Container World

February 26-28, 2018

SANTA CLARA CONVENTION CENTER, CA

Bringing the Promise of Cloud Native to the Enterprise

#ContainerWorld

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Container World

Containers: Polyglot Ninjas for Build and Delivery Toolchains

Mandy Hubbard, Software Engineer/QA at CS Disco

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About Me

Mandy Hubbard

@DevMandy

Software Engineer/QA Architect,
CS Disco, Inc.

DISCO

In which we talk about Ninjas

Today's session

- Monoliths: The good old days
- New and improved CI/CD
- Show me the Code!
- Try this at home

THE Build Machine

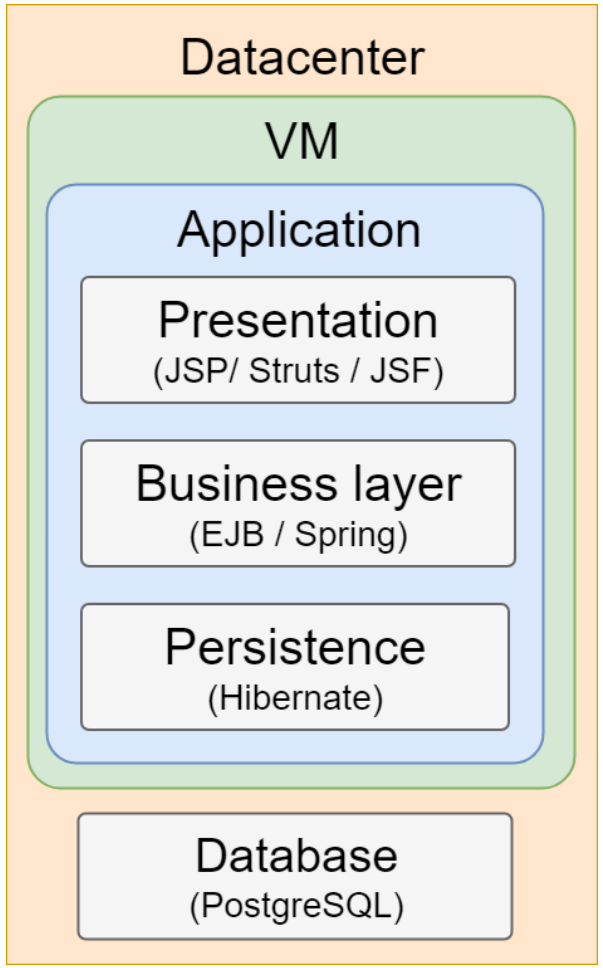
Ye Olde Workstationne

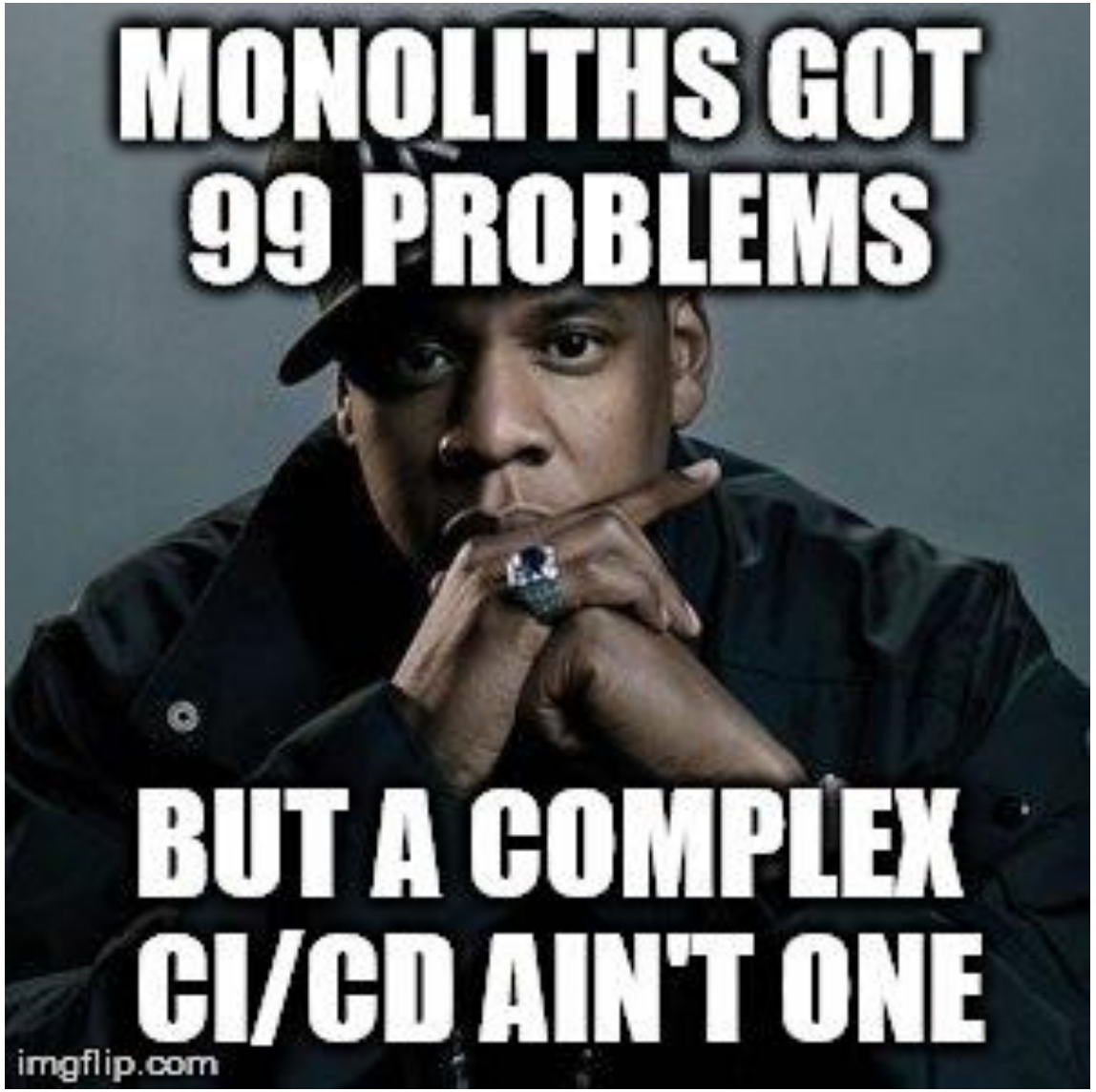
- IT took care of it
- Stayed where you put it
- Enduring configuration
- Warm footrest

THE Monolithic Build Target

Ye Olde Application Stackke

- Well-defined environment
- Consistent language and tools
- Single application
- Deployment?
  - Ops ¯_(ツ)_/¯




MONOLITHS GOT
99 PROBLEMS
BUT A COMPLEX
CI/CD AIN'T ONE
imgflip.com

Why Microservices

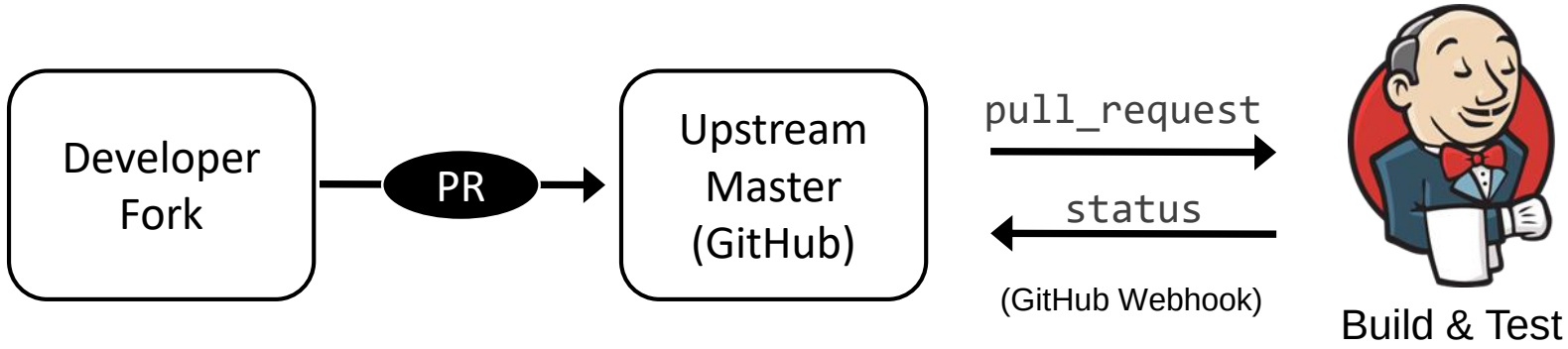
Reduced cost + Reduced risk

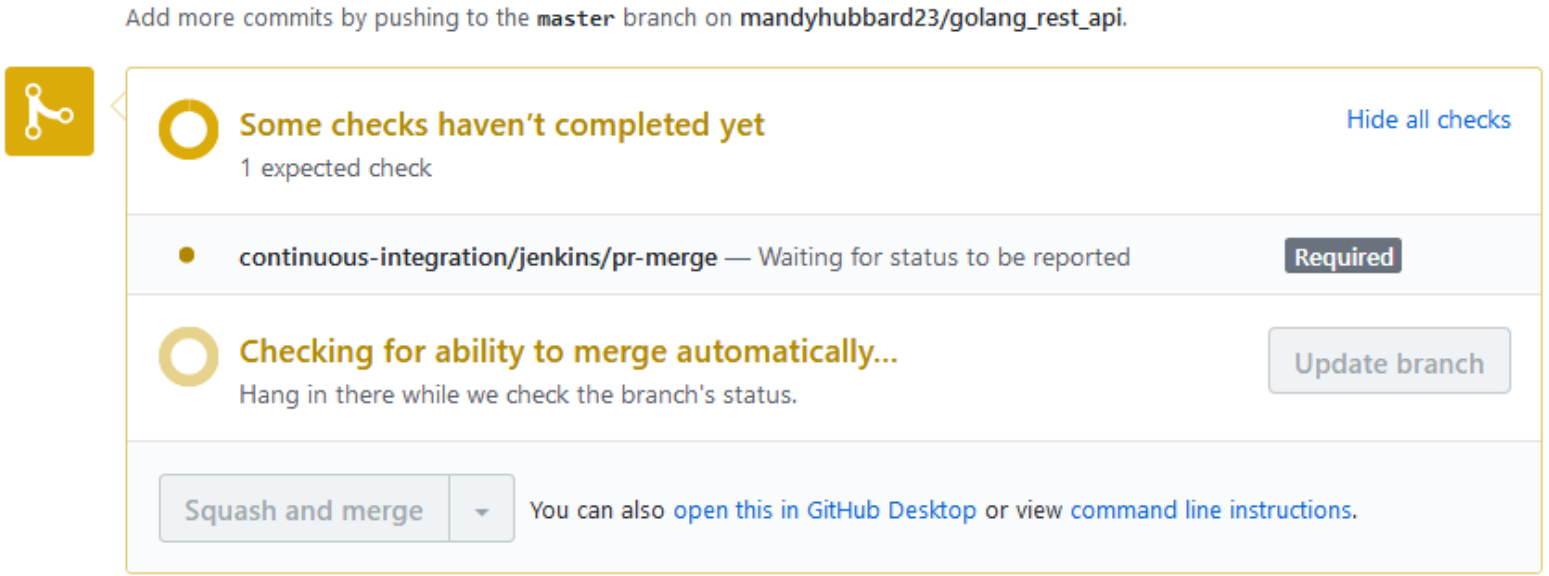
- Deploy services independently
- Make small, isolated units of change
- Scale at a more granular level
- Use the best tool for each task

CI/CD Platform- Just Pick One

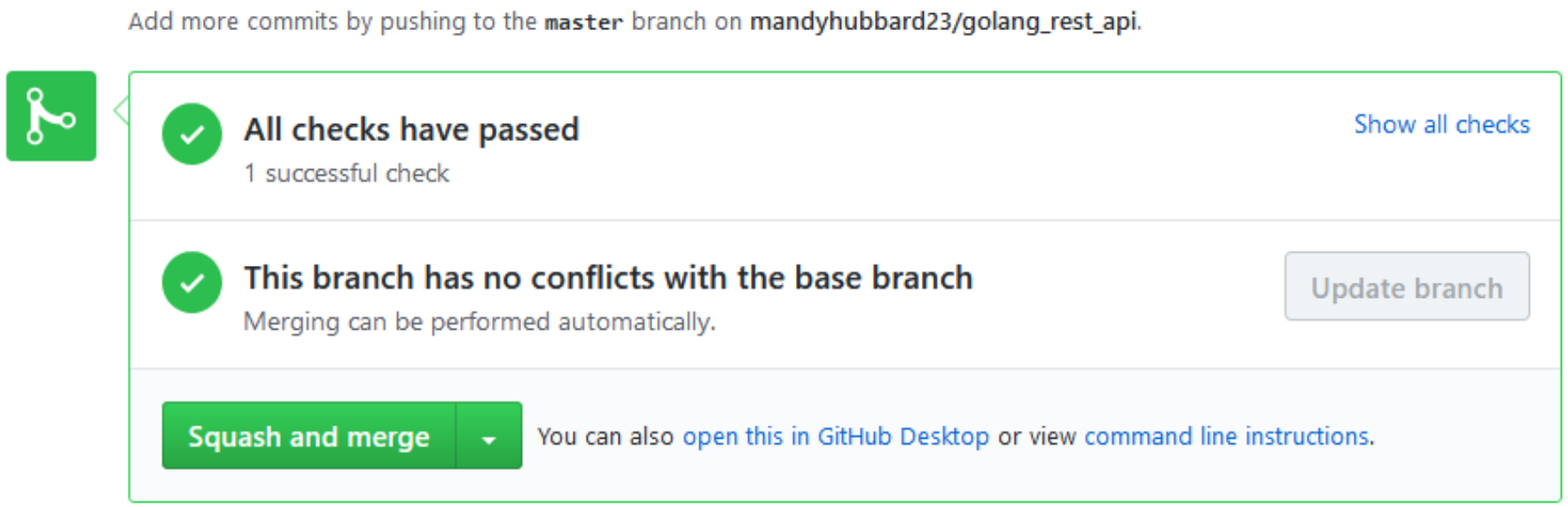
Commercial Products		Open Source	Public Cloud
• **Jenkins** • Travis • TeamCity • CircleCI • Codeship • GitLab CI • Buddy • Wrecker • Semaphore • Solano Labs • AppVeyor • Assertible • Shippable • Nevercode • Bamboo • Distelli • FinalBuilder • Buildkite	• QuickBuild • UrbanCode • Chef • BuildMaster • Puppet • Meister • Vexor • Flosum • Continua CI • XL Deploy • Codefresh • MidVision Rapid Deploy • Magnum CI • Buddybuild • Phabricator • Bitrise • OctopusDeploy	• GoCD • PHPCI • Hudson • CruiseControl • Integrity • Gump • Strider • Buildbot • Continuum • CABIE • Done.io • Buildout • easyCIS • Cake • Spinnaker	• AWS CodePipeline • AWS CodeBuild • Azure Continuous Delivery • Azure App Service • Visual Studio Team Services • Google mostly partners (Jenkins Spinnaker etc.) • IBM Bluemix Continuous Delivery

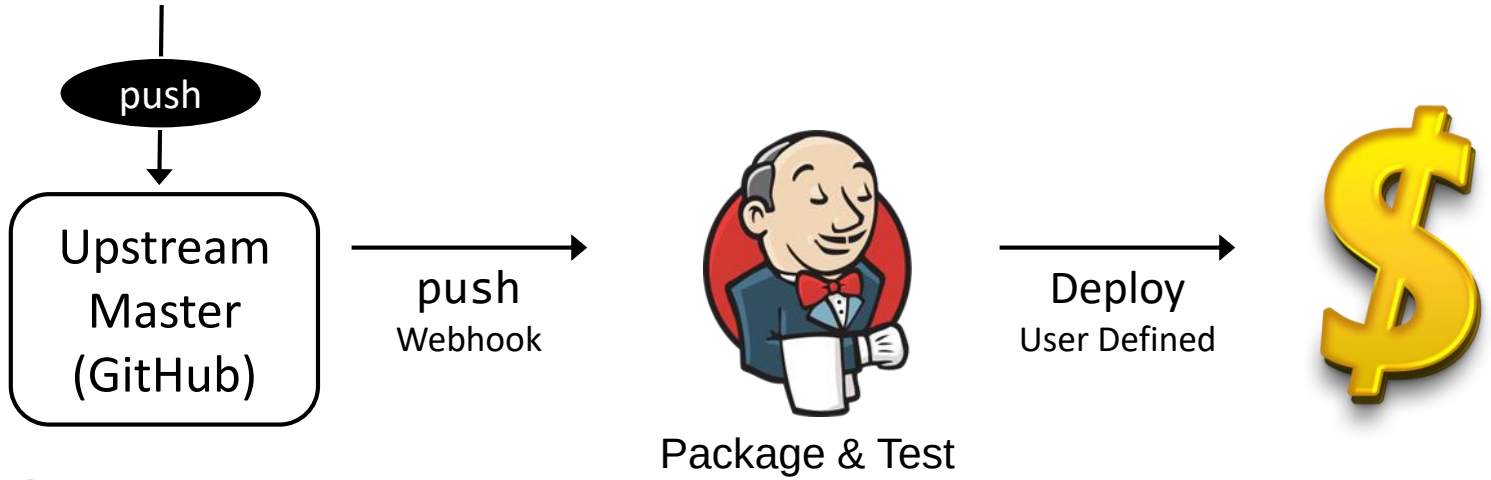
Continuous Integration



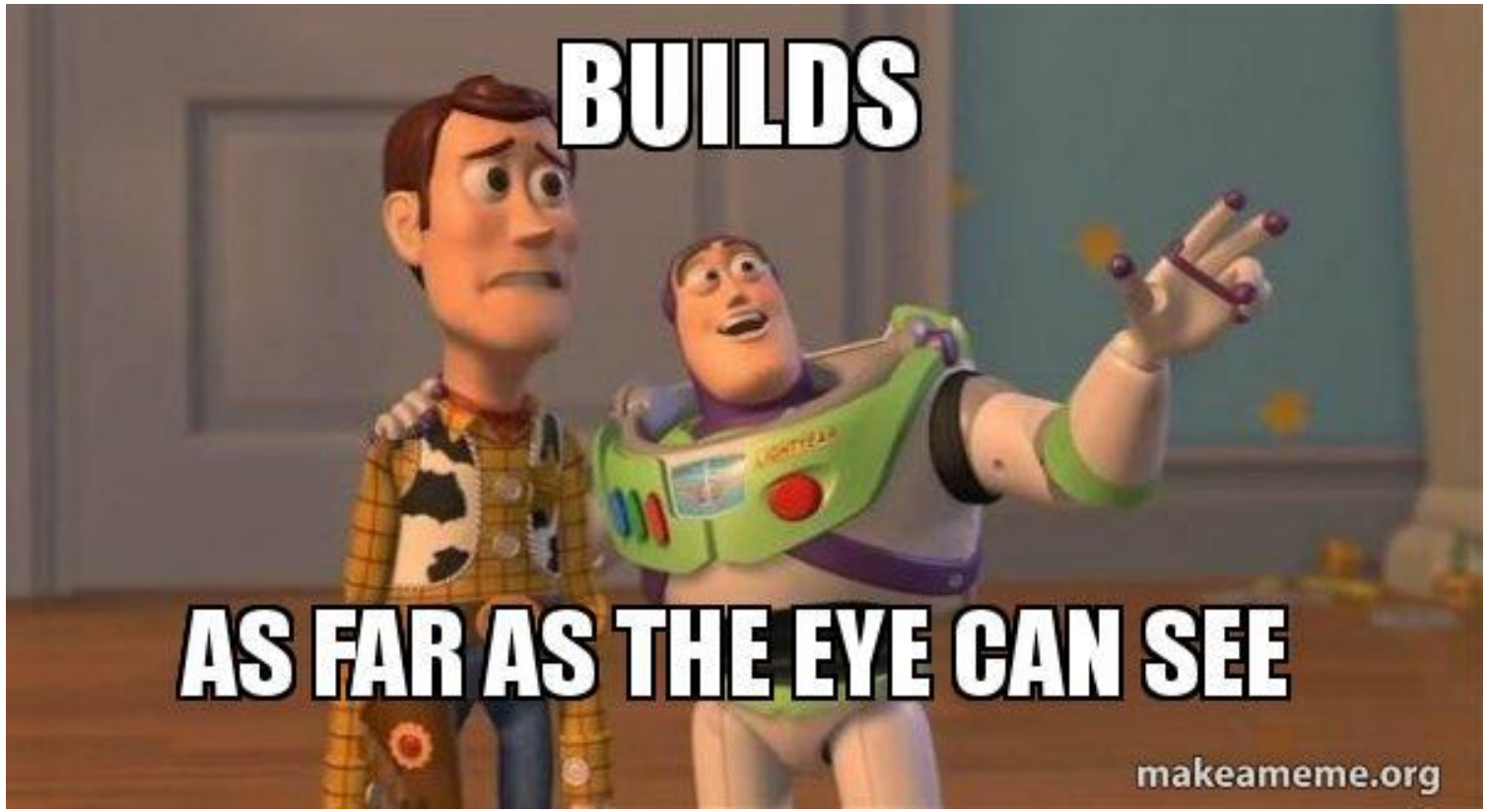


Continuous Deployment

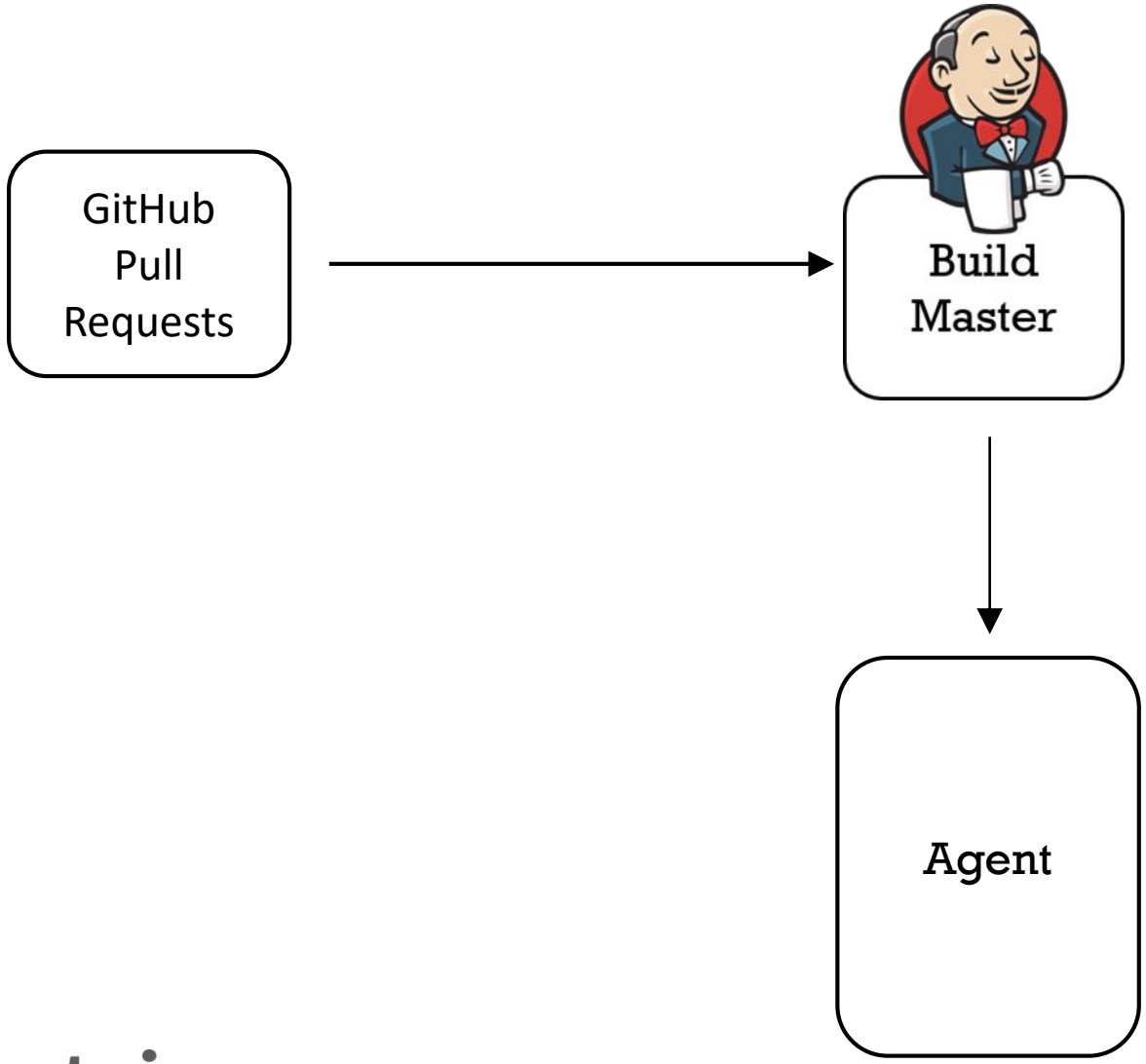




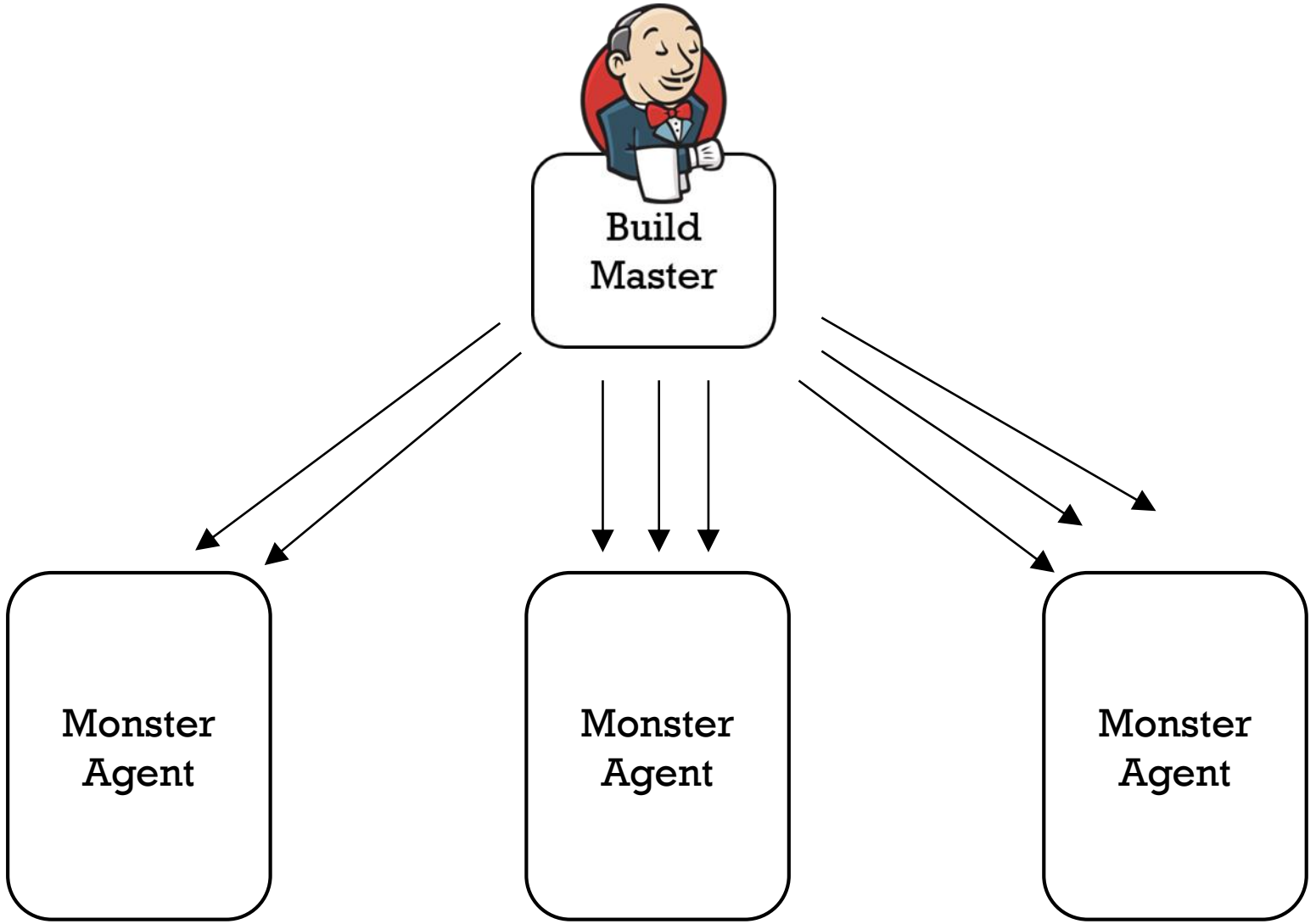
Continuous Integration x Microservices =



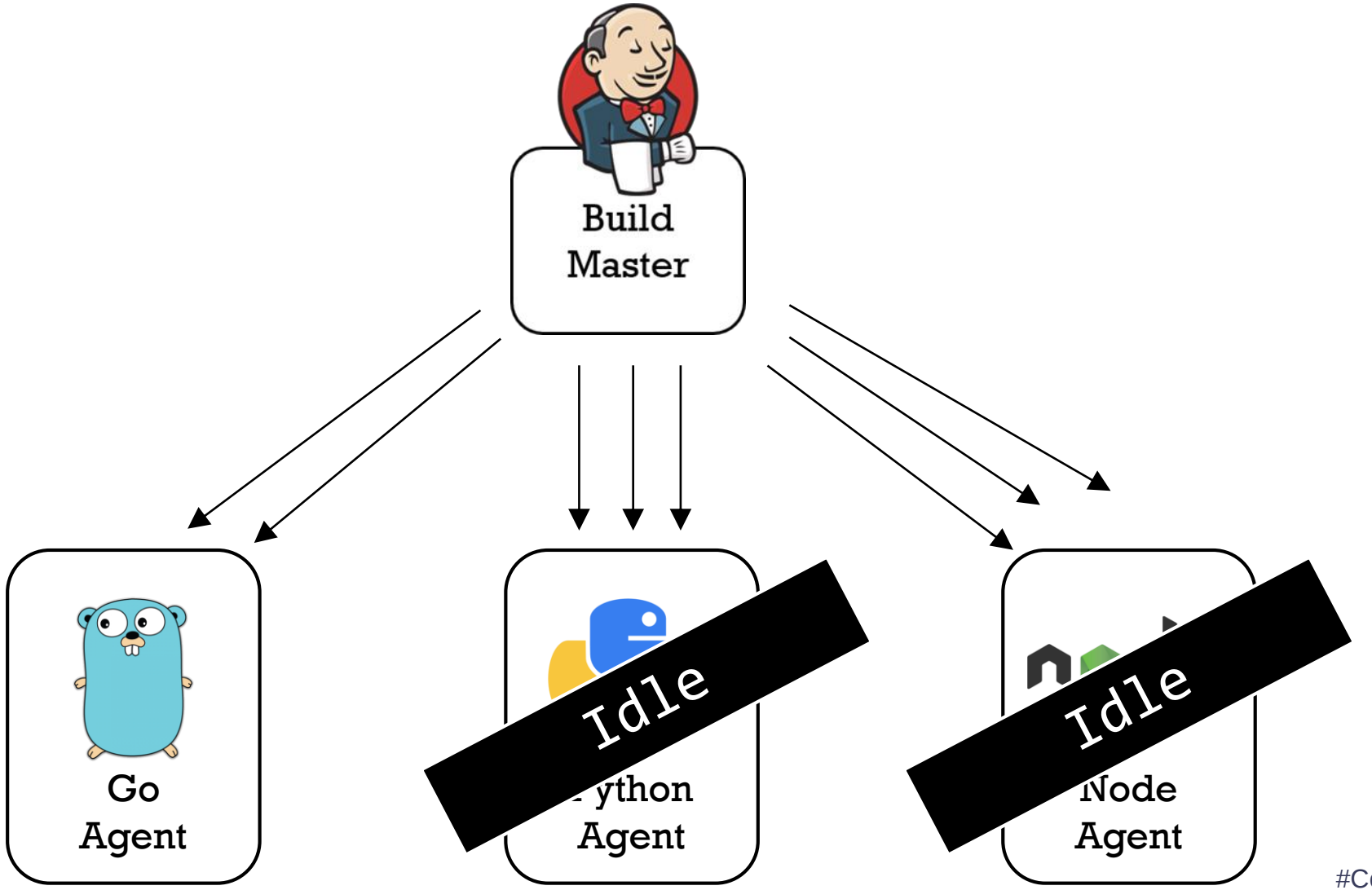
Master Agent Relationship



EC2 Build Monsters



EC2 Build Snowflakes



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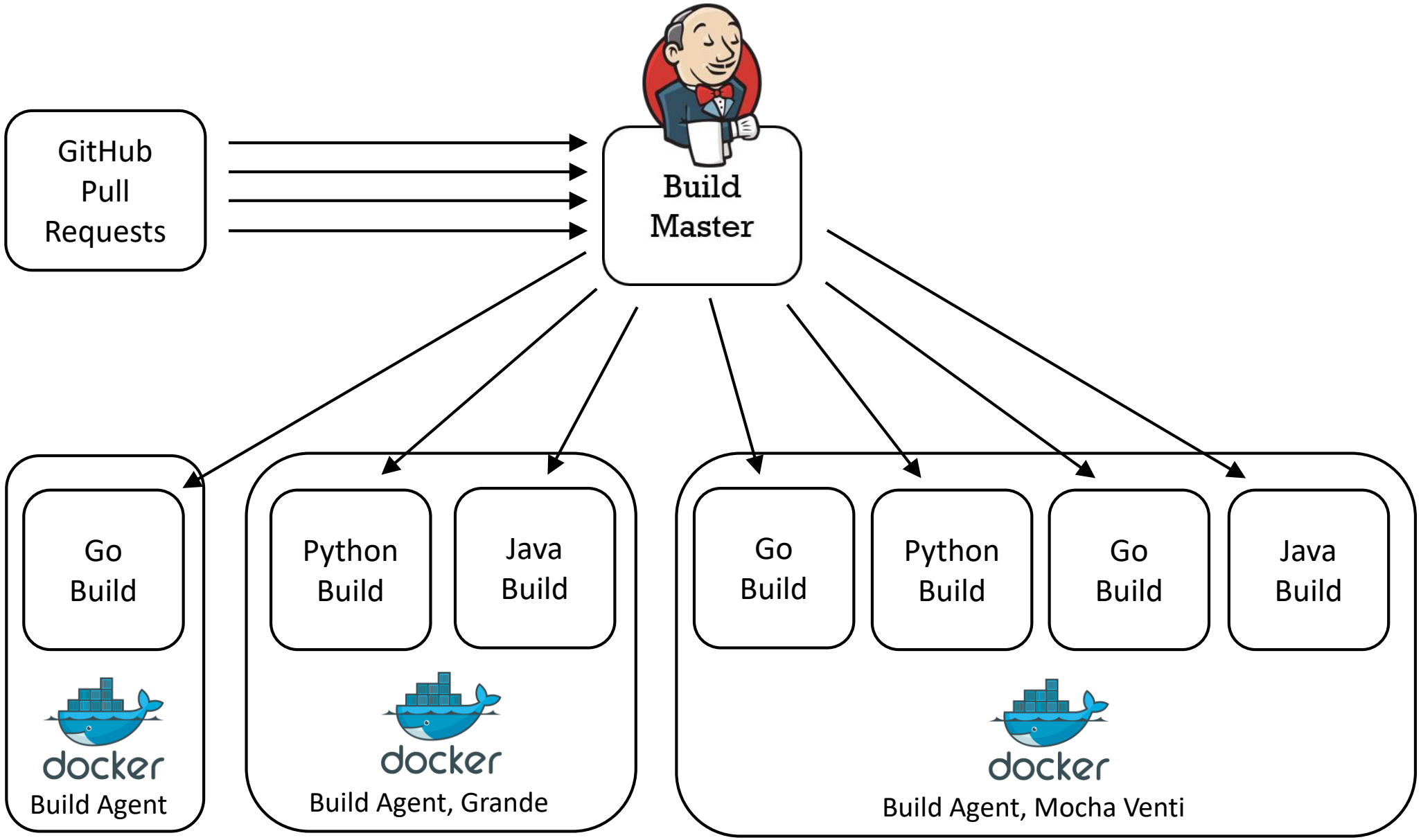

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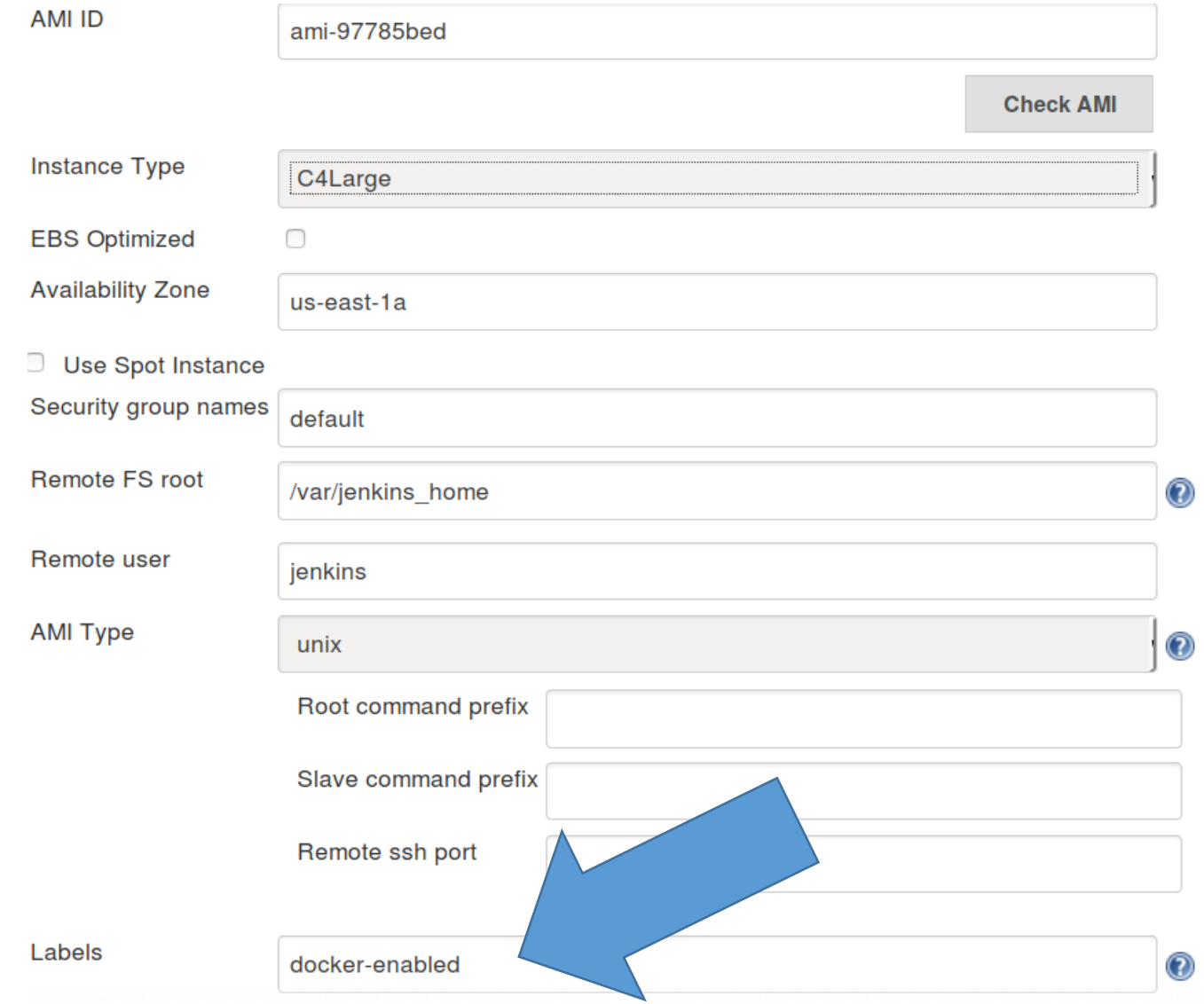
Jenkins EC2 Plugin Configuration



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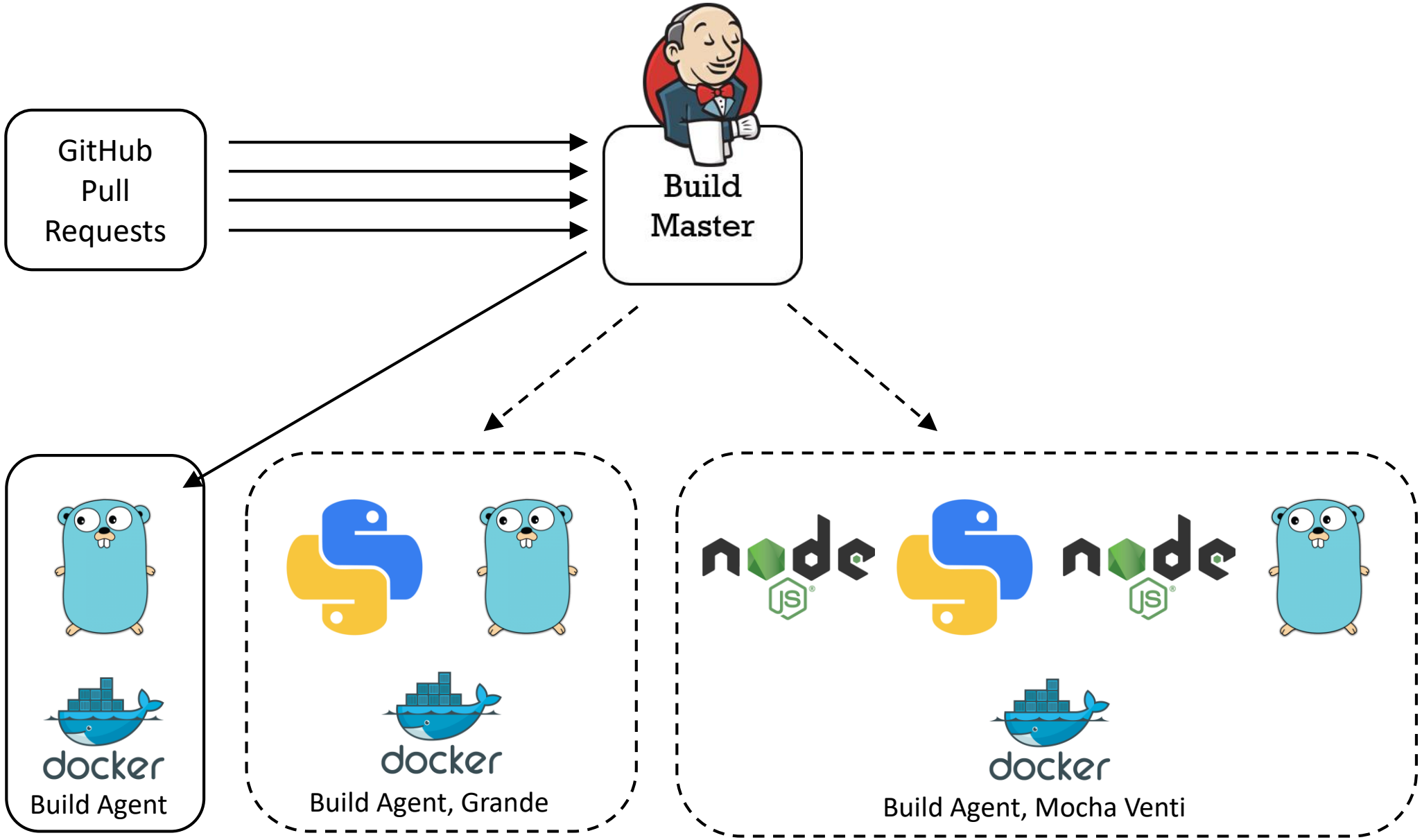

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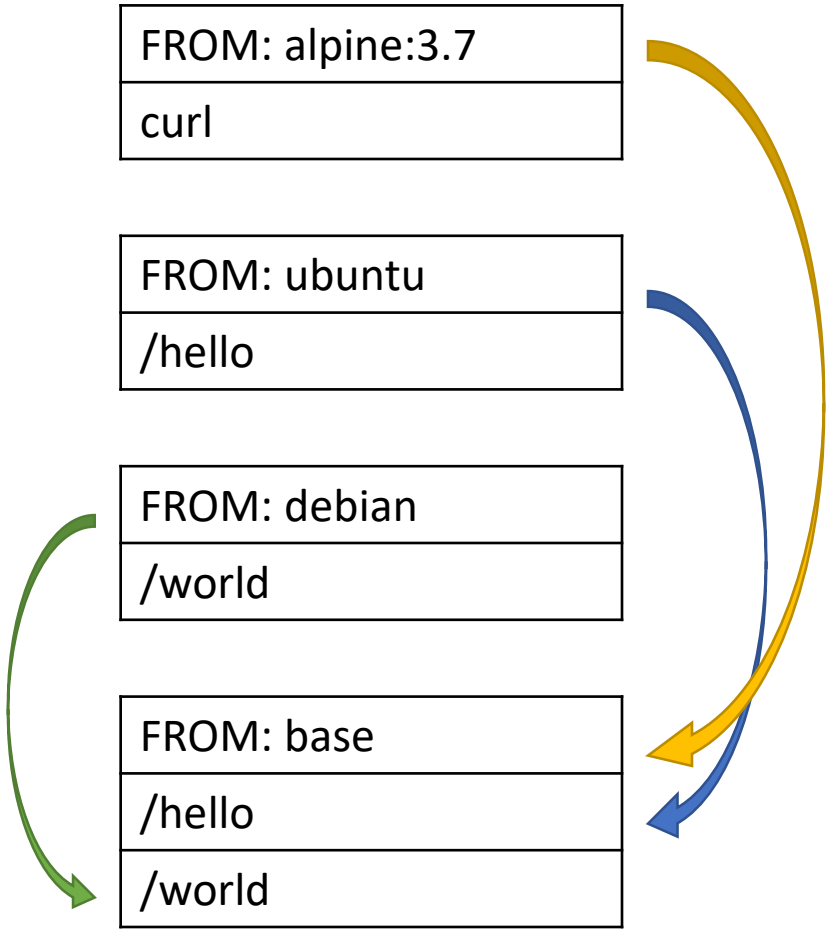
Code Examples

Because `Code` is so much cooler than diagrams

Dockerfile: Go Service

```
FROM golang:1.9.4-alpine3.7 as builder
WORKDIR /go/src/github.com/devmandy/go-rest-api
COPY service/* ./

RUN apk update && apk add git
RUN go get -u github.com/onsi/ginkgo/ginkgo && go get -u
github.com/onsi/gomega/...

RUN go test
RUN go build service.go

#Production Docker image
FROM alpine:3.7
WORKDIR /root/
COPY --from=builder /go/src/github.com/devmandy/go-rest-api/service .
CMD ["./service"]

EXPOSE 8123
```

PROTIP: Multi-stage Docker Builds




```
FROM alpine:3.7 as base
RUN apk add –no-cache curl

FROM ubuntu as second
RUN echo hello > /hello
LABEL image=second

FROM debian as third
RUN echo world > /world
LABEL image=third

FROM base
COPY --from=second /hello /hello
COPY --from=third /world /world
```

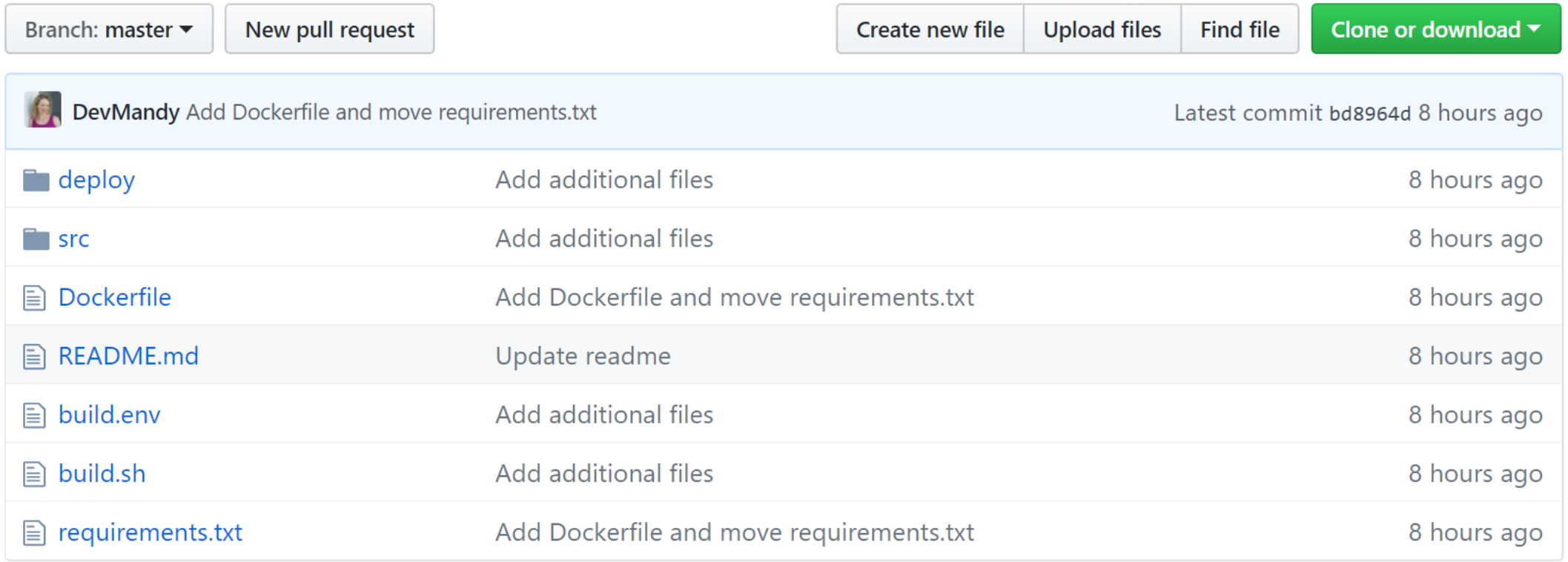
Container World

Side inspired by Dan Garfield @todaywasawesome at codefresh.io, as seen here:
http://www.notey.com/@codefresh_unofficial/external/16004232/webinar-using-docker-multi-stage-build-to-create-advanced-pipelines.html

Dockerfile: Go Service

```
#Stage 1 – Define builder image
FROM golang:1.9.4-alpine3.7 as builder
WORKDIR /go/src/github.com/devmandy/go-rest-api
COPY service/* ./

RUN apk update && apk add git
RUN go get -u github.com/onsi/ginkgo/ginkgo && go get -u
github.com/onsi/gomega/...

RUN go test
RUN go build service.go

#Stage 2 – Define production Docker image
FROM alpine:3.7
WORKDIR /root/
COPY --from=builder /go/src/github.com/devmandy/go-rest-api/service .
CMD ["./service"]

EXPOSE 8123
```

Dockerfile Repo Magic



Jenkinsfile: Go Service

```
node('docker-enabled') {
    stage('Checkout') {
        checkout scm
    }
    stage('Build Docker Image') {
        sh '''docker build -t devmandy/go_rest_api:"${version}" .'''
    }

    stage('Push to DockerHub') {
        docker.withRegistry('https://index.docker.io/v1/’,
         'dockerhub') {
            sh '''docker push devmandy/go_rest_api:"${version}"'''
        }
    }
}
```

Dockerfile: Python Service

```
FROM qnib/pytest as test
WORKDIR /src/python-rest-api
COPY ./ .

RUN pytest

#Production Docker image
FROM python:alpine3.7
WORKDIR /src/python-rest-api
COPY ./ .
RUN pip install --no-cache-dir -r requirements.txt

ENTRYPOINT ["python", "main.py"]
EXPOSE 5000
```

Jenkinsfile: Python Service

```
node('docker-enabled') {
    stage('Checkout') {
        checkout scm
    }
    stage('Build Docker Image') {
        sh '''docker build -t devmandy/python_rest_api:"${version}" .'''
    }

    stage('Push to DockerHub') {
        docker.withRegistry('https://index.docker.io/v1/', 'dockerhub') {
            sh '''docker push devmandy/python_rest_api:"${version}"'''
        }
    }
}
```

Containerizing the Build Environment

Recap

- Put build and deployment instructions in a Jenkinsfile in your repo
- Run build and deployment steps inside a container
- Use generic build agents rather than snowflakes
- Dynamically scale your docker-enabled agents

Container World

Developers

Getting Build out of Dev's Way

Share Your Build Containers with Dev

Reliable code environments for everyone, easy as 1-2-3

1. Clone the repo
2. Run ‘docker build’ using a stage target
3. Mount the workspace inside the container

Dockerfile: Go Service

```
#Stage 1 – Define builder image
FROM golang:1.9.4-alpine3.7 as builder
WORKDIR /go/src/github.com/devmandy/go-rest-api
COPY service/* ./

RUN apk update && apk add git
RUN go get -u github.com/onsi/ginkgo/ginkgo && go get -u
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RUN go test
RUN go build service.go

#Stage 2 – Define production Docker image
FROM alpine:3.7
WORKDIR /root/
COPY --from=builder /go/src/github.com/devmandy/go-rest-api/service .
CMD ["./service"]

EXPOSE 8123
```

Containerized Dev Environments

Dev: “That’s so easy!”

```
# 1 - Clone the repo
$ git clone git@github.com:DevMandy/go_rest_api.git

# 2 - Run docker build and stop after the builder stage
$ docker build -t dev-env --target builder .

# 3 - Mount the workspace in the builder container
$ docker run --rm -v
"$(pwd)"/service:/go/src/github.com/devmandy/go_rest_api:rw  dev-env
```

#SecContainerOps

Security in a Box (almost)

- Developers wake up thinking about security - not!
- Designated applications require audited tools access
- SecOps fears developer machines are the Wild West
- Containerized dev tools may be certified by the Security team
- 1.8 added Docker Content Trust - signed containers

The Last Mile – Disposable Jenkins

Icing on your continuously delivered cake

- Containerize the Jenkins master
- Inject credentials at runtime
- Pre-configure plugins and credentials
- All code lives in GitHub
- Manual configuration and configuration tools are unnecessary

Containerized Takeaways

Thoughts for the flight home

- CI/CD is needed to achieve benefits of microservices
- There's a perfect process that fits your needs – find it!
- Once you get the hang of it, the technical aspects are easy
- Developers will love workspaces in a box

Resources

- Jenkins World *Disposable Jenkins* presentation - http://bit.ly/2hfWQHiDevMandy
- Disposable Jenkins blog post - http://bit.ly/2okRqOtDevMandy
- Sample Go implementation - https://github.com/DevMandy/go_rest_api
- Sample Python implementation –
- https://github.com/DevMandy/python-rest-api
- Slides available at - https://github.com/DevMandy/ContainerWorld
- Questions? Twitter: @DevMandy or LinkedIn: mandyhubbard

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Thank You!

Mandy Hubbard @DevMandy

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