Kubernetes | spin Wordpress+ mysql | ELK and Kibana Monitoring

Create a secret which is going to be used as a password :

kubectl create secret generic mysqltest --from-literal=password=wordpress

Create a persistent volume → pv-create.yaml

```
root@master-node:/home/wordpress-proj# kubectl get pv
NAME          CAPACITY   ACCESS MODES   RECLAIM POLICY   STATUS   CLAIM                                                 STORAGECLASS
  REASON   AGE
pv-volume-1   20Gi       RWO            Retain           Bound    default/wp-pv-claim
           5h40m
pv-volume-2   20Gi       RWO            Retain           Bound    default/mysql-pv-claim
           5h49m
pv-volume-3   20Gi       RWO            Retain           Bound    default/elasticsearch-data-quickstart-es-default-0
           4h9m
```

```
root@master-node:/home/wordpress-proj# kubectl get pvc
NAME                                         STATUS   VOLUME        CAPACITY   ACCESS MODES   STORAGECLASS   AGE
elasticsearch-data-quickstart-es-default-0   Bound    pv-volume-3   20Gi       RWO                           4h18m
mysql-pv-claim                               Bound    pv-volume-2   20Gi       RWO                           5h50m
wp-pv-claim                                  Bound    pv-volume-1   20Gi       RWO                           5h41m
```

Error with wordpress pod :

```
    -> ;
ERROR 1006 (HY000): Can't create database 'mytest' (errno: 348538624)
mysql> exit
```

Deploy mysql ---- mysql-deployment.yaml

$ kubectl apply -f mysql-deployment.yaml

Deploy wordpress

$ kubectl apply -f wordpress-deployment.yaml

SetUp the Monitoring tools

> Install custom resource definition with RBAC rules

```
kubectl apply -f
https://download.elastic.co/downloads/eck/1.2.0/all-in-one.yaml
```

> Apply es specification with one ES node

```
cat <<EOF | kubectl apply -f -
apiVersion: elasticsearch.k8s.elastic.co/v1
kind: Elasticsearch
metadata:
  name: quickstart
spec:
  version: 7.8.1
  nodeSets:
  - name: default
    count: 1
    config:
      node.master: true
```

```
      node.data: true
      node.ingest: true
      node.store.allow_mmap: false
EOF
```

> To expose the elastic search to external user

$ kubectl edit service quickstart-es-http
Under “spec” change type: NodePort and add nodePort

```
spec:
  clusterIP: 10.108.251.182
  externalTrafficPolicy: Cluster
  ports:
  - name: https
    nodePort: 32323
    port: 9200
    protocol: TCP
    targetPort: 9200
  selector:
    common.k8s.elastic.co/type: elasticsearch
    elasticsearch.k8s.elastic.co/cluster-name: quickstart
  sessionAffinity: None
  type: NodePort
status:
```

> To get the “elastic” user password :
$ PASSWORD=$(kubectl get secret quickstart-es-elastic-user -o go-template='{{.data.elastic | base64decode}}')
$ echo $PASSWORD

```
root@ip-172-31-37-253:~# PASSWORD=$(kubectl get secret quickstart-es-elastic-user -o go-template='{{.data.elastic | base64decode}}')
root@ip-172-31-37-253:~# echo $PASSWORD
7IS0R91p412fYDsc8j54Gliv
```

This is required when access the elastic on webserver

https://Master-node-IP:nodePort #nodePort for es-http service

Username → elastic
Password → Got from above steps k8s secret

> Specify a Kibana instance and associate it with your Elasticsearch cluster:

```
cat <<EOF | kubectl apply -f -
apiVersion: kibana.k8s.elastic.co/v1
kind: Kibana
metadata:
  name: quickstart
spec:
  version: 7.8.
  count: 1
  elasticsearchRef:
    name: quickstart
EOF
```

> edit the service file to add node Port

$ kubectl edit service quickstart-kb-http

```
spec:
  clusterIP: 10.102.234.32
  externalTrafficPolicy: Cluster
  ports:
  - name: https
    nodePort: 32324
    port: 5601
    protocol: TCP
    targetPort: 5601
  selector:
    common.k8s.elastic.co/type: kibana
    kibana.k8s.elastic.co/name: quickstart
  sessionAffinity: None
  type: NodePort
status:
```

The service looks like this :

```
NAME                              TYPE        CLUSTER-IP       EXTERNAL-IP   PORT(S)          AGE
service/kubernetes                ClusterIP   10.96.0.1        <none>        443/TCP          6h59m
service/quickstart-es-default     ClusterIP   None             <none>        9200/TCP         6h46m
service/quickstart-es-http        NodePort    10.108.251.182   <none>        9200:32323/TCP   6h46m
service/quickstart-es-transport   ClusterIP   None             <none>        9300/TCP         6h46m
service/quickstart-kb-http        NodePort    10.102.234.32    <none>        5601:32324/TCP   6h31m
service/tomcat                    NodePort    10.108.68.79     <none>        8080:30167/TCP   4h21m
```

Filebeat

https://www.elastic.co/guide/en/beats/filebeat/master/running-on-kubernetes.html

Filebeat image → 7.9.3

`curl -L -O https://raw.githubusercontent.com/elastic/beats/master/deploy/kubernetes/filebeat-kubernetes.yaml`

$ vi `filebeat-kubernetes.yaml`

Change “namespace” value from “kube-system” to “default”

Add ssl.certificate parameter under output.elasticsearch

```
    output.elasticsearch:
      hosts: ['${ELASTICSEARCH_HOST:elasticsearch}:${ELASTICSEARCH_PORT:9200}']
      username: ${ELASTICSEARCH_USERNAME}
      password: ${ELASTICSEARCH_PASSWORD}
      ssl.certificate_authorities:
        - /etc/certificate/ca.crt
---
```

Now under demon set update volume point and volumes

VolumeMount
- name: certs
mountPath: /etc/certificate/ca.crt
readOnly: true
subPath: ca.crt

Volumes
- name: certs
secret:
secretName: quickstart-es-http-certs-public

```
  volumeMounts:
  - name: config
    mountPath: /etc/filebeat.yml
    readOnly: true
    subPath: filebeat.yml
  - name: certs
    mountPath: /etc/certificate/ca.crt
    readOnly: true
    subPath: ca.crt
  - name: data
    mountPath: /usr/share/filebeat/data
  - name: varlibdockercontainers
    mountPath: /var/lib/docker/containers
    readOnly: true
  - name: varlog
    mountPath: /var/log
    readOnly: true
```

```
volumes:
- name: config
  configMap:
    defaultMode: 0640
    name: filebeat-config
- name: certs
  secret:
    secretName: quickstart-es-http-certs-public
- name: varlibdockercontainers
  hostPath:
    path: /var/lib/docker/containers
- name: varlog
  hostPath:
    path: /var/log
```

Edit env too

```
env:
- name: ELASTICSEARCH_HOST
  value: https://quickstart-es-http
- name: ELASTICSEARCH_PORT
  value: "9200"
- name: ELASTICSEARCH_USERNAME
  value: elastic
- name: ELASTICSEARCH_PASSWORD
  value: DRUE0756VZ06k5k22ylPDyL1
- name: ELASTIC_CLOUD_ID
  value:
- name: ELASTIC_CLOUD_AUTH
  value:
- name: NODE_NAME
  valueFrom:
    fieldRef:
      fieldPath: spec.nodeName
```

Add below parameter to monitor master node also :

```
tolerations:
- key: node-role.kubernetes.io/master
  effect: NoSchedule
```

Save the file and run below command

$ kubectl create -f `filebeat-kubernetes.yaml`

Perform same steps for metric beat too

```
curl -L -O
https://raw.githubusercontent.com/elastic/beats/7.8/deploy/kubernetes/metricbeat-kubernetes.yaml
```

AT k8 end

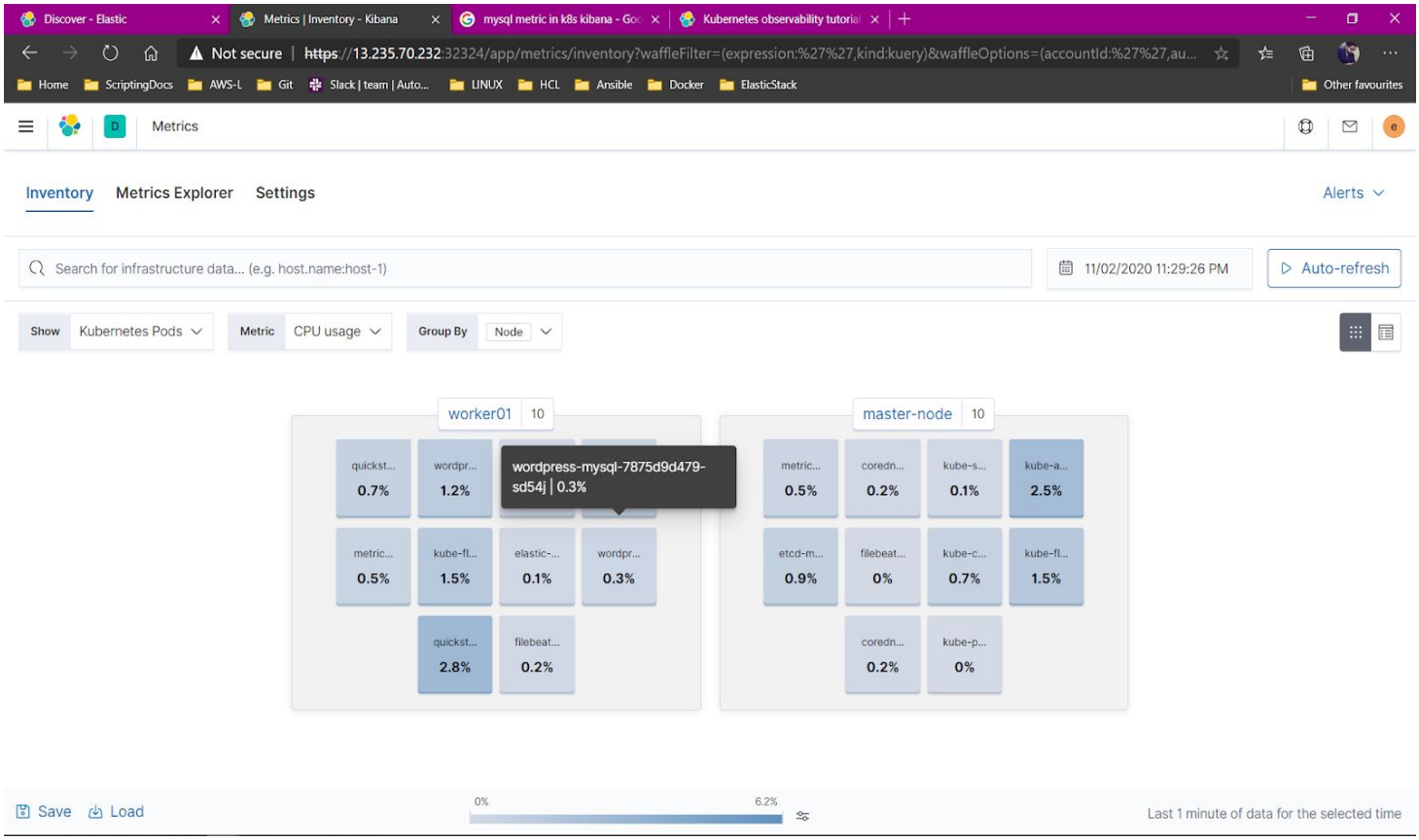
```
root@master-node:~# kubectl get all
NAME                                    READY   STATUS    RESTARTS   AGE
pod/filebeat-hzhzb                      1/1     Running   0          122m
pod/filebeat-jfttj                      1/1     Running   0          122m
pod/filebeat-tr4c9                      1/1     Running   0          122m
pod/metricbeat-645d9fc4c7-hqflm         1/1     Running   0          3h7m
pod/metricbeat-cb9df                    1/1     Running   0          3h7m
pod/metricbeat-tcfjj                    1/1     Running   0          3h7m
pod/quickstart-es-default-0             1/1     Running   0          7h5m
pod/quickstart-kb-574fd8f4f6-5zpql      1/1     Running   0          6h50m
pod/tomcat-6c5f9fc846-vq45n             1/1     Running   0          4h41m

NAME                               TYPE        CLUSTER-IP       EXTERNAL-IP   PORT(S)          AGE
service/kubernetes                 ClusterIP   10.96.0.1        <none>        443/TCP          7h18m
service/quickstart-es-default      ClusterIP   None             <none>        9200/TCP         7h5m
service/quickstart-es-http         NodePort    10.108.251.182   <none>        9200:32323/TCP   7h5m
service/quickstart-es-transport    ClusterIP   None             <none>        9300/TCP         7h5m
service/quickstart-kb-http         NodePort    10.102.234.32    <none>        5601:32324/TCP   6h50m
service/tomcat                     NodePort    10.108.68.79     <none>        8080:30167/TCP   4h41m

NAME                        DESIRED   CURRENT   READY   UP-TO-DATE   AVAILABLE   NODE SELECTOR   AGE
daemonset.apps/filebeat     3         3         3       3            3           <none>          122m
daemonset.apps/metricbeat   2         2         2       2            2           <none>          3h7m

NAME                              READY   UP-TO-DATE   AVAILABLE   AGE
deployment.apps/metricbeat        1/1     1            1           3h7m
deployment.apps/quickstart-kb     1/1     1            1           6h50m
deployment.apps/tomcat            1/1     1            1           4h41m

NAME                                         DESIRED   CURRENT   READY   AGE
replicaset.apps/metricbeat-645d9fc4c7        1         1         1       3h7m
replicaset.apps/quickstart-kb-574fd8f4f6     1         1         1       6h50m
replicaset.apps/tomcat-6c5f9fc846            1         1         1       4h41m
replicaset.apps/tomcat-77c64bb488            0         0         0       4h41m

NAME                                       READY   AGE
statefulset.apps/quickstart-es-default     1/1     7h5m
root@master-node:~#
```

NOTE :
> In MySql pod make sure the mysql directy owned by “mysql”

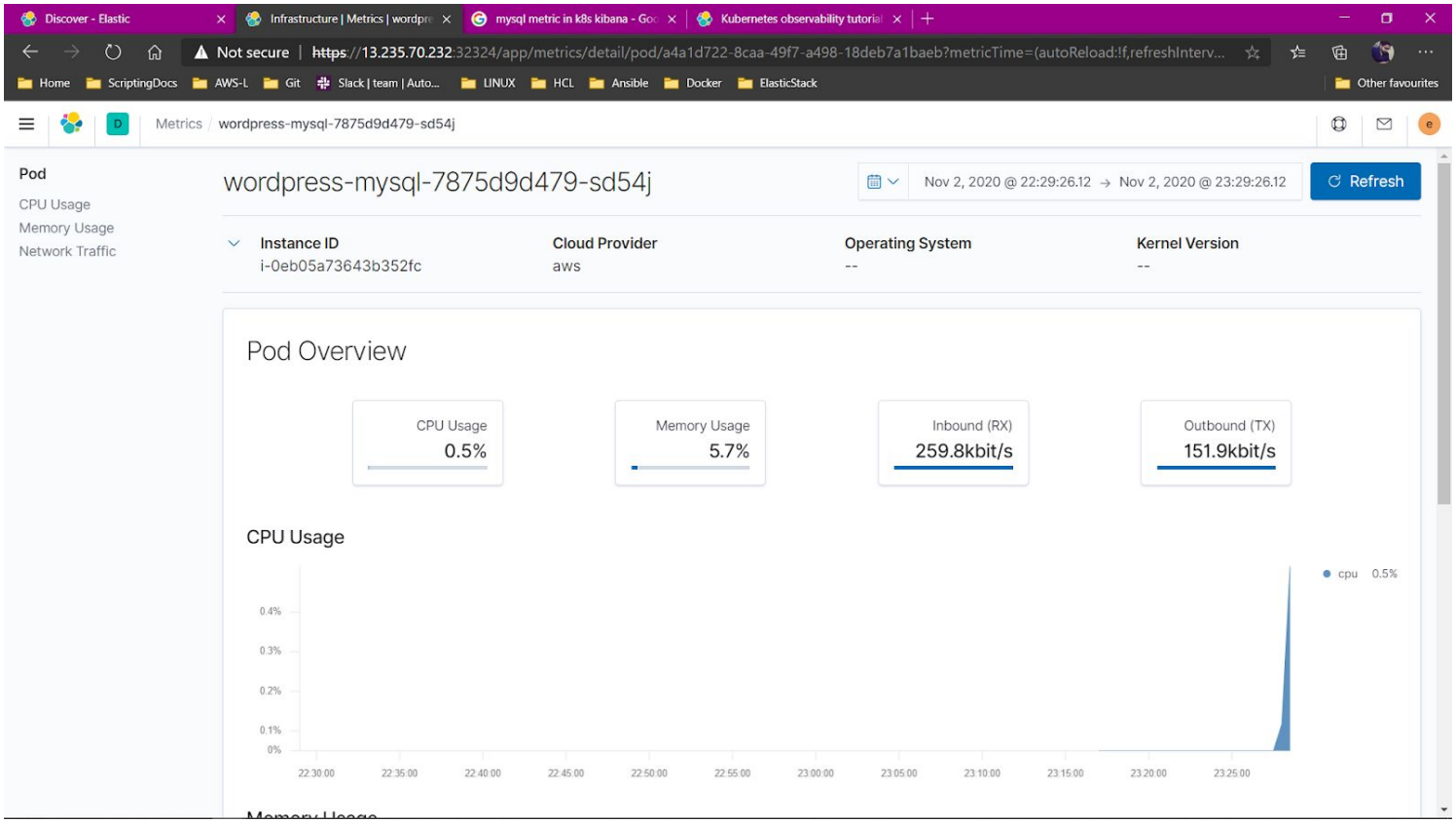
```
root@wordpress-mysql-7875d9d479-sd54j:/# ls -l /var/lib
total 32
drwxr-xr-x 1 root      root      4096 Oct 20 17:37 apt
drwxr-xr-x 1 root      root      4096 Oct 20 17:37 dpkg
drwxr-xr-x 2 root      root      4096 Sep 19 21:39 misc
drwxr-xr-x 8 www-data  www-data  4096 Nov  2 12:36 mysql
drwxrwx--- 2 mysql     mysql     4096 Oct 20 17:37 mysql-files
drwxr-x--- 2 mysql     mysql     4096 Oct 20 17:37 mysql-keyring
drwxr-xr-x 2 root      root      4096 Oct 12 07:00 pam
drwxr-xr-x 1 root      root      4096 Oct 12 07:00 systemd
```

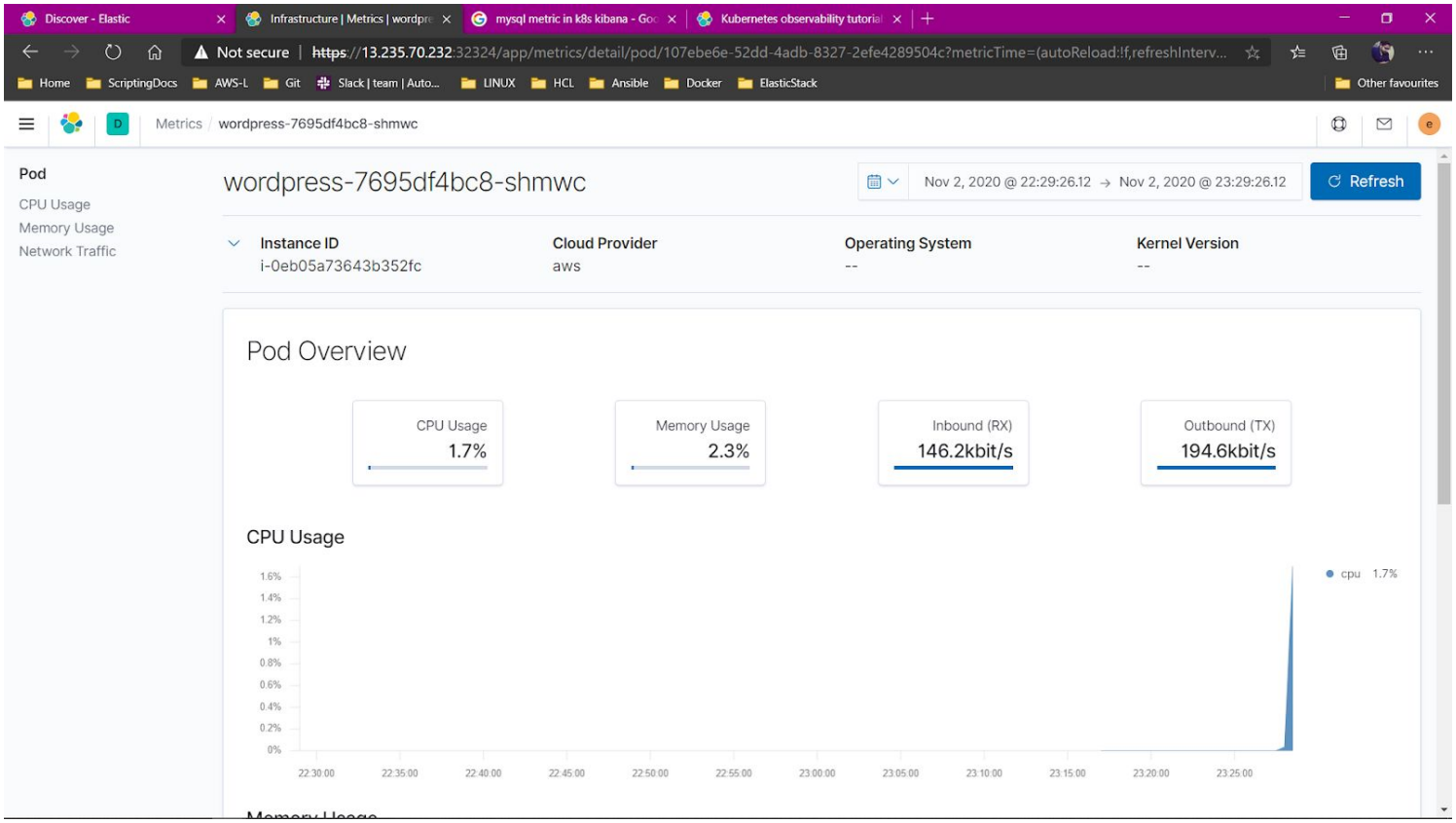
If this is the case run “ chown -R mysql:mysql /var/lib/mysql”

ELK and Kibana



Below 2 pods wordpress and mysql

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Pod
CPU Usage
Memory Usage
Network Traffic
wordpress-7695df4bc8-shmwc
Nov 2, 2020 @ 22:29:26.12 → Nov 2, 2020 @ 23:29:26.12
Refresh
Instance ID
i-0eb05a73643b352fc
Cloud Provider
aws
Operating System
--
Kernel Version
--
Pod Overview
CPU Usage
1.7%
Memory Usage
2.3%
Inbound (RX)
146.2kbit/s
Outbound (TX)
194.6kbit/s
CPU Usage
1.6%
1.4%
1.2%
1%
0.8%
0.6%
0.4%
0.2%
0%
22:30:00
22:35:00
22:40:00
22:45:00
22:50:00
22:55:00
23:00:00
23:05:00
23:10:00
23:15:00
23:20:00
23:25:00
cpu 1.7%