Distributed Systems

Lab 2 Report
Deploying a request splitting ambassador and a load balancer with Kubernetes

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Part 1

The problems being solved are:

1) Multiple disparate services
2) Multiple instances of the same service
3) Multiple versions of the same service

Client applications only need to know about a single endpoint and communicate with a single endpoint with this pattern.

Requirements:

1) Client needs to consume multiple services that can be accessed behind a gateway
2) Use single endpoint to simplify client applications/
3) Route requests from externally addressable endpoints to internal virtual endpoints
4) Clients require services running in many regions for availability or latency benefits.
5) Clients consume a variable number of service instances.
6) Create a deployment strategy so that clients can access many versions of the service simultaneously.

Part 2:

Creating the web-deployment.yaml file
Creating the deployment on the GKE
Checking pods

```
hem_distributedsystems@cloudshell:~ (cohesive-cell-362020)$ kubectl create -f web-deployment.yaml
deployment.apps/web-deployment created
hem_distributedsystems@cloudshell:~ (cohesive-cell-362020)$ kubectl get pods
NAME                              READY   STATUS    RESTARTS   AGE
mongo-0                           1/1     Running   0          30h
mongo-deployment-0                1/1     Running   0          30h
mongodb-0                         1/1     Running   0          30h
web-deployment-6fdbb5c6bb-7x2mv   1/1     Running   0          24s
web-deployment-6fdbb5c6bb-k87j6   1/1     Running   0          24s
hem_distributedsystems@cloudshell:~ (cohesive-cell-362020)$
```

Create clusterIP

```
hem_distributedsystems@cloudshell:~ (cohesive-cell-362020)$ kubectl expose deployment web-deployment --port=80 --type=ClusterIP --name web-deployment
service/web-deployment exposed
hem_distributedsystems@cloudshell:~ (cohesive-cell-362020)$
```

Creating a deployment for experiment-deployment.yaml.
Checking pods

```
hem_distributedsystems@cloudshell:~ (cohesive-cell-362020)$ kubectl create -f experiment-deployment.yaml
deployment.apps/experiment-deployment created
hem_distributedsystems@cloudshell:~ (cohesive-cell-362020)$
```

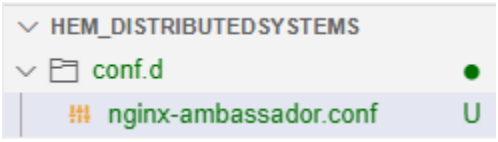
```
hem_distributedsystems@cloudshell:~ (cohesive-cell-362020)$ kubectl get pods
NAME                                     READY   STATUS    RESTARTS   AGE
experiment-deployment-7b47cbd668-9ljdm   1/1     Running   0          69s
experiment-deployment-7b47cbd668-r2rr9   1/1     Running   0          69s
mongo-0                                  1/1     Running   0          30h
mongo-deployment-0                       1/1     Running   0          30h
mongodb-0                                1/1     Running   0          30h
web-deployment-6fdbb5c6bb-7x2mv          1/1     Running   0          6m37s
web-deployment-6fdbb5c6bb-k87j6          1/1     Running   0          6m37s
hem_distributedsystems@cloudshell:~ (cohesive-cell-362020)$
```

Create clusterIP again

```
hem_distributedsystems@cloudshell:~ (cohesive-cell-362020)$ kubectl expose deployment experiment-deployment --port=80
--type=ClusterIP --name experiment-deployment
service/experiment-deployment exposed
hem_distributedsystems@cloudshell:~ (cohesive-cell-362020)$
```

Create request splitter

Part a:



Part b:

```
hem_distributedsystems@cloudshell:~ (cohesive-cell-362020)$ kubectl create configmap ambassador-config --from-file=con
f.d
configmap/ambassador-config created
hem_distributedsystems@cloudshell:~ (cohesive-cell-362020)$
```

Part c and d:

```
hem_distributedsystems@cloudshell:~ (cohesive-cell-362020)$ kubectl create -f ambassador-deployment.yaml
deployment.apps/ambassador-deployment created
hem_distributedsystems@cloudshell:~ (cohesive-cell-362020)$
```

Part e:

```
hem_distributedsystems@cloudshell:~ (cohesive-cell-362020)$ kubectl expose deployment ambassador-deployment --port=80
--type=LoadBalancer
service/ambassador-deployment exposed
hem_distributedsystems@cloudshell:~ (cohesive-cell-362020)$
```

Part f:

```
hem_distributedsystems@cloudshell:~ (cohesive-cell-362020)$ kubectl get pods
NAME                                    READY   STATUS    RESTARTS   AGE
ambassador-deployment-66db4f7766-8c9vz  1/1     Running   0          7m58s
ambassador-deployment-66db4f7766-drh5k  1/1     Running   0          7m58s
experiment-deployment-7b47cbd668-9ljdm  1/1     Running   0          24m
experiment-deployment-7b47cbd668-r2rr9  1/1     Running   0          24m
mongo-0                                 1/1     Running   0          30h
mongo-deployment-0                      1/1     Running   0          30h
mongodb-0                               1/1     Running   0          30h
web-deployment-6fdbb5c6bb-7x2mv         1/1     Running   0          29m
web-deployment-6fdbb5c6bb-k87j6         1/1     Running   0          29m
hem_distributedsystems@cloudshell:~ (cohesive-cell-362020)$ kubectl get deployments
NAME                   READY   UP-TO-DATE   AVAILABLE   AGE
ambassador-deployment  2/2     2            2           8m10s
experiment-deployment  2/2     2            2           24m
web-deployment         2/2     2            2           29m
hem_distributedsystems@cloudshell:~ (cohesive-cell-362020)$ kubectl get services
NAME                   TYPE           CLUSTER-IP     EXTERNAL-IP      PORT(S)           AGE
ambassador-deployment  LoadBalancer   10.80.4.204    35.203.83.103    80:31429/TCP      86s
experiment-deployment  ClusterIP      10.80.14.244   <none>           80/TCP            20m
kubernetes             ClusterIP      10.80.0.1      <none>           443/TCP           13d
mongo-nodeport-svc     NodePort       10.80.12.236   <none>           27017:32000/TCP   13d
mongo-service          LoadBalancer   10.80.13.8     35.234.254.180   27017:31794/TCP   13d
mongodb                ClusterIP      None           <none>           27017/TCP         13d
mongodb-service        LoadBalancer   10.80.12.59    34.152.21.61     27017:30683/TCP   13d
web-deployment         ClusterIP      10.80.10.46    <none>           80/TCP            26m
hem_distributedsystems@cloudshell:~ (cohesive-cell-362020)$
```

Step 5

Part a:

```
hem_distributedsystems@cloudshell:~ (cohesive-cell-362020)$ kubectl get services
NAME                   TYPE           CLUSTER-IP     EXTERNAL-IP      PORT(S)           AGE
ambassador-deployment  LoadBalancer   10.80.4.204    35.203.83.103    80:31429/TCP      86s
experiment-deployment  ClusterIP      10.80.14.244   <none>           80/TCP            20m
kubernetes             ClusterIP      10.80.0.1      <none>           443/TCP           13d
mongo-nodeport-svc     NodePort       10.80.12.236   <none>           27017:32000/TCP   13d
mongo-service          LoadBalancer   10.80.13.8     35.234.254.180   27017:31794/TCP   13d
mongodb                ClusterIP      None           <none>           27017/TCP         13d
mongodb-service        LoadBalancer   10.80.12.59    34.152.21.61     27017:30683/TCP   13d
web-deployment         ClusterIP      10.80.10.46    <none>           80/TCP            26m
hem_distributedsystems@cloudshell:~ (cohesive-cell-362020)$
```

Part b:

```
hem_distributedsystems@cloudshell:~ (cohesive-cell-362020)$ curl http://35.203.83.103
<html>
<head>
  <title>Welcome to Azure Container Instances!</title>
</head>
<style>
h1 {
    color: darkblue;
    font-family:arial, sans-serif;
    font-weight: lighter;
}
</style>

<body>

<div align="center">
<h1>Welcome to Azure Container Instances!</h1>

<svg id="Layer_1" data-name="Layer 1" xmlns="http://www.w3.org/2000/svg" viewBox="0 0 49.8 49.9" width="250px" height=
"250px">
  <title>ContainerInstances_rgb_UI</title>
  <path d="M41.9,11.368A11.929,11.929,0,0,0,20.3,5.061a9.444,9.444,0,0,0-14.932,9.8A8.969,8.969,0,0,0,9.064,32H39.442A
10.463,10.463,0,0,0,41.9,11.368Z" transform="translate(-0.1 -0.1)" fill="#fff"/>
        <path d="M41.9,11.368A11.929,11.929,0,0,0,20.3,5.061a9.444,9.444,0,0,0-14.932,9.8A8.969,8.969,0,0,0,9.064,32H3
9.442A10.463,10.463,0,0,0,41.9,11.368Z" transform="translate(-0.1 -0.1)" fill="#27a9e1" opacity="0.6" style="isolation
:isolate"/>
        <path d="M13,22a1,1,0,0,0-1,1V49a1,1,0,0,0,1,1H37a1,1,0,0,0,1-1V23a1,1,0,0,0-1-1Z" transform="translate(-0.1 -
0.1)" fill="#672a7a"/>
        <path d="M26.95,16" transform="translate(-0.1 -0.1)" fill="none"/>
        <path d="M34.95,20" transform="translate(-0.1 -0.1)" fill="none"/>
        <polygon points="22.9 21.9 22.9 14.9 19.9 14.9 24.9 7.9 29.9 14.9 26.9 14.9 26.9 21.9 22.9 21.9" fill="#fff"/>
        <path d="M26.95,16" transform="translate(-0.1 -0.1)" fill="#814a98"/>
        <path d="M33,25H15V47H35V25ZM21,45H17V27h4Zm6,0H23V27h4Zm6,0H29V27h4Z" transform="translate(-0.1 -0.1)" fill="
#b92025" opacity="0.3" style="isolation:isolate"/>
        <path d="M33,25H15V47H35V25ZM21,45H17V27h4Zm6,0H23V27h4Zm6,0H29V27h4Z" transform="translate(-0.1 -0.1)" fill="
#fff" style="isolation:isolate"/>
</svg>
</div>

</body>
```

Part c:

```
hem_distributedsystems@cloudshell:~ (cohesive-cell-362020)$ for _ in {1..20}; do curl http://35.203.83.103 -s > output
.txt; done

hem_distributedsystems@cloudshell:~ (cohesive-cell-362020)$
```

Part d:

```
hem_distributedsystems@cloudshell:~ (cohesive-cell-362020)$ kubectl logs -l run=web-deployment
::ffff:10.76.2.10 - - [02/Oct/2022:21:02:07 +0000] "GET / HTTP/1.0" 200 1663 "-" "curl/7.74.0"
::ffff:10.76.3.8 - - [02/Oct/2022:21:02:07 +0000] "GET / HTTP/1.0" 200 1663 "-" "curl/7.74.0"
::ffff:10.76.2.10 - - [02/Oct/2022:21:02:07 +0000] "GET / HTTP/1.0" 200 1663 "-" "curl/7.74.0"
::ffff:10.76.3.8 - - [02/Oct/2022:21:02:07 +0000] "GET / HTTP/1.0" 200 1663 "-" "curl/7.74.0"
::ffff:10.76.3.8 - - [02/Oct/2022:21:02:07 +0000] "GET / HTTP/1.0" 200 1663 "-" "curl/7.74.0"
::ffff:10.76.2.10 - - [02/Oct/2022:21:02:08 +0000] "GET / HTTP/1.0" 200 1663 "-" "curl/7.74.0"
::ffff:10.76.2.10 - - [02/Oct/2022:21:02:08 +0000] "GET / HTTP/1.0" 200 1663 "-" "curl/7.74.0"
::ffff:10.76.3.8 - - [02/Oct/2022:21:02:08 +0000] "GET / HTTP/1.0" 200 1663 "-" "curl/7.74.0"
::ffff:10.76.2.10 - - [02/Oct/2022:21:02:08 +0000] "GET / HTTP/1.0" 200 1663 "-" "curl/7.74.0"
::ffff:10.76.3.8 - - [02/Oct/2022:21:02:08 +0000] "GET / HTTP/1.0" 200 1663 "-" "curl/7.74.0"
listening on port 80
::ffff:10.76.3.8 - - [02/Oct/2022:21:00:13 +0000] "GET / HTTP/1.0" 200 1663 "-" "curl/7.74.0"
::ffff:10.76.3.8 - - [02/Oct/2022:21:02:07 +0000] "GET / HTTP/1.0" 200 1663 "-" "curl/7.74.0"
::ffff:10.76.2.10 - - [02/Oct/2022:21:02:07 +0000] "GET / HTTP/1.0" 200 1663 "-" "curl/7.74.0"
::ffff:10.76.3.8 - - [02/Oct/2022:21:02:07 +0000] "GET / HTTP/1.0" 200 1663 "-" "curl/7.74.0"
::ffff:10.76.2.10 - - [02/Oct/2022:21:02:07 +0000] "GET / HTTP/1.0" 200 1663 "-" "curl/7.74.0"
::ffff:10.76.3.8 - - [02/Oct/2022:21:02:07 +0000] "GET / HTTP/1.0" 200 1663 "-" "curl/7.74.0"
::ffff:10.76.2.10 - - [02/Oct/2022:21:02:07 +0000] "GET / HTTP/1.0" 200 1663 "-" "curl/7.74.0"
::ffff:10.76.2.10 - - [02/Oct/2022:21:02:08 +0000] "GET / HTTP/1.0" 200 1663 "-" "curl/7.74.0"
::ffff:10.76.2.10 - - [02/Oct/2022:21:02:08 +0000] "GET / HTTP/1.0" 200 1663 "-" "curl/7.74.0"
hem_distributedsystems@cloudshell:~ (cohesive-cell-362020)$ kubectl logs -l run=web-deployment
::ffff:10.76.2.10 - - [02/Oct/2022:21:02:07 +0000] "GET / HTTP/1.0" 200 1663 "-" "curl/7.74.0"
::ffff:10.76.3.8 - - [02/Oct/2022:21:02:07 +0000] "GET / HTTP/1.0" 200 1663 "-" "curl/7.74.0"
::ffff:10.76.2.10 - - [02/Oct/2022:21:02:07 +0000] "GET / HTTP/1.0" 200 1663 "-" "curl/7.74.0"
::ffff:10.76.3.8 - - [02/Oct/2022:21:02:07 +0000] "GET / HTTP/1.0" 200 1663 "-" "curl/7.74.0"
::ffff:10.76.3.8 - - [02/Oct/2022:21:02:07 +0000] "GET / HTTP/1.0" 200 1663 "-" "curl/7.74.0"
::ffff:10.76.2.10 - - [02/Oct/2022:21:02:08 +0000] "GET / HTTP/1.0" 200 1663 "-" "curl/7.74.0"
::ffff:10.76.2.10 - - [02/Oct/2022:21:02:08 +0000] "GET / HTTP/1.0" 200 1663 "-" "curl/7.74.0"
::ffff:10.76.3.8 - - [02/Oct/2022:21:02:08 +0000] "GET / HTTP/1.0" 200 1663 "-" "curl/7.74.0"
::ffff:10.76.2.10 - - [02/Oct/2022:21:02:08 +0000] "GET / HTTP/1.0" 200 1663 "-" "curl/7.74.0"
::ffff:10.76.3.8 - - [02/Oct/2022:21:02:08 +0000] "GET / HTTP/1.0" 200 1663 "-" "curl/7.74.0"
listening on port 80
::ffff:10.76.3.8 - - [02/Oct/2022:21:00:13 +0000] "GET / HTTP/1.0" 200 1663 "-" "curl/7.74.0"
::ffff:10.76.3.8 - - [02/Oct/2022:21:02:07 +0000] "GET / HTTP/1.0" 200 1663 "-" "curl/7.74.0"
::ffff:10.76.2.10 - - [02/Oct/2022:21:02:07 +0000] "GET / HTTP/1.0" 200 1663 "-" "curl/7.74.0"
::ffff:10.76.3.8 - - [02/Oct/2022:21:02:07 +0000] "GET / HTTP/1.0" 200 1663 "-" "curl/7.74.0"
::ffff:10.76.2.10 - - [02/Oct/2022:21:02:07 +0000] "GET / HTTP/1.0" 200 1663 "-" "curl/7.74.0"
::ffff:10.76.3.8 - - [02/Oct/2022:21:02:07 +0000] "GET / HTTP/1.0" 200 1663 "-" "curl/7.74.0"
::ffff:10.76.2.10 - - [02/Oct/2022:21:02:07 +0000] "GET / HTTP/1.0" 200 1663 "-" "curl/7.74.0"
::ffff:10.76.2.10 - - [02/Oct/2022:21:02:08 +0000] "GET / HTTP/1.0" 200 1663 "-" "curl/7.74.0"
::ffff:10.76.2.10 - - [02/Oct/2022:21:02:08 +0000] "GET / HTTP/1.0" 200 1663 "-" "curl/7.74.0"
hem_distributedsystems@cloudshell:~ (cohesive-cell-362020)$
```

Step 6:

```
hem_distributedsystems@cloudshell:~ (cohesive-cell-362020)$ kubectl delete deployment ambassador-deployment
deployment.apps "ambassador-deployment" deleted
hem_distributedsystems@cloudshell:~ (cohesive-cell-362020)$ kubectl delete deployment experiment-deployment
deployment.apps "experiment-deployment" deleted
hem_distributedsystems@cloudshell:~ (cohesive-cell-362020)$ kubectl delete deployment web-deployment
deployment.apps "web-deployment" deleted
hem_distributedsystems@cloudshell:~ (cohesive-cell-362020)$ kubectl delete service web-deployment
service "web-deployment" deleted
hem_distributedsystems@cloudshell:~ (cohesive-cell-362020)$ kubectl delete service web-deployment
Error from server (NotFound): services "web-deployment" not found
hem_distributedsystems@cloudshell:~ (cohesive-cell-362020)$ kubectl delete service experiment-deployment
service "experiment-deployment" deleted
hem_distributedsystems@cloudshell:~ (cohesive-cell-362020)$ kubectl delete service ambassador-deployment
service "ambassador-deployment" deleted
hem_distributedsystems@cloudshell:~ (cohesive-cell-362020)$
```

—--

Part 3

Step 1

Part a and b:

```
hem_distributedsystems@cloudshell:~ (cohesive-cell-362020)$ kubectl create -f loadbalancer-deployment.yaml
deployment.apps/loadbalancer-deployment created
hem_distributedsystems@cloudshell:~ (cohesive-cell-362020)$
```

Part c

```
hem_distributedsystems@cloudshell:~ (cohesive-cell-362020)$ kubectl get pods --output=wide
NAME                                    READY   STATUS    RESTARTS   AGE   IP          NODE                                          NOMINATED NODE   READINESS GATES
loadbalancer-deployment-6676f9ccf6-7pwz6   1/1     Running   0          61s   10.76.1.8   gke-openfaas-default-pool-392835dd-ryhh   <none>           <none>
loadbalancer-deployment-6676f9ccf6-gh27v   1/1     Running   0          61s   10.76.2.11  gke-openfaas-default-pool-392835dd-njso   <none>           <none>
loadbalancer-deployment-6676f9ccf6-s416m   1/1     Running   0          60s   10.76.3.9   gke-openfaas-default-pool-392835dd-mx0t   <none>           <none>
mongo-0                                 1/1     Running   0          31h   10.76.3.6   gke-openfaas-default-pool-392835dd-mx0t   <none>           <none>
mongo-deployment-0                      1/1     Running   0          31h   10.76.1.4   gke-openfaas-default-pool-392835dd-ryhh   <none>           <none>
mongodb-0                               1/1     Running   0          31h   10.76.3.7   gke-openfaas-default-pool-392835dd-mx0t   <none>           <none>
hem_distributedsystems@cloudshell:~ (cohesive-cell-362020)$
```

Step 2

Part a and b

```
hem_distributedsystems@cloudshell:~ (cohesive-cell-362020)$ kubectl expose deployment loadbalancer-deployment --port=8080 --type=LoadBalancer
service/loadbalancer-deployment exposed
hem_distributedsystems@cloudshell:~ (cohesive-cell-362020)$ kubectl get services --watch
NAME                    TYPE           CLUSTER-IP      EXTERNAL-IP      PORT(S)          AGE
kubernetes              ClusterIP      10.80.0.1       <none>           443/TCP          13d
loadbalancer-deployment LoadBalancer   10.80.11.182    <pending>        8080:31110/TCP   19s
mongo-nodeport-svc      NodePort       10.80.12.236    <none>           27017:32000/TCP  13d
mongo-service           LoadBalancer   10.80.13.8      35.234.254.180   27017:31794/TCP  13d
mongodb                 ClusterIP      None            <none>           27017/TCP        13d
mongodb-service         LoadBalancer   10.80.12.59     34.152.21.61     27017:30683/TCP  13d
loadbalancer-deployment LoadBalancer   10.80.11.182    35.203.83.103    8080:31110/TCP   45s
^Chem_distributedsystems@cloudshell:~ (cohesive-cell-362020)$
hem_distributedsystems@cloudshell:~ (cohesive-cell-362020)$
```

Step 3:

```
hem_distributedsystems@cloudshell:~ (cohesive-cell-362020)$ curl http://35.203.83.103:8080/dog
A quadruped of the genus Canis, esp. the domestic dog (C.familiaris).hem_distributedsystems@cloudshell:~ (cohesive-cell-362020)$ curl http://35.203.83.103:8080/storey
See Story.hem_distributedsystems@cloudshell:~ (cohesive-cell-362020)$ curl http://35.203.83.103:8080/storey
See Story.hem_distributedsystems@cloudshell:~ (cohesive-cell-362020)$ curl http://35.203.83.103/storey
```

Step 4

```
See Story.hem_distributedsystems@cloudshell:~ (cohesive-cell-362020)$ kubectl delete deployment loadbalancer-deployment
deployment.apps "loadbalancer-deployment" deleted
hem_distributedsystems@cloudshell:~ (cohesive-cell-362020)$ kubectl delete service loadbalancer-deployment
service "loadbalancer-deployment" deleted
```

Design - Autoscaling

```
hem_distributedsystems@cloudshell:~ (cohesive-cell-362020)$ kubectl get hpa
NAME         REFERENCE                TARGETS   MINPODS   MAXPODS   REPLICAS   AGE
php-apache   Deployment/php-apache   0%/50%    1         10        1          12m
hem_distributedsystems@cloudshell:~ (cohesive-cell-362020)$ kubectl get hpa php-apache --watch
NAME         REFERENCE                TARGETS   MINPODS   MAXPODS   REPLICAS   AGE
php-apache   Deployment/php-apache   43%/50%   1         10        1          14m
php-apache   Deployment/php-apache   250%/50%   1         10        1          14m
php-apache   Deployment/php-apache   250%/50%   1         10        4          14m
php-apache   Deployment/php-apache   158%/50%   1         10        5          14m
php-apache   Deployment/php-apache   69%/50%    1         10        5          15m
^Chem_distributedsystems@cloudshell:~ (cohesive-cell-362020)$ kubectl get deployment php-apache
NAME         READY   UP-TO-DATE   AVAILABLE   AGE
php-apache   5/5     5            5           4m42s
hem_distributedsystems@cloudshell:~ (cohesive-cell-362020)$ kubectl get hpa php-apache --watch
NAME         REFERENCE                TARGETS   MINPODS   MAXPODS   REPLICAS   AGE
php-apache   Deployment/php-apache   0%/50%    1         10        5          16m
^Chem_distributedsystems@cloudshell:~ (cohesive-cell-362020)$
hem_distributedsystems@cloudshell:~ (cohesive-cell-362020)$ kubectl get deployment php-apache
NAME         READY   UP-TO-DATE   AVAILABLE   AGE
php-apache   5/5     5            5           5m44s
hem_distributedsystems@cloudshell:~ (cohesive-cell-362020)$ kubectl get deployment php-apache
NAME         READY   UP-TO-DATE   AVAILABLE   AGE
php-apache   5/5     5            5           6m21s
hem_distributedsystems@cloudshell:~ (cohesive-cell-362020)$ kubectl get hpa php-apache --watch
NAME         REFERENCE                TARGETS   MINPODS   MAXPODS   REPLICAS   AGE
php-apache   Deployment/php-apache   0%/50%    1         10        5          18m
^Chem_distributedsystems@cloudshell:~ (cohesive-cell-362020)$
hem_distributedsystems@cloudshell:~ (cohesive-cell-362020)$ kubectl get deployment php-apache
NAME         READY   UP-TO-DATE   AVAILABLE   AGE
php-apache   5/5     5            5           7m39s
hem_distributedsystems@cloudshell:~ (cohesive-cell-362020)$ kubectl get deployment php-apache
NAME         READY   UP-TO-DATE   AVAILABLE   AGE
php-apache   5/5     5            5           8m15s
hem_distributedsystems@cloudshell:~ (cohesive-cell-362020)$ kubectl get hpa php-apache --watch
NAME         REFERENCE                TARGETS   MINPODS   MAXPODS   REPLICAS   AGE
php-apache   Deployment/php-apache   0%/50%    1         10        1          21m
^Chem_distributedsystems@cloudshell:~ (cohesive-cell-362020)$
hem_distributedsystems@cloudshell:~ (cohesive-cell-362020)$ kubectl get deployment php-apache
NAME         READY   UP-TO-DATE   AVAILABLE   AGE
php-apache   1/1     1            1           10m
hem_distributedsystems@cloudshell:~ (cohesive-cell-362020)$
```

There are 3 types of autoscaling features in Kubernetes:
i) Horizontal Pod Autoscaler
ii) Vertical Pod Autoscaler
iii) Cluster Autoscaler

For the Design section of this lab, I chose to work on Horizontal Pod Autoscaler (HPA). HPA helps with the automation of workload and demand management. That is, it automatically updates the deployment or the statefulset (workload resources) where increasing the load would lead to the deployment of more pods. With a subsequent decrease in load, HPA will ask the workload resource to scale back down as the number of Pods available is way higher than the minimum number specified in the configuration. The screenshot above shows how the number of replicas (pod deployment) increase and decrease according to the load. In the screenshot the load is indicated by the ‘Targets’ value.

The difference between auto scaling and load balancing is that an Auto Scaler allows automatic scaling up and down while a Loadbalancer distributes the incoming traffic across multiple targets. Meanwhile a request splitter is more of a controller for splitting incoming requests/traffic to different targets.

I have used the 2 following links to complete the Design section:
i) https://kubernetes.io/docs/tasks/run-application/horizontal-pod-autoscale/
ii) https://kubernetes.io/docs/tasks/run-application/horizontal-pod-autoscale-walkthrough/

Video Links:

https://drive.google.com/drive/folders/1gyiVFTrn_n7ga4bEZAI1sKPq0ZwX_5YH?usp=sharing