Running the Pod after mounting hostPath

In this lesson, we will create the Pod by mounting Docker socket and play around in it.

WE'LL COVER THE FOLLOWING

- Creating and Testing the Pod
- Playing Around with Docker
- Destroying the Pod

Creating and Testing the Pod

Let's create the Pod and check whether, this time, we can execute Docker commands from inside the container it'll create.

```
kubectl create \
  -f volume/docker.yml
```

Since the image is already pulled, starting the Pod should be almost instant.

Let's see whether we can retrieve the list of Docker images.

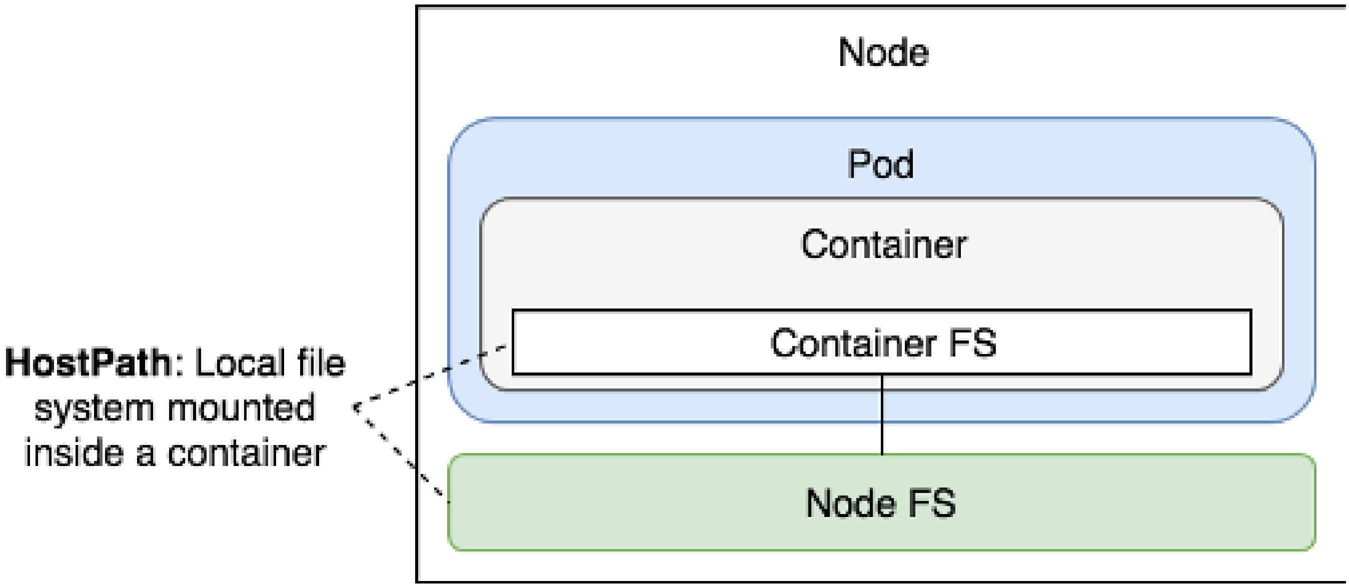
```
kubectl exec -it docker \
    -- docker image ls \
    --format "{{.Repository}}"
```

We executed `docker image ls` command and shortened the output by limiting its formatting only to `Repository`. The output is as follows.

```
k8s.gcr.io/kube-proxy
k8s.gcr.io/kube-controller-manager
k8s.gcr.io/kube-scheduler
k8s.gcr.io/kube-apiserver
quay.io/kubernetes-ingress-controller/nginx-ingress-controller
k8s.gcr.io/kube-addon-manager
k8s.gcr.io/coredns
k8s.gcr.io/kubernetes-dashboard-amd64
```

```
k8s.gcr.io/kubernetes-dashboard-amd64
k8s.gcr.io/etcd
k8s.gcr.io/k8s-dns-sidecar-amd64
k8s.gcr.io/k8s-dns-kube-dns-amd64
k8s.gcr.io/k8s-dns-dnsmasq-nanny-amd64
k8s.gcr.io/pause
docker
gcr.io/k8s-minikube/storage-provisioner
gcr.io/google_containers/defaultbackend
```

Even though we executed the `docker` command inside a container, the output clearly shows the images from the host. We proved that mounting the Docker socket (`/var/run/docker.sock`) as a Volume allows communication between Docker client inside the container, and Docker server running on the host.



HostPath mounted inside a container

Playing Around with Docker

Let's enter the container and see whether we can build a Docker image.

```
kubectl exec -it docker sh
```

To build an image, we need a `Dockerfile` as well as an application's source code. We'll continue using `go-demo-2` as the example, so our first action will be to clone the repository.

```
apk add -U git
git clone \
    https://github.com/vfarcic/go-demo-2.git
cd go-demo-2
```

We used `apk add` to install `git`.On the other hand, `docker` and many other images use `alpine` as the base. If you're not familiar with `alpine`, it is a very slim and efficient base image, and we strongly recommend that you use it when building your own.

> Images like `debian`, `centos`, `ubuntu`, `redhat`, and similar base images are often a terrible choice made because of a misunderstanding of how containers work.

`alpine` uses `apk` package management, so we invoked it to install `git`. Next, we cloned the `vfarcic/go-demo-2` repository, and, finally, we entered into the `go-demo-2` directory.

Let's take a quick look at the `Dockerfile`.

```
cat Dockerfile
```

The **output** is as follows.

```
FROM golang:1.9 AS build
ADD . /src
WORKDIR /src
RUN go get -d -v -t
RUN go test --cover -v ./... --run UnitTest
RUN go build -v -o go-demo


FROM alpine:3.4
MAINTAINER      Viktor Farcic <viktor@farcic.com>

RUN mkdir /lib64 && ln -s /lib/libc.musl-x86_64.so.1 /lib64/ld-linux-x86-64.so.2

EXPOSE 8080
ENV DB db
CMD ["go-demo"]
HEALTHCHECK --interval=10s CMD wget -qO- localhost:8080/demo/hello

COPY --from=build /src/go-demo /usr/local/bin/go-demo
RUN chmod +x /usr/local/bin/go-demo
```

Since this course is dedicated to Kubernetes, we won't go into details behind this Dockerfile, but only comment that it uses Docker's multi-stage builds. The first stage downloads the dependencies, it runs unit tests, and it builds the binary. The second stage starts over. It builds a fresh image with the `go-demo` binary copied from the previous stage.

> **i** We hope you're proficient with Docker and there's no need to explain image building further.

Let's test whether building an image indeed works.

```
docker image build \
    -t vfarcic/go-demo-2:beta .
docker image ls \
    --format "{{.Repository}}"
```

We executed the `docker image build` command, followed by `docker image ls`. The **output** of the latter command is as follows.

```
vfarcic/go-demo-2
<none>
golang
docker
alpine
gcr.io/google_containers/nginx-ingress-controller
gcr.io/google_containers/k8s-dns-sidecar-amd64
gcr.io/google_containers/k8s-dns-kube-dns-amd64
gcr.io/google_containers/k8s-dns-dnsmasq-nanny-amd64
gcr.io/google_containers/kubernetes-dashboard-amd64
gcr.io/google_containers/kubernetes-dashboard-amd64
gcr.io/google-containers/kube-addon-manager
gcr.io/google_containers/defaultbackend
gcr.io/google_containers/pause-amd64
```

If we compare this with the previous `docker image ls` output, we'll notice that, this time, a few new images are listed. The `golang` and `alpine` images are used as a basis for each of the build stages. The `vfarcic/go-demo-2` is the result of our build. Finally, `<none>` is only a left-over of the process and it can be safely removed.

```
docker system prune -f

docker image ls \
    --format "{{.Repository}}"
```

The `docker system prune` command removes all unused resources. At least, all those created and unused by Docker. We confirmed that by executing `docker image ls` again. This time, we can see the `<none>` image is gone.

Destroying the Pod

We’ll destroy the `docker` Pod and explore other usages of the `hostPath` Volume type.

```
exit

kubectl delete \
    -f volume/docker.yml
```

> `hostPath` is a great solution for accessing host resources like `/var/run/docker.sock`, `/dev/cgroups`, and others. That is, as long as the resource we’re trying to reach is on the same node as the Pod.

Let’s see whether we can find other use-cases for `hostPath`.

In the next lesson, we learn to use hostPath Volume type to inject configuration files.