Openshift

Kubernetes with a human face

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Openshift, where's Kubernetes?

Openshift - batteries included

- Internal OAuth server for authentication
- Internal container registry
- ImageStreams + BuildConfigs + DeploymentConfigs
- CI/CD via Jenkins Pipelines

DevOps 101

```
10 git commit
20 git push
30 ??? some ops magic ???
40 GOTO 10
```

Look mom, no Dockerfile!

```
$ oc login https://cloud.vrutkovs.eu -t
sUpeRSekret
$ oc new-project lvee
$ oc new-app  \
   --name=lvee-demo \
   https://github.com/vrutkovs/openshift-demo
$ oc expose svc/demo --
host=demo.cloud.vrutkovs.eu
```

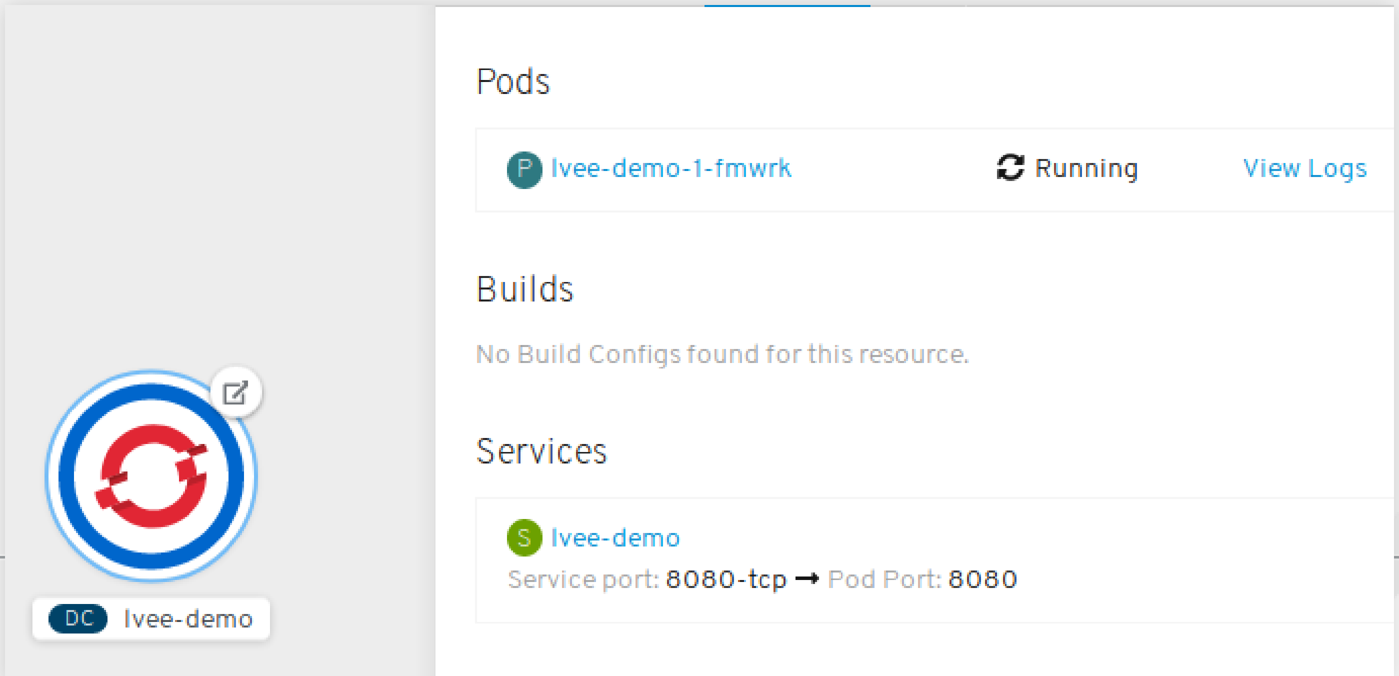
Build log

```
Cloning "https://github.com/vrutkovs/openshift-demo" ...
    Commit:    b74070426bbba32ba085846804b8b6b909880eeb (Simplify
    Author:    Vadim Rutkovsky <vrutkovs@redhat.com>
    Date:    Fri May 4 23:37:38 2018 +0200
--> Installing application source ...
--> Installing dependencies ...
Collecting aiohttp==2.3.10 (from -r requirements.txt (line 1))
Downloading https://files.pythonhosted.org/packages/7e/af/b2c6b59
Collecting yarl>=1.0.0 (from aiohttp==2.3.10->-r requirements.txt

Downloading https://files.pythonhosted.org/packages/61/67/df71b36
...
Installing collected packages: idna, multidict, yarl, idna-ssl, c
Running setup.py install for idna-ssl: started
Running setup.py install for idna-ssl: finished with status 'done
Successfully installed aiohttp-2.3.10 async-timeout-3.0.0 chardet

Pushing image 172.30.16.196:5000/lvee/lvee-demo:latest ...
Pushed 0/6 layers, 3% complete
...
Pushed 6/6 layers, 100% complete
Push successful
```

Web Console



Pods

P lvee-demo-1-fmwrk   Running   View Logs

Builds

No Build Configs found for this resource.

Services

S lvee-demo
Service port: 8080-tcp → Pod Port: 8080

Dockerfile + route settings in YAML

```
$ oc new-project lvee-custom
$ oc new-app --name=lvee-custom \
   http://github.com/vrutkovs/openshift-demo#custom-
dockerfile
$ oc create -f route.yaml
```

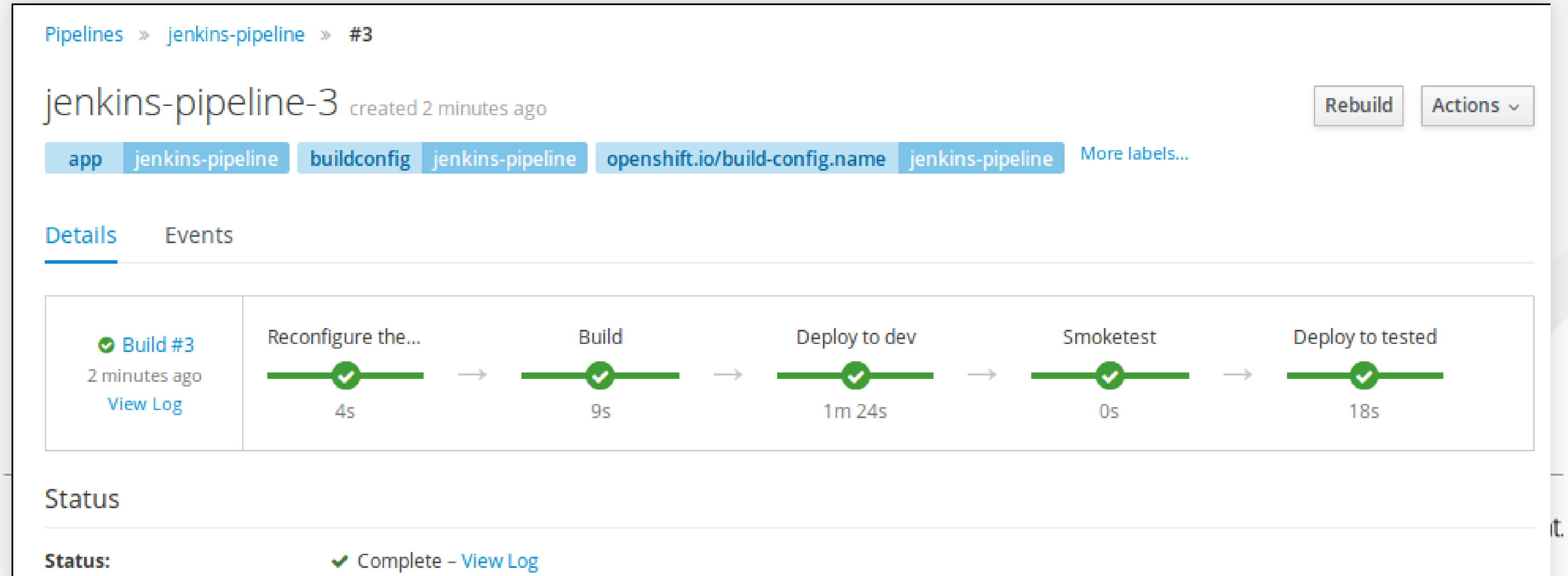
CI/CD with Jenkins Pipelines

```
$ oc new-project pipelines
$ oc new-app --name=jenkins-pipeline \
   http://github.com/vrutkovs/openshift-
demo#jenkins
```

```
stage("Build") {
  openshiftBuild
    buildConfig: "pipeline-app", showBuildLogs: "true"
}
stage("Deploy to dev") {
  openshiftDeploy deploymentConfig: "pipeline-app"
}

stage("Smoketest") {
  sh "curl -kLvs
      http://pipeline-app.pipelines.svc:8080/Minsk |
      grep 'Hello, Minsk'"
}

stage("Deploy to staging") {
  openshiftTag
    srcStream: "pipeline-app", srcTag: "latest",
    destinationStream: "pipeline-app", destinationTag: "staging"
  openshiftDeploy
    deploymentConfig: "pipeline-app",
    namespace: "staging-namespace"
}
```


Pipelines » jenkins-pipeline » #3

jenkins-pipeline-3 created 2 minutes ago

app jenkins-pipeline buildconfig jenkins-pipeline openshift.io/build-config.name jenkins-pipeline More labels...

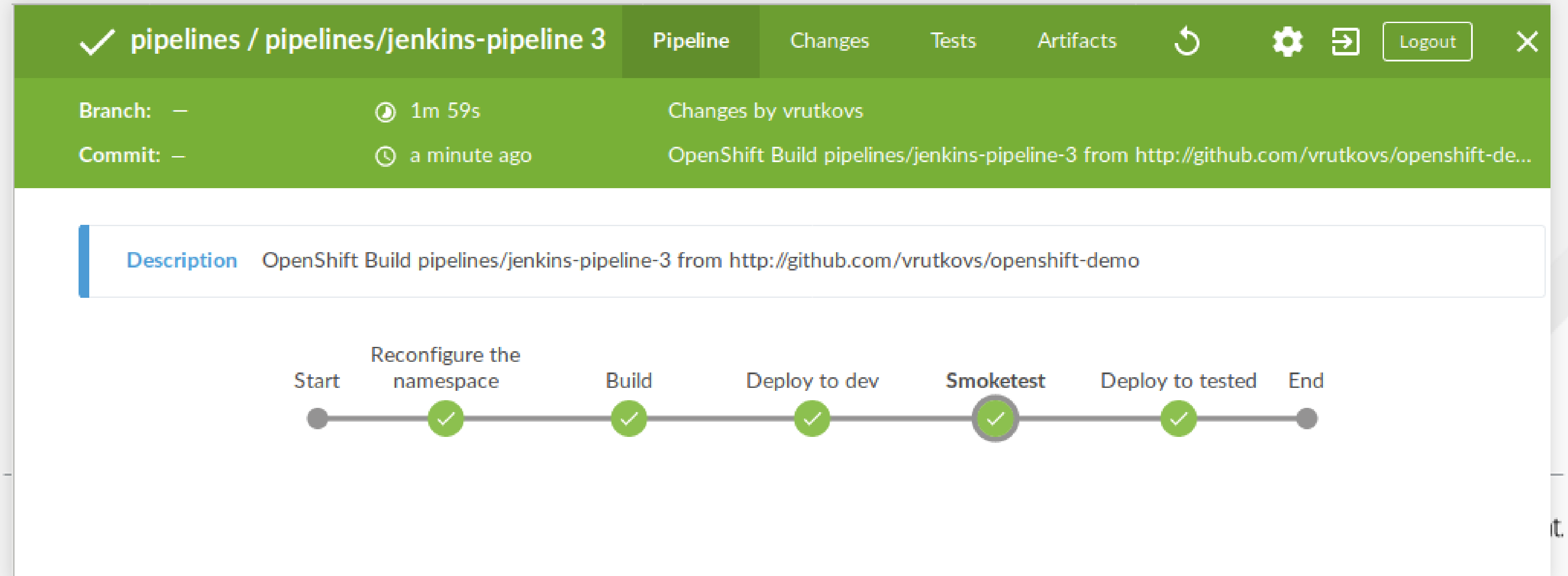
✓ Build #3
2 minutes ago
View Log

Reconfigure the...	Build	Deploy to dev	Smoketest	Deploy to tested
4s	9s	1m 24s	0s	18s

Status

Status: ✓ Complete – View Log

Jenkins Pipeline view

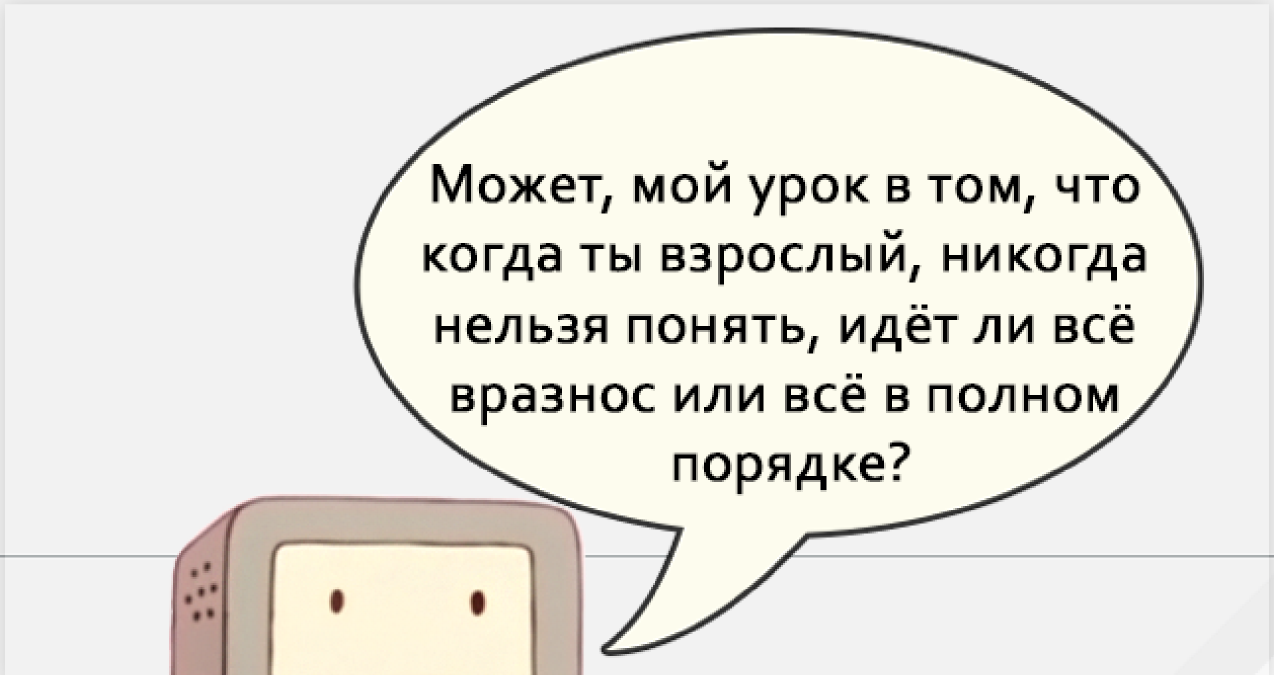


✓ pipelines / pipelines/jenkins-pipeline 3

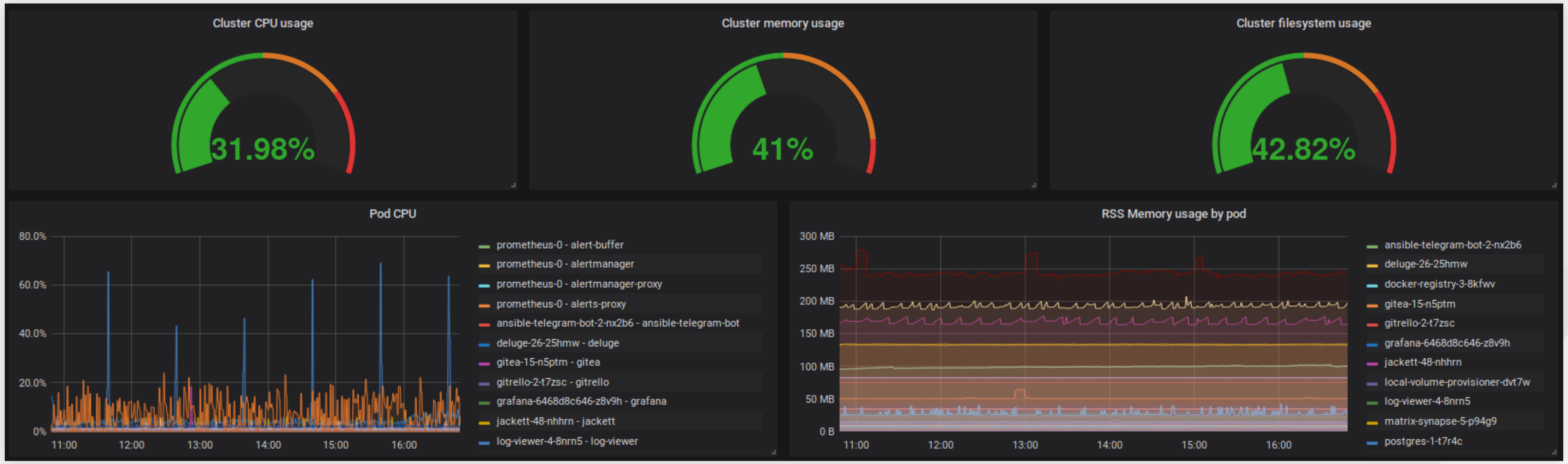
Branch: –
Commit: –
1m 59s
a minute ago
Changes by vrutkovs
OpenShift Build pipelines/jenkins-pipeline-3 from http://github.com/vrutkovs/openshift-de...

Description OpenShift Build pipelines/jenkins-pipeline-3 from http://github.com/vrutkovs/openshift-demo

Monitoring and Metrics


Может, мой урок в том, что когда ты взрослый, никогда нельзя понять, идёт ли всё вразнос или всё в полном порядке?

Prometheus + Grafana



See you later, operator

Operators - k8s pattern, application connects to k8s API server, uses CRDs to create k8s objects and may actively watch them

Prometheus Operator maintains and configures Prometheus cluster

Vitesse Operator creates, scales and backs up MySQL containers in kubernetes

Where Do I Find Operators?

https://operatorhub.io

Operator Lifecycle Manager takes care of operator provisioning, update and configuration

OpenShift-specific operator - MachineConfig

MachineConfig - custom object, which contains a list of encoded files and systemd units

MachineConfigs are assembled into MachineConfigPools, assigned to a node group

MachineConfigOperator runs a daemon on the hosts and synchronises files and systemd unit state with the k8s object specification

OpenShift-specific operator - Machine API

Machine API Operator takes care of additional nodes provisioning

Additional entities - Machine and MachineSet - is introduced to keep the info about desired node configs and quantity

MachineSet can be scaled, creating a new Machine instance. A new Machine joins the cluster via TLS bootstrapping

Operator benefits

* One image to rule them all

* Cluster config = sum of operator configs (GitOps)

* Operator status -> cluster health status

* Upgrading a cluster is essentially updating every operator

Operated Operating System

RHEL CoreOS is RHEL8, designed to run containers only. Community counterpart - Fedora CoreOS

RHEL CoreOS release cycle is bound to OpenShift, not RHEL

RHEL Core OS = ContainerLinux ideas + RHEL packages

RHEL CoreOS specifics

Ignition to declaratively configure the system

ostree to make use of read-only root and atomic transactions

MachineConfigDaemon to apply updates and custom configs to existing instances

Give it a try

https://try.openshift.com

Openshift Online

https://manage.openshift.com/

Code Ready Containers - local OpenShift4

https://code-ready.github.io/crc/

Get Shifty.
OPENSHIFT