Dockers 101 – Series 8 of N – Stateful containers and Importing and Exporting containers

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- **Stateless vs Stateful containers**
  - **Stateless** – they don't need to maintain the state of an application
    - e.g The TicTacToe game container we created is a simple game. We just wanted that when the container image is downloaded then the game should run. But we are not maintaining any users, their scores or anything like that.
  - **Stateful –** they need the application state to be maintained on some storage volume e.g in a database we are storing the users, scores, history of the games etc.
- **Approaches for Stateful containers**
  - *-v <host-dir>:<container-dir> parameter option*
    - -v host-dir:container-dir option instructs the docker to map a host directory to a container directory. It can be a good option for some scenarios but not an effective solution. What if the container is run from another docker where the host directory does not exist?
  - **Using Data Containers**
    - they are responsible for storing data
    - but they don't run like other containers
    - they hold the data/volume and are referenced by other containers who want to use this volume
- **Data containers in action**
  - Lets use Busybox(one of the smaller Linux distributions) we will use this container to hold our data and to be referenced by other containers
  - We will use **docker create** command to create a new container and pass **-v** parameter to create a container folder
  - We will then copy the configuration file from host folder to container folder
  - Now with the new data container created, we will use this container to reference/mount on a Ubuntu container using command **–volumes-from**
  - We will see how in the Ubuntu container since out container is mounted as volume, we can see the config file there.
  - This data container can be exported and imported too.
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 # create a config file
echo "test=true" >> config.conf

 # create a container by a specific name , with v option to create a folder in the container
 # (busybox is very small container)
docker create -v /config –name naeemsDataContainer busybox

 # copy data from local to the container
docker cp config.conf naeemsDataContainer:/config/

 # run an ubuntu container, referencing the container naeemsDataContainer using command –volumes-from
docker run –volumes-from naeemsDataContainer ubuntu ls /config

 # export the container
docker export naeemsDataContainer > naeemsDataContainer.tar

 # import the container
docker import naeemsDataContainer.tar

 # check the docker images and see the imported image (you will see naeemsDataContainer – a data container)
docker images

 # check docker containers and see the running container
 # (you will not see naeemsDataContainer, as it actually does not run, it is just a mount volume for other containers)
docker ps -a

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[root@mnaeemsiddiqui4 user]# # create a config file
[root@mnaeemsiddiqui4 user]# echo "test=true" >> config.conf
[root@mnaeemsiddiqui4 user]#
[root@mnaeemsiddiqui4 user]# # create a container by a specific name , with v option to create a folder in the container
[root@mnaeemsiddiqui4 user]# # (busybox is very small container)
[root@mnaeemsiddiqui4 user]# docker create -v /config --name naeemsDataContainer busybox
Unable to find image 'busybox:latest' locally
latest: Pulling from library/busybox
f70adabe43c0: Pull complete
Digest: sha256:58ac43b2cc92c687a32c8be6278e50a063579655fe3090125dcb2af0ff9e1a64
Status: Downloaded newer image for busybox:latest
0e2db193bc77f1a13f7680cf05d885716e855cf1cd25bbe9444cf3f1f4a0c839
[root@mnaeemsiddiqui4 user]#
[root@mnaeemsiddiqui4 user]# # copy data from local to the container
[root@mnaeemsiddiqui4 user]# docker cp config.conf naeemsDataContainer:/config/
[root@mnaeemsiddiqui4 user]#
[root@mnaeemsiddiqui4 user]# # run an ubuntu container, referencing the container naeemsDataContainer using command --volumes-from
[root@mnaeemsiddiqui4 user]# docker run --volumes-from naeemsDataContainer ubuntu ls /config
Unable to find image 'ubuntu:latest' locally
latest: Pulling from library/ubuntu
d3938036b19c: Pull complete
a9b30c108bda: Pull complete
67de21feec18: Pull complete
817da545be2b: Pull complete
d967c497ce23: Pull complete
Digest: sha256:9ee3b83bcaa383e5e3b657f042f4034c92cdd50c03f73166c145c9ceaea9ba7c
Status: Downloaded newer image for ubuntu:latest
config.conf
[root@mnaeemsiddiqui4 user]#
[root@mnaeemsiddiqui4 user]# # export the container
[root@mnaeemsiddiqui4 user]# docker export naeemsDataContainer > naeemsDataContainer.tar
[root@mnaeemsiddiqui4 user]#
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[root@mnaeemsiddiqui4 user]#
[root@mnaeemsiddiqui4 user]# # import the container
[root@mnaeemsiddiqui4 user]# docker import naeemsDataContainer.tar
sha256:f9af53e930b9b0d4b7be3b6f3e2d91d0a059c103b2e4b3c0271b127e224a55af
[root@mnaeemsiddiqui4 user]#
[root@mnaeemsiddiqui4 user]# # check the docker images and see the imported image (you will see naeemsDataContainer - a data container)
[root@mnaeemsiddiqui4 user]# docker images
REPOSITORY          TAG             IMAGE ID        CREATED                 SIZE
<none>              <none>          f9af53e930b9    Less than a second ago  1.15MB
ubuntu              latest          c9d990395902    8 days ago              113MB
busybox             latest          8ac48589692a    2 weeks ago             1.15MB
[root@mnaeemsiddiqui4 user]#
[root@mnaeemsiddiqui4 user]# # check docker containers and see the running container
[root@mnaeemsiddiqui4 user]# # (you will not see naeemsDataContainer, as it actually does not run, it is just a mount volume for other con
tainers)
[root@mnaeemsiddiqui4 user]# docker ps -a
CONTAINER ID        IMAGE           COMMAND         CREATED         STATUS                  PORTS           NAMES
530e32fbfb6f        ubuntu          "ls /config"    5 seconds ago   Exited (0) 2 seconds ago                gracious_bh
askara
0e2db193bc77        busybox         "sh"            25 seconds ago  Created                                 naeemsDataC
ontainer
[root@mnaeemsiddiqui4 user]#
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