

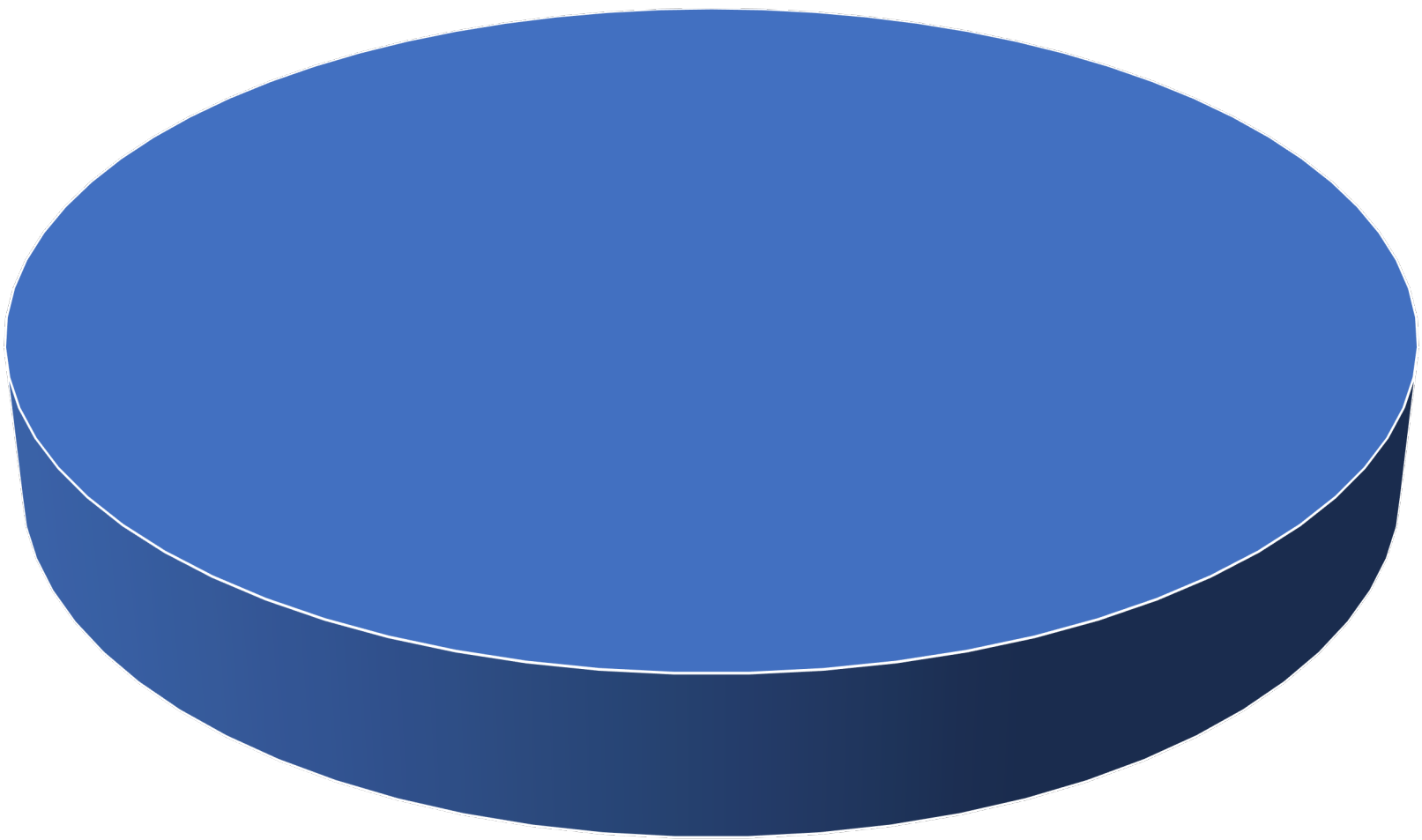
BEST PRACTICES IN IMPLEMENTING CONTAINER IMAGE PROMOTION PIPELINES

A still from the movie "Dr. Strangelove or: How I Learned to Stop Worrying and Love the Bomb". Dr. Strangelove, played by Peter Sellers, is shown from the chest up, wearing his signature grey military uniform. He is bald and has a wide-eyed, intense expression. Behind his head, a large black nuclear missile is positioned horizontally. He is making peace signs with both hands, with his index and middle fingers extended. The word "CONTAINERS" is superimposed in large, white, bold, sans-serif capital letters across the center of the image, partially obscuring his face and the missile. The background is a dimly lit control room with various panels and a red telephone visible on the left.

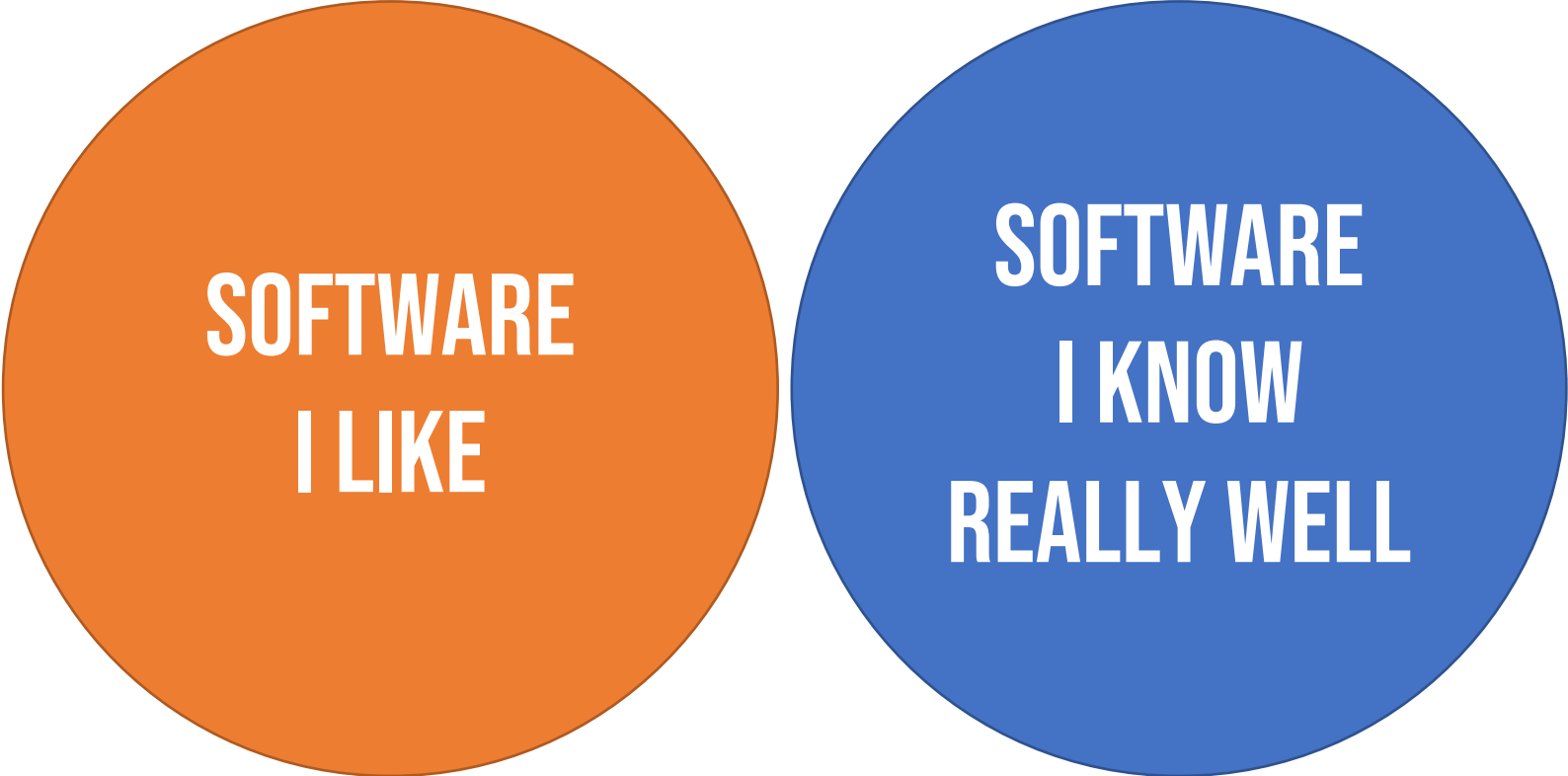
CONTAINERS

POLL TIME

Familiar with Docker*



*Among Docker meetup attendees



**SOFTWARE
I LIKE**

**SOFTWARE
I KNOW
REALLY WELL**

I LIKE YOU



BUT I DON'T TRUST YOU

BARUCH SADOGURSKY

CHIEF STICKER OFFICER

(ALSO 🎩 OF DEVELOPER ADVOCACY)



JBARUCH@JFROG.COM

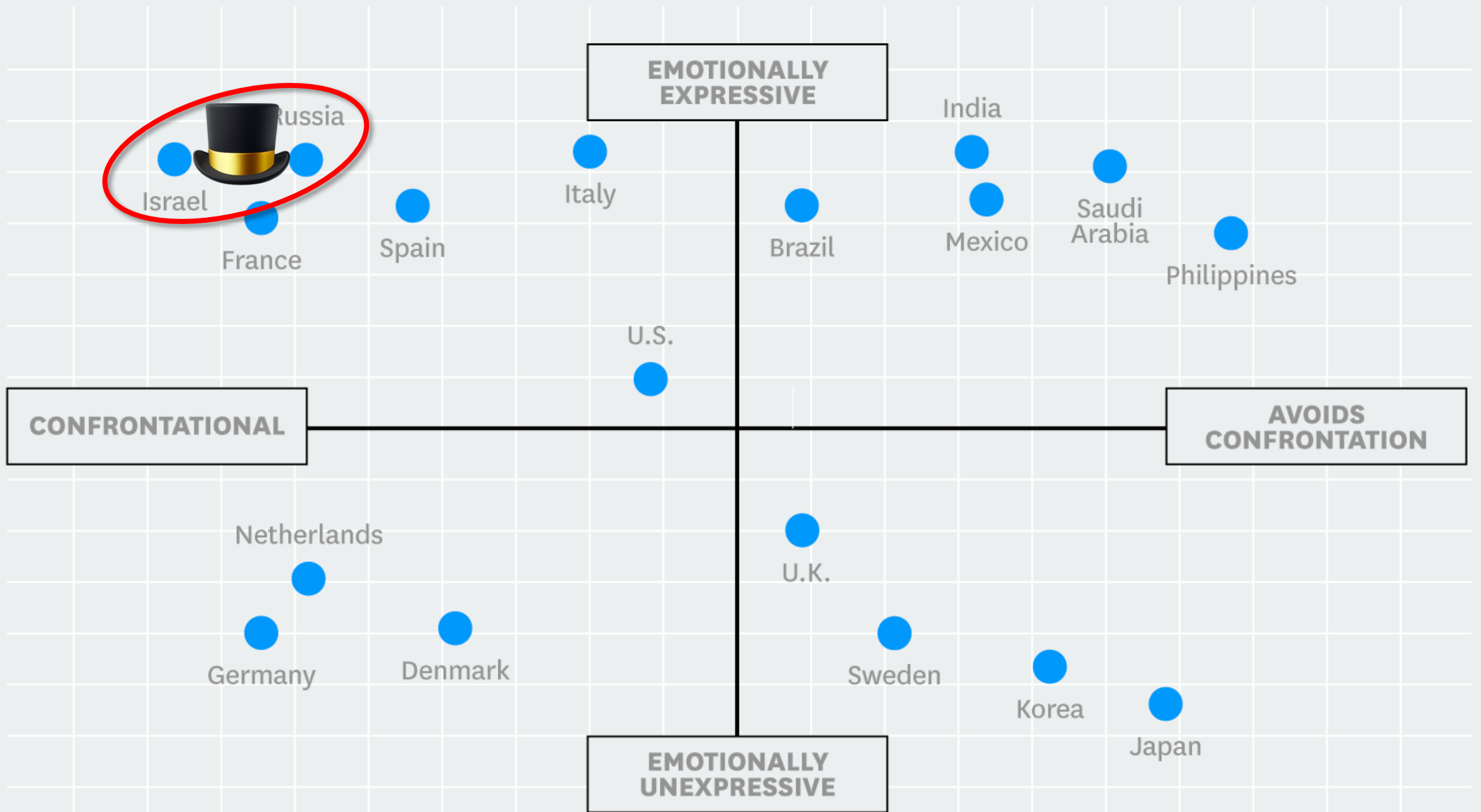


@JBARUCH



+1(408)890-9281





SHOWNOTES

➤ <http://jfrog.com/shownotes>

➤ Slides

➤ Video

➤ Links

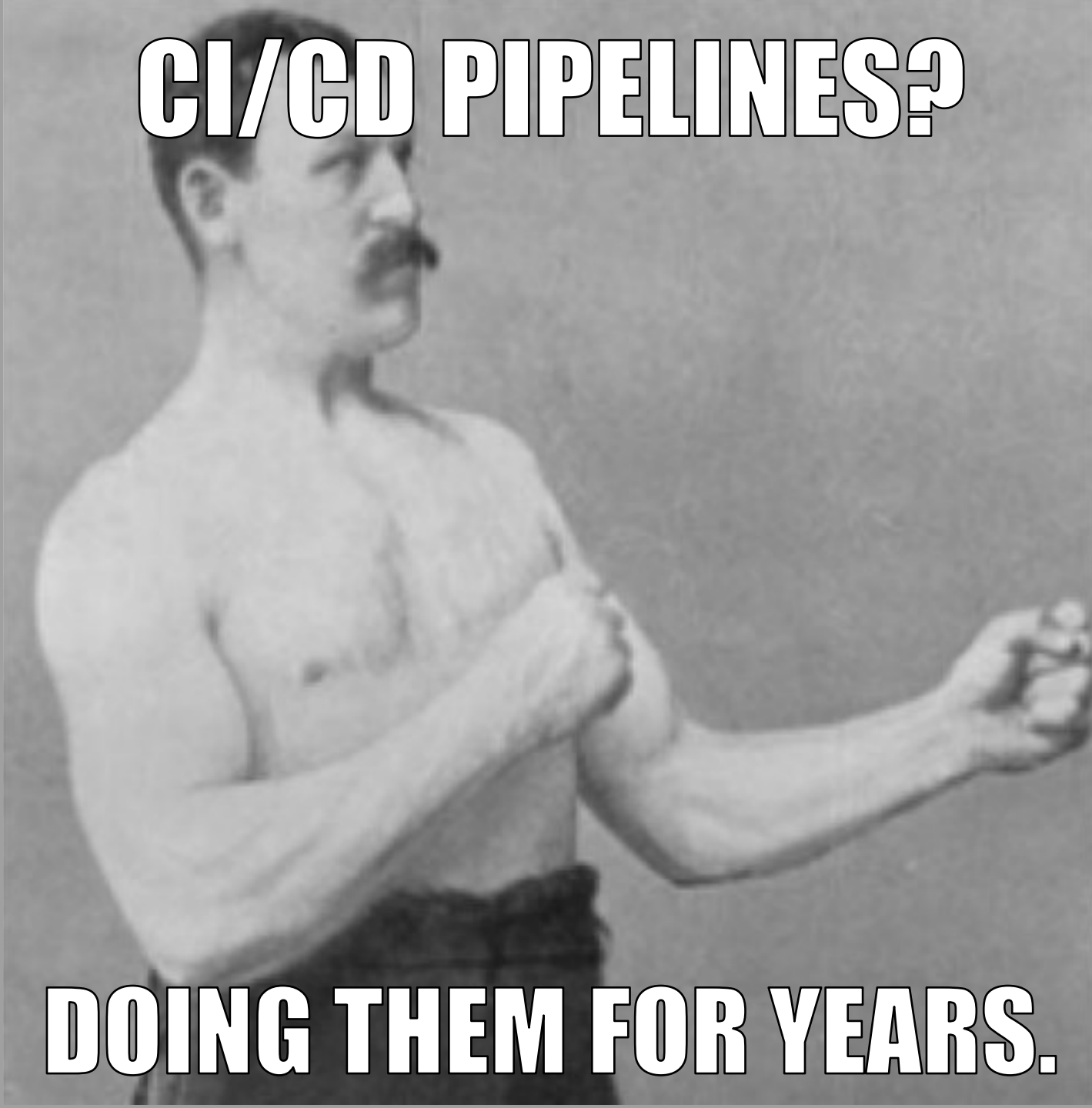
➤ Comments, Ratings

➤ Raffle

DO WE HAVE AN EXISTING PATTERN?

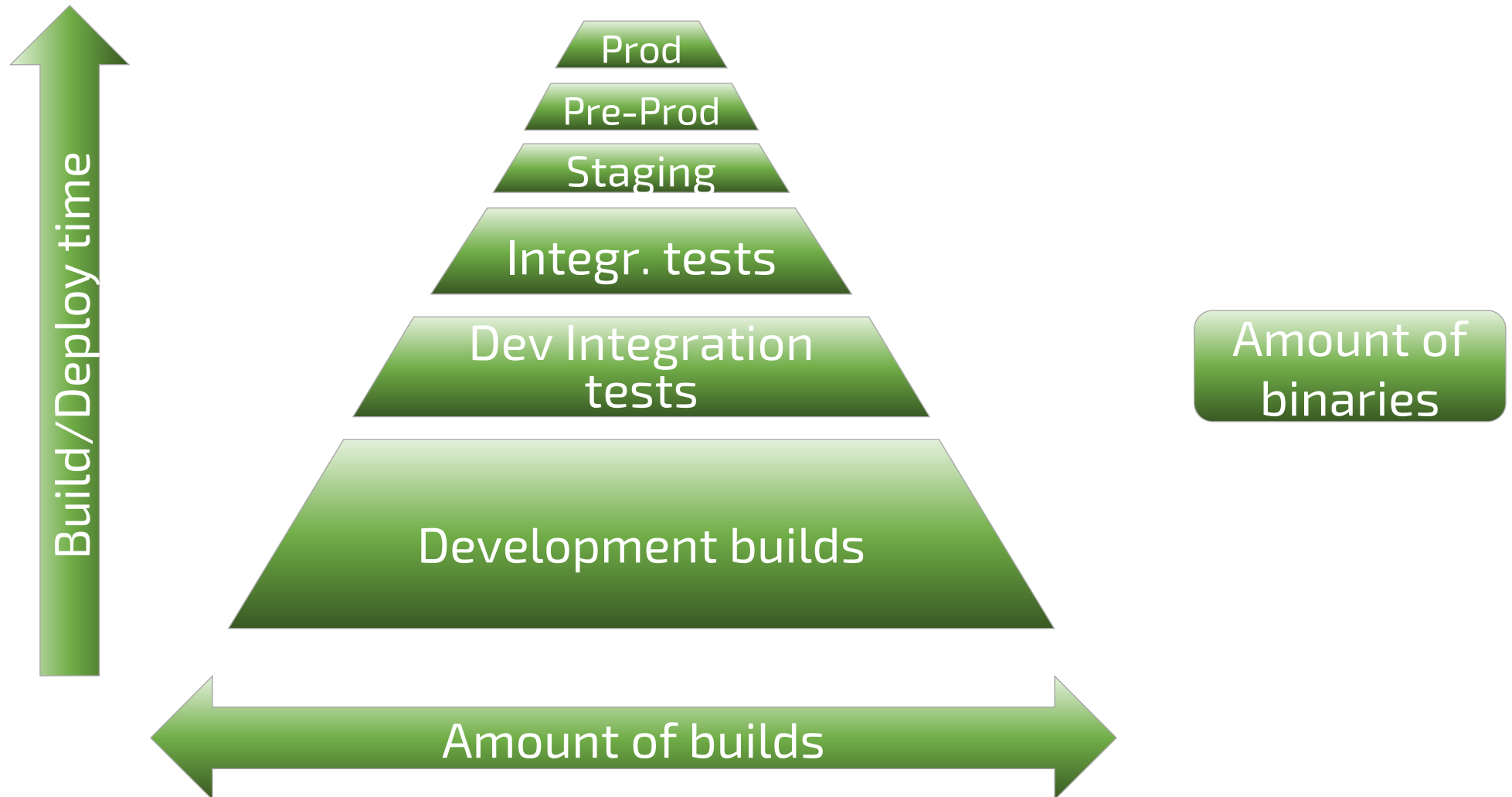
DO WE NEED TO ADAPT IT?

CI/CD PIPELINES?

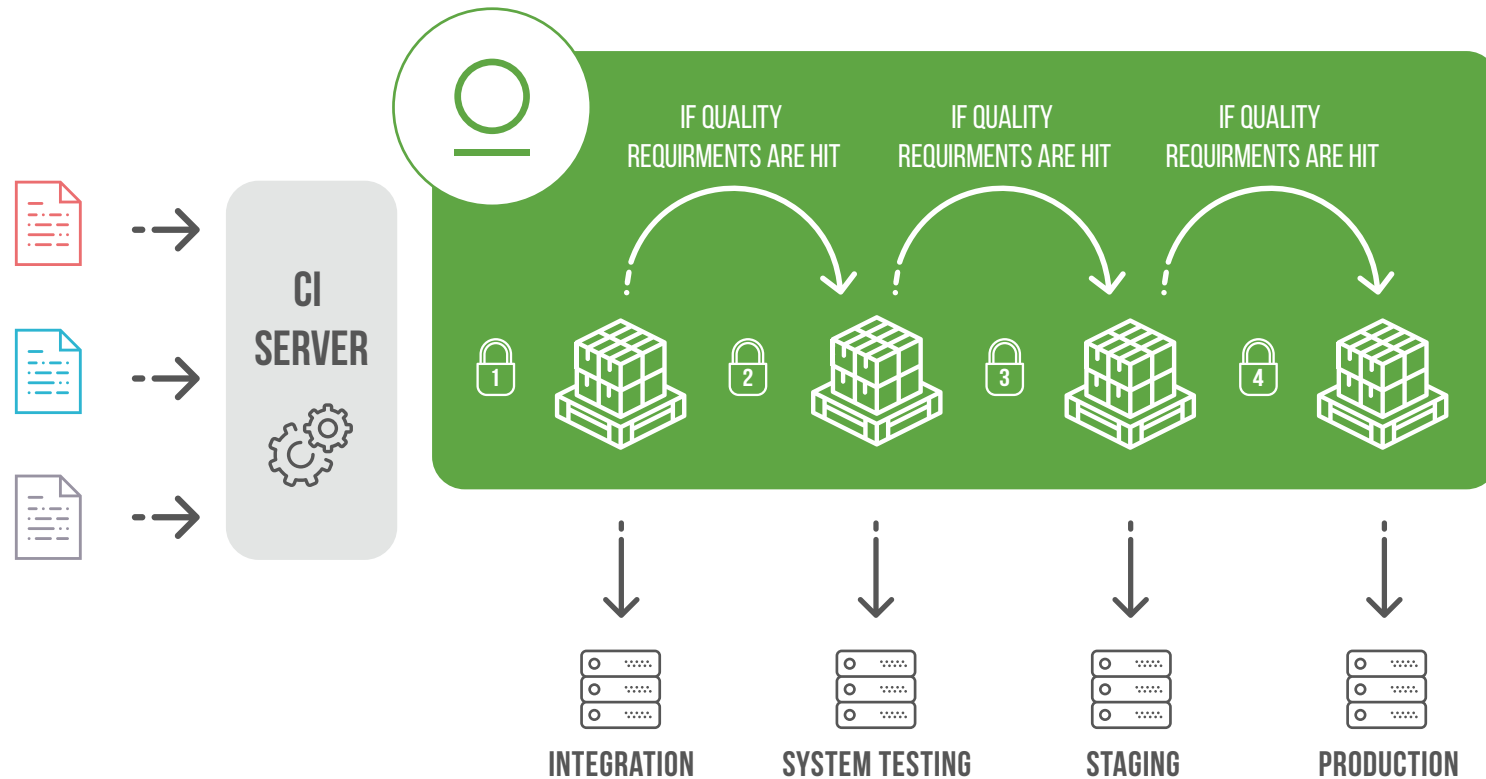


DOING THEM FOR YEARS.

THE PROMOTION PYRAMID



PIPELINE: QUALITY GATES AND VISIBILITY



\$docker build

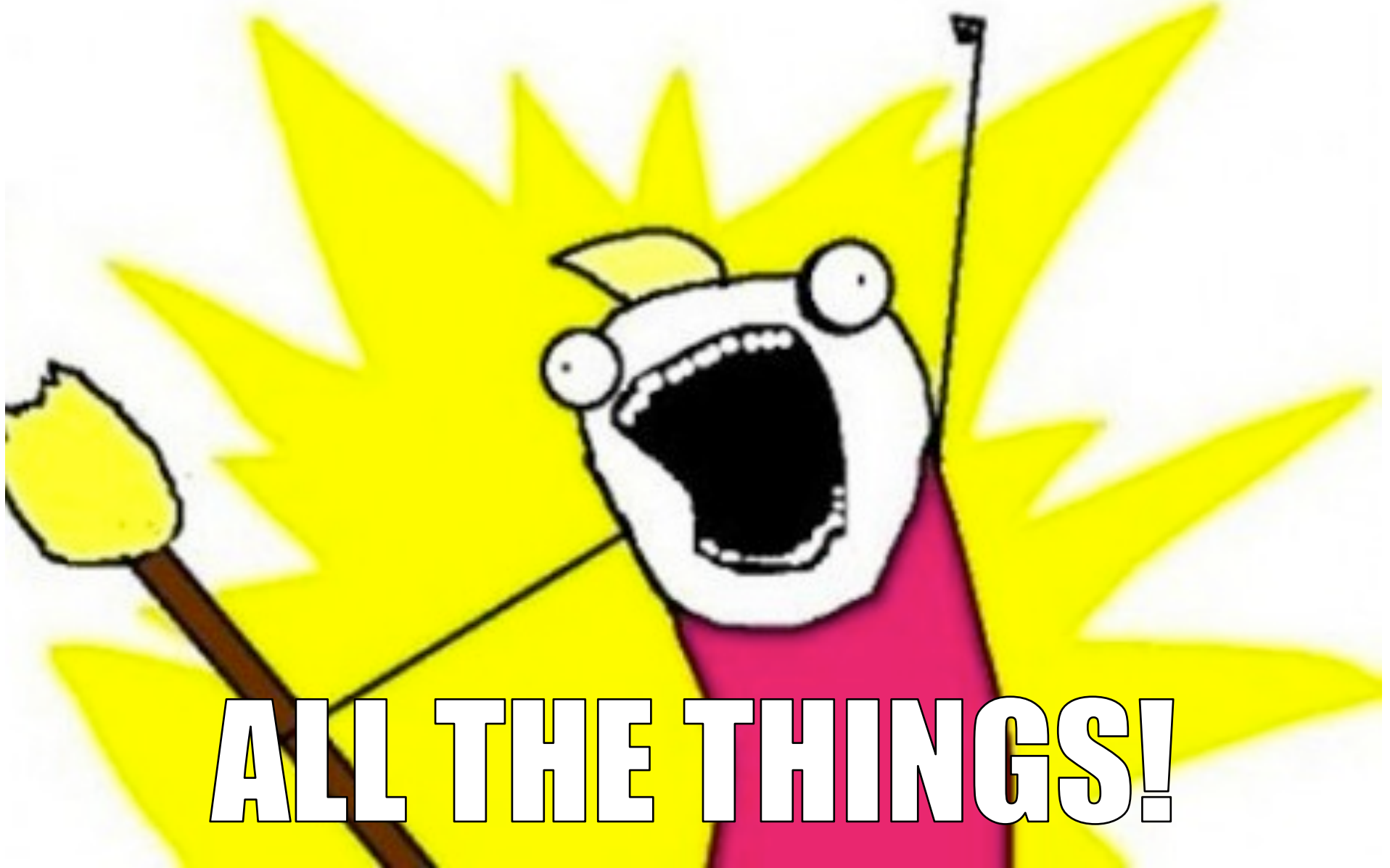


@jbaruch

#DockerChicago

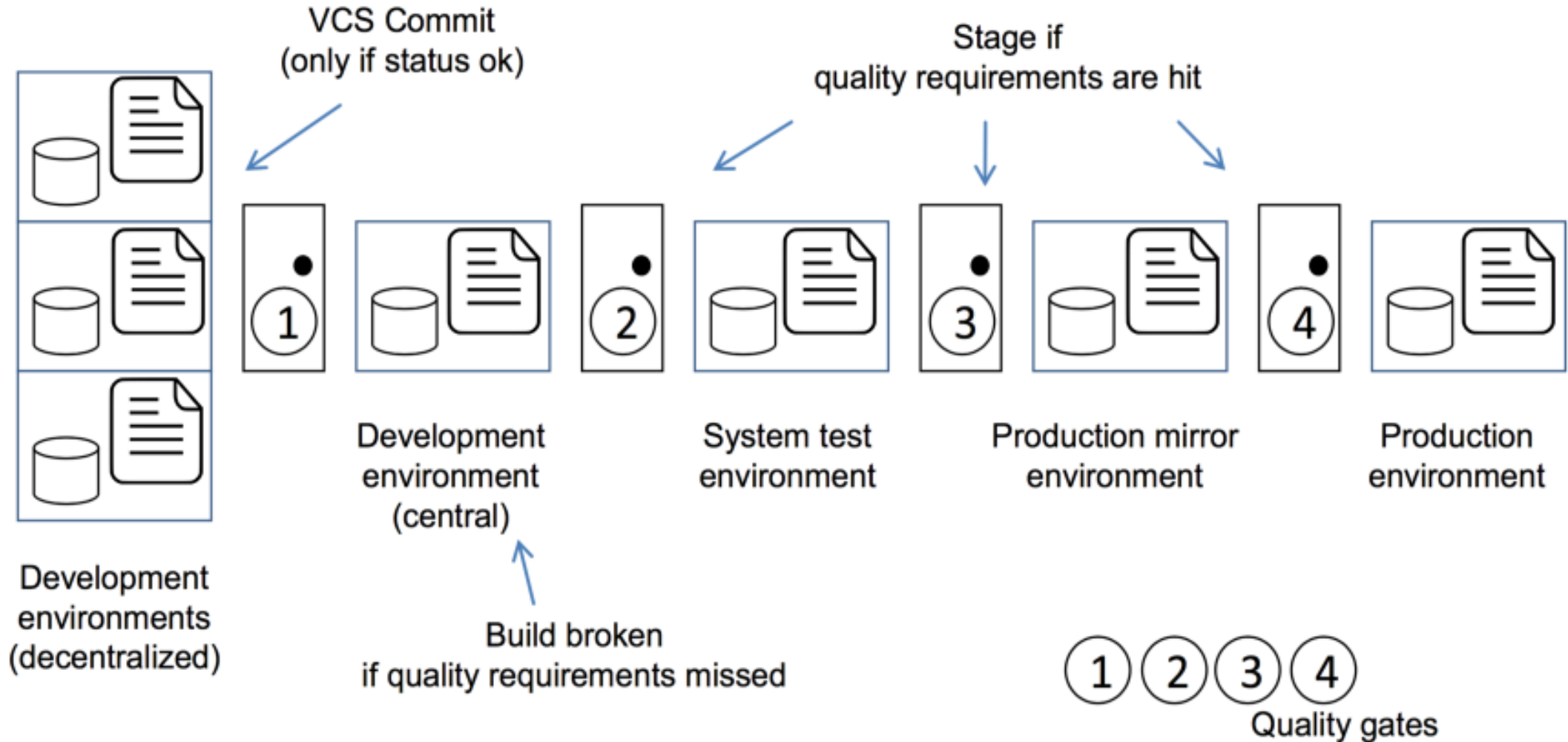
<http://jfrog.com/shownotes>

DOCKER BUILD



ALL THE THINGS!

LET'S docker build **IN EVERY ENV!**





FAST AND CHEAP BUILDS

NOT ALWAYS THE WAY TO GO

THAT'S WHY.

FROM ubuntu  Latest version

RUN apt-get install -y software-properties-common python

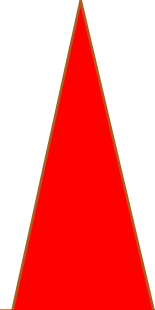
RUN apt-get install -y nodejs

RUN mkdir /var/www

 Latest version

ADD app.js /var/www/app.js

 Latest version

 Latest version

CMD ["/usr/bin/node", "/var/www/app.js"]

THAT'S WHY.

FROM ubuntu:19.04

Better now?

RUN apt-get install -y software-properties-common python

RUN apt-get install -y nodejs

RUN mkdir /var/www

ADD app.js /var/www/app.js

CMD ["/usr/bin/node", "/var/www/app.js"]

THAT'S WHY.

FROM ubuntu:4033353383af19ec179c01dda7f355a246c6adcafaf93c8f98

And now?

RUN apt-get install -y software-properties-common python

RUN apt-get install -y nodejs

RUN mkdir /var/www

ADD app.js /var/www/app.js

CMD ["/usr/bin/node", "/var/www/app.js"]

THAT'S WHY.

FROM ubuntu:4033353383af19ec179c01dda7f355a246c6adcafaf93c8f98

RUN apt-get install -y software-properties-common python

RUN apt-get install -y nodejs

RUN mkdir /var/www



What about those?

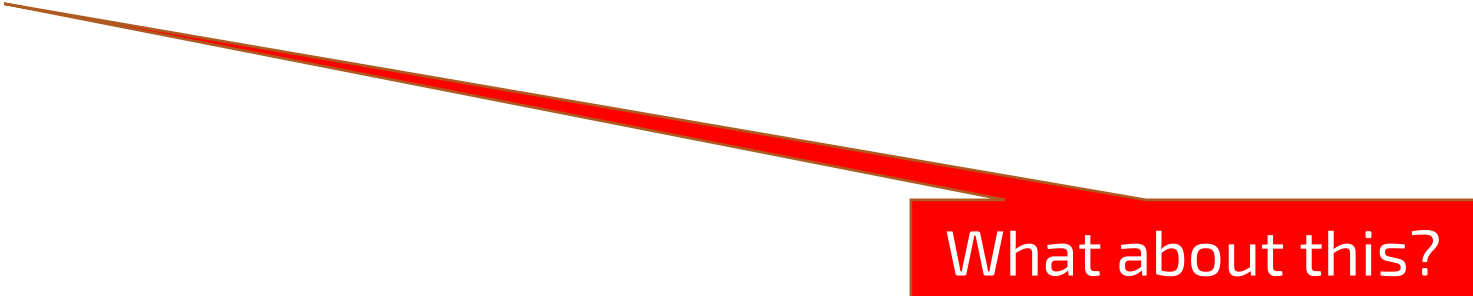
ADD app.js /var/www/app.js

CMD ["/usr/bin/node", "/var/www/app.js"]

THAT'S WHY.

FROM ubuntu:4033353383af19ec179c01dda7f355a246c6adcafaf93c8f98

RUN mvn clean install



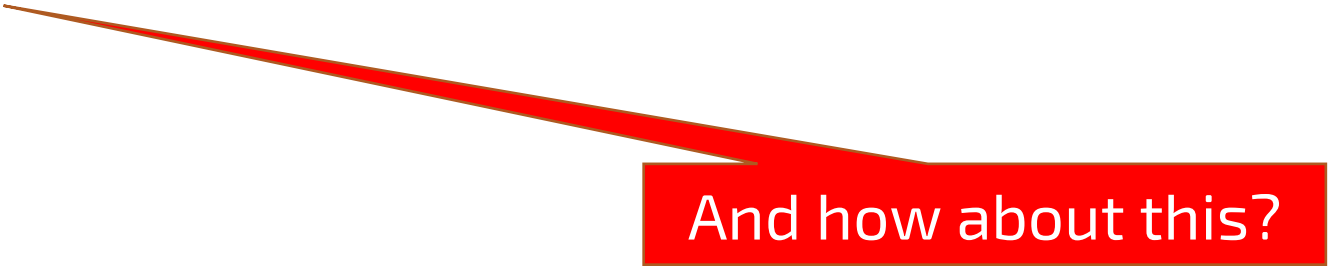
What about this?

CMD "java -jar Main.class"

THAT'S WHY.

FROM ubuntu:4033353383af19ec179c01dda7f355a246c6adcafaf93c8f98

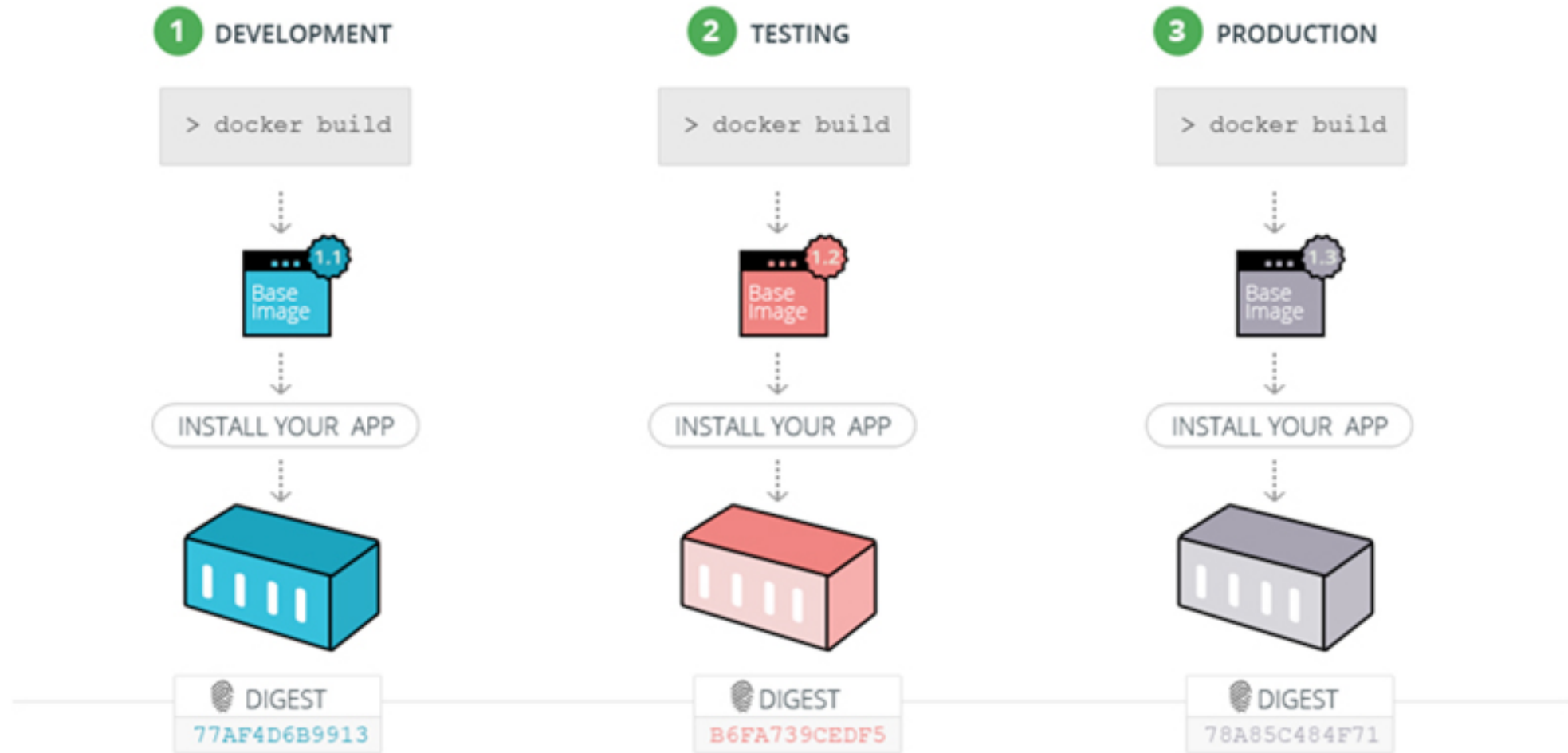
RUN download_random_sh*t_from_the_internet.sh



And how about this?

CMD ["/usr/bin/node", "/var/www/app.js"]

THAT'S WHY YOU DON'T TRUST DOCKER



I DON'T ALWAYS BUILD PROMOTION PIPELINES



**BUT WHEN I DO, IT'S WITH
IMMUTABLE AND STABLE BINARIES**

1 DEVELOPMENT

```
> docker build
```



INSTALL YOUR APP



DIGEST

77AF4D6B9913

2 TESTING

```
> build once
```

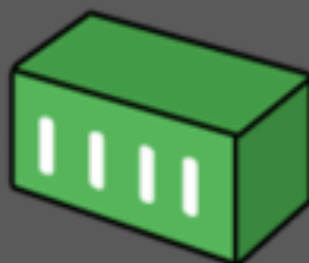
```
> automatically promote the same image  
through the pipeline to production
```



DIGEST

77AF4D6B9913

3 PRODUCTION



DIGEST

77AF4D6B9913

PROMOTE

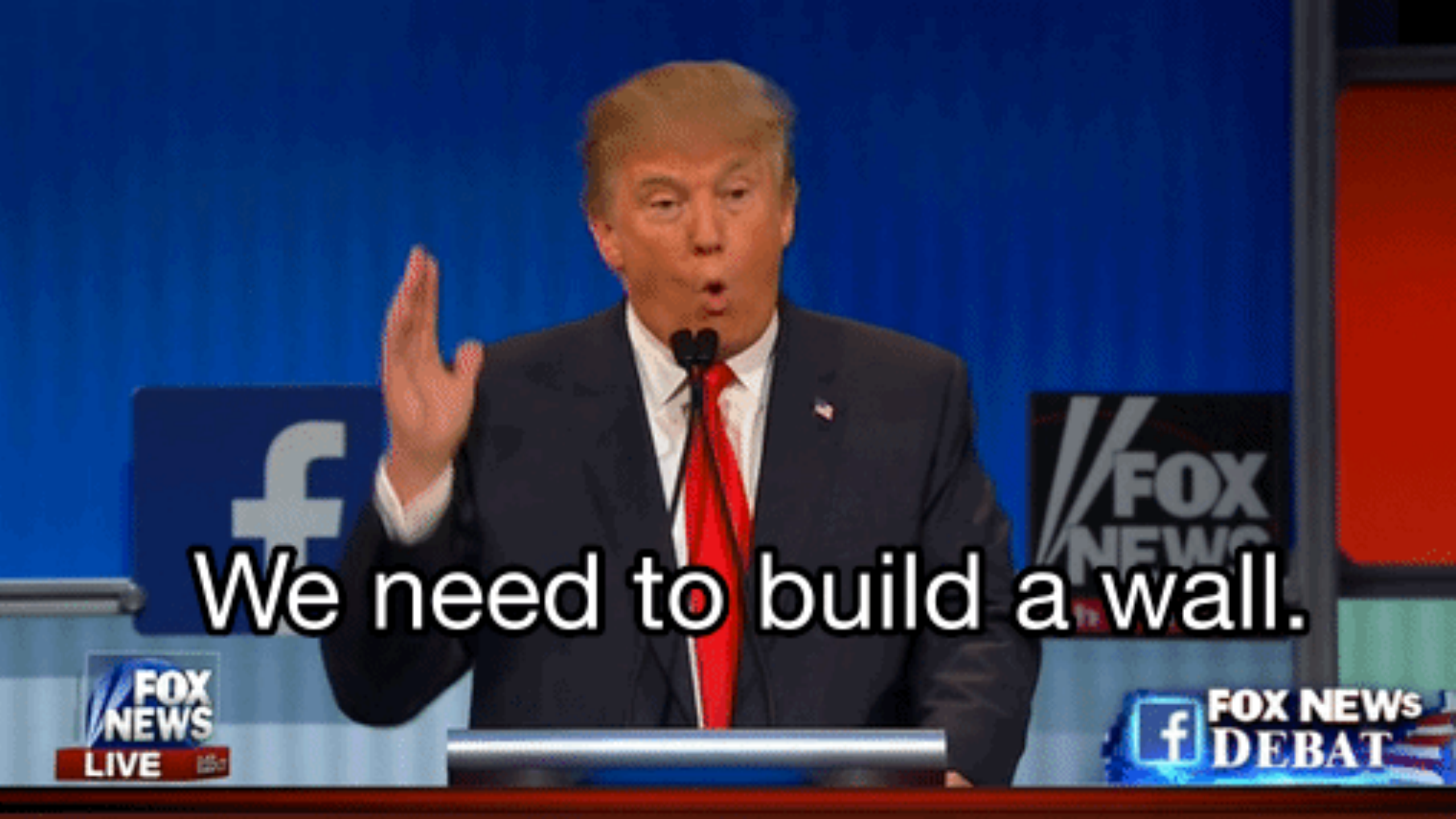
PROMOTE

WHAT'S UP WITH THE GATES?!

@jbaruch

#DockerChicago

<http://jfrog.com/shownotes>

A medium shot of Donald Trump speaking at a podium. He is wearing a dark suit, a white shirt, and a red tie. His right hand is raised with the palm facing forward. The background is a blue wall with a large white Facebook 'f' logo on the left and a 'FOX NEWS' logo on the right. A large white text overlay with a black outline reads 'We need to build a wall.' across the middle of the frame.

We need to build a wall.

**FOX
NEWS**

LIVE



**FOX NEWS
DEBATE**

WHAT'S UP WITH THE GATES?!

- QA SHOULDN'T TEST DEV IMAGES
- NON-TESTED IMAGES SHOULDN'T BE STAGED
- NON-STAGED, NON-TESTED OR DEV IMAGES SHOULDN'T END UP IN PRODUCTION!!!

LET'S BUILD ROCK-SOLID PIPELINE!





HOW DO I SEPARATE DEV FROM PROD?!

@jbaruch

#DockerChicago

<http://jfrog.com/shownotes>

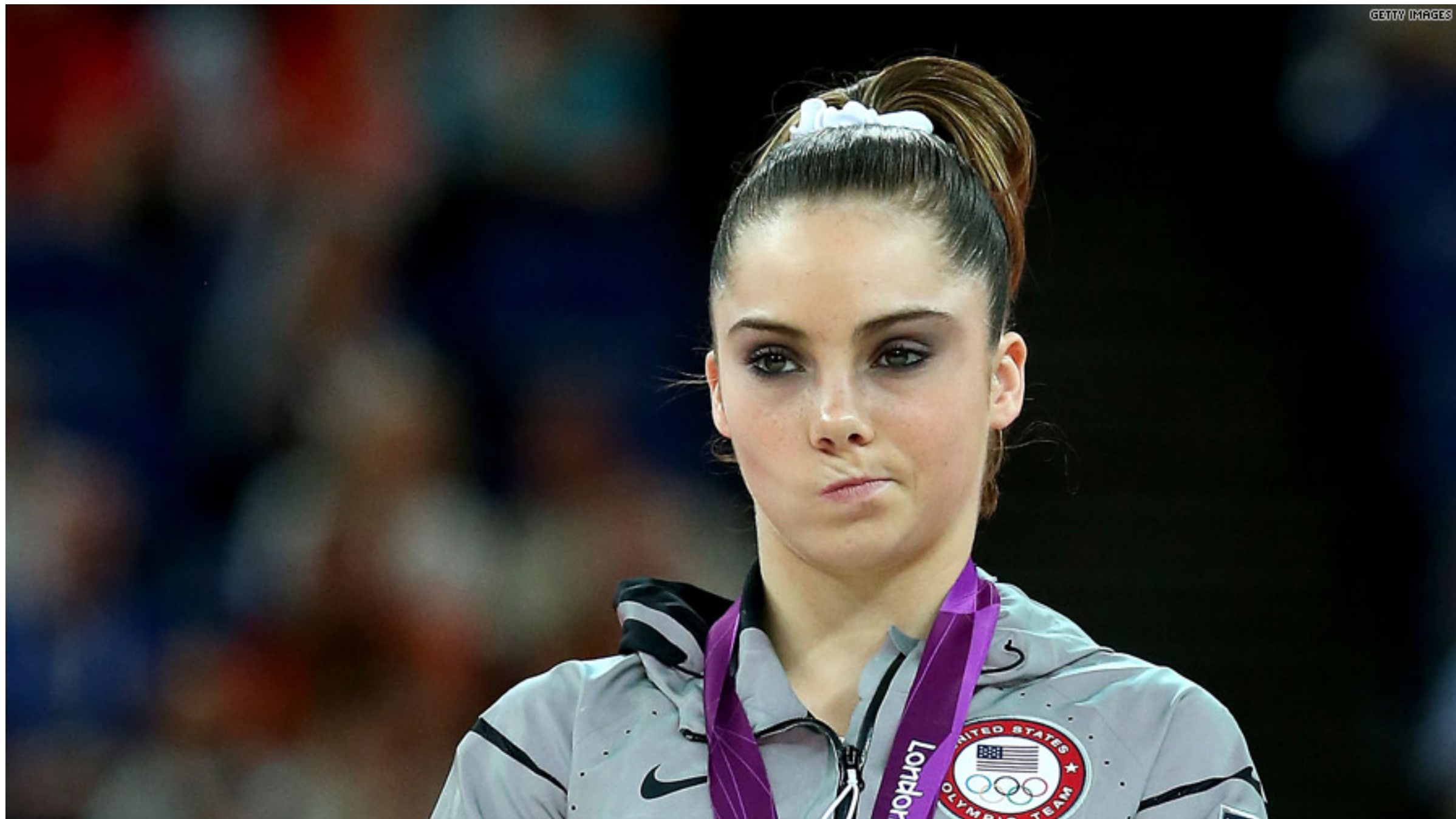
OPTION 1: METADATA TAGS

LABEL

```
LABEL <key>=<value> <key>=<value> <key>=<value> ...
```

The `LABEL` instruction adds metadata to an image. A `LABEL` is a key-value pair. To include spaces within a `LABEL` value, use quotes and backslashes as you would in command-line parsing. A few usage examples:

```
LABEL "com.example.vendor"="ACME Incorporated"  
LABEL com.example.label-with-value="foo"  
LABEL version="1.0"  
LABEL description="This text illustrates \  
that label-values can span multiple lines."
```



OPTION 2: DOCKER REPOSITORIES

Repositories

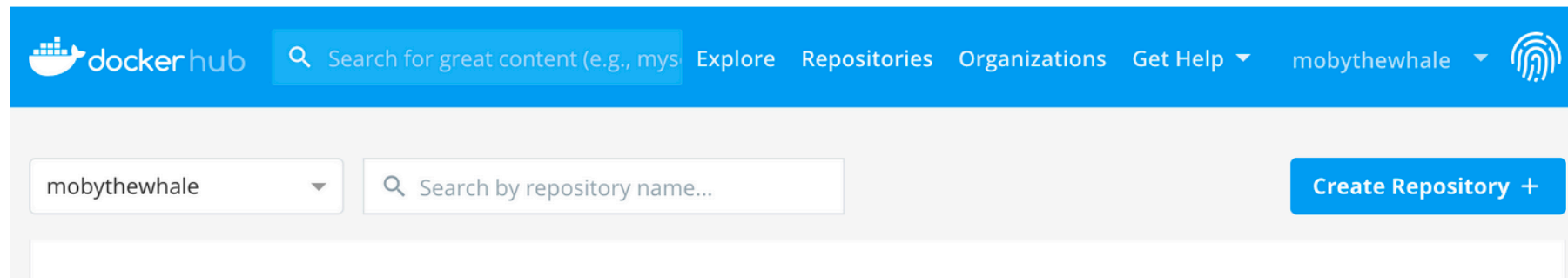
Estimated reading time: 5 minutes

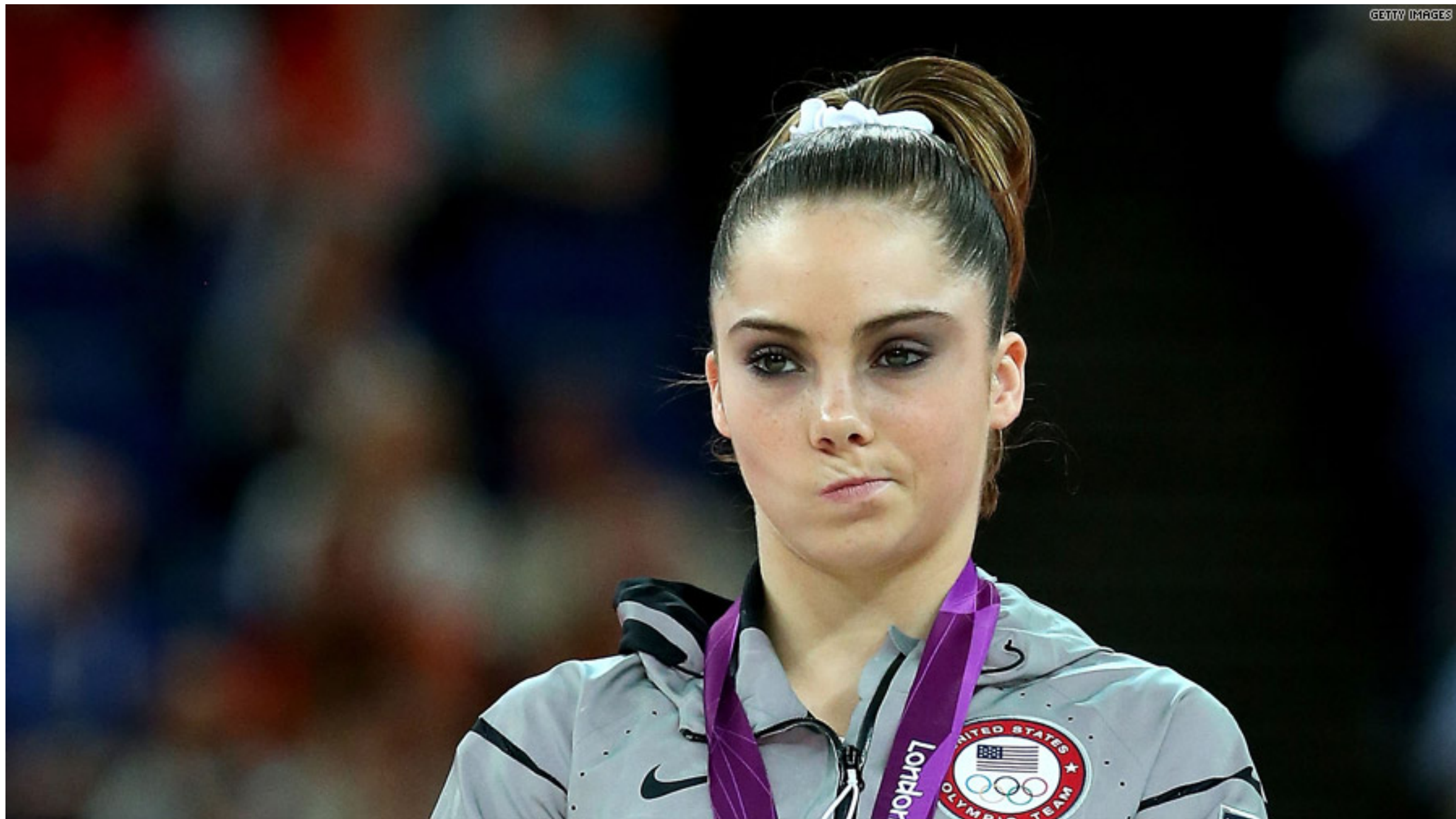
Docker Hub repositories allow you share container images with your team, customers, or the Docker community at large.

Docker images are pushed to Docker Hub through the `docker push` command. A single Docker Hub repository can hold many Docker images (stored as **tags**).

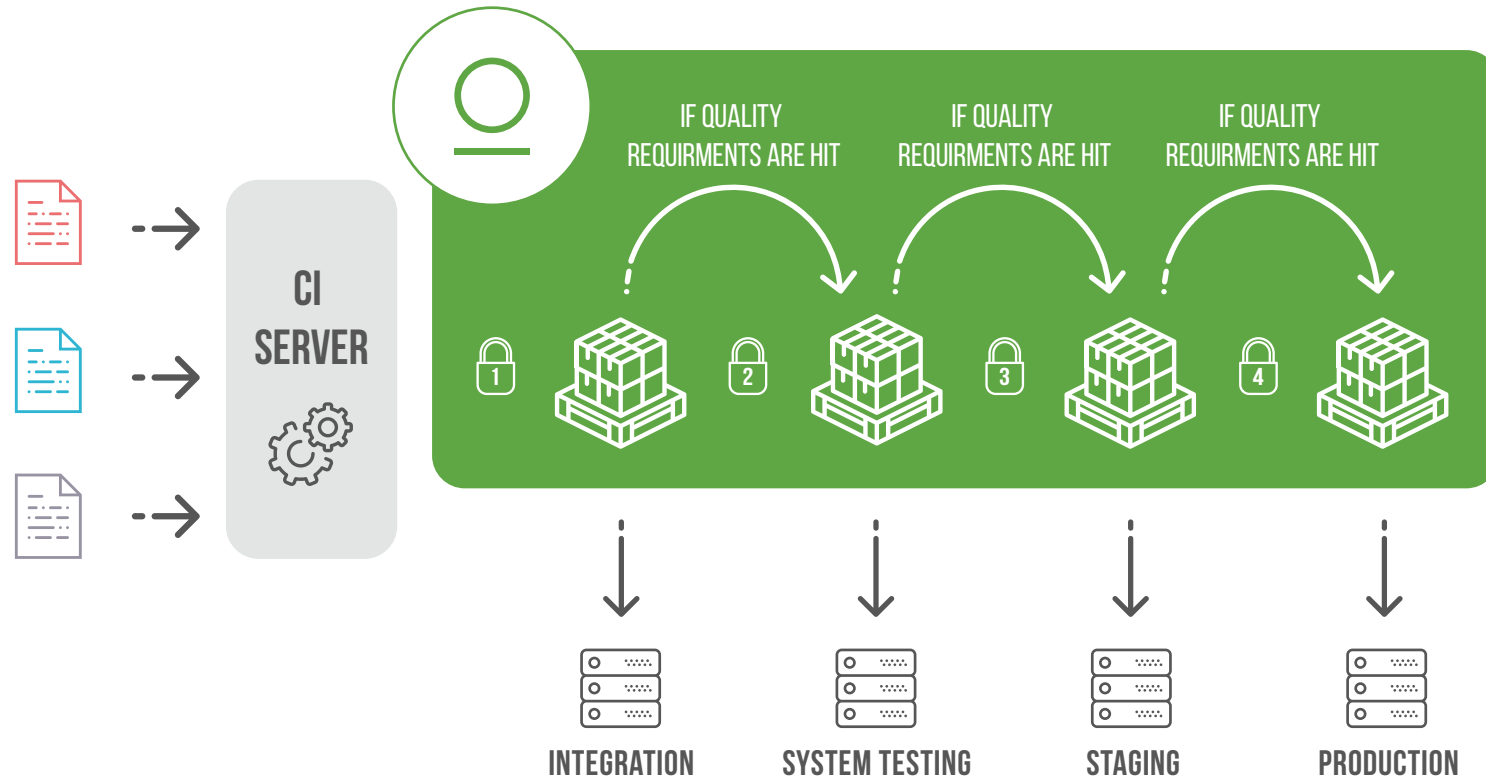
Creating repositories

To create a repository, sign into Docker Hub, click on **Repositories** then **Create Repository**:





SEPARATE REGISTRIES PER ENVIRONMENT





TRUMPED-UP LIMITATIONS



“640K OUGHT TO BE ENOUGH FOR ANYBODY.”

BILL GATES

© Lifehack Quotes

@jbaruch

#DockerChicago

<http://jfrog.com/shownotes>

THE ANATOMY OF DOCKER TAG

2r

Products

Customers

Community

Partners

tag

```
Usage: docker tag [OPTIONS] IMAGE[:TAG] [REGISTRYHOST/][USERNAME/]NAME[:TAG]
```

Tag an image into a repository

Wait a second, how can I
have more than one
registry per host now?!



HOW CAN WE SUPPORT THIS?

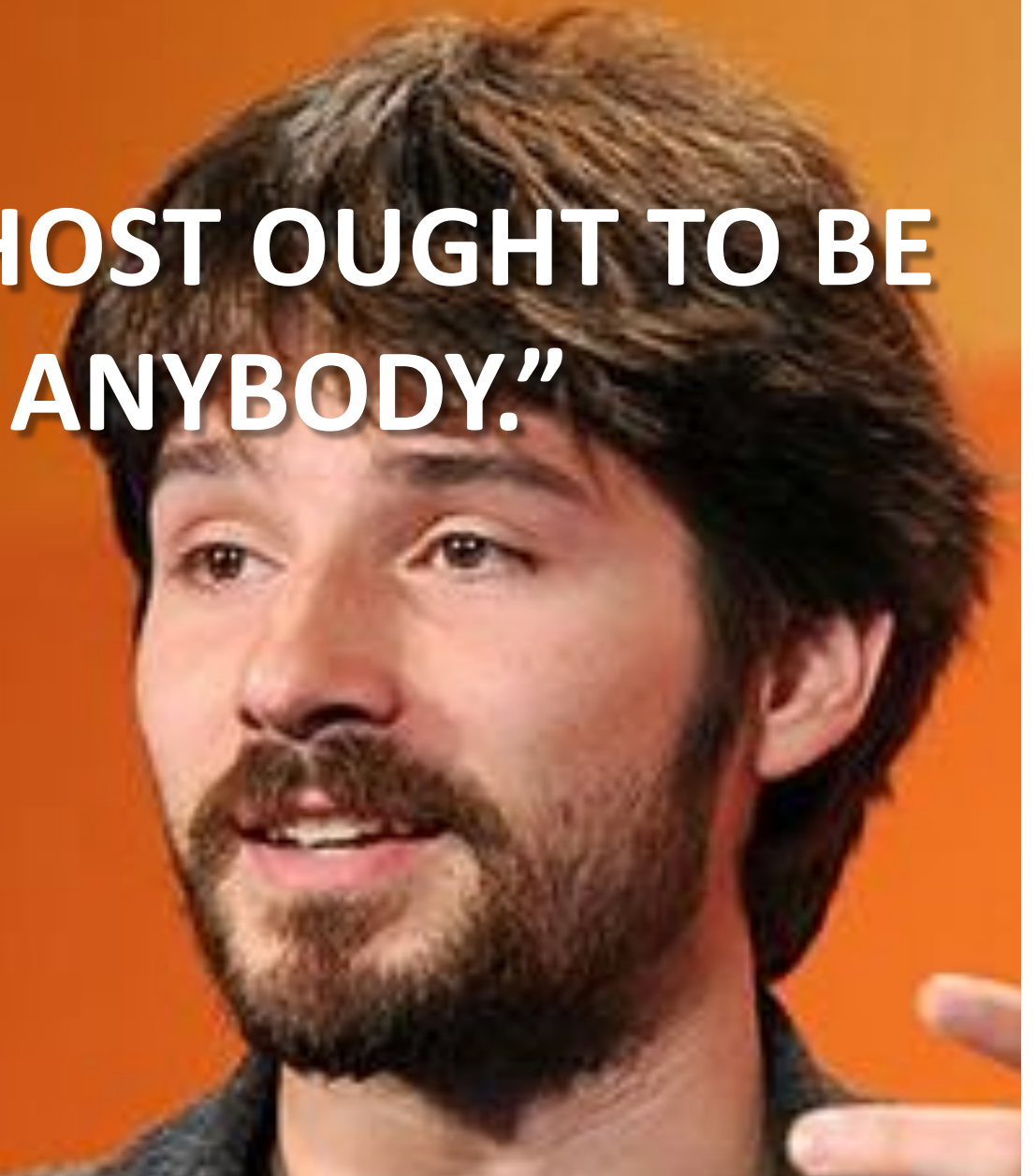
`https://host:8081/registry/docker-dev/busybox`

`https://host:8081/registry/docker-qa/busybox`

`https://host:8081/registry/docker-staging/busybox`

`https://host:8081/registry/docker-prod/busybox`

**“ONE REGISTRY PER HOST OUGHT TO BE
ENOUGH FOR ANYBODY.”**



PANIC!



@jbaruch

#DockerChicago

<http://jfrog.com/shownotes>

VIRTUAL HOSTS/PORTS TO THE RESCUE

`docker tag host:port/busybox`

Registry host

Tag name

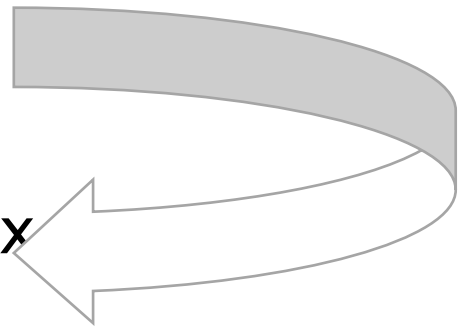
`https://host:port/v2/busybox`

`https://host:8081/registry/docker-dev/busybox`

Context name

Registry name

Tag name




```
server {  
    listen 5001;  
  
    server_name 192.168.99.100;  
    if ($http_x_forwarded_proto = '') {  
        set $http_x_forwarded_proto $scheme;  
    }  
    rewrite ^/(v1|v2)/(.*) /artifactory/api/docker/docker-dev/$1/$2;  
    ...  
}
```

BUT THEN YOU REALIZE...

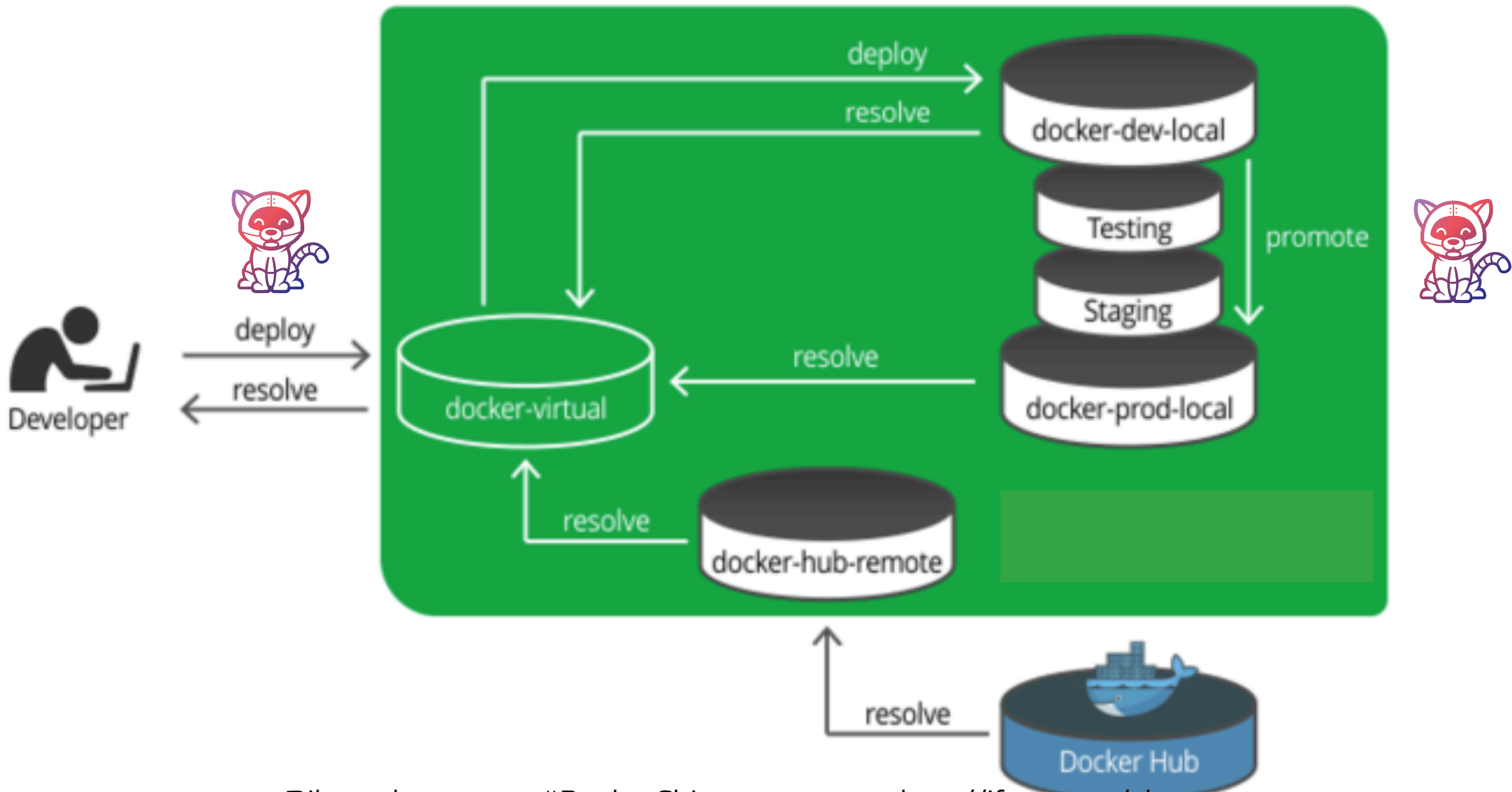
Wait a second, now I need to pull, retag and push for every step?!



@jbaruch

#DockerChicago

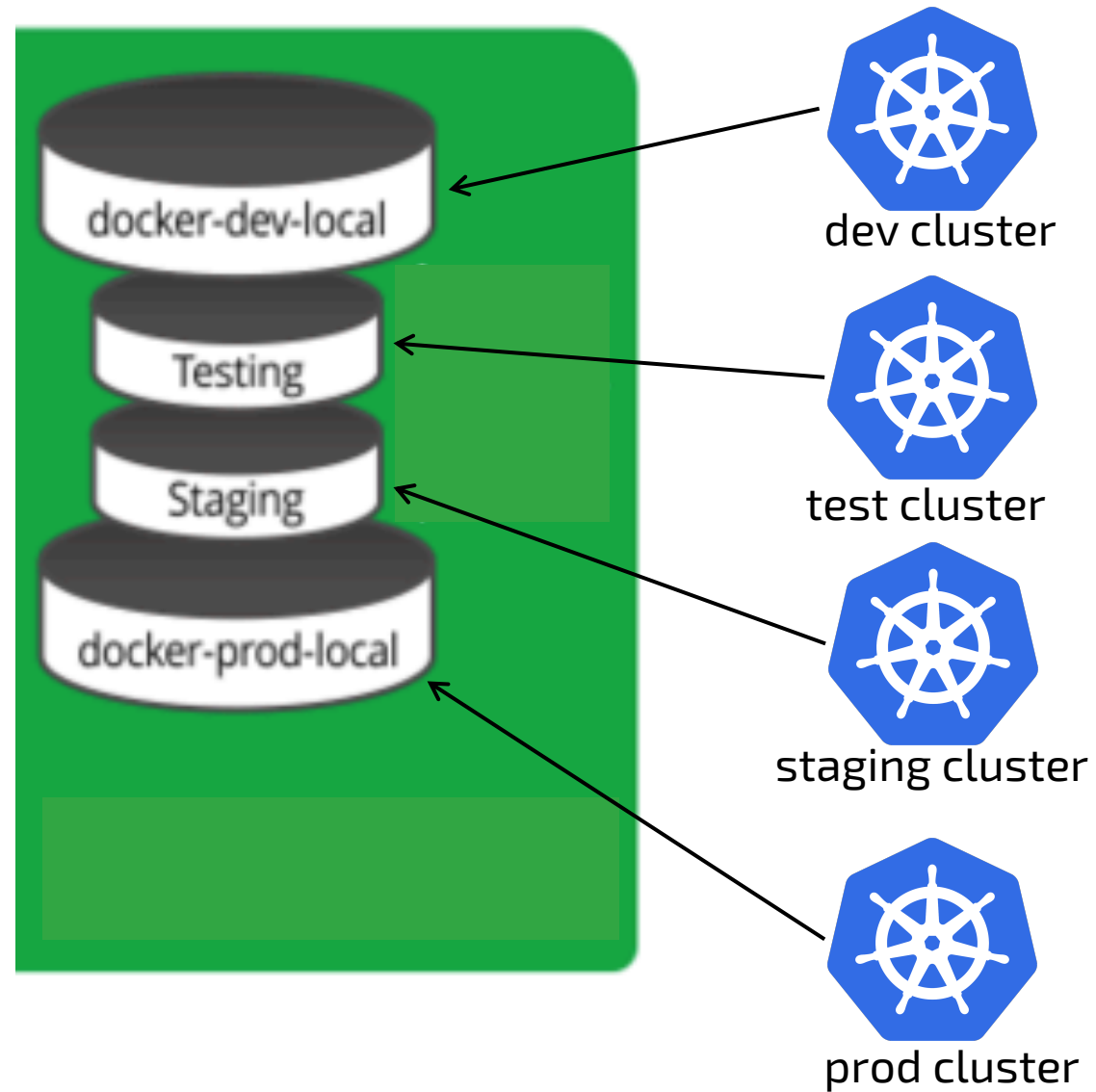
<http://jfrog.com/shownotes>



@jbaruch

#DockerChicago

<http://jfrog.com/shownotes>



@jbaruch

#DockerChicago

<http://jfrog.com/shownotes>



REPOSITORY (DOCKER): Top level directory in a registry

REPOSITORY (THE REST OF THE WORLD): A registry

WIN-WIN-WIN

- SINGLE POINT OF ACCESS TO MULTIPLE REGISTRIES WHEN NEEDED
- COMPLETELY ISOLATED ENVIRONMENTS
- IMMEDIATE AND FREE PROMOTIONS



BUT I LOVE MY LATEST!



Artifact Repository Browser

Set Me Up | Deploy

Tree Simple

- docker-prod-local
 - jfrog-docker-app
 - 11
 - 14
 - 15
 - 16
 - 17
 - 18
 - 19
 - 20
 - 21
 - 23
 - 25
 - 26
 - latest
 - manifest.json
 - sha256_0ce121b6a2ffae7f0fc0b7c20d3a0a46f62762dd7c1f14e
 - sha256_2fbb74461eb3d3e7d2e0c730359e88c1fd89e6b2d69d
 - sha256_5c0d6befd531e53b8f0d96dce9e3418f9b9531f903a42
 - sha256_6cb6319b1c7f389d3b74928b1a346b7573d4351a69da
 - sha256_6ef14aff1139e1065ec0928ae1c07f2cff8c2b35e760f4b
 - sha256_85a73a180fcd5ded2e134a9e9dca93c09068d1b4d529
 - sha256_90e9442097e7396b610beada64696692f066b6e66d2e
 - sha256_962785d3b7f9bd4442aa6df1862d8ad64e0ee1d57ec0
 - sha256_976199b2ac17369bb93597d858f5d7c4e52d6dfd3f358
 - sha256_9a0b0ce99936ce4861d44ce1f193e881e5b40b5bf1847

Trash Can

latest

manifest.json

Download View Actions

General Effective Permissions Properties Watchers Builds Xray

Add: Property | Property Set

Name * Value Add

☐ Recursive ?

9 Properties

Filter by Property Delete

Property	Value(s)
sha256	d002e5eafe3c4e2e1d69830342f7cf1d2150e3735bd17ee13e2258e0ad99f3dc
docker.repoName	jfrog-docker-app
build.timestamp	1575339511425
docker.manifest.digest	sha256:d002e5eafe3c4e2e1d69830342f7cf1d2150e3735bd17ee13e2258e0ad9...
build.name	demo_kubecon
docker.manifest	latest
build.number	26
docker.manifest.type	application/vnd.docker.distribution.manifest.v2+json
docker.refersTo	26

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#DockerChicago

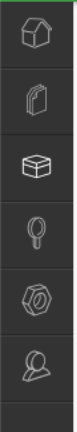
http://jfrog.com/shownotes

WIN-WIN

- SIMPLICITY OF LATEST
- ALWAYS KNOW WHAT IT REALLY MEANS
- AS LONG AS YOU PROMOTED IMMUTABLE ARTIFACT



But what about the rest
of the dependencies?



Package Viewer Docker

< Back to list of images

Image Name	Downloads	Last Modified
 jfrog-docker-framework	13	Dec 2, 2019 11:20:28 AM

12 Items

Details ☒ Xray

Tag Name	Repository	Digest	Last Modified ▾	Downloads	Xray Status
24	docker-prod-local	 9c2945b85ceb333c066273d9c691296ct	Dec 2, 2019 11:20:28 AM	 0 Downloads	N/A
22	docker-prod-local	 9c2945b85ceb333c066273d9c691296ct	Dec 1, 2019 8:33:10 PM	 0 Downloads	N/A

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#DockerChicago

<http://jfrog.com/shownotes>



Artifact Repository Browser

Tree Simple 🔍

- > 📦 docker
- > 📦 helmhub
- > 📦 artifactory-build-info
- > 📦 docker-dev-local
- > 📦 docker-local
- > 📦 docker-prod-local
- ✓ 📦 generic-local
 - └─ ✓ 📁 java
 - > 📄 jdk-8u91-linux-x64.tar.gz
 - > 📁 org
 - └─ ✓ 📁 tomcat
 - > 📄 apache-tomcat-8.tar.gz
- > 📦 helm-local
- > 📦 bintray-docker-remote

OWN YOUR DEPENDENCIES

- YOUR BASE IMAGE
- YOUR INFRA
- YOUR APPLICATION FILES

CONCLUSIONS

- BUILD ONLY ONCE
- SEPARATE ENVIRONMENTS
- PROMOTE WHAT YOU'VE BUILT
- OWN YOUR DEPENDENCIES

Q&A AND LINKS

- @jbaruch
- #DockerChicago
- <http://jfrog.com/shownotes>