8 September – Docker

1) The beauty of container is it can start in fraction of seconds

2) Containerization provides 2 types of images –

i) built in image – readymade images

ii) custom image

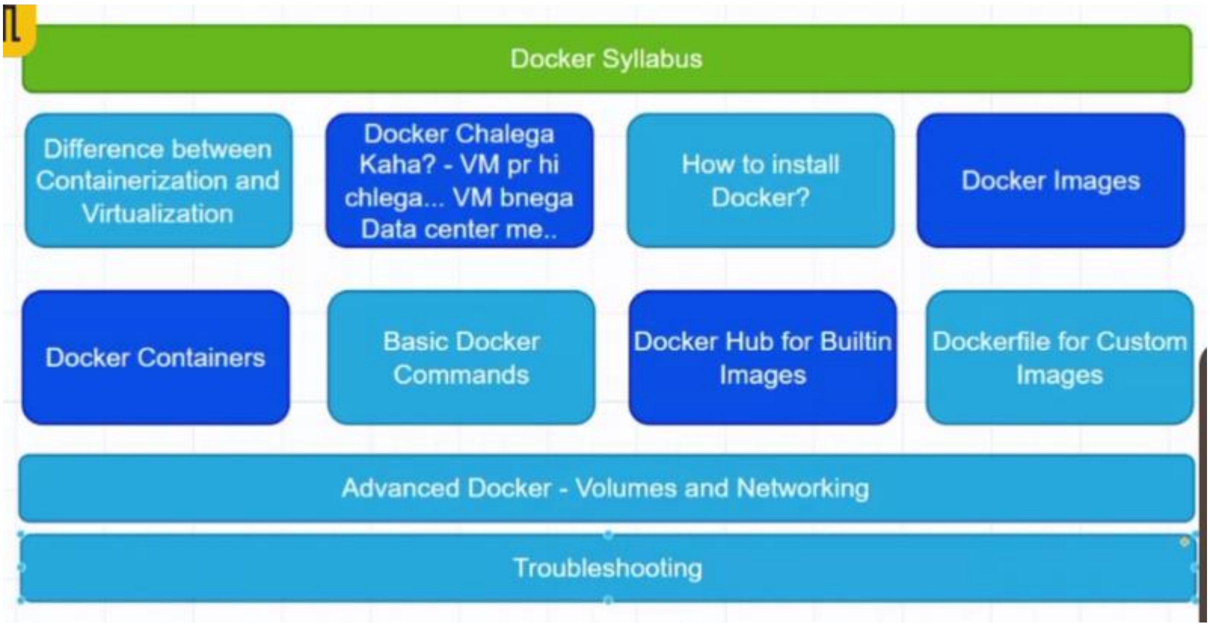
3) Docker hub – Docker registry where all built in images are kept here

4) alpine – light operating system image

5) Using image we will prepare our container

6) Container = VM

7) Docker file – By writing docker file we can make custom image



Docker Syllabus

Difference between Containerization and Virtualization

Docker Chalega Kaha? - VM pr hi chlega... VM bnega Data center me..

How to install Docker?

Docker Images

Docker Containers

Basic Docker Commands

Docker Hub for Builtin Images

Dockerfile for Custom Images

Advanced Docker - Volumes and Networking

Troubleshooting

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AGENDA – Creating VM, installing docker

1) Creating VM in portal

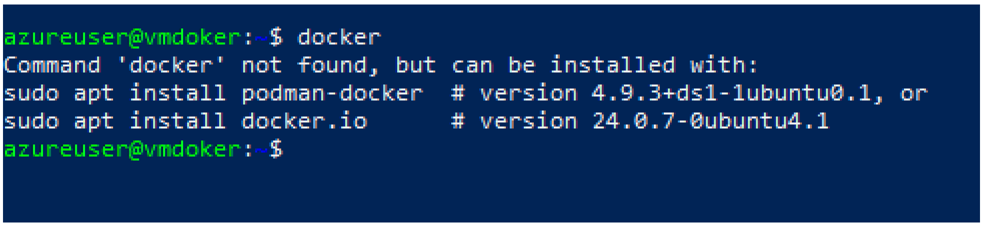
UN - azureuser

PW - Mommy7Daddy!

2) Open powershell

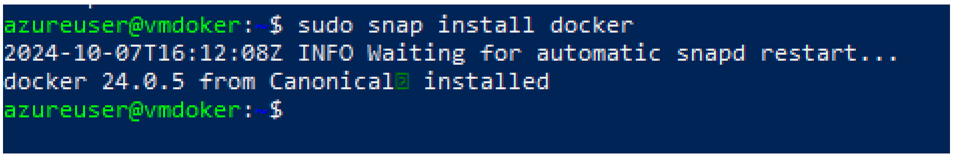
ssh azureuser@ip

3) docker



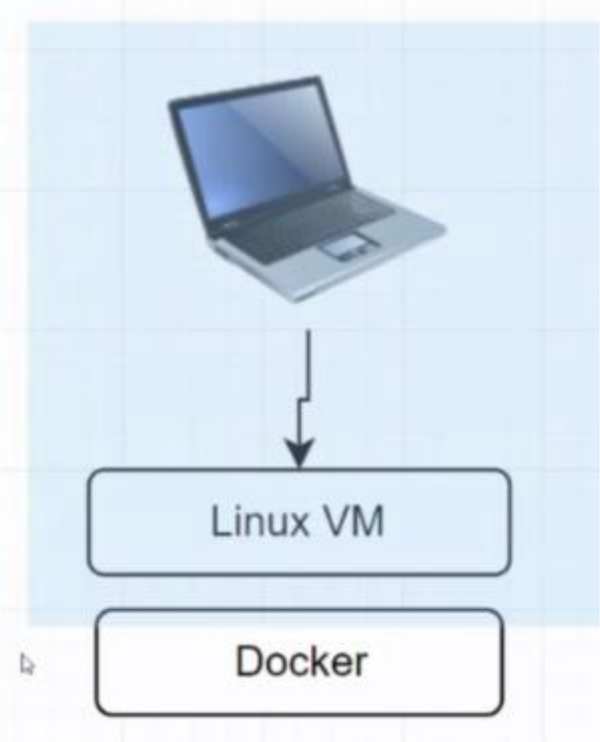
```
azureuser@vmdoker:~$ docker
Command 'docker' not found, but can be installed with:
sudo apt install podman-docker  # version 4.9.3+ds1-1ubuntu0.1, or
sudo apt install docker.io      # version 24.0.7-0ubuntu4.1
azureuser@vmdoker:~$
```

4) **sudo snap install docker**



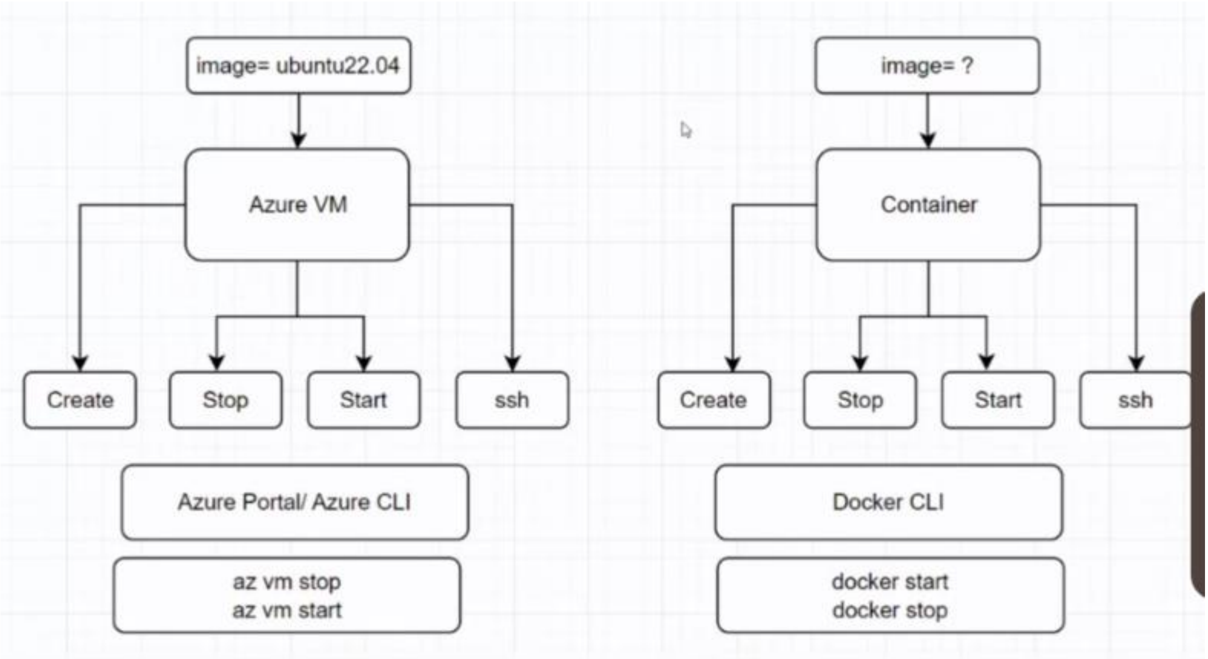
```
azureuser@vmdoker:~$ sudo snap install docker
2024-10-07T16:12:08Z INFO Waiting for automatic snapd restart...
docker 24.0.5 from Canonical✓ installed
azureuser@vmdoker:~$
```

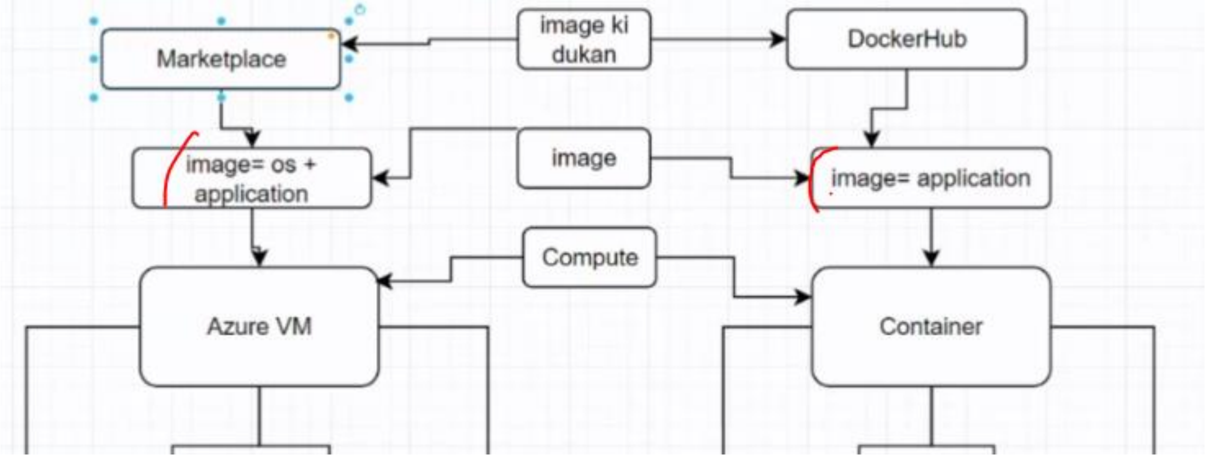
5) Docker installation on pc can have multiple issues



6) docker --version

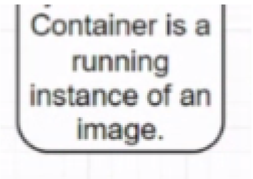
7) docker --help





8) **Compute –** On which our application actually runs

9) Image is a package in which our application is kept whereas in container our image runs



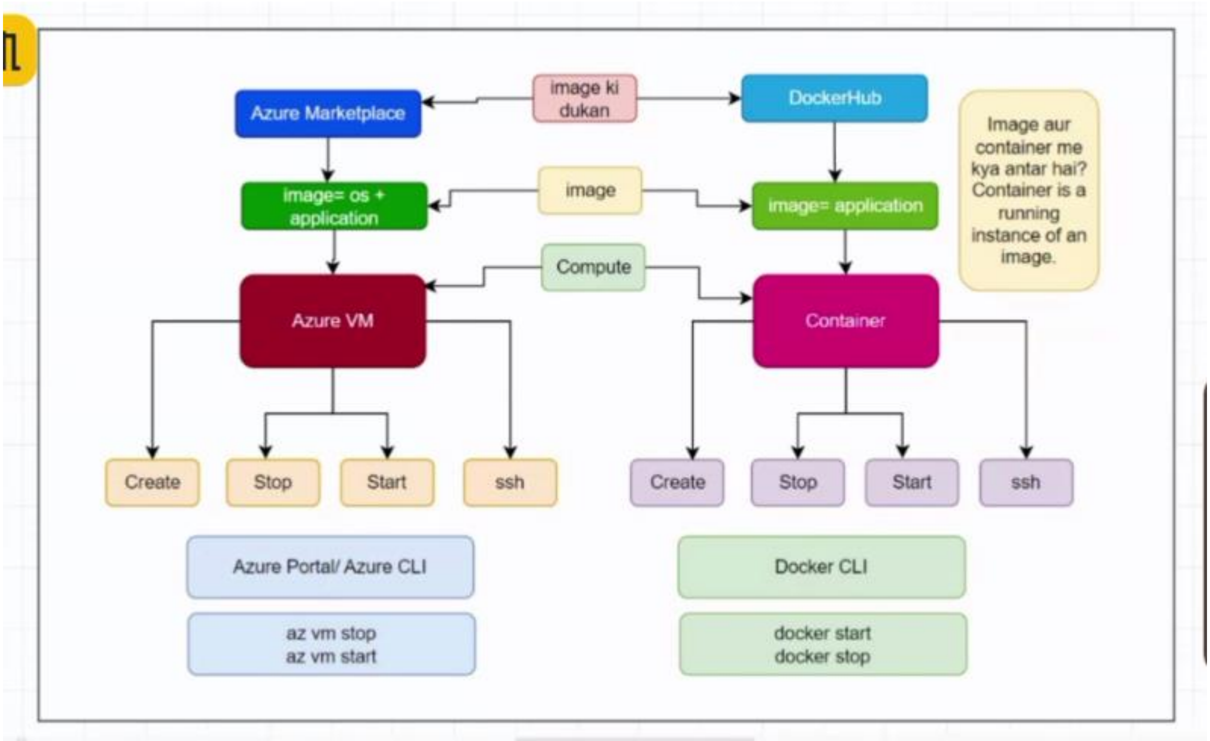
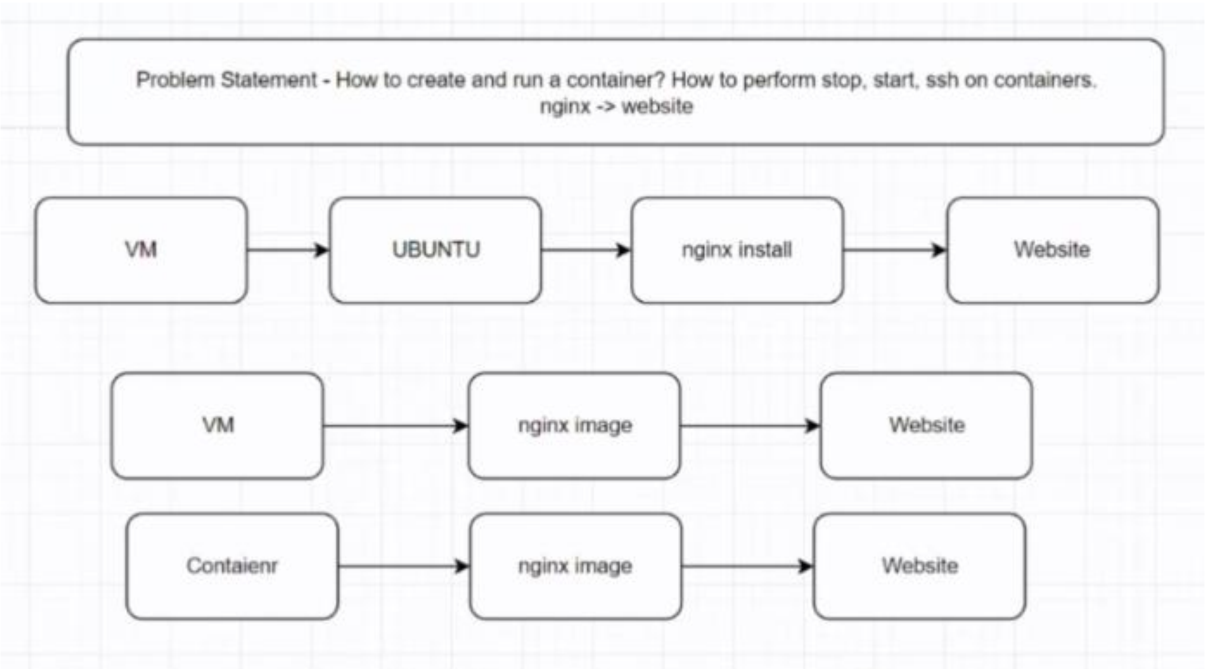


Image aur container me kya antar hai? Container is a running instance of an image.

```
az vm stop
az vm start
```

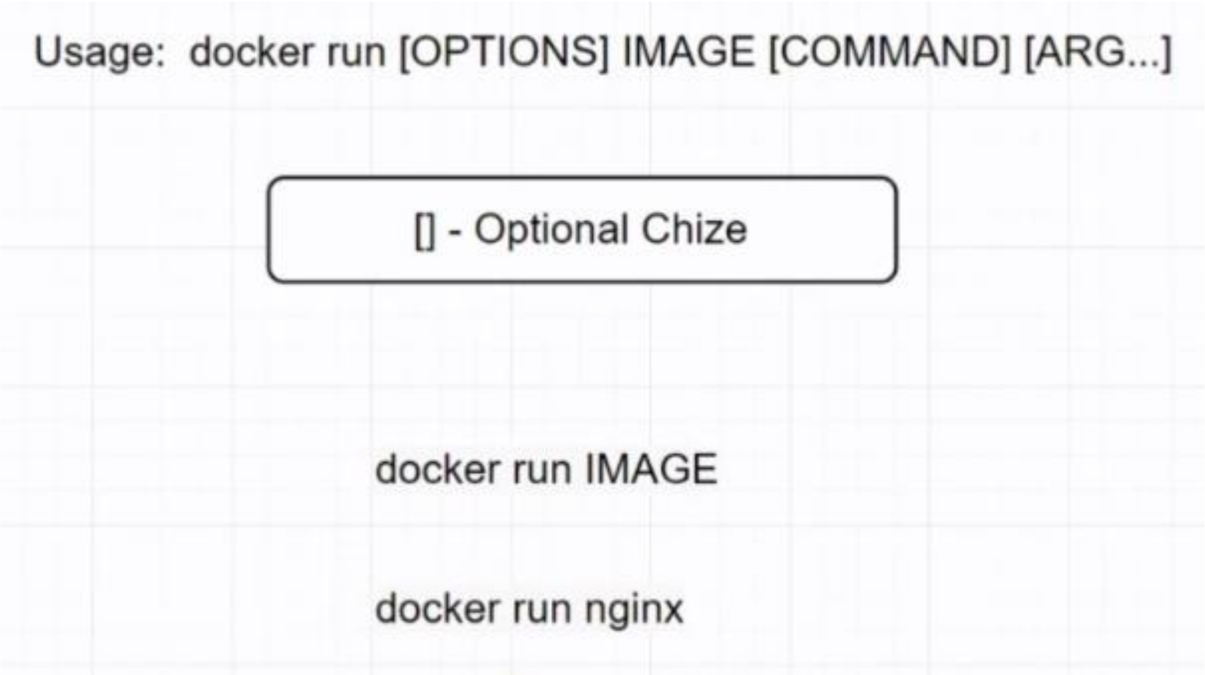
```
docker start
docker stop
```


Problem Statement - How to create and run a container? How to perform stop, start, ssh on containers.
nginx -> website

10) Now in our VM we have installed docker, so using docker, we will create our container.

11) **docker run --help**

12) Now downloading image of nginx which is a middleware



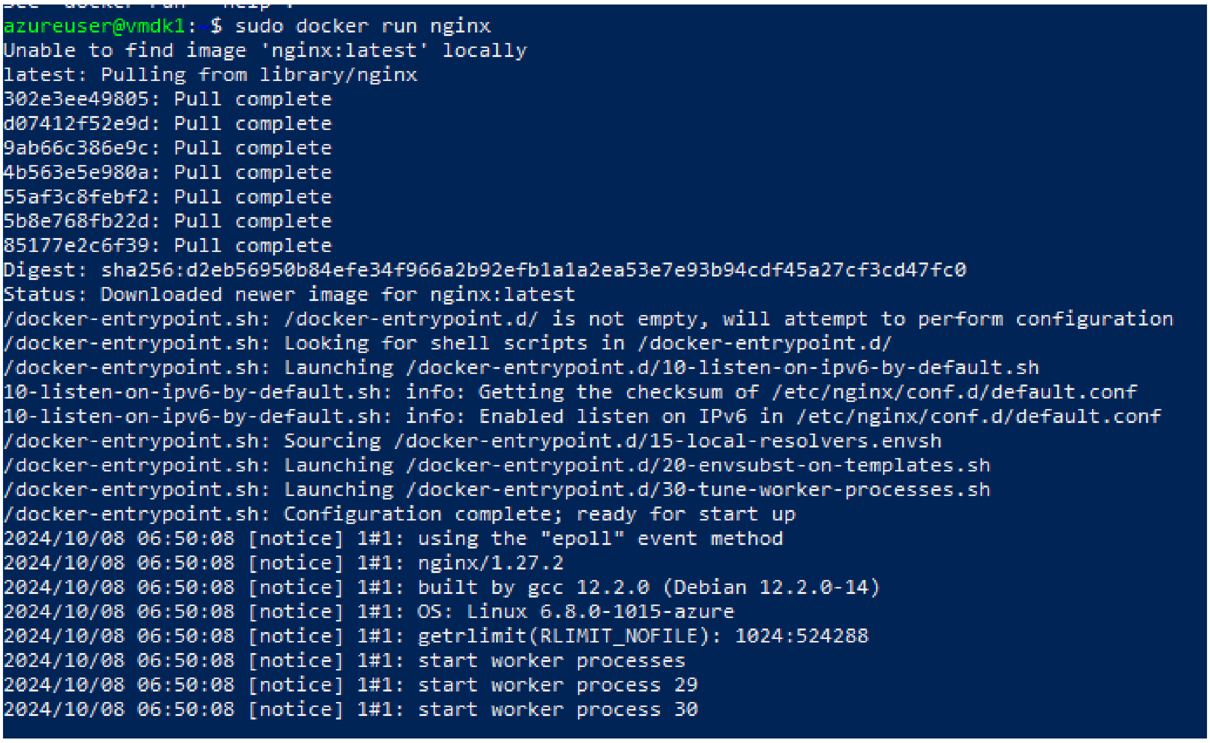
Usage: docker run [OPTIONS] IMAGE [COMMAND] [ARG...]

[] - Optional Chize

docker run IMAGE

docker run nginx

sudo docker run nginx



```
azureuser@vmdk1:~$ sudo docker run nginx
Unable to find image 'nginx:latest' locally
latest: Pulling from library/nginx
302e3ee49805: Pull complete
d07412f52e9d: Pull complete
9ab66c386e9c: Pull complete
4b563e5e980a: Pull complete
55af3c8febf2: Pull complete
5b8e768fb22d: Pull complete
85177e2c6f39: Pull complete
Digest: sha256:d2eb56950b84efe34f966a2b92efb1a1a2ea53e7e93b94cdf45a27cf3cd47fc0
Status: Downloaded newer image for nginx:latest
/docker-entrypoint.sh: /docker-entrypoint.d/ is not empty, will attempt to perform configuration
/docker-entrypoint.sh: Looking for shell scripts in /docker-entrypoint.d/
/docker-entrypoint.sh: Launching /docker-entrypoint.d/10-listen-on-ipv6-by-default.sh
10-listen-on-ipv6-by-default.sh: info: Getting the checksum of /etc/nginx/conf.d/default.conf
10-listen-on-ipv6-by-default.sh: info: Enabled listen on IPv6 in /etc/nginx/conf.d/default.conf
/docker-entrypoint.sh: Sourcing /docker-entrypoint.d/15-local-resolvers.envsh
/docker-entrypoint.sh: Launching /docker-entrypoint.d/20-envsubst-on-templates.sh
/docker-entrypoint.sh: Launching /docker-entrypoint.d/30-tune-worker-processes.sh
/docker-entrypoint.sh: Configuration complete; ready for start up
2024/10/08 06:50:08 [notice] 1#1: using the "epoll" event method
2024/10/08 06:50:08 [notice] 1#1: nginx/1.27.2
2024/10/08 06:50:08 [notice] 1#1: built by gcc 12.2.0 (Debian 12.2.0-14)
2024/10/08 06:50:08 [notice] 1#1: OS: Linux 6.8.0-1015-azure
2024/10/08 06:50:08 [notice] 1#1: getrlimit(RLIMIT_NOFILE): 1024:524288
2024/10/08 06:50:08 [notice] 1#1: start worker processes
2024/10/08 06:50:08 [notice] 1#1: start worker process 29
2024/10/08 06:50:08 [notice] 1#1: start worker process 30
```

Now this nginx image is running on our container.

12) Ctrl+c – stopped

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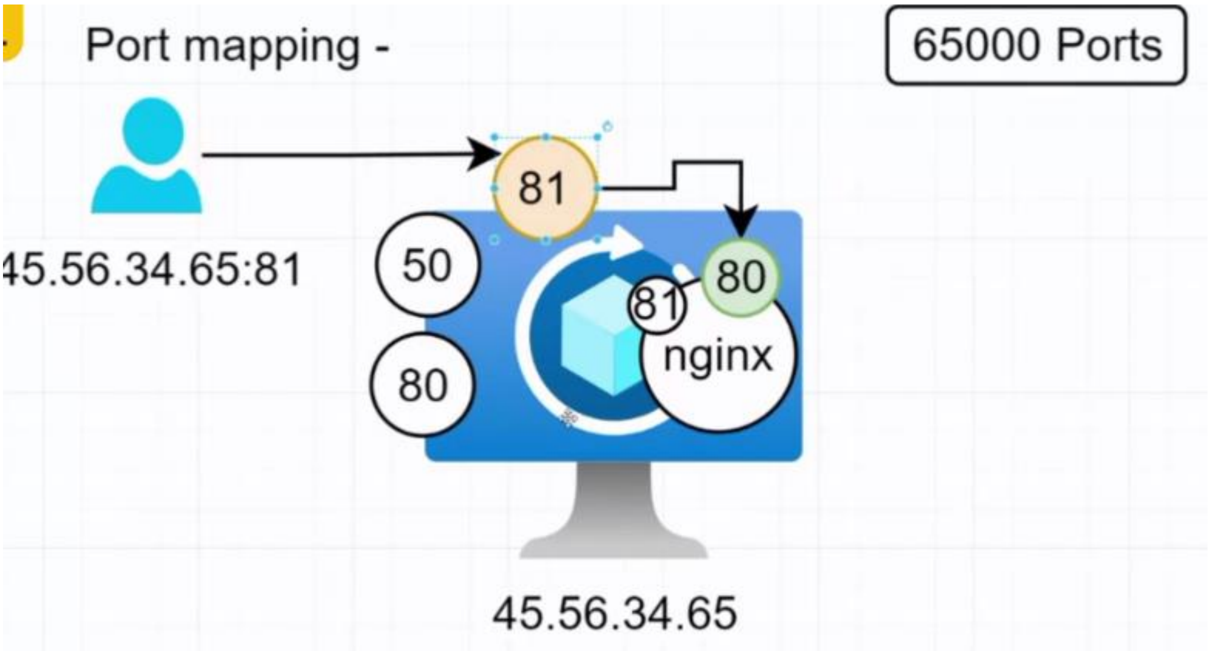
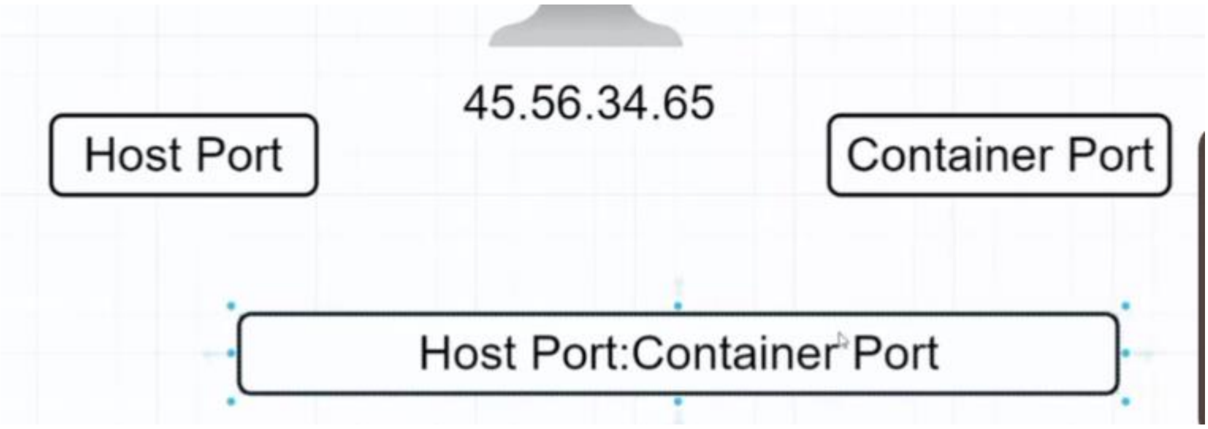
AGENDA – How to access container?



Port mapping -

65000 Ports

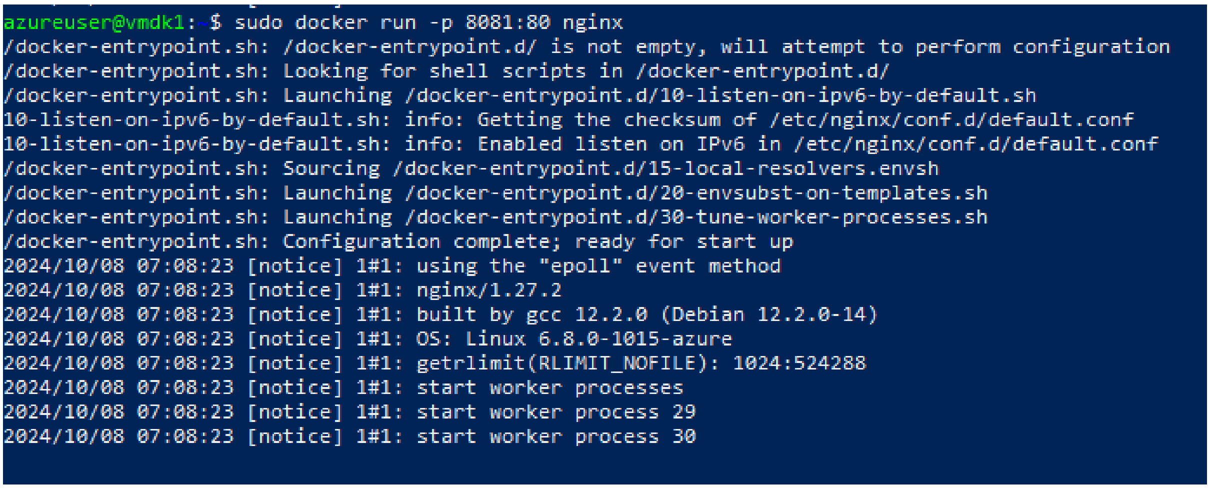


Host Port

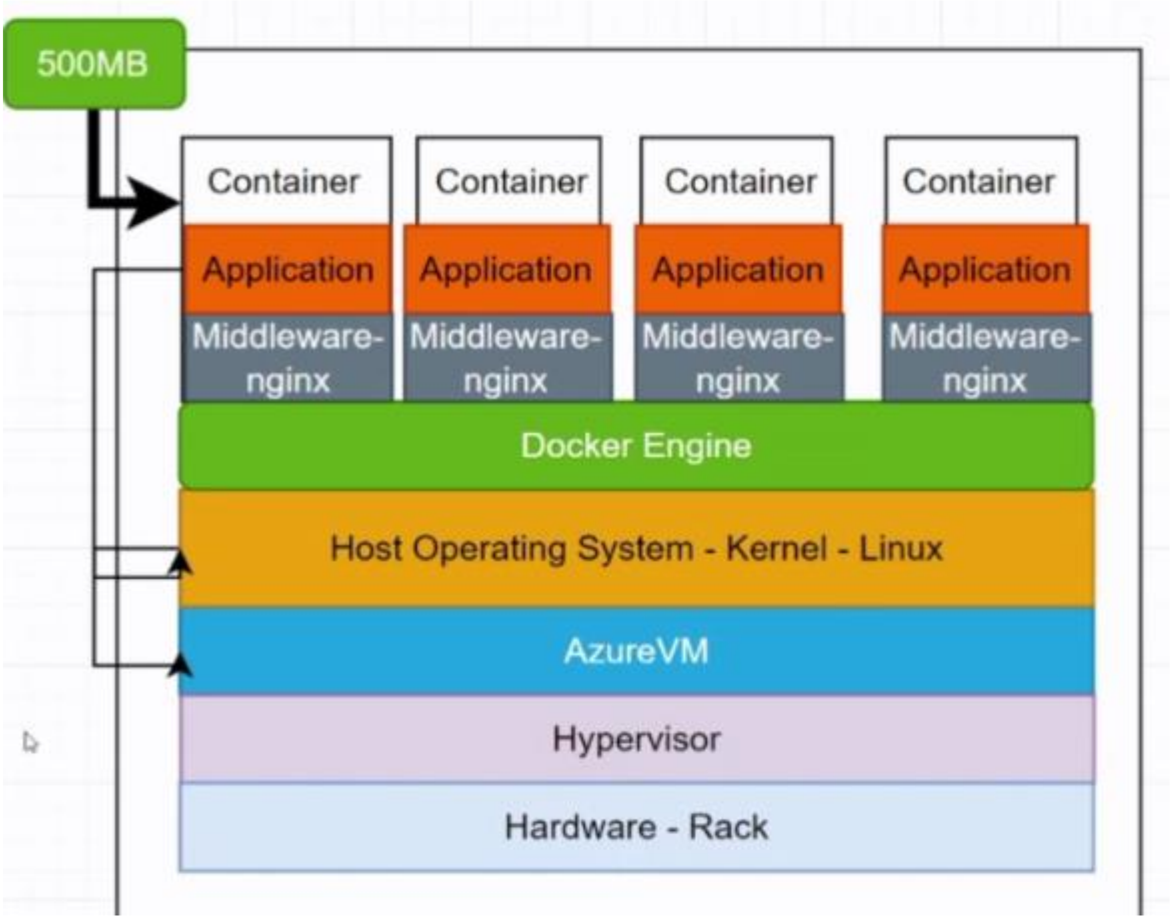
Container Port

Host Port:Container Port

1) **docker run -p 8081:80 nginx**

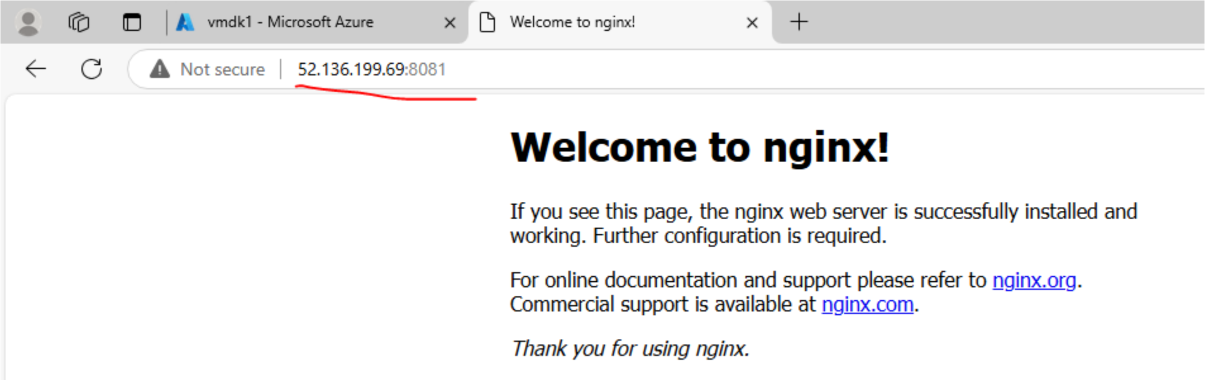


```
azureuser@vmdk1:~$ sudo docker run -p 8081:80 nginx
/docker-entrypoint.sh: /docker-entrypoint.d/ is not empty, will attempt to perform configuration
/docker-entrypoint.sh: Looking for shell scripts in /docker-entrypoint.d/
/docker-entrypoint.sh: Launching /docker-entrypoint.d/10-listen-on-ipv6-by-default.sh
10-listen-on-ipv6-by-default.sh: info: Getting the checksum of /etc/nginx/conf.d/default.conf
10-listen-on-ipv6-by-default.sh: info: Enabled listen on IPv6 in /etc/nginx/conf.d/default.conf
/docker-entrypoint.sh: Sourcing /docker-entrypoint.d/15-local-resolvers.envsh
/docker-entrypoint.sh: Launching /docker-entrypoint.d/20-envsubst-on-templates.sh
/docker-entrypoint.sh: Launching /docker-entrypoint.d/30-tune-worker-processes.sh
/docker-entrypoint.sh: Configuration complete; ready for start up
2024/10/08 07:08:23 [notice] 1#1: using the "epoll" event method
2024/10/08 07:08:23 [notice] 1#1: nginx/1.27.2
2024/10/08 07:08:23 [notice] 1#1: built by gcc 12.2.0 (Debian 12.2.0-14)
2024/10/08 07:08:23 [notice] 1#1: OS: Linux 6.8.0-1015-azure
2024/10/08 07:08:23 [notice] 1#1: getrlimit(RLIMIT_NOFILE): 1024:524288
2024/10/08 07:08:23 [notice] 1#1: start worker processes
2024/10/08 07:08:23 [notice] 1#1: start worker process 29
2024/10/08 07:08:23 [notice] 1#1: start worker process 30
```



2) Now open port 8081 through nsg of vm

3) 52.136.199.69:8081 – run



Welcome to nginx!

If you see this page, the nginx web server is successfully installed and working. Further configuration is required.

For online documentation and support please refer to nginx.org. Commercial support is available at nginx.com.

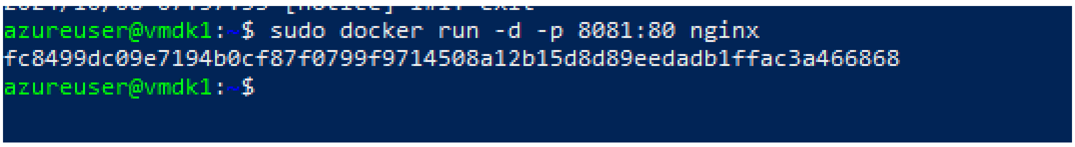
Thank you for using nginx.

4) Similarly to run more nginx we will change and open vm ports and run multiple nginx images like

52.136.199.69:8082, 52.136.199.69:8083, 52.136.199.69:8084, 52.136.199.69:8085

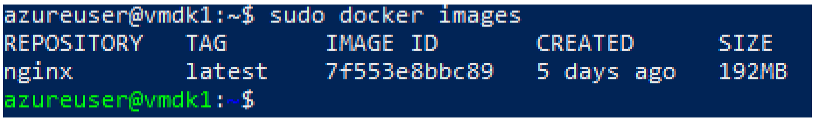
5) Now if we are doing ctrl +c them our container is stopping so for resolving that we will use detach mode

```
sudo docker run -d -p 8081:80 nginx
```



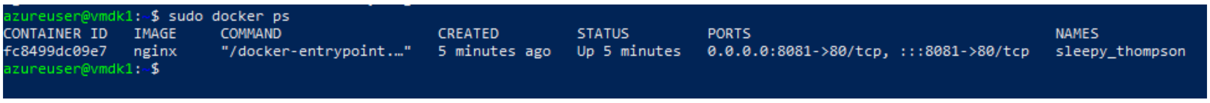
```
azureuser@vmdk1:~$ sudo docker run -d -p 8081:80 nginx
fc8499dc09e7194b0cf87f0799f9714508a12b15d8d89eedadb1ffac3a466868
azureuser@vmdk1:~$
```

6) **sudo docker images – 1 image can be used in multiple containers**



```
azureuser@vmdk1:~$ sudo docker images
REPOSITORY   TAG       IMAGE ID       CREATED      SIZE
nginx        latest    7f553e8bbc89   5 days ago   192MB
azureuser@vmdk1:~$
```

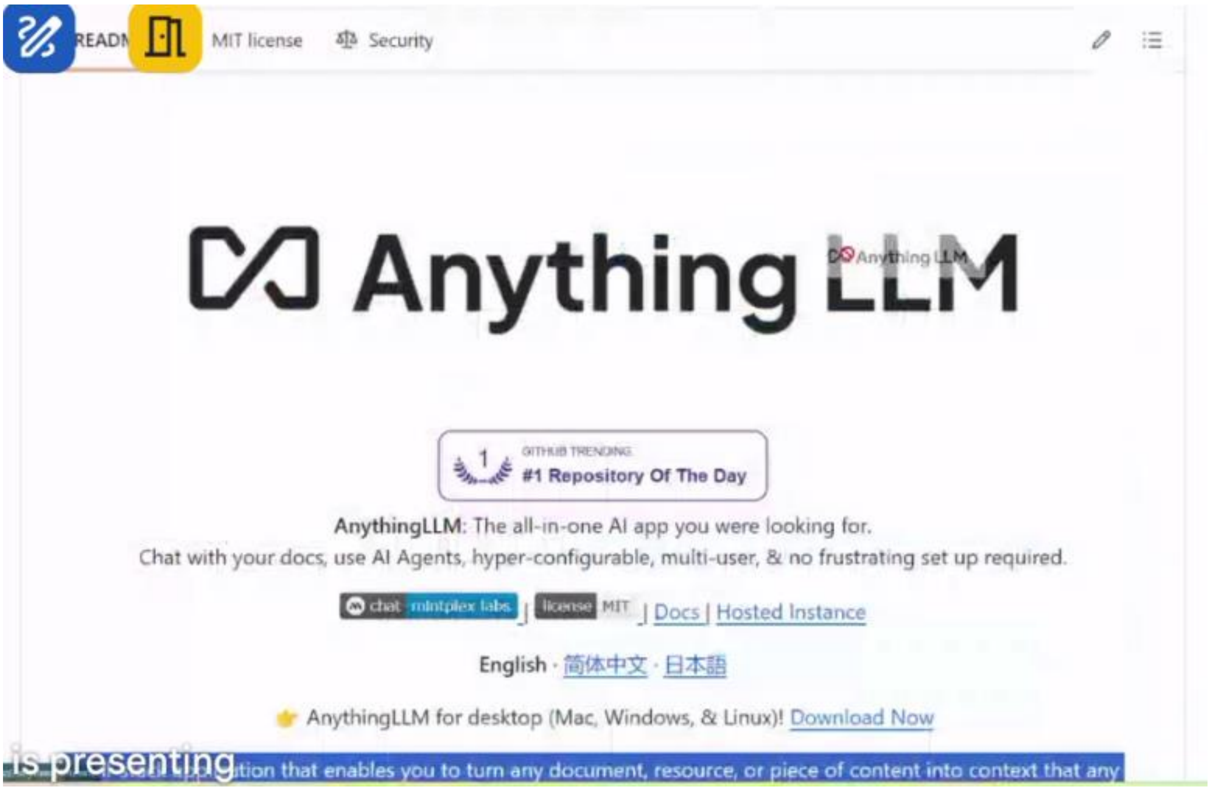
7) **sudo docker ps -** List running containers.



```
azureuser@vmdk1:~$ sudo docker ps
CONTAINER ID   IMAGE     COMMAND                  CREATED         STATUS         PORTS                                   NAMES
fc8499dc09e7   nginx     "/docker-entrypoint.…"   5 minutes ago   Up 5 minutes   0.0.0.0:8081->80/tcp, :::8081->80/tcp   sleepy_thompson
azureuser@vmdk1:~$
```

8) **sudo docker exec –** go inside running container

9) JNI TOOLS – Anything LLM



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