

Multi stage docker build

When we create a new image it creates a large image or occupies a big size.

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 artefacts from one stage to another, leaving behind everything you don't want in the final image.

Example:

1

```
FROM alpine/git:2.36.3 as build-stage1

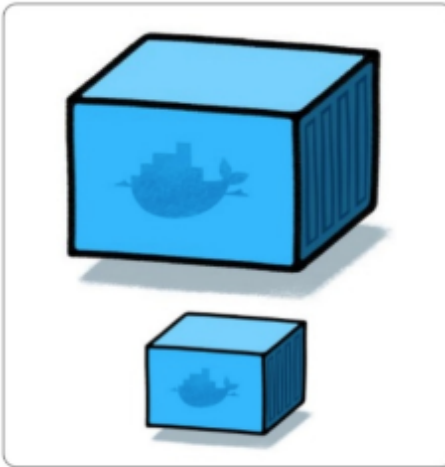
# RUN apt-get update
# RUN apt-get install -y git
# RUN apt-get install -y nginx
ARG SSHPRIVATEKEY

RUN mkdir /root/.ssh/
RUN echo "${SSHPRIVATEKEY}" > /root/.ssh/id_rsa
RUN chmod 400 ~/.ssh/id_rsa
RUN touch /root/.ssh/known_hosts
RUN ssh-keyscan -t rsa github.com
WORKDIR /MYAPP
```

2

```
RUN git clone git@github.com:kavya1234567890:MYAPP

FROM nginx:1.24.0-alpine-slim as final-stage
COPY --from=build-stage1 /MYAPP/.
```



We have only a minimal part of the image so it occupies less memory. So the main use of multistage docker is to decrease the size of images.

Practical Exercise for multi stage docker build

Dockerfile with one stage only.

```
FROM ubuntu:22.04
# as build-stage

RUN apt-get update
RUN apt-get install -y git
RUN apt-get install -y nginx
ARG SSHPRIVATEKEY

RUN mkdir /root/.ssh/
RUN echo "${SSHPRIVATEKEY}" > /root/.ssh/id_rsa
RUN chmod 400 ~/.ssh/id_rsa
RUN touch /root/.ssh/known_hosts
RUN ssh-keyscan -t rsa github.com >> ~/.ssh/known_hosts

WORKDIR /MYAPP

RUN git clone git@github.com:kavyakavathiya/simple_html.git

# FROM nginx:1.24.0-alpine-slim as run
# COPY --from=build-stage /MYAPP/simple_html/index.html /usr/share/nginx/html

RUN cp /MYAPP/simple_html/index.html /var/www/html

CMD [ "nginx", "-g", "daemon off;" ]
```

Git_clone_nginx:v1 image size is 247MB

```
kavya@sf-cpu-009:~/docker-all/image-exercise/git-clone-nginx$ docker images
REPOSITORY          TAG             IMAGE ID        CREATED         SIZE
git_clone_nginx     v1             f8e2d102d63a   53 seconds ago  247MB
kavya@sf-cpu-009:~/docker-all/image-exercise/git-clone-nginx$
```

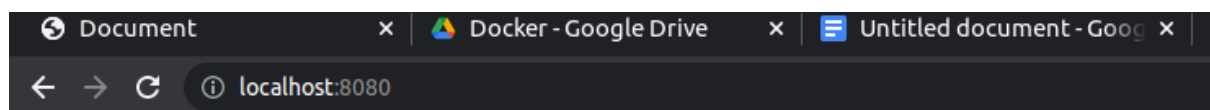
History of images.

```
avya@sf-cpu-009:~/docker-all/image-exercise/git-clone-nginx$ docker image history git_clone_nginx:v1
IMAGE          CREATED          CREATED BY                                      SIZE      COMMENT
8e2d102d63a    2 minutes ago   CMD ["nginx" "-g" "daemon off;"]              0B        buildkit.dockerfile.v
missing>       2 minutes ago   RUN |1 SSHPRIVATEKEY=-----BEGIN OPENSSH PRIV... 375B      buildkit.dockerfile.v
missing>       2 minutes ago   RUN |1 SSHPRIVATEKEY=-----BEGIN OPENSSH PRIV... 31.9kB    buildkit.dockerfile.v
missing>       3 minutes ago   WORKDIR /MYAPP                                  0B        buildkit.dockerfile.v
missing>       3 minutes ago   RUN |1 SSHPRIVATEKEY=-----BEGIN OPENSSH PRIV... 564B      buildkit.dockerfile.v
missing>       3 minutes ago   RUN |1 SSHPRIVATEKEY=-----BEGIN OPENSSH PRIV... 0B        buildkit.dockerfile.v
missing>       3 minutes ago   RUN |1 SSHPRIVATEKEY=-----BEGIN OPENSSH PRIV... 2.6kB     buildkit.dockerfile.v
missing>       3 minutes ago   RUN |1 SSHPRIVATEKEY=-----BEGIN OPENSSH PRIV... 2.6kB     buildkit.dockerfile.v
missing>       3 minutes ago   RUN |1 SSHPRIVATEKEY=-----BEGIN OPENSSH PRIV... 0B        buildkit.dockerfile.v
missing>       3 minutes ago   ARG SSHPRIVATEKEY                                0B        buildkit.dockerfile.v
missing>       3 minutes ago   RUN /bin/sh -c apt-get install -y nginx # bu... 51.5MB    buildkit.dockerfile.v
missing>       3 minutes ago   RUN /bin/sh -c apt-get install -y git # buil... 75.2MB    buildkit.dockerfile.v
missing>       3 minutes ago   RUN /bin/sh -c apt-get update # buildkit       42.8MB    buildkit.dockerfile.v
missing>       5 weeks ago    /bin/sh -c #(nop) CMD ["/bin/bash"]            0B        buildkit.dockerfile.v
missing>       5 weeks ago    /bin/sh -c #(nop) ADD file:c8ef6447752cab254... 77.8MB    buildkit.dockerfile.v
missing>       5 weeks ago    /bin/sh -c #(nop) LABEL org.opencontainers.... 0B        buildkit.dockerfile.v
missing>       5 weeks ago    /bin/sh -c #(nop) LABEL org.opencontainers.... 0B        buildkit.dockerfile.v
missing>       5 weeks ago    /bin/sh -c #(nop) ARG LAUNCHPAD_BUILD_ARCH      0B        buildkit.dockerfile.v
missing>       5 weeks ago    /bin/sh -c #(nop) ARG RELEASE                   0B        buildkit.dockerfile.v
avya@sf-cpu-009:~/docker-all/image-exercise/git-clone-nginx$
```

Run container

```
kavya@sf-cpu-009:~/docker-all/image-exercise/git-clone-nginx$ docker ps
CONTAINER ID   IMAGE          COMMAND                  CREATED
ef3442298836   git_clone_nginx:v2   "/docker-entrypoint...."   59 seconds ago
d9ff95b93ff3   git_clone_nginx:v1   "nginx -g 'daemon of..." 13 minutes ago
kavya@sf-cpu-009:~/docker-all/image-exercise/git-clone-nginx$
```

```
$ docker ps
CONTAINER ID   STATUS          PORTS
ef3442298836   Up 58 seconds   0.0.0.0:8088->80/tcp, :::8088->80/tcp   git_clone_nginx:v2
d9ff95b93ff3   Up 13 minutes   0.0.0.0:8080->80/tcp, :::8080->80/tcp   git_clone_nginx:v1
$
```



Welcome

Hello This is my Html file from private repository.

With multi stage

```
Dockerfile > ...
1 FROM alpine/git:2.36.3 as build-stage1
2
3 # RUN apt-get update
4 # RUN apt-get install -y git
5 # RUN apt-get install -y nginx
6 ARG SSHPRIVATEKEY
7
8 RUN mkdir /root/.ssh/
9 RUN echo "${SSHPRIVATEKEY}" > /root/.ssh/id_rsa
10 RUN chmod 400 ~/.ssh/id_rsa
11 RUN touch /root/.ssh/known_hosts
12 RUN ssh-keyscan -t rsa github.com >> ~/.ssh/known_hosts
13 WORKDIR /MYAPP
14
15 RUN git clone git@github.com:kavyakavathiya/simple_html.git
16
17 FROM nginx:1.24.0-alpine-slim as run
18 COPY --from=build-stage1 /MYAPP/simple_html/index.html /usr/share/nginx/html
19
20 # RUN cp /MYAPP/simple_html/index.html /var/www/nginx/html
21
22 # CMD [ "nginx", "-g", "daemon off;" ]
```

Git_clone:latest image size is 142MB

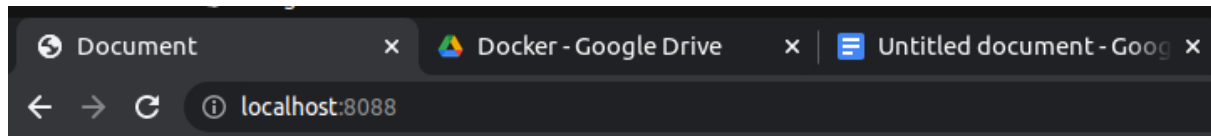
```
kavya@sf-cpu-009:~/docker-all/image-exercise/git-clone-nginx$ docker images
REPOSITORY          TAG          IMAGE ID          CREATED          SIZE
git_clone_nginx     v2          e358fa70a4bf     55 seconds ago  11.5MB
git_clone_nginx     v1          f8e2d102d63a     19 minutes ago  247MB
kavya@sf-cpu-009:~/docker-all/image-exercise/git-clone-nginx$
```

History of image using history command. (it removes unnecessary images).

```
git_clone_nginx v1 f8e2d102d63a 19 minutes ago 247MB
kavya@sf-cpu-009:~/docker-all/image-exercise/git-clone-nginx$ docker image history git_clone_nginx:v2
IMAGE          CREATED          CREATED BY          SIZE      COMMENT
e358fa70a4bf   14 minutes ago  COPY /MYAPP/simple_html/index.html /usr/shar... 347B      buildkit.docke
<missing>      12 hours ago   /bin/sh -c #(nop)  CMD ["nginx" "-g" "daemon... 0B
<missing>      12 hours ago   /bin/sh -c #(nop)  STOPSIGNAL SIGQUIT 0B
<missing>      12 hours ago   /bin/sh -c #(nop)  EXPOSE 80 0B
<missing>      12 hours ago   /bin/sh -c #(nop)  ENTRYPOINT ["/docker-entr... 0B
<missing>      12 hours ago   /bin/sh -c #(nop)  COPY file:e57eef017a414ca7... 4.62kB
<missing>      12 hours ago   /bin/sh -c #(nop)  COPY file:abbcbf84dc17ee44... 1.27kB
<missing>      12 hours ago   /bin/sh -c #(nop)  COPY file:5c18272734349488... 2.12kB
<missing>      12 hours ago   /bin/sh -c #(nop)  COPY file:7b307b62e82255f0... 1.62kB
<missing>      12 hours ago   /bin/sh -c set -x   && addgroup -g 101 -S ... 4.45MB
<missing>      12 hours ago   /bin/sh -c #(nop)  ENV PKG_RELEASE=1 0B
<missing>      12 hours ago   /bin/sh -c #(nop)  ENV NGINX_VERSION=1.24.0 0B
<missing>      13 days ago    /bin/sh -c #(nop)  LABEL maintainer=NGINX Do... 0B
<missing>      13 days ago    /bin/sh -c #(nop)  CMD ["/bin/sh"] 0B
<missing>      13 days ago    /bin/sh -c #(nop)  ADD file:9a4f77dfaba7fd2aa... 7.05MB
```

Run container

```
git-clone-nginx$ docker run -d -p 8088:80 --name git_clone_nginx_container_ssh2 git_clone_nginx:v2  
5ea72e629552d0a8066  
git-clone-nginx$ docker images
```



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