Introducing Docker

Application Containerization & Service Orchestration

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A 30 minutes of Pair Hacking made running a complex software as easy as:

$ docker run -p 8888:8888 ibnesayeed/archivespark

Read the full story at:

Relatables

- The *Magic Laptop* problem
- Wish, these researchers document their code
- Cannot upgrade X to run Y because Z will break
- This project is the spaghetti of a dozen different technologies
- Yay! Got new machine :-) … Wait! I need to install & configure everything again ;-(
- Too many VMs to manage
What Is Docker?

- An application container
- Packages dependencies
- Isolates applications
- Processes run on the host OS
- Uses Linux cgroups and namespaces
- Lighter than a virtual machine
- Open-source
Dockerization Process

Dockerfile → Build → Image → Run → Container
AUFS

Container Layer

More Layers ...

Image Layer 2

Image Layer 1

Image Base Layer
#!/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"))
Dockerized Link Extractor Script

linkextractor.py

```python
#!/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"))
```

Dockerfile

```bash
FROM python
LABEL maintainer="Sawood Alam <@ibnesayeed>"
RUN pip install beautifulsoup4
RUN pip install requests
COPY linkextractor.py /app/
WORKDIR /app
RUN chmod a+x linkextractor.py
ENTRYPOINT ["./linkextractor.py"]
```
Try It

me@thishost$ ls
>> Dockerfile  linkextractor.py
# Build an image from the Dockerfile (change "ibnesayeed" with your Docker ID)
me@thishost$ docker image build -t ibnesayeed/linkextractor .
>> Layered docker image...
# Run a container from the locally built image
me@thishost$ docker container run ibnesayeed/linkextractor https://odu.edu/
>> Extracted links...
# Push the image to the registry
me@thishost$ docker image push ibnesayeed/linkextractor
# Log in to a different host
me@thishost$ ssh you@otherhost
# Run a container on the other host using the image in the registry
you@otherhost$ docker container run ibnesayeed/linkextractor https://example.com/
>> Pull the image from the registry (if not cached already)
>> Extracted links...
Orchestration Demo

Link Extractor

http://example.com/

Summary

Page: http://example.com/
Domain: www.iana.org
Total: 1

Links

- More information...

https://github.com/ibnesayeed/linkextractor
Useful Links

- https://github.com/ibnesayeed/linkextractor
- https://docs.docker.com/
- http://training.play-with-docker.com/
- https://training.play-with-docker.com/microservice-orchestration/
- https://ws-dl.blogspot.com/

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