Q & A

Ansible FAQ (1)

- **Question: Timeout at the "Wait for connection" step**

  … I have not been able to get past the playbook step of checking that the instances are created (Role directory "openstack-instance:, step name "Wait for connection"). …

- **Cause:**

Only private IP addresses are assigned to instances, which are not accessible from the Internet

- **Solution:**

Connect to University of Melbourne Student VPN

Ansible FAQ (2)

- **Question:**

  I am trying to run ansible script to create an instance and it keeps failing with "failed: [localhost] (item={'name': 'demo-2-adv', 'volumes': ['demo-vol-2-1-adv', 'demo-vol-2-2-adv']}) => {"ansible_loop_var": "item", "changed": false, "extra_data": null, "item": {"name": "demo-2-adv", "volumes": ["demo-vol-2-1-adv", "demo-vol-2-2-adv"]}, "msg": "BadRequestException: 400: Client Error for url: https://nova.rc.nectar.org.au:8774/v2.1/f2aba5e6fc964fc18cb2078f3de2da8e/os-volumes_boot, Invalid key_name provided."}"

- **Cause:**

You need to update the playbook to match your settings

- **Solution:**

Update the "key_name" variable to the key pair you have on MRC

Ansible FAQ (3)

- **Problem:**

```
TASK [openstack-common : Install openstacksdk] **************************************************************************************************************************************
changed: [localhost]
TASK [openstack-images : Retrieve all available Openstack images] *********************************************************************************************
fatal: [localhost]: FAILED! => {"changed": false, "msg": "openstacksdk is required for this module"}
```

- **Debug: Run playbook in verbose mode**

```
. ./openrc.sh; ansible-playbook -vvv <playbook>
```

Ansible FAQ (3)

- **Debug:**

```
The full traceback is:
WARNING: The below traceback may *not* be related to the actual failure.
File
"/tmp/ansible_os_image_info_payload_qlzzWJ/ansible_os_image_info_payloa
d.zip/ansible/module_utils/openstack.py", line 116, in
openstack_cloud_from_module
sdk = importlib.import_module('openstack')
File "/usr/lib/python2.7/importlib/__init__.py", line 37, in import_module
…
from openstack import utils
File "/usr/local/lib/python2.7/dist-packages/openstack/utils.py", line 13, in
<module>
import queue
fatal: [localhost]: FAILED! => {
"changed": false,
…
```

Ansible FAQ (3)

- **Cause:**

  OpenStackSDK dropped Python 2 support since version 0.40.0

  https://pypi.org/project/openstacksdk/#history

- **Solution:**
  - *Use Python 3*
  - *Install a version of OpenStackSDK that supports Python 2*

- **Debugging:**
  - *Turn on verbose mode (when possible)*
  - *Google the error message*
  - *Check on Github and StackOverflow for solution*

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Ansible FAQ (4)

- **Question:**

  I've tried to add a Proxy configuration … I can use apt to update, but still can not connect to the docker repository

- **Cause:**

  Docker daemon is behind HTTP/HTTPS proxy

- **Solution:**
  - *Create a systemd drop-in directory **/etc/systemd/system/docker.service.d** for the docker service*
  - *Create a file called **/etc/systemd/system/docker.service.d/http-proxy.conf** that adds the **HTTP_PROXY**, **HTTPS_PROXY** and **NO_PROXY** environment variables*
  - *Flush the changes and restart the Docker service*

Ansible FAQ (4)

- **Ansible Solution:**
  - *Create a file called http-proxy.conf that contains*

```
[Service]
Environment="HTTP_PROXY=http://wwwproxy.unimelb.edu.au:8000/”
Environment="HTTPS_PROXY=http://wwwproxy.unimelb.edu.au:8000/”
Environment="NO_PROXY=localhost,127.0.0.1,localaddress,172.16.0.0/12,.melbourne.rc.nectar.org.au,.storage.unimelb.edu.au,.cloud.unimelb.edu.au"
```

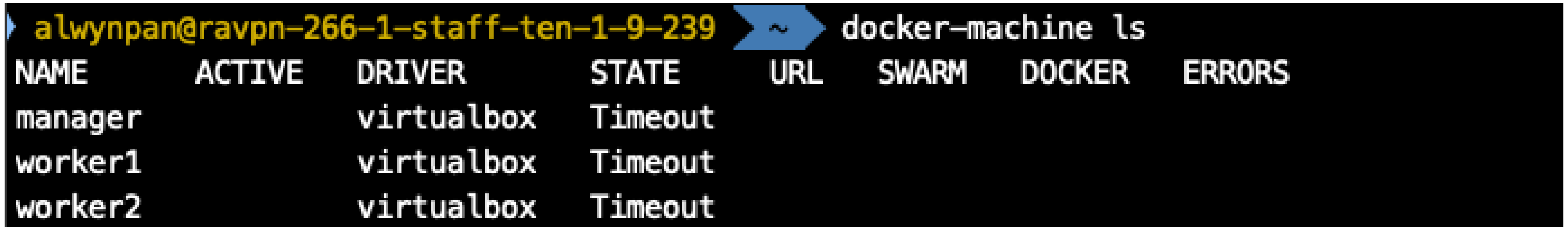
  - *file module: Create directory* ***/etc/systemd/system/docker.service.d***
  - *copy module: Copy the http-proxy.conf to* ***/etc/systemd/system/docker.service.d/***
  - *systemd module: Flush the changes and restart the Docker service*

```
$ sudo systemctl daemon-reload && sudo systemctl restart docker
```

Docker FAQ & Tips (1)

- **Problem:**

  docker-machine ls *showing the machine state is "Timeout"*



```
alwynpan@ravpn-266-1-staff-ten-1-9-239  ~  docker-machine ls
NAME      ACTIVE   DRIVER       STATE     URL   SWARM   DOCKER   ERRORS
manager            virtualbox   Timeout
worker1            virtualbox   Timeout
worker2            virtualbox   Timeout
```

- **Cause:**

  VPN / Antivirus / Internet Security is on

- **Debugging:**

  Turn off VPN / Antivirus / Internet Security

Docker FAQ & Tips (2)

- **Problem:**

  Dockerised application is running slow

  Docker commands suddenly stopped working, no error message was given

  Docker build failed halfway with no error message

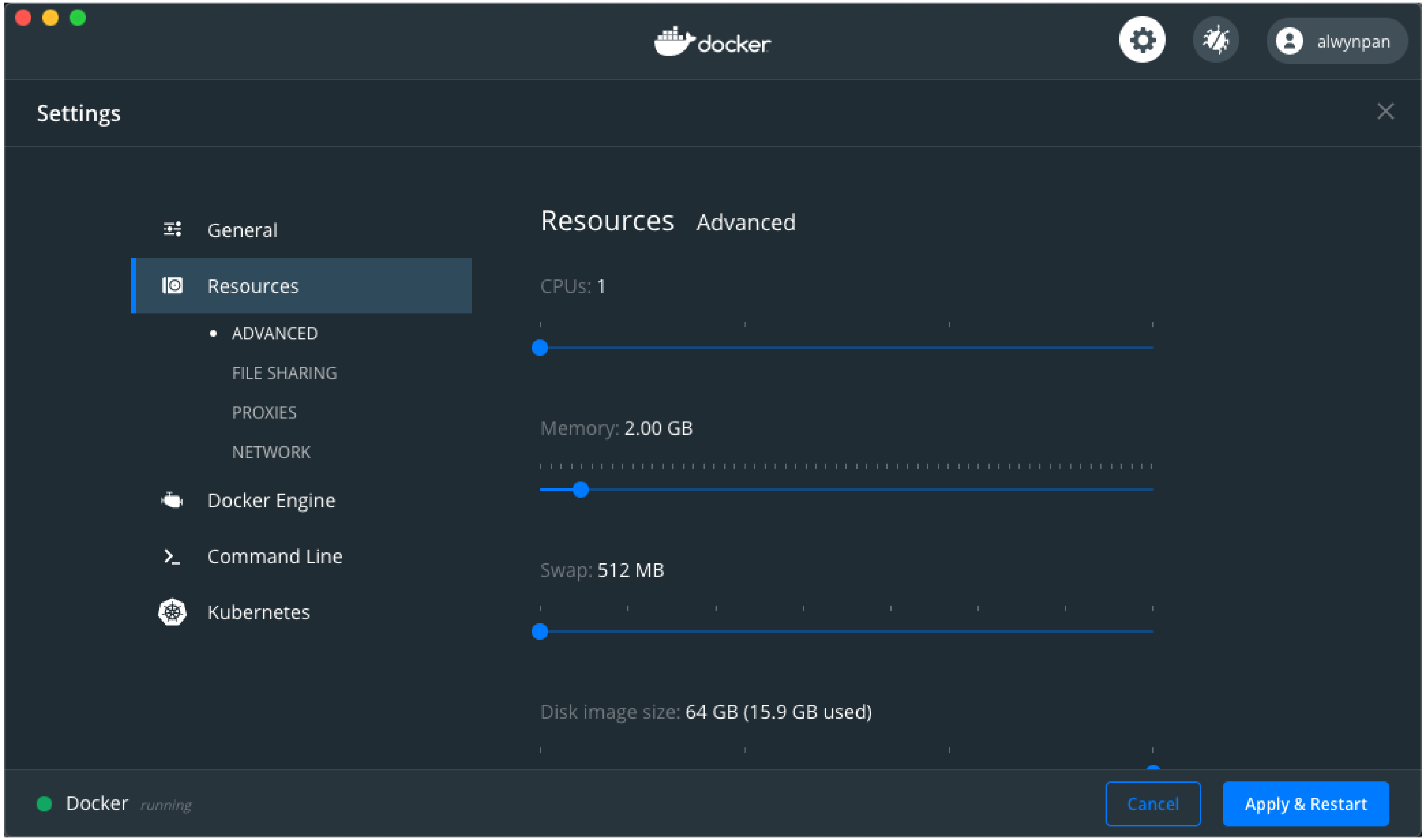
- **Cause:**

  Not enough resources were allocated to Docker

- **Solution:**

  Check Docker … Preferences … Resources … Advanced, and make sure reasonable resource was allocated to Docker.

Docker FAQ & Tips (2)



CPUs: 1

Memory: 2.00 GB

Swap: 512 MB

Disk image size: 64 GB (15.9 GB used)

Docker running

Docker FAQ & Tips (3)

- **Question: The difference between COPY and ADD in a Docker file**

```
FROM alpine:latest

WORKDIR /demo

RUN mkdir -p copy add1 add2

COPY ["release-1.18.0.tar.gz", "./copy/"]

ADD ["release-1.18.0.tar.gz", "./add1/"]

ADD ["https://github.com/nginx/nginx/archive/release-1.18.0.tar.gz", "./add2/"]
```

Docker FAQ & Tips (3)

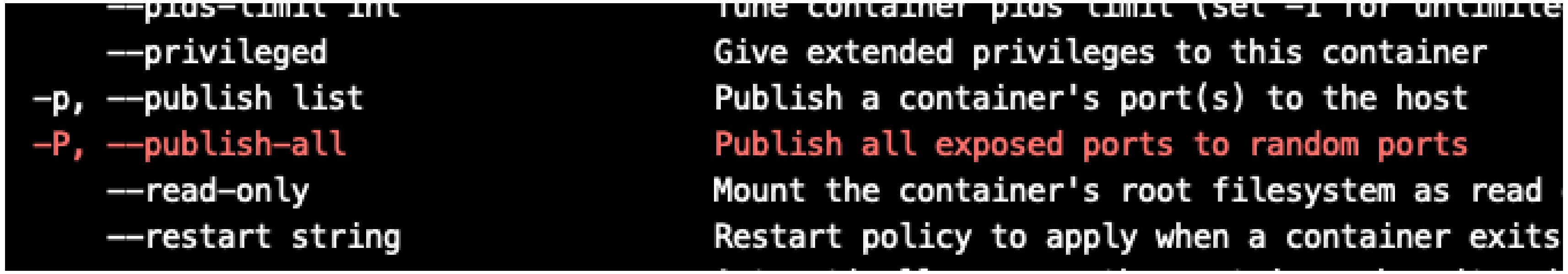
- **Use cases:**
  - **COPY**

    Copy local files from a specific location into a Docker image

  - **ADD**
    - Extract a local ***tar*** file into a specific directory into a Docker image
    - Download a file ***as is*** from an URI into a Docker image

Docker FAQ & Tips (4)

- **Question: The difference between EXPOSE and publish ports**



```
      --pids-limit int              Tune container pids limit (set -1 for unlimite
      --privileged                  Give extended privileges to this container
  -p, --publish list                Publish a container's port(s) to the host
  -P, --publish-all                 Publish all exposed ports to random ports
      --read-only                   Mount the container's root filesystem as read
      --restart string              Restart policy to apply when a container exits
```

```
FROM nginx:latest

EXPOSE 8080
```

____

```
$ docker run --name test1 -p 180:80 -d nginx-test:latest

$ docker run --name test2 -P -d nginx-test:latest

$ docker run --name test3 -P -d nginx:latest
```

Docker FAQ & Tips (4)

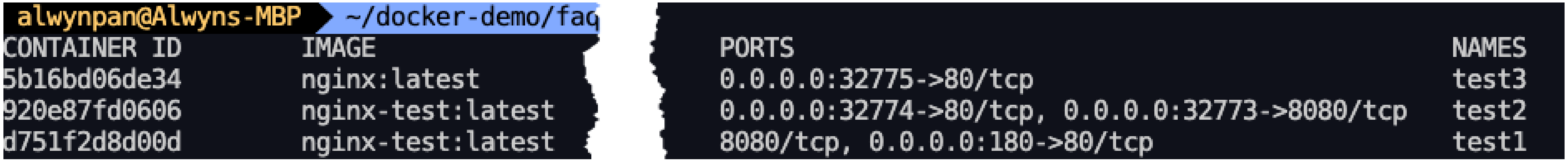
- **EXPOSE**

Tells Docker daemon and user which port(s) your service listens on

- **Publish**

Publishes the port (no matter exposed or not) to the host

- **Nginx:latest image Dockerfile**



```
alwynpan@Alwyns-MBP  ~/docker-demo/faq
CONTAINER ID        IMAGE                        PORTS                                              NAMES
5b16bd06de34        nginx:latest                 0.0.0.0:32775->80/tcp                              test3
920e87fd0606        nginx-test:latest            0.0.0.0:32774->80/tcp, 0.0.0.0:32773->8080/tcp     test2
d751f2d8d00d        nginx-test:latest            8080/tcp, 0.0.0.0:180->80/tcp                      test1
```

Docker FAQ & Tips (5)

- **Question: The difference between Build Time ENV and Run Time ENV**

```
FROM python:latest

ARG OPENSTACKSDK_VER=0.46.0
ENV REQUESTS_VER=2.18.0

COPY [ "entrypoint.sh", "/" ]

RUN pip install openstacksdk==${OPENSTACKSDK_VER}; \
        chmod +x /entrypoint.sh

ENTRYPOINT [ "/entrypoint.sh" ]
```

Docker FAQ & Tips (5)

- **Question: The difference between Build Time ENV and Run Time ENV**

```
FROM python:latest

ARG OPENSTACKSDK_VER=0.46.0
ENV OPENSTACKSDK_VER=${OPENSTACKSDK_VER}
ENV REQUESTS_VER=2.18.0

COPY [ "entrypoint2.sh", "/" ]

RUN pip install openstacksdk==${OPENSTACKSDK_VER}; \
      chmod +x /entrypoint2.sh

ENTRYPOINT [ "/entrypoint2.sh"  ]
```

Docker FAQ & Tips (4)

- **Built Time Variable (build arg)**

Variables defined in the Dockerfile, and works at build time only.

Use ”docker build --build-arg KEY=VALUE” to init or override

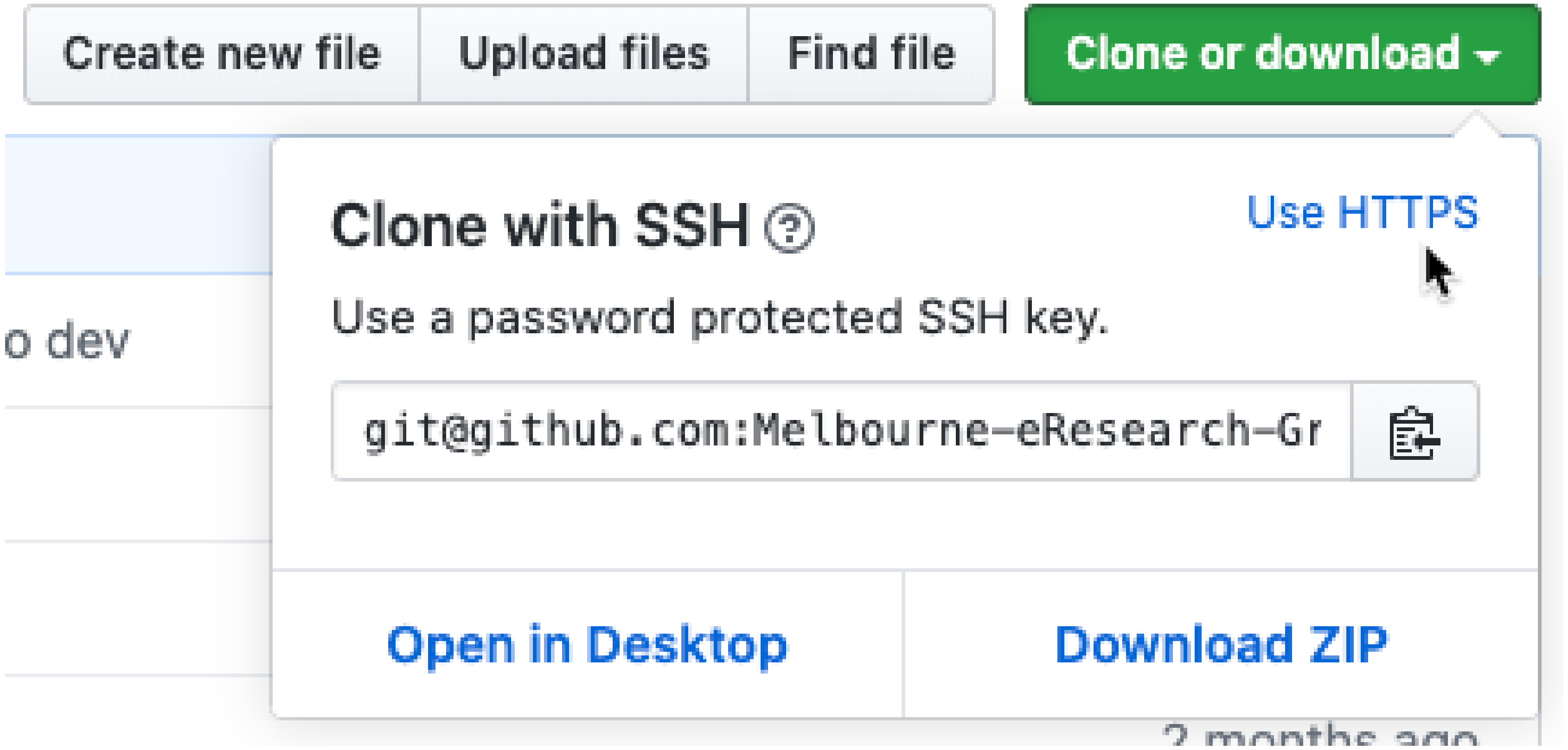
- **Run Time Variable**

Variables defined in Dockerfile / Entrypoint / application, and works at run time only.

Use “docker run -e KEY=VALUE …” to init or override

A New Question

- **Question: How to clone a GitHub repo behind the HTTP/HTTPS proxy?**



Clone with SSH

Use a password protected SSH key.

```
git@github.com:Melbourne-eResearch-Gr
```

A New Question

- **Question: How to clone a GitHub repo behind the HTTP/HTTPS proxy?**

- **Clone via HTTPS (use username / password)**

  git clone https://github.com/<username>/<repo>.git

- **Clone via SSH (use private / public key)**

  git clone git@github.com:<username>/<repo>.git

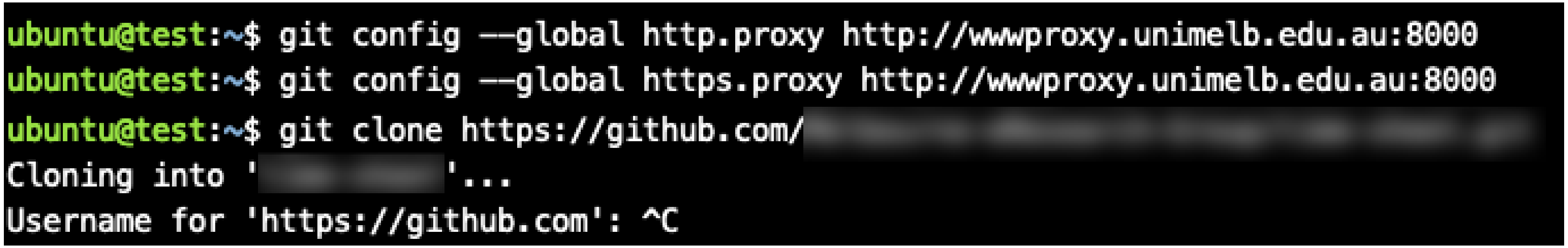
Adding a new SSH key to your GitHub account

A New Question

- **HTTPS option (command line):**

  git config --global http.proxy http://wwwproxy.unimelb.edu.au:8000

  git config --global https.proxy http://wwwproxy.unimelb.edu.au:8000



```
ubuntu@test:~$ git config --global http.proxy http://wwwproxy.unimelb.edu.au:8000
ubuntu@test:~$ git config --global https.proxy http://wwwproxy.unimelb.edu.au:8000
ubuntu@test:~$ git clone https://github.com/[redacted]
Cloning into '[redacted]'...
Username for 'https://github.com': ^C
```

- **HTTPS option (Ansible):**

  git_config module

A New Question

- **SSH option (command line):**

  sudo apt install socat vim

  vim ~/.ssh/config

```
host github.com
    user git
    hostname ssh.github.com
    port 443
    proxycommand socat - PROXY:wwwproxy.unimelb.edu.au:%h:%p,proxyport=8000
```

- **HTTPS option (Ansible):**

  copy module or blockinfile module

Docker Demo 5

- **Rolling update:**

```
docker service update --update-parallelism 1 --update-delay 5s \
                        --image=alwynpan/comp90024:demo1 nginx
```

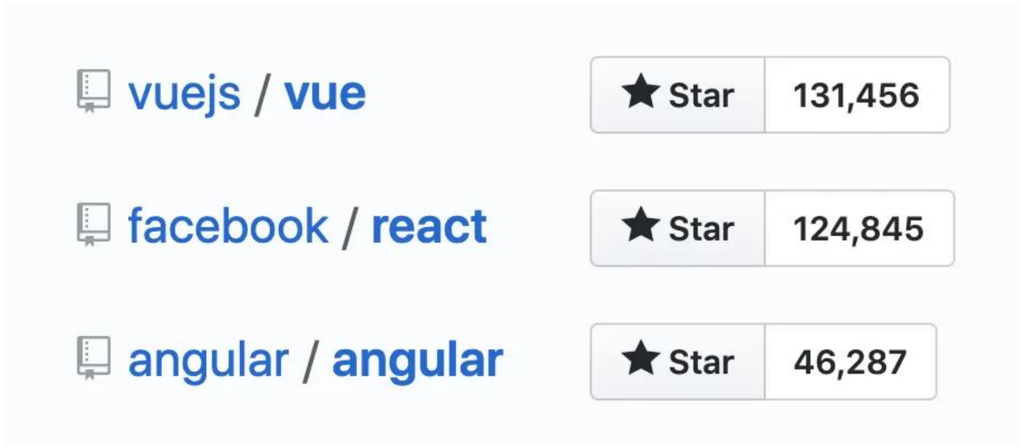
- **Rollback:**

```
docker service update --rollback nginx
```

Docker Demo 6

- [Create React App]()

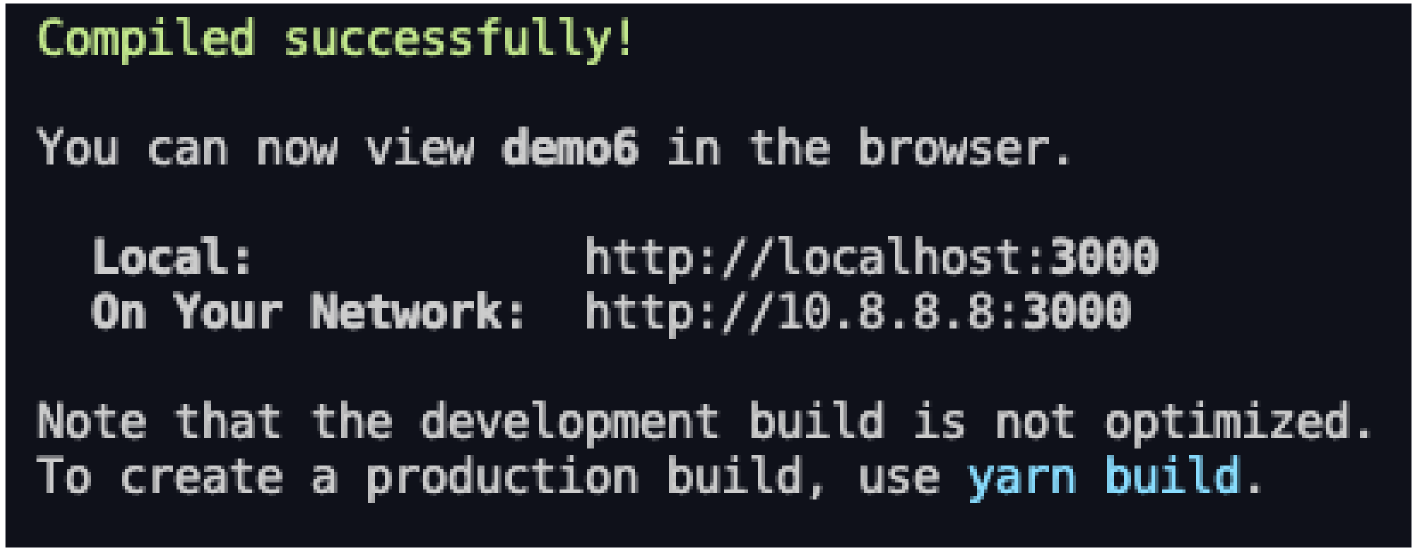
npx create-react-app demo6



vuejs / vue	★ Star 131,456
facebook / react	★ Star 124,845
angular / angular	★ Star 46,287

- **Run the app:**

yarn start



```
Compiled successfully!

You can now view demo6 in the browser.

  Local:            http://localhost:3000
  On Your Network:  http://10.8.8.8:3000

Note that the development build is not optimized.
To create a production build, use yarn build.
```

Docker Demo 6

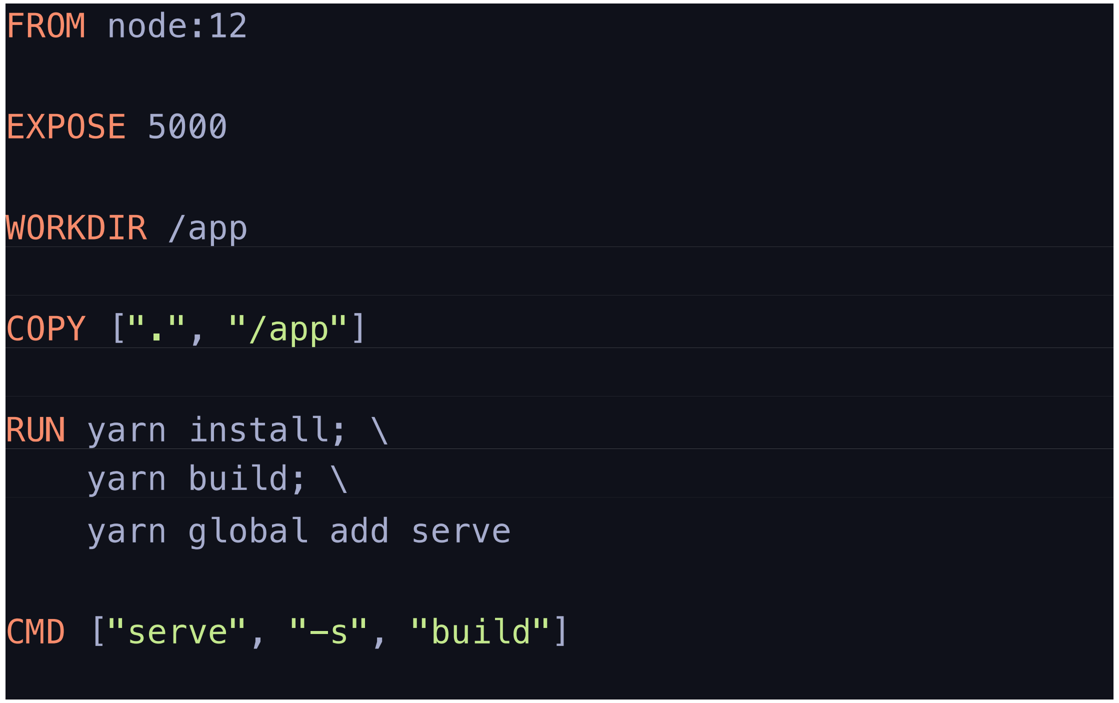
- **.dockerignore**

Before the docker CLI sends the context to the docker daemon, it looks for a file named .dockerignore in the root directory of the context. If this file exists, the CLI modifies the context to exclude files and directories that match patterns in it. This helps to avoid unnecessarily sending large or sensitive files and directories to the daemon and potentially adding them to images using ***ADD*** or ***COPY***.

Reference: https://docs.docker.com/engine/reference/builder/#dockerignore-file

Docker Demo 6

- **React UI (simple)**



```
FROM node:12

EXPOSE 5000

WORKDIR /app

COPY [".", "/app"]

RUN yarn install; \
    yarn build; \
    yarn global add serve

CMD ["serve", "-s", "build"]
```

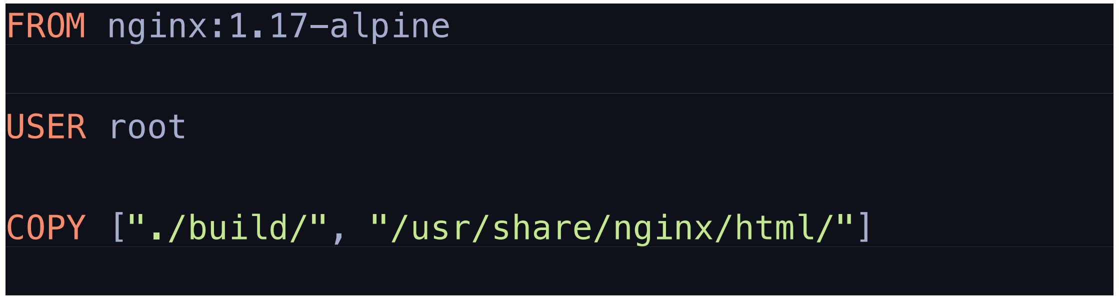
Build: *docker build -t react:simple .*

Run: *docker run --name simple -p 5000:5000 -d react:simple*

Docker Demo 6

- **Challenge – image size, the smaller the better**
- **React UI – reduced size**

Pre-build: *yarn build*



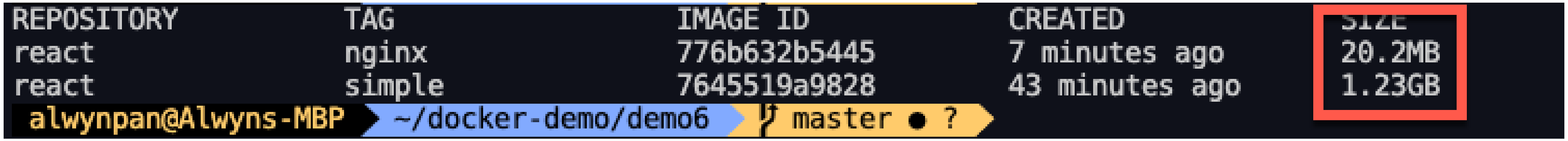
```
FROM nginx:1.17-alpine

USER root

COPY ["./build/", "/usr/share/nginx/html/"]
```

Build: *docker build -t react:nginx -f Dockerfile.nginx .*

Run: *docker run --name small -p 8080:80 -d react:nginx*

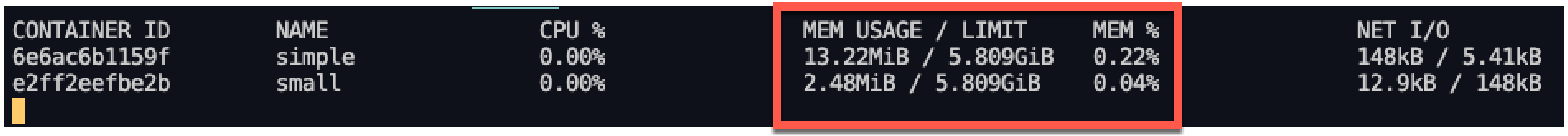
Docker Demo 6

- **Node vs Nginx (image size)**



```
REPOSITORY          TAG                 IMAGE ID            CREATED             SIZE
react               nginx               776b632b5445        7 minutes ago       20.2MB
react               simple              7645519a9828        43 minutes ago      1.23GB
 alwynpan@Alwyns-MBP  ~/docker-demo/demo6   master ● ?
```

- **Node vs Nginx (resource usage)**



```
CONTAINER ID        NAME                CPU %               MEM USAGE / LIMIT     MEM %               NET I/O
6e6ac6b1159f        simple              0.00%               13.22MiB / 5.809GiB   0.22%               148kB / 5.41kB
e2ff2eefbe2b        small               0.00%               2.48MiB / 5.809GiB    0.04%               12.9kB / 148kB
```

Docker Demo 6

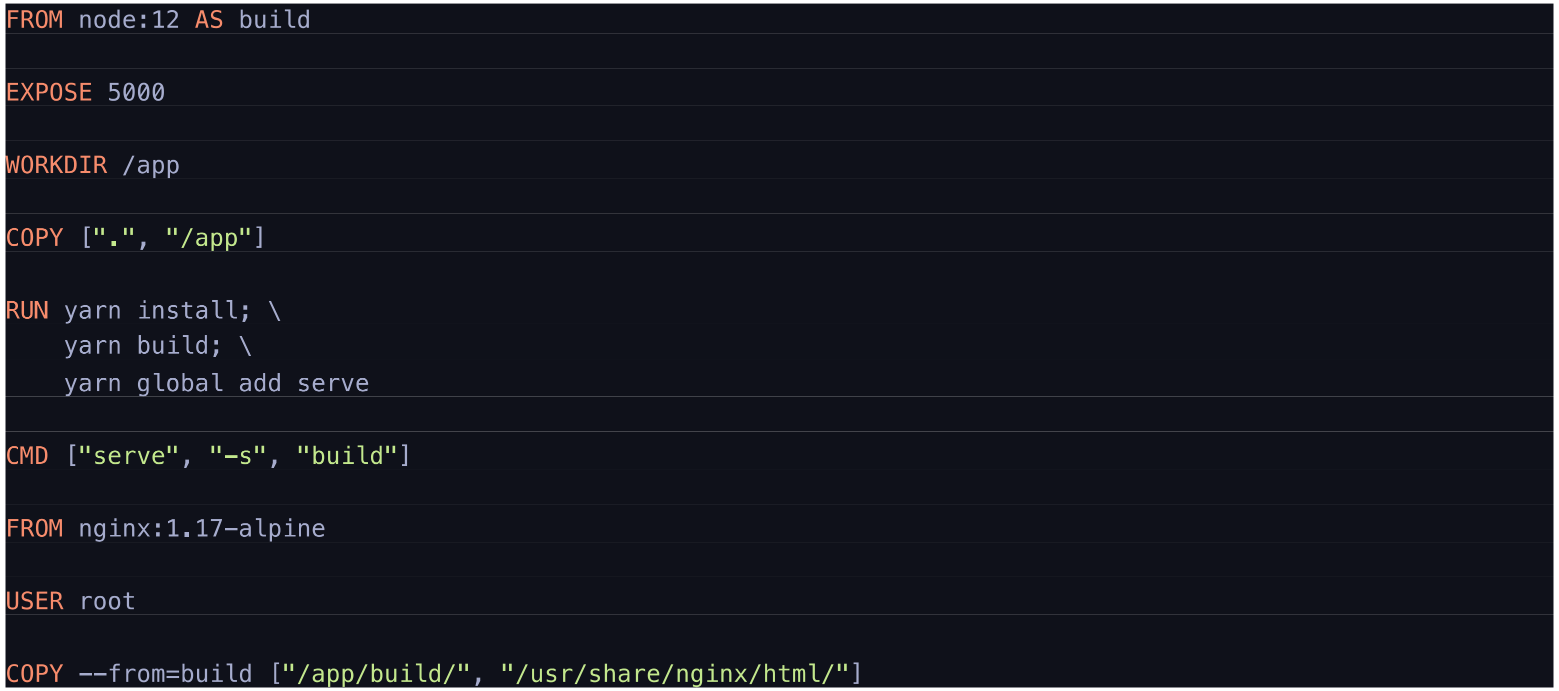
- **Multi-stage build**

With multi-stage builds, you use multiple ***FROM*** statements in your Dockerfile. Each ***FROM*** instruction can use a different base, and each of them begins a new stage of the build. You can selectively copy artifacts from one stage to another, leaving behind everything you don’t want in the final image.

Reference: https://docs.docker.com/develop/develop-images/multistage-build/#use-multi-stage-builds

Docker Demo 6

- **React UI (multi-stage)**



```
FROM node:12 AS build

EXPOSE 5000

WORKDIR /app

COPY [".", "/app"]

RUN yarn install; \
    yarn build; \
    yarn global add serve

CMD ["serve", "-s", "build"]

FROM nginx:1.17-alpine

USER root

COPY --from=build ["/app/build/", "/usr/share/nginx/html/"]
```

Build: *docker build -t react:multi -f Dockerfile.multi-stage .*

Run: *docker run --name multi -p 8081:80 -d react:multi*

Docker Demo 6

- **React UI (multi-stage) –Build only one stage**

Build: *docker build --target build -t react:build -f Dockerfile.multi-stage .*

Run: *docker run --name build -p 5001:5000 -d react:build*