

LAB 5

Create Kubernetes Deployments

Lab Objectives

In this lab, we'll create a simple deployment with several replicas and a basic web server. After that, we'll deploy a series of deployments to configure a fully functional monitoring service for Kubernetes.


Lab Structure - Overview

1. Write a basic manifest that creates a deployment and a service

Lab Overview

Conventions

Lab Guide Conventions

<code>reboot</code>	Any text a student needs to enter is printed like this.
<code><your.ip></code>	Any time a student needs to insert their own value, the text has brackets.
	Focuses the student's attention to a particular part of an image.
File	User Interface (UI) buttons and objects are bold.
<i>Special Font</i>	Unusual or important words or phrases are marked with italics.

Code Blocks

Blocks of sample code are set apart from the body and marked accordingly. It is recommended that students do not copy/paste text from the lab into their files. Extra formatting is often transferred in this process and can result in failed operations.

```
# ls -l /var/www/html/index.html
-rw-rw-r-- 1 root root 1872 Jun 21 09:33 /var/www/html/index.html
# date
Wed Jun 21 09:33:42 EDT 200
```

1. Create a Deployment (Pod, Service, Replicas)

Step by Step Guide

This process will take approximately 10 minutes.

Step	Action
1.	Open a terminal console (iTerm, Terminal, PowerShell, Ubuntu Bash, Git Bash, etc).
2.	<p>In your working directory, create a file called hello-world.yaml with the following content: NOTE the “selector” app field is the same as the deployment metadata app field. NOTE that Kind is Service and Deployment, also, note the statically declared NodePort.</p> <pre>apiVersion: v1 kind: Service metadata: labels: name: hello-world-deployment spec: selector: app: hello-world type: NodePort ports: - name: hello-world-deployment protocol: TCP port: 80 nodePort: 30901</pre> <p>---</p> <pre>apiVersion: apps/v1beta1 kind: Deployment metadata: name: hello-world-deployment spec: replicas: 3 template: metadata: labels: app: hello-world spec: containers: - name: hello-world image: lindison/hello-world:k8s ports: - containerPort: 80</pre>

3.	Delete all Kubernetes objects: kubectl delete all --all <pre>\$ kubectl delete all --all pod "hw-deployment-2133595761-0qndd" deleted service "hw-deployment" deleted service "kubernetes" deleted deployment "hw-deployment" deleted</pre>
4.	Confirm all objects are deleted: kubectl get all <pre>\$ kubectl get all NAME CLUSTER-IP EXTERNAL-IP PORT(S) AGE svc/kubernetes 10.0.0.1 <none> 443/TCP 55s</pre>
5.	Deploy the basic deployment: kubectl create -f hello-world.yaml <pre>\$ kubectl create -f hello-world.yaml service "hw-deployment" created deployment "hw-deployment" created</pre>
6.	Show the deployments: kubectl get deployment <pre>\$ kubectl get deployment NAME DESIRED CURRENT UP-TO-DATE AVAILABLE AGE hw-deployment 1 1 1 1 13s</pre>
7.	Show information on the Kubernetes cluster: kubectl get all Note all the created objects, pods, service, deployments, and replica set. This will show all the created Kubernetes Objects. Take note of the port, in this example, the port is 30901 . <pre>\$ kubectl get all NAME READY STATUS RESTARTS AGE po/hw-deployment-2133595761-ng11h 1/1 Running 0 17s NAME CLUSTER-IP EXTERNAL-IP PORT(S) AGE svc/hw-deployment 10.0.0.84 <nodes> 80:30901/TCP 17s svc/kubernetes 10.0.0.1 <none> 443/TCP 1m NAME DESIRED CURRENT UP-TO-DATE AVAILABLE AGE deploy/hw-deployment 1 1 1 1 17s NAME DESIRED CURRENT READY AGE rs/hw-deployment-2133595761 1 1 1 17s</pre>
8.	Using a browser, open the web page (e.g. <a href="http://<MasterIP>:30901">http://<MasterIP>:30901)

	<p>A page similar to the below should display.</p> <div><div><div><div></div><div></div><div></div><div></div></div><div>192.168.64.13:30901</div><div><div>☆</div><div></div><div></div><div></div></div></div></div> <div><h1>Hello from Kubernetes!</h1><p>My hostname is hello-world-deployment-2133595761-47xk0</p><p>Links found</p><p>KUBERNETES listening in 443 available at tcp://10.0.0.1:443 HELLO_WORLD_DEPLOYMENT listening in 80 available at tcp://10.0.0.159:80</p></div>																
9.	<p>Let's scale the hello-world application from the command line. First, get a list of pods.</p> <pre>kubectl get pods</pre> <pre>\$ kubectl get pods</pre> <table><thead><tr><th>NAME</th><th>READY</th><th>STATUS</th><th>RESTARTS</th></tr></thead><tbody><tr><td>hello-world-deployment-2133595761-47xk0</td><td>1/1</td><td>Running</td><td>0</td></tr><tr><td>hello-world-deployment-2133595761-hbzmj</td><td>1/1</td><td>Running</td><td>0</td></tr><tr><td>hello-world-deployment-2133595761-k5102</td><td>1/1</td><td>Running</td><td>0</td></tr></tbody></table>	NAME	READY	STATUS	RESTARTS	hello-world-deployment-2133595761-47xk0	1/1	Running	0	hello-world-deployment-2133595761-hbzmj	1/1	Running	0	hello-world-deployment-2133595761-k5102	1/1	Running	0
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10.	<p>Show the deployments.</p> <pre>kubectl get deployments</pre> <pre>\$ kubectl get deployment</pre> <table><thead><tr><th>NAME</th><th>DESIRED</th><th>CURRENT</th><th>UP-TO-DATE</th><th>AVAILABLE</th></tr></thead><tbody><tr><td>hello-world-deployment</td><td>3</td><td>3</td><td>3</td><td>3</td></tr></tbody></table>	NAME	DESIRED	CURRENT	UP-TO-DATE	AVAILABLE	hello-world-deployment	3	3	3	3						
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11.	<p>Scale the deployment:</p> <pre>kubectl scale deployment hello-world-deployment --replicas=5</pre> <p>Note: --replicas was originally defined in the manifest from step 2. --replicas sets the number of replicas that'll be hosted in the Kubernetes cluster. Note, this DOES NOT automatically handle replication of state.</p> <pre>\$ kubectl scale deployment hello-world-deployment --replicas=5</pre> <pre>deployment "hello-world-deployment" scaled</pre>																
12.	<p>Create a standalone nginx pod in the default namespace:</p>																

	<pre>kubectl get pods</pre>																								
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13.	Run the appropriate command to scale the deployment back to its original target of 3.																								
	Show all pods: <pre>kubectl get pods</pre>																								
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	Run a set of commands that will delete all pods and get pods. <pre>kubectl delete pods --all && kubectl get pods</pre> Why do the containers keep getting created even though we deleted all pods?																								
15.	<pre>\$ kubectl delete pods --all && kubectl get pods</pre> <pre>pod "hello-world-deployment-2133595761-7cnvd" deleted</pre> <pre>pod "hello-world-deployment-2133595761-jwxkp" deleted</pre> <pre>pod "hello-world-deployment-2133595761-wx58j" deleted</pre> <table><tr><th>NAME</th><th>READY</th><th>STATUS</th></tr><tr><td>hello-world-deployment-2133595761-5j07h</td><td>0/1</td><td>Pending</td></tr><tr><td>hello-world-deployment-2133595761-7cnvd</td><td>1/1</td><td>Terminating</td></tr><tr><td>hello-world-deployment-2133595761-flwst</td><td>0/1</td><td>ContainerCreating</td></tr><tr><td>hello-world-deployment-2133595761-jwxkp</td><td>1/1</td><td>Terminating</td></tr><tr><td>hello-world-deployment-2133595761-wx58j</td><td>1/1</td><td>Terminating</td></tr><tr><td>hello-world-deployment-2133595761-z7qjb</td><td>0/1</td><td>ContainerCreating</td></tr></table>	NAME	READY	STATUS	hello-world-deployment-2133595761-5j07h	0/1	Pending	hello-world-deployment-2133595761-7cnvd	1/1	Terminating	hello-world-deployment-2133595761-flwst	0/1	ContainerCreating	hello-world-deployment-2133595761-jwxkp	1/1	Terminating	hello-world-deployment-2133595761-wx58j	1/1	Terminating	hello-world-deployment-2133595761-z7qjb	0/1	ContainerCreating			
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16.	Clean up the environment: <pre>kubectl delete all --all</pre>																								

Lab Complete!