Practical – 8

Aim: Implement Kubernetes Cluster.

Theory:

Kubernetes is an open-source container orchestration framework which was built upon the learnings of Google. It enables you to run applications using containers in a production ready-cluster. Kubernetes has many moving parts and there are countless ways to configure its pieces - from the various system components, network transport drivers, CLI utilities not to mention applications and workloads.
Kubernetes provides you with:

Service discovery and load balancing
Kubernetes can expose a container using the DNS name or using their own IP address. If traffic to a container is high, Kubernetes is able to load balance and distribute the network traffic so that the deployment is stable.

Storage orchestration
Kubernetes allows you to automatically mount a storage system of your choice, such as local storages, public cloud providers, and more.

Automated rollouts and rollbacks
You can describe the desired state for your deployed containers using Kubernetes, and it can change the actual state to the desired state at a controlled rate. For example, you can automate Kubernetes to create new containers for your deployment, remove existing containers and adopt all their resources to the new container.

Automatic bin packing
Kubernetes allows you to specify how much CPU and memory (RAM) each container needs. When containers have resource requests specified, Kubernetes can make better decisions to manage the resources for containers.

Self-healing
Kubernetes restarts containers that fail, replaces containers, kills containers that don't respond to your user-defined health check, and doesn't advertise them to clients until they are ready to serve.

Secret and configuration management
Kubernetes lets you store and manage sensitive information, such as passwords, OAuth tokens, and ssh keys. You can deploy and update secrets and application configuration without rebuilding your container images, and without exposing secrets in your stack configuration.

Output:

List Active Account:

```
google5202571_student@cloudshell:~ (qwiklabs-gcp-64269ed6736cecee)$ gcloud auth list
            Credentialed Accounts
ACTIVE  ACCOUNT
*       google5202571_student@qwiklabs.net

To set the active account, run:
    $ gcloud config set account `ACCOUNT`

google5202571_student@cloudshell:~ (qwiklabs-gcp-64269ed6736cecee)$ gcloud config list project
[core]
project = qwiklabs-gcp-64269ed6736cecee

Your active configuration is: [cloudshell-540]
google5202571_student@cloudshell:~ (qwiklabs-gcp-64269ed6736cecee)$ []
```

Setup Environment:

```
google5202571_student@cloudshell:~ (qwiklabs-gcp-64269ed6736cecee)$ gcloud config set compute/zone us-central1-f
Updated property [compute/zone].
google5202571_student@cloudshell:~ (qwiklabs-gcp-64269ed6736cecee)$ gcloud container clusters create spinnaker-tutorial \
>     --machine-type=n1-standard-2
WARNING: In October 2019, node auto-upgrade will be enabled by default for newly created clusters and node pools. To disable it, use the `--no-enable-autoupgrade` flag.
WARNING: Starting in 1.12, new clusters will have basic authentication disabled by default. Basic authentication can be enabled (or disabled) manually using the `--[no-]en
WARNING: Starting in 1.12, new clusters will not have a client certificate issued. You can manually enable (or disable) the issuance of the client certificate using the `-
WARNING: Currently VPC-native is not the default mode during cluster creation. In the future, this will become the default mode and can be disabled using `--no-enable-ip-a
WARNING: Starting in 1.12, default node pools in new clusters will have their legacy Compute Engine instance metadata endpoints disabled by default. To create a cluster wi
run `clusters create` with the flag `--metadata disable-legacy-endpoints=true`.
WARNING: Your Pod address range (`--cluster-ipv4-cidr`) can accommodate at most 1008 node(s).
This will enable the autorepair feature for nodes. Please see https://cloud.google.com/kubernetes-engine/docs/node-auto-repair for more information on node autorepairs.
Creating cluster spinnaker-tutorial in us-central1-f... Cluster is being health-checked...
```

```
google5202571_student@cloudshell:~ (qwiklabs-gcp-64269ed6736cecee)$ gcloud container clusters create spinnaker-tutorial \
>     --machine-type=n1-standard-2
WARNING: In October 2019, node auto-upgrade will be enabled by default for newly created clusters and node pools. To disable it, use
WARNING: Starting in 1.12, new clusters will have basic authentication disabled by default. Basic authentication can be enabled (or
WARNING: Starting in 1.12, new clusters will not have a client certificate issued. You can manually enable (or disable) the issuance
WARNING: Currently VPC-native is not the default mode during cluster creation. In the future, this will become the default mode and
WARNING: Starting in 1.12, default node pools in new clusters will have their legacy Compute Engine instance metadata endpoints disa
un `clusters create` with the flag `--metadata disable-legacy-endpoints=true`.
WARNING: Your Pod address range (`--cluster-ipv4-cidr`) can accommodate at most 1008 node(s).
This will enable the autorepair feature for nodes. Please see https://cloud.google.com/kubernetes-engine/docs/node-auto-repair for m
Creating cluster spinnaker-tutorial in us-central1-f... Cluster is being health-checked (master is healthy)...done.
Created [https://container.googleapis.com/v1/projects/qwiklabs-gcp-64269ed6736cecee/zones/us-central1-f/clusters/spinnaker-tutorial]
To inspect the contents of your cluster, go to: https://console.cloud.google.com/kubernetes/workload_/gcloud/us-central1-f/spinnaker
kubeconfig entry generated for spinnaker-tutorial.
NAME                LOCATION       MASTER_VERSION  MASTER_IP     MACHINE_TYPE   NODE_VERSION  NUM_NODES  STATUS
spinnaker-tutorial  us-central1-f  1.13.7-gke.8    108.59.86.83  n1-standard-2  1.13.7-gke.8  3          RUNNING
google5202571_student@cloudshell:~ (qwiklabs-gcp-64269ed6736cecee)$
```

Configure identity and access management

```
google5202571_student@cloudshell:~ (qwiklabs-gcp-64269ed6736cecee)$ gcloud iam service-accounts create spinnaker-account \
>     --display-name spinnaker-account
Created service account [spinnaker-account].
google5202571_student@cloudshell:~ (qwiklabs-gcp-64269ed6736cecee)$ export SA_EMAIL=$(gcloud iam service-accounts list \
>     --filter="displayName:spinnaker-account" \
>     --format='value(email)')
google5202571_student@cloudshell:~ (qwiklabs-gcp-64269ed6736cecee)$ export PROJECT=$(gcloud info --format='value(config.project)')
google5202571_student@cloudshell:~ (qwiklabs-gcp-64269ed6736cecee)$
```

```
google5202571_student@cloudshell:~ (qwiklabs-gcp-64269ed6736cecee)$ gcloud projects add-iam-policy-binding $PROJECT \
>     --role roles/storage.admin \
>     --member serviceAccount:$SA_EMAIL
Updated IAM policy for project [qwiklabs-gcp-64269ed6736cecee].
bindings:
- members:
  - serviceAccount:service-1024134275209@gae-api-prod.google.com.iam.gserviceaccount.com
  role: roles/appengineflex.serviceAgent
- members:
  - serviceAccount:service-1024134275209@gcp-sa-bigquerydatatransfer.iam.gserviceaccount.com
  role: roles/bigquerydatatransfer.serviceAgent
- members:
  - serviceAccount:1024134275209@cloudbuild.gserviceaccount.com
  role: roles/cloudbuild.builds.builder
- members:
  - serviceAccount:service-1024134275209@gcp-sa-cloudbuild.iam.gserviceaccount.com
  role: roles/cloudbuild.serviceAgent
- members:
  - serviceAccount:service-1024134275209@gcf-admin-robot.iam.gserviceaccount.com
  role: roles/cloudfunctions.serviceAgent
- members:
  - serviceAccount:service-1024134275209@gcp-sa-cloudiot.iam.gserviceaccount.com
  role: roles/cloudiot.serviceAgent
- members:
  - serviceAccount:service-1024134275209@gcp-sa-cloudspeech.iam.gserviceaccount.com
  role: roles/cloudspeech.serviceAgent
- members:
  - serviceAccount:service-1024134275209@gcp-sa-cloudtasks.iam.gserviceaccount.com
  role: roles/cloudtasks.serviceAgent
```

```
google5202571_student@cloudshell:~ (qwiklabs-gcp-64269ed6736cecee)$ gcloud iam service-accounts keys create spinnaker-sa.json \
>     --iam-account $SA_EMAIL
created key [6beee82000edaf2f74a30a6aa727050b653f9f19] of type [json] as [spinnaker-sa.json] for [spinnaker-account@qwiklabs-gcp-64269ed6736cecee.iam.gserviceaccount.com]
```

```
google5202571_student@cloudshell:~ (qwiklabs-gcp-64269ed6736cecee)$ gcloud iam service-accounts keys create spinnaker-sa.json \
>     --iam-account $SA_EMAIL
created key [6beee82000edaf2f74a30a6aa727050b653f9f19] of type [json] as [spinnaker-sa.json] for [spinnaker-account@qwiklabs-gcp-64269ed6736cecee.iam.gserviceaccount.com]
google5202571_student@cloudshell:~ (qwiklabs-gcp-64269ed6736cecee)$ gcloud pubsub topics create projects/$PROJECT/topics/gcr
Created topic [projects/qwiklabs-gcp-64269ed6736cecee/topics/gcr].
google5202571_student@cloudshell:~ (qwiklabs-gcp-64269ed6736cecee)$ gcloud pubsub subscriptions create gcr-triggers \
>     --topic projects/${PROJECT}/topics/gcr
Created subscription [projects/qwiklabs-gcp-64269ed6736cecee/subscriptions/gcr-triggers].
google5202571_student@cloudshell:~ (qwiklabs-gcp-64269ed6736cecee)$ export SA_EMAIL=$(gcloud iam service-accounts list \
>     --filter="displayName:spinnaker-account" \
>     --format='value(email)')
google5202571_student@cloudshell:~ (qwiklabs-gcp-64269ed6736cecee)$ gcloud beta pubsub subscriptions add-iam-policy-binding gcr-triggers \
>     --role roles/pubsub.subscriber --member serviceAccount:$SA_EMAIL
Updated IAM policy for subscription [gcr-triggers].
bindings:
- members:
  - serviceAccount:spinnaker-account@qwiklabs-gcp-64269ed6736cecee.iam.gserviceaccount.com
  role: roles/pubsub.subscriber
etag: BwWSvFCmXyg=
version: 1
google5202571_student@cloudshell:~ (qwiklabs-gcp-64269ed6736cecee)$ []
```

Deploying Spinnaker using Helm

- **Install Helm**

```
google5202571_student@cloudshell:~ (qwiklabs-gcp-64269ed6736cecee)$ wget https://storage.googleapis.com/kubernetes-helm/helm-v2.10.0-linux-amd64.tar.gz
--2019-09-17 14:57:40--  https://storage.googleapis.com/kubernetes-helm/helm-v2.10.0-linux-amd64.tar.gz
Resolving storage.googleapis.com (storage.googleapis.com)... 74.125.24.128, 2404:6800:4003:c04::80
Connecting to storage.googleapis.com (storage.googleapis.com)|74.125.24.128|:443... connected.
HTTP request sent, awaiting response... 200 OK
Length: 9207549 (8.8M) [application/x-tar]
Saving to: 'helm-v2.10.0-linux-amd64.tar.gz'

helm-v2.10.0-linux-amd64.tar.gz       100%[===================================================================================>]

2019-09-17 14:57:41 (23.1 MB/s) - 'helm-v2.10.0-linux-amd64.tar.gz' saved [9207549/9207549]

google5202571_student@cloudshell:~ (qwiklabs-gcp-64269ed6736cecee)$ tar zxfv helm-v2.10.0-linux-amd64.tar.gz
linux-amd64/
linux-amd64/LICENSE
linux-amd64/helm
linux-amd64/README.md
google5202571_student@cloudshell:~ (qwiklabs-gcp-64269ed6736cecee)$ cp linux-amd64/helm .
google5202571_student@cloudshell:~ (qwiklabs-gcp-64269ed6736cecee)$ 
```

```
google5202571_student@cloudshell:~ (qwiklabs-gcp-64269ed6736cecee)$ kubectl create clusterrolebinding user-admin-binding \
>     --clusterrole=cluster-admin --user=$(gcloud config get-value account)
Your active configuration is: [cloudshell-540]
clusterrolebinding.rbac.authorization.k8s.io/user-admin-binding created
google5202571_student@cloudshell:~ (qwiklabs-gcp-64269ed6736cecee)$ kubectl create serviceaccount tiller \
>     --namespace kube-system
serviceaccount/tiller created
google5202571_student@cloudshell:~ (qwiklabs-gcp-64269ed6736cecee)$ kubectl create clusterrolebinding tiller-admin-binding \
>     --clusterrole=cluster-admin --serviceaccount=kube-system:tiller
clusterrolebinding.rbac.authorization.k8s.io/tiller-admin-binding created
google5202571_student@cloudshell:~ (qwiklabs-gcp-64269ed6736cecee)$ 
```

```
google5202571_student@cloudshell:~ (qwiklabs-gcp-64269ed6736cecee)$ kubectl create clusterrolebinding tiller-admin-binding \
>     --clusterrole=cluster-admin --serviceaccount=kube-system:tiller
clusterrolebinding.rbac.authorization.k8s.io/tiller-admin-binding created
google5202571_student@cloudshell:~ (qwiklabs-gcp-64269ed6736cecee)$ kubectl create clusterrolebinding --clusterrole=cluster-admin \
>     --serviceaccount=default:default spinnaker-admin
clusterrolebinding.rbac.authorization.k8s.io/spinnaker-admin created
google5202571_student@cloudshell:~ (qwiklabs-gcp-64269ed6736cecee)$ ./helm init --service-account=tiller
Creating /home/google5202571_student/.helm
Creating /home/google5202571_student/.helm/repository
Creating /home/google5202571_student/.helm/repository/cache
Creating /home/google5202571_student/.helm/repository/local
Creating /home/google5202571_student/.helm/plugins
Creating /home/google5202571_student/.helm/starters
Creating /home/google5202571_student/.helm/cache/archive
Creating /home/google5202571_student/.helm/repository/repositories.yaml
Adding stable repo with URL: https://kubernetes-charts.storage.googleapis.com
Adding local repo with URL: http://127.0.0.1:8879/charts
$HELM_HOME has been configured at /home/google5202571_student/.helm.

Tiller (the Helm server-side component) has been installed into your Kubernetes Cluster.

Please note: by default, Tiller is deployed with an insecure 'allow unauthenticated users' policy.
To prevent this, run `helm init` with the --tiller-tls-verify flag.
For more information on securing your installation see: https://docs.helm.sh/using_helm/#securing-your-helm-installation
Happy Helming!
google5202571_student@cloudshell:~ (qwiklabs-gcp-64269ed6736cecee)$ ./helm repo update
Hang tight while we grab the latest from your chart repositories...
...Skip local chart repository
...Successfully got an update from the "stable" chart repository
Update Complete. * Happy Helming!*
google5202571_student@cloudshell:~ (qwiklabs-gcp-64269ed6736cecee)$ ./helm version
Client: &version.Version{SemVer:"v2.10.0", GitCommit:"9ad53aac42165a5fadc6c87be0dea6b115f93090", GitTreeState:"clean"}
Server: &version.Version{SemVer:"v2.10.0", GitCommit:"9ad53aac42165a5fadc6c87be0dea6b115f93090", GitTreeState:"clean"}
google5202571_student@cloudshell:~ (qwiklabs-gcp-64269ed6736cecee)$
```

- **Configure Spinnaker**

```
google5202571_student@cloudshell:~ (qwiklabs-gcp-64269ed6736cecee)$ export PROJECT=$(gcloud info \
>     --format='value(config.project)')
google5202571_student@cloudshell:~ (qwiklabs-gcp-64269ed6736cecee)$ export BUCKET=$PROJECT-spinnaker-config
google5202571_student@cloudshell:~ (qwiklabs-gcp-64269ed6736cecee)$ gsutil mb -c regional -l us-central1 gs://$BUCKET
Creating gs://qwiklabs-gcp-64269ed6736cecee-spinnaker-config/...
google5202571_student@cloudshell:~ (qwiklabs-gcp-64269ed6736cecee)$
```

```
google5202571_student@cloudshell:~ (qwiklabs-gcp-64269ed6736cecee)$ export SA_JSON=$(cat spinnaker-sa.json)
google5202571_student@cloudshell:~ (qwiklabs-gcp-64269ed6736cecee)$ export PROJECT=$(gcloud info --format='value(config.project)')
google5202571_student@cloudshell:~ (qwiklabs-gcp-64269ed6736cecee)$ export BUCKET=$PROJECT-spinnaker-config
google5202571_student@cloudshell:~ (qwiklabs-gcp-64269ed6736cecee)$ cat > spinnaker-config.yaml <<EOF
> gcs:
>   enabled: true
>   bucket: $BUCKET
>   project: $PROJECT
>   jsonKey: '$SA_JSON'
>
> dockerRegistries:
> - name: gcr
>   address: https://gcr.io
>   username: _json_key
>   password: '$SA_JSON'
>   email: 1234@5678.com
>
> # Disable minio as the default storage backend
> minio:
>   enabled: false
>
> # Configure Spinnaker to enable GCP services
> halyard:
>   spinnakerVersion: 1.10.2
>   image:
>     tag: 1.12.0
>   additionalScripts:
>     create: true
>     data:
>       enable_gcs_artifacts.sh: |-
>         \$HAL_COMMAND config artifact gcs account add gcs-$PROJECT --json-path /opt/gcs/key.json
>         \$HAL_COMMAND config artifact gcs enable
>       enable_pubsub_triggers.sh: |-
>         \$HAL_COMMAND config pubsub google enable
>         \$HAL_COMMAND config pubsub google subscription add gcr-triggers \
>           --subscription-name gcr-triggers \
>           --json-path /opt/gcs/key.json \
>           --project $PROJECT \
>           --message-format GCR
> EOF
google5202571_student@cloudshell:~ (qwiklabs-gcp-64269ed6736cecee)$
```

```
google5202571_student@cloudshell:~ (qwiklabs-gcp-64269ed6736cecee)$ ./helm install -n cd stable/spinnaker -f spinnaker-config.yaml \
>     --timeout 600 --version 1.1.6 --wait

NAME:   cd
LAST DEPLOYED: Tue Sep 17 15:03:14 2019
NAMESPACE: default
STATUS: DEPLOYED

RESOURCES:
==> v1/Secret
NAME                     TYPE      DATA  AGE
cd-redis                 Opaque    1     3m
cd-spinnaker-gcs         Opaque    1     3m
cd-spinnaker-registry    Opaque    1     3m

==> v1/RoleBinding
NAME                  AGE
cd-spinnaker-halyard  3m

==> v1/Service
NAME                   TYPE        CLUSTER-IP    EXTERNAL-IP  PORT(S)   AGE
cd-redis-master        ClusterIP   10.43.245.2   <none>       6379/TCP  3m
cd-spinnaker-halyard   ClusterIP   None          <none>       8064/TCP  3m

==> v1beta2/StatefulSet
NAME            DESIRED  CURRENT  AGE
cd-redis-master 1        1        3m

==> v1/ConfigMap
NAME                             DATA  AGE
cd-spinnaker-additional-scripts  2     3m
cd-spinnaker-halyard-config      3     3m

==> v1/ServiceAccount
NAME                  SECRETS  AGE
cd-spinnaker-halyard  1        3m

==> v1/ClusterRoleBinding
NAME                  AGE
cd-spinnaker-spinnaker  3m

==> v1/StatefulSet
NAME            DESIRED  CURRENT  AGE
```

```
google5202571_student@cloudshell:~ (qwiklabs-gcp-64269ed6736cecee)$ export DECK_POD=$(kubectl get pods --namespace default -l "cluster=spin-deck" \
>     -o jsonpath="{.items[0].metadata.name}")
google5202571_student@cloudshell:~ (qwiklabs-gcp-64269ed6736cecee)$ kubectl port-forward --namespace default $DECK_POD 8080:9000 >> /dev/null &
[1] 860
google5202571_student@cloudshell:~ (qwiklabs-gcp-64269ed6736cecee)$
```


Building the docker image:

```
google5202571_student@cloudshell:~ (qwiklabs-gcp-64269ed6736cecee)$ wget https://gke-spinnaker.storage.googleapis.com/sample-app-v2.tgz
--2019-09-17 15:10:45--  https://gke-spinnaker.storage.googleapis.com/sample-app-v2.tgz
Resolving gke-spinnaker.storage.googleapis.com (gke-spinnaker.storage.googleapis.com)... 172.217.194.128, 2404:6800:4003:c04::80
Connecting to gke-spinnaker.storage.googleapis.com (gke-spinnaker.storage.googleapis.com)|172.217.194.128|:443... connected.
HTTP request sent, awaiting response... 200 OK
Length: 844409 (825K) [application/x-tar]
Saving to: 'sample-app-v2.tgz'

sample-app-v2.tgz                          100%[===================================================================>]

2019-09-17 15:10:45 (79.5 MB/s) - 'sample-app-v2.tgz' saved [844409/844409]

google5202571_student@cloudshell:~ (qwiklabs-gcp-64269ed6736cecee)$ tar xzfv sample-app-v2.tgz
sample-app/
sample-app/cloudbuild.yaml
sample-app/pkg/
sample-app/pkg/stackdriver/
sample-app/pkg/stackdriver/monitoring.go
sample-app/README.md
sample-app/spinnaker/
sample-app/spinnaker/pipeline-deploy.json
sample-app/Dockerfile
sample-app/Jenkinsfile
sample-app/glide.yaml
sample-app/.dockerignore
sample-app/LICENSE
sample-app/cmd/
sample-app/cmd/gke-info/
sample-app/cmd/gke-info/common-service.go
sample-app/cmd/gke-info/transport.go
sample-app/cmd/gke-info/main.go
sample-app/cmd/gke-info/messages.go
sample-app/cmd/gke-info/stackdriver.go
sample-app/cmd/gke-info/html.go
sample-app/labs/
sample-app/labs/installing-spinnaker.md
sample-app/labs/triggering-deployments.md
sample-app/labs/creating-your-pipeline.md
sample-app/labs/workshop-cleanup.md
sample-app/labs/building-container-images.md
sample-app/labs/workshop-setup.md
```
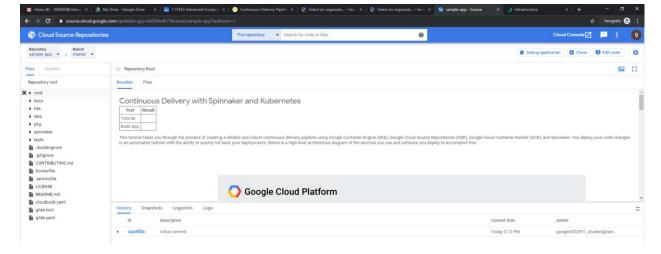
Configure Trigger:

← Create trigger

1 **Select source**   2 Select repository   3 Trigger settings

Select source

Choose a repository hosting option

- ● Cloud Source Repository
- ○ Bitbucket
- ○ GitHub

[Continue] [Cancel]

← Create trigger

✓ Select source   2 **Select repository**   3 Trigger settings

Select repository

Source: Cloud Source Repository

⌕ Filter repositories

● sample-app

[Continue] [Cancel]

---

qwiklabs-gcp-64269ed6736cecee ▾   🔍

← Create trigger

✓ Select source   ✓ Select repository   3 **Trigger settings**

Trigger settings

Source: Cloud Source Repository   Repository: https://source.developers.google.com/p/qwiklabs-gcp-64269ed6736cecee/r/sample-app

Name
Must be unique within the project

| sample-app-tags |

Description

| Push to v.* tag |

Trigger type ⓘ
- ○ Branch
- ● Tag

Tag (regex) ⓘ
No tag matches

☐ Invert Regex

| v.* |

Included files filter (glob) (Optional)
Changes affecting at least one included file will trigger builds

| glob pattern example: src/* |

Ignored files filter (glob) (Optional)
Changes only affecting ignored files won't trigger builds

| glob pattern example: .gitignore |

⌃ Hide included and ignored files filters

Build configuration
- ○ Dockerfile
  Specify the path within the Git repo
- ● Cloud Build configuration file (yaml or json)
  Specify the path to a Cloud Build configuration file in the Git repo   Learn more

Cloud Build configuration file location ⓘ

| / cloudbuild.yaml |

Substitution variables (Optional)
Substitutions allow to re-use a cloudbuild.yaml file with different variable values   Learn more

| + Add item |

[Create trigger] [Cancel]

Preparing menifests for use in kubernetes:

```
google5202571_student@cloudshell:~/sample-app (qwiklabs-gcp-64269ed6736cecee)$ export PROJECT=$(gcloud info --format='value(config.project)')
google5202571_student@cloudshell:~/sample-app (qwiklabs-gcp-64269ed6736cecee)$ gsutil mb -l us-central1 gs://$PROJECT-kubernetes-manifests
Creating gs://qwiklabs-gcp-64269ed6736cecee-kubernetes-manifests/...
google5202571_student@cloudshell:~/sample-app (qwiklabs-gcp-64269ed6736cecee)$ gsutil versioning set on gs://$PROJECT-kubernetes-manifests
Enabling versioning for gs://qwiklabs-gcp-64269ed6736cecee-kubernetes-manifests/...
google5202571_student@cloudshell:~/sample-app (qwiklabs-gcp-64269ed6736cecee)$ sed -i s/PROJECT/$PROJECT/g k8s/deployments/*
google5202571_student@cloudshell:~/sample-app (qwiklabs-gcp-64269ed6736cecee)$ git commit -a -m "Set project ID"
[master 53a3cf7] Set project ID
 4 files changed, 4 insertions(+), 4 deletions(-)
google5202571_student@cloudshell:~/sample-app (qwiklabs-gcp-64269ed6736cecee)$
```

Build Image:

```
google5202571_student@cloudshell:~/sample-app (qwiklabs-gcp-64269ed6736cecee)$ git tag v1.0.0
google5202571_student@cloudshell:~/sample-app (qwiklabs-gcp-64269ed6736cecee)$ git push --tags
Counting objects: 8, done.
Compressing objects: 100% (8/8), done.
Writing objects: 100% (8/8), 785 bytes | 0 bytes/s, done.
Total 8 (delta 5), reused 0 (delta 0)
remote: Resolving deltas: 100% (5/5)
To https://source.developers.google.com/p/qwiklabs-gcp-64269ed6736cecee/r/sample-app
 * [new tag]         v1.0.0 -> v1.0.0
google5202571_student@cloudshell:~/sample-app (qwiklabs-gcp-64269ed6736cecee)$
```

Build history   C REFRESH

Build	Source	Git commit	Trigger name	Trigger	Started	Duration	Artifac
cb0df03e-645d...	Cloud Source Repository sample-app	53a3cf7	Push to v.* tag	Push to v1.0.0 tag	Just now	–	gc

Build history   C REFRESH

Build	Source	Git commit	Trigger name	Trigger	Started	Duration	Artifacts
cb0df03e-645d...	Cloud Source Repository sample-app	53a3cf7	Push to v.* tag	Push to v1.0.0 tag	3 minutes ago	–	gcr.io/qwiklabs-gcp-64269ed6736cecee/sample-a

Configure deployment pipelines:

```
google5202571_student@cloudshell:~/sample-app (qwiklabs-gcp-64269ed6736cecee)$ curl -LO https://storage.googleapis.com/spinnaker-artifacts/spin/1.6.0/linux/amd64/spin
  % Total    % Received % Xferd  Average Speed   Time    Time     Time  Current
                                 Dload  Upload   Total   Spent    Left  Speed
100 12.2M  100 12.2M    0     0  10.6M      0  0:00:01  0:00:01 --:--:-- 10.6M
google5202571_student@cloudshell:~/sample-app (qwiklabs-gcp-64269ed6736cecee)$ chmod +x spin
google5202571_student@cloudshell:~/sample-app (qwiklabs-gcp-64269ed6736cecee)$ ./spin application save --application-name sample \
>                 --owner-email "$(gcloud config get-value core/account)" \
>                 --cloud-providers kubernetes \
>                 --gate-endpoint http://localhost:8080/gate
Your active configuration is: [cloudshell-540]
Could not read configuration file from /home/google5202571_student/.spin/config.
Application save succeeded
google5202571_student@cloudshell:~/sample-app (qwiklabs-gcp-64269ed6736cecee)$ export PROJECT=$(gcloud info --format='value(config.project)')
google5202571_student@cloudshell:~/sample-app (qwiklabs-gcp-64269ed6736cecee)$ sed s/PROJECT/$PROJECT/g spinnaker/pipeline-deploy.json > pipeline.json
google5202571_student@cloudshell:~/sample-app (qwiklabs-gcp-64269ed6736cecee)$ ./spin pipeline save --gate-endpoint http://localhost:8080/gate -f pipeline.json
Could not read configuration file from /home/google5202571_student/.spin/config.
Pipeline save succeeded
google5202571_student@cloudshell:~/sample-app (qwiklabs-gcp-64269ed6736cecee)$
```

Applications   Search applications   Actions ▾

Name	Created	Updated	Owner	Account(s)	Description
sample	2019-09-17 02:58:55 PDT	2019-09-17 02:58:55 PDT	google5202571_student@qwiklabs.net		
cd	-	-		default	
kubernetes	-	-		default	
spin	-	-		default	

« ‹ **1** › »

PIPELINES 1   ☁ INFRASTRUCTURE   ☑ TASKS

+ − Group by [Pipeline ▼] Show [2 ▼] executions per pipeline ☐ stage durations   [⊕ Create] [⚙ Configure ▼]

Deploy to Production?

[Continue] [Stop]

∨ **DEFAULT** Deploy 1   ...led   ⚙ Configure

MANUAL START
[anonymous]
8 minutes ago
🔵 gs://qwiklabs-gcp-64269ed673...   Status: RUNNING   Duratio
🔵 gs://qwiklabs-gcp-64269ed673...
🔵 gs://qwiklabs-gcp-64269ed673...
🔵 gs://qwiklabs-gcp-64269ed673...

+ − Group by [Pipeline ▼] Show [2 ▼] executions per pipeline ☐ stage durations   [⊕ Create] [⚙ Configure ▼] [▶ Start Manual Execution]

∨ **DEFAULT** Deploy   Trigger: enabled   ⚙ Configure   ▶ Start Manual Execution

MANUAL START
[anonymous]
9 minutes ago
🔵 gs://qwiklabs-gcp-64269ed673...   Status: SUCCEEDED   Duration: 09:21   ↻ 🗑
🔵 gs://qwiklabs-gcp-64269ed673...
🔵 gs://qwiklabs-gcp-64269ed673...
🔵 gs://qwiklabs-gcp-64269ed673...
🐳 gcr.io/qwiklabs-gcp-64269ed67...
Version v1.0.0
🔵 gs://qwiklabs-gcp-64269ed673...
🔵 gs://qwiklabs-gcp-64269ed673...
🔵 gs://qwiklabs-gcp-64269ed673...
🔵 gs://qwiklabs-gcp-64269ed673...
❯ Details

Backend that serviced this request

Pod Name	sample-backend-production-69fb5fdccd-sspsc
Node Name	gke-spinnaker-tutorial-default-pool-309bc164-scwn
Version	production
Zone	projects/1024134275209/zones/us-central1-f
Project	qwiklabs-gcp-64269ed6736cecee
Node Internal IP	10.128.0.4
Node External IP	34.69.144.6

Frontend that handled this request

Frontend IP:PORT	10.40.2.12:42426
Request to Backend	GET /metadata HTTP/1.1 Host: sample-backend-production:8080 Connection: close Accept-Encoding: gzip Connection: close User-Agent: Go-http-client/1.1
Error	None

```
google5202571_student@cloudshell:~/sample-app (qwiklabs-gcp-64269ed6736cecee)$ sed -i 's/orange/blue/g' cmd/gke-info/common-service.go
google5202571_student@cloudshell:~/sample-app (qwiklabs-gcp-64269ed6736cecee)$ git commit -a -m "Change color to blue"
[master 5fc0f00] Change color to blue
 1 file changed, 1 insertion(+), 1 deletion(-)
google5202571_student@cloudshell:~/sample-app (qwiklabs-gcp-64269ed6736cecee)$ git tag v1.0.1
google5202571_student@cloudshell:~/sample-app (qwiklabs-gcp-64269ed6736cecee)$ git push --tags
Counting objects: 5, done.
Compressing objects: 100% (4/4), done.
Writing objects: 100% (5/5), 419 bytes | 0 bytes/s, done.
Total 5 (delta 3), reused 0 (delta 0)
remote: Resolving deltas: 100% (3/3)
To https://source.developers.google.com/p/qwiklabs-gcp-64269ed6736cecee/r/sample-app
 * [new tag]        v1.0.1 -> v1.0.1
google5202571_student@cloudshell:~/sample-app (qwiklabs-gcp-64269ed6736cecee)$
```

Build	Source	Git commit	Trigger name	Trigger	Started	Duration	Artifacts
a0d7edcd-621f...	Cloud Source Repository sample-app	5fc0f00	Push to v.* tag	Push to v1.0.1 tag	2 minutes ago	–	gcr.io/qwiklabs-gcp-64269ed6736cecee/sample-app:v1.0.1
cb0df03e-645d...	Cloud Source Repository sample-app	53a3cf7	Push to v.* tag	Push to v1.0.0 tag	27 minutes ago	3 min 33 sec	gcr.io/qwiklabs-gcp-64269ed6736cecee/sample-app:v1.0.0

Backend that serviced this request

Pod Name	sample-backend-canary-66d577c575-fcl7n
Node Name	gke-spinnaker-tutorial-default-pool-309bc164-hm61
Version	canary
Zone	projects/1024134275209/zones/us-central1-f
Project	qwiklabs-gcp-64269ed6736cecee
Node Internal IP	10.128.0.2
Node External IP	34.69.178.8

Frontend that handled this request

Frontend IP:PORT	10.40.0.8:45912
Request to Backend	GET /metadata HTTP/1.1 Host: sample-backend-canary:8080 Connection: close Accept-Encoding: gzip Connection: close User-Agent: Go-http-client/1.1
Error	None

Conclusion:

We have learned the concept of kubernetes and implemented on Google Cloud Platform with Qwiklab.