Creating a Continuous Delivery Pipeline

Getting Started With Google Kubernetes Engine

Version 1.5

Google Cloud

Agenda

Introduction to Jenkins

Provisioning Jenkins

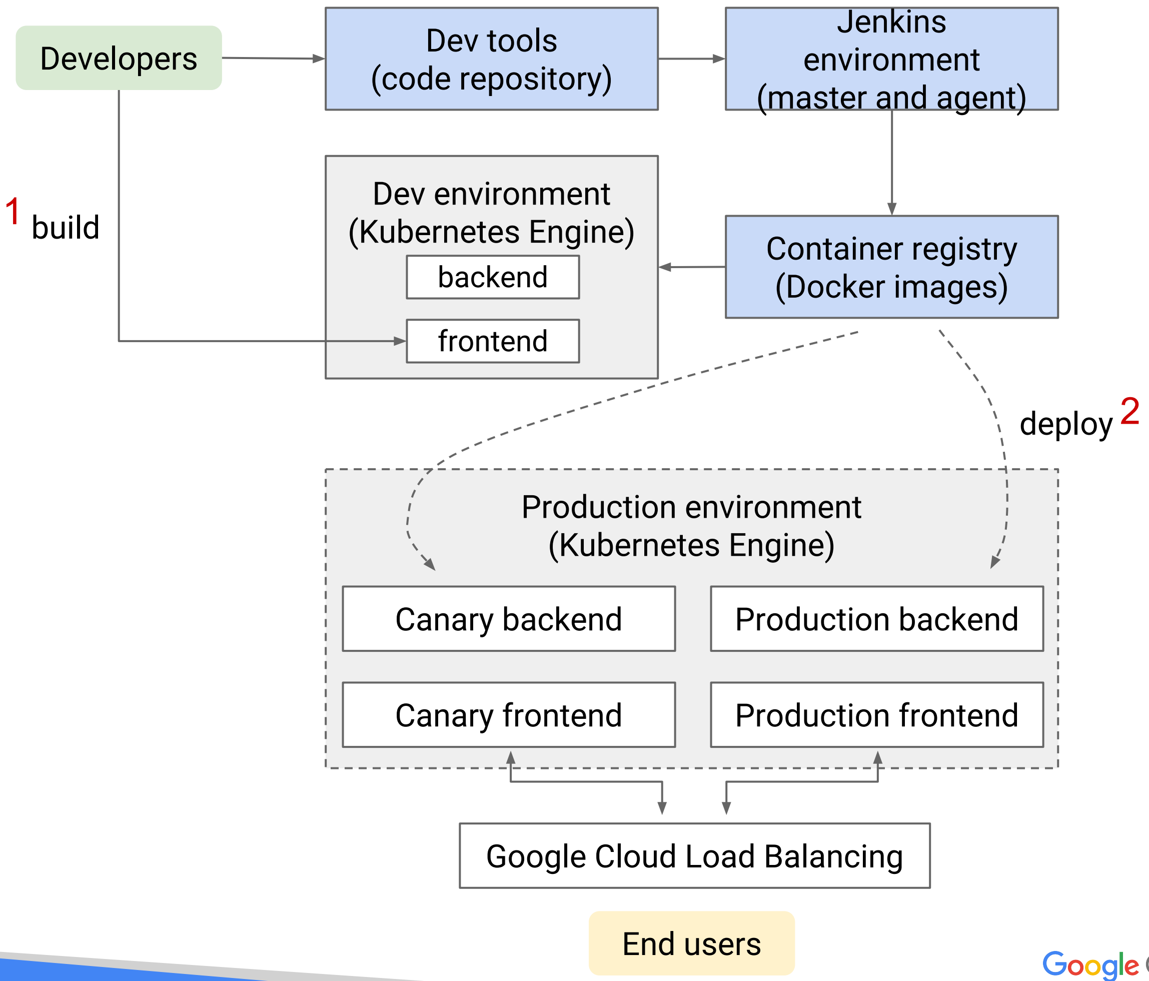
Understanding the application

Creating the Jenkins pipeline

Deploying a Canary release

Google Cloud

Here is the flow that you will go through with Jenkins



Developers
Dev tools (code repository)
Jenkins environment (master and agent)
1 build
Dev environment (Kubernetes Engine)
backend
frontend
Container registry (Docker images)
deploy 2
Production environment (Kubernetes Engine)
Canary backend
Production backend
Canary frontend
Production frontend
Google Cloud Load Balancing
End users

Agenda

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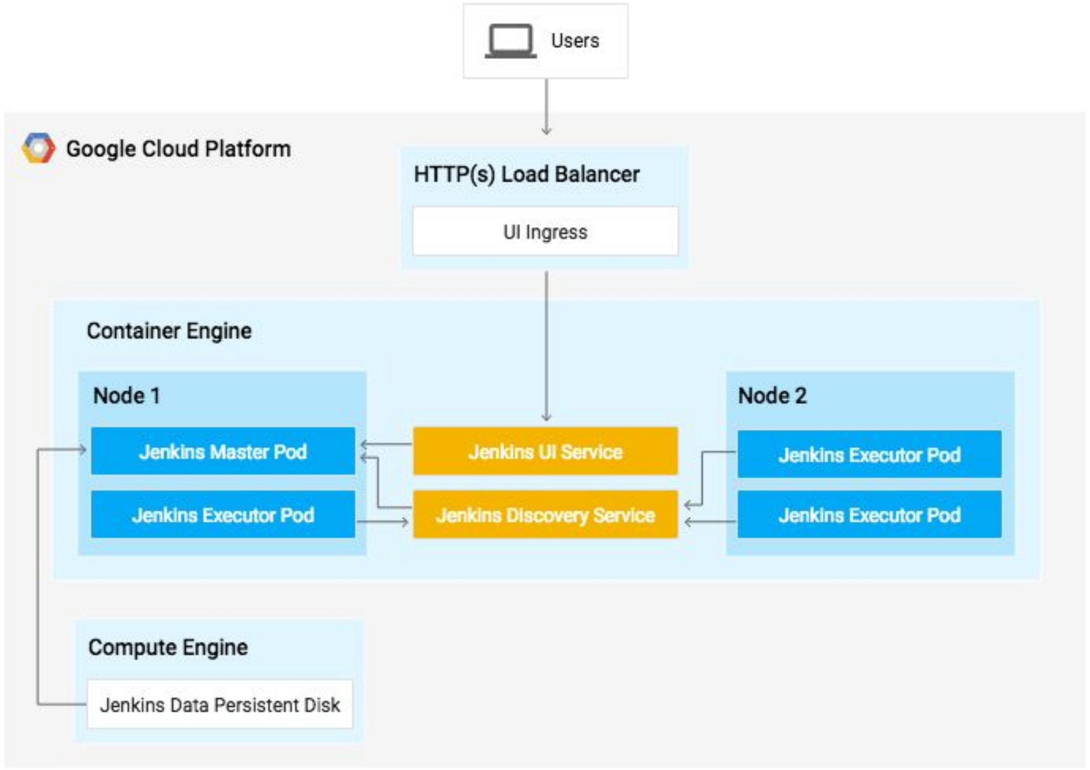
Google Cloud

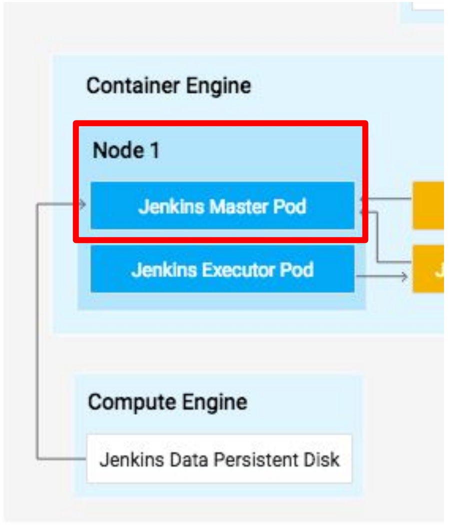
Here is how Jenkins gets deployed to Kubernetes



Jenkins is run through a Kubernetes deployment

For the master, you define:

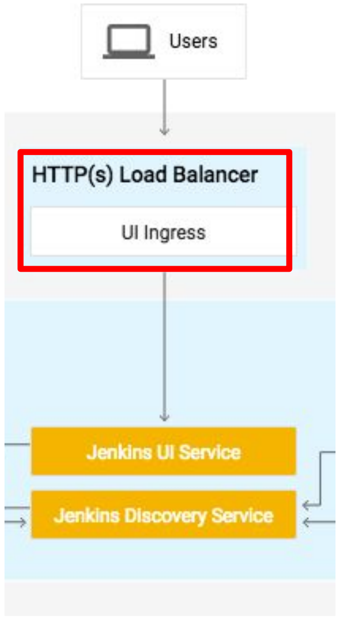
- 1 replica
- Image
- Ports
- Mount volume and path



```
apiVersion: extensions/v1beta1
kind: Deployment
metadata:
  name: jenkins
  namespace: jenkins
spec:
  replicas: 1
  template:
    metadata:
      labels:
        app: master
    spec:
      containers:
      - name: master
        image: jenkins:1.642.4
        ports:
        - containerPort: 8080
        - containerPort: 50000
        env:
        volumeMounts:
        - mountPath: /var/jenkins_home
          name: jenkins-home
      volumes:
      - name: jenkins-home
        gcePersistentDisk:
          pdName: jenkins-home
          fsType: ext4
          partition: 1
```

For the ingress you define

- TLS cert secret
- Service name
- Service port



```
apiVersion: extensions/v1beta1
kind: Ingress
metadata:
  name: jenkins
  namespace: jenkins
spec:
  tls:
  - secretName: tls
  backend:
    serviceName: jenkins-ui
    servicePort: 8080
```

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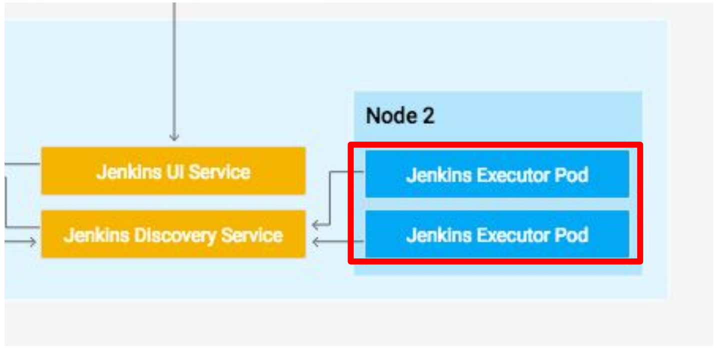
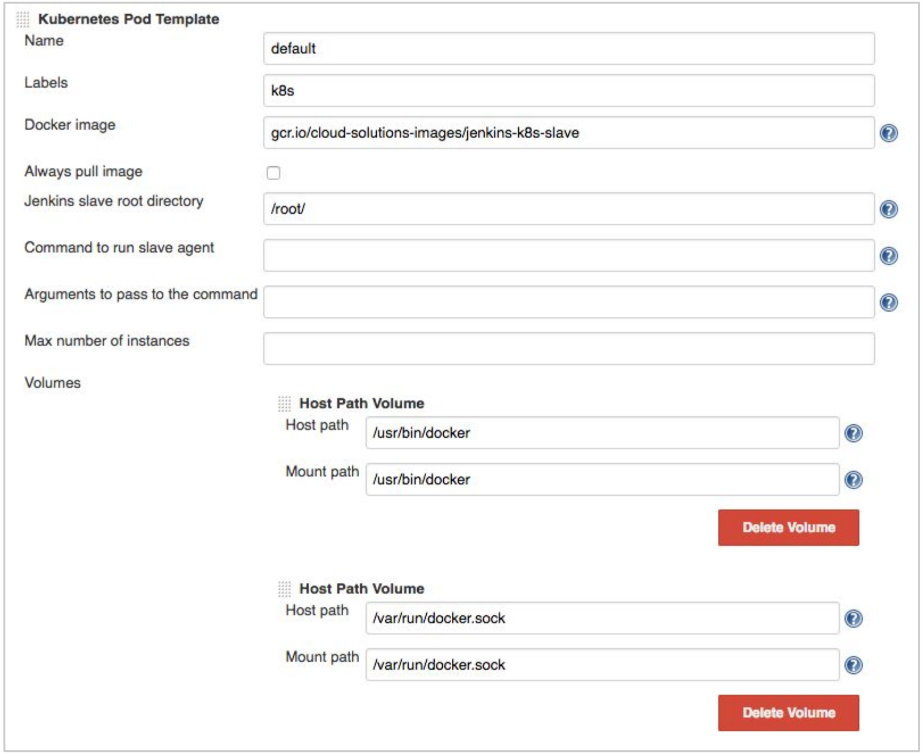
The Jenkins executors (agents) are defined inside Jenkins

You define

- Your Docker image to run
- Docker binary/socket





Kubernetes Pod Template

Name	default
Labels	k8s
Docker image	gcr.io/cloud-solutions-images/jenkins-k8s-slave
Always pull image	☐
Jenkins slave root directory	/root/
Command to run slave agent	
Arguments to pass to the command	
Max number of instances	
Volumes	

Host Path Volume

Host path	/usr/bin/docker
Mount path	/usr/bin/docker

Host Path Volume

Host path	/var/run/docker.sock
Mount path	/var/run/docker.sock

Agenda

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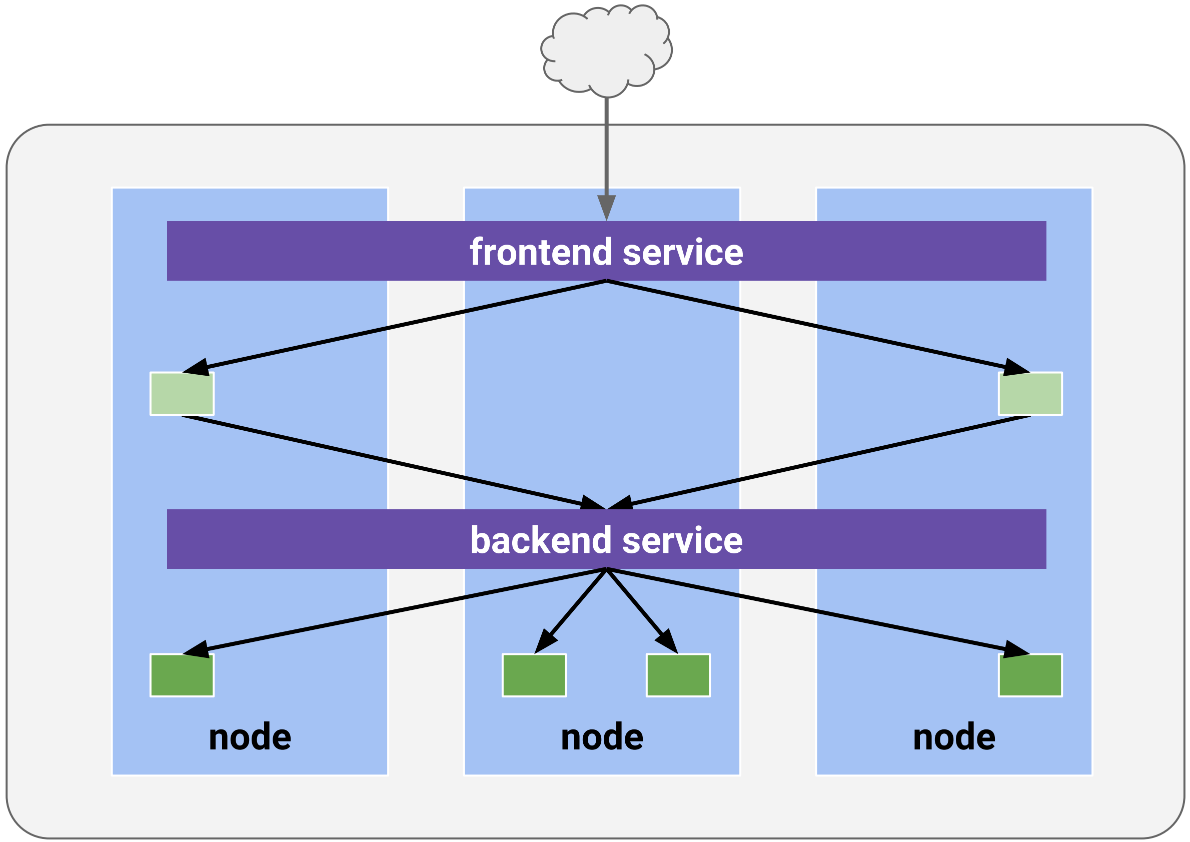
The application has a frontend and backend (frontend exposed to the Internet)



Agenda

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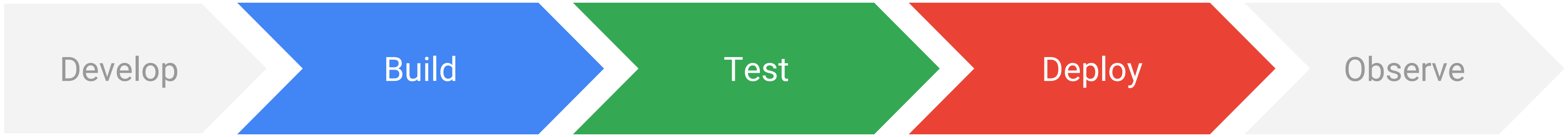
Google Cloud

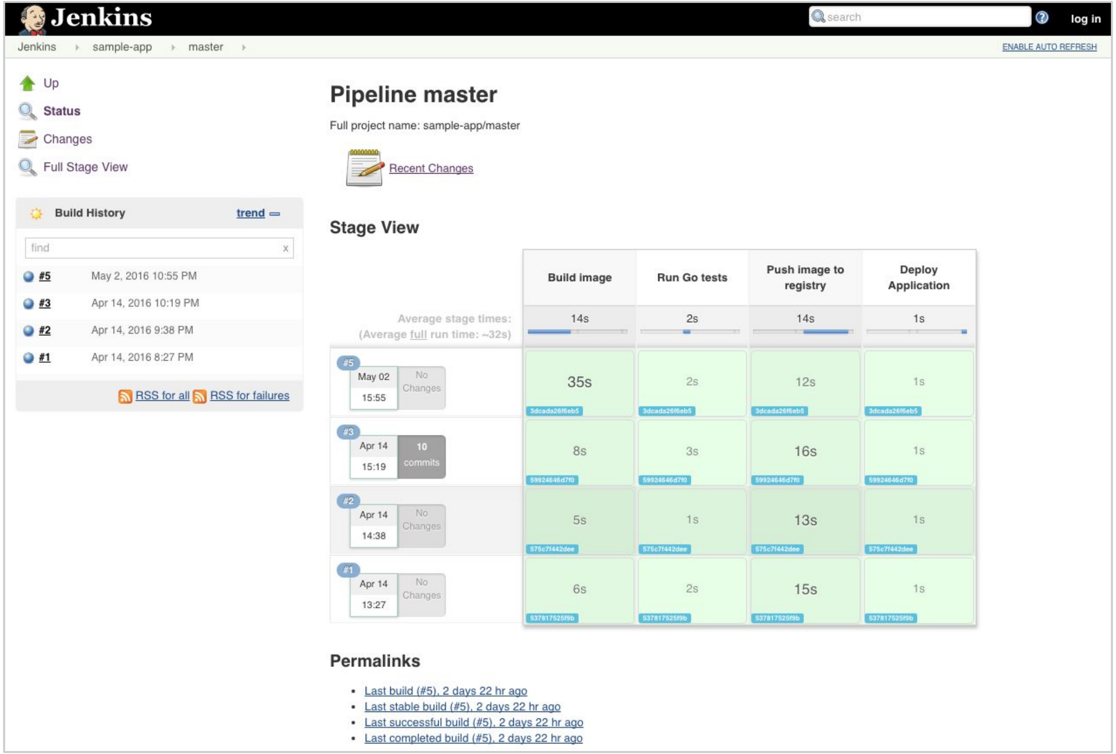
You build the Jenkins pipeline that defines how your build, test, and deploy cycle managed



Example Jenkins pipeline file with checkout, build, test, push, and deployment

```
node {
  def project = 'vic-goog'
  def appName = 'gceme'
  def feSvcName = "${appName}-frontend"
  def imageTag =
"gcr.io/${project}/${appName}:${env.BUILD_NUMBER}"

  checkout scm

  stage 'Build image'
  sh("docker build -t ${imageTag} .")

  stage 'Run Go tests'
  sh("docker run ${imageTag} go test")

  stage 'Push image to registry'
  sh("gcloud docker push ${imageTag}")

  stage "Deploy Application"
  sh("sed -i.bak 's#IMAGE_NAME#${imageTag}#' ./k8s/*.yaml")
  sh("kubectl --namespace=production apply -f k8s/")
}
```

A configured pipeline has run a few times with different stages, times, status, and logs



Jenkins › sample-app › master ›

ENABLE AUTO REFRESH

- Up
- Status
- Changes
- Full Stage View

Build History trend

#5	May 2, 2016 10:55 PM
#3	Apr 14, 2016 10:19 PM
#2	Apr 14, 2016 9:38 PM
#1	Apr 14, 2016 8:27 PM

RSS for all RSS for failures

Pipeline master

Full project name: sample-app/master

Recent Changes

Stage View

	Build image	Run Go tests	Push image to registry	Deploy Application
Average stage times: (Average full run time: ~32s)	14s	2s	14s	1s
#5 May 02 15:55 No Changes	35s 3dcada26f6eb5	2s 3dcada26f6eb5	12s 3dcada26f6eb5	1s 3dcada26f6eb5
#3 Apr 14 15:19 10 commits	8s 59924646d7f0	3s 59924646d7f0	16s 59924646d7f0	1s 59924646d7f0
#2 Apr 14 14:38 No Changes	5s 575c7f442dee	1s 575c7f442dee	13s 575c7f442dee	1s 575c7f442dee
#1 Apr 14 13:27 No Changes	6s 537817525f9b	2s 537817525f9b	15s 537817525f9b	1s 537817525f9b

Permalinks

- Last build (#5), 2 days 22 hr ago
- Last stable build (#5), 2 days 22 hr ago
- Last successful build (#5), 2 days 22 hr ago
- Last completed build (#5), 2 days 22 hr ago

Google Cloud

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With Canary, you have the same labels across deployments

```
kind: Service
apiVersion: v1
metadata:
  name: frontend
spec:
  type: LoadBalancer
  ports:
  - name: http
    port: 80
    targetPort: 80
    protocol: TCP
  selector:
    app: awesome-stuff
    role: frontend
```

```
kind: Deployment
apiVersion: extensions/v1beta1
metadata:
  name: frontend-prod
spec:
  replicas: 90
  template:
    metadata:
      name: frontend
      labels:
        app: awesome-stuff
        role: frontend
        env: prod
    spec:
      containers:
      - name: frontend
        image: my-img:v1
        ports:
        - name: ui
          containerPort: 80
```

```
kind: Deployment
apiVersion: extensions/v1beta1
metadata:
  name: frontend-staging
spec:
  replicas: 10
  template:
    metadata:
      name: frontend
      labels:
        app: awesome-stuff
        role: frontend
        env: staging
    spec:
      containers:
      - name: frontend
        image:my-img:v2
        ports:
        - name: ui
          containerPort: 80
```

But you have another label to distinguish production from staging

```yaml
kind: Service
apiVersion: v1
metadata:
  name: frontend
spec:
  type: LoadBalancer
  ports:
  - name: http
    port: 80
    targetPort: 80
    protocol: TCP
  selector:
    app: awesome-stuff
    role: frontend
```

```yaml
kind: Deployment
apiVersion: extensions/v1beta1
metadata:
  name: frontend-prod
spec:
  replicas: 90
  template:
    metadata:
      name: frontend
      labels:
        app: awesome-stuff
        role: frontend
        env: prod
    spec:
      containers:
      - name: frontend
        image: my-img:v1
        ports:
        - name: ui
          containerPort: 80
```

```yaml
kind: Deployment
apiVersion: extensions/v1beta1
metadata:
  name: frontend-staging
spec:
  replicas: 10
  template:
    metadata:
      name: frontend
      labels:
        app: awesome-stuff
        role: frontend
        env: staging
    spec:
      containers:
      - name: frontend
        image:my-img:v2
        ports:
        - name: ui
          containerPort: 80
```

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Lab