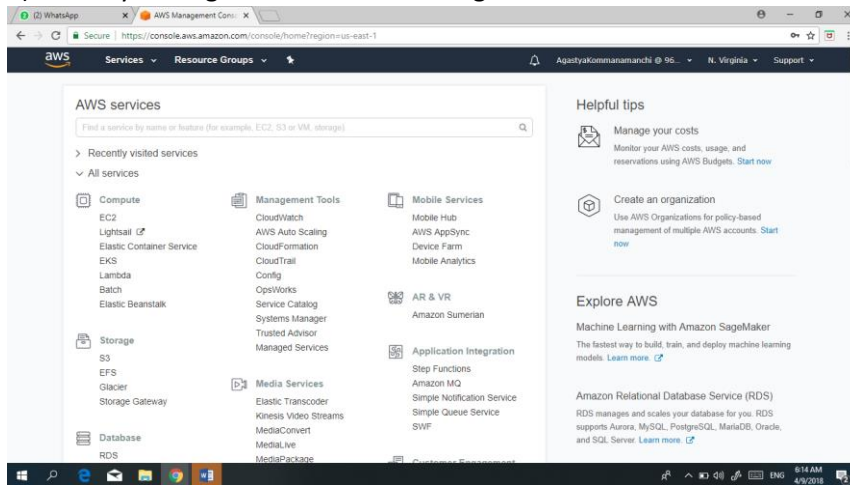


Solution Dockers and Microservices Lab1

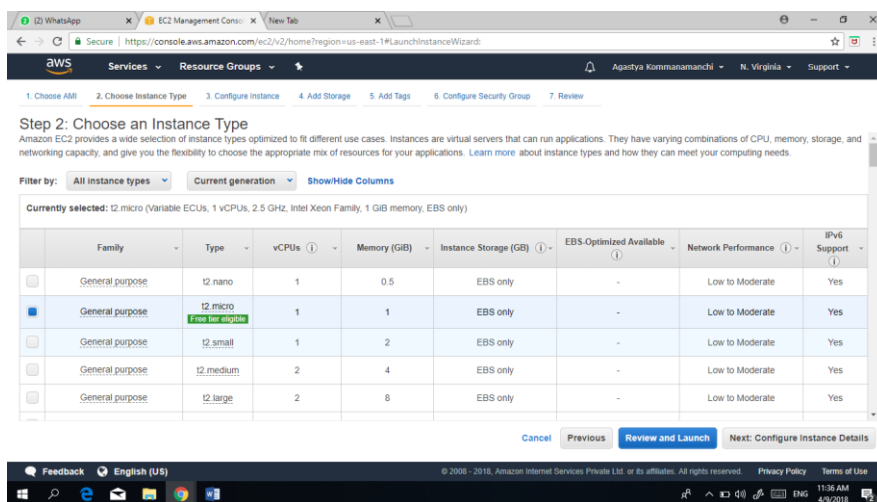
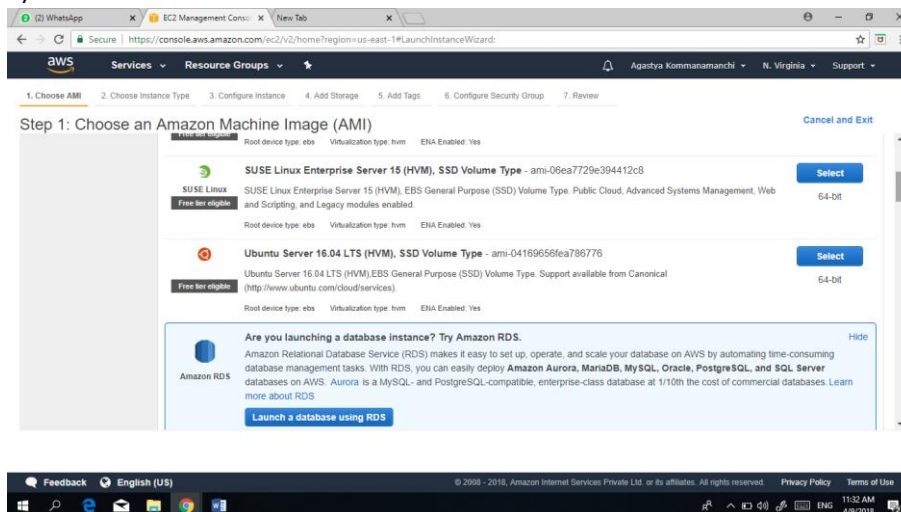
PartA

1)Ensure your region is set to North Virginia



2)Create an EC2 instance using seven step workflow

a)"T2 Small" instance with ubuntu16.04LTS



Solution Dockers and Microservices Lab1

Step 3: Configure Instance Details

Configure the instance to suit your requirements. You can launch multiple instances from the same AMI, request Spot instances to take advantage of the lower pricing, assign an access management role to the instance, and more.

Number of instances: 1 [Launch into Auto Scaling Group](#)

Purchasing option: ☐ Request Spot instances

Network: vpc-5164932a (default) [Create new VPC](#)

Subnet: subnet-d7849cd3 | Default in us-east-1a [Create new subnet](#)

Auto-assign Public IP: Use subnet setting (Enable)

Placement group: ☐ Add instance to placement group

IAM role: None [Create new IAM role](#)

Shutdown behavior: Stop

Enable termination protection: ☐ Protect against accidental termination

[Cancel](#) [Previous](#) [Review and Launch](#) [Next: Add Storage](#)

Step 5: Add Tags

A tag consists of a case-sensitive key-value pair. For example, you could define a tag with key = Name and value = Webserver. A copy of a tag can be applied to volumes, instances or both. Tags will be applied to all instances and volumes. [Learn more](#) about tagging your Amazon EC2 resources.

Key	Value	Instances	Volumes
Name	docker	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>

[Add another tag](#) (Up to 50 tags maximum)

[Cancel](#) [Previous](#) [Review and Launch](#) [Next: Configure Security Group](#)

c)Download a New pem file

Step 7: Review Instance Launch

Select an existing key pair or create a new key pair

A key pair consists of a public key that AWS stores, and a private key file that you store. Together, they allow you to connect to your instance securely. For Windows AMIs, the private key file is required to obtain the password used to log into your instance. For Linux AMIs, the private key file allows you to securely SSH into your instance.

Note: The selected key pair will be added to the set of keys authorized for this instance. Learn more about removing existing key pairs from a public AMI.

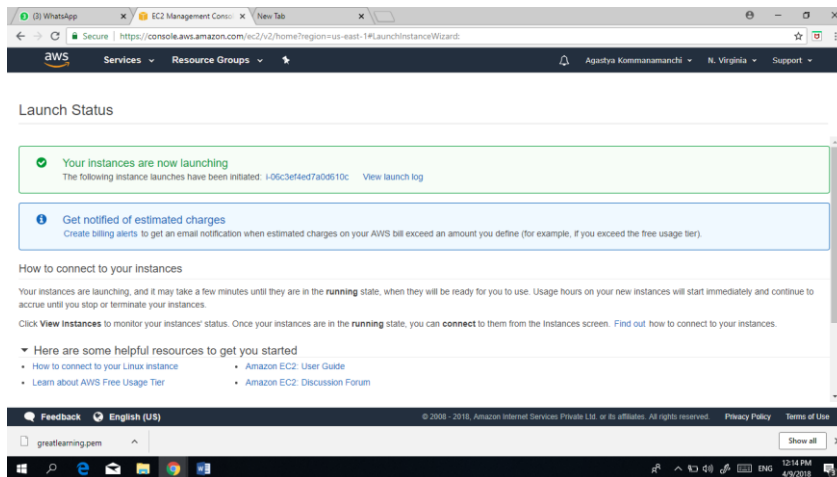
Create a new key pair

Key pair name: greatlearning [Download Key Pair](#)

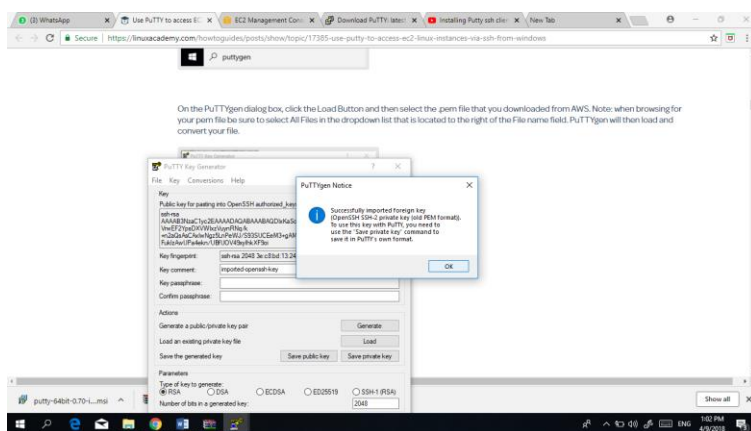
You have to download the private key file (*.pem file) before you can continue. Store it in a secure and accessible location. You will not be able to download the file again after it's created.

[Cancel](#) [Launch Instances](#)

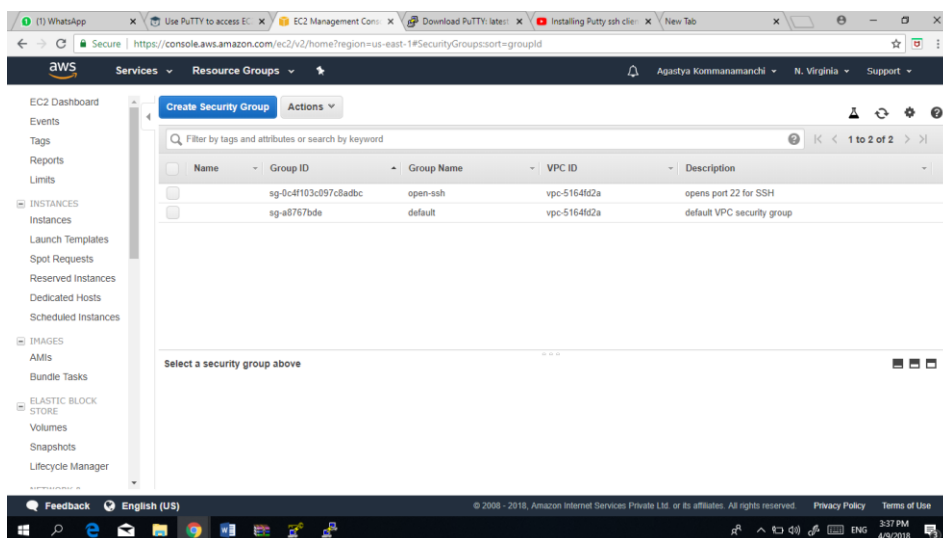
Solution Dockers and Microservices Lab1



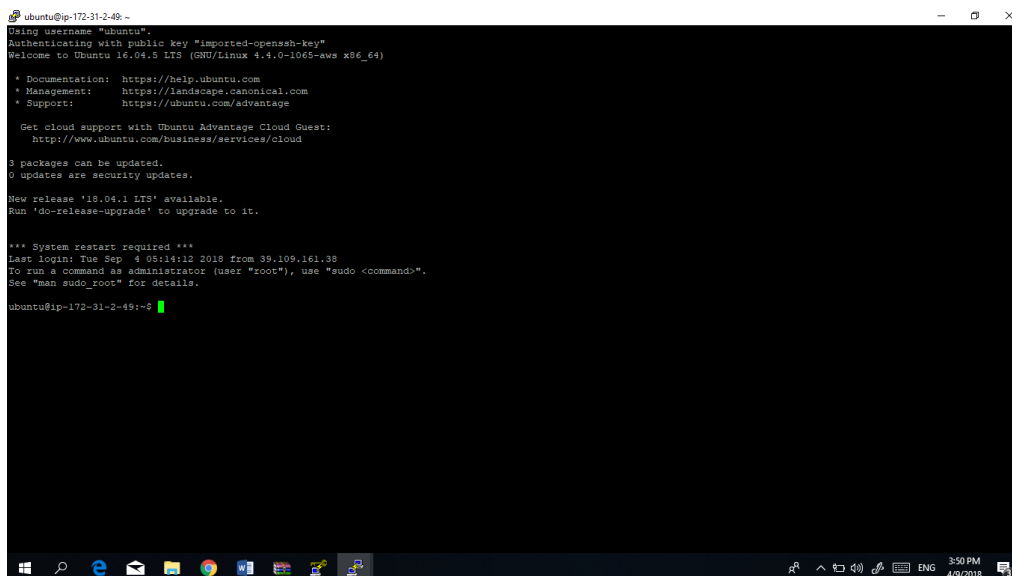
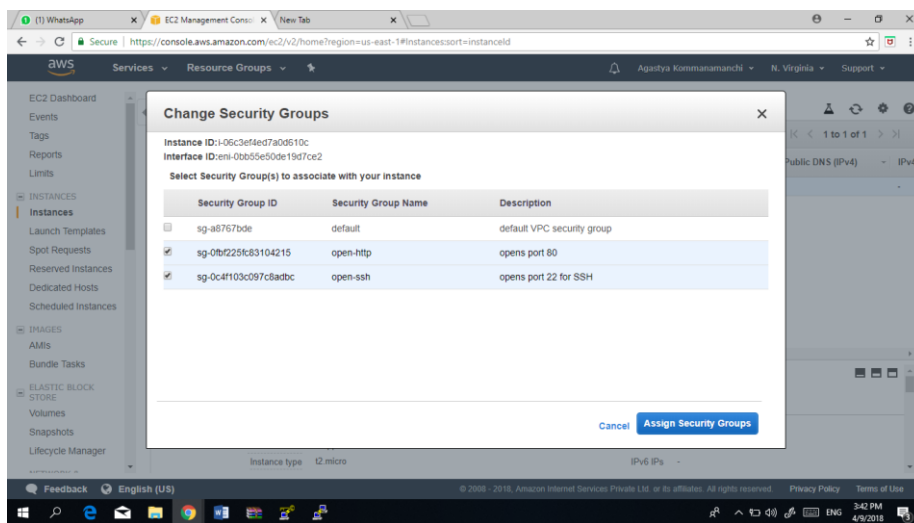
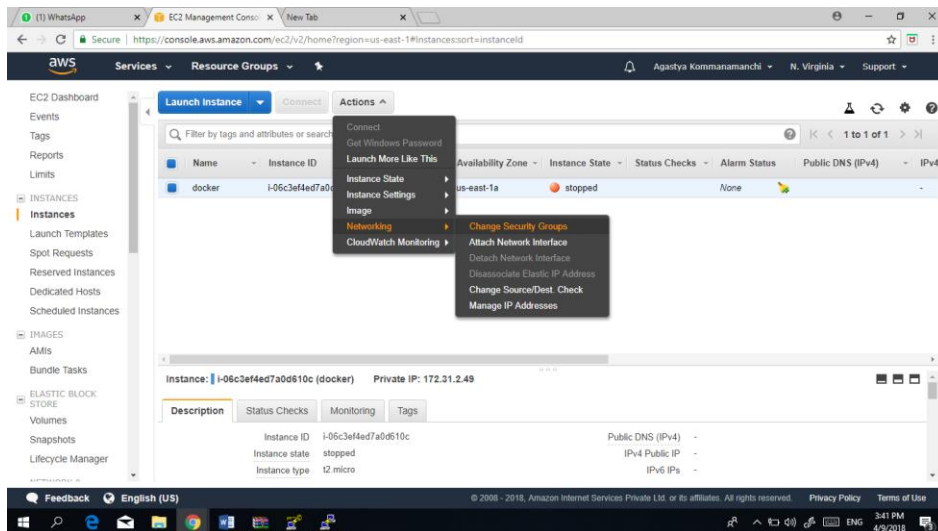
C)SSH into the instance



4) Create a new SG port to open port 80 and assign to the EC2 instance



Solution Dockers and Microservices Lab1



Solution Dockers and Microservices Lab1

4) Install Docker from scratch Commands used from reference 1

- `sudo apt update`
- `sudo apt install docker.io`

```
ubuntu@ip-172-31-2-49:~$  
Last login: Tue Sep  4 05:14:12 2018 from 39.109.161.38  
To run a command as administrator (user "root"), use "sudo <command>".  
See "man sudo_root" for details.  
  
ubuntu@ip-172-31-2-49:~$ sudo apt update  
Hit:1 http://us-east-1.ec2.archive.ubuntu.com/ubuntu xenial InRelease  
Get:2 http://us-east-1.ec2.archive.ubuntu.com/ubuntu xenial-updates InRelease [109 kB]  
Get:3 http://us-east-1.ec2.archive.ubuntu.com/ubuntu xenial-backports InRelease [107 kB]  
Hit:4 http://security.ubuntu.com/ubuntu xenial-security InRelease  
Get:5 http://us-east-1.ec2.archive.ubuntu.com/ubuntu xenial-updates/main amd64 Packages [841 kB]  
Get:6 http://us-east-1.ec2.archive.ubuntu.com/ubuntu xenial-updates/universe amd64 Packages [681 kB]  
Fetched 1,738 kB in 0s (2,972 kB/s)  
Reading package lists... Done  
Building dependency tree  
Reading state information... Done  
3 packages can be upgraded. Run 'apt list --upgradable' to see them.  
ubuntu@ip-172-31-2-49:~$ sudo apt install docker.io  
Reading package lists... Done  
Building dependency tree  
Reading state information... Done  
The following additional packages will be installed:  
  bridge-utils cgroupfs-mount ubuntu-fan  
Suggested packages:  
  mountall aufs-tools debootstrap docker-doc rinse zfs-fuse | zfsutils  
The following NEW packages will be installed:  
  bridge-utils cgroupfs-mount docker.io ubuntu-fan  
0 upgraded, 4 newly installed, 0 to remove and 3 not upgraded.  
Need to get 17.1 MB of archives.  
After this operation, 90.5 MB of additional disk space will be used.  
Do you want to continue? [Y/n] y  
Get:1 http://us-east-1.ec2.archive.ubuntu.com/ubuntu xenial/main amd64 bridge-utils amd64 1.5-9ubuntu1 [28.6 kB]  
Get:2 http://us-east-1.ec2.archive.ubuntu.com/ubuntu xenial/universe amd64 cgroupfs-mount all 1.2 [4,970 B]  
Get:3 http://us-east-1.ec2.archive.ubuntu.com/ubuntu xenial-updates/universe amd64 docker.io amd64 17.03.2-0ubuntu2-16.04.1 [17.1 MB]  
Get:4 http://us-east-1.ec2.archive.ubuntu.com/ubuntu xenial-updates/main amd64 ubuntu-fan all 0.12.8-16.04.2 [35.6 kB]  
Fetched 17.1 MB in 0s (49.3 MB/s)  
Preconfiguring packages ...  
Selecting previously unselected package bridge-utils.  
(Reading database ... 76410 files and directories currently installed.)  
Preparing to unpack .../bridge-utils_1.5-9ubuntu1_amd64.deb ...  
Unpacking bridge-utils (1.5-9ubuntu1) ...  
Selecting previously unselected package cgroupfs-mount.  
Preparing to unpack .../cgroupfs-mount_1.2_all.deb ...  
Unpacking cgroupfs-mount (1.2) ...  
Selecting previously unselected package docker.io.  
Preparing to unpack .../docker.io_17.03.2-0ubuntu2-16.04.1_amd64.deb ...  
Unpacking docker.io (17.03.2-0ubuntu2-16.04.1) ...  
Setting up bridge-utils (1.5-9ubuntu1) ...  
Setting up cgroupfs-mount (1.2) ...  
Setting up docker.io (17.03.2-0ubuntu2-16.04.1) ...  
Setting up ubuntu-fan (0.12.8-16.04.2) ...  
Processing triggers for libc-bin (2.23-0ubuntu1) ...
```

```
sudo docker version
```

```
sudo usermod -a -G docker ubuntu
```

```
sudo chown ubuntu:ubuntu -R /opt
```

```
ubuntu@ip-172-31-2-42:~$
0 packages can be updated.
0 updates are security updates.

New release '18.04.1 LTS' available.
Run 'do-release-upgrade' to upgrade to it.

*** System restart required ***

Last login: Tue Sep  4 08:31:41 2018 from 39.109.161.38
ubuntu@ip-172-31-2-49:~$ docker version
Client:
Version:      17.03.2-ce
API version:  1.27
Go version:   gol.6.2
Git commit:   f5ec1e2
Built:        Thu Jul  5 23:07:48 2018
OS/Arch:      linux/amd64

Get permission denied while trying to connect to the Docker daemon socket at unix:///var/run/docker.sock: Get http://%2Fvar%2Frun%2Fdocker.sock/v1.27/version: dial unix
/var/run/docker.sock: connect: permission denied
ubuntu@ip-172-31-2-49:~$ sudo usermod -a -G docker ubuntu
ubuntu@ip-172-31-2-49:~$
ubuntu@ip-172-31-2-49:~$ sudo docker version
Client:
Version:      17.03.2-ce
API version:  1.27
Go version:   gol.6.2
Git commit:   f5ec1e2
Built:        Thu Jul  5 23:07:48 2018
OS/Arch:      linux/amd64

Server:
Version:      17.03.2-ce
API version:  1.27 (minimum version 1.12)
Go version:   gol.6.2
Git commit:   f5ec1e2
Built:        Thu Jul  5 23:07:48 2018
OS/Arch:      linux/amd64
Experimental: false
ubuntu@ip-172-31-2-49:~$ sudo chown ubuntu:ubuntu -R /opt
ubuntu@ip-172-31-2-49:~$ ls -al /opt
total 8
drwxr-xr-x  2 ubuntu ubuntu 4096 Aug 14 20:45 .
drwxr-xr-x  3 root    root   4096 Sep  4 07:44 ..
ubuntu@ip-172-31-2-49:~$
```

Solution Dockers and Microservices Lab1

#After SSH type the below command (notice there is no sudo)

docker version

```
ubuntu@ip-172-31-2-49: ~
Using username "ubuntu".
Authenticating with public key "imported-openssh-key"
Welcome to Ubuntu 16.04.5 LTS (GNU/Linux 4.4.0-1065-aws x86_64)

 * Documentation:  https://help.ubuntu.com
 * Management:    https://landscape.canonical.com
 * Support:       https://ubuntu.com/advantage

Get cloud support with Ubuntu Advantage Cloud Guest:
http://www.ubuntu.com/business/services/cloud

3 packages can be updated.
0 updates are security updates.

New release '16.04.1 LTS' available.
Run 'do-release-upgrade' to upgrade to it.

*** System restart required ***
Last login: Tue Sep  4 08:38:00 2018 from 39.109.161.38
ubuntu@ip-172-31-2-49:~$ docker version
Client:
 Version:      17.03.2-ce
 API version:  1.27
 Go version:   go1.6.2
 Git commit:   f5ec1e2
 Built:        Thu Jul  5 23:07:48 2018
 OS/Arch:      linux/amd64

Server:
 Version:      17.03.2-ce
 API version:  1.27 (minimum version 1.12)
 Go version:   go1.6.2
 Git commit:   f5ec1e2
 Built:        Thu Jul  5 23:07:48 2018
 OS/Arch:      linux/amd64
 Experimental: false
ubuntu@ip-172-31-2-49:~$
```

Part B

1) Run a tomcat instance with the following settings (reference 2)

- docker images
- docker ps -a
- docker run --rm busybox /bin/echo "Hello World"

```
ubuntu@ip-172-31-2-49: ~
 * Management:    https://landscape.canonical.com
 * Support:       https://ubuntu.com/advantage

Get cloud support with Ubuntu Advantage Cloud Guest:
http://www.ubuntu.com/business/services/cloud

3 packages can be updated.
0 updates are security updates.

New release '16.04.1 LTS' available.
Run 'do-release-upgrade' to upgrade to it.

*** System restart required ***
Last login: Tue Sep  4 08:38:00 2018 from 39.109.161.38
ubuntu@ip-172-31-2-49:~$ docker version
Client:
 Version:      17.03.2-ce
 API version:  1.27
 Go version:   go1.6.2
 Git commit:   f5ec1e2
 Built:        Thu Jul  5 23:07:48 2018
 OS/Arch:      linux/amd64

Server:
 Version:      17.03.2-ce
 API version:  1.27 (minimum version 1.12)
 Go version:   go1.6.2
 Git commit:   f5ec1e2
 Built:        Thu Jul  5 23:07:48 2018
 OS/Arch:      linux/amd64
 Experimental: false
ubuntu@ip-172-31-2-49:~$ docker images
REPOSITORY          TAG                 IMAGE ID            CREATED             SIZE
ubuntu@ip-172-31-2-49:~$ docker ps -a
CONTAINER ID        IMAGE               COMMAND             CREATED             STATUS             PORTS             NAMES
ubuntu@ip-172-31-2-49:~$ docker run --rm busybox:lastest /bin/echo "Hello world"
Unable to find image 'busybox:lastest' locally
docker: Error response from daemon: manifest for busybox:lastest not found.
See 'docker run --help'.
ubuntu@ip-172-31-2-49:~$ docker run --rm busybox :lastest /bin/echo "Hello world"
Unable to find image 'busybox:lastest' locally
latest: Pulling from library/busybox
8c5a7dalaefbc: Pull complete
```

After downloading busybox image

Solution Dockers and Microservices Lab1

- docker images
- docker ps -a

```
ubuntu@ip-172-31-2-49:~$ docker run --rm busybox /bin/echo "Hello world"
Hello world
ubuntu@ip-172-31-2-49:~$ docker images
REPOSITORY          TAG                 IMAGE ID            CREATED             SIZE
busybox              latest             e1ddd7948alc       4 weeks ago        1.16 MB
ubuntu@ip-172-31-2-49:~$ docker ps -a
CONTAINER ID        IMAGE               COMMAND             CREATED             STATUS             PORTS             NAMES
ubuntu@ip-172-31-2-49:~$ docker ps -a
CONTAINER ID        IMAGE               COMMAND             CREATED             STATUS             PORTS             NAMES
ubuntu@ip-172-31-2-49:~$ docker images
REPOSITORY          TAG                 IMAGE ID            CREATED             SIZE
busybox              latest             e1ddd7948alc       4 weeks ago        1.16 MB
ubuntu@ip-172-31-2-49:~$ docker -d -p 80:8080 tomcat:jre8
unknown shorthand flag: 'd' in -d
See 'docker --help'.

Usage:  docker COMMAND

A self-sufficient runtime for containers

Options:
  --config string      Location of client config files (default "/home/ubuntu/.docker")
  -D, --debug           Enable debug mode
  --help               Print usage
  -H, --host list       Daemon socket(s) to connect to (default [])
  -l, --log-level string Set the logging level ("debug", "info", "warn", "error", "fatal") (default "info")
  --tls                Use TLS; implied by --tlsverify
  --tlscacert string   Trust certs signed only by this CA (default "/home/ubuntu/.docker/ca.pem")
  --tlscert string      Path to TLS certificate file (default "/home/ubuntu/.docker/cert.pem")
  --tlskey string       Path to TLS key file (default "/home/ubuntu/.docker/key.pem")
  --tlsverify           Use TLS and verify the remote
  -v, --version         Print version information and quit

Management Commands:
  checkpoint      Manage checkpoints
  container       Manage containers
  image           Manage images
  network         Manage networks
  node            Manage Swarm nodes
  plugin          Manage plugins
  secret          Manage Docker secrets
  service         Manage services
  stack           Manage Docker stacks
  swarm          Manage Swarm
```

b) Should be JRE8

```
ubuntu@ip-172-31-2-49:~$ docker restart
restart      Restart one or more containers
rm           Remove one or more containers
rmi          Remove one or more images
run          Run a command in a new container
save         Save one or more images to a tar archive (streamed to STDOUT by default)
search       Search the Docker Hub for images
start        Start one or more stopped containers
stats        Display a live stream of container(s) resource usage statistics
stop         Stop one or more running containers
tag          Create a tag TARGET_IMAGE that refers to SOURCE_IMAGE
top          Display the running processes of a container
unpause      Unpause all processes within one or more containers
update       Update configuration of one or more containers
version      Show the Docker version information
wait         Block until one or more containers stop, then print their exit codes

Run 'docker COMMAND --help' for more information on a command.

ubuntu@ip-172-31-2-49:~$ docker run -d -p 80:8080 tomcat:jre8
Unable to find image 'tomcat:jre8' locally
jre8: Pulling from library/tomcat
55cbf04beb70: Pull complete
1607093a898c: Pull complete
9a8ae045e926: Pull complete
1290813ebd5d: Pull complete
8a6b982ed6d7: Pull complete
abb029e69402: Pull complete
d068d0a738e5: Pull complete
42ee47bb0c52: Pull complete
ae9c861aed25: Pull complete
60bba9d0dc8d: Pull complete
091c1d70257: Pull complete
86903483ef7: Pull complete
Digest: sha256:eab533908d6c7760a84a5edbb4490b64848491dfa708alc5f4286db3caab825
Status: Downloaded newer image for tomcat:jre8
7035b3e774612e2f767e69273ed4934104f4dc10a997cc5929b0f3bbeafb8905
ubuntu@ip-172-31-2-49:~$ docker ps -a
CONTAINER ID        IMAGE               COMMAND             CREATED             STATUS             PORTS             NAMES
7035b3e77461      tomcat:jre8        "catalina.sh run"   5 minutes ago      Up 5 minutes      0.0.0.0:80->8080/tcp   infallible_chandrasekhar
ubuntu@ip-172-31-2-49:~$ docker images
REPOSITORY          TAG                 IMAGE ID            CREATED             SIZE
tomcat              jre8               690cb3b9c7d1       12 days ago        463 MB
busybox             latest             e1ddd7948alc       4 weeks ago        1.16 MB
```

c) Default tomcat port 8080 should be mapped to port 80 of host

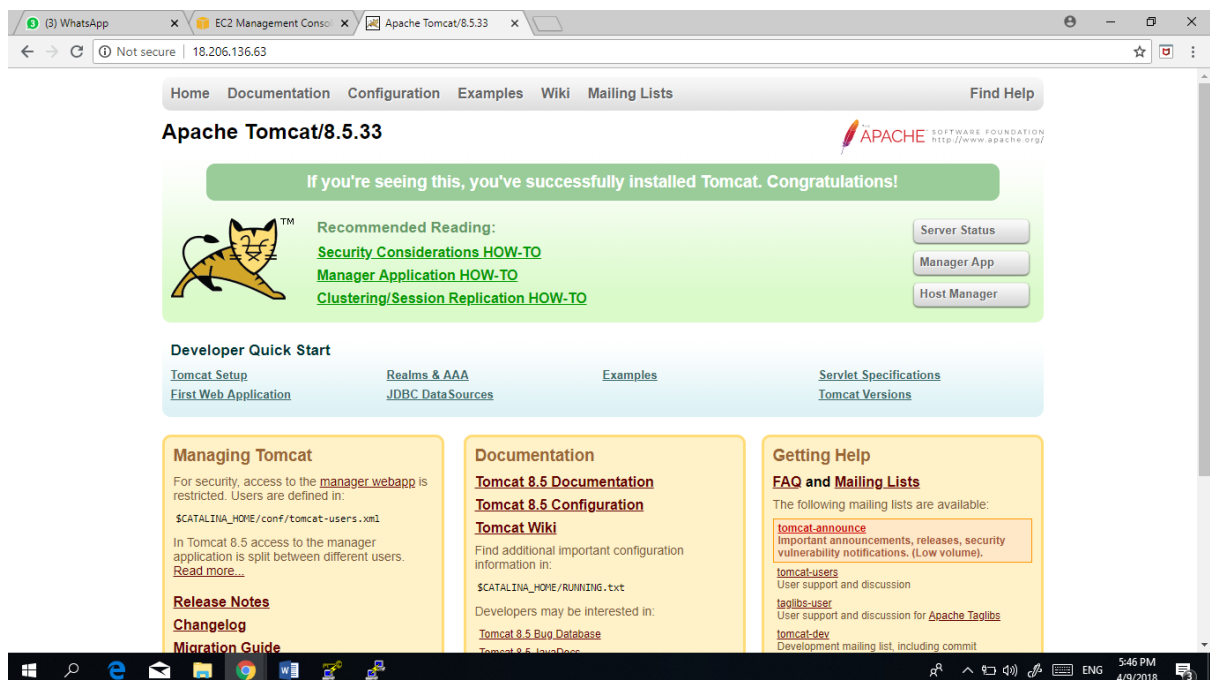
Solution Dockers and Microservices Lab1

```
ubuntu@ip-172-31-2-49: ~
rm          Remove one or more containers
rmi         Remove one or more images
run         Run a command in a new container
save        Save one or more images to a tar archive (streamed to STDOUT by default)
search      Search the Docker Hub for images
start       Start one or more stopped containers
stats       Display a live stream of container(s) resource usage statistics
stop        Stop one or more running containers
tag         Create a tag TARGET_IMAGE that refers to SOURCE_IMAGE
top         Display the running processes of a container
unpause     Unpause all processes within one or more containers
update      Update configuration of one or more containers
version     Show the Docker version information
wait        Block until one or more containers stop, then print their exit codes

Run 'docker COMMAND --help' for more information on a command.

ubuntu@ip-172-31-2-49:~$ docker run -d -p 80:8080 tomcat:jre8
Unable to find image 'tomcat:jre8' locally
jre8: Pulling from library/tomcat
55cbf04beb70: Pull complete
1e07093a898c: Pull complete
9a8ea045e926: Pull complete
1290813abd5d: Pull complete
8a6b982ad6d7: Pull complete
abb029e69402: Pull complete
d068d0a738e5: Pull complete
42ee47bb0c52: Pull complete
ae9c861aed25: Pull complete
60bba9d0dc8d: Pull complete
b91c11d70297: Pull complete
869034983fc7: Pull complete
Digest: sha256:cab533908d6c7760a84a5eddbb4490b648484941dfa708alc5f4286db8caab825
Status: Downloaded newer image for tomcat:jre8
7035b3e774612e2f767e69273ed49344104fddc10a997cc5929b0f3bbeafb9905
ubuntu@ip-172-31-2-49:~$ docker ps -a
CONTAINER ID        IMAGE               COMMAND             CREATED             STATUS              PORTS               NAMES
7035b3e77461        tomcat:jre8        "catalina.sh run"   5 minutes ago       Up 5 minutes       0.0.0.0:80->8080/tcp   infallible_chandrasekhar
ubuntu@ip-172-31-2-49:~$ docker images
REPOSITORY          TAG                 IMAGE ID            CREATED             SIZE
tomcat               jre8               690cb389c7d1       12 days ago        463 MB
busybox             latest             e1ddd7948alc        4 weeks ago        1.16 MB
ubuntu@ip-172-31-2-49:~$ docker rm
```

d) Be able to access the default tomcat page from the browser



Solution Dockers and Microservices Lab1

Removing the docker images and containers created

Below are the commands used

- `docker rm [container id]`
- `docker rmi [image id]`
- `docker build -t [your image name without spaces]` .

```
ubuntu@ip-172-31-2-49:~$ docker stop e5f
e5f
ubuntu@ip-172-31-2-49:~$ docker ps -a
CONTAINER ID        IMAGE               COMMAND             CREATED             STATUS              PORTS              NAMES
e5fb5c3fbd63        siab               "/bin/sh -c 'servi..." 11 minutes ago      Exited (137) 8 seconds ago
828d2205411c        felc7fa01c8f      "/bin/sh -c 'apt i..." 24 minutes ago      Exited (100) 24 minutes ago
839f195e69f3        debian            "tail -f /dev/null"     About an hour ago   Exited (137) 48 minutes ago
204a02d283d7        smartfin          "httpd-foreground"      36 hours ago        Exited (0) 45 seconds ago
a0f2e61ae5f24       helloworld        "catalina.sh run"        37 hours ago        Exited (143) 37 hours ago
703b3bc77461        tomcat:jre8       "catalina.sh run"        2 days ago          Exited (143) 2 days ago
ubuntu@ip-172-31-2-49:~$ docker rm e5f
e5f
ubuntu@ip-172-31-2-49:~$ docker rm 828
828
ubuntu@ip-172-31-2-49:~$ docker rm 839
839
ubuntu@ip-172-31-2-49:~$ docker rm 204
204
ubuntu@ip-172-31-2-49:~$ docker rm a0f
a0f
ubuntu@ip-172-31-2-49:~$ docker rm 703
703
ubuntu@ip-172-31-2-49:~$ docker ps -a
CONTAINER ID        IMAGE               COMMAND             CREATED             STATUS              PORTS              NAMES
ubuntu@ip-172-31-2-49:~$ docker images
docker: 'images' is not a docker command.
See 'docker --help'
ubuntu@ip-172-31-2-49:~$ docker images
REPOSITORY          TAG                 IMAGE ID            CREATED             SIZE
siab                 latest             4f2f5aa870dd        25 minutes ago     178 MB
siabdebian-base     latest             612df5402688        48 minutes ago     147 MB
smartfin            latest             9cec81098a49        36 hours ago       178 MB
helloworld          latest             7a31af5c6aea        37 hours ago       472 MB
httpd               latest             d595a4011ae3        45 hours ago       178 MB
debian              latest             f2aae6ff5d89        2 days ago         101 MB
tomcat              jre8               690cb3b9c7d1        2 weeks ago        463 MB
busybox             latest             e1ddd7948alc        5 weeks ago        1.16 MB
ubuntu@ip-172-31-2-49:~$ docker rmi 690
Error response from daemon: conflict: unable to delete 690cb3b9c7d1 (cannot be forced) - image has dependent child images
ubuntu@ip-172-31-2-49:~$ docker rmi 4f2
No command '4f2' found, did you mean:
  Command '4f2' from package 'ctsim' (universe)
4f2: command not found
ubuntu@ip-172-31-2-49:~$ docker rmi 4f2
```

```
ubuntu@ip-172-31-2-49:~$ docker ps -a
CONTAINER ID        IMAGE               COMMAND             CREATED             STATUS              PORTS              NAMES
ubuntu@ip-172-31-2-49:~$ docker images
docker: 'images' is not a docker command.
See 'docker --help'
ubuntu@ip-172-31-2-49:~$ docker images
REPOSITORY          TAG                 IMAGE ID            CREATED             SIZE
siab                 latest             4f2f5aa870dd        25 minutes ago     178 MB
siabdebian-base     latest             612df5402688        48 minutes ago     147 MB
smartfin            latest             9cec81098a49        36 hours ago       178 MB
helloworld          latest             7a31af5c6aea        37 hours ago       472 MB
httpd               latest             d595a4011ae3        45 hours ago       178 MB
debian              latest             f2aae6ff5d89        2 days ago         101 MB
tomcat              jre8               690cb3b9c7d1        2 weeks ago        463 MB
busybox             latest             e1ddd7948alc        5 weeks ago        1.16 MB
ubuntu@ip-172-31-2-49:~$ docker rmi 690
Error response from daemon: conflict: unable to delete 690cb3b9c7d1 (cannot be forced) - image has dependent child images
ubuntu@ip-172-31-2-49:~$ docker rmi 4f2
No command '4f2' found, did you mean:
  Command '4f2' from package 'ctsim' (universe)
4f2: command not found
ubuntu@ip-172-31-2-49:~$ docker rmi 4f2
Untagged: siab:latest
Deleted: sha256:4f2f5aa870dd5a1e411d9dbf86398869ab5f1c406fd56bc3161296abb93ef929
Deleted: sha256:2470d8593d7a94b1fe71e5c66d5620dbd480fedec9f85d669d0523170007540b
Deleted: sha256:12e734962970bf40c822005d746891cf67c504a652d3bbcc2240165a0340cbd4
Deleted: sha256:felc7fa01c8fa98d5024b4168c02bcd442de63b88cf22165eb1fa76f10c363b4
ubuntu@ip-172-31-2-49:~$ docker rmi 4f2
Error response from daemon: No such image: 4f2:latest
ubuntu@ip-172-31-2-49:~$ docker images
REPOSITORY          TAG                 IMAGE ID            CREATED             SIZE
siabdebian-base     latest             612df5402688        55 minutes ago     147 MB
smartfin            latest             9cec81098a49        36 hours ago       178 MB
helloworld          latest             7a31af5c6aea        37 hours ago       472 MB
httpd               latest             d595a4011ae3        45 hours ago       178 MB
debian              latest             f2aae6ff5d89        2 days ago         101 MB
tomcat              jre8               690cb3b9c7d1        2 weeks ago        463 MB
busybox             latest             e1ddd7948alc        5 weeks ago        1.16 MB
ubuntu@ip-172-31-2-49:~$ docker rmi 612
Untagged: siabdebian-base:latest
Deleted: sha256:612df5402688b9e6f1035d527d4044f1ff02a0e7b6be6116432a1a5ea3be387a4
Deleted: sha256:dfl1776104f724eeb376eeefa9628354674a3e4acbf58021e6a67a1d367b244ab
ubuntu@ip-172-31-2-49:~$
```

Solution Dockers and Microservices Lab1

Part C

1. Stop the previous container running only Tomcat

```
ubuntu@ip-172-31-2-49: ~  
start      Start one or more stopped containers  
stats      Display a live stream of container(s) resource usage statistics  
stop       Stop one or more running containers  
tag        Create a tag TARGET_IMAGE that refers to SOURCE_IMAGE  
top        Display the running processes of a container  
unpause    Unpause all processes within one or more containers  
update     Update configuration of one or more containers  
version    Show the Docker version information  
wait       Block until one or more containers stop, then print their exit codes  
  
Run 'docker COMMAND --help' for more information on a command.  
  
ubuntu@ip-172-31-2-49:~$ docker run -d -p 80:8080 tomcat:jre8  
Unable to find image 'tomcat:jre8' locally  
jre8: Pulling from library/tomcat  
55cd404bcb70: Pull complete  
1d07093a890c: Pull complete  
9a8ea045c926: Pull complete  
1290813ab9d: Pull complete  
8a6b982ad6d7: Pull complete  
abb029e68402: Pull complete  
d068d0a738e5: Pull complete  
42ee47bb0c52: Pull complete  
ae9c561aed28: Pull complete  
6bba94d0cd4d: Pull complete  
091c1ld70257: Pull complete  
869034383fc7: Pull complete  
Digest: sha256:eab533908d6c7760a84a5edbb4490b648484941dfa708alc5f4286db8caab825  
Status: Downloaded newer image for tomcat:jre8  
7035b3e774612e2f767e69273ed4934184fcd10a997cc5529b0f3bbeafb8905  
ubuntu@ip-172-31-2-49:~$ docker ps -a  
CONTAINER ID        IMAGE               COMMAND             CREATED             STATUS              PORTS               NAMES  
7035b3e77461        tomcat:jre8        "catalina.sh run"   5 minutes ago       Up 5 minutes       0.0.0.0:80->8080/tcp  infallible_chandrasekhar  
ubuntu@ip-172-31-2-49:~$ docker images  
REPOSITORY          TAG                IMAGE ID            CREATED             SIZE  
tomcat               jre8              690cb3b9c7d1       12 days ago        463 MB  
busybox             latest            elddd7948alc       4 weeks ago        1.16 MB  
ubuntu@ip-172-31-2-49:~$ docker stop 703  
703  
ubuntu@ip-172-31-2-49:~$ docker ps -a  
CONTAINER ID        IMAGE               COMMAND             CREATED             STATUS              PORTS               NAMES  
7035b3e77461        tomcat:jre8        "catalina.sh run"   31 minutes ago     Exited (143) 13 seconds ago           infallible_chandrasekhar  
ubuntu@ip-172-31-2-49:~$
```

- 2.

2. To create a custom image of a java web app using Tomcat8 (reference 3)

a) Download the HelloWorld.war in the EC2 instance

b) Create a file by the name "Dockerfile", this file does not have any extension

```
ubuntu@ip-172-31-2-49: /opt/helloworld  
Run 'docker COMMAND --help' for more information on a command.  
  
ubuntu@ip-172-31-2-49:~$ docker ps -a  
CONTAINER ID        IMAGE               COMMAND             CREATED             STATUS              PORTS               NAMES  
7035b3e77461        tomcat:jre8        "catalina.sh run"   22 hours ago       Exited (143) 21 hours ago           infallible_chandrasekhar  
ubuntu@ip-172-31-2-49:~$ docker images  
REPOSITORY          TAG                IMAGE ID            CREATED             SIZE  
tomcat               jre8              690cb3b9c7d1       13 days ago        463 MB  
busybox             latest            elddd7948alc       5 weeks ago        1.16 MB  
ubuntu@ip-172-31-2-49:~$ cd /opt/  
ubuntu@ip-172-31-2-49:~$ ls -al  
total 8  
drwxr-xr-x 2 ubuntu ubuntu 4096 Aug 14 20:45 .  
drwxr-xr-x 3 root    root    4096 Sep 5 07:42 ..  
ubuntu@ip-172-31-2-49:~$ cd..  
cd..: command not found  
ubuntu@ip-172-31-2-49:~$ cd /opt/  
ubuntu@ip-172-31-2-49:~$ mkdir helloworld  
ubuntu@ip-172-31-2-49:~$ cd helloworld/  
ubuntu@ip-172-31-2-49:~$ wget https://storage.googleapis.com/skl-training/aws-codelabs/aws-intro/HelloWorld.war  
--2018-09-05 07:56:31-- https://storage.googleapis.com/skl-training/aws-codelabs/aws-intro/HelloWorld.war  
Resolving storage.googleapis.com (storage.googleapis.com)... 172.217.8.16, 2607:f8b0:4004:800::2010  
Connecting to storage.googleapis.com (storage.googleapis.com)|172.217.8.16|:443... connected.  
HTTP request sent, awaiting response... 200 OK  
Length: 9845218 (9.4M) [application/octet-stream]  
Saving to: 'HelloWorld.war'  
  
HelloWorld.war      100%[=====] 9.39M  18.5MB/s  in 0.5s  
2018-09-05 07:56:34 (18.5 MB/s) - 'HelloWorld.war' saved [9845218/9845218]  
  
ubuntu@ip-172-31-2-49:~$ cd /opt/helloworld$ ls -al  
total 8624  
drwxr-xr-x 2 ubuntu ubuntu 4096 Sep 5 07:56 .  
drwxr-xr-x 3 ubuntu ubuntu 4096 Sep 5 07:54 ..  
-rw-rw-r-- 1 ubuntu ubuntu 9845218 Nov 19 2017 HelloWorld.war  
ubuntu@ip-172-31-2-49:~$ cd /opt/helloworld$ nano Dockerfile  
ubuntu@ip-172-31-2-49:~$ cd /opt/helloworld$ ls -al  
total 8628  
drwxr-xr-x 2 ubuntu ubuntu 4096 Sep 5 08:03 .  
drwxr-xr-x 3 ubuntu ubuntu 4096 Sep 5 07:54 ..  
-rw-rw-r-- 1 ubuntu ubuntu 97 Sep 5 08:03 Dockerfile  
-rw-rw-r-- 1 ubuntu ubuntu 9845218 Nov 19 2017 HelloWorld.war  
ubuntu@ip-172-31-2-49:~$
```

- c) Create the custom image using the appropriate command

Solution Dockers and Microservices Lab1

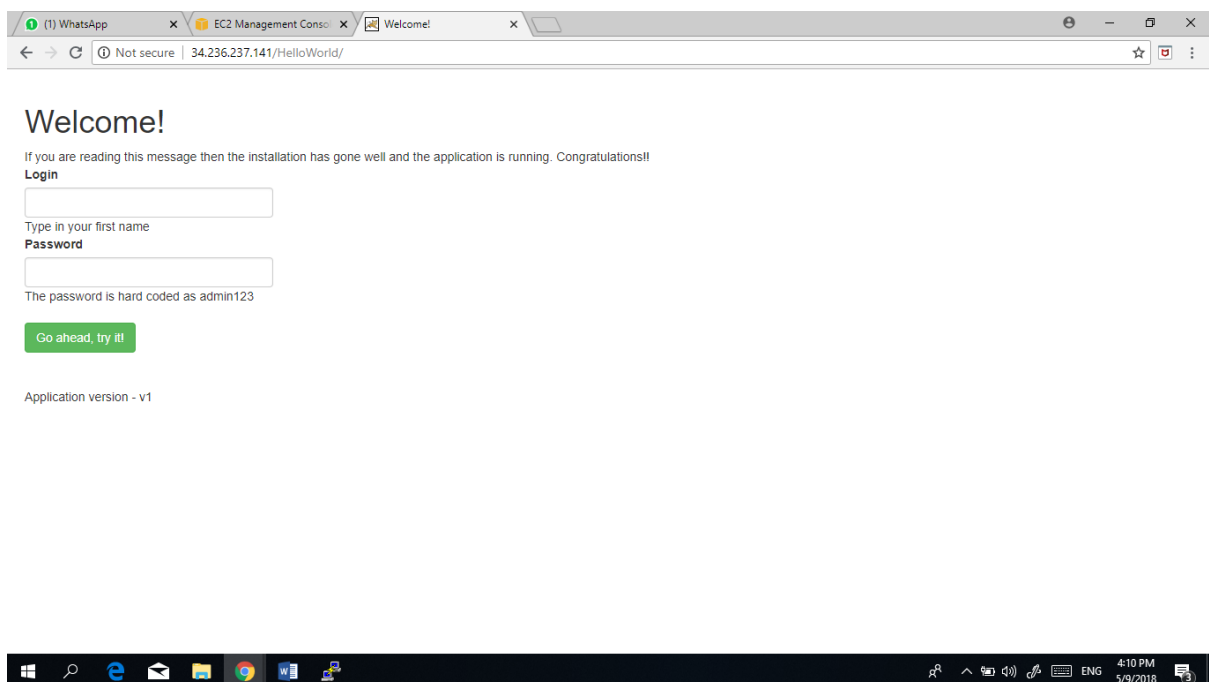
```
ubuntu@ip-172-31-2-49:/opt/helloworld$
Connecting to storage.googleapis.com (storage.googleapis.com)[172.217.8.16]:443... connected.
HTTP request sent, awaiting response... 200 OK
Length: 9845218 (9.4M) [application/octet-stream]
Saving to: 'HelloWorld.war'

HelloWorld.war
100%[=====] 9.39M 18.5MB/s in 0.5s

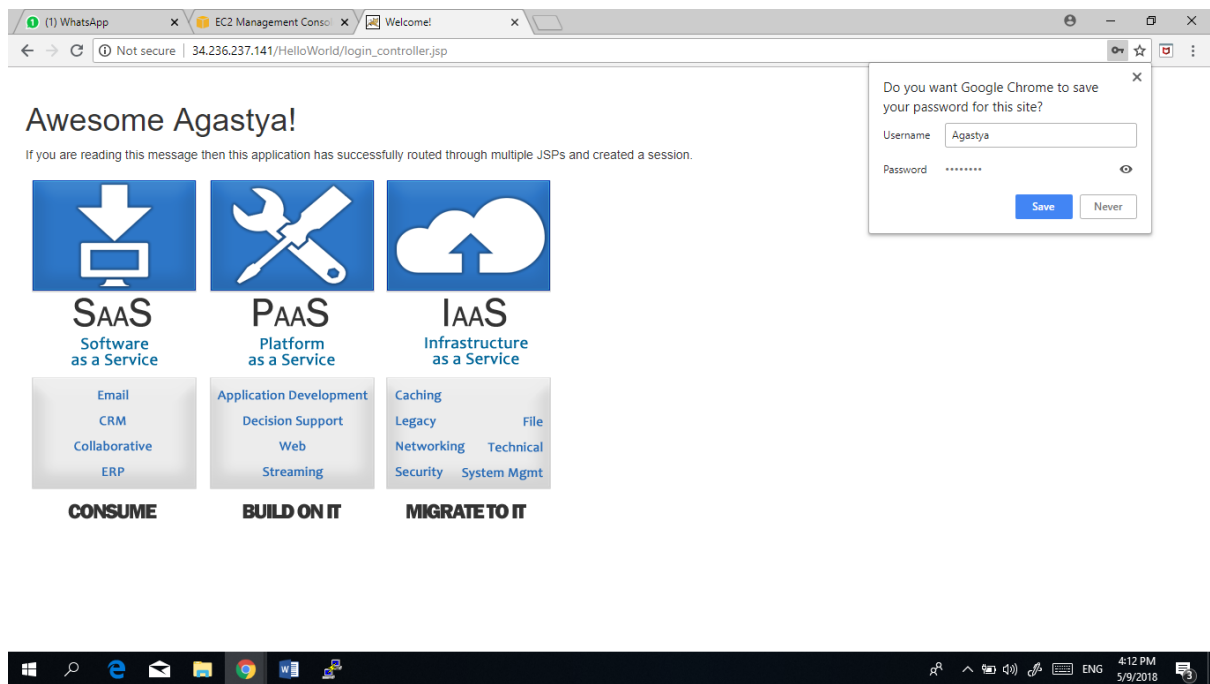
2018-09-05 07:56:34 (18.5 MB/s) - 'HelloWorld.war' saved [9845218/9845218]

ubuntu@ip-172-31-2-49:/opt/helloworld$ ls -al
total 9624
drwxrwxr-x 2 ubuntu ubuntu 4096 Sep  5 07:56 .
drwxr-xr-x 3 ubuntu ubuntu 4096 Sep  5 07:54 ..
-rw-rw-r-- 1 ubuntu ubuntu 9845218 Nov 19 2017 HelloWorld.war
ubuntu@ip-172-31-2-49:/opt/helloworld$ nano Dockerfile
ubuntu@ip-172-31-2-49:/opt/helloworld$ ls -al
total 9628
drwxrwxr-x 2 ubuntu ubuntu 4096 Sep  5 08:03 .
drwxr-xr-x 3 ubuntu ubuntu 4096 Sep  5 07:54 ..
-rw-rw-r-- 1 ubuntu ubuntu 97 Sep  5 08:03 Dockerfile
-rw-rw-r-- 1 ubuntu ubuntu 9845218 Nov 19 2017 HelloWorld.war
ubuntu@ip-172-31-2-49:/opt/helloworld$ docker build -t helloworld .
Sending build context to Docker daemon 9.848 MB
Step 1/3 : FROM tomcat:jre8
--> 690cb3b9c7d1
Step 2/3 : MAINTAINER Agastya Kommanamanchi
--> Running in 3a951e9b2da6
--> 342831a565aa
Removing intermediate container 3a951e9b2da6
Step 3/3 : COPY HelloWorld.war /usr/local/tomcat/webapps/
--> 7a31af5c6aea
Removing intermediate container 15a2660c6ed8
Successfully built 7a31af5c6aea
ubuntu@ip-172-31-2-49:/opt/helloworld$ docker images
docker: 'images' is not a docker command.
See 'docker --help'
ubuntu@ip-172-31-2-49:/opt/helloworld$ docker images
REPOSITORY          TAG             IMAGE ID        CREATED         SIZE
helloworld          latest         7a31af5c6aea   44 seconds ago 472 MB
tomcat              jre8          690cb3b9c7d1   13 days ago    463 MB
busybox            latest         c1dd47948e1c   5 weeks ago    1.16 MB
ubuntu@ip-172-31-2-49:/opt/helloworld$ docker run -d -p 80:8080 helloworld
a0f2e61a9f242d273432c9e7c61e3090a4166eaa13780100bef2ce07f0cb1f
ubuntu@ip-172-31-2-49:/opt/helloworld$
```

3. Launch a container from your custom image and access the application from the browser using the URL [http:// 34.236.237.141/ HelloWorld](http://34.236.237.141/HelloWorld/)



Solution Dockers and Microservices Lab1



Part D

. Stop the previous container that is running the Java web application in Tomcat

```
ubuntu@ip-172-31-2-49:/opt/smartfin$ docker ps -a
CONTAINER ID        IMAGE               COMMAND             CREATED             STATUS              PORTS              NAMES
a0f2e61a9f24       helloworld         "catalina.sh run"   10 minutes ago     Exited (143)        20 seconds ago    tender_jennings
7035b3e77461       tomcat:jre8        "catalina.sh run"   22 hours ago       Exited (143)        22 hours ago      infallible_chandrasekhar

ubuntu@ip-172-31-2-49:/opt/helloworld$ docker images
REPOSITORY          TAG                 IMAGE ID            CREATED             SIZE
helloworld          latest             7a31af5c6aea       44 seconds ago     472 MB
tomcat              jre8              690cb3b9c7d1       13 days ago        463 MB
busybox            latest            elddd7948alc       5 weeks ago        1.16 MB

ubuntu@ip-172-31-2-49:/opt/helloworld$ docker run -d -p 80:8080 helloworld
a0f2e61a9f242d2d7943209e7c61e38090a4166eaa13780100bdf2ce07f0cb1f

ubuntu@ip-172-31-2-49:/opt/helloworld$ docker stop a0f
a0f

ubuntu@ip-172-31-2-49:/opt/helloworld$ docker ps -a
CONTAINER ID        IMAGE               COMMAND             CREATED             STATUS              PORTS              NAMES
a0f2e61a9f24       helloworld         "catalina.sh run"   10 minutes ago     Exited (143)        20 seconds ago    tender_jennings
7035b3e77461       tomcat:jre8        "catalina.sh run"   22 hours ago       Exited (143)        22 hours ago      infallible_chandrasekhar

ubuntu@ip-172-31-2-49:/opt/helloworld$ docker images
REPOSITORY          TAG                 IMAGE ID            CREATED             SIZE
helloworld          latest             7a31af5c6aea       13 minutes ago     472 MB
tomcat              jre8              690cb3b9c7d1       13 days ago        463 MB
busybox            latest            elddd7948alc       5 weeks ago        1.16 MB

ubuntu@ip-172-31-2-49:/opt/helloworld$ cd ..
ubuntu@ip-172-31-2-49:/opt$ mkdir smartfin
ubuntu@ip-172-31-2-49:/opt$ cd smartfin/
ubuntu@ip-172-31-2-49:/opt/smartfin$ wget https://storage.googleapis.com/skl-training/docker/smart_finance.tar.gz
--2018-09-05 08:21:51-- https://storage.googleapis.com/skl-training/docker/smart_finance.tar.gz
Resolving storage.googleapis.com (storage.googleapis.com)... 172.217.7.144, 2607:f8b0:4004:8001::2010
Connecting to storage.googleapis.com (storage.googleapis.com)|172.217.7.144|:443... connected.
HTTP request sent, awaiting response... 200 OK
Length: 249203 (243K) [application/gzip]
Saving to: 'smart_finance.tar.gz'

smart_finance.tar.gz      100%[=====] 243.36K  --.-KB/s  in 0.006s

2018-09-05 08:21:52 (40.6 MB/s) - 'smart_finance.tar.gz' saved [249203/249203]

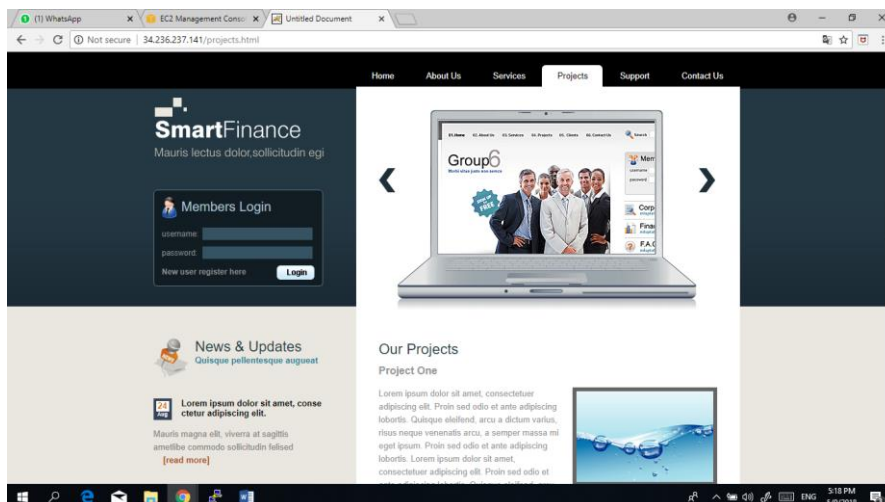
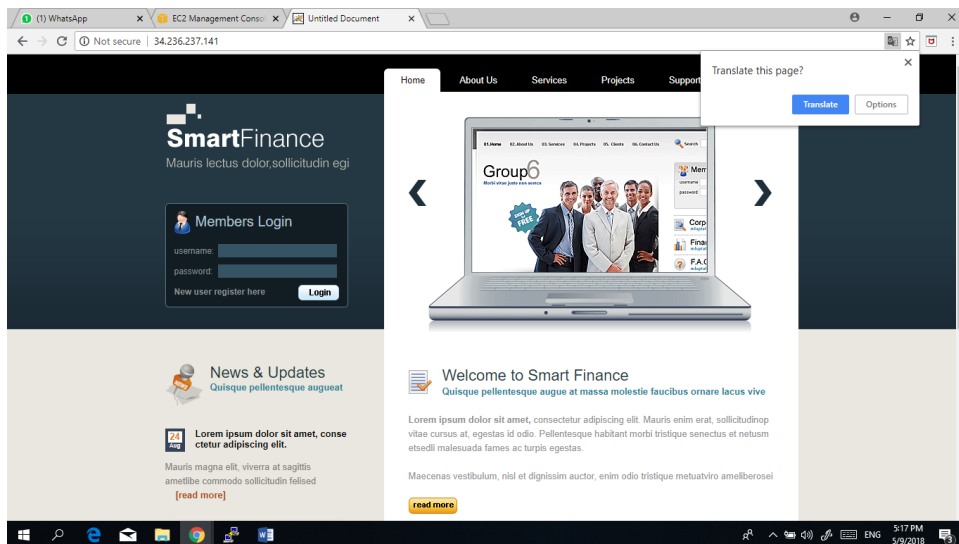
ubuntu@ip-172-31-2-49:/opt/smartfin$ tar -zxvf smart_finance.tar.gz
ubuntu@ip-172-31-2-49:/opt/smartfin$ ls -al
total 256
drwxrwxr-x 3 ubuntu ubuntu 4096 Sep  5 08:21 .
drwxr-xr-x 4 ubuntu ubuntu 4096 Sep  5 08:20 ..
drwxrwxr-x 4 ubuntu ubuntu 4096 Mar 11 13:46 site
-rw-r--r-- 1 ubuntu ubuntu 249203 Mar 11 14:35 smart_finance.tar.gz
ubuntu@ip-172-31-2-49:/opt/smartfin$ tar -zxvf smart_finance.tar.gz
ubuntu@ip-172-31-2-49:/opt/smartfin$ ls -al
```

3. Create a custom image with a static website running in httpd (reference 4)

Solution Dockers and Microservices Lab1

```
ubuntu@ip-172-31-2-49: /opt/smartfin
$ docker build -t smartfin .
Sending build context to Docker daemon 597 kB
Step 1/4 : FROM httpd
latest: Pulling from library/httpd
f189db1b98b3: Pull complete
ba2d31de2e7: Pull complete
23ae5f5e3746: Pull complete
44e0e0b4b6f: Pull complete
4c145ee018d8: Pull complete
1c74f7fda8a2: Pull complete
1a21f03081b: Pull complete
Digest: sha256:1f1f1a7a25361f309065a5a41b60e74e530a34f5593320b9570a12a492e101
Status: Downloaded newer image for httpd:latest
--> d595a4011ae3
Step 2/4 : MAINTAINER Apastya Kommanamanchi
--> Running in be5673fd43ae
--> 24da8fad2e89
Removing intermediate container be5673fd43ae
Step 3/4 : RUN mv /usr/local/apache2/htdocs/index.html /usr/local/apache2/htdocs/index.html
--> Running in c1e13e0ad5a0
--> 243939ba7188
Removing intermediate container c1e13e0ad5a0
Step 4/4 : COPY ./site/ /usr/local/apache2/htdocs/
--> 90ec81098a49
Removing intermediate container 9a4298cc9ff2
Successfully built 90ec81098a49
ubuntu@ip-172-31-2-49: /opt/smartfin$ docker images
REPOSITORY          TAG         IMAGE ID      CREATED        SIZE
smartfin             latest      90ec81098a49  6 minutes ago  176 MB
helloworld           latest      7a1a1f5cdaa4  About an hour ago  492 MB
httpd                latest      d595a4011ae3  9 hours ago    176 MB
tomcat               jre8       690cb3b9c7d1  13 days ago    463 MB
busybox              latest     c1ddd784da1c  5 weeks ago    1.16 MB
ubuntu@ip-172-31-2-49: /opt/smartfin$ docker run -d -p 80:80 smartfin
206a02d283d79c0fad12d4bee8ad42516f9b8782e33ade46c92b60dddbb2ba46
ubuntu@ip-172-31-2-49: /opt/smartfin$ docker ps -a
CONTAINER ID        IMAGE               COMMAND                  CREATED        STATUS        PORTS                    NAMES
206a02d283d7        smartfin            "httpd-foreground"      16 seconds ago Up 16 seconds    0.0.0.0:80->80/tcp      mystifying_haibt
a0f2e61a9f24        helloworld          "catalina.sh run"        About an hour ago Exited (143) 58 minutes ago    tender_jennings
763b3e77461        tomcat:jre8         "catalina.sh run"        23 hours ago   Exited (143) 23 hours ago    infallible_chandrasekhar
ubuntu@ip-172-31-2-49: /opt/smartfin$
```

4.



Part E(Advanced)

1)PULL Debian

```

ubuntu@ip-172-31-2-49: /opt/smartfin$
helloworld      latest      7a31af5c6aea      36 hours ago      472 MB
httpd           latest      d595a4011ae3      44 hours ago      178 MB
debian          latest      f2aae6ff5d89      46 hours ago      101 MB
tomcat          jre8       690cb3b9c7d1      2 weeks ago       463 MB
busybox         latest      e1ddd7948alc      5 weeks ago       1.16 MB
ubuntu@ip-172-31-2-49:/opt/smartfin$ docker run --name siabdebian -d -it debian -f /dev/null
docker: Error response from daemon: Conflict. The container name "/siabdebian" is already in use by container 168e293d00a011599f98a848d453506e957593346d43c03782a0e4970597c. You have to remove (or rename) that container to be able to reuse that name..
See 'docker run --help'.
ubuntu@ip-172-31-2-49:/opt/smartfin$ docker rm 168
168
ubuntu@ip-172-31-2-49:/opt/smartfin$ docker run --name siabdebian -d -it debian -f /dev/null
c64c332599019d170f5767b24beaf57934702279da157a3c53d8571a897ad93a
docker: Error response from daemon: OCI runtime error: container_linux.go:247: starting container process caused "exec: \"-f\": executable file not found in $PATH".
ubuntu@ip-172-31-2-49:/opt/smartfin$ docker ps -a
CONTAINER ID   IMAGE      COMMAND                  CREATED        STATUS        PORTS                    NAMES
204a02d283d7   smartfin   "httpd-foreground"      35 hours ago   Up 15 minutes   0.0.0.0:80->80/tcp       mystifying_haibt
a0f2e61e9f24   helloworld "catalina.sh run"       36 hours ago   Exited (143)   36 hours ago            tender_jennings
7035b3e774e1   tomcat:jre8 "catalina.sh run"       2 days ago     Exited (143)   2 days ago              infallible_chandrasekhar
ubuntu@ip-172-31-2-49:/opt/smartfin$ docker run --name siabdebian -d -it debian tail -f /dev/null
docker: Error response from daemon: Conflict. The container name "/siabdebian" is already in use by container c64c332599019d170f5767b24beaf57934702279da157a3c53d8571a897ad93a. You have to remove (or rename) that container to be able to reuse that name..
See 'docker run --help'.
ubuntu@ip-172-31-2-49:/opt/smartfin$ docker rm c64
c64
ubuntu@ip-172-31-2-49:/opt/smartfin$ docker run --name siabdebian -d -it debian tail -f /dev/null
839f195e69f566d8440e813e00b32aa2e20b9259490f3ae603ae6db27c8f32
ubuntu@ip-172-31-2-49:/opt/smartfin$ docker ps -a
CONTAINER ID   IMAGE      COMMAND                  CREATED        STATUS        PORTS                    NAMES
839f195e69f3   debian     "tail -f /dev/null"     29 seconds ago Up 28 seconds   0.0.0.0:80->80/tcp       siabdebian
204a02d283d7   smartfin   "httpd-foreground"      35 hours ago   Up 17 minutes   0.0.0.0:80->80/tcp       mystifying_haibt
a0f2e61e9f24   helloworld "catalina.sh run"       2 days ago     Exited (143)   36 hours ago            tender_jennings
7035b3e774e1   tomcat:jre8 "catalina.sh run"       2 days ago     Exited (143)   2 days ago              infallible_chandrasekhar
ubuntu@ip-172-31-2-49:/opt/smartfin$ docker images
REPOSITORY    TAG       IMAGE ID       CREATED        SIZE
smartfin       latest    9ec81098a49   35 hours ago   178 MB
helloworld     latest    7a31af5c6aea   36 hours ago   472 MB
httpd          latest    d595a4011ae3   44 hours ago   178 MB
debian         latest    f2aae6ff5d89   47 hours ago   101 MB
tomcat         jre8      690cb3b9c7d1   2 weeks ago    463 MB
busybox        latest    e1ddd7948alc   5 weeks ago    1.16 MB
ubuntu@ip-172-31-2-49:/opt/smartfin$

```

1.

a)update and upgrade

```

ubuntu@ip-172-31-2-49:/opt/smartfin$
root@839f195e69f3:/# apt install -y apt-utils procs sudo wget curl
Reading package lists... Done
Building dependency tree
Reading state information... Done
The following additional packages will be installed:
  ca-certificates krb5-locales libapt-inst2.0 libcurl3 libffi6 libgmp10 libgnutls30 libgpm2 libgssapi-krb5-2 libhogweed4 libidn2-0 libk5crypto3 libkeyutils1 libkrb5-3
  libkrb5support0 libldap-2.4-2 libldap-common libncurses5 libnghttp2-14 libp11-kit0 libprocps6 libpsl5 librtmp1 libsaas12-2 libsaas12-modules libsaas12-modules-db
  libssh2-1 libssl1.0.2 libssl1.1 libtasn1-6 libunistring0 openssl psmisc publicsuffix
Suggested packages:
  gnutls-bin gpm krb5-doc krb5-user libsaas12-modules-gssapi-mit | libsaas12-modules-gssapi-heimdal libsaas12-modules-ldap libsaas12-modules-otp libsaas12-modules-sql
The following NEW packages will be installed:
  apt-utils ca-certificates curl krb5-locales libapt-inst2.0 libcurl3 libffi6 libgmp10 libgnutls30 libgpm2 libgssapi-krb5-2 libhogweed4 libidn2-0 libk5crypto3
  libkeyutils1 libkrb5-3 libkrb5support0 libldap-2.4-2 libldap-common libncurses5 libnghttp2-14 libp11-kit0 libprocps6 libpsl5 librtmp1 libsaas12-2 libsaas12-modules
  libsaas12-modules-db libssh2-1 libssl1.0.2 libssl1.1 libtasn1-6 libunistring0 openssl procs psmisc publicsuffix sudo wget
0 upgraded, 39 newly installed, 0 to remove and 0 not upgraded.
Need to get 10.6 MB of archives.
After this operation, 29.0 MB of additional disk space will be used.
Get:1 http://security.debian.org/debian-security stretch/updates/main amd64 libcurl3 amd64 7.52.1-5+deb9u7 [292 kB]
Get:2 http://security.debian.org/debian-security stretch/updates/main amd64 curl amd64 7.52.1-5+deb9u7 [228 kB]
Get:3 http://security.debian.org/debian-security stretch/updates/main amd64 libapt-inst2.0 amd64 1.4.8 [192 kB]
Get:4 http://cdn-fastly.deb.debian.org/debian stretch/main amd64 apt-utils amd64 1.4.8 [410 kB]
Get:5 http://cdn-fastly.deb.debian.org/debian stretch/main amd64 libprocps6 amd64 2:3.3.12-3+deb9u1 [58.5 kB]
Get:6 http://cdn-fastly.deb.debian.org/debian stretch/main amd64 libssl1.0.2 amd64 1.0.2j-2+deb9u3 [1294 kB]
Get:7 http://cdn-fastly.deb.debian.org/debian stretch/main amd64 libssl1.1 amd64 1.1.0f-3+deb9u2 [1344 kB]
Get:8 http://cdn-fastly.deb.debian.org/debian stretch/main amd64 libncurses5 amd64 6.0+20161126-1+deb9u2 [59.4 kB]
Get:9 http://cdn-fastly.deb.debian.org/debian stretch/main amd64 procs amd64 2:3.3.12-3+deb9u1 [250 kB]
Get:10 http://cdn-fastly.deb.debian.org/debian stretch/main amd64 libgmp10 amd64 2:6.1.2+dfsg-1 [253 kB]
Get:11 http://cdn-fastly.deb.debian.org/debian stretch/main amd64 libhogweed4 amd64 3.3-1+deb9u1 [136 kB]
Get:12 http://cdn-fastly.deb.debian.org/debian stretch/main amd64 libffi6 amd64 3.2.1-6 [20.4 kB]
Get:13 http://cdn-fastly.deb.debian.org/debian stretch/main amd64 libp11-kit0 amd64 0.23.3-2 [111 kB]
Get:14 http://cdn-fastly.deb.debian.org/debian stretch/main amd64 libtasn1-6 amd64 4.10-1.1+deb9u1 [50.6 kB]
Get:15 http://cdn-fastly.deb.debian.org/debian stretch/main amd64 libgnutls30 amd64 3.5.8-5+deb9u3 [895 kB]
Get:16 http://cdn-fastly.deb.debian.org/debian stretch/main amd64 libunistring0 amd64 0.9.4+rebuild-5.3-0.1 [279 kB]
Get:17 http://cdn-fastly.deb.debian.org/debian stretch/main amd64 libidn2-0 amd64 0.16-1+deb9u1 [60.7 kB]
Get:18 http://cdn-fastly.deb.debian.org/debian stretch/main amd64 libpsl5 amd64 0.17.0-3 [41.8 kB]
Get:19 http://cdn-fastly.deb.debian.org/debian stretch/main amd64 wget amd64 1.18-5+deb9u2 [799 kB]
Get:20 http://cdn-fastly.deb.debian.org/debian stretch/main amd64 krb5-locales all 1.15-1+deb9u1 [93.8 kB]
Get:21 http://cdn-fastly.deb.debian.org/debian stretch/main amd64 libgpm2 amd64 1.20.4-6.2+b1 [34.2 kB]
Get:22 http://cdn-fastly.deb.debian.org/debian stretch/main amd64 libkeyutils1 amd64 1.5.9-9 [12.4 kB]
Get:23 http://cdn-fastly.deb.debian.org/debian stretch/main amd64 libkrb5support0 amd64 1.15-1+deb9u1 [61.9 kB]
Get:24 http://cdn-fastly.deb.debian.org/debian stretch/main amd64 libk5crypto3 amd64 1.15-1+deb9u1 [115 kB]
Get:25 http://cdn-fastly.deb.debian.org/debian stretch/main amd64 libkrb5-3 amd64 1.15-1+deb9u1 [311 kB]
Get:26 http://cdn-fastly.deb.debian.org/debian stretch/main amd64 libgssapi-krb5-2 amd64 1.15-1+deb9u1 [155 kB]

```

Solution Dockers and Microservices Lab1

Adding user

```
ubuntu@ip-172-31-2-49:/opt/smartfin$ root@8839f195e69f3:/# adduser guest
Adding user 'guest' ...
Adding new group 'guest' (1000) ...
Adding new user 'guest' (1000) with group 'guest' ...
Creating home directory '/home/guest' ...
Copying files from '/etc/skel' ...
Enter new UNIX password:
Retype new UNIX password:
passwd: password updated successfully
Changing the user information for guest
Enter the new value, or press ENTER for the default
    Full Name []: Agastya
    Room Number []:
    Work Phone []:
    Home Phone []:
    Other []:
Is the information correct? [Y/n] y
root@8839f195e69f3:/#
root@8839f195e69f3:/#
root@8839f195e69f3:/# adduser guest sudo
Adding user 'guest' to group 'sudo' ...
Adding user guest to group sudo
Done.
root@8839f195e69f3:/# docker ps -a
bash: docker: command not found
root@8839f195e69f3:/# exist
bash: exist: command not found
root@8839f195e69f3:/# exit
exit
ubuntu@ip-172-31-2-49:/opt/smartfin$ docker ps -a
CONTAINER ID        IMAGE               COMMAND                  CREATED            STATUS              PORTS              NAMES
839f195e69f3        debian             "tail -f /dev/null"    17 minutes ago    Up 17 minutes      0.0.0.0:80->80/tcp  siabdebian
204a02d283d7        smartfin          "httpd-foreground"     35 hours ago      Up 34 minutes      0.0.0.0:80->80/tcp  mystifying_haibt
a0f2e61a9f24        helloworld        "catalina.sh run"      36 hours ago      Exited (143) 36 hours ago          tender_jennings
7035b3e77461        tomcat:jre8       "catalina.sh run"      2 days ago        Exited (143) 2 days ago          infallible_chandrasekhar
ubuntu@ip-172-31-2-49:/opt/smartfin$ docker stop 839
839
ubuntu@ip-172-31-2-49:/opt/smartfin$ docker ps -a
CONTAINER ID        IMAGE               COMMAND                  CREATED            STATUS              PORTS              NAMES
839f195e69f3        debian             "tail -f /dev/null"    18 minutes ago    Exited (137) 8 seconds ago          siabdebian
204a02d283d7        smartfin          "httpd-foreground"     35 hours ago      Up 35 minutes      0.0.0.0:80->80/tcp  mystifying_haibt
a0f2e61a9f24        helloworld        "catalina.sh run"      36 hours ago      Exited (143) 36 hours ago          tender_jennings
7035b3e77461        tomcat:jre8       "catalina.sh run"      2 days ago        Exited (143) 2 days ago          infallible_chandrasekhar
```

Debian base=user setup +Debian

Docker file

```
ubuntu@ip-172-31-2-49:/opt/siab$ GNU nano 2.5.3      File: SIABDockerfile      Modified
FROM siabdebian-base

MAINTAINER Agastya Kommanamanchi @ Pointer.Next.com

#bash commands
RUN \
    apt install -y vim && \
    apt install -y openssh shellinabox
#The end tail is needed for the container not to stop
CMD service shellinabox start && tail -f /dev/null
```


Solution Dockers and Microservices Lab1

```
ubuntu@ip-172-31-2-49:/opt/siab$ dpkg-preconfigure: unable to re-open stdin:
Fetching 125 kB in 0s (1141 kB/s)
Selecting previously unselected package shellinabox.
(Reading database ... 9284 files and directories currently installed.)
Preparing to unpack .../shellinabox_2.20+b1_amd64.deb ...
Unpacking shellinabox (2.20+b1) ...
Setting up shellinabox (2.20+b1) ...
invoke-rc.d: could not determine current runlevel
invoke-rc.d: policy-rc.d denied execution of start.
----> 2470d85593d7a
Removing intermediate container b3f5295ecb5a
Step 4/4 : CMD service shellinabox start && tail -f /dev/null
----> Running in 0b298f5563d0
----> 4f2f5aa870dd
Removing intermediate container 0b298f5563d0
Successfully built 4f2f5aa870dd
ubuntu@ip-172-31-2-49:/opt/siab$ docker images
```

REPOSITORY	TAG	IMAGE ID	CREATED	SIZE
siab	latest	4f2f5aa870dd	30 seconds ago	178 MB
siabdebian-base	latest	612df5402688	23 minutes ago	147 MB
smartfin	latest	9cec81098a49	36 hours ago	178 MB
helloworld	latest	7a31af5c6aea	37 hours ago	472 MB
htupd	latest	d595a401iae3	45 hours ago	178 MB
chshian	latest	f2aae0ffdb98	47 hours ago	101 MB
tomcat	jre8	690cb3b5c7d1	2 weeks ago	463 MB
buzbybox	latest	e1ddd7948alc	5 weeks ago	1.16 MB

```
ubuntu@ip-172-31-2-49:/opt/siab$ docker run -d -p 443:4200 --name siab -i siab
unknown shorthand flag: 'n' in -name
See 'docker run --help'.
ubuntu@ip-172-31-2-49:/opt/siab$ docker run -d -p 443:4200 --Name siab -i siab
unknown shorthand flag: 'N' in -Name
See 'docker run --help'.
ubuntu@ip-172-31-2-49:/opt/siab$ docker run -d -p 443:4200 --name siab -i siab
e5fb5c3bd63621ba271757ffe6188c730636728253bdf716d56c7ca56ad91c44
ubuntu@ip-172-31-2-49:/opt/siab$ docker ps -a
```

CONTAINER ID	IMAGE	COMMAND	CREATED	STATUS	PORTS	NAMES
e5fb5c3bd63	siab	/bin/sh -c "servi..."	30 seconds ago	Up 29 seconds	0.0.0.0:443->4200/tcp	siab
82bd205411c	felc7fa01c8f	/bin/sh -c "apt i..."	13 minutes ago	Exited (100)	13 minutes ago	flamboyant_galileo
939f195ee9f3	debian	"tail -f /dev/null"	54 minutes ago	Exited (137)	36 minutes ago	siabdebian
29fe4e69eb9d	smartfin	"siab--foreground"	36 hours ago	Up About an hour		mystifying_habit
40f2e61a9f24	helloworld	"catalina.sh run"	37 hours ago	Exited (143)	36 hours ago	tender_jennings
7035b8e77461	tomcat:jre8	"catalina.sh run"	2 days ago	Exited (143)	2 days ago	infallible_chandrasekhar

```
ubuntu@ip-172-31-2-49:/opt/siab$
```

Adding port HTTPS

The screenshot shows the AWS Management Console for an EC2 instance named 'docker'. The instance is in the 'running' state and is a t2.micro instance in the us-east-1a availability zone. A modal window displays the security groups associated with the instance: sg-04169656fea786776, which allows inbound traffic on ports 22 (SSH) and 80 (HTTP).

Ports	Protocol	Source	open-ssh	open-http
22	tcp	0.0.0.0, ::/0	✓	
80	tcp	0.0.0.0, ::/0		✓
443	tcp	0.0.0.0, ::/0		✓

Final Result

Lab Maintenance

[illegible]