

Task Introduction

Getting comfortable with kubectl and docker

During this course the student will be required to use the CLI tools cloudctl and kubectl.

Tasks will describe a challenge. The student must execute the appropriate command(s) to obtain the needed information. Be sure to review the Step-by-Step instructions and press the button to mark the task complete.

If at any time you are needing assistance press the **Hint** button. If you are still needing assistance use the **Step-by-Step** button to get detailed instructions for the task.

- The instructor will provide the IP address of target IBM Cloud Environment (ICP) environment along with the credentials to authenticate.
- Using the cloudctl CLI authenticate to the ICP environment with the instructor provided credentials:

cloudctl login -a https://<IP Address>:8443 -u admin -n <team> --skip-ssl-validation

<IP Address> - replace with instructor provided information

<team> - replace with team name

Hint Introduction

No hint necessary for the introduction.

Step-by-Step Introduction

No step-by-step necessary for the introduction. Once done reading the introduction select another task to begin.

Task T01

What are the node names in the cluster? Use both the kubectl and cloudctl CLIs to get this information.

Hint T01

kubectl get nodes -o wide (use the -o wide parameter to get more information)

cloudctl cm nodes

Step-by-Step T01

kubectl example:

Command:

```
kubectl get nodes -o wide (OR) kubectl get nodes
```

Example output:

NAME	STATUS	ROLES	AGE	VERSION	INTERNAL-IP	EXTERNAL-IP	OS-IMAGE
KERNEL-VERSION		CONTAINER-RUNTIME					
10.135.8.195	Ready	worker	20h	v1.11.5+icp	10.135.8.195	<none>	Ubuntu

```

16.04.5 LTS 4.4.0-135-generic docker://18.3.1
10.135.8.213 Ready worker 20h v1.11.5+icp 10.135.8.213 <none> Ubuntu
16.04.5 LTS 4.4.0-135-generic docker://18.3.1
10.135.8.214 Ready worker 20h v1.11.5+icp 10.135.8.214 <none> Ubuntu
16.04.5 LTS 4.4.0-135-generic docker://18.3.1
10.135.8.232 Ready etcd,master 20h v1.11.5+icp 10.135.8.232 <none> Ubuntu
16.04.5 LTS 4.4.0-140-generic docker://18.3.1
10.135.8.233 Ready management 20h v1.11.5+icp 10.135.8.233 <none> Ubuntu
16.04.5 LTS 4.4.0-135-generic docker://18.3.1
10.135.8.244 Ready proxy 20h v1.11.5+icp 10.135.8.244 <none> Ubuntu
16.04.5 LTS 4.4.0-135-generic docker://18.3.1
10.135.8.248 Ready worker 20h v1.11.5+icp 10.135.8.248 <none> Ubuntu
16.04.5 LTS 4.4.0-135-generic docker://18.3.1

```

cloudctl example:

Command:

```
cloudctl cm nodes
```

Example output:

ID	Type	Private IP	Public IP	Machine Type	State	K8s Status
faststart-m1	master	10.135.8.232	-	-	deployed	Ready
faststart-p1	proxy	10.135.8.244	-	-	deployed	Ready
faststart-w1	worker	10.135.8.195	-	-	deployed	Ready
faststart-w2	worker	10.135.8.213	-	-	deployed	Ready
faststart-w3	worker	10.135.8.214	-	-	deployed	Ready
faststart-w4	worker	10.135.8.248	-	-	deployed	Ready

Confirm T01 complete

Press to mark completed

Task T02

What is the Allocatable CPU count for the master node?

Hint T02

Describe the master node using the name from previous results.

Step-by-Step T02

Command:

```
kubectl describe node <master node name>
```

View output section Allocatable, and find cpu. Example:

```
. . .
Allocatable:
  cpu:          16
  ...
  pods:         160
  ...
```

Confirm T02 complete

Press to mark completed

Task T03

Display the top CPU and Memory for all nodes and display the top pods

Hint T03

kubectl top

Step-by-Step T03

Command:

```
kubectl top nodes
```

Example output:

NAME	CPU (cores)	CPU%	MEMORY (bytes)	MEMORY%
10.186.56.74	812m	5%	12278Mi	38%
10.186.56.76	839m	10%	10765Mi	67%
10.186.56.85	109m	0%	2453Mi	7%
10.187.230.157	108m	0%	2608Mi	8%

Confirm T03 complete

Press to mark completed

Task T04

Display the status of the cluster components.

Hint T04

Command contains the componentstatuses as a parameter.

Step-by-Step T04

Command:

```
kubectl get componentstatuses
```

Example output:

NAME	STATUS	MESSAGE	ERROR
controller-manager	Healthy	ok	
scheduler	Healthy	ok	
etcd-0	Healthy	{"health": "true"}	

Confirm T04 complete

Press to mark completed

Task T05

What taints are defined for management and worker nodes?

Hint T05

Use node names from `kubectl get nodes` results.

Step-by-Step T05

Command:

```
kubectl describe node <name of management node>
kubectl describe node <name of worker node>
```

Example output:

```
Mgmt   -   Taints:      dedicated=infra:NoSchedule
Worker -   Taints:      <none>
```

Confirm T05 complete

Press to mark completed

Task T06

How many pods in the kube-system namespace begin with auth?

Hint T06

Think at the pod level

Step-by-Step T06

Command:

```
kubectl get pods -n kube-system (consider using grep to reduce the volume of output)
```

Example output:

auth-apikeys-h2lzz	1/1	Running	0	8d
auth-idp-5ghjh	4/4	Running	0	8d
auth-pap-72xhq	2/2	Running	0	8d
auth-pdp-9pjzd	2/2	Running	0	8d

Confirm T06 complete

Press to mark completed

Task T07

Set the default namespace to kube-system using the kubectl config set-context capability.

Hint T07

Be sure to include: faststart-context --namespace=kube-system

Step-by-Step T07

Command:

```
kubectl config set-context faststart-context --namespace=kube-system
```

Example output:

```
Context "faststart-context" modified.
```

Confirm T07 complete

Press to mark completed

Task T08

What are the container names in the pod that begins with auth-pap?

Hint T08

Full pod name will be similar to: auth-pap-72xhq

Step-by-Step T08

Command:

```
kubectl describe pod auth-pap-72xhq (or)
kubectl get pod -l component=auth-pap -o=jsonpath='{.items[*].spec.containers[*].name}'
```

Example output:

- describe output: search for section Containers: and then view each container name:

Containers:

icp-audit-service:

. . .

auth-pdp

- get pod output: (each container name is listed with a space separator)

icp-audit-service auth-pap

Confirm T08 complete

Press to mark completed

Task T09

What is the first message in the container log for pod that begins with unified-router? The pod is in the kube-system namespace. The full pod name will be similar to: unified-router-k768f

Hint T09

kubectl logs

Step-by-Step T09

Command:

kubectl get pods -n kube-system

Example output:

NAME	READY	STATUS	RESTARTS	AGE
audit-logging-fluentd-ds-7v5br	1/1	Running	0	20h

. . . data truncated . . .

tiller-deploy-5d8494fb8-sjmbn	1/1	Running	0	21h
unified-router-4ltff	1/1	Running	0	20h
web-terminal-f77dc4d7d-stzgj	1/1	Running	0	20h

Command:

kubectl logs unified-router-????? <== use the pod name from the previous output

Example output:

2018/12/21 00:00:39 Using HTTP port: 9090

Confirm T09 complete

Press to mark completed

Task T10

Exec into pod mariadb-0 and using the command: `ls -la /sys` list the contents for the directory. To lose the prompt enter the exit command.

Hint T10

Don't forget the `-it` parameter. Don't forget the command follows double dashes e.g. `-- /bin/bash` Try the `sh` or `/bin/bash` for the entrypoint of the pod

Step-by-Step T10

Command:

```
kubectl exec -it mariadb-0 -- sh (or) kubectl exec -it mariadb-0 -- /bin/bash
```

Example output:

```
dr-xr-xr-x 13 root root  0 Dec 29 18:22 .
drwxr-xr-x  1 root root 4096 Dec 20 23:50 ..
drwxr-xr-x  2 root root  0 Dec 29 18:25 block
. . .
drwxr-xr-x  2 root root  0 Dec 29 18:25 power
```

Confirm T10 complete

Press to mark completed

Task T11

Without using an interactive shell prompt, list the `/etc/hosts` file of the mariadb-0 pod.

Hint T11

'cat' the `/etc/hosts` file.

Step-by-Step T11

Command:

```
kubectl exec mariadb-0 -- sh -c 'cat /etc/hosts'
```

Example output:

```
# Kubernetes-managed hosts file (host network).
10.186.56.85      faststart-worker-1
10.187.230.157   faststart-worker-2
```

```
10.186.56.74      faststart-master-1
10.186.56.74      faststart-master-1
10.186.56.76      faststart-mgmt-1
127.0.0.1 localhost
. . .
```

Confirm T11 complete

Press to mark completed

Task T12

12 - How many builtin services are running in the cluster.

Hint T12

This is cluster information.

Step-by-Step T12

Command:

```
kubectl cluster-info
```

Answer: count the items shown in the output

Example output:

```
Kubernetes master is running at https://169.62.194.213:8001
catalog-ui is running at https://169.62.194.213:8001/api/v1/namespaces/kube-system/services/catalog-
ui:catalog-ui/proxy
Heapster is running at https://169.62.194.213:8001/api/v1/namespaces/kube-
system/services/heapster/proxy
image-manager is running at https://169.62.194.213:8001/api/v1/namespaces/kube-system/services/image-
manager:image-manager/proxy
CoreDNS is running at https://169.62.194.213:8001/api/v1/namespaces/kube-system/services/kube-
dns:dns/proxy
metrics-server is running at https://169.62.194.213:8001/api/v1/namespaces/kube-
system/services/https:metrics-server:/proxy
platform-ui is running at https://169.62.194.213:8001/api/v1/namespaces/kube-
system/services/platform-ui:platform-ui/proxy
```

Confirm T12 complete

Press to mark completed