

All references to <team> should be replaced with your team name.

This lab is intended to get the student familiar with creating a pod in the team project. There is no problem to be researched or diagnosis to be performed.

This lab demonstrates how to deploy a pod.

### Resources

- K8 yaml - [house.yaml](#)
- Dockerfile - [Dockerfile](#)

### Useful information

Item	Value
cpu:	50m
memory:	50Mi
image:	ibmicpcoc/house:latest
ports	none
Docker	CMD ["/bin/bash", "-c", "./house.sh"]

Task description
Download the resource K8 yaml file.
Edit and save the file after replacing all references of <team> with your team name.
Create the K8 objects using oc create
Did the pod deploy successfully? If not, correct the issue and re-create the K8 objects.

---

To create the pod use the command: **oc create -f <file>**; (replace <file> with the name of the yaml file you have saved and edited.)

---

### Diagnosis

No diagnosis is necessary for this lab. A new pod should be created after editing the yaml file and using the oc create command.

### Problem discovered

N/A

### Resolution

Edit the house.yaml file and modify all references of <team> to your team name.

```
--- #
--- # Course :: Problem Diagnosis and Troubleshooting Lab
---
apiVersion: apps/v1
kind: Deployment
metadata:
  name: <team>-house
  namespace: <team>
  labels:
    app: <team>-house
spec:
  selector:
    matchLabels:
      app: <team>-house
  replicas: 1
  template:
    metadata:
      labels:
        app: <team>-house
    spec:
      containers:
      - name: <team>-house
        image: docker.io/ibmicpcoc/house:latest
        imagePullPolicy: Always
        env:
          - name: APP_NAMESPACE
            valueFrom:
              fieldRef:
                fieldPath: metadata.namespace
          - name: APP_NAME
            valueFrom:
              fieldRef:
                fieldPath: metadata.name
          - name: COLLECTOR_CONFIG
            valueFrom:
              configMapKeyRef:
                name: <team>-collector-config
                key: COLLECTOR_CONFIG
          - name: INSTRUCTOR_CONFIG
            valueFrom:
              configMapKeyRef:
                name: <team>-collector-config
                key: INSTRUCTOR_CONFIG
      resources:
        requests:
          cpu: 50m
          memory: 50Mi
---
```

Saved the modified file.

Create the pod with the modified "house.yaml" file.

```
-- Create --  
  
Command:  
  
    oc create -f house.yaml  
  
Example output:  
  
    deployment.apps/house created
```

Verify the pod deployed successfully.

```
-- Get --  
  
Command:  
  
    oc get pods -n <team>          # change <team> to your team project  
  
Example output:  
  
    NAME                                READY   STATUS    RESTARTS   AGE  
    team10-house-85976f7b7d-hprtq      1/1     Running   0           3h  
  
    . . . portions of output removed
```

:section\_1: Lab Resources

All references to <team> should be replaced with your team name.

#### Resources

- K8 yaml - [carbs.yaml](#)
- Dockerfile - [Dockerfile](#)

**Useful information**

Item	Value
spec.template.spec.containers[*].resouces.request.cpu	100m
spec.template.spec.containers[*].resouces.request.memory:	100Mi
spec.template.spec.containers[*].image:	ibmicpcoc/carbs:latest
spec.template.spec.containers[*].ports	none
Docker CMD	["/bin/bash", "-c", "./carbs.sh"]

**Task description**

Within your team project diagnose the pod that begins with **<team> -carbs**

Download the resource K8 yaml file.

Edit and save the file after replacing all references of <team> with your team name.

Create the K8 objects.

Did the pod deploy successfully? If not, correct the issue and re-create the K8 objects.

- Describe the pod.
- You can get all events from the namespace by using, `oc get events -n <team>`
- A single cpu is defined with 1000m. The container cpu resources should use **1/10** of a cpu.
- Editing a running pod is another method to change the pod. Use the command:

```
OC_EDITOR="nano" oc edit deployment/<team>-carbs <<<--- replace <team> with team name
```

Nano is the editor defined in the above command. By removing the `OC_EDITOR="nano"` parameter the default editor on your machine will be opened.

**Diagnosis**

When attempting to deploy the pod the yaml file is not properly defined.

Check the Pod status

```
-- Get --
```

Command:

```
oc get pods
```

Example output:

NAME	READY	STATUS	RESTARTS	AGE
team01-carbs-5c96bc649-tjnhb	0/1	Pending	0	2m

Describe the pod

-- Describe --

Command:

```
oc describe po team01-carbs-5c96bc649-tjnhb
```

Example output:

```
Name: team01-carbs-5c96bc649-tjnhb
Namespace: team01
Priority: 0
PriorityClassName: <none>
Node: <none>
Labels: app=team01-carbs
        pod-template-hash=175267205
Annotations: kubernetes.io/psp=ibm-privileged-psp
Status: Pending
IP:
Controlled By: ReplicaSet/team01-carbs-5c96bc649
Containers:
  team01-carbs:
    Image: ibmicpcoc/carbs:latest
    Port: <none>
    Host Port: <none>
    Requests:
      cpu: 25
      memory: 100Mi
    Environment:
      APP_NAMESPACE: team01 (v1:metadata.namespace)
      APP_NAME: team01-carbs-5c96bc649-tjnhb (v1:metadata.name)
      COLLECTOR_CONFIG: <set to the key 'COLLECTOR_CONFIG' of config map 'team01-collector-config'>
Optional: false
  INSTRUCTOR_CONFIG: <set to the key 'INSTRUCTOR_CONFIG' of config map 'team01-collector-config'>
```

```
Optional: false
Mounts:
  /var/run/secrets/kubernetes.io/serviceaccount from default-token-mq64m (ro)
Conditions:
  Type           Status
  PodScheduled   False
Volumes:
  default-token-mq64m:
    Type:          Secret (a volume populated by a Secret)
    SecretName:     default-token-mq64m
    Optional:       false
QoS Class:       Burstable
Node-Selectors:  <none>
Tolerations:     node.kubernetes.io/memory-pressure:NoSchedule
                  node.kubernetes.io/not-ready:NoExecute for 300s
                  node.kubernetes.io/unreachable:NoExecute for 300s
Events:
  Type           Reason             Age           From           Message
  ----           -
  Warning        FailedScheduling    58s (x121 over 5m)  default-scheduler  0/3 nodes are available: 3
Insufficient cpu.
```

In the "Events" section review the "Message" from the entry with "Type" Warning and "Reason" FailedScheduling

```
0/3 nodes are available: 3 Insufficient cpu.
```

Example of Get Events in namespace

```
-- Get Events --
```

Command:

```
oc get events -n <team>
```

Example output:

LAST SEEN	FIRST SEEN	COUNT	NAME	KIND
SUBJECT	TYPE	REASON	SOURCE	MESSAGE
7m	7m	1	team01-carbs.157belef7ad1a77	Deployment
Normal	ScalingReplicaSet	deployment-controller	Scaled up replica set team01-carbs-5c96bc649 to 1	
7m	7m	1	team01-carbs-5c96bc649.157belef85494ba	ReplicaSet

Normal	SuccessfulCreate	replicaset-controller	Created pod: team01-carbs-5c96bc649-tjnhb
2m	7m	121	team01-carbs-5c96bc649-tjnhb.157be1efb858b4b3 Pod
Warning	FailedScheduling	default-scheduler	0/4 nodes are available: 4 Insufficient cpu.

### Problem discovered

Events output indicates the pod is FailedScheduling because there are not enough CPU resources available.

### Resolution

Multiple methods exist to correct the issue, below are two options.

*The first method is deleting the old pod, edit the yaml file, and re-create the pod.*

Edit the carbs.yaml file and modify *cpu* to decrease the amount of cpu to 10% of a single CPU.

Delete the running pod.

```
-- Delete --
```

Command:

```
oc delete -f carbs.yaml
```

Example output:

```
deployment.apps "carbs" deleted
```

Example of the edited file carbs.yaml (only a portion of file shown below)

```
spec:
  selector:
    matchLabels:
      app: <team>-carbs
  replicas: 1
  template:
    metadata:
      labels:
        app: <team>-carbs
    spec:
```

```
containers:
- name: <team>-carbs
  image: ibmicpcoc/carbs:latest
  resources:
    requests:
      cpu: 25000m          <=== change value to 100m
      memory: 100Mi
```

Create the deployment using the modified **carbs.yaml** file.

-- Create --

Command:

```
oc create -f carbs.yaml
```

Example output:

```
deployment.apps/<team>-carbs created.  <<<--- <team> will be replaced with team name
```

*The second method shown is editing the running pod.*

Edit the running pod. The kubernetes object content is available in the editor (shown below). Note the content has both the spec: and status: sections.

Locate the line cpu: "25" and change the line to cpu: 100m (without quotes)

-- Edit --

Command:

```
OC_EDITOR="nano" oc edit deployment/<team>-carbs    # replace <team>
```

Content shown when editor is open. The team01-carbs deployment is being shown:

```
# Please edit the object below. Lines beginning with a '#' will be ignored,
# and an empty file will abort the edit. If an error occurs while saving this file will be
# reopened with the relevant failures.
```



```
#
apiVersion: extensions/v1beta1
kind: Deployment
metadata:
  annotations:
    deployment.kubernetes.io/revision: "1"
  creationTimestamp: 2019-01-21T14:01:56Z
  generation: 1
  labels:
    app: team01-carbs
  name: team01-carbs
  namespace: team01
  resourceVersion: "5834141"
  selfLink: /apis/extensions/v1beta1/namespaces/team01/deployments/team01-carbs
  uid: 1d02fbe9-1d85-11e9-b012-06ed6a534df5
spec:
  progressDeadlineSeconds: 600
  replicas: 1
  revisionHistoryLimit: 10
  selector:
    matchLabels:
      app: team01-carbs
  strategy:
    rollingUpdate:
      maxSurge: 25%
      maxUnavailable: 25%
    type: RollingUpdate
  template:
    metadata:
      creationTimestamp: null
      labels:
        app: team01-carbs
    spec:
      containers:
        - env:
            - name: APP_NAMESPACE
              valueFrom:
                fieldRef:
                  apiVersion: v1
                  fieldPath: metadata.namespace
            - name: APP_NAME
              valueFrom:
                fieldRef:
                  apiVersion: v1
                  fieldPath: metadata.name
            - name: COLLECTOR_CONFIG
              valueFrom:
                configMapKeyRef:
                  key: COLLECTOR_CONFIG
                  name: team01-collector-config
            - name: INSTRUCTOR_CONFIG
```

```

    valueFrom:
      configMapKeyRef:
        key: INSTRUCTOR_CONFIG
        name: team01-collector-config
    image: ibmicpcoc/carbs:latest
    imagePullPolicy: Always
    name: team01-carbs
    resources:
      requests:
        cpu: "25"                                <=== change value to 100m without quotes
        memory: 100Mi
      terminationMessagePath: /dev/termination-log
      terminationMessagePolicy: File
    dnsPolicy: ClusterFirst
    restartPolicy: Always
    schedulerName: default-scheduler
    securityContext: {}
    terminationGracePeriodSeconds: 30
status:
  conditions:
  - lastTransitionTime: 2019-01-21T14:01:56Z
    lastUpdateTime: 2019-01-21T14:01:56Z
    message: Deployment does not have minimum availability.
    reason: MinimumReplicasUnavailable
    status: "False"
    type: Available
  - lastTransitionTime: 2019-01-21T14:11:57Z
    lastUpdateTime: 2019-01-21T14:11:57Z
    message: ReplicaSet "team01-carbs-5c96bc649" has timed out progressing.
    reason: ProgressDeadlineExceeded
    status: "False"
    type: Progressing
  observedGeneration: 1
  replicas: 1

```

NOTE: You must save the file for the changes to take effect.

Example output:  
 deployment.extensions/team01-carbs edited

Did this resolve the issue?

-- Get --

Command:

```
oc get pods
```

Example output:

NAME	READY	STATUS	RESTARTS	AGE
team01-carbs-7784b95958-pct15	1/1	Running	0	2m

All references to <team> should be replaced with your team name.

Resources

- K8 yaml - [doors.yaml](#)
- Dockerfile - [Dockerfile](#)

Useful information

Item	Value
cpu:	50m
memory:	50Mi
image:	ibmicpcoc/doors:latest
ports	none
Docker	CMD ["node", "app.js"]

Task description
Within your team project diagnose the pod that begins with <team>-doors
Download the resource K8 yaml file.
Use either of the delete-create-pod or edit-running-pod approaches to resolve the issue.
Did the pod deploy successfully? If not, correct the issue and re-create the K8 objects.

Check the "tag" of the image that is being pulled.

Diagnosis

Describe the pod.

```
-- Get --
```

Command:

```
oc get pods
```

Example output:

NAME	READY	STATUS	RESTARTS	AGE
team01-doors-78b7f6598d-p8kvf	0/1	ImagePullBackOff	0	10m

```
-- Describe --
```

Command:

```
oc describe po team01-doors-78b7f6598d-p8kvf
```

Example output:

```
Name: team01-doors-78b7f6598d-p8kvf
Namespace: team01
Priority: 0
PriorityClassName: <none>
Node: 10.186.56.85/10.186.56.85
Start Time: Mon, 21 Jan 2019 10:18:18 -0600
Labels: app=team01-doors
        pod-template-hash=3349118043
```

```
. . .
```

portions of output removed

```
. . .
```

Events:

Type	Reason	Age	From	Message
----	-----	----	----	-----
Normal	Scheduled	46s	default-scheduler	Successfully assigned team01/team01-doors-78b7f6598d-p8kvf to 10.186.56.85
Normal	Pulling	28s (x2 over 43s)	kubelet, 10.186.56.85	pulling image "ibmicpcoc/doors:last"
Warning	Failed	27s (x2 over 43s)	kubelet, 10.186.56.85	Failed to pull image "ibmicpcoc/doors:last": rpc error: code = Unknown desc = Error response from daemon: manifest for ibmicpcoc/doors:last not found
Warning	Failed	27s (x2 over 43s)	kubelet, 10.186.56.85	Error: ErrImagePull
Normal	BackOff	12s (x3 over 42s)	kubelet, 10.186.56.85	Back-off pulling image

```
"ibmicpcoc/doors:last"
Warning Failed 12s (x3 over 42s) kubelet, 10.186.56.85 Error: ImagePullBackOff
```

Multiple Warning messages are displayed in the Events section. Review all of the Warning messages.

In the "Events" section review the "Message" from the entry with "Type" Warning and "Reason" Failed

```
... Failed to pull image "ibmicpcoc/doors:last": rpc error: code = Unknown desc = Error response from
daemon: manifest for ibmicpcoc/doors:last not found
```

```
(output is from the first Failed message)
```

### Problem discovered

The image cannot be located as indicated by the "Failed to pull image" message. The image tag last on the container is incorrect. The image tag should be latest.

### Resolution

The edit-running-pod is shown in the following example to resolve the issue:

```
-- Edit --
```

Command to edit the running pod:

```
OC_EDITOR="nano" oc -n <team> edit deployment/<team>-doors
```

Example editor content: (modify the tag of the image to "latest")

```
# Please edit the object below. Lines beginning with a '#' will be ignored,
# and an empty file will abort the edit. If an error occurs while saving this file will be
# reopened with the relevant failures.
#
apiVersion: extensions/v1beta1
kind: Deployment
metadata:
  annotations:
    deployment.kubernetes.io/revision: "1"
  creationTimestamp: 2019-01-21T16:18:18Z
```

```

generation: 1
labels:
  app: team01-doors
name: team01-doors
namespace: team01
resourceVersion: "5853628"
selfLink: /apis/extensions/v1beta1/namespaces/team01/deployments/team01-doors
uid: 29914949-1d98-11e9-b012-06ed6a534df5
spec:
  progressDeadlineSeconds: 600
  replicas: 1
  revisionHistoryLimit: 10
  selector:
    matchLabels:
      app: team01-doors
  strategy:
    rollingUpdate:
      maxSurge: 25%
      maxUnavailable: 25%
    type: RollingUpdate
  template:
    metadata:
      creationTimestamp: null
      labels:
        app: team01-doors
    spec:
      containers:
      - env:
        - name: APP_NAMESPACE
          valueFrom:
            fieldRef:
              apiVersion: v1
              fieldPath: metadata.namespace
        - name: APP_NAME
          valueFrom:
            fieldRef:
              apiVersion: v1
              fieldPath: metadata.name
        - name: COLLECTOR_CONFIG
          valueFrom:
            configMapKeyRef:
              key: COLLECTOR_CONFIG
              name: team01-collector-config
        - name: INSTRUCTOR_CONFIG
          valueFrom:
            configMapKeyRef:
              key: INSTRUCTOR_CONFIG
              name: team01-collector-config
      image: ibmicpcoc/doors:last
      imagePullPolicy: Always

```

<=== change the :last to :latest

```
. . . additional content not shown
```

Ensure you have save the modified file.

Example output:

```
deployment/team01-doors
```

Validate the pod status is Running.

```
-- Get --
```

Command:

```
oc get pods
```

Example output:

NAME	READY	STATUS	RESTARTS	AGE
team01-doors-767f49c748-6gvcg	1/1	Running	0	1m

All references to <team> should be replaced with your team name.

### Resources

- K8 yaml - [eagle.yaml](#)
- Dockerfile - [Dockerfile](#)

### Useful information

Item	Value
cpu:	50m
memory:	50Mi
image:	ibmicpcoc/eagle:latest
ports	4100

Item	Value
Docker	CMD ["node", "server.js"]

**Task description**

This lab uses the pod with a name that starts with **<team>-eagle**

The web application is not working properly. The application is has a K8 Deployment and Service defined.

Research why the web application is not working properly.

Once you have resolved the issue locate the NodePort (is a number in the 30000 range) for the service. Example: `oc get svc -n <team> -o wide`

Using the same IP that has been used to access the Collector now access the web application using the newly located node port number. Example URL to access web application: <http://xxx.xxx.xxx.xxx:NodePort>

Once the web application is successfully accessed press the button to complete the lab.

**NOTICE: The last step must be completed to mark the lab complete in the Instructor UI.**

- Deployment and Service port definitions must match.
- What port should the application be available on? Refer to **Useful Information**.

**Diagnosis**

The pod is running successfully yet describing the pod can provide information about the configured K8 objects. Describe the pod that begins with: `<team>-eagle`

```
-- Get pods --
```

Command:

```
oc get po
```

Example output:

NAME	READY	STATUS	RESTARTS	AGE
team10-eagle-56dcf97b6b-msjwt	1/1	Running	0	40s



```
-- Describe pod --
```

```
Command:          # Use the pod name from the previous output
```

```
oc describe po team10-eagle-56dcf97b6b-msjwt
```

```
Example output:
```

```
Name:                team10-eagle-56dcf97b6b-msjwt
Namespace:           team10
Priority:             0
PriorityClassName:    <none>
Node:                pysyd.159.23.66.104.nip.io/159.23.66.104
Start Time:          Sat, 28 Sep 2019 18:39:25 +1000
Labels:              app=team10-eagle
                    pod-template-hash=1287953626
Annotations:         openshift.io/scc=restricted
Status:              Running
IP:                  10.129.0.173
Controlled By:       ReplicaSet/team10-eagle-56dcf97b6b
Containers:
  team10-eagle:
    Container ID:      docker://05e5e2f6ff0ad45fc5c913953a3442553792848e02bb6401e2bc4f40eb132267
    Image:             docker.io/ibmicpcoc/eagle:latest
    Image ID:          docker-
pullable://docker.io/ibmicpcoc/eagle@sha256:9868019eda5069768539f8b765025caf18d65734d9f6164512332dfbbdf630eb
    Port:              4100/TCP
    Host Port:         0/TCP
    State:             Running
      Started:         Sat, 28 Sep 2019 18:39:37 +1000
    Ready:             True
    Restart Count:     0
    Requests:
      cpu:              50m
      memory:           50Mi
    Environment:
      APP_NAMESPACE:    team10 (v1:metadata.namespace)
      APP_NAME:         team10-eagle-56dcf97b6b-msjwt (v1:metadata.name)
      COLLECTOR_CONFIG: <set to the key 'COLLECTOR_CONFIG' of config map 'team10-collector-config'>
Optional: false
      INSTRUCTOR_CONFIG: <set to the key 'INSTRUCTOR_CONFIG' of config map 'team10-collector-config'>
Optional: false
Mounts:
  /var/run/secrets/kubernetes.io/serviceaccount from default-token-kcr98 (ro)
Conditions:
  Type             Status
  Initialized       True
  Ready            True
  ContainersReady   True
```

```

    PodScheduled      True
  Volumes:
    default-token-kcr98:
      Type:          Secret (a volume populated by a Secret)
      SecretName:    default-token-kcr98
      Optional:      false
  QoS Class:         Burstable
  Node-Selectors:    node-role.kubernetes.io/compute=true
  Tolerations:       node.kubernetes.io/memory-pressure:NoSchedule
  Events:
    Type      Reason      Age   From                                     Message
    ----      -
    Normal    Scheduled   48s   default-scheduler                     Successfully assigned team10/team10-
eagle-56dcf97b6b-msjwt to pysyd.159.23.66.104.nip.io
    Normal    Pulling     44s   kubelet, pysyd.159.23.66.104.nip.io   pulling image
"docker.io/ibmicpcoc/eagle:latest"
    Normal    Pulled      35s   kubelet, pysyd.159.23.66.104.nip.io   Successfully pulled image
"docker.io/ibmicpcoc/eagle:latest"
    Normal    Created     35s   kubelet, pysyd.159.23.66.104.nip.io   Created container
    Normal    Started     35s   kubelet, pysyd.159.23.66.104.nip.io   Started container

```

Review the port definitions from the describe output.

Describe the service defined for this pod.

```
-- Get Services --
```

Command:

```
oc get svc
```

Example output:

NAME	TYPE	CLUSTER-IP	EXTERNAL-IP	PORT(S)	AGE
team10-eagle	NodePort	172.30.100.2	<none>	80:31024/TCP	1h
team10-igloo	NodePort	172.30.224.252	<none>	80:30814/TCP	2h
team10-jazzy	NodePort	172.30.217.79	<none>	80:30092/TCP	1h
team10-quake	NodePort	172.30.69.77	<none>	80:30836/TCP	3h
team10-salty	NodePort	172.30.174.1	<none>	80:30624/TCP	2h
team10-student-ui	NodePort	172.30.89.80	<none>	80:31010/TCP	1d

```
-- Describe service --
```

Command:

```
oc describe svc team10-eagle
```

Example output:

```
Name:                team10-eagle
Namespace:           team10
Labels:              app=team10-eagle
Annotations:         <none>
Selector:            app=team10-eagle
Type:                NodePort
IP:                  172.30.225.217
Port:                team10-eagle 80/TCP
TargetPort:          4010/TCP
NodePort:            team10-eagle 32308/TCP
Endpoints:           10.129.0.173:4010
Session Affinity:    None
External Traffic Policy: Cluster
Events:              <none>
```

### Problem discovered

The ports do not match for the Deployment and Service definitions. The values are 4100 and 4010.

### Resolution

Edit the Service definition and change the port from 4010 to 4100.

**NOTE: Complete this lab by accessing the URL and pressing the button shown in the browser with the value 'Click to complete lab!'.**

Example URL using the master IP and the node port from the service definition after fixing the above issue.

```
http://159.23.66.107:31024/
```

All references to <team> should be replaced with your team name.

### Resources

- K8 yaml - [floor.yaml](#)
- Dockerfile - [Dockerfile](#)

### Useful information

Item	Value
cpu:	50m
memory:	50Mi
image:	ibmicpcoc/floor:latest
ports	none
YAML	command: ["node", "app.js"]

**Task description**

A container within a successfully deployed pod is not working properly. Research the running container to diagnose the issue.

View the logs of the running container.

Correct the issue inside the running container.

- Exec into the running container
- Use touch, nano, or echo with piping to assist in resolving the issue

**Diagnosis**

Check the logs of the running container that begins with <team>

-- Get --

Command :

```
oc get pods
```

Example output:

NAME	READY	STATUS	RESTARTS	AGE
team01-floor-6ff9f54f44-zpchp	1/1	Running	0	41s

-- Logs --

Command:

```
oc logs -f team01-floor-6ff9f54f44-zpchp
```

Example output:

Note the instructions from viewing the log

```
1/21/2019, 10:21:14 PM :: clnt012i - Check for file: /app/team.txt check count: 43
1/21/2019, 10:21:14 PM :: clnt013i - The file team.txt in the /app directory must exist for this lab to
be completed.
1/21/2019, 10:21:14 PM :: clnt014i - Create the file in the running container.
```

### Problem discovered

The file team.txt is missing from the /app directory in the running container.

### Resolution

Here are two methods that can be used to resolve the creating of the file.

*First method is to run a "command" using the oc CLI from outside the container.*

-- Get --

Command to get pods in namespace

```
oc get po
```

Example output:

NAME	READY	STATUS	RESTARTS	AGE
team01-floor-6ff9f54f44-zpchp	1/1	Running	0	41s

Add the team.txt file using the touch command from outside the container.

-- Exec --

Command:

```
oc exec -n team01 team01-floor-6ff9f54f44-zpchp -- sh -c "touch /app/team.txt"
```

The above command is using 'sh'.

Example output: (wait a few seconds for the messages to show)

1/21/2019, 10:25:30 PM :: clnt014i - Create the file in the running container.

1/21/2019, 10:25:45 PM :: -----

-----

1/21/2019, 10:25:45 PM :: clnt008i - File located. Reporting to collector.

1/21/2019, 10:25:45 PM :: -----

-----

1/21/2019, 10:25:45 PM :: clnt007i - Student count: 61 from /team01/team01-floor-6ff9f54f44-zpchg

1/21/2019, 10:25:45 PM :: clnt010i - Instructor count: 1 from /team01/team01-floor-6ff9f54f44-

The clnt007i and clnt010i messages are produced once the file has been located.

*Second method is to exec into the running container and create the file from a shell prompt. This method requires 'sh' capability must be installed in the container for this to work.*

-- Get --

Command to get pods in namespace

oc get po

Example output from "team01" namespace

NAME	READY	STATUS	RESTARTS	AGE
team01-floor-6ff9f54f44-zpchg	1/1	Running	0	41s

-- Exec to open a terminal session with the running container --

Command:

oc exec -it team01-floor-6ff9f54f44-zpchg -- sh

Note: The above command is using 'sh'. The 'sh' capability must be installed in the container for this

to work.

Example result output:

```
/app #
```

-- Create the file using touch --

Command:

```
touch team.txt
```

Notice the "/app" directory is not included as part of the touch command since the prompt is open to that directory.

Example output: (wait a few seconds for the messages to show)

```
1/21/2019, 10:25:30 PM :: clnt014i - Create the file in the running container.
```

```
1/21/2019, 10:25:45 PM :: -----
```

```
-----
```

```
1/21/2019, 10:25:45 PM :: clnt008i - File located. Reporting to collector.
```

```
1/21/2019, 10:25:45 PM :: -----
```

```
-----
```

```
1/21/2019, 10:25:45 PM :: clnt007i - Student count: 61 from /team01/team01-floor-6ff9f54f44-zpchp
```

```
1/21/2019, 10:25:45 PM :: clnt010i - Instructor count: 1 from /team01/team01-floor-6ff9f54f44-
```

The clnt007i and clnt010i messages are produced once the file has been located.

---

All references to <team> should be replaced with your team name.

#### Resources

- K8 yaml - [gonzo.yaml](#)
- Dockerfile - [Dockerfile](#)

#### Useful information

Item	Value
cpu:	50m

Item	Value
memory:	50Mi
image:	ibmicpcoc/gonzo:latest
ports	none
YAML	command: ["/bin/bash", "-c", "/app/app.sh gonzo"]

**Task description**

A pod that begins with <team>-gonzo is failing creation.

Research the issue to determine what is causing the failure.

Edit the gonzo.yaml file to correct the issue.

Verify the deployment successfully deployed

- What ENTRYPOINT or CMD is defined for the Docker image?
- What container "command" parameter is defined for the pod definition?
- Command: docker history ibmicpcoc/gonzo --no-trunc can also be used to check the docker image.
- The gonzo.yaml must be modified to correct the issue. You will not be allowed to rebuild or modify the Docker image.

**Diagnosis**

-- Get --

Command:

```
oc get po
```

Example output:

NAME	READY	STATUS	RESTARTS	AGE
team01-gonzo-75d79787b7-88pnr	0/1	CrashLoopBackOff	4	2m

-- Describe --

Command:

```
oc describe pod team01-gonzo-75d79787b7-88pnr
```



Example output:

```
Name:          team01-gonzo-75d79787b7-88pnr
Namespace:     team01
Priority:       0
PriorityClassName: <none>
Node:          10.186.56.85/10.186.56.85
Start Time:    Mon, 21 Jan 2019 18:13:15 -0600
Labels:        app=team01-gonzo
                pod-template-hash=3183534363
```

. . .

portions of output removed

. . .

Conditions:

```
Type          Status
Initialized    True
Ready          False
ContainersReady False
PodScheduled   True
```

Volumes:

```
default-token-mq64m:
  Type:          Secret (a volume populated by a Secret)
  SecretName:    default-token-mq64m
  Optional:      false
```

QoS Class: Burstable

Node-Selectors: <none>

```
Tolerations:    node.kubernetes.io/memory-pressure:NoSchedule
                 node.kubernetes.io/not-ready:NoExecute for 300s
                 node.kubernetes.io/unreachable:NoExecute for 300s
```

Events:

Type	Reason	Age	From	Message
Normal	Scheduled	11m	default-scheduler	Successfully assigned team01/team01-gonzo-75d79787b7-88pnr to 10.186.56.85
Normal	Created	10m (x4 over 11m)	kubelet, 10.186.56.85	Created container
Normal	Started	10m (x4 over 11m)	kubelet, 10.186.56.85	Started container
Normal	Pulling	9m (x5 over 11m)	kubelet, 10.186.56.85	pulling image "ibmicpcoc/gonzo:latest"
Normal	Pulled	9m (x5 over 11m)	kubelet, 10.186.56.85	Successfully pulled image "ibmicpcoc/gonzo:latest"
Warning	BackOff	58s (x46 over 11m)	kubelet, 10.186.56.85	Back-off restarting failed container

In the "Events" section review the "Message" from the entry with "Type" Warning and "Reason" BackOff

... Back-off restarting failed container

Check the image for the command or entrypoint defined to execute when the container is created

- Review the Dockerfile provided in the Resources section of this lab.
- Browse the Dockerfile and review the entrypoint or command defined to start when container is created.

(or)

- Check the Docker image using the following command:

```
docker history ibmicpcoc/gonzo --no-trunc
```

### Problem discovered

The container is ending as soon as it starts. The entrypoint or command that executes when the container starts is not defined in either the Dockerfile or gonzo.yaml file.

### Resolution

Add the "command" parameter to the pod container definition using the file gonzo.yaml provided in the Resources section of this lab. The "command" parameter should define the bash script /app/gonzo.sh using /bin/bash

Example parameter:

```
command: ["/bin/bash", "-c", "/app/gonzo.sh"]
```

Add the "command" parameter to the container.

-- Example of of the modified yaml file --

```
apiVersion: apps/v1
kind: Deployment
metadata:
  name: team01-gonzo
  namespace: team01
  labels:
    app: team01-gonzo
spec:
  selector:
    matchLabels:
      app: team01-gonzo
  replicas: 1
  template:
    metadata:
      labels:
        app: team01-gonzo
```

```
spec:
  containers:
  - name: team01-gonzo
    image: ibmicpcoc/gonzo:latest
    imagePullPolicy: Always
    command: ["/bin/bash", "-c", "/app/gonzo.sh"]    <== inserted this line
. . . reaminder of file not shown . . .
```

Re-deploy the pod and verify the pod is running. There will be no visible log messages so the **oc describe** command must be used for validation.

---

All references to <team> should be replaced with your team name.

#### Resources

- K8 yaml - [igloo.yaml](#)
- Dockerfile - [Dockerfile](#)

#### Useful information

Item	Value
Misc	Readiness and Liveness probes defined

Task description
A pod that begins with <team>-igloo is frequently restarting.
Research the issue to determine what is causing the pod to restart frequently.
Review the pod log to determine how long the http server waits to be started.
Edit the igloo.yaml file to correct the issue.
Verify the deployment successfully deployed.

**The target url must be accessed to mark this task complete.**

Once issue is successfully resolved perform the following.

- Get the NodePort for the <team>-igloo service.
- Get the IP address for the master node.
- Using the above NodePort and the master IP address access the url: http://: to mark the task as complete.

- 
- How long do both probes delay before starting?

---

**Diagnosis**

-- Get pods --

Command:

```
oc -n <team> get pods          <=== Replace <team>
```

(if in team project already)

```
oc get po
```

Example output:

NAME	READY	STATUS	RESTARTS	AGE
team20-igloo-7b85976d87-x6z6r	0/1	Running	3	2m

-- Describe --

Command:

```
oc describe po team20-igloo-7b85976d87-x6z6r
```

Example output:

```
Name: team20-igloo-7b85976d87-x6z6r
Namespace: team20
Priority: 0
PriorityClassName: <none>
Node: gfstst.169.62.225.201.nip.io/169.62.225.201
Start Time: Tue, 03 Sep 2019 20:06:13 -0400
Labels: app=team20-igloo
        pod-template-hash=3641532843
Annotations: openshift.io/scc=restricted
Status: Running
IP: 10.129.0.94
Controlled By: ReplicaSet/team20-igloo-7b85976d87
Containers:
  team20-igloo:
    Container ID: docker://e9b6049395fa281c1ca0d6e63001ac3226fc211c5948bf1673023c9dc6f74f37
    Image: ibmicpcoc/igloo:latest
    Image ID: docker-
```

```

pullable://docker.io/ibmicpcoc/igloo@sha256:4968f5c1ca641e3267d9a163c68eceb307973e06a30df51a47d86dcd0e301a40
  Port:          <none>
  Host Port:     <none>
  State:         Running
    Started:      Tue, 03 Sep 2019 20:06:49 -0400
  Last State:    Terminated
    Reason:       Error
    Exit Code:    137
    Started:      Tue, 03 Sep 2019 20:06:16 -0400
    Finished:     Tue, 03 Sep 2019 20:06:48 -0400
  Ready:         False
  Restart Count: 1
  Requests:
    cpu:          50m
    memory:       50Mi
  Liveness:      http-get http://:4100/health delay=1s timeout=1s period=2s #success=1 #failure=1
  Readiness:     http-get http://:4100/ready delay=1s timeout=1s period=5s #success=1 #failure=3
  Environment:
    APP_NAMESPACE:    team20 (v1:metadata.namespace)
    APP_NAME:         team20-igloo-7b85976d87-x6z6r (v1:metadata.name)
    COLLECTOR_CONFIG: <set to the key 'COLLECTOR_CONFIG' of config map 'team20-collector-config'>
Optional: false
    INSTRUCTOR_CONFIG: <set to the key 'INSTRUCTOR_CONFIG' of config map 'team20-collector-config'>
Optional: false
  Mounts:
    /var/run/secrets/kubernetes.io/serviceaccount from default-token-dxnzt (ro)
  Conditions:
    Type             Status
    Initialized       True
    Ready             False
    ContainersReady   False
    PodScheduled      True
  Volumes:
    default-token-dxnzt:
      Type:          Secret (a volume populated by a Secret)
      SecretName:    default-token-dxnzt
      Optional:      false
  QoS Class:         Burstable
  Node-Selectors:    node-role.kubernetes.io/compute=true
  Tolerations:       node.kubernetes.io/memory-pressure:NoSchedule
  Events:
    Type      Reason      Age      From      Message
    ----      -
    Normal    Scheduled    42s      default-scheduler    Successfully assigned
team20/team20-igloo-7b85976d87-x6z6r to gfstst.169.62.225.201.nip.io
    Normal    Pulling      7s (x2 over 40s)    kubelet, gfstst.169.62.225.201.nip.io    pulling image
"ibmicpcoc/igloo:latest"
    Normal    Killing      7s      kubelet, gfstst.169.62.225.201.nip.io    Killing container with
id docker://team20-igloo:Container failed liveness probe.. Container will be killed and recreated.
    Normal    Pulled       6s (x2 over 39s)    kubelet, gfstst.169.62.225.201.nip.io    Successfully pulled
image "ibmicpcoc/igloo:latest"

```

```

Normal    Created    6s (x2 over 39s)  kubelet, gfstst.169.62.225.201.nip.io  Created container
Normal    Started    6s (x2 over 39s)  kubelet, gfstst.169.62.225.201.nip.io  Started container
Warning   Unhealthy  4s (x2 over 38s)  kubelet, gfstst.169.62.225.201.nip.io  Liveness probe failed:
Get http://10.129.0.94:4100/health: dial tcp 10.129.0.94:4100: connect: connection refused
Warning   Unhealthy  2s (x3 over 37s)  kubelet, gfstst.169.62.225.201.nip.io  Readiness probe failed:
Get http://10.129.0.94:4100/ready: dial tcp 10.129.0.94:4100: connect: connection refused

```

### Problem discovered

The liveness and readiness probes do not wait long enough for the pod to successfully start. These probes must ensure there are configured to wait long enough for the pod to start before checking.

### Resolution

Modify the readinessProbe initialDelaySeconds to 15 seconds and the livenessProbe initialDelaySeconds to 20 seconds. This will allow the pod to start before the probes begin checking.

Example modifications to the parameters:

```

readinessProbe:
  httpGet:
    path: /ready
    port: 4100
    initialDelaySeconds: 15      <<<--- modified
    timeoutSeconds: 1
    periodSeconds: 5
    successThreshold: 1
    failureThreshold: 3

livenessProbe:
  httpGet:
    path: /health
    port: 4100
    initialDelaySeconds: 20     <<<--- modified
    timeoutSeconds: 1
    periodSeconds: 15
    failureThreshold: 1

```

---

All references to <team> should be replaced with your team name.

### Resources

- K8 yaml - [jazzy.yaml](#)

- Dockerfile - [Dockerfile](#)

**Useful information**

Item	Value
cpu:	50m
memory:	50Mi
image:	ibmicpcoc/jazzy:latest
ports	9000
YAML	command: ["node", "app.js"]
Misc	Application waits

**Task description**

A pod that begins with <team>-jazzy has started successfully.

Review the pod logs.

Can the pod access the target URL as defined in the **YARNS\_URL** environment variable.

Remote into the pod and use **curl** to test accessing the yarns service that is running in the **default** namespace.

Edit the jazzy.yaml file to correct the issue by modifying the **YARNS\_URL** environment variable.

Verify the pod is successfully communicating with the yarns service. Success is indicated by the presence of the **jazz400i** in the log messages.

- You need to tell the service which namespace to communicate with if it is not in the same namespace.
- Review the environment variable "INSTRUCTOR\_CONFIG" as this points to a service in the **default** namespace.

**Diagnosis**

Notice: use the `oc get pods` to obtain the pod name

-- Logs --

Command:

```
oc logs team20-jazzy-5ffc4f7-4n8qg
```

Example output:

```
9/28/2019, 3:25:13 AM :: jazz003i - Environment APP_NAMESPACE: team20
9/28/2019, 3:25:13 AM :: jazz004i - Environment APP_NAME: Using random key = team20-jazzy-5ffc4f7-4n8qg
9/28/2019, 3:25:13 AM :: jazz005i - Environment COLLECTOR_CONFIG: http://team20-student-ui
9/28/2019, 3:25:13 AM :: jazz006i - Environment INSTRUCTOR_CONFIG: http://dashboard.default
9/28/2019, 3:25:13 AM :: jazz007i - Environment YARNS_URL: http://yarns
9/28/2019, 3:25:13 AM :: jazz017i - Jazzy Server is asking yarns data server for data
9/28/2019, 3:25:13 AM :: jazz500i - Invoke startAsking
9/28/2019, 3:25:13 AM :: jazz014i - Start asking data server for information
9/28/2019, 3:25:13 AM :: jazz032e - Error asking yarns data server, count: 1
{
  "errno": "ENOTFOUND",
  "code": "ENOTFOUND",
  "syscall": "getaddrinfo",
  "hostname": "yarns",
  "host": "yarns",
  "port": 80
}
```

-- RSH --

Command:

```
oc rsh team20-jazzy-5ffc4f7-4n8qg
```

Example output:

```
/app $
```

-- curl test 1 --

Commands:

```
curl http://yarns
```

Example output:

```
curl: (6) Could not resolve host: yarns
```



```
-- curl test 2 --
```

Commands:

```
curl http://yarns.default
```

Example output:

```
Yarns server is ready
```

### Problem discovered

The pod is unable to communicate with the target URL as configured. Error message **jazz032e** indicates the pod cannot access the yarns service.

### Resolution

Modify the target YARNS\_URL in the environment variables to the appropriate URL.  
Verify the pod is communicating with yarns service.

Notice: use the `oc get pods` to obtain the pod name

```
-- Logs --
```

Command:

```
oc logs team20-jazzy-76f6879566-nxlbcc
```

Example output:

```
9/28/2019, 3:44:20 AM :: jazz003i - Environment APP_NAMESPACE: team20
9/28/2019, 3:44:20 AM :: jazz004i - Environment APP_NAME: Using random key = team20-jazzy-76f6879566-nxlbcc
9/28/2019, 3:44:20 AM :: jazz005i - Environment COLLECTOR_CONFIG: http://team20-student-ui
9/28/2019, 3:44:20 AM :: jazz006i - Environment INSTRUCTOR_CONFIG: http://dashboard.default
9/28/2019, 3:44:20 AM :: jazz007i - Environment YARNS_URL: http://yarns.default
9/28/2019, 3:44:20 AM :: jazz017i - Jazzy Server is asking yarns data server for data
9/28/2019, 3:44:20 AM :: jazz500i - Invoke startAsking
9/28/2019, 3:44:20 AM :: jazz014i - Start asking data server for information
9/28/2019, 3:44:20 AM :: jazz400i - Success
```

```
NOTICE the jazz400i message indicating success.
```

All references to <team> should be replaced with your team name.

#### Resources

- K8 yaml - [karma.yaml](#)
- Dockerfile - [Dockerfile](#)

#### Useful information

Item	Value
cpu:	50m
memory:	50Mi
image:	ibmicpcoc/karma:latest
YAML	command: ["node", "app.js"]

#### Task description

A pod that begins with <team>-karma is in a CrashLoopBackOff state.

Research the issue to determine what is causing the pod to restart frequently.

Review the pod log to determine how long the application http server waits to be started.

Editing the karma.yaml **WILL NOT** correct the issue.

Resolution will require using **oc adm policy** command

Ensure the pod is deleted and restarts after fixing the issue.

- Are pods permitted to run as root?

#### Diagnosis

```
NOTE: Get the pod name using the oc get pods
```

```
-- Describe --
```

Command:

```
oc describe po team14-karma-7db6fb5cc9-6kjcg
```

Example output:

```
Name:                team14-karma-7db6fb5cc9-6kjcg
Namespace:           team14
Priority:             0
PriorityClassName:    <none>
Node:                pysyd.159.23.66.101.nip.io/159.23.66.101
Start Time:          Sat, 28 Sep 2019 12:35:07 +1000
Labels:              app=team14-karma
                    pod-template-hash=3862961775
Annotations:         openshift.io/scc=restricted
Status:              Running
IP:                  10.130.1.186
Controlled By:       ReplicaSet/team14-karma-7db6fb5cc9
Containers:
  team14-karma:
    Container ID:  docker://215630c1bcc8861b1679062155bc87240f1cbbabc848277a06c1fc5f5c83b675
    Image:         docker.io/ibmicpcoc/karma:latest
    Image ID:      docker-
pullable://docker.io/ibmicpcoc/karma@sha256:e84351a5833886d42a113b317d9527afe3aa5d8bbc7da5112be0ab9b5058e59c
    Port:          <none>
    Host Port:     <none>
    Command:
      node
      app.js
    State:          Waiting
      Reason:       CrashLoopBackOff
    Last State:     Terminated
      Reason:       Error
      Exit Code:    1
      Started:      Sat, 28 Sep 2019 12:46:22 +1000
      Finished:     Sat, 28 Sep 2019 12:46:22 +1000
    Ready:          False
    Restart Count:  7
    Requests:
      cpu:          50m
      memory:       50Mi
    Environment:
      APP_NAMESPACE: team14 (v1:metadata.namespace)
      APP_NAME:       team14-karma-7db6fb5cc9-6kjcg (v1:metadata.name)
      COLLECTOR_CONFIG: <set to the key 'COLLECTOR_CONFIG' of config map 'team14-collector-config'>
Optional: false
      INSTRUCTOR_CONFIG: <set to the key 'INSTRUCTOR_CONFIG' of config map 'team14-collector-config'>
Optional: false
Mounts:
```

```

    /var/run/secrets/kubernetes.io/serviceaccount from default-token-lzmmh (ro)
Conditions:
  Type              Status
  Initialized        True
  Ready              False
  ContainersReady    False
  PodScheduled       True
Volumes:
  default-token-lzmmh:
    Type:          Secret (a volume populated by a Secret)
    SecretName:     default-token-lzmmh
    Optional:       false
QoS Class:         Burstable
Node-Selectors:     node-role.kubernetes.io/compute=true
Tolerations:        node.kubernetes.io/memory-pressure:NoSchedule
Events:
  Type    Reason      Age          From              Message
  ----    -
  Normal   Scheduled   16m          default-scheduler  Successfully assigned
team14/team14-karma-7db6fb5cc9-6kjcg to pysyd.159.23.66.101.nip.io
  Normal   Created     15m (x4 over 15m)  kubelet, pysyd.159.23.66.101.nip.io  Created container
  Normal   Started     15m (x4 over 15m)  kubelet, pysyd.159.23.66.101.nip.io  Started container
  Normal   Pulling     14m (x5 over 15m)  kubelet, pysyd.159.23.66.101.nip.io  pulling image
"docker.io/ibmicpcoc/karma:latest"
  Normal   Pulled      14m (x5 over 15m)  kubelet, pysyd.159.23.66.101.nip.io  Successfully pulled
image "docker.io/ibmicpcoc/karma:latest"
  Warning  BackOff     49s (x66 over 15m)  kubelet, pysyd.159.23.66.101.nip.io  Back-off restarting
failed container

-- Logs --

Command:

oc logs team14-karma-7db6fb5cc9-6kjcg

Example output:

9/28/2019, 2:46:22 AM :: karm001i - Application random key: b42bde37-f4f2-40f1-9ae9-6b7b80b2442c
9/28/2019, 2:46:22 AM :: karm003i - Environment APP_NAMESPACE: team14
9/28/2019, 2:46:22 AM :: karm004i - Environment APP_NAME: Using random key = team14-karma-7db6fb5cc9-
6kjcg
9/28/2019, 2:46:22 AM :: karm013i - Environment COLLECTOR_CONFIG: http://team14-student-ui
9/28/2019, 2:46:22 AM :: karm014i - Environment INSTRUCTOR_CONFIG: http://dashboard.default
9/28/2019, 2:46:22 AM :: karm109e - Error writing file: /app/karma.txt Error message: Error: EACCES:
permission denied, open '/app/karma.txt'

```

### Problem discovered

Error message: **Error: EACCES: permission denied, open '/app/karma.txt'** is indicating the pod lacks permissions. By default, OpenShift does not allow running privileged pods. By default, Docker builds images with "root" user making the it privileged.

### Resolution

Add the security policy anyuid to the service account responsible for creating your deployment, by default this user is default. The dash z indicates that we want to manipulate a service account.

User either of the following commands:

- `oc adm policy add-scc-to-user anyuid -z default`
- `oc adm policy add-scc-to-user anyuid system:serviceaccount:<team>:default`

NOTE: If second command above is used, replace **<team>** with team name.

After issuing the command the pod will need to be deleted. Once deleted the pod will restart and will then be able to run as a privileged pod.

---

All references to <team> should be replaced with your team name.

### Resources

- K8 yaml - [lacey.yaml](#)
- Dockerfile - [Dockerfile](#)

### Useful information

Init container specs:

```
initContainers:
- name: <team>-init      <<<--- replace <team> with team name
  image: centos:7
  command:
  - "bin/bash"
  - "-c"
  - "echo <team> > /data/<team>.txt"      <<<--- replace <team> with team name
  volumeMounts:
  - mountPath: /data
    name: config-data
```

Task description
A pod that begins with <team>-lacey is frequently restarting.
Research the issue to determine what is causing the pod to restart frequently.

**Task description**

Edit the lacey.yaml file to correct the issue.

Verify the deployment successfully deployed.

There must be an init container that creates the missing file.

**Diagnosis**

Checking the running pod for application information.

-- Describe --

Command:

```
oc describe po team10-lacey-56b79fcdf8-9xrz7
```

Example output:

```
Name: team10-lacey-56b79fcdf8-9xrz7
Namespace: team10
Priority: 0
PriorityClassName: <none>
Node: pysyd.159.23.66.104.nip.io/159.23.66.104
Start Time: Sat, 28 Sep 2019 14:55:43 +1000
Labels: app=team10-lacey
        pod-template-hash=1263597894
Annotations: openshift.io/scc=restricted
Status: Running
IP: 10.129.0.16
Controlled By: ReplicaSet/team10-lacey-56b79fcdf8
Containers:
  team10-lacey:
    Container ID: docker://bef4c14016aaac6120343233cb8e05753636c0478302075f7cad2eca65ddc101
    Image: docker.io/ibmicpcoc/lacey:latest
    Image ID: docker-
pullable://docker.io/ibmicpcoc/lacey@sha256:c71f2b2d10a70140bf690dd0cef4834cfcccfece786f8a35de7f71faa608c249
    Port: <none>
    Host Port: <none>
    Command:
      node
      app.js
    State: Waiting
    Reason: CrashLoopBackOff
```

```

Last State:      Terminated
Reason:          Error
Exit Code:       1
Started:         Sat, 28 Sep 2019 14:56:19 +1000
Finished:        Sat, 28 Sep 2019 14:56:19 +1000
Ready:           False
Restart Count:   1
Requests:
  cpu:           50m
  memory:        50Mi
Environment:
  APP_NAMESPACE: team10 (v1:metadata.namespace)
  APP_NAME:       team10-lacey-56b79fcdf8-9xrz7 (v1:metadata.name)
  COLLECTOR_CONFIG: <set to the key 'COLLECTOR_CONFIG' of config map 'team10-collector-config'>
Optional: false
  INSTRUCTOR_CONFIG: <set to the key 'INSTRUCTOR_CONFIG' of config map 'team10-collector-config'>
Optional: false
Mounts:
  /data from config-data (rw)
  /var/run/secrets/kubernetes.io/serviceaccount from default-token-kcr98 (ro)
Conditions:
  Type              Status
  Initialized        True
  Ready              False
  ContainersReady    False
  PodScheduled       True
Volumes:
  config-data:
    Type: EmptyDir (a temporary directory that shares a pod's lifetime)
    Medium:
  default-token-kcr98:
    Type: Secret (a volume populated by a Secret)
    SecretName: default-token-kcr98
    Optional: false
QoS Class:          Burstable
Node-Selectors:     node-role.kubernetes.io/compute=true
Tolerations:        node.kubernetes.io/memory-pressure:NoSchedule
Events:
  Type    Reason      Age    From                      Message
  ----    -
  Normal  Scheduled    47s    default-scheduler        Successfully assigned
team10/team10-lacey-56b79fcdf8-9xrz7 to pysyd.159.23.66.104.nip.io
  Normal  Pulling      29s (x2 over 42s)    kubelet, pysyd.159.23.66.104.nip.io  pulling image
"docker.io/ibmicpcoc/lacey:latest"
  Normal  Pulled       11s (x2 over 30s)    kubelet, pysyd.159.23.66.104.nip.io  Successfully pulled image
"docker.io/ibmicpcoc/lacey:latest"
  Normal  Created      11s (x2 over 30s)    kubelet, pysyd.159.23.66.104.nip.io  Created container
  Normal  Started      11s (x2 over 30s)    kubelet, pysyd.159.23.66.104.nip.io  Started container
  Warning BackOff      9s (x2 over 10s)    kubelet, pysyd.159.23.66.104.nip.io  Back-off restarting
failed container

```

```
-- Logs --
```

```
Command:
```

```
oc logs team10-lacey-56b79fcdf8-9xrz7
```

```
Example output:
```

```
9/28/2019, 4:56:39 AM :: lacy001i - Application random key: 64016eb5-bf87-4e94-9b4a-bd13553f2811
9/28/2019, 4:56:39 AM :: lacy003i - Environment APP_NAMESPACE: team10
9/28/2019, 4:56:39 AM :: lacy004i - Environment APP_NAME: Using random key = team10-lacey-56b79fcdf8-9xrz7
9/28/2019, 4:56:39 AM :: lacy013i - Environment COLLECTOR_CONFIG: http://team10-student-ui
9/28/2019, 4:56:39 AM :: lacy014i - Environment INSTRUCTOR_CONFIG: http://dashboard.default
9/28/2019, 4:56:39 AM :: lacy109e - Did not locate config file: /data/team10.txt Error message: Error: ENOENT: no such file or directory, open '/data/team10.txt'
```

### Problem discovered

Log message **lacy109** indicates a missing file. The file must exist before the pod can be started. The Deployment needs an **initContainers** defined to resolve the issue.

### Resolution

An **initContainer** must be added to the Deployment Describe the resolution. The init container specification is added in the **spec** section at the same level as the **container** definition. Example:

```
spec:
  initContainers:
  - name: {{team}}-init
    image: centos:7
    command:
    - "bin/bash"
    - "-c"
    - "echo {{team}} > /data/{{team}}.txt"
  volumeMounts:
  - mountPath: /data
    name: config-data
  containers:
  - name: {{team}}-lacey
    image: {{repoName}}/lacey:latest
    imagePullPolicy: Always
```



Newly running deployment output using **oc describe**.

Checking the running pod for application information. Review the **Init Containers** section and the additional messages in the **Events** sections.

```
-- Describe --
```

Command:

```
oc describe po team10-lacey-56b79fcd8-9xrz7
```

Example output:

```
Name: team10-lacey-5b76654dd9-h2lhw
Namespace: team10
Priority: 0
PriorityClassName: <none>
Node: pysyd.159.23.66.108.nip.io/159.23.66.108
Start Time: Sat, 28 Sep 2019 15:23:12 +1000
Labels: app=team10-lacey
        pod-template-hash=1632210885
Annotations: openshift.io/scc=restricted
Status: Running
IP: 10.131.0.73
Controlled By: ReplicaSet/team10-lacey-5b76654dd9
Init Containers:
  team10-init:
    Container ID: docker://70317ff8877b015b5ffeb905ab005c2e182f7c111ffa8015be40a2f497e2692a
    Image: centos:7
    Image ID: docker-pullable://docker.io/centos@sha256:307835c385f656ec2e2fec602cf093224173c51119bbebd602c53c3653a3d6eb
    Port: <none>
    Host Port: <none>
    Command:
      bin/bash
      -c
      echo team10 > /data/team10.txt
    State: Terminated
      Reason: Completed
      Exit Code: 0
      Started: Sat, 28 Sep 2019 15:23:17 +1000
      Finished: Sat, 28 Sep 2019 15:23:17 +1000
    Ready: True
    Restart Count: 0
    Environment: <none>
```

```

Mounts:
  /data from config-data (rw)
  /var/run/secrets/kubernetes.io/serviceaccount from default-token-kcr98 (ro)
Containers:
  team10-lacey:
    Container ID:   docker://8313ad22372c8d58eeaf0a0d77aaaf557854020f8918e95d9bc65517f749153c
    Image:          docker.io/ibmicpcoc/lacey:latest
    Image ID:       docker-
pullable://docker.io/ibmicpcoc/lacey@sha256:c71f2b2d10a70140bf690dd0cef4834cfcccfece786f8a35de7f71faa608c249
    Port:           <none>
    Host Port:      <none>
    Command:
      node
      app.js
    State:          Running
      Started:      Sat, 28 Sep 2019 15:23:27 +1000
    Ready:          True
    Restart Count:  0
    Requests:
      cpu:          50m
      memory:       50Mi
    Environment:
      APP_NAMESPACE:    team10 (v1:metadata.namespace)
      APP_NAME:         team10-lacey-5b76654dd9-h2lhw (v1:metadata.name)
      COLLECTOR_CONFIG: <set to the key 'COLLECTOR_CONFIG' of config map 'team10-collector-config'>
Optional: false
      INSTRUCTOR_CONFIG: <set to the key 'INSTRUCTOR_CONFIG' of config map 'team10-collector-config'>
Optional: false
Mounts:
  /data from config-data (rw)
  /var/run/secrets/kubernetes.io/serviceaccount from default-token-kcr98 (ro)
Conditions:
  Type            Status
  Initialized      True
  Ready            True
  ContainersReady  True
  PodScheduled     True
Volumes:
  config-data:
    Type:      EmptyDir (a temporary directory that shares a pod's lifetime)
    Medium:
  default-token-kcr98:
    Type:      Secret (a volume populated by a Secret)
    SecretName: default-token-kcr98
    Optional:   false
QoS Class:     Burstable
Node-Selectors: node-role.kubernetes.io/compute=true
Tolerations:   node.kubernetes.io/memory-pressure:NoSchedule
Events:
  Type    Reason      Age    From          Message
  ----    -

```

```

Normal Scheduled 1m default-scheduler Successfully assigned team10/team10-
lacey-5b76654dd9-h2lhw to pysyd.159.23.66.108.nip.io
Normal Pulled 1m kubelet, pysyd.159.23.66.108.nip.io Container image "centos:7" already
present on machine
Normal Created 1m kubelet, pysyd.159.23.66.108.nip.io Created container
Normal Started 1m kubelet, pysyd.159.23.66.108.nip.io Started container
Normal Pulling 1m kubelet, pysyd.159.23.66.108.nip.io pulling image
"docker.io/ibmicpcoc/lacey:latest"
Normal Pulled 1m kubelet, pysyd.159.23.66.108.nip.io Successfully pulled image
"docker.io/ibmicpcoc/lacey:latest"
Normal Created 1m kubelet, pysyd.159.23.66.108.nip.io Created container
Normal Started 1m kubelet, pysyd.159.23.66.108.nip.io Started container

```

All references to <team> should be replaced with your team name.

#### Resources

- K8 yaml - [magma.yaml](#)
- Dockerfile - [Dockerfile](#)

#### Useful information

Item	Value
cpu:	50m
memory:	50Mi
image:	ibmicpcoc/magma:latest
ports	none
YAML	command: ["node", "app.js"]

Secret Parameter	Value
Name	<team>-secret-file
Content	Base64 encoded: debug me
Type	Opaque
Mount	/var/config
File	secret.txt

**Note** that the value of the parameter 'Content' must be base64 encoded.

ConfigMap Parameter	Value
Name	<team>-configmap-file
Content	debug
Mount	/var/secret
File	config.txt

Task description
A pod that begins with <team>-magma has a status of ContainerCreating.
Research the issue to determine what is causing the pod to be in this status.
Describe the pod to assist in determining why this issue is occurring.
Edit the magma.yaml file to correct the issue using provided <b>Useful Information</b> .
Verify the deployment successfully deployed by viewing log message <b>magm115i</b>

---

Create the secret and configmap resources in the Deployment yaml.

Examples of the base64 command:

Encode:

```
echo -n "debug me" | base64      <<<--- be sure to include the -n
ZGVidWcgbWU=
```

Decode:

```
echo "ZGVidWcgbWU=" | base64 --decode
debug me
```

---

### Diagnosis

Checking the running pod for information.

NOTE: Use oc get po to get pod name

-- Describe --

Command:

```
oc describe po team10-magma-54644c86d-5zb25
```

Example output:

```
Name: team10-magma-54644c86d-5zb25
Namespace: team10
Priority: 0
PriorityClassName: <none>
Node: pysyd.159.23.66.101.nip.io/
Labels: app=team10-magma
        pod-template-hash=102007428
Annotations: openshift.io/scc=restricted
Status: Pending
IP:
Controlled By: ReplicaSet/team10-magma-54644c86d
Containers:
  team10-magma:
    Image: docker.io/ibmicpcoc/magma:latest
    Port: <none>
    Host Port: <none>
    Command:
      node
      app.js
    Requests:
      cpu: 50m
      memory: 50Mi
    Environment:
      APP_NAMESPACE: team10 (v1:metadata.namespace)
      APP_NAME: team10-magma-54644c86d-5zb25 (v1:metadata.name)
      COLLECTOR_CONFIG: <set to the key 'COLLECTOR_CONFIG' of config map 'team10-collector-config'>
Optional: false
      INSTRUCTOR_CONFIG: <set to the key 'INSTRUCTOR_CONFIG' of config map 'team10-collector-config'>
Optional: false
Mounts:
  /var/config from configvol (rw)
  /var/run/secrets/kubernetes.io/serviceaccount from default-token-kcr98 (ro)
  /var/secret from secretvol (rw)
Conditions:
  Type          Status
  PodScheduled   True
```

```

Volumes:
  configvol:
    Type:          ConfigMap (a volume populated by a ConfigMap)
    Name:          team10-configmap-file
    Optional:      false
  secretvol:
    Type:          Secret (a volume populated by a Secret)
    SecretName:    team10-secret-file
    Optional:      false
  default-token-kcr98:
    Type:          Secret (a volume populated by a Secret)
    SecretName:    default-token-kcr98
    Optional:      false
QoS Class:       Burstable
Node-Selectors:  node-role.kubernetes.io/compute=true
Tolerations:     node.kubernetes.io/memory-pressure:NoSchedule
Events:
  Type     Reason      Age      From          Message
  ----     -
Normal    Scheduled    19s      default-scheduler    Successfully assigned
team10/team10-magma-54644c86d-5zb25 to pysyd.159.23.66.101.nip.io
Warning   FailedMount  3s (x4 over 16s)  kubelet, pysyd.159.23.66.101.nip.io  MountVolume.SetUp failed
for volume "configvol" : configmaps "team10-configmap-file" not found
Warning   FailedMount  2s (x4 over 16s)  kubelet, pysyd.159.23.66.101.nip.io  MountVolume.SetUp failed
for volume "secretvol" : secrets "team10-secret-file" not found

```

### Problem discovered

Two volume mounts, configvol and secretvol, are failing. These mounts require a configmap and secret resource definitions that are not found.

### Resolution

In the Deployment yaml add definitions for the secret and configmap resources using the data provided in the **Useful Information** section.

```

Example secret:

---
--- # Secret
---
apiVersion: v1
kind: Secret
metadata:
  name: <team>-secret-file      <<<--- replace <team> with team name
  namespace: <team>            <<<--- replace <team> with team name
type: Opaque

```

```

data:
  secret.txt: <base64 encoded value for debug me>

Example configmap:
---
--- # Configmap
---
kind: ConfigMap
apiVersion: v1
metadata:
  name: <team>-secret-file      <<<--- replace <team> with team name
  namespace: <team>            <<<--- replace <team> with team name
data:
  config.txt:  debug

```

Log message "**magm115i - All OK**" indicates the pod has successfully deployed and running.

```

-- Logs --

Command:

  oc logs team10-magma-54644c86d-74jqs

Example output:

  9/28/2019, 5:59:34 AM :: magm001i - Application random key: 409c2512-0680-4071-93c4-23e5b0f25220
  9/28/2019, 5:59:34 AM :: magm003i - Environment APP_NAMESPACE: team10
  9/28/2019, 5:59:34 AM :: magm004i - Environment APP_NAME: Using random key = team10-magma-54644c86d-
74jqs
  9/28/2019, 5:59:34 AM :: magm013i - Environment COLLECTOR_CONFIG: http://team10-student-ui
  9/28/2019, 5:59:34 AM :: magm014i - Environment INSTRUCTOR_CONFIG: http://dashboard.default
  9/28/2019, 5:59:34 AM :: magm115i - All OK
  9/28/2019, 5:59:34 AM :: magm011i - Initial reporting to student
  9/28/2019, 5:59:34 AM :: magm012i - Initial reporting to instructor

```