Lab 6
BTI525 NCC
Fall 2025

INSTRUCTOR: ROBIN HUANG

Title: *Working with Docker Hub and Fragments*
Course: Web Programming for the Cloud
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Github Link: https://github.com/minhazabedin53/bti525_lab6
Docker Hub Link: https://hub.docker.com/r/abedin53/fragments

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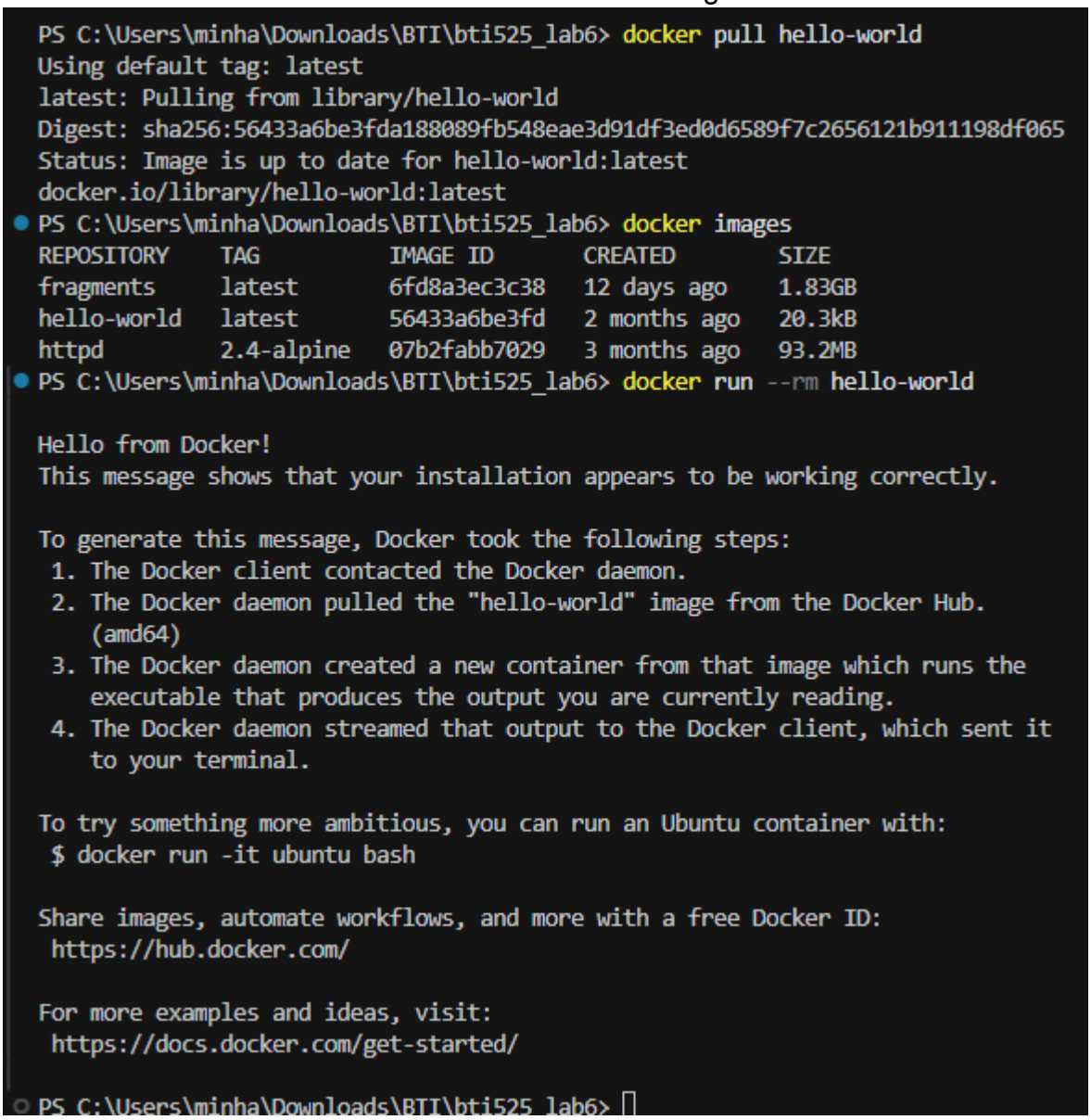
Screenshot after:

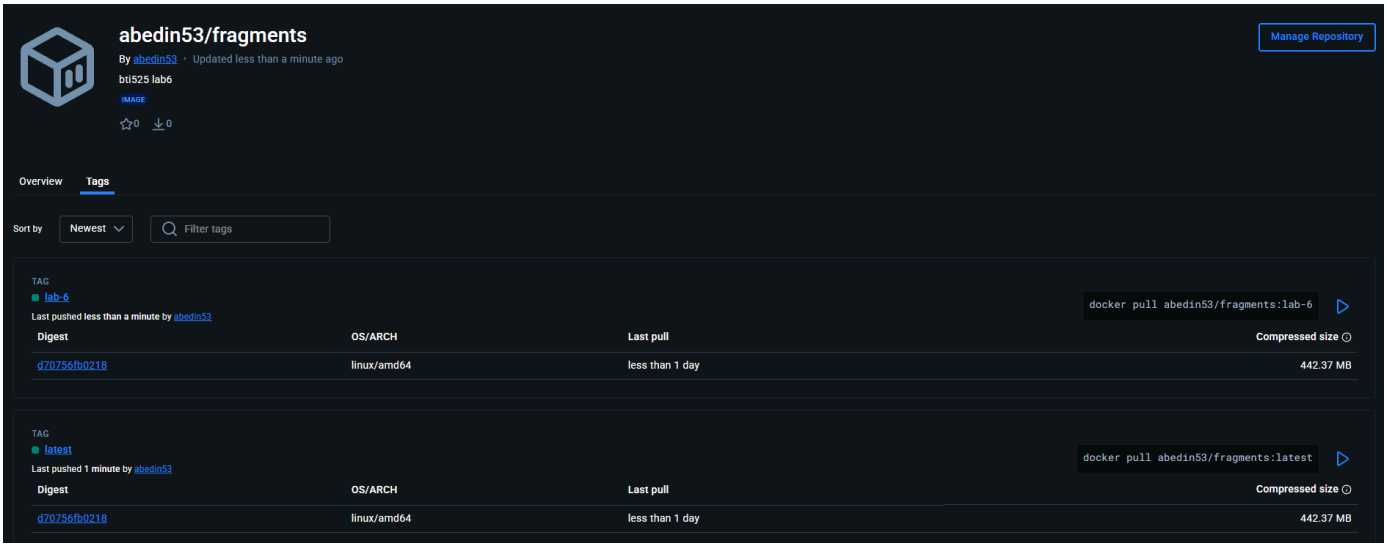
- Pulled hello-world from Docker Hub
- Verified it appears in docker images
- Ran it and saw the “Hello from Docker!” message



Screenshots of Tagging and Pushing My Image to Docker Hub

```
PS C:\Users\minha\Downloads\BTI\bti525_lab6> docker tag fragments:latest abedin53/fragments:latest
PS C:\Users\minha\Downloads\BTI\bti525_lab6> docker tag fragments:latest abedin53/fragments:lab-6
PS C:\Users\minha\Downloads\BTI\bti525_lab6> docker login --username abedin53

i Info → A Personal Access Token (PAT) can be used instead.
         To create a PAT, visit https://app.docker.com/settings


Password:
```

```
Login Succeeded
PS C:\Users\minha\Downloads\BTI\bti525_lab6> docker push abedin53/fragments:latest
The push refers to repository [docker.io/abedin53/fragments]
fdf894e782a2: Pushed
5bd71677db44: Pushed
480cf7800ccb: Pushed
6f76c9e452df: Pushed
cd8cd1fac358: Pushed
460b77464f81: Pushed
551df7f94f9c: Pushed
d1b68cc99c4c: Pushed
d841a39ee66b: Pushed
ce82e98d553d: Pushed
0b8ec04fd63d: Pushed
a626dd299f99: Pushed
151024cdfe55: Pushed
latest: digest: sha256:6fd8a3ec3c38467c38145d6072b10c8de1ea18e31cddfeffb7a27dc3cb9fe8ae size: 856
PS C:\Users\minha\Downloads\BTI\bti525_lab6> docker push abedin53/fragments:lab-6
The push refers to repository [docker.io/abedin53/fragments]
151024cdfe55: Layer already exists
460b77464f81: Layer already exists
ce82e98d553d: Layer already exists
6f76c9e452df: Layer already exists
0b8ec04fd63d: Layer already exists
cd8cd1fac358: Layer already exists
d1b68cc99c4c: Layer already exists
fdf894e782a2: Layer already exists
a626dd299f99: Layer already exists
551df7f94f9c: Layer already exists
480cf7800ccb: Layer already exists
5bd71677db44: Layer already exists
d841a39ee66b: Already exists
lab-6: digest: sha256:6fd8a3ec3c38467c38145d6072b10c8de1ea18e31cddfeffb7a27dc3cb9fe8ae size: 856
```



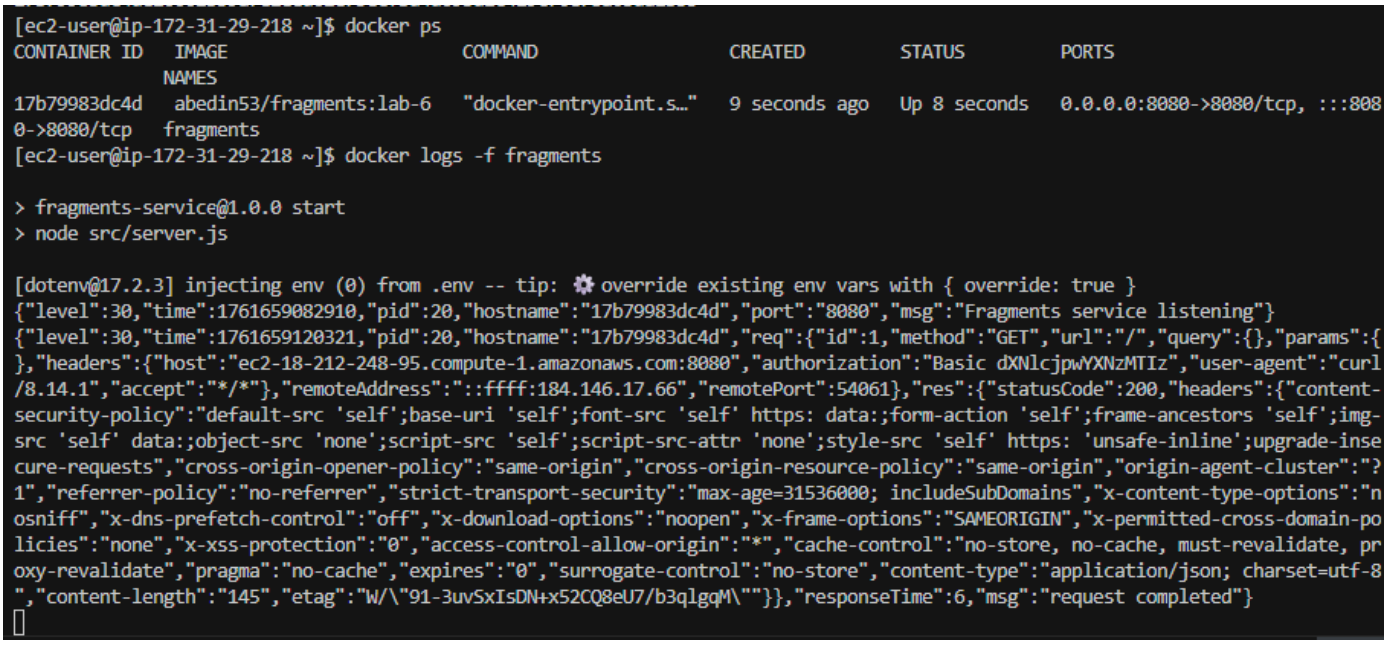
Screenshot: Pulling & running from Docker Hub (local):

```
PS C:\Users\minha\Downloads\BTI\bti525_lab6> docker kill fragments 2>$null
PS C:\Users\minha\Downloads\BTI\bti525_lab6> docker pull abedin53/fragments:lab-6
lab-6: Pulling from abedin53/fragments
Digest: sha256:6fd8a3ec3c38467c38145d6072b10c8de1ea18e31cddfeffb7a27dc3cb9fe8ae
Status: Image is up to date for abedin53/fragments:lab-6
docker.io/abedin53/fragments:lab-6
PS C:\Users\minha\Downloads\BTI\bti525_lab6> docker run --rm --name fragments --env-file env.basic -p 5555:8
080 -d abedin53/fragments:lab-6
7bbdb6a4c728097cc6f2543886fb6465c71033a38d40c6dc550e1ce50e1c024e
PS C:\Users\minha\Downloads\BTI\bti525_lab6> curl.exe -u user:pass123 http://localhost:5555
{"status":"ok","author":"Minhaz Abedin mabedin1@myseneca.ca","githubUrl":"https://github.com/minhazabedin53/
fragments-service","version":"1.0.0"}
PS C:\Users\minha\Downloads\BTI\bti525_lab6> docker logs fragments

> fragments-service@1.0.0 start
> node src/server.js

[dotenv@17.2.3] injecting env (0) from .env -- tip: ⚙ load multiple .env files with { path: ['.env.local',,
 '.env'] }
{"level":30,"time":1761656330670,"pid":20,"hostname":"7bbdb6a4c728","port":"8080","msg":"Fragments service l
istening"}
{"level":30,"time":1761656337852,"pid":20,"hostname":"7bbdb6a4c728","req":{"id":1,"method":"GET","url":"/","
query":{},"params":{},"headers":{"host":"localhost:5555","authorization":"Basic dXNlcjpwYXNzMTIz","user-agen
t":"curl/8.14.1","accept":"*/*"},"remoteAddress":"::ffff:172.17.0.1","remotePort":48558},"res":{"statusCode"
:200,"headers":{"content-security-policy":"default-src 'self';base-uri 'self';font-src 'self' https: data:;f
orm-action 'self';frame-ancestors 'self';img-src 'self' data:;object-src 'none';script-src 'self';script-src
-attr 'none';style-src 'self' https: 'unsafe-inline';upgrade-insecure-requests","cross-origin-opener-policy"
:"same-origin","cross-origin-resource-policy":"same-origin","origin-agent-cluster":"?1","referrer-policy":"n
o-referrer","strict-transport-security":"max-age=31536000; includeSubDomains","x-content-type-options":"nosn
iff","x-dns-prefetch-control":"off","x-download-options":"noopen","x-frame-options":"SAMEORIGIN","x-permitte
d-cross-domain-policies":"none","x-xss-protection":"0","access-control-allow-origin":"*","cache-control":"no
-store, no-cache, must-revalidate, proxy-revalidate","pragma":"no-cache","expires":"0","surrogate-control":"
no-store","content-type":"application/json; charset=utf-8","content-length":"145","etag":"W/\"91-3uvSxIsDN+x
52CQ8eU7/b3qlgqM\""}},"responseTime":4,"msg":"request completed"}
PS C:\Users\minha\Downloads\BTI\bti525_lab6> docker ps
CONTAINER ID   IMAGE                      COMMAND                  CREATED              STATUS
PORTS                                      NAMES
7bbdb6a4c728   abedin53/fragments:lab-6   "docker-entrypoint.s…"   About a minute ago   Up About a minute
0.0.0.0:5555->8080/tcp, [::]:5555->8080/tcp   fragments
PS C:\Users\minha\Downloads\BTI\bti525_lab6>
```

Screenshot: Docker running on EC2:

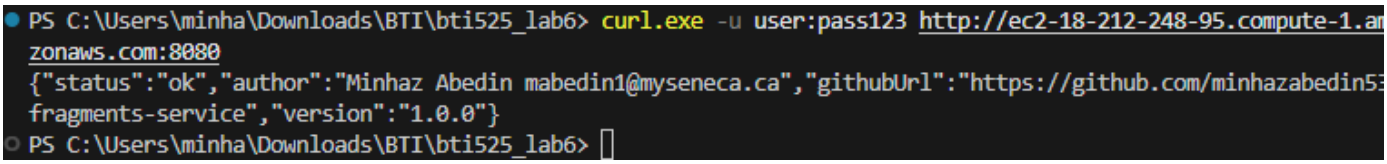
docker ps on EC2 showing 0.0.0.0:8080->8080 and Up

docker logs fragments on EC2 showing the GET request



Screenshot: Docker call on EC2 from local

curl.exe -u user:pass123 http://ec2-18-212-248-95.compute-1.amazonaws.com:8080 returning JSON



Screenshot: Step 21 convert working on ec2

```
PS C:\Users\minha\Downloads\BTI\bti525_lab6> curl.exe -u user:pass123 http://ec2-18-212-248-95.compute-1.amazonaws.com:8080/
{"status":"ok","author":"Minhaz Abedin mabedin1@myseneca.ca","githubUrl":"https://github.com/minhazabedin53/fragments-service","version":"1.0.0"}
PS C:\Users\minha\Downloads\BTI\bti525_lab6> curl.exe -u user:pass123 -H "Content-Type: text/markdown" --data "# Hello`n`n**bold**" -i http://ec2-18-212-248-95.compute-1.amazonaws.com:8080/v1/fragments
HTTP/1.1 201 Created
Content-Security-Policy: default-src 'self';base-uri 'self';font-src 'self' https: data:;form-action 'self';frame-ancestors 'self';img-src 'self' data:;object-src 'none';script-src 'self';script-src-attr 'none';style-src 'self' https: 'unsafe-inline';upgrade-insecure-requests
Cross-Origin-Opener-Policy: same-origin
Cross-Origin-Resource-Policy: same-origin
Origin-Agent-Cluster: ?1
Referrer-Policy: no-referrer
Strict-Transport-Security: max-age=31536000; includeSubDomains
X-Content-Type-Options: nosniff
X-DNS-Prefetch-Control: off
X-Download-Options: noopen
X-Frame-Options: SAMEORIGIN
X-Permitted-Cross-Domain-Policies: none
X-XSS-Protection: 0
Access-Control-Allow-Origin: *
Location: http://localhost:8080/v1/fragments/642fa7d0-43f8-44d7-94af-348a6ddcd648
Content-Type: application/json; charset=utf-8
Content-Length: 256
ETag: W/"100-BS+xgSQowr/fjGz0ySvwiAsbHPQ"
Date: Tue, 28 Oct 2025 15:31:19 GMT
Connection: keep-alive
Keep-Alive: timeout=5

{"status":"ok","fragment":{"id":"642fa7d0-43f8-44d7-94af-348a6ddcd648","ownerId":"04f8996da763b7a969b1028ee3007569eaf3a635486ddab211d512c85b9df8fb","created":"2025-10-28T15:31:19.008Z","updated":"2025-10-28T15:31:19.008Z","type":"text/markdown","size":17}}
PS C:\Users\minha\Downloads\BTI\bti525_lab6> curl.exe -u user:pass123 -i http://ec2-18-212-248-95.compute-1.amazonaws.com:8080/v1/fragments/642fa7d0-43f8-44d7-94af-348a6ddcd648.html
HTTP/1.1 200 OK
Content-Security-Policy: default-src 'self';base-uri 'self';font-src 'self' https: data:;form-action 'self';frame-ancestors 'self';img-src 'self' data:;object-src 'none';script-src 'self';script-src-attr 'none';style-src 'self' https: 'unsafe-inline';upgrade-insecure-requests
Cross-Origin-Opener-Policy: same-origin
Cross-Origin-Resource-Policy: same-origin
Origin-Agent-Cluster: ?1
Referrer-Policy: no-referrer
Strict-Transport-Security: max-age=31536000; includeSubDomains
X-Content-Type-Options: nosniff
X-DNS-Prefetch-Control: off
X-Download-Options: noopen
X-Frame-Options: SAMEORIGIN
X-Permitted-Cross-Domain-Policies: none
X-XSS-Protection: 0
Access-Control-Allow-Origin: *
Content-Type: text/html; charset=utf-8
Content-Length: 44
ETag: W/"2c-ytLCOSjEQcfNfXbYZTFtuPxnS2o"
Date: Tue, 28 Oct 2025 15:31:55 GMT
Connection: keep-alive
Keep-Alive: timeout=5

<h1>Hello</h1>
<p><strong>bold</strong></p>
PS C:\Users\minha\Downloads\BTI\bti525_lab6>
```

Explanation of Optimizations (Step 20)

For Step 20, optimized my Dockerfile following Docker's official best-practice guidelines.

- Used official base image: node:22.11.0-alpine (lightweight, secure).
- Pinned version: used a specific version tag to ensure reproducibility.
- Multi-stage build: separated the build and runtime stages so the final image contains only the production dependencies and compiled code.
- Non-root user: switched to a dedicated node user for better security.
- Environment variables: set NODE_ENV=production and LOG_LEVEL=info to optimize runtime behavior.
- Healthcheck: added a Docker HEALTHCHECK instruction to monitor container health.
- Optimized layer caching: copied only package*.json before installing dependencies, reducing rebuild time.

Implementation of Requirement (Step 21)

For Step 21, I implemented one new Assignment 2 requirement: "GET /v1/fragments/:id.ext returns an existing fragment's data converted to a supported type."

I created a new module src/services/convert.js that uses the markdown-it library to convert Markdown fragments (text/markdown) to HTML (text/html). A new route /v1/fragments/:id.:ext was added in src/routes/convert.js and registered in app.js.

I verified this feature using:

curl -u user:pass123 -H "Content-Type: text/markdown"
--data "# Hello\n\n**bold**" http://localhost:3000/v1/fragments curl -u user:pass123
http://localhost:3000/v1/fragments/.html

The second command successfully returned:

<h1>Hello</h1>

** bold **

This proves the Markdown-to-HTML conversion works correctly in both local and EC2 deployments.