

docker

Docker



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Deployment



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Why docker?



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Why docker?

- Easy if mastered once
- Everything is reproducible
 - Deployment is not dependent on server environment
 - Much cloud
 - Testing is easy
 - Shipping complex code
- Security



This talk only
covers hobbyist
scenarios.



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Especially if your
store data, research
common security
measures!



Docker internals



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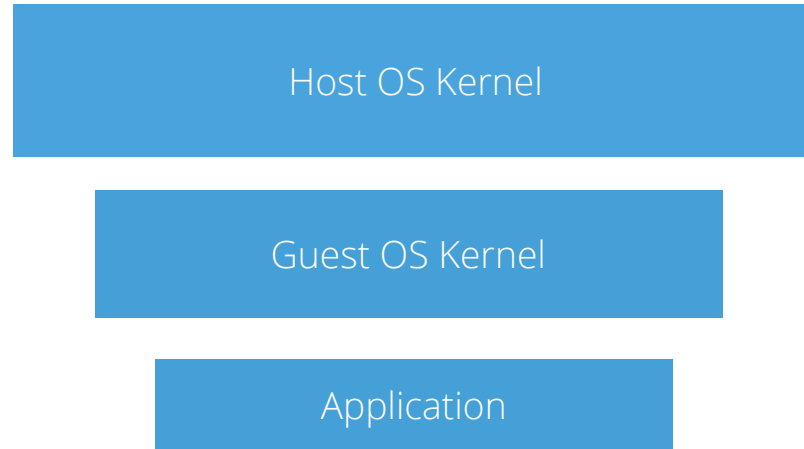
By Vesahjr - Own work, CC BY-SA 3.0, <https://commons.wikimedia.org/w/index.php?curid=20083285>



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VM

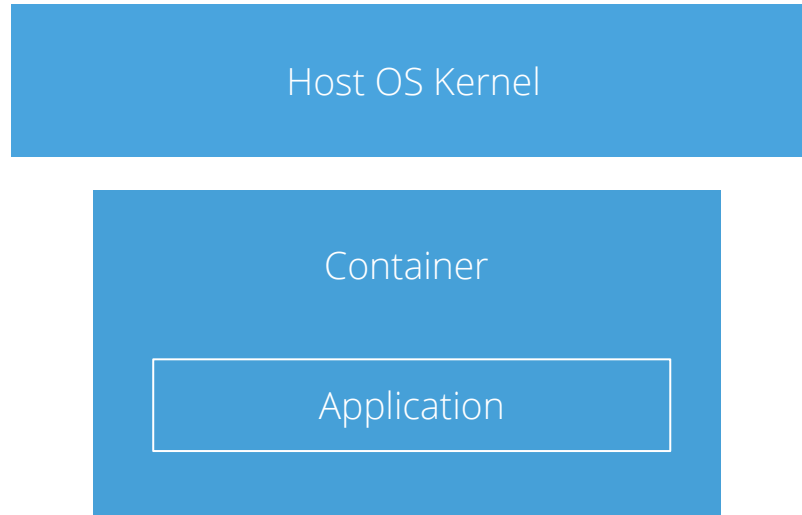


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Docker



Cgroups

the kernel keeps track which processes belong together and what their capabilities are



Docker Daemon

- powers docker
- manages the containers
 - sets up the cgroups
 - updates capabilities on change
 - keeps track of the containers
- simply interact via **docker xy**



Virtualizations (overview)



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Dynamic file system - container

/certificates

/html

/java-code

...



./docker/server/certs

image

the parent

...

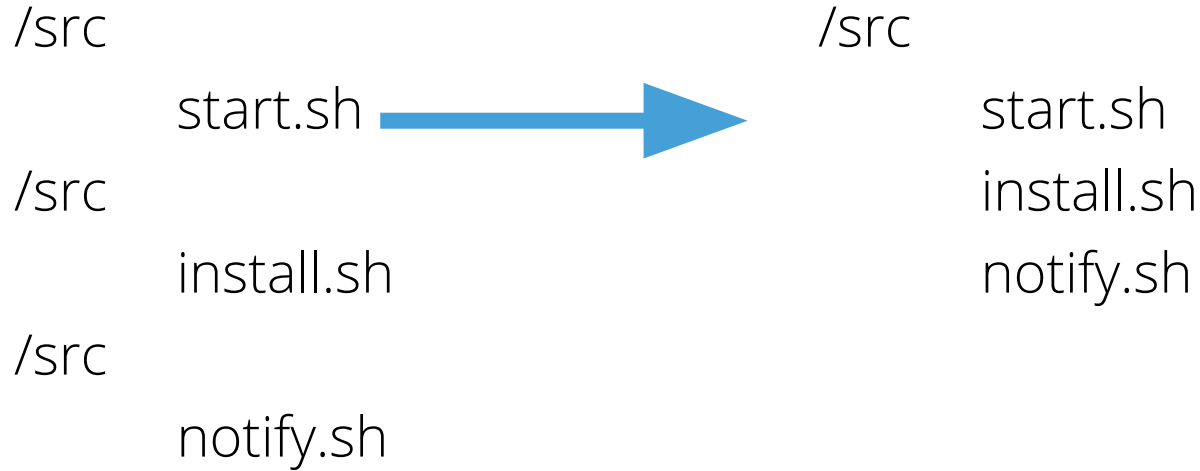


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Dynamic file system - overlayfs

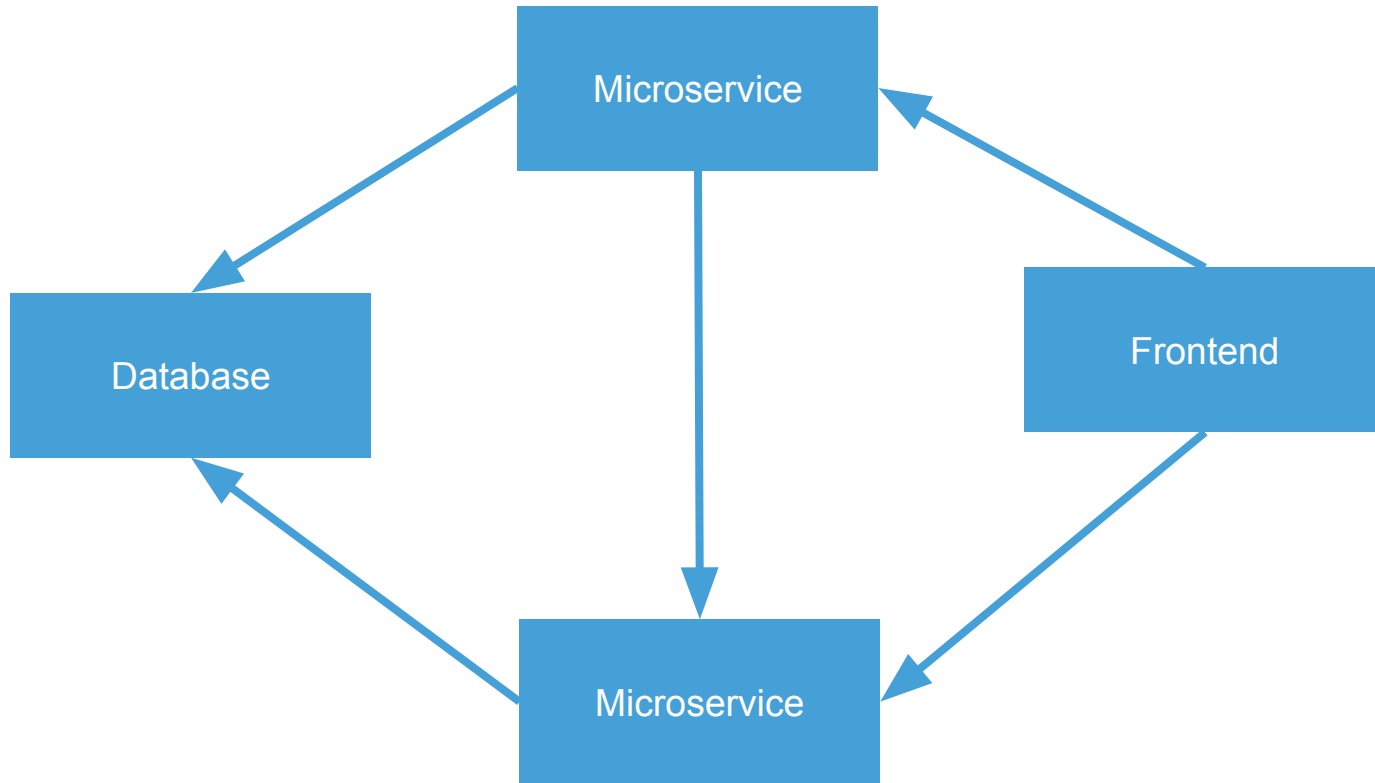


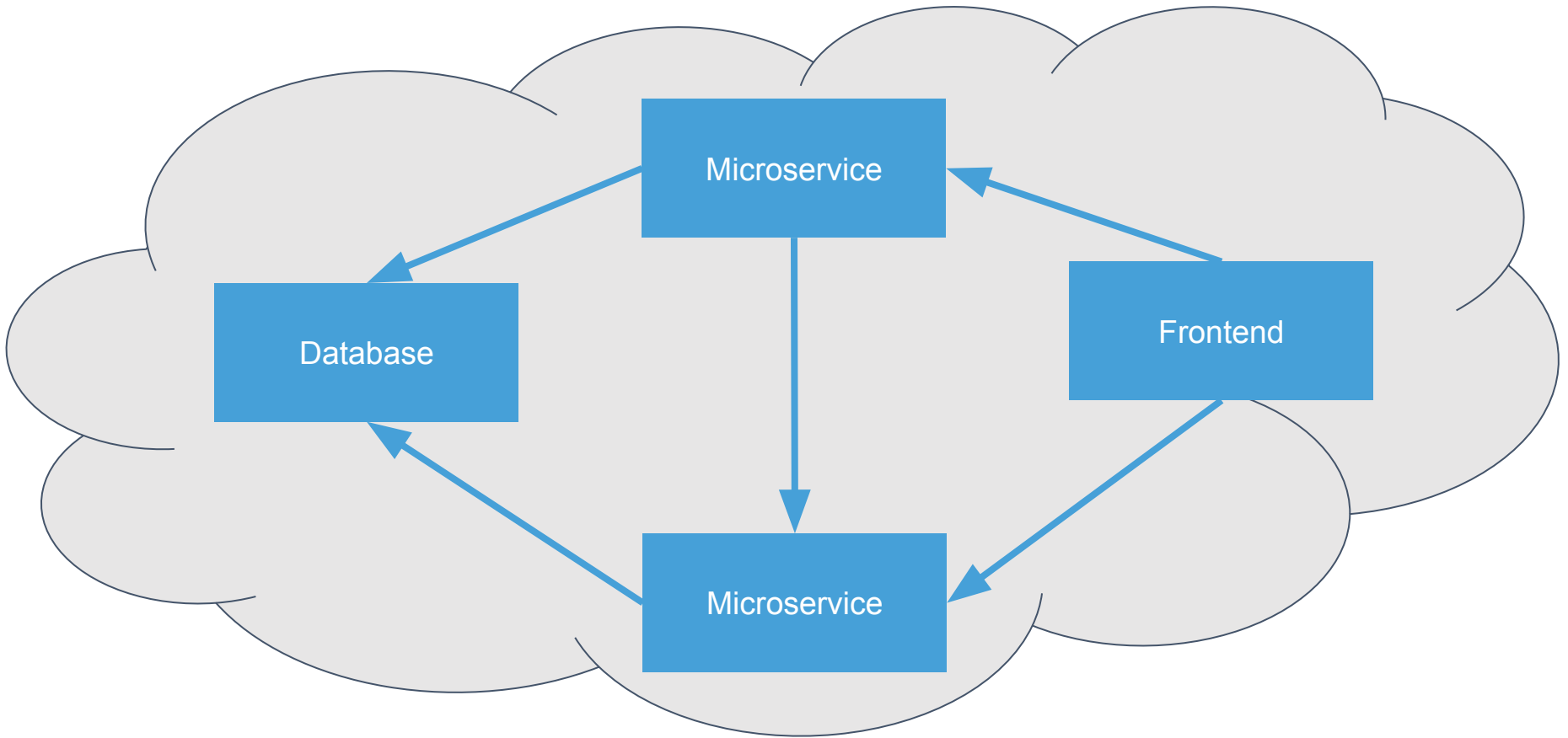
Network

3 levels:

- exposed ports of the container
 - (on which ports should the container be reachable?)
- docker networks
 - (with which containers does the container communicate?)
- exposed ports of the host
 - (with which containers should the outside world be able to communicate?)

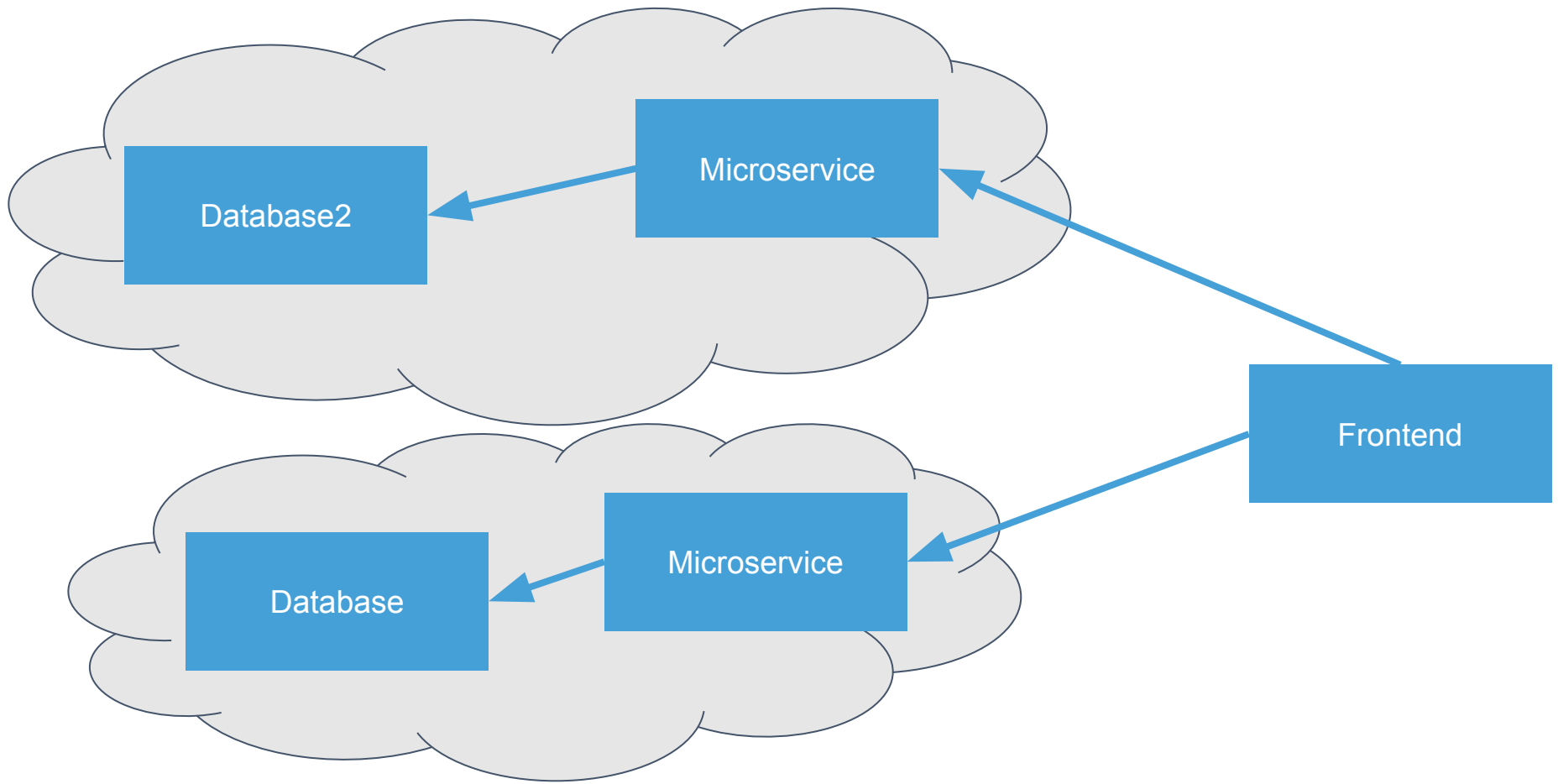






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CPU Resources

ability to limit the containers

- CPU-share
- CPU-cores
- ram-access



Docker Frontend



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Docker Engine



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Demo Time!



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installing docker

- clone **hackundsoehne/docker-assignments**
- instructions are in the **README.md** (best viewed in the browser)



Commands Cheatsheet

- **docker build** - Build your docker image
- **docker push** - Push your docker image to a repository
- **docker pull** - Pull a docker image from a repository
- **docker run** - Run a docker image (image => container)
- **docker ps** - List all containers
- **docker rm** - Remove a container
- **docker stop** - Stop a container
- **docker logs** - see the logs of a container



Check your
containers -
they eat a lot of
disk space



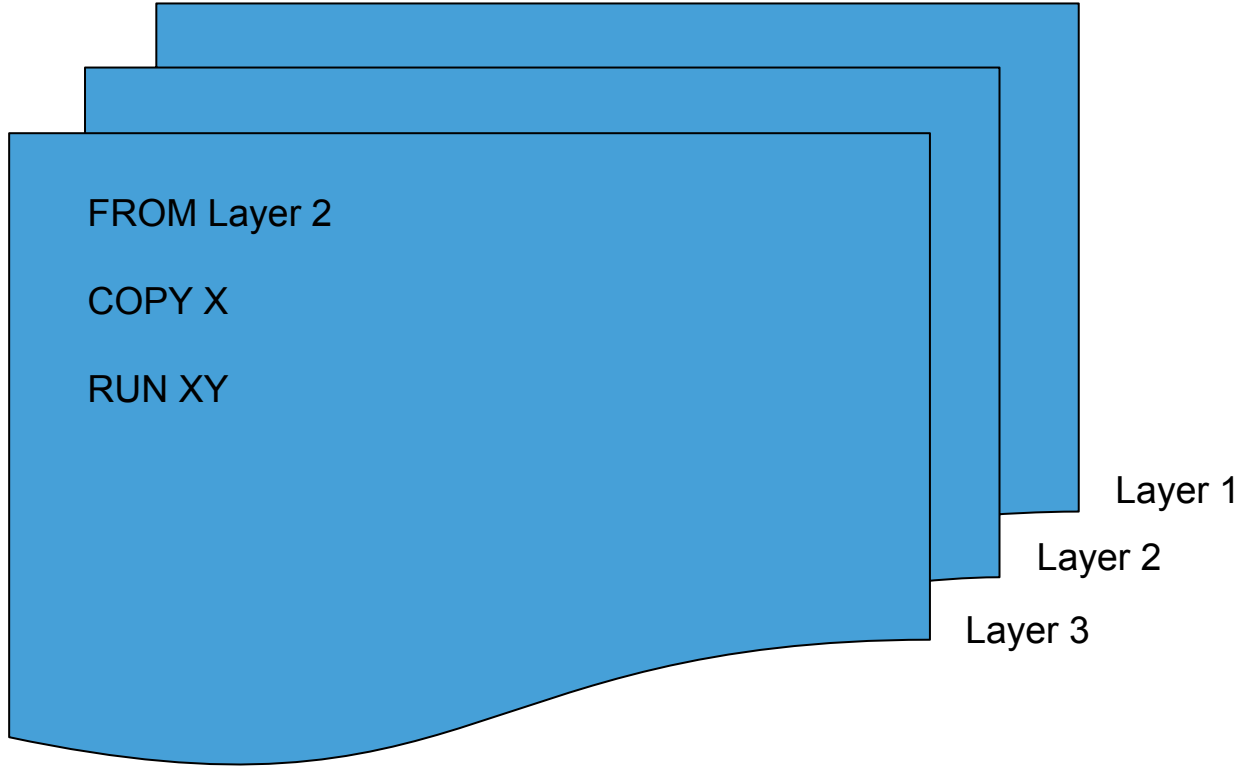
Dockerfile



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Demo Time!



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Dockerfile Cheatsheet

- **FROM X** - the parent image
- **COPY X Y** - copies files from X (your local filesystem) to Y (image)
- **WORKDIR X** - changes the workdir to X
- **RUN X** - runs X during image-creation time
- **EXPOSE X** - opens the ports X from the docker-container
- **FROM X** - the parent image
- **CMD X** - runs THE COMMAND X when the container starts
- **ENTRYPOINT X** - runs x when the container starts



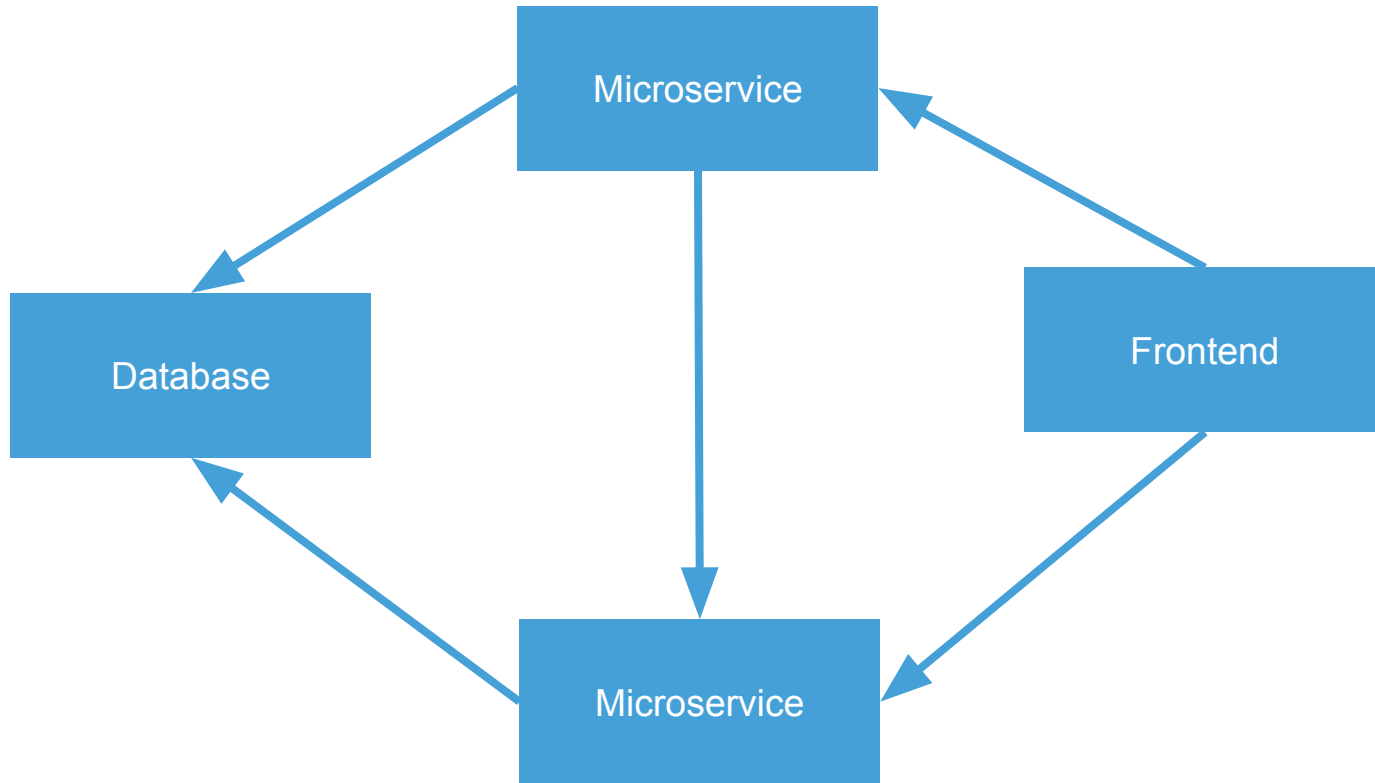
Docker Compose



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Docker compose to the rescue!



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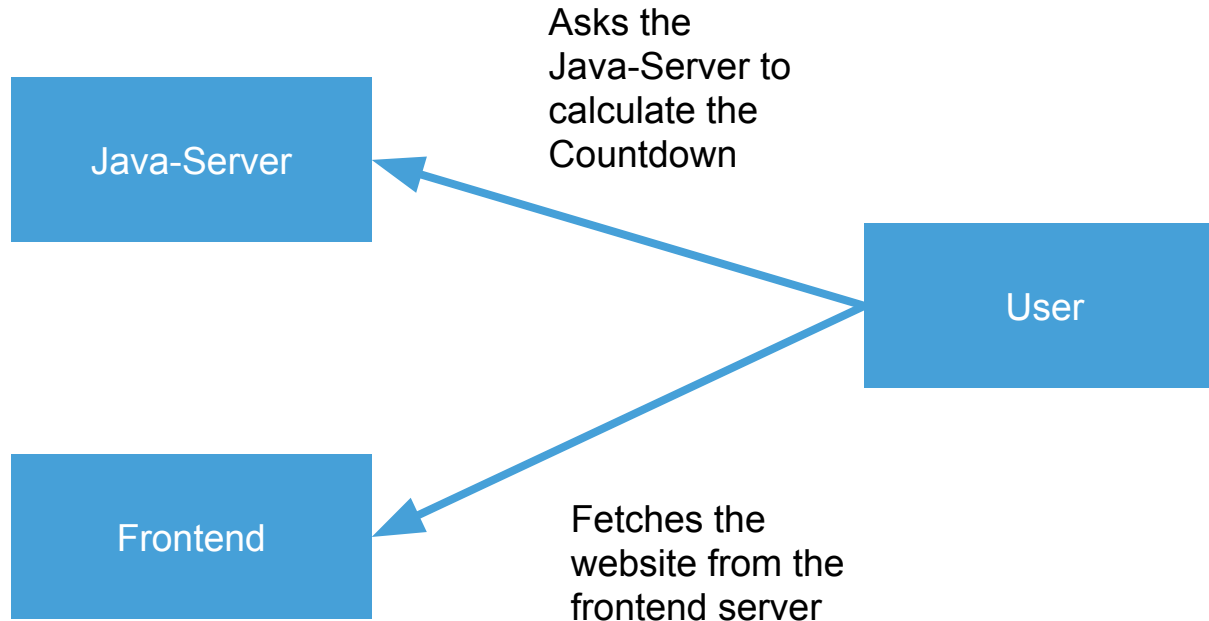
Demo time



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Docker Compose Cheatsheet

YAML - Syntax (**significant indentations with tabs**)

```
Group:                               Item: value
- Item1
- item2
```



Docker Compose Cheatsheet

version: '3' - needs to be on the top

services: - list your services

name: - the name of your service

image: "redis:alpine" - the source of your image

ports:

- **"8080:80"** - the open ports and the mapping
(HOST:CONTAINER)

environment:

- **KEY:VALUE** - sets the environment variable KEY to the value VALUE



Docker Volumes

- the file-system is virtualized, but we still want to map local directories into docker container.
- useful for databases (you want to have the database-file in a local directory) etc.
- Docker Volumes to the rescue!
- They are used to map local directories dynamically into the container



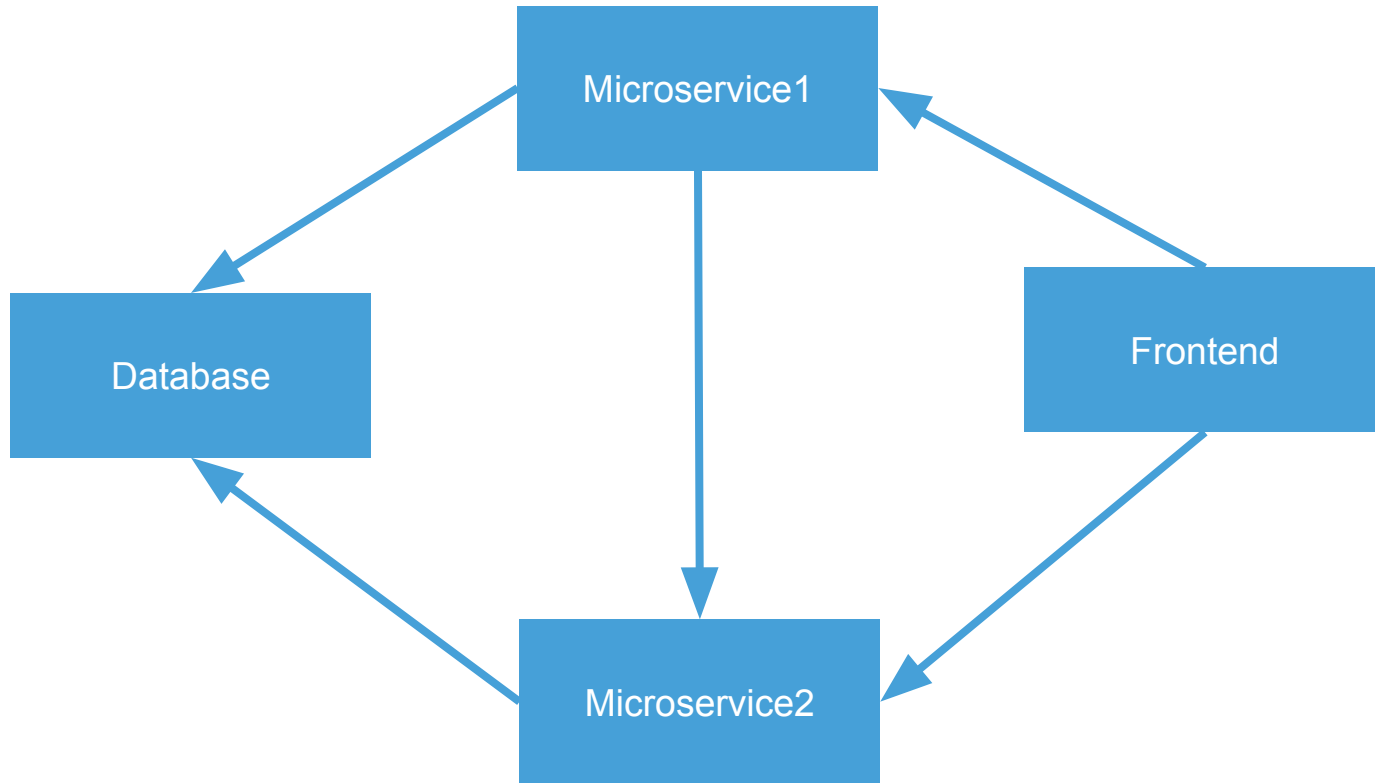
How to beautifully link two services?

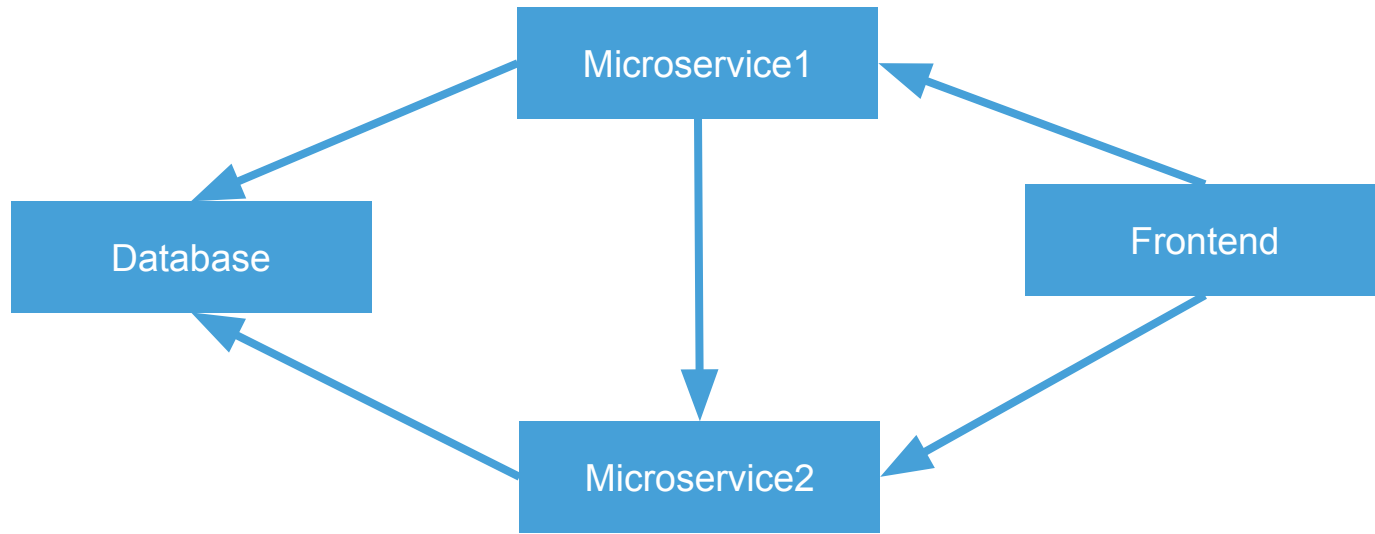


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ms1:
link:
- ms2:microservicetwo

→ <http://microservicetwo:8080/calculate>



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Docker Compose - links

web:

links:

- **db:database** - SERVICE:ALIAS
- **ws:workerservice**

example usage: `http://workerservice:80/list/customers`



Docker Compose - networks

web:

networks:

- frontend**
- backend**



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Docker Compose Cheatsheet

version: '3' - needs to be on the top

services: - list your services

name: - the name of your service

image: "redis:alpine" - the source of your image

ports:

- **"8080:80"** - the open ports and the mapping (HOST:CONTAINER)

networks: - assign the container to explicit networks, if left out it is added to the default network

- **backend**

- **frontend**

links: - provides explicit links to services

- **db:database**



(Assignment)



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Docker ecosystem



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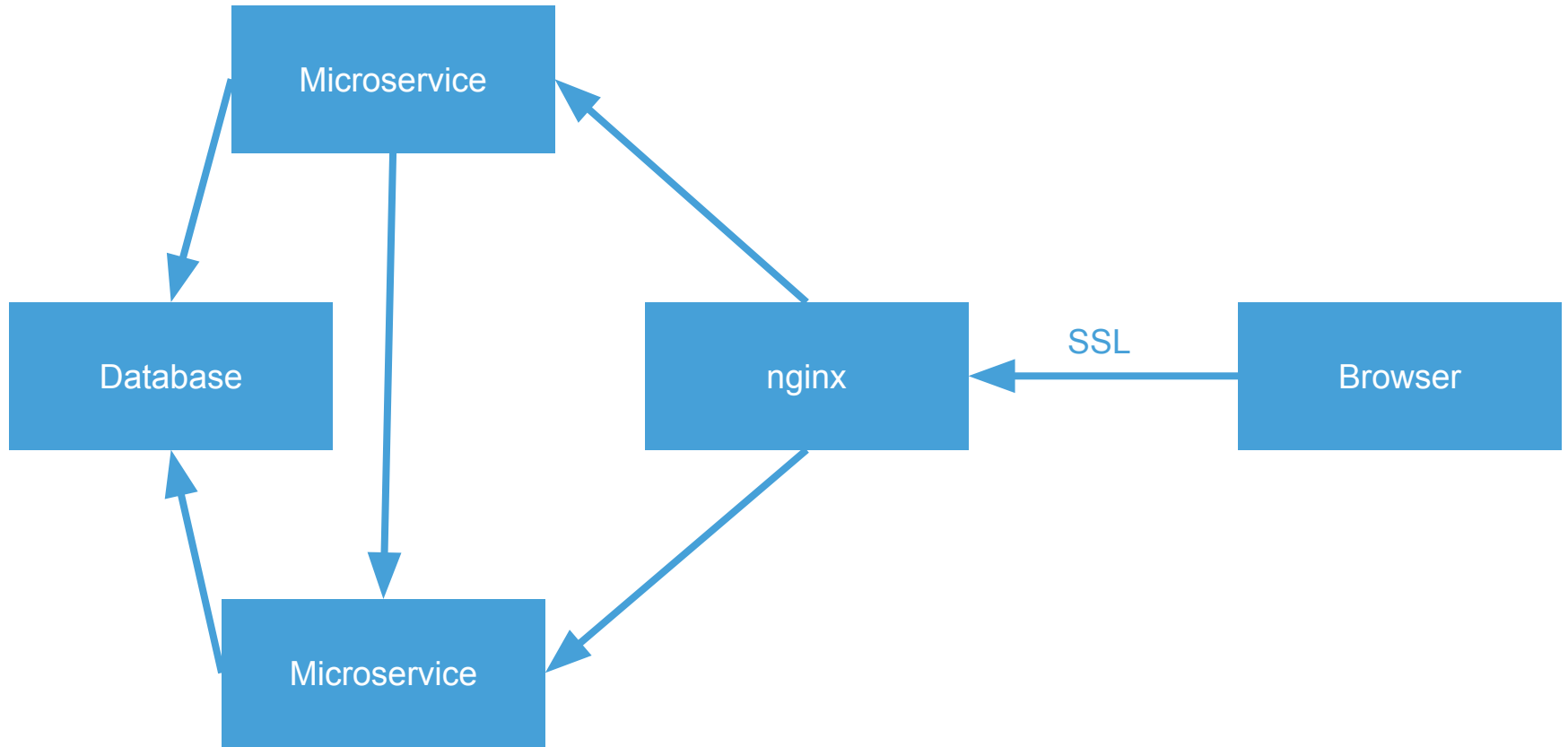


Docker ecosystem: nginx-proxy

auto-generates the nginx reverse proxy file based on the config file.

needs docker-daemon socket!





Docker ecosystem: letsencrypt-nginx-proxy-companion

automatically installs & configures SSL-certificates and
communicates with nginx-proxy



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Docker ecosystem: watchtower

automatically updates your images.

needs docker daemon socket!

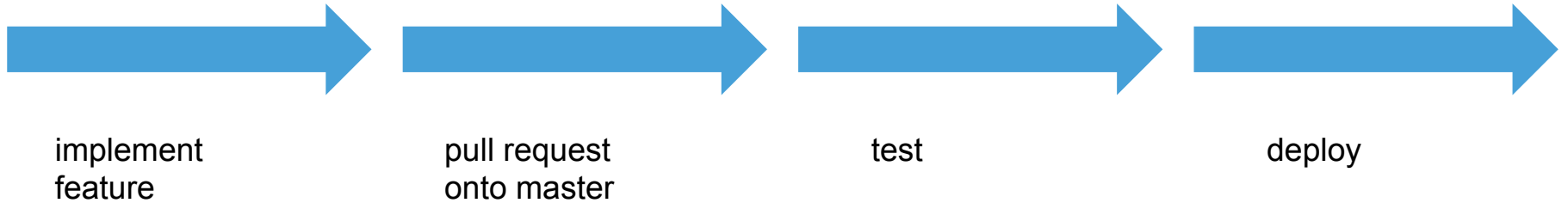


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Automate all the things!



fast iterations,
immediate
feedback, chance
to immediately
f**k things up



Demo time!



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Thank You



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Stay in touch



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