

Problem 5:

1. Kubernetes cluster setup

skv2109-Deep Learning Sys perf

Kubernetes clusters

CREATE CLUSTER

DEPLOY

REFRESH

DELETE

SHOW INFO PANEL

A Kubernetes cluster is a managed group of VM instances for running containerized applications. [Learn more](#)

Filter by label or name

<input type="checkbox"/>	Name ^	Location	Cluster size	Total cores	Total memory	Notifications	Labels	
<input type="checkbox"/>	✓ kubeflow	us-central1-a	3	20 vCPUs	75.00 GB		application : kubeflow	<div>Connect</div> <div></div> <div></div>

2. Container Registry Image prescence:

Container Registry

Images

REFRESH

DELETE

kubeflow-train

us.gcr.io / skv2109-deep-learning-sys-perf / kubeflow-train

Filter by name or tag

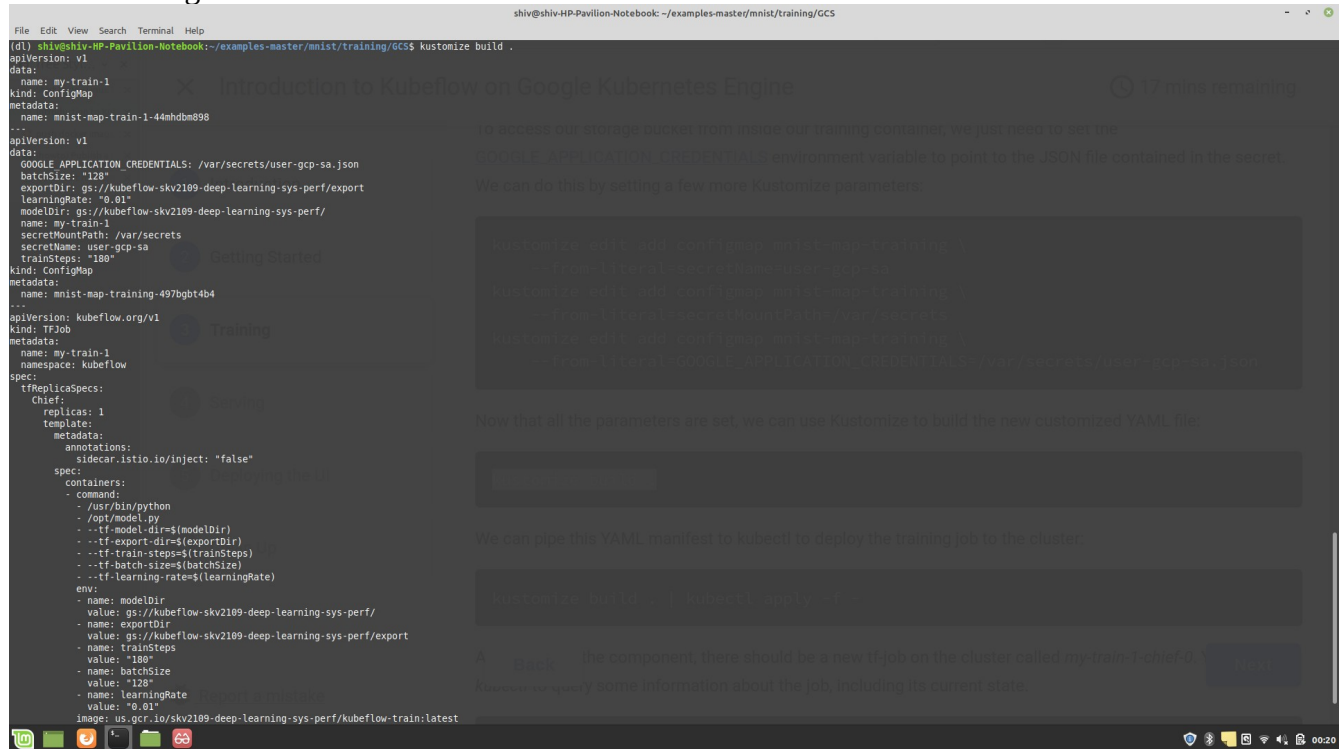
Columns

<input type="checkbox"/>	Name	Tags	Uploaded
<input type="checkbox"/>	312b4104991c	latest	2 days ago

### 3. Job Parameters YAML file:

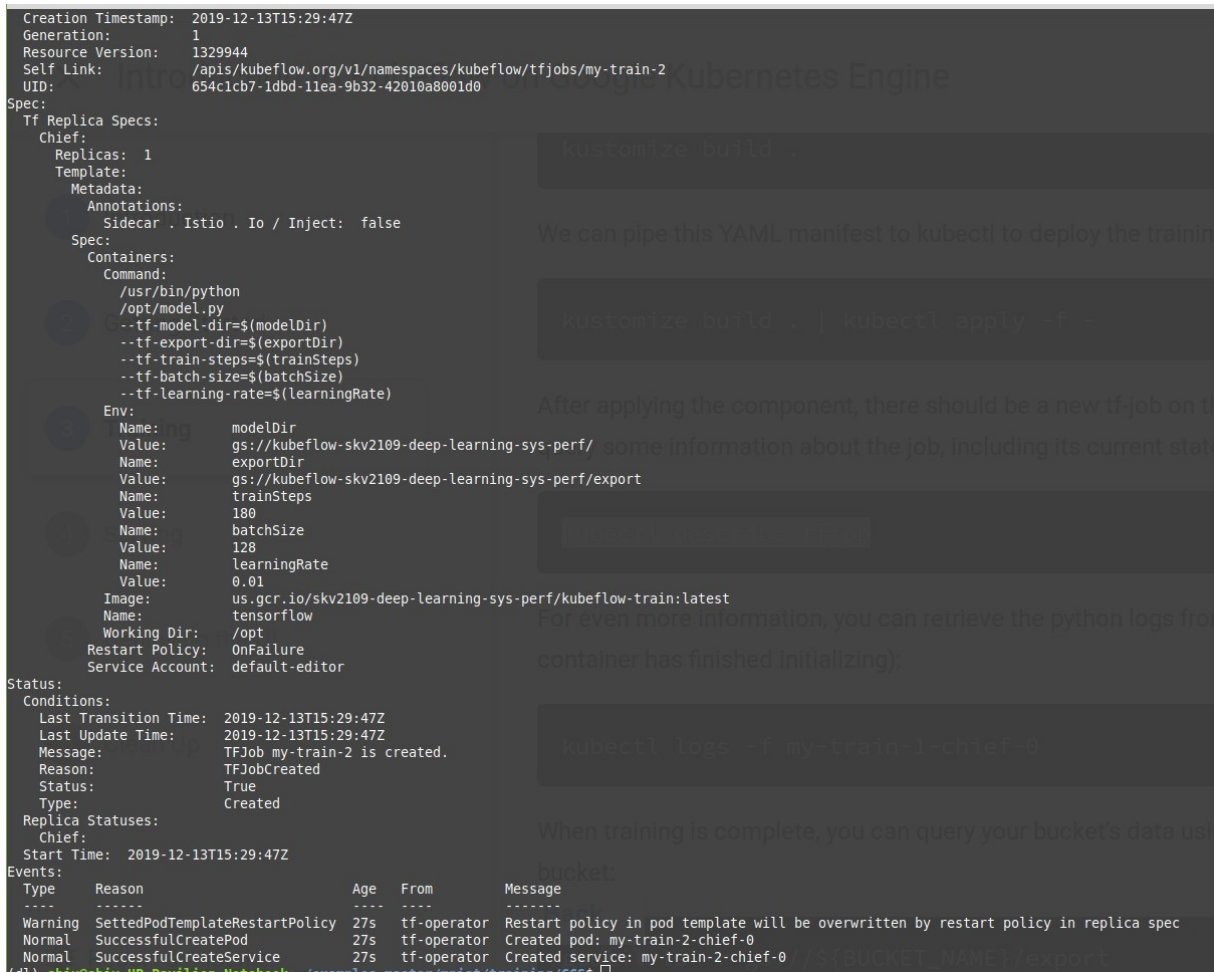
```
name: mnist-map-training-2-mg58gthtg6
---
apiVersion: v1
data:
  GOOGLE_APPLICATION_CREDENTIALS: /var/secrets/user-gcp-sa.json
  batchSize: "128"
  exportDir: gs://kubeflow-skv2109-deep-learning-sys-perf/export
  learningRate: "0.01"
  modelDir: gs://kubeflow-skv2109-deep-learning-sys-perf/
  name: my-train-1
  secretMountPath: /var/secrets
  secretName: user-gcp-sa
  trainSteps: "180"
kind: ConfigMap
metadata:
  name: mnist-map-training-497bgbt4b4
---
apiVersion: kubeflow.org/v1
kind: TFJob
metadata:
  name: my-train-1
  namespace: kubeflow
spec:
  tfReplicaSpecs:
    Chief:
      replicas: 1
      template:
        metadata:
          annotations:
            sidecar.istio.io/inject: "false"
        spec:
          containers:
            - command:
                - /usr/bin/python
                - /opt/model.py
                - --tf-model-dir=$(modelDir)
                - --tf-export-dir=$(exportDir)
                - --tf-train-steps=$(trainSteps)
                - --tf-batch-size=$(batchSize)
                - --tf-learning-rate=$(learningRate)
              env:
                - name: modelDir
                  value: gs://kubeflow-skv2109-deep-learning-sys-perf/
                - name: exportDir
                  value: gs://kubeflow-skv2109-deep-learning-sys-perf/export
                - name: trainSteps
                  value: "180"
                - name: batchSize
                  value: "128"
                - name: learningRate
                  value: "0.01"
              image: us.gcr.io/skv2109-deep-learning-sys-perf/kubeflow-train:latest
              name: tensorflow
              workingDir: /opt
            restartPolicy: OnFailure
            serviceAccount: default-editor
```

## 4. Job building:



```
(dl) shiv@shiv-HP-Pavilion-Notebook:~/examples-master/mnist/training/GCS$ kustomize build .
apiVersion: v1
data:
  name: my-train-1
kind: ConfigMap
metadata:
  name: mnist-map-train-1-44mhbm898
...
apiVersion: v1
data:
  GOOGLE_APPLICATION_CREDENTIALS: /var/secrets/user-gcp-sa.json
  batchSize: "128"
  exportDir: gs://kubeflow-skv2109-deep-learning-sys-perf/export
  learningRate: "0.01"
  modelDir: gs://kubeflow-skv2109-deep-learning-sys-perf/
  name: my-train-1
  secretMountPath: /var/secrets
  secretName: user-gcp-sa
  trainSteps: "180"
kind: ConfigMap
metadata:
  name: mnist-map-training-497bgbt4b4
...
apiVersion: kubeflow.org/v1
kind: TFJob
metadata:
  name: my-train-1
  namespace: kubeflow
spec:
  tfReplicaSpecs:
    Chief:
      replicas: 1
      template:
        metadata:
          annotations:
            sidecar.istio.io/inject: "false"
        spec:
          containers:
            - command:
                - /usr/bin/python
                - /opt/model.py
                - --tf-model-dir=$(modelDir)
                - --tf-export-dir=$(exportDir)
                - --tf-train-steps=$(trainSteps)
                - --tf-batch-size=$(batchSize)
                - --tf-learning-rate=$(learningRate)
              env:
                - name: modelDir
                  value: gs://kubeflow-skv2109-deep-learning-sys-perf/
                - name: exportDir
                  value: gs://kubeflow-skv2109-deep-learning-sys-perf/export
                - name: trainSteps
                  value: "180"
                - name: batchSize
                  value: "128"
                - name: learningRate
                  value: "0.01"
              image: us.gcr.io/skv2109-deep-learning-sys-perf/kubeflow-train:latest
```

## 5. Job submission details:



```
CreationTimestamp: 2019-12-13T15:29:47Z
Generation: 1
Resource Version: 1329944
Self Link: /apis/kubeflow.org/v1/namespaces/kubeflow/tfjobs/my-train-2
UID: 654c1cb7-1dbd-11ea-9b32-42010a8001d0
Spec:
  Tf Replica Specs:
    Chief:
      Replicas: 1
      Template:
        Metadata:
          Annotations:
            Sidecar . Istio . Io / Inject: false
        Spec:
          Containers:
            Command:
              - /usr/bin/python
              - /opt/model.py
              - --tf-model-dir=$(modelDir)
              - --tf-export-dir=$(exportDir)
              - --tf-train-steps=$(trainSteps)
              - --tf-batch-size=$(batchSize)
              - --tf-learning-rate=$(learningRate)
            Env:
              Name: modelDir
              Value: gs://kubeflow-skv2109-deep-learning-sys-perf/
              Name: exportDir
              Value: gs://kubeflow-skv2109-deep-learning-sys-perf/export
              Name: trainSteps
              Value: 180
              Name: batchSize
              Value: 128
              Name: learningRate
              Value: 0.01
              Image: us.gcr.io/skv2109-deep-learning-sys-perf/kubeflow-train:latest
              Name: tensorflow
              Working Dir: /opt
              Restart Policy: OnFailure
              Service Account: default-editor
Status:
  Conditions:
    Last Transition Time: 2019-12-13T15:29:47Z
    Last Update Time: 2019-12-13T15:29:47Z
    Message: TFJob my-train-2 is created.
    Reason: TFJobCreated
    Status: True
    Type: Created
  Replica Statuses:
    Chief:
      Start Time: 2019-12-13T15:29:47Z
Events:
  Type Reason Age From Message
  ----
Warning SettedPodTemplateRestartPolicy 27s tf-operator Restart policy in pod template will be overwritten by restart policy in replica spec
Normal SuccessfulCreatePod 27s tf-operator Created pod: my-train-2-chief-0
Normal SuccessfulCreateService 27s tf-operator Created service: my-train-2-chief-0
```

## 6. Error faced during cluster training, despite adding the required permissions, users and groups:

```
(dl) shiv@shiv-HP-Pavilion-Notebook:~/examples-master/mnist$ kubectl logs -f my-train-1-chief-0
Error from server (BadRequest): container "tensorflow" in pod "my-train-1-chief-0" is waiting to start: trying and failing to pull image
(dl) shiv@shiv-HP-Pavilion-Notebook:~/examples-master/mnist$ kubectl create sa default-editor
Error from server (AlreadyExists): serviceaccounts "default-editor" already exists
(dl) shiv@shiv-HP-Pavilion-Notebook:~/examples-master/mnist$ kubectl create clusterrolebinding cluster-admin-binding --clusterrole cluster-admin --user default-editor
Error from server (AlreadyExists): clusterrolebindings.rbac.authorization.k8s.io "cluster-admin-binding" already exists
(dl) shiv@shiv-HP-Pavilion-Notebook:~/examples-master/mnist$
```