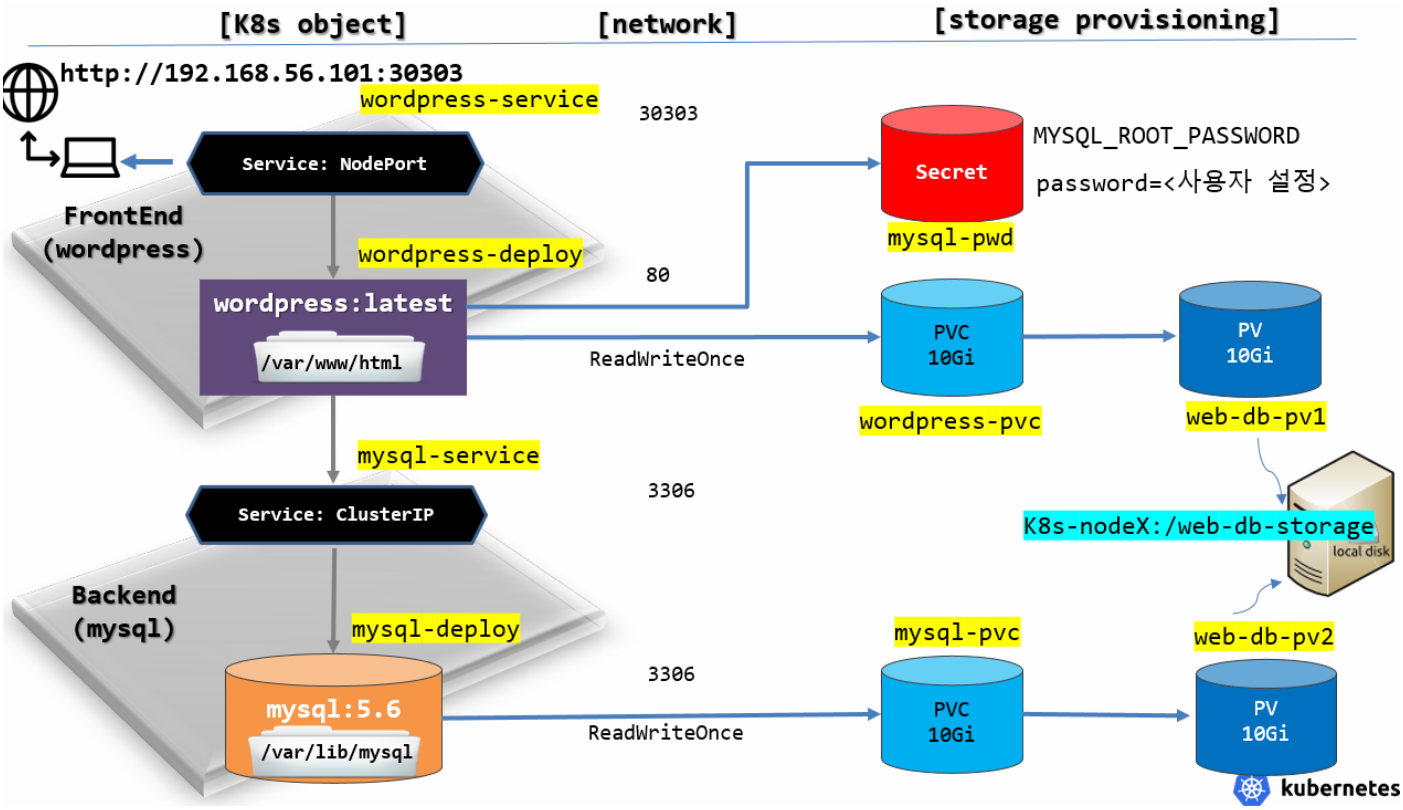
[Kubernetes: Web(wordpress) + DB(mysql) + Volume(PV,PVC)]




```
[root@k8s-master ~]# cd LABs/
[root@k8s-master LABs]# mkdir web-db
[root@k8s-master LABs]# cd web-db/
```

```
-- PV(Persistent Volume) 생성: mysql & wordpress 전용 2개 생성
-- ReadWriteOnce/10Gi
```

```
[root@k8s-master web-db]# vi web-db-pv1.yaml

apiVersion: v1
kind: PersistentVolume
metadata:
  name: web-db-pv1
  labels:
    type: local
spec:
  capacity:
    storage: 10Gi
  accessModes:
    - ReadWriteOnce
  hostPath:
    path: "/web-db-storage/pv01"
```

```
[root@k8s-master web-db]# vi web-db-pv2.yaml

apiVersion: v1
kind: PersistentVolume
metadata:
  name: web-db-pv2
  labels:
    type: local
spec:
  capacity:
    storage: 10Gi
  accessModes:
    - ReadWriteOnce
  hostPath:
    path: "/web-db-storage/pv02"


[root@k8s-master web-db]# kubectl apply -f web-db-pv1.yaml
persistentvolume/web-db-pv1 created

[root@k8s-master web-db]# kubectl apply -f web-db-pv2.yaml
persistentvolume/web-db-pv2 created

[root@k8s-master web-db]# kubectl get pv
NAME         CAPACITY   ACCESS MODES   RECLAIM POLICY   STATUS      CLAIM             STORAGECLASS   REASON   AGE
web-db-pv1   10Gi       RWO            Retain           Available                                           21s
web-db-pv2   10Gi       RWO            Retain           Available                                           19s
```

-- 생성한 PV를 사용할 PVC 생성: 용량과 접근권한을 비교하여 자동 지정

```
[root@k8s-master web-db]# vi wordpress-pvc.yaml

kind: PersistentVolumeClaim
apiVersion: v1
metadata:
  name: wordpress-pvc
spec:
  accessModes:
    - ReadWriteOnce
  resources:
    requests:
      storage: 5Gi


[root@k8s-master web-db]# vi mysql-pvc.yaml

kind: PersistentVolumeClaim
apiVersion: v1
metadata:
  name: mysql-pvc
spec:
  accessModes:
    - ReadWriteOnce
  resources:
    requests:
      storage: 5Gi
```

```
[root@k8s-master web-db]# kubectl apply -f wordpress-pvc.yaml
persistentvolumeclaim/wordpress-pvc created

[root@k8s-master web-db]# kubectl apply -f mysql-pvc.yaml
persistentvolumeclaim/mysql-pvc created

[root@k8s-master web-db]# kubectl get pv,pvc
NAME                          CAPACITY   ACCESS MODES   RECLAIM POLICY   STATUS   CLAIM     STORAGECLASS   REASON   AGE
persistentvolume/mongo-pv     5Gi        RWO            Retain           Bound    default/mongo-pvc       3h3m
persistentvolume/web-db-pv1   10Gi       RWO            Retain           Bound    default/wordpress-pvc   108s
persistentvolume/web-db-pv2   10Gi       RWO            Retain           Bound    default/mysql-pvc       106s

NAME                                  STATUS        VOLUME       CAPACITY   ACCESS MODES   STORAGECLASS   AGE
persistentvolumeclaim/mongo-pvc       Terminating   mongo-pv     5Gi        RWO                           3h1m
persistentvolumeclaim/mysql-pvc       Bound         web-db-pv2   10Gi       RWO                           12s
persistentvolumeclaim/wordpress-pvc   Bound         web-db-pv1   10Gi       RWO                           17s
```

-- secret object 생성: mysql 암호 저장용

```
[root@k8s-master web-db]# kubectl create secret generic mysql-pwd --from-literal=password=Passw0rD
secret/mysql-pwd created

[root@k8s-master web-db]# kubectl describe secret mysql-pwd
Name:         mysql-pwd
Namespace:    default
Labels:       <none>
Annotations:  <none>

Type:  Opaque

Data
====
password:  8 bytes
```

-- mysql pod를 배포할 Deployment 생성

```
[root@k8s-master web-db]# vi mysql-deploy.yaml

apiVersion: apps/v1
kind: Deployment
metadata:
  name: mysql
  labels:
    app: mysql
spec:
  replicas: 1
  selector:
    matchLabels:
      app: mysql
  template:
    metadata:
      labels:
        app: mysql
    spec:
      containers:
        - image: mysql:5.6
          name: mysql
          env:
            - name: MYSQL_ROOT_PASSWORD
              valueFrom:
                secretKeyRef:
                  name: mysql-pwd
                  key: password
            - name: MYSQL_DATABASE
```

```
            value: kube-db
          - name: MYSQL_USER
            value: kube-user
          - name: MYSQL_ROOT_HOST
            value: '%'
          - name: MYSQL_PASSWORD
            value: Passw0rD
        ports:
          - containerPort: 3306
            name: mysql
        volumeMounts:
          - name: mysql-persistent-storage
            mountPath: /var/lib/mysql
    volumes:
      - name: mysql-persistent-storage
        persistentVolumeClaim:
          claimName: mysql-pvc
```

```
[root@k8s-master web-db]# kubectl apply -f mysql-deploy.yaml
deployment.apps/mysql created

[root@k8s-master web-db]# kubectl get deploy,pods -o wide
deployment.apps/mysql            1/1     1           1          40s   mysql      mysql:5.6     app=mysql

pod/mysql-5dd474459-rghl5                1/1     Running   0          40s    10.111.156.104   k8s-node1
<none>  <none>
```

-- mysql service 생성

```
[root@k8s-master web-db]# vi mysql-service.yaml
apiVersion: v1
kind: Service
metadata:
  name: mysql
  labels:
    app: mysql
spec:
  type: ClusterIP
  ports:
    - port: 3306
  selector:
    app: mysql

[root@k8s-master web-db]# kubectl apply -f mysql-service.yaml

[root@k8s-master web-db]# kubectl get svc -o wide
NAME         TYPE        CLUSTER-IP      EXTERNAL-IP   PORT(S)          AGE   SELECTOR
kubernetes   ClusterIP   10.96.0.1       <none>        443/TCP          38h   <none>
mysql-svc    ClusterIP   10.101.111.65   <none>        3306/TCP         4s    app=mysql
```

-- wordpress를 배포할 Deployment 생성

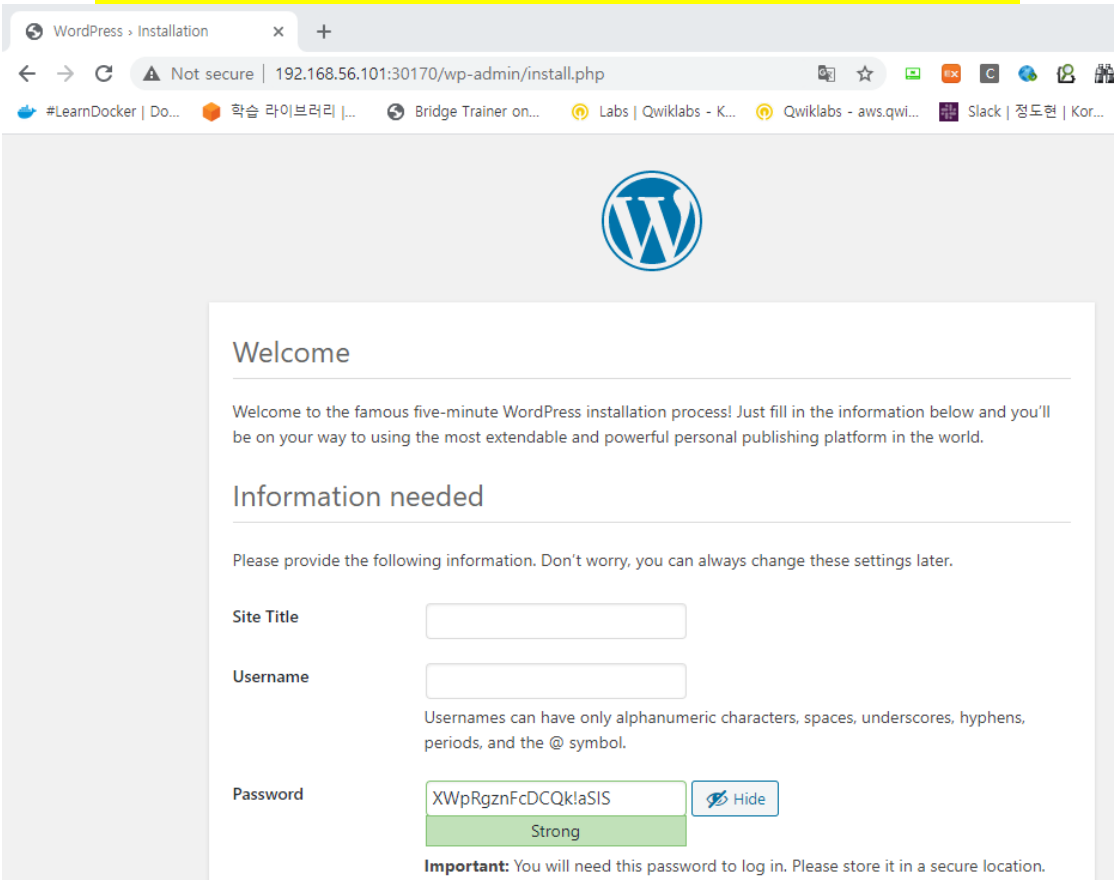
```
[root@k8s-master web-db]# vi wordpress-deploy.yaml

apiVersion: apps/v1
kind: Deployment
metadata:
  name: wordpress
  labels:
    app: wordpress
spec:
  replicas: 1
  selector:
    matchLabels:
      app: wordpress
  template:
    metadata:
      labels:
        app: wordpress
    spec:
      containers:
        - image: wordpress
          name: wordpress
          env:
          - name: WORDPRESS_DB_HOST
            value: mysql:3306
          - name: WORDPRESS_DB_NAME
            value: kube-db
          - name: WORDPRESS_DB_USER
            value: kube-user
          - name: WORDPRESS_DB_PASSWORD
            value: Passw0rD
          ports:
            - containerPort: 80
              name: wordpress
          volumeMounts:
            - name: wordpress-persistent-storage
              mountPath: /var/www/html
      volumes:
        - name: wordpress-persistent-storage
          persistentVolumeClaim:
            claimName: wordpress-pvc
[root@k8s-master web-db]# kubectl apply -f wordpress-deploy.yaml
deployment.apps/wordpress created

[root@k8s-master web-db]# kubectl get deploy,pods -o wide
deployment.apps/wordpress          1/1     1            1           34s     wordpress         wordpress
app=wordpress

pod/wordpress-57687d995d-6vhjh          1/1     Running   0          34s     10.111.156.105   k8s-node1
<none>          <none>
```

-- wordpress service 생성

```
[root@k8s-master web-db]# vi wordpress-service.yaml

apiVersion: v1
kind: Service
metadata:
  name: wordpress
  labels:
    app: wordpress
spec:
  type: NodePort
  ports:
    - port: 80
      targetPort: 80
      protocol: TCP
  selector:
    app: wordpress


[root@k8s-master web-db]# kubectl apply -f wordpress-service.yaml
service/wordpress-svc created

[root@k8s-master web-db]# kubectl get svc -o wide
NAME           TYPE        CLUSTER-IP       EXTERNAL-IP   PORT(S)          AGE     SELECTOR
kubernetes     ClusterIP   10.96.0.1        <none>        443/TCP          38h     <none>
mysql-svc      ClusterIP   10.101.111.65    <none>        3306/TCP         3m21s   app=mysql
wordpress-svc  NodePort    10.97.36.57      <none>        80:31453/TCP     7s      app=wordpress

[root@k8s-master ~]# kubectl get pod -o wide
mysql-5dd474459-s6gvg          1/1     Running   0          10m     10.109.131.33   k8s-node2   <none>           <none>
wordpress-57687d995d-tzhpp     1/1     Running   0          5m32s   10.109.131.34   k8s-node2   <none>           <none>

[root@k8s-master ~]# kubectl get pod/wordpress-57687d995d-6vhjh -o wide
NAME                         READY   STATUS    RESTARTS   AGE    IP              NODE        NOMINATED NODE   READINESS GATES
wordpress-57687d995d-6vhjh   1/1     Running   0          6m3s   10.111.156.105   k8s-node1   <none>           <none>

[root@k8s-master ~]# kubectl describe pod/wordpress-57687d995d-6vhjh
Name:         wordpress-57687d995d-6vhjh
Namespace:    default
Priority:     0
Node:         k8s-node1/192.168.56.101
...

[root@k8s-master web-db]# kubectl get po,svc,deploy
NAME                                READY   STATUS    RESTARTS   AGE
pod/mysql-5dd474459-tz6bn           1/1     Running   0          3m35s
pod/wordpress-57687d995d-nqj7j      1/1     Running   0          3m17s

NAME                 TYPE        CLUSTER-IP       EXTERNAL-IP   PORT(S)          AGE
service/kubernetes   ClusterIP   10.96.0.1        <none>        443/TCP          39h
service/mysql        ClusterIP   10.108.93.154    <none>        3306/TCP         3m27s
service/wordpress    NodePort    10.98.13.244     <none>        80:30170/TCP     3m8s

NAME                              READY   UP-TO-DATE   AVAILABLE   AGE
deployment.apps/mysql             1/1     1            1           3m35s
deployment.apps/wordpress         1/1     1            1           3m17s
[root@k8s-node1 ~]# netstat -nlp | grep 30170
tcp        0      0 0.0.0.0:30170           0.0.0.0:*               LISTEN      3407/kube-proxy
```

```
[root@k8s-master web-db]# kubectl exec -it mysql-5dd474459-rghl5 -- bash

root@mysql-5dd474459-rghl5:/# env | grep MYSQL
MYSQL_PASSWORD=Passw0rD
MYSQL_DATABASE=kube-db
MYSQL_ROOT_PASSWORD=Passw0rD
MYSQL_MAJOR=5.6
MYSQL_USER=kube-user
MYSQL_VERSION=5.6.50-1debian9
MYSQL_ROOT_HOST=%

root@mysql-5dd474459-rghl5:/# mysql -uroot -p
Enter password: (Passw0rD)

mysql> show databases;
+--------------------+
| Database           |
+--------------------+
| information_schema |
| kube-db            |
| mysql              |
| performance_schema |
+--------------------+
4 rows in set (0.00 sec)

mysql> use kube-db
Database changed

mysql> show tables;
Empty set (0.00 sec)
```

[wordpress Pod가 생성된 node의 IP와 NodePort가 지정한 port로 접속]



```
-- wordpress 사이트 install 이후 테이블 생성됨.
mysql> show tables;
+----------------------+
| Tables_in_kube-db    |
+----------------------+
| wp_commentmeta       |
| wp_comments          |
| wp_links             |
| wp_options           |
| wp_postmeta          |
| wp_posts             |
| wp_term_relationships |
| wp_term_taxonomy     |
| wp_termmeta          |
| wp_terms             |
| wp_usermeta          |
| wp_users             |
+----------------------+
12 rows in set (0.00 sec)

mysql> select * from wp_users;
+----+------------+------------------------------------+--------------+-------------+-----------------------------+
---------------------+---------------------+-------------+--------------+
| ID | user_login | user_pass                          | user_nicename | user_email  | user_url                    |
user_registered     | user_activation_key | user_status | display_name |
+----+------------+------------------------------------+--------------+-------------+-----------------------------+
---------------------+---------------------+-------------+--------------+
|  1 | hylee      | $P$BcftZDxQz/f6z6Nfu2M5URN7nyyhlM. | hylee         | abc@abc.com | http://192.168.56.101:30404 |
2020-11-06 01:48:19 |                     |           0 | hylee        |
+----+------------+------------------------------------+--------------+-------------+-----------------------------+
---------------------+---------------------+-------------+--------------+
1 row in set (0.00 sec)


[root@k8s-node1 ~]# cd /
[root@k8s-node1 /]# ls
bin  boot  dev  etc  home  lib  lib64  media  mnt  opt  proc  root  run  sbin  srv  sys  tmp  usr
var  web-db-storage
[root@k8s-node1 /]# cd web-db-storage/
[root@k8s-node1 web-db-storage]# ls
pv01  pv02
```