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BCDV 4032

Building Scalable Blockchain
Apps

Lab 02

13th Jan 2024

Keerthi Nelaturu

Lab 2

Section 1 – Full-stack Ethereum using Docker containers

Video Link for Youtube –

<https://www.youtube.com/watch?v=obhyBQ0E8oE>

Section 2 – Kubernetes and Minikube Installation Screenshots

Name	Date modified	Type	Size
minikube-installer.exe	2024-01-13 8:05 PM	Application	36,904 KB
kubect.exe	2024-01-13 8:05 PM	Application	49,827 KB

```
Administration Command Prompt

C:\Windows\System32>minikube start
W0113 20:20:38.085257 27140 main.go:291] Unable to resolve the current Docker CLI context "default": context "default"
: context not found: open C:\Users\anish\.docker\contexts\meta\37a8eec1ce19687d132fe29051dca629d164e2c4958ba141d5f4133a3
3f0688f\meta.json: The system cannot find the path specified.
* minikube v1.32.0 on Microsoft Windows 11 Pro 10.0.22631.3007 Build 22631.3007
* Automatically selected the docker driver. Other choices: hyperv, virtualbox, ssh
* Using Docker Desktop driver with root privileges
* Starting control plane node minikube in cluster minikube
* Pulling base image ...
* Downloading Kubernetes v1.28.3 preload ...
  > preloaded-images-k8s-v18-v1...: 403.35 MiB / 403.35 MiB 100.00% 38.73 M
  > gcr.io/k8s-minikube/kicbase...: 453.90 MiB / 453.90 MiB 100.00% 33.61 M
* Creating docker container (CPUs=2, Memory=2200MB) ...
* Preparing Kubernetes v1.28.3 on Docker 24.0.7 ...
  - Generating certificates and keys ...
  - Booting up control plane ...
  - Configuring RBAC rules ...
* Configuring bridge CNI (Container Networking Interface) ...
* Verifying Kubernetes components...
  - Using image gcr.io/k8s-minikube/storage-provisioner:v5
* Enabled addons: storage-provisioner, default-storageclass
* Done! kubectl is now configured to use "minikube" cluster and "default" namespace by default

C:\Windows\System32>
```

```
C:\Windows\System32\cmd.exe

Microsoft Windows [Version 10.0.22631.3007]
(c) Microsoft Corporation. All rights reserved.

C:\Users\anish\Downloads\GBC_Blockchain_Development\Semester_02\BCDV_4032_Building_Scalable_Blockchain_Apps\Week_01>
kubectl version
Client Version: v1.29.0
Kustomize Version: v5.0.4-0.20230601165947-6ce0bf390ce3
Server Version: v1.28.3

C:\Users\anish\Downloads\GBC_Blockchain_Development\Semester_02\BCDV_4032_Building_Scalable_Blockchain_Apps\Week_01>
kubectl cluster-info
Kubernetes control plane is running at https://127.0.0.1:54229
CoreDNS is running at https://127.0.0.1:54229/api/v1/namespaces/kube-system/services/kube-dns:dns/proxy

To further debug and diagnose cluster problems, use 'kubectl cluster-info dump'.

C:\Users\anish\Downloads\GBC_Blockchain_Development\Semester_02\BCDV_4032_Building_Scalable_Blockchain_Apps\Week_01>
```

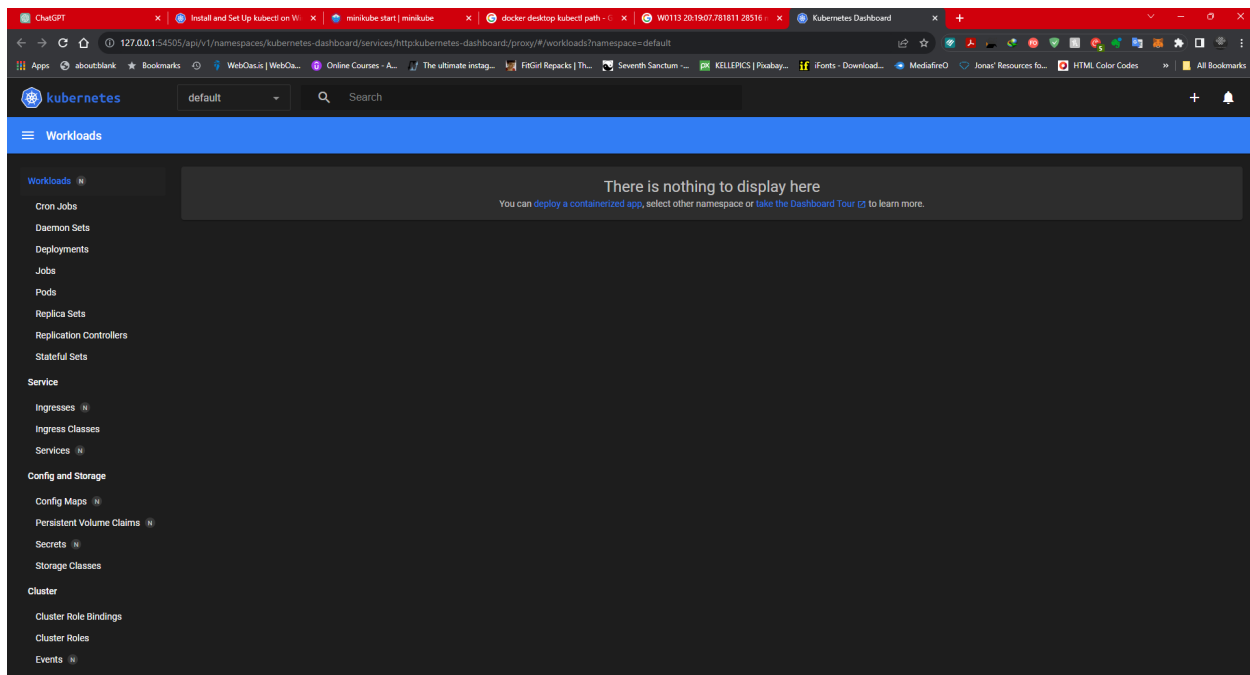
```
C:\Windows\System32\cmd.exe

C:\Users\anish\Downloads\GBC_Blockchain_Development\Semester_02\BCDV_4032_Building_Scalable_Blockchain_Apps\Week_01k
ubectl get po -A
NAMESPACE      NAME                                     READY   STATUS    RESTARTS   AGE
kube-system     coredns-5dd5756b68-8h724              1/1     Running   0           5m55s
kube-system     etcd-minikube                          1/1     Running   0           6m6s
kube-system     kube-apiserver-minikube               1/1     Running   0           6m6s
kube-system     kube-controller-manager-minikube      1/1     Running   0           6m6s
kube-system     kube-proxy-ghhsc                      1/1     Running   0           5m55s
kube-system     kube-scheduler-minikube               1/1     Running   0           6m6s
kube-system     storage-provisioner                   1/1     Running   2 (4m3s ago) 5m57s
```

```
C:\Users\anish\Downloads\GBC_Blockchain_Development\Semester_02\BCDV_4032_Building_Scalable_Blockchain_Apps\Week_01k>
minikube dashboard
W0113 20:31:35.625797 24140 main.go:291] Unable to resolve the current Docker CLI context "default": context "default": context not found: open C:\Users\anish\.docker\contexts\meta\37a8eec1ce19687d132fe29051dca629d164e2c4958ba141d5f4133a33f0688f\meta.json: The system cannot find the path specified.
* Enabling dashboard ...
  - Using image docker.io/kubernetesui/dashboard:v2.7.0
  - Using image docker.io/kubernetesui/metrics-scrafer:v1.0.8
* Some dashboard features require the metrics-server addon. To enable all features please run:

    minikube addons enable metrics-server

* Verifying dashboard health ...
* Launching proxy ...
* Verifying proxy health ...
* Opening http://127.0.0.1:54505/api/v1/namespaces/kubernetes-dashboard/services/http:kubernetes-dashboard:/proxy/ in your default browser...
```



```
C:\Users\anish\Downloads\GBC_Blockchain_Development\Semester_02\BCDV_4032_Building_Scalable_Blockchain_Apps\Week_01>
ubectl create deployment hello-minikube --image=kicbase/echo-server:1.0
deployment.apps/hello-minikube created

C:\Users\anish\Downloads\GBC_Blockchain_Development\Semester_02\BCDV_4032_Building_Scalable_Blockchain_Apps\Week_01>
kubectl expose deployment hello-minikube --type=NodePort --port=8080
service/hello-minikube exposed

C:\Users\anish\Downloads\GBC_Blockchain_Development\Semester_02\BCDV_4032_Building_Scalable_Blockchain_Apps\Week_01>
kubectl get services hello-minikube
NAME         TYPE        CLUSTER-IP    EXTERNAL-IP    PORT(S)          AGE
hello-minikube  NodePort    10.102.194.234 <none>         8080:31552/TCP   7s

C:\Users\anish\Downloads\GBC_Blockchain_Development\Semester_02\BCDV_4032_Building_Scalable_Blockchain_Apps\Week_01>
minikube service hello-minikube
W0113 20:34:18.446567 9820 main.go:291] Unable to resolve the current Docker CLI context "default": context "default": context not found: open C:\Users\anish\.docker\contexts\meta\37a8eec1ce19687d132fe29051dca629d164e2c4958ba141d5f4133a33f0688f\meta.json: The system cannot find the path specified.
|-----|
| NAMESPACE | NAME       | TARGET PORT | URL                |
|-----|
| default   | hello-minikube | 8080        | http://192.168.49.2:31552 |
|-----|
* Starting tunnel for service hello-minikube.
|-----|
| NAMESPACE | NAME       | TARGET PORT | URL                |
|-----|
| default   | hello-minikube |             | http://127.0.0.1:54683 |
|-----|
* Opening service default/hello-minikube in default browser...
! Because you are using a Docker driver on windows, the terminal needs to be open to run it.
```

```
ChatGPT x minikube start | minikube x localhost x 127.0.0.1:54683 x +
127.0.0.1:54683
Request served by hello-minikube-7f54cff968-n7fv9
HTTP/1.1 GET /
Host: 127.0.0.1:54683
Accept: text/html,application/xhtml+xml,application/xml;q=0.9,image/avif,image/webp,image/apng,*/*;q=0.8,application/signed-exchange;v=b3;q=0.7
Accept-Encoding: gzip, deflate, br
Accept-Language: en-US,en;q=0.9,hi;q=0.8
Connection: keep-alive
Cookie: ai_user=JZoAaLOwhg0IQZFicc/wt|2023-11-24T23:13:37.450Z
Dnt: 1
Sec-Ch-Ua: "Chromium";v="118", "Google Chrome";v="118", "Not=A?Brand";v="99"
Sec-Ch-Ua-Mobile: ?0
Sec-Ch-Ua-Platform: "Windows"
Sec-Fetch-Dest: document
Sec-Fetch-Mode: navigate
Sec-Fetch-Site: none
Sec-Fetch-User: ?1
Upgrade-Insecure-Requests: 1
User-Agent: Mozilla/5.0 (Windows NT 10.0; Win64; x64) AppleWebKit/537.36 (KHTML, like Gecko) Chrome/118.0.0.0 Safari/537.36
```

```
C:\Users\anish\Downloads\GBC_Blockchain_Development\Semester_02\BCDV_4032_Building_Scalable_Blockchain_Apps\Week_01>
kubectl port-forward service/hello-minikube 7080:8080
Forwarding from 127.0.0.1:7080 -> 8080
Forwarding from [::1]:7080 -> 8080
Handling connection for 7080
```

```
Request served by hello-minikube-7f54cff968-n7fv9

HTTP/1.1 GET /

Host: localhost:7080
Accept: text/html,application/xhtml+xml,application/xml;q=0.9,image/avif,image/webp,image/apng,*/*;q=0.8,application/signed-exchange;v=b3;q=0.7
Accept-Encoding: gzip, deflate, br
Accept-Language: en-US,en;q=0.9,hi;q=0.8
Connection: keep-alive
Cookie: ai_user=db3s4KAk0gU6eC5LGKaobI|2023-11-26T23:35:33.596Z; JSESSIONID.344f04c2=1xh0scfgpwwmktxfz7q3vowu; screenResolution=1536x864; voter_id=31bb020c13a17f1
Dnt: 1
Sec-Ch-Ua: "Chromium";v="118", "Google Chrome";v="118", "Not=A?Brand";v="99"
Sec-Ch-Ua-Mobile: ?0
Sec-Ch-Ua-Platform: "Windows"
Sec-Fetch-Dest: document
Sec-Fetch-Mode: navigate
Sec-Fetch-Site: cross-site
Sec-Fetch-User: ?1
Upgrade-Insecure-Requests: 1
User-Agent: Mozilla/5.0 (Windows NT 10.0; Win64; x64) AppleWebKit/537.36 (KHTML, like Gecko) Chrome/118.0.0.0 Safari/537.36
```

```
C:\Windows\System32\cmd.exe

C:\Users\anish\Downloads\GBC_Blockchain_Development\Semester_02\BCDV_4032_Building_Scalable_Blockchain_Apps\Week_01>
kubectl get po -A
NAMESPACE          NAME                                READY   STATUS    RESTARTS   AGE
default            hello-minikube-7f54cff968-n7fv9    1/1     Running   0           2m57s
kube-system        coredns-5dd5756b68-8h7z4          1/1     Running   0           11m
kube-system        etcd-minikube                     1/1     Running   0           11m
kube-system        kube-apiserver-minikube           1/1     Running   0           11m
kube-system        kube-controller-manager-minikube  1/1     Running   0           11m
kube-system        kube-proxy-ghhsc                  1/1     Running   0           11m
kube-system        kube-scheduler-minikube           1/1     Running   0           11m
kube-system        storage-provisioner                1/1     Running   2 (9m35s ago) 11m
kubernetes-dashboard dashboard-metrics-scraper-7fd5cb4ddc-bvpcn 1/1     Running   0           5m6s
kubernetes-dashboard kubernetes-dashboard-8694d4445c-2l7pl 1/1     Running   0           5m6s

C:\Users\anish\Downloads\GBC_Blockchain_Development\Semester_02\BCDV_4032_Building_Scalable_Blockchain_Apps\Week_01>
```

```
C:\Windows\System32\cmd.exe

C:\Users\anish\Downloads\GBC_Blockchain_Development\Semester_02\BCDV_4032_Building_Scalable_Blockchain_Apps\Week_01>
minikube stop
W0113 20:37:33.983424 26804 main.go:291] Unable to resolve the current Docker CLI context "default": context "default": context not found: open C:\Users\anish\.docker\contexts\meta\37a8eec1ce19687d132fe29051dca629d164e2c4958ba141d5f4133a33f0688f\meta.json: The system cannot find the path specified.
* Stopping node "minikube" ...
* Powering off "minikube" via SSH ...
* 1 node stopped.

C:\Users\anish\Downloads\GBC_Blockchain_Development\Semester_02\BCDV_4032_Building_Scalable_Blockchain_Apps\Week_01>
kubectl get po -A
E0113 20:38:03.253791 28268 memcache.go:265] couldn't get current server API group list: Get "http://localhost:8080/api?timeout=32s": dial tcp [::1]:8080: connectex: No connection could be made because the target machine actively refused it.
E0113 20:38:03.255451 28268 memcache.go:265] couldn't get current server API group list: Get "http://localhost:8080/api?timeout=32s": dial tcp [::1]:8080: connectex: No connection could be made because the target machine actively refused it.
E0113 20:38:03.256605 28268 memcache.go:265] couldn't get current server API group list: Get "http://localhost:8080/api?timeout=32s": dial tcp [::1]:8080: connectex: No connection could be made because the target machine actively refused it.
E0113 20:38:03.257174 28268 memcache.go:265] couldn't get current server API group list: Get "http://localhost:8080/api?timeout=32s": dial tcp [::1]:8080: connectex: No connection could be made because the target machine actively refused it.
E0113 20:38:03.258262 28268 memcache.go:265] couldn't get current server API group list: Get "http://localhost:8080/api?timeout=32s": dial tcp [::1]:8080: connectex: No connection could be made because the target machine actively refused it.
Unable to connect to the server: dial tcp [::1]:8080: connectex: No connection could be made because the target machine actively refused it.

C:\Users\anish\Downloads\GBC_Blockchain_Development\Semester_02\BCDV_4032_Building_Scalable_Blockchain_Apps\Week_01>
```

Section 3 - Quiz

Q 1 –

Understand what kubernetes doesn't do from here (<https://kubernetes.io/docs/concepts/overview/>) and explain in your own words. **Do not copy and paste from the website.**

Ans –

Based on the Kubernetes documentation, here are 12 key points about what Kubernetes doesn't do:

1. **Not a Traditional OS:** Kubernetes is not an operating system; it works on top of an OS.
2. **No Hardware Layer Management:** It does not manage the hardware layer.
3. **Doesn't Limit Types of Applications:** Kubernetes doesn't restrict the types of applications it supports.
4. **No Data Processing Workloads:** It doesn't deploy source code or handle data processing workloads directly.
5. **No Application-Level Services:** Kubernetes does not offer application-level services like middleware, databases, or cluster storage.
6. **Doesn't Dictate Logging/Monitoring Solutions:** It does not offer logging or monitoring solutions but can integrate with them.
7. **No Prescribing Deployment Methods:** Kubernetes does not prescribe deployment methods for applications.
8. **No CI/CD Workflow Management:** It does not manage continuous integration and deployment (CI/CD) workflows.
9. **Doesn't Provide Machine Configuration:** Kubernetes doesn't configure machines.
10. **No Limitation on Programming Languages:** It doesn't limit the programming languages or frameworks you can use.
11. **No Direct Service Discovery Management:** Kubernetes allows, but doesn't directly manage service discovery.
12. **Not a Source Code Repository:** It is not a place to store your source code.

Q 2 –

What other Orchestration tools are available other than Kubernetes?

Ans –

Other orchestration tools available in addition to Kubernetes include:

1. Docker Swarm
2. Apache Mesos
3. OpenShift
4. Nomad
5. Rancher