

Ruby in Containers

What, Why and Best Practices

Joannah Nanjekye

The Plan

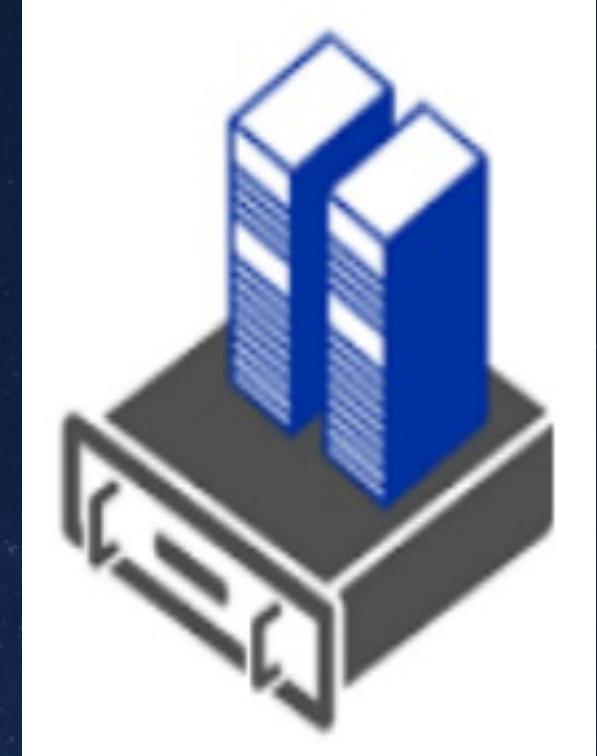
- ★ What are containers.
- ★ How to Containerize a ruby Application.
- ★ Creating small images.
- ★ Testing Containers.

Deploying Ruby Applications

- ★ Physical machines.
- ★ Virtual Machines.
- ★ Containers.

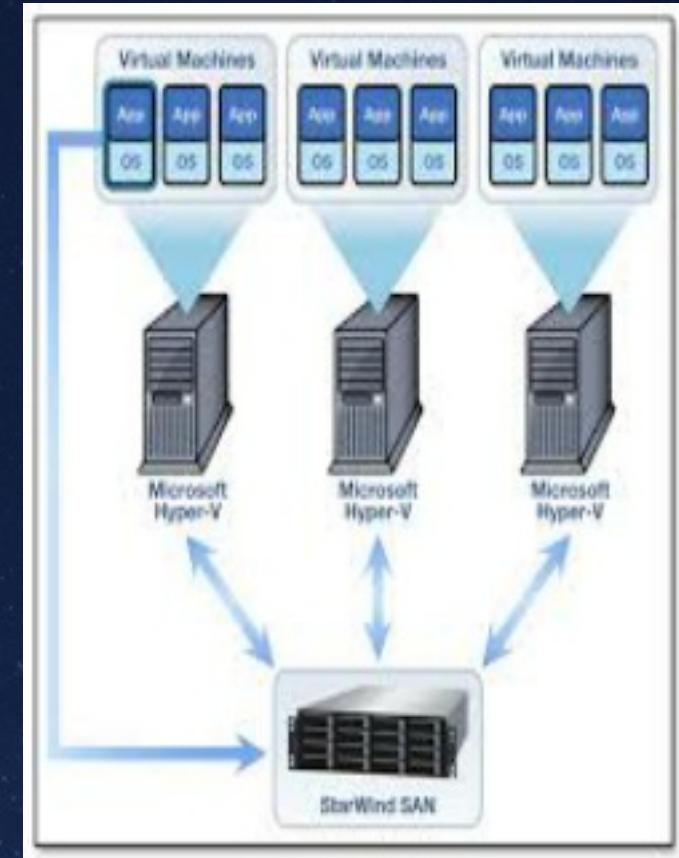
Physical Machines

- ★ Typically one application per host or physical machine.



Virtual Machines

- ★ Virtualize the hardware.
- ★ Use same hardware to run multiple applications.

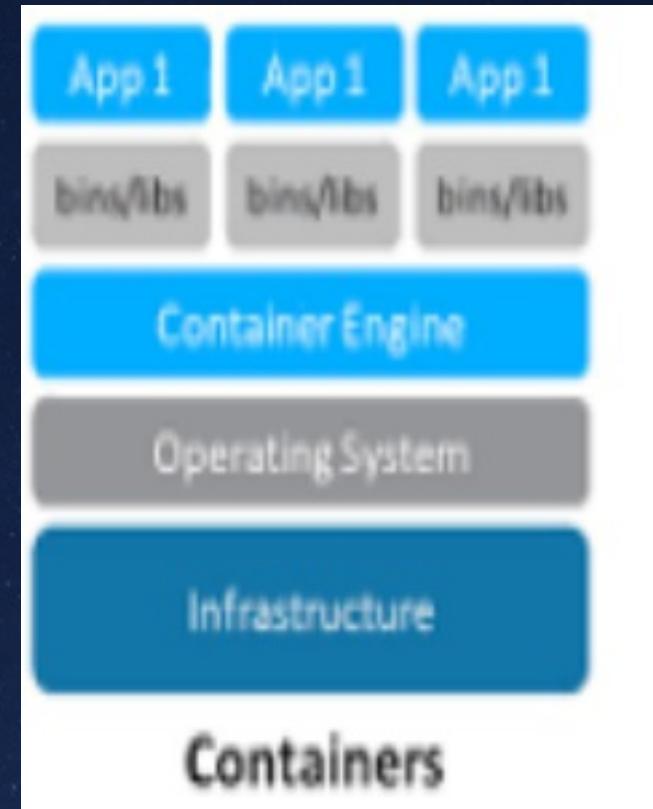


Containers

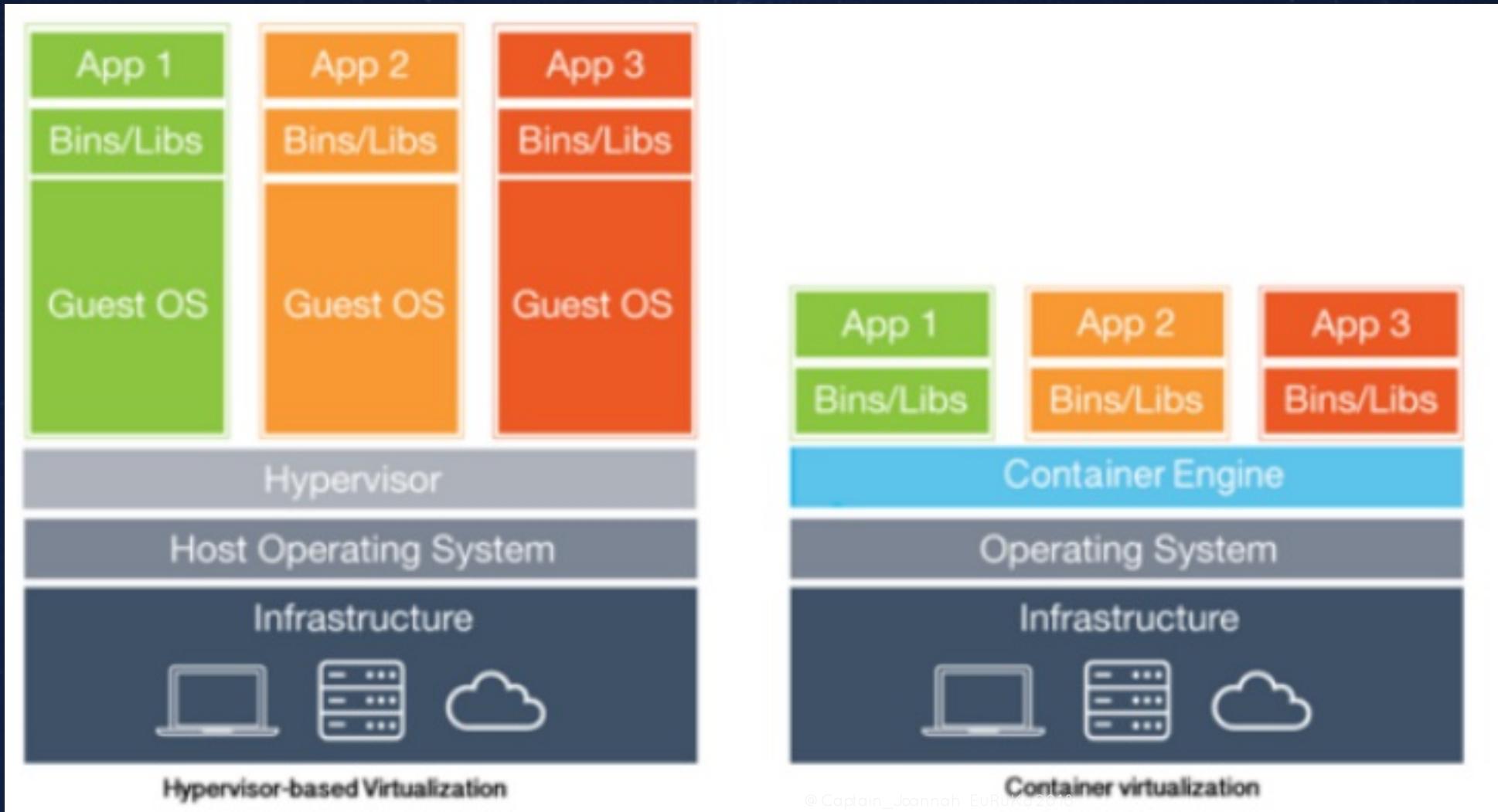


1. What are Containers

- ☆ Sandbox for application processes.
- ☆ logical packaging for applications to run abstracted away from the environment.



Containers Vs Virtual Machines



Why should we even care.....

- ★ Portability.
- ★ Productivity.
- ★ Scaling.



Kelsey Hightower

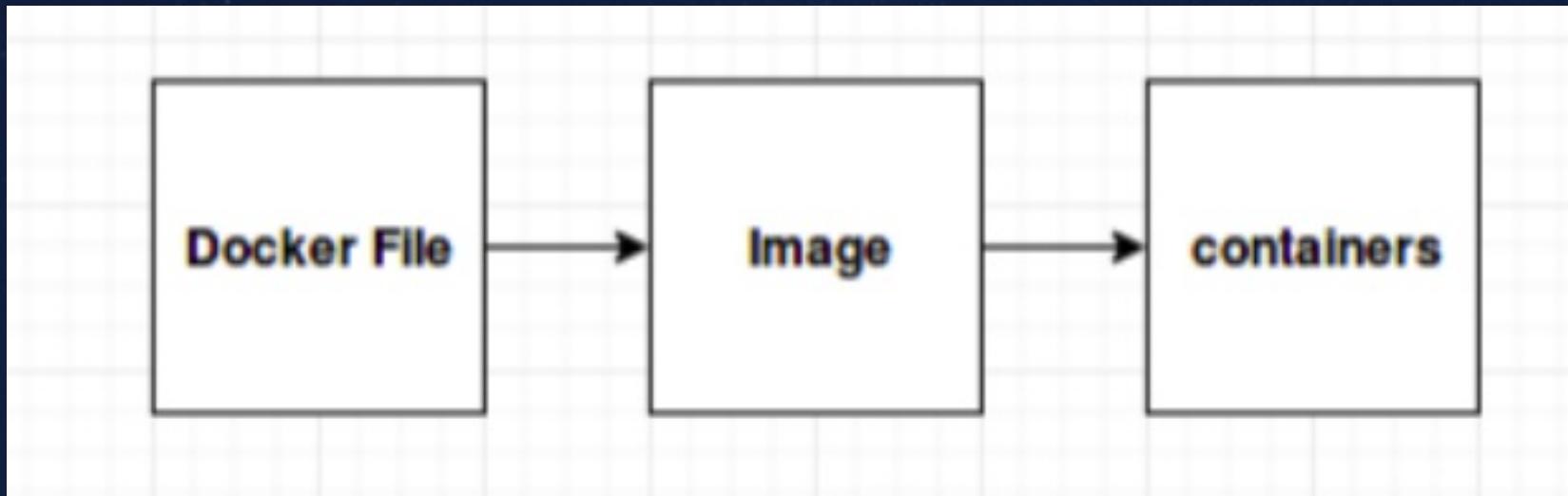
@kelseyhightower

Follow

The container image is just a packaging concept; think of them as the price of admission to modern platforms such as Kubernetes.

2. Containerization

- ★ Use a container technology like Docker.



For example

```
# app.rb
require "sinatra"
get '/' "Hello World !"
end
```

```
#Gemfile
source 'https://rubygems.org'
gem 'sinatra'
```

Dockerfile

```
FROM ruby:2.3.1-slim

RUN apt-get update -qq && apt-get install -y build-essential
ENV APP_ROOT /var/www/docker-sinatra
RUN mkdir -p $APP_ROOT
WORKDIR $APP_ROOT
ADD Gemfile* $APP_ROOT/
RUN bundle install
ADD . $APP_ROOT EXPOSE 80
CMD ["bundle", "exec", "rackup", "config.ru", "-p", "80", "-s", "thin", "-o", "0.0.0.0"]
```

Build and Run

Build the image

```
docker build -t docker-sinatra .
```

Run the image

```
docker run -p 4000:80 docker-sinatra
```

In summary ..

- Containers are a packaging for applications.
- Giving us portability, increased productivity and scaling.
- Create a container by creating a Docker file, build the image using instructions from this file, and run it to start the container.

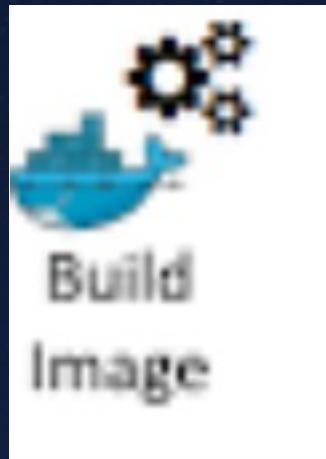


Whats there to think of ..

- Performance
- Security

Reduce the size of the image

3. Small Images : Performance



Small Images : Security

- Small surface Area for vulnerability.

How to create a Small Image

1. Use small base images.
2. Install only what you need.

Just to take you back a bit...

```
FROM ubuntu:latest
```

```
# Install Ruby.
```

```
RUN \ apt-get update
```

```
RUN apt-get install -y ruby ruby-dev ruby-bundler
```

```
# Define working directory.
```

```
WORKDIR /data
```

```
# Define default command.
```

```
CMD ["bash"]
```

Available Options

★	ubuntu	latest	187.9 MB
★	ruby	2.5.1-alpine	55.5 MB
★	ruby	2.5.1	863 MB
★	alpine	latest	5.249 MB

Bad

```
FROM ubuntu:latest
```

```
# Install Ruby.
```

```
RUN \ apt-get update
```

```
RUN apt-get install -y ruby ruby-dev ruby-bundler
```

```
# Define working directory.
```

```
WORKDIR /data
```

```
# Define default command.
```

```
CMD ["bash"]
```

Better

FROM ruby:2.5.1-alpine

```
RUN apk --update add --virtual build-dependencies ruby-dev build-base  
&& \ gem install bundler --no-ri --no-rdoc
```

```
RUN cd /app ; bundle install --without development test && \ apk del  
build-dependencies
```

```
# Define working directory.
```

```
WORKDIR /data
```

```
# Define default command.
```

```
CMD ["bash"]
```

Even Better

```
FROM alpine:latest

# Install Ruby.

RUN \ apt-get update
RUN apt-get install -y ruby ruby-dev ruby-bundler
# Define working directory.

WORKDIR /data
# Define default command.

CMD ["bash"]
```

Alpine Image Gotchas...

- ★ More development work.
- ★ Standards and security.

Chain Commands... bad

```
FROM alpine:latest  
# Install Ruby.  
RUN \ apt-get update  
RUN apt-get install -y ruby ruby-dev ruby-bundler  
# Define working directory.  
WORKDIR /data  
# Define default command.  
CMD ["bash"]
```

Chain Commands....Good

```
FROM alpine:latest

# Install Ruby.

RUN \ apt-get update && apt-get install -y ruby ruby-dev
ruby-bundler

# Define working directory.

WORKDIR /data

# Define default command.

CMD ["bash"]
```

Install just enough for your task..

```
FROM alpine:latest
ADD Gemfile /app/
ADD Gemfile.lock /app/
RUN apk --update add --virtual build-dependencies ruby-dev build-base && \
    gem install bundler --no-ri --no-rdoc && \
    cd /app ; bundle install --without development test && \
    apk del build-dependencies -no-install-recommends
ADD . /app
RUN chown -R nobody:nogroup /app
USER nobody
ENV RACK_ENV production EXPOSE 9292
WORKDIR /app
```

Clean Up....

```
FROM alpine:latest

# Install Ruby.

RUN \ apt-get update
RUN apt-get install -y ruby ruby-dev ruby-bundler && \ rm -rf
/var/lib/apt/lists/*

# Define working directory.

WORKDIR /data

# Define default command.

CMD ["bash"]
```

Inspiration

For more information on attaining smaller images
watch Abby Fuller's talk at DockerCon 2017.

4. Testing your Containers

- Container Structure Test.
 - **Command Tests** - to run a command inside your container image and verify the output or error it produces
 - **File Existence Tests** - to check the existence of a file in a specific location in the image's filesystem
 - **File Content Tests** - to check the contents and metadata of a file in the filesystem
 - A unique **Metadata Test** - to verify configuration and metadata of the container itself

Stand on the shoulders of others...

- ★ The Container Testing Framework from google has great documentation that you find online.
- ★ There are other container testing tools you can explore.

To Wrap Up...

- ★ Containers give us benefits in portability, productivity and scaling.
- ★ Create small container images for better performance and security.
- ★ Unit test your containers with available tools like the Container Structure Test Framework and any other tools...

Resources

- ★ https://www.youtube.com/watch?v=wGz_cbtCiEA
- ★ <https://www.youtube.com/watch?v=vIS5Eiapill>
- ★ <https://opensource.googleblog.com/2018/01/container-structure-tests-unit-tests.html>
- ★ <https://medium.com/@aelabbahy/tutorial-how-to-test-your-docker-image-in-half-a-second-bbd13e06a4a9>

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