# Chapter 12

# Logging and Troubleshooting


## 12.1 Labs

### Exercise 12.1: Review Log File Locations

### Overview

In addition to various logs files and command output, you can use **journalctl** to view logs from the node perspective. We will view common locations of log files, then a command to view container logs. There are other logging options, such as the use of a **sidecar** container dedicated to loading the logs of another container in a pod.

Whole cluster logging is not yet available with Kubernetes. Outside software is typically used, such as **Fluentd**, part of https://fluentd.org/, which is another member project of **CNCF**, like Kubernetes.

### Review Log File Locations

Take a quick look at the following log files and web sites. As server processes move from node level to running in containers the logging also moves.

1. If using a **systemd** based Kubernetes cluster view the node level logs for **kubelet**, the local Kubernetes agent. Each node will have different contents as this is node specific.

```
student@lfs458-node-1a0a:~$ journalctl -u kubelet |less
<output_omitted>
```

2. Major Kubernetes processes now run in containers. You can view them from the container or the pod perspective. Use the **find** command to locate the **kube-apiserver** log. Your output will be different, but will be very long. Once you locate the files use the **diff** utility to compare them. There should be no difference.

```
student@lfs458-node-1a0a:~$ sudo find / -name "*apiserver*log"
/var/log/pods/56c55117e68ed986eaddeb0f78ca405e/kube-apiserver_0.log
```

```
/var/log/containers/kube-apiserver-lfs458-node-9q6r_kube-system_kube...

student@lfs458-node-1a0a:~$ sudo diff \
/var/log/pods/56c55117e68ed986eaddeb0f78ca405e/kube-apiserver_0.log
/var/log/containers/kube-apiserver-lfs458-node-9q6r_kube-system_kube...
```

3. Take a look at the log file.

```
student@lfs458-node-1a0a:~$ sudo less \
/var/log/pods/56c55117e68ed986eaddeb0f78ca405e/kube-apiserver_0.log
```

4. Search for and review other log files for `kube-dns`, `kube-flannel`, and `kube-proxy`.
5. If not on a Kubernetes cluster using **systemd** you can view the text files on the master node.
   (a) `/var/log/kube-apiserver.log`
   Responsible for serving the API
   (b) `/var/log/kube-scheduler.log`
   Responsible for making scheduling decisions
   (c) `/var/log/kube-controller-manager.log`
   Controller that manages replication controllers
6. `/var/log/containers`
   Various container logs
7. `/var/log/pods/`
   More log files for current Pods.
8. Worker Nodes Files (on non-**systemd** systems)
   (a) `/var/log/kubelet.log`
   Responsible for running containers on the node
   (b) `/var/log/kube-proxy.log`
   Responsible for service load balancing
9. More reading: https://kubernetes.io/docs/tasks/debug-application-cluster/\debug-service/ and https://kubernetes.io/docs/tasks/debug-application-cluster/\determine-reason-pod-failure/

## Exercise 12.2: Viewing Logs Output

Container standard out can be seen via the **kubectl logs** command. If there is no standard out, you would not see any output. In addition, the logs would be destroyed if the container is destroyed.

1. View the current Pods in the cluster. Be sure to view Pods in all namespaces.

```
student@lfs458-node-1a0a:~$ kubectl get po --all-namespaces
NAMESPACE     NAME                                       READY     STATUS    RESTARTS   AGE
default       ds-one-qc72k                               1/1       Running   0          3h
default       ds-one-z31r4                               1/1       Running   0          3h
....
kube-system   etcd-lfs458-node-1a0a                      1/1       Running   2          9h
kube-system   kube-apiserver-lfs458-node-1a0a            1/1       Running   2          9h
kube-system   kube-controller-manager-lfs458-node-1a0a   1/1       Running   2          9h
kube-system   kube-dns-2425271678-w80vx                  3/3       Running   6          9h
kube-system   kube-scheduler-lfs458-node-1a0a            1/1       Running   2          9h

...
```

 

2. View the logs associated with the container scheduler. Your particular Pod name will be different. You will get a lot of output. Consider narrowing down the output to only the **nginx** server.

```
student@lfs458-node-1a0a:~$ kubectl logs kube-scheduler-lfs458-node-1a0a\
     -n kube-system | grep nginx
....
I1024 19:47:54.955077       1 event.go:218] Event(v1.ObjectReference
{Kind:"Pod", Namespace:"default", Name:"nginx-2060361664-4g2g2",
UID:"3a670a6f-b8f4-11e7-8350-0a053b35c9b8", APIVersion:"v1",
ResourceVersion:"809652", FieldPath:""}): type: 'Normal' reason:
'Scheduled' Successfully assigned nginx-2060361664-4g2g2 to
lfs458-node-1a0a
I1024 19:49:33.096360       1 event.go:218] Event(v1.ObjectReference
{Kind:"Pod", Namespace:"default", Name:"nginx-2060361664-zbv36",
UID:"74e66be7-b8f4-11e7-8350-0a053b35c9b8", APIVersion:"v1",
ResourceVersion:"809834", FieldPath:""}): type: 'Normal'
reason: 'Scheduled' Successfully assigned nginx-2060361664-zbv36
to lfs458-node-1a0a
```

3. View the logs of other Pods in your cluster.

 