RED HAT® DEVELOPER

Pipelines & Pods: DevOps with Kubernetes

Burr Sutter (burrsutter.com)

http://bit.ly/kubernetes-tutorial
http://bit.ly/istio-tutorial
http://bit.ly/knative-tutorial

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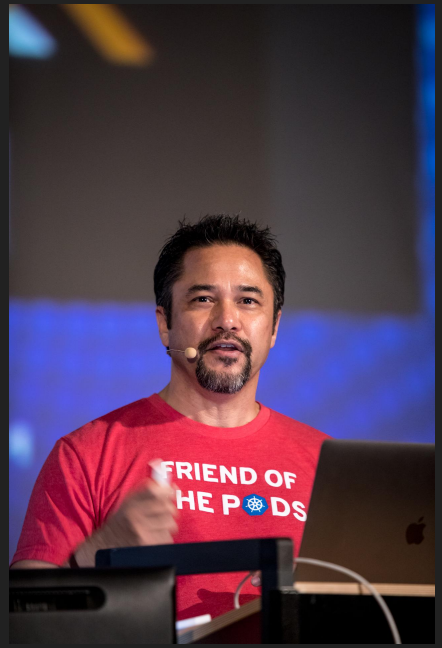


- Red Hat's Global Director of Developer Experience
- Featured speaker at technology events around the globe
- A Java Champion since 2005
- Former President of the Atlanta Java User Group
- Founded the DevNexus conference
- Always looking for technologies that enable Dev&Ops to deliver better software, faster

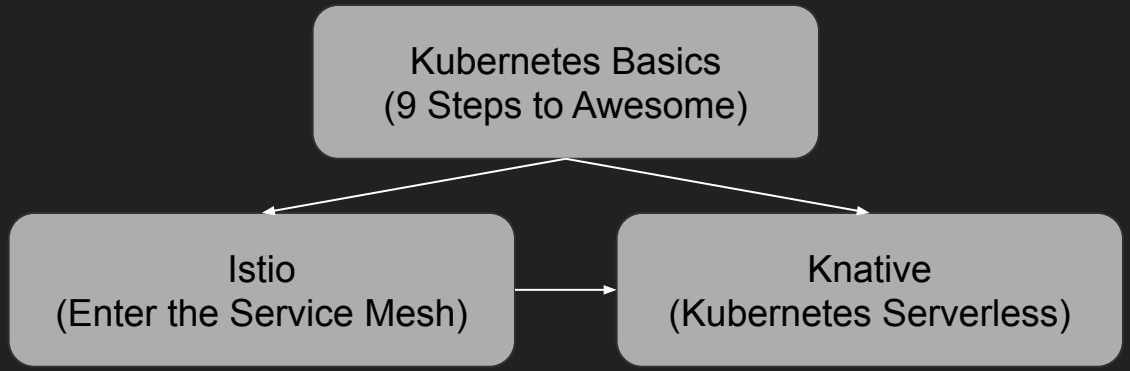
- bit.ly/kubernetes-tutorial
- bit.ly/istio-tutorial
- bit.ly/knative-tutorial

@burrsutter

Kubernetes, Istio & Knative (and Tekton)

https://www.oreilly.com/live-training/

Control-F and search for "burr"



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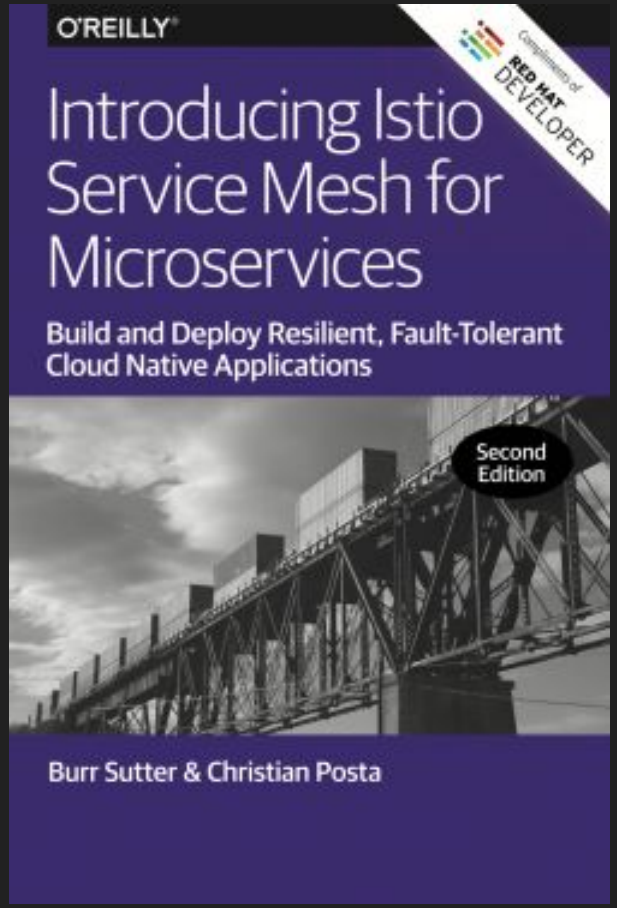
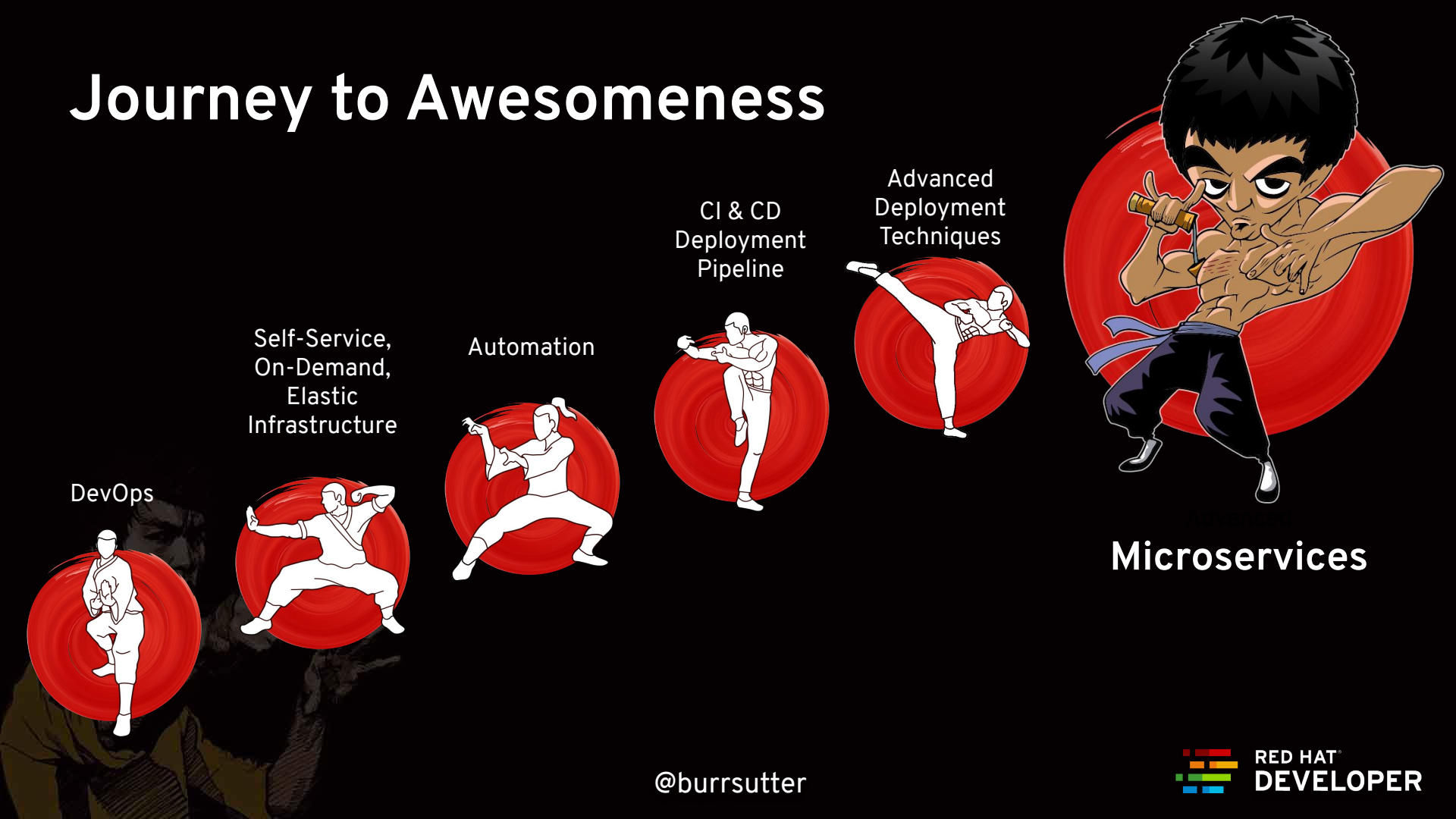


bit.ly/istiobook

2nd Edition

Journey to Awesomeness



@burrsutter

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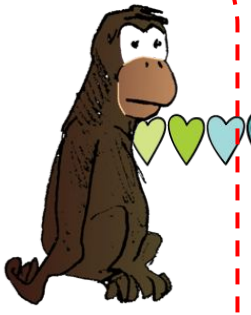
Your Journey to Awesomeness

Re-Org to DevOps

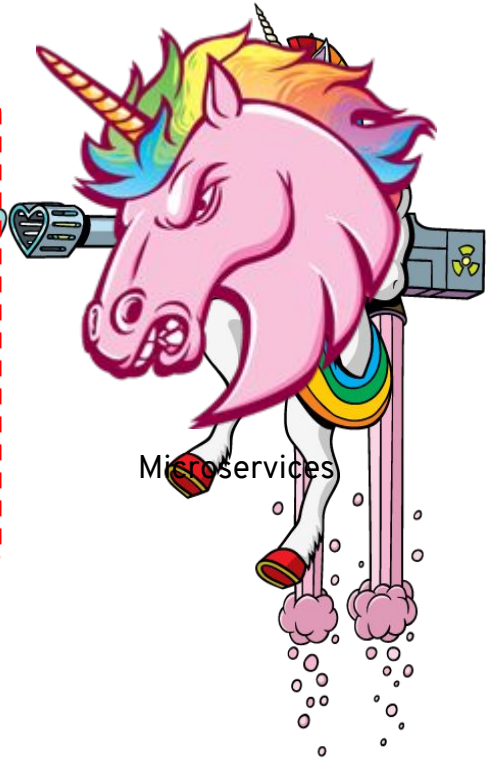
Self-Service, On-Demand, Elastic Infrastructure

Automation

CI & CD Deployment Pipeline



Advanced Deployment Techniques



Microservices

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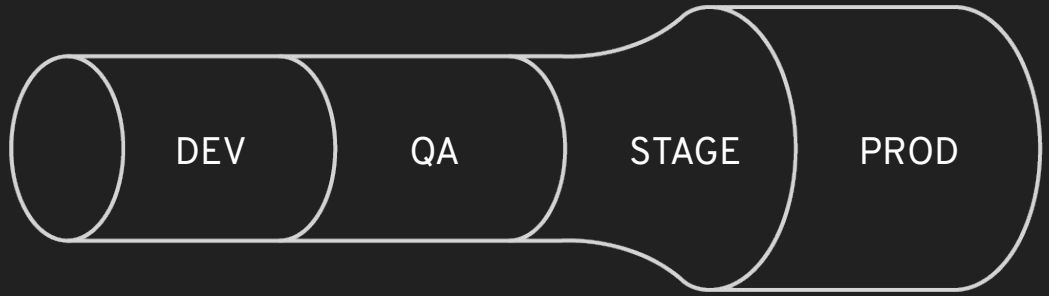
DEV
OPS
WALL OF CONFUSION

The Pipeline



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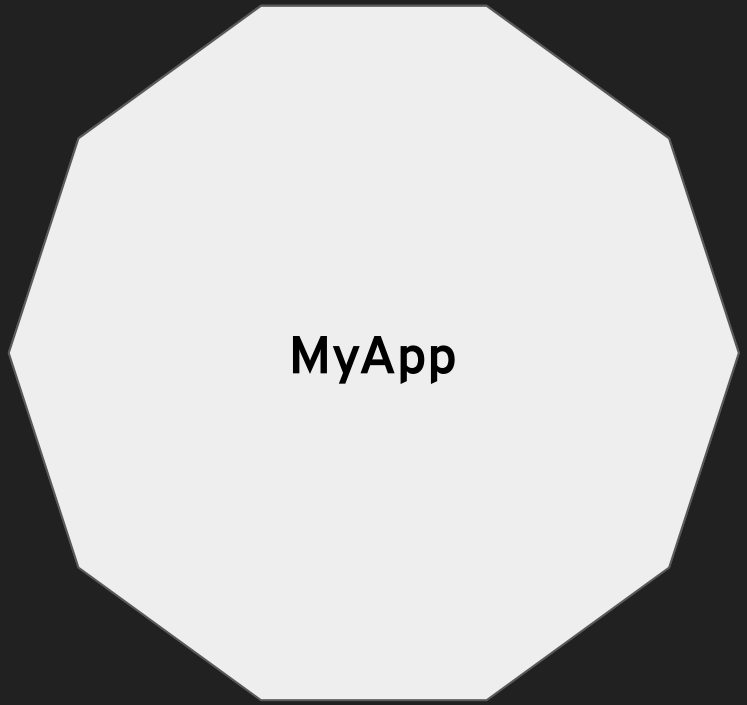
Our Apps



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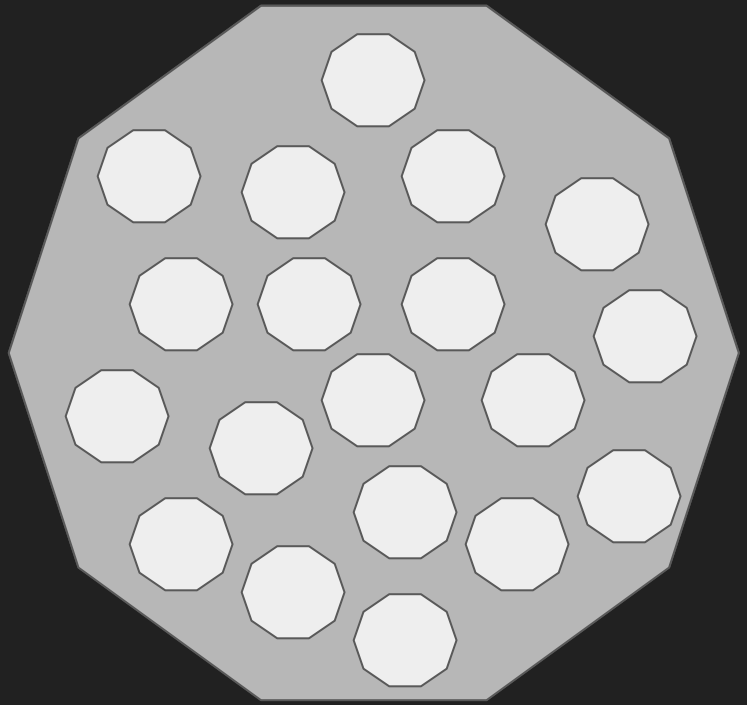
The Application



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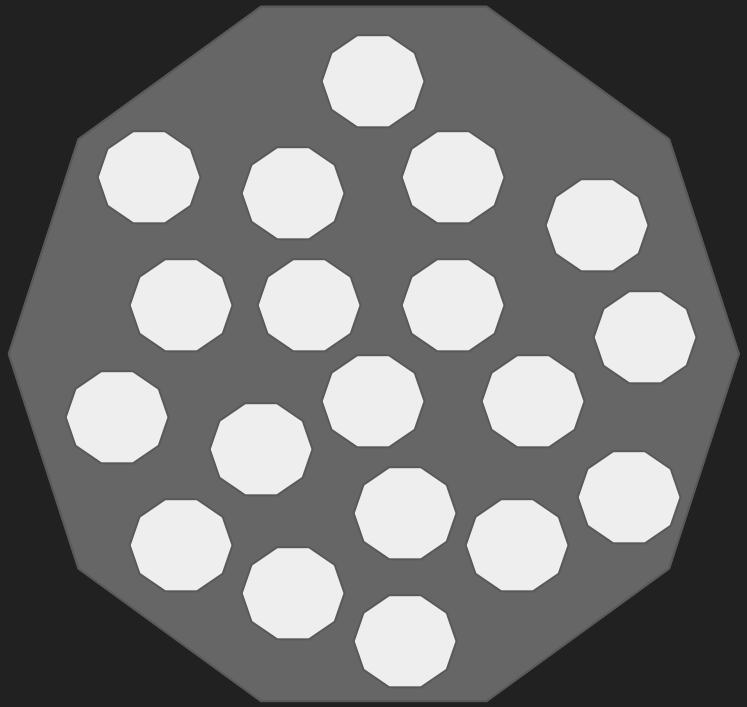
Modules



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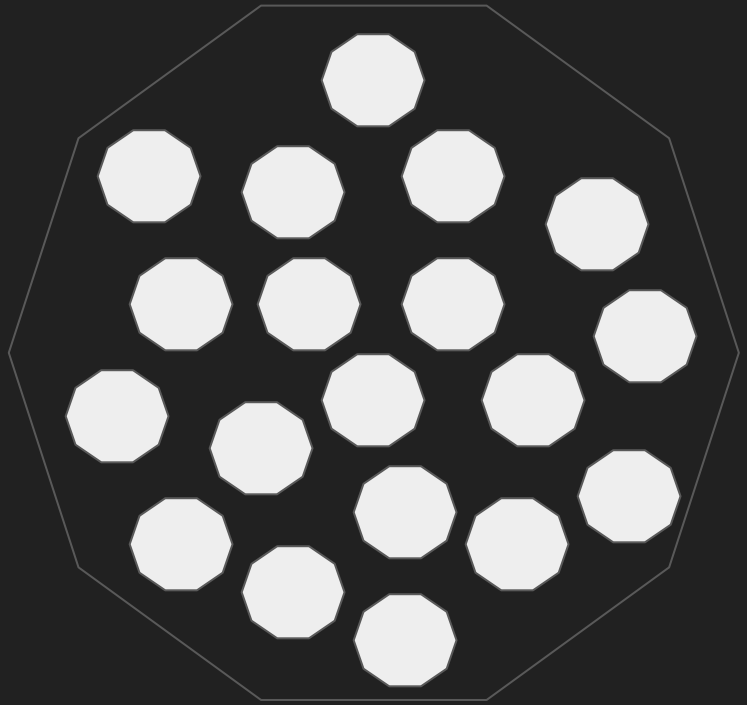
Microservices



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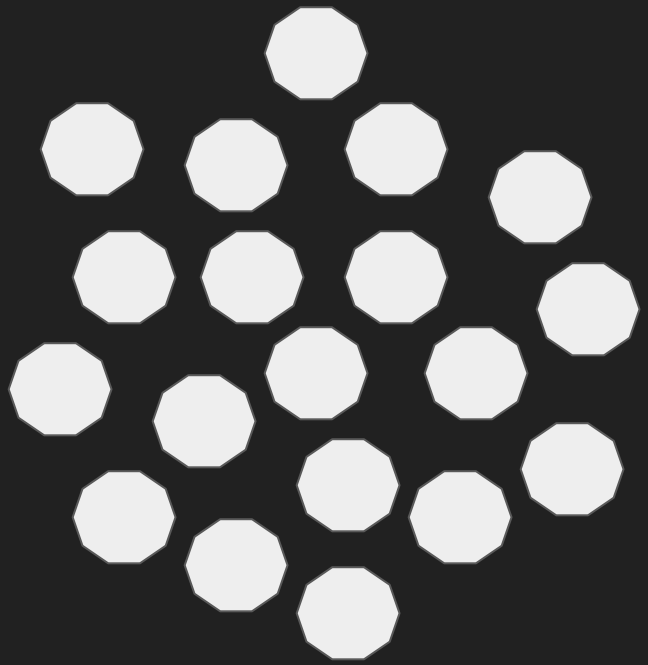
Microservices



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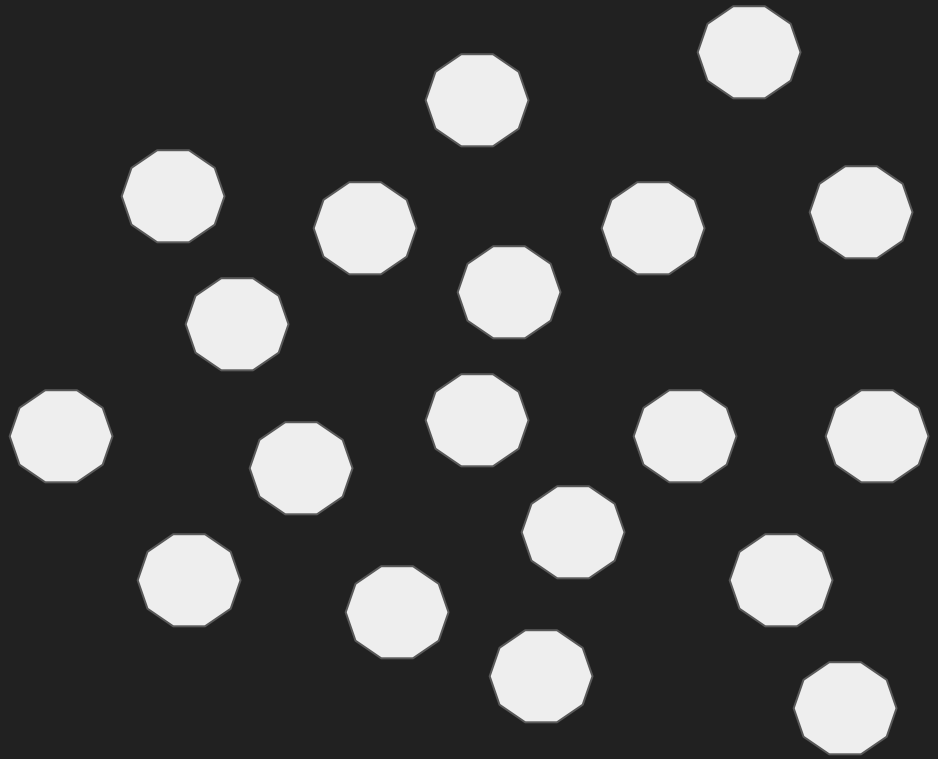
Microservices



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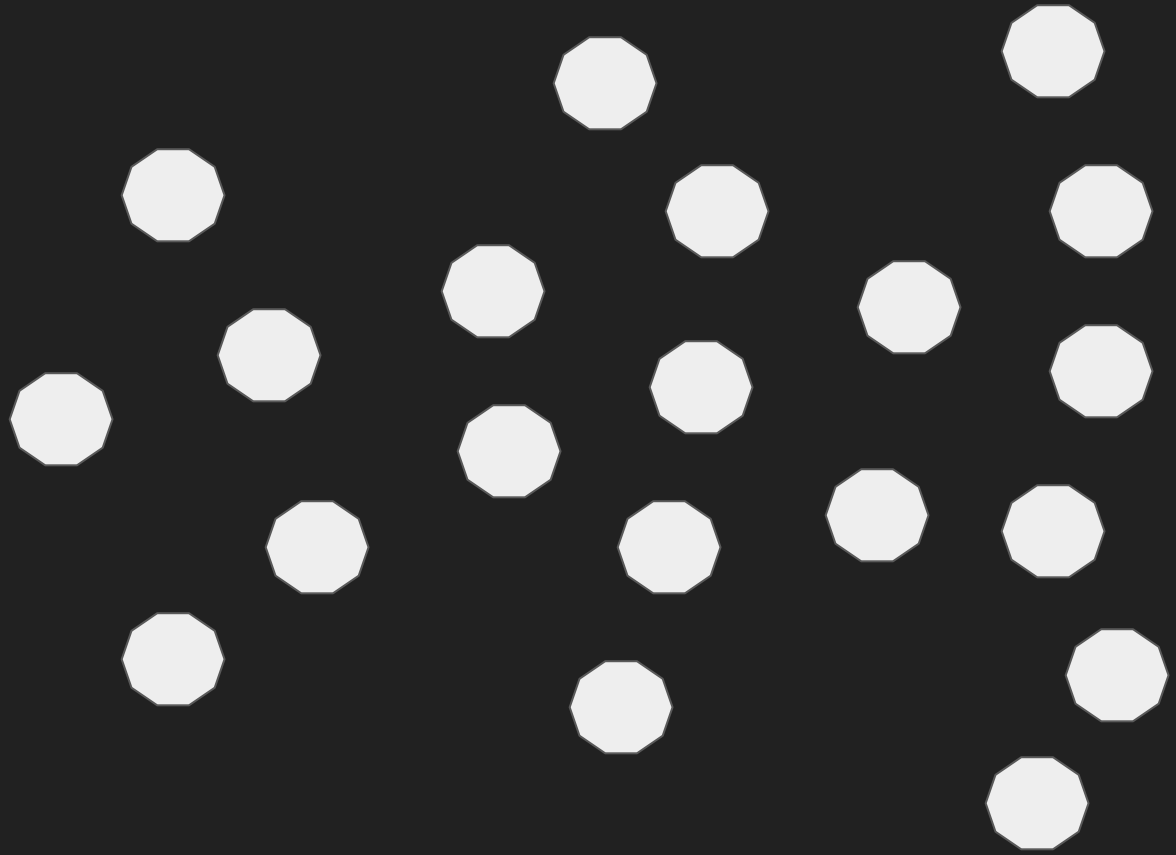
Microservices



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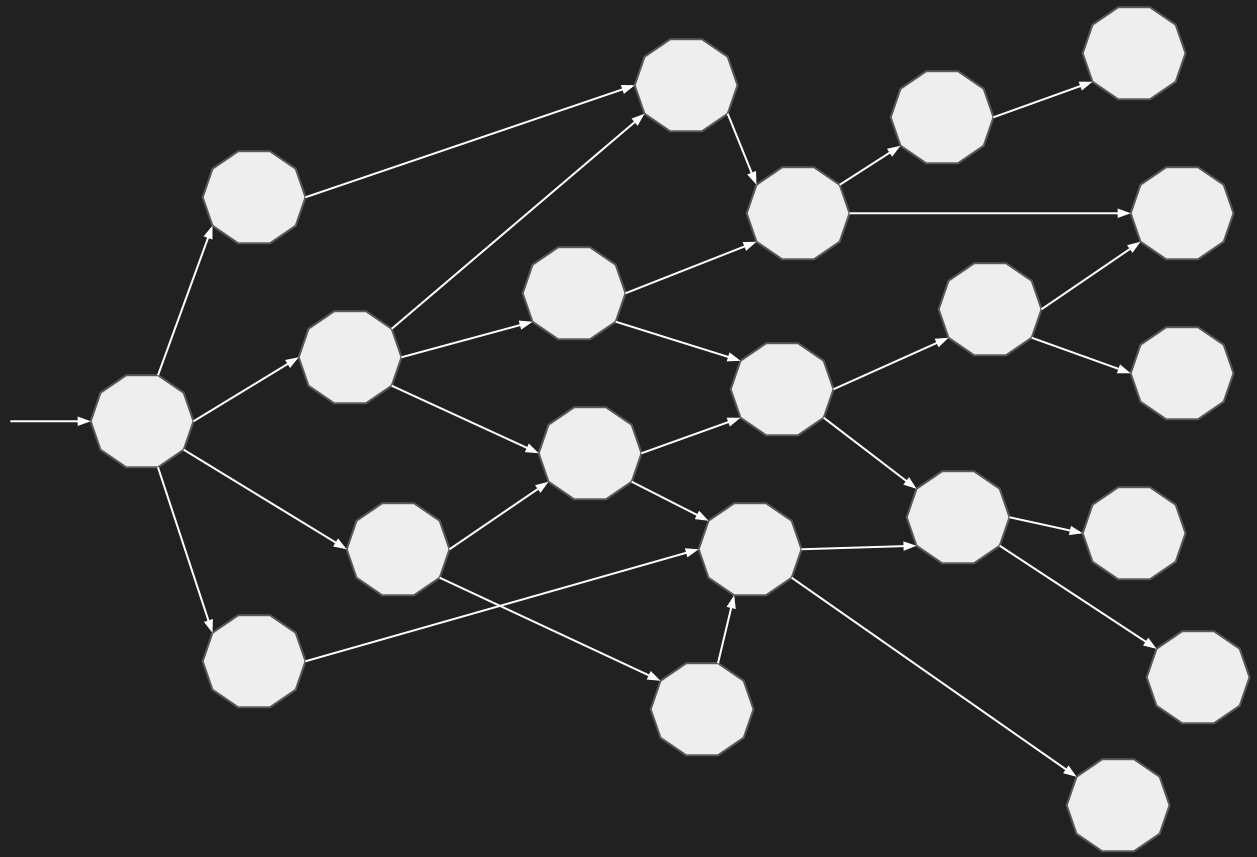
Network of Services



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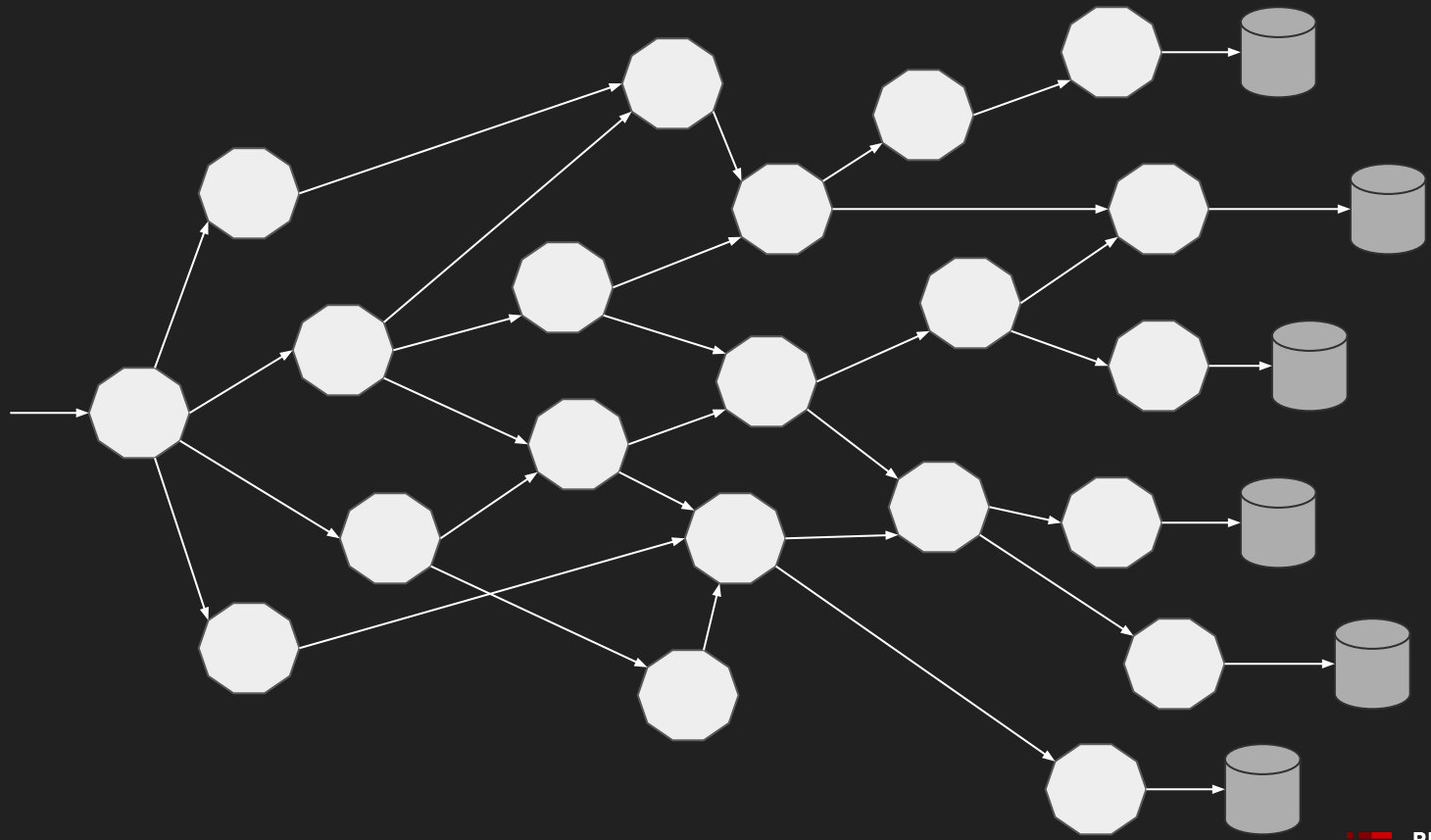
Microservices own their Data



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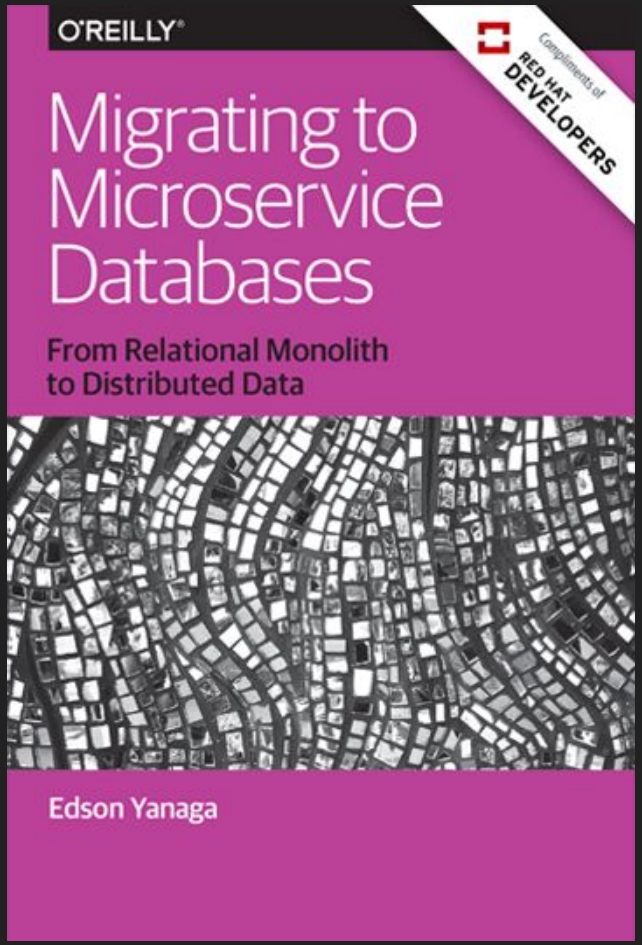

bit.ly/mono2microdb

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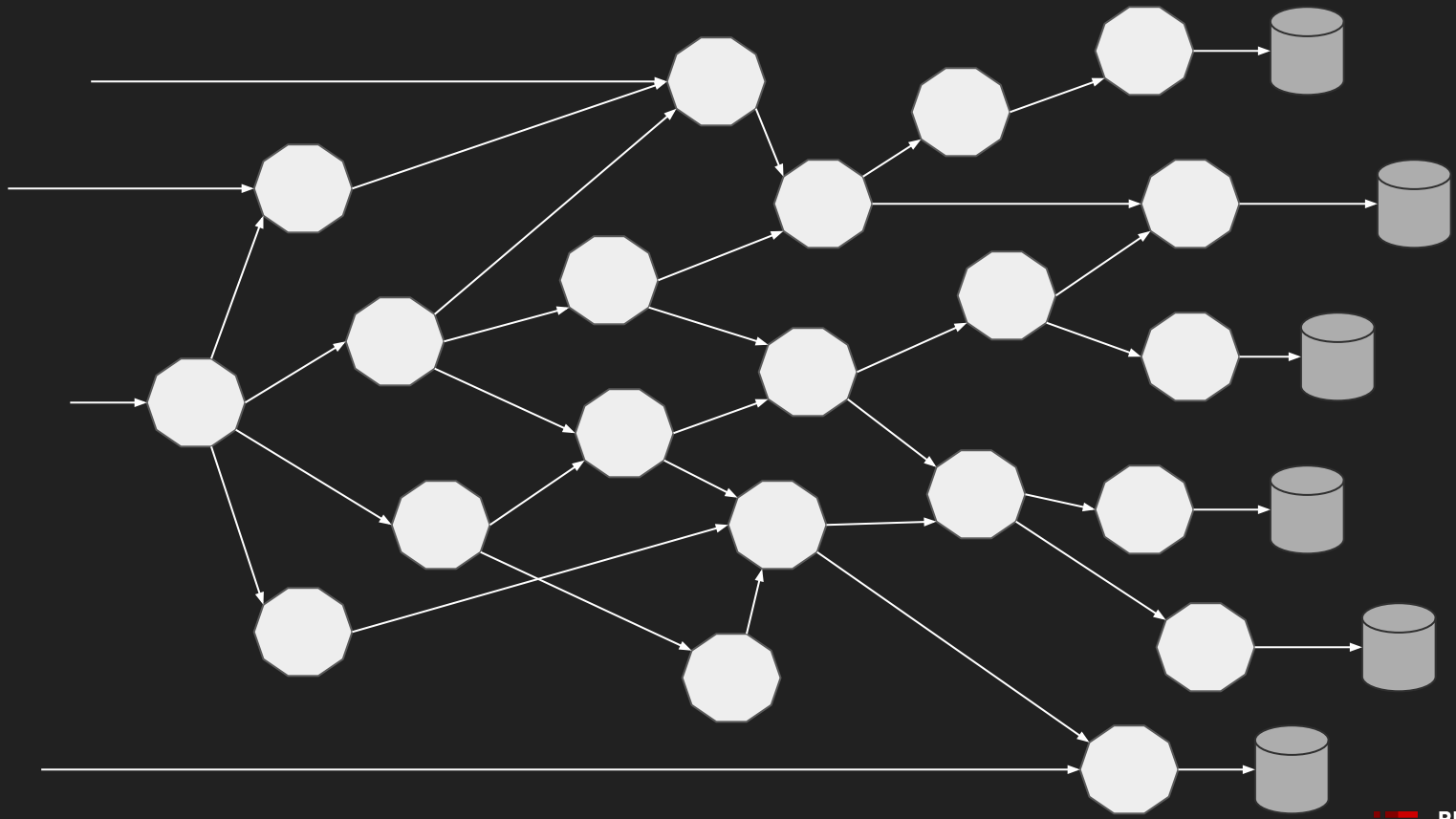
Multiple Points of Entry



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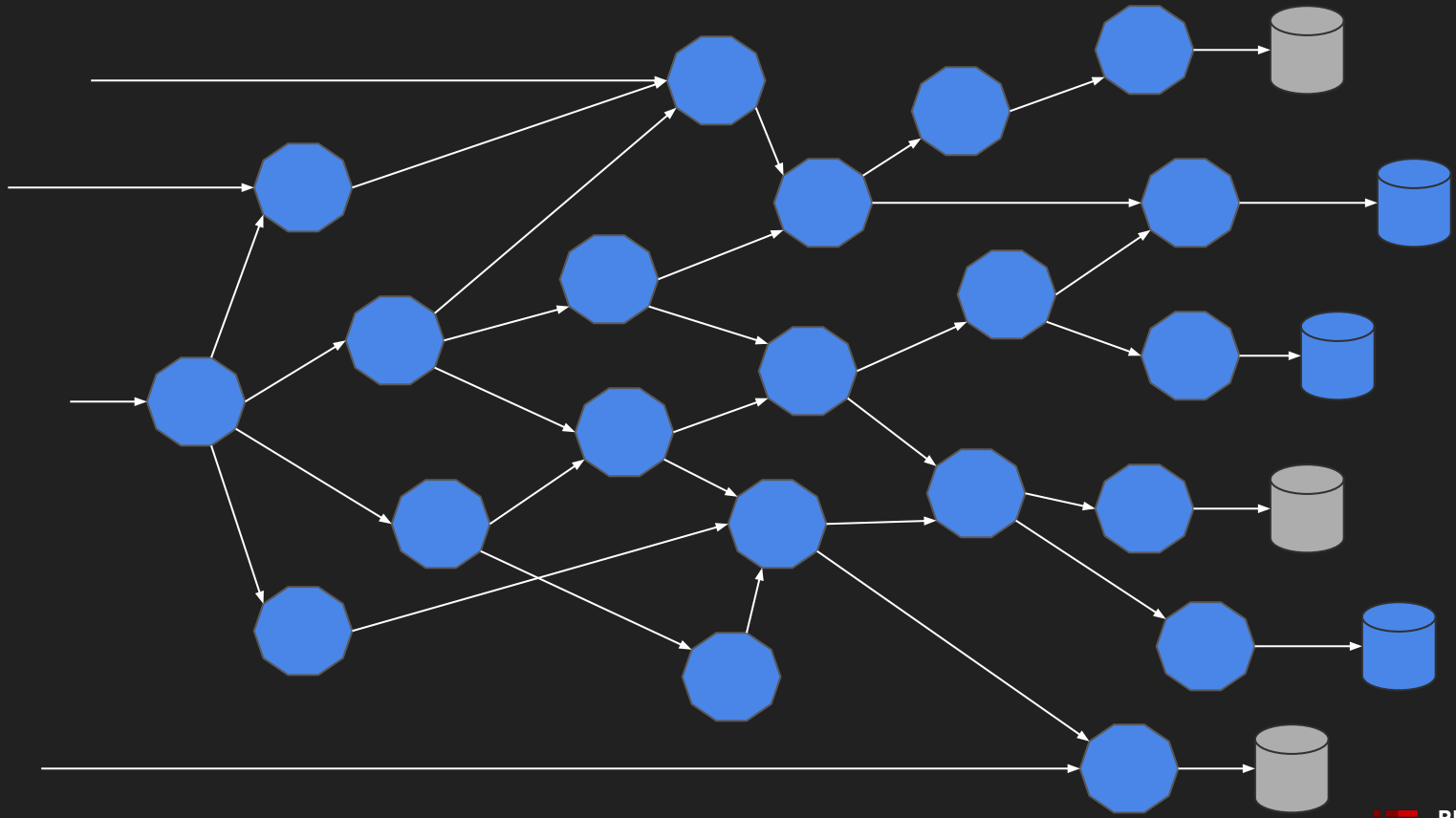
Kubernetes Pods



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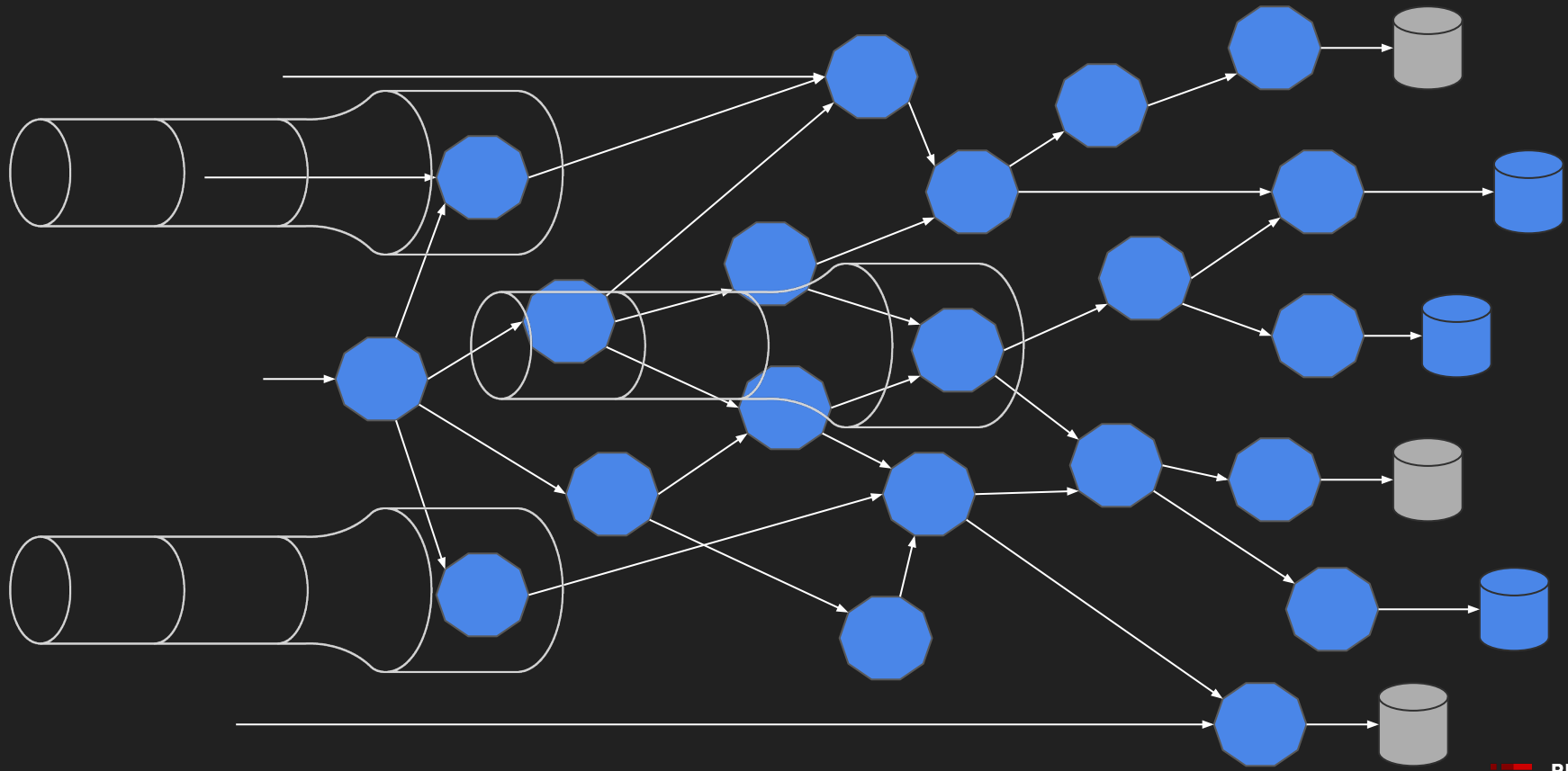
Pipeline Pod Delivery



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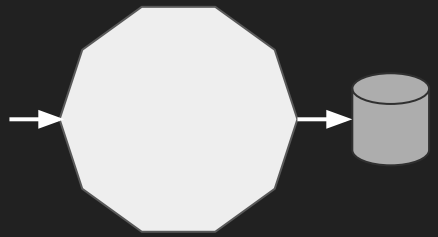
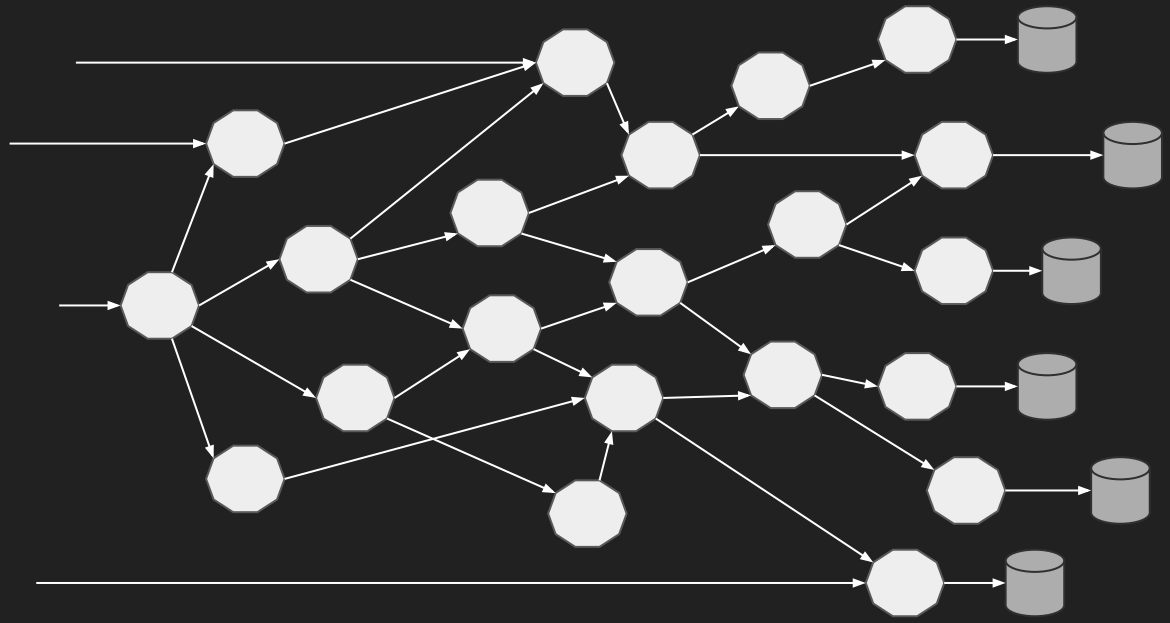
Old School



Love Thy Mono

New School



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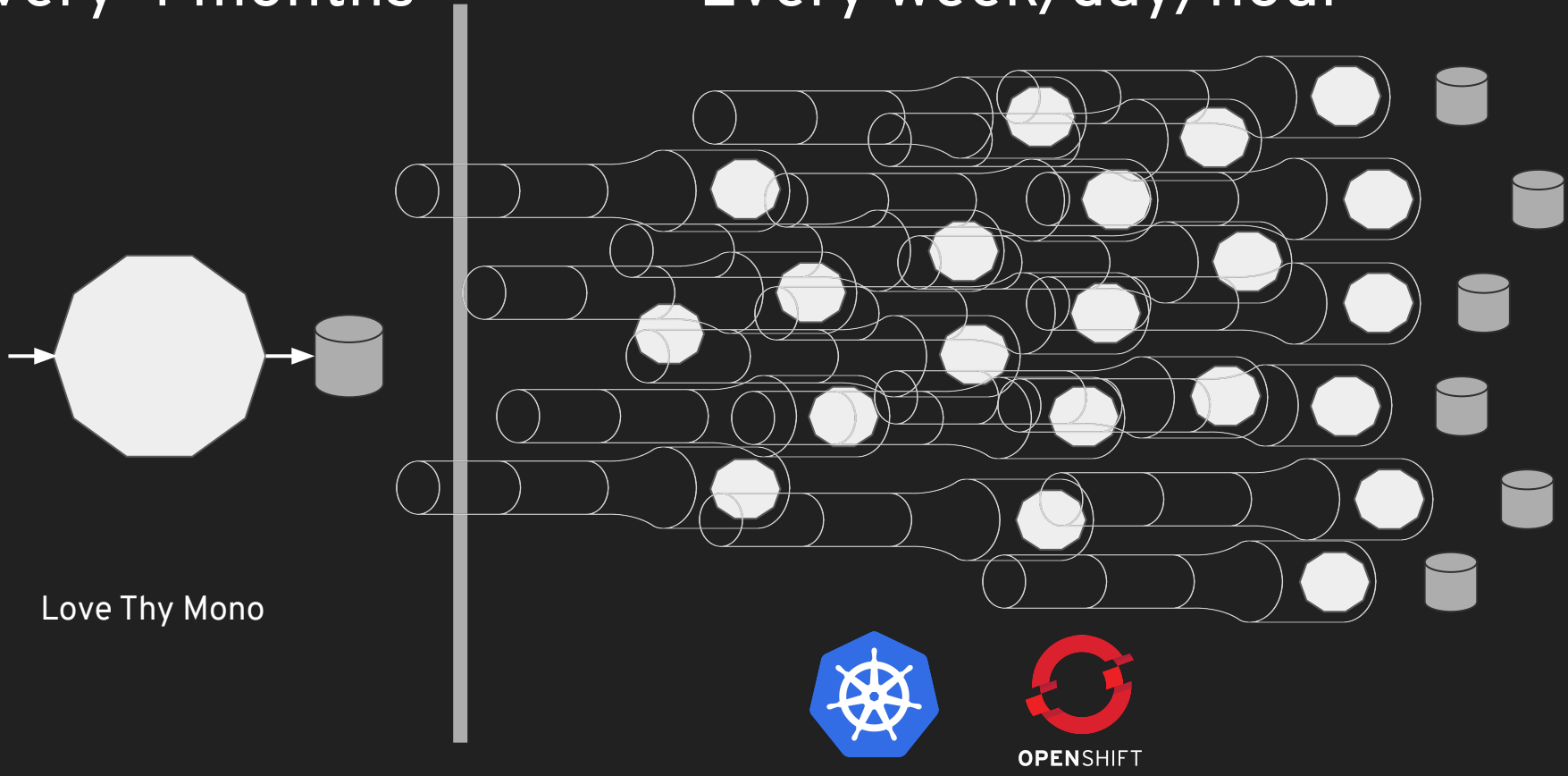
Every 4 months

Every week/day/hour



Love Thy Mono

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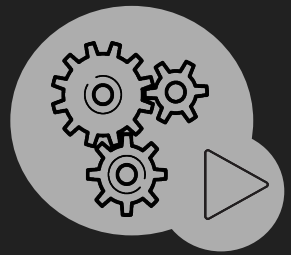
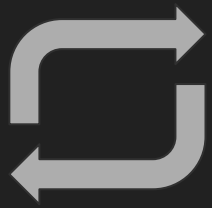
Kubernetes Terms

Pod



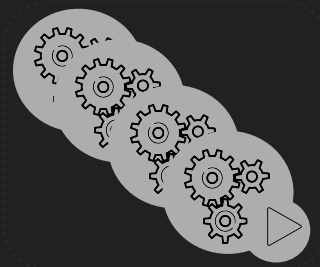
- ✓ 1+ containers
- ✓ Shared IP
- ✓ Shared storage (ephemeral)
- ✓ Shared resources
- ✓ Shared lifecycle

Replicaset/ Deployment



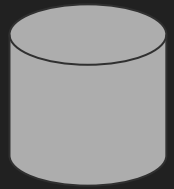
- ✓ The Desired State - replicas, pod template: health checks, resources, image

Service



- ✓ Grouping of pods (acting as one) has stable virtual IP and DNS name

Persistent Volume



- ✓ Network available storage
- ✓ PVs and PVCs

Label

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

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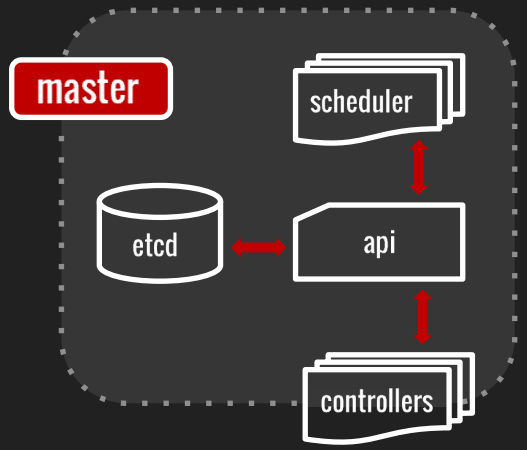
```
Image:
quay.io/images/custservice:1.1.0
Replicas:
2
Labels:
customerservice=prod,ci_build=1213
ConfigMap:
cust_config
```



RED HAT DEVELOPER

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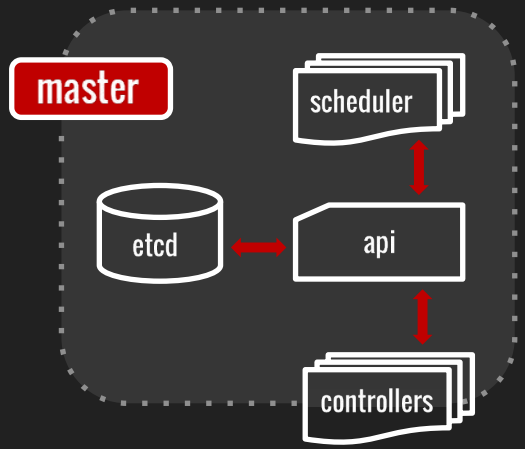

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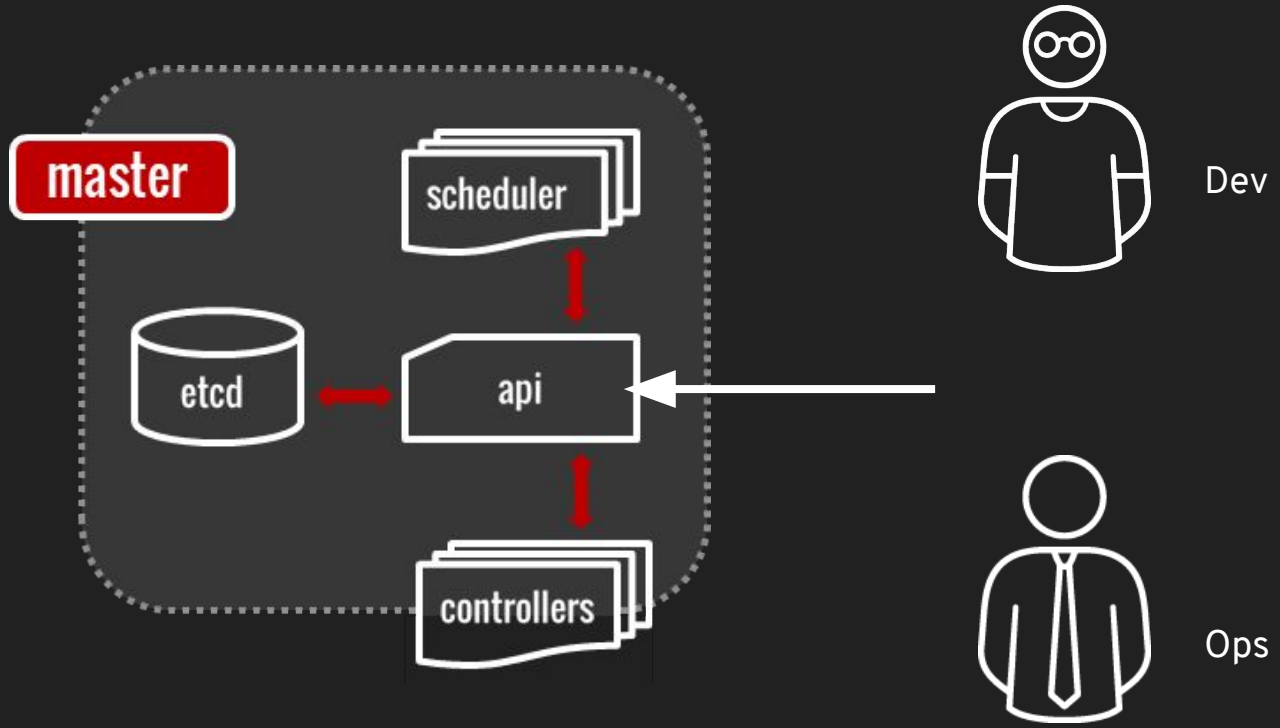
Kubernetes API



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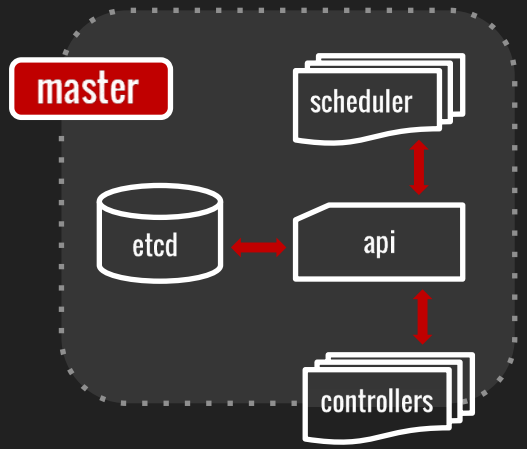
Out-of-the-Box Kinds




```
kind:ConfigMap
```

```
kind:Deployment
```

```
kind:Service
```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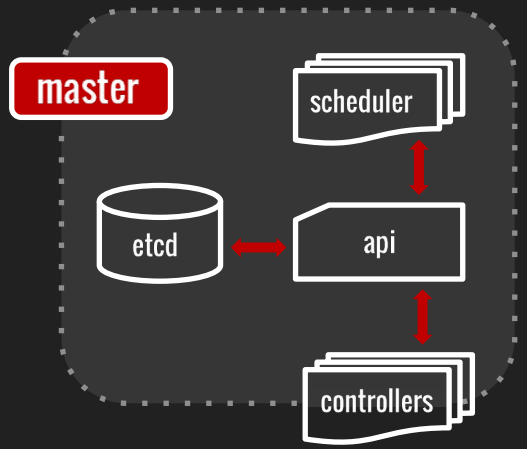
Custom Kinds




```
kind:ConfigMap
```

```
kind:VirtualService
```

```
kind:Deployment
```

```
kind:ServerlessServ
ice
```

```
kind:Service
```

```
kind:Pipeline
```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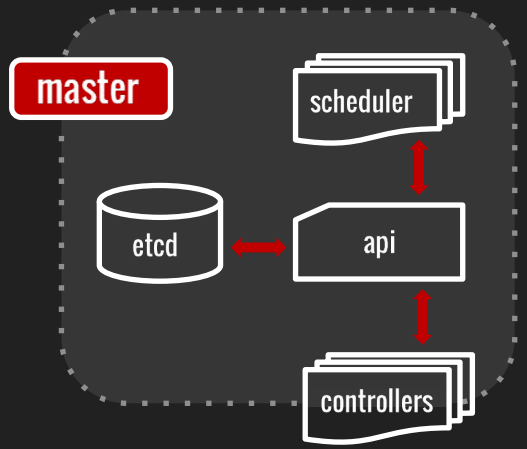
Even more Custom Kinds



`kind:ConfigMap`

`kind:VirtualService`

`kind:Kafka`
Strimzi.io

`kind:Deployment`

`kind:ServerlessServ ice`

`kind:Integration`
Camel-K

`kind:Service`

`kind:Pipeline`

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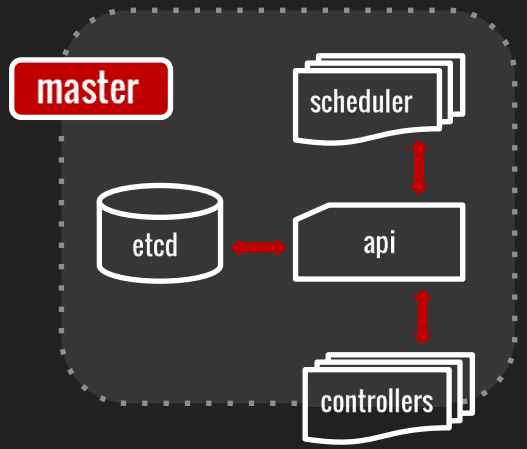
Even more Custom Kinds



`kind:ConfigMap`

`kind:`**`VirtualService`**
Istio.io

`kind:Kafka`
Strimzi.io

`kind:Deployment`

`kind:ServerlessServ`
`ice`

`kind:Integration`
Camel-K

`kind:Service`

`kind:`**`Pipeline`**
Tekton.dev

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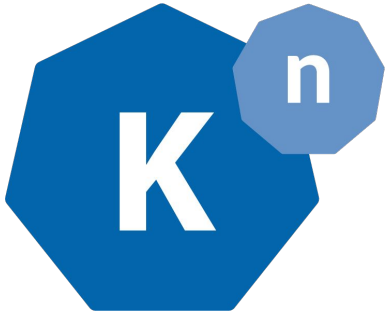
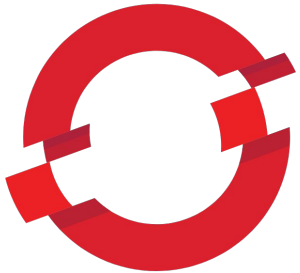
istio.io



knative.dev

tekton.dev

kubernetes



OPENSHIFT

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Istio - Sail

(Kubernetes - Helmsman or ship's pilot)

istio.io

bit.ly/istio-tutorial

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Next Generation Microservices - Service Mesh

Code Independent (Polyglot)

- Intelligent Routing and Load-Balancing
  - Smarter Canary Releases
  - Dark Launch
- Chaos: Fault Injection
- Resilience: Circuit Breakers
- Observability & Telemetry: Metrics and Tracing
- Security: Encryption & Authorization
- Fleet wide policy enforcement

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TEKTON

tekton.dev
bit.ly/knative-tutorial

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Pipelines - Tekton

- Governed by the Continuous Delivery Foundation (cd.foundation)
- Contributions from Google, Cloudbees, IBM, Pivotal, Red Hat and more
- Originated from the Knative Build subproject
- Build your linux container images in-cluster
- Automate deployments
- Defines new Kinds via CRDs: Pipeline, Task
- Reusable Tasks (https://github.com/tektoncd/catalog)
  - git clone
  - mvn, bazel, s2i (python, ruby, etc)
  - "docker build" (buildah, kaniko, makisu)

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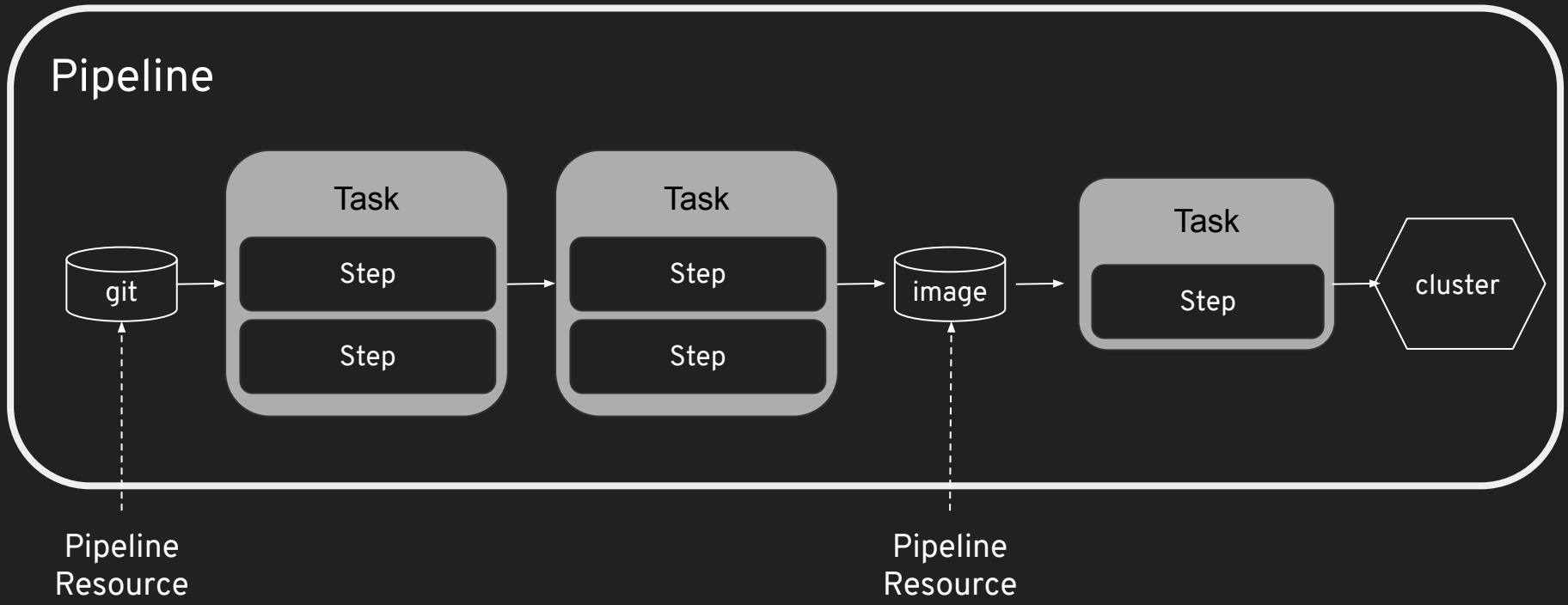
Pipelines, Tasks, Steps, Resources



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Istio Traffic Control

- Blue/Green part of base Kubernetes/OpenShift
- Percentages not based on pod count - Canary Deployment
- Smart Canaries
- Dark Launch

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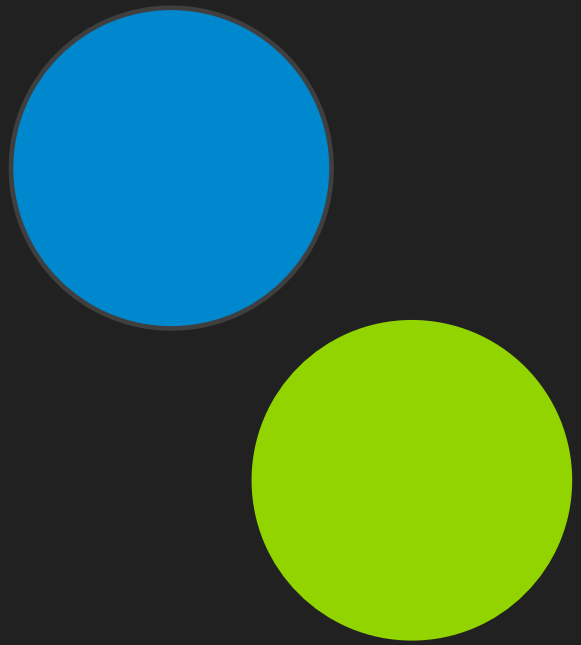
Blue/Green Deployment



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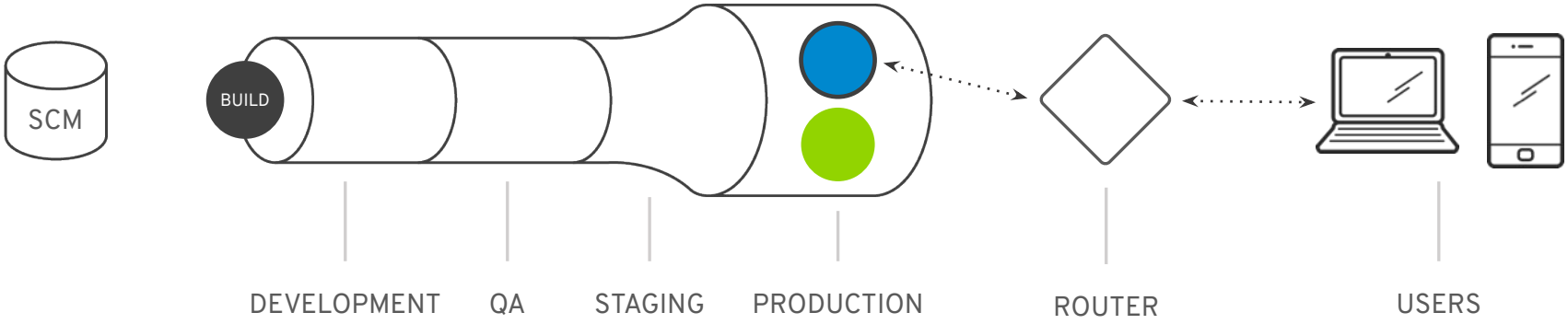
Blue/Green Deployment



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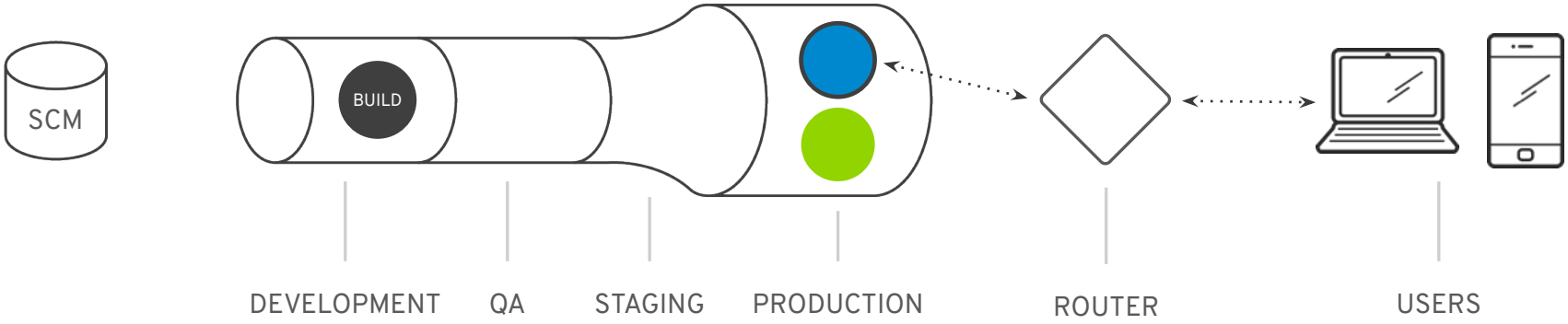
Blue/Green Deployment



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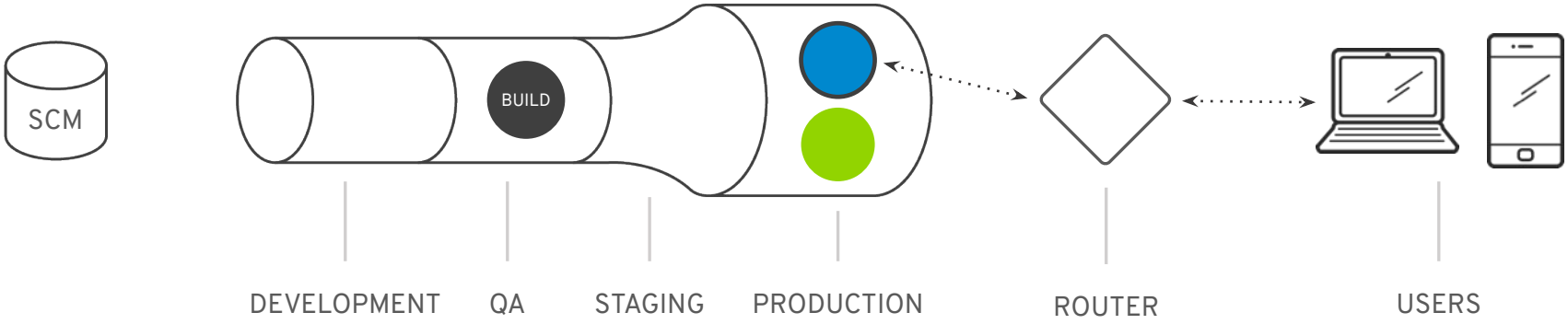
Blue/Green Deployment



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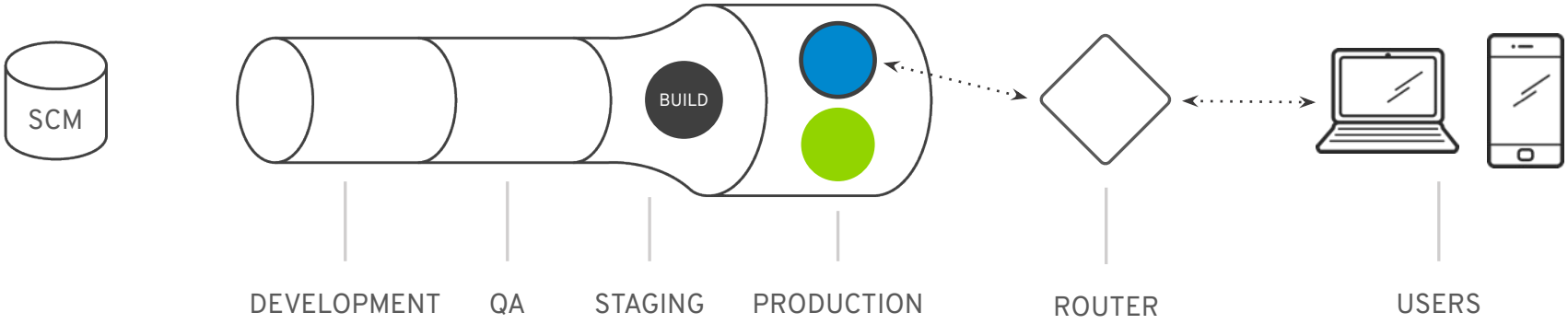

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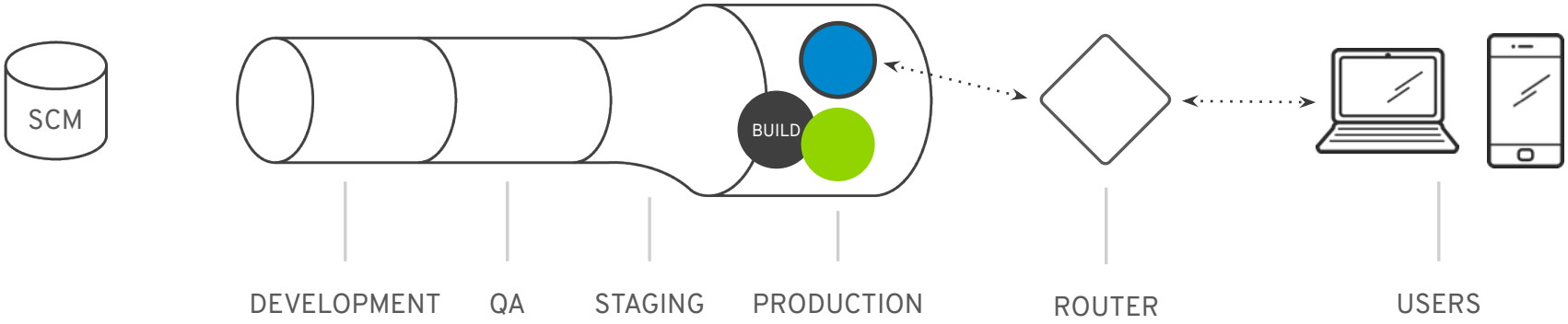

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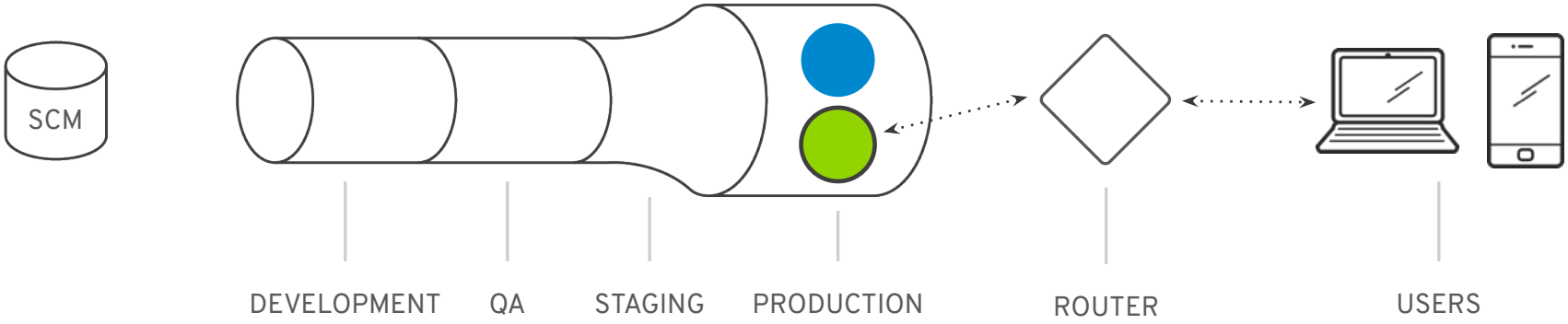
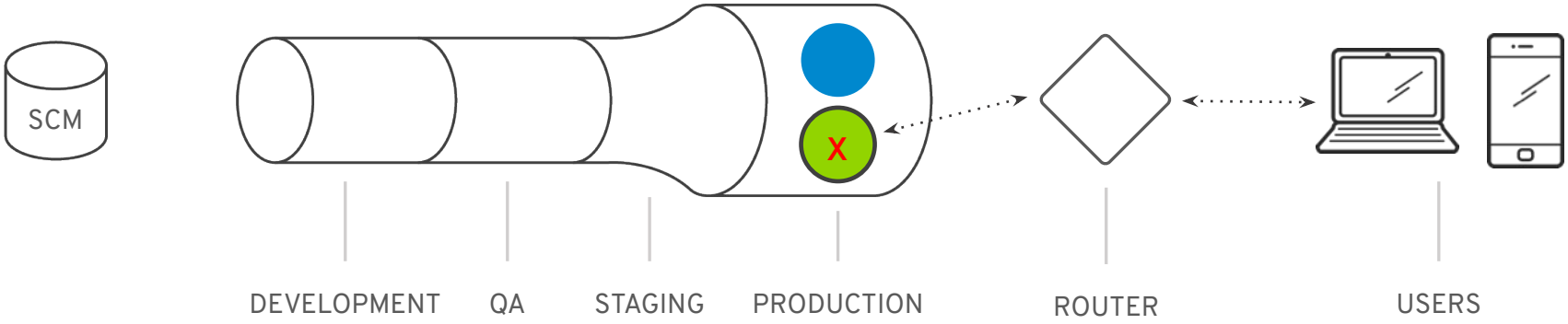


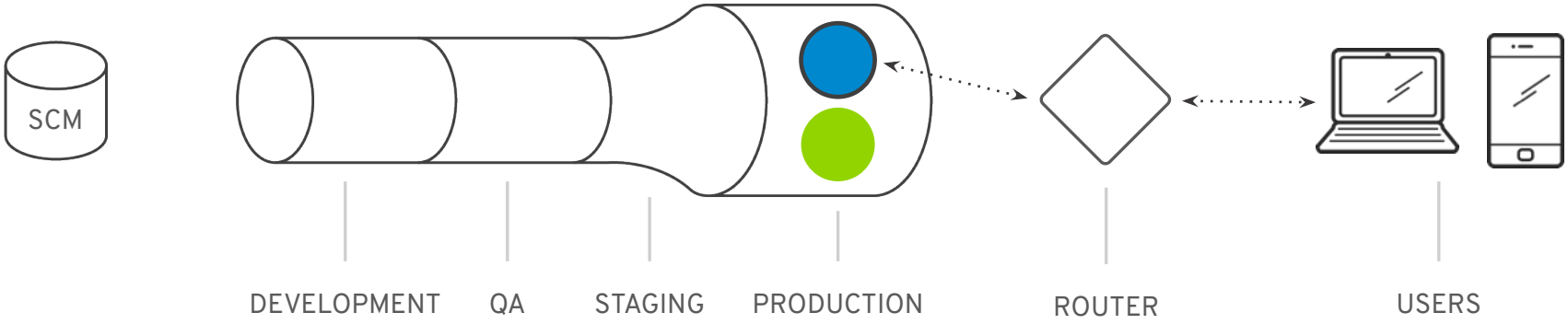
RED HAT DEVELOPER

Blue/Green Deployment



RED HAT DEVELOPER

Blue/Green Deployment



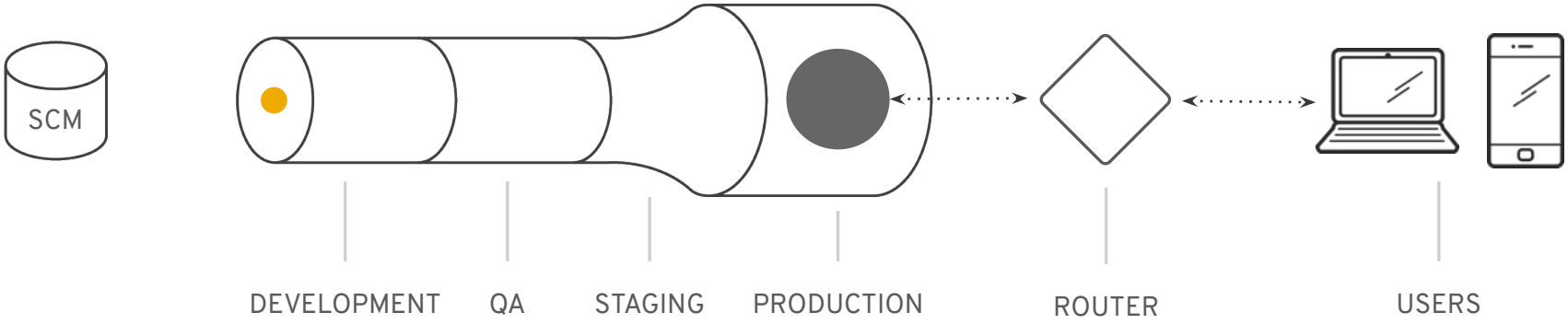
RED HAT DEVELOPER

Canary Deployment

RED HAT DEVELOPER

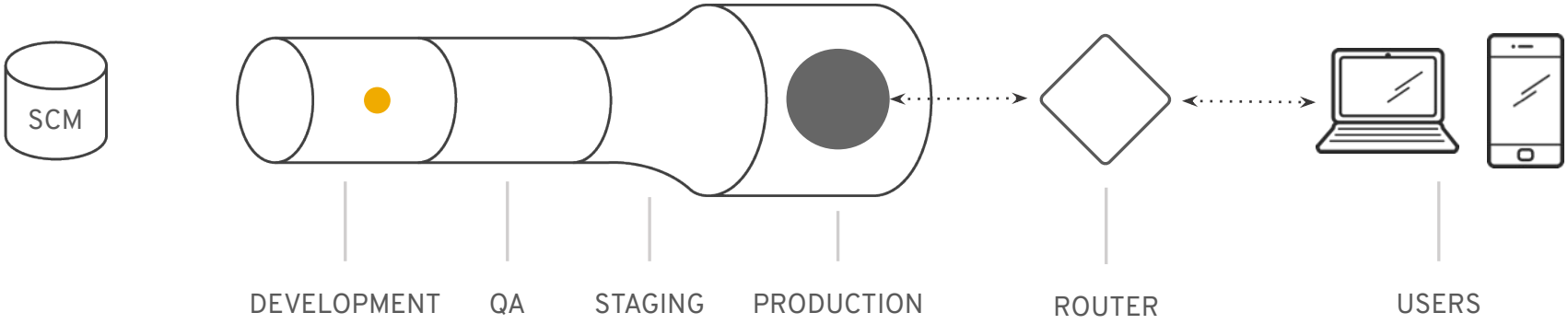
RED HAT DEVELOPER

Canary Deployment



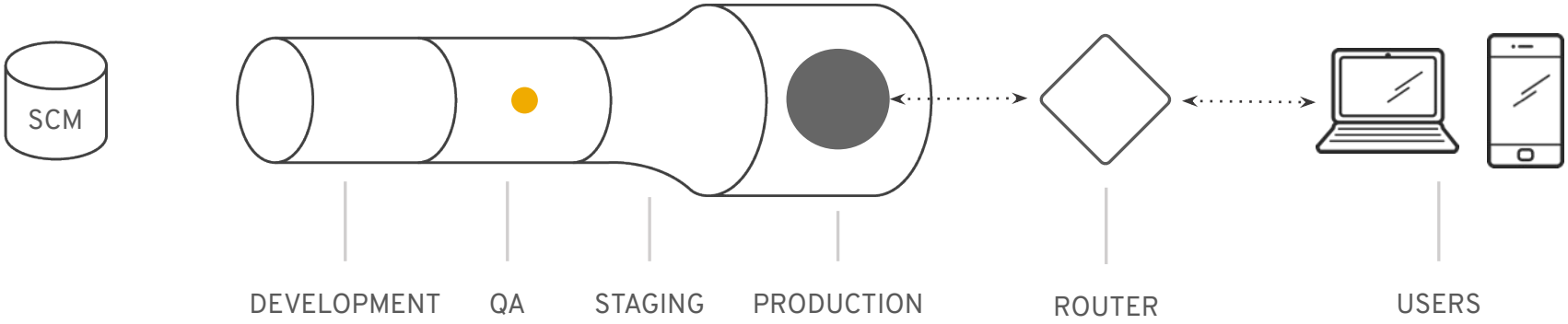
RED HAT DEVELOPER

Canary Deployment



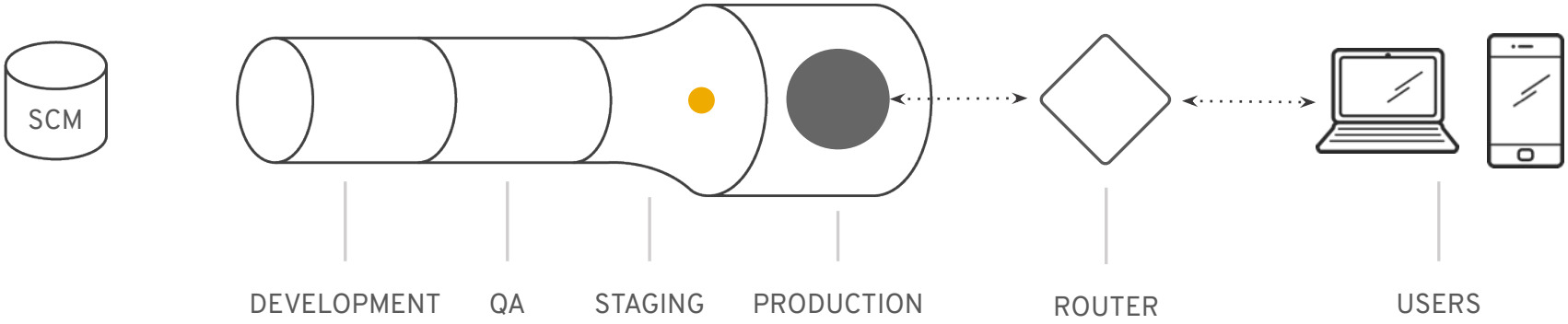
RED HAT DEVELOPER

Canary Deployment



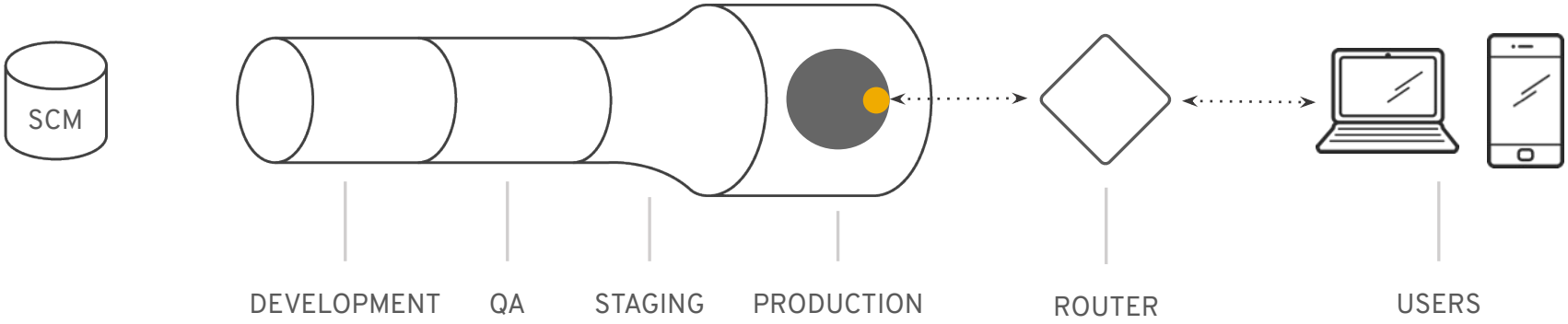
RED HAT DEVELOPER

Canary Deployment



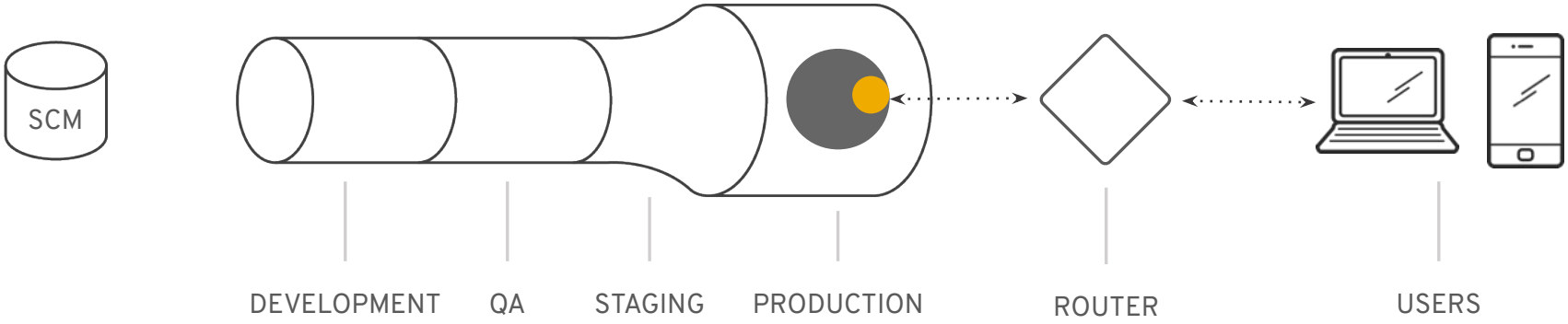
RED HAT DEVELOPER

Canary Deployment



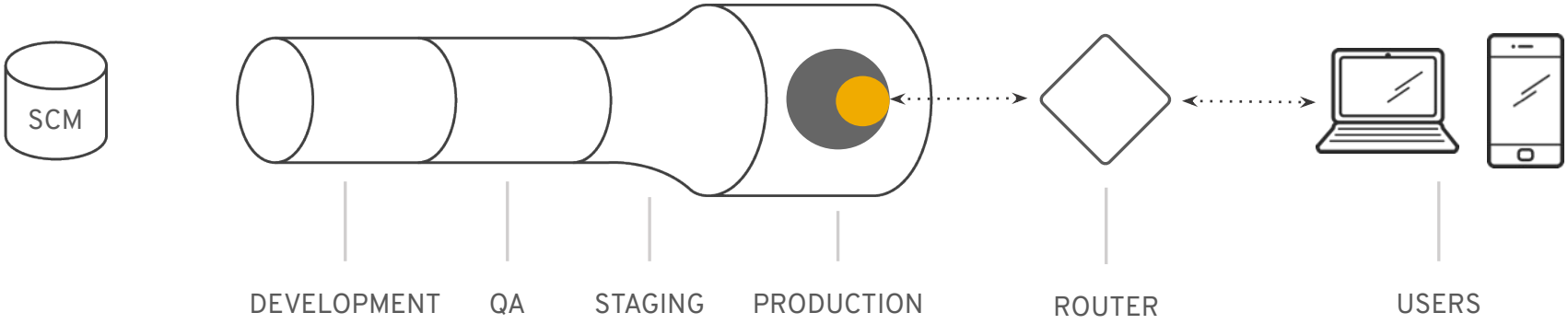
RED HAT DEVELOPER

Canary Deployment



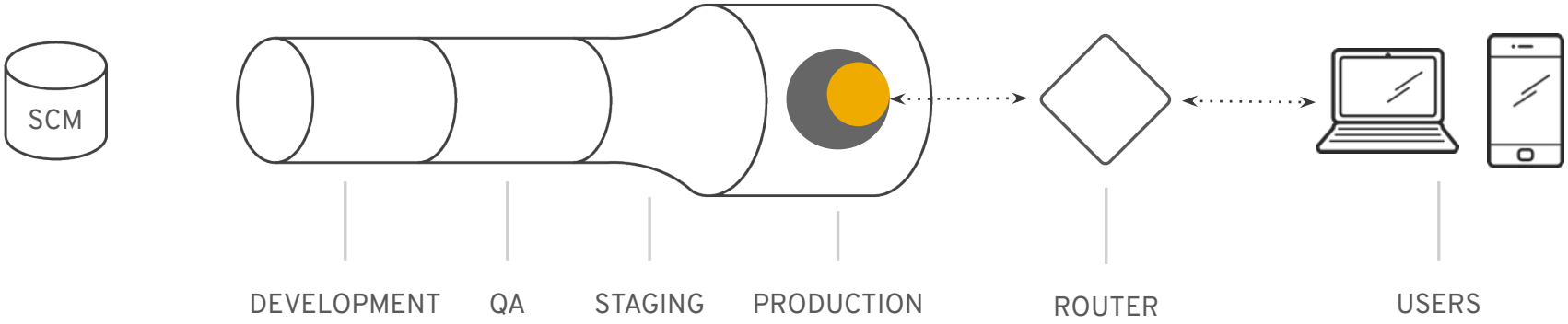
RED HAT DEVELOPER

Canary Deployment



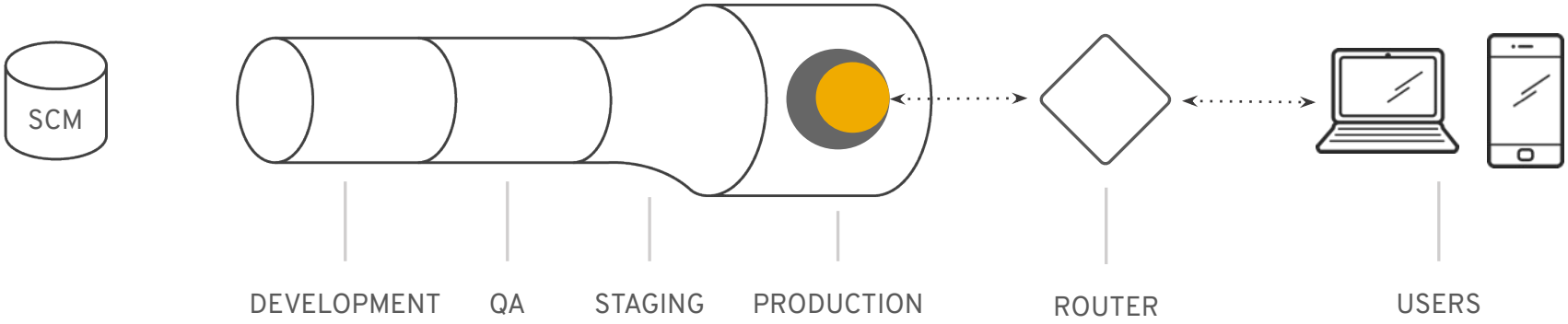
RED HAT DEVELOPER

Canary Deployment



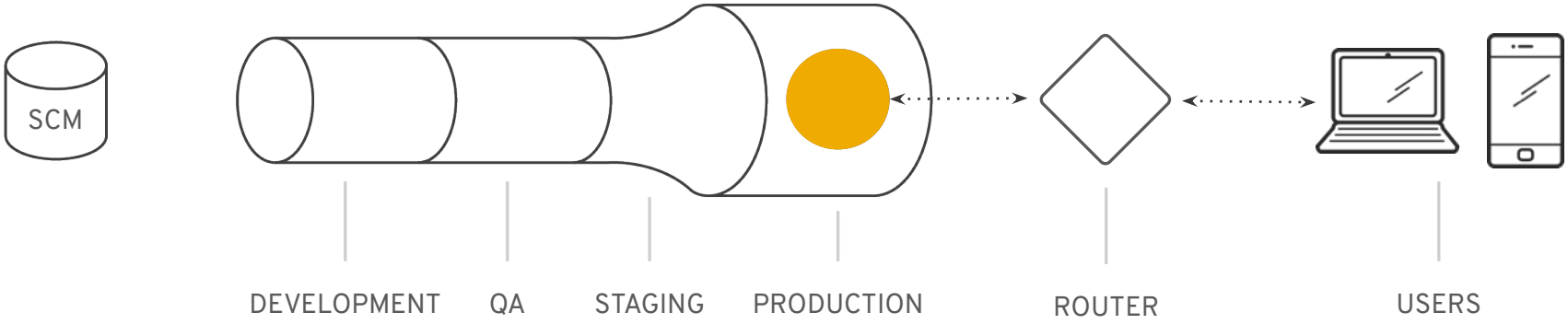
RED HAT DEVELOPER

Canary Deployment



RED HAT DEVELOPER

Canary Deployment

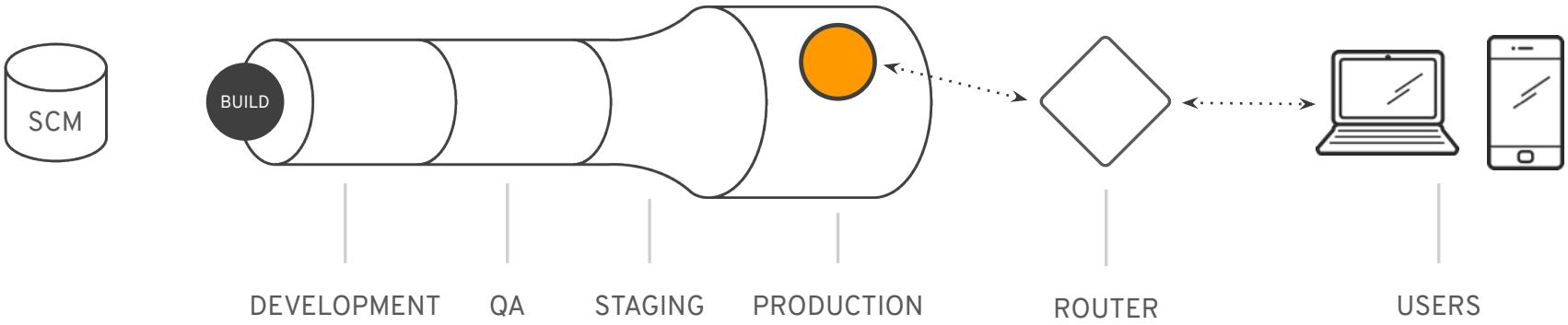


RED HAT DEVELOPER

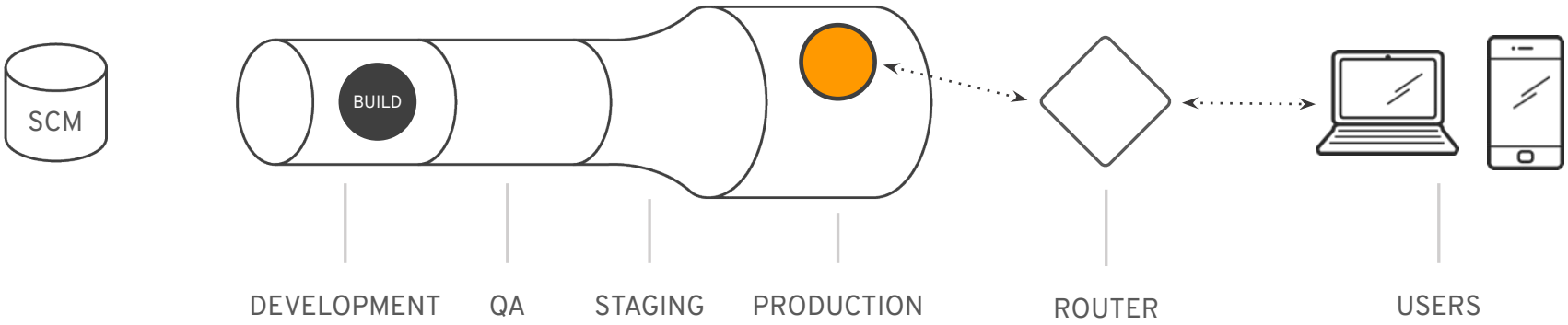
Dark Launch

Dark

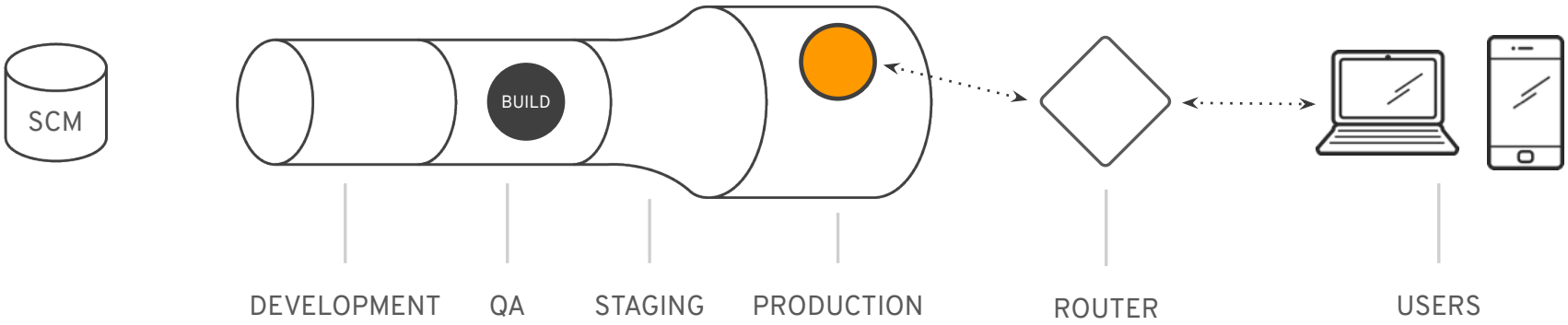
Dark Launch



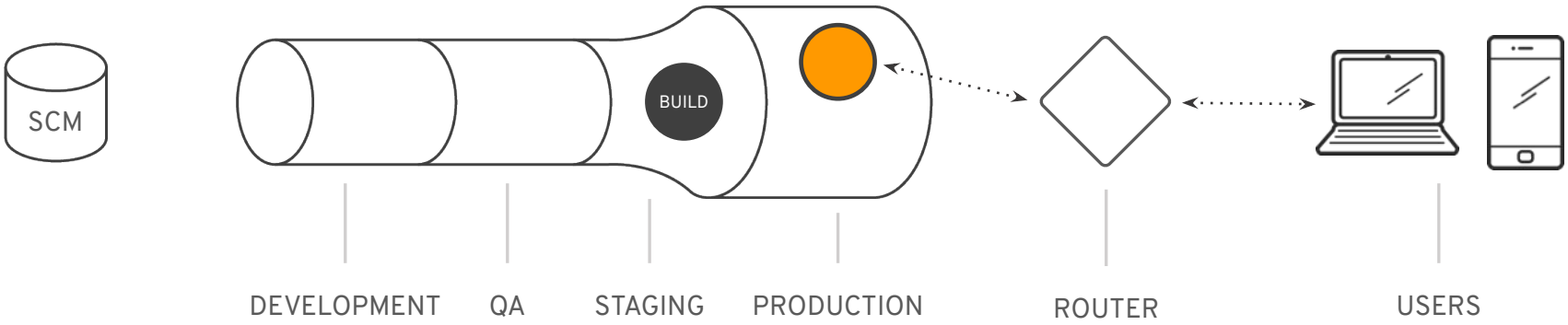
Dark Launch



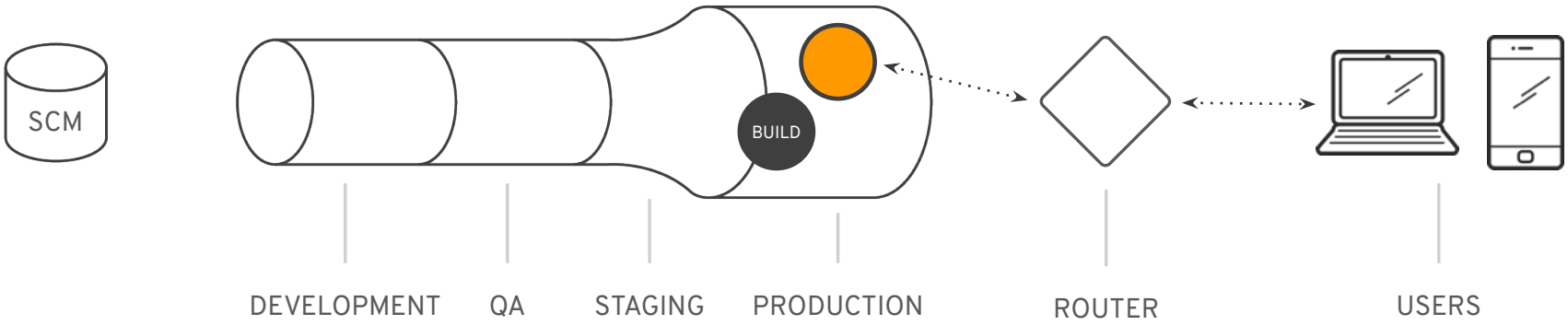
Dark Launch



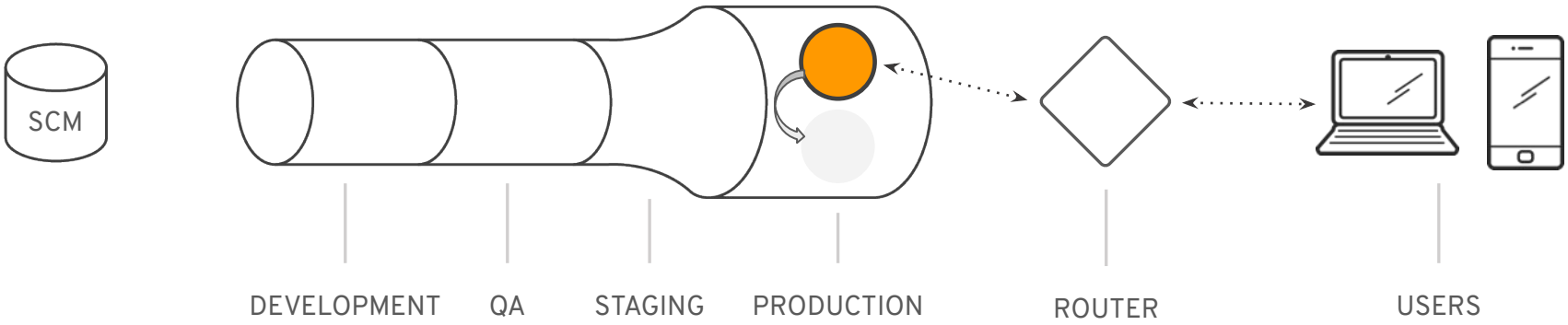
Dark Launch



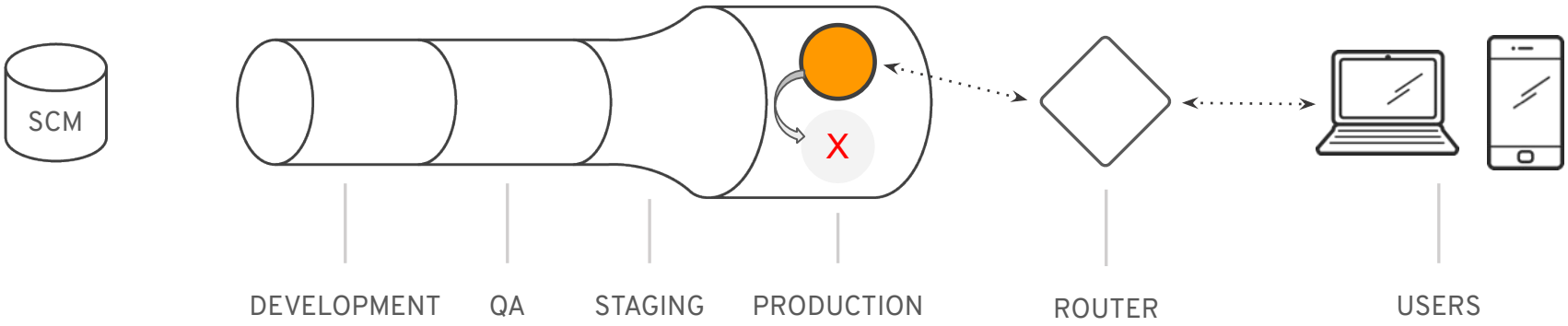
Dark Launch



Dark Launch - Mirroring



Dark Launch - Monitoring the Mirror



Resources

http://bit.ly/9stepsawesome
http://bit.ly/kubernetes-tutorial
http://bit.ly/istio-intro
http://bit.ly/istio-tutorial
http://bit.ly/serverless-kube
http://bit.ly/knative-tutorial
(includes Tekton)

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