

Devops - Assignment - 07

RollNo: 21111036

Class: MSc. C.S. B-21

1. Explain kubernetes architecture in your own words.

Kubernetes is an open-source container orchestration platform that helps in automating deployment, scaling, and management of containerized applications. The architecture of Kubernetes is designed in a way that it is highly scalable, fault-tolerant, and extensible.

The core components of the Kubernetes architecture are:

- **Master Nodes:** It is responsible for managing the Kubernetes cluster and consists of components like API server, etcd, controller manager, and scheduler.
 - **API Server:** It receives and processes requests from clients, such as kubectl or other Kubernetes components, and then communicates with other components to execute those requests.
 - **etcd:** This is a distributed key-value store that is used to store all the configuration data and state of the Kubernetes cluster.
 - **Controller Manager:** This component is responsible for maintaining the desired state of the cluster by monitoring changes to the cluster's state and making appropriate updates. It includes several sub-controllers that manage specific aspects of the cluster's state, such as replication, endpoints, and services.
 - **Scheduler:** This component is responsible for scheduling pods onto worker nodes based on resource availability, placement constraints, and other policies.
- **Worker Nodes:** The worker node is responsible for running the application containers. Each worker node consists of a container runtime, kubelet, and kube-proxy.
 - **Kubelet:** This component runs on each worker node and is responsible for managing the lifecycle of pods and containers on that node. It communicates with the API server to receive instructions on what pods and containers should be running, and then ensures that they are started, stopped, or restarted as needed.
 - **Kube-proxy:** This component is responsible for managing network connectivity between pods and services within the cluster. It creates and manages virtual IP addresses for services, and routes traffic between pods and services as needed.
- **Pods:** A pod is the smallest unit in the Kubernetes architecture. It is a logical host for one or more containers. Containers in the same pod share the same network namespace and can communicate with each other using localhost.
- **Services:** A service provides a stable IP address and DNS name to a set of pods. It helps in load balancing traffic to the pods.
- **StatefulSet:** Manages deployment and scaling of a set of Pods with durable storage and persistent identifiers for each pod.
- **DaemonSet:** Ensures that all nodes run a copy of a Pod.

2. Use the Play with kubernetes and create pod of any image with your roll number. Upload the screenshot of “kubectl get pod” command in the pdf

03:31:40

CLOSE SESSION

Instances

+ ADD NEW INSTANCE

192.168.0.18
node1

192.168.0.17
node2

chdjQ2v9_chdjs4f9gifg00ckj6l0

IP

192.168.0.18

Memory

98.44% (3.845GiB / 3.906GiB)

CPU

83.90%

URL

ip172-18-0-25-chdjQ2v9gifg00ckj6c0.direct.labs.play-with-k8s.com

DELETE

Kubernetes control plane is running at <https://192.168.0.18:6443>
KubeDNS is running at <https://192.168.0.18:6443/api/v1/namespaces/kube-system/services/kube-dns:dns/proxy>

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

[node1 ~]\$ docker ps

CONTAINER ID IMAGE COMMAND CREATED STATUS PORTS NAMES

1ef16e427146 bfe3a36ebd25 "/coredns -conf /etc..." 15 minutes ago Up 15 minutes k8s_coredns_coredns-74ff55c5b-88xrq_kube-system_9fd2849c-3a2c-

4009-a129-d34137ded84d_0 "/coredns -conf /etc..." 15 minutes ago Up 15 minutes k8s_coredns_coredns-74ff55c5b-gcdsn_kube-system_63646c17-2f1b-

5c76936372b5 bfe3a36ebd25 "/pause" 15 minutes ago Up 15 minutes k8s_POD_coredns-74ff55c5b-88xrq_kube-system_9fd2849c-3a2c-4009

424ff-a566-e85e936c8cb3_0 "/pause" 15 minutes ago Up 15 minutes k8s_POD_coredns-74ff55c5b-gcdsn_kube-system_63646c17-2f1b-42df

fc84d56cbfef k8s.gcr.io/pause:3.2 "-a129-d34137ded84d_0" 15 minutes ago Up 15 minutes k8s_kube-router_kube-router-tkd7m_kube-system_2062092d-4dc8-45

99ef4cd2416f k8s.gcr.io/pause:3.2 "/pause" 15 minutes ago Up 15 minutes k8s_POD_kube-router-tkd7m_kube-system_2062092d-4dc8-4547-8f6e-

fa56e-e85e936c8cb3_0 "/usr/local/bin/kube..." 15 minutes ago Up 15 minutes k8s_kube-proxy_kube-proxy-26kmx_kube-system_4b56d198-fac5-494b

bf6377f1d04 cloudnativelabs/kube-router 15 minutes ago Up 15 minutes k8s_POD_kube-proxy-26kmx_kube-system_4b56d198-fac5-494b-a77e-b

47-8f6e-467684b7caad_0 "/pause" 16 minutes ago Up 16 minutes k8s_kube-scheduler_kube-scheduler-node1_kube-system_e8f872f9a0

2bc0b3f1bd99 k8s.gcr.io/pause:3.2 "/pause" 16 minutes ago Up 16 minutes k8s_kube-controller-manager_kube-controller-manager-node1_kube

407684b7caad_0 46e2cd1b2594 "/usr/local/bin/kube..." 16 minutes ago Up 16 minutes k8s_etcd_etcd-node1_kube-system_3adf556b82cea67ad1352d7f75f810

5e21ee448a41 46e2cd1b2594 "/pause" 16 minutes ago Up 16 minutes k8s_kube-apiserver_kube-apiserver-node1_kube-system_e8ce4f59f6

-a77e-bf8071c8507f_0 "kube-scheduler --au..." 17 minutes ago Up 17 minutes k8s_POD_kube-scheduler-node1_kube-system_e8f872f9a07112e96e684

aa64ae174c8e k8s.gcr.io/pause:3.2 "/pause" 17 minutes ago Up 17 minutes k8s_POD_kube-controller-manager-node1_kube-system_0a3b793b9eae

f8071c8507f_0 9155e4deabb3 "kube-controller-man..." 17 minutes ago Up 17 minutes k8s_POD_kube-controller-manager-node1_kube-system_0a3b793b9eae

74e10b1ec48c 9155e4deabb3 "etcd --advertise-cl..." 17 minutes ago Up 17 minutes k8s_POD_kube-apiserver-node1_kube-system_e8ce4f59f64db1ef8544d

7112e96e684366d7248982_0 "etcd --advertise-cl..." 17 minutes ago Up 17 minutes k8s_POD_etcd-node1_kube-system_3adf556b82cea67ad1352d7f75f8100

a73340079885 d6296d0e06d2 "kube-controller-man..." 17 minutes ago Up 17 minutes

-system_0a3b793b9eae90b0938d275be2e1a5c6_0 "etcd --advertise-cl..." 17 minutes ago Up 17 minutes

030ba27fd432c 0309cf4303ff "kube-apiserver --ad..." 17 minutes ago Up 17 minutes

0c_0 7abda535a867 323f6347f5e2 "kube-scheduler --au..." 17 minutes ago Up 17 minutes

4db1cf8544dad727f1c5a5_0 "/pause" 17 minutes ago Up 17 minutes

33df00baf945 k8s.gcr.io/pause:3.2 "/pause" 17 minutes ago Up 17 minutes

366d7248982_0 k8s.gcr.io/pause:3.2 "/pause" 17 minutes ago Up 17 minutes

acc388086d22 k8s.gcr.io/pause:3.2 "/pause" 17 minutes ago Up 17 minutes

90b0938d275be2e1a5c6_0 k8s.gcr.io/pause:3.2 "/pause" 17 minutes ago Up 17 minutes

815d32172a0b k8s.gcr.io/pause:3.2 "/pause" 17 minutes ago Up 17 minutes

ad727f1c5a5_0 k8s.gcr.io/pause:3.2 "/pause" 17 minutes ago Up 17 minutes

7c2616b1b82e k8s.gcr.io/pause:3.2 "/pause" 17 minutes ago Up 17 minutes

c_0

[node1 ~]\$ kubectl run devops-21111036 --image=python:latest

pod/devops-21111036 created

[node1 ~]\$ kubectl get pod

NAME	READY	STATUS	RESTARTS	AGE
devops-21111036	0/1	ContainerCreating	0	17s

[node1 ~]\$