

Sail in the Cloud

An Introduction to Istio

Alex Soto @alexsotob



Who Am I?

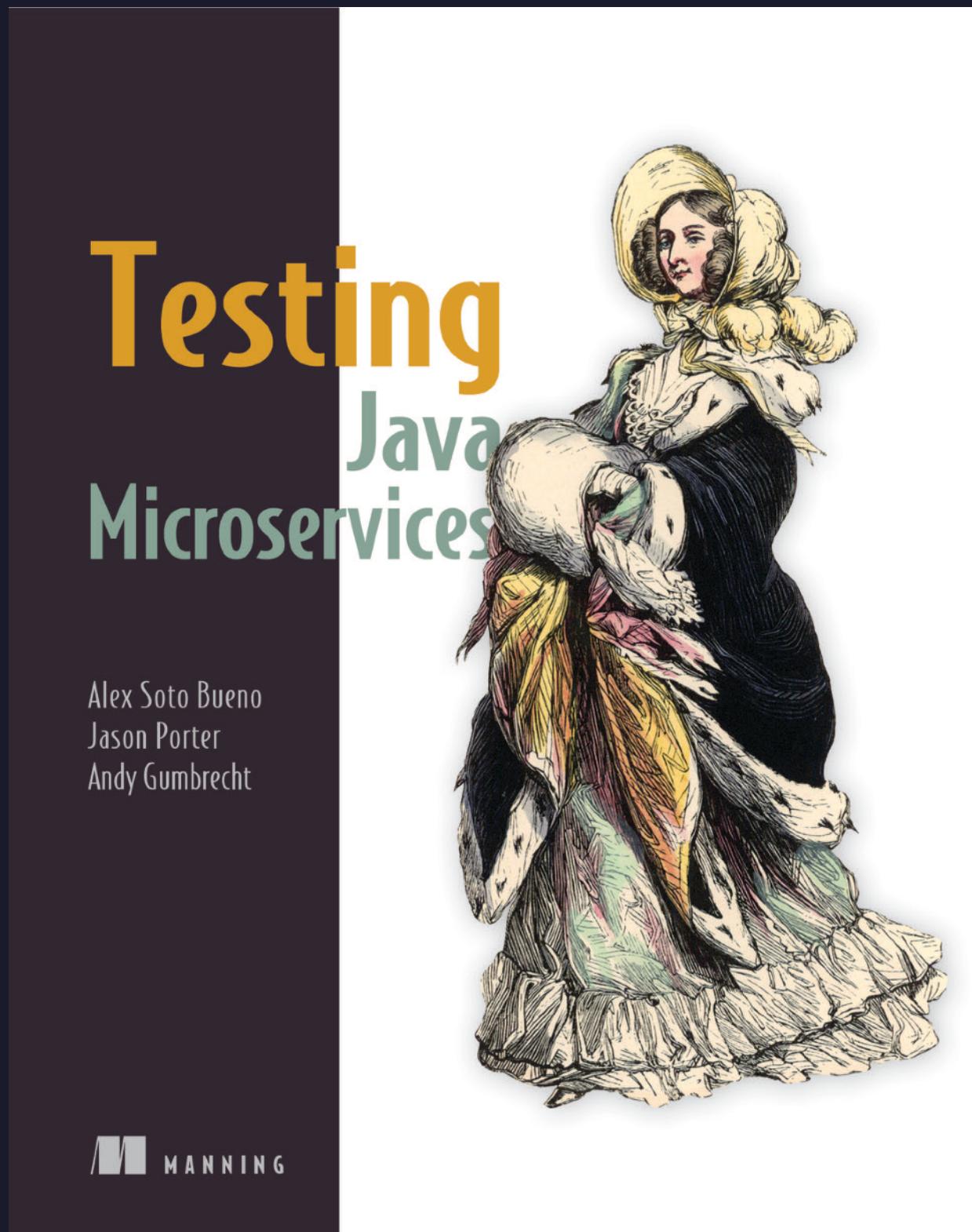
Alex Soto

Red Hat Engineer

www.lordofthejars.com

@alexso**tob**





<https://www.manning.com/books/testing-java-microservices>



PT-BR- ATENÇÃO: ESTE CABO DEVE SER UTILIZADO APENAS COM ALIMENTAÇÃO ELÉTRICA DE **220-240 V!**

Ру- ВНИМАНИЕ! ЭТОТ КАБЕЛЬ МОЖНО ИСПОЛЬЗОВАТЬ ТОЛЬКО ДЛЯ ПОДКЛЮЧЕНИЯ К ЭЛЕКТРОСЕТИ НАПРЯЖЕНИЕМ **220—240 В!**

Ελ- ΠΡΟΕΙΔΟΠΟΙΗΣΗ: ΑΥΤΟ ΤΟ ΚΑΛΩΔΙΟ ΠΡΕΠΕΙ ΝΑ ΧΡΗΣΙΜΟΠΟΙΕΙΤΑΙ ΜΟΝΟ ΜΕ ΠΡΙΖΑ ΓΙΑ ΤΡΟΦΟΔΟΣΙΑ **220-240V**



TÜ- BU KABLO YALNIZCA **220-240V** ELEKTRİK ŞEBEKESİ İLE KULLANILMALIDIR!

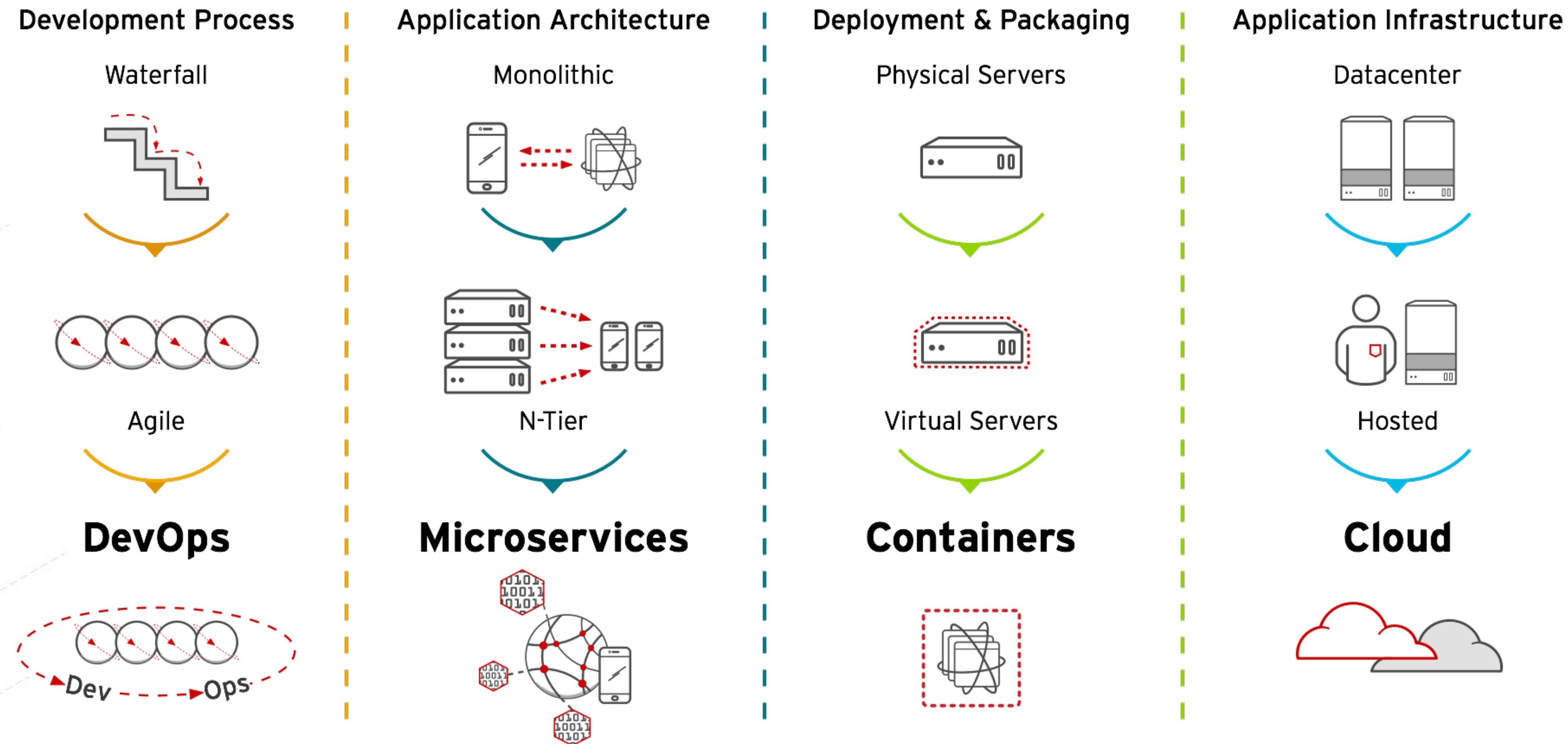
PL- OSTRZEŻENIE: TEGO KABLA WOLNO UŻYWAĆ WYŁĄCZNIE ZE ŹRÓDŁEM PRĄDU ELEKTRYCZNEGO O NAPIĘCIU **220-240 V!**

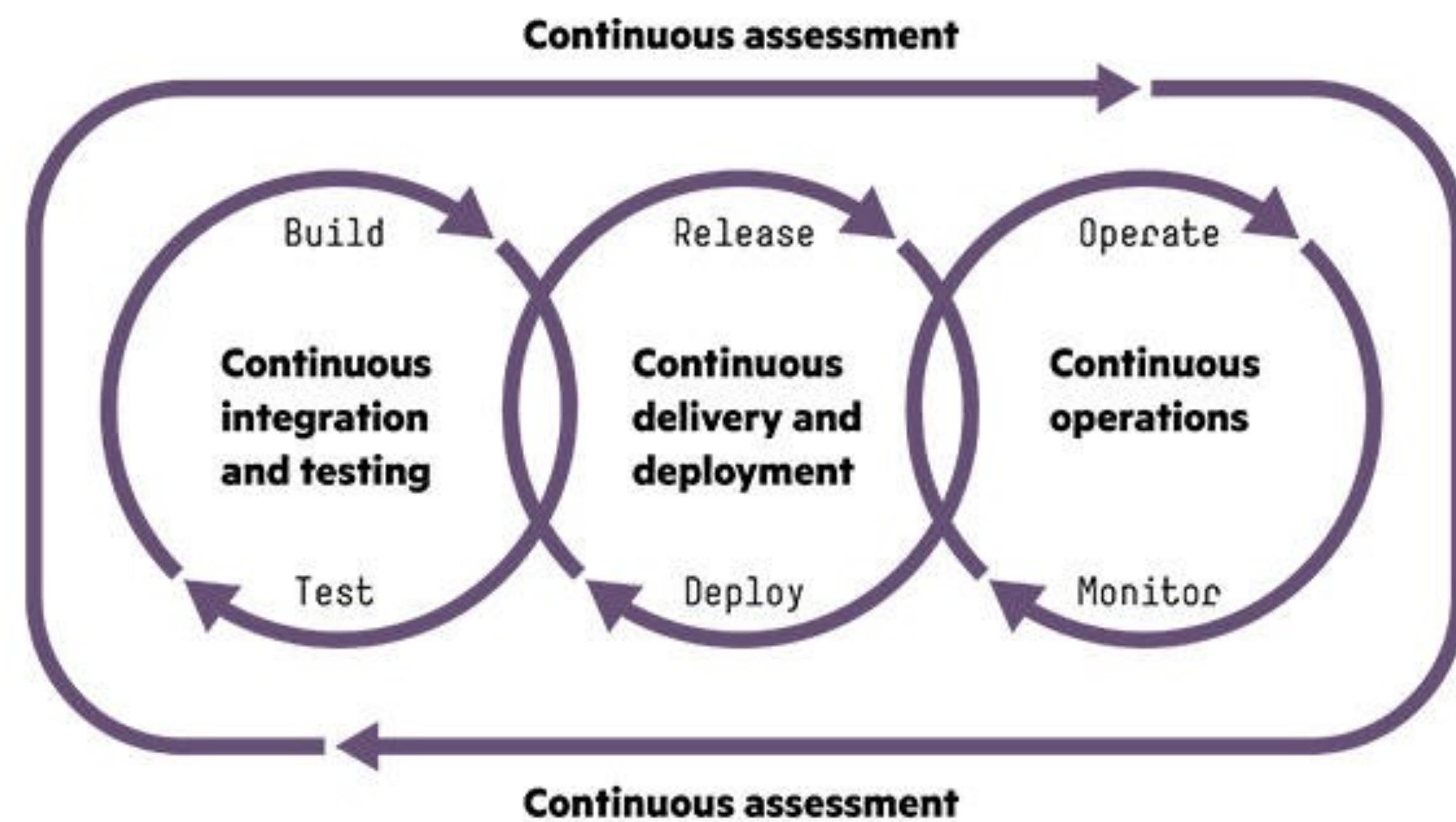
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Questions

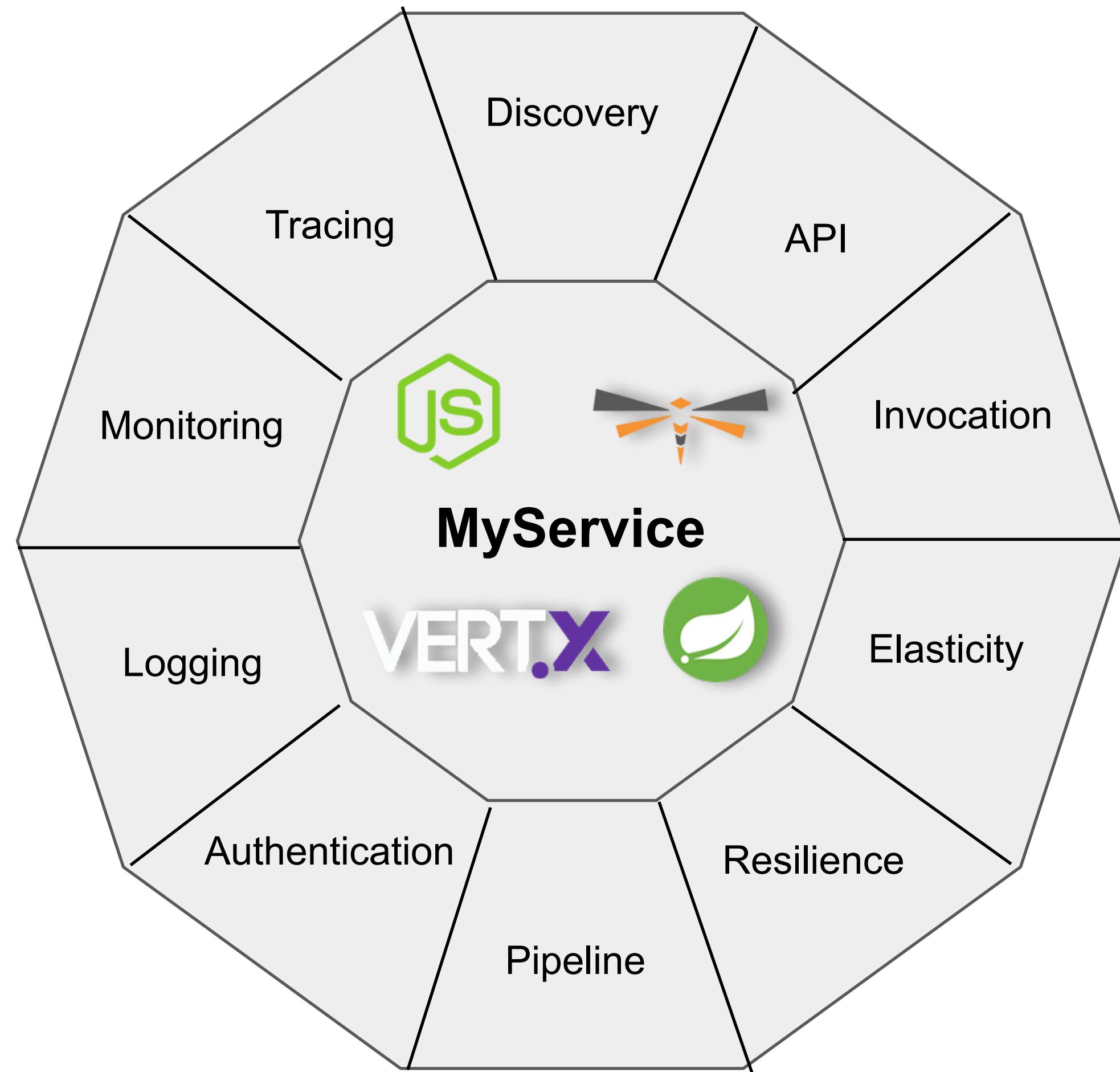


Our IT World Morphs

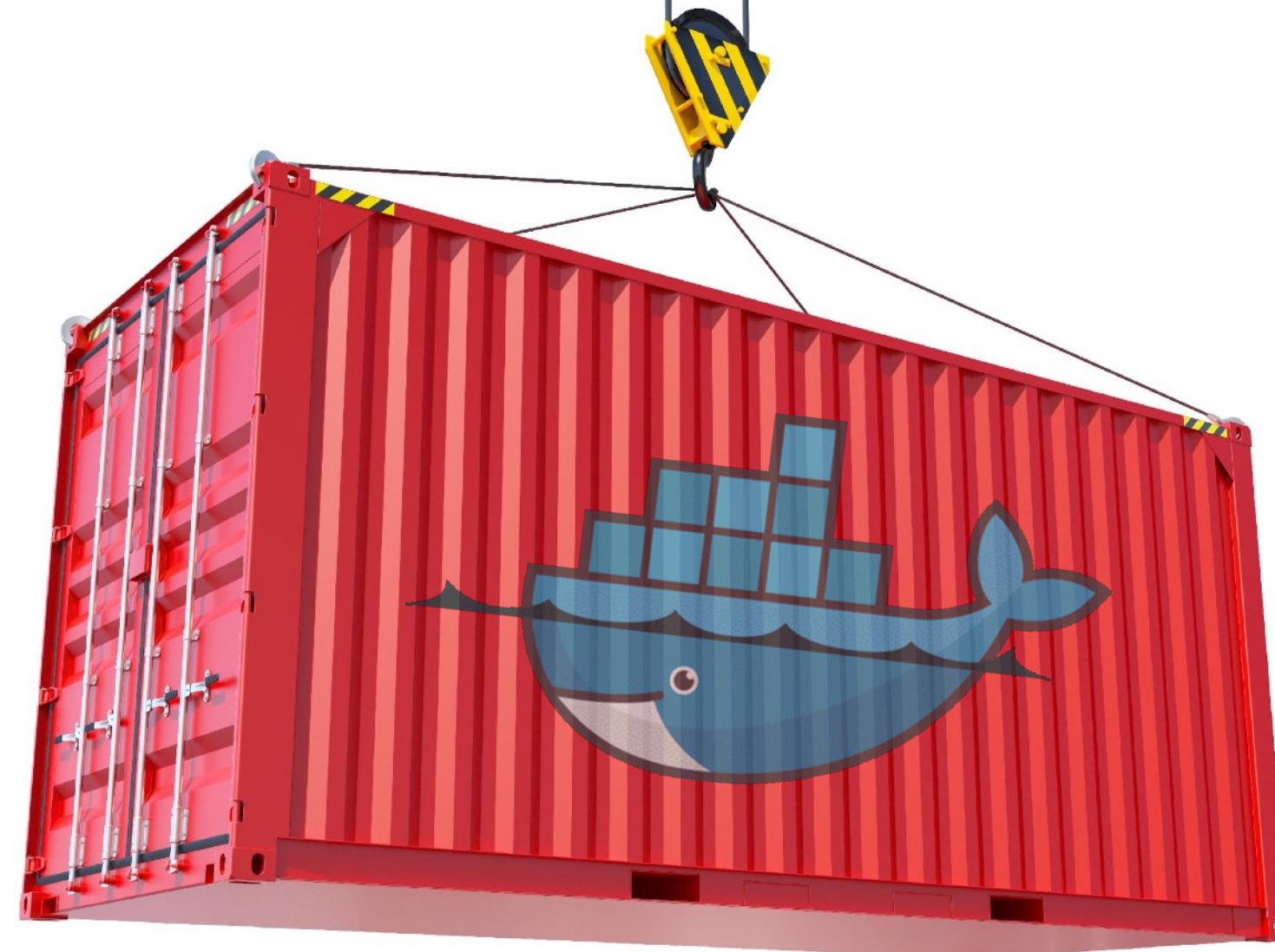
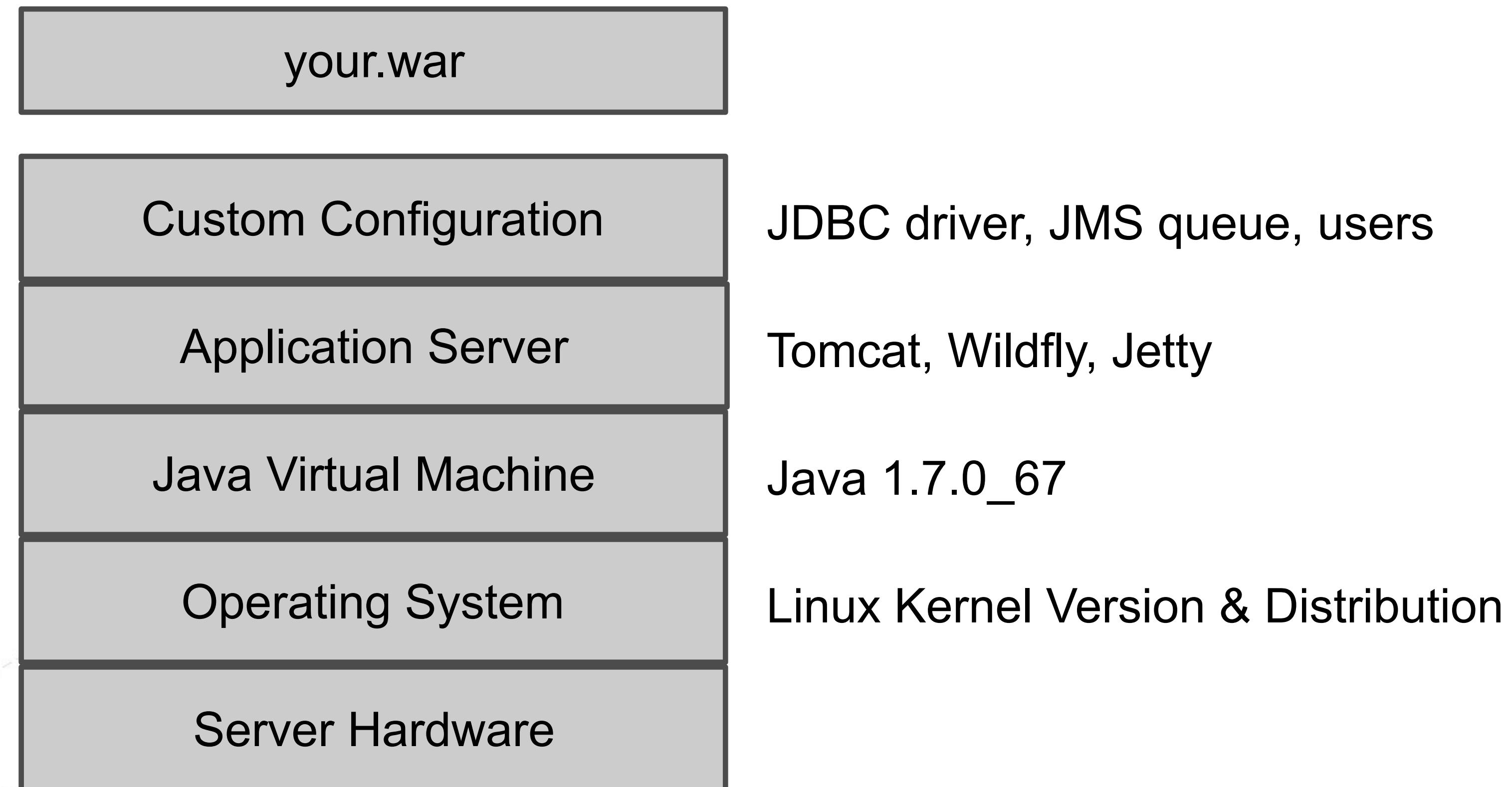




Microservices Core Principles



Your Stack Matters



DevOps Challenges for Multiple Containers

- How to scale?
- How to avoid port conflicts?
- How to manage them on multiple hosts?
- What happens if a host has trouble?
- How to keep them running?
- How to update them?
- Where are my containers?



ssh docker run

ssh docker run

ssh docker run

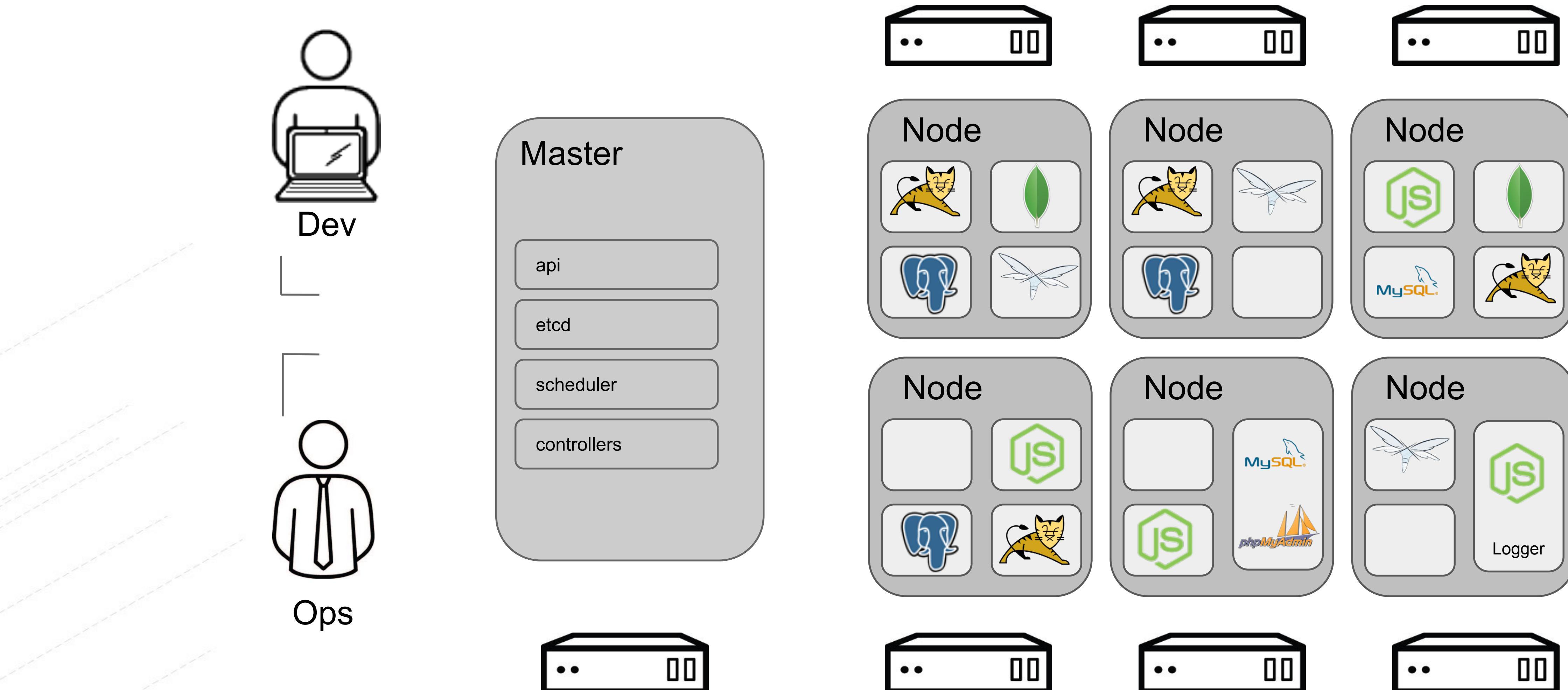


Meet Kubernetes

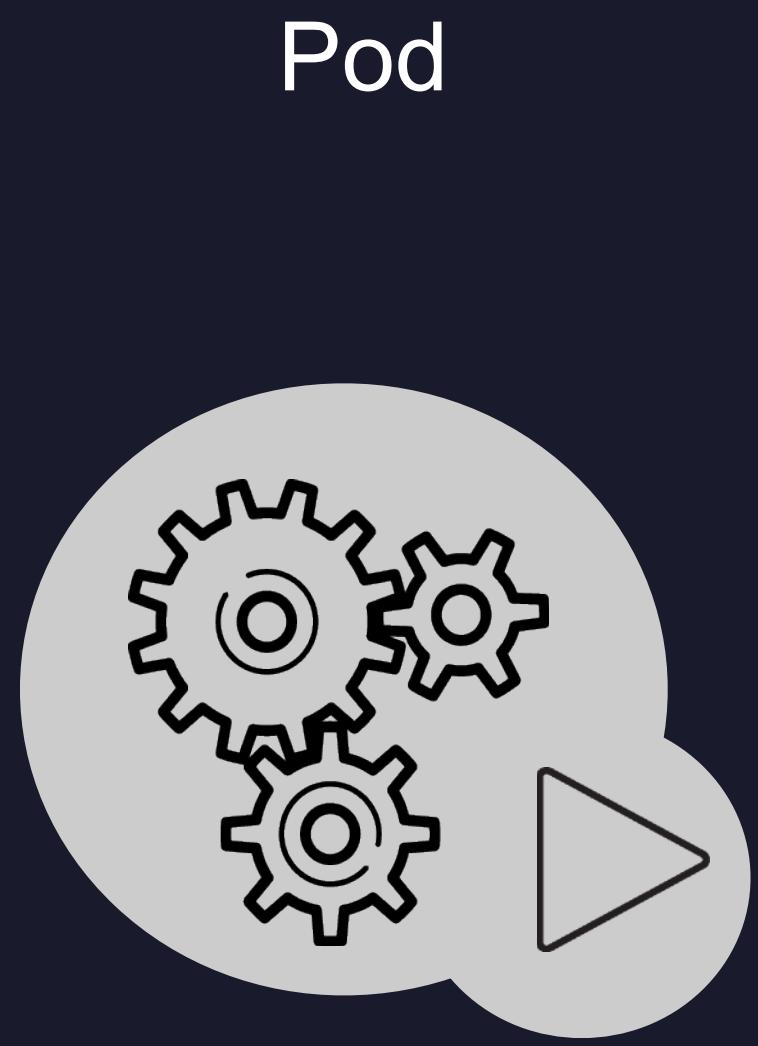
- Greek for “Helmsman,” also the root of the word “Governor” (from latin: gubernator)
- Container orchestrator
- Supports multiple cloud and bare-metal environments
- Inspired by Google’s experience with containers
- Open source, written in Go
- Manage applications, not machines



Kubernetes Cluster

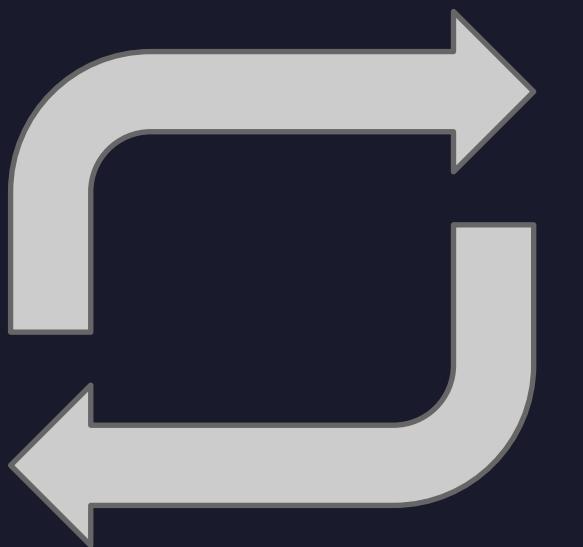


Kubernetes Cluster

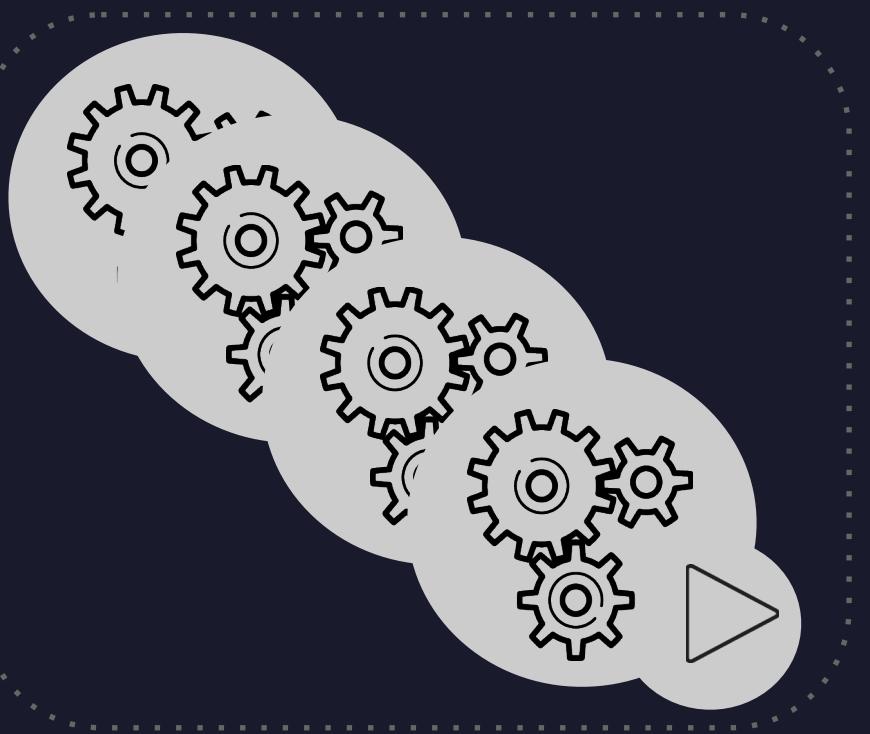


- ✓ 1+ containers
- ✓ Shared IP
- ✓ Shared storage volume
- ✓ Shared resources
- ✓ Shared lifecycle

Replication
Controller/
Deployment

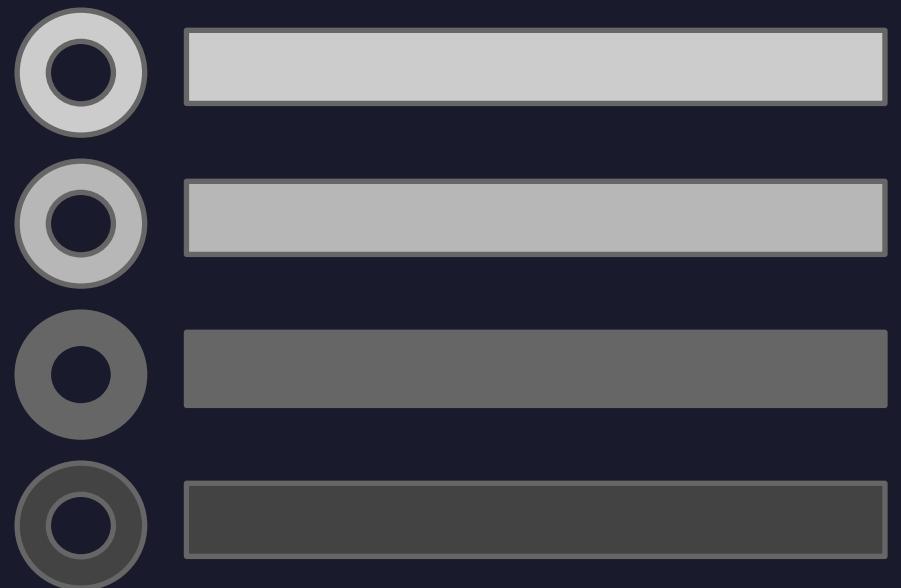


Service



- ✓ Ensures that a specified number of pod replicas are running at any one time
- ✓ Grouping of pods (acting as one) has stable virtual IP and DNS name

Label



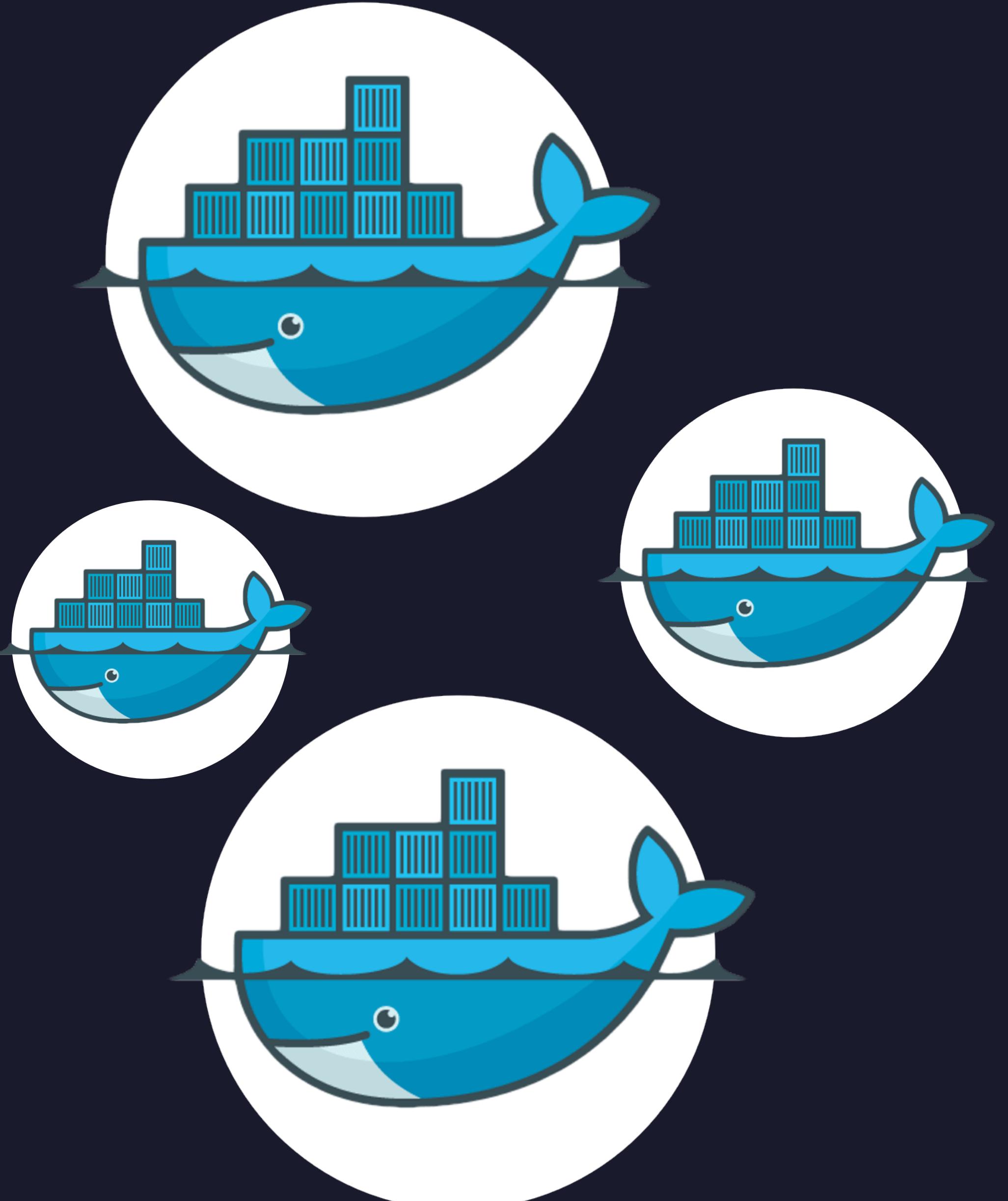
- ✓ Key/Value pairs associated with Kubernetes objects (env=production)

Pods

A group of whales is commonly referred to as a pod and a pod usually consists a group of whales that have bonded together either because of biological reasons or through friendships developed between two or more whales.

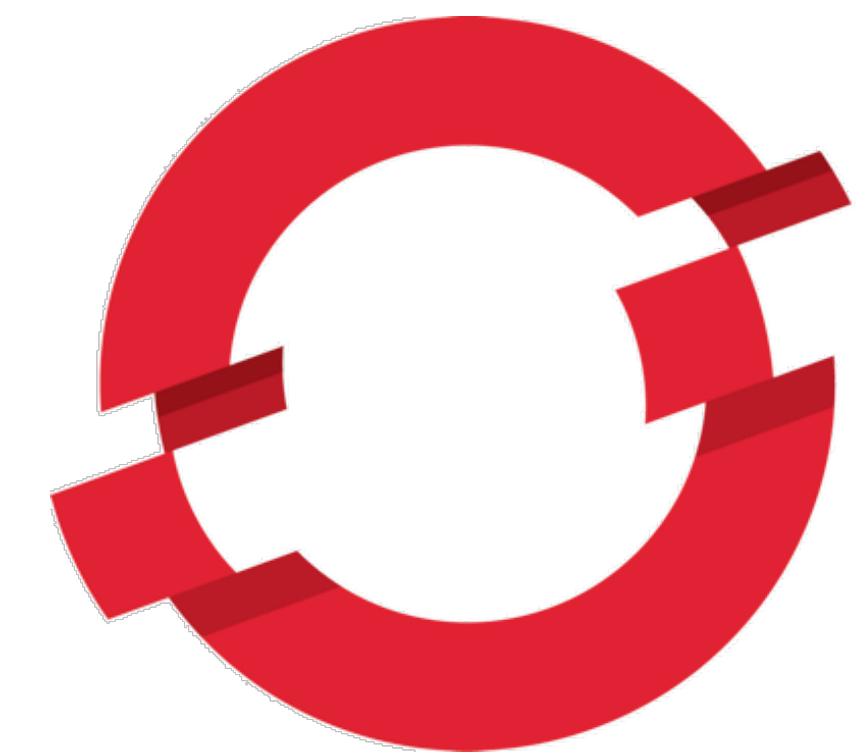
In many cases a typical whale pod consists of anywhere from 2 to 30 whales or more.*

*<http://www.whalefacts.org/what-is-a-group-of-whales-called/>



Deploy Something To Kubernetes

```
● ● ●  
1 apiVersion: apps/v1beta2 # for versions before 1.8.0 use apps/v1beta1  
2 kind: Deployment  
3 metadata:  
4   name: hello  
5 spec:  
6   selector: ● ● ●  
7     ma  
8  
9   replicas: 1 kubectl apply -f hello-deployment.yaml template  
10  template:  
11    metadata:  
12      labels:  
13        app: hello  
14    spec:  
15      containers:  
16        - name: hello  
17          image: hello-node:v1  
18      ports:  
19        - containerPort: 80
```



RED HAT®
OPENSHIFT
Container Platform



OPENSIFT

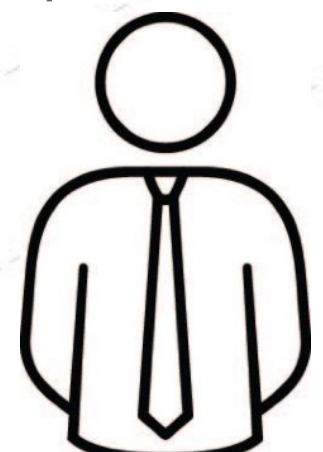


Dev

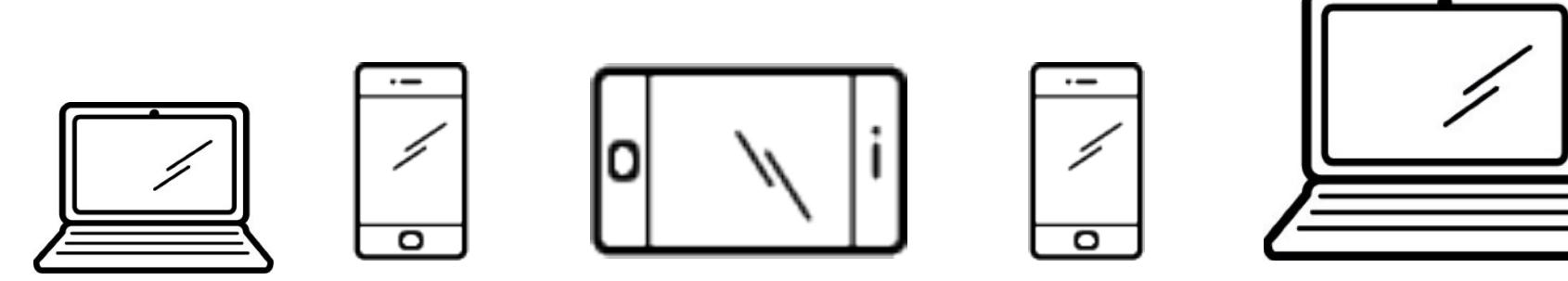
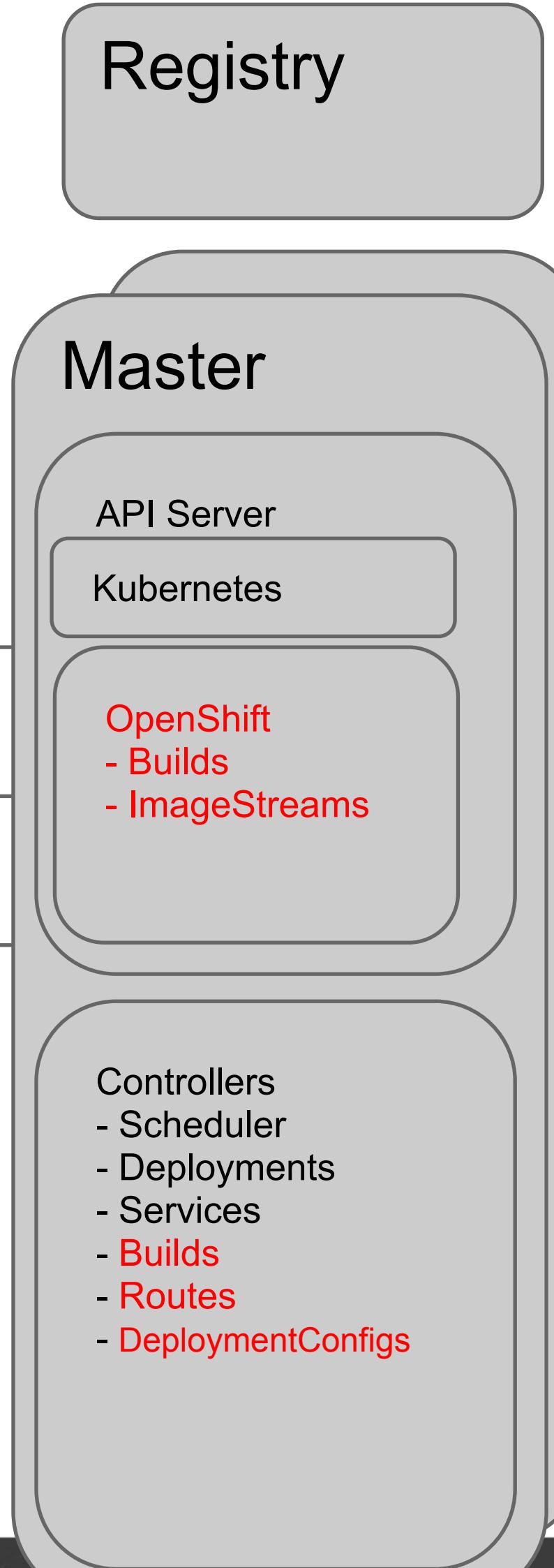
SCM
(Git/Svn)

CI/CD

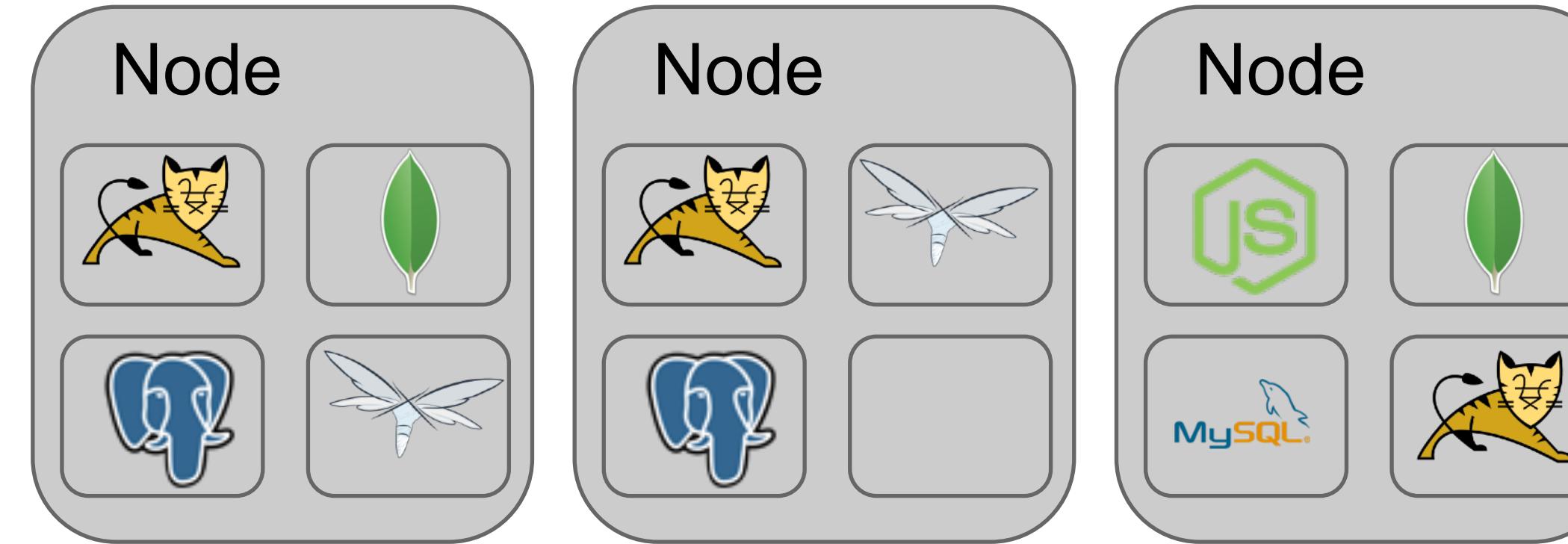
Automation



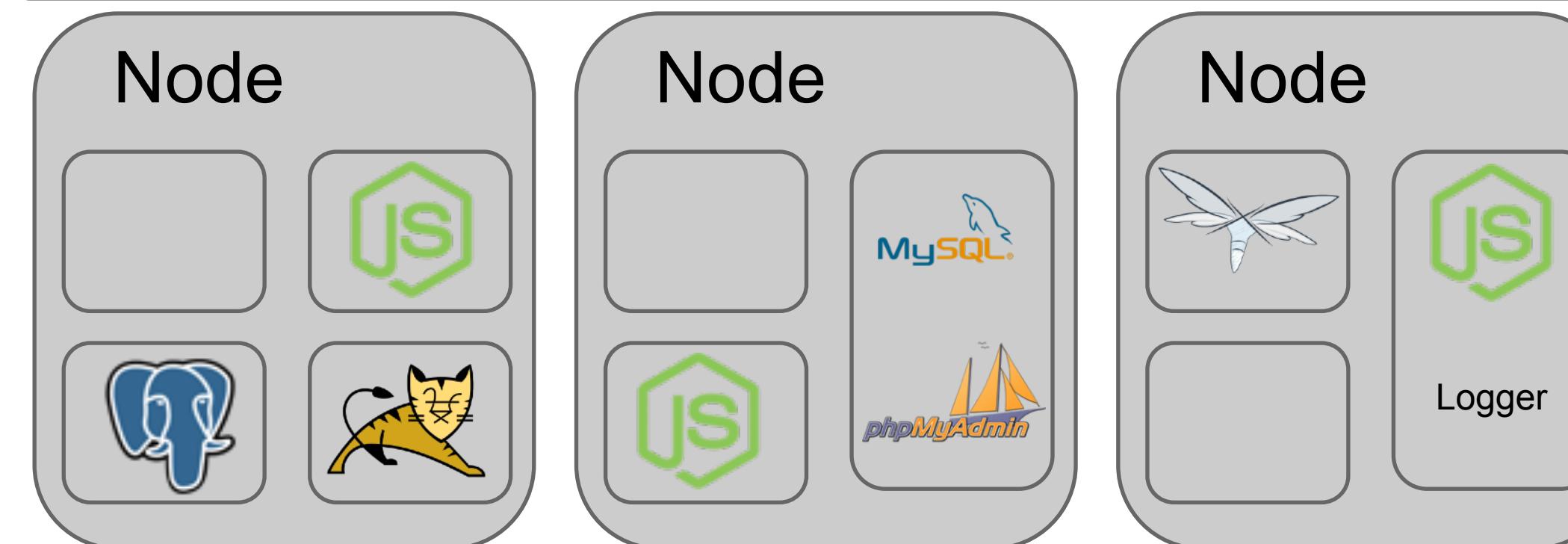
Ops



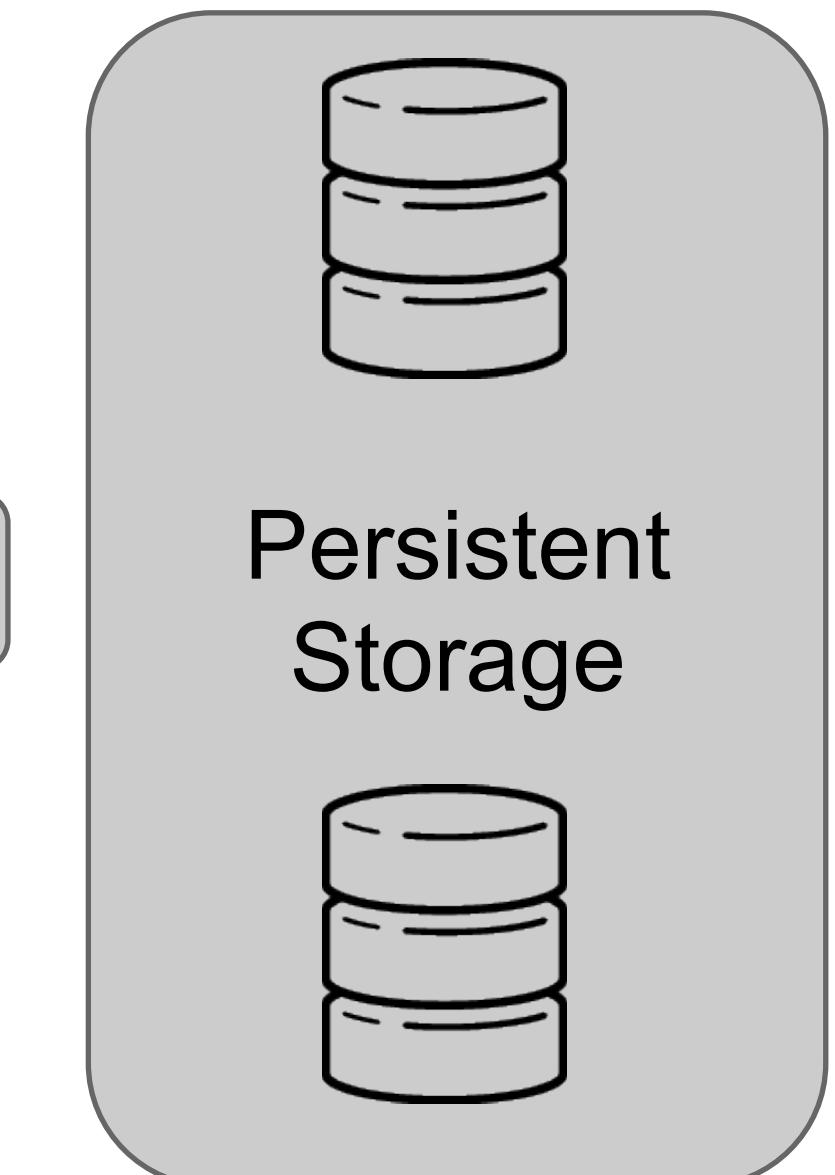
Routing Layer



SDN Overlay Network



Persistent Storage



Service Layer



Demo1: <https://www.youtube.com/watch?v=jTX-Lg73nXA>

Demo2: <https://www.youtube.com/watch?v=lj4NE0mcxFY>

DEMO



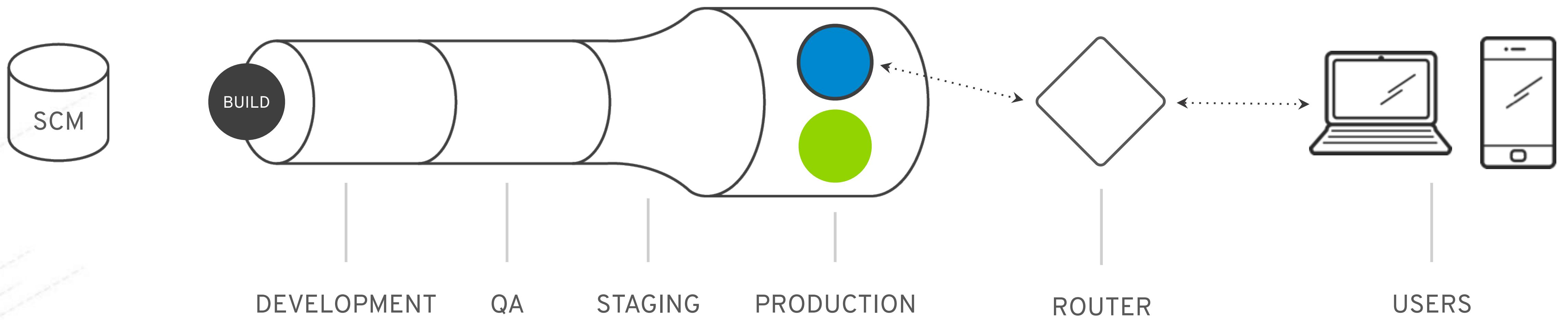
Lead Time



Blue-Green Deployments

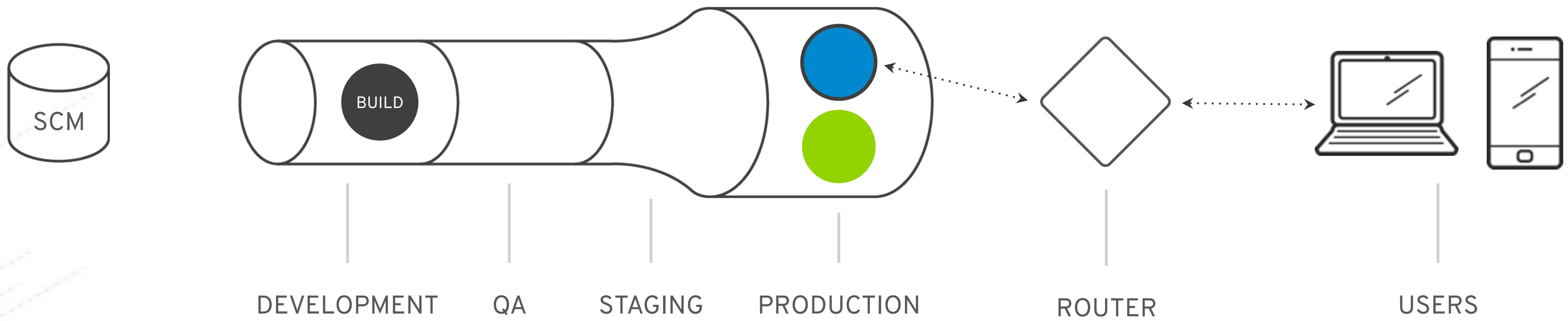


Blue/Green Deployment

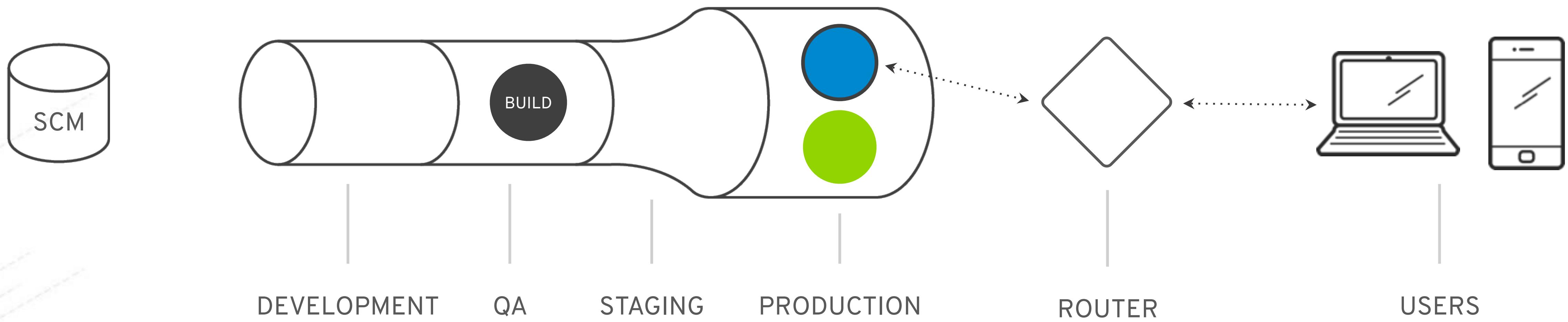


Starts with a “git commit and git push”

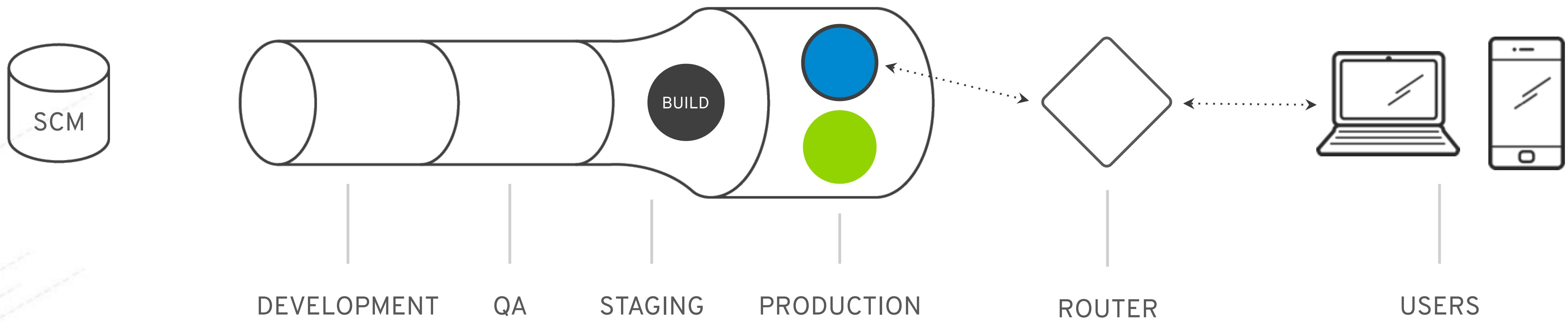
Blue/Green Deployment



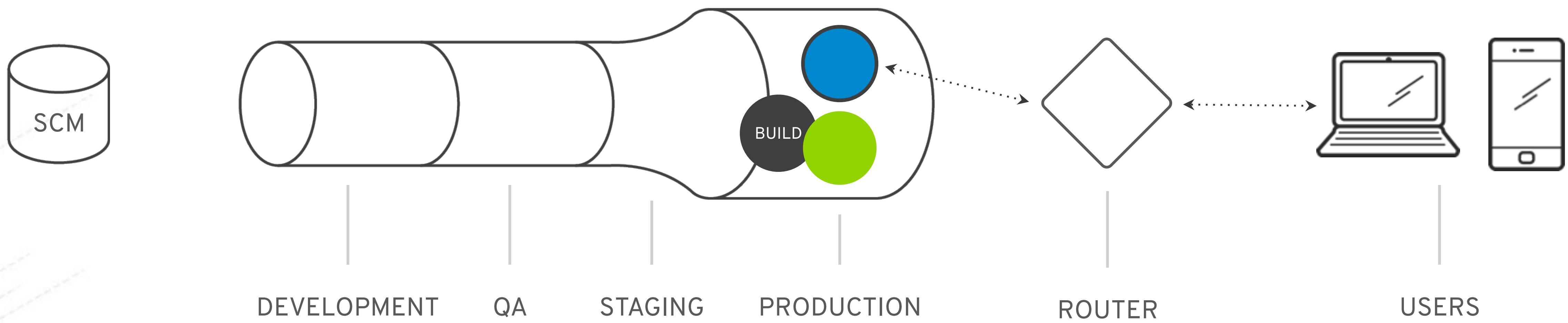
Blue/Green Deployment



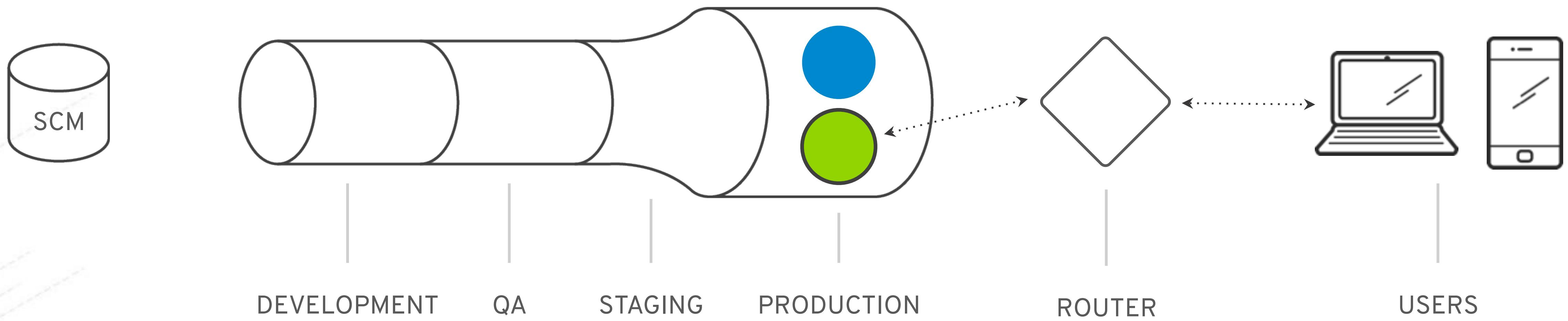
Blue/Green Deployment



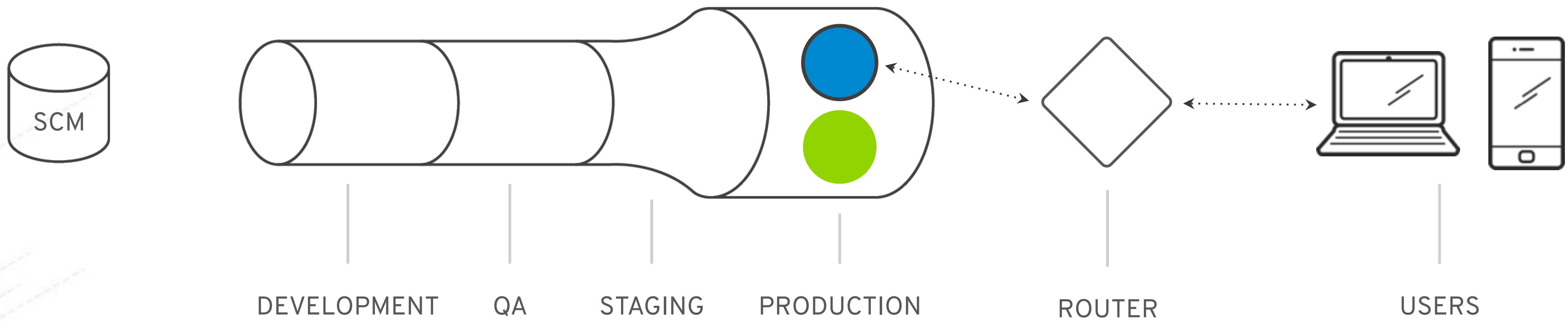
Blue/Green Deployment



Blue/Green Deployment



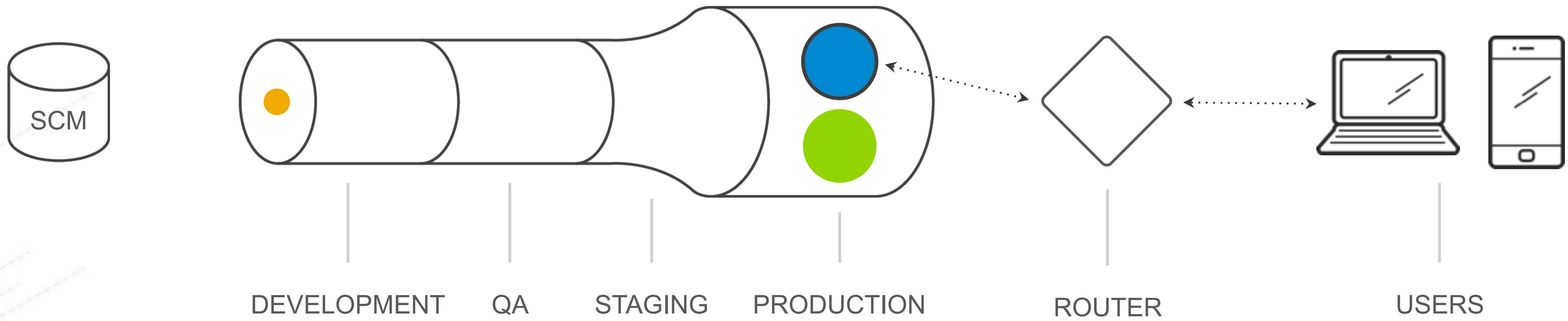
Blue/Green Deployment



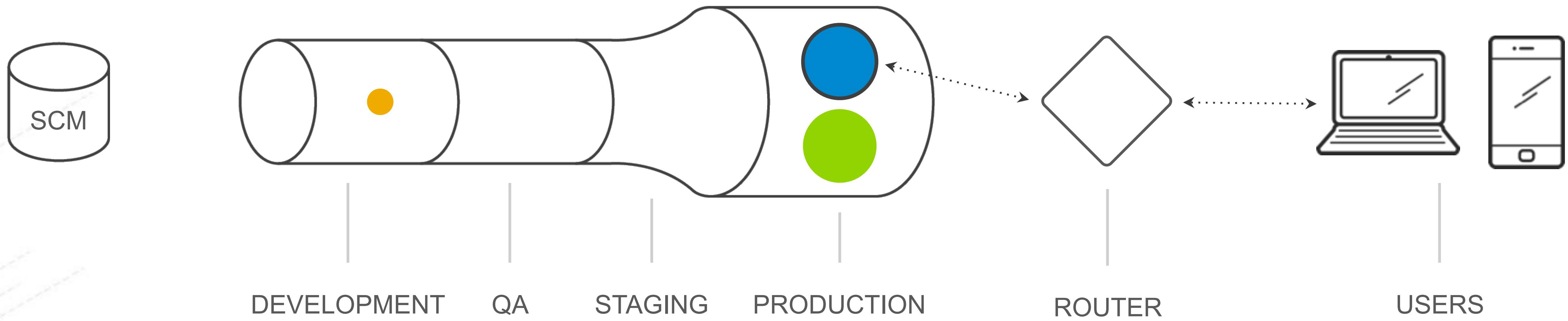
Canary Release



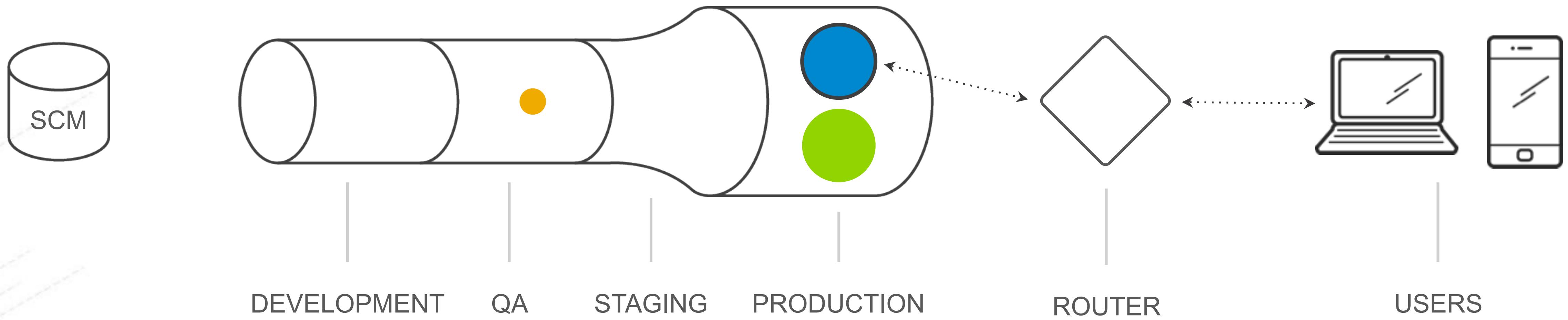
Canary Deployment



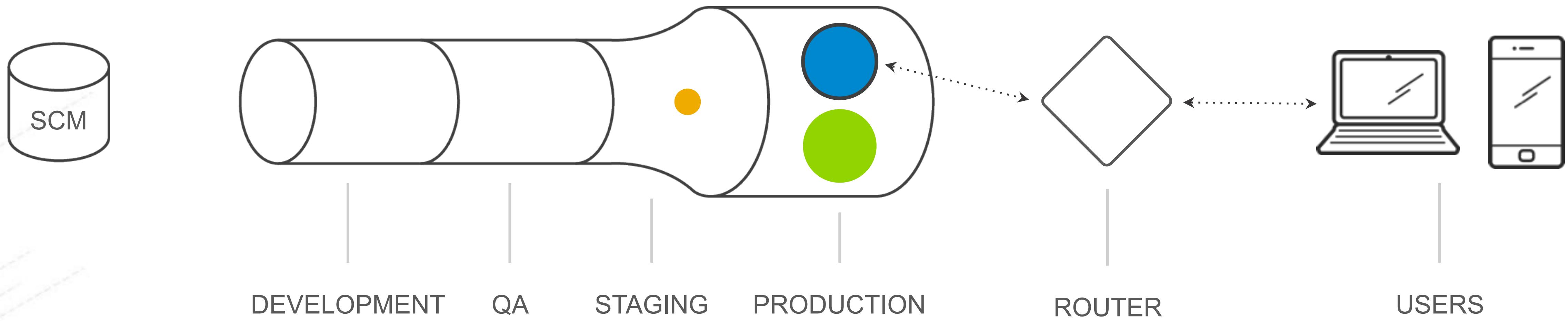
Canary Deployment



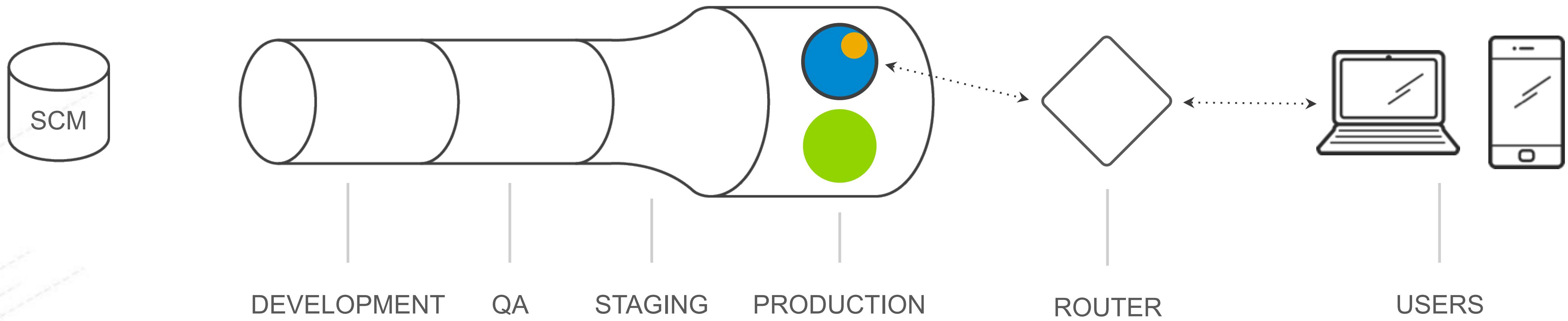
Canary Deployment



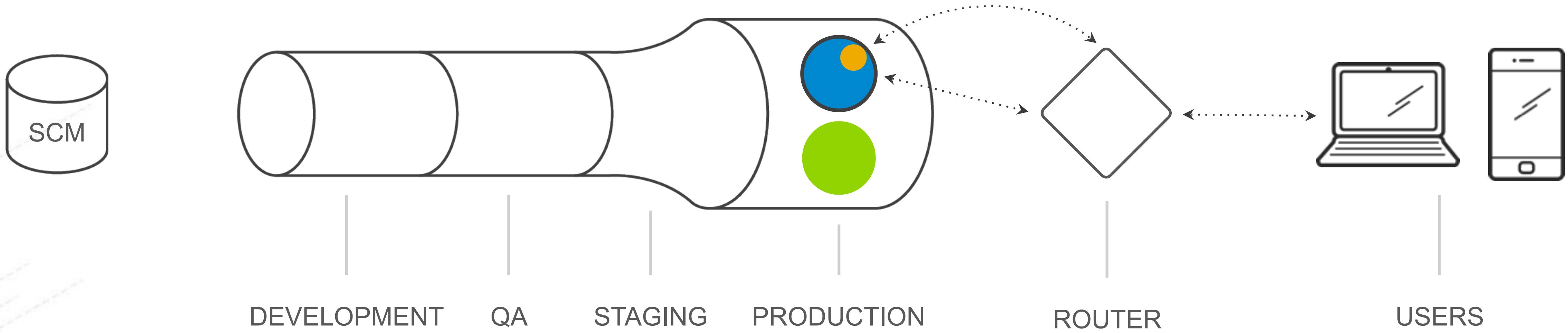
Canary Deployment



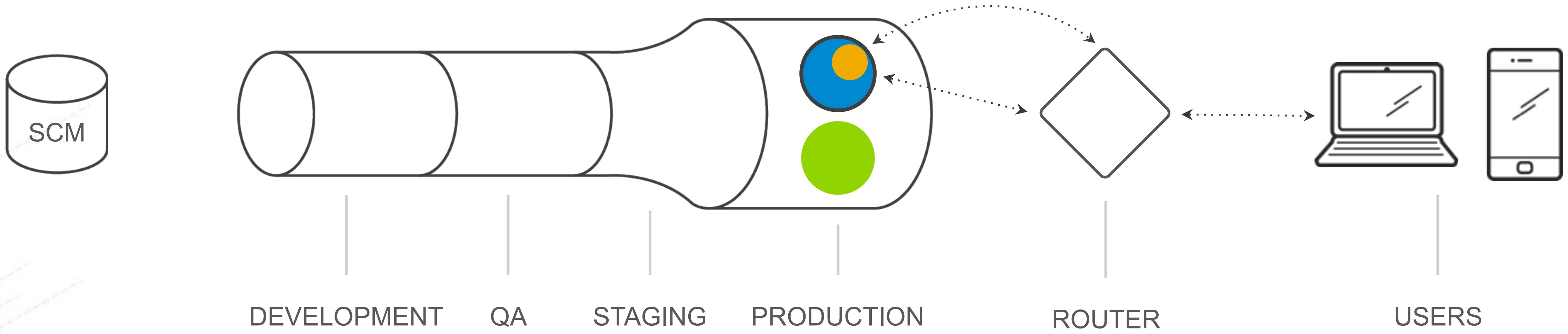
Canary Deployment



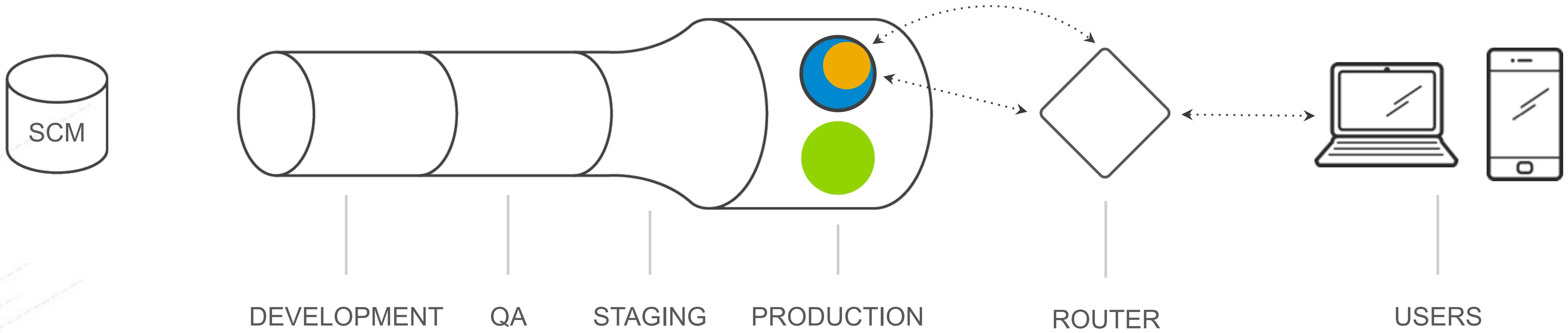
Canary Deployment



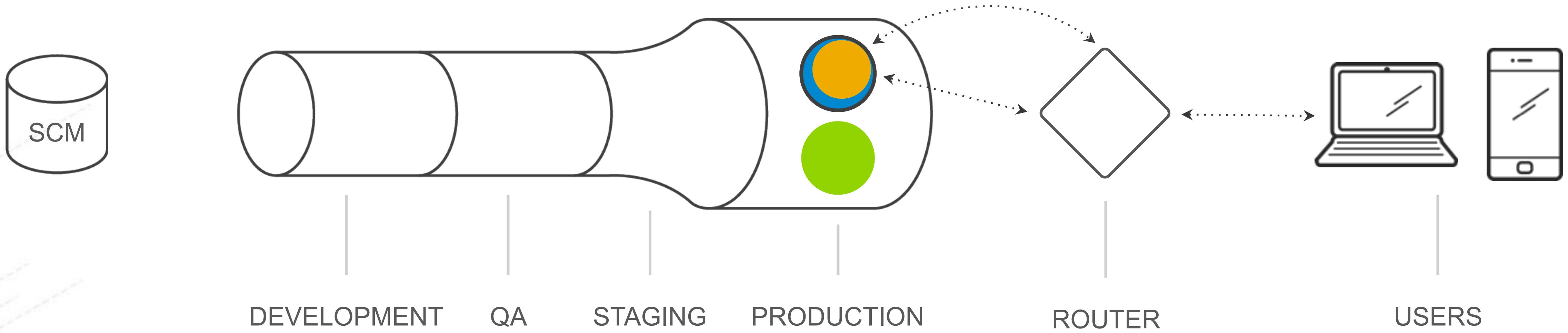
Canary Deployment



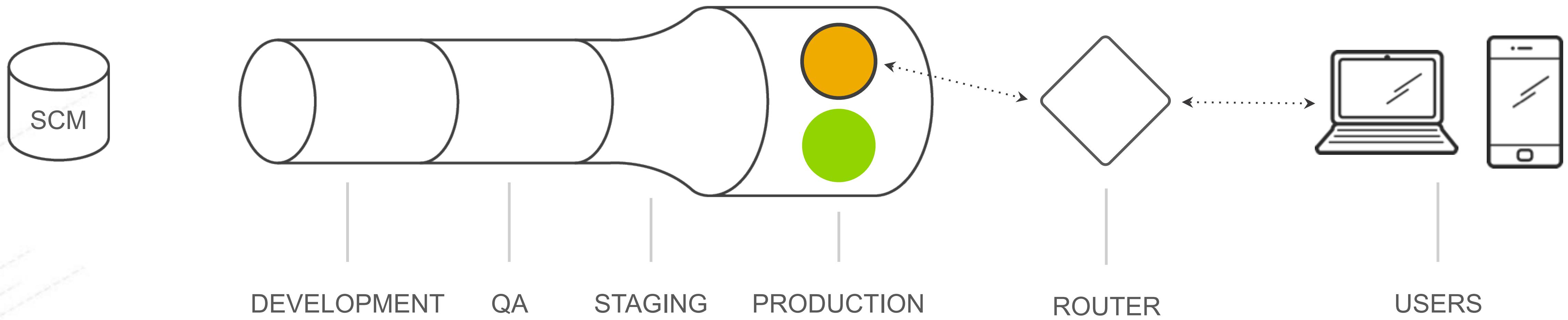
Canary Deployment



Canary Deployment



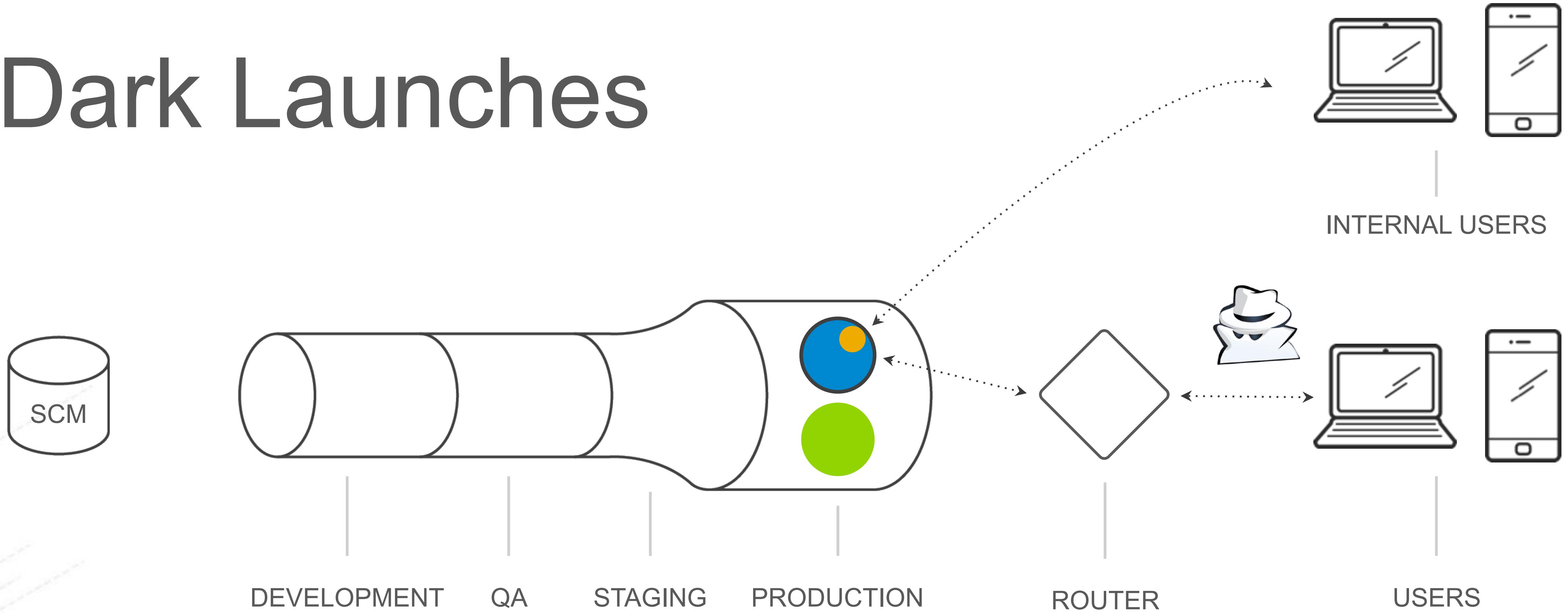
Canary Deployment



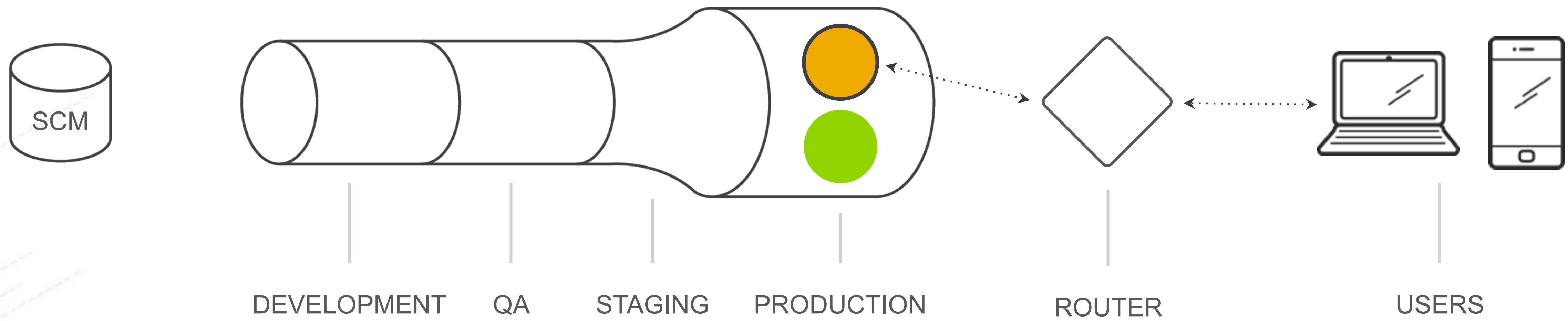
Dark Launches

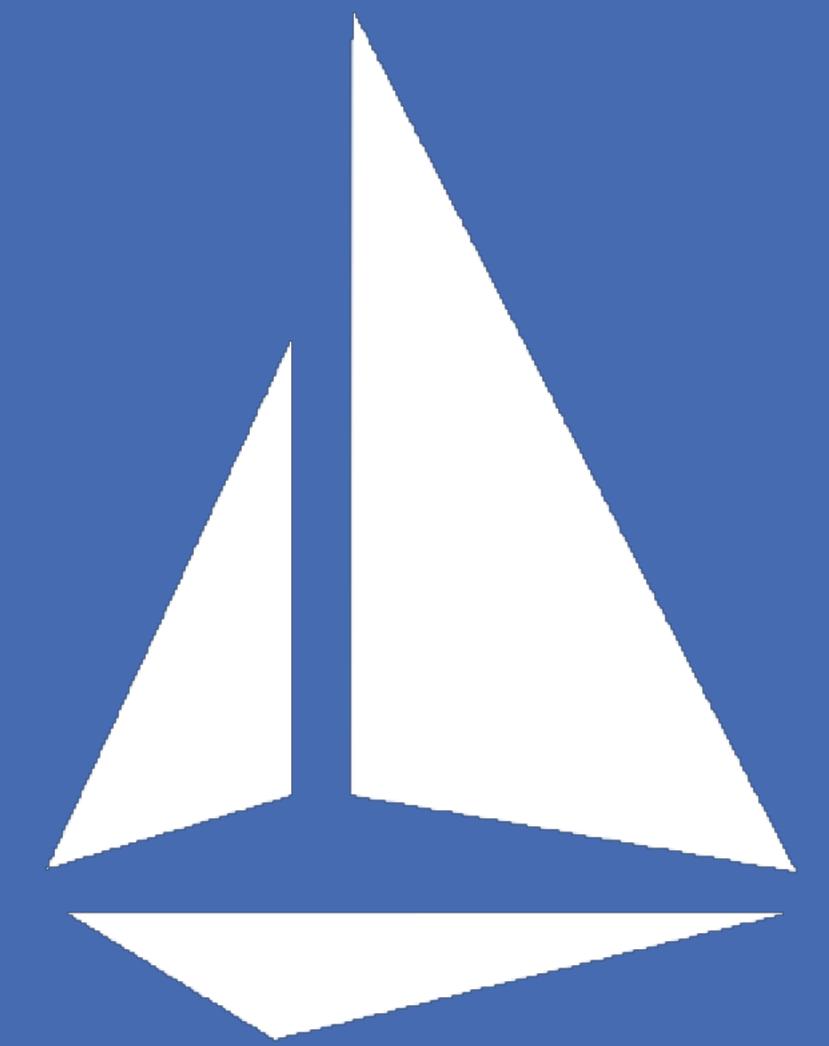


Dark Launches

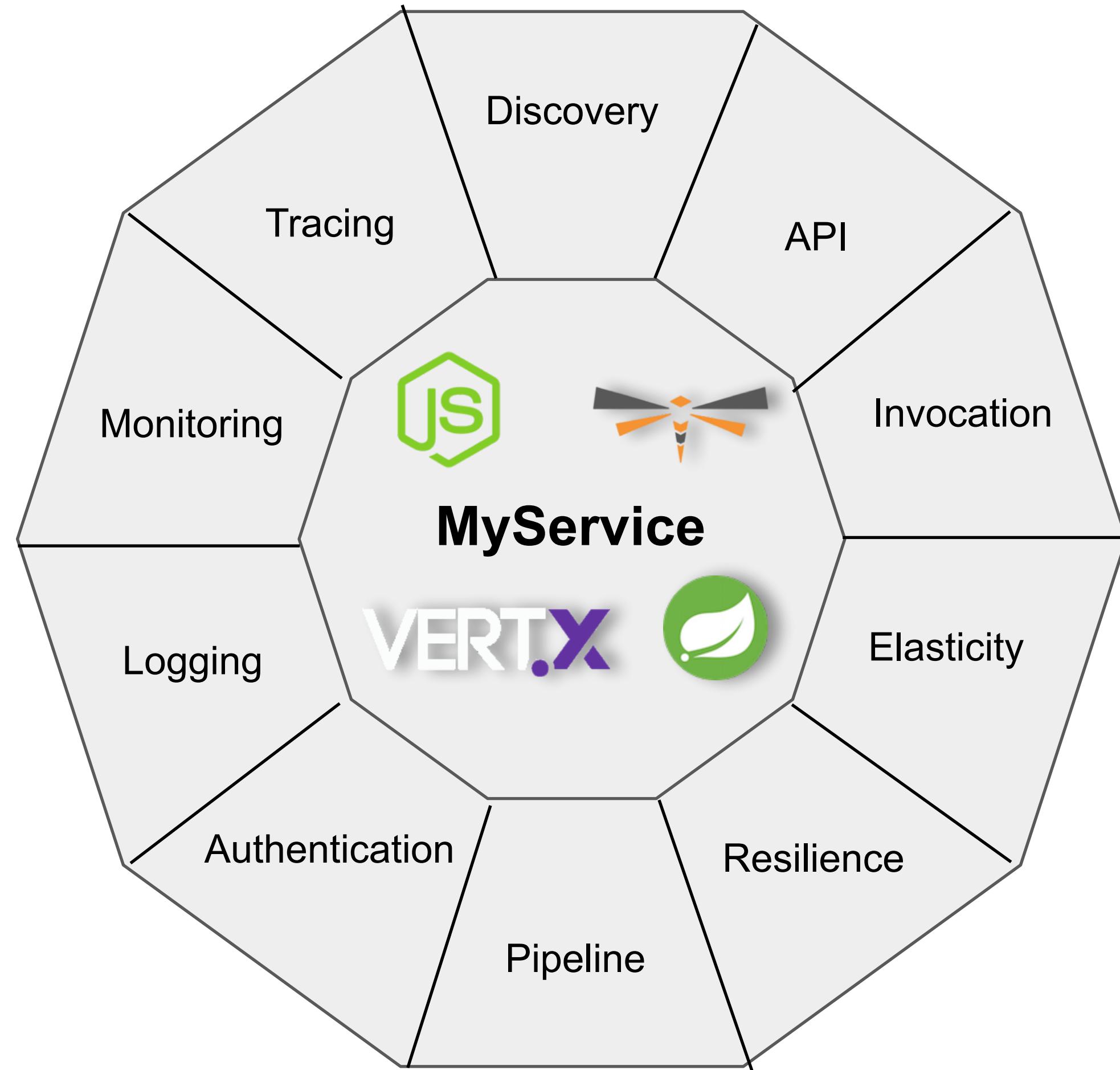


Dark Launches





Microservices Core Principles





As we move to services
architectures, we push the
complexity to the space
between our services

CHRISTIAN POSTA

Java Microservices Platform circa 2016



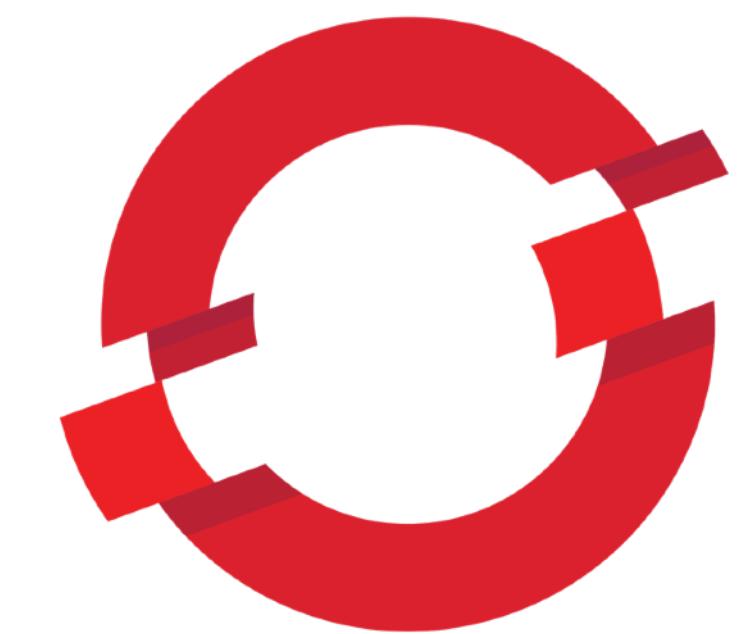
Config Server



ARCHAIUS



NETFLIX Ribbon

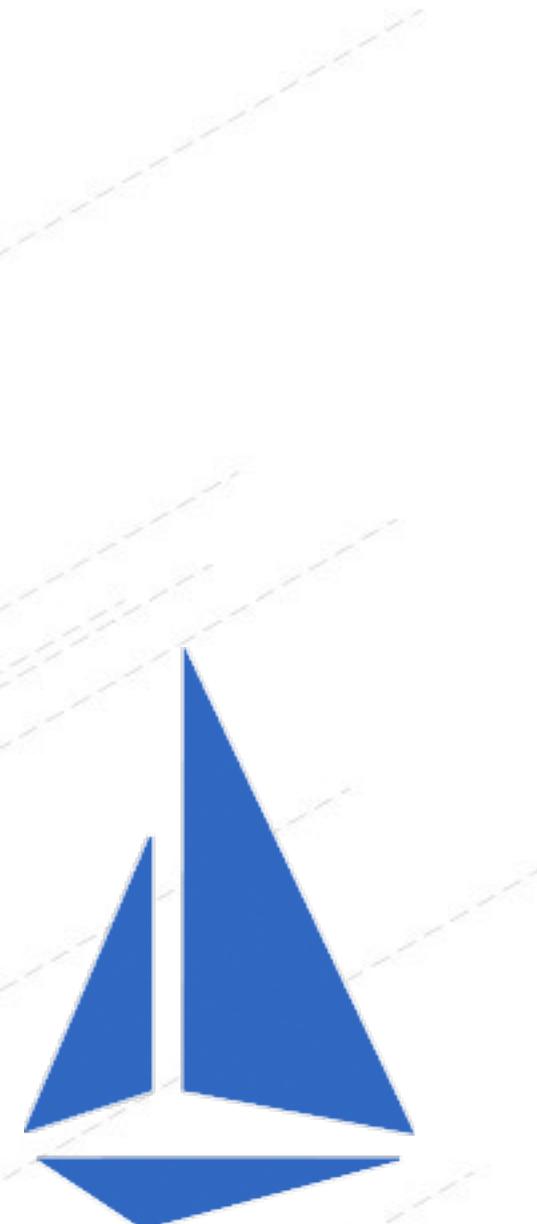


OPENSIFT



HYSTRIX
DEFEND YOUR APP

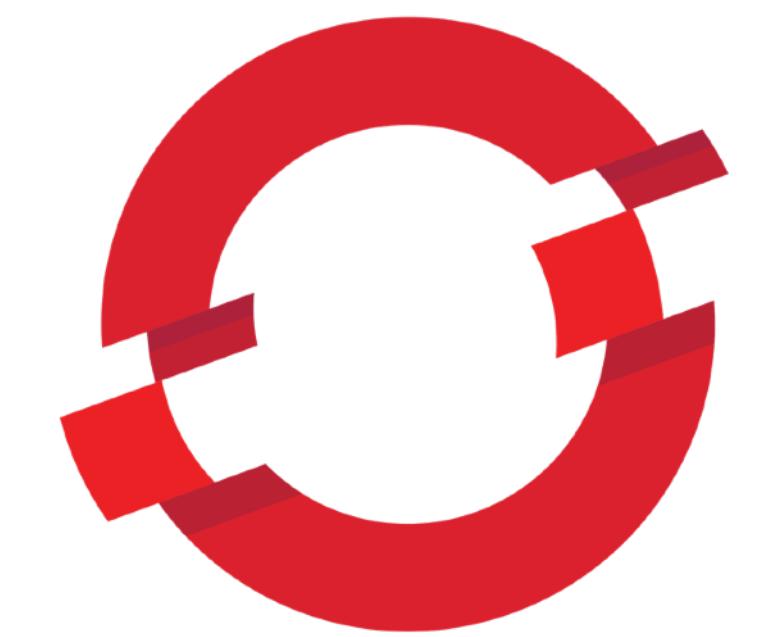
Java Microservices Platform circa 2018



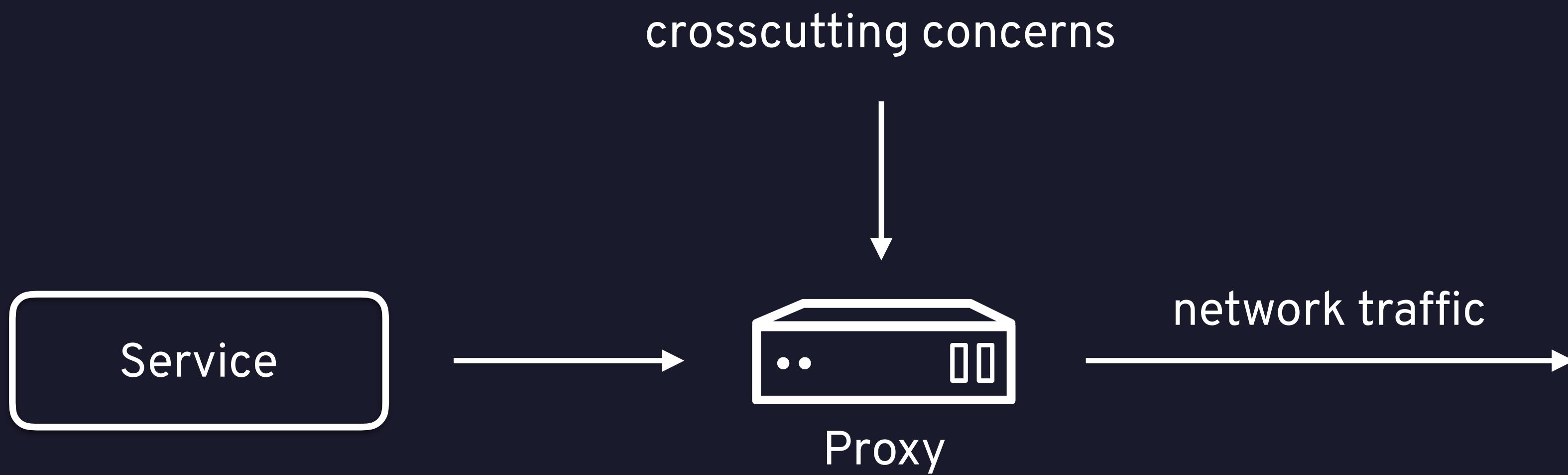
Istio



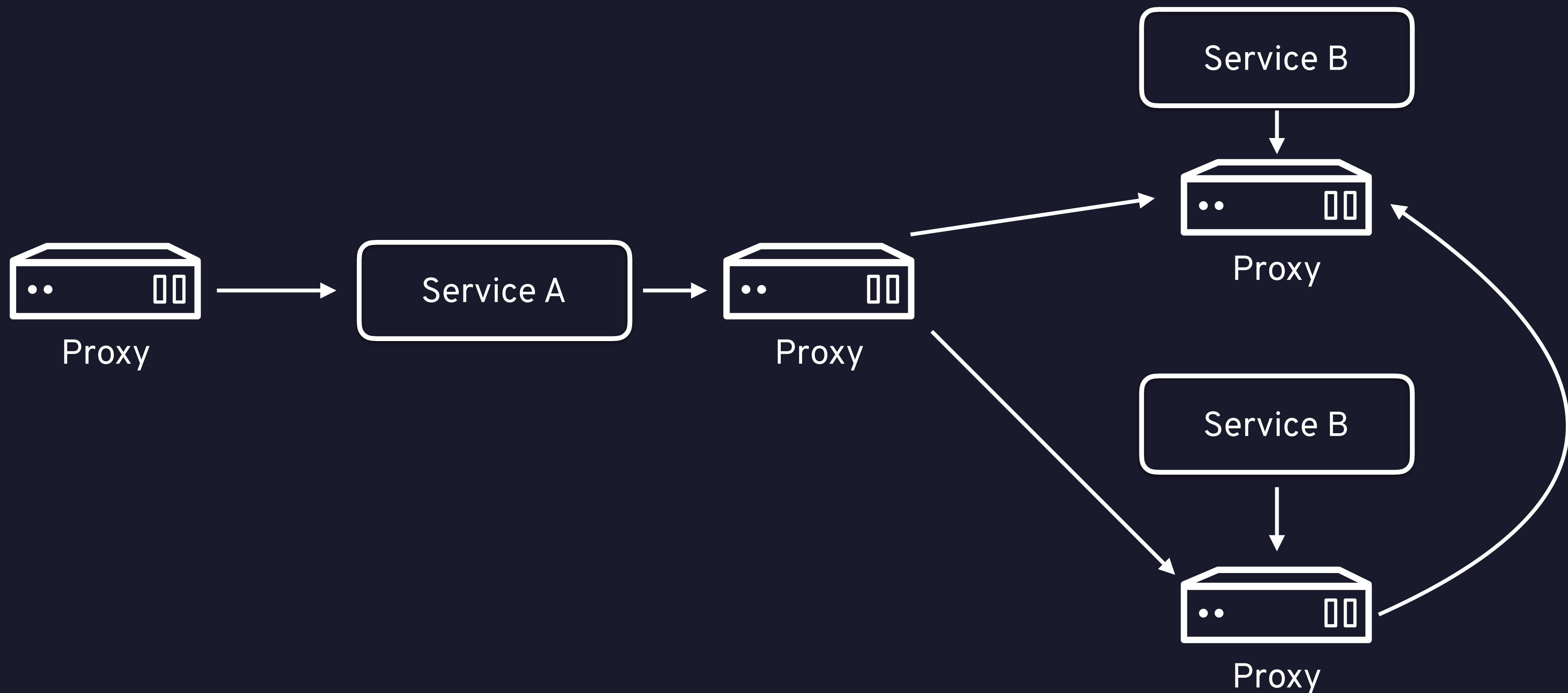
OPENSOURCE



What If...



... more explicitly



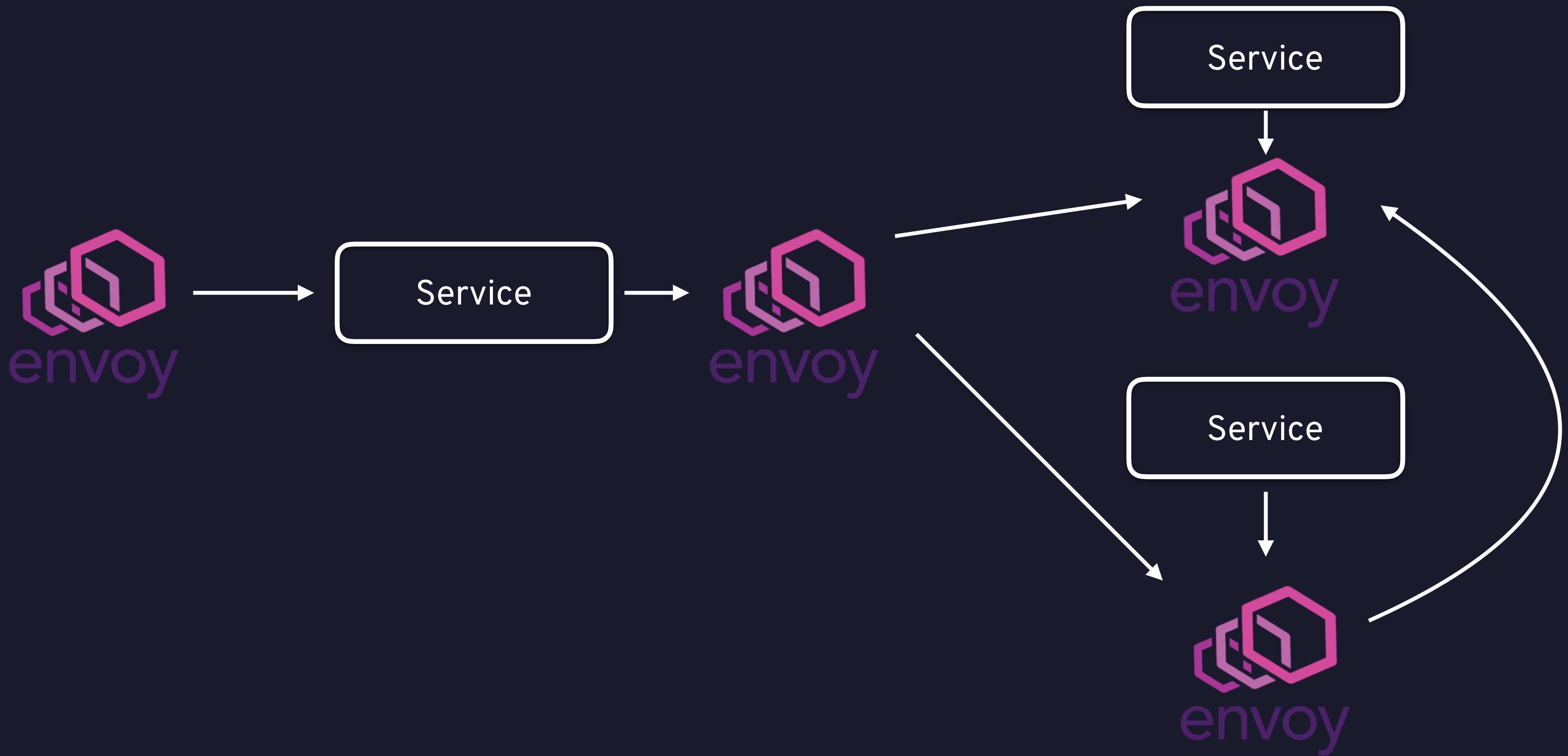


Meet Envoy

- Service proxy
- Highly parallel, non-blocking
- L3/4 network filter
- Out of the box L7 filters
- HTTP 2, including gRPC
- Baked in service discovery/health checking
- Advanced load balancing
- stats, metrics, tracing
- dynamic configuration through xDS



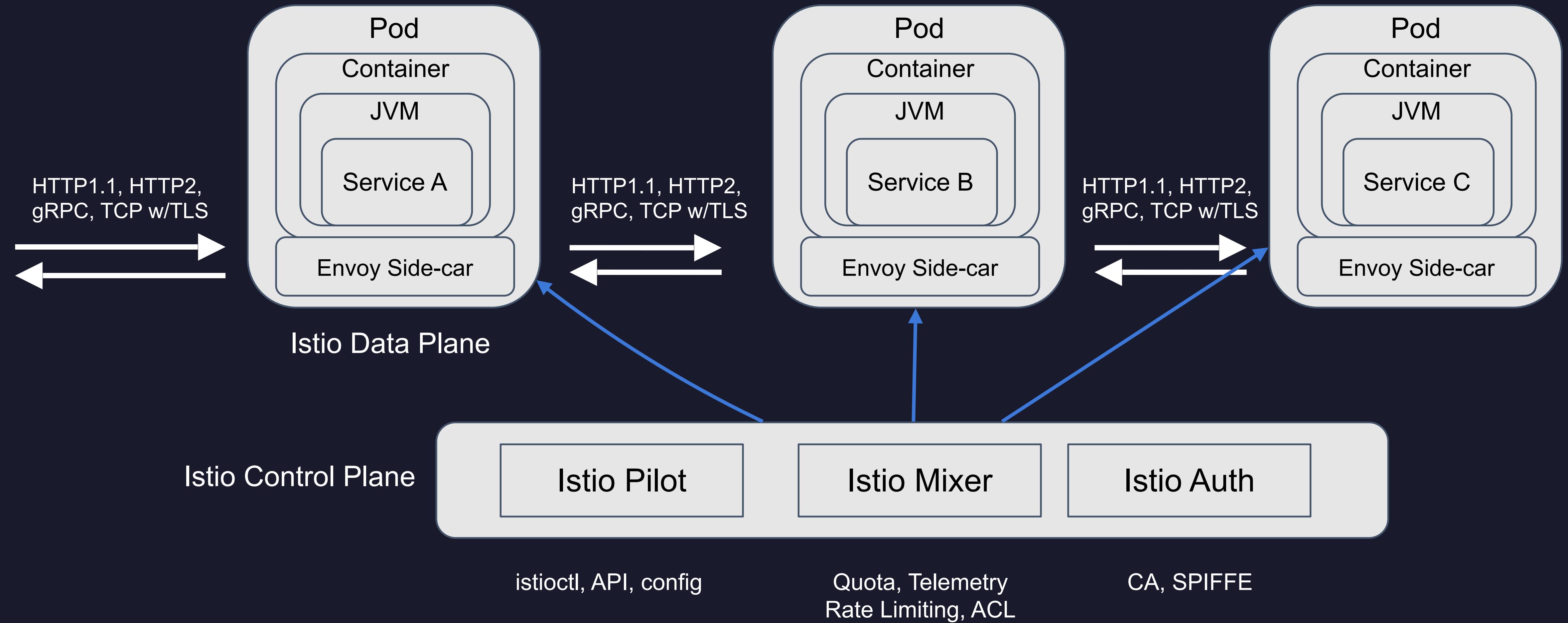
In reality



Istio To Rescue

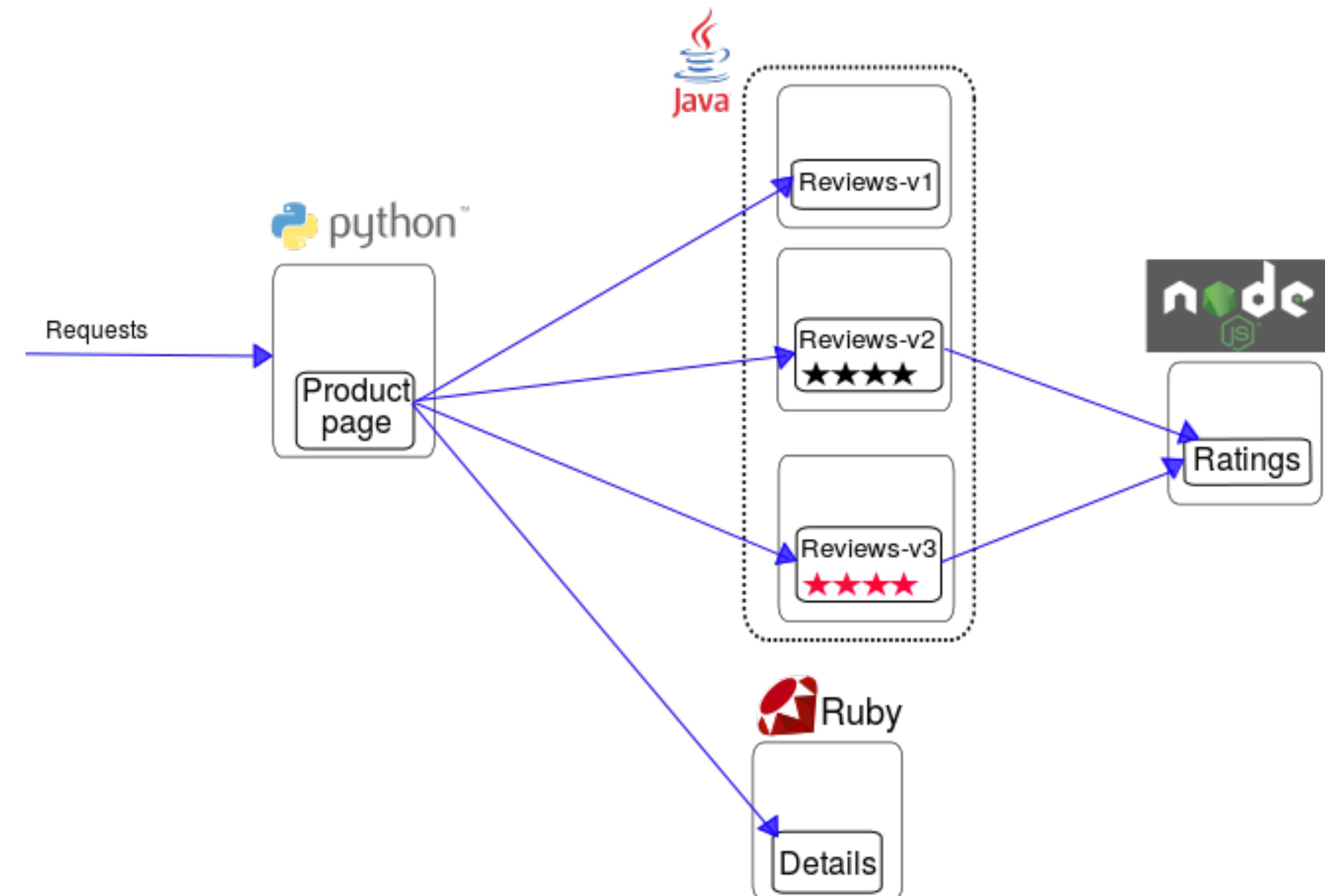
- Greek word for “sail”
- Fleet configuration
- Routing and Load-Balancing control
- Observability
- Chaos Testing
- Security Options





Running Istio

```
● ● ●  
1 # Install  
2 kubectl/oc apply -f install/kubernetes/istio.yaml  
3 kubectl/oc create -f install/kubernetes/addons/prometheus.yaml  
4 kubectl/oc create -f install/kubernetes/addons/grafana.yaml  
5 kubectl/oc create -f install/kubernetes/addons/servicegraph.yaml  
6 kubectl/oc create -f install/kubernetes/addons/zipkin.yaml  
7  
8 # Deploy App  
9 kubectl/oc apply -f <(istioctl kube-inject -f samples/bookinfo/kube/bookinfo.yaml)  
10  
11 # Apply Rule  
12 kubectl/oc create -f samples/bookinfo/kube/route-rule-all-v1.yaml
```



Canary Release

```
1 apiVersion: config.istio.io/v1alpha2
2 kind: RouteRule
3 metadata:
4   name: recommendations-v1-v2
5 spec:
6   destination:
7     namespace: tutorial
8     name: recommendations
9   precedence: 1
10  route:
11    - labels:
12      version: v1
13      weight: 90
14    - labels:
15      version: v2
16      weight: 10
```



Blocking

```
● ● ●

1 apiVersion: "config.istio.io/v1alpha2"
2 kind: denier
3 metadata:
4   name: handler
5   namespace: istio-system
6 spec:
7   status:
8     code: 7
9     message: Not allowed
10 ---
11 apiVersion: "config.istio.io/v1alpha2"
12 kind: checknothing
13 metadata:
14   name: denyrequest
15   namespace: istio-system
16 spec:
17
18 ---
19 apiVersion: "config.istio.io/v1alpha2"
20 kind: rule
21 metadata:
22   name: denynotuser
23   namespace: istio-system
24 spec:
25   match: request.headers["x-user"] == ""
26   actions:
27     - handler: handler.denier.istio-system
28       instances: [ denyrequest.checknothing.istio-system ]
29
```



Fault Injection

```
1 apiVersion: config.istio.io/v1alpha2
2 kind: RouteRule
3 metadata:
4   name: ratings-test-delay
5 spec:
6   destination:
7     name: ratings
8   precedence: 2
9   match:
10    request:
11      headers:
12        cookie:
13          regex: "^(.*?;)?(user=jason)(;.*)?$"
14   route:
15     - labels:
16       version: v1
17     httpFault:
18       delay:
19         percent: 100
20         fixedDelay: 7s
```



Demo1: <https://www.youtube.com/watch?v=CSd91BoG-sc>

DEMO





ARQUILLIAN CUBE



```
1 @RunWith(Arquillian.class)
2 @IstioResource("classpath:route-rule-reviews-test-v${serviceVersion:2}.yaml")
3 public class ReviewsIT {
4
5     @RouteURL("productpage")
6     @AwaitRoute
7     private URL url;
8
9     @Test
10    public void alex_should_use_reviews_v2_version() {
11        final Request request = new Request.Builder()
12            .url(url.toString() + "api/v1/products/0/reviews")
13            .addHeader("Cookie", "user=alex; Domain=" + url.getHost() +"; Path=/")
14            .build();
15
16        final OkHttpClient okHttpClient = new OkHttpClient();
17        try(Response response = okHttpClient.newCall(request).execute()) {}
18    }
19 }
20 }
```

Let's Wind Down







“Change is the essential process
of all of existence.”

—SPOCK

ISTIO: CANARIES AND KUBERNETES

Thursday February 1, 2018 | 12:00:00 PM EST

REGISTER NOW

DEVNATION LIVE

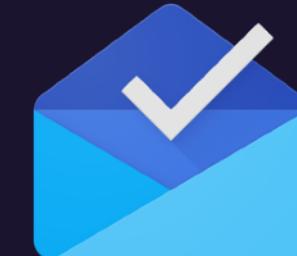
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