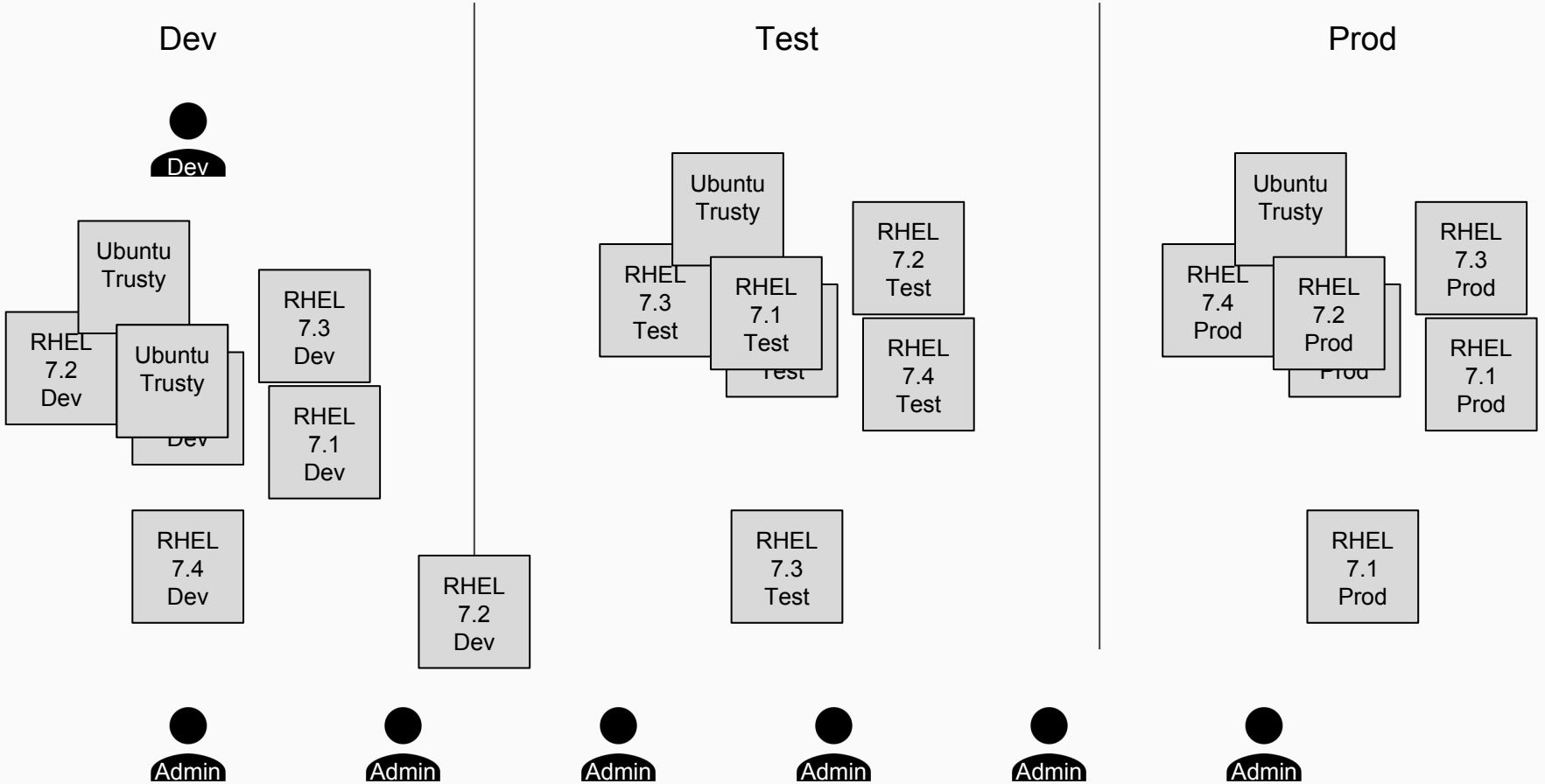
Becoming a Plumber

Building Deployment Pipelines

Dan Barker
@barkerd427
danbarker.codes


BUILDING PIPELINE,
BABY
memecrunch.com

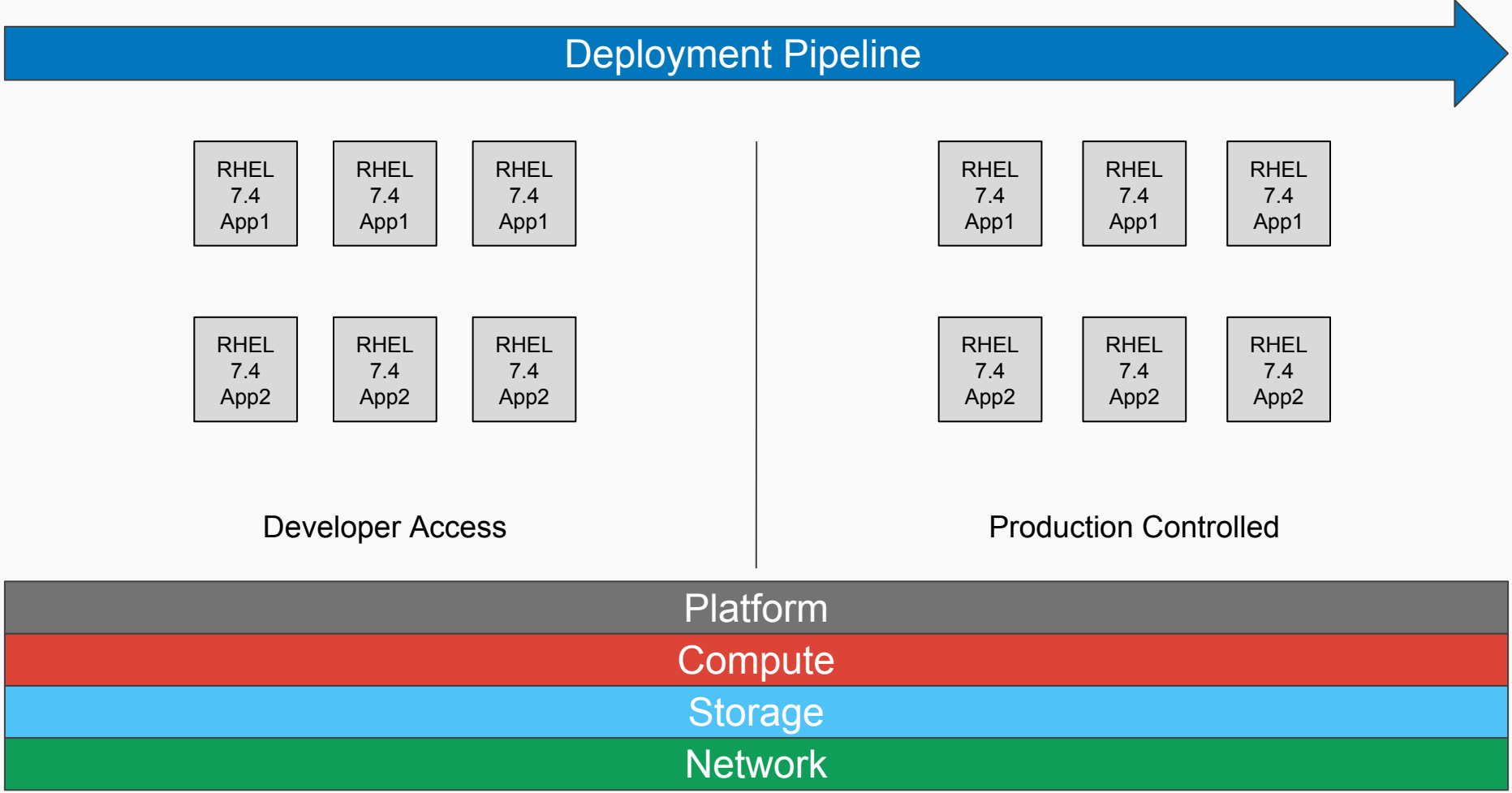
Why?



The current data center is...challenging...

@barkerd427


@AARON


Deployment Pipeline
RHEL 7.4 App1
RHEL 7.4 App1
RHEL 7.4 App1
RHEL 7.4 App2
RHEL 7.4 App2
RHEL 7.4 App2
RHEL 7.4 App1
RHEL 7.4 App1
RHEL 7.4 App1
RHEL 7.4 App2
RHEL 7.4 App2
RHEL 7.4 App2
Developer Access
Production Controlled
Platform
Compute
Storage
Network

The value of Pipelines

- Abstract audit and compliance
- Trivialities eliminated
- Security checks occur early/often
- Test all the things!

The value of Pipelines

- Nimble security
- Common artifact repositories
- Standardized approval system
- Apps become secure by default

Jenkins Pipelines

Two types of pipelines

Scripted:

- Very Groovy!
- More powerful
- Provides greatest level of flexibility

Declarative:

- Only a little Groovy
- Simpler to maintain
- Easier to read and understand

Shared Libraries

- Global or local
- Groovy
- Third-party
- Src
- Var
- Resources

Fabric8

- Shared Library
  - Kubernetes
  - Fabric8 Jenkins
  - Specialized
- Pipelines
  - Golang
  - Node
  - .Net

Alternatives?

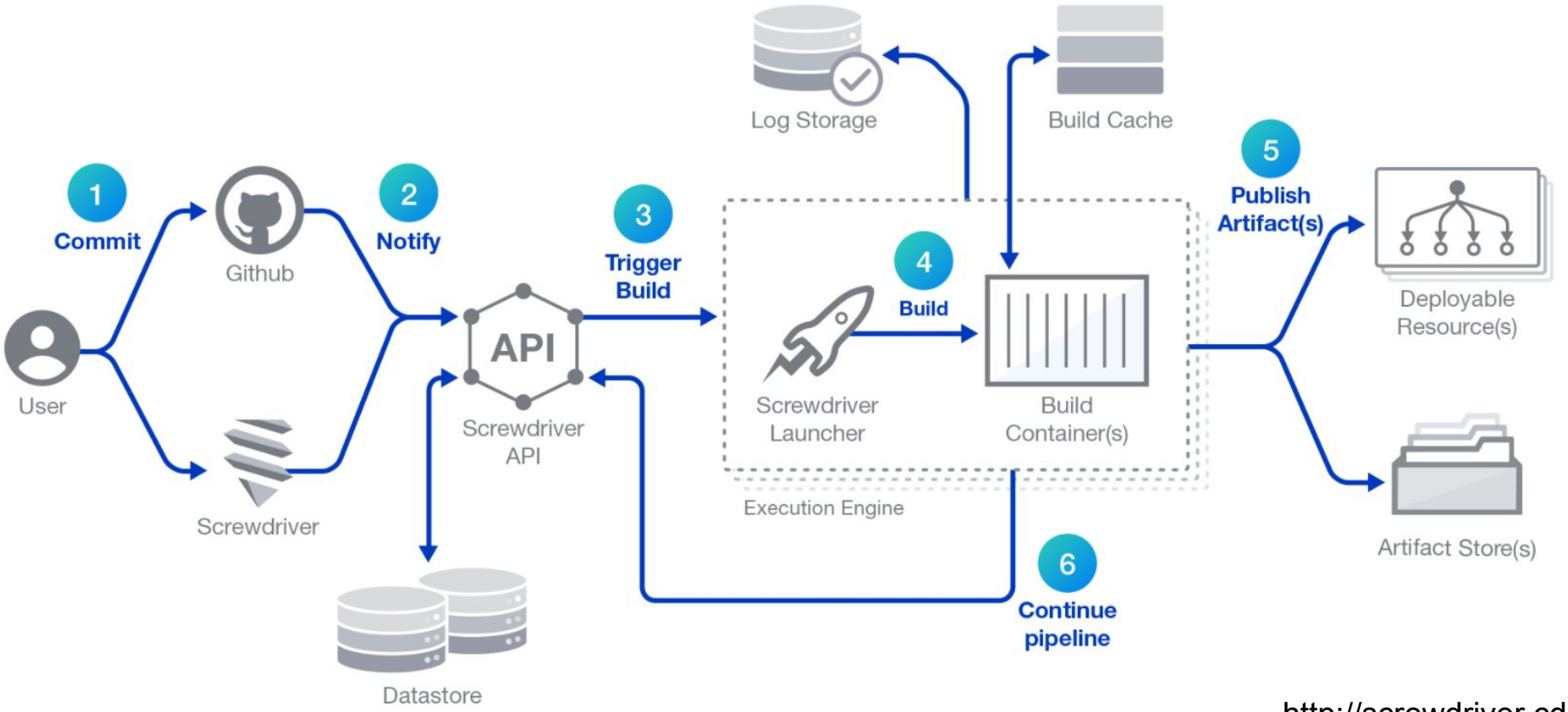

gifbin.com

Screwdriver

- No orange juice
- Yahoo!
- Distributed system
- Independently scalable

- Components
  - ReST API
  - Web UI
  - Launcher
  - Execution Engine
  - Datastore

Screwdriver Architecture

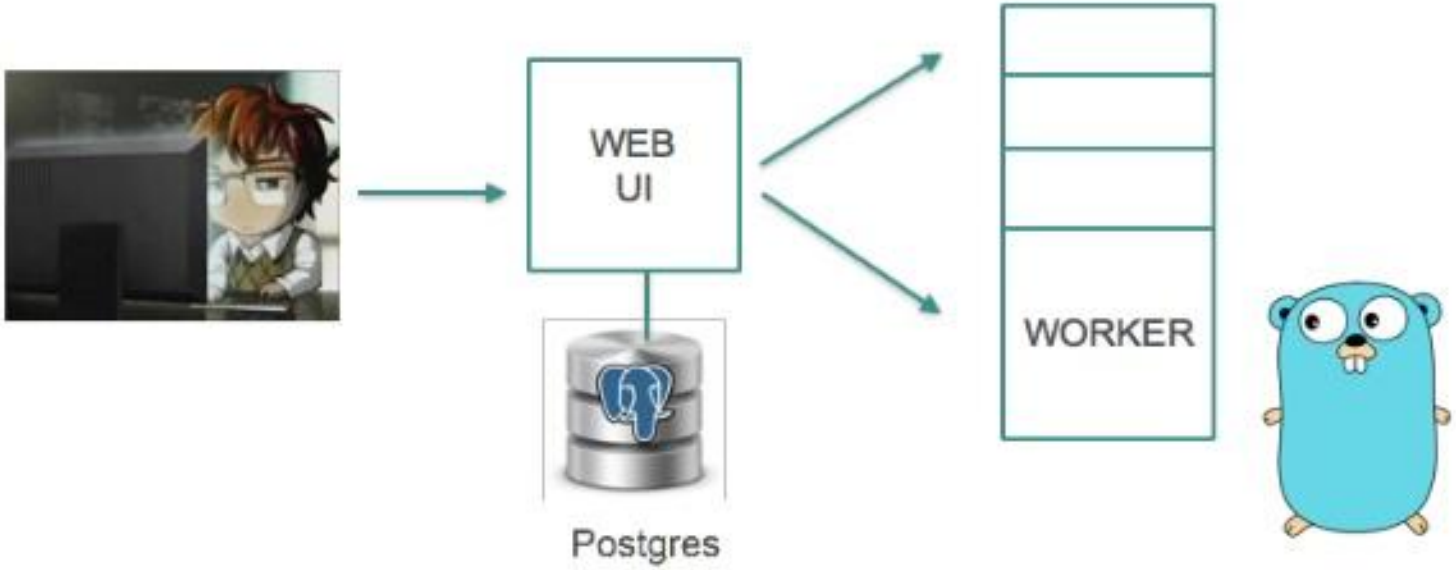


http://screwdriver.cd/

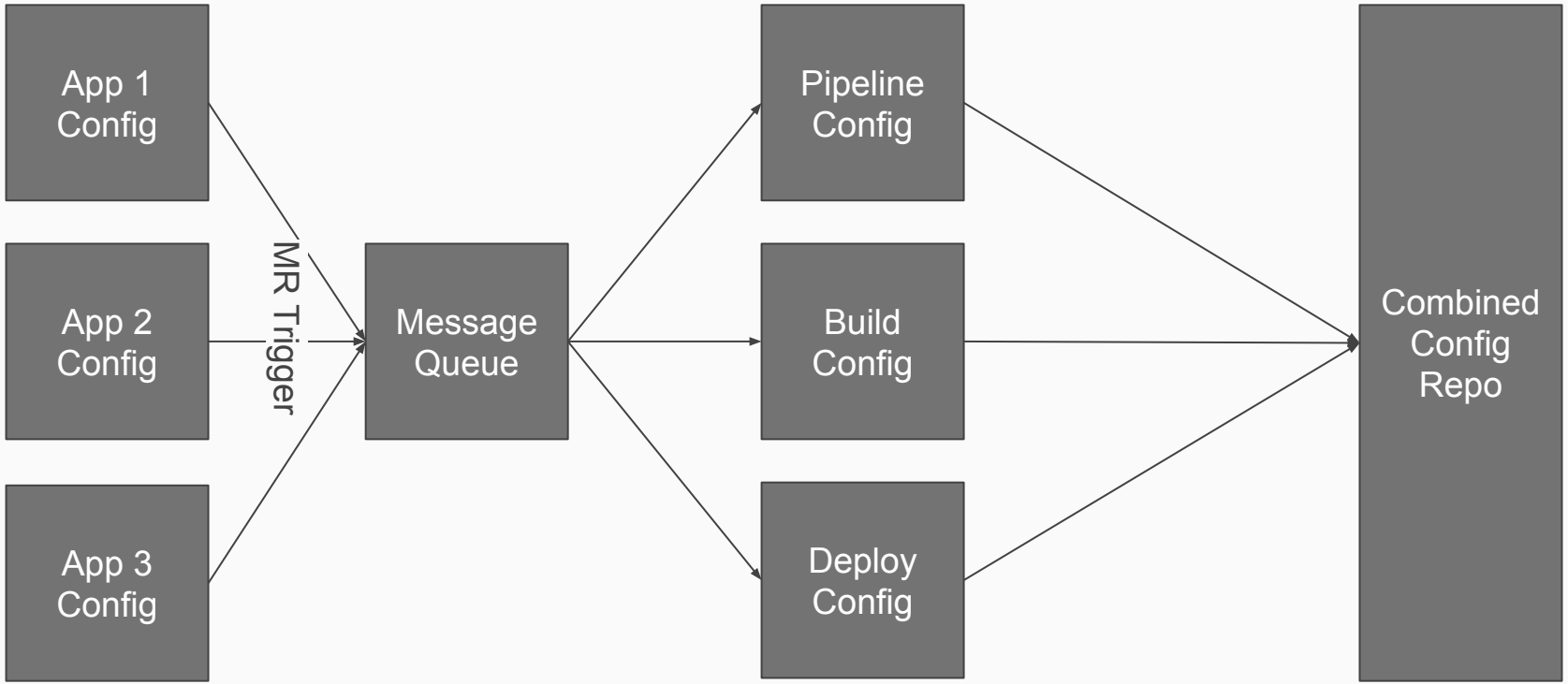
Concourse

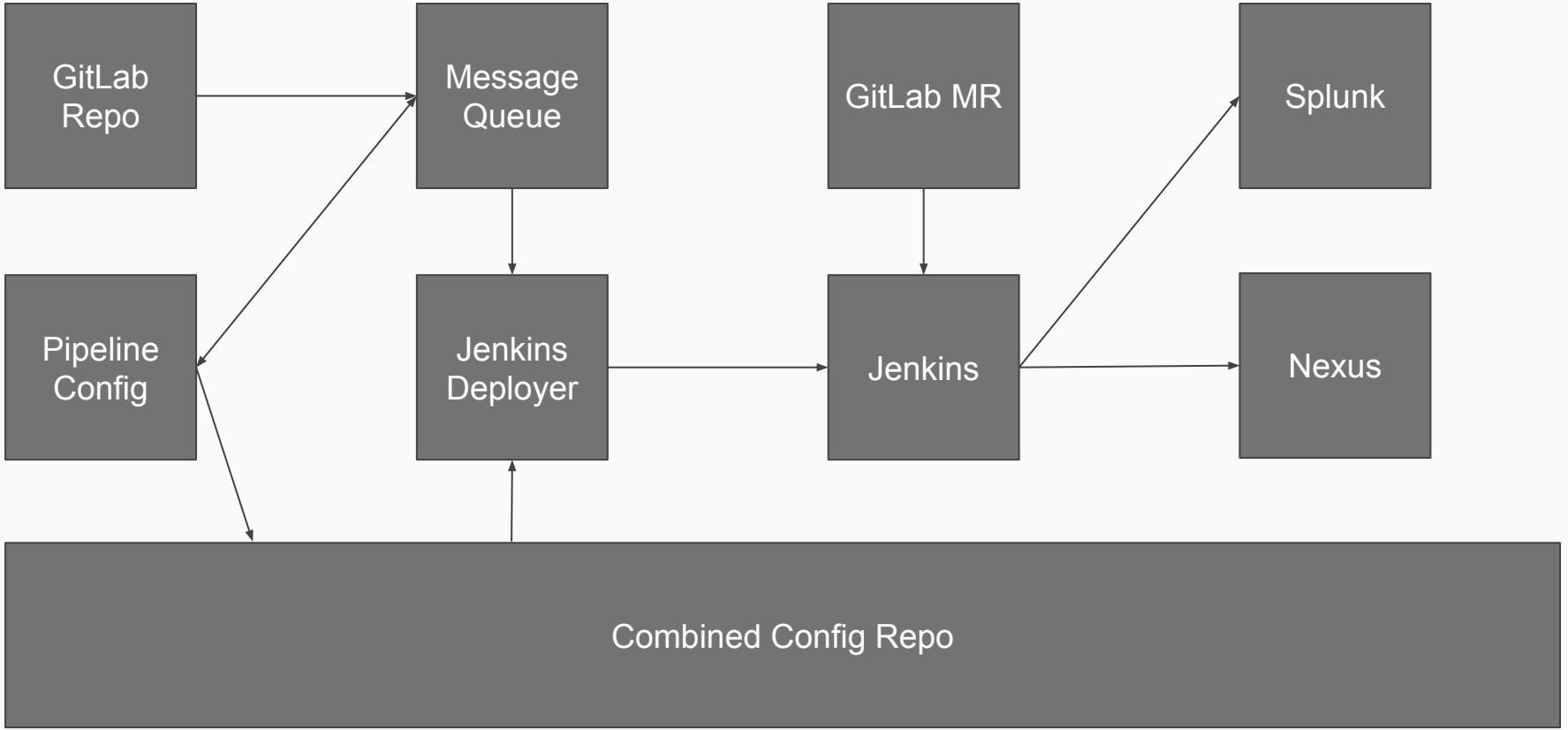
- Immutable architecture
- Ephemeral architecture
- Tasks
- Resources
- Jobs
- Builds

Architecture (Simple)

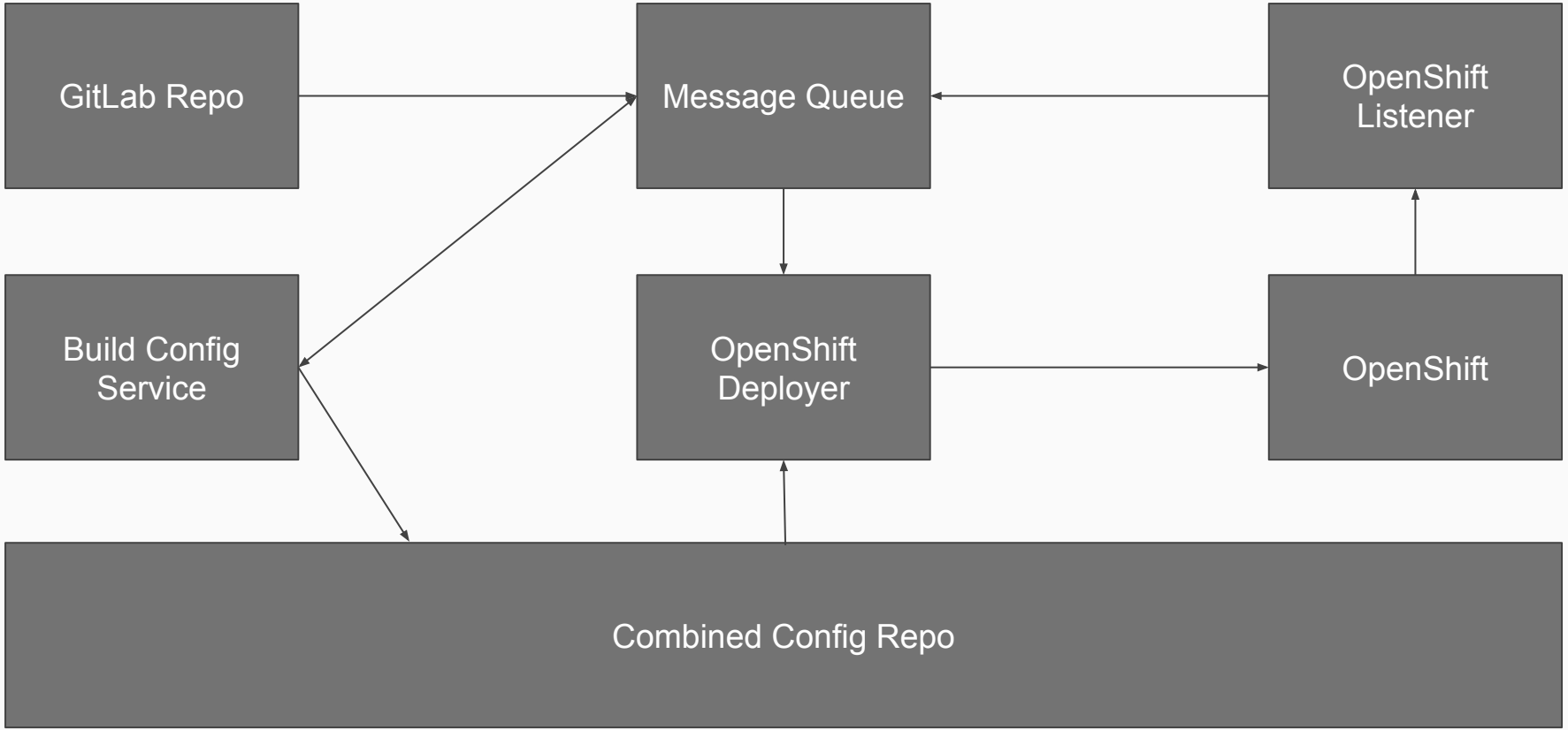


Deployment Pipeline’s have fallen behind

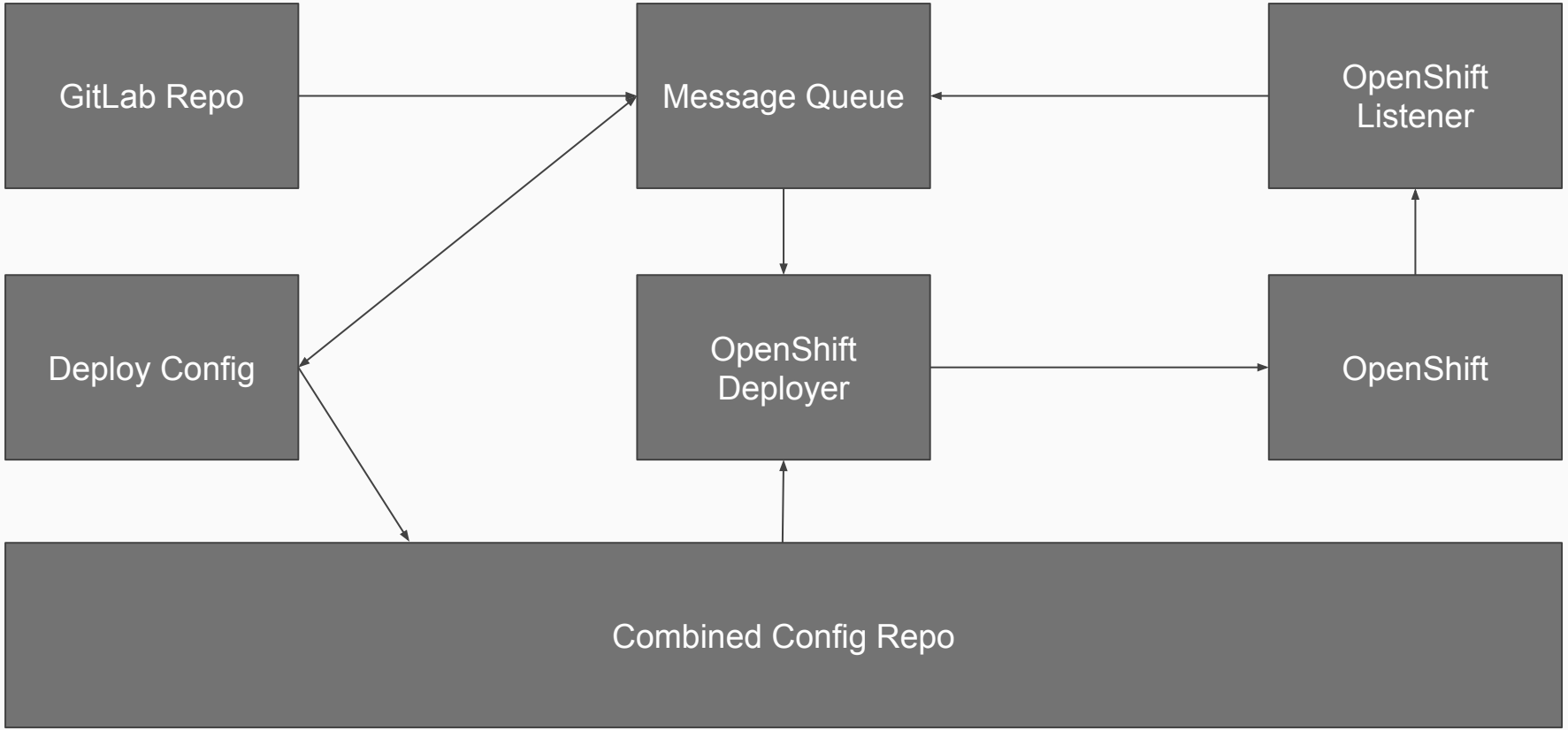

App 1 Config
App 2 Config
App 3 Config
MR Trigger
Message Queue
Pipeline Config
Build Config
Deploy Config
Combined Config Repo



Pipeline Config Flow



Build Config Flow



Deploy Config Flow

Pipelines

- Stages
- Steps
- Environments
- Application
- PipelineTemplate
- PipelineConfig

```yaml
apiVersion: v1
kind: Application
name: app1
cap:
  template:
      name: approvedTemplates/Tomcat8.yaml
    pipeline:
      notifications:
        mattermost:
          team: cloud
          channel: general
          on_success: never
          on_failure: always
      dependencies:
      - name: authn
        dnsName: authn
      - name: key-management
        username: reference_to_username
        password: reference_to_password
      stages:
      - name: build
        steps:
        - action: build
          baseImage:
            version: 8.0.41
      - name: dev
        approvers:
        - role: app1-dev
        steps:
        - action: deploy
          params:
            environment: dev
```

```yaml
apiVersion: v1
kind: PipelineTemplate
name: Tomcat8
labels:
  type: application
build:
  manager: maven
    version: latest
  builderImage: java8-builder
    version: latest
  baseImage: tomcat8
    version: latest
deploy:
  deploymentType: canary
    maxUnavailable: 10%
    maxSurge: 20%
```



```yaml
apiVersion: v1
kind: PipelineConfig
name: app1-pipeline
labels:
  type: application
pipeline:
    notifications:
      mattermost:
        team: cloud
        channel: general
        on_success: never
        on_failure: always
    dependencies:
    - name: authn
      dnsName: authn
    - name: key-management
      username: reference_to_username
      password: reference_to_password
    stages:
    - name: build
      steps:
      - action: build
        manager: maven
        builderImage: java8-builder
        baseImage: tomcat8
          version: 8.0.41
    - name: dev
      approvers:
      - role: app1-dev
      steps:
      - action: deploy
        params:
          environment: dev
```

An Application includes a Pipeline, based on an opinionated PipelineTemplate. These combine as a PipelineConfig. @barkerd427

```yaml
apiVersion: v1
kind: Application
name: app1
cap:
  template:
      name: approvedTemplates/Tomcat8.yaml
    pipeline:
      notifications:
        mattermost:
          team: cloud
          channel: general
          on_success: never
          on_failure: always
      dependencies:
      - name: authn
        dnsName: authn
      - name: key-management
        username: reference_to_username
        password: reference_to_password
      stages:
      - name: build
        steps:
        - action: build
          baseImage:
            version: 8.0.41
      - name: dev
        approvers:
        - role: app1-dev
        steps:
        - action: deploy
          params:
            environment: dev
```

```yaml
apiVersion: v1
kind: PipelineTemplate
name: Tomcat8
labels:
  type: application
build:
  manager: maven
    version: latest
  builderImage: java8-builder
    version: latest
  baseImage: tomcat8
    version: latest
deploy:
  deploymentType: canary
    maxUnavailable: 10%
    maxSurge: 20%
```



```yaml
apiVersion: v1
kind: DeploymentConfig
metadata:
  name: app1-pipeline
  type: application
spec:
  replicas: 2
  selector:
    name: frontend
  template: { ... }
  triggers:
  - type: ConfigChange
  - imageChangeParams:
      automatic: true
      containerNames:
      - helloworld
      from:
        kind: ImageStreamTag
        name: hello-openshift:latest
    type: ImageChange
  strategy:
    type: Rolling
```

An Application and PipelineTemplate also combine to create a DeploymentConfig.

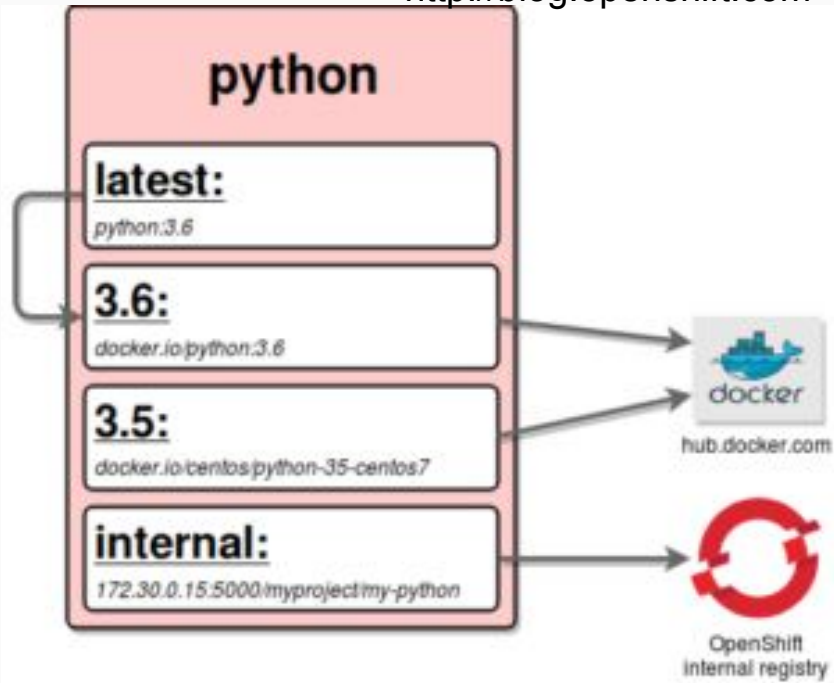
@barkerd427

ImageStreams are an image abstraction

ImageStreams

- Contains images from:
  - Integrated registry
  - Other ImageStreams
  - External registries
- Automatic event triggers

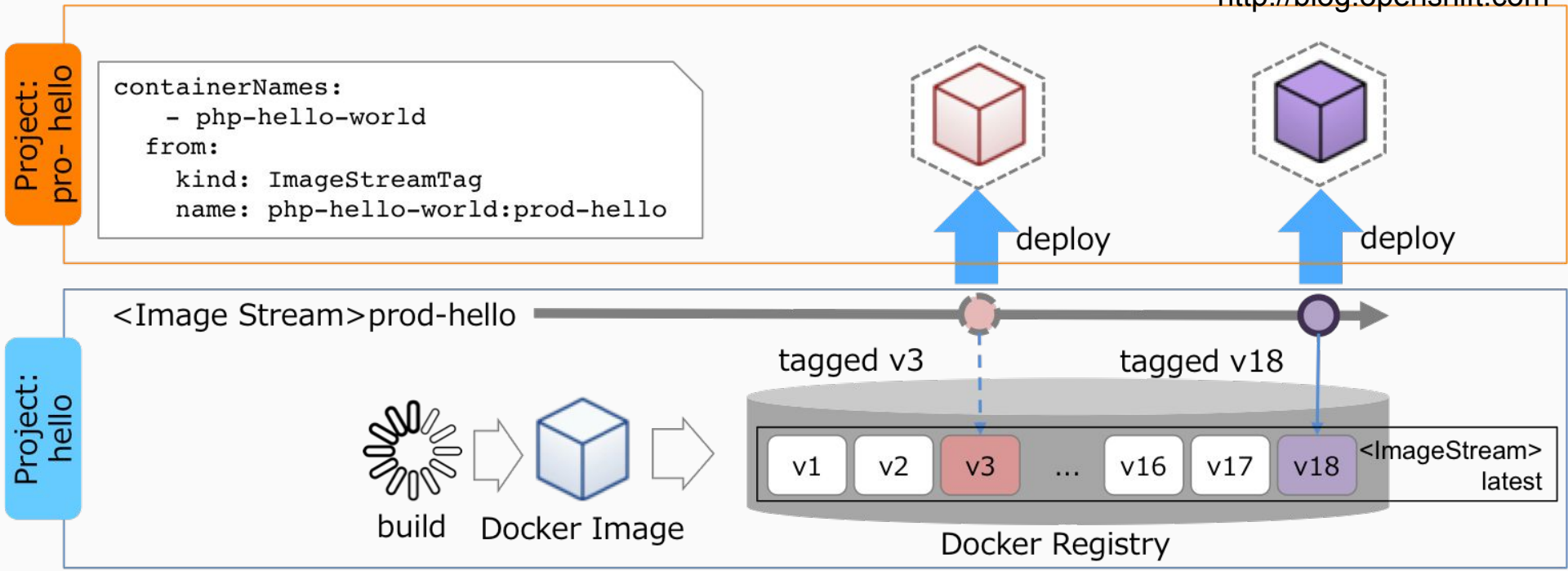
http://blog.openshift.com



ImageStreams - Metadata

- Commands
- Entrypoint
- EnvVars
- Layers
- Labels
- Ports

http://blog.openshift.com






gif-finder.com

CoreOS Operators are magical

(not really)

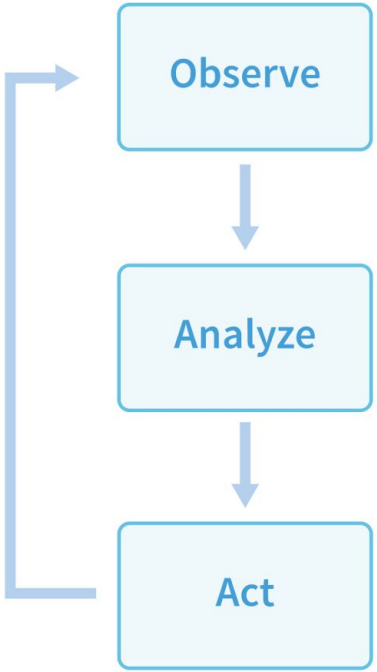
@barkerd427

Operators

- Represents human operational knowledge in software
- CustomResource Definitions
  - Extends Kubernetes API
- Identical model to k8s controllers
  - OODA Loop
- Now in Beta!!!

Operators

- Deployed into k8s cluster
- Interactions through new API
  - `kubectl get prometheuses`
  - `kubectl get alertmanagers`
- Abstraction around k8s primitives
  - *Users* just want to *use* a MySQL cluster.
- Complex tasks that can be performed
  - Rotating credentials, certs, versions, backups



Cluster “A” has 2 running pods:

- name: A-000, version 3.0.9
- name: A-001, version 3.1.0

Differences from desired config:

- should be version 3.1.0
- should have 3 members

How to get to desired config:

- Recover 1 member
- Back up cluster
- Upgrade to 3.1.0



CoreOS


4GIFs
.com

What to take away?

Do not take a picture of this slide!!!
Do not take a picture of this slide!!!
picture of...
No, stop!

STOP!!!

Really, STOP!!!

Security!

SECURITY!!!!

- Just Start
- Start Small
- Abstract Consciously
- Let Others Do The Work
- Contribute Back

Resources

- https://github.com/jenkinsci/pipeline-examples/blob/master/global-library-examples/global-function/standardBuild.groovy
- https://github.com/jenkinsci/pipeline-examples/blob/master/global-library-examples/global-function/Jenkinsfile
- https://github.com/jenkinsci/pipeline-examples/blob/master/jenkinsfile-examples/nodejs-build-test-deploy-docker-notify/Jenkinsfile
- https://github.com/jenkinsci/pipeline-examples/blob/master/declarative-examples/jenkinsfile-examples/mavenDocker.groovy
- https://github.com/fabric8io/fabric8-pipeline-library/blob/master/src/io/fabric8/Utils.groovy
- https://github.com/fabric8io/fabric8-jenkinsfile-library/blob/master/golang/ReleaseAndStage/Jenkinsfile
- https://istio.io/
- https://kubernetes.io/docs/getting-started-guides/minikube/
- http://danbarker.codes

Thanks!

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dan@danbarker.codes
danbarker.codes
@barkerd427

