**Application Containerization and Microservice Orchestration**

Langkah yang dilalui

* Stage Setup

Dimulai dengan menggandakan repositori kode demo, mengubah direktori kerja, dan memeriksa cabang demo.

Perintah :

git clone https://github.com/ibnesayeed/linkextractor.git

cd linkextractor

git checkout demo

Hasil :

$ git clone https://github.com/ibnesayeed/linkextractor.git

Cloning into 'linkextractor'...

remote: Enumerating objects: 4, done.

remote: Counting objects: 100% (4/4), done.

remote: Compressing objects: 100% (4/4), done.

remote: Total 144 (delta 0), reused 0 (delta 0), pack-reused 140

Receiving objects: 100% (144/144), 44.55 KiB | 8.91 MiB/s, done.

Resolving deltas: 100% (43/43), done.

[node1] (local) root@192.168.0.13 ~

$ cd linkextractor

[node1] (local) root@192.168.0.13 ~/linkextractor

$ git checkout demo

Branch 'demo' set up to track remote branch 'demo' from 'origin'.

Switched to a new branch 'demo'

* Step 0: Basic Link Extractor Script

Cek Branch dan List File dengan perintah :

git checkout step0

tree

hasil :

.

├── README.md

└── linkextractor.py

Melihat isi file  linkextractor.py :

cat linkextractor.py

hasil :

#!/usr/bin/env python

import sys

import requests

from bs4 import BeautifulSoup

res = requests.get(sys.argv[-1])

soup = BeautifulSoup(res.text, "html.parser")

for link in soup.find\_all("a"):

print(link.get("href"))

langkah selanjutnya ketik perintah :

./linkextractor.py http://example.com/

Hasilnya :

bash: ./linkextractor.py: Permission denied

terlihat bahwa perintah tersebut tidak bisa diakses. Untuk mengecek hak akses, gunakan perintah :

ls -l linkextractor.py

Hasil :

-rw-r--r-- 1 root root 220 Dec 17 10:38 linkextractor.py

Hak akses -rw-r - r-- menunjukkan bahwa skrip tidak diset untuk dapat dieksekusi. Untuk mengubahnya jalankan perintah :

chmod a+x linkextractor.py

hasil dapat dilihat dengan perintah : ls –l linkextractor.py

sehingga dihasilkan :

-rwxr-xr-x 1 root root 220 Dec 17 10:38 linkextrac

* Step 1: Containerized Link Extractor Script

Cek Branch dan list file di step 1:

git checkout step1

tree

hasil :

.

├── Dockerfile

├── README.md

└── linkextractor.py

Terdapat file baru Dockerfile

Cek isi file Dockerfile :

cat Dockerfile

hasil :

FROM python:3

LABEL maintainer="Sawood Alam <@ibnesayeed>"

RUN pip install beautifulsoup4

RUN pip install requests

WORKDIR /app

COPY linkextractor.py /app/

RUN chmod a+x linkextractor.py

ENTRYPOINT ["./linkextractor.py"]

Untuk mengenal Docker Image, ketik perintah :

docker image build -t linkextractor:step1

hasil :

Successfully built 8196e73c205d

Successfully tagged linkextractor:step1

Docker image telah berhasil dibuat dengan nama linkextractor:step1. Untuk melihat isinya, ketik perintah :

docker image ls

hasil :

REPOSITORY TAG IMAGE ID CREATED SIZE

linkextractor step1 8196e73c205d 2 minutes ago 895MB

python 3 2770b69c10e1 37 hours ago 885MB

Jalankan container mengunakan imae yang baru dibuat dan ekstrak link dari beberapa halaman web aktif.

docker container run -it --rm linkextractor:step1 http://example.com/

hasil berupa link yang ada di halaman web example.com:

<https://www.iana.org/domains/example>

* Step 2: Link Extractor Module with Full URI and Anchor Text

Cek branc dan list file :

git checkout step2

tree

hasil :

── Dockerfile

├── README.md

└── linkextractor.py

Skrip linkextractor.py diperbarui dengan perubahan fungsi :

* Jalur dinormalisasi menjadi URL lengkap
* Melaporkan tautan dan teks tautan
* Dapat digunakan sebagai modul di skrip lain

Perintah berikut untuk mengecek perubahannya :

cat linkextractor.py

hasil :

#!/usr/bin/env python

import sys

import requests

from bs4 import BeautifulSoup

res = requests.get(sys.argv[-1])

soup = BeautifulSoup(res.text, "html.parser")

for link in soup.find\_all("a"):

print(link.get("href"))

Buat imae baru pada step 2 :

docker image build -t linkextractor:step2 .

hasil :

Successfully built 8196e73c205d

Successfully tagged linkextractor:step2

Image di step 2 ini tidak akan menganti image yang dibuat di step 0.

docker image ls

hasil :

REPOSITORY TAG IMAGE ID CREATED SIZE

linkextractor step1 8196e73c205d 16 minutes ago 895MB

linkextractor step2 8196e73c205d 16 minutes ago 895MB

python 3 2770b69c10e1 37 hours ago 885MB

Menjalankan container dengan image di step 2 :

docker container run -it --rm linkextractor:step2 https://training.play-with-docker.com/

Hasil nya akan sedikit berbeda :

g.play-with-docker.com/

/

/about/

#ops

#dev

/ops-stage1

/ops-stage2

/ops-stage3

/dev-stage1

/dev-stage2

/dev-stage3

/alacart

https://twitter.com/intent/tweet?text=Play with Docker Classroom&url=https://training.play-with-docker.com/&via=docker&related=docker

https://facebook.com/sharer.php?u=https://training.play-with-docker.com/

https://plus.google.com/share?url=https://training.play-with-docker.com/

http://www.linkedin.com/shareArticle?mini=true&url=https://training.play-with-docker.com/&title=Play%20with%20Docker%20Classroom&source=https://training.play-with-docker.com

https://www.docker.com/dockercon/

https://www.docker.com/dockercon/

https://dockr.ly/slack

https://www.docker.com/legal/docker-terms-service

https://www.docker.com

https://www.facebook.com/docker.run

https://twitter.com/docker

<https://www.github.com/play-with-docker/play-with-docker.github.io>

* Step 3: Link Extractor API Service

Periksa image di step 3

git checkout step3

tree

hasil :

├── Dockerfile

├── README.md

└── linkextractor.py

Cek perubahan pada file docker :

cat Dockerfile

hasil :

FROM python:3

LABEL maintainer="Sawood Alam <@ibnesayeed>"

RUN pip install beautifulsoup4

RUN pip install requests

WORKDIR /app

COPY linkextractor.py /app/

RUN chmod a+x linkextractor.py

ENTRYPOINT ["./linkextractor.py"]

Tidak ada perubahan pada modul linkextractor.py. Cek file baru main.py :

Membuat image baru :

docker image build -t linkextractor:step3

hasil :

Successfully built 94c662c39c3c

Successfully tagged linkextractor:step3

Jalankan container docker :

docker container run -d -p 5000:5000 --name=linkextractor linkextractor:step3

hasil :

d6b40e0f8fe44b188b8a6e0528134eb92dad28669cbb6e053a3811ab9ecfa0b9

* Step 4: Link Extractor API and Web Front End Services

Cek branch dan file masih seperti step sebelumnya :

├── Dockerfile

├── README.md

└── linkextractor.py

* Step 5: Redis Service for Caching

Cek branch dan file masih seperti step sebelumnya :

├── Dockerfile

├── README.md

└── linkextractor.py

* Step 6: Swap Python API Service with Ruby

Cek Branch dan file :

git checkout step6

tree

hasil :

.

├── README.md

├── api

│ ├── Dockerfile

│ ├── Gemfile

│ └── linkextractor.rb

├── docker-compose.yml

├── logs

└── www

├── Dockerfile

└── index.php

Cek file yang berubah :

cat api/linkextractor.rb

hasil :

#!/usr/bin/env ruby

# encoding: utf-8

require "sinatra"

require "open-uri"

require "uri"

require "nokogiri"

require "json"

require "redis"

set :protection, :except=>:path\_traversal

redis = Redis.new(url: ENV["REDIS\_URL"] || "redis://localhost:6379")

Dir.mkdir("logs") unless Dir.exist?("logs")

cache\_log = File.new("logs/extraction.log", "a")

get "/" do

"Usage: http://<hostname>[:<prt>]/api/<url>"

end

get "/api/\*" do

url = [params['splat'].first, request.query\_string].reject(&:empty?).join("?")

cache\_status = "HIT"

jsonlinks = redis.get(url)

if jsonlinks.nil?

cache\_status = "MISS"

jsonlinks = JSON.pretty\_generate(extract\_links(url))

redis.set(url, jsonlinks)

end

cache\_log.puts "#{Time.now.to\_i}\t#{cache\_status}\t#{url}"

status 200

headers "content-type" => "application/json"

body jsonlinks

end

def extract\_links(url)

links = []

doc = Nokogiri::HTML(open(url))

doc.css("a").each do |link|

text = link.text.strip.split.join(" ")

begin

links.push({

text: text.empty? ? "[IMG]" : text,

href: URI.join(url, link["href"])

})

rescue

end

end

links

end

file lain :

cat api/Dockerfile

hasil :

FROM ruby:2.6

LABEL maintainer="Sawood Alam <@ibnesayeed>"

ENV LANG C.UTF-8

ENV REDIS\_URL="redis://localhost:6379"

WORKDIR /app

COPY Gemfile /app/

RUN bundle install

COPY linkextractor.rb /app/

RUN chmod a+x linkextractor.rb

CMD ["./linkextractor.rb", "-o", "0.0.0.0"]

Cek juga file :

cat docker-compose.yml

hasil :

version: '3'

services:

api:

image: linkextractor-api:step6-ruby

build: ./api

ports:

- "4567:4567"

environment:

- REDIS\_URL=redis://redis:6379

volumes:

- ./logs:/app/logs

web:

image: linkextractor-web:step6-php

build: ./www

ports:

- "80:80"

environment:

- API\_ENDPOINT=http://api:4567/api/

redis:

image: redis

service stack :

docker-compose up -d --build

hasil :

Status: Downloaded newer image for redis:latest

Creating linkextractor\_web\_1 ... done

Creating linkextractor\_api\_1 ... done

Creating linkextractor\_redis\_1 ... done

Akses API :

curl -i http://localhost:4567/api/http://example.com/

Hasil :

HTTP/1.1 200 OK

Content-Type: application/json

Content-Length: 97

X-Content-Type-Options: nosniff

Server: WEBrick/1.4.2 (Ruby/2.6.6/2020-03-31)

Date: Thu, 17 Dec 2020 11:59:28 GMT

Connection: Keep-Alive

[

{

"text": "More information...",

"href": "https://www.iana.org/domains/example"

}

Menutup stack :

docker-compose down

hasil :

Stopping linkextractor\_redis\_1 ... done

Stopping linkextractor\_web\_1 ... done

Stopping linkextractor\_api\_1 ... done

Removing linkextractor\_redis\_1 ... done

Removing linkextractor\_web\_1 ... done

Removing linkextractor\_api\_1 ... done

Removing network linkextractor\_default

Log masih ada walaupun service sudah di matikan :

cat logs/extraction.log

Hasil :

1608206368 MISS http://example.com/