mysterium network

Golang application packed into minimal Docker image

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Valdas Petrulis

- Golang / PHP / JAVA Engineer
- Backend and Devops
- Past in Fintech, Lamoda.ru, Bigbank.eu
- Now Blockchain Developer at www.mysterium.network

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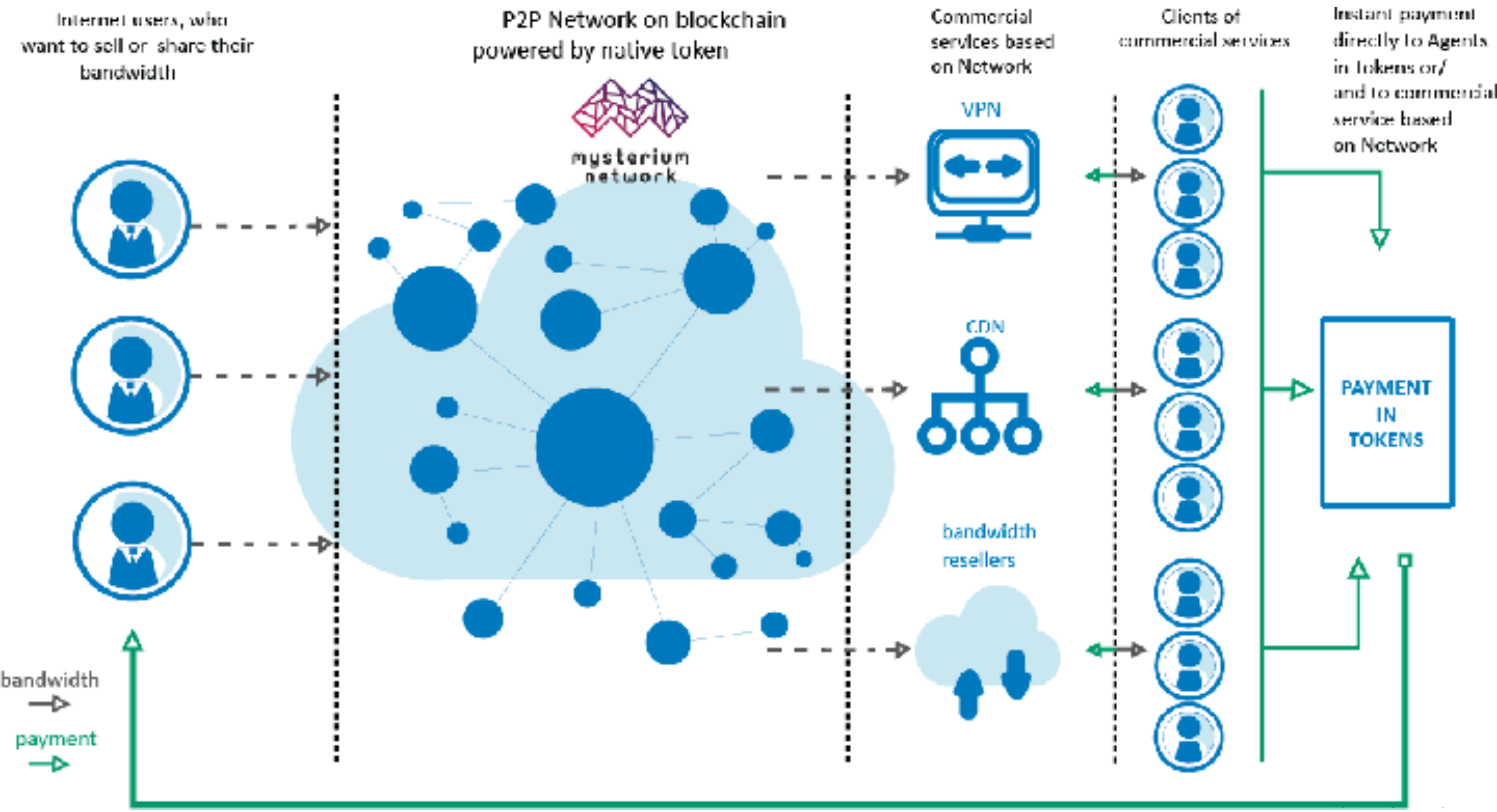
Doing Bandwidth Marketplace



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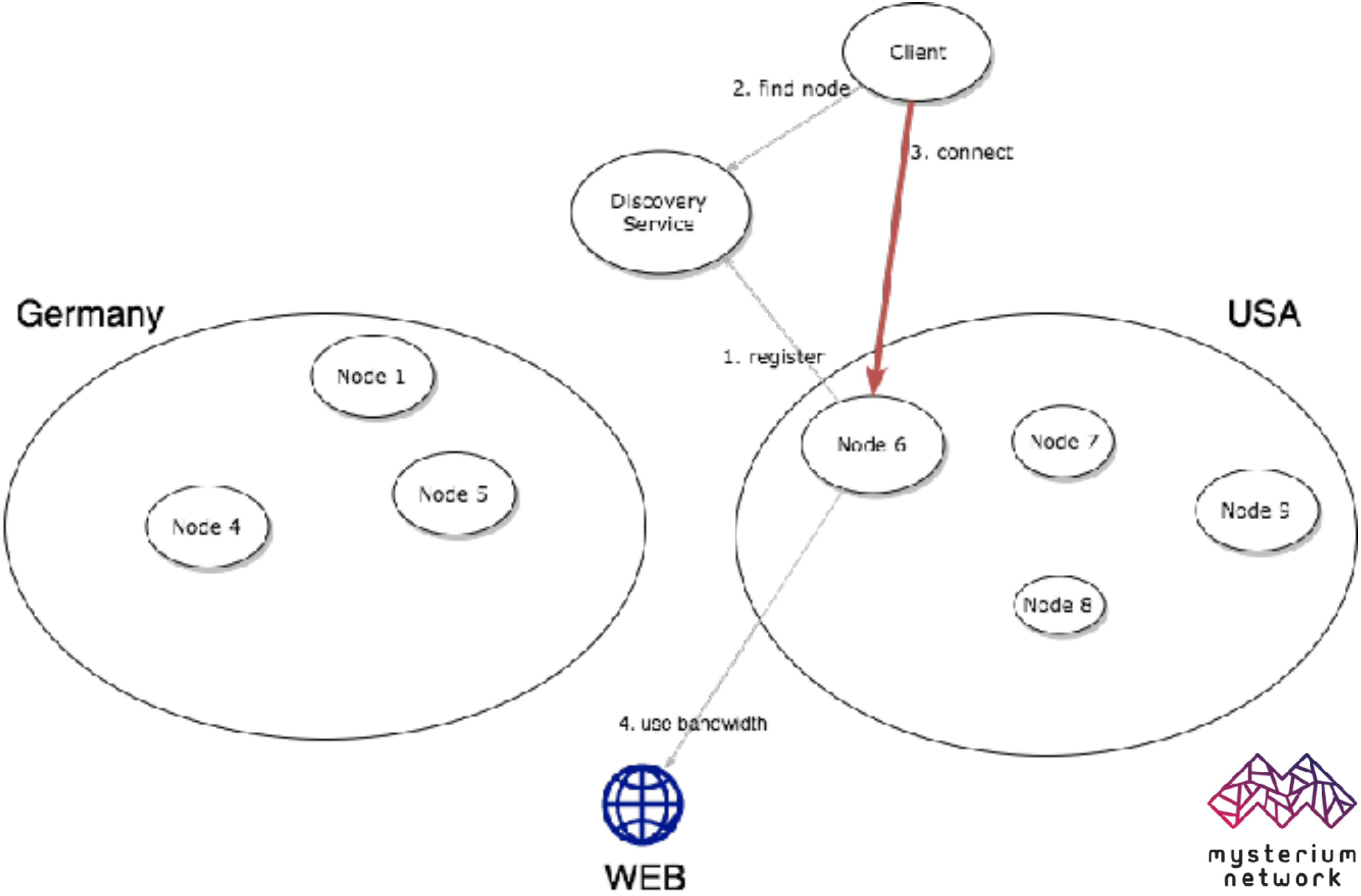
Node Discovery Service



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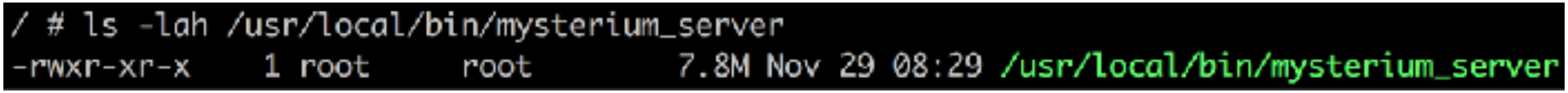
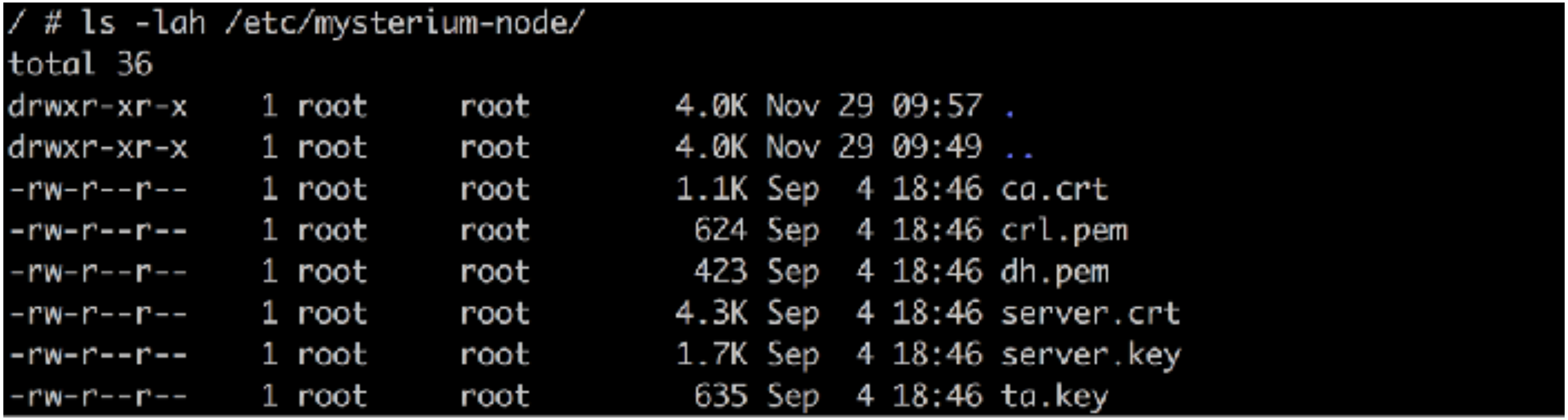
Application structure

- github.com/MysteriumNetwork/node



```
/ # ls -lah /usr/local/bin/mysterium_server
-rwxr-xr-x    1 root     root        7.8M Nov 29 08:29 /usr/local/bin/mysterium_server
```

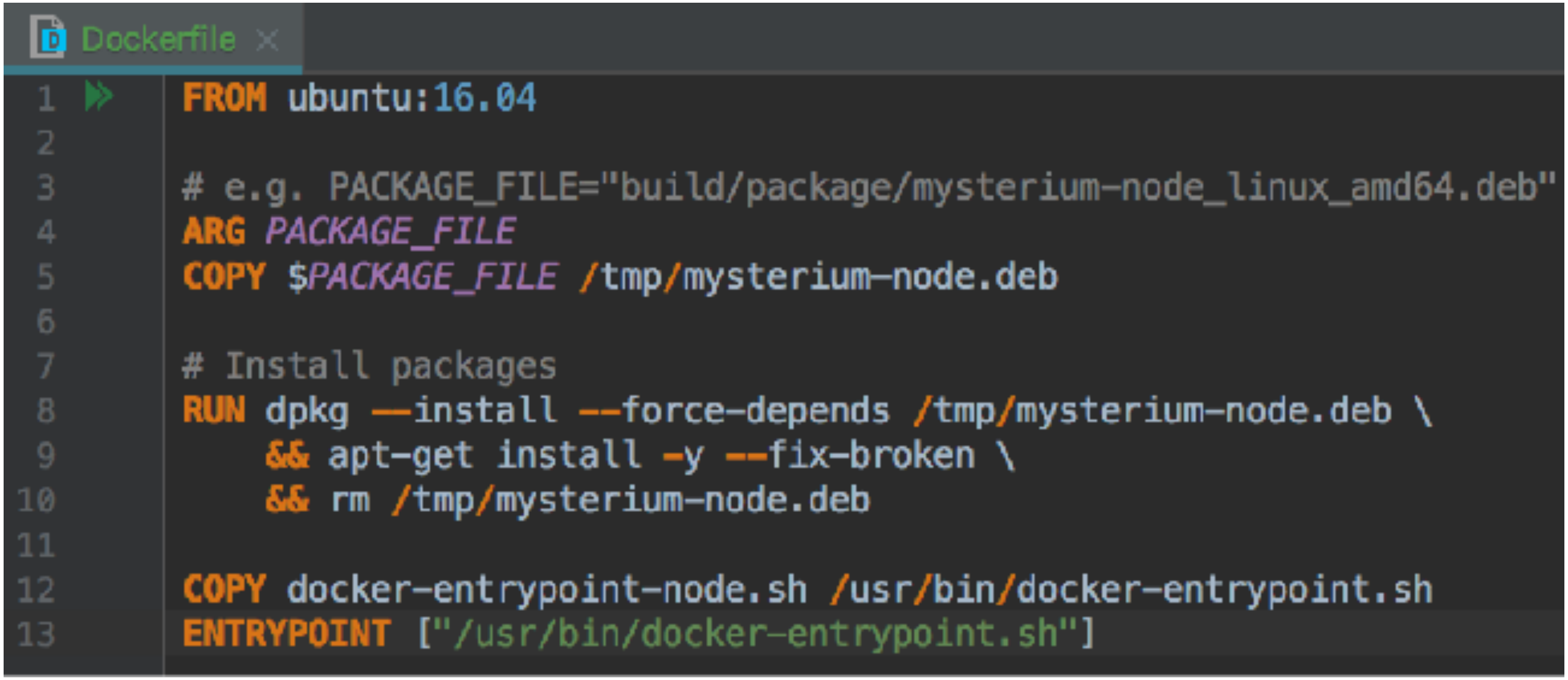


```
/ # ls -lah /etc/mysterium-node/
total 36
drwxr-xr-x    1 root     root        4.0K Nov 29 09:57 .
drwxr-xr-x    1 root     root        4.0K Nov 29 09:49 ..
-rw-r--r--    1 root     root        1.1K Sep  4 18:46 ca.crt
-rw-r--r--    1 root     root         624 Sep  4 18:46 crl.pem
-rw-r--r--    1 root     root         423 Sep  4 18:46 dh.pem
-rw-r--r--    1 root     root        4.3K Sep  4 18:46 server.crt
-rw-r--r--    1 root     root        1.7K Sep  4 18:46 server.key
-rw-r--r--    1 root     root         635 Sep  4 18:46 ta.key
```

Binary resources

	Size	Time cold	Time warm	RAM
Binary	7.8 MB	3.4s	1.8	10.1 MB

Ubuntu image



```
FROM ubuntu:16.04

# e.g. PACKAGE_FILE="build/package/mysterium-node_linux_amd64.deb"
ARG PACKAGE_FILE
COPY $PACKAGE_FILE /tmp/mysterium-node.deb

# Install packages
RUN dpkg --install --force-depends /tmp/mysterium-node.deb \
    && apt-get install -y --fix-broken \
    && rm /tmp/mysterium-node.deb

COPY docker-entrypoint-node.sh /usr/bin/docker-entrypoint.sh
ENTRYPOINT ["/usr/bin/docker-entrypoint.sh"]
```

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Ubuntu image resources

	Size	Time cold	Time warm	RAM
Binary	7.8 MB	3.4s	1.8	10.1 MB
Ubuntu + binary	145 MB 123 MB	60s	38s	13.2 MB

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Why Golang 1: Lightweight

- Strong core library
- No dependencies
  - HTTP router
  - Logger
  - UID generator
  - NATS pub-sub library
- Executable size 7.8 MB
- Eats RAM 12 MB

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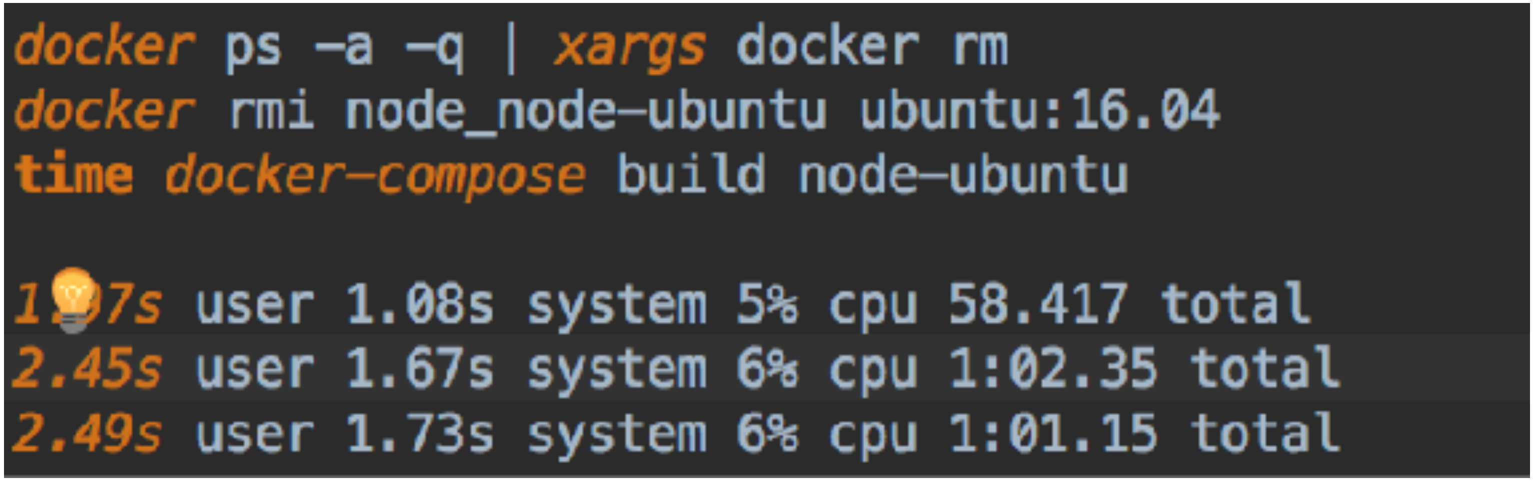
Why Golang 2: Cross-platform

- Statically compiled
- Linux server (Debian, Centos)
- OSX client (same codebase)
- Windows (not tested yet)

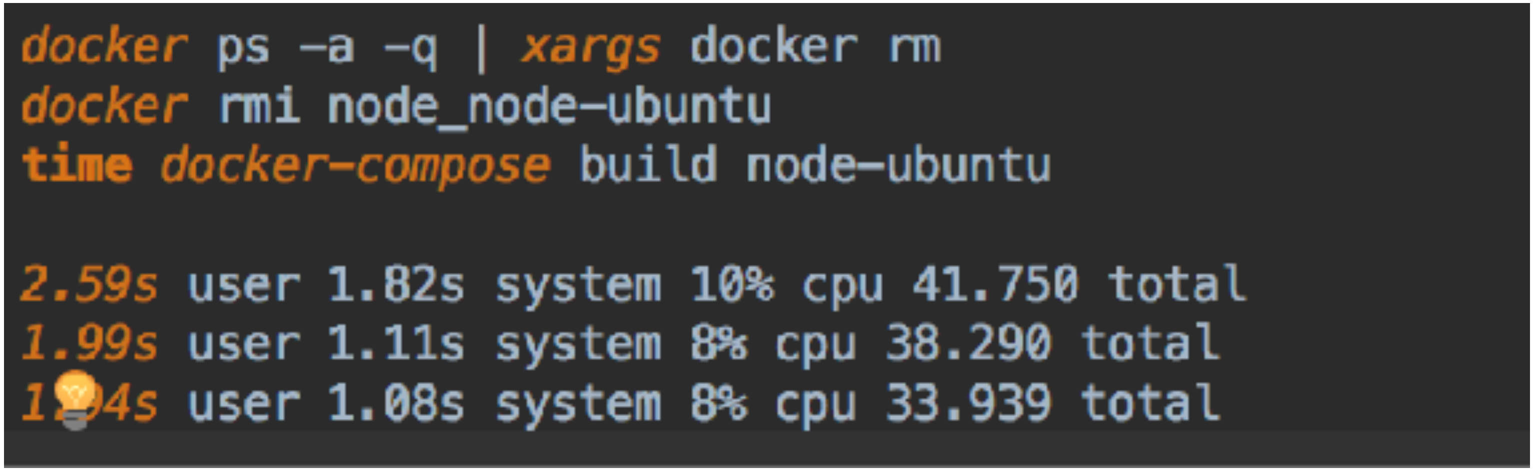
- Arduino (community implemented)
- Router (willing to investigate)
- IoT enabler (same codebase for mobile)

Ubuntu image building time



```
docker ps -a -q | xargs docker rm
docker rmi node_node-ubuntu ubuntu:16.04
time docker-compose build node-ubuntu

1.97s user 1.08s system 5% cpu 58.417 total
2.45s user 1.67s system 6% cpu 1:02.35 total
2.49s user 1.73s system 6% cpu 1:01.15 total
```



```
docker ps -a -q | xargs docker rm
docker rmi node_node-ubuntu
time docker-compose build node-ubuntu

2.59s user 1.82s system 10% cpu 41.750 total
1.99s user 1.11s system 8% cpu 38.290 total
1.94s user 1.08s system 8% cpu 33.939 total
```

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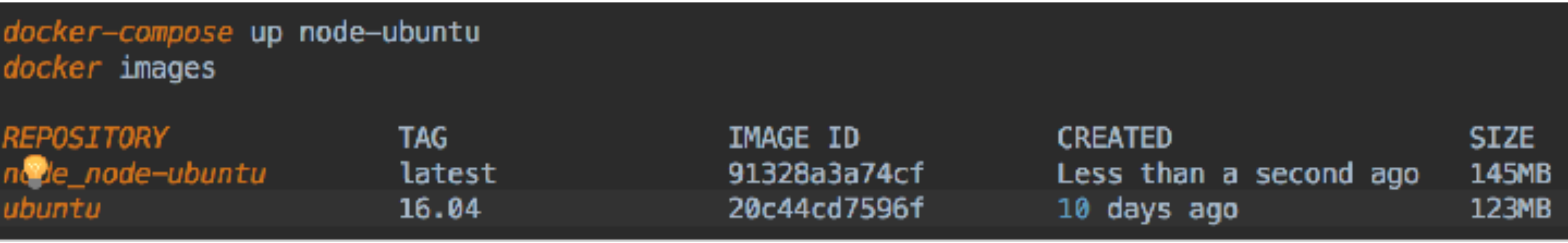
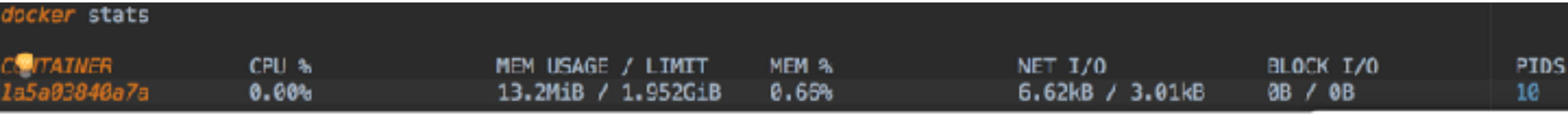
Ubuntu image size

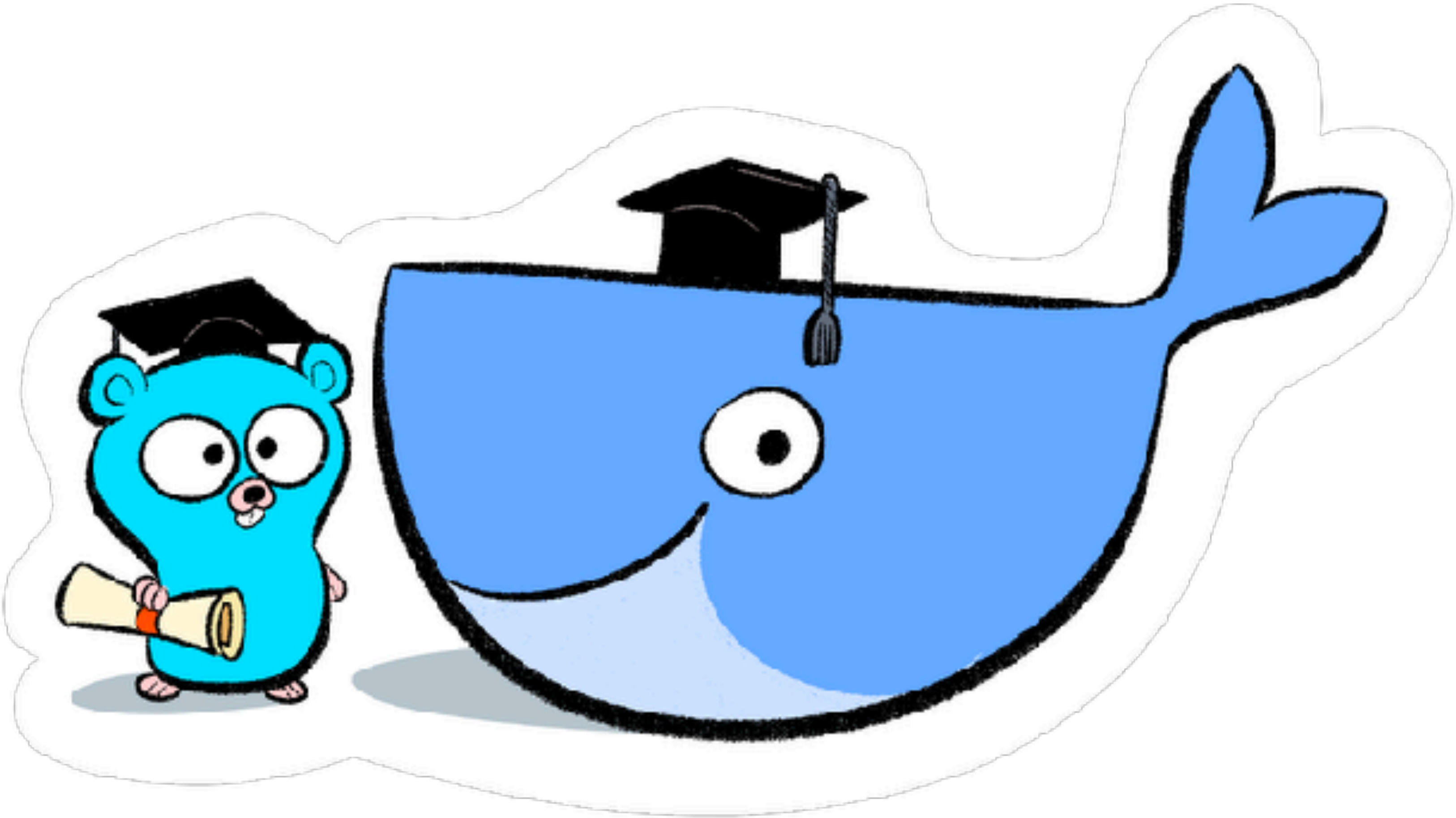


```
docker-compose up node-ubuntu
docker images

REPOSITORY          TAG                 IMAGE ID            CREATED                  SIZE
node_node-ubuntu    latest              91328a3a74cf        Less than a second ago   145MB
ubuntu              16.04               20c44cd7596f        10 days ago              123MB
```



```
docker stats

CONTAINER           CPU %               MEM USAGE / LIMIT     MEM %               NET I/O             BLOCK I/O           PIDS
1a5a03840a7a        0.00%               13.2MiB / 1.952GiB    0.65%               6.62kB / 3.01kB     0B / 0B             10
```

Hey Docker, we’re Effective Go :(



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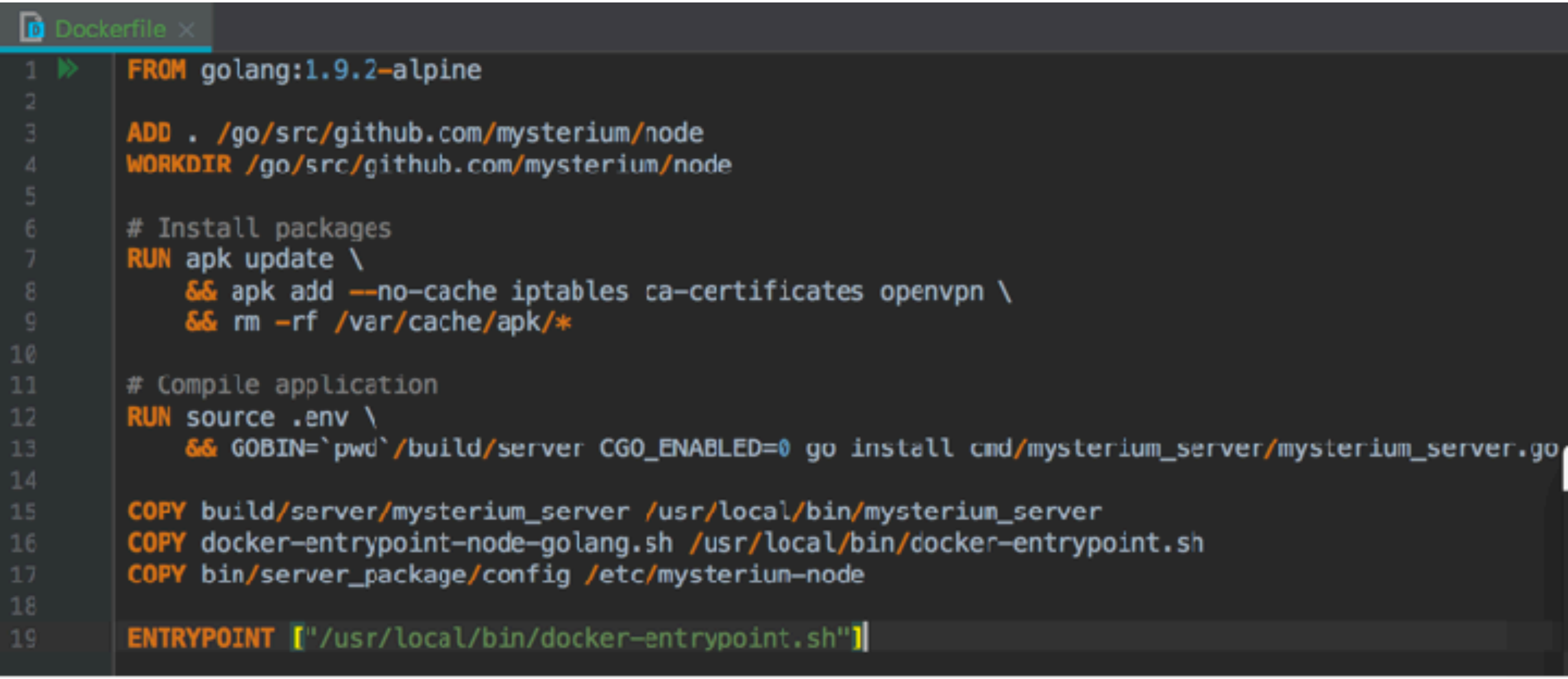
Golang official image



```
FROM golang:1.9.2-alpine

ADD . /go/src/github.com/mysterium/node
WORKDIR /go/src/github.com/mysterium/node

# Install packages
RUN apk update \
    && apk add --no-cache iptables ca-certificates openvpn \
    && rm -rf /var/cache/apk/*

# Compile application
RUN source .env \
    && GOBIN=`pwd`/build/server CGO_ENABLED=0 go install cmd/mysterium_server/mysterium_server.go

COPY build/server/mysterium_server /usr/local/bin/mysterium_server
COPY docker-entrypoint-node-golang.sh /usr/local/bin/docker-entrypoint.sh
COPY bin/server_package/config /etc/mysterium-node

ENTRYPOINT ["/usr/local/bin/docker-entrypoint.sh"]
```

Golang images resources

	Size	Time cold	Time warm	RAM
Binary	7.8 MB	3.4s	1.8	10.1 MB
Ubuntu + binary	145 MB 123 MB	60s	38s	13.2 MB
Alpine + Golang	535 MB 269 MB	44s	43s	11.75 MB

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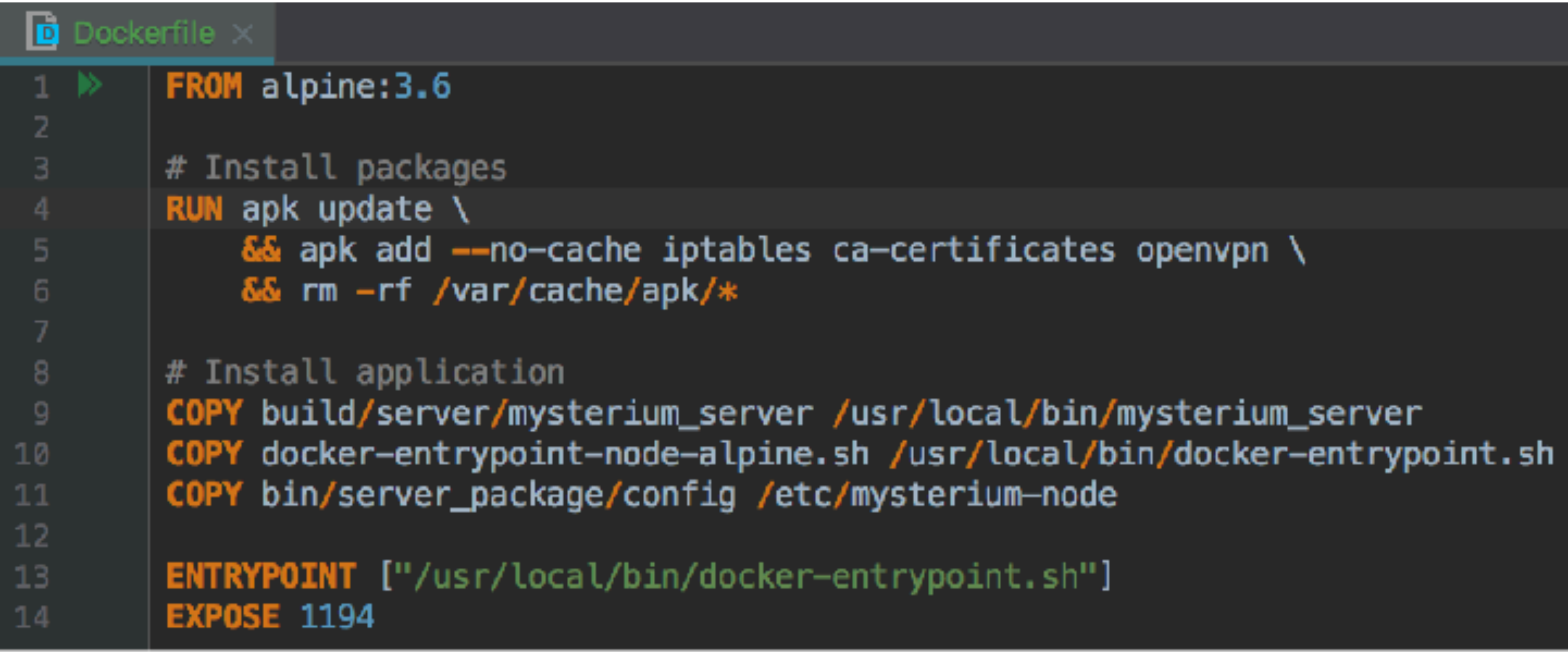
Alpine minimal image



```
FROM alpine:3.6

# Install packages
RUN apk update \
    && apk add --no-cache iptables ca-certificates openvpn \
    && rm -rf /var/cache/apk/*

# Install application
COPY build/server/mysterium_server /usr/local/bin/mysterium_server
COPY docker-entrypoint-node-alpine.sh /usr/local/bin/docker-entrypoint.sh
COPY bin/server_package/config /etc/mysterium-node

ENTRYPOINT ["/usr/local/bin/docker-entrypoint.sh"]
EXPOSE 1194
```

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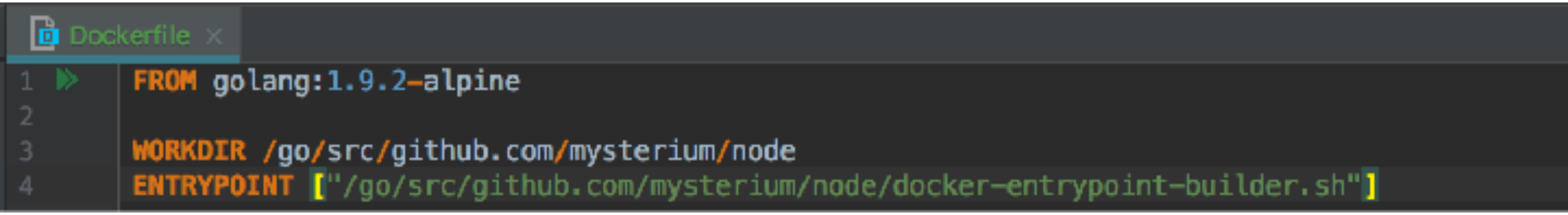
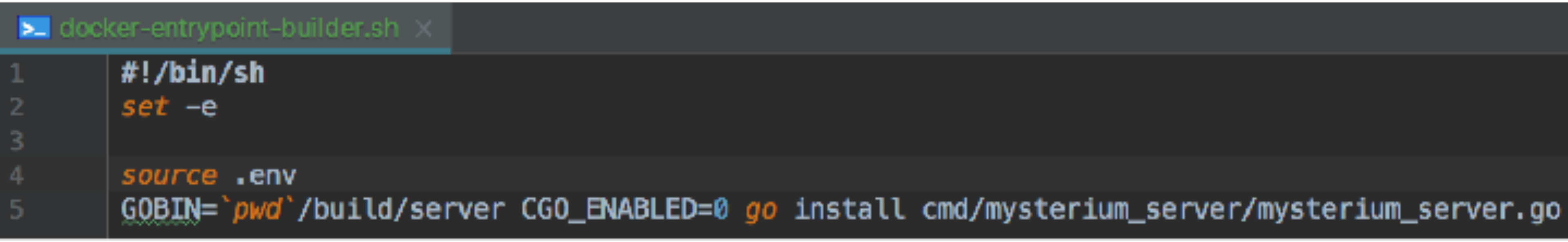
Alpine builder image



```
FROM golang:1.9.2-alpine

WORKDIR /go/src/github.com/mysterium/node
ENTRYPOINT ["/go/src/github.com/mysterium/node/docker-entrypoint-builder.sh"]
```



```
#!/bin/sh
set -e

source .env
GOBIN=`pwd`/build/server CGO_ENABLED=0 go install cmd/mysterium_server/mysterium_server.go
```

Shipping resources comparison

	Size	Time cold	Time warm	RAM
Binary	7.8 MB	3.4s	1.8	10.1 MB
Ubuntu + binary	145 MB 123 MB	60s	38s	13.2 MB
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Alpine + binary	16.5 MB 3.97 MB	30s	27s	12.93MB

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Shipping resources comparison

	Size	Time cold	Time warm	RAM
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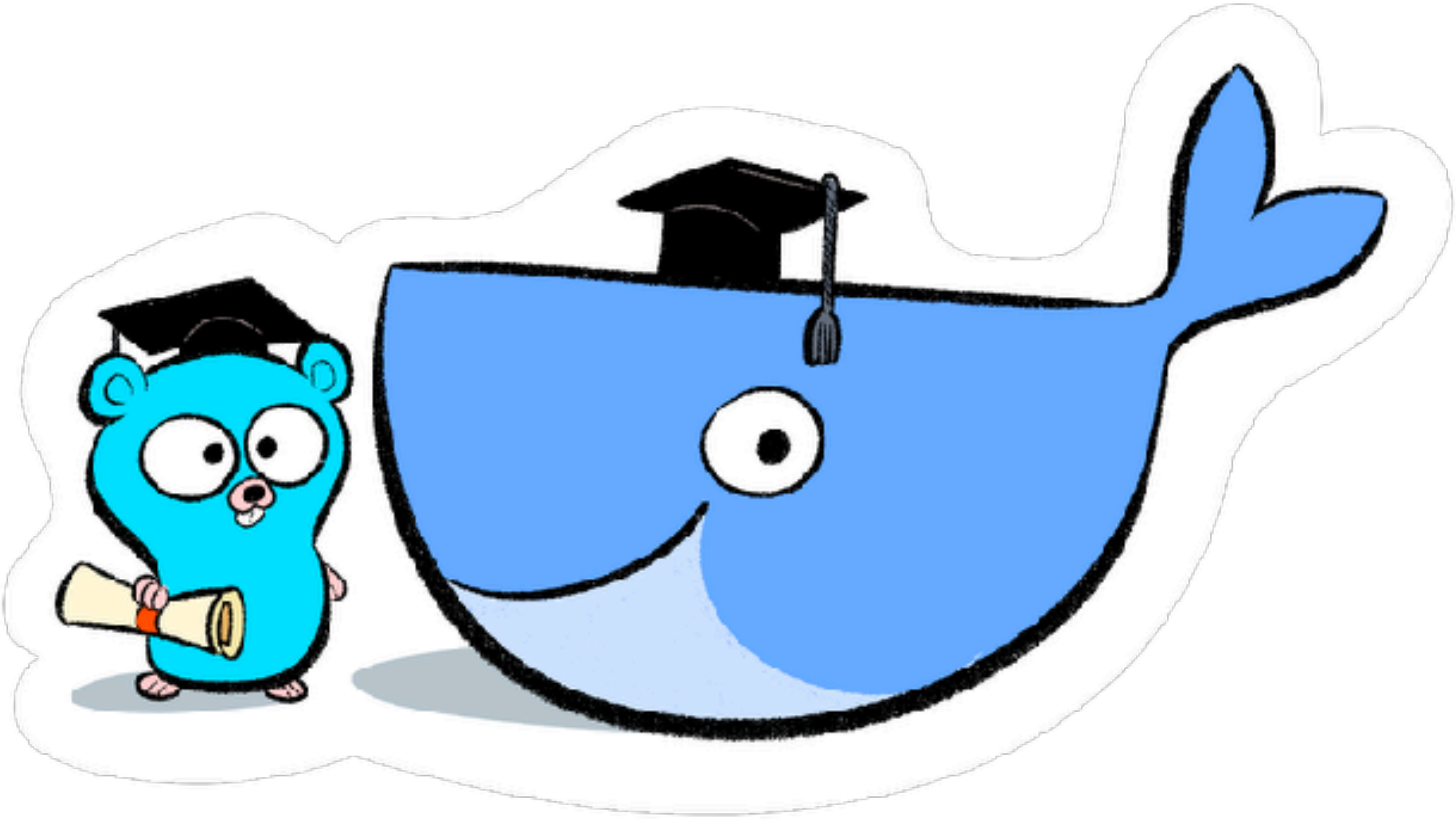
Alpine + Golang	535 MB 269 MB	44s	43s	11.75 MB
Alpine + binary	16.5 MB 3.97 MB	30s	27s	12.93MB
AlpineGlibc + binary	35.5MB 11.2MB	-	22s	17MB

Lets make Go Effective again



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Effective Alpine

Questions?

- https://github.com/MysteriumNetwork/node
- valdas@mysterium.network

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