Part 1: Understanding Sockets

Sockets and Their Difference from HTTP

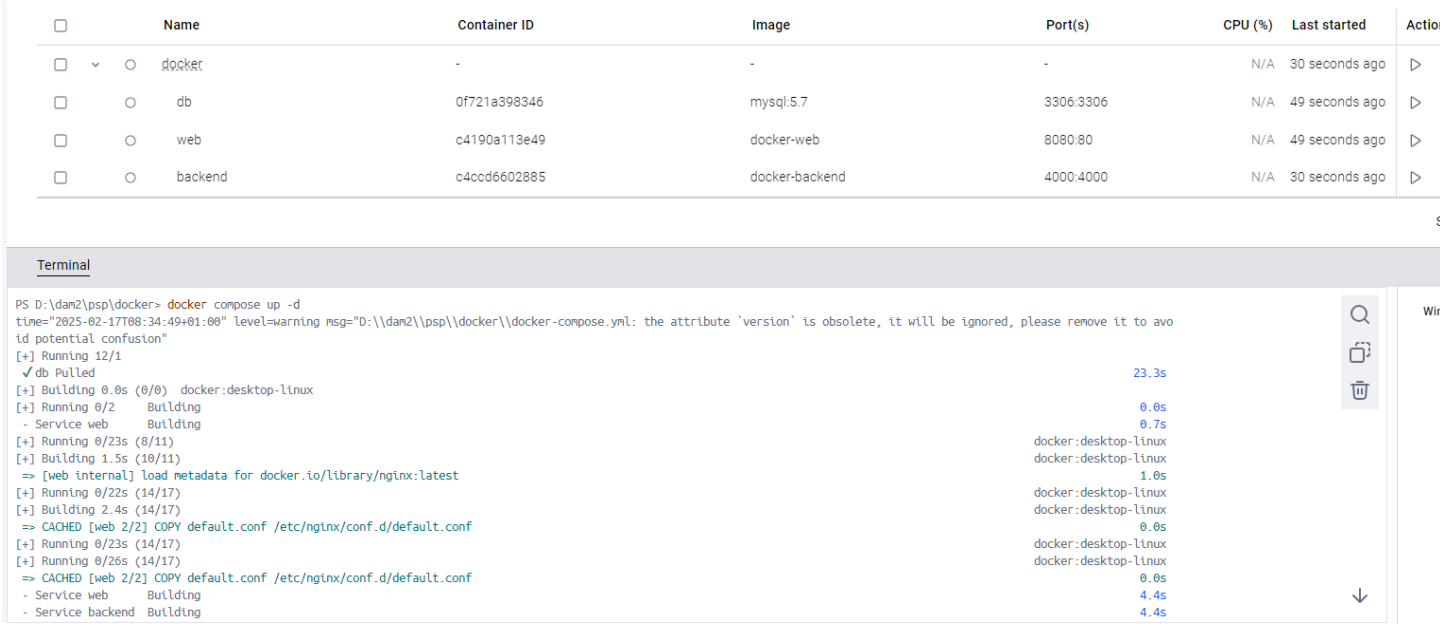
Sockets are endpoints for communication between two machines over a network. They provide a low-level interface for sending and receiving data between applications, enabling real-time communication. Unlike HTTP, which operates over a request-response model using the stateless TCP/IP protocol, sockets allow bidirectional, persistent connections. This makes sockets ideal for real-time applications like chat systems, multiplayer games, and financial trading platforms, whereas HTTP is more suited for web browsing and APIs.

TCP Sockets vs. Unix Domain Sockets (UDS)

TCP sockets operate over the Internet using the Transmission Control Protocol (TCP), ensuring reliable, ordered, and error-checked communication between networked devices. They are commonly used for web applications, file transfers, and remote services. On the other hand, Unix Domain Sockets (UDS) facilitate inter-process communication (IPC) within the same machine. UDS offers lower latency and higher efficiency compared to TCP sockets since they bypass network stack overhead. While TCP sockets are necessary for communication between different machines, UDS is ideal for fast communication between processes on a local system.

Part 2: Implementing Socket Communication

I managed to build and run all the containers with *“docker compose up -d”.*



Name	Container ID	Image	Port(s)	CPU (%)	Last started	Actio
docker	-	-	-	N/A	30 seconds ago	
db	0f721a398346	mysql:5.7	3306:3306	N/A	49 seconds ago	
web	c4190a113e49	docker-web	8080:80	N/A	49 seconds ago	
backend	c4ccd6602885	docker-backend	4000:4000	N/A	30 seconds ago	

Terminal

```
PS D:\dam2\psp\docker> docker compose up -d
time="2025-02-17T08:34:49+01:00" level=warning msg="D:\\dam2\\psp\\docker\\docker-compose.yml: the attribute `version` is obsolete, it will be ignored, please remove it to avo
id potential confusion"
[+] Running 12/1
 ✓ db Pulled                                                                                                                                              23.3s
[+] Building 0.0s (0/0)  docker:desktop-linux
[+] Running 0/2     Building                                                                                                                              0.0s
 - Service web      Building                                                                                                                              0.7s
[+] Running 0/23s (8/11)                                                                                                                  docker:desktop-linux
[+] Building 1.5s (10/11)                                                                                                                 docker:desktop-linux
 => [web internal] load metadata for docker.io/library/nginx:latest                                                                                       1.0s
[+] Running 0/22s (14/17)                                                                                                                 docker:desktop-linux
[+] Building 2.4s (14/17)                                                                                                                 docker:desktop-linux
 => CACHED [web 2/2] COPY default.conf /etc/nginx/conf.d/default.conf                                                                                     0.0s
[+] Running 0/23s (14/17)                                                                                                                 docker:desktop-linux
[+] Running 0/26s (14/17)                                                                                                                 docker:desktop-linux
 => CACHED [web 2/2] COPY default.conf /etc/nginx/conf.d/default.conf                                                                                     0.0s
 - Service web      Building                                                                                                                              4.4s
 - Service backend  Building                                                                                                                              4.4s
```

None of them kept running due to an error with the already in use socket, found by running “*docker logs db”*.

```
2025-02-17T07:37:44.206150Z 0 [ERROR] Can't start server : Bind on unix socket: Address already in use
2025-02-17T07:37:44.206170Z 0 [ERROR] Do you already have another mysqld server running on socket: /var/run/mysqld/mysqld.sock ?
2025-02-17T07:37:44.206179Z 0 [ERROR] Aborting
```