



# Lab 7

## Portable Technologies in Cloud

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CODE: CLO835

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# WEEK 9 – LAB 7

## Workshop 1 - Exploring hostPath

```
voclabs:~/environment $ k get nodes
NAME                                STATUS    ROLES    AGE   VERSION
ip-192-168-10-207.ec2.internal      Ready    <none>   22m   v1.22.17-eks-0a21954
ip-192-168-63-190.ec2.internal      Ready    <none>   22m   v1.22.17-eks-0a21954
voclabs:~/environment $
```

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Screenshot 1 running cluster nodes verified

```
voclabs:~/environment $ ^C
voclabs:~/environment $ kubectl create ns week9
namespace/week9 created
voclabs:~/environment $ cd kubectl apply -f mongodb_hostpath.yaml -n week9
bash: cd: kubectl: No such file or directory
voclabs:~/environment $ cd week9/mongodb
voclabs:~/environment/week9/mongodb $ kubectl apply -f mongodb_hostpath.yaml -n week9
pod/mongodb created
voclabs:~/environment/week9/mongodb $
```

Screenshot 2 Mongodb app backed by the hostpath was deployed

```
voclabs:~/environment/week9/mongodb $ kubectl exec -it mongodb -n week9 -- mongosh
Current Mongosh Log ID: 64b5f602603328f14a56b946
Connecting to:  mongodb://127.0.0.1:27017/?directConnection=true&serverSelectionTimeoutMS=2000&appName=mongosh+1.10.1
Using MongoDB: 6.0.8
Using Mongosh: 1.10.1

For mongosh info see: https://docs.mongodb.com/mongodb-shell/

To help improve our products, anonymous usage data is collected and sent to MongoDB periodically (https://www.mongodb.com/legal/privacy-policy).
You can opt-out by running the disableTelemetry() command.

-----
The server generated these startup warnings when booting
2023-07-18T02:14:42.039+00:00: Access control is not enabled for the database. Read and write access to data and configuration is unrestricted
2023-07-18T02:14:42.040+00:00: vm.max_map_count is too low
-----

test> use mystore
switched to db mystore
mystore> db.foo.insert({name:'foo'})
DeprecationWarning: Collection.insert() is deprecated. Use insertOne, insertMany, or bulkWrite.
{
  acknowledged: true,
  insertedIds: { '0': ObjectId("64b5f619603328f14a56b947") }
}
mystore> db.foo.find()
[ { _id: ObjectId("64b5f619603328f14a56b947"), name: 'foo' } ]
mystore> exit
voclabs:~/environment/week9/mongodb $
```

restricted. For n  
credentials.

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Screenshot 3 Sample json document was added to DB

```
mystore> exit
voclabs:~/environment/week9/mongodb $ kubectl get pods -o wide -n week9
NAME      READY   STATUS    RESTARTS   AGE   IP            NODE                                NOMINATED NODE   READINESS GATES
mongodb   1/1     Running   0           5m15s  192.168.52.228  ip-192-168-63-190.ec2.internal      <none>            <none>
voclabs:~/environment/week9/mongodb $
```

Screenshot 4 node that the pod is scheduled to was examined

```

pod/mongodb created
voclabs:~/environment/week9/mongodb $ kubectl exec -it mongodb -n week9 -- mongosh
Current Mongosh Log ID: 64b5f763f1973b203cf1bb3d
Connecting to:      mongodb://127.0.0.1:27017/?directConnection=true&serverSelectionTimeoutMS=2000&appName=mongosh+1.10.1
Using MongoDB:      6.0.8
Using Mongosh:      1.10.1

For mongosh info see: https://docs.mongodb.com/mongosh-shell/

-----
The server generated these startup warnings when booting
2023-07-18T02:21:51.751+00:00: Access control is not enabled for the database. Read and write access to data and configuration is unrestricted
2023-07-18T02:21:51.753+00:00: vm.max_map_count is too low
-----

test>

test> use mystore
switched to db mystore
mystore> db.foo.find()
[ { _id: ObjectId("64b5f619603328f14a56b947"), name: 'foo' } ]
mystore> exit
voclabs:~/environment/week9/mongodb $ kubectl get pods -o wide -n week
9
NAME      READY   STATUS    RESTARTS   AGE   IP              NODE                                NOMINATED NODE   READINESS GATES
mongodb   1/1     Running   0           2m    192.168.52.228  ip-192-168-63-190.ec2.internal     <none>            <none>
voclabs:~/environment/week9/mongodb $

```

Screenshot 5 MongoDB pod was recreated and scheduled

it's noted that the data appears to be persisted. However, the potential inconsistency or "hit and miss" behavior of data persistence could be due to the use of hostPath as the storage mechanism for MongoDB.

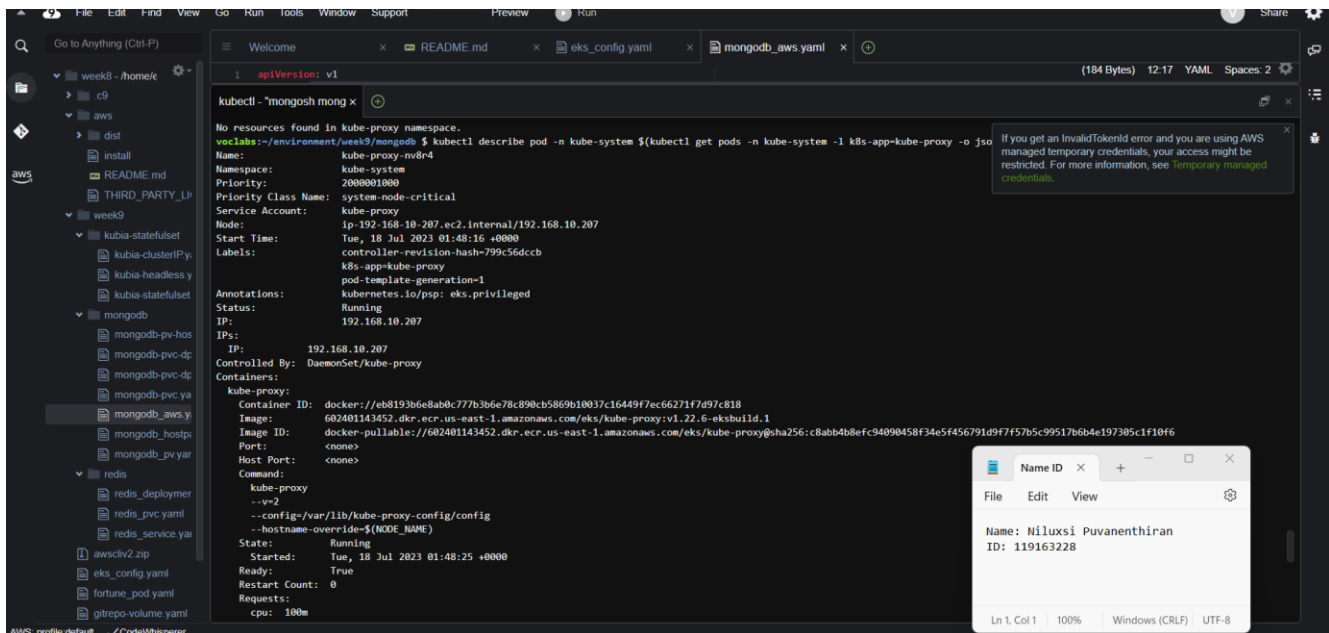
When using hostPath, the data is stored directly on the node's file system. If the Pod gets rescheduled to a different node (e.g., due to a node failure or cluster scaling), the data stored on the previous node will not be available on the new node. Therefore, data persistence is not guaranteed across node rescheduling.

```

NAME      READY   STATUS    RESTARTS   AGE   IP              NODE                                NOMINATED NODE   READINESS GATES
mongodb   1/1     Running   0           2m    192.168.52.228  ip-192-168-63-190.ec2.internal     <none>            <none>
voclabs:~/environment/week9/mongodb $ aws ec2 create-volume --volume-type gp2 --size 80 --availability-zone us-east-1a
{
  "AvailabilityZone": "us-east-1a",
  "CreateTime": "2023-07-18T02:28:34+00:00",
  "Encrypted": false,
  "Size": 80,
  "SnapshotId": "",
  "State": "creating",
  "VolumeId": "vol-06248f838777eb69a",
  "Iops": 240,
  "Tags": [],
  "VolumeType": "gp2",
  "MultiAttachEnabled": false
}
voclabs:~/environment/week9/mongodb $ kubectl apply -f mongodb_aws.yaml -n week9
pod/mongodb-aws created
voclabs:~/environment/week9/mongodb $

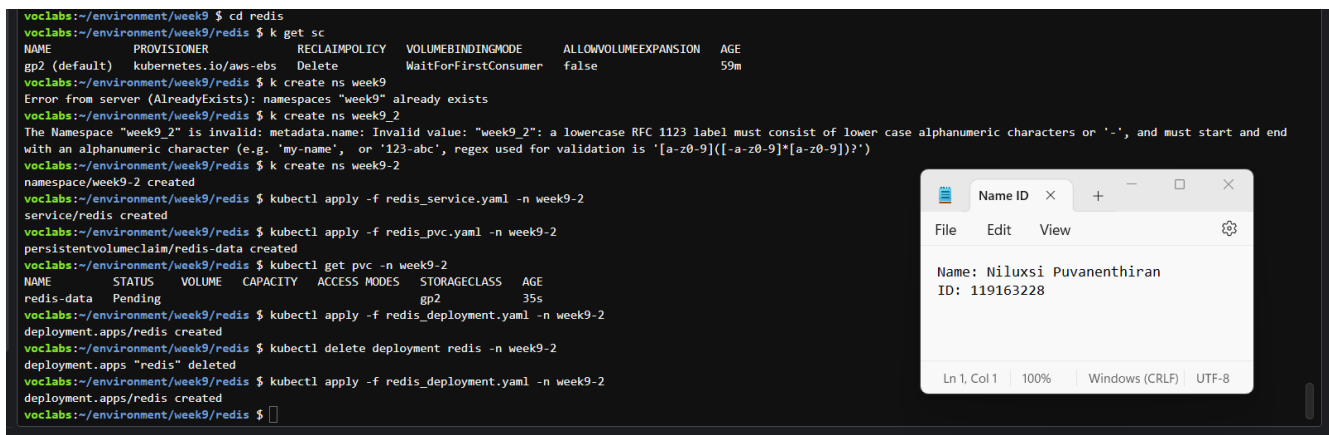
```

Screenshot 6 EBS volume was provisioned

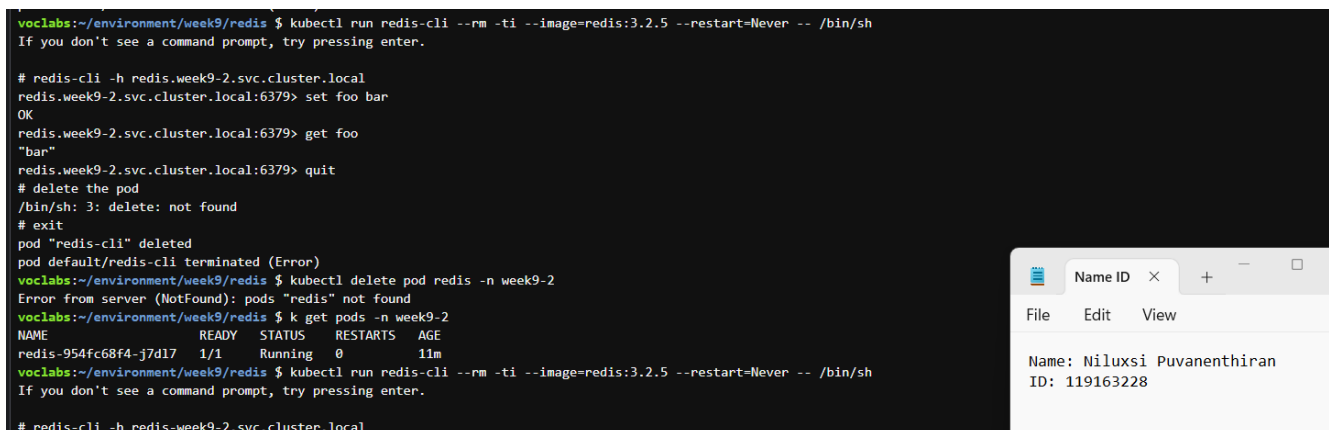


Screenshot 7 kube-proxy was examined

## Workshop 2– PV, PVC, StorageClasses



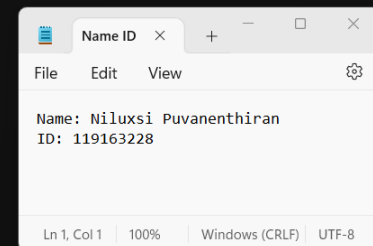
Screenshot 8 created redis deployment, service and PVC



Screenshot 9 Data stored in redis and pod was recreated

## Workshop 3 - Statefulsets

```
voclabs:~/environment/week9/redis $ cd ..
voclabs:~/environment/week9 $ cd kubia-statefulset
voclabs:~/environment/week9/kubia-statefulset $ clear
voclabs:~/environment/week9/kubia-statefulset $ k create -f kubia-statefulset
error: the path "kubia-statefulset" does not exist
voclabs:~/environment/week9/kubia-statefulset $
voclabs:~/environment/week9/kubia-statefulset $ kubectl create -f week9/kubia-statefulset/kubia-statefulset.yaml
error: the path "week9/kubia-statefulset/kubia-statefulset.yaml" does not exist
voclabs:~/environment/week9/kubia-statefulset $ ls
kubia-clusterIP.yaml  kubia-statefulset.yaml
kubia-headless.yaml
voclabs:~/environment/week9/kubia-statefulset $ kubectl create -f kubia-statefulset.yaml
statefulset.apps/kubia created
voclabs:~/environment/week9/kubia-statefulset $ k get pvc
NAME          STATUS    VOLUME                                     CAPACITY   ACCESS MODES   STORAGECLASS   AGE
data-kubia-0   Bound    pvc-bb6a36ea-a97b-49c8-94cf-ccd14aa8254c   1Gi        RWO            gp2            30s
data-kubia-1   Pending                                     1Gi        RWO            gp2            1s
voclabs:~/environment/week9/kubia-statefulset $ k get pv
NAME          CAPACITY   ACCESS MODES   RECLAIM POLICY   STATUS   CLAIM                STORAGECLASS   REASON   AGE
pvc-16a63a95-e684-4780-a53c-a472f269f157   1Gi        RWO            Delete           Bound    default/data-kubia-1   gp2       6s
pvc-bb6a36ea-a97b-49c8-94cf-ccd14aa8254c   1Gi        RWO            Delete           Bound    default/data-kubia-0   gp2       34s
pvc-f237d9c9-f91f-4d56-b680-fddb2c323793   10Gi       RWO            Delete           Bound    week9-2/redis-data    gp2       18m
voclabs:~/environment/week9/kubia-statefulset $
```

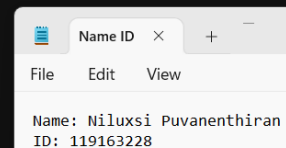


Screenshot 10 statefulset was created

```
voclabs:~/environment/week9/kubia-statefulset $ get po
bash: get: command not found
voclabs:~/environment/week9/kubia-statefulset $ k get po
NAME          READY    STATUS    RESTARTS   AGE
kubia-0       1/1      Running   0           7m41s
kubia-1       1/1      Running   0           7m12s
voclabs:~/environment/week9/kubia-statefulset $
```

Screenshot 11 Get po

```
voclabs:~/environment $ cd week9/kubia-statefulset
voclabs:~/environment/week9/kubia-statefulset $ curl localhost:8001/api/v1/namespaces/default/pods/kubia-0/proxy/
You've hit kubia-0
Data stored on this pod: No data posted yet
voclabs:~/environment/week9/kubia-statefulset $ curl -X POST -d "Hey there! This greeting was submitted to kubia-0." localhost:8001/api/v1/namespaces/default/pods/kubia-0/proxy/
Data stored on pod kubia-0
voclabs:~/environment/week9/kubia-statefulset $ curl -X POST -d "Hey there! This greeting was submitted to kubia-0." localhost:8001/api/v1/namespaces/default/pods/kubia-0/proxy/
Data stored on pod kubia-0
voclabs:~/environment/week9/kubia-statefulset $ curl localhost:8001/api/v1/namespaces/default/pods/kubia-0/proxy/
You've hit kubia-0
Data stored on this pod: Hey there! This greeting was submitted to kubia-0.
voclabs:~/environment/week9/kubia-statefulset $ curl localhost:8001/api/v1/namespaces/default/pods/kubia-0/proxy/
You've hit kubia-0
Data stored on this pod: Hey there! This greeting was submitted to kubia-0.
voclabs:~/environment/week9/kubia-statefulset $ curl localhost:8001/api/v1/namespaces/default/pods/kubia-1/proxy/
You've hit kubia-1
Data stored on this pod: No data posted yet
voclabs:~/environment/week9/kubia-statefulset $
```



Screenshot 12 Communicating with the application via proxy

```
voclabs:~/environment/week9/kubia-statefulset $ curl localhost:8001/api/v1/namespaces/default/pods/kubia-0/proxy/
You've hit kubia-0
Data stored on this pod: Hey there! This greeting was submitted to kubia-0.
voclabs:~/environment/week9/kubia-statefulset $
```

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Screenshot 13 persistent volume gets re-attached to a "new" kubia-0 pod

```
voclabs:~/environment $ cd week9/kubia-statefulset
voclabs:~/environment/week9/kubia-statefulset $ curl localhost:8001/api/v1/namespaces/default/services/kubia-public/proxy/
You've hit kubia-1
Data stored on this pod: No data posted yet
voclabs:~/environment/week9/kubia-statefulset $
```

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Screenshot 14 kubia-1 was hit as that was default

```
voclabs:~/environment/week9/kubia-statefulset $ k apply -f kubia-headless.yaml
service/kubia created
voclabs:~/environment/week9/kubia-statefulset $ kubectl run -it srvlookup --image=tutum/dnsutils --rm --restart=Never -- /bin/bash
If you don't see a command prompt, try pressing enter.
root@srvlookup:/#
root@srvlookup:/# dig SRV kubia.default.svc.cluster.local

; <<>> DiG 9.9.5-3ubuntu0.2-Ubuntu <<>> SRV kubia.default.svc.cluster.local
;; global options: +cmd
;; Got answer:
;; ->HEADER<- opcode: QUERY, status: NOERROR, id: 8878
;; flags: qr aa rd; QUERY: 1, ANSWER: 2, AUTHORITY: 0, ADDITIONAL: 3
;; WARNING: recursion requested but not available

;; OPT PSEUDOSECTION:
;; EDNS: version: 0, flags:; udp: 4096
;; QUESTION SECTION:
;kubia.default.svc.cluster.local. IN SRV

;; ANSWER SECTION:
kubia.default.svc.cluster.local. 5 IN SRV      0 50 80 kubia-1.kubia.default.svc.cluster.local.
kubia.default.svc.cluster.local. 5 IN SRV      0 50 80 kubia-0.kubia.default.svc.cluster.local.

;; ADDITIONAL SECTION:
kubia-0.kubia.default.svc.cluster.local. 5 IN A 192.168.38.74
kubia-1.kubia.default.svc.cluster.local. 5 IN A 192.168.9.130

;; Query time: 1 msec
;; SERVER: 10.100.0.10#53(10.100.0.10)
;; WHEN: Tue Jul 18 03:20:27 UTC 2023
;; MSG SIZE rcvd: 350
```

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Screenshot 15 discovering peers

```
generation: 2
name: kubia
namespace: default
resourceVersion: "20645"
uid: 765a7b4f-5ffb-446d-971f-e0e498a5448d
spec:
  podManagementPolicy: OrderedReady
  replicas: 2
  revisionHistoryLimit: 10
  selector:
    matchLabels:
      app: kubia
  serviceName: kubia
  template:
    metadata:
      creationTimestamp: null
      labels:
        app: kubia
    spec:
      containers:
      - image: luksa/kubia-pet-peers
        imagePullPolicy: Always
        name: kubia
        ports:
        - containerPort: 8080
          name: http
          protocol: TCP
```

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Ln 1, Col 1 100% Windows (CRLF) UTF

Screenshot 16 Updated container image

```
voclabs:~/environment/week9/kubia-statefulset $ curl -X POST -d "The sun is shining" localhost:8001/api/v1/namespaces/default/services/kubia-public/proxy/
Data stored on pod kubia-1
voclabs:~/environment/week9/kubia-statefulset $ curl -X POST -d "The rain is raining" localhost:8001/api/v1/namespaces/default/services/kubia-public/proxy/
Data stored on pod kubia-0
voclabs:~/environment/week9/kubia-statefulset $ curl localhost:8001/api/v1/namespaces/default/services/kubia-public/proxy/
You've hit kubia-0
Data stored in the cluster:
- kubia-1.kubia.default.svc.cluster.local: The sun is shining
- kubia-0.kubia.default.svc.cluster.local: The rain is raining
voclabs:~/environment/week9/kubia-statefulset $
```

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Screenshot 17 Post was sent to a random pod

# REFERENCES

Geiman, I. (2023, Summer). Lectures and Slides, CLO835\_Portable Technologies in cloud.  
Seneca Newham Campus, North York.

*Learner Lab*. (2023). Retrieved from <https://awsacademy.instructure.com/>.