



Janos Pasztor

Practical Docker Operations

Stuff I do



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<https://pasztor.at>

@janoszen

About this talk

1. Maintaining your Build Stack

2. Orchestrating your Cluster

3. Pitfalls and Recommendations

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1. Maintaining your Build Stack
2. Orchestrating your Cluster
3. Details and Recommendations

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1. Maintaining your Build Stack
2. Orchestrating your Cluster
3. Pitfalls and Recommendations

Maintaining your Build Stack

How Docker Images are Built

Maintaining your Build Stack

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```
FROM ubuntu:16.04
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Maintaining your Build Stack

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Maintaining your Build Stack

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Maintaining your Build Stack

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Maintaining your Build Stack

How Docker Images are Built

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CMD /init.sh
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Maintaining your Build Stack

How Docker Images are Built

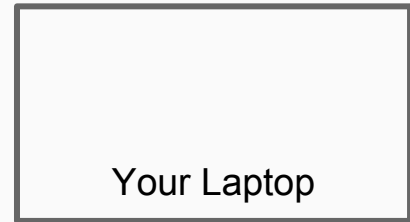
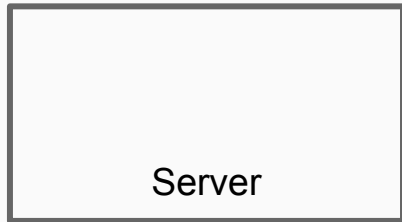
FROM ubuntu:16.04	e87eea024487
RUN apt-get install...	c90c59c78830
COPY files/etc /etc	31c6577f6847
COPY init.sh /init.sh	54511612f1c4
CMD /init.sh	9e54da99b80c

Maintaining your Build Stack

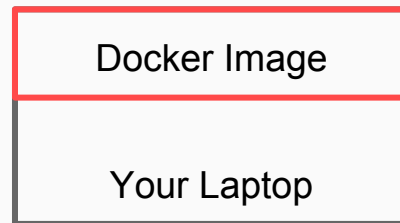
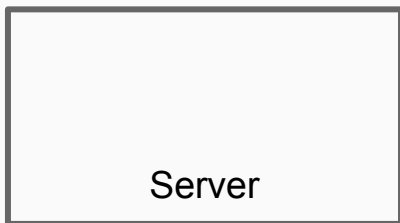
How Docker Images are Built

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Maintaining your Build Stack



Maintaining your Build Stack



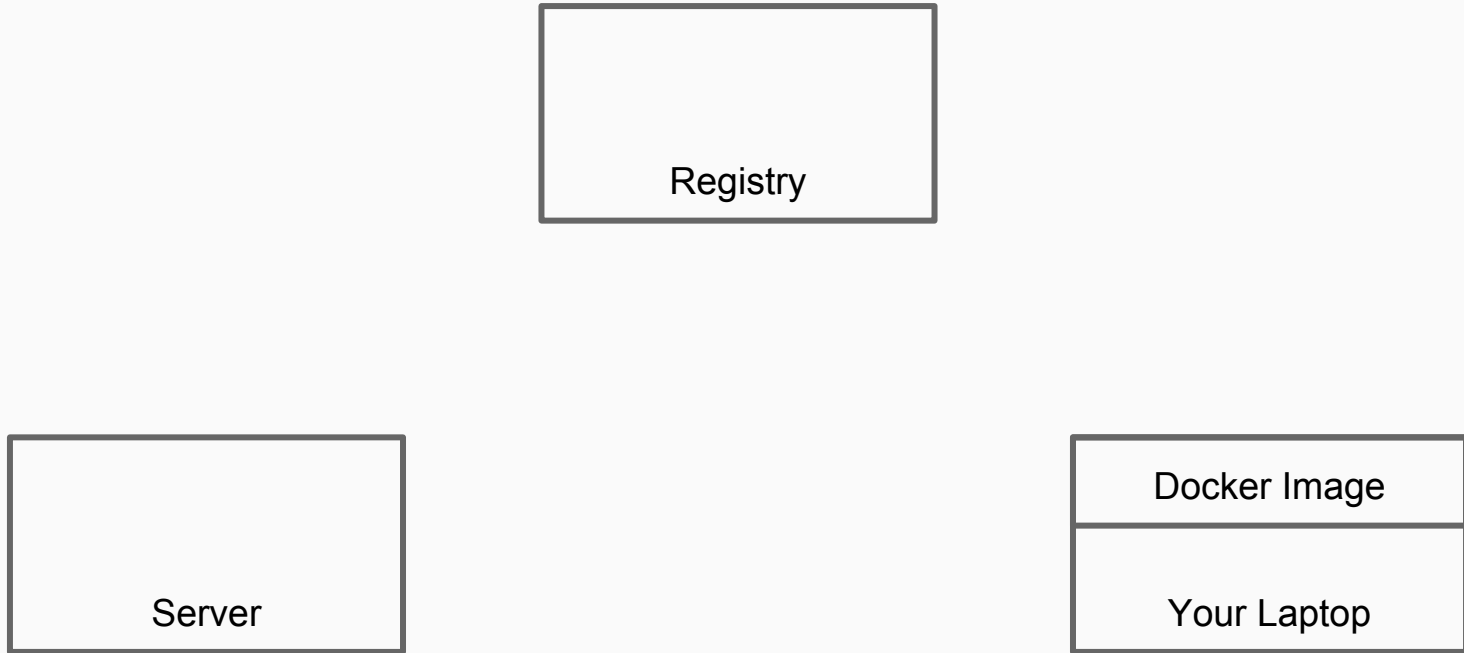
Maintaining your Build Stack



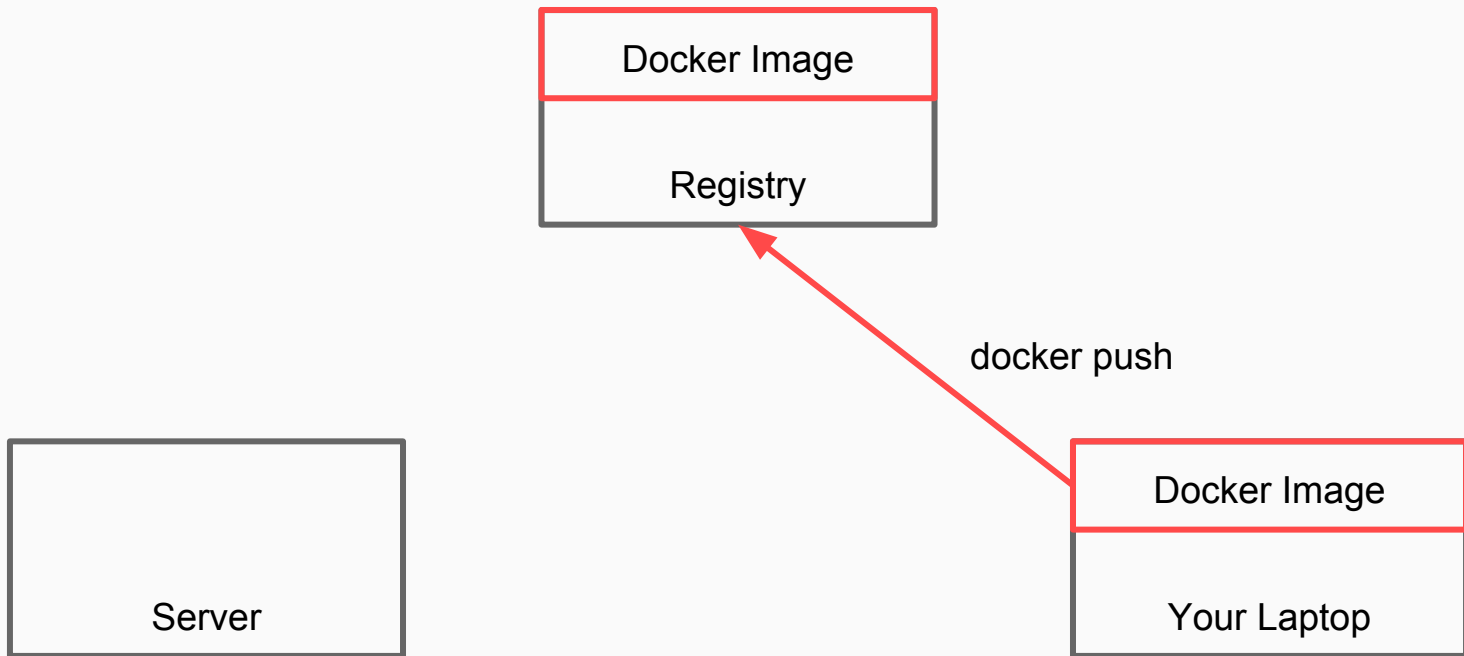
Maintaining your Build Stack



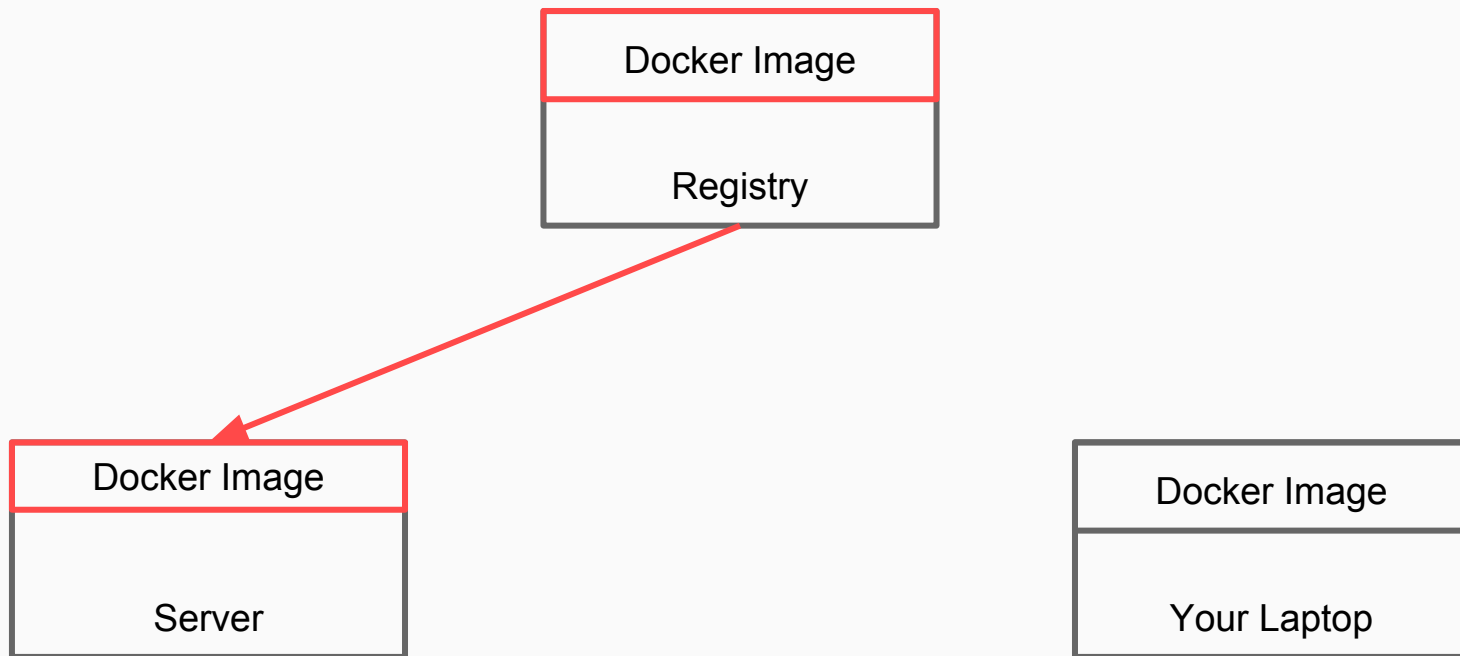
Maintaining your Build Stack



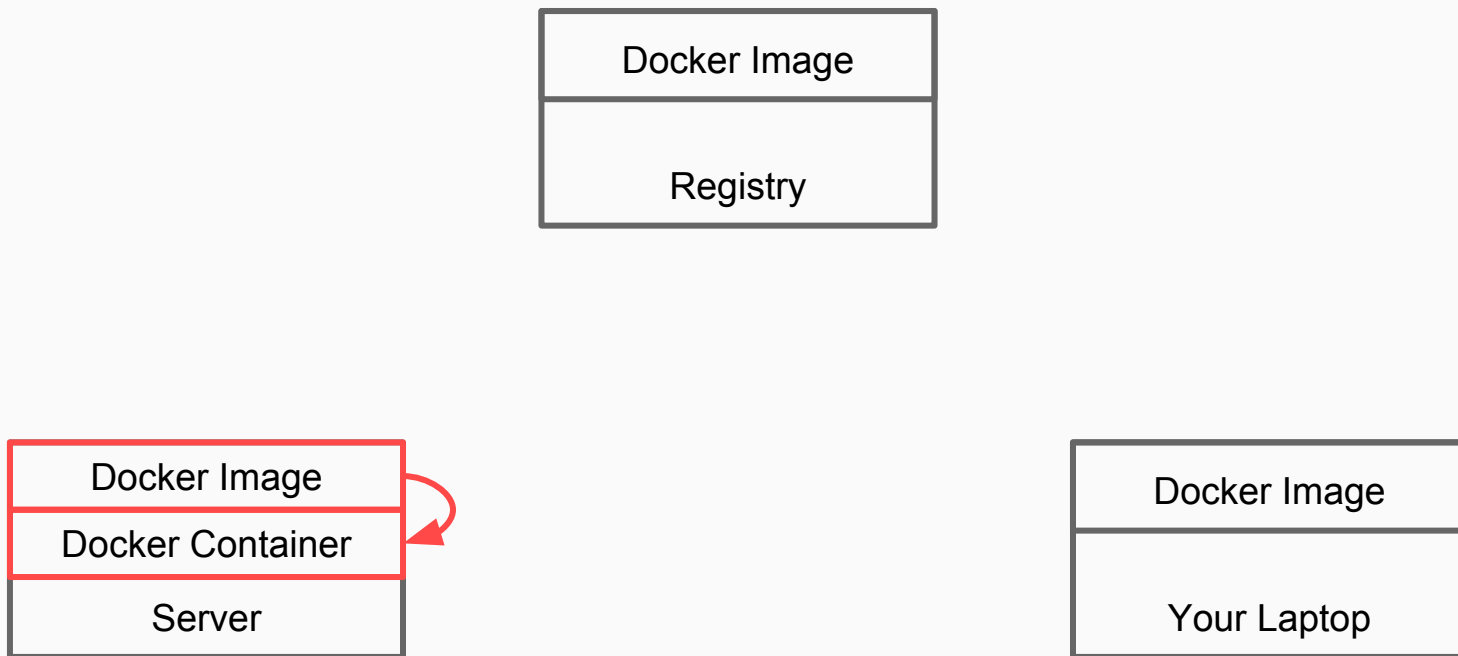
Maintaining your Build Stack



Maintaining your Build Stack



Maintaining your Build Stack



Follow me!

Problems:

Follow me!

Problems:

High Bandwidth Usage

Follow me!

Problems:

High Bandwidth Usage

Different Hashes on Different Machines

Maintaining your Build Stack

Registry

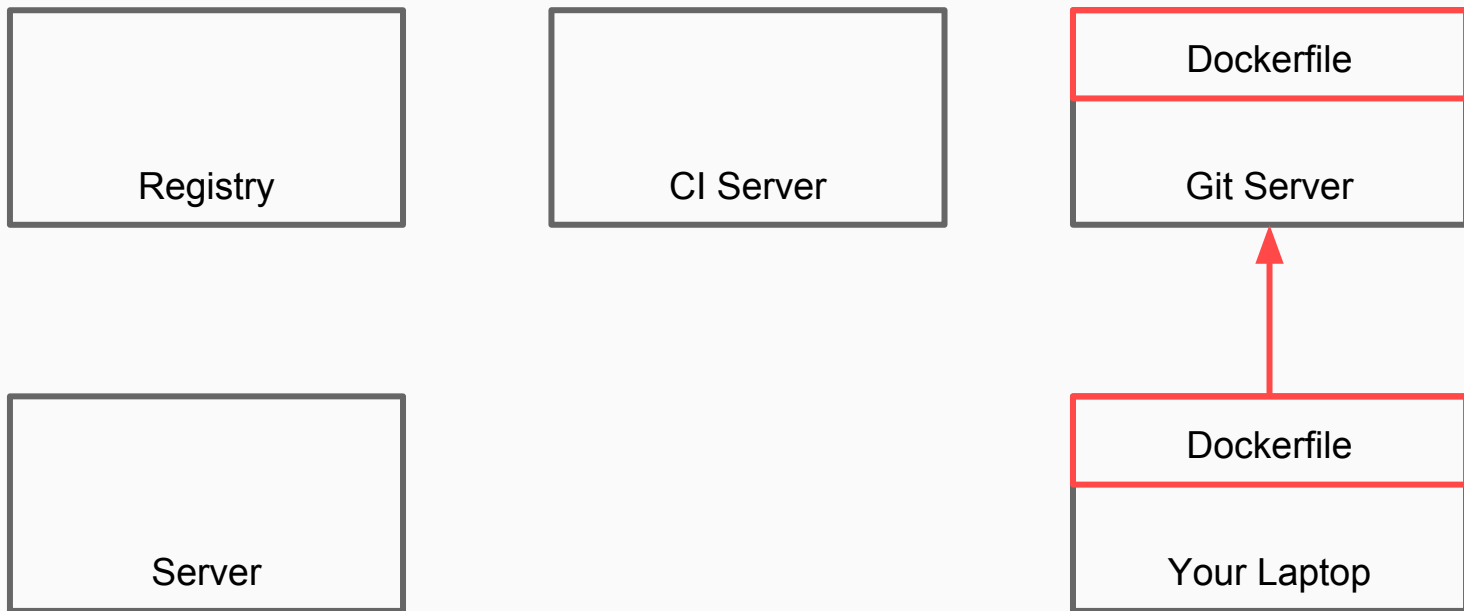
CI Server

Git Server

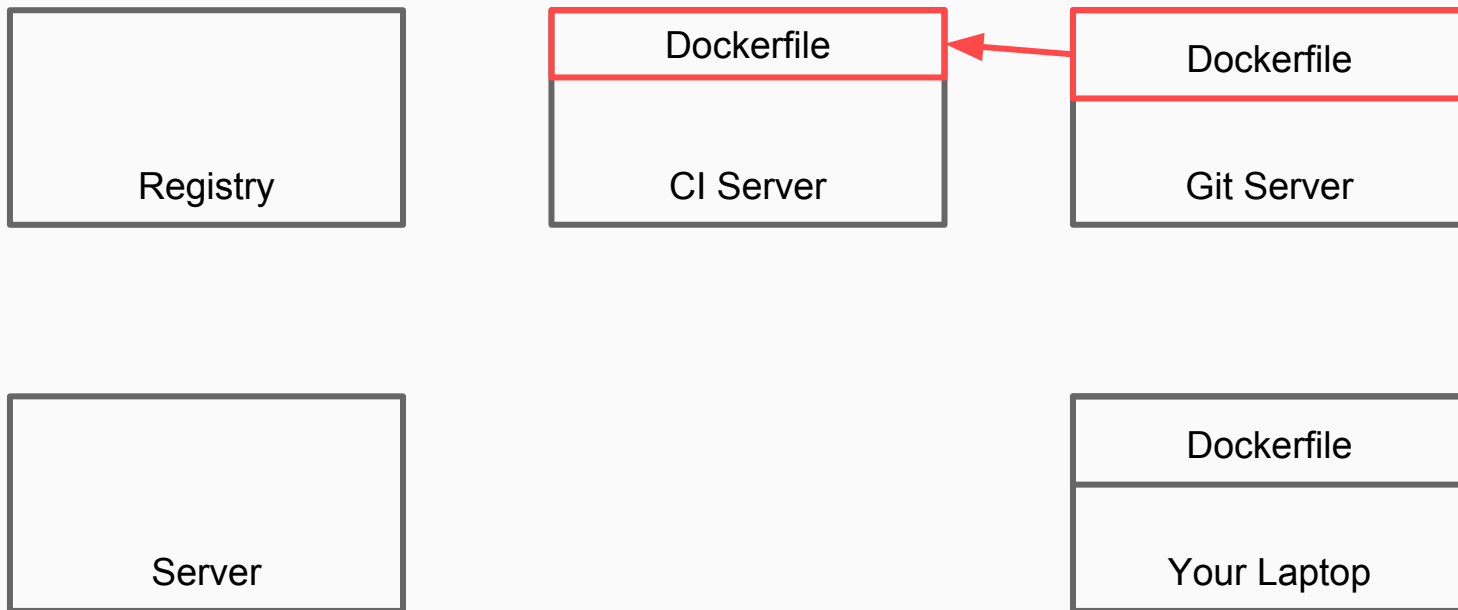
Server

Dockerfile
Your Laptop

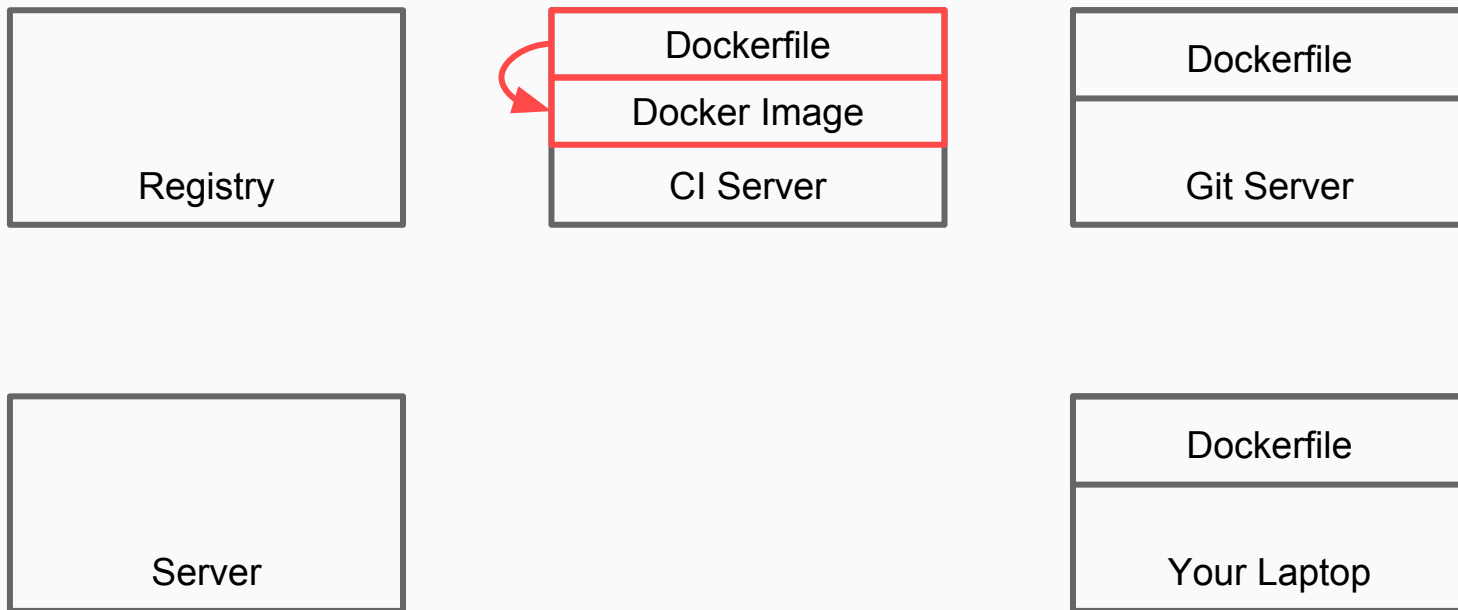
Maintaining your Build Stack



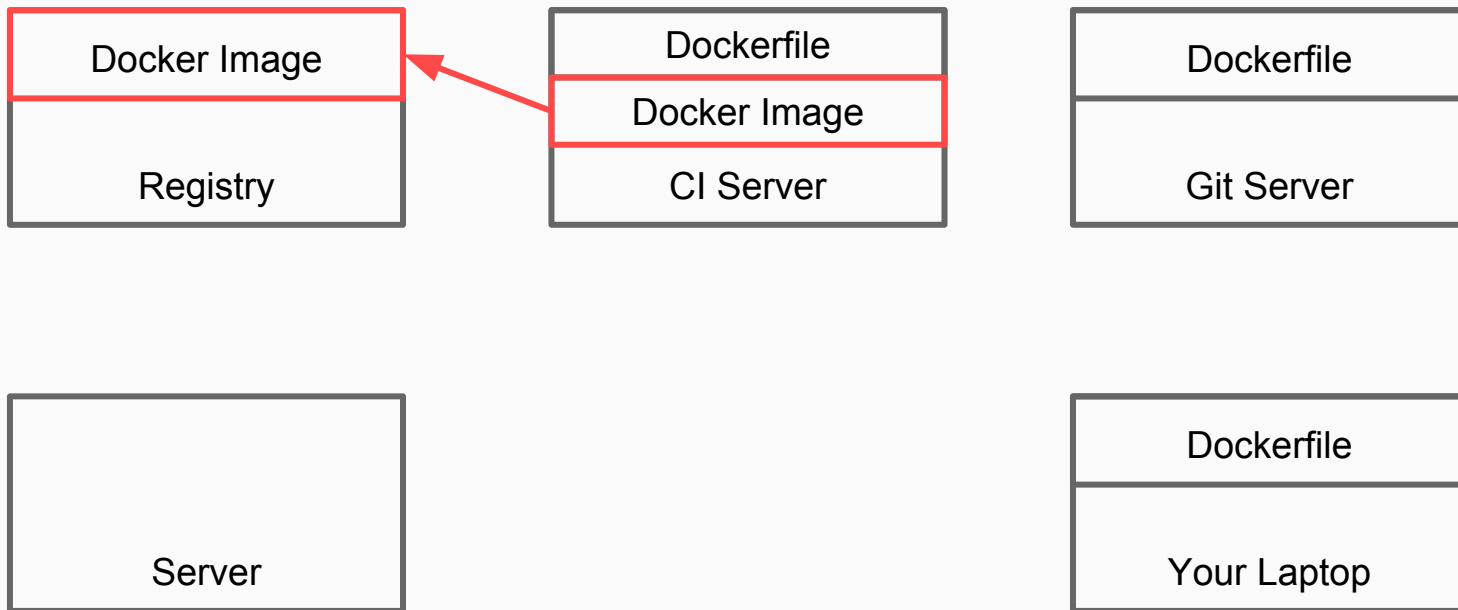
Maintaining your Build Stack



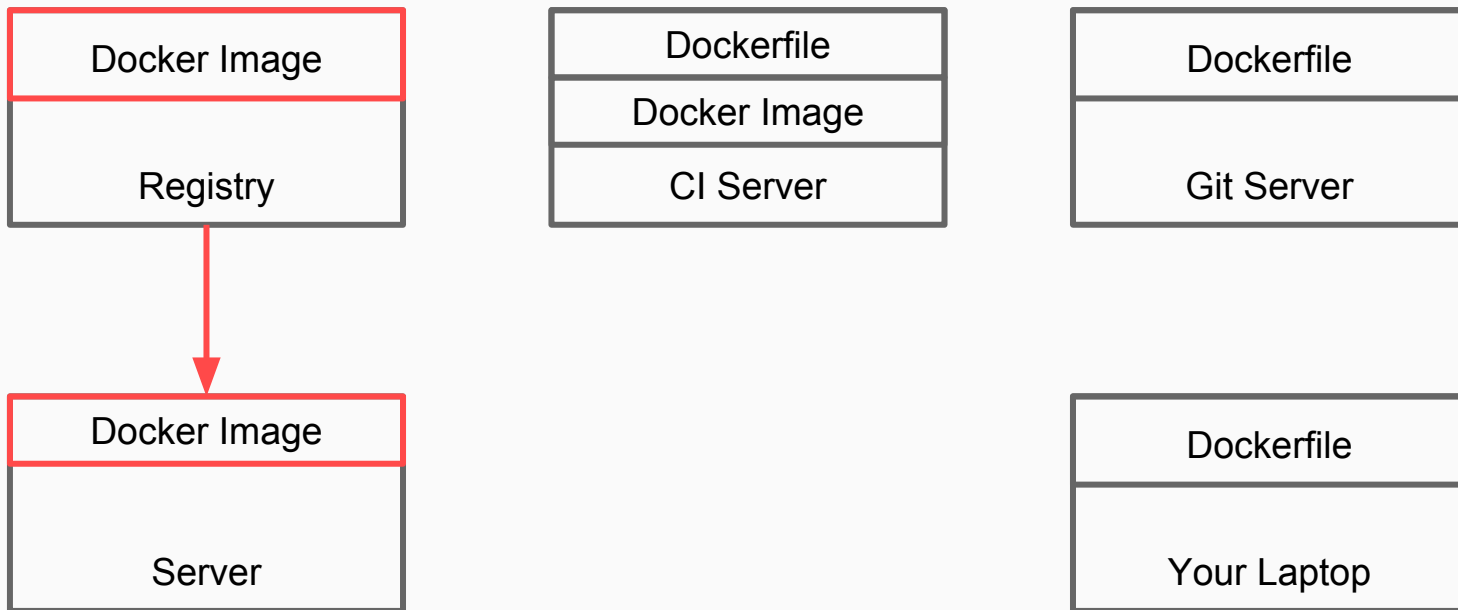
Maintaining your Build Stack



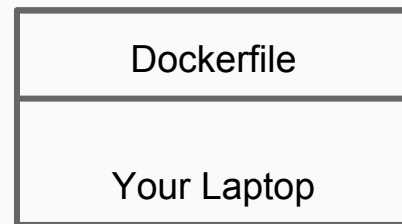
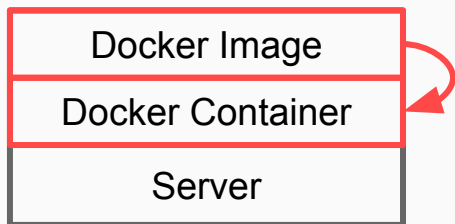
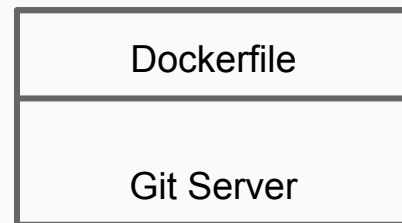
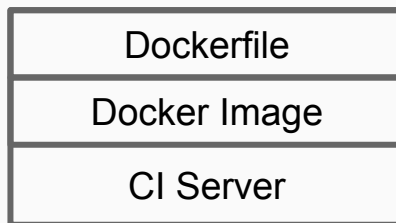
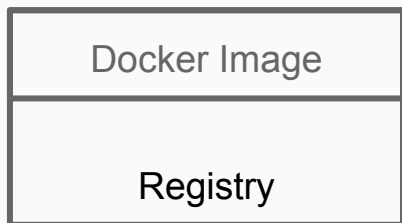
Maintaining your Build Stack








Maintaining your Build Stack



Maintaining your Build Stack



Maintaining your Build Stack

	 docker	 amazon web services	 GitLab	 circleci	 Google Cloud Platform
CI server	YES		YES	YES	YES
Docker Repository	YES	YES	YES		YES

Orchestrating your Cluster

How do you run a Docker image?

Orchestrating your Cluster

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```
ssh youruser@example.com "docker run yourcontainer"
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Orchestrating your Cluster

Orchestration tools

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Orchestration tools

Where is my service?

Orchestrating your Cluster

Orchestration tools

Where is my service?

Rolling updates

Orchestrating your Cluster

Orchestration tools

Where is my service?

Rolling updates

Scaling

Orchestrating your Cluster

Orchestration tools

Where is my service?

Rolling updates

Scaling

Virtual networks

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Orchestration tools

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...

Orchestrating your Cluster

Orchestration tools

AWS EC2 Container Service

Docker Swarm

Kubernetes

...

Orchestrating your Cluster

EC2 Container Service

Orchestrating your Cluster

EC2 Container Service

- + Integrated with AWS

Orchestrating your Cluster

EC2 Container Service

- + Integrated with AWS
- + **Autoscaling (limited)**

Orchestrating your Cluster

EC2 Container Service

- + Integrated with AWS
- + Autoscaling (limited)
- + Integrated registry

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EC2 Container Service

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- **Slow rollout**

Orchestrating your Cluster

EC2 Container Service

- + Integrated with AWS
- + Autoscaling (limited)
- + Integrated registry
- Using the ELB is a must
- No built-in DNS server
- Slow rollout
- No overlay network

Orchestrating your Cluster

EC2 Container Service

- + Integrated with AWS
- + Autoscaling (limited)
- + Integrated registry
- Using the ELB is a must
- No built-in DNS server
- Slow rollout
- No overlay network
- **Outdated**

Orchestrating your Cluster

Docker Swarm

Orchestrating your Cluster

Docker Swarm

- + (Very) Simple

Orchestrating your Cluster

Docker Swarm

- + (Very) Simple
- + **Overlay Networks**

Orchestrating your Cluster

Docker Swarm

- + (Very) Simple
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- + Built-in DNS server and LB

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- + **Fast rollout**

Orchestrating your Cluster

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- Very young (YMMV)

Orchestrating your Cluster

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Orchestrating your Cluster

Docker Swarm

- + (Very) Simple
- + Overlay Networks
- + Built-in DNS server and LB
- + Fast rollout
- Very young (YMMV)
- No Autoscaling
- **Monolithic (no plugins)**

Orchestrating your Cluster

Kubernetes

- + Overlay networks

Orchestrating your Cluster

Kubernetes

- + Overlay networks
- + **Autoscaling**

Orchestrating your Cluster

Kubernetes

- + Overlay networks
- + Autoscaling
- + Rack awareness

Orchestrating your Cluster

Kubernetes

- + Overlay networks
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- + **Plugins, everywhere**

Orchestrating your Cluster

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- Complex to set up

Orchestrating your Cluster

Kubernetes

- + Overlay networks
- + Autoscaling
- + Rack awareness
- + Plugins, everywhere
- + Makes you coffee
- Complex to set up
- Setup scripts and docs are beta / unstable / outdated

Pitfalls and Recommendations

Oops...

Pitfalls and Recommendations

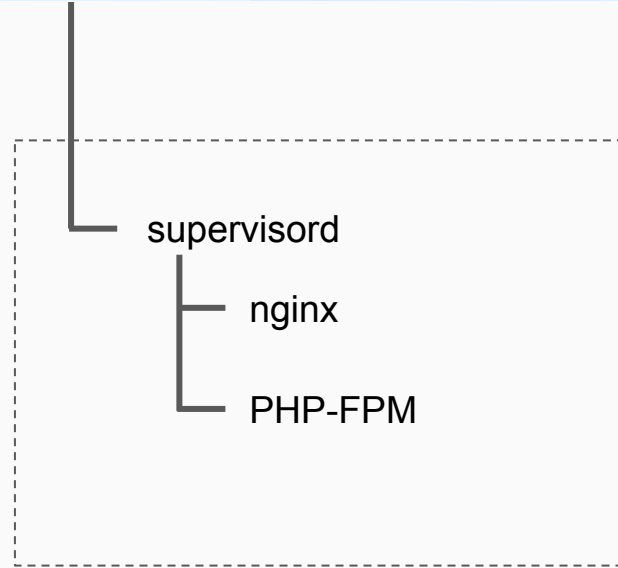
Multiple services in one container?

Pitfalls and Recommendations

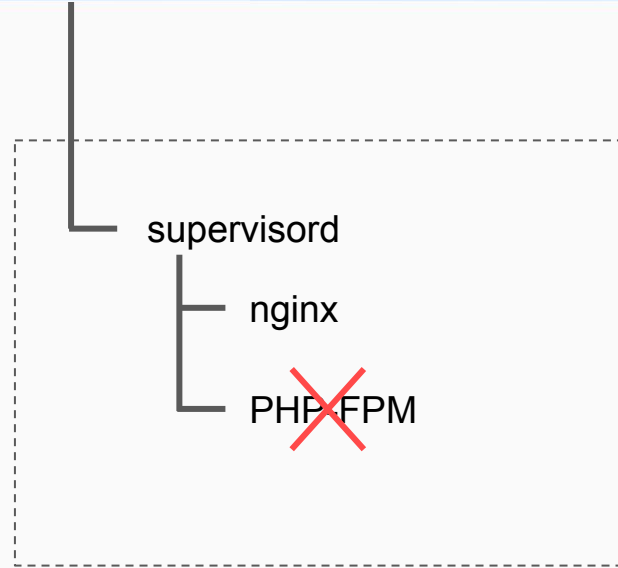
Multiple services in one container?

DON'T!

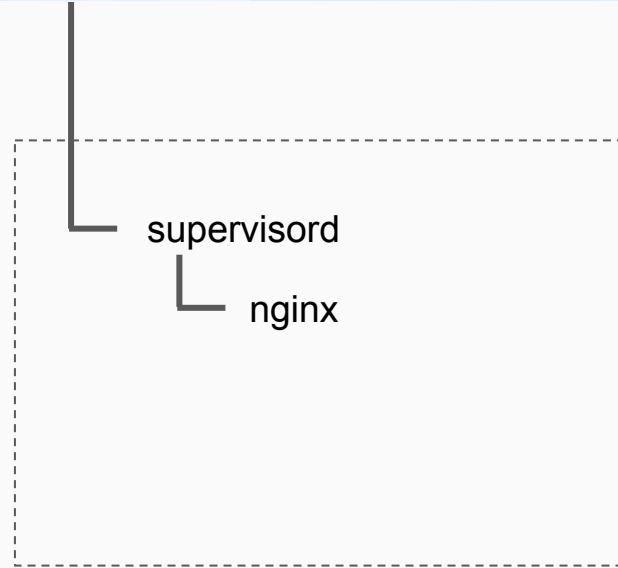
Pitfalls and Recommendations



Pitfalls and Recommendations



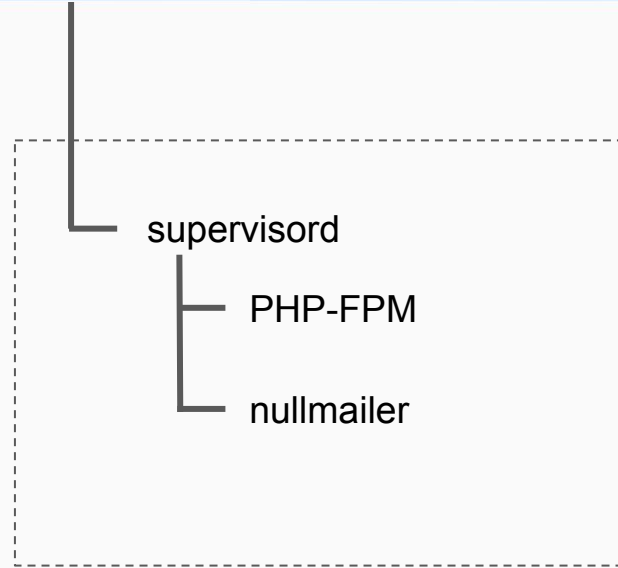
Pitfalls and Recommendations



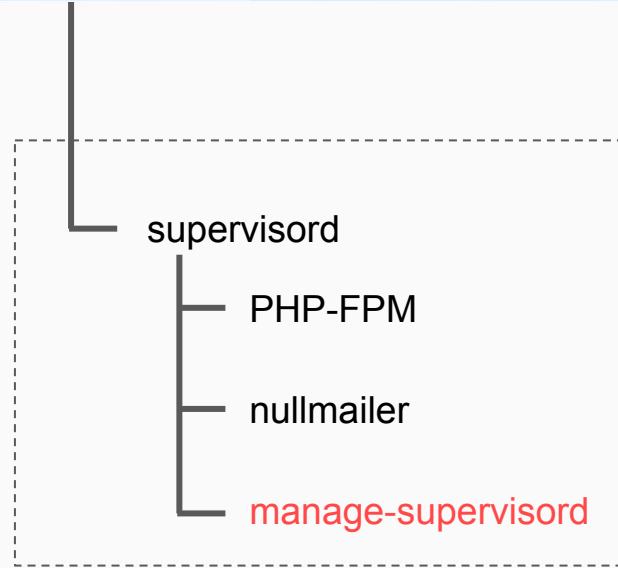
Pitfalls and Recommendations

Sidecar services

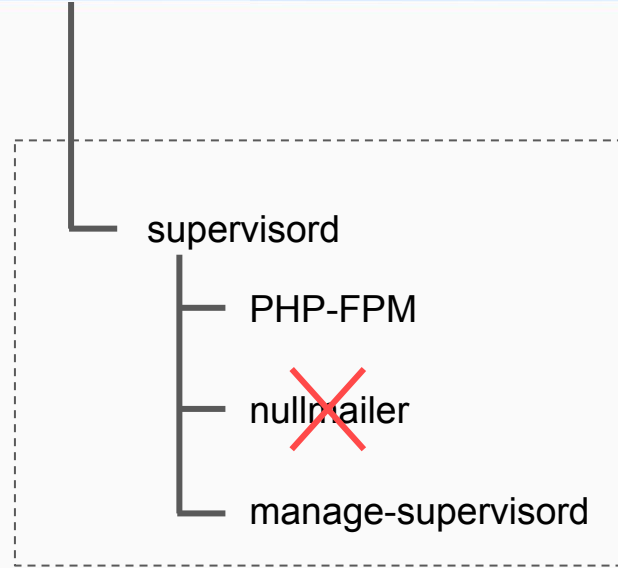
Pitfalls and Recommendations



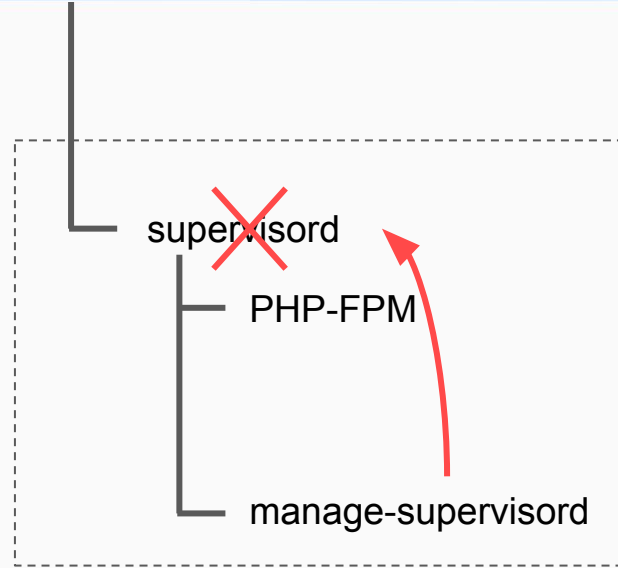
Pitfalls and Recommendations



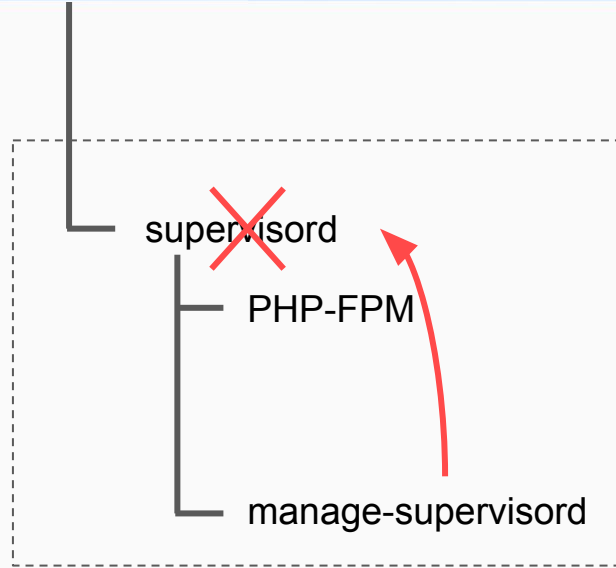
Pitfalls and Recommendations



Pitfalls and Recommendations



Pitfalls and Recommendations



<https://github.com/opsbears/docker-supervisord>

Pitfalls and Recommendations

Shell script in CMD?

Pitfalls and Recommendations

Shell script in CMD?

BE CAREFUL!

Pitfalls and Recommendations

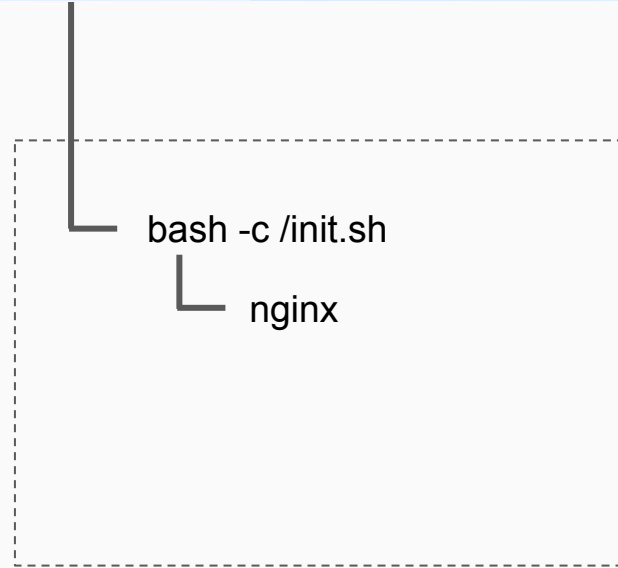
```
#!/bin/bash
```

```
# Other stuff here
```

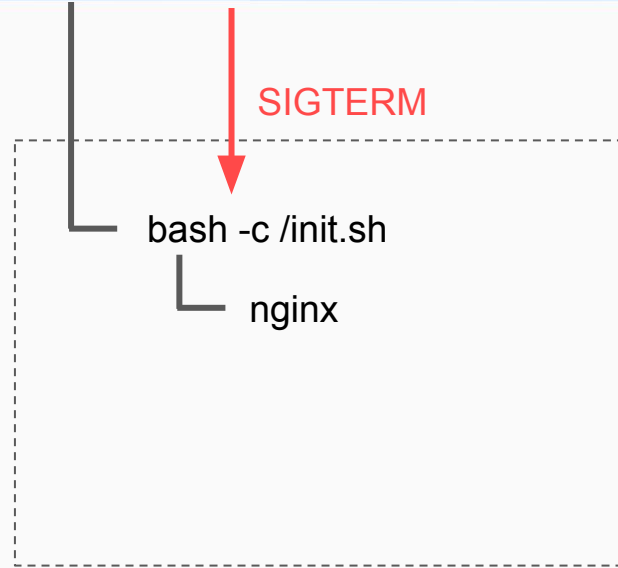
```
/usr/sbin/nginx -g "daemon off;"
```

```
exit $?
```

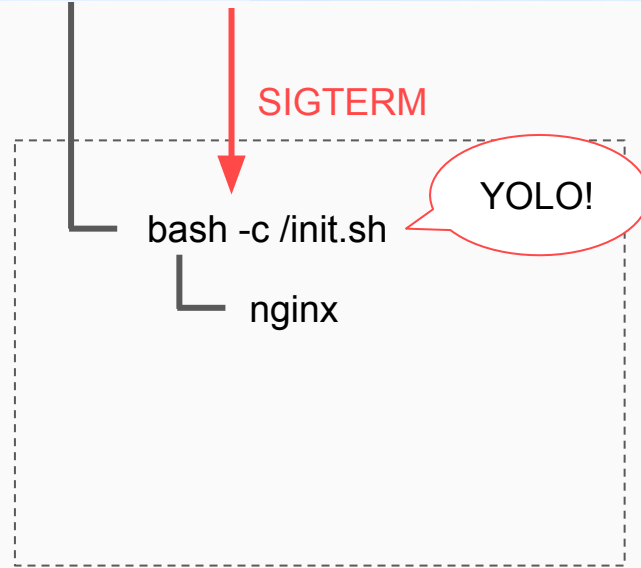
Pitfalls and Recommendations



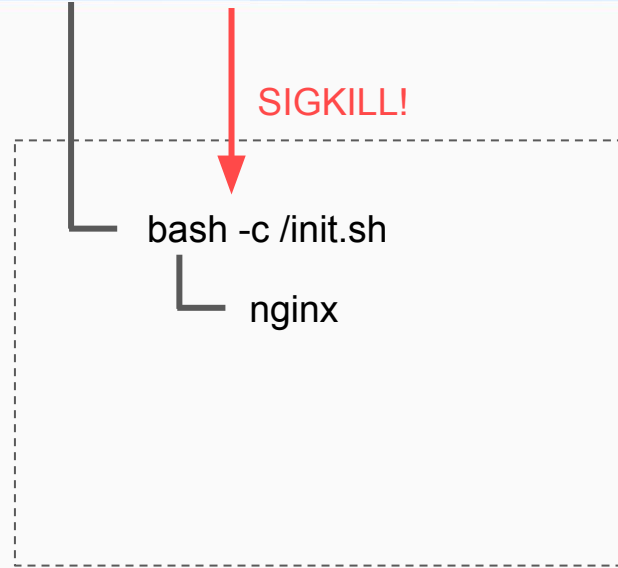
Pitfalls and Recommendations



Pitfalls and Recommendations



Pitfalls and Recommendations



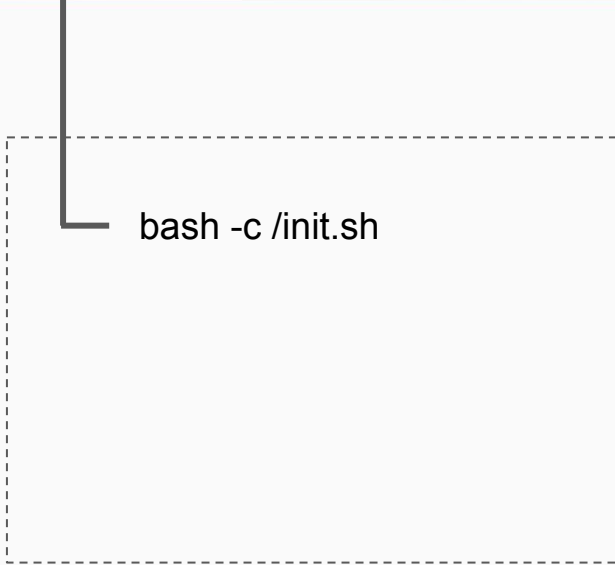
Pitfalls and Recommendations

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#!/bin/bash
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# Other stuff here
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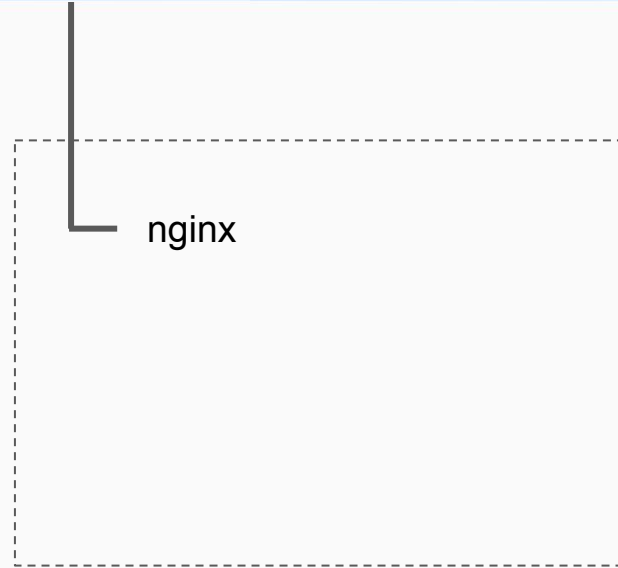
```
exec /usr/sbin/nginx -g "daemon off;"
```

Pitfalls and Recommendations



```
bash -c /init.sh
```


Pitfalls and Recommendations



Pitfalls and Recommendations

Don't update your containers!

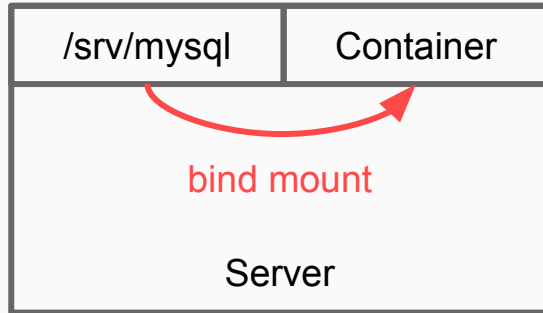
Pitfalls and Recommendations

Shared data?

Pitfalls and Recommendations



Pitfalls and Recommendations



Pitfalls and Recommendations



Pitfalls and Recommendations

Healthchecks?

Pitfalls and Recommendations

Dockerfile:

```
HEALTHCHECK \
  --interval=10s \
  --timeout=3s \
  CMD /usr/local/bin/healthcheck
```

healthcheck:

```
#!/bin/bash

test $(SCRIPT_NAME=/status
SCRIPT_FILENAME=/status
REQUEST_METHOD=GET cgi-fcgi -bind
-connect 127.0.0.1:9000 | grep
pool | cut -d: -f2 | sed 's/ //g')
== www || exit 1
```


Pitfalls and Recommendations

healthcheck:

```
#!/bin/bash
```

```
test $(SCRIPT_NAME=/status SCRIPT_FILENAME=/status REQUEST_METHOD=GET  
cgi-fcgi -bind -connect 127.0.0.1:9000 | grep pool | cut -d: -f2 | sed 's/  
//g') == www || exit 1
```

Pitfalls and Recommendations

Docker Swarm:

```
HEALTHCHECK \  
  --interval=10s \  
  --timeout=3s \  
  CMD /usr/local/bin/healthcheck
```

Pitfalls and Recommendations

Kubernetes:

```
spec:
  containers:
  - name: yourpod
    livenessProbe:
      exec:
        command:
        - /usr/local/bin/healthcheck
      initialDelaySeconds: 5
      periodSeconds: 5
    readinessProbe:
      ....
```

Pitfalls and Recommendations

TEST YO' CONTAINERS!

Pitfalls and Recommendations

docker-compose.test.yml

```
version: '3.2'
services:
  mysql:
    container_name: mysql
    build: .
    ...
  sut:
    build: ./test
    ...
```

Pitfalls and Recommendations

DO NOT HARD-CODE CREDENTIALS!

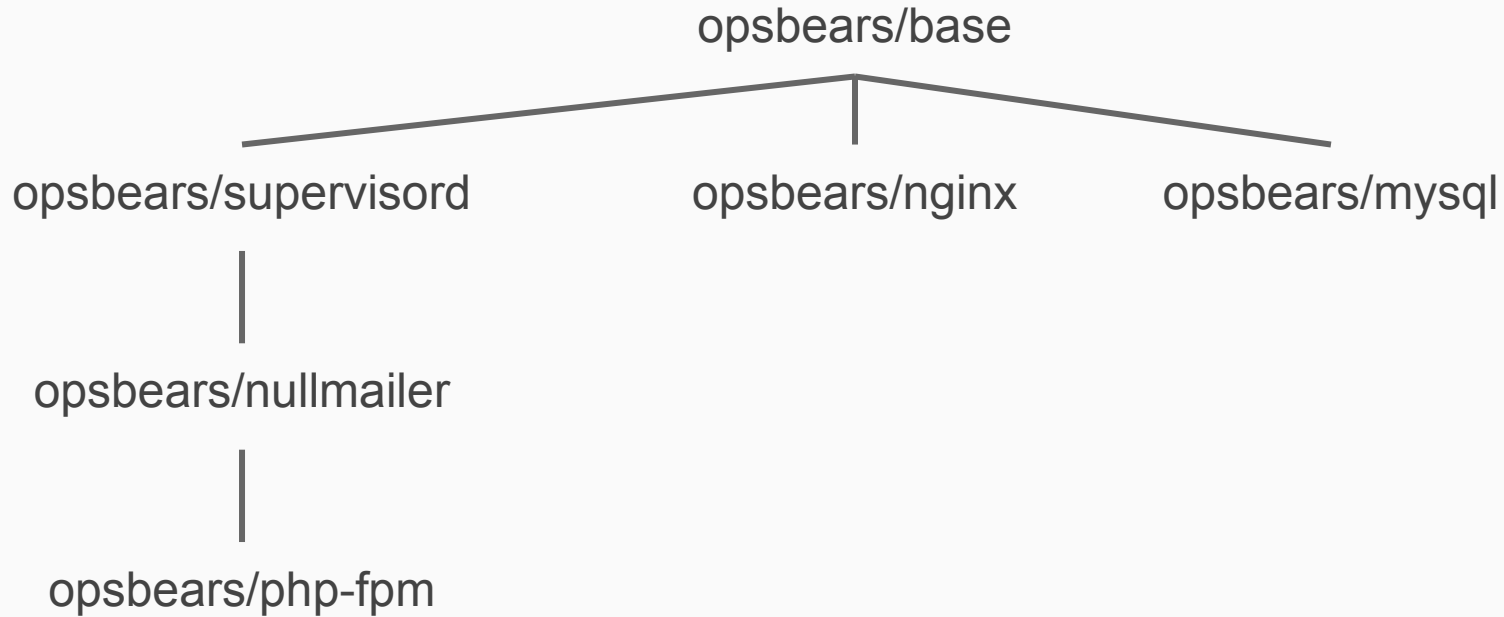
Pitfalls and Recommendations

VERSION YOUR IMAGES!

Pitfalls and Recommendations

CAREFUL WITH 3RD PARTY IMAGES!

Pitfalls and Recommendations



Pitfalls and Recommendations

REMOVE DEV STUFF!

That's all!

Questions?

Many thanks to
Bence Sántha, Gábor Vereb, Dávid Papp
for their inspiration and feedback.