

The Evolution of the **AppDirect** Kubernetes Network Infrastructure



KubeCon



CloudNativeCon

North America 2018



About Us



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TOC

1. The Beginnings
2. LBs, Consul Template and HAProxy
3. Strangler Pattern
4. API Gateway and Ambassador
5. Observability
6. Lessons Learned (Failures)
7. What's Next?





Who?



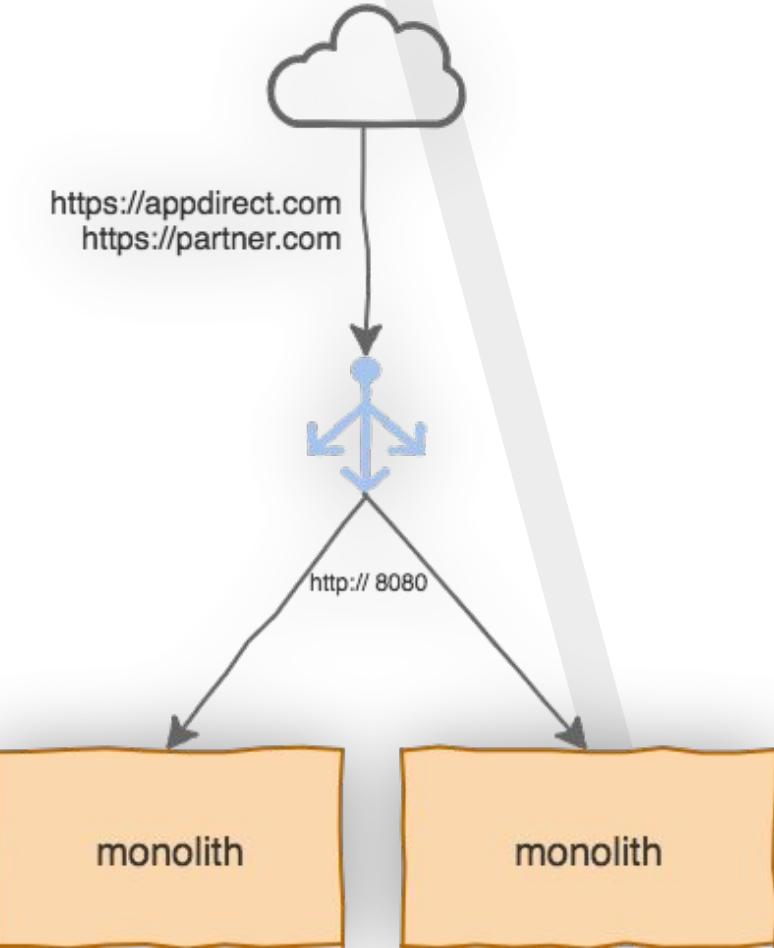
Load Balancer

Monolith

SNI

Cloud agnostic

Terraform automation



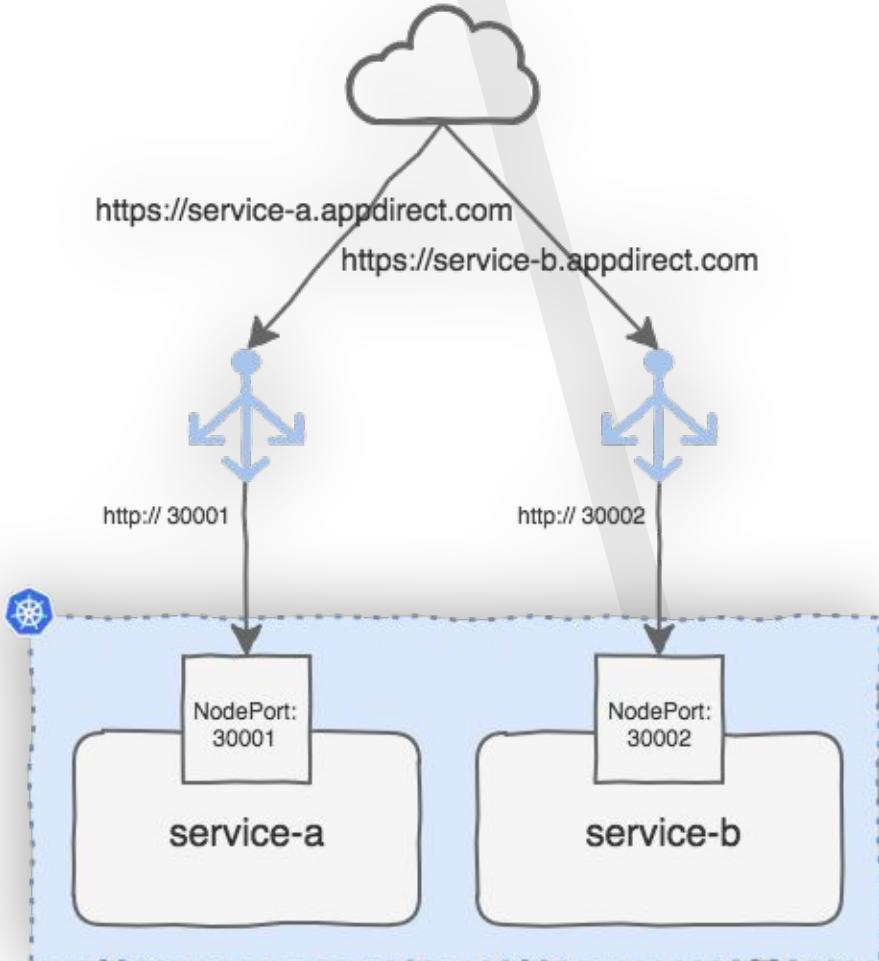
Load Balancers

Reserved ports

Duplications & Clutter

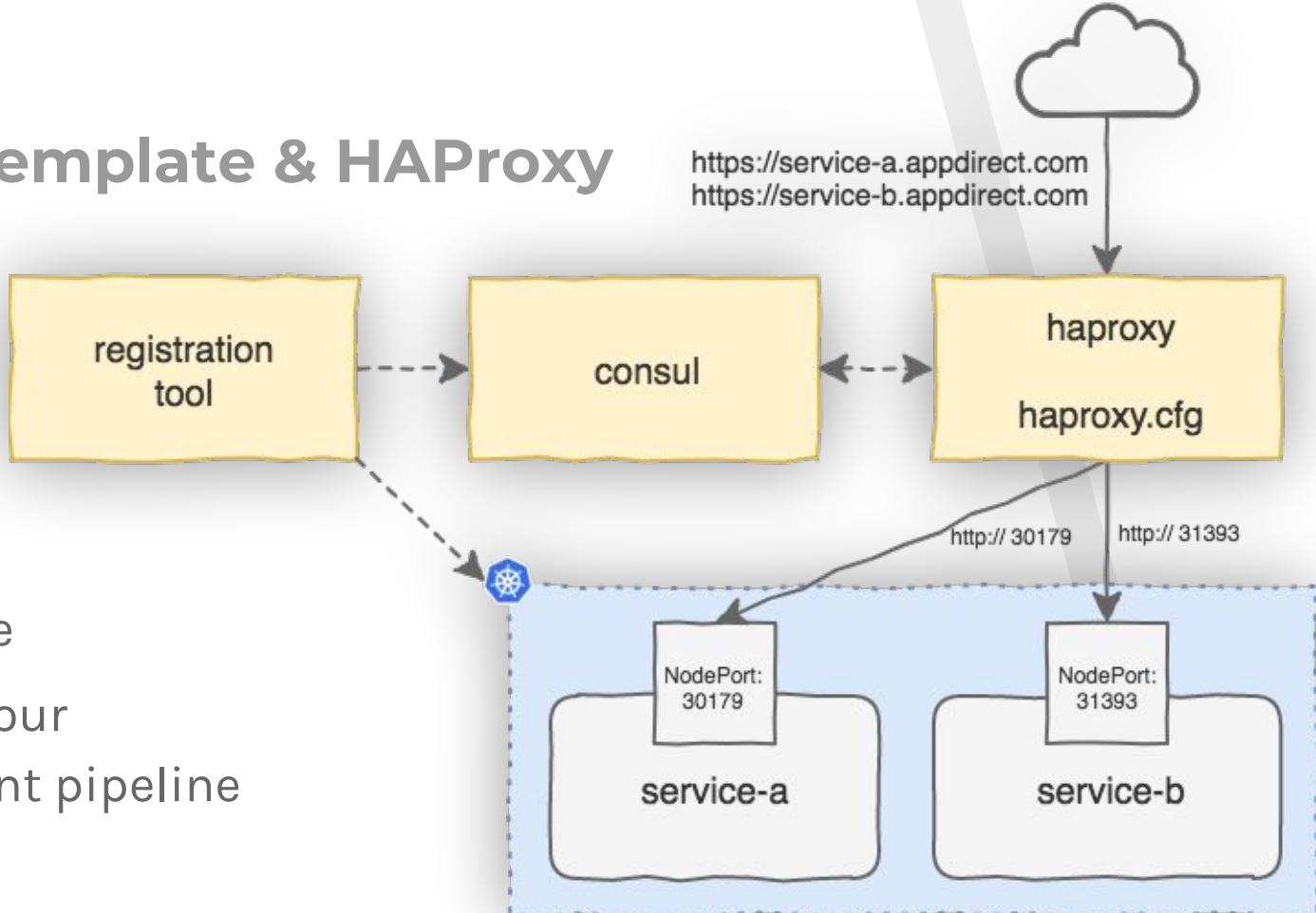
Development teams are
not autonomous

DNS



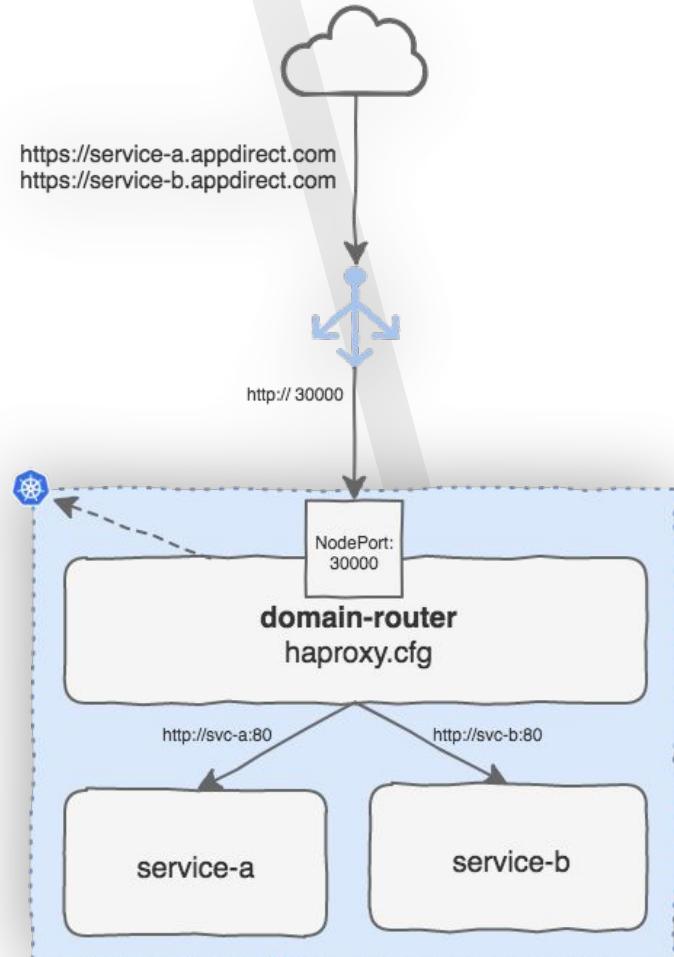
Consul Template & HAProxy

Complexity
Performance
Changes to our
deployment pipeline



Domain Router

```
apiVersion: v1
kind: Service
metadata:
  annotations:
    appdirect.com/ingress.name: service-a
  name: a-svc
spec:
  ports:
  - port: 80
```





Strangler Pattern

Landscape

Build vs Buy

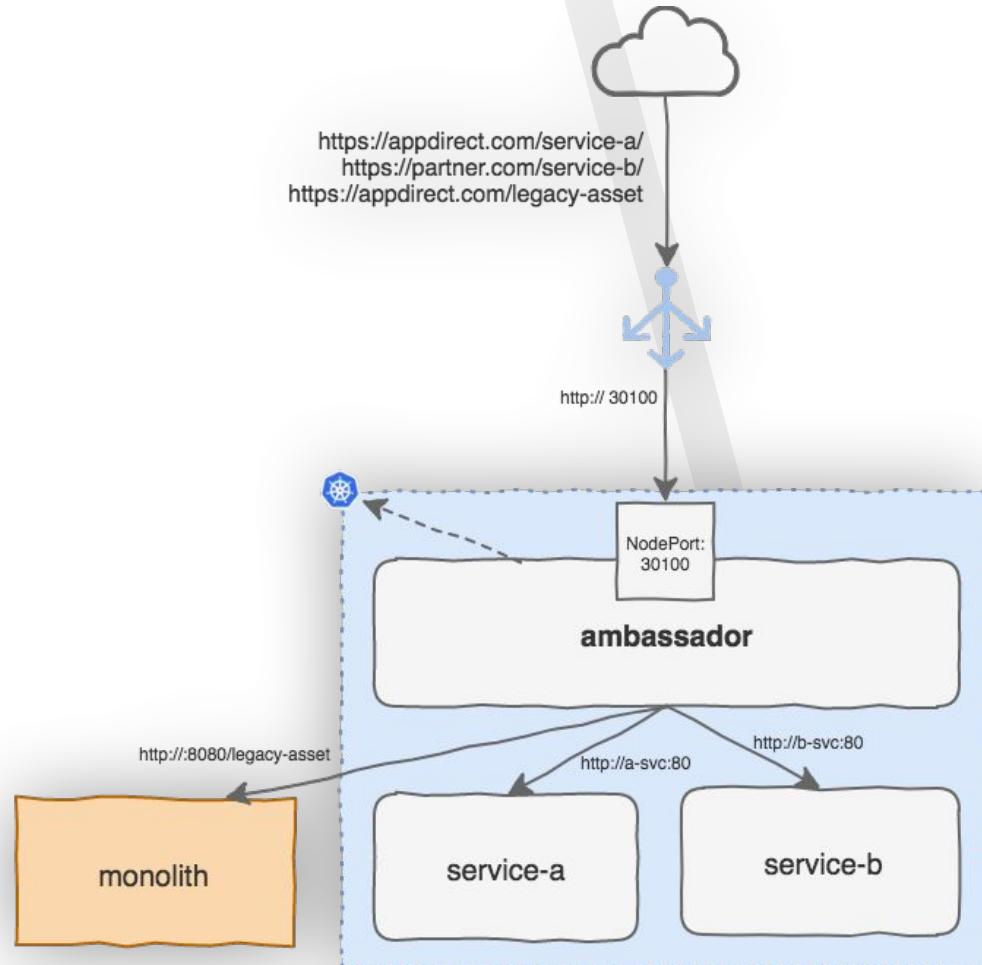
Cloud provider solutions

Open source solutions



API Gateway

```
apiVersion: v1
kind: Service
metadata:
  annotations:
    getambassador.io/config: |
      apiVersion: ambassador/v0
      kind: Mapping
      name: catch-service-a
      prefix: /service-a
      service: a-svc:80
      rate_limits:
        - descriptor: {}
      cors:
        origins: "*"
      name: a-svc
spec:
  ports:
  - port: 80
```



Ambassador Architecture

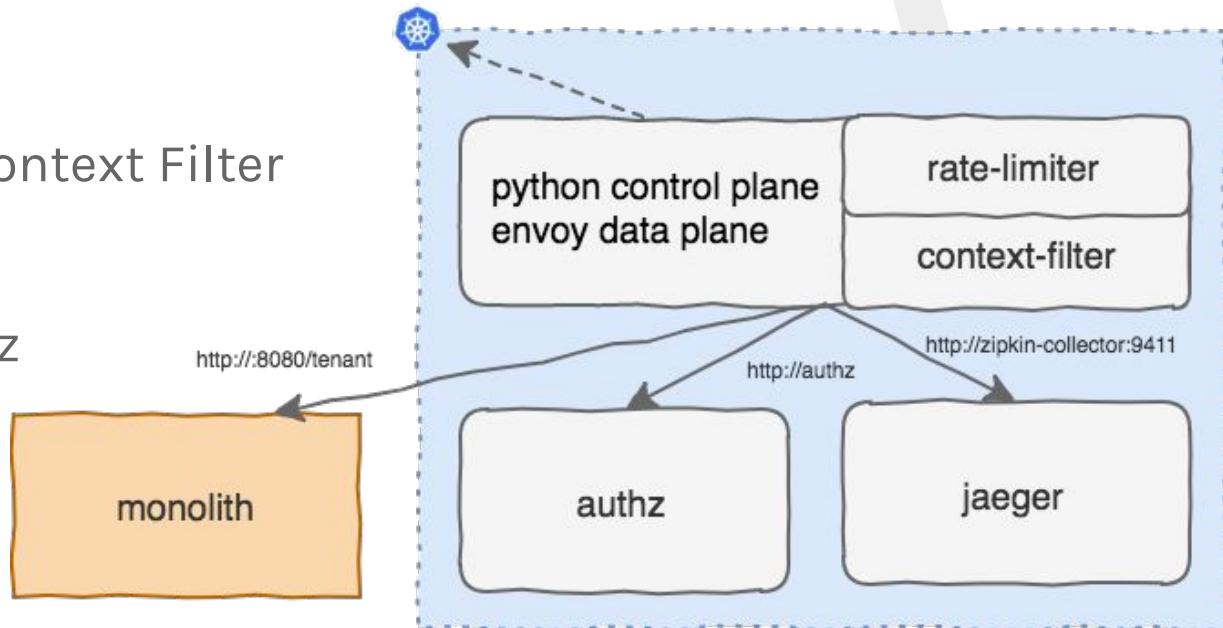
Ambassador

Rate Limiting

Authentication / Context Filter

Tracing

Monolith and Authz

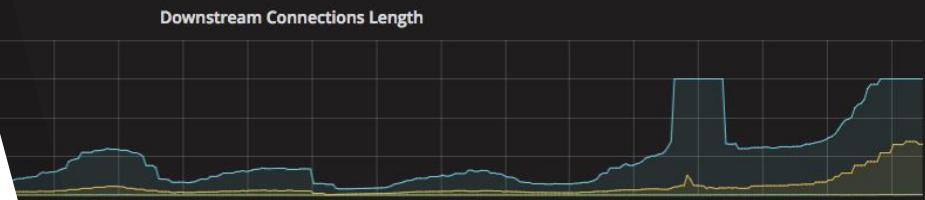
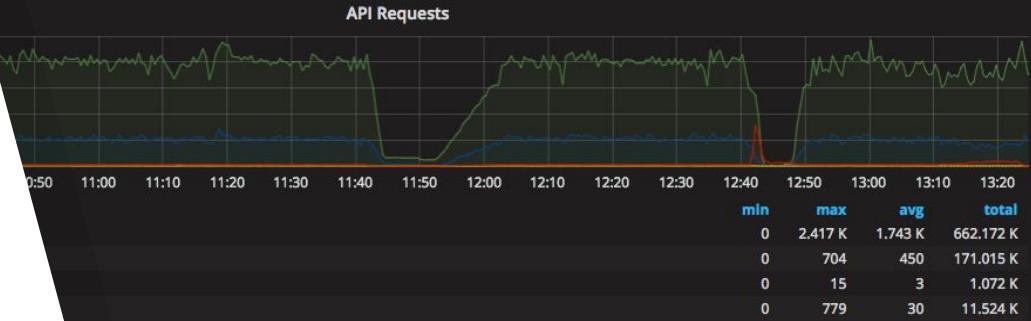


Observability

Logs

Traces

Metrics



<https://grafana.com/dashboards/4698>

Lessons Learned

(Where did we fail?)



Everything went well...
not!

Layers | Layers

- ▶ Org Structure
- ▶ Different technologies
- ▶ Alignment
- ▶ HTTP Proxies



Contributing to Open Source is hard

(but so rewarding!)

- ▶ First contact is key
- ▶ Aligned on the product vision
- ▶ Huge motivator



Watch out for Defensive Decisions

- ▶ Before Ambassador, we spent 6 months on another POC
- ▶ Should we start over?
- ▶ How will leadership see this?
- ▶ How will the team react to this?



API Gateway will not fix your Culture

- ▶ “If you build it, they will come”
- ▶ Our monolith is still around
- ▶ Code freeze is not an option for us



What's Next for AppDirect

Reducing the number of layers (HAProxy -> ELB -> HAProxy -> API Gateway) to improve debugging

More CRDs (RabbitMQ, Databases, Ambassador)

Service Mesh

Chaos Engineering

Continuous Deployment, Canaries

What's Next for Ambassador

Broader protocol support: gRPC-Web, GraphQL, TCP

More load balancing algorithms: sticky sessions,
Maglev

Simplify contributor onboarding: CI/tests on PR,
better developer guides

Total system integrity: Insure that one bad
configuration is isolated and does not impact
Ambassador



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Thank you!