



POSEDIO

Your guiding light to innovation



JAVA CONTAINERIZATION

JAVA MEETUP - VIENNA

DAMJAN GJUROVSKI

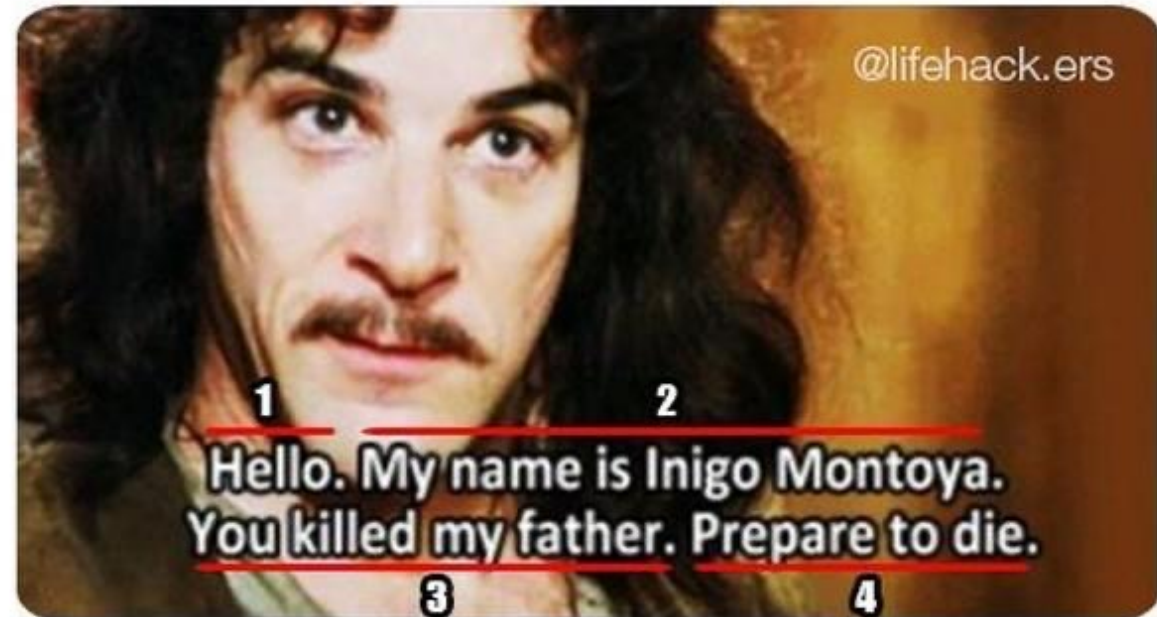
13 November 2023

HI

- Damjan Gjurovski
- Dev and Ops ☺
- Debugging Java containers for many years, gathered many stories

How to be good at talking

1. Polite greeting
2. Name
3. Relevant personal link
4. Manage expectations

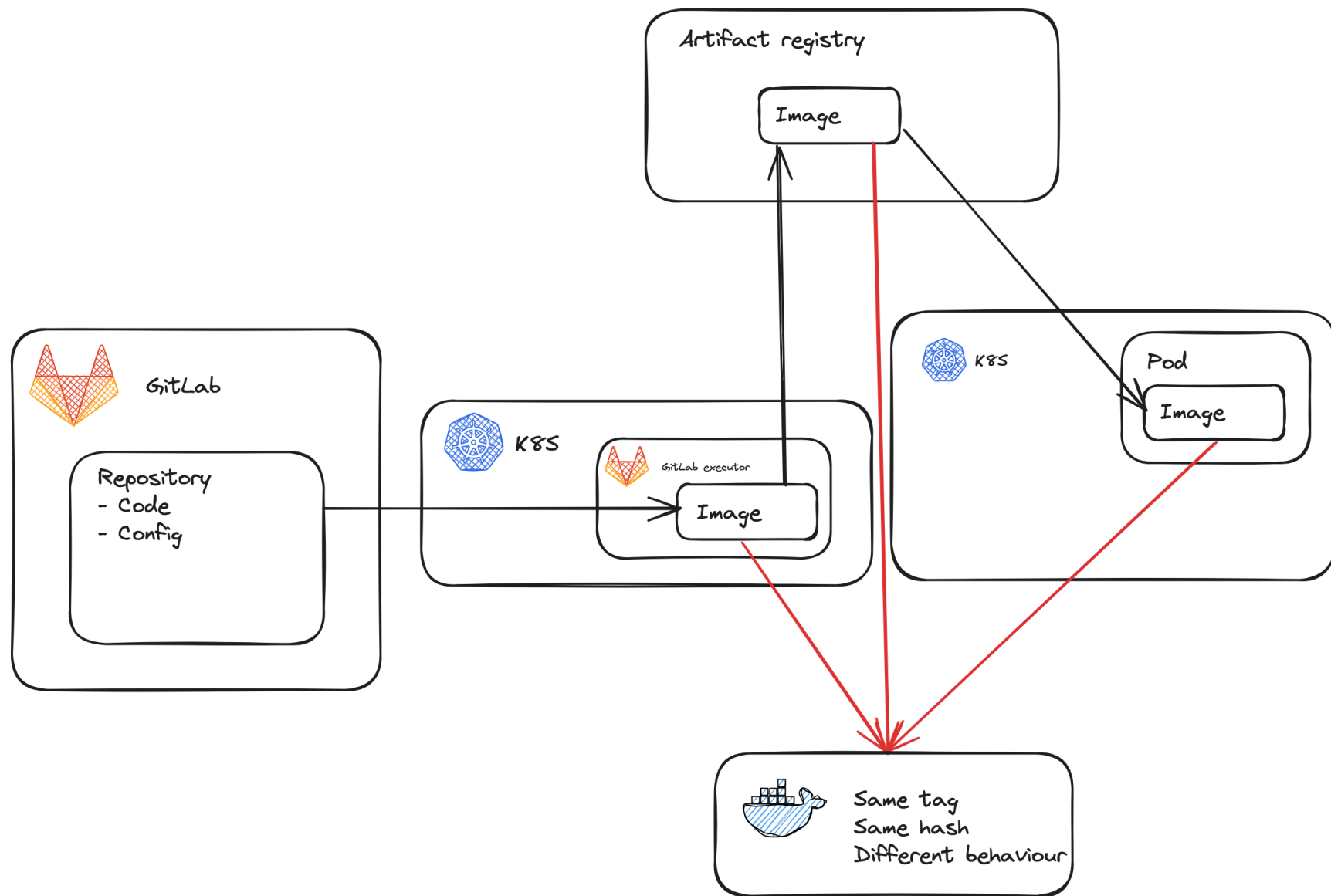




WHAT'S IN IT FOR ME

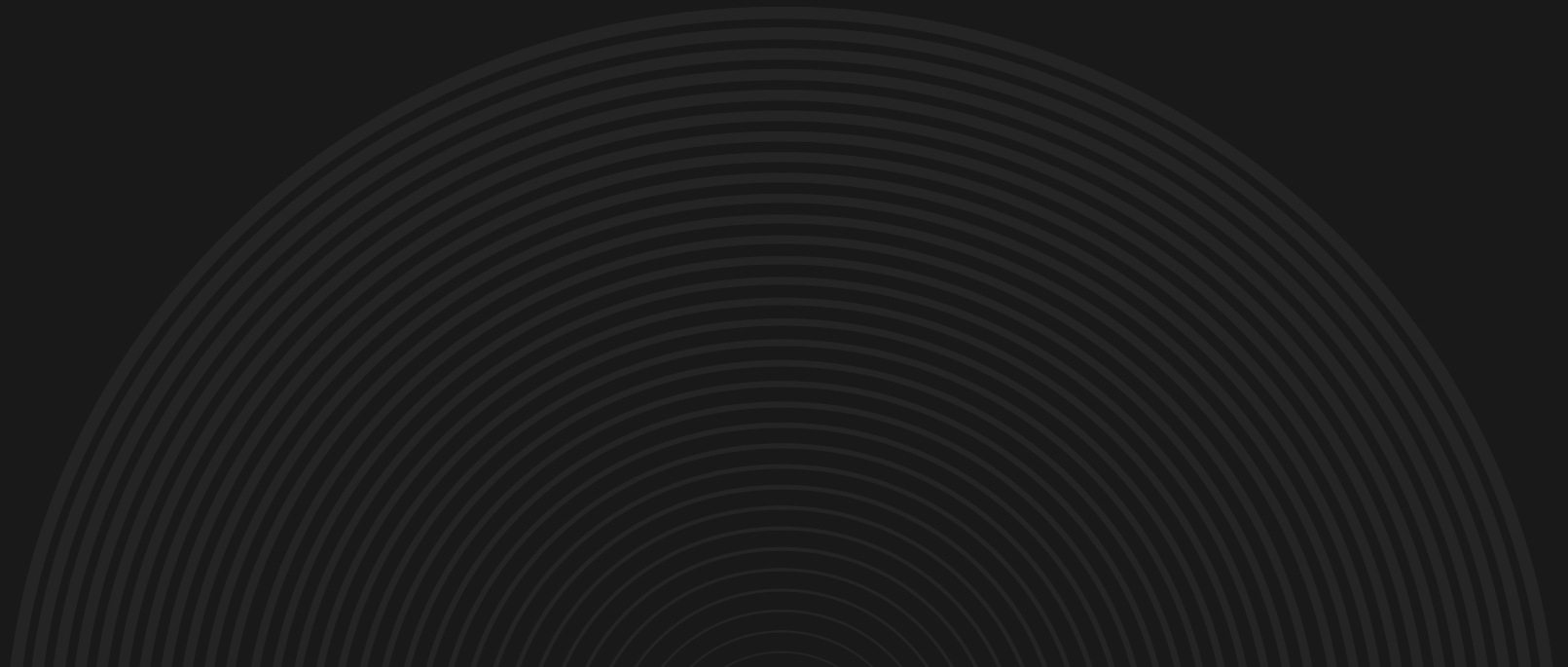
1. Improve build time
2. Use the right tool for the job
3. Start up faster and stay up longer
4. Understand what's running

A SHORT STORY





WHAT ARE CONTAINERS ANYWAY?!?

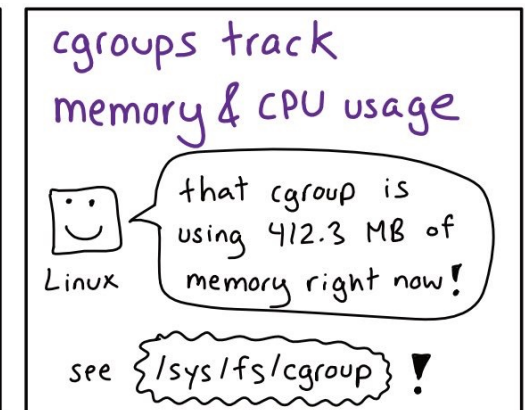
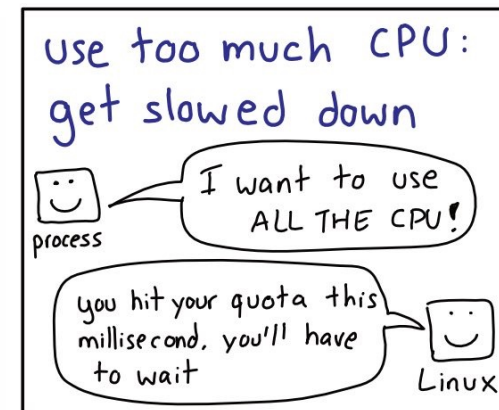
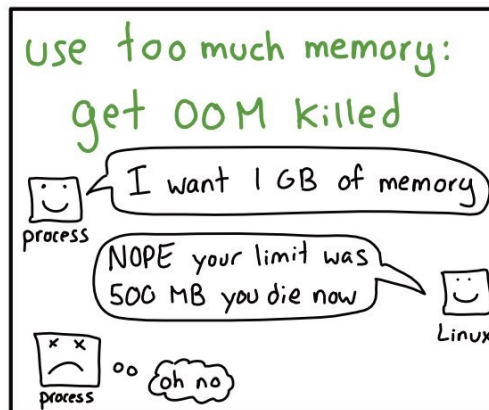
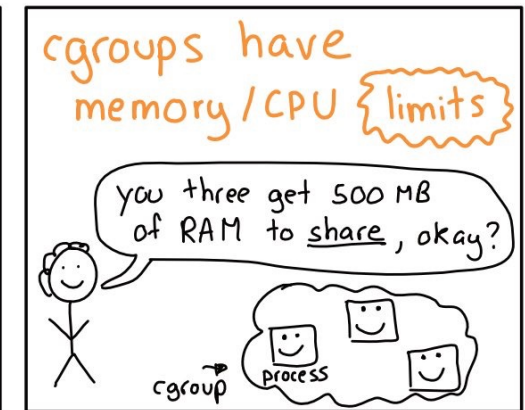
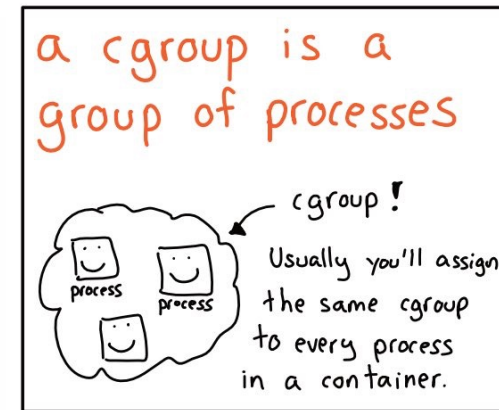
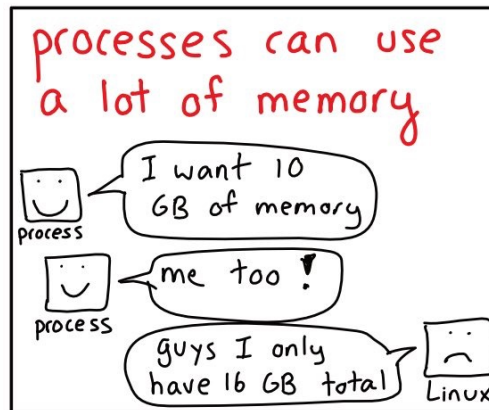


A CONTAINER IS JUST A PROCESS

JULIA EVANS
@b0rk

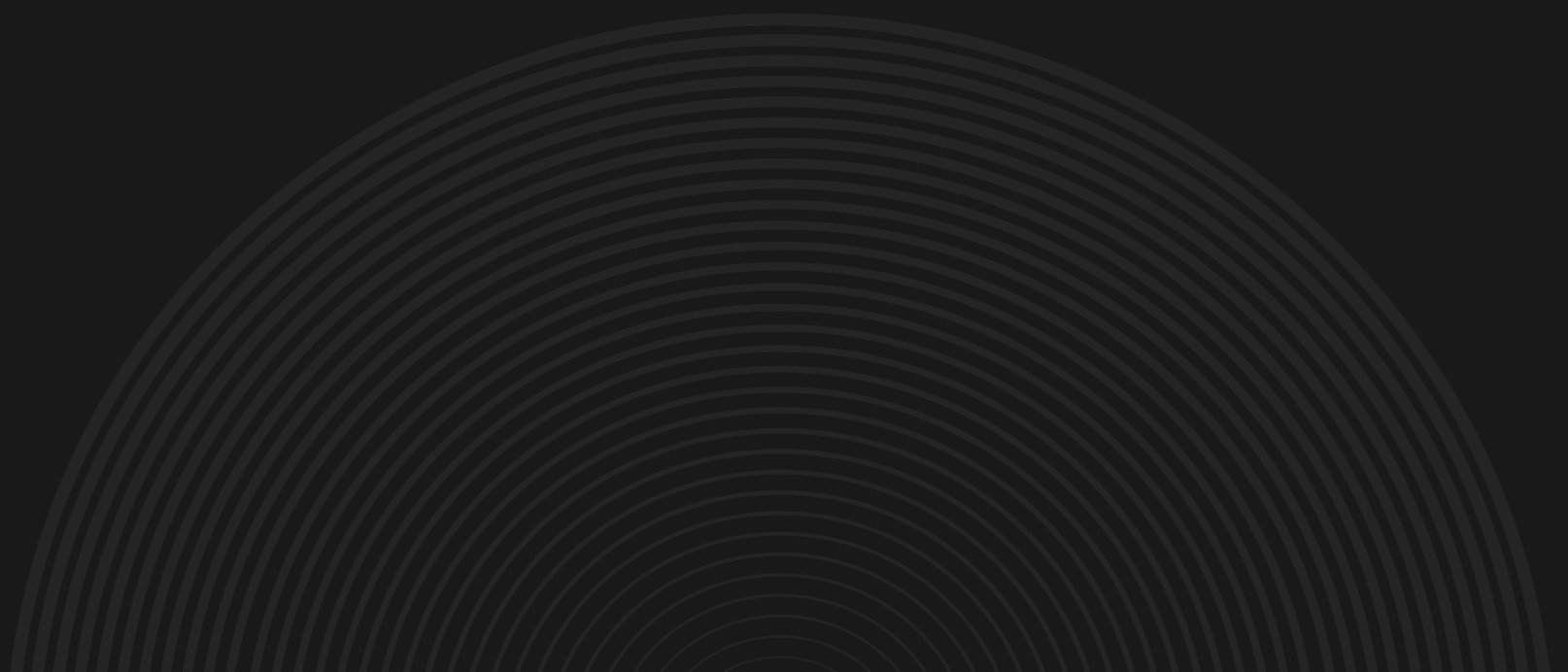
cgroups

- filesystem overlay
- cgroups
- namespaces
- tarball





IMPROVE BUILD TIME



TIPS & TRICKS

- Image size
- Distroless images
- Build order
- Cache
- Multi-stage builds



[dapl/dbt-builder-basic](#)



[dapl/dbt-builder-basic/cache](#)

Name	Description	Tags
00b10d7f6b8f		4dad7dd5932b4f9a3f58eb06e4bc90babb7784d67ff6b7da625de2d4ff3cd386
36512b3eee5d		0145049b82e8385a37f2f1472189e718df4bcea387ba1ca3e3b339624630b145
e73e71cde108		9b302afe3f2c1b1eb7c88374cc35ed83eeee764fdbcb5a2a20d1d7e9849f2509c
e33c1b2ba84a		619603a8438a19472451aeb45d2a2446d9ba9220c8994a05a960cd4801127f73
cb438e8101f9		
5317b8a4cb90		

```
# syntax=docker/dockerfile:1

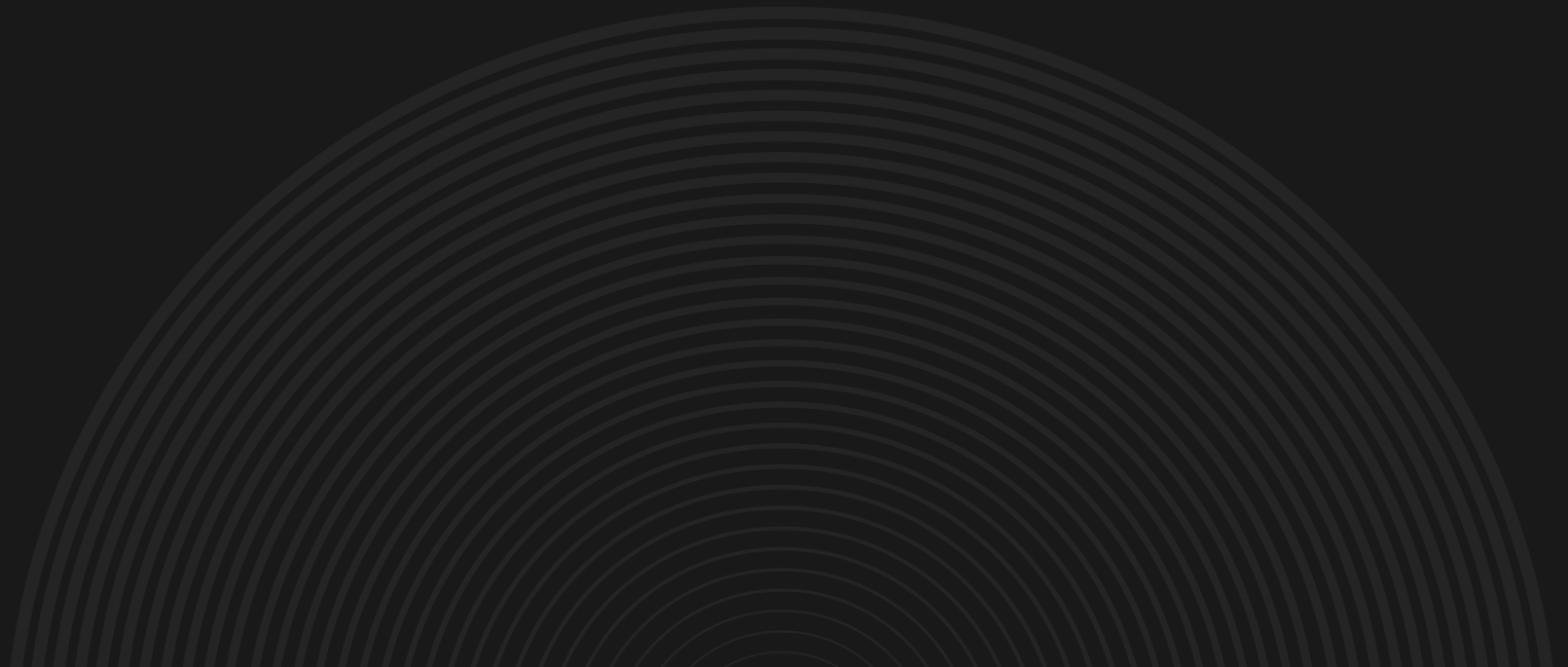
# stage 1
FROM alpine as git
RUN apk add git

# stage 2
FROM git as fetch
WORKDIR /repo
RUN git clone https://github.com/your/repository.git .

# stage 3
FROM nginx as site
COPY --from=fetch /repo/docs/ /usr/share/nginx/html
```

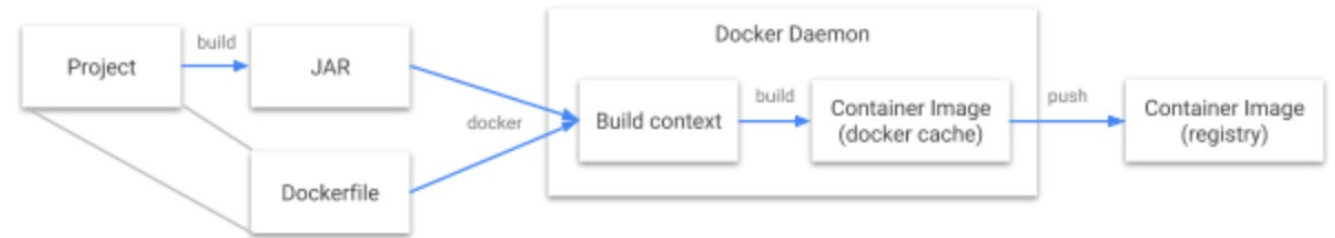


THE RIGHT TOOL



THE RIGHT TOOL

- Docker
- Kaniko
- JIB
- Why is my image created 48+ years ago?



Jib build flow:

```
<plugin>
  <groupId>com.google.cloud.tools</groupId>
  <artifactId>jib-maven-plugin</artifactId>
  <version>0.9.0</version>
  <configuration>
    <to>
      <image>gcr.io/my-project/image-built-with-jib</image>
    </to>
  </configuration>
</plugin>
```

```
# Builds to a container image registry.
$ mvn compile jib:build
# Builds to a Docker daemon.
$ mvn compile jib:dockerBuild
```

JIB MAGIC

```
# Jib uses Adoptium Eclipse Temurin (formerly AdoptOpenJDK).
FROM eclipse-temurin:11-jre

# Multiple copy statements are used to break the app into layers,
# allowing for faster rebuilds after small changes
COPY dependencyJars /app/libs
COPY snapshotDependencyJars /app/libs
COPY projectDependencyJars /app/libs
COPY resources /app/resources
COPY classFiles /app/classes

# Jib's extra directory ("src/main/jib" by default) is used to add extra, non-classpath files
COPY src/main/jib /

# Jib's default entrypoint when container.entrypoint is not set
ENTRYPOINT ["java", jib.container.jvmFlags, "-cp", "/app/resources:/app/classes:/app/libs/*", jib.container.mainClass]
CMD [jib.container.args]
```



3

START UP + STAYING UP



SLOW START = NO START

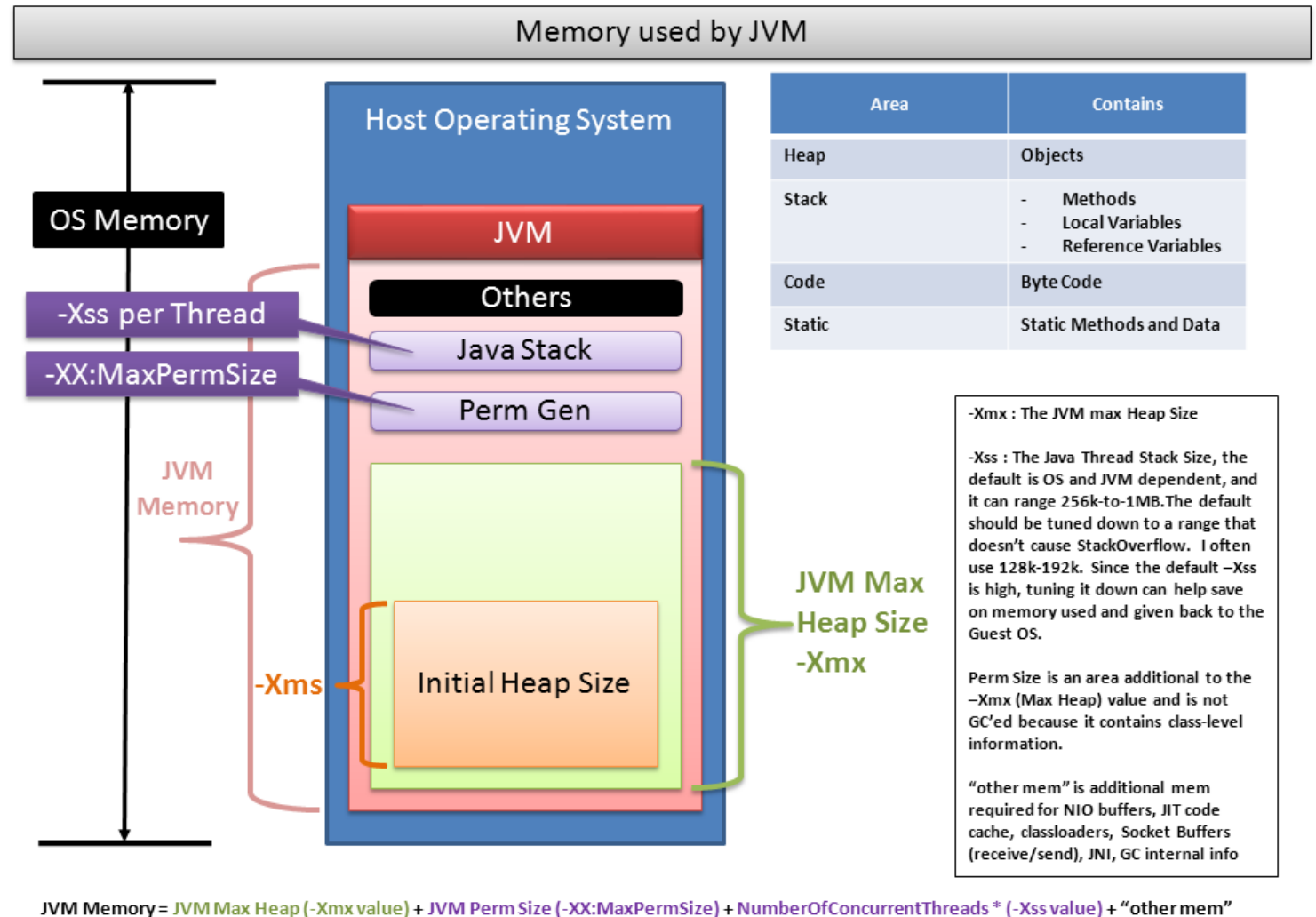
- User experience
- Kubernetes health checks

```
readinessProbe:
  httpGet:
    scheme: HTTP
    path: /actuator/health
    port: 9001
  initialDelaySeconds: 30
  periodSeconds: 5
  timeoutSeconds: 10
livenessProbe:
  httpGet:
    scheme: HTTP
    path: /actuator/health
    port: 9001
  initialDelaySeconds: 30
  periodSeconds: 5
  timeoutSeconds: 10
```



MEMORY MANAGEMENT

- System info, proc vs cgroups
- Heap space
- Container-aware java



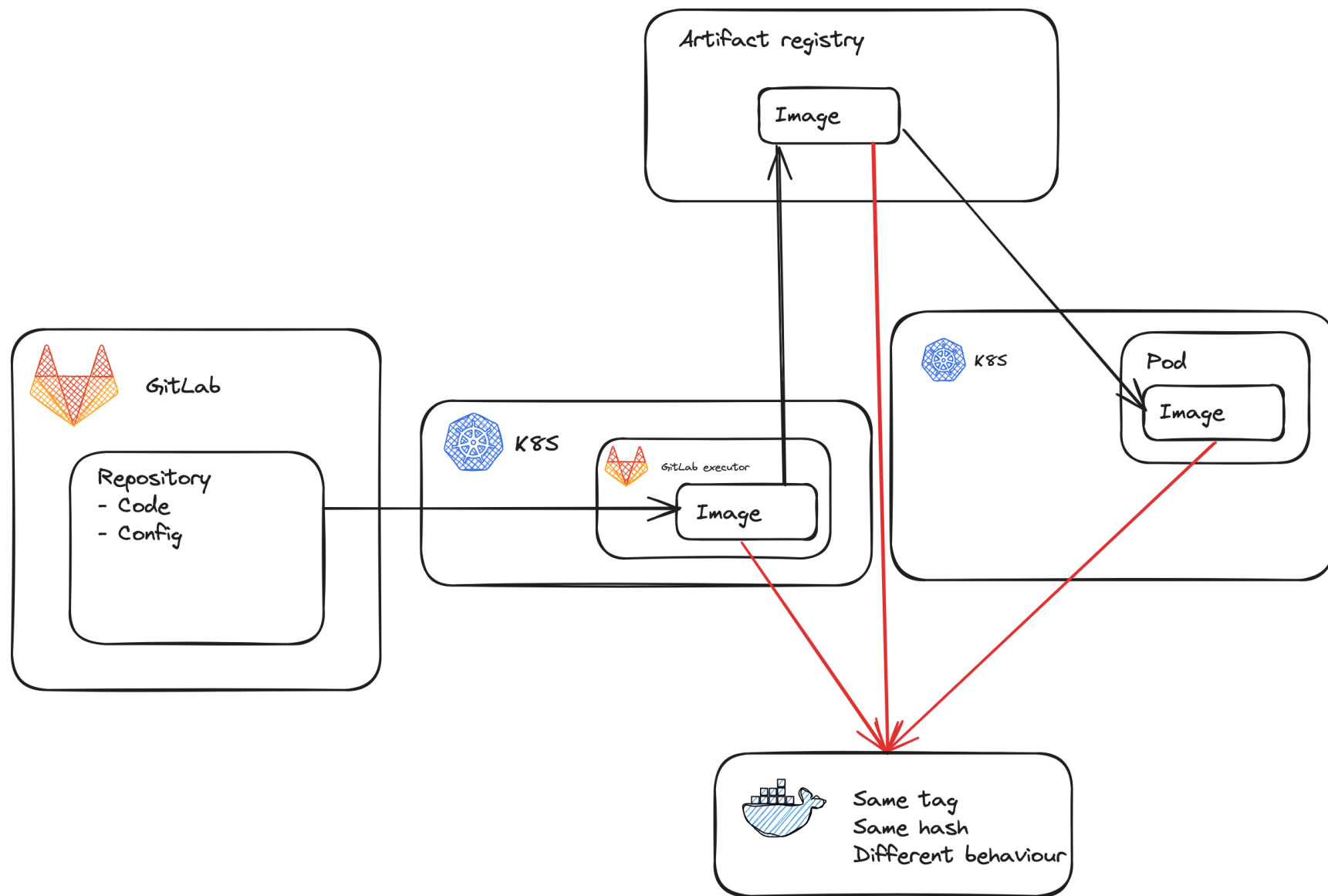


4

WHAT'S IN MY CONTAINER



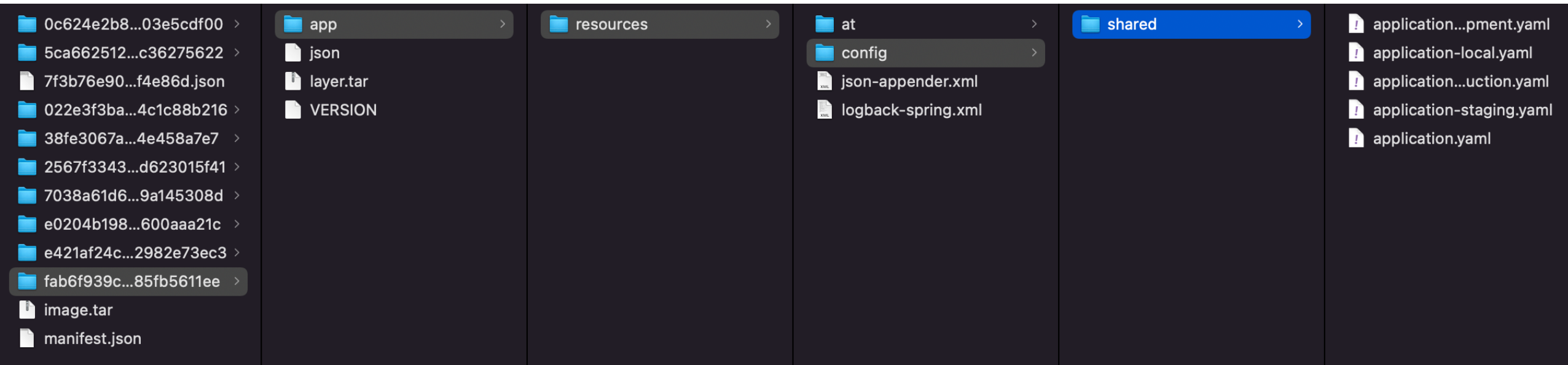
DO YOU REMEMBER



TARBALL TO THE RESCUE

- docker image save \
- abc.jfrog.io/docker-virtual/ap/development/image@sha256:xyz -o image.tar
- tar xvf image.tar
- Your favorite file explorer ☺

```
danjan@Danjans-MacBook-Pro: ~/Desktop/tmp
$ tar xvf image.tar
022e3f3ba3c1a340729557467ffdad7aadcc1ff96d0447331703534c1c88b216/
022e3f3ba3c1a340729557467ffdad7aadcc1ff96d0447331703534c1c88b216/VERSION
022e3f3ba3c1a340729557467ffdad7aadcc1ff96d0447331703534c1c88b216/.json
0c624e2b8cb1f7d62e2e9fa90239b40dba332a84755a0081e4e27af03e5cdf00/
0c624e2b8cb1f7d62e2e9fa90239b40dba332a84755a0081e4e27af03e5cdf00/VERSION
0c624e2b8cb1f7d62e2e9fa90239b40dba332a84755a0081e4e27af03e5cdf00/.json
2567f3343f60ce38032458009c80c378952d86ecb0bf71be24d0b9d623015f41/
2567f3343f60ce38032458009c80c378952d86ecb0bf71be24d0b9d623015f41/VERSION
2567f3343f60ce38032458009c80c378952d86ecb0bf71be24d0b9d623015f41/.json
2567f3343f60ce38032458009c80c378952d86ecb0bf71be24d0b9d623015f41/layer.tar
38fe3067a3a2ad3b52f82805b2063cfdcd3dd68dec8f466585b48894e458a7e7/
38fe3067a3a2ad3b52f82805b2063cfdcd3dd68dec8f466585b48894e458a7e7/VERSION
38fe3067a3a2ad3b52f82805b2063cfdcd3dd68dec8f466585b48894e458a7e7/.json
38fe3067a3a2ad3b52f82805b2063cfdcd3dd68dec8f466585b48894e458a7e7/layer.tar
5ca66251281b210c5cc7aba254de34436a5a1181ef1217abd6ed923c36275622/
5ca66251281b210c5cc7aba254de34436a5a1181ef1217abd6ed923c36275622/VERSION
5ca66251281b210c5cc7aba254de34436a5a1181ef1217abd6ed923c36275622/.json
5ca66251281b210c5cc7aba254de34436a5a1181ef1217abd6ed923c36275622/layer.tar
7038a61d6ef796966ac35720af4e585453d9642501555a88d4883fa9a145308d/
7038a61d6ef796966ac35720af4e585453d9642501555a88d4883fa9a145308d/VERSION
7038a61d6ef796966ac35720af4e585453d9642501555a88d4883fa9a145308d/.json
7038a61d6ef796966ac35720af4e585453d9642501555a88d4883fa9a145308d/layer.tar
7f3b76e90584d25b98349825ad73b5f6a99b2b3997ce48cdcb6b48008f4e86d/.json
e0204b198dbff71f5b5c5c41aeb7f006bc6bba98c03334d3efa962600aaa21c/
e0204b198dbff71f5b5c5c41aeb7f006bc6bba98c03334d3efa962600aaa21c/VERSION
e0204b198dbff71f5b5c5c41aeb7f006bc6bba98c03334d3efa962600aaa21c/.json
e0204b198dbff71f5b5c5c41aeb7f006bc6bba98c03334d3efa962600aaa21c/layer.tar
e421af24c26681bbcccd615bfce5909ef7e81579e6d9f051bda7eeb2982e73ec3/
e421af24c26681bbcccd615bfce5909ef7e81579e6d9f051bda7eeb2982e73ec3/VERSION
e421af24c26681bbcccd615bfce5909ef7e81579e6d9f051bda7eeb2982e73ec3/.json
e421af24c26681bbcccd615bfce5909ef7e81579e6d9f051bda7eeb2982e73ec3/layer.tar
fab6f939c0a54c2f91c50a531c5a31b0ca7335c16c7faea3e9bb3d85fb5611ee/
fab6f939c0a54c2f91c50a531c5a31b0ca7335c16c7faea3e9bb3d85fb5611ee/VERSION
fab6f939c0a54c2f91c50a531c5a31b0ca7335c16c7faea3e9bb3d85fb5611ee/.json
fab6f939c0a54c2f91c50a531c5a31b0ca7335c16c7faea3e9bb3d85fb5611ee/layer.tar
manifest.json
```



SO, WHAT HAPPENED

- User experience
- Kubernetes health checks



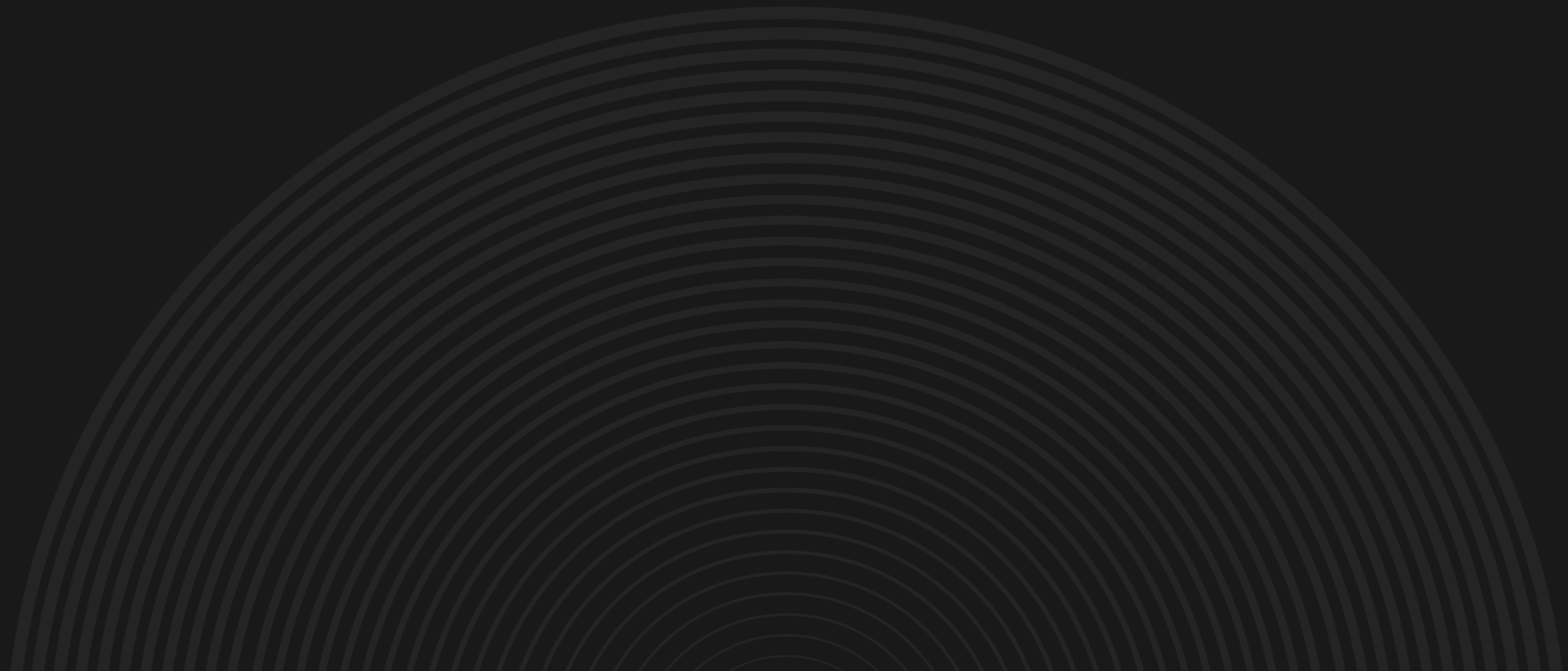
force pushing to shared branches can cause lost work

A few people mentioned the following situation:

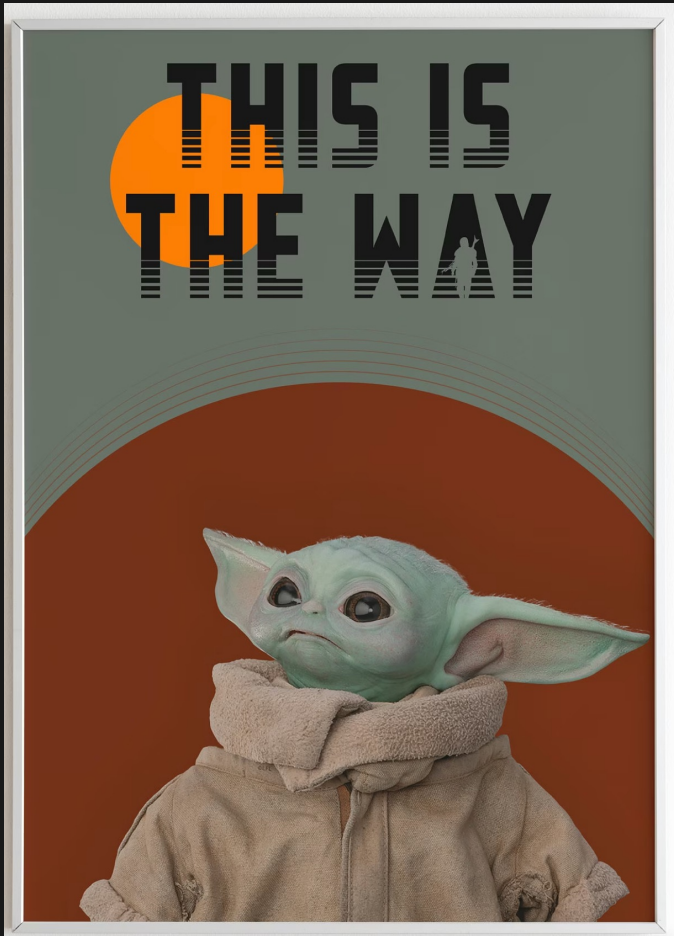
1. You're collaborating on a branch with someone
2. You push some changes
3. They rebase the branch and run `git push --force` (maybe by accident)
4. Now when you run `git pull`, it's a mess – you get the a `fatal: Need to specify how to reconcile divergent branches` error
5. While trying to deal with the fallout you might lose some commits, especially if some of the people are involved aren't very comfortable with git



SHOW ME THE MONEY



THIS IS THE WAY



- Use light-weight (distroless) images
- Let JIB optimize your build
- Don't trust the memory management tools – optimize when needed
- Think about cold start
- Remember to confirm what you have running before making assumptions!



WANT TO KEEP THE
DISCUSSION
GOING? MESSAGE
ME ON LINKEDIN!



Damjan Gjurovski
Head of Technology

