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Developer Operations

Exercise #9

24-MAR-2023

1. Step 1 involves two (2) tests; below I submit 1 pipeline and console log output per test with additional screenshots.

**Test #1:**

Before delivery…I already have 2 replicas in staging…shown below…

Text

Description automatically generated

Now I will update to 3 and push to my feature branch…

Text

Description automatically generated

I made a pull request and verified it in Github…

Graphical user interface, text, application, email

Description automatically generated

…ok I’m on a Windows 11 temp machine, had to get sidecar running…and now I’m getting PR triggers…

**“kubectl get pods” shows the number of replicas changes:**

Text

Description automatically generated

**Jenkins Pipeline:**

podTemplate(yaml: '''

apiVersion: v1

kind: Pod

spec:

containers:

- name: gradle

image: gradle:8-jdk8

command:

- sleep

args:

- 99d

volumeMounts:

- name: shared-storage

mountPath: /mnt

- name: centos

image: centos

command:

- sleep

args:

- 99d

restartPolicy: Never

volumes:

- name: shared-storage

persistentVolumeClaim:

claimName: jenkins-pv-claim

- name: kaniko-secret

secret:

secretName: dockercred

items:

- key: .dockerconfigjson

path: config.json

''') {

node(POD\_LABEL) {

stage('k8s') {

git branch: env.BRANCH\_NAME, url: 'https://github.com/bsieraduml/week9.git'

container('centos') {

stage('rolling update calculator') {

sh '''

curl -LO "https://dl.k8s.io/release/$(curl -L -s https://dl.k8s.io/release/stable.txt)/bin/linux/amd64/kubectl"

chmod +x ./kubectl

./kubectl apply -f calculator.yaml -n staging

./kubectl apply -f hazelcast.yaml -n staging

'''

}

}

}

} // NODE pod label

} //root

**Console Log Output:**

Pull request #3 closed

00:06:08 Connecting to [https://api.github.com](https://api.github.com/) using bsieraduml/\*\*\*\*\*\*

Obtained Jenkinsfile from 628466c5094dd2288ae8e9cb324de68ee5a7c828

[Pipeline] Start of Pipeline

[Pipeline] podTemplate

[Pipeline] {

[Pipeline] node

Created Pod: kubernetes devops-tools/week9-exercise1-feaex1-3-m8q8p-9j005-z6qqz

Still waiting to schedule task

‘[week9-exercise1-feaex1-3-m8q8p-9j005-z6qqz](http://localhost:32000/computer/week9-exercise1-feaex1-3-m8q8p-9j005-z6qqz/)’ is offline

Agent [week9-exercise1-feaex1-3-m8q8p-9j005-z6qqz](http://localhost:32000/computer/week9-exercise1-feaex1-3-m8q8p-9j005-z6qqz) is provisioned from template week9\_exercise1\_feaEx1\_3-m8q8p-9j005

---

apiVersion: "v1"

kind: "Pod"

metadata:

annotations:

buildUrl: "<http://jenkins-service.devops-tools.svc.cluster.local:8080/job/week9_exercise1/job/feaEx1/3/>"

runUrl: "job/week9\_exercise1/job/feaEx1/3/"

labels:

jenkins: "agent"

jenkins/label-digest: "8ff714f3394fd0a7bdde17d378eff96e1f897ada"

jenkins/label: "week9\_exercise1\_feaEx1\_3-m8q8p"

name: "week9-exercise1-feaex1-3-m8q8p-9j005-z6qqz"

namespace: "devops-tools"

spec:

containers:

- args:

- "99d"

command:

- "sleep"

image: "gradle:8-jdk8"

name: "gradle"

volumeMounts:

- mountPath: "/mnt"

name: "shared-storage"

- mountPath: "/home/jenkins/agent"

name: "workspace-volume"

readOnly: false

- args:

- "99d"

command:

- "sleep"

image: "centos"

name: "centos"

volumeMounts:

- mountPath: "/home/jenkins/agent"

name: "workspace-volume"

readOnly: false

- env:

- name: "JENKINS\_SECRET"

value: "\*\*\*\*\*\*\*\*"

- name: "JENKINS\_AGENT\_NAME"

value: "week9-exercise1-feaex1-3-m8q8p-9j005-z6qqz"

- name: "JENKINS\_NAME"

value: "week9-exercise1-feaex1-3-m8q8p-9j005-z6qqz"

- name: "JENKINS\_AGENT\_WORKDIR"

value: "/home/jenkins/agent"

- name: "JENKINS\_URL"

value: "<http://jenkins-service.devops-tools.svc.cluster.local:8080/>"

image: "jenkins/inbound-agent:3107.v665000b\_51092-4"

name: "jnlp"

resources:

requests:

memory: "256Mi"

cpu: "100m"

volumeMounts:

- mountPath: "/home/jenkins/agent"

name: "workspace-volume"

readOnly: false

nodeSelector:

kubernetes.io/os: "linux"

restartPolicy: "Never"

volumes:

- name: "kaniko-secret"

secret:

items:

- key: ".dockerconfigjson"

path: "config.json"

secretName: "dockercred"

- emptyDir:

medium: ""

name: "workspace-volume"

- name: "shared-storage"

persistentVolumeClaim:

claimName: "jenkins-pv-claim"

Running on [week9-exercise1-feaex1-3-m8q8p-9j005-z6qqz](http://localhost:32000/computer/week9-exercise1-feaex1-3-m8q8p-9j005-z6qqz/) in /home/jenkins/agent/workspace/week9\_exercise1\_feaEx1

[Pipeline] {

[Pipeline] stage

[Pipeline] { (k8s)

[Pipeline] git

The recommended git tool is: NONE

No credentials specified

Cloning the remote Git repository

Cloning repository <https://github.com/bsieraduml/week9.git>

> git init /home/jenkins/agent/workspace/week9\_exercise1\_feaEx1 # timeout=10

Fetching upstream changes from <https://github.com/bsieraduml/week9.git>

> git --version # timeout=10

> git --version # 'git version 2.30.2'

> git fetch --tags --force --progress -- <https://github.com/bsieraduml/week9.git> +refs/heads/\*:refs/remotes/origin/\* # timeout=10

> git config remote.origin.url <https://github.com/bsieraduml/week9.git> # timeout=10

> git config --add remote.origin.fetch +refs/heads/\*:refs/remotes/origin/\* # timeout=10

Avoid second fetch

Checking out Revision 628466c5094dd2288ae8e9cb324de68ee5a7c828 (refs/remotes/origin/feaEx1)

> git rev-parse refs/remotes/origin/feaEx1^{commit} # timeout=10

> git config core.sparsecheckout # timeout=10

> git checkout -f 628466c5094dd2288ae8e9cb324de68ee5a7c828 # timeout=10

> git branch -a -v --no-abbrev # timeout=10

> git checkout -b feaEx1 628466c5094dd2288ae8e9cb324de68ee5a7c828 # timeout=10

Commit message: "fix file"

First time build. Skipping changelog.

[Pipeline] container

[Pipeline] {

[Pipeline] stage

[Pipeline] { (rolling update calculator)

[Pipeline] sh

++ curl -L -s <https://dl.k8s.io/release/stable.txt>

+ curl -LO <https://dl.k8s.io/release/v1.26.3/bin/linux/amd64/kubectl>

% Total % Received % Xferd Average Speed Time Time Time Current

Dload Upload Total Spent Left Speed

0 0 0 0 0 0 0 0 --:--:-- --:--:-- --:--:-- 0

0 0 0 0 0 0 0 0 --:--:-- --:--:-- --:--:-- 0

100 138 100 138 0 0 346 0 --:--:-- --:--:-- --:--:-- 345

5 45.8M 5 2798k 0 0 2181k 0 0:00:21 0:00:01 0:00:20 2181k

15 45.8M 15 7183k 0 0 3154k 0 0:00:14 0:00:02 0:00:12 4411k

24 45.8M 24 11.2M 0 0 3525k 0 0:00:13 0:00:03 0:00:10 4389k

34 45.8M 34 15.6M 0 0 3737k 0 0:00:12 0:00:04 0:00:08 4403k

43 45.8M 43 19.8M 0 0 3846k 0 0:00:12 0:00:05 0:00:07 4381k

50 45.8M 50 23.3M 0 0 3810k 0 0:00:12 0:00:06 0:00:06 4228k

59 45.8M 59 27.4M 0 0 3857k 0 0:00:12 0:00:07 0:00:05 4178k

68 45.8M 68 31.4M 0 0 3895k 0 0:00:12 0:00:08 0:00:04 4137k

77 45.8M 77 35.6M 0 0 3931k 0 0:00:11 0:00:09 0:00:02 4098k

86 45.8M 86 39.5M 0 0 3936k 0 0:00:11 0:00:10 0:00:01 4032k

95 45.8M 95 43.8M 0 0 3985k 0 0:00:11 0:00:11 --:--:-- 4204k

100 45.8M 100 45.8M 0 0 3989k 0 0:00:11 0:00:11 --:--:-- 4203k

+ chmod +x ./kubectl

+ ./kubectl apply -f calculator.yaml -n staging

deployment.apps/calculator-deployment configured

service/calculator-service unchanged

+ ./kubectl apply -f hazelcast.yaml -n staging

deployment.apps/hazelcast unchanged

service/hazelcast unchanged

[Pipeline] }

[Pipeline] // stage

[Pipeline] }

[Pipeline] // container

[Pipeline] }

[Pipeline] // stage

[Pipeline] }

[Pipeline] // node

[Pipeline] }

[Pipeline] // podTemplate

[Pipeline] End of Pipeline

Could not update commit status, please check if your scan credentials belong to a member of the organization or a collaborator of the repository and repo:status scope is selected

GitHub has been notified of this commit’s build result

Finished: SUCCESS

**Test #2:**

**Jenkins Pipeline:**

podTemplate(yaml: '''

apiVersion: v1

kind: Pod

spec:

containers:

- name: gradle

image: gradle:8-jdk8

command:

- sleep

args:

- 99d

volumeMounts:

- name: shared-storage

mountPath: /mnt

- name: centos

image: centos

command:

- sleep

args:

- 99d

restartPolicy: Never

volumes:

- name: shared-storage

persistentVolumeClaim:

claimName: jenkins-pv-claim

- name: kaniko-secret

secret:

secretName: dockercred

items:

- key: .dockerconfigjson

path: config.json

''') {

node(POD\_LABEL) {

stage('k8s') {

git branch: env.BRANCH\_NAME, url: 'https://github.com/bsieraduml/week9.git'

container('centos') {

stage('rolling update calculator') {

sh '''

curl -LO "https://dl.k8s.io/release/$(curl -L -s https://dl.k8s.io/release/stable.txt)/bin/linux/amd64/kubectl"

chmod +x ./kubectl

echo 'week 9 exercise 1 part 2 a - test sum and div with first image'

./kubectl delete deployment calculator-deployment -n staging

./kubectl apply -f calculator.yaml -n staging

./kubectl apply -f hazelcast.yaml -n staging

echo 'after deployment sleep 30 seconds'

sleep 30

test $(curl calculator-service.staging.svc.cluster.local:8080/sum?a=10\\&b=2) -eq 12 && echo 'sum passes' || echo 'sum fails'

test $(curl calculator-service.staging.svc.cluster.local:8080/div?a=10\\&b=2) -eq 5 && echo 'div passes' || echo 'div fails'

echo 'week 9 exercise 1 part 2 b - test sum and div with second image'

./kubectl delete deployment calculator-deployment -n staging

./kubectl apply -f calculator2.yaml -n staging

echo 'after deployment sleep 30 seconds'

sleep 30

test $(curl calculator-service.staging.svc.cluster.local:8080/sum?a=10\\&b=2) -eq 12 && echo 'sum passes' || echo 'sum fails'

test $(curl calculator-service.staging.svc.cluster.local:8080/div?a=10\\&b=2) -eq 5 && echo 'div passes' || echo 'div fails'

'''

}

}

}

} // NODE pod label

} //root

**Console Log Output:**

Push event to branch feaEx1

23:10:41 Connecting to [https://api.github.com](https://api.github.com/) using bsieraduml/\*\*\*\*\*\*

23:10:41 GitHub throttling is disabled, which is not allowed for public GitHub usage, so ThrottleOnOver will be used instead. To configure a different rate limiting strategy, go to "GitHub API usage" under "Configure System" in the Jenkins settings.

Obtained Jenkinsfile from 9de688a42b0ce2b12e4facded94f0d7a81f24414

[Pipeline] Start of Pipeline

[Pipeline] podTemplate

[Pipeline] {

[Pipeline] node

Created Pod: kubernetes devops-tools/week9-exercise1-feaex1-13-cj128-r2b4k-0wfbm

Still waiting to schedule task

‘[week9-exercise1-feaex1-13-cj128-r2b4k-0wfbm](http://localhost:32000/computer/week9-exercise1-feaex1-13-cj128-r2b4k-0wfbm/)’ is offline

Agent [week9-exercise1-feaex1-13-cj128-r2b4k-0wfbm](http://localhost:32000/computer/week9-exercise1-feaex1-13-cj128-r2b4k-0wfbm) is provisioned from template week9\_exercise1\_feaEx1\_13-cj128-r2b4k

---

apiVersion: "v1"

kind: "Pod"

metadata:

annotations:

buildUrl: "<http://jenkins-service.devops-tools.svc.cluster.local:8080/job/week9_exercise1/job/feaEx1/13/>"

runUrl: "job/week9\_exercise1/job/feaEx1/13/"

labels:

jenkins: "agent"

jenkins/label-digest: "9bd48a6f00843e5435d11d9e7476190b8a6d7f76"

jenkins/label: "week9\_exercise1\_feaEx1\_13-cj128"

name: "week9-exercise1-feaex1-13-cj128-r2b4k-0wfbm"

namespace: "devops-tools"

spec:

containers:

- args:

- "99d"

command:

- "sleep"

image: "gradle:8-jdk8"

name: "gradle"

volumeMounts:

- mountPath: "/mnt"

name: "shared-storage"

- mountPath: "/home/jenkins/agent"

name: "workspace-volume"

readOnly: false

- args:

- "99d"

command:

- "sleep"

image: "centos"

name: "centos"

volumeMounts:

- mountPath: "/home/jenkins/agent"

name: "workspace-volume"

readOnly: false

- env:

- name: "JENKINS\_SECRET"

value: "\*\*\*\*\*\*\*\*"

- name: "JENKINS\_AGENT\_NAME"

value: "week9-exercise1-feaex1-13-cj128-r2b4k-0wfbm"

- name: "JENKINS\_NAME"

value: "week9-exercise1-feaex1-13-cj128-r2b4k-0wfbm"

- name: "JENKINS\_AGENT\_WORKDIR"

value: "/home/jenkins/agent"

- name: "JENKINS\_URL"

value: "<http://jenkins-service.devops-tools.svc.cluster.local:8080/>"

image: "jenkins/inbound-agent:3107.v665000b\_51092-4"

name: "jnlp"

resources:

requests:

memory: "256Mi"

cpu: "100m"

volumeMounts:

- mountPath: "/home/jenkins/agent"

name: "workspace-volume"

readOnly: false

nodeSelector:

kubernetes.io/os: "linux"

restartPolicy: "Never"

volumes:

- name: "kaniko-secret"

secret:

items:

- key: ".dockerconfigjson"

path: "config.json"

secretName: "dockercred"

- emptyDir:

medium: ""

name: "workspace-volume"

- name: "shared-storage"

persistentVolumeClaim:

claimName: "jenkins-pv-claim"

Running on [week9-exercise1-feaex1-13-cj128-r2b4k-0wfbm](http://localhost:32000/computer/week9-exercise1-feaex1-13-cj128-r2b4k-0wfbm/) in /home/jenkins/agent/workspace/week9\_exercise1\_feaEx1

[Pipeline] {

[Pipeline] stage

[Pipeline] { (k8s)

[Pipeline] git

The recommended git tool is: NONE

No credentials specified

Cloning the remote Git repository

Cloning repository <https://github.com/bsieraduml/week9.git>

> git init /home/jenkins/agent/workspace/week9\_exercise1\_feaEx1 # timeout=10

Fetching upstream changes from <https://github.com/bsieraduml/week9.git>

> git --version # timeout=10

> git --version # 'git version 2.30.2'

> git fetch --tags --force --progress -- <https://github.com/bsieraduml/week9.git> +refs/heads/\*:refs/remotes/origin/\* # timeout=10

> git config remote.origin.url <https://github.com/bsieraduml/week9.git> # timeout=10

> git config --add remote.origin.fetch +refs/heads/\*:refs/remotes/origin/\* # timeout=10

Avoid second fetch

Checking out Revision 9de688a42b0ce2b12e4facded94f0d7a81f24414 (refs/remotes/origin/feaEx1)

> git rev-parse refs/remotes/origin/feaEx1^{commit} # timeout=10

> git config core.sparsecheckout # timeout=10

> git checkout -f 9de688a42b0ce2b12e4facded94f0d7a81f24414 # timeout=10

> git branch -a -v --no-abbrev # timeout=10

> git checkout -b feaEx1 9de688a42b0ce2b12e4facded94f0d7a81f24414 # timeout=10

Commit message: "add sleep 30 after deployment"

> git rev-list --no-walk 7db5274012695485608f082052be4b33d17f56f3 # timeout=10

[Pipeline] container

[Pipeline] {

[Pipeline] stage

[Pipeline] { (rolling update calculator)

[Pipeline] sh

++ curl -L -s <https://dl.k8s.io/release/stable.txt>

+ curl -LO <https://dl.k8s.io/release/v1.26.3/bin/linux/amd64/kubectl>

% Total % Received % Xferd Average Speed Time Time Time Current

Dload Upload Total Spent Left Speed

0 0 0 0 0 0 0 0 --:--:-- --:--:-- --:--:-- 0

100 138 100 138 0 0 951 0 --:--:-- --:--:-- --:--:-- 958

0 0 0 0 0 0 0 0 --:--:-- --:--:-- --:--:-- 0

7 45.8M 7 3342k 0 0 2873k 0 0:00:16 0:00:01 0:00:15 3345k

14 45.8M 14 6605k 0 0 3038k 0 0:00:15 0:00:02 0:00:13 3286k

21 45.8M 21 9903k 0 0 3131k 0 0:00:14 0:00:03 0:00:11 3302k

28 45.8M 28 13.1M 0 0 3243k 0 0:00:14 0:00:04 0:00:10 3376k

35 45.8M 35 16.4M 0 0 3249k 0 0:00:14 0:00:05 0:00:09 3356k

43 45.8M 43 19.7M 0 0 3272k 0 0:00:14 0:00:06 0:00:08 3365k

50 45.8M 50 22.9M 0 0 3287k 0 0:00:14 0:00:07 0:00:07 3396k

57 45.8M 57 26.2M 0 0 3292k 0 0:00:14 0:00:08 0:00:06 3395k

65 45.8M 65 29.7M 0 0 3324k 0 0:00:14 0:00:09 0:00:05 3391k

72 45.8M 72 33.1M 0 0 3337k 0 0:00:14 0:00:10 0:00:04 3428k

78 45.8M 78 36.1M 0 0 3316k 0 0:00:14 0:00:11 0:00:03 3371k

85 45.8M 85 39.3M 0 0 3310k 0 0:00:14 0:00:12 0:00:02 3343k

93 45.8M 93 42.6M 0 0 3317k 0 0:00:14 0:00:13 0:00:01 3356k

100 45.8M 100 45.8M 0 0 3331k 0 0:00:14 0:00:14 --:--:-- 3344k

+ chmod +x ./kubectl

+ echo 'week 9 exercise 1 part 2 a - test sum and div with first image'

week 9 exercise 1 part 2 a - test sum and div with first image

+ ./kubectl delete deployment calculator-deployment -n staging

deployment.apps "calculator-deployment" deleted

+ ./kubectl apply -f calculator.yaml -n staging

deployment.apps/calculator-deployment created

service/calculator-service unchanged

+ ./kubectl apply -f hazelcast.yaml -n staging

deployment.apps/hazelcast unchanged

service/hazelcast unchanged

+ echo 'after deployment sleep 30 seconds'

after deployment sleep 30 seconds

+ sleep 30

++ curl 'calculator-service.staging.svc.cluster.local:8080/sum?a=10&b=2'

% Total % Received % Xferd Average Speed Time Time Time Current

Dload Upload Total Spent Left Speed

0 0 0 0 0 0 0 0 --:--:-- --:--:-- --:--:-- 0

100 2 100 2 0 0 3 0 --:--:-- --:--:-- --:--:-- 3

100 2 100 2 0 0 3 0 --:--:-- --:--:-- --:--:-- 3

+ test 12 -eq 12

+ echo 'sum passes'

sum passes

++ curl 'calculator-service.staging.svc.cluster.local:8080/div?a=10&b=2'

% Total % Received % Xferd Average Speed Time Time Time Current

Dload Upload Total Spent Left Speed

0 0 0 0 0 0 0 0 --:--:-- --:--:-- --:--:-- 0

100 124 0 124 0 0 253 0 --:--:-- --:--:-- --:--:-- 253

+ test '{"timestamp":"2023-03-24T23:12:15.424+0000","status":404,"error":"Not' 'Found","message":"No' message 'available","path":"/div"}' -eq 5

/home/jenkins/agent/workspace/week9\_exercise1\_feaEx1@tmp/durable-238ab489/script.sh: line 12: test: too many arguments

+ echo 'div fails'

div fails

+ echo 'week 9 exercise 1 part 2 b - test sum and div with second image'

week 9 exercise 1 part 2 b - test sum and div with second image

+ ./kubectl delete deployment calculator-deployment -n staging

deployment.apps "calculator-deployment" deleted

+ ./kubectl apply -f calculator2.yaml -n staging

deployment.apps/calculator-deployment created

service/calculator-service unchanged

+ echo 'after deployment sleep 30 seconds'

after deployment sleep 30 seconds

+ sleep 30

++ curl 'calculator-service.staging.svc.cluster.local:8080/sum?a=10&b=2'

% Total % Received % Xferd Average Speed Time Time Time Current

Dload Upload Total Spent Left Speed

0 0 0 0 0 0 0 0 --:--:-- --:--:-- --:--:-- 0

100 2 100 2 0 0 3 0 --:--:-- --:--:-- --:--:-- 3

100 2 100 2 0 0 3 0 --:--:-- --:--:-- --:--:-- 3

+ test 12 -eq 12

+ echo 'sum passes'

sum passes

++ curl 'calculator-service.staging.svc.cluster.local:8080/div?a=10&b=2'

% Total % Received % Xferd Average Speed Time Time Time Current

Dload Upload Total Spent Left Speed

0 0 0 0 0 0 0 0 --:--:-- --:--:-- --:--:-- 0

100 1 100 1 0 0 41 0 --:--:-- --:--:-- --:--:-- 41

+ test 5 -eq 5

+ echo 'div passes'

div passes

[Pipeline] }

[Pipeline] // stage

[Pipeline] }

[Pipeline] // container

[Pipeline] }

[Pipeline] // stage

[Pipeline] }

[Pipeline] // node

[Pipeline] }

[Pipeline] // podTemplate

[Pipeline] End of Pipeline

Could not update commit status, please check if your scan credentials belong to a member of the organization or a collaborator of the repository and repo:status scope is selected

GitHub has been notified of this commit’s build result

Finished: SUCCESS

**Describe your solution, including any problems you find and how you fixed them.**

In test one, I demonstrated I’m able to modify a deployment by updating my \*.yaml file and applying it in my pipeline (where I changed the replica count from 2 to 3). The only problem I had was getting my pull requests in github to trigger my Jenkins instance (I forgot to install sidecar on the borrowed Windows 11 machine last week as I was having issues with my Apple M1 arm64 machine). Once that was in place, I began to receive callbacks in Jenkins from github. In test two, I followed a pattern of: tear down, deploy, sleep, and test for two different calculator images. The first calculator image (dlambrig/hello-kaniko:0.5) only had the sum service (not the div service). The second calculator image (dlambrig/week8:1.1) has both the sum and div services. In my console log output, we can see the both images passed my curl test for the sum service, but the first image failed (404 not found) on the div service. Both tests passed with the second image. I was planning to try and use arguments with my deployment yaml file (so I could dynamically change the image source name) but I didn’t find it easy to implement. I ended up using two distinct yaml files (you can see this in my second Jenkinsfile) where each yaml file defines at different calculator image source. The biggest problem I had with this test was related to github callbacks and Jenkins making me wait 45 minutes many times (and I’m not making many PR requests).

1. **Pipeline deploying to ‘production’ in Google’s cloud.**