Exercise 1 – report

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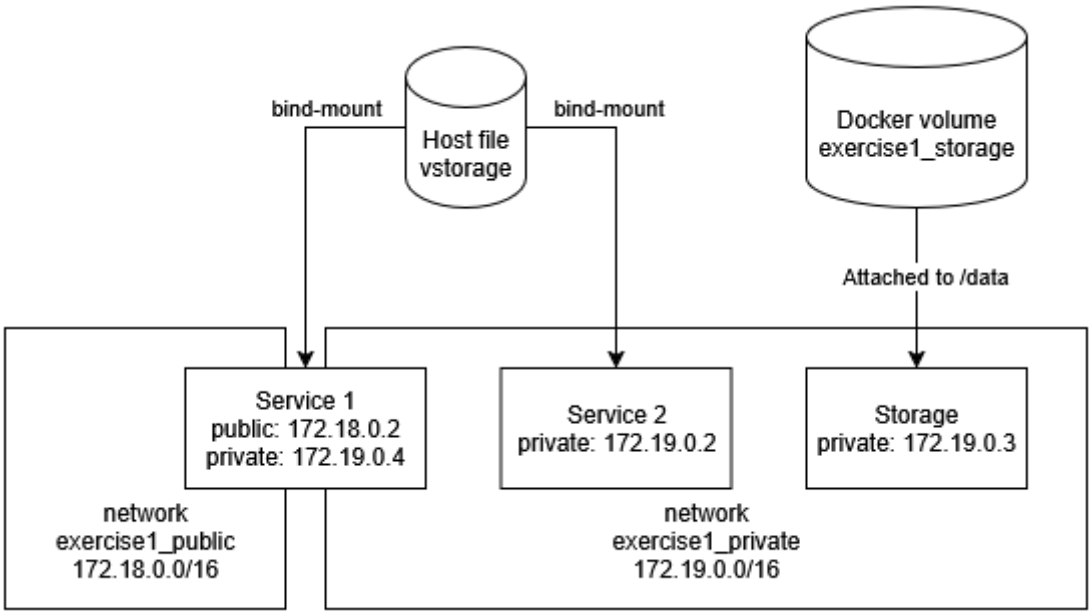
Basic information:

HW	Windows 11, 64-bit, x64/AMD64
VM	WSL2
OS (in WSL2)	Ubuntu 22.04.3 LTS
Docker version	27.1.2, build d01f264
Docker-Compose version	v2.29.2

System diagram



Analysis

Uptime measured the container uptime since boot. It will reset on every restart. It is a useful metric to tell if a container had just restarted and how long it has been on. A better idea external observation, meaning monitoring and health checks. That would reveal periods when the service was not running also.

Disk space in this case measured free disk space on / inside the container. That may differ from the actual log targets. Better would be to also report free space for /vstorage and /data, including % used and some low space threshold. Log rotation would be something good also.

Analysison the storage solutions. Vstorage was the bind-mounted host file, which services directly write to. The other solution is services sending log lines over HTTP to Storage, and Storage appending them to a file in its persistent volume. First looking at vstorage solution.

vstorage

Pros	Cons
We can easily see what is stored	File must exist on host before starting the containers
Shared between the containers automatically	Host-coupling transfers file information, for example permissions
Does not need extra infra	No cross-process locking for concurrent write operation on the file
Simple	Cleanup is manual
	Does not scale for multiple hosts

This vstorage type of storage solution suits only really demo or temporary development setups. Not a solution for production use cases.

Storage service + docker volume

Pros	Cons
Persists across container recreations automatically	Not directly readable on host, requires API call or going inside the container
Easier to scale and modify	If storage is down, POST requests will fail
Clean reset with docker commands	Still just a single file without indexing or retention
Does not need manual file creation	Docker volume still lives on one host, no access across hosts

This would be a better pattern to use in real production environments, but it still should be modified for example, to use a database, add logging, make there not be a single point of failure, add retries, better formatting and capacity management. Overall, much better solution still than the vstorage.

Persistent storage (and network) cleanup

Cleanup can be done with the following commands:

Storage	Command
vStorage	> ./vstorage
Docker volume storage	docker volume rm exercise1_storage OR docker compose down -v

To remove networks, use “docker network rm exercise1_public exercise1_private” or “docker compose down -v –remove-orphans”

Difficulties and problems

There weren’t any major difficulties related to this exercise, due to previous experience with docker and web development. The coding of the services and storage code took the most time, since I had not made a web server with plain python previously and how to get the details in javascript were unfamiliar to me.