Deploying an API

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What are microservices ?

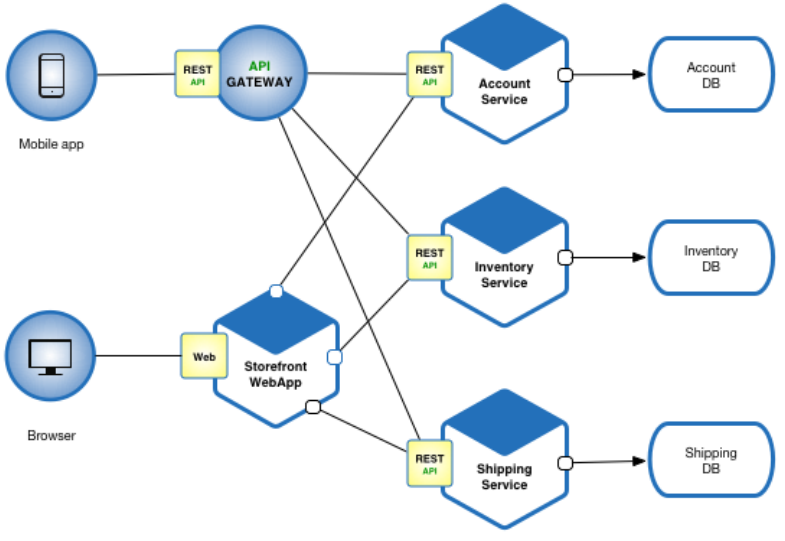
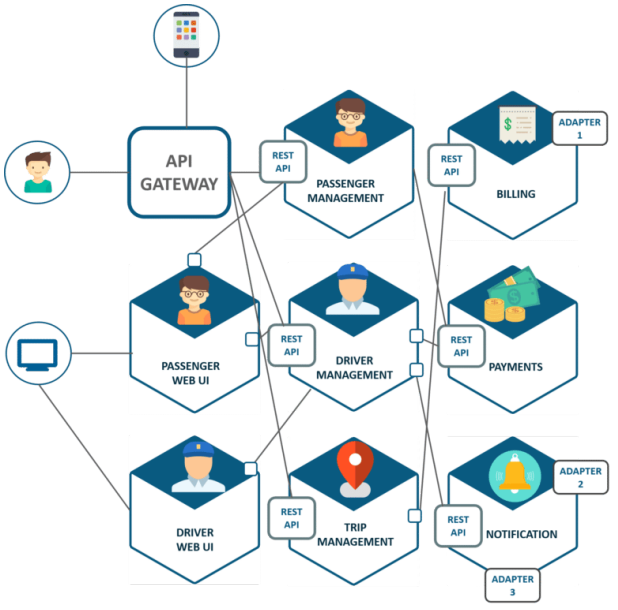


image from https://microservices.io/

Example: Uber microservices



Creating and deploying an API

We will create an API for our Recommender System (Agent) that can be requested by users (Environment).

We will use the following technologies:

- Flask
- Docker
- Nginx

Creating an API with Flask

```
from flask import Flask
app = Flask(__name__)

@app.route("/")
def hello():
    return "Hello World!"

if __name__ == '__main__':
    app.run(host='0.0.0.0', port=5000)
```

http://localhost:5000/

Input and outputs

```
@app.route("/add", methods=['GET', 'POST'])
def predict():
    input1 = request.args.get('input1')
    input2 = request.args.get('input2')
    append = input1 + input2
    sum = float(input1) + float(input2)
    d = {'sum': sum, 'append': append}
    return jsonify(d)
```

Calling

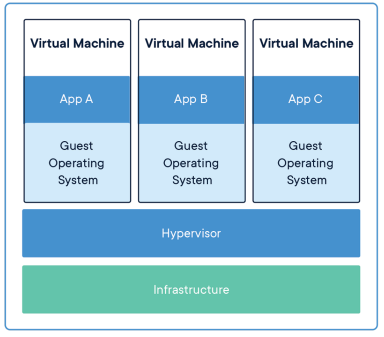
- http://localhost:5000/add?input1=2&input2=3.1

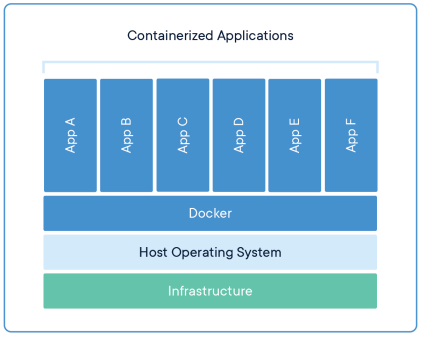
Return

- {"append":"23.1","sum":5.1}

Docker

Different part of an application may require different environment.





"Containers virtualize the operating system instead of hardware." Docker

Dockerfile

A simple example running Ubuntu.

```
FROM ubuntu:18.04

# keep container running
CMD tail -f /dev/null
```

Build Docker image

```
docker build -t my_image_name .
```

Start a container with this image

```
docker run -d --name my_container_name my_image_name
```

Run bash inside this container

```
docker exec -it my_container_name bash
```

Docker

Exit bash shell: ctrl + d

Stop and remove

```
docker stop my_container_name
docker rm my_container_name
docker rmi my_image_name
```

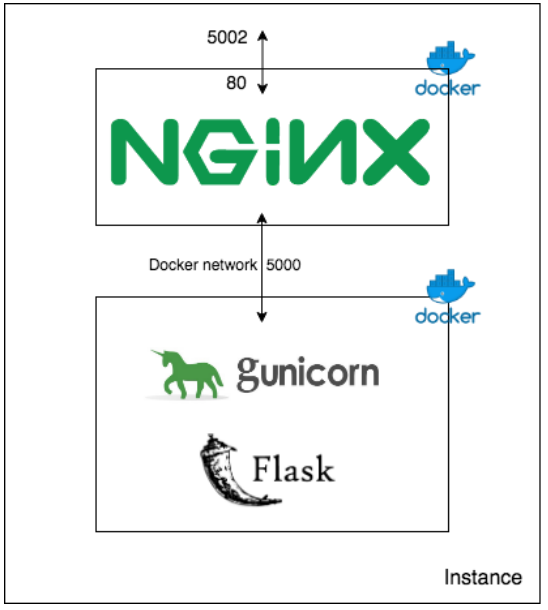
Adding commands

```
FROM ubuntu:18.04

RUN apt-get update && \
    apt-get -y upgrade && \
    apt-get install -y build-essential && \
    apt-get install -y software-properties-common && \
    apt-get install -y curl wget git htop vim

# keep container running
CMD tail -f /dev/null
```

Flask API Dockerfile

```
# Inherit from Python 3.6 image
FROM python:3.6

# Set a working directory
WORKDIR /usr/src

# Copy requirements
COPY requirements.txt .

# Install requirements
RUN pip install -r requirements.txt

# Copy current folder
COPY . .

# Run python code
CMD python app.py
```

Web server


5002
80
docker
NGINX
Docker network
5000
docker
gunicorn
Flask
Instance

Docker-compose

```
version: '3'

services:

  flask_app:
    container_name: flask_app
    restart: always
    build: ./flask_app
    command: gunicorn app:app -w 1 -b :5000

  nginx:
    container_name: nginx
    restart: always
    build:
      context: nginx
      args:
        - PROXY_PASS=http://flask_app:5000
    ports:
    - "5002:80"
    depends_on:
    - flask_app
```

Check you can access the environment API

Once deployed you can call the api using your browser, that should print a beautifull *Hello World!*

If you deployed it on a remote server replace 0.0.0.0 by the server ip adress.

```
http://0.0.0.0:5002
```

You can also do it in command line with curl

```
curl "http://0.0.0.0:5002"
```

Passing parameters

```
http://0.0.0.0:5002/add?input1=2&input2=3.1
```

Calling an API with requests

```
import requests
r = requests.get(url='http://0.0.0.0:5002/add',
                 params={'input1': 2,
                         'input2': 3.1})
data = r.json()
```

data is then a dict containing the returned *key:values*.