

# Experiment 6

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## Aim:

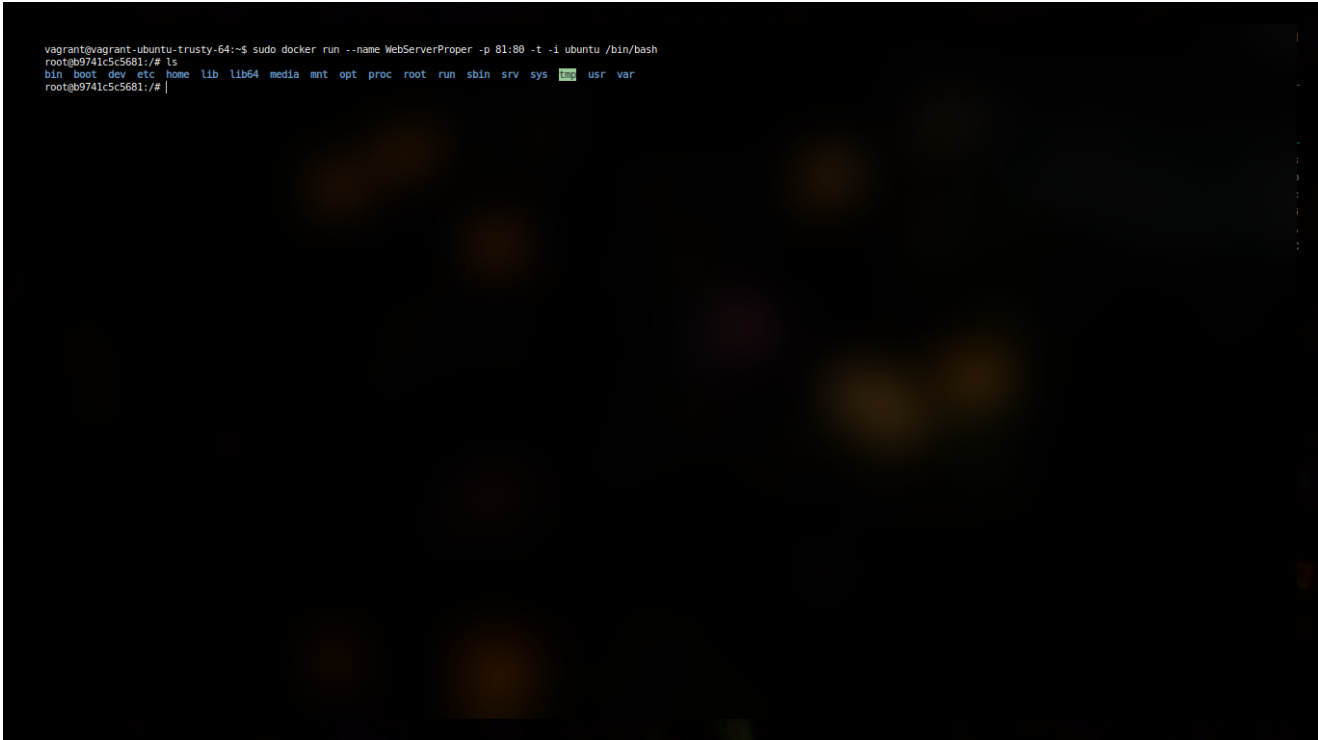
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To containerize Apache in docker

- a) using commandline
- b) Using DOCKERFILE

## Containerization using Command line

```
sudo docker run --name WebServerProper -p 81:80 -t -i ubuntu /bin/bash
```



```
vagrant@vagrant-ubuntu-trusty-64:~$ sudo docker run --name WebServerProper -p 81:80 -t -i ubuntu /bin/bash
root@9741c5c5681:/# ls
bin boot dev etc home lib lib64 media mnt opt proc root run sbin srv sys usr var
root@9741c5c5681:/#
```

Once inside the prompt,

```
apt update && apt install apache2
```

```

root@44ff0710c84a:/# sudo apt install apache2
bash: sudo: command not found
root@44ff0710c84a:/# apt install apache2
Reading package lists... Done
Building dependency tree
Reading state information... Done
E: Unable to locate package apache2
root@44ff0710c84a:/# apt update
Get:1 http://archive.ubuntu.com/ubuntu bionic InRelease [242 kB]
Get:2 http://security.ubuntu.com/ubuntu bionic-security InRelease [88.7 kB]
Get:3 http://archive.ubuntu.com/ubuntu bionic-updates InRelease [88.7 kB]
Get:4 http://archive.ubuntu.com/ubuntu bionic-backports InRelease [74.6 kB]
Get:5 http://archive.ubuntu.com/ubuntu bionic/main amd64 Packages [1344 kB]
Get:6 http://security.ubuntu.com/ubuntu bionic-security/restricted amd64 Packages [44.6 kB]
Get:7 http://security.ubuntu.com/ubuntu bionic-security/main amd64 Packages [889 kB]
Get:8 http://archive.ubuntu.com/ubuntu bionic/restricted amd64 Packages [13.5 kB]
Get:9 http://security.ubuntu.com/ubuntu bionic-security/multiverse amd64 Packages [8213 B]
Get:10 http://archive.ubuntu.com/ubuntu bionic/universe amd64 Packages [11.3 MB]
Get:11 http://security.ubuntu.com/ubuntu bionic-security/universe amd64 Packages [839 kB]
Get:12 http://archive.ubuntu.com/ubuntu bionic/multiverse amd64 Packages [186 kB]
Get:13 http://archive.ubuntu.com/ubuntu bionic-updates/multiverse amd64 Packages [12.6 kB]
Get:14 http://archive.ubuntu.com/ubuntu bionic-updates/main amd64 Packages [1183 kB]
Get:15 http://archive.ubuntu.com/ubuntu bionic-updates/universe amd64 Packages [1372 kB]
Get:16 http://archive.ubuntu.com/ubuntu bionic-updates/restricted amd64 Packages [59.0 kB]
Get:17 http://archive.ubuntu.com/ubuntu bionic-backports/main amd64 Packages [2496 B]
Get:18 http://archive.ubuntu.com/ubuntu bionic-backports/universe amd64 Packages [4247 B]
Fetched 17.8 MB in 38s (463 kB/s)
Reading package lists... Done
Building dependency tree
Reading state information... Done
12 packages can be upgraded. Run 'apt list --upgradable' to see them.
root@44ff0710c84a:/# apt install apache2
bash: apt: command not found
root@44ff0710c84a:/# apt install apache2
Reading package lists... Done
Building dependency tree
Reading state information... Done
The following additional packages will be installed:
  apache2-bin apache2-data apache2-utils file libapr1 libaprutil1 libaprutil1-dbd-sqlite3 libaprutil1-ldap libasn1-8-heimdal libexpat1 libgdbm-compat4 libgdbm5 libgssapi3-heimdal libhcrypto4-heimdal
  libheimbase1-heimdal libheimntlm0-heimdal libhvs509-5-heimdal libicu60 libkrb5-26-heimdal libldap-2.4-2 libldap-common liblua5.2-0 libmagic-mgc libmagic1 libnghttp2-14 libperl5.26 libroken18-heimdal libssl2-2
  libtasn1-modules libtasn1-modules-db libsqlite3-0 libssl1.1 libwind0-heimdal libxml2 mime-support netbase openssl perl perl-modules-5.26 ssl-cert xz-utils
Suggested packages:
  www-browser apache2-doc apache2-suexec-pristine | apache2-suexec-custom ufw gdbm-l10n libtasn1-modules-gssapi-mit | libtasn1-modules-gssapi-heimdal libssl2-modules-ldap libssl2-modules-otp
The following NEW packages will be installed:
  libasn1-8-heimdal libexpat1 libgdbm-compat4 libgdbm5 libgssapi3-heimdal libhcrypto4-heimdal
  libheimbase1-heimdal libheimntlm0-heimdal libhvs509-5-heimdal libicu60 libkrb5-26-heimdal libldap-2.4-2 libldap-common liblua5.2-0 libmagic-mgc libmagic1 libnghttp2-14 libperl5.26 libroken18-heimdal libssl2-2
  libtasn1-modules libtasn1-modules-db libsqlite3-0 libssl1.1 libwind0-heimdal libxml2 mime-support netbase openssl perl perl-modules-5.26 ssl-cert xz-utils
0 upgraded, 42 newly installed, 0 to remove and 12 not upgraded.
Need to get 21.0 MB of archives.
After this operation, 99.4 MB of additional disk space will be used.
Do you want to continue? [Y/n] |

```

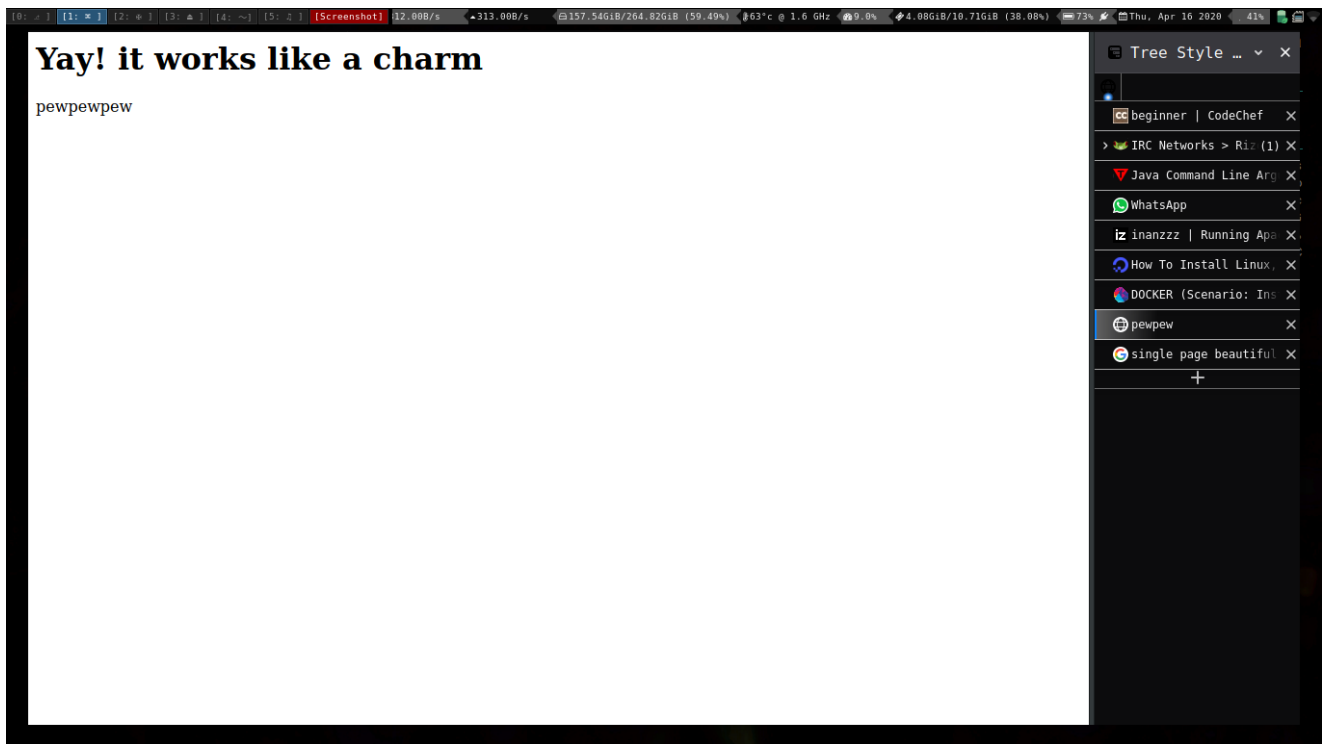
service apache2 start

That will start the apache webserver on docker container

```

Enabling module mpm_event.
Enabling module authz_core.
Enabling module authz_host.
Enabling module authn_core.
Enabling module auth_basic.
Enabling module access_compat.
Enabling module authn_file.
Enabling module authz_user.
Enabling module alias.
Enabling module dir.
Enabling module autoindex.
Enabling module env.
Enabling module mime.
Enabling module negotiation.
Enabling module setenvif.
Enabling module filter.
Enabling module deflate.
Enabling module status.
Enabling module reqtimeout.
Enabling conf charset.
Enabling conf localized-error-pages.
Enabling conf other-vhosts-access-log.
Enabling conf security.
Enabling conf serve-cgi-bin.
Enabling site 000-default.
invoke-rc.d: could not determine current runlevel
invoke-rc.d: policy-rc.d denied execution of start.
Processing triggers for libc-bin (2.27-3ubuntu1) ...
root@b9741c5c5681:/# apache2
[Thu Apr 16 16:42:26.157389 2020] [core:warn] [pid 935] AH00111: Config variable ${APACHE_RUN_DIR} is not defined
apache2: Syntax error on line 80 of /etc/apache2/apache2.conf: DefaultRuntimeDir must be a valid directory, absolute or relative to ServerRoot
root@b9741c5c5681:/# service apache2 start
* Starting Apache httpd web server apache2
AH00558: apache2: Could not reliably determine the server's fully qualified domain name, using 172.17.0.3. Set the 'ServerName' directive globally to suppress this message
*
root@b9741c5c5681:/# cd /var/
root@b9741c5c5681:/var# ls
backups cache lib local lock log mail opt run spool www
root@b9741c5c5681:/var# cd www
root@b9741c5c5681:/var/www# ls
html
root@b9741c5c5681:/var/www/html# cd html
root@b9741c5c5681:/var/www/html# ls
index.html
root@b9741c5c5681:/var/www/html# mv index.html peapew.html
root@b9741c5c5681:/var/www/html# wget -c javascript:void(0);
bash: syntax error near unexpected token `;'
root@b9741c5c5681:/var/www/html# nano index.html
bash: nano: command not found
root@b9741c5c5681:/var/www/html# pico index.html
bash: pico: command not found
root@b9741c5c5681:/var/www/html# |

```



## Containerization using DOCKERFILE

Start with creating a base directory and creating two files

```
mkdir DockerHTTPD && cd DockerHTTPD
```

```

# Write in a file named apache-conf
Mutex file:${APACHE_LOCK_DIR} default
PidFile ${APACHE_PID_FILE}
Timeout 300
KeepAlive On
MaxKeepAliveRequests 100
KeepAliveTimeout 5
User ${APACHE_RUN_USER}
Group ${APACHE_RUN_GROUP}
HostnameLookups Off
ErrorLog ${APACHE_LOG_DIR}/error.log
LogLevel warn
IncludeOptional mods-enabled/*.load
IncludeOptional mods-enabled/*.conf
Include ports.conf

<Directory />
    Options FollowSymLinks
    AllowOverride None
    Require all denied
</Directory>
<Directory /usr/share>
    AllowOverride None
    Require all granted
</Directory>
<Directory /var/www/>
    Options Indexes FollowSymLinks
    AllowOverride All
    Require all granted
</Directory>

AccessFileName .htaccess

<FilesMatch "^\.ht">
    Require all denied
</FilesMatch>

LogFormat "%v:%p %h %l %u %t \"%r\" %>s %O \"%{Referer}i\" \"%{User-Agent}i\"" vhost_combined
LogFormat "%h %l %u %t \"%r\" %>s %O \"%{Referer}i\" \"%{User-Agent}i\""
combined
LogFormat "%h %l %u %t \"%r\" %>s %O" common
LogFormat "%{Referer}i -> %U" referer
LogFormat "%{User-agent}i" agent

IncludeOptional conf-enabled/*.conf
IncludeOptional sites-enabled/*

```

```

FROM ubuntu:16.04

# Apache ENVs
ENV APACHE_RUN_USER www-data
ENV APACHE_RUN_GROUP www-data
ENV APACHE_LOCK_DIR /var/lock/apache2
ENV APACHE_LOG_DIR /var/log/apache2
ENV APACHE_PID_FILE /var/run/apache2/apache2.pid
ENV APACHE_SERVER_NAME localhost

# Install services, packages and do cleanup
RUN apt-get update \
    && apt-get install -y \
        apache2 \
    && rm -rf /var/lib/apt/lists/*

# Copy files
COPY apache-conf /etc/apache2/apache2.conf

# Expose Apache
EXPOSE 80

# Launch Apache
CMD ["/usr/sbin/apache2ctl", "-DFOREGROUND"]

```

```

LogFormat "%(Referer)l -> %U" referer
LogFormat "%(User-agent)l" agent

IncludeOptional conf-enabled/*.conf
IncludeOptional sites-enabled/*

vagrant@vagrant-ubuntu-trusty-64:~/DockerHTTPS$ cat apache-conf | lolcat -p 1000
Mutex file:${APACHE_LOCK_DIR} default
PidFile ${APACHE_PID_FILE}
Timeout 300
KeepAlive On
MaxKeepAliveRequests 100
KeepAliveTimeout 5
User ${APACHE_RUN_USER}
Group ${APACHE_RUN_GROUP}
HostnameLookups Off
ErrorLog ${APACHE_LOG_DIR}/error.log
LogLevel warn
IncludeOptional mods-enabled/*.load
IncludeOptional mods-enabled/*.conf
Include ports.conf

<Directory />
    Options FollowSymLinks
    AllowOverride None
    Require all denied
</Directory>
<Directory /usr/share>
    AllowOverride None
    Require all granted
</Directory>
<Directory /var/www/>
    Options Indexes FollowSymLinks
    AllowOverride All
    Require all granted
</Directory>

AccessFileName .htaccess

<FilesMatch "\.ht">
    Require all denied
</FilesMatch>

LogFormat "%v:%p %h %l %u %t \"%r\" %s %O \"%{Referer}l\" \"%{User-Agent}l\"" vhost_combined
LogFormat "%h %l %u %t \"%r\" %s %O \"%{Referer}l\" \"%{User-Agent}l\"" combined
LogFormat "%h %l %u %t \"%r\" %s %O" common
LogFormat "%(Referer)l -> %U" referer
LogFormat "%(User-agent)l" agent

IncludeOptional conf-enabled/*.conf
IncludeOptional sites-enabled/*

vagrant@vagrant-ubuntu-trusty-64:~/DockerHTTPS$

[0] @:bash*

```

```

vagrant@vagrant-ubuntu-trusty-64:~/DockerHTTPS$ cat DOCKERFILE | lolcat -p 1000
FROM ubuntu:16.04

# Apache ENVs
ENV APACHE_RUN_USER www-data
ENV APACHE_RUN_GROUP www-data
ENV APACHE_LOCK_DIR /var/lock/apache2
ENV APACHE_LOG_DIR /var/log/apache2
ENV APACHE_PID_FILE /var/run/apache2/apache2.pid
ENV APACHE_SERVER_NAME localhost

# Install services, packages and do cleanup
RUN apt-get update \
    && apt-get install -y \
        apache2 \
    && rm -rf /var/lib/apt/lists/*

# Copy files
COPY apache-conf /etc/apache2/apache2.conf

# Expose Apache
EXPOSE 80

# Launch Apache
CMD ["/usr/sbin/apache2ctl", "-DFOREGROUND"]

vagrant@vagrant-ubuntu-trusty-64:~/DockerHTTPS$

```

Build the container using


```
docker build -t webserver_img .
```

```
[0] x | [1] x | [2] x | [3] x | [4] x | [5] x | [Screenshot] .61KiB/s +1.27KiB/s 157.74GiB/264.82GiB (59.57%) 67°C @ 1.7 GHz 24.6% 4.96GiB/10.71GiB (37.89%) 91% Thu, Apr 16 2020 41%

-t, --tag= Repository name (and optionally a tag) for the image
vagrant@vagrant-ubuntu-trusty-64:~/DockerHTTP$ docker build -t web_server .
FATA[0000] Cannot locate Dockerfile: Dockerfile
vagrant@vagrant-ubuntu-trusty-64:~/DockerHTTP$ sudo docker build -t web_server .
FATA[0000] Cannot locate Dockerfile: Dockerfile
vagrant@vagrant-ubuntu-trusty-64:~/DockerHTTP$ ls
apache.conf  DOCKERFILE
vagrant@vagrant-ubuntu-trusty-64:~/DockerHTTP$ mv DOCKERFILE Dockerfile
vagrant@vagrant-ubuntu-trusty-64:~/DockerHTTP$ sudo docker build -t web_server .
Sending build context to Docker daemon 4.688 kB
Sending build context to Docker daemon
Step 0 : FROM ubuntu:16.04
16.04: Pulling from ubuntu
cfa6e334227c: Downloading [=====] 43.59 MB/44.19 MB
cfa6e334227c: Pull complete
1cc594f0d47b: Pull complete
dead9fe094f2: Pull complete
f25a39e582b7: Pull complete
362f75b03428: Pull complete
Digest: sha256:eaf6ba9337fe0bfc0fbale2937a7fb8f528d0f073422324cb9ffcc4c7abe7fc
Status: Downloaded newer image for ubuntu:16.04
--> 362f75b03428
Step 1 : ENV APACHE_RUN_USER www-data
--> Running in f9769a38350c
--> b53f55a1cbf5
Removing intermediate container f9769a38350c
Step 2 : ENV APACHE_RUN_GROUP www-data
--> Running in 25daaaf6b14
--> 2d599e7cc242
Removing intermediate container 25daaaf6b14
Step 3 : ENV APACHE_LOCK_DIR /var/lock/apache2
--> Running in 5b26d62cff35
--> 392b03604015
Removing intermediate container 5b26d62cff35
Step 4 : ENV APACHE_LOG_DIR /var/log/apache2
--> Running in a92f9428004e
--> c9e11c0074de
Removing intermediate container a92f9428004e
Step 5 : ENV APACHE_PID_FILE /var/run/apache2/apache2.pid
--> Running in becaa74bf0d5
--> 0bd6d419a33d
Removing intermediate container becaa74bf0d5
Step 6 : ENV APACHE_SERVER_NAME localhost
--> Running in f3cf9d78daa8
--> 938aefc63186
Removing intermediate container f3cf9d78daa8
Step 7 : RUN apt-get update && apt-get install -y apache2 && rm -rf /var/lib/apt/lists/*
--> Running in ec5185d9a4c7
Get:1 http://archive.ubuntu.com/ubuntu xenial InRelease [247 kB]
[0] 0:sudo* "vagrant-ubuntu-trusty-64" 17:01 16-Apr-20
```

After that, simply run the resultant container and yay!

```
docker run -i -t -d -p 5000:80 --name=webserver_con webserver_img
```



## Apache2 Ubuntu Default Page

**It works!**

This is the default welcome page used to test the correct operation of the Apache2 server after installation on Ubuntu systems. It is based on the equivalent page on Debian, from which the Ubuntu Apache packaging is derived. If you can read this page, it means that the Apache HTTP server installed at this site is working properly. You should **replace this file** (located at `/var/www/html/index.html`) before continuing to operate your HTTP server.

If you are a normal user of this web site and don't know what this page is about, this probably means that the site is currently unavailable due to maintenance. If the problem persists, please contact the site's administrator.

### Configuration Overview

Ubuntu's Apache2 default configuration is different from the upstream default configuration, and split into several files optimized for interaction with Ubuntu tools. The configuration system is **fully documented in `/usr/share/doc/apache2/README.Debian.gz`**. Refer to this for the full documentation. Documentation for the web server itself can be found by accessing the **manual** if the `apache2-doc` package was installed on this server.

The configuration layout for an Apache2 web server installation on Ubuntu systems is as follows:

```
/etc/apache2/
|-- apache2.conf
|   |-- ports.conf
|-- mods-enabled
|   |-- *.load
|   |-- *.conf
|-- conf-enabled
|   |-- *.conf
|-- sites-enabled
|   |-- *.conf
```

- `apache2.conf` is the main configuration file. It puts the pieces together by including all remaining

Tree Style ... x

beginner | CodeChef x

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WhatsApp x

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single page beautiful x

Problem loading page x

Apache2 Ubuntu Defaul x

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