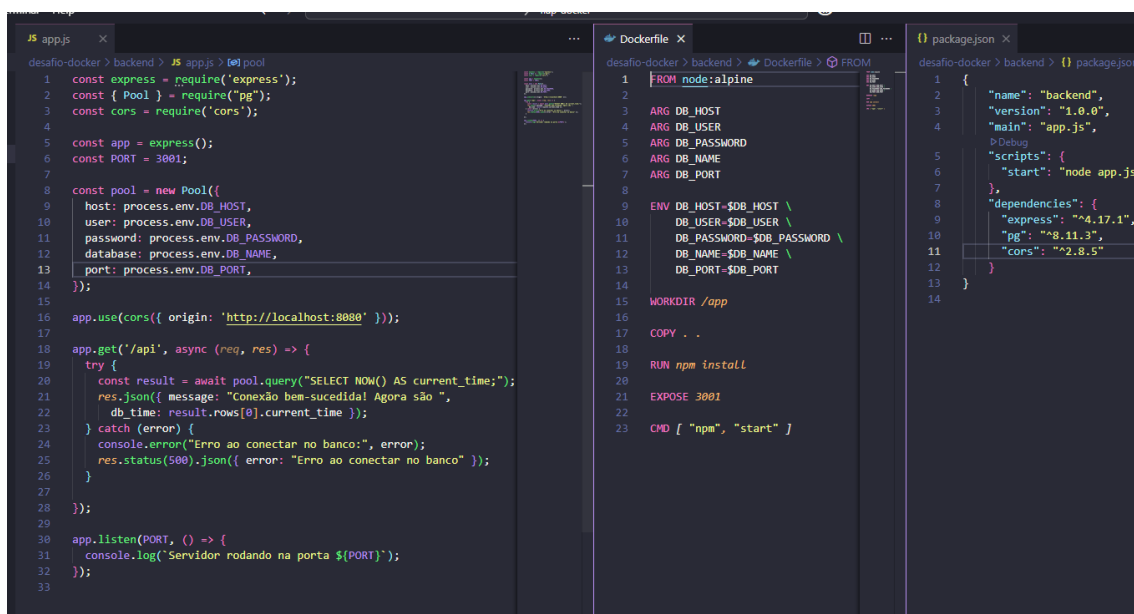


Desafio – Dockerização

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Objetivo: Integrar Front, Back e Banco de dados, que devem estar em contêineres e conversando entre si com a mesma rede criados pelo Docker Compose. A ferramenta Trivy deve ser usada para analisar as imagens criadas.

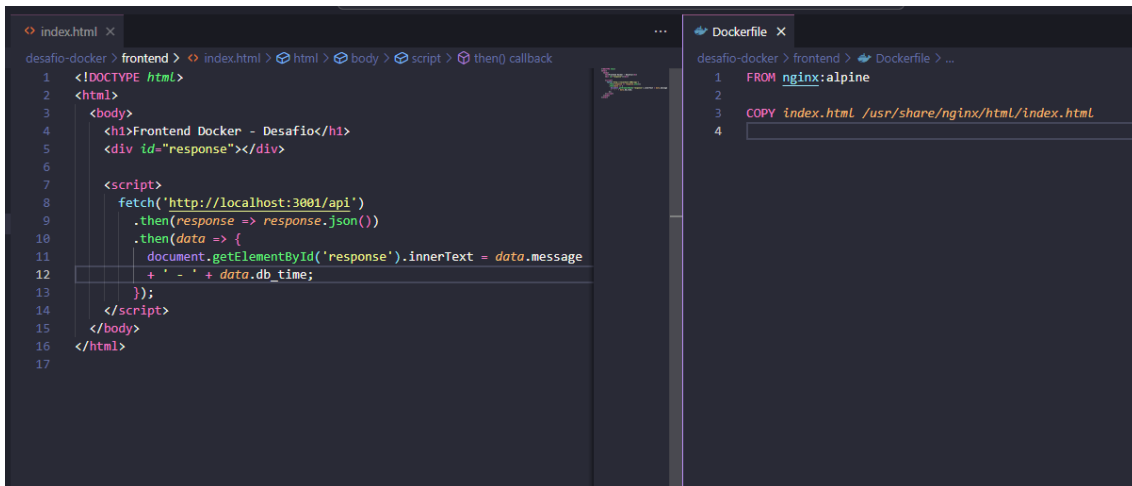
1. Configuração do back-end



```
desafio-docker > backend > JS app.js > pool
1 const express = require('express');
2 const { Pool } = require('pg');
3 const cors = require('cors');
4
5 const app = express();
6 const PORT = 3001;
7
8 const pool = new Pool({
9   host: process.env.DB_HOST,
10  user: process.env.DB_USER,
11  password: process.env.DB_PASSWORD,
12  database: process.env.DB_NAME,
13  port: process.env.DB_PORT,
14 });
15
16 app.use(cors({ origin: 'http://localhost:8080' }));
17
18 app.get('/api', async (req, res) => {
19   try {
20     const result = await pool.query("SELECT NOW() AS current_time;");
21     res.json({ message: "Conexão bem-sucedida! Agora são ",
22               db_time: result.rows[0].current_time });
23   } catch (error) {
24     console.error("Erro ao conectar no banco:", error);
25     res.status(500).json({ error: "Erro ao conectar no banco" });
26   }
27 });
28
29 app.listen(PORT, () => {
30   console.log("Servidor rodando na porta ${PORT}");
31 });
32
33
desafio-docker > backend > Dockerfile > FROM
1 FROM node:alpine
2
3 ARG DB_HOST
4 ARG DB_USER
5 ARG DB_PASSWORD
6 ARG DB_NAME
7 ARG DB_PORT
8
9 ENV DB_HOST=${DB_HOST} \
10     DB_USER=${DB_USER} \
11     DB_PASSWORD=${DB_PASSWORD} \
12     DB_NAME=${DB_NAME} \
13     DB_PORT=${DB_PORT}
14
15 WORKDIR /app
16
17 COPY . .
18
19 RUN npm install
20
21 EXPOSE 3001
22
23 CMD [ "npm", "start" ]
desafio-docker > backend > package.json
1 {
2   "name": "backend",
3   "version": "1.0.0",
4   "main": "app.js",
5   "scripts": {
6     "start": "node app.js"
7   },
8   "dependencies": {
9     "express": "^4.17.1",
10    "pg": "^8.11.3",
11    "cors": "^2.8.5"
12  }
13 }
```

Back-end com Node.js simples, com um endpoint, conexão com o banco e com o node:alpine no Dockerfile.

2. Configuração do front-end

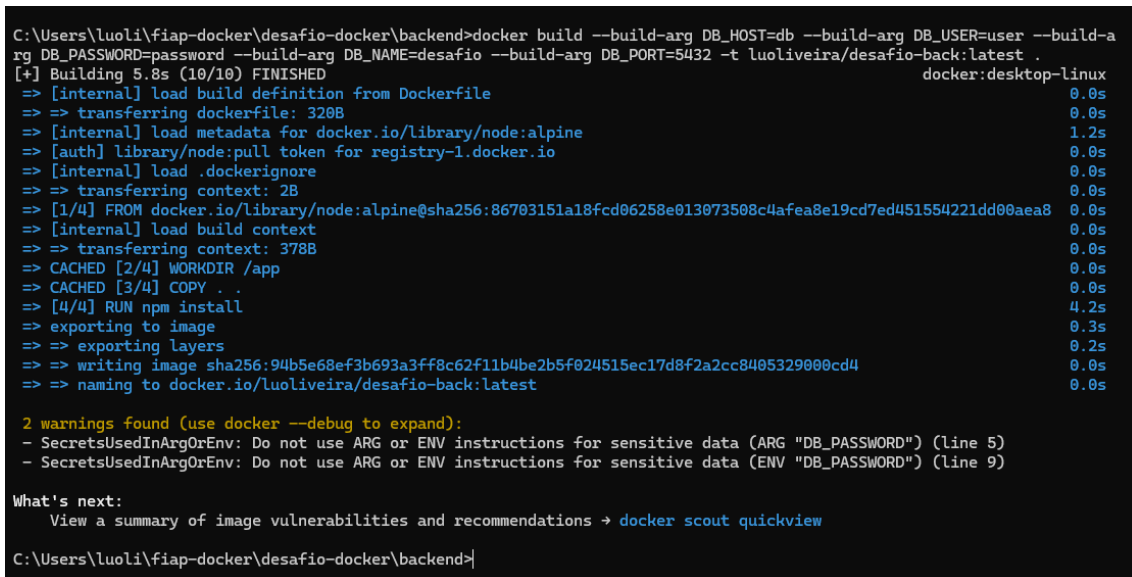


```
index.html X
desafio-docker > frontend > index.html > html > body > script > then() callback
1 <!DOCTYPE html>
2 <html>
3   <body>
4     <h1>Frontend Docker - Desafio</h1>
5     <div id="response"></div>
6
7     <script>
8       fetch('http://localhost:3001/api')
9         .then(response => response.json())
10        .then(data => {
11          document.getElementById('response').innerText = data.message
12          + ' - ' + data.db_time;
13        });
14     </script>
15   </body>
16 </html>
17

Dockerfile X
desafio-docker > frontend > Dockerfile > ...
1 FROM nginx:alpine
2
3 COPY index.html /usr/share/nginx/html/index.html
4
```

Front-end com chamada para o endpoint no contêiner back-end na porta que foi exposta (3001), usando Nginx.

3. Build das imagens



```
C:\Users\luoli\fiap-docker\desafio-docker\backend>docker build --build-arg DB_HOST=db --build-arg DB_USER=user --build-arg DB_PASSWORD=password --build-arg DB_NAME=desafio --build-arg DB_PORT=5432 -t luoliveira/desafio-back:latest .
[+] Building 5.8s (10/10) FINISHED
=> [internal] load build definition from Dockerfile                                docker:desktop-linux 0.0s
=> => transferring dockerfile: 320B                                              0.0s
=> [internal] load metadata for docker.io/library/node:alpine                    1.2s
=> [auth] library/node:pull token for registry-1.docker.io                      0.0s
=> [internal] load .dockerignore                                                 0.0s
=> => transferring context: 2B                                                  0.0s
=> [1/4] FROM docker.io/library/node:alpine@sha256:86703151a18fcd06258e013073508c4afea8e19cd7ed451554221dd00aea8 0.0s
=> [internal] load build context                                                0.0s
=> => transferring context: 378B                                                0.0s
=> CACHED [2/4] WORKDIR /app                                                    0.0s
=> CACHED [3/4] COPY . .                                                        0.0s
=> [4/4] RUN npm install                                                         4.2s
=> exporting to image                                                            0.3s
=> => exporting layers                                                            0.2s
=> writing image sha256:94b5e68ef3b693a3ff8c62f11b4be2b5f024515ec17d8f2a2cc8405329000cd4 0.0s
=> naming to docker.io/luoliveira/desafio-back:latest                          0.0s

2 warnings found (use docker --debug to expand):
- SecretsUsedInArgOrEnv: Do not use ARG or ENV instructions for sensitive data (ARG "DB_PASSWORD") (line 5)
- SecretsUsedInArgOrEnv: Do not use ARG or ENV instructions for sensitive data (ENV "DB_PASSWORD") (line 9)

What's next:
  View a summary of image vulnerabilities and recommendations -> docker scout quickview

C:\Users\luoli\fiap-docker\desafio-docker\backend>
```

Build back-end

```
C:\Users\luoli\fiap-docker\desafio-docker\frontend>docker build -t luoliveira/desafio-front:latest .
[+] Building 4.6s (8/8) FINISHED
=> [internal] load build definition from Dockerfile
=> => transferring dockerfile: 105B
=> [internal] load metadata for docker.io/library/nginx:alpine
=> [auth] library/nginx:pull token for registry-1.docker.io
=> [internal] load .dockerignore
=> => transferring context: 2B
=> [internal] load build context
=> => transferring context: 391B
=> [1/2] FROM docker.io/library/nginx:alpine@sha256:4ff102c5d78d254a6f0da062b3cf39eaf07f01eec0927fd21e219d0af8bc
=> => resolve docker.io/library/nginx:alpine@sha256:4ff102c5d78d254a6f0da062b3cf39eaf07f01eec0927fd21e219d0af8bc
=> => sha256:4ff102c5d78d254a6f0da062b3cf39eaf07f01eec0927fd21e219d0af8bc0591 10.36kB / 10.36kB
=> => sha256:43f2ec460bdf5babe56d7e13b060b308f42cbf2103f6665c349f0b98dac8962 627B / 627B
=> => sha256:984583bcf083fa6900b5e7834795a9a57a9b4dfe7448d5350474f5d309625e9c 955B / 955B
=> => sha256:ccc35e35d420d6dd115290f1074afc6ad1c474b6f94897434e6befd33be781d2 1.79MB / 1.79MB
=> => sha256:a71e0884a7f1192ecf5decf062b67d46b54ad63f0cc1b8aa7e705f739a97c2fc 2.50kB / 2.50kB
=> => sha256:1ff4bb4faebcfb1f7e01144fa9904a570ab9bab88694457855feb6c6bba3fa07 11.23kB / 11.23kB
=> => extracting sha256:ccc35e35d420d6dd115290f1074afc6ad1c474b6f94897434e6befd33be781d2
=> => sha256:8d27c072a58f81ecf2425172ac0e5b25010ff2d014f89de35b90104e462568eb 402B / 402B
=> => sha256:ab3286a7346303a31b69a5189f63f1414cc1de44e397088dcd07edb322df1fe9 1.21kB / 1.21kB
=> => sha256:6d79cc6084d434876ce0f038c675d20532f28e476283a29e7e63bc0bf13a4ed6 1.40kB / 1.40kB
=> => sha256:0c7e4c092ab716c95e1a8840943549b4ac5e6c5d1a1cc74496528e1b03e1e67a 15.38MB / 15.38MB
=> => extracting sha256:43f2ec460bdf5babe56d7e13b060b308f42cbf2103f6665c349f0b98dac8962
=> => extracting sha256:984583bcf083fa6900b5e7834795a9a57a9b4dfe7448d5350474f5d309625e9c
=> => extracting sha256:8d27c072a58f81ecf2425172ac0e5b25010ff2d014f89de35b90104e462568eb
=> => extracting sha256:ab3286a7346303a31b69a5189f63f1414cc1de44e397088dcd07edb322df1fe9
=> => extracting sha256:6d79cc6084d434876ce0f038c675d20532f28e476283a29e7e63bc0bf13a4ed6
=> => extracting sha256:0c7e4c092ab716c95e1a8840943549b4ac5e6c5d1a1cc74496528e1b03e1e67a
=> [2/2] COPY index.html /usr/share/nginx/html/index.html
=> exporting to image
=> => exporting layers
=> => writing image sha256:3828d2c90c3298822376508bfff830d36269cce48f43a05b5d90e5cb91a967917
=> => naming to docker.io/luoliveira/desafio-front:latest

What's next:
  View a summary of image vulnerabilities and recommendations → docker scout quickview

C:\Users\luoli\fiap-docker\desafio-docker\frontend>
```

Build front-end

4. Análise das imagens com Trivy

```
C:\Users\luoli\fiap-docker\desafio-docker\frontend>trivy image luoliveira/desafio-back:latest
2025-04-04T01:20:02.521-0300 INFO Vulnerability scanning is enabled
2025-04-04T01:20:02.522-0300 INFO Secret scanning is enabled
2025-04-04T01:20:02.522-0300 INFO If your scanning is slow, please try '--scanners vuln' to disable secret scanning
2025-04-04T01:20:02.522-0300 INFO Please see also https://aquasecurity.github.io/trivy/v0.48/docs/scanner/secret/#
recomendation for faster secret detection
2025-04-04T01:20:08.346-0300 INFO Detected OS: alpine
2025-04-04T01:20:08.346-0300 WARN This OS version is not on the EOL list: alpine 3.21
2025-04-04T01:20:08.346-0300 INFO Detecting Alpine vulnerabilities...
2025-04-04T01:20:08.374-0300 INFO Number of language-specific files: 1
2025-04-04T01:20:08.374-0300 INFO Detecting node-pkg vulnerabilities...

luoliveira/desafio-back:latest (alpine 3.21.3)
=====
Total: 0 (UNKNOWN: 0, LOW: 0, MEDIUM: 0, HIGH: 0, CRITICAL: 0)

C:\Users\luoli\fiap-docker\desafio-docker\frontend>
```

Análise da imagem back-end node:alpine.

```
C:\Users\luoli\fiap-docker\desafio-docker\frontend>trivy image luoliveira/desafio-front:latest
2025-04-04T01:23:41.166-0300 INFO Vulnerability scanning is enabled
2025-04-04T01:23:41.167-0300 INFO Secret scanning is enabled
2025-04-04T01:23:41.167-0300 INFO If your scanning is slow, please try '--scanners vuln' to disable secret scanning
2025-04-04T01:23:41.167-0300 INFO Please see also https://aquasecurity.github.io/trivy/v0.48/docs/scanner/secret/#recommendation for faster secret detection
2025-04-04T01:23:42.342-0300 INFO Detected OS: alpine
2025-04-04T01:23:42.342-0300 WARN This OS version is not on the EOL list: alpine 3.21
2025-04-04T01:23:42.342-0300 INFO Detecting Alpine vulnerabilities...
2025-04-04T01:23:42.350-0300 INFO Number of language-specific files: 0

luoliveira/desafio-front:latest (alpine 3.21.3)
=====
Total: 6 (UNKNOWN: 0, LOW: 0, MEDIUM: 0, HIGH: 6, CRITICAL: 0)
```

Library	Vulnerability	Severity	Status	Installed Version	Fixed Version	Title
libexpat	CVE-2024-8176	HIGH	fixed	2.6.4-r0	2.7.0-r0	Libexpat: expat: Improper Restriction of XML Entity Expansion Depth in libexpat https://avd.aquasec.com/nvd/cve-2024-8176
	CVE-2024-56171			2.13.4-r3	2.13.4-r4	Libxml2: Use-After-Free in libxml2 https://avd.aquasec.com/nvd/cve-2024-56171
	CVE-2025-24928					Libxml2: Stack-based buffer overflow in xmlSprintfElements of libxml2 https://avd.aquasec.com/nvd/cve-2025-24928
	CVE-2025-27113				2.13.4-r5	Libxml2: NULL Pointer Dereference in libxml2 xmlPatMatch https://avd.aquasec.com/nvd/cve-2025-27113
libxslt	CVE-2024-55549	HIGH	fixed	1.1.42-r1	1.1.42-r2	Libxslt: Use-After-Free in libxslt (xsltGetInheritedNsList) https://avd.aquasec.com/nvd/cve-2024-55549
	CVE-2025-24855					Libxslt: Use-After-Free in libxslt numbers.c https://avd.aquasec.com/nvd/cve-2025-24855

```
C:\Users\luoli\fiap-docker\desafio-docker\frontend>
```

Análise da imagem front-end nginx:alpine.

5. Arquivo docker-compose

```
1 version: '3.9'
2
3 services:
4   db:
5     image: postgres:14
6     environment:
7       POSTGRES_USER: user
8       POSTGRES_PASSWORD: password
9       POSTGRES_DB: desafio
10    ports:
11      - "5432:5432"
12    networks:
13      - app-network
14    volumes:
15      - pgdata:/var/lib/postgresql/data
16
17   backend:
18     image: luoliveira/desafio-back:latest
19     ports:
20       - "3001:3001"
21     depends_on:
22       - db
23     networks:
24       - app-network
25
26   frontend:
27     image: luoliveira/desafio-front:latest
28     ports:
29       - "8080:80"
30     depends_on:
31       - backend
32     networks:
33       - app-network
34
35 networks:
36   app-network:
37     driver: bridge
38
39 volumes:
40   pgdata: {}
```

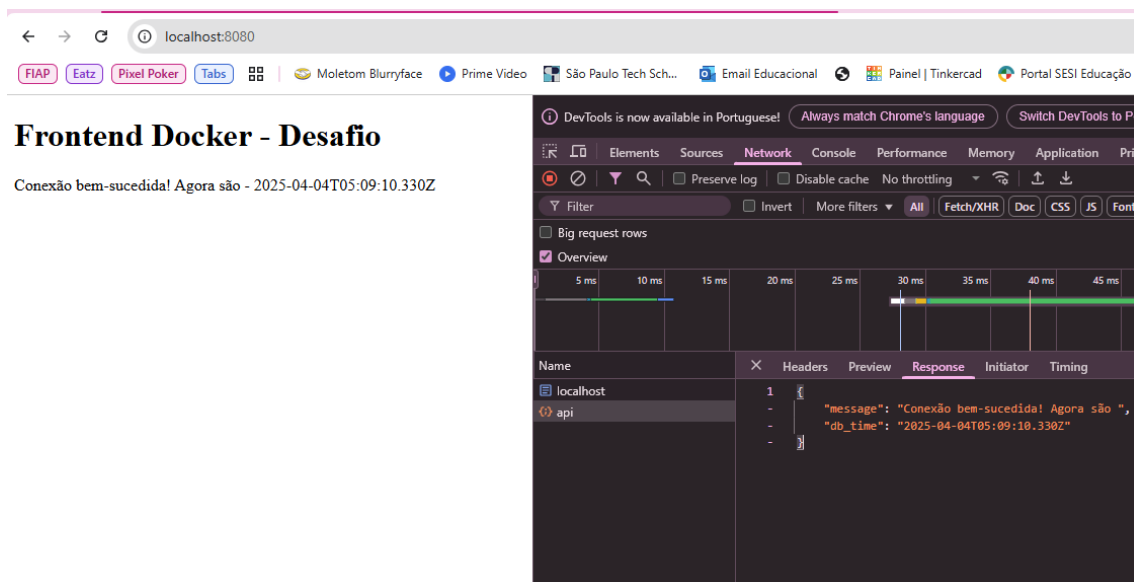
```
C:\Users\luoli\fiap-docker\desafio-docker>docker-compose up -d
time="2025-04-04T01:50:02-03:00" level=warning msg="C:\Users\luoli\fiap-docker\desafio-docker\docker-compose.yml: the attribute 'version' is obsolete, it will be ignored, please remove it to avoid potential confusion"
[+] Creating 5/5
✓Network desafio-docker_app-network Created 0.0s
✓Volume "desafio-docker_pgdata" Created 0.0s
✓Container desafio-docker-db-1 Started 0.0s
✓Container desafio-docker-backend-1 Started 0.0s
✓Container desafio-docker-frontend-1 Started 0.0s

C:\Users\luoli\fiap-docker\desafio-docker>ps
CONTAINER ID   IMAGE                                COMMAND                  CREATED        STATUS        PORTS                               NAMES
fc16d28268ad   luoliveira/desafio-front:latest     "/docker-entrypoint..." 8 seconds ago Up 7 seconds 0.0.0.0:8080->380/tcp   desafio-docker-frontend-1
dc728b9e4edc   luoliveira/desafio-back:latest      "docker-entrypoint.s..." 9 seconds ago Up 7 seconds 0.0.0.0:3801->3801/tcp  desafio-docker-backend-1
13d57d6f38d9   postgres:14                         "docker-entrypoint.s..." 9 seconds ago Up 8 seconds 0.0.0.0:5432->5432/tcp  desafio-docker-db-1

C:\Users\luoli\fiap-docker\desafio-docker>
```

Contêineres rodando após docker compose up.

6. Verificar integração funcionando no navegador



Link do repositório no GitHub:

<https://github.com/luuh-oliveira/desafio-docker-fiap>

Link das imagens no Docker Hub:

<https://hub.docker.com/repository/docker/luoliveira/desafio-front/general>

<https://hub.docker.com/repository/docker/luoliveira/desafio-back/general>