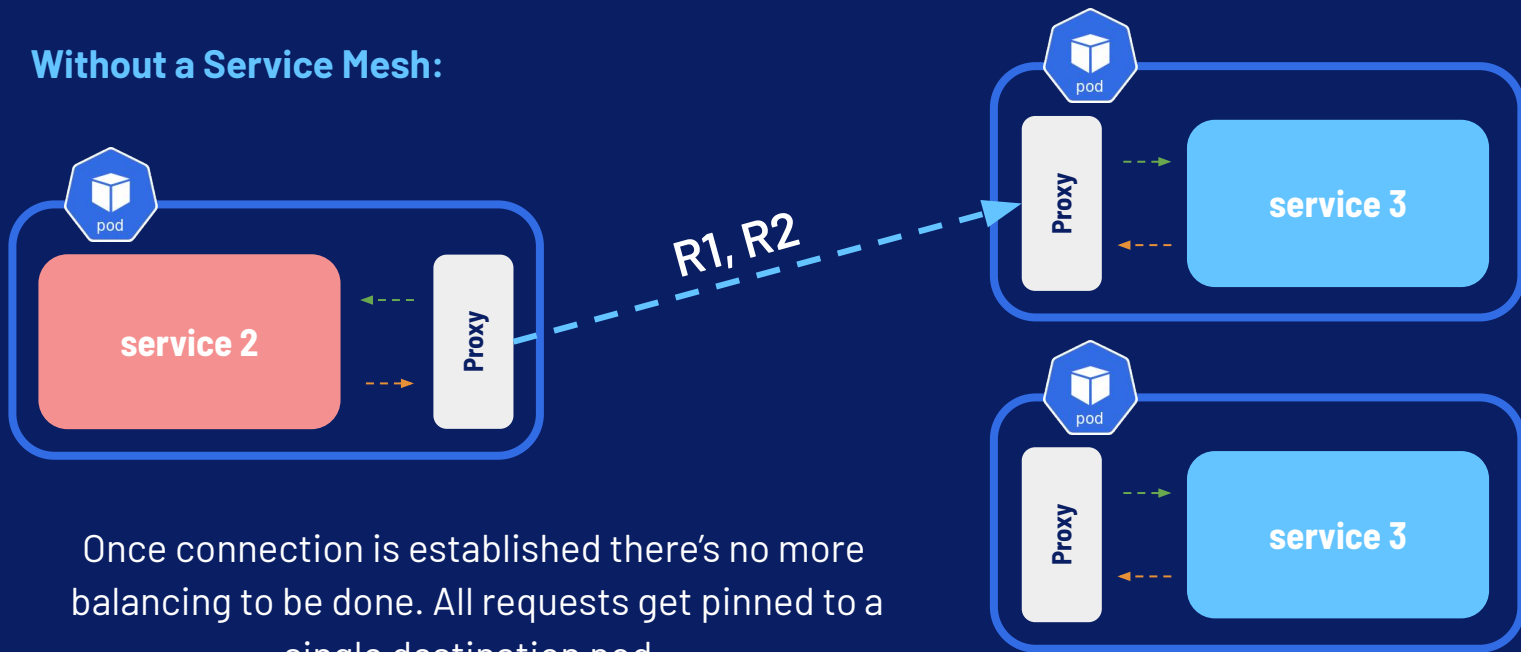
Pros: Increases security by minimizing internal man-in-the-middle attacks.

Step towards zero-trust networking

FEATURE

gRPC Load balancing

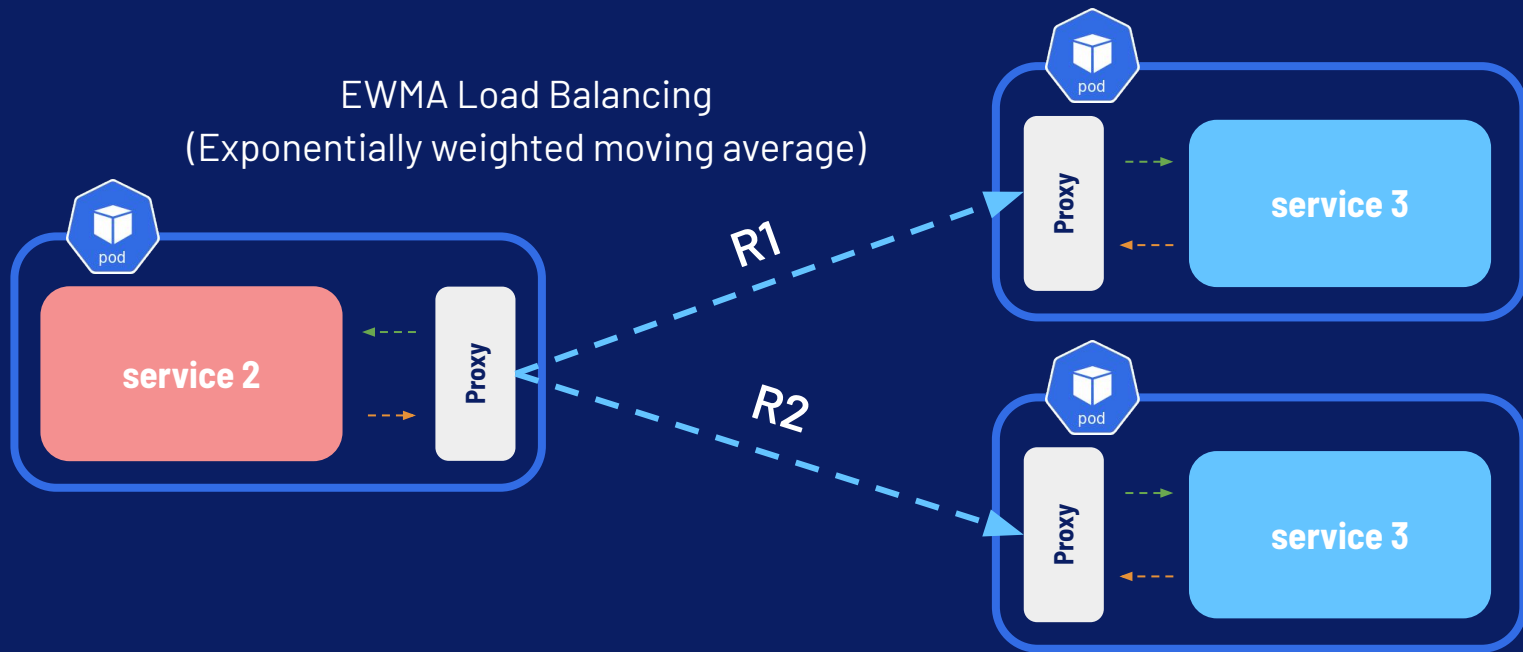
Without a Service Mesh:



Once connection is established there's no more balancing to be done. All requests get pinned to a single destination pod.

FEATURE

gRPC Load balancing



FEATURE

Service Profiles

Linkerd ServiceProfiles are generated from Swagger/Open API, or protobuf definitions.

Retries

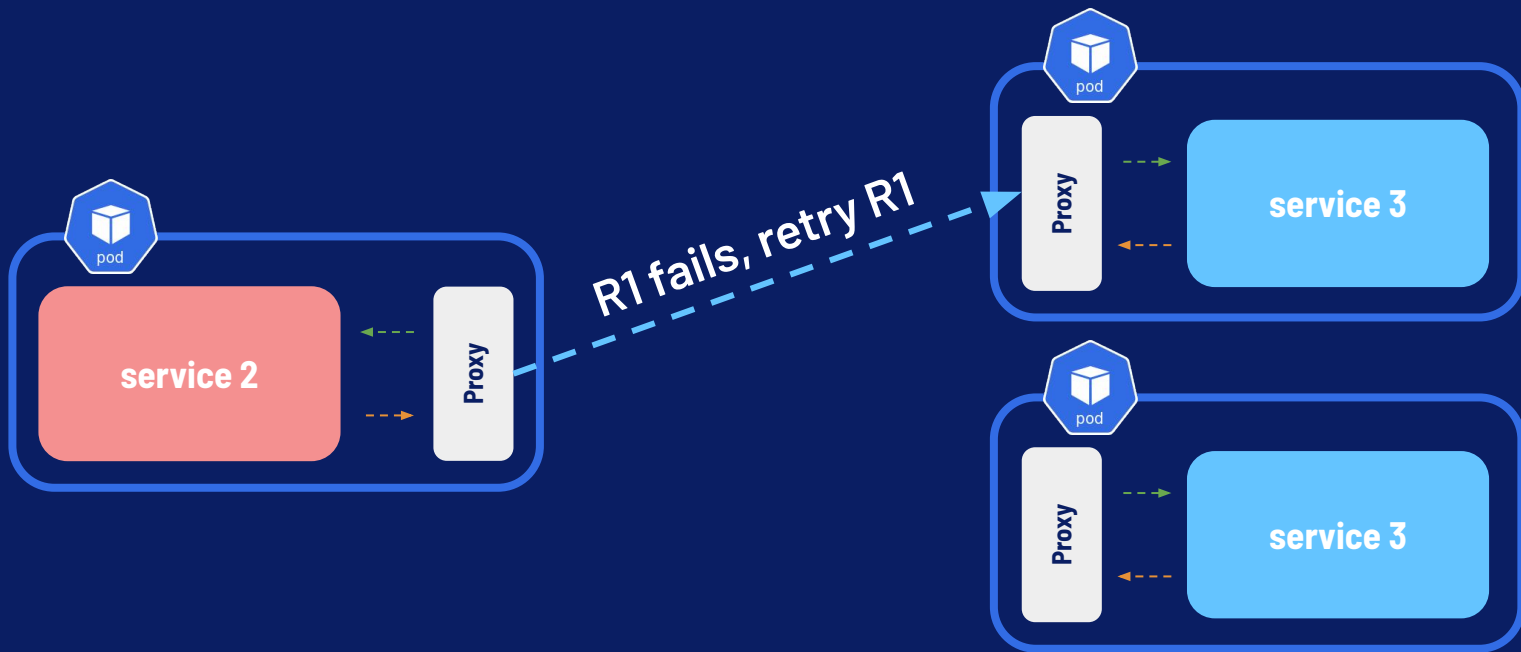
```
paths:  
  some-path:  
    get:  
      x-linkerd-retryable: true
```

Timeouts

```
paths:  
  some-path:  
    get:  
      x-linkerd-timeout: 500ms
```

FEATURE

Service Profiles

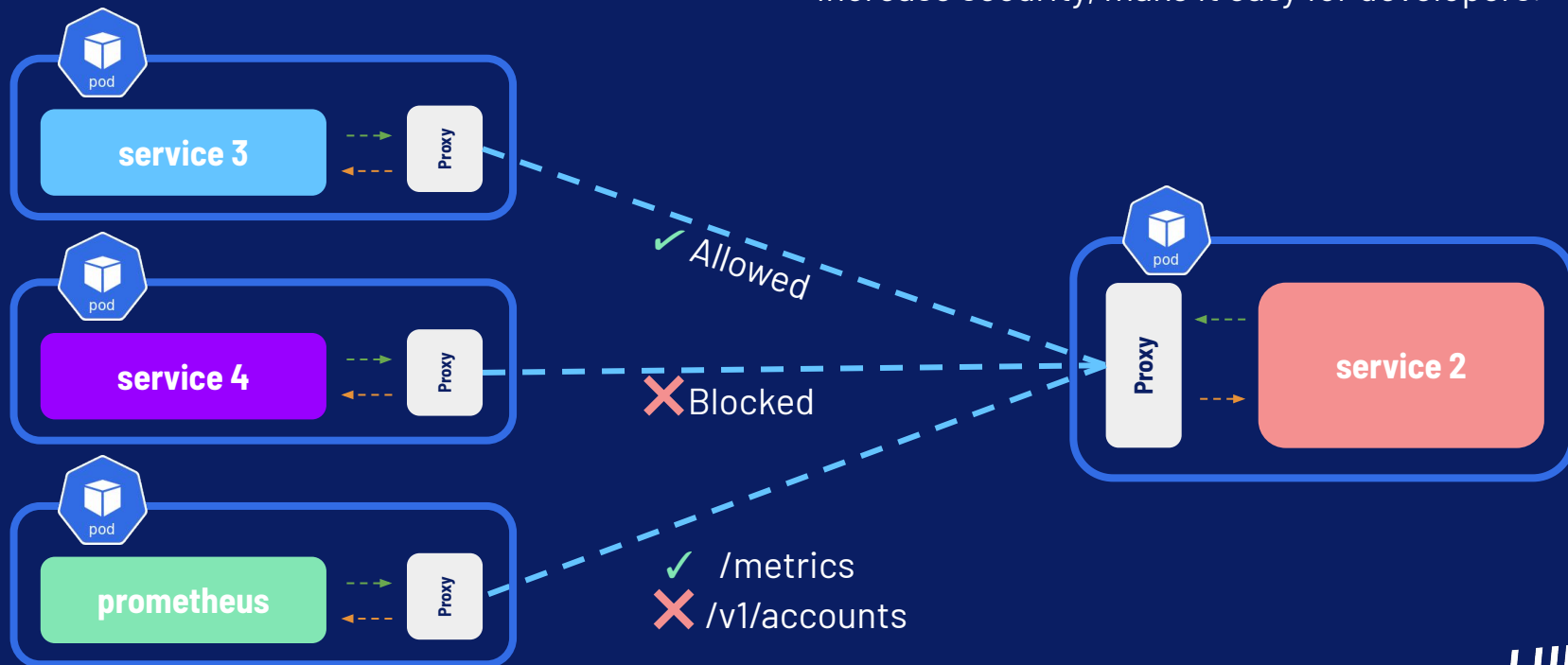


FEATURE

Policies

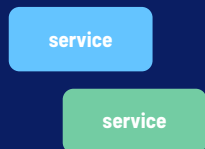
Follow principle of least privilege.

Increase security, make it easy for developers.



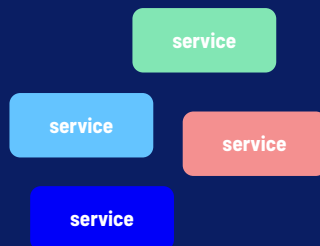
Incremental adoption

1: Testing per environment



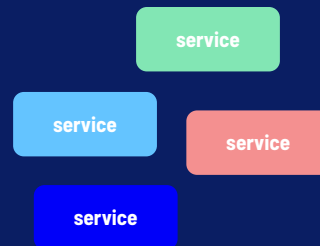
```
# alpha feature in shuttle.yaml
k8s:
  dev:
    linkerd: true
```

2: Global support



```
# beta feature in shuttle.yaml
k8s:
  linkerd: true
```

3: Enabled by default



```
# no special configuration
```

LINKERD MULTI-CLUSTER FUNCTIONALITY



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DIY

Linking two clusters



```
// Install linkerd-multicluster in both clusters
$ linkerd multicluster install | kubectl apply -f -

//Generate a link that allows services in east to be mirrored to west
$ linkerd --context=east multicluster link --cluster-name east |
  kubectl --context=west apply -f -

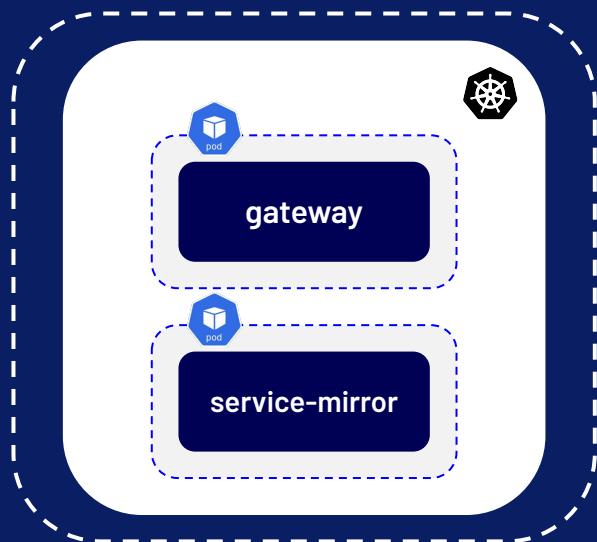
//Generate a link that allows services in west to be mirrored to east
$ linkerd --context=west multicluster link --cluster-name west |
  kubectl --context=east apply -f -
```

Source: <https://linkerd.io/2.11/tasks/installing-multicluster/>

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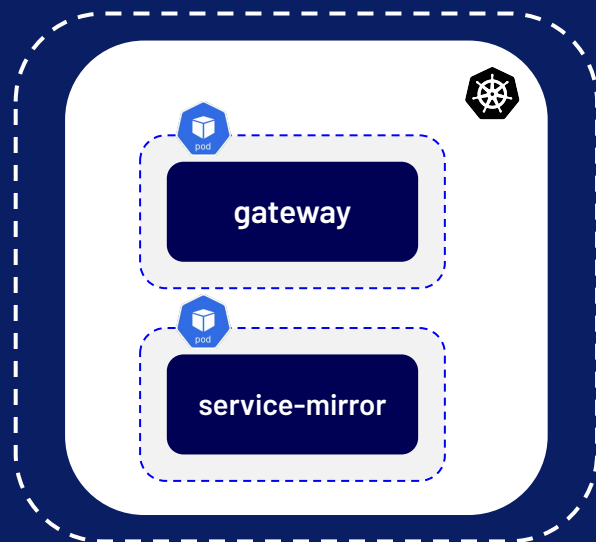
LINKERD

Multi-cluster components



aws

west

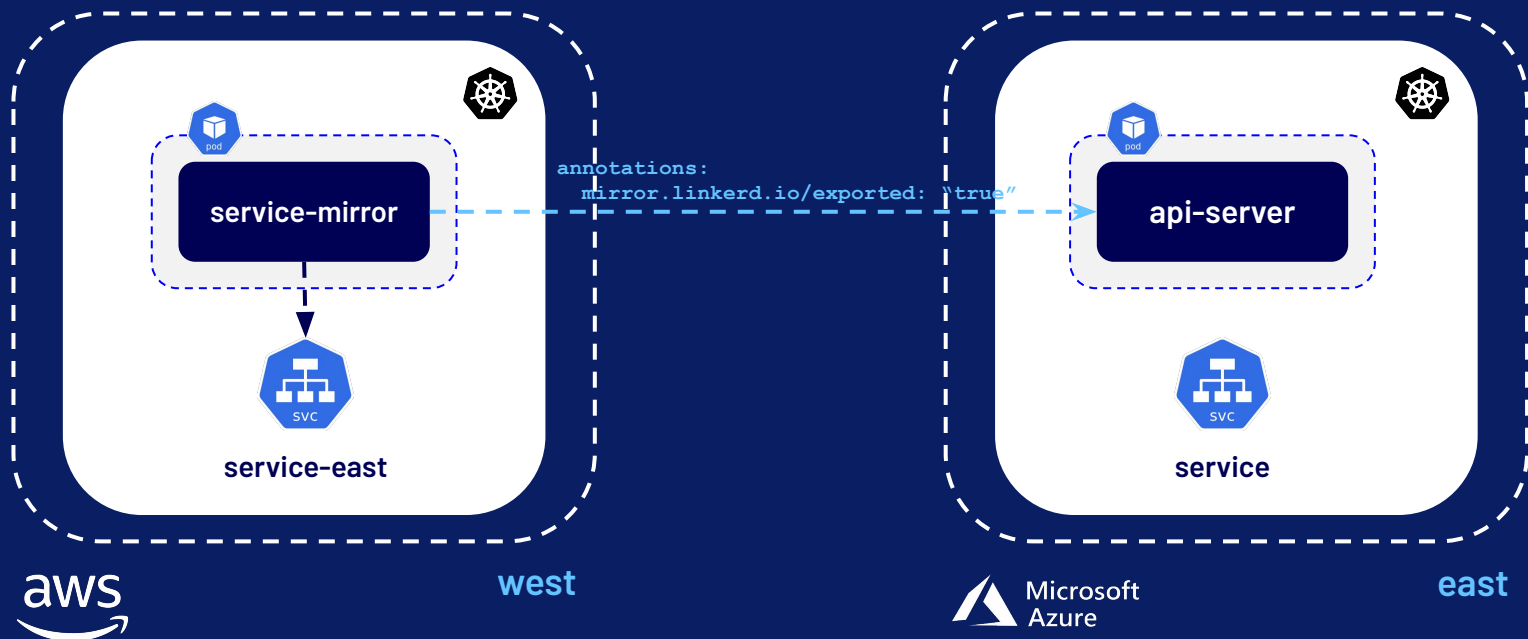


Microsoft
Azure

east

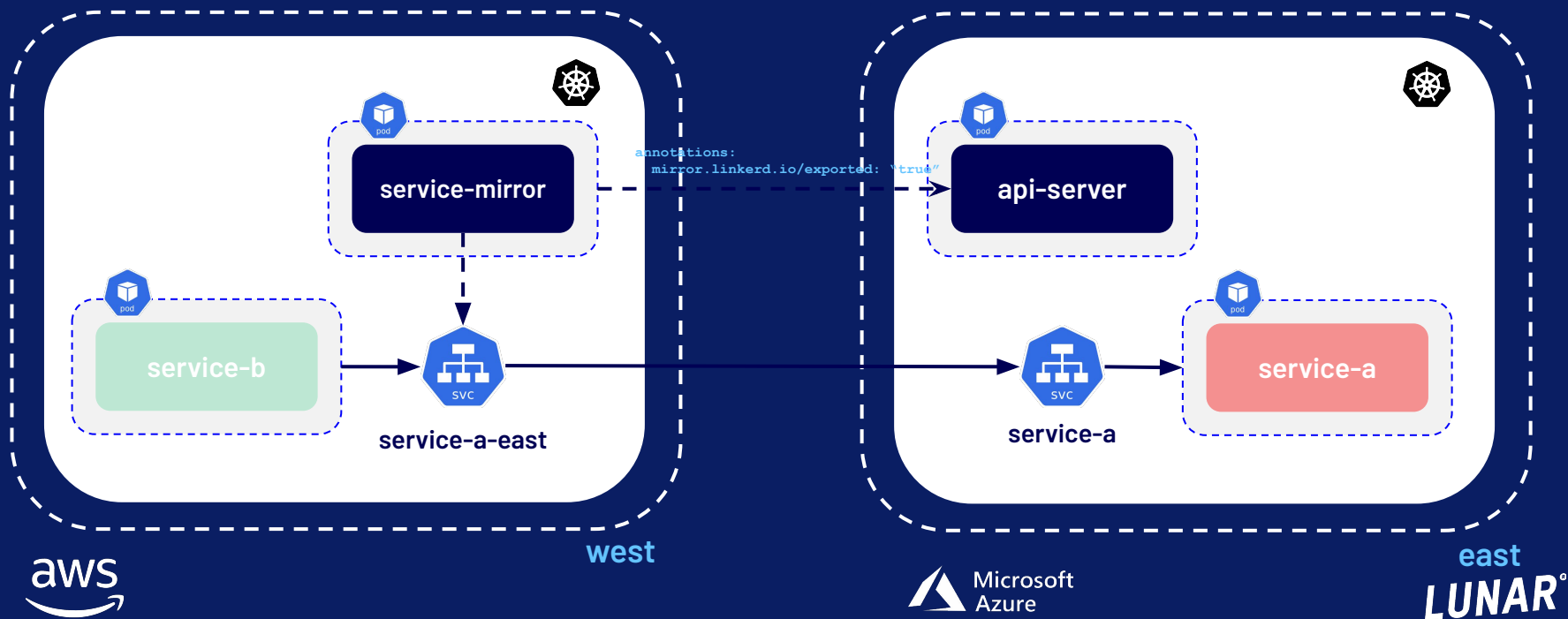
LINKERD

Service Mirror



LINKERD

Transparent Communication



BEYOND A SINGLE CLOUD



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Danish neobank Lunar acquires Swedish lender Lendify

Written by [Ruby Hinchliffe](#) 22nd April 2021



Lunar, the Nordic neobank with offices across Denmark, Sweden, and Norway, has acquired Lendify, a Swedish lending and savings platform.

The deal, the sum of which remains undisclosed, is pending regulatory approval but firms expect it to close by mid-May.

The Danish challenger intends to grow its consumer credit offering through Lendify, having launched its own credit buy now, pay later product back in December.

Lendify's loan book is worth some €300 million, bringing with it 40,000 active savings and loan customers.

Lunar, which has acquired 250,000 customers of its own, will also use Lendify's customer base to sure up its position in the Swedish market as part of a wider pan-Nordic expansion play.

"Lendify has for several years been considered one of



Ken Villum Klausen, Lunar's founder and CEO

Danish neobank Lunar acquires payments platform Paylike

Written by [Paul Hindle](#) 19th October 2021



Danish digital bank Lunar has acquired full-stack payments platform Paylike for an undisclosed sum.

Lunar says the deal will make it possible for its business customers to receive e-commerce payments without having to use an intermediary.

The firm has also launched a one-step checkout solution alongside the acquisition as it aims to make online payments "simpler and faster" for businesses and consumers.

Paylike operates across Europe and claims to handle a transaction volume of €100 million a year.

Speaking on the acquisition, Lunar founder and CEO, Ken Villum Klausen, says the move is part of the firm's plans to move "beyond banking", adding that payments will be "at the forefront of our next growth phase".

Founded in 2015, Lunar has offices across Denmark, Sweden and Norway and claims to serve more than 325,000 customers.

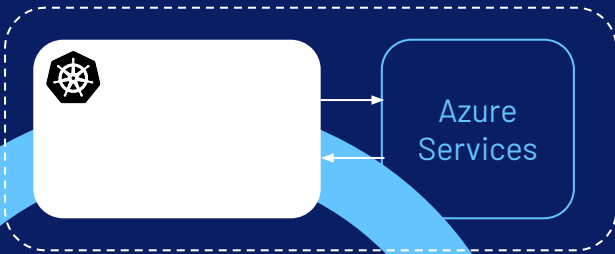
The firm started out as a personal finance management (PFM) app before securing its banking licence in August 2019.



Paylike was founded in 2015 and operates across Europe

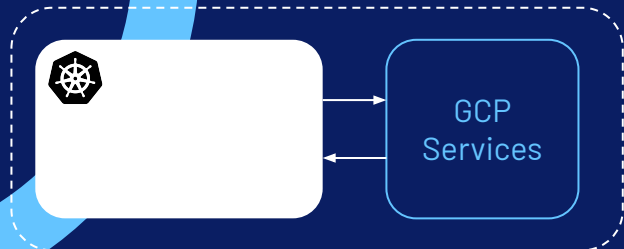
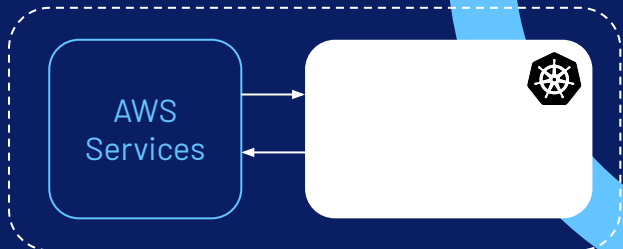


Lendify



The Lunar Platform

Building a new data platform

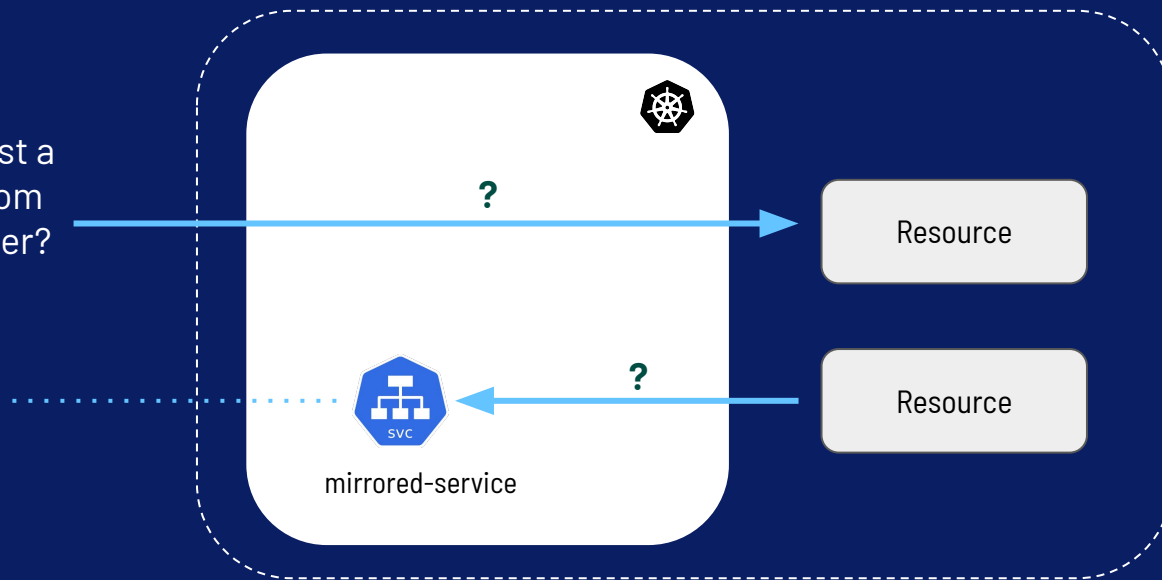


Google Cloud Platform

EDGE

Ingress/Egress

How to request a resource from another cluster?



How to request a mirrored service?

HOW

Introducing the Backbone Gateway

The responsibility of the backbone-gateway proxy is to provide a simple abstraction that allows exposing services running in cloud providers for services in a cluster or outside a cluster on a different provider.



EDGE

Egress

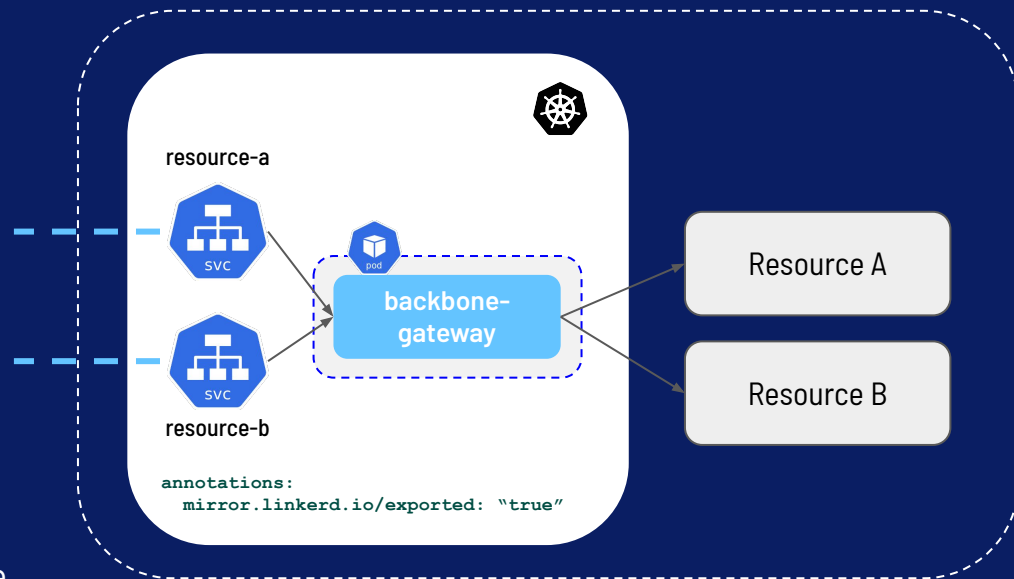
shuttle.yaml

targets:

- `hostName: resource-a`
`dnsName: resource-a.azurewebsites.net`
`environment: east`
`squad: maxus`
- `hostName: resource-b`
`dnsName: resource-b.azurewebsites.net`
`environment: east`
`squad: maxus`

Services will be mirrored to the opposite cluster and be available as e.g.

<http://resource-a-east.namespace.svc.cluster.local>



east

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EDGE

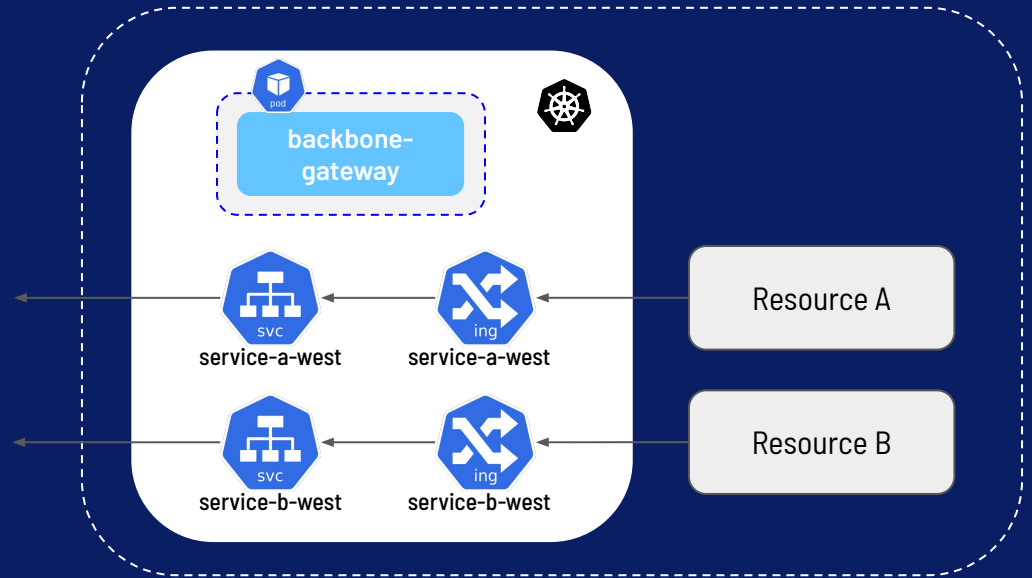
Ingress

shuttle.yaml

```
ingress:  
  - service: service-a  
    namespace: services  
    cluster: west  
    squad: nasa  
    port: 3000  
  
  - service: service-b  
    namespace: services  
    cluster: platform  
    squad: nasa  
    port: 3000
```

The backbone-gateway is responsible for creating ingress objects.

nginx-ingress-controller, external-dns, and cert-manager ensures networking

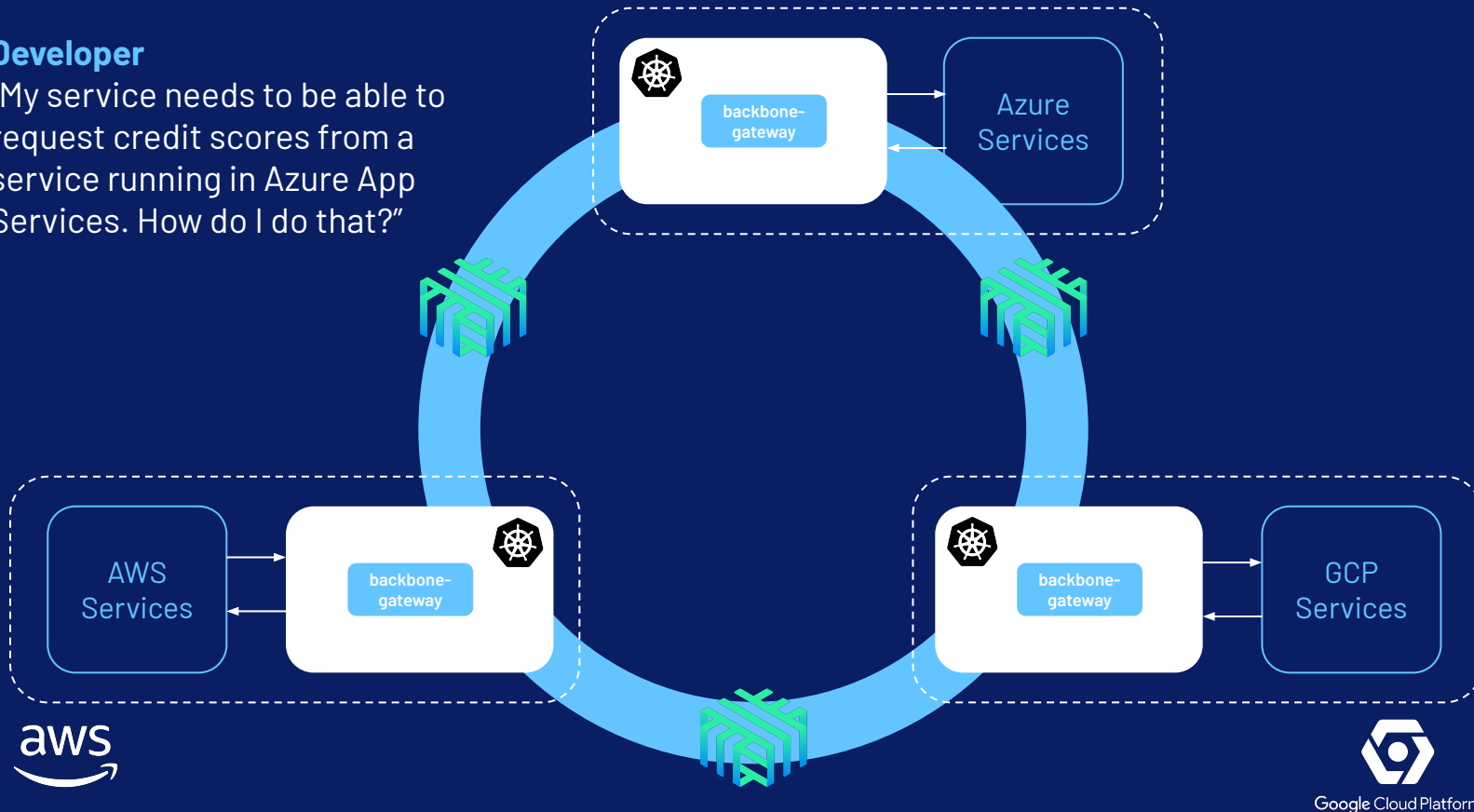


east



Developer

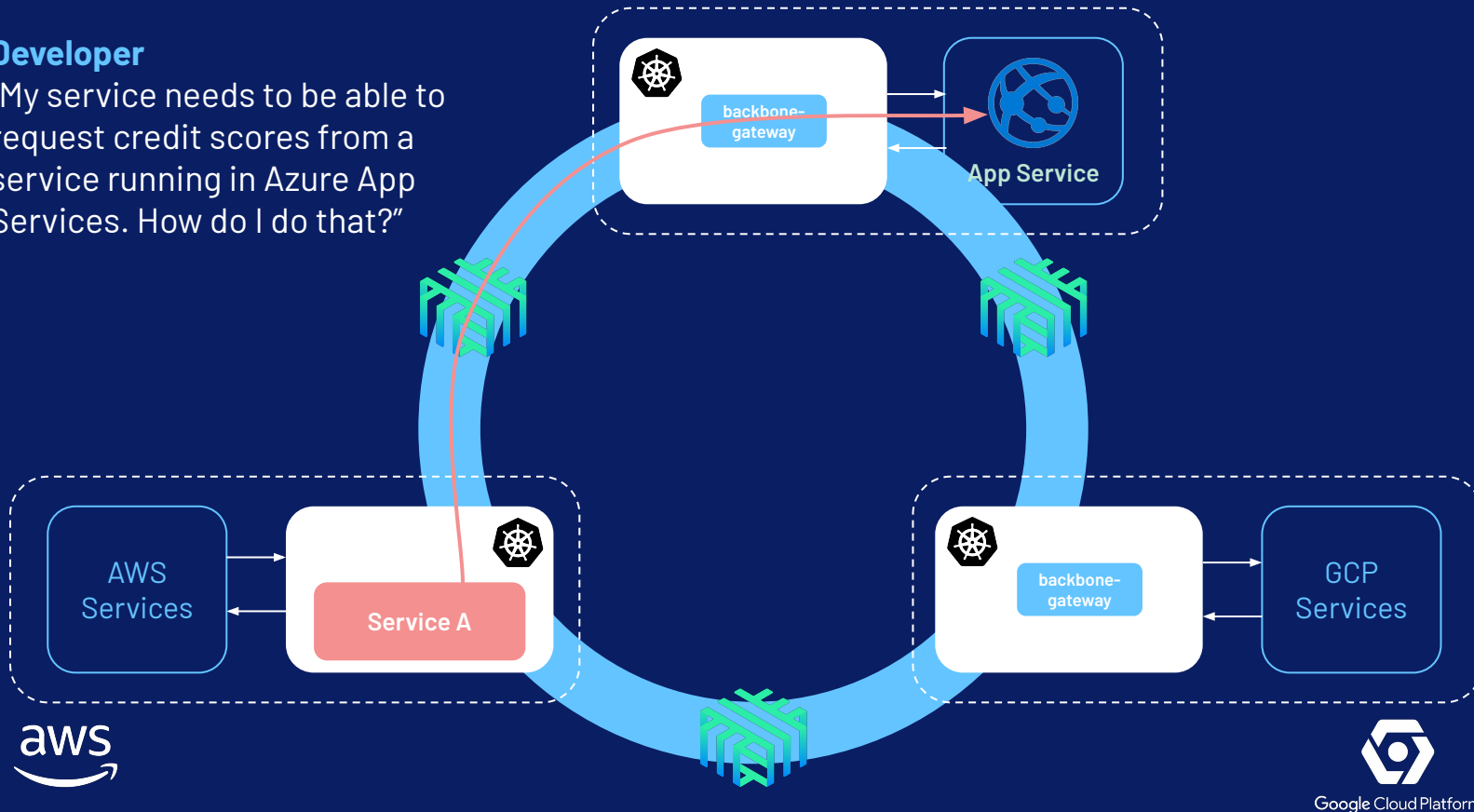
“My service needs to be able to request credit scores from a service running in Azure App Services. How do I do that?”





Developer

"My service needs to be able to request credit scores from a service running in Azure App Services. How do I do that?"



Monitor the Links

From AWS to GCP/Azure

AWS -> AWS: 10 ms
AWS -> GCP: 30 ms
AWS -> Azure: 25 ms

From Azure to GCP/AWS

Azure -> AWS: 60 ms
Azure -> GCP: 20 ms

From GCP to Azure/AWS

GCP -> AWS: 60 ms
GCP -> Azure: 20 ms

AWS (eu-west-1), **Azure** (westeurope), **GCP** (europe-west-1)



WRAPPING UP



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WRAPPING UP

KEY TAKEAWAYS

- Service Mesh increases security, reliability, and scalability of our setup.
- Backbone Gateway and linkerd ensures a communication backbone across clouds.
- Shuttle allows us to build abstractions that make it easy for our developers to adopt.
- GitOps and Release Manager allow us to deploy uniformly across clusters and clouds.

Thank you!

Contact:

Twitter: [@phennex](#)
Email: kni@lunar.app



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