

# Exercise 14b

*Create a Kubernetes Cluster in DigitalOcean and Deploy Cassandra*

## Prior Knowledge

Unix Command Line Shell

YAML

Completion of Ex 14a

## Learning Objectives

See how Cassandra replicates

Introduction to Kubernetes

## Software Requirements

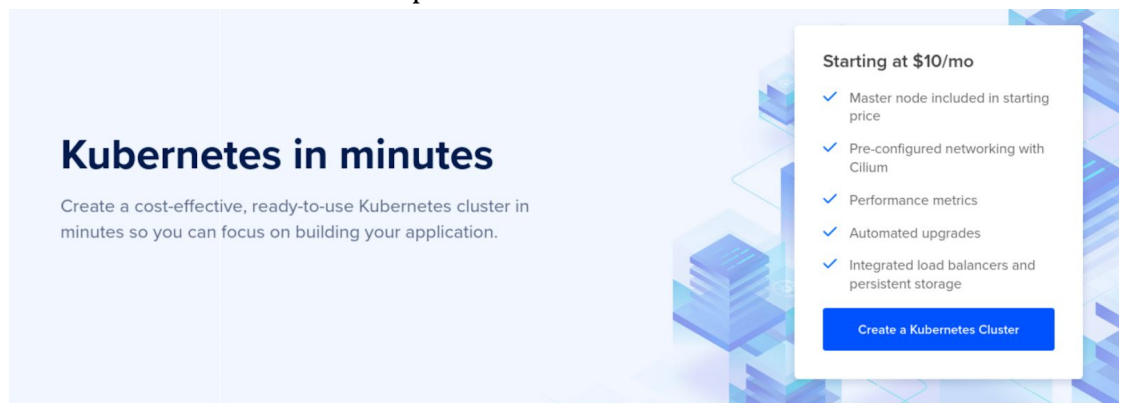
Browser

kubectl

## Overview

In this exercise we are going to instantiate a Kubernetes cluster in DO, then install a Cassandra ring onto the kubernetes cluster. Finally we will do some load-testing.

1. If you have left the cluster running from Ex14a, go straight to **step 2**
  - a. Otherwise redo the steps to create a cluster:



- b. Make sure you install the monitoring 1-click app.

- d. Download the config file, then:

```
mv ~/Downloads/k8s-cass-kubeconfig.yaml ~/.kube/
```

In your terminal window:

```
export KUBECONFIG=~/.kube/k8s-cass-kubeconfig.yaml
```

(There are also other things we can do, but this works fine)

- e. Check it works:

```
kubectl get all
```

You should see something like:

NAME	TYPE	CLUSTER-IP	EXTERNAL-IP	PORT(S)	AGE
service/kubernetes	ClusterIP	10.245.0.1	<none>	443/TCP	45m

2. Now let's make a directory for our Cassandra YAMLs:

```
mkdir ~/cassandra
```

3. There are only two small YAML files required to get Cassandra running. They come from this webpage:

<https://kubernetes.io/docs/tutorials/stateful-application/cassandra/>

Because we need to modify one of them, let's download them:

```
cd ~/cassandra
wget https://k8s.io/examples/application/cassandra/cassandra-service.yaml
wget https://k8s.io/examples/application/cassandra/cassandra-statefulset.yaml
```

4. Take a look at the cassandra-service.yaml:

It is really simple (for YAML!):

```
apiVersion: v1
kind: Service
metadata:
  labels:
    app: cassandra
    name: cassandra
spec:
  clusterIP: None
  ports:
  - port: 9042
  selector:
    app: cassandra
```

5. This is “kind of” the equivalent of EXPOSE in Docker. You could compare this to the one in the “hello-kubernetes” app if you like.

6. Let’s deploy this:

```
kubectl apply -f cassandra-service.yaml
```

```
service/cassandra created
```

7. Check if it is happy:

```
kubectl get svc
```

NAME	TYPE	CLUSTER-IP	EXTERNAL-IP	PORT(S)	AGE
cassandra	ClusterIP	None	<none>	9042/TCP	29s
kubernetes	ClusterIP	10.245.0.1	<none>	443/TCP	28m

8. You should see the cassandra service running alongside the kubernetes master. We need this to be in place **before** we start the next part because the different pods need to be able to access each other via port 9042 for the cluster to form.

9. The second file is more complex. It basically defines three things:

- a. The cassandra images and config to start a cassandra container

```
apiVersion: apps/v1
kind: StatefulSet
metadata:
  name: cassandra
  labels:
    app: cassandra
spec:
  serviceName: cassandra
  replicas: 3
  selector:
    matchLabels:
      app: cassandra
  template:
    metadata:
      labels:
        app: cassandra
```

(That is just the start of that bit)

- b. Defines the storage that will be needed by these servers in a StatefulSet  
(<https://cloud.google.com/kubernetes-engine/docs/concepts/statefulset>)

```
volumeClaimTemplates:
- metadata:
  name: cassandra-data
spec:
  accessModes: [ "ReadWriteOnce" ]
  storageClassName: fast
  resources:
    requests:
      storage: 1Gi
```

- c. Defines a StorageClass for deploying into Minikube (a kubernetes distro designed to run on developers' machines).

```
---
kind: StorageClass
apiVersion: storage.k8s.io/v1
metadata:
  name: fast
provisioner: k8s.io/minikube-hostpath
parameters:
  type: pd-ssd
```

10. This YAML will **not work** as is. That is because we need the Kubernetes cluster to request disk from DigitalOcean specifically, not from minikube.

11. Let's see what StorageClass is available in our DO cluster:

```
kubectl get storageclass
```

NAME	PROVISIONER	RECLAIMPOLICY	VOLUMEBINDINGMODE	ALLOWVOLUMEEXPANSION	AGE
do-block-storage (default)	dobs.csi.digitalocean.com	Delete	Immediate	true	5h26m

This is a pre-configured storage class for DO called `do-block-storage`

12. We need to edit the YAML file:

```
code ~/cassandra/cassandra-statefulset.yaml
```

13. Firstly, lets delete the StorageClass section:

Delete all the highlighted lines:

```
90 resources:
91   requests:
92     storage: 1Gi
93   ---
94   kind: StorageClass
95   apiVersion: storage.k8s.io/v1
96   metadata:
97     name: fast
98   provisioner: k8s.io/minikube-hostpath
99   parameters:
100     type: pd-ssd
101
```

14. Secondly, change the storageClassName from **fast** to **do-block-storage** (which we just identified above).

```

80     mountPath: /cassandra_data
81     # These are converted to volume claims by the controller
82     # and mounted at the paths mentioned above.
83     # do not use these in production until ssd GCEPersistentDisk or
84     volumeClaimTemplates:
85     - metadata:
86         name: cassandra-data
87       spec:
88         accessModes: [ "ReadWriteOnce" ]
89         storageClassName: do-block-storage
90       resources:
91         requests:
92           storage: 1Gi
93
94

```

15. Save the file

16. Let's deploy this now:

```
kubectl apply -f cassandra-statefulset.yaml
```

```
statefulset.apps/cassandra created
```

17. We need to wait a bit for this to start. Basically the system is making API requests to DigitalOcean to provision disks.

If you go to k9s, you should see the containers appearing and starting up:

The screenshot shows the k9s terminal interface. On the left, it displays context and cluster information: Context: do-lon1-k8s-cass, Cluster: do-lon1-k8s-cass, User: do-lon1-k8s-cass-admin, K9s Rev: 0.7.12, K8s Rev: v1.18.3, CPU: 21%, MEM: 35%. On the right, there's a sidebar with navigation options like Delete, Describe, Edit, Logs, etc. The main area shows a table of pods for the 'cassandra' statefulset.

Pods(default) [2]											
NAME	READY	STATUS	RS	CPU	MEM	%CPU	%MEM	IP	NODE	QOS	AGE
cassandra-0	1/1	Running	0	330	752	66	73	10.244.0.153	pool-m5zkj3x5p-3o7gb	GA	115s
cassandra-1	0/1	Running	0	0	1	0	0	10.244.0.73	pool-m5zkj3x5p-3o7gw	GA	47s

19. If you go to the DigitalOcean control panel you will see **Volumes** being created:

Volumes Create Volume

Name	Droplet	Created
pvc-9780eb20-c8b9-4b2c-b9d3-97... LON1 / 1 GB	pool-m5zkj3x5p-3o7gw 4 GB / 80 GB / LON1	1 minute ago <span>More</span>
pvc-fc0ff55a-041f-439a-9ed9-2074... LON1 / 1 GB	pool-m5zkj3x5p-3o7gb 4 GB / 80 GB / LON1	3 minutes ago <span>More</span>

**Block storage basics**

[Overview](#) [API docs](#) [Tell us what you think](#)

Discover block storage, and what you can do with volumes. Use block storage volumes via the DigitalOcean API. Submit your feedback on block storage.

20. After about 5 minutes the cluster should be up and running:

```
kubectl get all
```

```
NAME                READY   STATUS    RESTARTS   AGE
pod/cassandra-0     1/1     Running   0           10m
pod/cassandra-1     1/1     Running   0           9m21s
pod/cassandra-2     1/1     Running   0           7m37s

NAME                TYPE          CLUSTER-IP   EXTERNAL-IP   PORT(S)    AGE
service/cassandra   ClusterIP     None         <none>         9042/TCP   5h14m
service/kubernetes  ClusterIP     10.245.0.1   <none>         443/TCP    5h42m

NAME                READY   AGE
statefulset.apps/cassandra  3/3     10m
```

21. We can now execute commands in the cassandra cluster.

“kubectl exec -ti” is a bit like docker exec. This executes the command that follows -- on the cassandra-0 container instance.

```
kubectl exec -ti cassandra-0 -- nodetool status
```

```
Datacenter: DC1-K8Demo
=====
Status=Up/Down
-- State=Normal/Leaving/Joining/Moving
-- Address      Load      Tokens     Owns (effective)  Host ID                               Rack
UN  10.244.1.109  89.9 KiB  32         52.6%             70e6195b-3629-4d66-a10c-f345015cf68c  Rack1-K8Demo
UN  10.244.0.153  104.55 KiB  32         73.9%             5690399f-6052-439d-b23d-e76e6c152758  Rack1-K8Demo
UN  10.244.0.73   65.81 KiB  32         73.5%             c5a95d05-6891-4586-b416-db5b828b3ccf  Rack1-K8Demo
```

22. Now let's stress test the server. We can do it over the network between our machine and the DO cluster, but be warned this isn't terribly efficient.

First, let's forward the cluster port 9042 to local port 9040. We are choosing 9040 locally because we might still be running cassandra locally on 9042 and we want to be sure we are talking to the remote cluster:

```
kubectl port-forward pods/cassandra-0 9040:9042
```

You should see:

```
Forwarding from 127.0.0.1:9040 -> 9042
Forwarding from [::1]:9040 -> 9042
```

*Leave that window and **start a new terminal window**.*

23. Now let's to a stress test on port 9040:

```
cassandra-stress write n=100000 -port native=9040 -rate threads=1000
```

You may see some Java exceptions in the logs (due to networking challenges). Eventually it should finish with something like:

```
Results:
Op rate           :    1,745 op/s  [WRITE: 1,745 op/s]
Partition rate    :    1,745 pk/s  [WRITE: 1,745 pk/s]
Row rate          :    1,745 row/s [WRITE: 1,745 row/s]
Latency mean      :   562.7 ms [WRITE: 562.7 ms]
Latency median    :   504.9 ms [WRITE: 504.9 ms]
Latency 95th percentile : 995.1 ms [WRITE: 995.1 ms]
Latency 99th percentile : 1297.1 ms [WRITE: 1,297.1 ms]
Latency 99.9th percentile : 1903.2 ms [WRITE: 1,903.2 ms]
Latency max       :  2493.5 ms [WRITE: 2,493.5 ms]
Total partitions  :    100,000 [WRITE: 100,000]
Total errors      :             0 [WRITE: 0]
Total GC count    :      0
Total GC memory   :    0.000 KiB
Total GC time     :     0.0 seconds
Avg GC time       :     NaN ms
StdDev GC time    :     0.0 ms
Total operation time : 00:00:57

END
```

24. Kill the port forwarding process (Ctrl-C).



26. Let's now do the same test from within the cluster. Use the same window you've been using for kubectl before (i.e. the one where you did `export KUBECONFIG=`)  
To do this, we can start a new pod and get shell access:

```
kubectl apply -f https://raw.githubusercontent.com/pzfreo/ox-clo/master/code/cass-tools/shell.yaml
```

You should see:

```
root@pool-gdbx1mdop-3oyjy:/#
```

27. This is just an Ubuntu container with cassandra tools installed.

Start another window and do

```
export KUBECONFIG=~/.kube/k8s-cass-kubeconfig.yaml
```

Let's check it started:

```
kubectl get all
```

NAME	READY	STATUS	RESTARTS	AGE
pod/cassandra-0	1/1	Running	0	4h27m
pod/cassandra-1	1/1	Running	0	4h26m
pod/cassandra-2	1/1	Running	0	4h24m
<b>pod/casstool</b>	<b>1/1</b>	<b>Running</b>	<b>0</b>	<b>23m</b>

NAME	TYPE	CLUSTER-IP	EXTERNAL-IP	PORT(S)
service/cassandra	ClusterIP	None	<none>	9042/TCP
service/kubernetes	ClusterIP	10.245.0.1	<none>	443/TCP

NAME	READY	AGE
statefulset.apps/cassandra	3/3	4h27m

28. Inside kubernetes, the networking is different to the real world. We need to know a host IP to contact the pods on:

```
kubectl describe svc/cassandra
```

```
Name:                cassandra
Namespace:           default
Labels:              app=cassandra
Annotations:         Selector: app=cassandra
Type:                ClusterIP
IP:                  None
Port:                <unset> 9042/TCP
TargetPort:          9042/TCP
Endpoints:           10.244.0.153:9042,10.244.0.73:9042,10.244.1.109:9042
Session Affinity:    None
Events:              <none>
```

Choose one of the IP addresses listed as an endpoint. Make a note (in my case 10.244.0.153)

29. We can now get a command-line in that container:

```
kubectl exec -it casstool -- bash
```

### 30. Now let's redo that test from within the cluster (with your IP address)

```
cassandra-stress write n=100000 -rate threads=1000 -node 10.244.0.153
```

Unless you have a massively fast connection from your machine to the DO datacentre, you should see much better performance now:

```
Results:
Op rate           : 7,527 op/s [WRITE: 7,527 op/s]
Partition rate    : 7,527 pk/s [WRITE: 7,527 pk/s]
Row rate          : 7,527 row/s [WRITE: 7,527 row/s]
Latency mean      : 123.7 ms [WRITE: 123.7 ms]
Latency median    : 87.9 ms [WRITE: 87.9 ms]
Latency 95th percentile : 419.7 ms [WRITE: 419.7 ms]
Latency 99th percentile : 649.6 ms [WRITE: 649.6 ms]
Latency 99.9th percentile : 1015.0 ms [WRITE: 1,015.0 ms]
Latency max       : 1106.2 ms [WRITE: 1,106.2 ms]
Total partitions  : 100,000 [WRITE: 100,000]
Total errors       : 0 [WRITE: 0]
Total GC count     : 0
Total GC memory    : 0.000 KiB
Total GC time      : 0.0 seconds
Avg GC time        : NaN ms
StdDev GC time     : 0.0 ms
Total operation time : 00:00:13
```

END

### 31. Now let's add another node into the cluster.

Quit that container shell (Ctrl-D) and execute this command:

```
kubectl scale --replicas 4 statefulset/cassandra
```

Wait for the new instance to be live:

The screenshot shows a terminal window with the following content:

```
Context: do-lon1-k8s-cass
Cluster: do-lon1-k8s-cass
User: do-lon1-k8s-cass-admin
K8s Rev: 0.7.12
K8s Rev: v1.18.3
CPU: 29%
MEM: 67%
```

Below this, there is a table of pods (default) [5]:

NAME	READY	STATUS	RS	CPU	MEM	%CPU	%MEM	IP	NODE	QOS	AGE
cassandra-0	1/1	Running	0	230	814	46	79	10.244.0.153	pool-m5zkj3x5p-3o7gb	GA	4h43m
cassandra-1	1/1	Running	0	257	801	51	78	10.244.0.73	pool-m5zkj3x5p-3o7gb	GA	4h42m
cassandra-2	1/1	Running	0	425	849	85	82	10.244.1.189	pool-m5zkj3x5p-3o7gb	GA	4h41m
cassandra-3	1/1	Running	0	332	722	66	70	10.244.0.125	pool-m5zkj3x5p-3o7gb	GA	3m45s
cass-tool	1/1	Running	0	1	2	0	0	10.106.0.5	pool-m5zkj3x5p-3o7gb	BE	39m

At the bottom of the terminal, the command `kubectl scale --replicas 4 statefulset/cassandra` is visible.

### 33. Now lets ask the status from Cassandra:

```

oxclo@oxclo: ~/cassandra
kubectl exec -ti cassandra-0 -- nodetool status
Datacenter: DC1-K8Demo
=====
Status=Up/Down
|/ State=Normal/Leaving/Joining/Moving
-- Address          Load          Tokens         Owns (effective)  Host ID                               Rack
UN  10.244.0.125     11.04 MiB     32             34.2%             bedbd45a-1cba-4e51-ad2e-d32aad43773  Rack1-K8Demo
UN  10.244.1.109     22.65 MiB     32             20.2%             70e6195b-3629-4d66-a10c-f345015cf68c  Rack1-K8Demo
UN  10.244.0.153     27.48 MiB     32             23.8%             5690399f-6052-439d-b23d-e76e6c152758  Rack1-K8Demo
UN  10.244.0.73      10.19 MiB     32             21.9%             c5a95d05-6891-4586-b416-db5b828b3ccf  Rack1-K8Demo

```

### 34. Rerun the stress test (Steps 29 and 30).

Unfortunately, we may not be any faster - because now at least 2 pods are on one node (4 pods, 3 nodes).

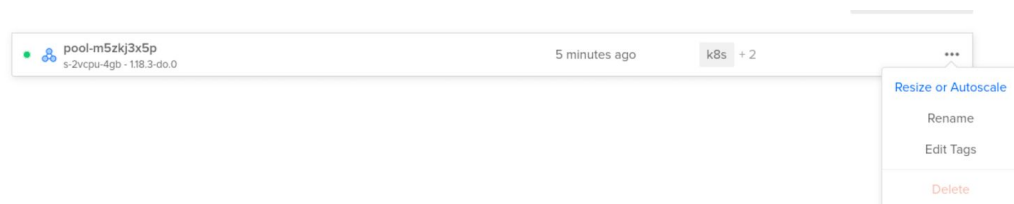
```

Results:
Op rate           :      5,695 op/s  [WRITE: 5,695 op/s]
Partition rate    :      5,695 pk/s  [WRITE: 5,695 pk/s]
Row rate          :      5,695 row/s [WRITE: 5,695 row/s]
Latency mean      :    164.1 ms [WRITE: 164.1 ms]
Latency median    :     72.7 ms [WRITE: 72.7 ms]
Latency 95th percentile :  590.3 ms [WRITE: 590.3 ms]
Latency 99th percentile :  788.0 ms [WRITE: 788.0 ms]
Latency 99.9th percentile : 976.2 ms [WRITE: 976.2 ms]
Latency max       :   1406.1 ms [WRITE: 1,406.1 ms]
Total partitions  :    100,000 [WRITE: 100,000]
Total errors      :              0 [WRITE: 0]
Total GC count    :      0
Total GC memory   :    0.000 KiB
Total GC time     :      0.0 seconds
Avg GC time       :      NaN ms
StdDev GC time    :      0.0 ms
Total operation time : 00:00:17

```

### 35. Let's fix that:

Go to the Digital Ocean **Kubernetes**-> **k8s-cass**-> **Nodes**. Click on the Node Pool ...



Now choose **Resize or Autoscale**

Add an extra node:

Adjust node count

Select a scaling type

☒ Fixed size
☐ Autoscale ?

Best for predictable workloads. Manually add and remove nodes.

Number of nodes  
4

Monthly rate  
\$80.00 (\$0.12/hr)  
Standard - 2 vCPU 4 GB RAM

Cancel Save

36. Wait until the new node is in place:

pool-m5zkj3x5p	6 minutes ago	k8s + 2	...
pool-m5zkj3x5p-3o7gr	11 hours ago		...
pool-m5zkj3x5p-3o7gb	11 hours ago		...
pool-m5zkj3x5p-3o7gw	11 hours ago		...
pool-m5zkj3x5p-3oqta	6 minutes ago		...

37. Quit the casstool shell (Ctrl-D)

38. Check from kubectl that the new node is active:

```
kubectl get nodes
```

NAME	STATUS	ROLES	AGE	VERSION
pool-m5zkj3x5p-3o7gb	Ready	<none>	11h	v1.18.3
pool-m5zkj3x5p-3o7gr	Ready	<none>	11h	v1.18.3
pool-m5zkj3x5p-3o7gw	Ready	<none>	11h	v1.18.3
pool-m5zkj3x5p-3oqta	Ready	<none>	5m57s	v1.18.3

39. Use either the Kubernetes Dashboard or k9s or kubectl to see how the pods are assigned to nodes. Unfortunately we are unbalanced, because Kubernetes hasn't had any impetus to move the extra pod to the new node.

40. Rerun the stress test and see what the performance is like. Why isn't it better?!

41. We have two options. We could just create a few more Cassandra nodes to more evenly use the nodes. However, there is another option using a cool tool called the Kubernetes Descheduler:

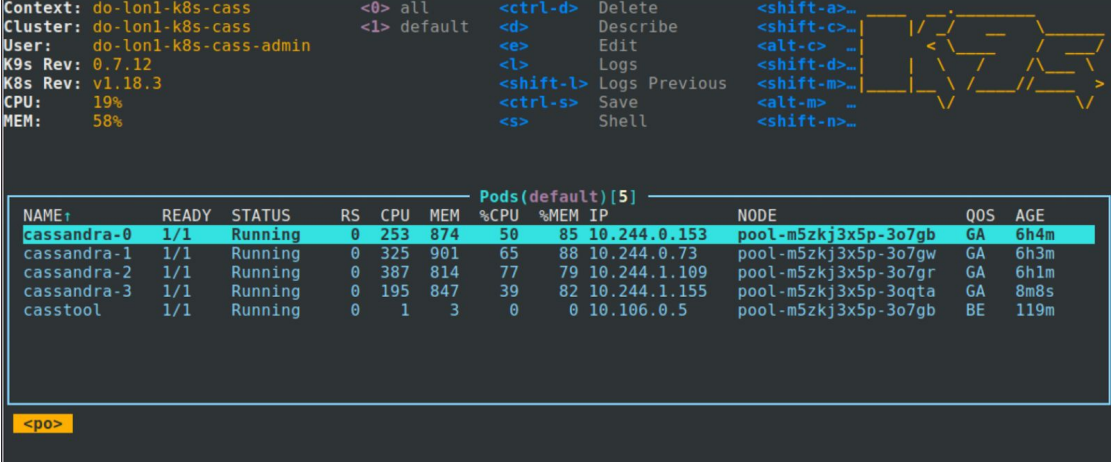
<https://github.com/kubernetes-sigs/descheduler>

42. In a window do this:

```
export KUBECONFIG=~/.kube/k8s-cass-kubeconfig.yaml
git clone
https://github.com/kubernetes-sigs/descheduler.git
cd descheduler
kubectl create -f kubernetes/rbac.yaml
kubectl create -f kubernetes/configmap.yaml
kubectl create -f kubernetes/job.yaml
```

43. Watch what happens using k9s

44. Once the pod has moved, all the cassandra pods should be on different nodes:



The screenshot shows the k9s terminal interface. At the top, it displays context and cluster information. Below that, a table lists the pods running on the cluster. The table has columns for NAME, READY, STATUS, RS, CPU, MEM, %CPU, %MEM, IP, NODE, QOS, and AGE. The pods listed are cassandra-0, cassandra-1, cassandra-2, cassandra-3, and casstool. All are in a 'Running' state. The cassandra pods are distributed across different nodes: pool-m5zkj3x5p-3o7gb, pool-m5zkj3x5p-3o7gw, pool-m5zkj3x5p-3o7gr, and pool-m5zkj3x5p-3o7qa.

NAME	READY	STATUS	RS	CPU	MEM	%CPU	%MEM	IP	NODE	QOS	AGE
cassandra-0	1/1	Running	0	253	874	50	85	10.244.0.153	pool-m5zkj3x5p-3o7gb	GA	6h4m
cassandra-1	1/1	Running	0	325	901	65	88	10.244.0.73	pool-m5zkj3x5p-3o7gw	GA	6h3m
cassandra-2	1/1	Running	0	387	814	77	79	10.244.1.109	pool-m5zkj3x5p-3o7gr	GA	6h1m
cassandra-3	1/1	Running	0	195	847	39	82	10.244.1.155	pool-m5zkj3x5p-3o7qa	GA	8m8s
casstool	1/1	Running	0	1	3	0	0	10.106.0.5	pool-m5zkj3x5p-3o7gb	BE	119m

45. Now rerun the stress test one more time:  
You can see my results were considerably better:

```
Results:
Op rate           : 9,650 op/s [WRITE: 9,650 op/s]
Partition rate    : 9,650 pk/s [WRITE: 9,650 pk/s]
Row rate          : 9,650 row/s [WRITE: 9,650 row/s]
Latency mean      : 98.2 ms [WRITE: 98.2 ms]
Latency median    : 81.1 ms [WRITE: 81.1 ms]
Latency 95th percentile : 299.9 ms [WRITE: 299.9 ms]
Latency 99th percentile : 464.0 ms [WRITE: 464.0 ms]
Latency 99.9th percentile : 724.6 ms [WRITE: 724.6 ms]
Latency max       : 801.6 ms [WRITE: 801.6 ms]
Total partitions  : 100,000 [WRITE: 100,000]
Total errors      : 0 [WRITE: 0]
Total GC count    : 0
Total GC memory   : 0.000 KiB
Total GC time     : 0.0 seconds
Avg GC time       : NaN ms
StdDev GC time    : 0.0 ms
Total operation time : 00:00:10
```

46. Congratulations - we have deployed cassandra, scaled it, tested it and increased performance all in a kubernetes cluster.

47. Let's clean up.

48. Firstly, let's delete our cassandra cluster.

```
cd ~/cassandra
kubectl delete -f cassandra-statefulset.yaml
```

49. Delete our casstool pod:

```
kubectl delete pod/casstool
```

50. Delete the volumes / volume claims:

```
kubectl delete persistentvolumeclaim -l app=cassandra
```

51. Delete the kubernetes cluster (from the DO web panel):

### Kubernetes Clusters

Name	Created	Tags
<b>k8s-cass</b> LONTI - 118-3-do-0	12 hours ago	k8s k8s:18cf58b9-1b8...

Learn more about Managed Kubernetes

**PRODUCT DOCS**  
[DigitalOcean Kubernetes overview](#)  
Detailed information covering the specifics of DigitalOcean Kubernetes.

**TUTORIALS**  
[Community Tutorials](#)  
Beginner, intermediate and advanced guides on Kubernetes concepts, third-party tools.

**EDUCATION**  
[Resource Center](#)  
Learn more about building and deploying microservices with a robust library of Kubernetes assets.

**API**  
[Kubernetes API Docs](#)  
Use the API to manage Kubernetes clusters programmatically.

- Download Config
- View Nodes
- Settings
- Edit Tags
- Destroy



## Click **Destroy**

### Upgrade window

DigitalOcean automatically applies critical patches during this window. You can enable [automatic upgrades](#) to have us apply the latest patch-level upgrade at the same time.

Enable Automatic Upgrades

Edit

Critical patches will be applied on: Any Day after 12AM - (BST)

### Destroy Cluster

Destroying your cluster will remove all workloads and terminate worker nodes. Be sure to export your configuration using kubectl if they will be needed later.

Destroy

## Then **Destroy** again.



Then enter the cluster name (k8s-cass) and actually finally **Destroy**

×

Destroy Kubernetes cluster

Destroying a Kubernetes cluster is permanent. This will destroy the cluster and all worker nodes. Load balancers and block storage volumes will NOT be destroyed.

Confirm you want to permanently destroy this Kubernetes cluster by entering its name below.

k8s-cass

Enter the name of this Kubernetes cluster  
k8s-cass ✓

Cancel

Destroy

51. If you came straight to this lab from the last one, you will also have one last remaining load balancer running.

DigitalOcean will also have created a load-balancer to handle the incoming traffic for your service. Go to **Networking -> Load Balancers**

PROJECTS

cassandra

+ New Project

MANAGE

Droplets

Kubernetes

Volumes

Databases

Spaces

Images

Networking

Monitoring

Q Search by resource name or public IP (Cmd+B)

Create ▼

USAGE \$0.00

Networking

Domains

Floating IPs

Load Balancers

VPC

Firewalls

PTR records

Create Load Balancer

Name	Status	IP Address	Healthy	Reqs/s	Created
<div><div></div><div>a653833c77a014ae2bc105e719cc...</div><div>LON1 / 0 Droplets</div></div>	<div>▼</div> No droplets	188.166.139.3	0/0	0 reqs/s	13 hours ago <div>More ▼</div>

Load balancing basics

Load Balancer overview

Learn about DigitalOcean Load Balancers, or follow our step-by-step guide to creating one.

API docs

Use the DigitalOcean API to create and manage Load Balancers programmatically.

Tell us what you think

Submit your feedback on Load Balancers.

Create Load Balancer

hy	Reqs/s	Created
	0 reqs/s	13 hours ago

Tell us what you think

Submit your feedback on Load

View Droplets

View graphs

Edit settings

Move to...

Destroy

52. Click on **Destroy** and once again enter the name (copy and paste!)

×

### Destroy load balancer

a653833c77a014ae2bc105e719cc3a2a will be permanently destroyed. Any associated Droplets will be disconnected and will stop receiving distributed traffic. Droplets will **not** be destroyed.

You will lose the provisioned IP address, which might impact any DNS records pointing to it. This will not affect any associated Droplets.

Confirm you want to permanently destroy this load balancer by entering its name below.

a653833c77a014ae2bc105e719cc3a2a

Enter the name of this load balancer

a653833c77a014ae2bc105e719cc3a2a ✓

Cancel

Destroy

53. Have a hunt round all the resources in DigitalOcean and just check you haven't left anything running!

54. This lab is done! Congratulations.