

# K6 Load Testing

## Introduction

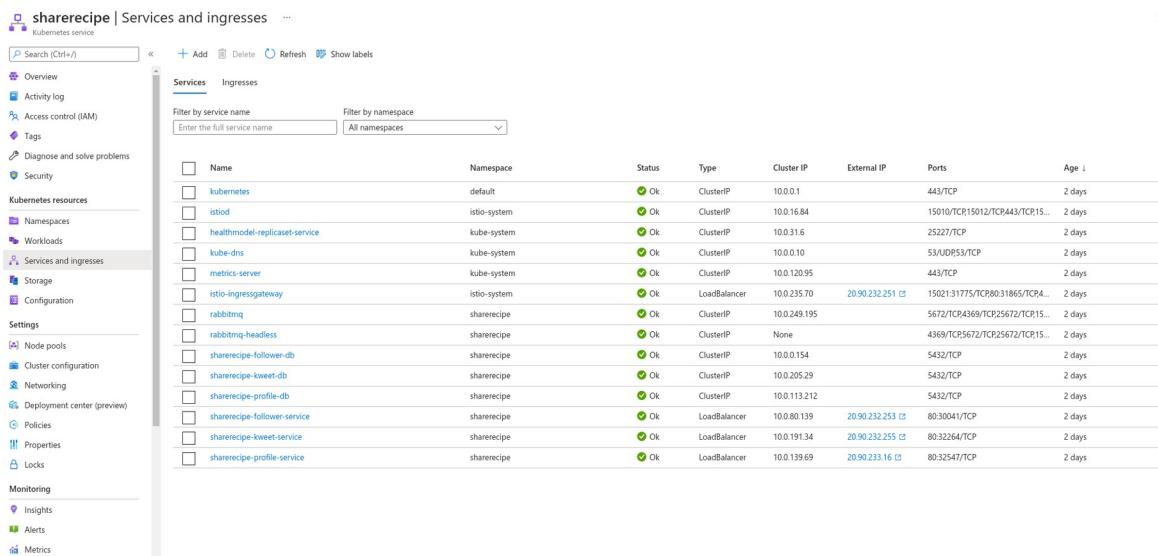
In this document you will find the information on the load tests that were done with the tool k6. The goal of this document is to show the scalability of the project.

## Test Setup

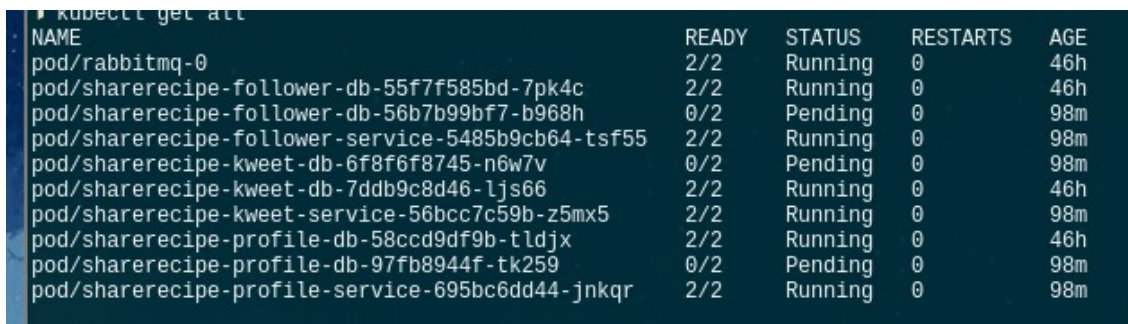
We will be testing scalability in the Azure environment and on the local environment. The reason for this is that the scalability is poorly shown on the azure environment since my subscription has limited me in the amount of cpu I can use for my project.

## Cloud

For my cloud setup I have everything setup in azure as can be seen in the image below.



Name	Namespace	Status	Type	Cluster IP	External IP	Ports	Age
kubernetes	default	Ok	ClusterIP	10.0.0.1		443/TCP	2 days
istiod	istio-system	Ok	ClusterIP	10.0.16.84		15010/TCP,15012/TCP,443/TCP,15...	2 days
healthmodel-replicaset-service	kube-system	Ok	ClusterIP	10.0.31.6		25227/TCP	2 days
kube-dns	kube-system	Ok	ClusterIP	10.0.0.10		53/UDP,53/TCP	2 days
metrics-server	kube-system	Ok	ClusterIP	10.0.120.95		443/TCP	2 days
istio-ingressgateway	istio-system	Ok	LoadBalancer	10.0.235.70	20.90.232.251	15021:31775/TCP,80:31865/TCP,4...	2 days
rabbitmq	sharerecipe	Ok	ClusterIP	10.0.249.195		5672/TCP,5672/TCP,25672/TCP,15...	2 days
rabbitmq-headless	sharerecipe	Ok	ClusterIP	None		4369/TCP,5672/TCP,25672/TCP,15...	2 days
sharerecipe-follower-db	sharerecipe	Ok	ClusterIP	10.0.0.154		5432/TCP	2 days
sharerecipe-kweet-db	sharerecipe	Ok	ClusterIP	10.0.205.29		5432/TCP	2 days
sharerecipe-profile-db	sharerecipe	Ok	ClusterIP	10.0.113.212		5432/TCP	2 days
sharerecipe-follower-service	sharerecipe	Ok	LoadBalancer	10.0.80.139	20.90.232.253	80:30041/TCP	2 days
sharerecipe-kweet-service	sharerecipe	Ok	LoadBalancer	10.0.191.34	20.90.232.255	80:32264/TCP	2 days
sharerecipe-profile-service	sharerecipe	Ok	LoadBalancer	10.0.139.69	20.90.233.16	80:32547/TCP	2 days



NAME	READY	STATUS	RESTARTS	AGE
pod/rabbitmq-0	2/2	Running	0	46h
pod/sharerecipe-follower-db-55f7f585bd-7pk4c	2/2	Running	0	46h
pod/sharerecipe-follower-db-56b7b99bf7-b968h	0/2	Pending	0	98m
pod/sharerecipe-follower-service-5485b9cb64-ts5f55	2/2	Running	0	98m
pod/sharerecipe-kweet-db-6f8f6f8745-n6w7v	0/2	Pending	0	98m
pod/sharerecipe-kweet-db-7ddb9c8d46-ljs66	2/2	Running	0	46h
pod/sharerecipe-kweet-service-56bcc7c59b-z5mx5	2/2	Running	0	98m
pod/sharerecipe-profile-db-58ccd9df9b-tldjx	2/2	Running	0	46h
pod/sharerecipe-profile-db-97fb8944f-tk259	0/2	Pending	0	98m
pod/sharerecipe-profile-service-695bc6dd44-jnkqr	2/2	Running	0	98m

# Local

For my local setup I have the current configuration. In this example I can make use of an Horizontal scaler to automatically scale my application.

```
Semester6/ShareRecipe/K8s ~master x
# kubectl get all
NAME                                READY   STATUS    RESTARTS   AGE
pod/rabbitmq-0                      2/2     Running   0           8m10s
pod/sharerecipe-follower-db-55f7f585bd-7pxkd    2/2     Running   0           8m9s
pod/sharerecipe-follower-service-6f7f888d6f-zp7vs  2/2     Running   0           8m9s
pod/sharerecipe-kweet-db-7ddb9c8d46-mfbz2      2/2     Running   0           8m9s
pod/sharerecipe-kweet-service-77f4b85455-tsbnj   2/2     Running   0           8m9s
pod/sharerecipe-profile-db-58ccd9df9b-7rsg2     2/2     Running   0           8m9s
pod/sharerecipe-profile-service-79d7df789c-4s8sr  2/2     Running   0           8m9s

NAME                                TYPE                CLUSTER-IP      EXTERNAL-IP      PORT(S)              AGE
service/rabbitmq                    ClusterIP            10.111.230.215   <none>            5672/TCP, 4369/TCP, 25672/TCP, 15672/TCP  8m10s
service/rabbitmq-headless           ClusterIP            None             <none>            4369/TCP, 5672/TCP, 25672/TCP, 15672/TCP  8m10s
service/sharerecipe-follower-db     ClusterIP            10.104.78.36     <none>            5432/TCP              8m10s
service/sharerecipe-follower-service LoadBalancer         10.110.183.80    192.168.49.1     80:32585/TCP          8m9s
service/sharerecipe-kweet-db        ClusterIP            10.104.228.141   <none>            5432/TCP              8m9s
service/sharerecipe-kweet-service   LoadBalancer         10.102.74.44     192.168.49.2     80:30240/TCP          8m9s
service/sharerecipe-profile-db       ClusterIP            10.104.105.60    <none>            5432/TCP              8m9s
service/sharerecipe-profile-service LoadBalancer         10.111.229.253   192.168.49.3     80:31258/TCP          8m9s

NAME                                READY   UP-TO-DATE   AVAILABLE   AGE
deployment.apps/sharerecipe-follower-db  1/1     1             1           8m10s
deployment.apps/sharerecipe-follower-service  1/1     1             1           8m9s
deployment.apps/sharerecipe-kweet-db        1/1     1             1           8m9s
deployment.apps/sharerecipe-kweet-service   1/1     1             1           8m9s
deployment.apps/sharerecipe-profile-db       1/1     1             1           8m9s
deployment.apps/sharerecipe-profile-service  1/1     1             1           8m9s

NAME                                DESIRED   CURRENT   READY   AGE
replicaset.apps/sharerecipe-follower-db-55f7f585bd  1         1         1       8m9s
replicaset.apps/sharerecipe-follower-service-6f7f888d6f  1         1         1       8m9s
replicaset.apps/sharerecipe-kweet-db-7ddb9c8d46  1         1         1       8m9s
replicaset.apps/sharerecipe-kweet-service-77f4b85455  1         1         1       8m9s
replicaset.apps/sharerecipe-profile-db-58ccd9df9b  1         1         1       8m9s
replicaset.apps/sharerecipe-profile-service-79d7df789c  1         1         1       8m9s

NAME                                READY   AGE
statefulset.apps/rabbitmq            1/1     8m10s

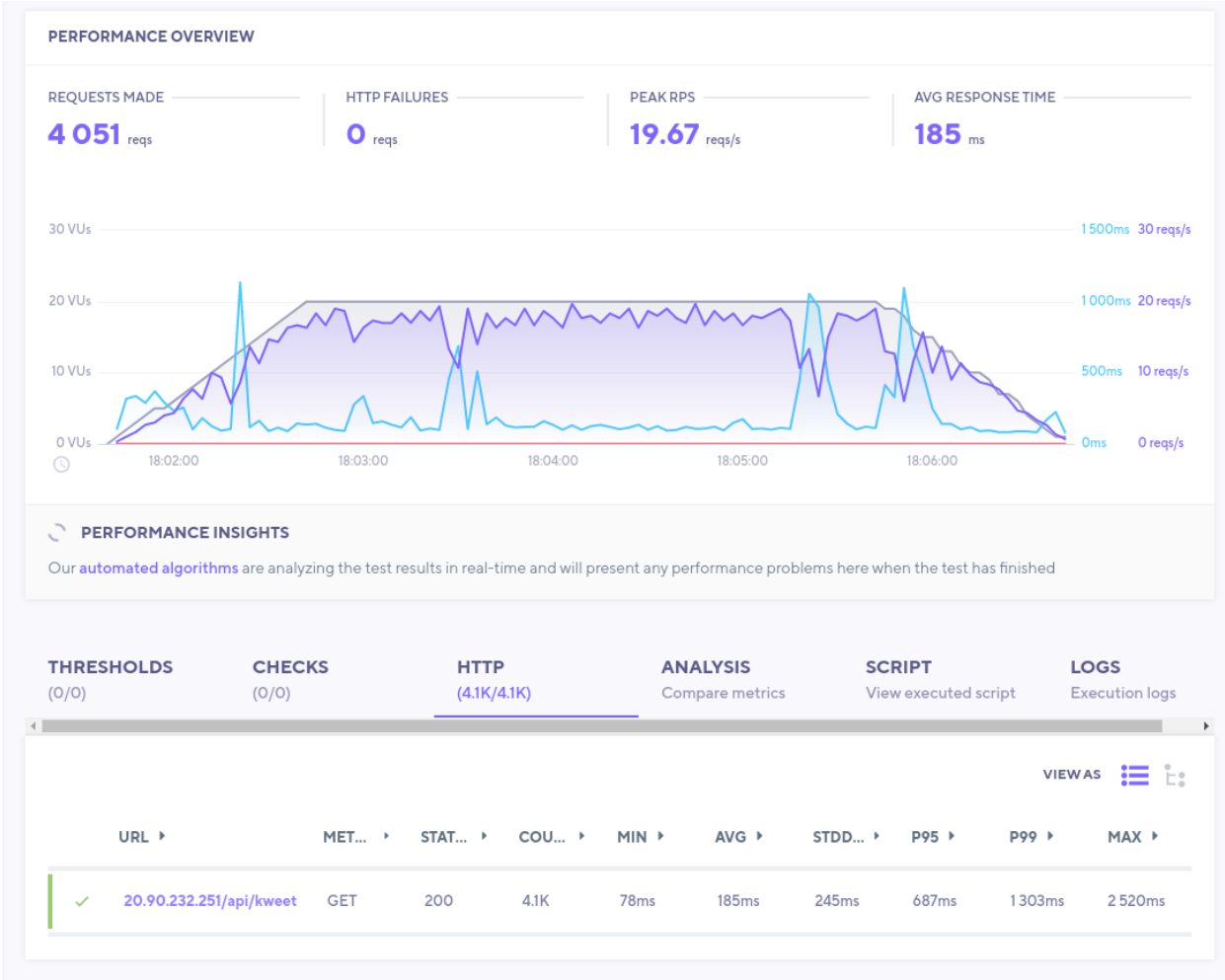
NAME                                REFERENCE                                TARGETS      MINPODS   MAXPODS   REPLICAS   AGE
horizontalpodautoscaler.autoscaling/sharerecipe-follower-service-autoscaler  Deployment/sharerecipe-follower-service  <unknown>/75%  1         5         1           8m9s
horizontalpodautoscaler.autoscaling/sharerecipe-kweet-service-autoscaler      Deployment/sharerecipe-kweet-service      <unknown>/75%  1         5         1           8m9s
horizontalpodautoscaler.autoscaling/sharerecipe-profile-service-autoscaler     Deployment/sharerecipe-profile-service     <unknown>/75%  1         5         1           8m9s

Semester6/ShareRecipe/K8s ~master x
```

# Test Results

## Cloud

For my cloud environment this was the result. the reason for this is that the services were limited on the amount of cpu which caused it to not scale properly. This is the reason for those spikes you see in the report. Blue line shows the response time while the purple gradient shows the amount of requests being sent at the same time. As you can see it struggles a bit when it's trying to process 20 requests at the same time.



VIEWS

## Local

This is the results on local. In this load test you see there are a lot less spikes. Another thing you can see is that It will showcase the load that the service is facing in the autoscaler.

This looks a lot better since here the autoscaler does it's job and makes the service scale when necessary and descale when it's not necessary anymore. At the same time you can see that the time it takes for requests has drastically reduced.

NAME	REFERENCE	TARGETS	MINPODS	MAXPODS	REPLICAS	AGE
horizontalpodautoscaler.autoscaling/sharerecipe-follower-service-autoscaler	Deployment/sharerecipe-follower-service	2%/75%	1	5	1	57m
horizontalpodautoscaler.autoscaling/sharerecipe-kweet-service-autoscaler	Deployment/sharerecipe-kweet-service	22%/75%	1	5	1	57m
horizontalpodautoscaler.autoscaling/sharerecipe-profile-service-autoscaler	Deployment/sharerecipe-profile-service	3%/75%	1	5	1	57m

```

ko run script.js

  execution: local
    script: script.js
    output: -

  scenarios: (100.00%) 1 scenario, 20 max VUs, 5m30s max duration (incl. graceful stop):
    * default: Up to 20 looping VUs for 5m0s over 3 stages (gracefulRampDown: 30s, gracefulStop: 30s)

running (5m01.2s), 00/20 VUs, 4576 complete and 0 interrupted iterations
default ✓ [=====] 00/20 VUs  5m0s

  data_received.....: 1.2 MB 3.8 kB/s
  data_sent.....: 6.6 MB 22 kB/s
  http_req_blocked.....: avg=7.42µs min=912ns med=4.91µs max=831.73µs p(90)=9.07µs p(95)=11.21µs
  http_req_connecting.....: avg=1.52µs min=0s med=0s max=689.38µs p(90)=0s p(95)=0s
  http_req_duration.....: avg=57ms min=1.1ms med=3.79ms max=1.1s p(90)=94.93ms p(95)=302.49ms
  http_req_receiving.....: avg=51.34µs min=7.27µs med=46µs max=2.94ms p(90)=83.07µs p(95)=98.5µs
  http_req_sending.....: avg=30.32µs min=5.3µs med=25.55µs max=3.06ms p(90)=51.85µs p(95)=60.88µs
  http_req_tls_handshaking...: avg=0s min=0s med=0s max=0s p(90)=0s p(95)=0s
  http_req_waiting.....: avg=56.92ms min=1.07ms med=3.71ms max=1.1s p(90)=94.85ms p(95)=302.34ms
  http_reqs.....: 4576 15.191232/s
  iteration_duration.....: avg=1.05s min=1s med=1s max=2.1s p(90)=1.09s p(95)=1.3s
  iterations.....: 4576 15.191232/s
  vus.....: 1 min=1 max=20
  vus_max.....: 20 min=20 max=20

Time: 0h:05m:03s

School/Semester6/ShareRecipe master x

```