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Cloud Computing

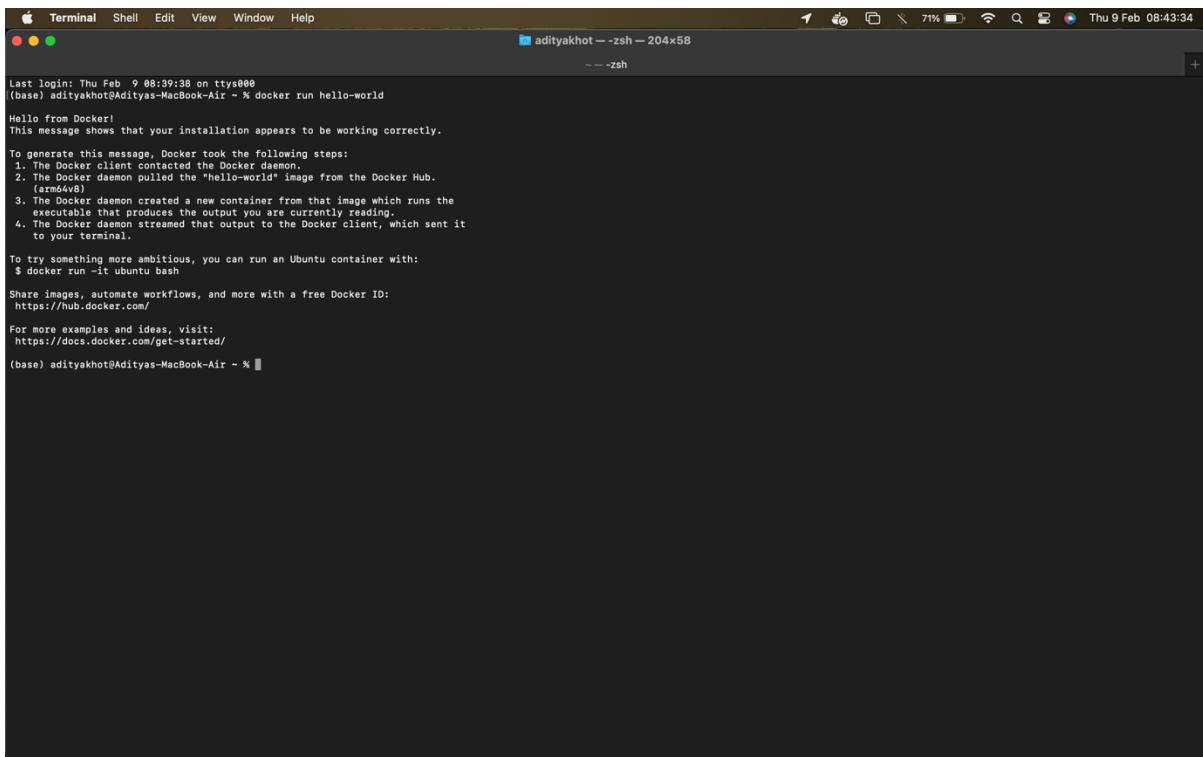
Experiment 2 - Docker on Linux/Windows/Mac OS

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Section : G

- **1a.jpg:** Screenshot of running docker hello-world.



The screenshot shows a macOS Terminal window with the title bar "Terminal Shell Edit View Window Help" and the window title "adityakhot -- zsh -- 204x58". The terminal content is as follows:

```
Last login: Thu Feb 9 08:39:38 on ttys000
(base) adityakhot@Adityas-MacBook-Air ~ % docker run hello-world
Hello from Docker!
This message shows that your installation appears to be working correctly.

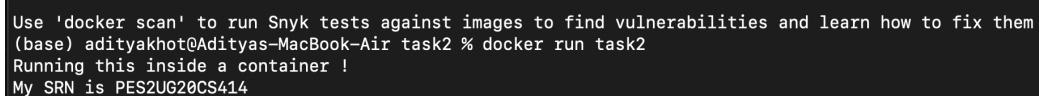
To generate this message, Docker took the following steps:
1. The Docker client contacted the Docker daemon.
2. The Docker daemon pulled the "hello-world" image from the Docker Hub.
   (arm64v8)
3. The Docker daemon created a new container from that image which runs the
   executable that produces the output you are currently reading.
4. The Docker daemon streamed that output to the Docker client, which sent it
   to your terminal.

To try something more ambitious, you can run an Ubuntu container with:
$ docker run -it ubuntu bash

Share images, automate workflows, and more with a free Docker ID:
https://hub.docker.com/

For more examples and ideas, visit:
https://docs.docker.com/get-started/
(base) adityakhot@Adityas-MacBook-Air ~ %
```

- **2a.jpg:** Screenshot of C Program successfully run inside the container.



```
Use 'docker scan' to run Snyk tests against images to find vulnerabilities and learn how to fix them
(base) adityakhot@Adityas-MacBook-Air task2 % docker run task2
Running this inside a container !
My SRN is PES2UG20CS414
```

- **2b.jpg:** Screenshot of the image pushed to Dockerhub.

The screenshot shows the Docker Hub interface for the repository `adityakhot/task2`. The General tab is active. A note at the top says "Add a short description for this repository". Below it, a Docker command is shown: `docker push adityakhot/task2:tagname`. The Tags section lists one tag: `1.0` (Image). The Automated Builds section notes that manually pushing images to Hub? is disabled. It also mentions connecting to GitHub or Bitbucket for automated builds.

- **3a.jpg:** Screenshot of docker container running nginx

```
-fDownloads/experiment/task3/task3-nginx --zsh
To generate this message, Docker took the following steps:
1. The Docker client contacted the Docker daemon.
2. The Docker daemon pulled the "hello-world" image from the Docker Hub.
   (arm64v8)
3. The Docker daemon created a new container from that image which runs the
   executable that produces the output you are currently reading.
4. The Docker daemon streamed that output to the Docker client, which sent it
   to your terminal.

To try something more ambitious, you can run an Ubuntu container with:
$ docker run -it ubuntu bash

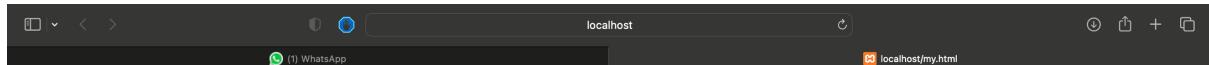
Share images, automate workflows, and more with a free Docker ID:
https://hub.docker.com/

For more examples and ideas, visit:
https://docs.docker.com/get-started/

(base) adityakhot@Adityas-MacBook-Air ~ % cd /Users/adityakhot/Desktop/pesuniversity/assignment/cdlab/lab1
(base) adityakhot@Adityas-MacBook-Air lab1 % cd /Users/adityakhot/Downloads/experiment/task3
(base) adityakhot@Adityas-MacBook-Air task3 % docker build -t task3 .
[+] Building 0.0s (1/2)
=> [internal] load build definition from Dockerfile
=> => transferring dockerfile: 2B
failed to solve with frontend dockerfile.v0: failed to read dockerfile: open /var/lib/docker/tmp/buildkit-mount3354307295/Dockerfile: no such file or directory
(base) adityakhot@Adityas-MacBook-Air task3 % cd /Users/adityakhot/Downloads/experiment/task3/task3-nginx
(base) adityakhot@Adityas-MacBook-Air task3-nginx % docker build -t task3 .
[+] Building 0.1s (7/7) FINISHED
=> [internal] load build definition from Dockerfile
=> => transferring dockerfile: 169B
=> [internal] load .dockerignore
=> => transferring context: 2B
=> [internal] load metadata for docker.io/library/nginx:latest
=> [internal] load build context
=> => transferring context: 277B
=> [1/2] FROM docker.io/library/nginx
=> [2/2] COPY my.html /usr/share/nginx/html
=> exporting image
=> => exporting layers
=> => writing image sha256:be2e034681baa21165ba71fe5a0511f53484e9a73bd5b17f3c2264b545ae4e34
=> => naming to docker.io/library/task3

Use 'docker scan' to run Snyk tests against images to find vulnerabilities and learn how to fix them
(base) adityakhot@Adityas-MacBook-Air task3-nginx %
```

- **3b.jpg:** Sample.html showing the web page on the browser.



My SRN is PES2UG20CS414

I am running a nginx container!

- **3c.jpg:** Screenshot of python application successfully writing and reading from the MongoDB database

```
--> [4/4] COPY sample.py sample.py
=> exporting to image
=> => exporting layers
=> => writing image sha256:5eaf4b1cacf68762ac02ab95fea0653929588fefc3913e6d6fc845b81c86557
=> => naming to docker.io/library/task3

Use 'docker scan' to run Snyk tests against images to find vulnerabilities and learn how to fix them
(base) adityakhot@Adityas-MacBook-Air task3-pymongo % docker run task3
Inserted into the MongoDB database!
Fetched from MongoDB:  {'_id': ObjectId('63e518f3deeb1808bc44c32c'), 'Name': '<Your Name>', 'SRN': '<YOUR_SRN>'}
(base) adityakhot@Adityas-MacBook-Air task3-pymongo %
```

- **3d.jpg:** Screenshot showing mongodb being run within the network(docker command has to be clearly highlighted)

```
Fetched from MongoDB: {'_id': ObjectId('63e518f3deeb1808bc44c32c'), 'Name': '<Your Name>', 'SRN': '<YOUR_SRN>'}
(base) adityakhot@Adityas-MacBook-Air task3-pymongo % docker ps
CONTAINER ID IMAGE COMMAND CREATED STATUS PORTS NAMES
0862fdbbf14 mongo "docker-entrypoint.s..." 10 minutes ago Up 10 minutes 0.0.0.0:27017->27017/tcp brave_golick
(base) adityakhot@Adityas-MacBook-Air task3-pymongo %
```

- **3e.jpg:** Screenshot showing python file being run within the network and successfully writing and reading from MongoDB(docker command has to be clearly highlighted)

```
~/Downloads/experiment/task3/task3-pymongo — zsh
0.0s

Use 'docker scan' to run Snyk tests against images to find vulnerabilities and learn how to fix them
(base) adityakhot@Adityas-MacBook-Air task3-pymongo % docker run task3
Inserted into the MongoDB database!
Fetched from MongoDB: {'_id': ObjectId('63e518f3deeb1808bc44c32c'), 'Name': '<Your Name>', 'SRN': '<YOUR_SRN>'}
(base) adityakhot@Adityas-MacBook-Air task3-pymongo % docker ps
CONTAINER ID IMAGE COMMAND CREATED STATUS PORTS NAMES
0862fdbbf14 mongo "docker-entrypoint.s..." 10 minutes ago Up 10 minutes 0.0.0.0:27017->27017/tcp brave_golick
(base) adityakhot@Adityas-MacBook-Air task3-pymongo % docker stop 0862fdbbf14
0862fdbbf14
(base) adityakhot@Adityas-MacBook-Air task3-pymongo % docker network create my-bridge-network
8ff1ba3d58a8e9244659ce7234cef22dbd4daf3063238a1a64b8035c90a1125
(base) adityakhot@Adityas-MacBook-Air task3-pymongo % docker run -dp 27017:27017 --network=my-bridge-network --name=mongodb mongo:latest
e26678aefceeb771f9716ff590a5f2a7facf0c390474bd52596940d1fdd2ea1b
(base) adityakhot@Adityas-MacBook-Air task3-pymongo % docker build -t task3 .
[+] Building 0.1s (9/9) FINISHED
=> [internal] load build definition from Dockerfile
=> => transferring dockerfile: 117B
=> [internal] load .dockerrcignore
=> => transferring context: 2B
=> [internal] load metadata for docker.io/library/python:latest
=> [internal] load build context
=> => transferring context: 112B
=> [1/4] FROM docker.io/library/python
=> CACHED [2/4] RUN apt-get update
=> CACHED [3/4] RUN pip install pymongo
=> CACHED [4/4] COPY sample.py sample.py
=> exporting to image
=> => exporting layers
=> => writing image sha256:5eaf4b1cacf68762ac02ab95fea0653929588fefc3913e6d6cf845b81c86557
=> => naming to docker.io/library/task3

Use 'docker scan' to run Snyk tests against images to find vulnerabilities and learn how to fix them
(base) adityakhot@Adityas-MacBook-Air task3-pymongo %
```

- **4a.jpg:** Screenshot of python-mongodb application running as a docker-compose application(logs of the application)

```

~/Downloads/experiment/task4 -- docker-compose - docker compose up +  

ent metadata", "attr": {"remote": "172.19.0.3:36416", "client": "conn1", "doc": {"driver": {"name": "PyMongo", "version": "4.3.3"}, "os": {"type": "Linux", "name": "Linux", "architecture": "aarch64", "version": "5.15.49-linuxkit"}, "platform": "CPython 3.11.2.final.0"} }  

task4-mongodb-1 | {"t": {"$date": "2023-02-09T16:07:05.161+00:00"}, "s": "I", "c": "NETWORK", "id": 22943, "ctx": "listener", "msg": "Connection accepted", "attr": {"remote": "172.19.0.3:36424", "uuid": "48259db3-22d7-47bc-85fd-9e046703eb85", "connectionId": 2, "connectionCount": 2}}  

task4-mongodb-1 | {"t": {"$date": "2023-02-09T16:07:05.161+00:00"}, "s": "I", "c": "NETWORK", "id": 22943, "ctx": "listener", "msg": "Connection accepted", "attr": {"remote": "172.19.0.3:36436", "uuid": "9fe85fa-660d-435e-9567-7e2a744f490a", "connectionId": 3, "connectionCount": 3}}  

task4-mongodb-1 | {"t": {"$date": "2023-02-09T16:07:05.162+00:00"}, "s": "I", "c": "NETWORK", "id": 51800, "ctx": "conn2", "msg": "client metadata", "attr": {"remote": "172.19.0.3:36424", "client": "conn2", "doc": {"driver": {"name": "PyMongo", "version": "4.3.3"}, "os": {"type": "Linux", "name": "Linux", "architecture": "aarch64", "version": "5.15.49-linuxkit"}, "platform": "CPython 3.11.2.final.0"} } }  

task4-mongodb-1 | {"t": {"$date": "2023-02-09T16:07:05.162+00:00"}, "s": "I", "c": "NETWORK", "id": 51800, "ctx": "conn3", "msg": "client metadata", "attr": {"remote": "172.19.0.3:36436", "client": "conn3", "doc": {"driver": {"name": "PyMongo", "version": "4.3.3"}, "os": {"type": "Linux", "name": "Linux", "architecture": "aarch64", "version": "5.15.49-linuxkit"}, "platform": "CPython 3.11.2.final.0"} } }  

task4-mongodb-1 | {"t": {"$date": "2023-02-09T16:07:05.162+00:00"}, "s": "I", "c": "STORAGE", "id": 20320, "ctx": "conn3", "msg": "createCollection", "attr": {"namespace": "sample_db.sample_collection", "uuidDisposition": "generated", "uuid": {"$uuid": "d9c1f7be-cf96-48c2-8156-579fda548e1d"}}, "options": {} } }  

task4-mongodb-1 | {"t": {"$date": "2023-02-09T16:07:05.167+00:00"}, "s": "I", "c": "INDEX", "id": 20345, "ctx": "conn3", "msg": "Index build: done building", "attr": {"buildUUID": null, "collectionUUID": {"$uuid": "d9c1f7be-cf96-48c2-8156-579fda548e1d"}, "nameSpace": "sample_db.sample_collection", "index": {"_id": "ident": "index-8--7728878864523695074"}, "collectionIdent": "collection-7--7728878864523695074", "commitTimestamp": null}}  

task4-pycode-1 | Inserted into the MongoDB database!  

task4-pycode-1 | Fetched from MongoDB: {'_id': ObjectId('63e51a28209124c8b01207f7')}, 'Name': '<Your Name>', 'SRN': '<Your SRN>' }  

task4-mongodb-1 | {"t": {"$date": "2023-02-09T16:07:05.665+00:00"}, "s": "I", "c": "-", "id": 20883, "ctx": "conn1", "msg": "Interrupted operation as its client disconnected", "attr": {"opId": 13}}  

task4-mongodb-1 | {"t": {"$date": "2023-02-09T16:07:05.669+00:00"}, "s": "I", "c": "NETWORK", "id": 22944, "ctx": "conn1", "msg": "Connection ended", "attr": {"remote": "172.19.0.3:36416", "uuid": "f0588420-6bd0-49d4-9679-87a88773ada5", "connectionId": 1, "connectionCount": 1}}  

task4-mongodb-1 | {"t": {"$date": "2023-02-09T16:07:05.683+00:00"}, "s": "I", "c": "NETWORK", "id": 22944, "ctx": "conn3", "msg": "Connection ended", "attr": {"remote": "172.19.0.3:36436", "uuid": "9fe85fa-660d-435e-9567-7e2a744f490a", "connectionId": 3, "connectionCount": 1}}  

task4-mongodb-1 | {"t": {"$date": "2023-02-09T16:07:05.683+00:00"}, "s": "I", "c": "NETWORK", "id": 22944, "ctx": "conn2", "msg": "Connection ended", "attr": {"remote": "172.19.0.3:36424", "uuid": "48259db3-22d7-47bc-85fd-9e046703eb85", "connectionId": 2, "connectionCount": 1}}  

task4-pycode-1 exited with code 0

```

- **4b.jpg:** Screenshot of 3 python application writes and reads from MongoDB after scaling the python application.

```

~/Downloads/experiment/task4 -- docker-compose - docker compose up --scale pycode=3 +  

task4-mongodb-1 | {"t": {"$date": "2023-02-09T16:08:17.475+00:00"}, "s": "I", "c": "-", "id": 20883, "ctx": "conn1", "msg": "Interrupted operation as its client disconnected", "attr": {"opId": 15}}  

task4-mongodb-1 | {"t": {"$date": "2023-02-09T16:08:17.480+00:00"}, "s": "I", "c": "NETWORK", "id": 22944, "ctx": "conn1", "msg": "Connection ended", "attr": {"remote": "172.19.0.3:59148", "uuid": "7c03cc29-b17e-4fa7-a6c6-74af865636dc", "connectionId": 1, "connectionCount": 8}}  

task4-mongodb-1 | {"t": {"$date": "2023-02-09T16:08:17.493+00:00"}, "s": "I", "c": "NETWORK", "id": 22944, "ctx": "conn2", "msg": "Connection ended", "attr": {"remote": "172.19.0.3:59162", "uuid": "aece3063-9584-435c-8df1-f2f857ccb15d", "connectionId": 2, "connectionCount": 7}}  

task4-mongodb-1 | {"t": {"$date": "2023-02-09T16:08:17.493+00:00"}, "s": "I", "c": "NETWORK", "id": 22944, "ctx": "conn3", "msg": "Connection ended", "attr": {"remote": "172.19.0.3:59164", "uuid": "19d36d9e-9685-462c-bd16-c6b2f320e378", "connectionId": 3, "connectionCount": 6}}  

task4-mongodb-1 | {"t": {"$date": "2023-02-09T16:08:17.606+00:00"}, "s": "I", "c": "-", "id": 20883, "ctx": "conn4", "msg": "Interrupted operation as its client disconnected", "attr": {"opId": 24}}  

task4-mongodb-1 | {"t": {"$date": "2023-02-09T16:08:17.606+00:00"}, "s": "I", "c": "NETWORK", "id": 22944, "ctx": "conn4", "msg": "Connection ended", "attr": {"remote": "172.19.0.4:47282", "uuid": "274720aa-db65-4f22-bbd6-3abdd4da6575", "connectionId": 4, "connectionCount": 5}}  

task4-mongodb-1 | {"t": {"$date": "2023-02-09T16:08:17.611+00:00"}, "s": "I", "c": "NETWORK", "id": 22944, "ctx": "conn5", "msg": "Connection ended", "attr": {"remote": "172.19.0.4:47286", "uuid": "1e771d52-40b2-44f0-8300-e79bf4efc66", "connectionId": 5, "connectionCount": 4}}  

task4-mongodb-1 | {"t": {"$date": "2023-02-09T16:08:17.611+00:00"}, "s": "I", "c": "NETWORK", "id": 22944, "ctx": "conn6", "msg": "Connection ended", "attr": {"remote": "172.19.0.4:47290", "uuid": "4cd1c934-6626-4b2c-9fab-b78f476dd111", "connectionId": 6, "connectionCount": 3}}  

task4-pycode-3 exited with code 0  

task4-mongodb-1 | {"t": {"$date": "2023-02-09T16:08:17.694+00:00"}, "s": "I", "c": "-", "id": 20883, "ctx": "conn7", "msg": "Interrupted operation as its client disconnected", "attr": {"opId": 31}}  

task4-mongodb-1 | {"t": {"$date": "2023-02-09T16:08:17.694+00:00"}, "s": "I", "c": "NETWORK", "id": 22944, "ctx": "conn7", "msg": "Connection ended", "attr": {"remote": "172.19.0.5:55608", "uuid": "eaaa91e-6349-4aad-9733-221fce93226", "connectionId": 7, "connectionCount": 2}}  

task4-pycode-1 exited with code 0  

task4-mongodb-1 | {"t": {"$date": "2023-02-09T16:08:17.700+00:00"}, "s": "I", "c": "NETWORK", "id": 22944, "ctx": "conn9", "msg": "Connection ended", "attr": {"remote": "172.19.0.5:55616", "uuid": "f8c4016e-b42e-417c-90aa-a1e264adfaf", "connectionId": 9, "connectionCount": 0}}  

task4-mongodb-1 | {"t": {"$date": "2023-02-09T16:08:17.700+00:00"}, "s": "I", "c": "NETWORK", "id": 22944, "ctx": "conn8", "msg": "Connection ended", "attr": {"remote": "172.19.0.5:55620", "uuid": "5dd182c8-a8de-4cd5-97fb-95c7f8895120", "connectionId": 8, "connectionCount": 1}}  

task4-pycode-2 exited with code 0

```