

1. Kubernetes

- No screenshots or observations

2. Setup

```
coddb@cloudshell:~ (cs356-w21-branden-codd)$ gcloud config set compute/zone us-west1-b
Updated property [compute/zone].
coddb@cloudshell:~ (cs356-w21-branden-codd)$ gcloud config list
[component_manager]
disable_update_check = True
[compute]
gce_metadata_read_timeout_sec = 30
zone = us-west1-b
[core]
account = coddb@sou.edu
disable_usage_reporting = True
project = cs356-w21-branden-codd
[metrics]
environment = devshell

Your active configuration is: [cloudshell-19484]
coddb@cloudshell:~ (cs356-w21-branden-codd)$
```

3. Assigning privileges

Member

guestbook@cs356-w21-branden-codd.iam.gserviceaccount.com

Project

cs356-w21-Branden-Codd

Role

Cloud Datastore User

Provides read/write access to data in a Cloud Datastore database. Intended for application developers and service accounts.

Condition

[Add condition](#)



Role

Storage Object Viewer

Read access to GCS objects.

Condition

[Add condition](#)



[+ ADD ANOTHER ROLE](#)

SAVE

CANCEL

4. Create Kubernetes cluster

Go to Compute Engine and navigate around to answer the following questions in your lab notebook:

- What is the name of the Instance Template dynamically generated to create the two nodes (VMs)?

Instance templates						
CREATE INSTANCE TEMPLATE REFRESH COPY CREATE INSTANCE GROUP DELETE						
Filter instance templates						
Columns						
Name	Machine type	Image	Disk type	Placement policy	In use by	Creation time
gke-guestbook-default-pool-9a668e16	2 vCPUs, 4 GB	gke-11812-gke1210-cos-85-13310-1041-24-v210205-pre	Standard persistent disk	No policy	gke-guestbook-default-pool-9a668e16-grp	Feb 23, 2021, 5:37:55 PM

- What is the name of the Instance Group dynamically generated that the two nodes belong to?-

Instance groups										
CREATE INSTANCE GROUP REFRESH DELETE										
Instance groups are collections of VM instances that use load balancing and automated services, like autoscaling and autohealing. Learn more										
Filter table										
<input type="checkbox"/>	Name	Instances	Template	Group type	Creation time	Recommendation	Autoscaling	Zone	In Use By	
<input checked="" type="checkbox"/>	gke-guestbook-default-pool-9a668e16-grp	2	gke-guestbook-default-pool-9a668e16	Managed	Feb 23, 2021, 5:38:03 PM UTC-08:00		No configuration	us-west1-b	guestbook	

- What are the names of the two nodes?

Filter VM instances									
<input type="checkbox"/>	Name	Zone	Recommendation	In use by	Internal IP	External IP	Network	Connect	
<input checked="" type="checkbox"/>	gke-guestbook-default-pool-9a668e16-gsh6	us-west1-b		gke-guestbook-default-pool-9a668e16-grp	10.138.0.18 (nic0)	35.233.228.34	default	SSH	
<input checked="" type="checkbox"/>	gke-guestbook-default-pool-9a668e16-gzwq	us-west1-b		gke-guestbook-default-pool-9a668e16-grp	10.138.0.19 (nic0)	34.82.129.152	default	SSH	

5. Prepare a container image

- No screenshots or observations

6. Kubernetes.yaml

- Edit the file to fill in YOUR_PROJECT_ID with yours. Also, this is likely all lowercase, even if you have capital letters when viewing the project id in the console.

```
labels:
  app: guestbook
  tier: frontend
spec:
  containers:
  - name: guestbook-app
    image: gcr.io/cs356-w21-branden-codd/gcp_gb
    env:
    - name: PROCESSES
      value: guestbook
    - name: PORT
      value: "8000"
    ports:
    - containerPort: 8000
apiVersion: v1
```

7. Deploy the configuration

- Show a screenshot of the output of the following command when all 3 replicas reach a "Running" state. This may take a few minutes.
- `kubectl get pods`

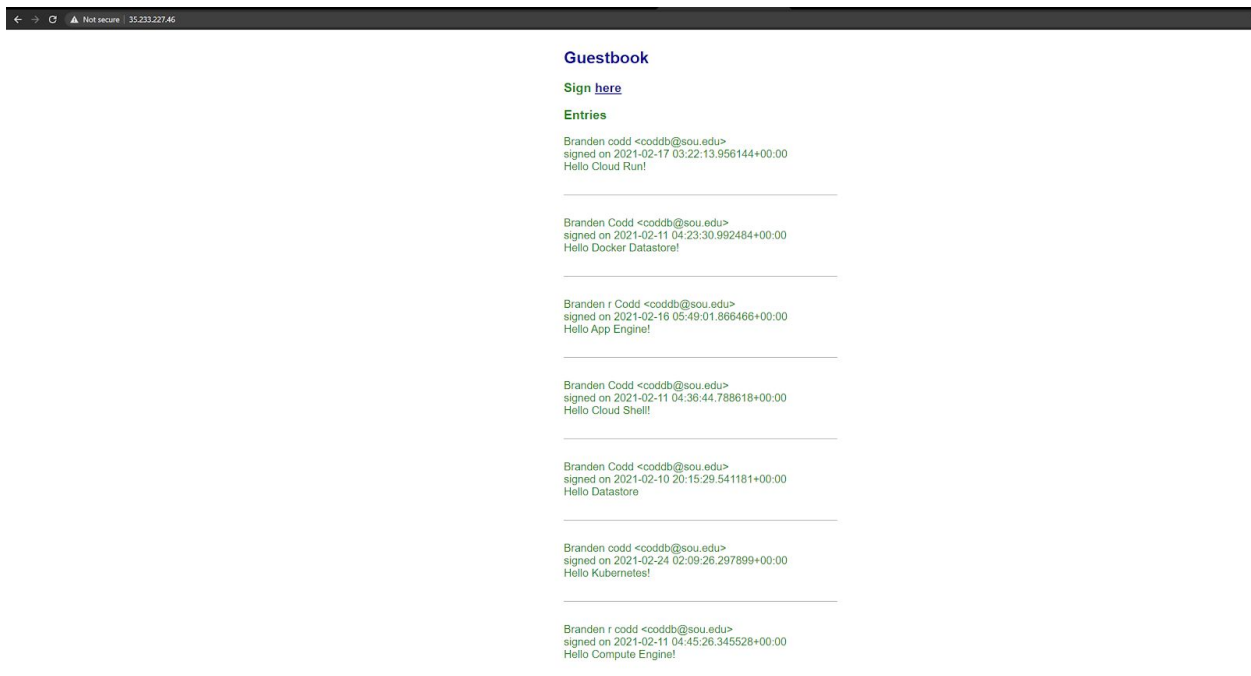
```
codd@cloudshell:~/cs356-cloud-files/05_gcp_datastore (cs356-w21-branden-codd)$ kubectl get pods
NAME                                READY    STATUS    RESTARTS   AGE
guestbook-replicas-cd5pz            1/1      Running   0           98s
guestbook-replicas-wkr17            1/1      Running   0           98s
guestbook-replicas-z9zbp            1/1      Running   0           98s
codd@cloudshell:~/cs356-cloud-files/05_gcp_datastore (cs356-w21-branden-codd)$
```

- Show a screenshot of listing services with LoadBalancer indicating an external IP address that is ready for access.
- `kubectl get services`

```
codd@cloudshell:~/cs356-cloud-files/05_gcp_datastore (cs356-w21-branden-codd)$ kubectl get services
NAME      TYPE        CLUSTER-IP    EXTERNAL-IP    PORT(S)    AGE
guestbook LoadBalancer 10.3.250.255   35.233.227.46  80:31499/TCP 2m7s
kubernetes ClusterIP    10.3.240.1     <none>         443/TCP      28m
codd@cloudshell:~/cs356-cloud-files/05_gcp_datastore (cs356-w21-branden-codd)$
```

8. View the Guestbook

- Take a screenshot of the Guestbook including the URL with the entry in it.



- Visit Kubernetes engine via the web console and view the cluster nodes, the workload of pod replicas placed on them, and the service exported

Kubernetes Engine

Clusters

Workloads

Services & Ingress

Applications

Configuration

Storage

Object browser

Migrate to containers

← Clusters

EDIT

DELETE

ADD NODE POOL

DEPLOY

CONNECT

Duplicate

guestbook

DETAILS

NODES

STORAGE

LOGS

Filter

Filter node pools

Name	Status	Version	Number of nodes	Machine type	Image type	Autoscaling
default-pool	OK	1.18.12-gke.1210	2	e2-medium	Container-Optimized OS with Docker (cos)	Off

Filter

Filter nodes

Name	Status	CPU requested	CPU allocatable	Memory requested	Memory allocatable	Storage requested	Storage allocatable
gke-guestbook-default-pool-9a668e16-gh6	Ready	483 mCPU	940 mCPU	387.97 MB	2.96 GB	0 B	0 B
gke-guestbook-default-pool-9a668e16-gzwq	Ready	619 mCPU	940 mCPU	720.37 MB	2.96 GB	0 B	0 B

Pods

Filter

Filter pods

Name	Status	CPU requested	Memory requested	Storage requested	Namespace	Restarts	Created on
event-exporter-gke-564b597f9-zg5hc	Running	0 CPU	0 B	0 B	kube-system	0	Feb 23, 2021, 5:40:38 PM
kube-dns-autoscaler-7f89fb6b79-zdht	Running	20 mCPU	10.49 MB	0 B	kube-system	0	Feb 23, 2021, 5:40:43 PM
fluentbit-gke-478n8	Running	100 mCPU	209.72 MB	0 B	kube-system	0	Feb 23, 2021, 5:40:49 PM
gke-metrics-agent-jvwhg	Running	3 mCPU	52.43 MB	0 B	kube-system	0	Feb 23, 2021, 5:40:49 PM
pdcsi-node-mnsgp	Running	0 CPU	0 B	0 B	kube-system	0	Feb 23, 2021, 5:40:49 PM
kube-proxy-gke-guestbook-default-pool-9a668e16-gh6	Running	100 mCPU	0 B	0 B	kube-system	0	Feb 23, 2021, 5:41:13 PM
kube-dns-ebd88c18b66-6z75q	Running	260 mCPU	115.34 MB	0 B	kube-system	0	Feb 23, 2021, 5:41:20 PM
guestbook-replicas-cdfpz	Running	0 CPU	0 B	0 B	default	0	Feb 23, 2021, 6:06:09 PM

Google Cloud Platform

sa356-w21-Brandon-Cook

Search products and resources

Kubernetes Engine

Replication Controller details

REFRESH

EDIT

DELETE

ACTIONS

KUBECTL

guestbook-replicas

DETAILS

EVENTS

LOGS

YAML

CPU

Memory

Disk

Cluster

Namespace

Created

Labels

Annotations

Logs

Pods

Label selector

Pod specification

Labels

Termination grace period

Restart policy

Containers

Managed pods

Name

Status

Restarts

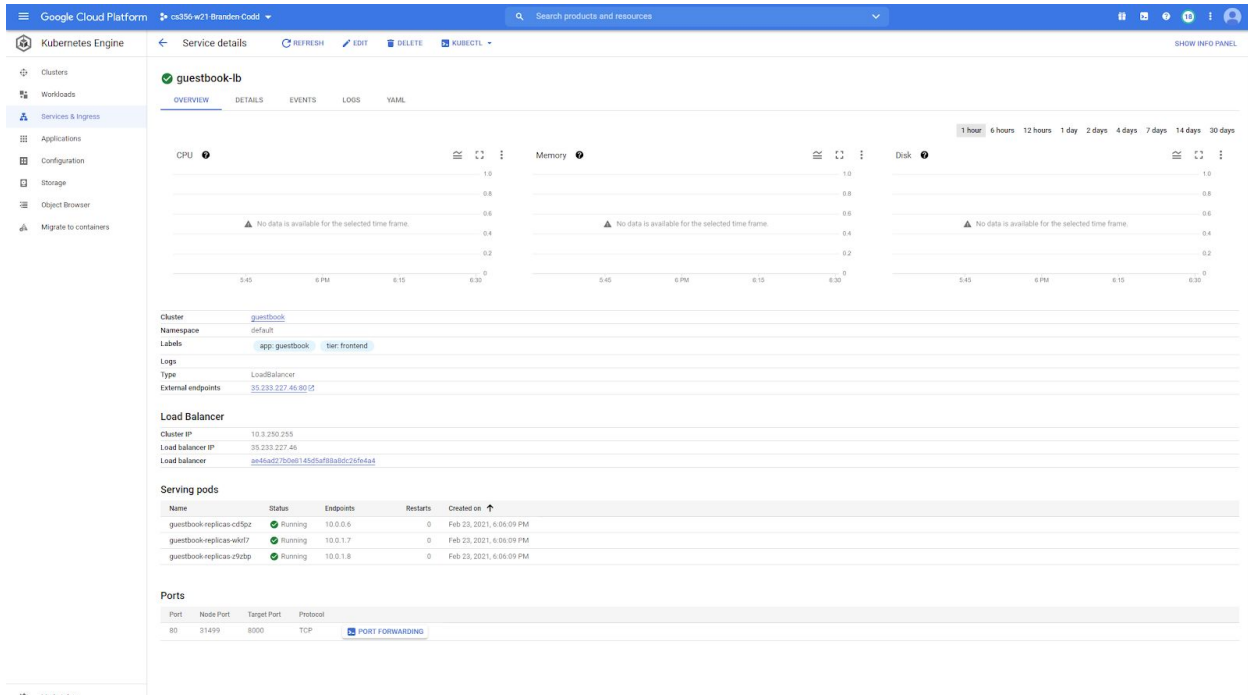
Created on

Exposing services

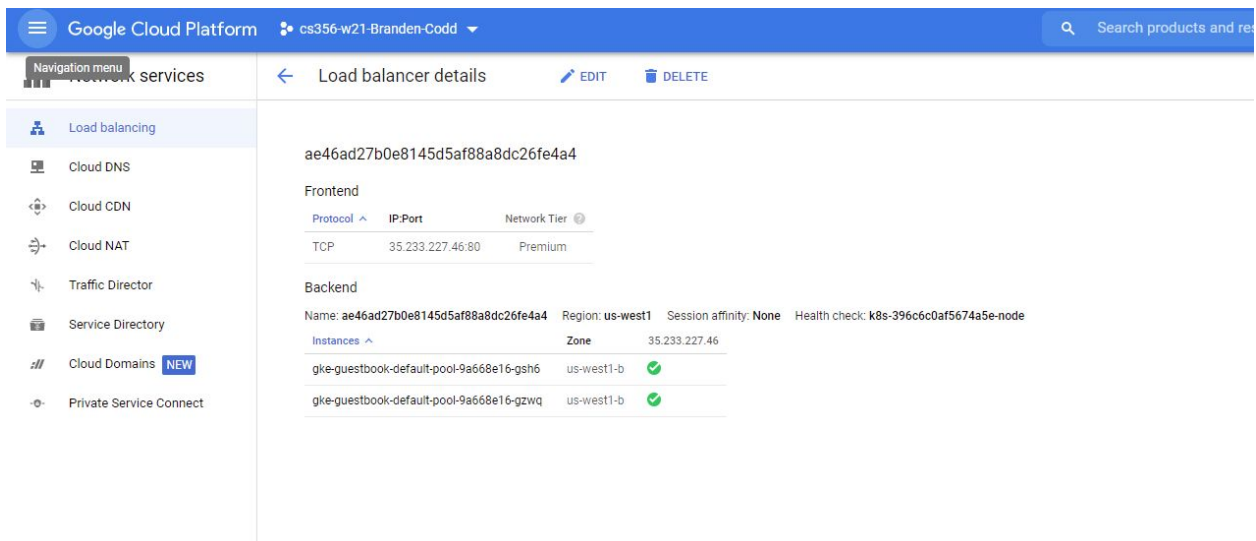
Name

Type

Endpoints



- Visit Network Services and show the load balancer and its details



- Visit VPC network and External IP addresses to see the addresses allocated. Which ones are associated with nodes and which ones are associated with the load balancer?

Google Cloud Platform

cs356-w21-Branden-Codd

Search products and resources

VPC network

VPC networks

External IP addresses

Firewall

Routes

VPC network peering

Shared VPC

Serverless VPC access

Packet mirroring

External IP addresses

RESERVE STATIC ADDRESS

REFRESH

RELEASE STATIC ADDRESS

Filter

Filter table

<input type="checkbox"/>	Name	External Address	Region	Type	Version	In use by	Network Tier	Labels
<input type="checkbox"/>	—	34.82.129.152	us-west1	Ephemeral	IPv4	VM instance gke-guestbook-default-pool-9a668e16-gzwq (Zone us-west1-b)		
<input type="checkbox"/>	—	35.233.227.46	us-west1	Ephemeral	IPv4	Forwarding rule ee46ad27b0e6145d5af88a8dc26fe4a4	Premium	
<input type="checkbox"/>	—	35.233.228.34	us-west1	Ephemeral	IPv4	VM instance gke-guestbook-default-pool-9a668e16-gsh6 (Zone us-west1-b)		

- The first and second ones are associated with the nodes

- Visit Container Registry and see the Docker image created.

Container Registry	Digest details												
Images	52bb199ce0a2												
Settings	gcr.io / cs356-w21-branden-codd / gcp_gb @ sha256:52bb199ce0a21107b6363535795d8cf246a4933595c939d3c50cb433b1ad3c28												
	<div>Show Pull Command</div> <div>Deploy</div> <div>Delete</div>												
	<div>General information</div> <table> <tr><td>Image type</td><td>Docker Manifest, Schema 2</td></tr> <tr><td>Media type</td><td>application/vnd.docker.distribution.manifest.v2+json</td></tr> <tr><td>Virtual size</td><td>1.08 GB</td></tr> <tr><td>Created time</td><td>February 23, 2021 at 5:58:56 PM UTC-8</td></tr> <tr><td>Uploaded time</td><td>February 23, 2021 at 6:01:36 PM UTC-8</td></tr> <tr><td>Build ID</td><td>—</td></tr> </table>	Image type	Docker Manifest, Schema 2	Media type	application/vnd.docker.distribution.manifest.v2+json	Virtual size	1.08 GB	Created time	February 23, 2021 at 5:58:56 PM UTC-8	Uploaded time	February 23, 2021 at 6:01:36 PM UTC-8	Build ID	—
Image type	Docker Manifest, Schema 2												
Media type	application/vnd.docker.distribution.manifest.v2+json												
Virtual size	1.08 GB												
Created time	February 23, 2021 at 5:58:56 PM UTC-8												
Uploaded time	February 23, 2021 at 6:01:36 PM UTC-8												
Build ID	—												
	<div>Container classification</div> <table> <tr><td>Digest</td><td>sha256:52bb199ce0a21107b6363535795d8cf246a4933595c939d3c50cb433b1ad3c28</td></tr> <tr><td>Tags</td><td>latest</td></tr> <tr><td>Repository</td><td>gcp_gb</td></tr> <tr><td>Project</td><td>cs356-w21-branden-codd</td></tr> </table>	Digest	sha256:52bb199ce0a21107b6363535795d8cf246a4933595c939d3c50cb433b1ad3c28	Tags	latest	Repository	gcp_gb	Project	cs356-w21-branden-codd				
Digest	sha256:52bb199ce0a21107b6363535795d8cf246a4933595c939d3c50cb433b1ad3c28												
Tags	latest												
Repository	gcp_gb												
Project	cs356-w21-branden-codd												
	Manifest												