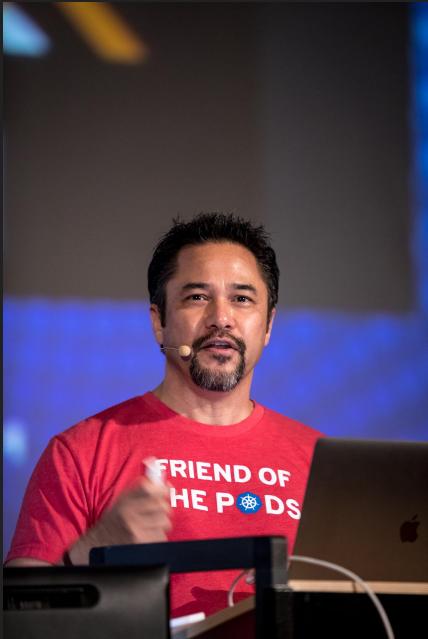


Pipelines & Pods: DevOps with Kubernetes

Burr Sutter (burrsutter.com)

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

Burr Sutter (burrsutter.com)

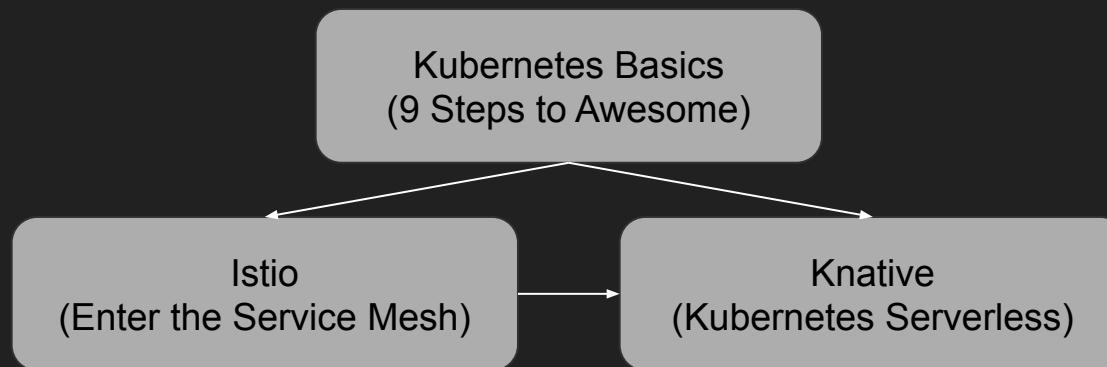


- Red Hat's Global Director of Developer Experience
- Featured speaker at technology events around the globe
- A Java Champion since 2005
- Former President of the Atlanta Java User Group
- Founded the DevNexus conference
- Always looking for technologies that enable Dev&Ops to deliver better software,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

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

Kubernetes, Istio & Knative (and Tekton)

<https://www.oreilly.com/live-training/>
Control-F and search for "burr"



O'REILLY®

Introducing Istio Service Mesh for Microservices

Build and Deploy Resilient, Fault-Tolerant
Cloud Native Applications

Second
Edition



Burr Sutter & Christian Posta

bit.ly/istiobook

2nd Edition

Journey to Awesomeness

DevOps



Self-Service,
On-Demand,
Elastic
Infrastructure



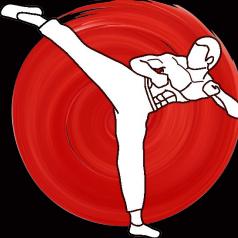
Automation



CI & CD
Deployment
Pipeline



Advanced
Deployment
Techniques

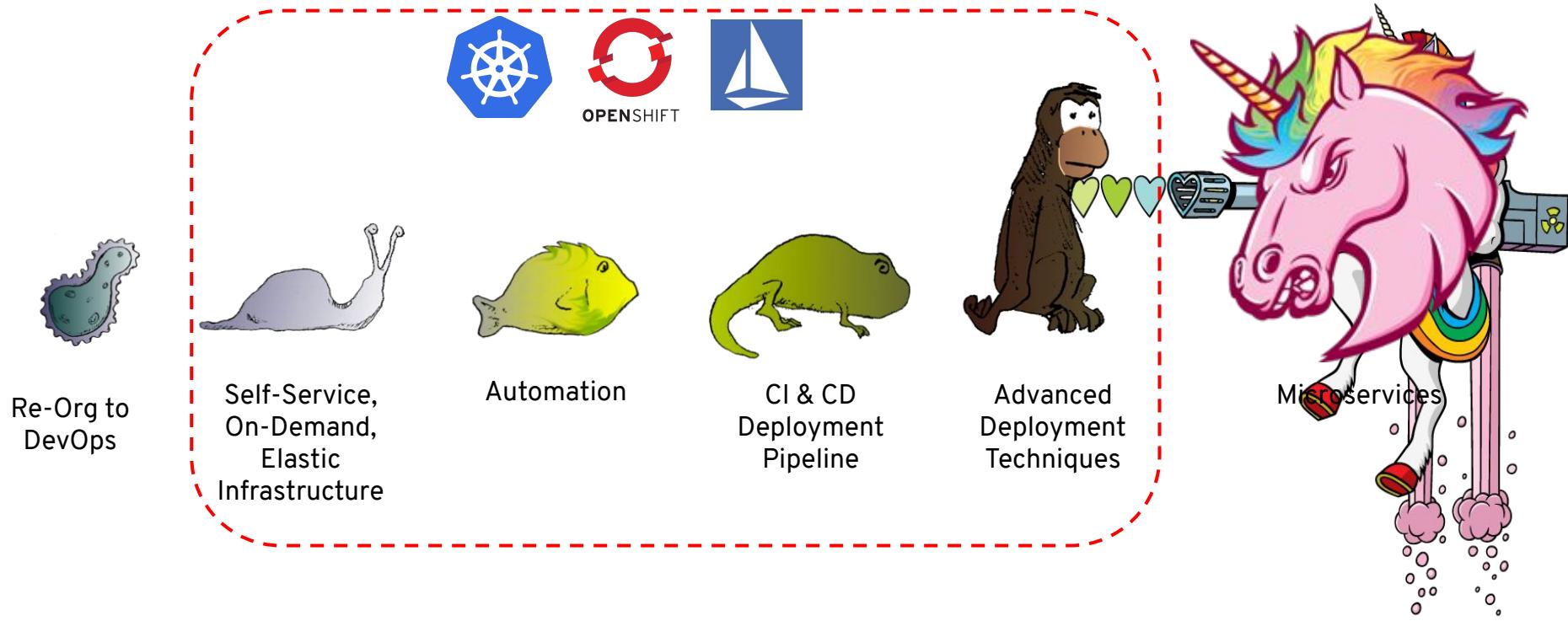


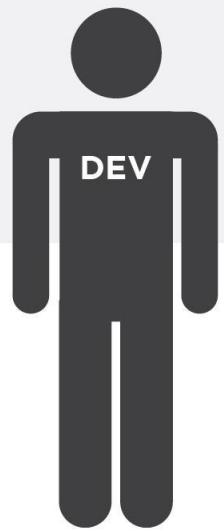
Microservices



@burrsutter

Your Journey to Awesomeness





WALL OF CONFUSION



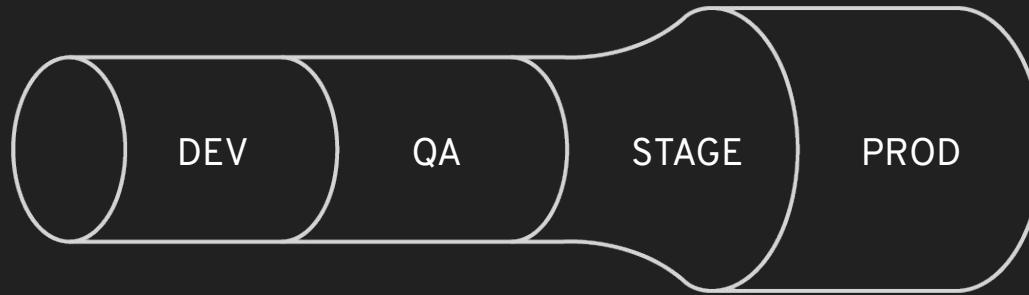


WALL OF CONFUSION

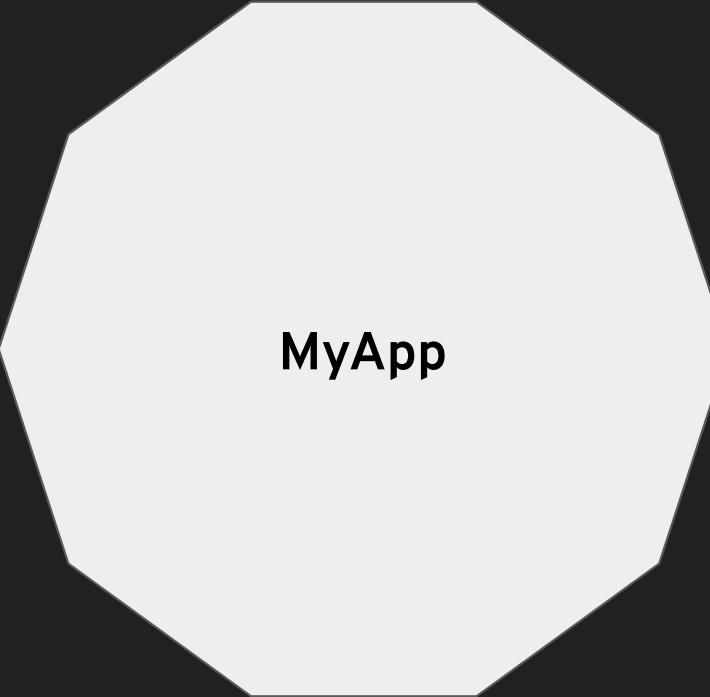




The Pipeline

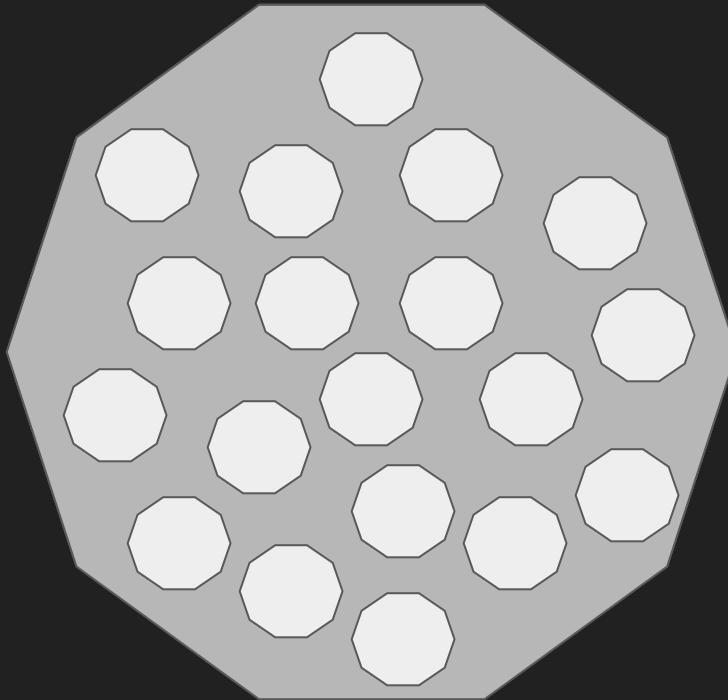


Our Apps

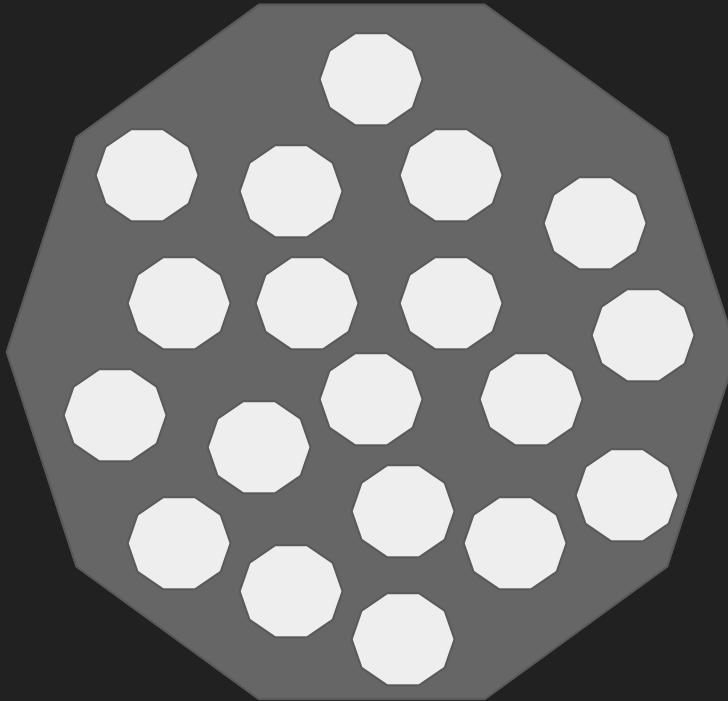


MyApp

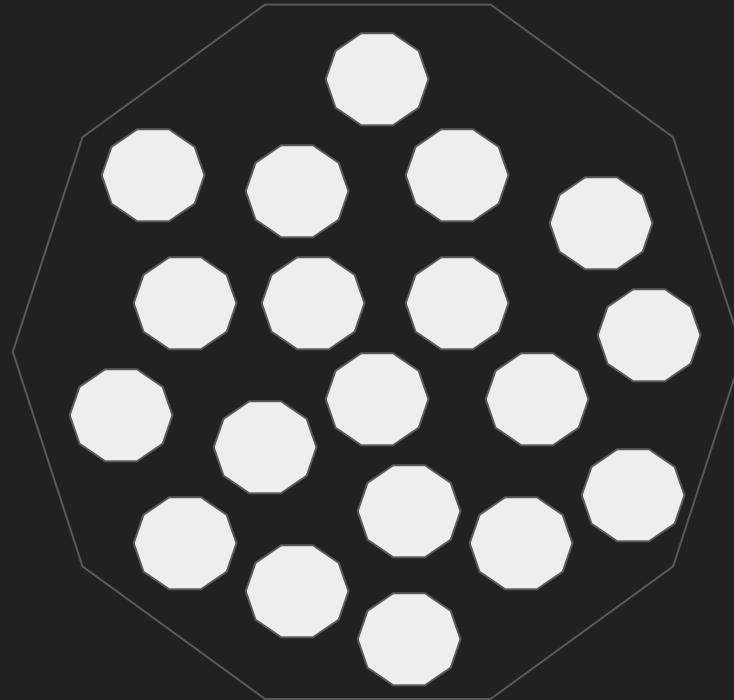
The Application



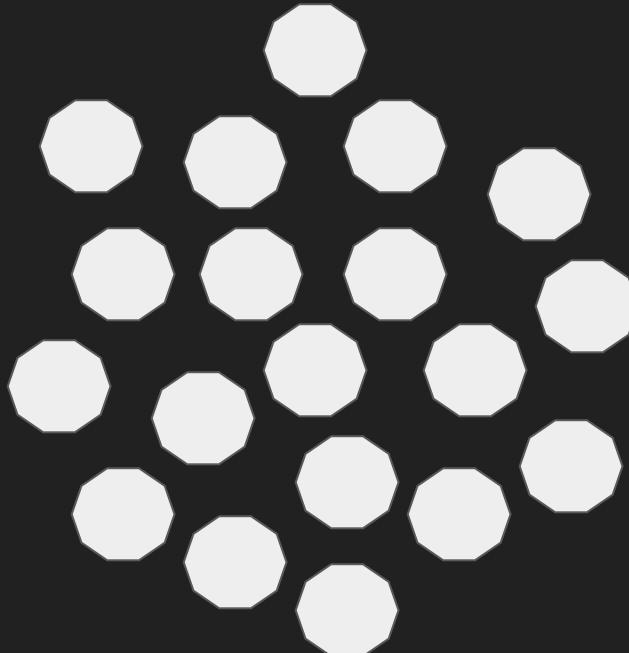
Modules



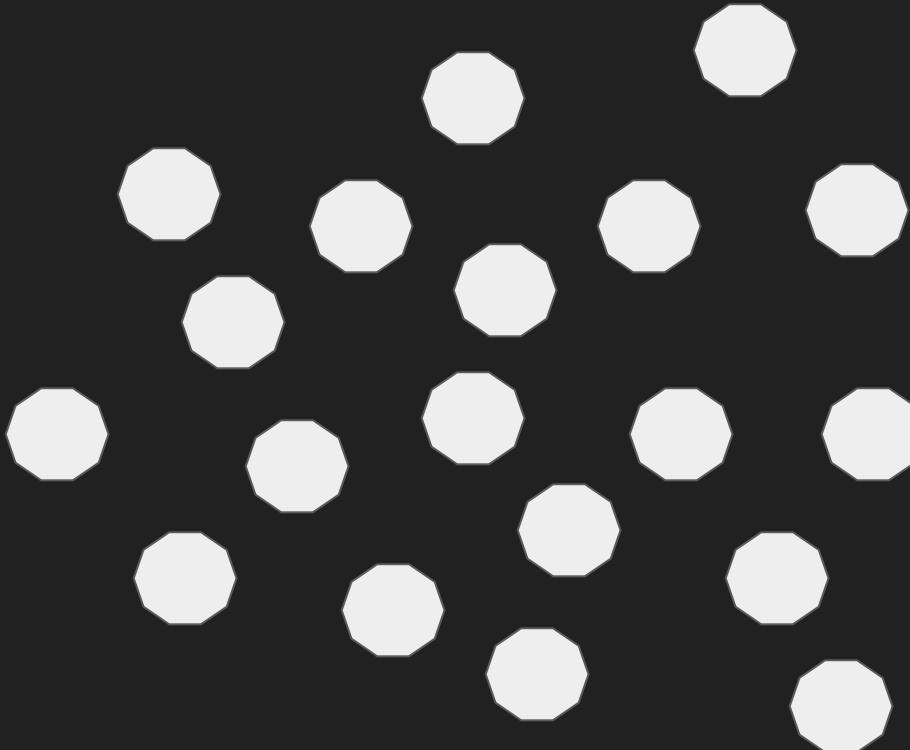
Microservices



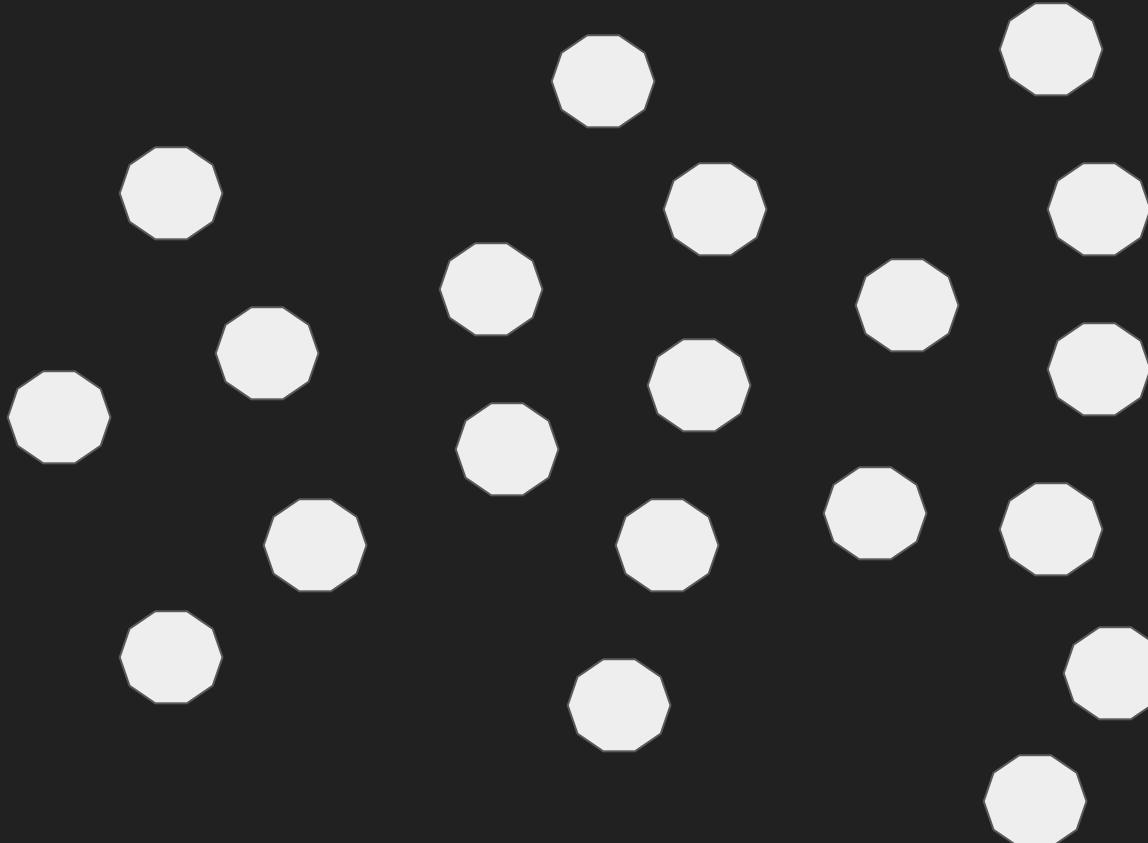
Microservices



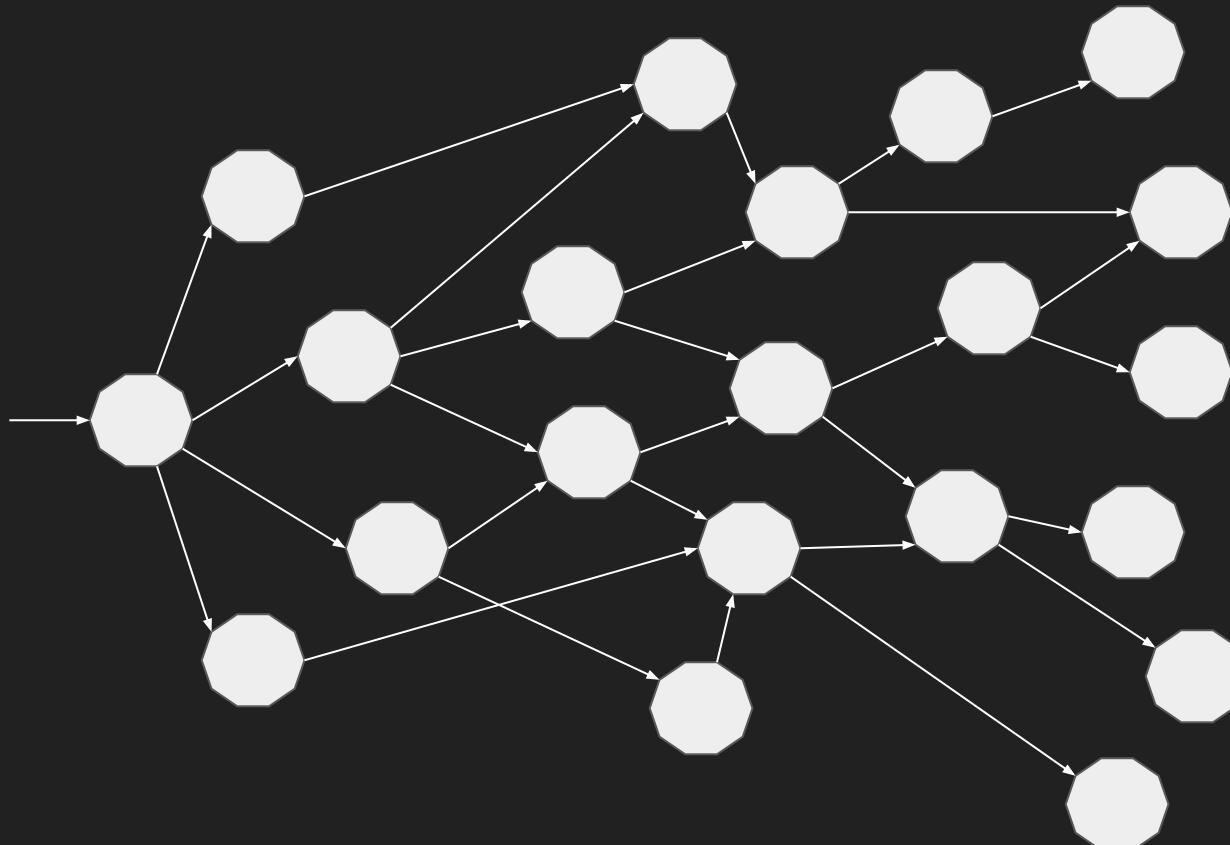
Microservices



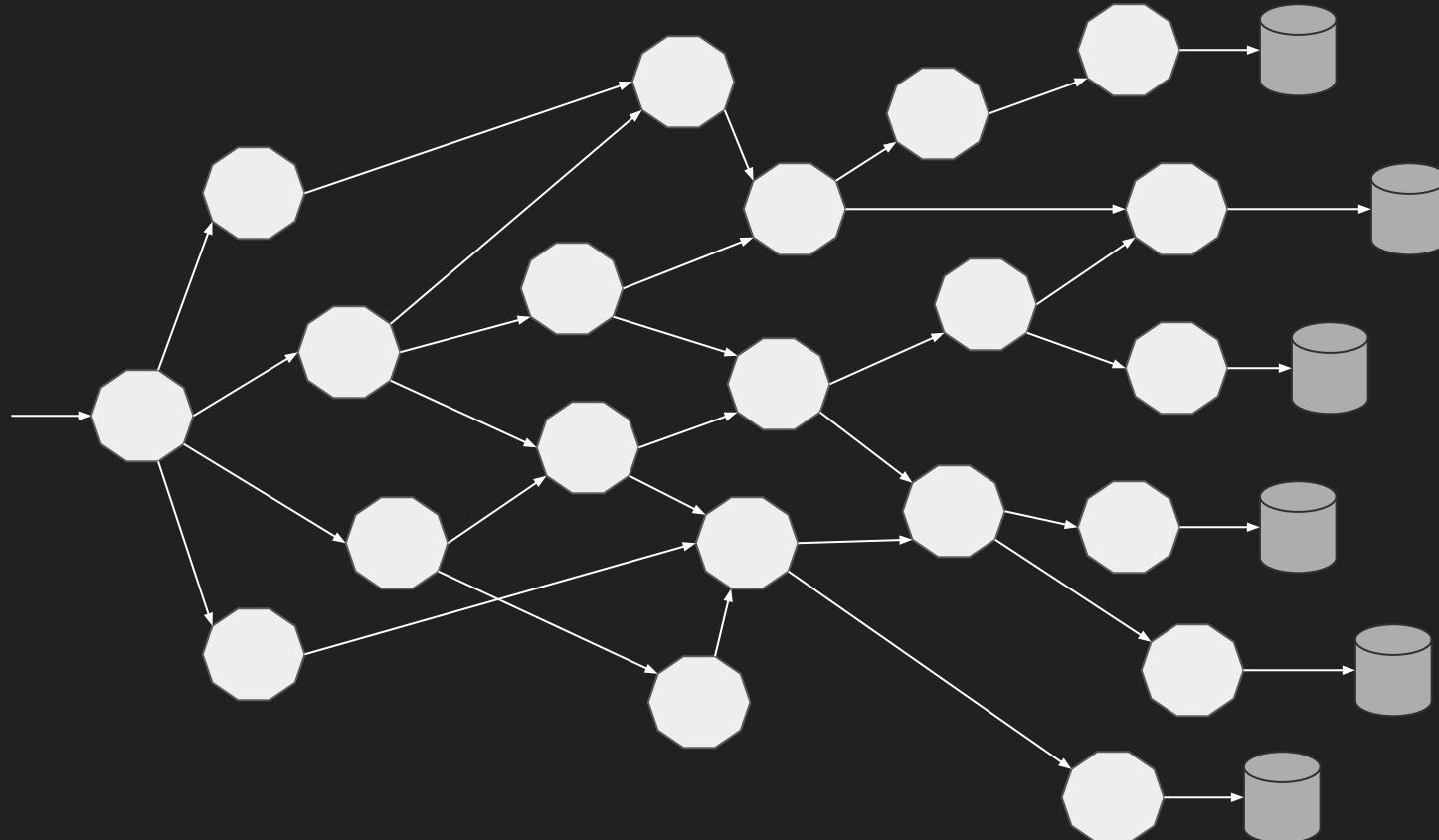
Microservices



Network of Services



Microservices own their Data



O'REILLY®



Migrating to Microservice Databases

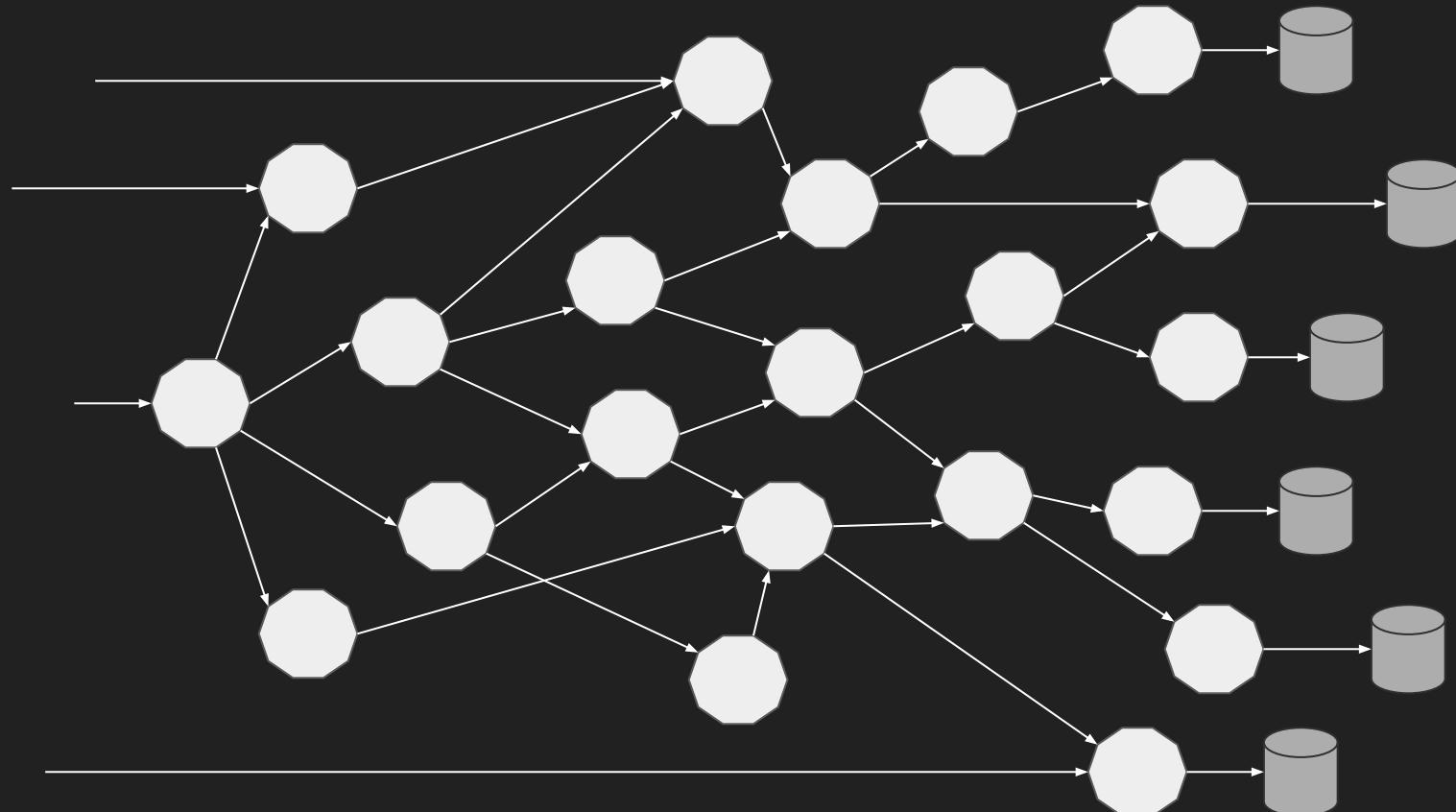
From Relational Monolith
to Distributed Data



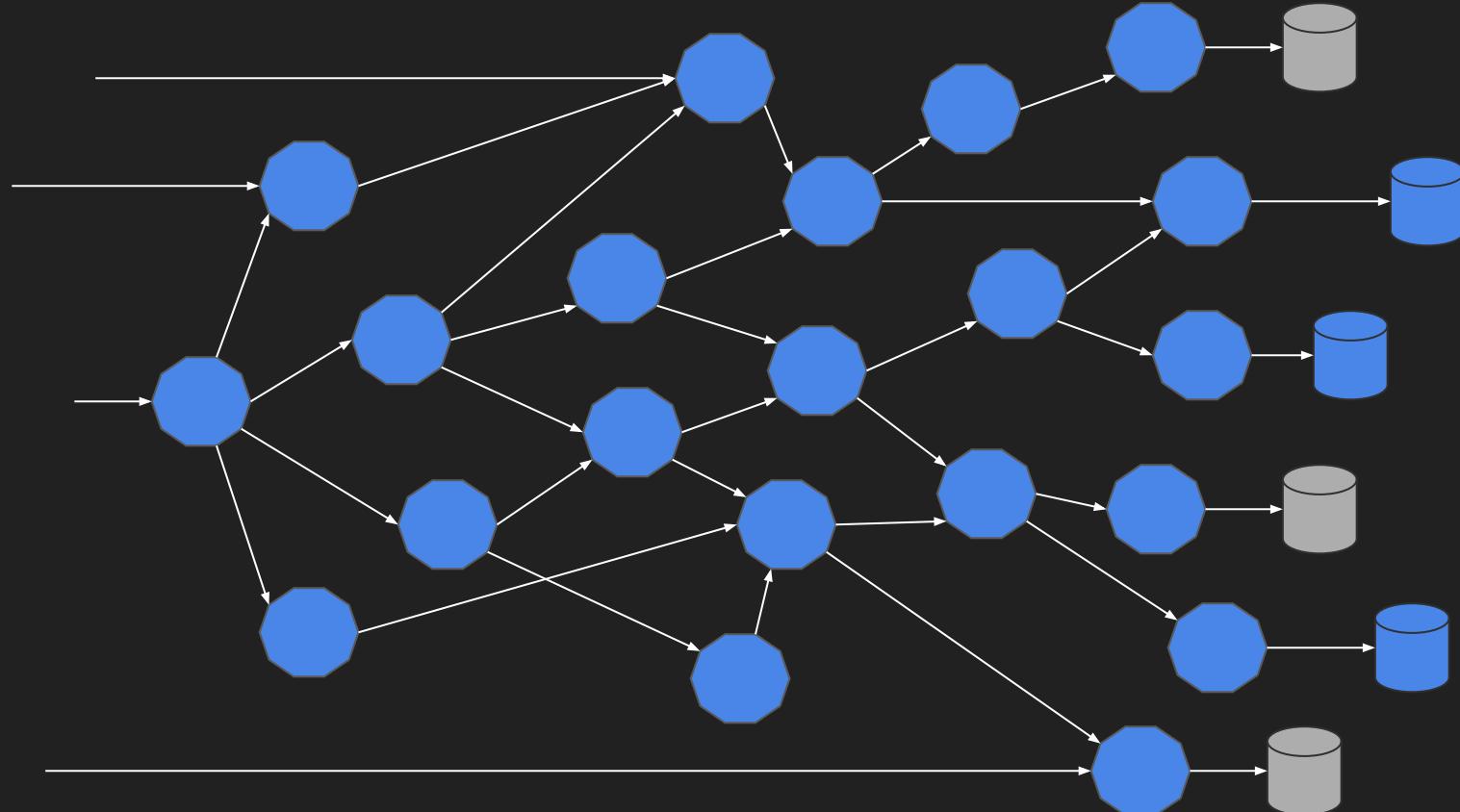
Edson Yanaga

bit.ly/mono2microdb

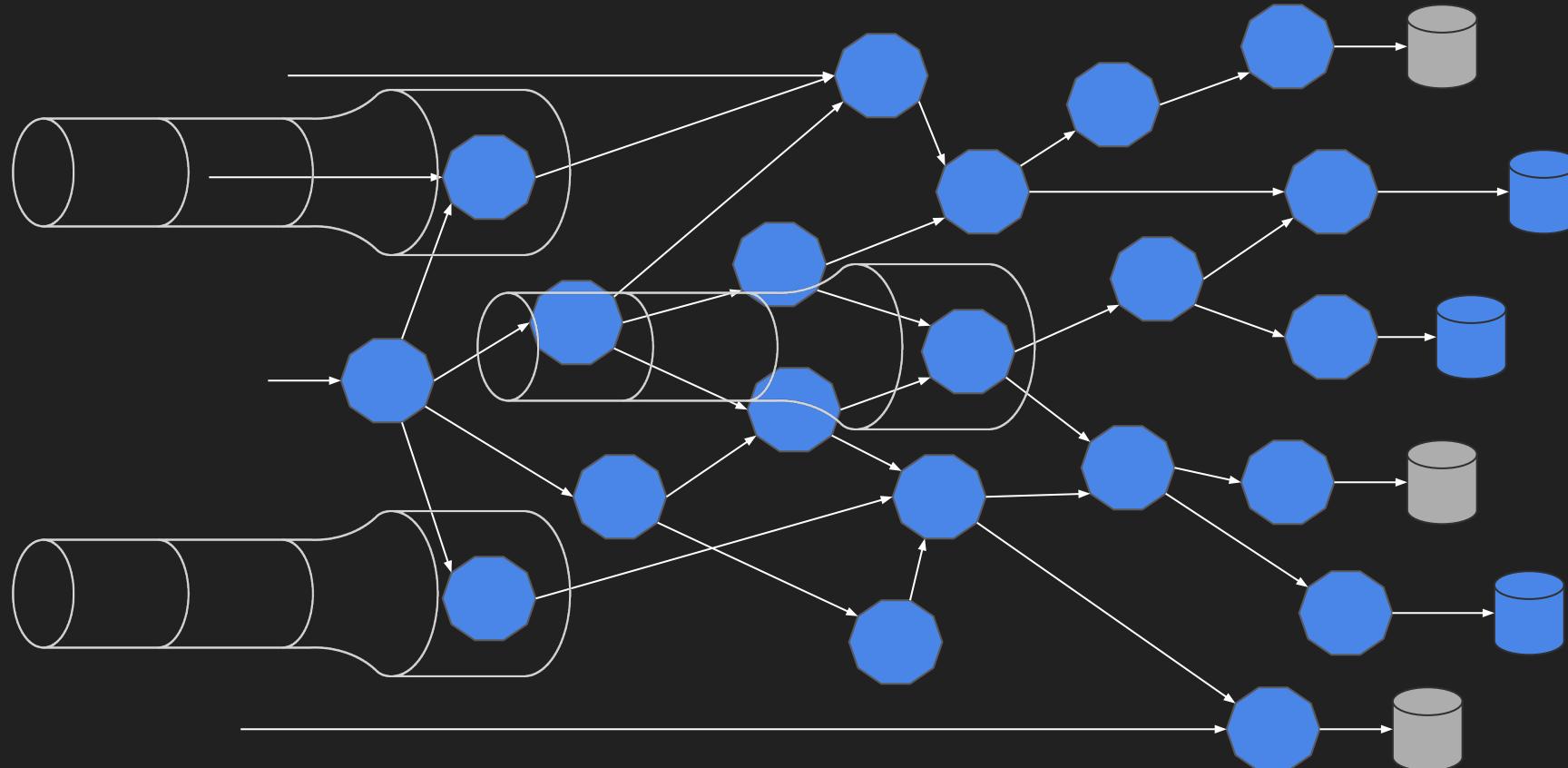
Multiple Points of Entry



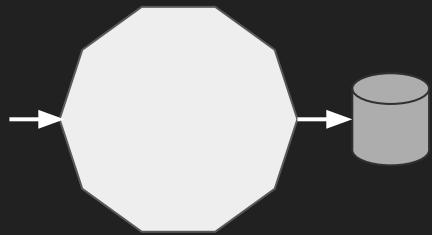
Kubernetes Pods



Pipeline Pod Delivery

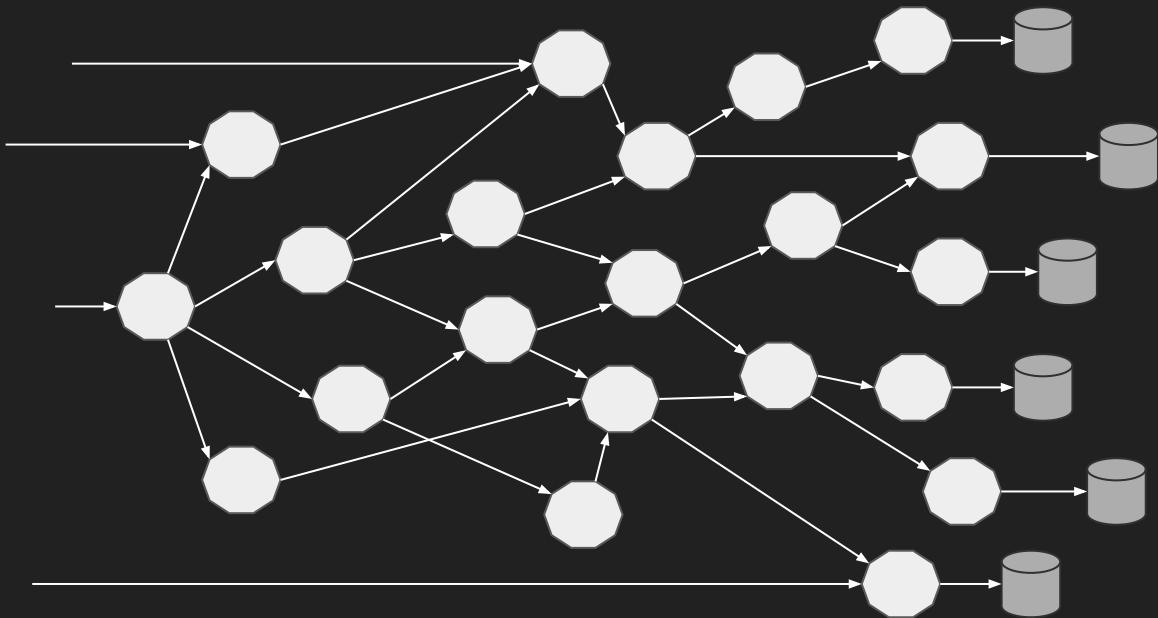


Old School

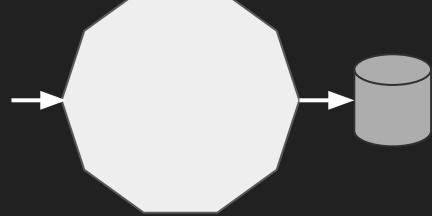


Love Thy Mono

New School

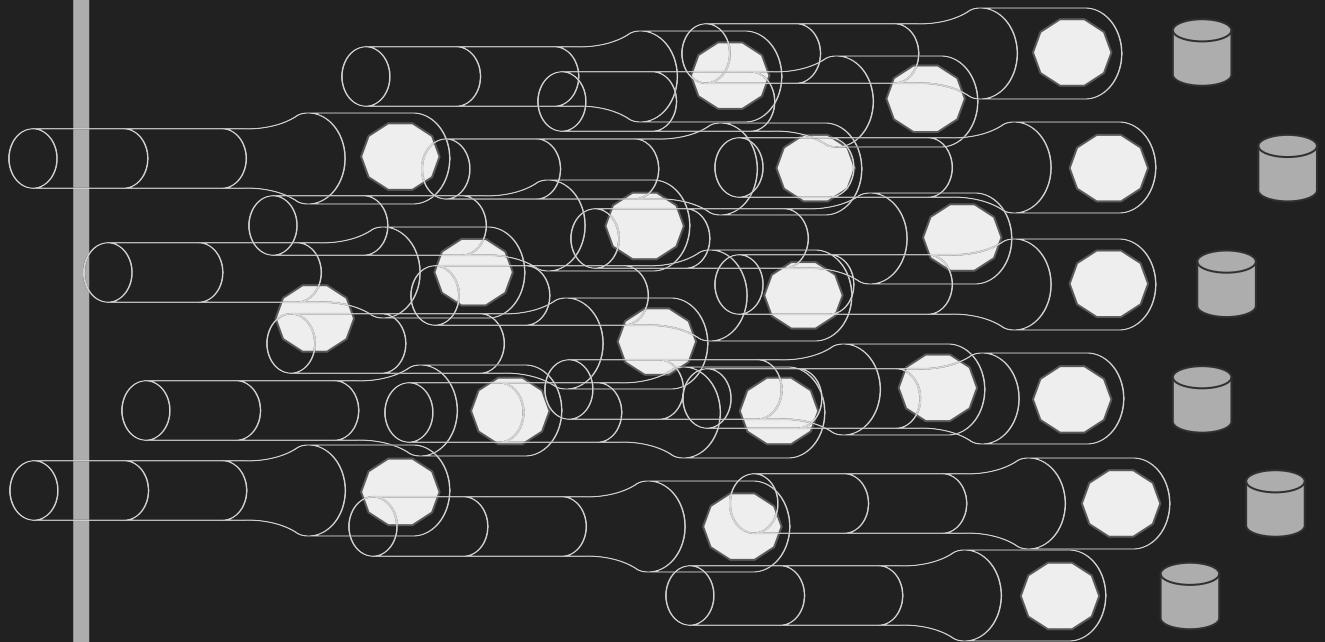


Every 4 months



Love Thy Mono

Every week/day/hour



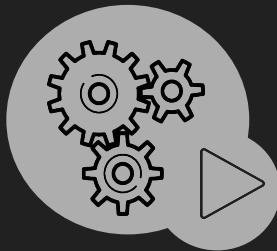
OPENSHIFT



OPENSIFT

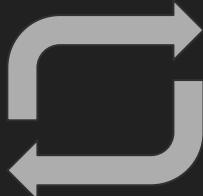
Kubernetes Terms

Pod



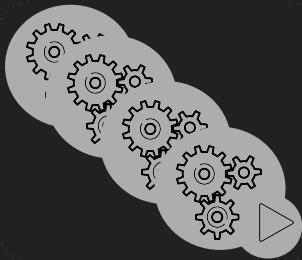
- ✓ 1+ containers
- ✓ Shared IP
- ✓ Shared storage (ephemeral)
- ✓ Shared resources
- ✓ Shared lifecycle

Replicaset/ Deployment



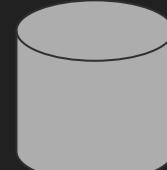
- ✓ The Desired State - replicas, pod template: health checks, resources, image

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)

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

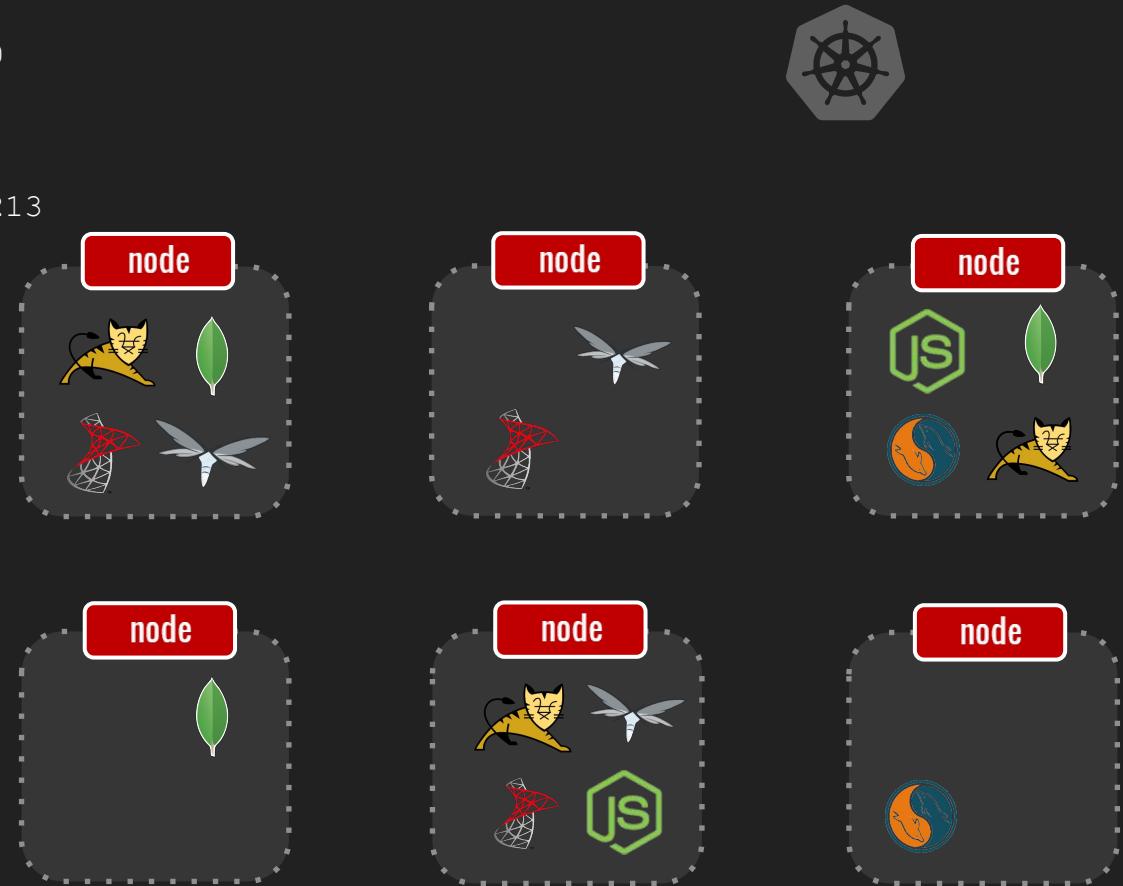
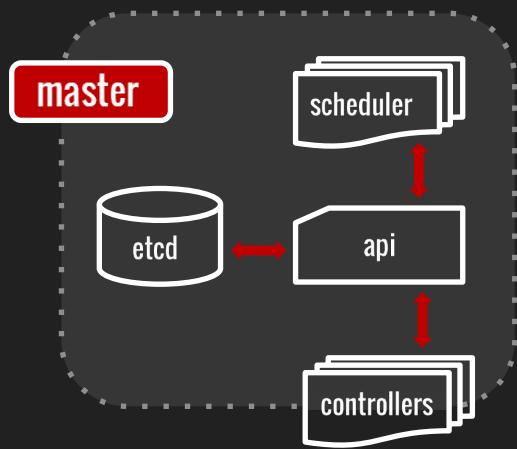


Image:

quay.io/images/custservice:1.1.0

Replicas:

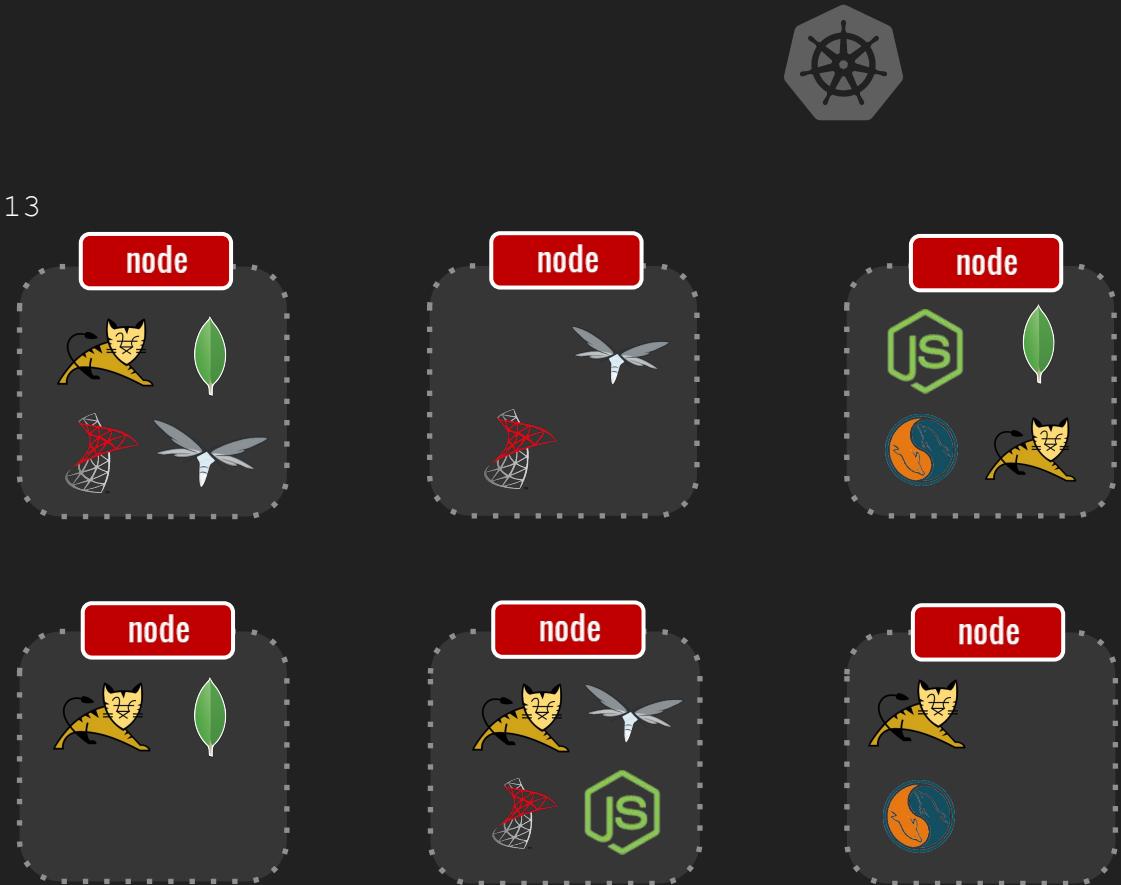
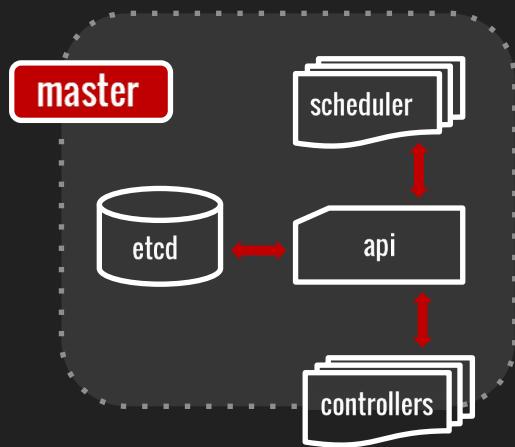
2

Labels:

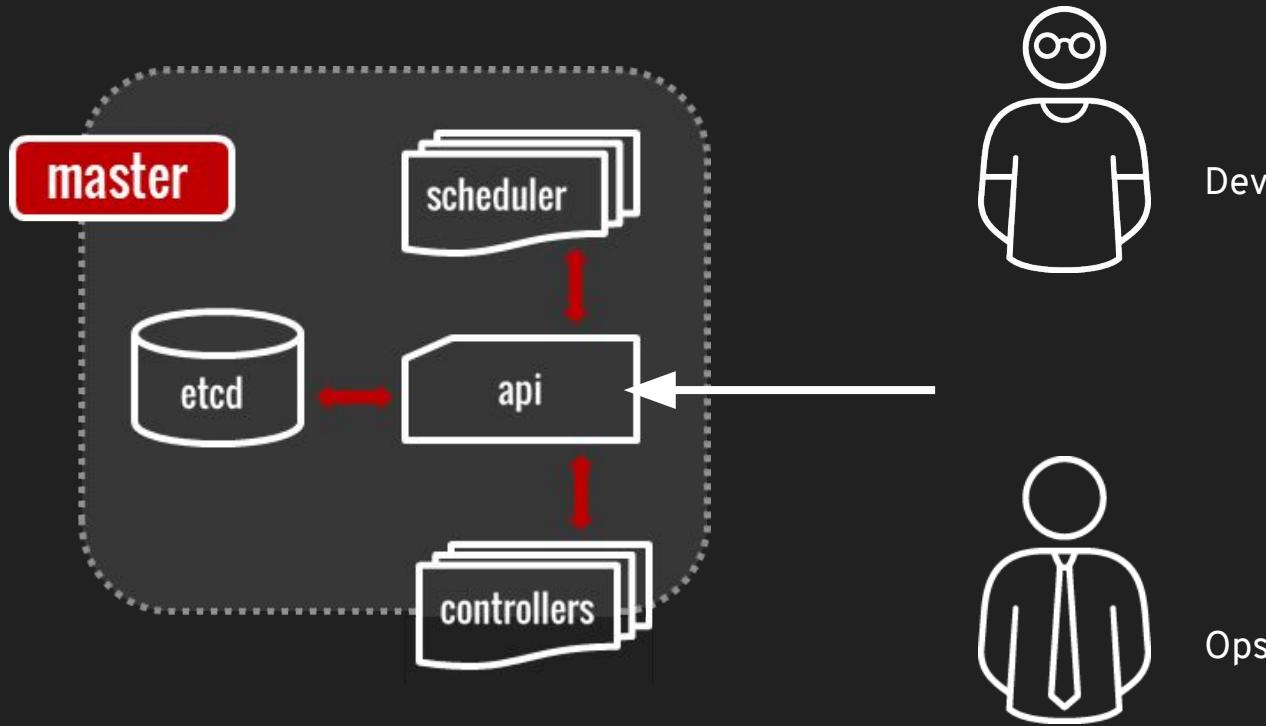
customerservice=prod, ci_build=1213

ConfigMap:

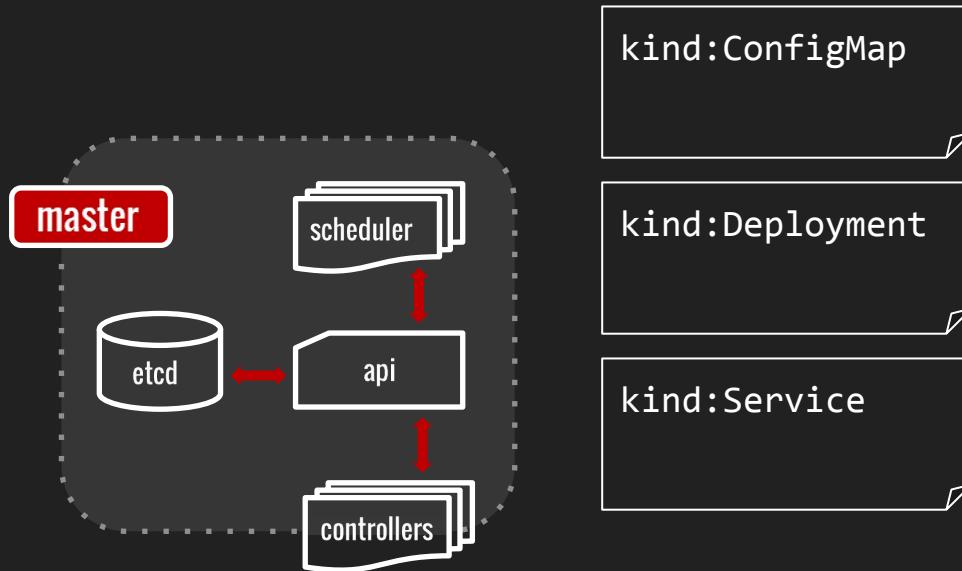
cust_config



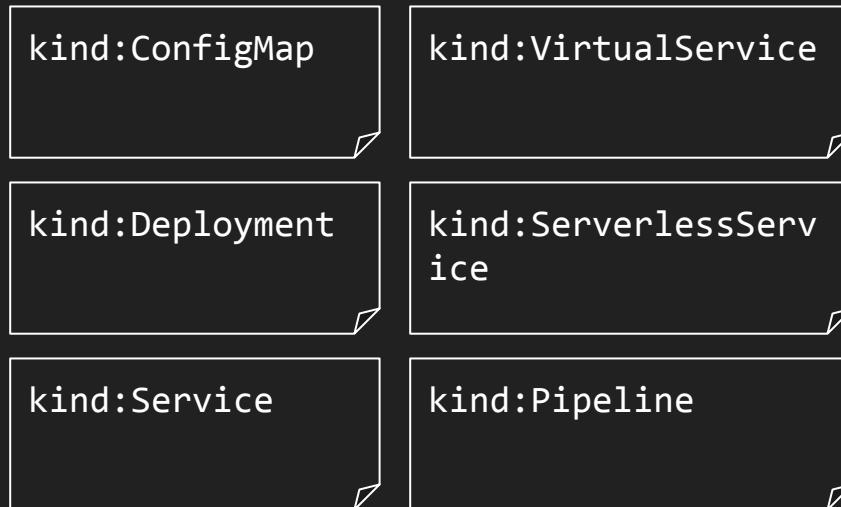
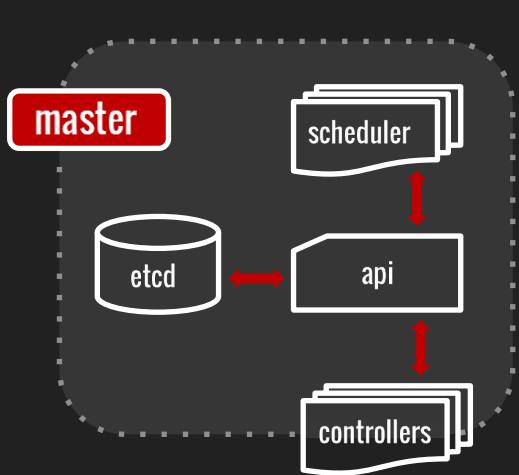
Kubernetes API



Out-of-the-Box Kinds



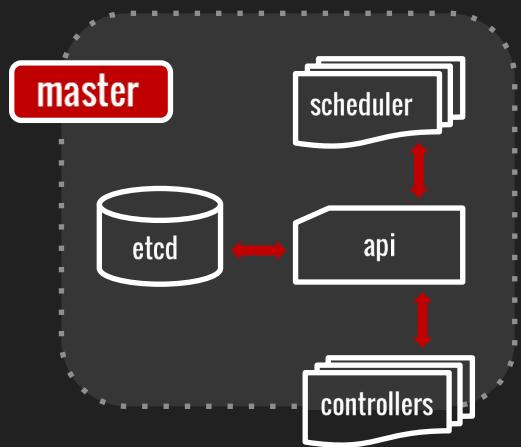
Custom Kinds

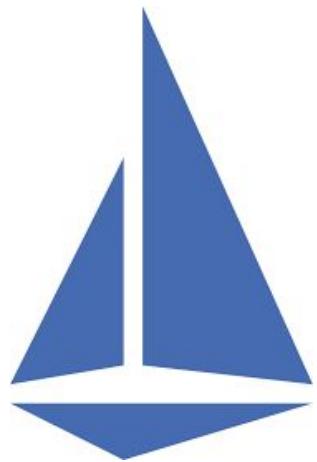


Even more Custom Kinds



Even more Custom Kinds





istio.io



knative.dev

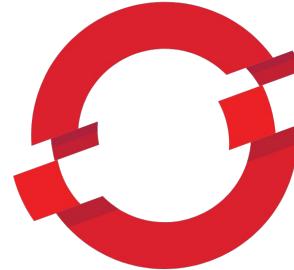


TEKTON

tekton.dev



kubernetes OPENSHIFT





Istio - Sail

(Kubernetes - Helmsman or ship's pilot)

istio.io

bit.ly/istio-tutorial

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



TEKTON

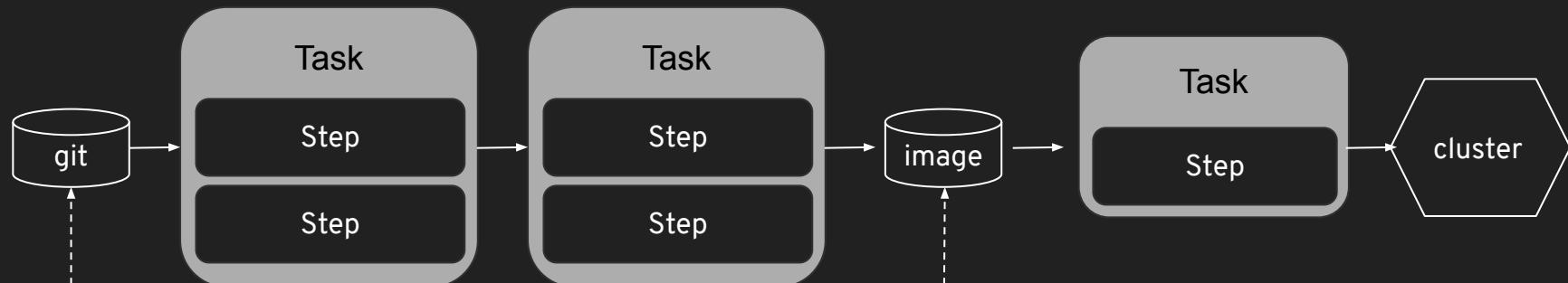
tekton.dev
bit.ly/knative-tutorial

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)

Pipelines, Tasks, Steps, Resources

Pipeline



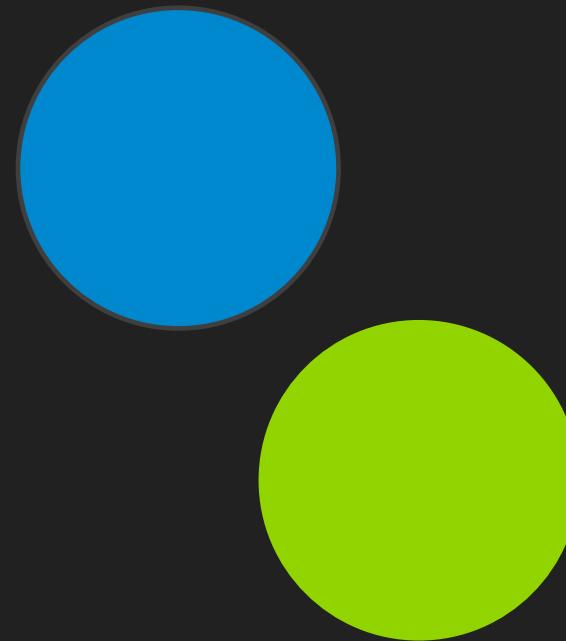
Pipeline
Resource

Pipeline
Resource

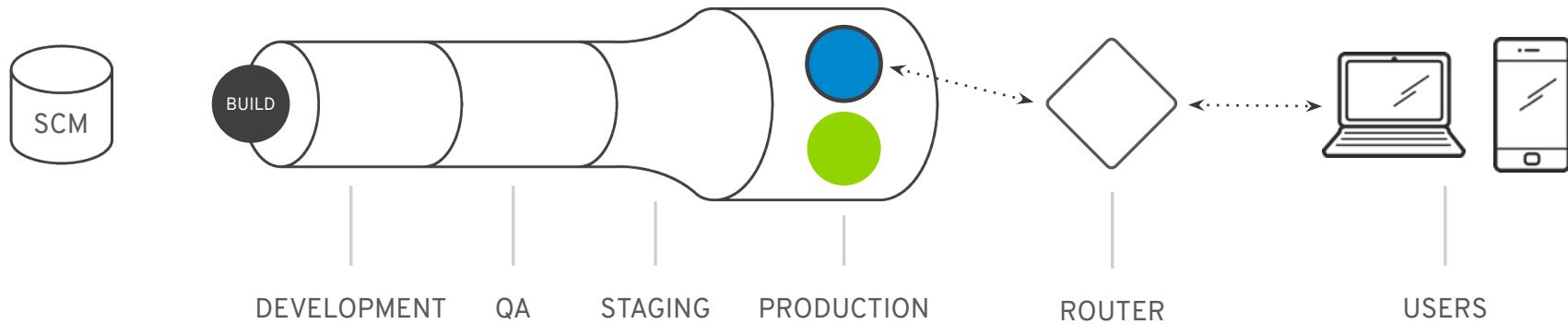
Istio Traffic Control

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

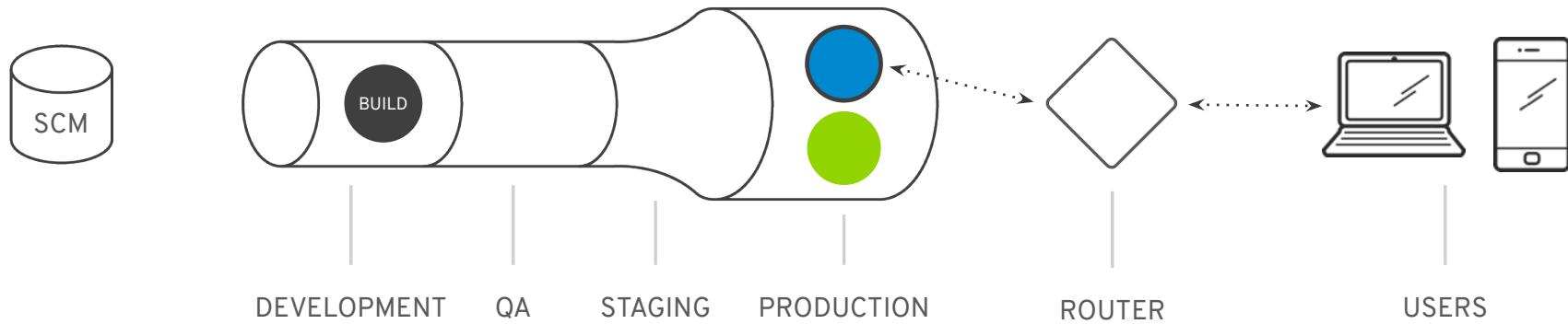
Blue/Green Deployment



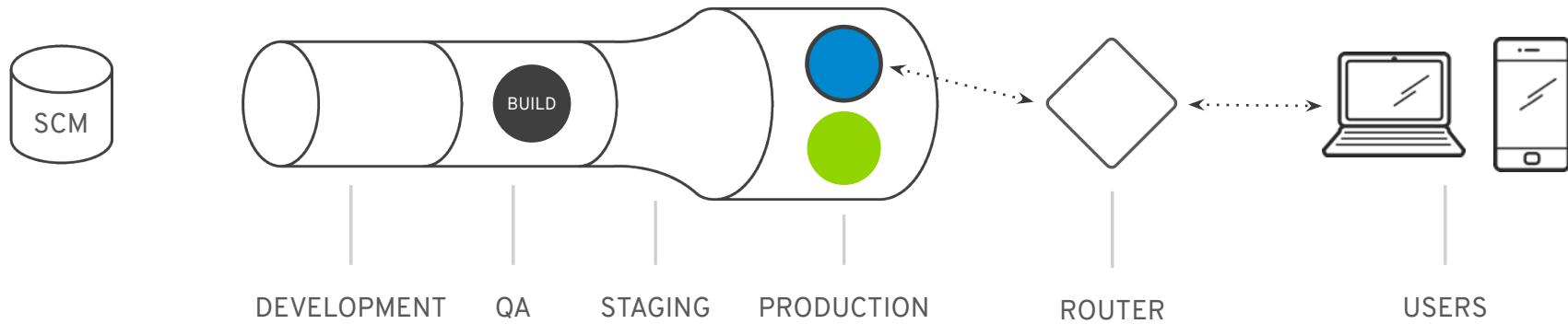
Blue/Green Deployment



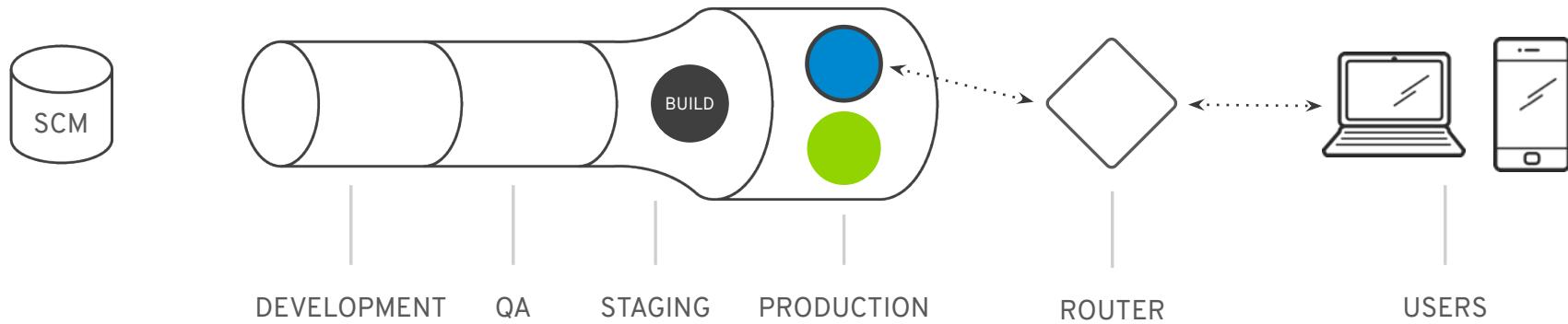
Blue/Green Deployment



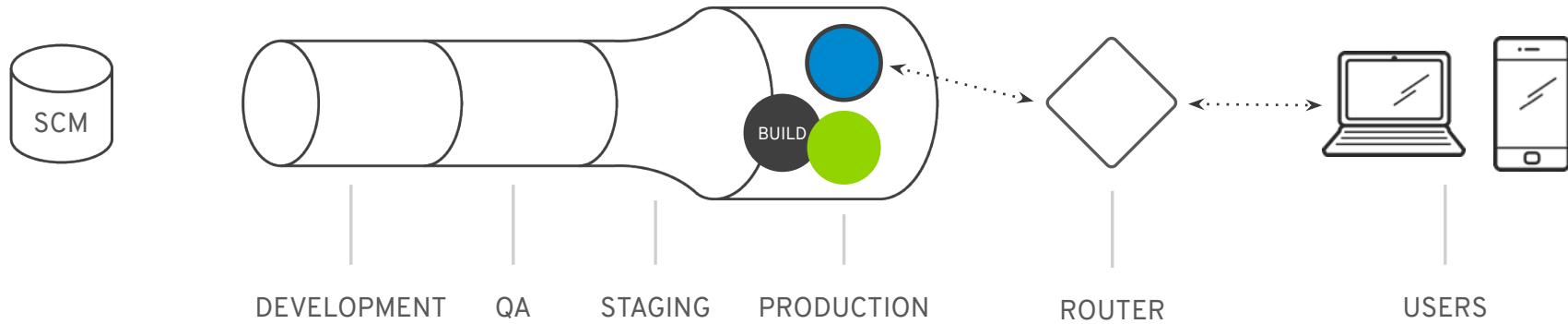
Blue/Green Deployment



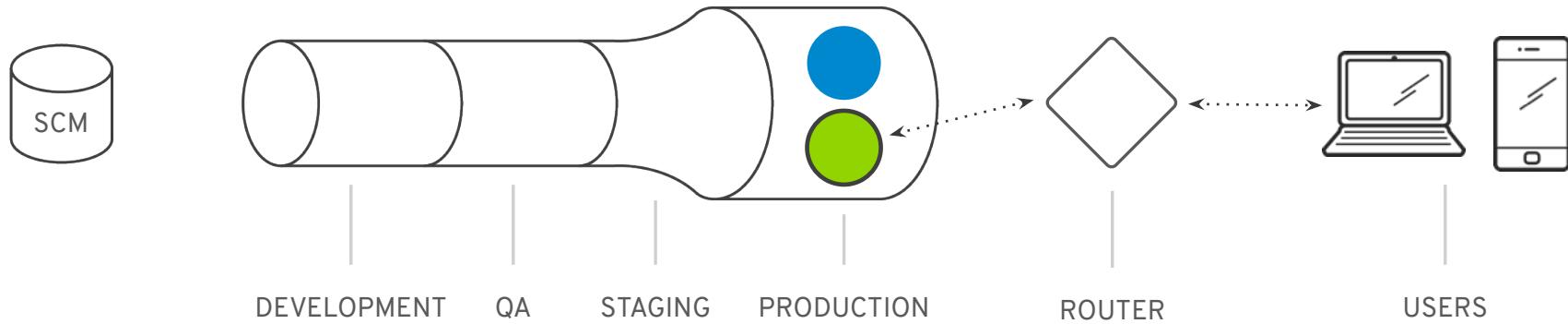
Blue/Green Deployment



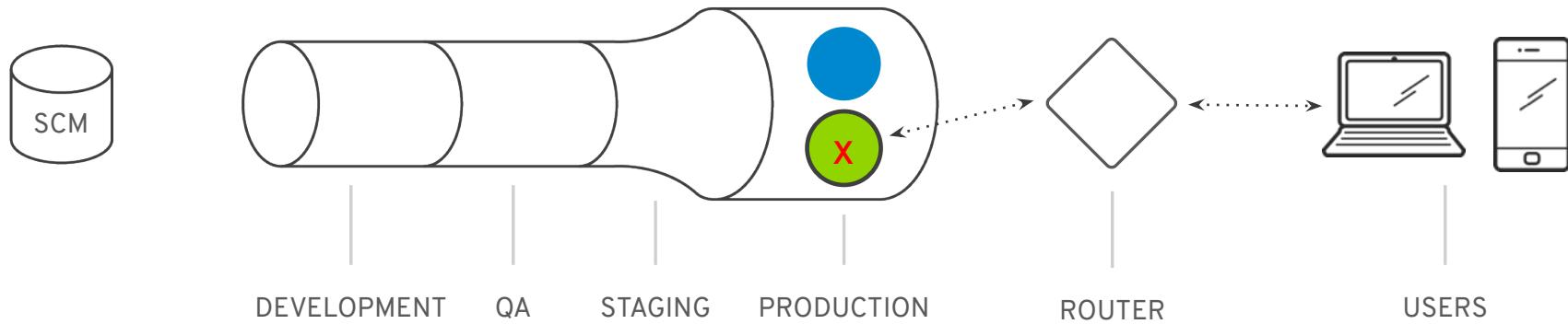
Blue/Green Deployment



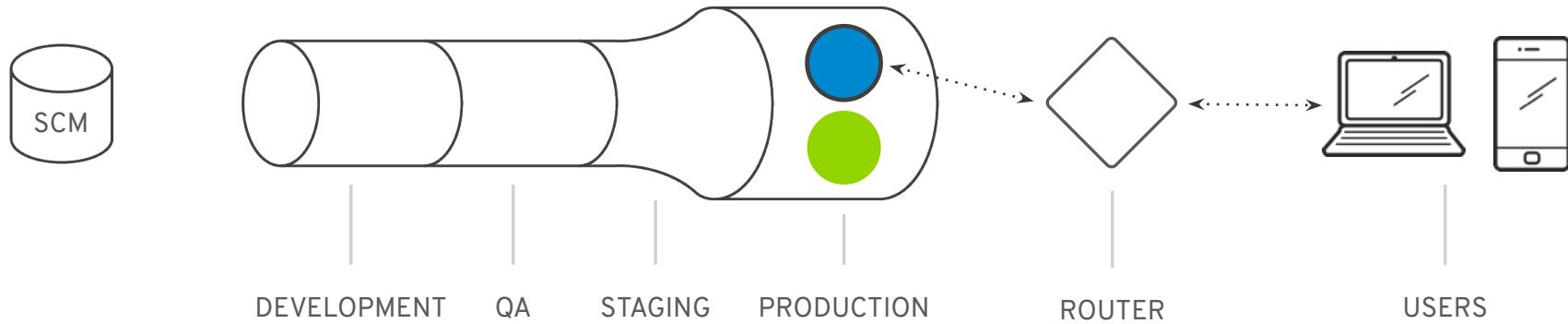
Blue/Green Deployment



Blue/Green Deployment



Blue/Green Deployment

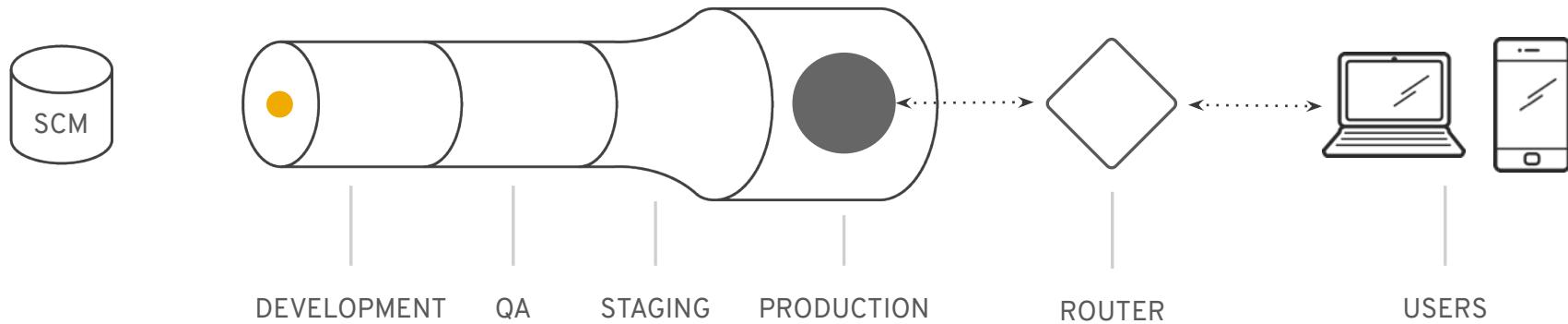


Canary Deployment

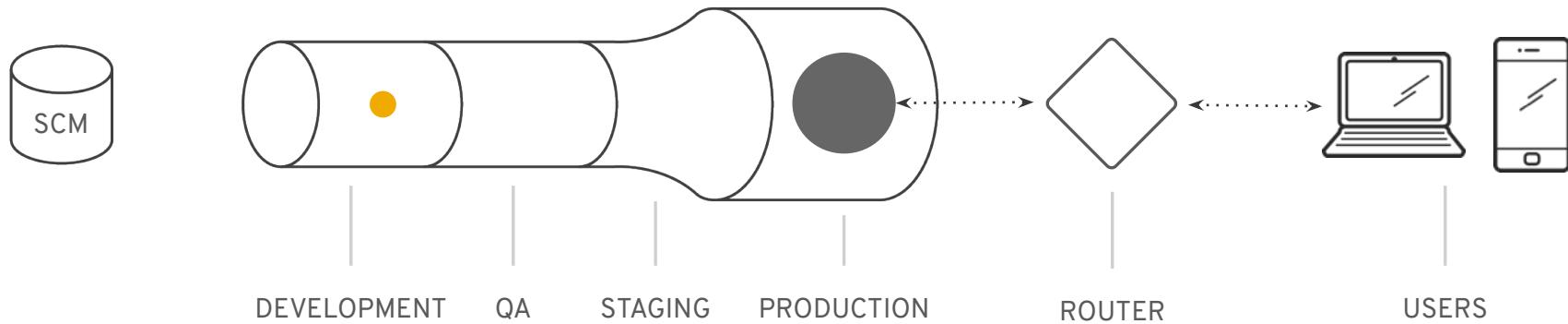




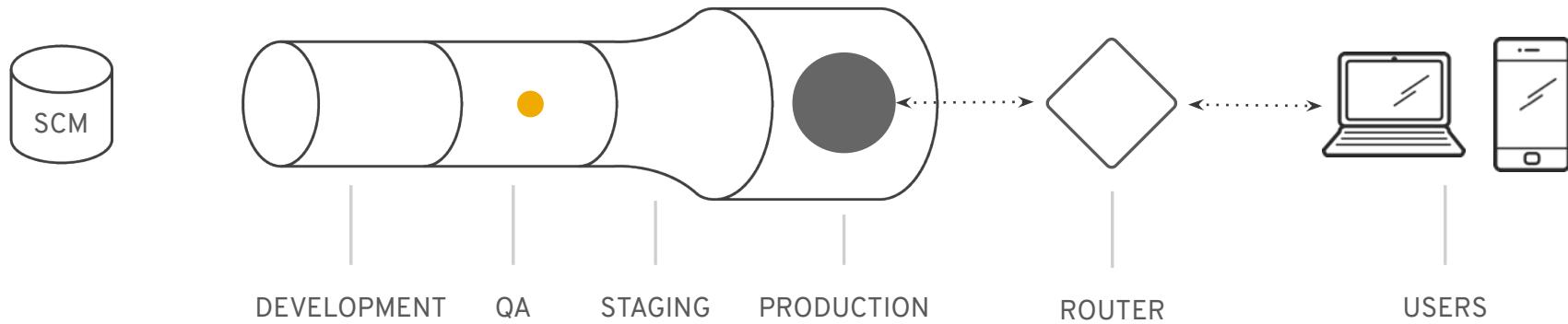
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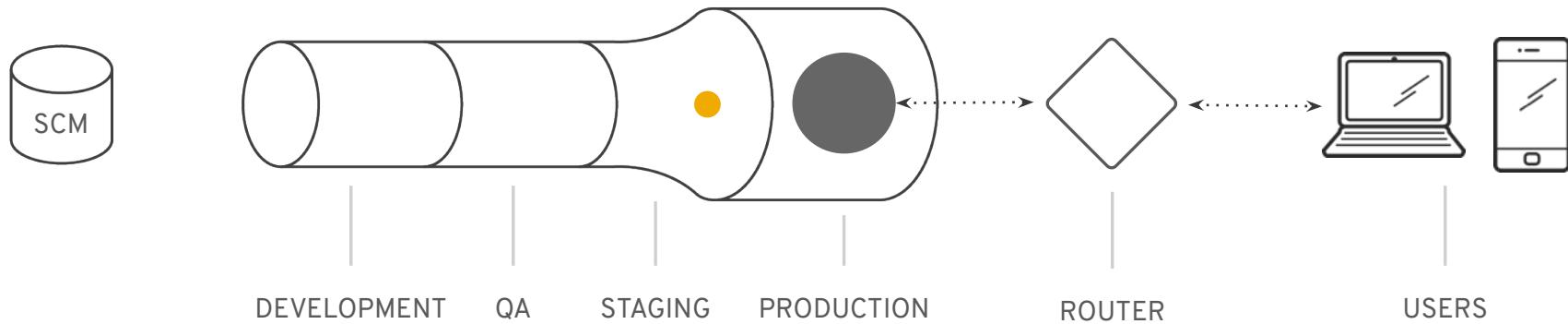
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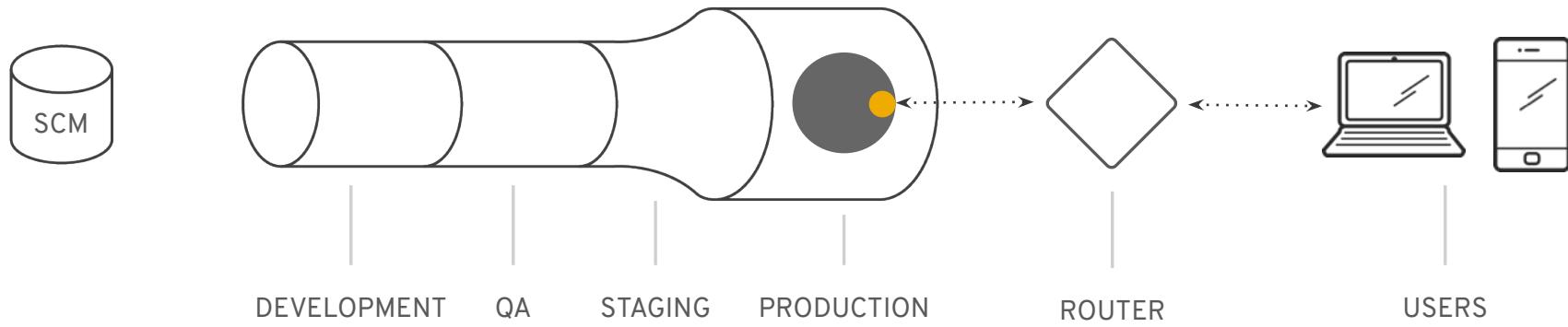
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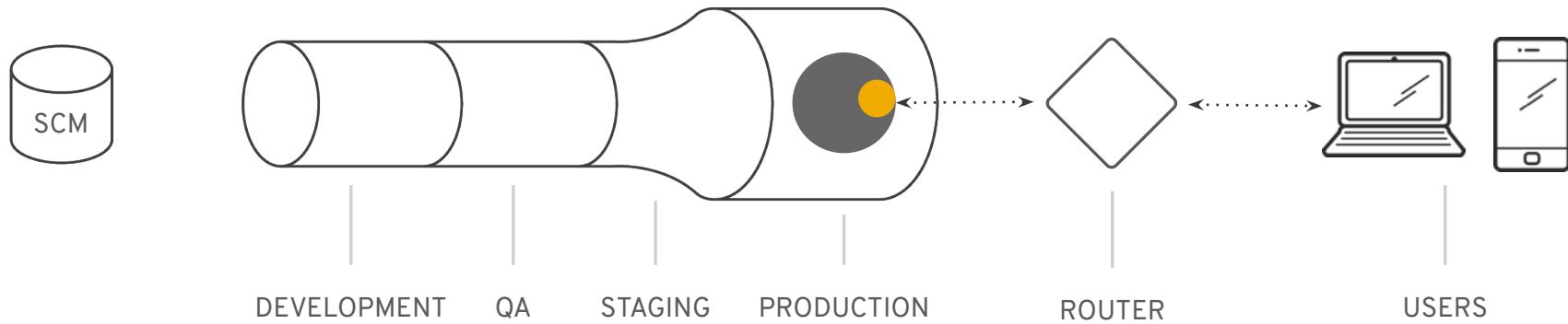
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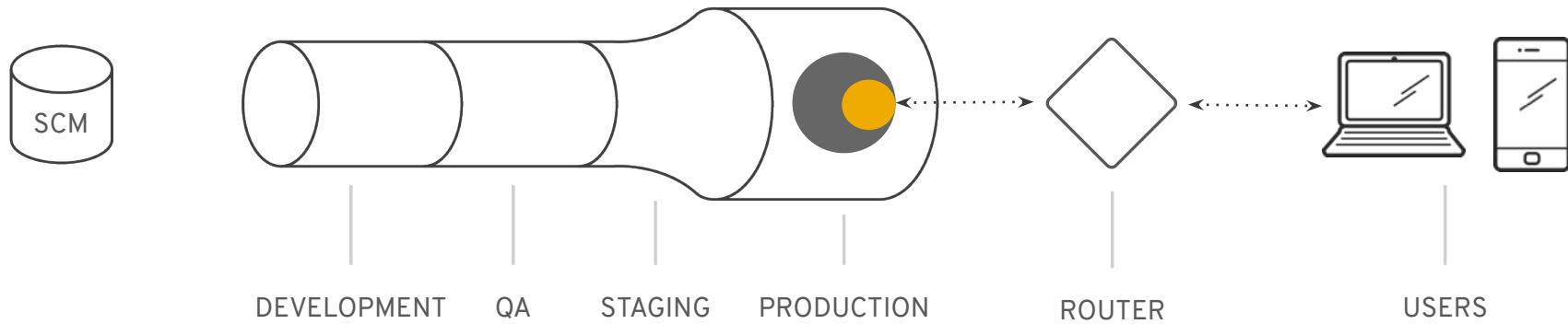
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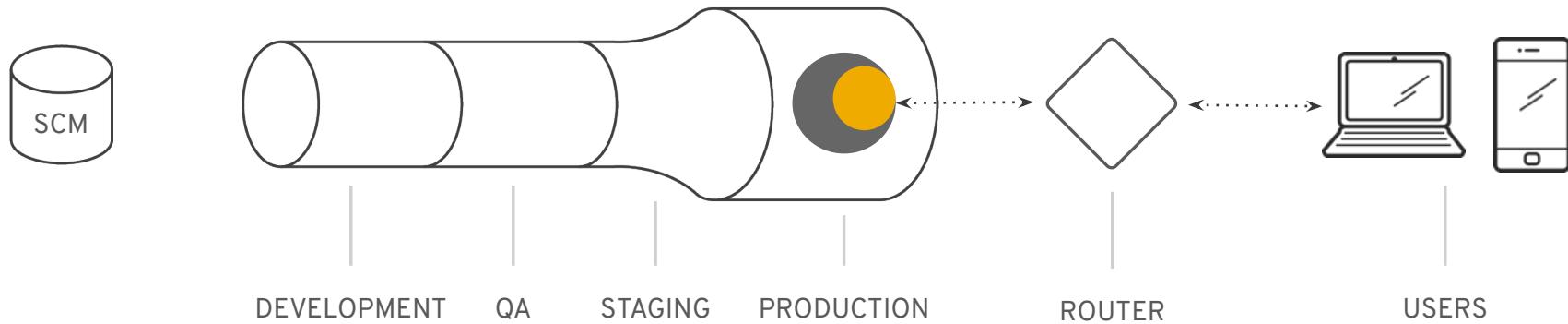
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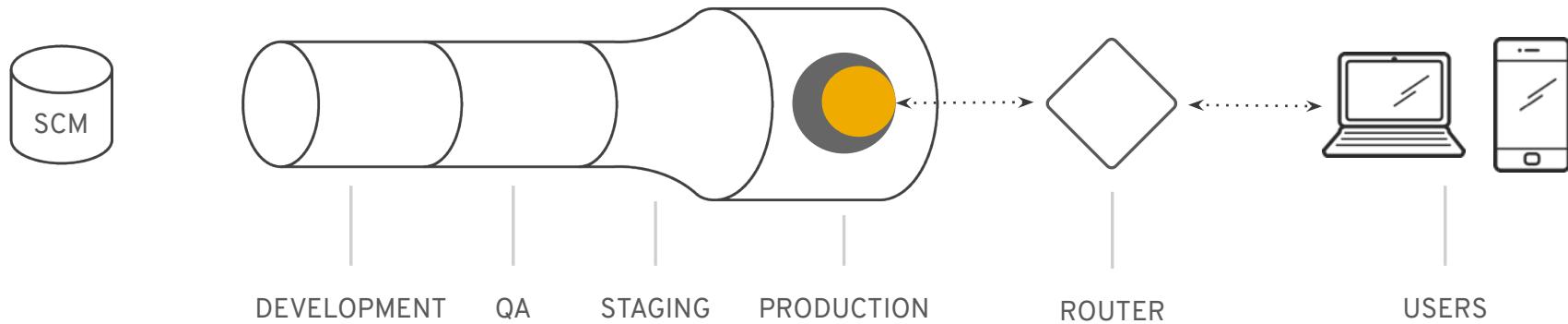
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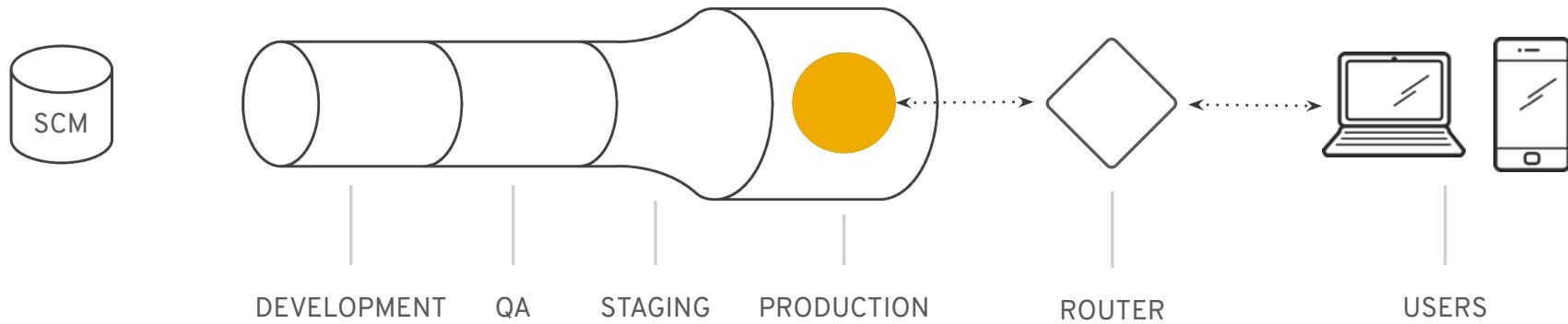
Canary Deployment



Canary Deployment



Canary Deployment



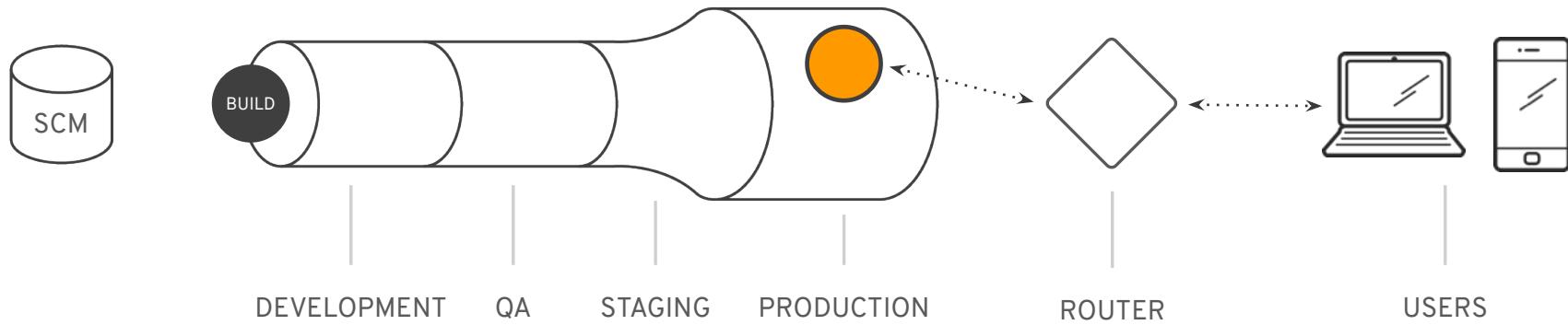


Active

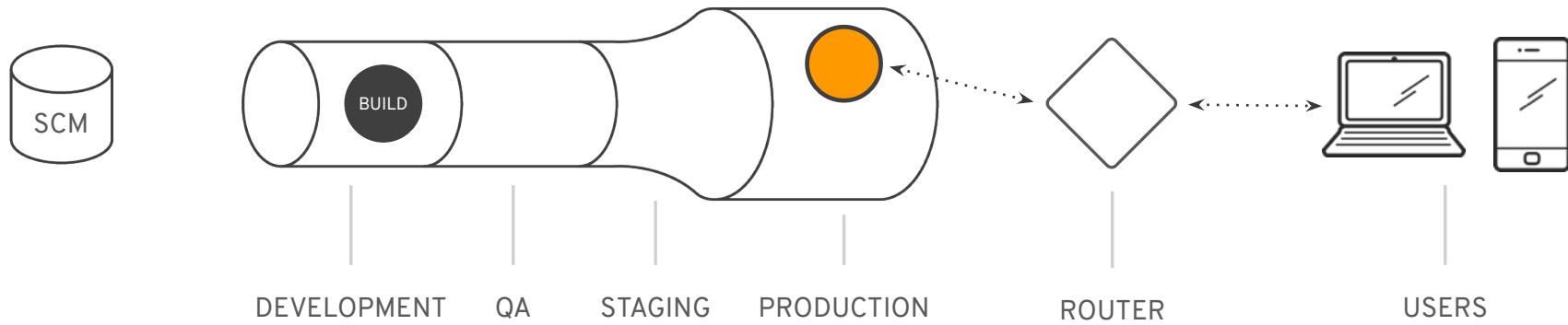
Dark Launch

Dark

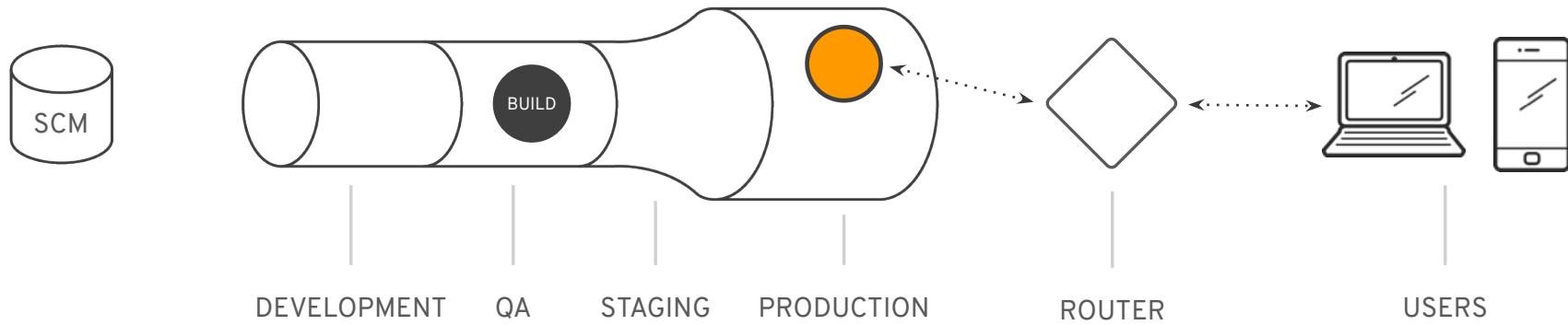
Dark Launch



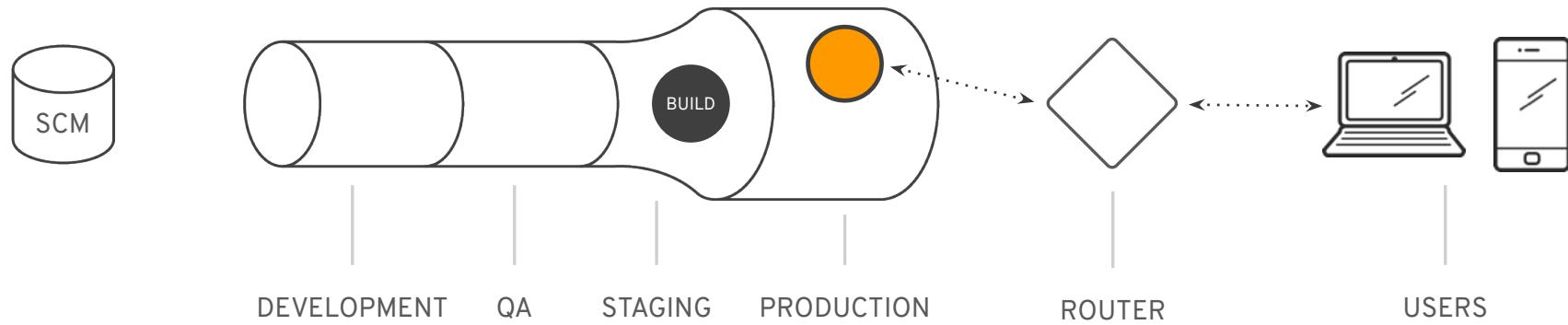
Dark Launch



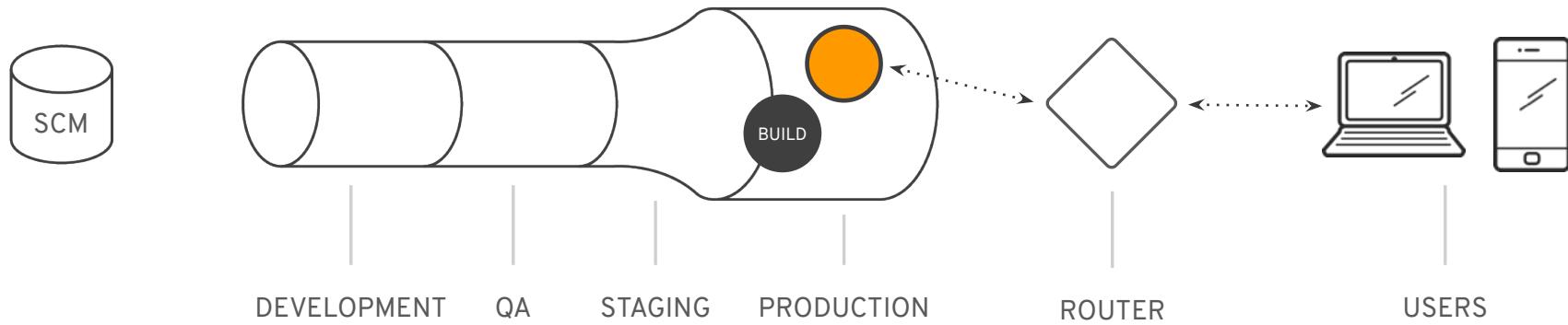
Dark Launch



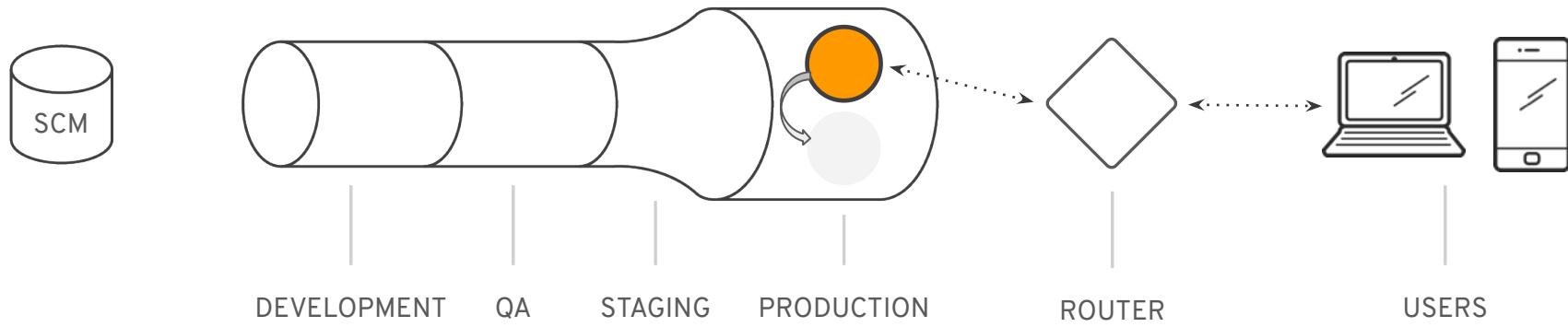
Dark Launch



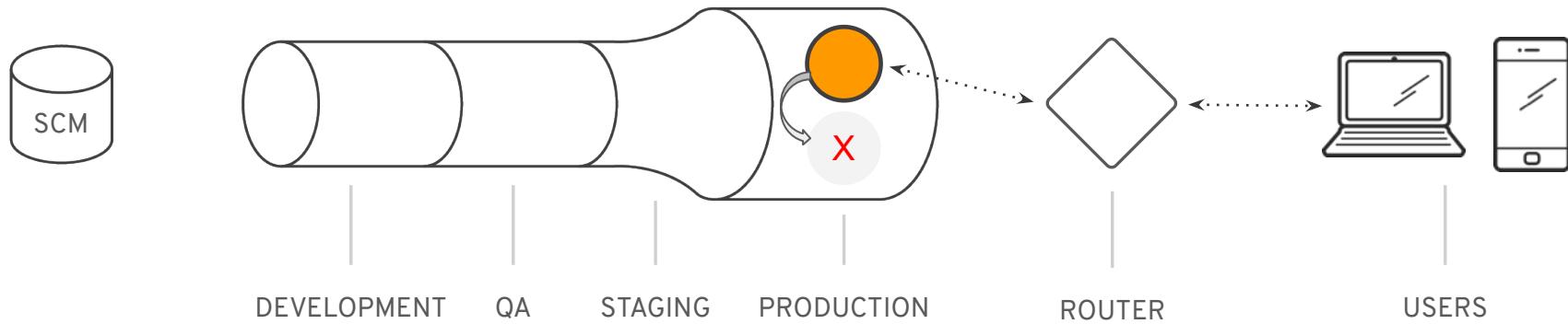
Dark Launch



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)