

Deploy to Kubernetes in Google Cloud: Challenge Lab

Task 1: Create a Docker image and store the Dockerfile

```
← → ↺ console.cloud.google.com/getting-started?project=qwiklabs-gcp-04-78fe4b032c99&folder&organizationId&cloudshell=true

Google Cloud Platform qwiklabs-gcp-04-78fe4b032c99 Search products and resources

CLOUD SHELL
Terminal (qwiklabs-gcp-04-78fe4b032c99) x +

Welcome to Cloud Shell! Type "help" to get started.
Your cloud Platform project in this session is set to qwiklabs-gcp-04-78fe4b032c99.
Use "gcloud config set project [PROJECT_ID]" to change to a different project.
Welcome to Cloud Shell! Type "help" to get started.
Your cloud Platform project in this session is set to qwiklabs-gcp-04-78fe4b032c99.
Use "gcloud config set project [PROJECT_ID]" to change to a different project.
student_04_e310950b5213@cloudshell:~ (qwiklabs-gcp-04-78fe4b032c99)$ ls
README-cloudshell.txt
student_04_e310950b5213@cloudshell:~ (qwiklabs-gcp-04-78fe4b032c99)$ gsutil cat gs://cloud-training/gsp318/marketing/setup_marking.sh | bash
Copying gs://cloud-training/gsp318/marketing/step1.sh...
Copying gs://cloud-training/gsp318/marketing/step2.sh...
/ [2 files][ 1.2 KiB/ 1.2 KiB]
Operation completed over 2 objects/1.2 KiB.
student_04_e310950b5213@cloudshell:~ (qwiklabs-gcp-04-78fe4b032c99)$ gcloud source repos clone valkyrie-app
Cloning into '/home/student_04_e310950b5213/valkyrie-app'...
remote: Counting objects: 41, done
remote: Finding sources: 100% (41/41)
remote: Total 41 (delta 5), reused 41 (delta 5)
Unpacking objects: 100% (41/41), done.
Project [qwiklabs-gcp-04-78fe4b032c99] repository [valkyrie-app] was cloned to [/home/student_04_e310950b5213/valkyrie-app].
student_04_e310950b5213@cloudshell:~ (qwiklabs-gcp-04-78fe4b032c99)$ cd valkyrie-app
student_04_e310950b5213@cloudshell:~/valkyrie-app (qwiklabs-gcp-04-78fe4b032c99)$ cat > Dockerfile <<EOF
> FROM golang:1.10
> WORKDIR /go/src/app
> COPY source .
> RUN go install -v
> ENTRYPOINT ["app", "-single=true", "-port=8080"]
> EOF
student_04_e310950b5213@cloudshell:~/valkyrie-app (qwiklabs-gcp-04-78fe4b032c99)$ docker build -t valkyrie-app:v0.0.1 .
Sending build context to Docker daemon 227.3kB
Step 1/5 : FROM golang:1.10
1.10: Pulling from library/golang
741437d97401: Pull complete
34d8874714d7: Pull complete
0a180aa26d79: Pull complete
7f0334c3e886: Pull complete
d35724ed4672: Pull complete
c8aaf021aear: Pull complete
d30c0e6d11f1: Pull complete
Digest: sha256:6d5e79878a3e4f1b30b7aa4d24fb6ee6184e905a9b172fc72593935633be4c46
Status: Downloaded newer image for golang:1.10
--> 6f01f7e6ba0
Step 2/5 : WORKDIR /go/src/app
--> Running in 7294165f90bc
Removing intermediate container 7294165f90bc
--> 139d8a33da4
Step 3/5 : COPY source .
--> 47b62351f7f3
Step 4/5 : RUN go install -v
--> Running in 43c2fdaa8b38
app/vendor/golang.org/x/net/context
app/vendor/golang.org/x/net/context/ctxhttp
app/vendor/cloud.google.com/go/compute/metadata
app
Removing intermediate container 43c2fdaa8b38
--> 1bf5ff05174d
Step 5/5 : ENTRYPOINT ["app", "-single=true", "-port=8080"]
--> Running in fbe03a8ec8e9
Removing intermediate container fbe03a8ec8e9
--> 64019bc7eba9
Successfully built 64019bc7eba9
Successfully tagged valkyrie-app:v0.0.1
student_04_e310950b5213@cloudshell:~/valkyrie-app (qwiklabs-gcp-04-78fe4b032c99)$ cd ..
student_04_e310950b5213@cloudshell:~ (qwiklabs-gcp-04-78fe4b032c99)$ cd marking
student_04_e310950b5213@cloudshell:~/marking (qwiklabs-gcp-04-78fe4b032c99)$ ./step1.sh
Image exists
Go ahead and check the activity tracking on the lab page
student_04_e310950b5213@cloudshell:~/marking (qwiklabs-gcp-04-78fe4b032c99)$
```

Now, open app on port 8080.

Task 2: Test the created Docker image

```
Successfully tagged valkyrie-app:v0.0.1
student_04_e310950b5213@cloudshell:~/valkyrie-app (qwiklabs-gcp-04-78fe4b032c99)$ cd ..
student_04_e310950b5213@cloudshell:~ (qwiklabs-gcp-04-78fe4b032c99)$ cd marking
student_04_e310950b5213@cloudshell:~/marking (qwiklabs-gcp-04-78fe4b032c99)$ ./step1.sh
Image exists
Go ahead and check the activity tracking on the lab page
student_04_e310950b5213@cloudshell:~/marking (qwiklabs-gcp-04-78fe4b032c99)$ cd ..
student_04_e310950b5213@cloudshell:~ (qwiklabs-gcp-04-78fe4b032c99)$ cd valkyrie-app
student_04_e310950b5213@cloudshell:~/valkyrie-app (qwiklabs-gcp-04-78fe4b032c99)$ docker run -p 8080:8080 valkyrie-app:v0.0.1 &
[1] 1728
student_04_e310950b5213@cloudshell:~/valkyrie-app (qwiklabs-gcp-04-78fe4b032c99)$ cd ..
student_04_e310950b5213@cloudshell:~ (qwiklabs-gcp-04-78fe4b032c99)$ cd marking
student_04_e310950b5213@cloudshell:~/marking (qwiklabs-gcp-04-78fe4b032c99)$ ./step2.sh
No container running
2020/07/28 11:57:57 Operating in single mode...
Are you sure you ran the image?
student_04_e310950b5213@cloudshell:~/marking (qwiklabs-gcp-04-78fe4b032c99)$ ./step2.sh
Container running and visible on port 8080, good job!
Go ahead and check the activity tracking on the lab page
student_04_e310950b5213@cloudshell:~/marking (qwiklabs-gcp-04-78fe4b032c99)$
```

Task 3: Push the Docker image in the Google Container Repository

```
student_04_e310950b5213@cloudshell:~/marking (qwiklabs-gcp-04-78fe4b032c99)$ ./step2.sh
Container running and visible on port 8080, good job!
Go ahead and check the activity tracking on the lab page
student_04_e310950b5213@cloudshell:~/marking (qwiklabs-gcp-04-78fe4b032c99)$ cd ..
student_04_e310950b5213@cloudshell:~ (qwiklabs-gcp-04-78fe4b032c99)$ cd valkyrie-app
student_04_e310950b5213@cloudshell:~/valkyrie-app (qwiklabs-gcp-04-78fe4b032c99)$ docker tag valkyrie-app:v0.0.1 gcr.io/$G00GLE_CLOUD_PROJECT/valkyrie-app:v0.0.1
student_04_e310950b5213@cloudshell:~/valkyrie-app (qwiklabs-gcp-04-78fe4b032c99)$ docker push gcr.io/$G00GLE_CLOUD_PROJECT/valkyrie-app:v0.0.1
The push refers to repository [gcr.io/qwiklabs-gcp-04-78fe4b032c99/valkyrie-app]
26748add6922: Pushed
0c09504b0e4c: Pushed
eb8e267fbee1f: Pushed
7b9a9415b73a: Pushed
faef15440126: Pushed
77b4b6493272: Pushed
6257fa9f9597: Pushed
578414b39509: Pushed
abc3259a6c7f: Pushed
13d5529fd232: Pushed
v0.0.1: digest: sha256:bd987b9af722cbc8695745cfae599f41a4a3d37074152329e1726582ecb835d size: 2423
student_04_e310950b5213@cloudshell:~/valkyrie-app (qwiklabs-gcp-04-78fe4b032c99)$
```

Task 4: Create and expose a deployment in Kubernetes

```
13d5529fd232: Pushed
v0.0.1: digest: sha256:bd9876b9af722cbc8695745cfae599f41a4a3d37074152329e1726582ecb835d size: 2423
student_04_e310950b5213@cloudshell:~/valkyrie-app (qwiklabs-gcp-04-78fe4b032c99)$ sed -i s#IMAGE_HERE#gcr.io/$GOOGLE_CLOUD_PROJECT/valkyrie-app:v0.0.1#g k8s/deployment.yaml
student_04_e310950b5213@cloudshell:~/valkyrie-app (qwiklabs-gcp-04-78fe4b032c99)$ gcloud container clusters get-credentials valkyrie-dev --zone us-east1-d
Fetching cluster endpoint and auth data.
kubeconfig entry generated for valkyrie-dev.
student_04_e310950b5213@cloudshell:~/valkyrie-app (qwiklabs-gcp-04-78fe4b032c99)$ kubectl create -f k8s/deployment.yaml
deployment.extensions/valkyrie-dev created
student_04_e310950b5213@cloudshell:~/valkyrie-app (qwiklabs-gcp-04-78fe4b032c99)$ kubectl create -f k8s/service.yaml
service/valkyrie-dev created
student_04_e310950b5213@cloudshell:~/valkyrie-app (qwiklabs-gcp-04-78fe4b032c99)$ []
```

Note: It takes couple of minute to reflect the score for task 4 after, executing the commands

Task 5: Update the deployment with a new version of valkyrie-app

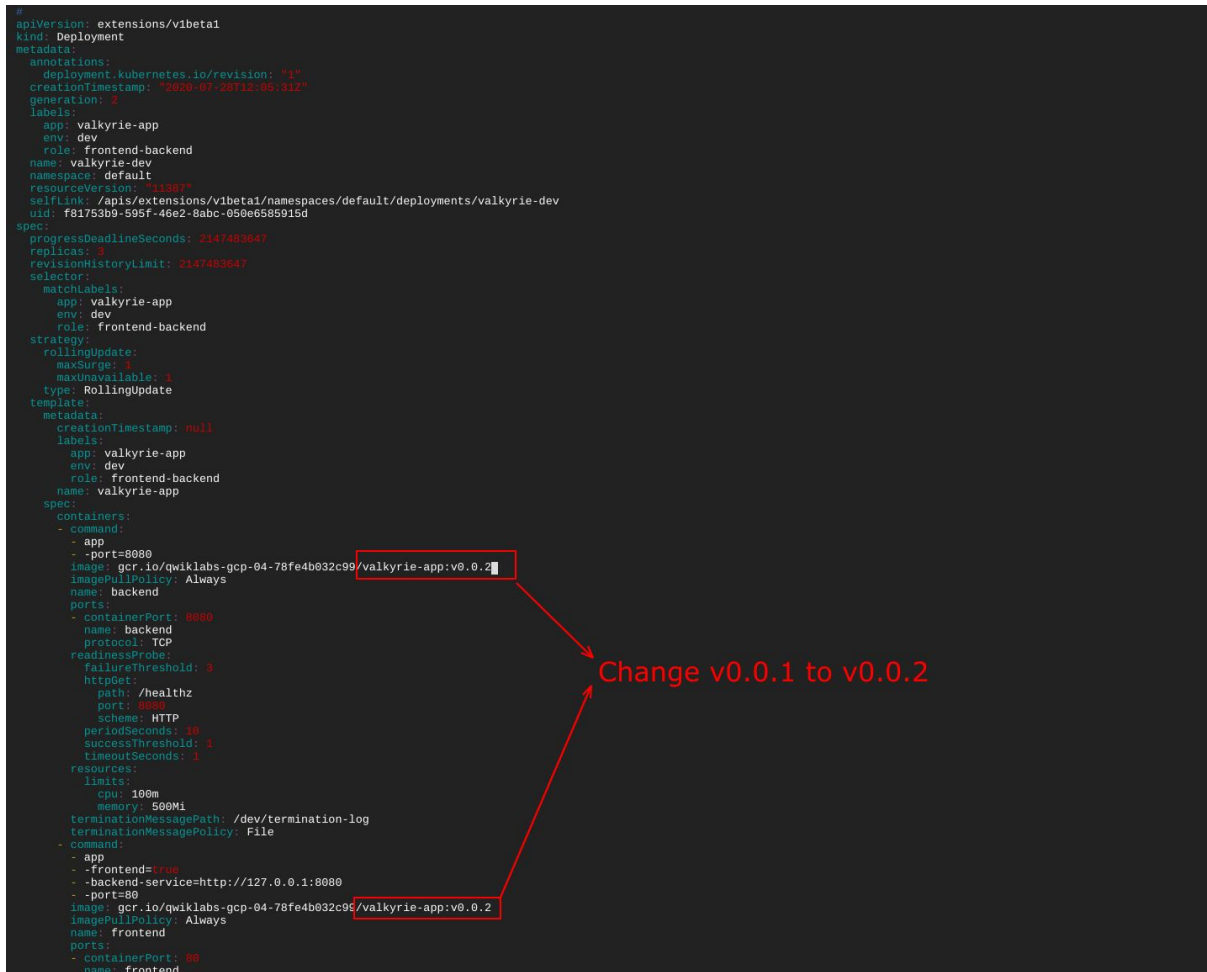
After command “kubectl edit deployment valkyrie-dev” edit referring below screenshot:

```
# Please edit the object below. Lines beginning with a '#' will be ignored,
# and an empty file will abort the edit. If an error occurs while saving this file will be
# reopened with the relevant failures.
#
apiVersion: extensions/v1beta1
kind: Deployment
metadata:
  annotations:
    deployment.kubernetes.io/revision: "1"
  creationTimestamp: "2020-07-28T12:05:31Z"
  generation: 1
  labels:
    app: valkyrie-app
    env: dev
    role: frontend-backend
  name: valkyrie-dev
  namespace: default
  resourceVersion: "8028"
  selfLink: /apis/extensions/v1beta1/namespaces/default/deployments/valkyrie-dev
  uid: f81753b9-595f-46e2-8abc-050e6585915d
spec:
  progressDeadlineSeconds: 2147483647
  replicas: 3
  revisionHistoryLimit: 2147483647
  selector:
    matchLabels:
      app: valkyrie-app
      env: dev
      role: frontend-backend
  strategy:
    rollingUpdate:
      maxSurge: 1
      maxUnavailable: 1
    type: RollingUpdate
  template:
    metadata:
      creationTimestamp: null
      labels:
        app: valkyrie-app
        env: dev
        role: frontend-backend
      name: valkyrie-app
    spec:
      containers:
        - command:
            - app
            - -port=8080
          image: gcr.io/qwiklabs-gcp-04-78fe4b032c99/valkyrie-app:v0.0.1
          imagePullPolicy: Always
          name: backend
          ports:
            - containerPort: 8080
              name: backend
              protocol: TCP
          readinessProbe:
            failureThreshold: 3
            httpGet:
              -- INSERT --
```

Change replica 1 to 3

After command “kubectl edit deployment valkyrie-dev”, edit referring below screenshot:

```
apiVersion: extensions/v1beta1
kind: Deployment
metadata:
  annotations:
    deployment.kubernetes.io/revision: "1"
    creationTimestamp: "2020-07-28T12:05:51Z"
    generation: 2
  labels:
    app: valkyrie-app
    env: dev
    role: frontend-backend
  name: valkyrie-dev
  namespace: default
  resourceVersion: "11387"
  selfLink: /apis/extensions/v1beta1/namespaces/default/deployments/valkyrie-dev
  uid: f81753b9-595f-46e2-8abc-050e6585915d
spec:
  progressDeadlineSeconds: 2147483647
  replicas: 3
  revisionHistoryLimit: 2147483647
  selector:
    matchLabels:
      app: valkyrie-app
      env: dev
      role: frontend-backend
  strategy:
    rollingUpdate:
      maxSurge: 1
      maxUnavailable: 1
      type: RollingUpdate
  template:
    metadata:
      creationTimestamp: null
      labels:
        app: valkyrie-app
        env: dev
        role: frontend-backend
      name: valkyrie-app
    spec:
      containers:
        - command:
            - app
            - -port=8080
          image: gcr.io/qwiklabs-gcp-04-78fe4b032c99/valkyrie-app:v0.0.2
          imagePullPolicy: Always
          name: backend
          ports:
            - containerPort: 8080
              name: backend
              protocol: TCP
          readinessProbe:
            failureThreshold: 3
            httpGet:
              path: /healthz
              port: 8080
              scheme: HTTP
            periodSeconds: 10
            successThreshold: 1
            timeoutSeconds: 1
          resources:
            limits:
              cpu: 100m
              memory: 500Mi
            terminationMessagePath: /dev/termination-log
            terminationMessagePolicy: File
        - command:
            - app
            - -frontend=dev
            - -backend-service=http://127.0.0.1:8080
            - -port=80
          image: gcr.io/qwiklabs-gcp-04-78fe4b032c99/valkyrie-app:v0.0.2
          imagePullPolicy: Always
          name: frontend
          ports:
            - containerPort: 80
              name: frontend
```



Task 6: Create a pipeline in Jenkins to deploy your app

CloudShell commands:

```
student_04_e31095b52130@cloudshell:~/valkyrie-app [qwiklabs-gcp-04-78fe4b032c99]$ docker ps
CONTAINER ID        IMAGE               COMMAND             CREATED             STATUS              PORTS              NAMES
516f039dcbcc5      valkyrie-app:v0.0.1 "app -single=true -p..." 47 minutes ago      Up 47 minutes      0.0.0.0:8080->8080/tcp   exciting_williamson
student_04_e31095b52130@cloudshell:~/valkyrie-app [qwiklabs-gcp-04-78fe4b032c99]$ docker kill 516f039dcbcc5
516f039dcbcc5
[1]+  Exit 137                  docker run -p 8080:8080 valkyrie-app:v0.0.1
student_04_e31095b52130@cloudshell:~/valkyrie-app [qwiklabs-gcp-04-78fe4b032c99]$ export POD_NAME=$(kubectl get pods --namespace default -l "app.kubernetes.io/component=jenkins-master" -l "app.kubernetes.io/instanceid" -o jsonpath="{.items[0].metadata.name}")
student_04_e31095b52130@cloudshell:~/valkyrie-app [qwiklabs-gcp-04-78fe4b032c99]$ kubectl port-forward $POD_NAME 8080:8080 >> /dev/null &
[1] 2822
student_04_e31095b52130@cloudshell:~/valkyrie-app [qwiklabs-gcp-04-78fe4b032c99]$ printf $(kubectl get secret cd-jenkins -o jsonpath="{.data.jenkins-admin-password}" | base64 --decode);echo
ket2b8u0pa
student_04_e31095b52130@cloudshell:~/valkyrie-app [qwiklabs-gcp-04-78fe4b032c99]$ gcloud source repos list
#POD_NAME      #PROJ_ID      URL
valkyrie-app   qwiklabs-gcp-04-78fe4b032c99 https://source.developers.google.com/p/qwiklabs-gcp-04-78fe4b032c99/r/valkyrie-app
student_04_e31095b52130@cloudshell:~/valkyrie-app [qwiklabs-gcp-04-78fe4b032c99]$ sed -i 's/green/orange/g' source/html.go
student_04_e31095b52130@cloudshell:~/valkyrie-app [qwiklabs-gcp-04-78fe4b032c99]$ sed -i 's/YOUR_PROJECT/3009612-CLLOUD_PROJECT/g' Jenkinsfile
student_04_e31095b52130@cloudshell:~/valkyrie-app [qwiklabs-gcp-04-78fe4b032c99]$ git config --global user.email "you@example.com"
student_04_e31095b52130@cloudshell:~/valkyrie-app [qwiklabs-gcp-04-78fe4b032c99]$ git config --global user.name "student"
student_04_e31095b52130@cloudshell:~/valkyrie-app [qwiklabs-gcp-04-78fe4b032c99]$ git add .
student_04_e31095b52130@cloudshell:~/valkyrie-app [qwiklabs-gcp-04-78fe4b032c99]$ git commit -m "build pipeline init"
[master 9b757f0] build pipeline init
4 files changed, 10 insertions(+), 5 deletions(-)
create mode 100644 Dockerfile
student_04_e31095b52130@cloudshell:~/valkyrie-app [qwiklabs-gcp-04-78fe4b032c99]$ git push
Enumerating objects: 14, done.
Counting objects: 100% (14/14), done.
Delta compression using up to 2 threads
Compressing objects: 100% (8/8), done.
Writing objects: 100% (8/8), 837 bytes | 279.00 KiB/s, done.
Total 8 (delta 4), reused 0 (delta 0)
remote: Resolving deltas: 100% (4/4)
To https://source.developers.google.com/p/qwiklabs-gcp-04-78fe4b032c99/r/valkyrie-app
dec826c..9b757f0 master -> master
student_04_e31095b52130@cloudshell:~/valkyrie-app [qwiklabs-gcp-04-78fe4b032c99]$
```

Login to Jenkins:



Welcome to Jenkins!

Deploy to Kubernetes in Google Cloud Platform | Manage Jenkins [Jenkins] | Frontend Web Server | Frontend Web Server

8080-dot-13415053-dot-devshell.appspot.com/manage

Jenkins

search

admin log out

New Item
People
Build History
Manage Jenkins
My Views
Lockable Resources
New View

Build Queue
No builds in the queue.

Build Executor Status
master

Manage Jenkins

It appears that your reverse proxy set up is broken. [More info](#) [Dismiss](#)

System Configuration

- Configure System**
Configure global settings and paths.
- Global Tool Configuration**
Configure tools, their locations and automatic installers.
- Manage Plugins**
Add, remove, disable or enable plugins that can extend the functionality of Jenkins.
There are updates available
- Manage Nodes and Clouds**
Add, remove, control and monitor the various nodes that Jenkins runs jobs on.

Security

- Configure Global Security**
Secure Jenkins; define who is allowed to access/use the system.
- Manage Credentials**
Configure credentials
- Configure Credential Providers**
Configure the credential providers and types

Status Information

- System Information**
Displays various environmental information to assist trouble-shooting.
- System Log**
System log captures output from java.util.logging output related to Jenkins.
- Load Statistics**
Check your resource utilization and see if you need more computers for your builds.
- About Jenkins**
See the version and license information.

Troubleshooting


- Manage Old Data**
Scrub configuration files to remove remnants from old plugins and earlier versions.

←

→


↺


8080-dot-13415053-dot-devshell.appspot.com/credentials/


 **Jenkins**


Jenkins


Credentials


 New Item


 People

 Build History

 Manage Jenkins

 My Views

 Lockable Resources


 New View

Build Queue

No builds in the queue.

Build Executor Status

master

 **Credentials**

T

P

Store ↓

Domain


Icon: [S](#) [M](#) [L](#)


Stores scoped to Jenkins


P

Store ↓

Domains

 Jenkins ▼

 (global)


 **Jenkins**


Jenkins


Credentials

System

Global credentials (unrestricted)

 Back to credential domains


 Add Credentials

 **Global credentials (unrestricted)**

Credentials that should be available irrespective of domain specification to requirements matching.

ID	Name	Kind	Description
This credential domain is empty. How about adding some credentials?			

Icon: [S](#) [M](#) [L](#)


 **Jenkins**


Jenkins

Credentials

System

Global credentials (unrestricted)

 Back to credential domains

 Add Credentials

Kind

Google Service Account from metadata

Project Name

qwiklabs-gcp-04-78fe4b032c99

NOTE: This instance is limited to accessing:

- <https://www.googleapis.com/auth/cloud-platform>
- https://www.googleapis.com/auth/source.read_write

OK

Click jenkins (top left)

Click new item

Jenkins

search

admin

Jenkins > All >

Enter an item name

valkyrie-app

» Required field

- Freestyle project**
This is the central feature of Jenkins. Jenkins will build your project, combining any SCM with any build system, and this can be even used for something other than software build.
- Pipeline**
Orchestrates long-running activities that can span multiple build agents. Suitable for building pipelines (formerly known as workflows) and/or organizing complex activities that do not easily fit in free-style job type.
- Multi-configuration project**
Suitable for projects that need a large number of different configurations, such as testing on multiple environments, platform-specific builds, etc.
- Folder**
Creates a container that stores nested items in it. Useful for grouping things together. Unlike view, which is just a filter, a folder creates a separate namespace, so you can have multiple things of the same name as long as they are in different folders.
- Multibranch Pipeline**
Creates a set of Pipeline projects according to detected branches in one SCM repository.

OK

enter valkyrie-app

click pipeline

click ok

select pipeline script from SCM

Set SCM to Git

Add the source code repo (find it using gcloud source repos list)

Set credentials to qwiklabs-...

Click save

Pipeline

Definition

SCM

Repositories

Repository URL

Credentials

Branches to build

Branch Specifier (blank for 'any')

Repository browser

Additional Behaviours

Return to Cloud shell, and run following commands:

Change color

```
sed -i "s/green/orange/g" source/html.go
```

Update project in Jenkinsfile

```
sed -i "s/YOUR_PROJECT/$GOOGLE_CLOUD_PROJECT/g" Jenkinsfile
```

```
git config --global user.email "you@example.com"
```

```
git config --global user.name "student"
```

```
git add .
```

```
git commit -m "build pipeline init"
```

```
git push
```


Now return to Jenkins console

Pipeline valkyrie-app

Return to this page, and click "Build Now"

Stage View

Declarative: Checkout SCM	Test	Build and push image with Container Builder	Deploy
23s	8s	50s	23s

Average stage times:
(Average full run time: ~5min 4s)

Build History

find X

#1 Jul 28, 2020 1:10 PM

Atom feed for all Atom feed for failures

Permalinks

Once done, wait until the Build Completes

Hurray! Now check for full scores!

Deploy to Kubernetes in Google Cloud: Challenge Lab

1 hour 9 Credits  [Rate Lab](#)

GSP318



Score 100/100	Create a Docker image and store the Dockerfile	Run Step	10 / 10
	Test the created Docker image	Run Step	10 / 10
	Push the Docker image in the Google Container Repository	Run Step	10 / 10
	Create and expose a deployment in Kubernetes	Run Step	20 / 20
	Increase the replicas from 1 to 3	Run Step	10 / 10
	Update the deployment with a new version of valkyrie-app	Run Step	20 / 20
	Create a pipeline in Jenkins to deploy your app	Run Step	20 / 20
	store the Dockerfile		
	Task 2: Test the created Docker image		