{Kubernets} Ports EXPOSED

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Purpose: This lab will demonstrate how Kubernetes ports are exposed and published.

ClusterIP Lab

To start with, we will first deploy an nginx application

1. Create a deployment called **web** with *3 replicas* using the *nginx* docker image. Do not used the ***--port*** flag. Also used the declaritive form to create this deployment. Make sure to use the ***--save-config*** option

```
 kubectl create deploy web --image=docker.io/library/nginx --
replicas=3 --save-config=true -o yaml --dry-run=client > web.yaml

 kubectl create -f web.yaml
```

2. Use **kubectl** to check one of the pods and make sure **nginx** is actually running. *(HINT: You can also SSH into one fo the cluster nodes and use the **docker**, **crictl**, or **nsenter** commands)*

```
 kubectl get pods

 kubectl exec web-564d578c4-9b4wt -- curl -s localhost:80
```

> In the previous command, make sure to replace **web-564d578c4-9b4wt** with the actual name of one of the pods returned in the **kubectl get pods** command

3. Expose the **web** depolyment as a ClusterIP service named **web-svc**. Do not use the **--port** or **--target-pot** options.

```
 kubectl expose deploy web --name web-svc
```

> Notice you have an **error: couldn't find port via --port flag or introspection**. The **expose** command requires the **--port** option and if missing, will use the **port** defined in the **deployment**. But you did not define a port with **--port** when you initially created the the deployment. Thus you are gettign the error.

4. Used the **describe** command to verify there is no **port** defined in the deployment

```
 kubectl describe deploy web
```

5. Edit the declarative file you created in STEP #1, adding port **7480** to the file.

> **HINT**: If you don't know the correct syntax to add to the file you can just re-run the **create** command from STEP #1, but this time using the **--port** option.

6. Apply the changes to the **web** *deployment*

```
kubectl apply -f web.yaml
```

> It's very important that you initially used the **--save-config** with the **create** command in STEP #1 (I'ts not necessarily required in STEP #5). This is because the **apply** command requires that the initial deployment was created using the **--save-config** option of the **create** command or using the **apply** command. Examine ***kubectl apply deploy -h*** for details.

7. Run STEP #3 again

```
kubectl expose deploy web --name web-svc
```

> Notice you get no errors... why? HINT: use ***kubectl expose -h*** to see why. Search for the string: ***--port="*** inside the help and notice it says: *"Copied from the resource being exposed, if unspecified"*. The resource, which is the **web** deployment now has a **port**, that you added in STEP #5. The **expose** command uses this **port** by default.

8. SSH into one of the culster nodes and try to acces the nginx service using the **ClusterIP** over port **7480** (*use **telnet** or **curl** to test*). HINT: To get the **node names** of one of the cluster nodes you can use the kubectl ***get nodes*** or ***get pods*** command. To get the clusterIP address use **get service**

```
kubectl get nodes

kubectl get pods -o wide

kubectl get svc

minikube ssh -n devops-m03
```

> Make sure to use one of the actual node names from *your* result of running ***get nodes*** and NOT my example node name: ***devops-m03***

9. Describe the **web-svc** service to see the issue. Use **kubectl edit** to fix the issue

```
kubectl describe web-svc

kubectl edit web-svc
```

> Understand that the issue was that the **TargetPort** in the **web-svc** service was not pointing to the *actual* port the service is running on *inside* the container. Because the **--target-port** option was NOT used when creating the service, the **TargetPort** of **7480** was copied from the **--port** option that was used when creating the service. And again, if there was no **--port** used when creating the service, then it gets copied from the **--port** that was used when creating the object being exposed, in this case the **deployment**. If there was no **--port** used when creating the deployment, then you MUST specify the **--port** when creating the service.

NodeIP Lab