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Abdelilah OUASSINI · Follow

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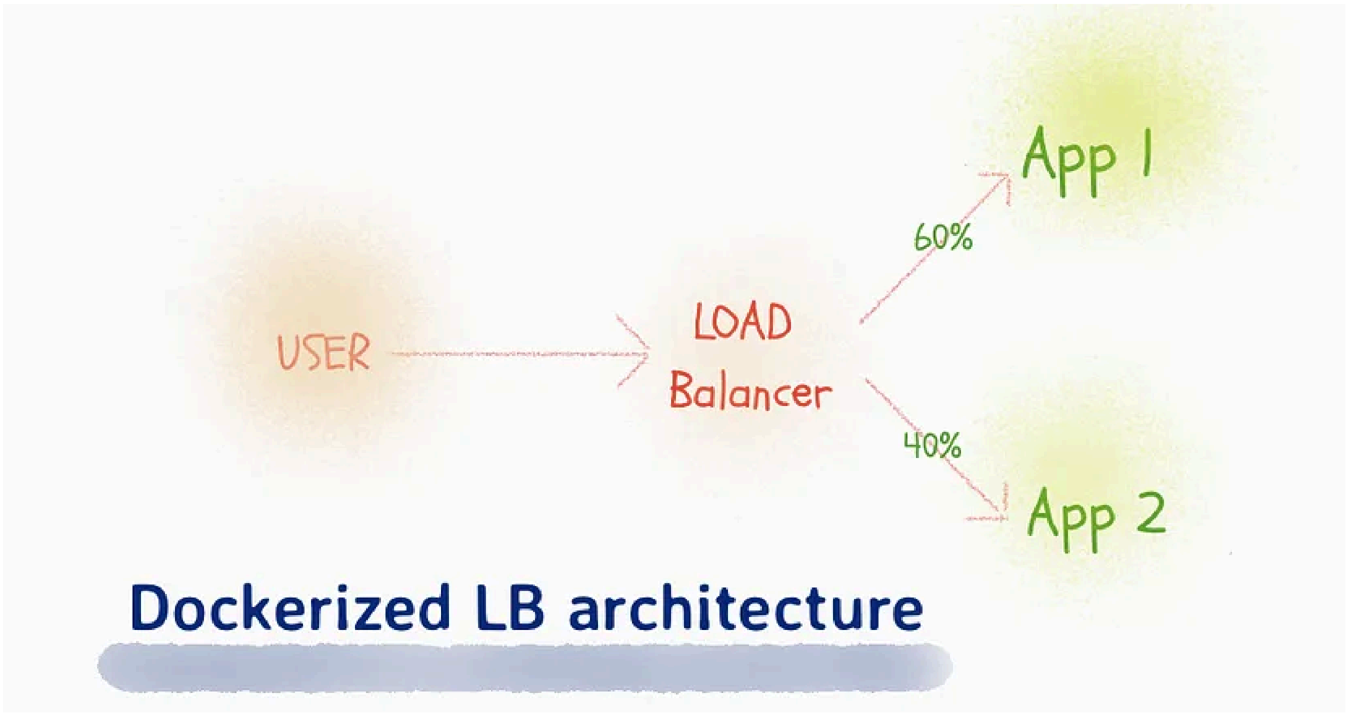


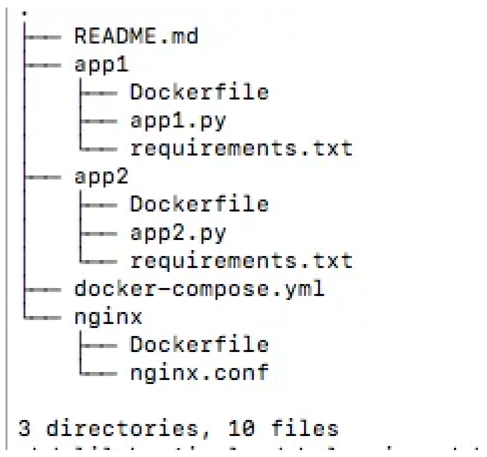
Most of today's business applications use load balancing to distribute traffic among different resources and avoid overload of a single resource.

One of the obvious advantages of load balancing architecture is to increase the availability and reliability of applications, so if a certain number of clients request some number of resources to backends, Load balancer stays between them and route the traffic to the backend that fills most the routing criteria (less busy, most healthy, located in a given region .. etc).

There are a lot of routing criteria, but we will focus on this article on fixed round-robin criteria — meaning each backend receives a fixed amount of traffic — which I think rarely documented :).

To simplify we will create two backends "applications" based on flask Python files. We will use NGINX as a load balancer to distribute 60% of traffic to application1 and 40% of traffic to application2.

Let's start the coding, hereafter the complete architecture of our project:



```
.
├── README.md
├── app1
│   ├── Dockerfile
│   ├── app1.py
│   └── requirements.txt
├── app2
│   ├── Dockerfile
│   ├── app2.py
│   └── requirements.txt
├── docker-compose.yml
└── nginx
    ├── Dockerfile
    └── nginx.conf

3 directories, 10 files
```

Load balancing Project tree

app1/app1.py

```
from flask import request, Flask
import json

app1 = Flask(__name__)
@app1.route('/')

def hello_world():
return 'Salam alikom, this is App1 :) '

if __name__ == '__main__':
app1.run(debug=True, host='0.0.0.0')
```

app2/app2.py

```
from flask import request, Flask
import json

app1 = Flask(__name__)
@app1.route('/')

def hello_world():
return 'Salam alikom, this is App2 :) '

if __name__ == '__main__':
app1.run(debug=True, host='0.0.0.0')
```

Then we have to dockerize both applications by adding the requirements.txt file. It will contain only the flask library since we are using the python3 image.

app1/requirements.txt

You may create the same for app2.

```
Flask==1.1.1
```

app1/Dockerfile

You may create the same for app2.

```
FROM python:3
COPY ./requirements.txt /requirements.txt
WORKDIR /
RUN pip install -r requirements.txt
COPY . /
ENTRYPOINT [ "python3" ]
CMD [ "app1.py" ]
```

We will use NGINX as a load balancer, the routing criteria will be guaranteed by the round-robin **weight** parameter :

nginx/nginx.conf

```
upstream loadbalancer {
server 172.17.0.1:5001 weight=6;
server 172.17.0.1:5002 weight=4;
}
server {
location / {
proxy_pass http://loadbalancer;
}}
```

We will then dockerize our load balancer by creating a Dockerfile using the Nginx image. It will copy the above conf file on the related path inside the container when starting it.

nginx/Dockerfile

```
FROM nginx
RUN rm /etc/nginx/conf.d/default.conf
COPY nginx.conf /etc/nginx/conf.d/default.conf
```

Now we will create the docker-compose file which will spin-up our complete architecture so we can access it from the browser.

docker-compose.yml

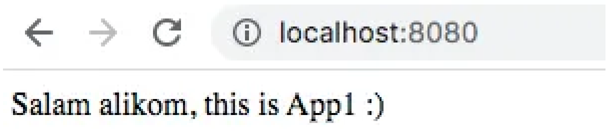
```
version: '3'
services:
app1:
build: ./app1
ports:
- "5001:5000"
app2:
build: ./app2
ports:
- "5002:5000"
nginx:
build: ./nginx
ports:
- "8080:80"
depends_on:
- app1
- app2
```

Some important points regarding docker-compose.yml:

- It will build images for app1, app2, Nginx based on our Dockerfiles and then spin up containers from those images.
- The opened port inside app1 and app2 containers are 5000 (default port used by flask), these ports will be mapped to 5001 and 5002.
  The load balancer will route traffic to the appropriate application based on that port.
- The load balancer (Nginx) will expose his internal 80 port to 8080, so we can access the application from http://localhost:8080

Finally, we will spin up our architecture by running below command and enjoy the result in the browser :)

```
docker-compose up
```



```
Salam alikom, this is App1 :)
```

You may also find the complete code on the below GitLab repo:

Abdelilah OUASSINI / load-balancing
GitLab.com
gitlab.com

As always, I hope you have learned something new. Salam :)

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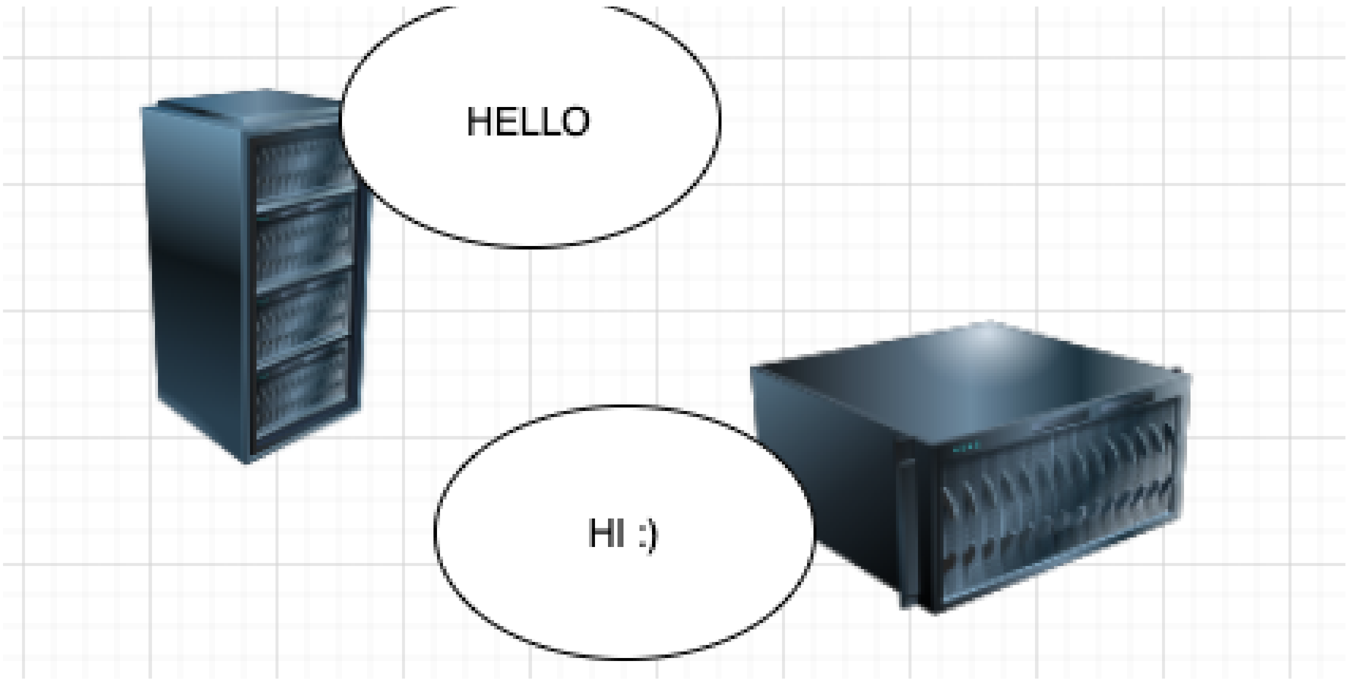

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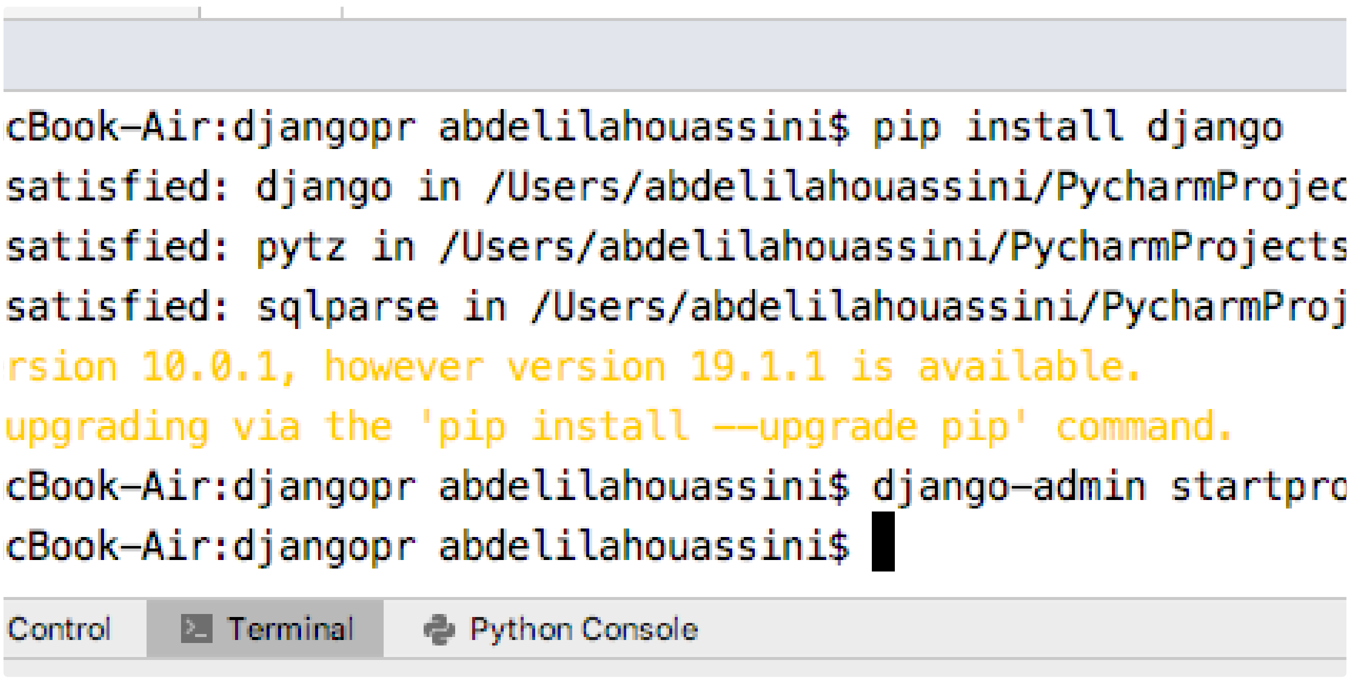

```
cBook-Air:djangopr abdelilahouassini$ pip install django
satisfied: django in /Users/abdelilahouassini/PycharmProjec
satisfied: pytz in /Users/abdelilahouassini/PycharmProjects
satisfied: sqlparse in /Users/abdelilahouassini/PycharmProj
rsion 10.0.1, however version 19.1.1 is available.
upgrading via the 'pip install --upgrade pip' command.
cBook-Air:djangopr abdelilahouassini$ django-admin startpro
cBook-Air:djangopr abdelilahouassini$
```

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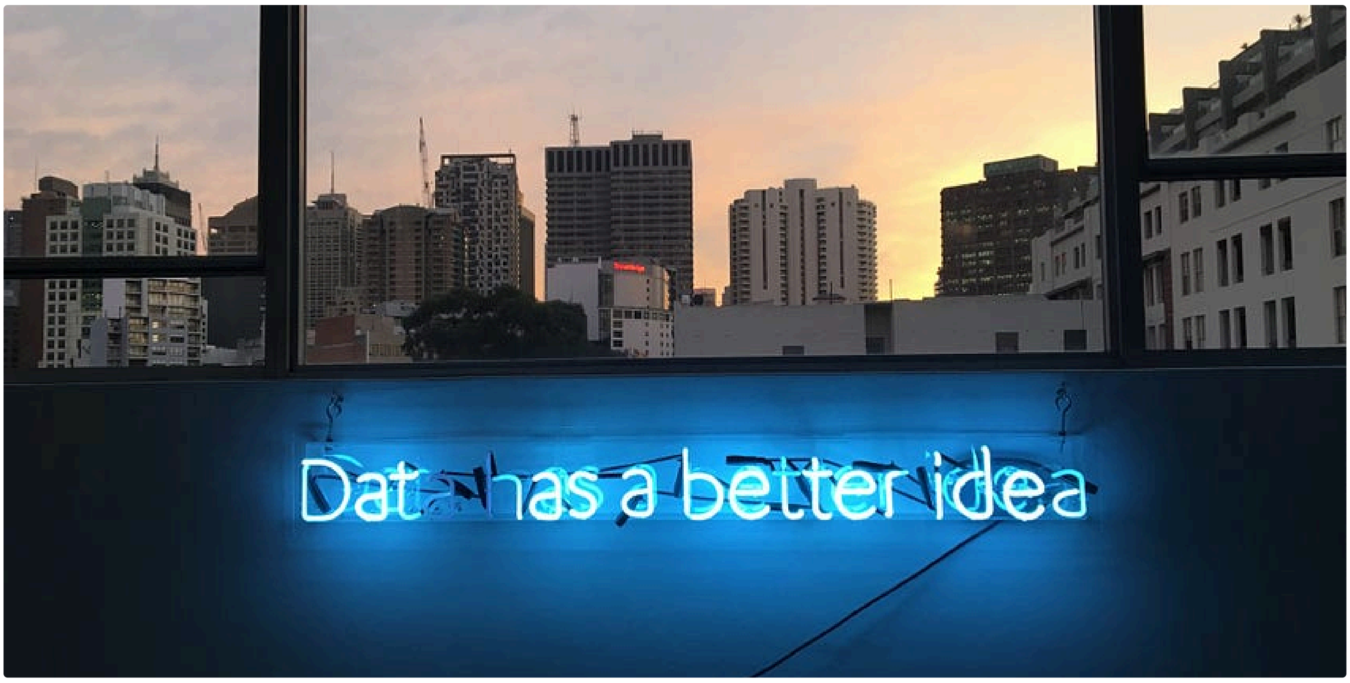

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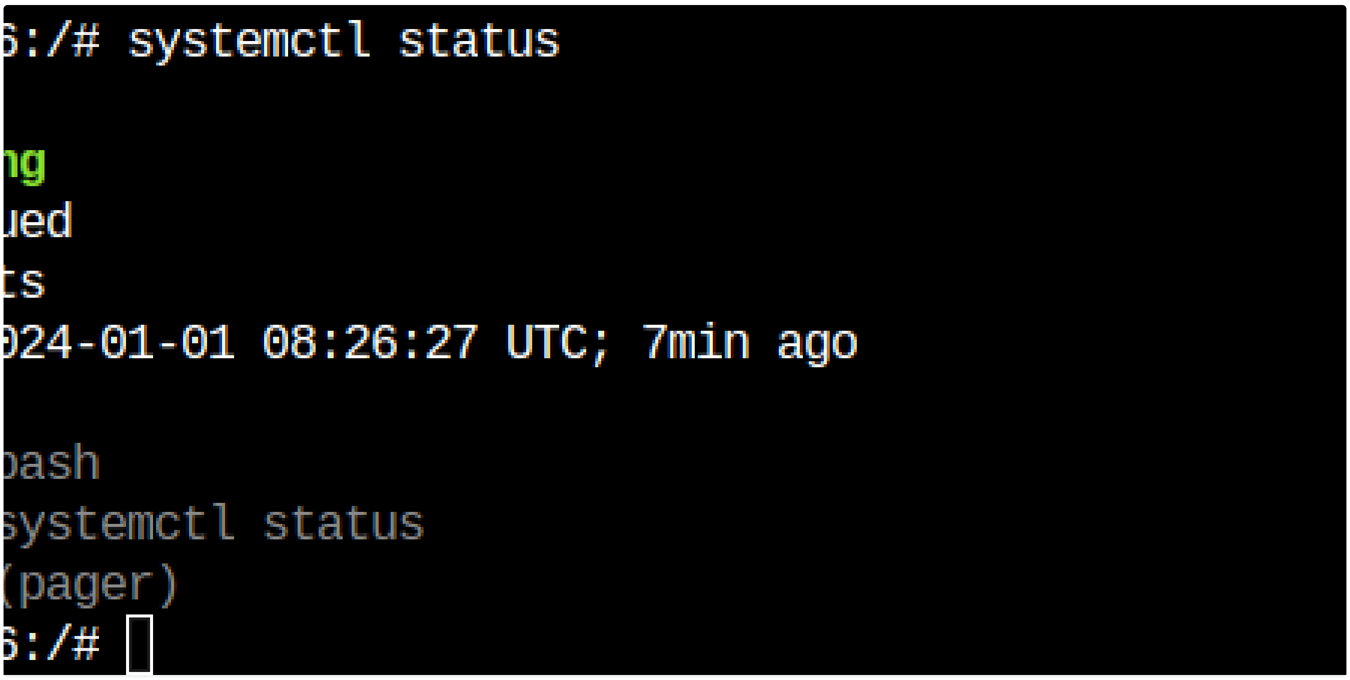

```
:/# systemctl status

ng
ued
ts
024-01-01 08:26:27 UTC; 7min ago

bash
systemctl status
(pager)
:/# 
```

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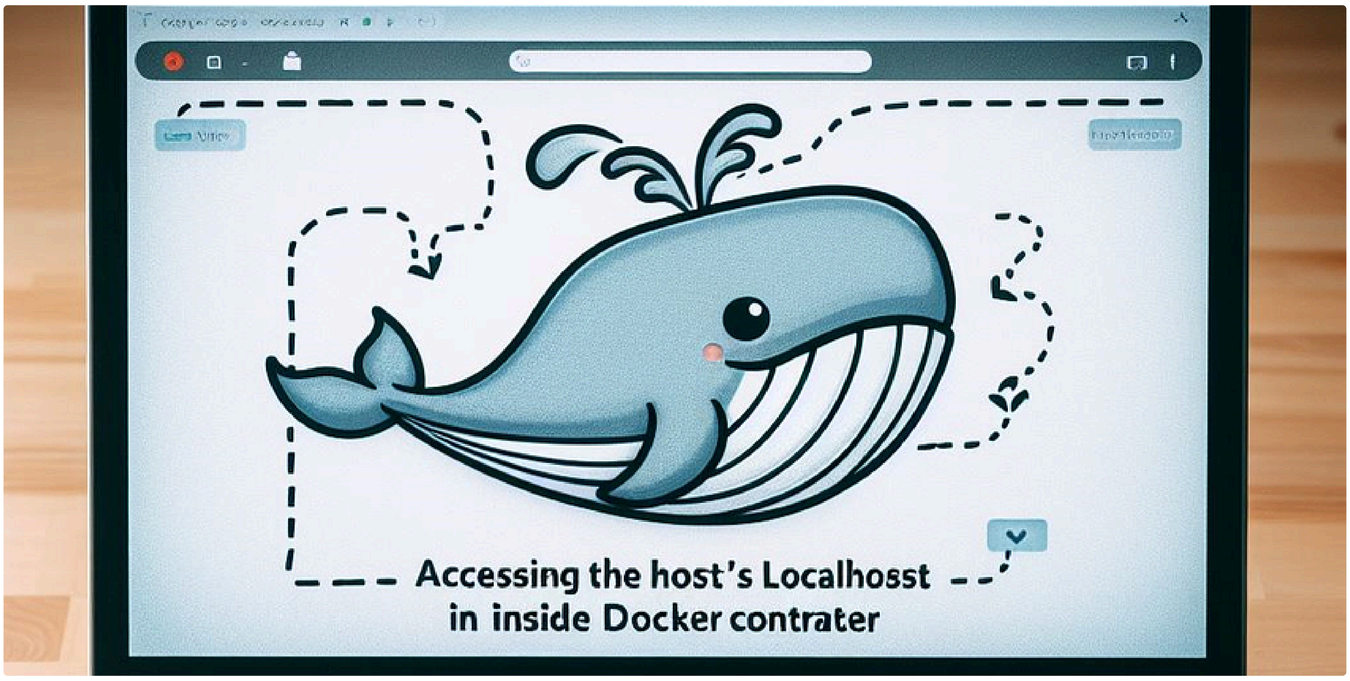

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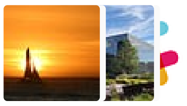

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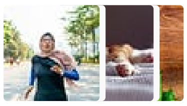

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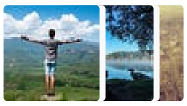

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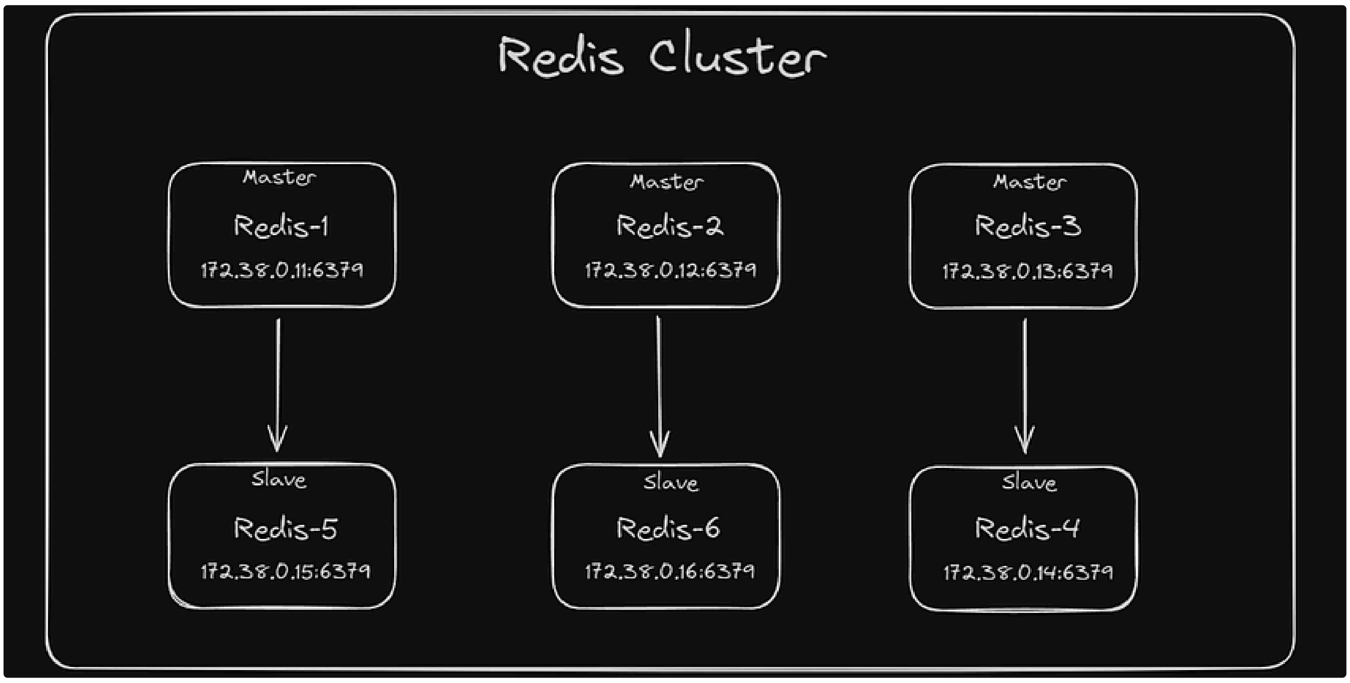

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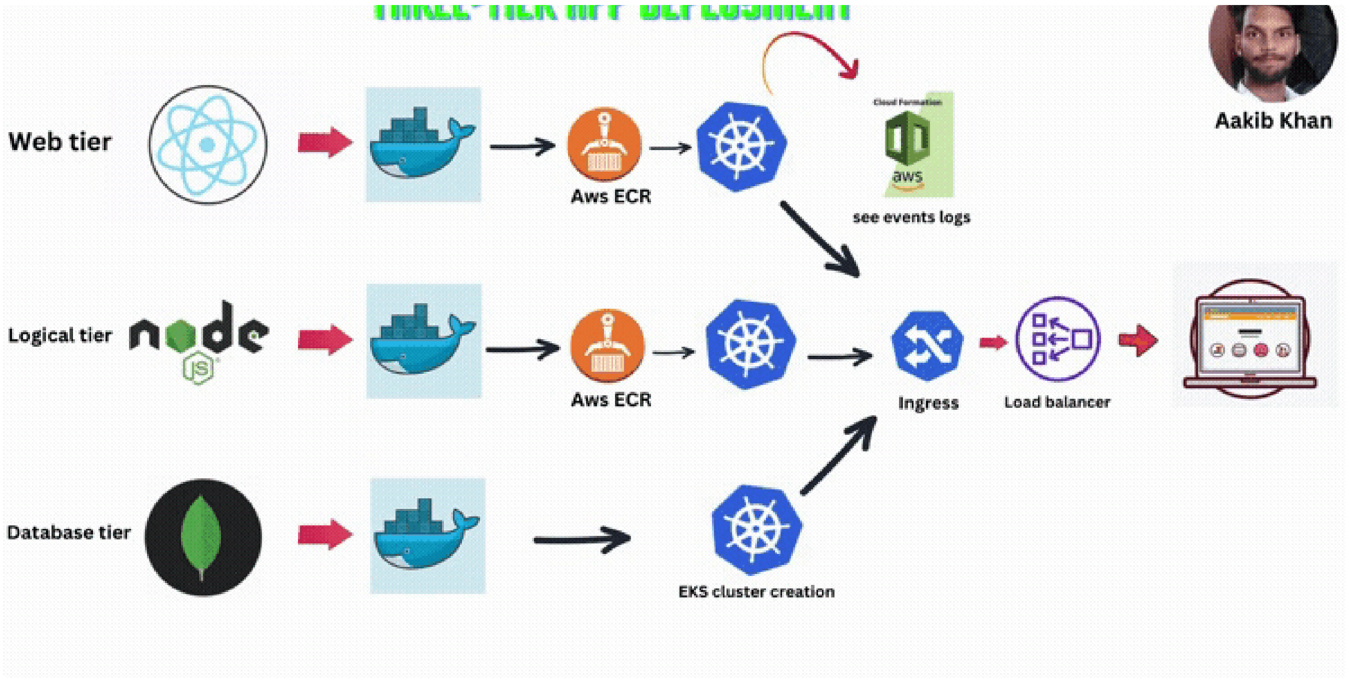

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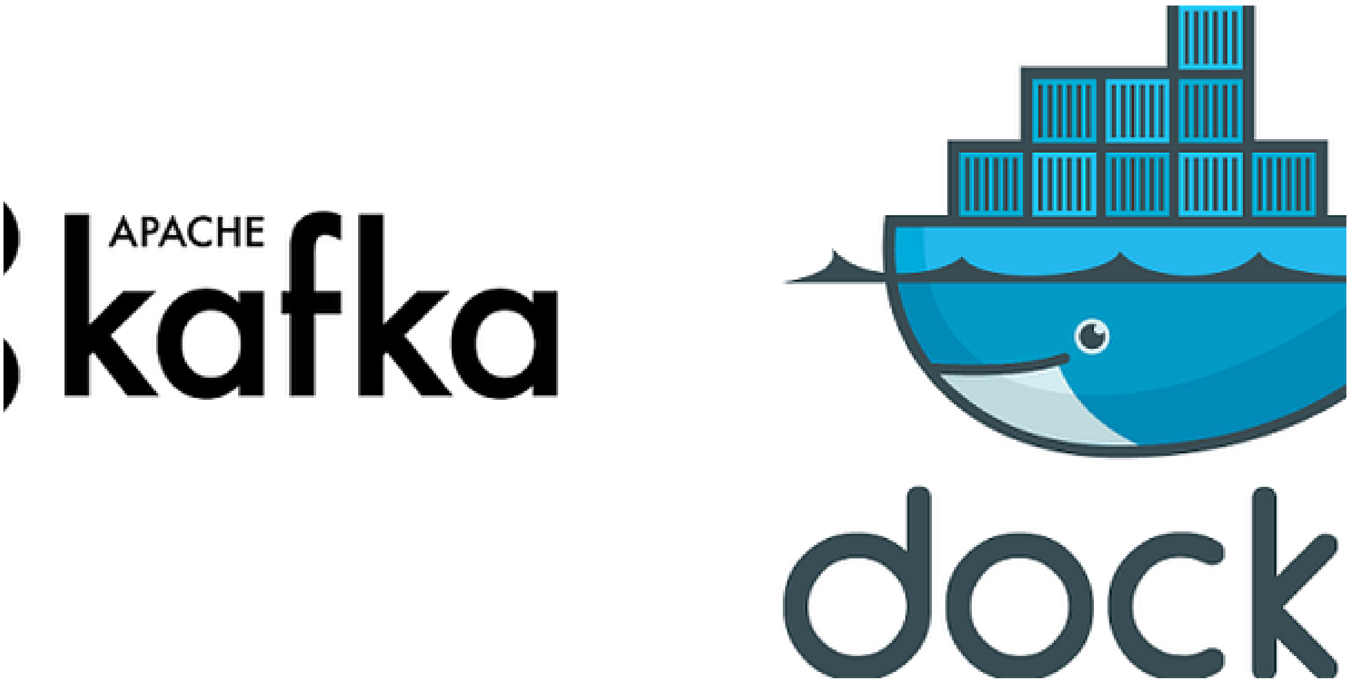

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