

Applications Deployment

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Applications Deployment



run ...



apply ...

Plan

Motivation

Containers internals

Deployment strategies

Versioning

Automation & orchestration

Toolings

Expectations



Downtime



mBank Polska ✓

18 hrs · 🌐

⚠️ W najbliższy weekend - z 19 na 20 marca będziemy modernizować nasze systemy.

W związku z tym przez kilka godzin nie będziecie mieć dostępu do banku:

- między 2:00 a 8:30 nie zapłacicie kartą💳 w sklepach i nie skorzystacie z bankomatów,
 - od 2:00 do 10:00 nie zrobicie zakupów online🌐 i nie zalogujecie się na swoje konto w serwisie transakcyjnym💻 ani w aplikacji mobilnej📱,
 - w godzinach 1:30-11:00 nie będziecie mogli składać wniosków.
- W czasie przerwy nie będzie możliwości logowania się na konto, a mLinia👉 będzie działać w trybie informacyjnym.

Żeby przerwa nie pokrzyżowała Wam weekendowych planów, warto na ten czas zaopatrzyć się w gotówkę💵 i zlecić z wyprzedzeniem ważne przelewy.

Sprawdźcie szczegóły na ➡ www.mbank.pl/przerwa

Preparations

Environment

Application part

- dependencies
- configurations
- containers

Strategy of deployment

Automation



Machine

a piece of hardware or a VM

Server

software that provides a service

nginx

postgres

redis

envoy

memcached

kafka

Devs

Containerization

SysAdm

Image

ENSALADA DE "ATÚN" EN CHIPOTLE

(Chipotle "Tuna" Salad)

If you were a lucky kid like me, you probably ate tons of cups of noodles and canned tuna growing up. There were staples we had in our kitchen pantry that were one step away from an easy after-school snack. A tuna salad with heaps of mayonnaise and a splattering of Tapatio hot sauce was enough to get me through dinner. This version spurs the tuna and calls for jackfruit as a substitute. It's loaded with chipotle mayo to give it a burst of flavor and heat and uses for an ocean resource.

YIELD: 4 SERVINGS

- 2 (20-oz [565-g]) cans jackfruit
- ¼ cup (60 ml) lemon juice
- 1 tbsp (12 g) kelp granules
- ½ cup (120 ml) vegan mayonnaise
- ¼ cup (60 ml) chipotle sauce
- 1–2 dried chipotle (anchoitos), finely chopped for 1½ cups
- Salt and pepper, to taste
- 2 celery ribs, cut into ½-inch (1-cm) pieces
- 6 radishes, Cherry Belle or your favorite variety, sliced
- For Serving
 - 4–6 (6-inch [15-cm]) norisitas
 - 4–6 mini avocados (you can use the prepackaged sliced ones)
 - ¼ cup (30 ml) pickled radish from Guacamole con Camote (page 18)
 - 1 tbsp (9 g) black sesame seeds
 - 2 tbsp (2 g) cilantro

Strain and rinse the jackfruit thoroughly. Separate as much liquid as you can from the jackfruit and place it on a cutting board. Return the two-shedded can to a knife and reserve. Remove any solids from the sheddable portion of the can. Add the sheddable jackfruit to a medium bowl.

Add the corn and seedpods to a blender with the lemon juice, kelp granules, oil, chipotle, salt and pepper, and blend until smooth. Strain the jackfruit and pour the thick sauce from the blender over the jackfruit. Mix well and pour all the sauce into the bowl. Add the celery and radish and mix well. Sprinkle with the anchitos, sesame seeds, and cilantro.

To serve, divide the salad among 4 bowls. Garnish with the pickled radish, black sesame seeds, and cilantro.

CHEF'S NOTES: Young green jackfruit can typically be found in jars at Asian markets or bulk food stores.

Choose your favorite plant-based mayonnaise brand. I prefer the one and tang of Trader Joe's Vegan Spread & Dressing.

Dockerfile

Image

ENSALADA DE "ATÚN" N CHIPOTLE

Chipotle "Tuna" Salad

One of our lucky chefs told me, you probably ate some of cups of noodles and noodle cups growing up. We were inspired we had in our kitchen pantry that were not any more than an old school snack. This version gives the tuna and adds for jackfruit as a substitute. It's loaded with dips to give it a burst of flavor and heat and includes kale and nuts for an extra crunch.

YIELD: 4 SERVINGS

(20 to 240 g) cans jackfruit
1/2 cup (60 ml) lemon juice
1 tbsp (12 g) help granules
1 cup (120 ml) vegan mayonnaise
1/2 cup (60 ml) olive oil
1/2 cup (60 ml) chipotle sauce, refrigerated
for 10 minutes
Salt and pepper, to taste
2 cherry ribs, cut into 1/2 inch
10-minute dish

Cherry Ribs on your favorite
variety, dried

For Serving

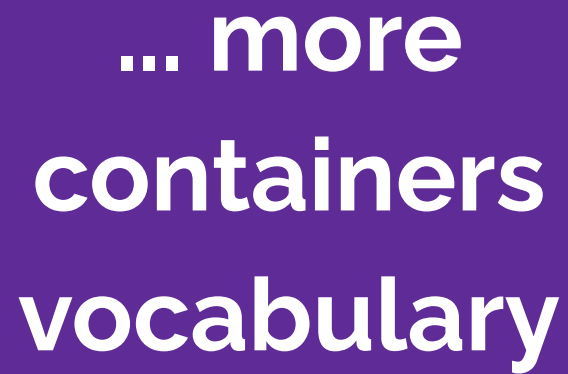
4-6 (6-inch [15-cm]) noodles
4 small bowls (you can use the
prepackaged noodle bowls)
1 cup (100 ml) pickled radish from
canned cans (Carnitas page 18)
1 cup (10 g) black sesame seeds
2 tbsp (2 g) cilantro

CHEF'S NOTES: Young green jackfruit can typically be found
in cans or preserved in brine in jars at Asian markets or health food stores.

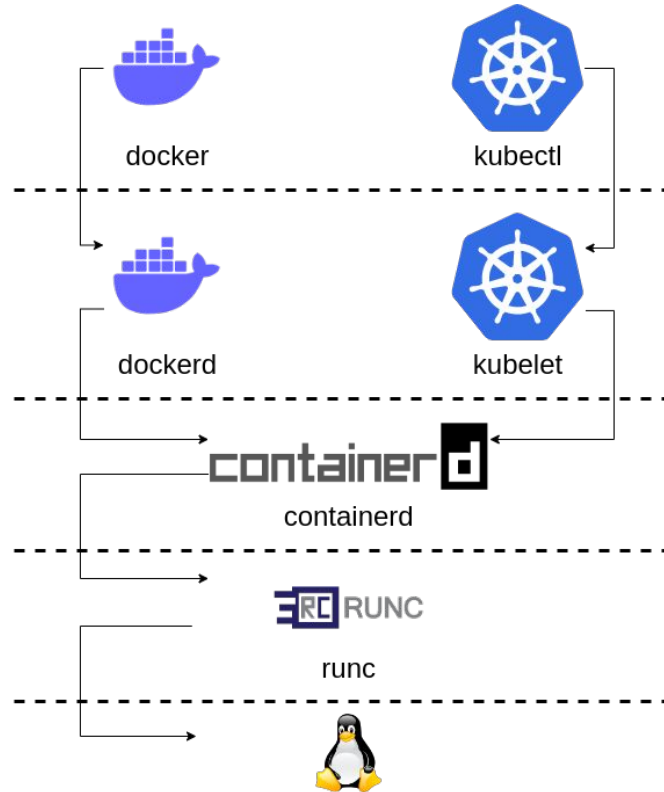
Choose your favorite plant-based mayonnaise brand. I prefer Miyoko's
and using of Trader Joe's Vegan Spread & Dressing.

Container





Single container spawn



Linux stuff behind containers

1 systemd (prev: init)

523 vim

823 VBoxSVC

833 \ VirtualBoxVM

715 containerd-shim-runc-v2

719 _ postgres

720 _ postgres

721 _ postgres

723 _ postgres

351 containerd-shim-runc-v2

352 _ redis-server

user@host:~\$

user@host:~\$

user@host:~\$

user@host:~\$

user@host:~\$ docker pull mcr.microsoft.com/
> windows/server:ltsc2022-amd64


```
user@host:~$  
user@host:~$  
user@host:~$  
user@host:~$  
user@host:~$ docker pull mcr.microsoft.com/\  
> windows/server:ltsc2022-amd64  
ltsc2022-amd64: Pulling from windows/server  
6d889b139513: Pulling fs layer  
60fff5ce9fed: Downloading 538.4kB/1.995GB  
image operating system "windows" cannot be  
used on this platform  
user@host:~$
```

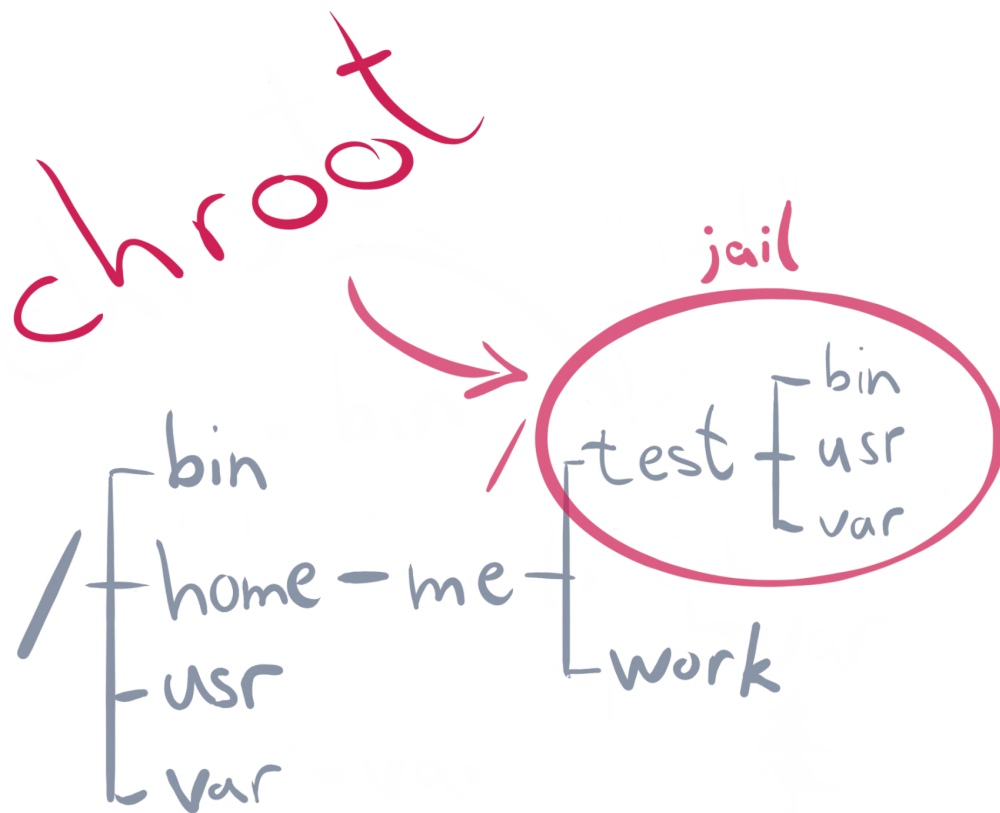
Containers

namespaces

cgroups

(capabilities)

chroot



Namespaces

1 systemd (prev: init)		
523 vim		
823 VBoxSVC		
833 \ VirtualBoxVM		
715 containerd-shim-runc-v2		
719 _ postgres	1 postgres	
720 _ postgres	49 _ postgres	
721 _ postgres	50 _ postgres	
723 _ postgres	51 _ postgres	
351 containerd-shim-runc-v2		
352 _ redis-server		1 redis-server

Namespaces

- mount [the first one introduced in 2002]
- cgroup
- ipc
- network
- pid
- uts (hostname)
- user [2013, allowed to make kernelspace-containers]
- time [most recent one, delivered in 2020]

unshare --help

<code>-m, --mount[=<file>]</code>	unshare mounts namespace
<code>-u, --uts[=<file>]</code>	unshare UTS namespace (hostname etc)
<code>-i, --ipc[=<file>]</code>	unshare System V IPC namespace
<code>-n, --net[=<file>]</code>	unshare network namespace
<code>-p, --pid[=<file>]</code>	unshare pid namespace
<code>-U, --user[=<file>]</code>	unshare user namespace
<code>-C, --cgroup[=<file>]</code>	unshare cgroup namespace
<code>-T, --time[=<file>]</code>	unshare time namespace
<code>-f, --fork</code>	fork before launching <program>
<code>--map-user=<uid> <name></code>	map current user to uid (implies --user)
<code>--map-group=<gid> <name></code>	map current group to gid (implies --user)
<code>-r, --map-root-user</code>	map current user to root (implies --user)
<code>-c, --map-current-user</code>	map current user to itself (implies --user)

Cgroups

monitor
limit

Resources

```
$ docker stats --no-stream
```

CONTAINER ID	CPU %	MEM USAGE / LIMIT	MEM %	NET I/O	BLOCK I/O	PIDS
8146f077d595	0.08%	1.502GiB / 31.09GiB	4.83%	145kB / 8.43MB	39.3MB / 132MB	96
7e9ba2b3294f	0.04%	986.7MiB / 31.09GiB	3.10%	1.5MB / 1.71MB	40.5MB / 277MB	10
fbcc1b97a31e	4.28%	377.7MiB / 31.09GiB	1.19%	188kB / 1.46MB	25MB / 169MB	5
c96a75487a8d	10.05%	2.183GiB / 31.09GiB	7.02%	106kB / 10.7MB	47.8MB / 623kB	34
2e21a1888ae0	0.00%	2.012MiB / 31.09GiB	0.01%	29.8kB / 0B	0B / 0B	6
5e7719e3faf6	0.13%	2.684MiB / 31.09GiB	0.01%	1.65MB / 1.12MB	3.86MB / 16.4kB	4
0c0efa52440e	0.00%	77.78MiB / 31.09GiB	0.24%	6.65MB / 6.82MB	528kB / 350MB	20
649ba7510e1b	0.05%	11.34MiB / 31.09GiB	0.04%	175kB / 126B	0B / 0B	13

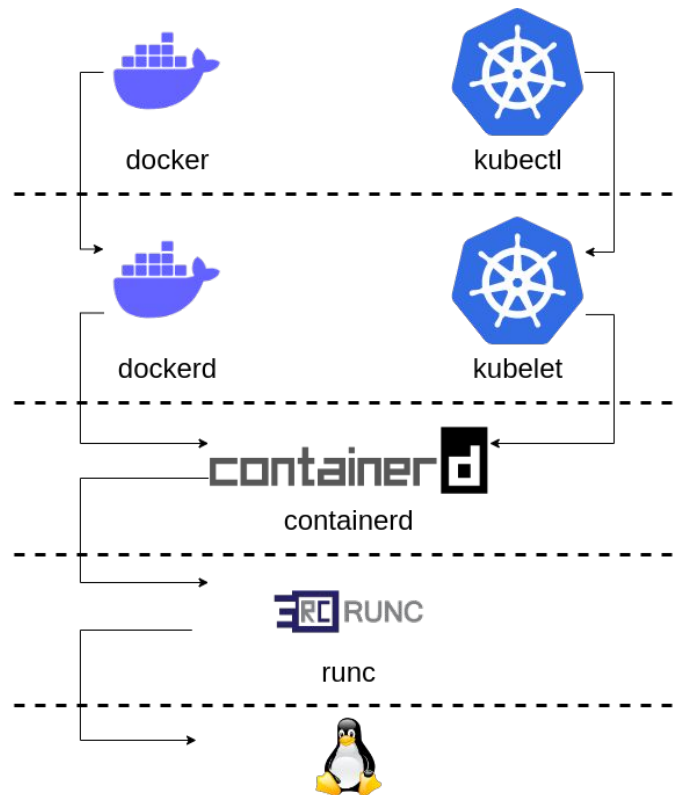
Single container spawn

Top-level API (docker, kubectl)

Rich on-host daemon (dockerd, kubelet)

Containers runtime daemon (containerd)

Low-level containers runtime (runc)



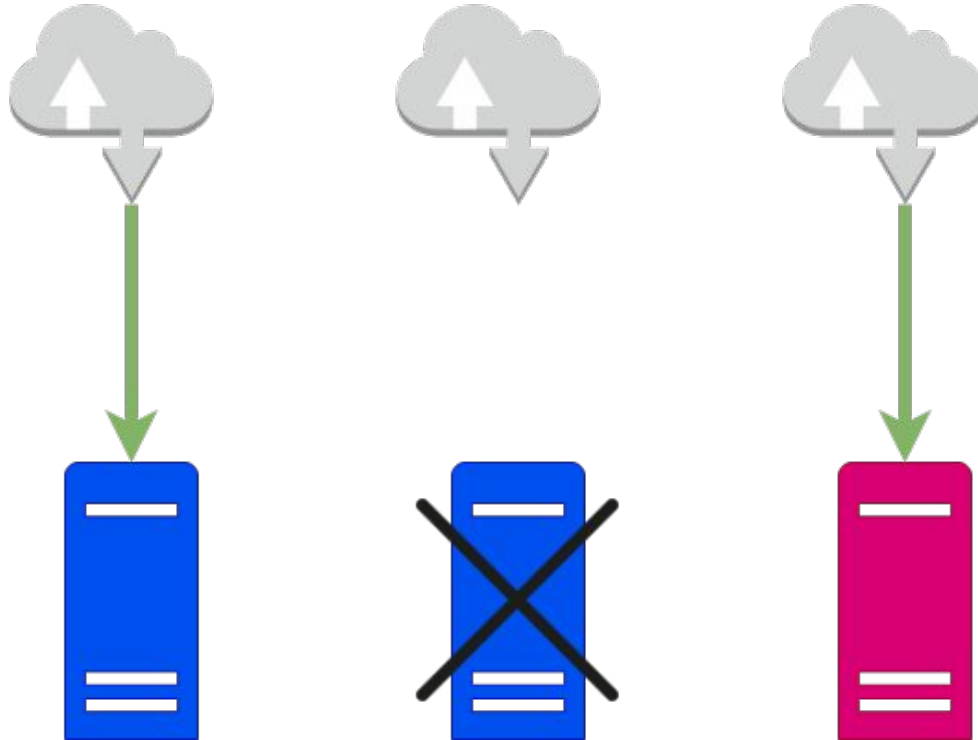
It works for me

Containers to build, to test and to deploy

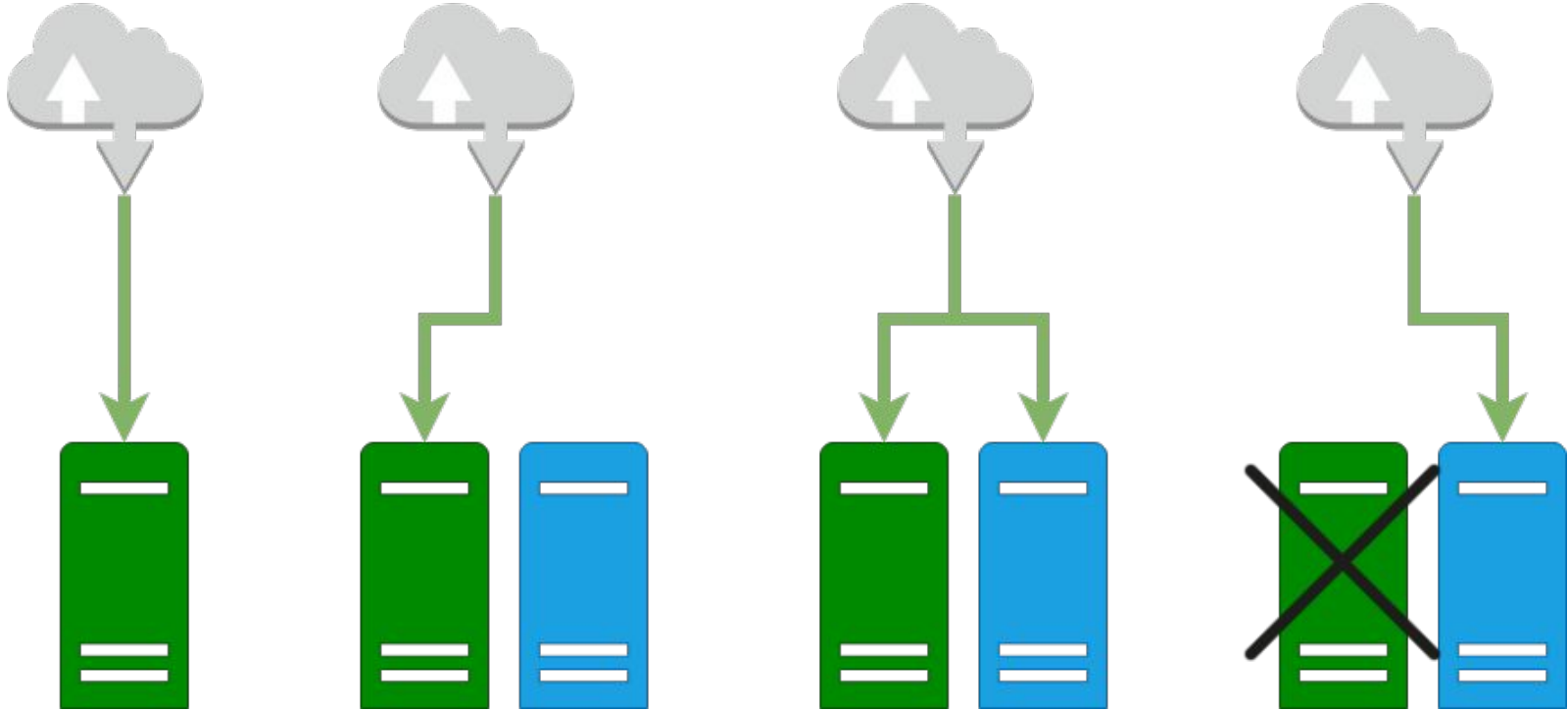
Deployment strategies



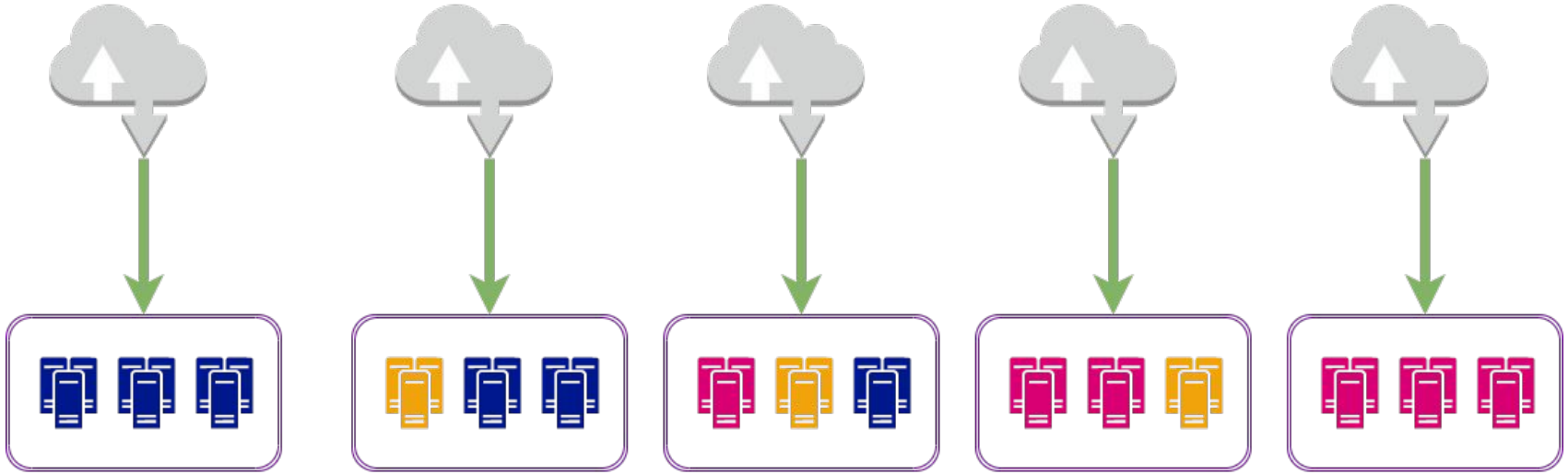
Take-down



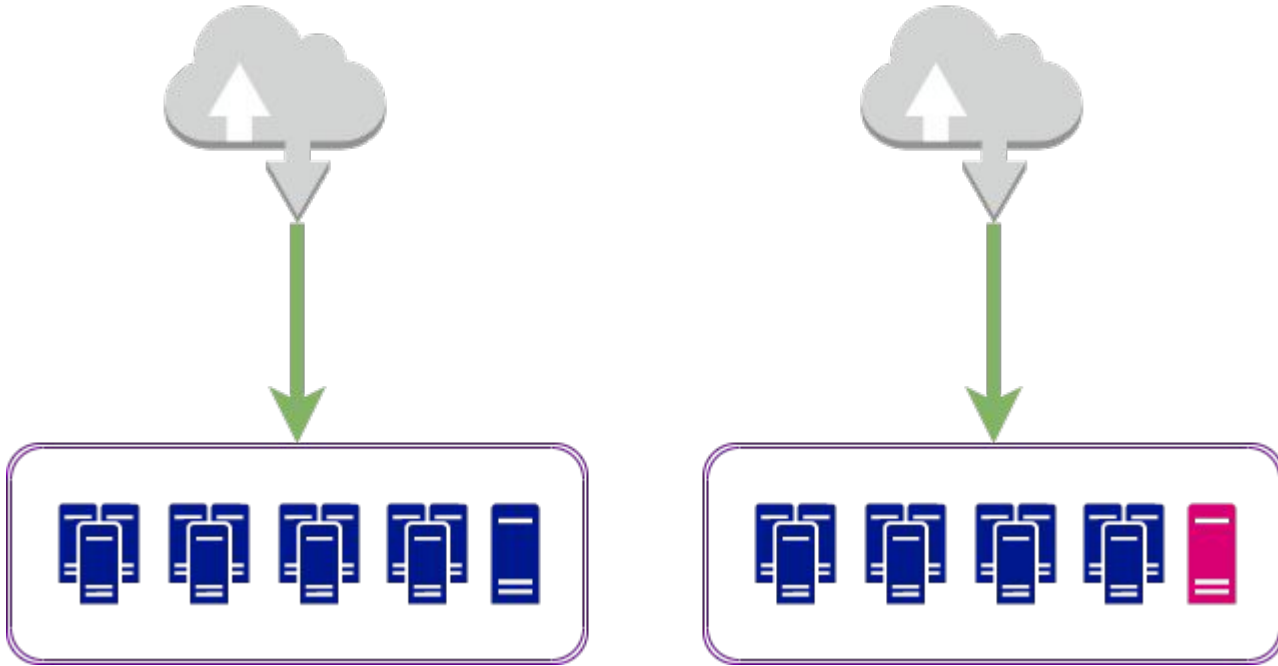
Blue/green



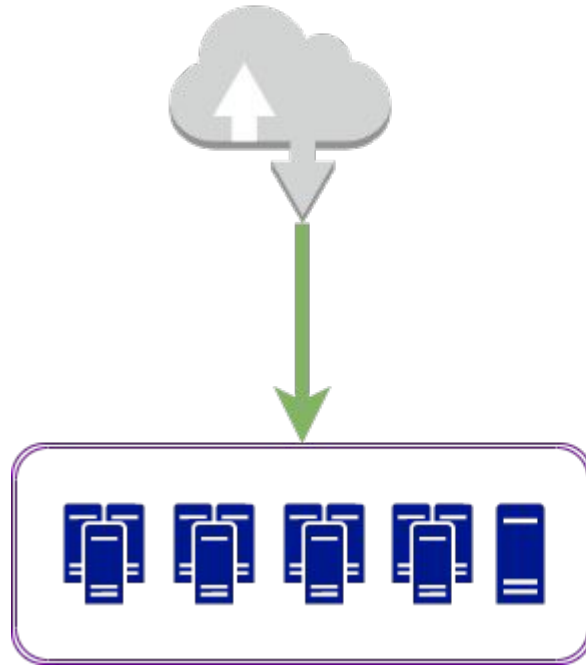
Rolling



Canary



Microservices deployment



Versioning

4.26.53

1.734.34-ef23c9

2021.11.351

Versioning

- (obviously) sources
- network configurations
- database schemas
- credentials
- OS configuration
- filesystem content
- ... something else?

Automation & orchestration

Infrastructure as code

Approach

- declarative
- imperative

Method

- push
- pull

Infrastructure as code



ANSIBLE



Terraform



CHEF



puppet

Terraform



validate

plan

apply

*Ops

Continuous

Integration

Delivery

Deployment

Configuration Automation

Continuous Integration



CD /Continuous Delivery /Continuous Deployment



Continuous Configuration Automation



Dockerfiles for build, test, deploy

```
FROM node
```

```
WORKDIR /usr/src/app
```

```
COPY . /usr/src/app
```

```
RUN npm install
```

```
RUN npm run bundle
```

```
FROM nginx
```

```
RUN rm /etc/nginx/conf.d/default.conf
```

```
COPY content /usr/share/nginx/html
```

```
COPY conf /etc/nginx
```

Multistage Dockerfile

```
FROM node as build
```

```
WORKDIR /usr/src/app
```

```
COPY . /usr/src/app
```

```
RUN npm install
```

```
RUN npm run bundle
```

```
...
```

```
...
```

```
FROM nginx
```

```
RUN rm /etc/nginx/conf.d/default.conf
```

```
COPY --from=build content  
/usr/share/nginx/html
```

```
COPY conf /etc/nginx
```

Layers

FROM python:3.10-alpine

COPY src /code

WORKDIR /code

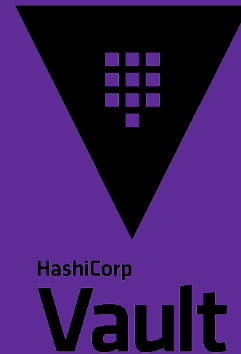
RUN apk add bash

RUN pip install -r /code/requirements.txt

RUN python3 py_compile *.py

CMD python3 app.py

Secrets management



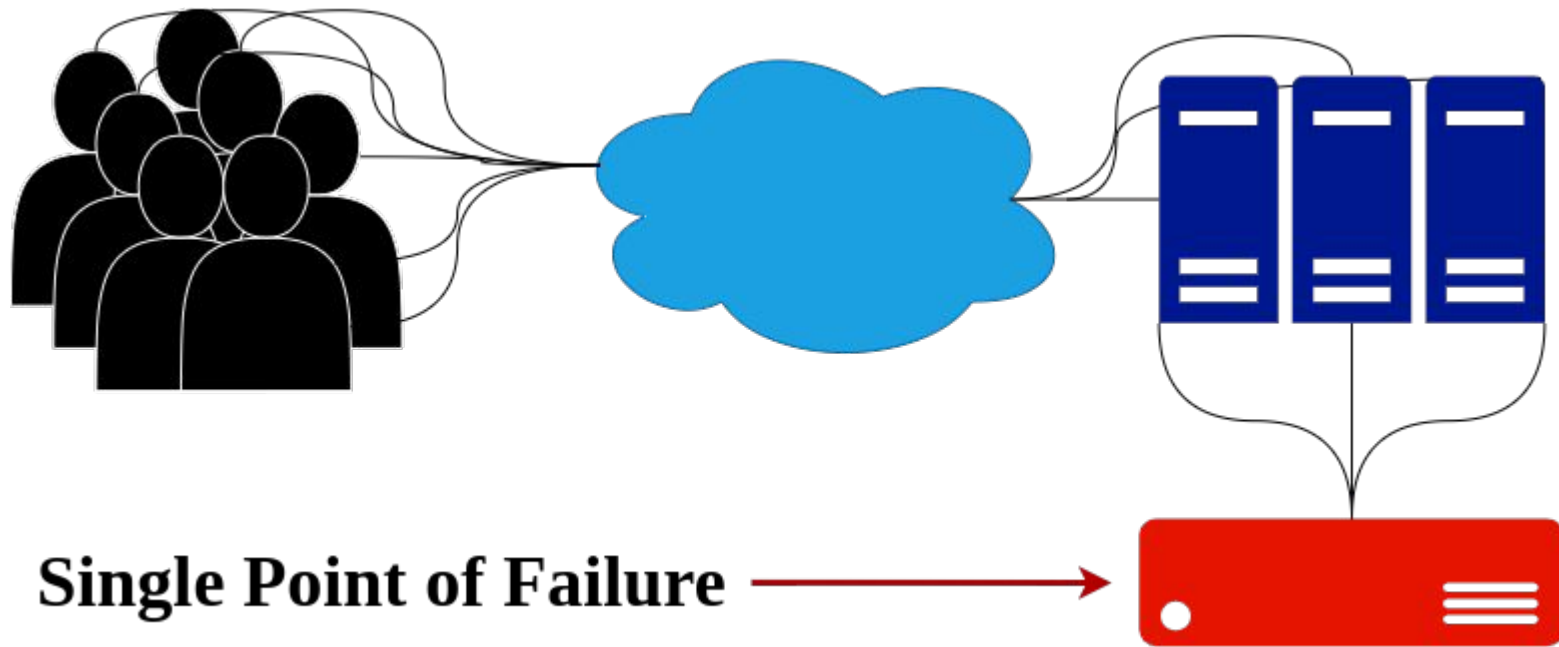
Jenkins



Docker Swarm

Kubernetes

SPOF



Intro to laboratory

```
@app.route('/run/<string:task_name>',  
methods=['POST'])  
def run_attendee_program(task_name: str):  
    assert request.content_type == 'text/plain'  
    code = request.data  
    validate_attendee_code(task_name, code)  
    return {  
        'exit_code': 0,  
        'results': [0] * 10  
    }
```