Atlassian

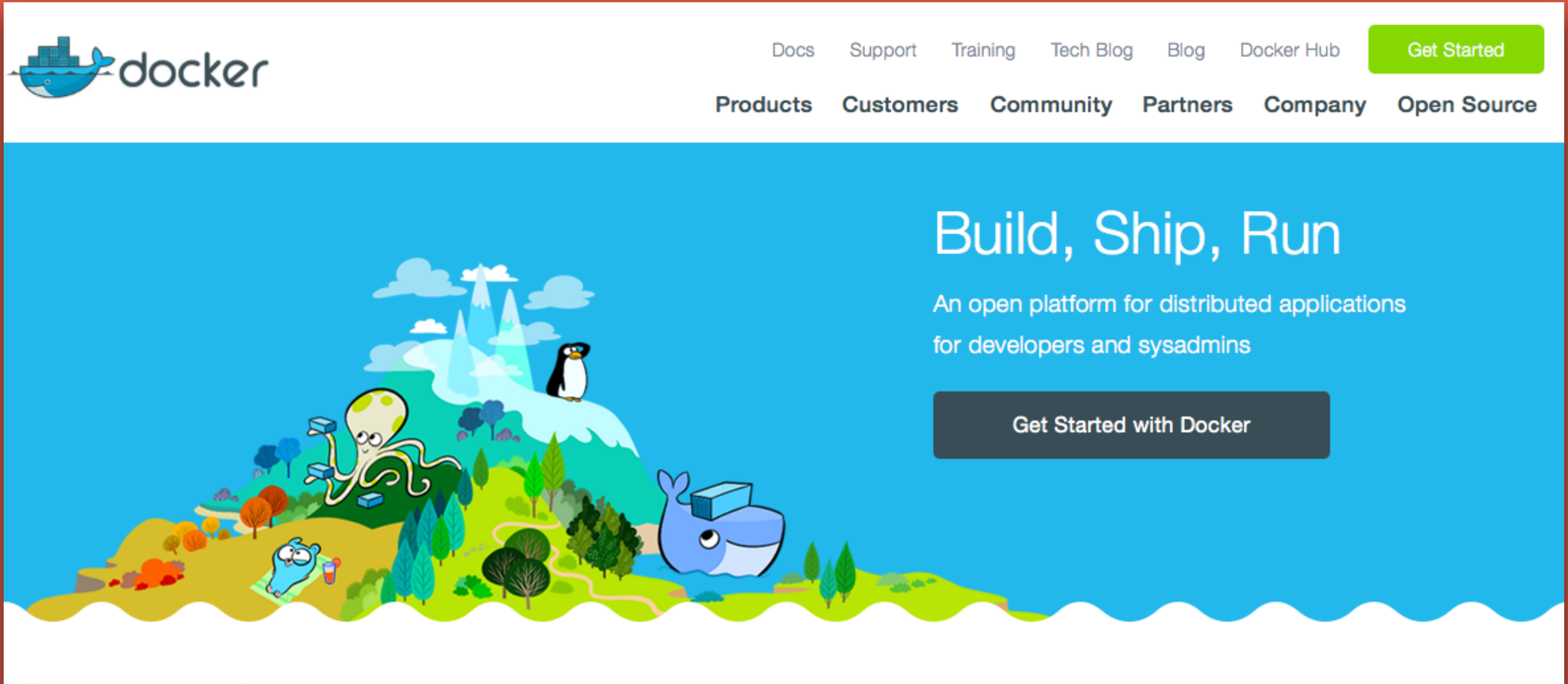
The age of orchestration

From Docker basics to cluster management

NICOLA PAOLUCCI • DEVELOPER INSTIGATOR • ATLASSIAN • @DURDN

Three minute Docker intro?

Time me and ring a bell if I am over it. Just kidding I'll be over by a bit but it's ok. We're friends.



Docs Support Training Tech Blog Blog Docker Hub Get Started

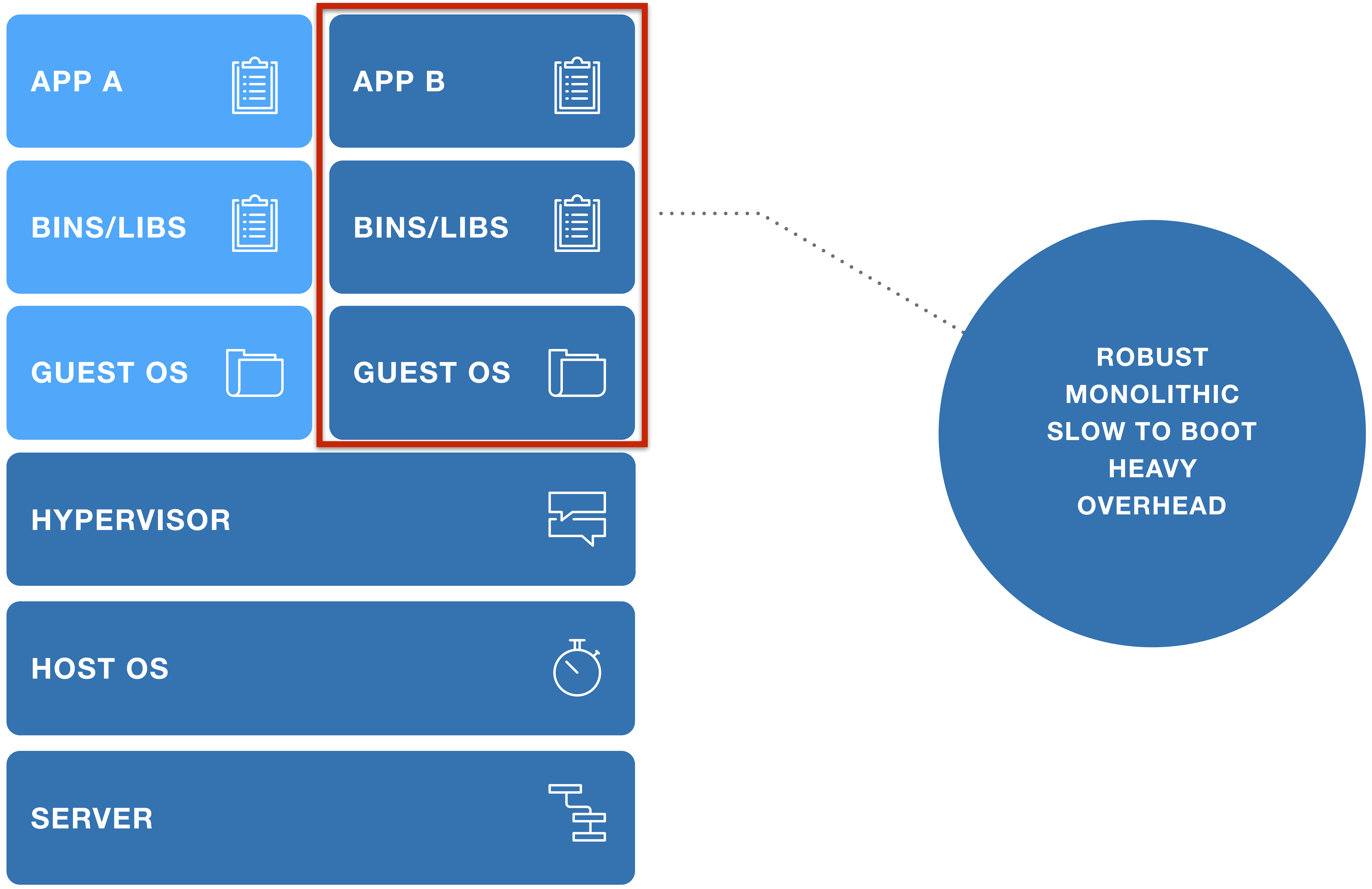
Products Customers Community Partners Company Open Source

Build, Ship, Run

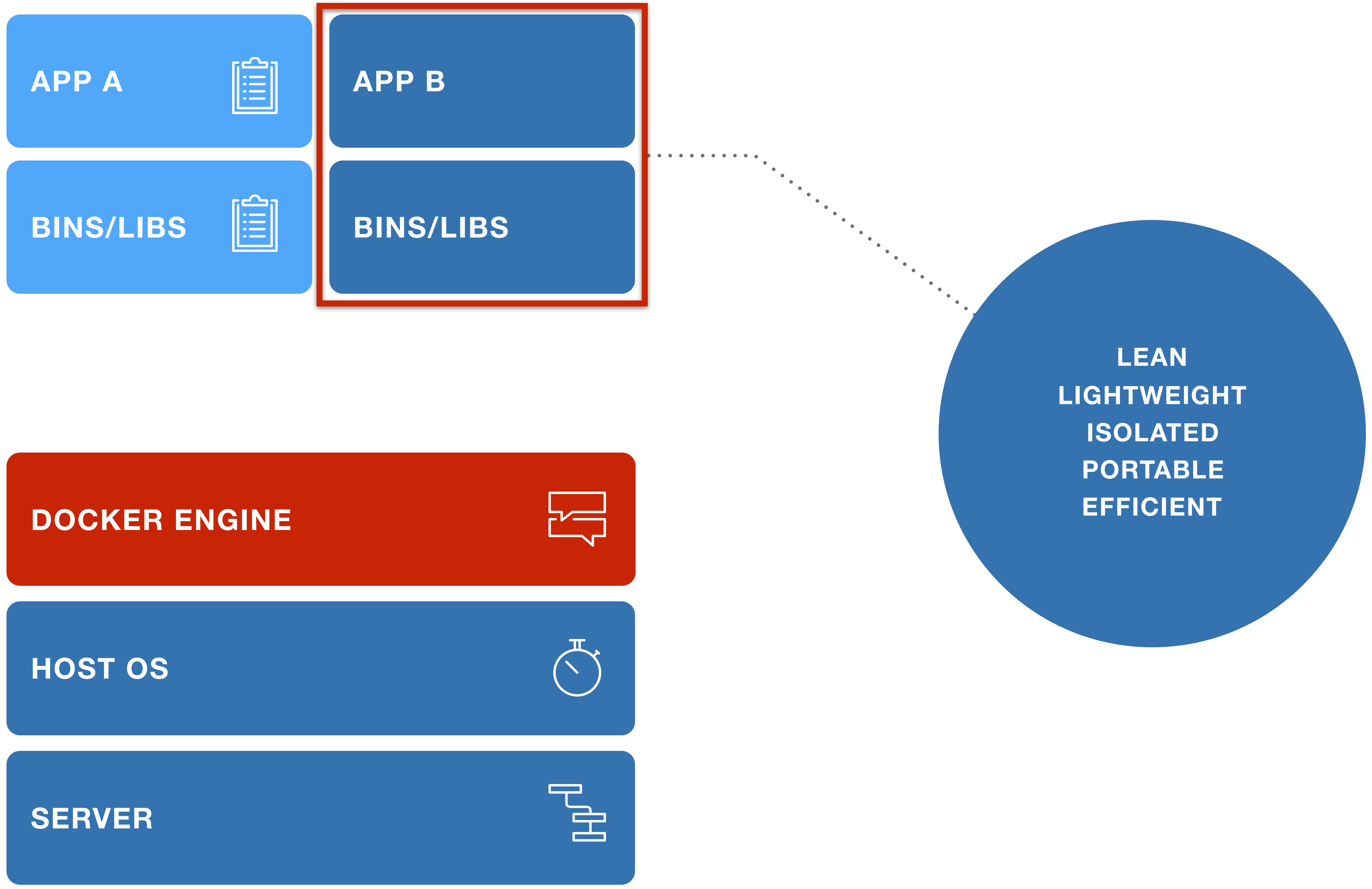
An open platform for distributed applications for developers and sysadmins

Get Started with Docker

Traditional Virtual Machines



Docker Containers



DEFINITIONS

Seen from another angle, the core of Docker is four distinct things

A standard format to package applications

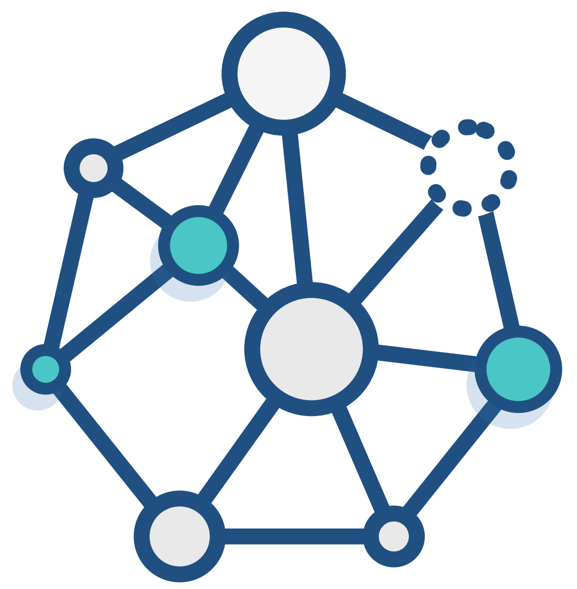
Clearly defined interfaces

Caching mechanism to re-use steps

Central registry of ready images

DO WE USE IT?

We have embraced Docker on two fronts



For our internal PaaS

In our products

Atlassian

Our internal PaaS, called Micros

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Overall Micros Numbers

600+

Microservices

40%

Docker containers

Java
Node.js
Python

Rest is pre-made stacks

Media Services

@durdn

Our Conversion Stack

ImageMagick

ghostscript®

node JS®

LibreOffice
The Document Foundation

FFMPEG

Media Services Numbers

10

Microservices

TBs

Processed every month

6M

containers spun per month

CONCLUSIONS

Docker has been a great fit for our Media Services team

Easily scale horizontally

Worked around tools not easy to parallelise

Isolating data from different customers

Manage resource control

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Orchestration is the next arena

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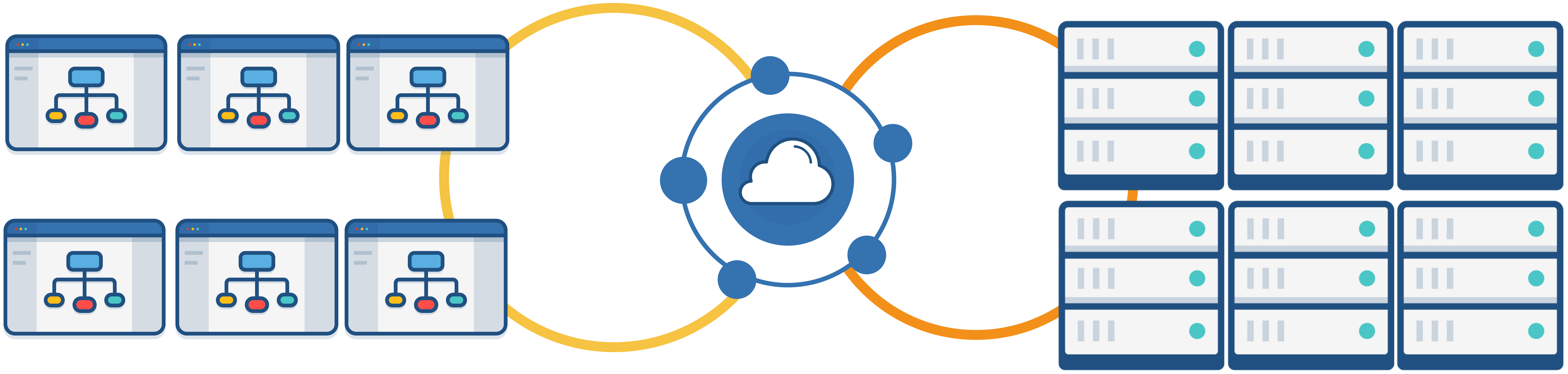
What's Orchestration?



Services

YOUR APPLICATION

Orchestration

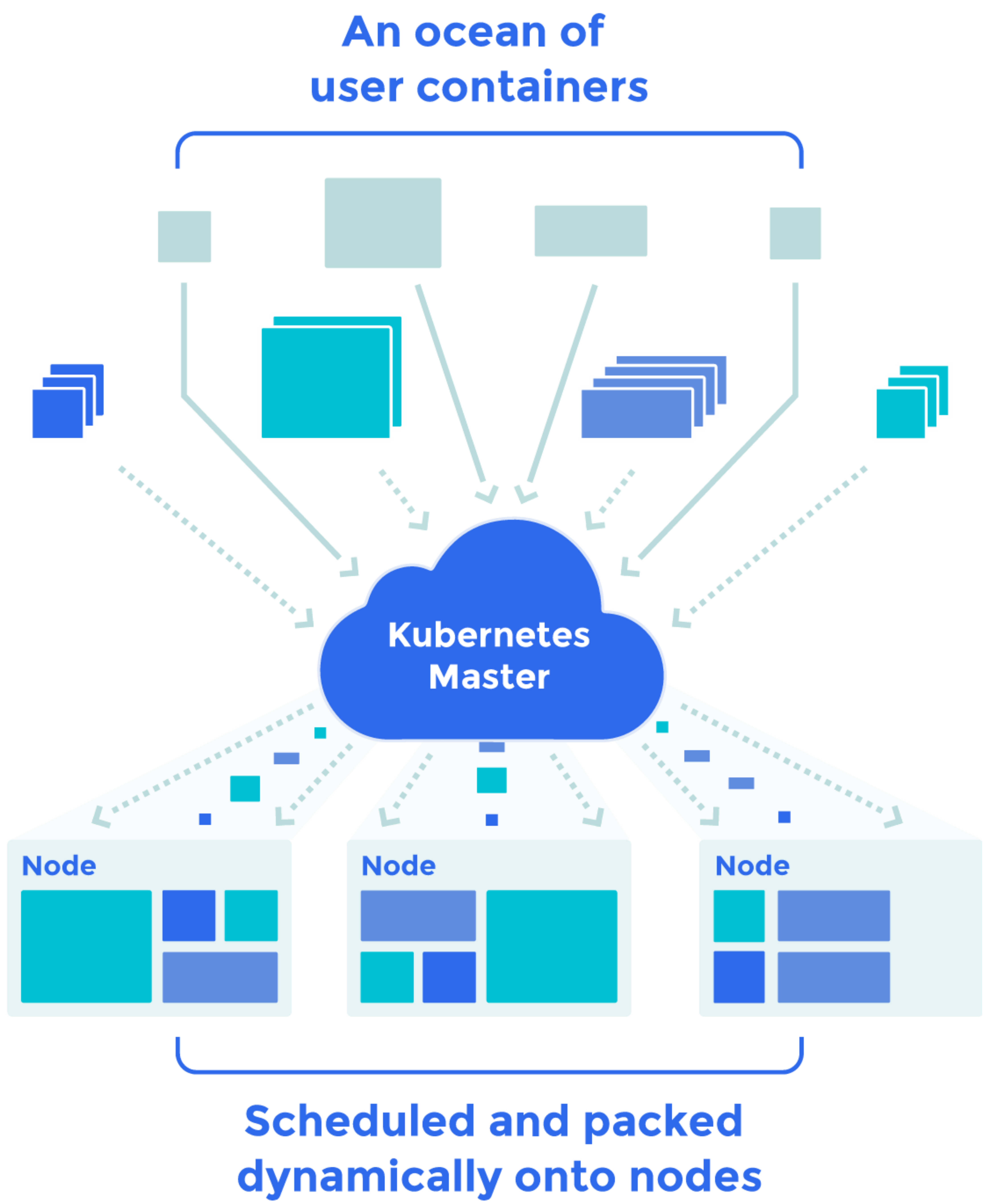
FRAMEWORKS

Data Center

PHYSICAL INFRA

kubernetes by Google

Manage a cluster of Linux containers as a single system to accelerate Dev and simplify Ops.


An ocean of user containers
Kubernetes Master
Node
Node
Node
Scheduled and packed dynamically onto nodes

Apache Software Foundation / Apache Mesos

Apache MESOS™

Getting Started Documentation Downloads Community

Program against your datacenter like it's a single pool of resources

Apache Mesos abstracts CPU, memory, storage, and other compute resources away from machines (physical or virtual), enabling fault-tolerant and elastic distributed systems to easily be built and run effectively.

Download Mesos 0.25.0 or learn how to get started

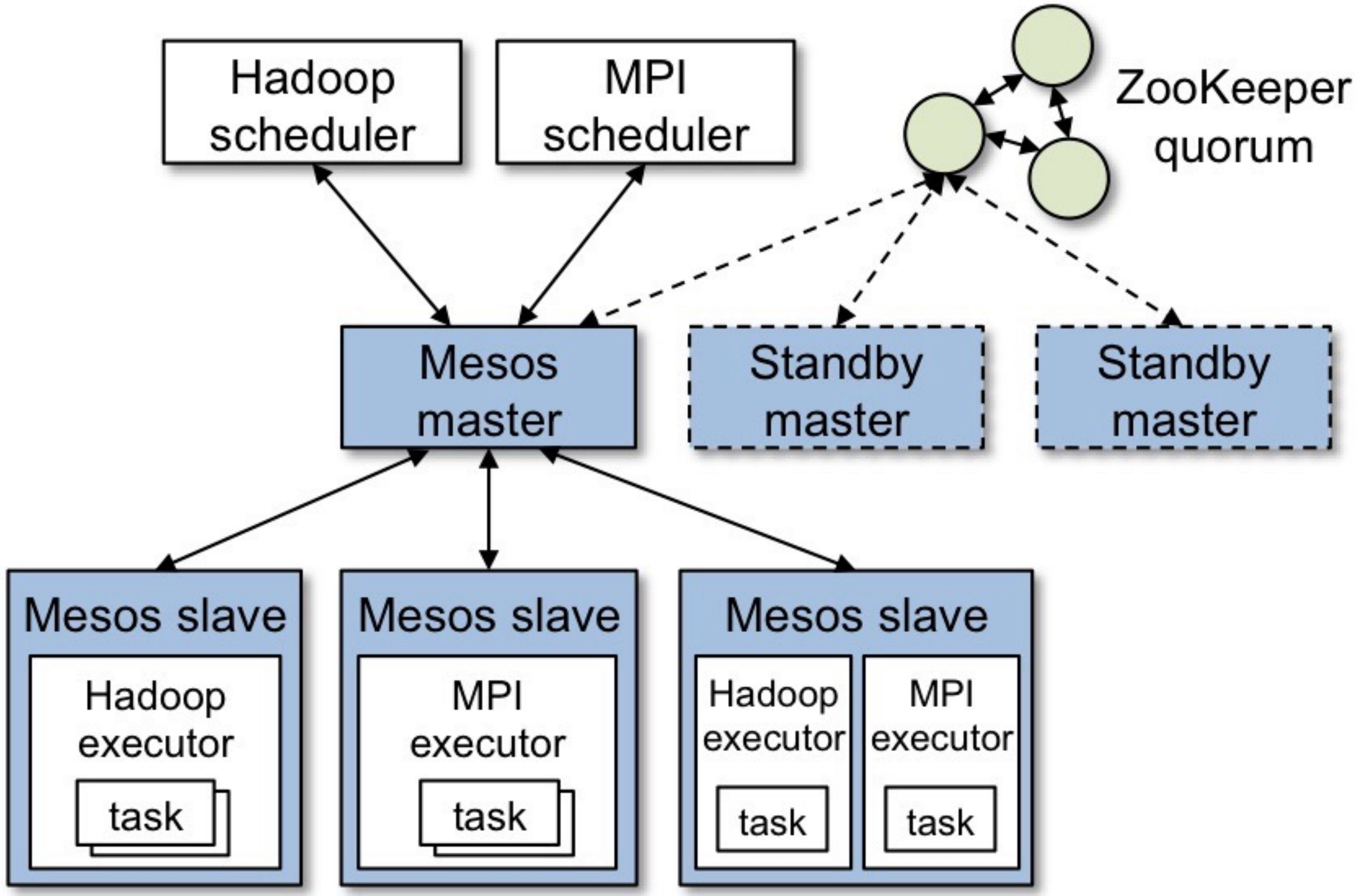
UPCOMING EVENT

MesosCon Europe

Dublin, October 8 - 9th, 2015

#MesosCon Europe is conference organized by the Apache Mesos community, bringing together users and developers to share and learn about the project and its growing ecosystem.

REGISTER TODAY


Hadoop scheduler
MPI scheduler
ZooKeeper quorum
Mesos master
Standby master
Standby master
Mesos slave
Hadoop executor
task
Mesos slave
MPI executor
task
Mesos slave
Hadoop executor
task
MPI executor
task

Docker's Own Orchestration Tools

Docker machine

Docker compose

Docker swarm

Docker network

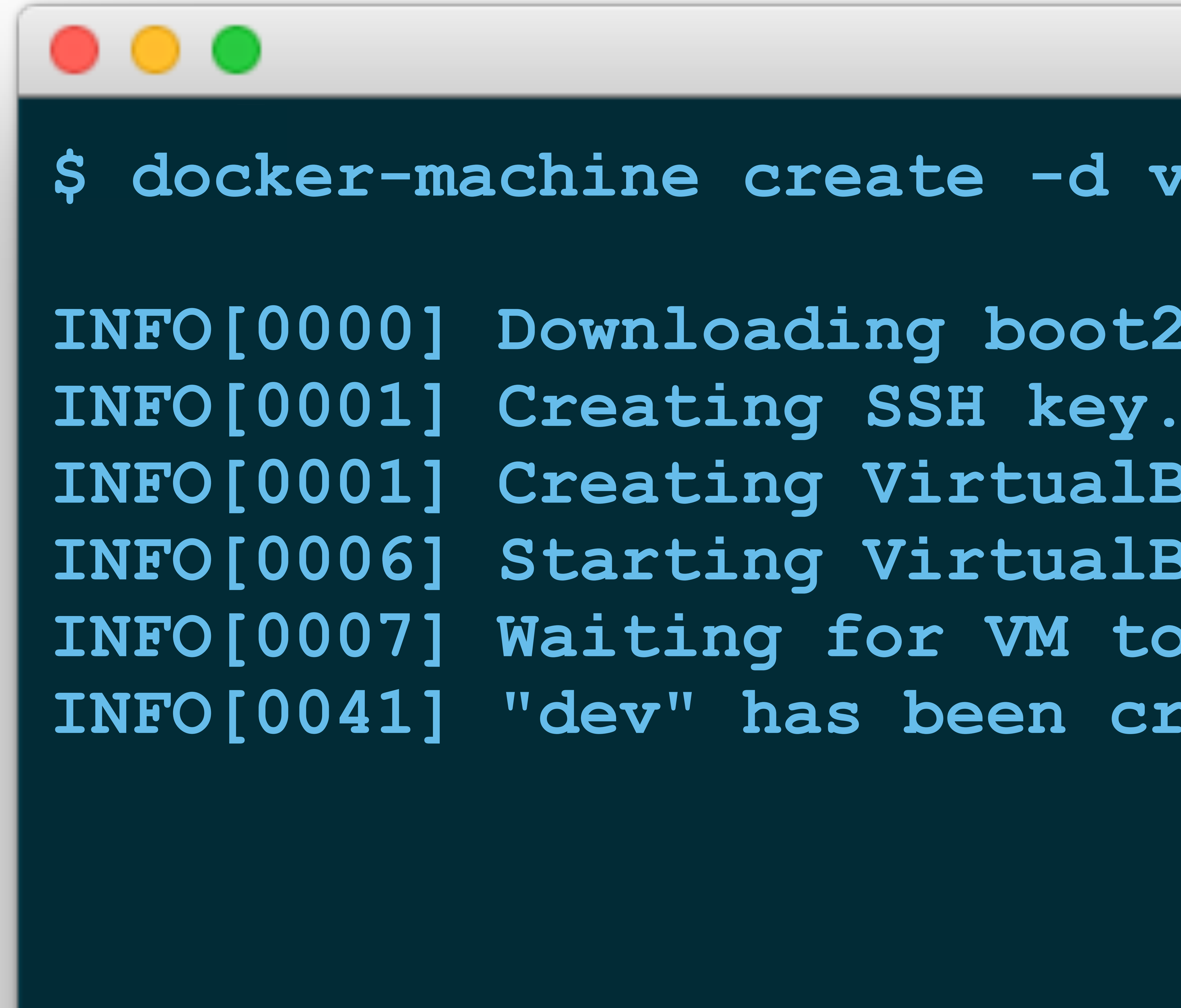
Where is the DEMO Lebowski?

TOOL NR.1

Docker machine

Docker machine

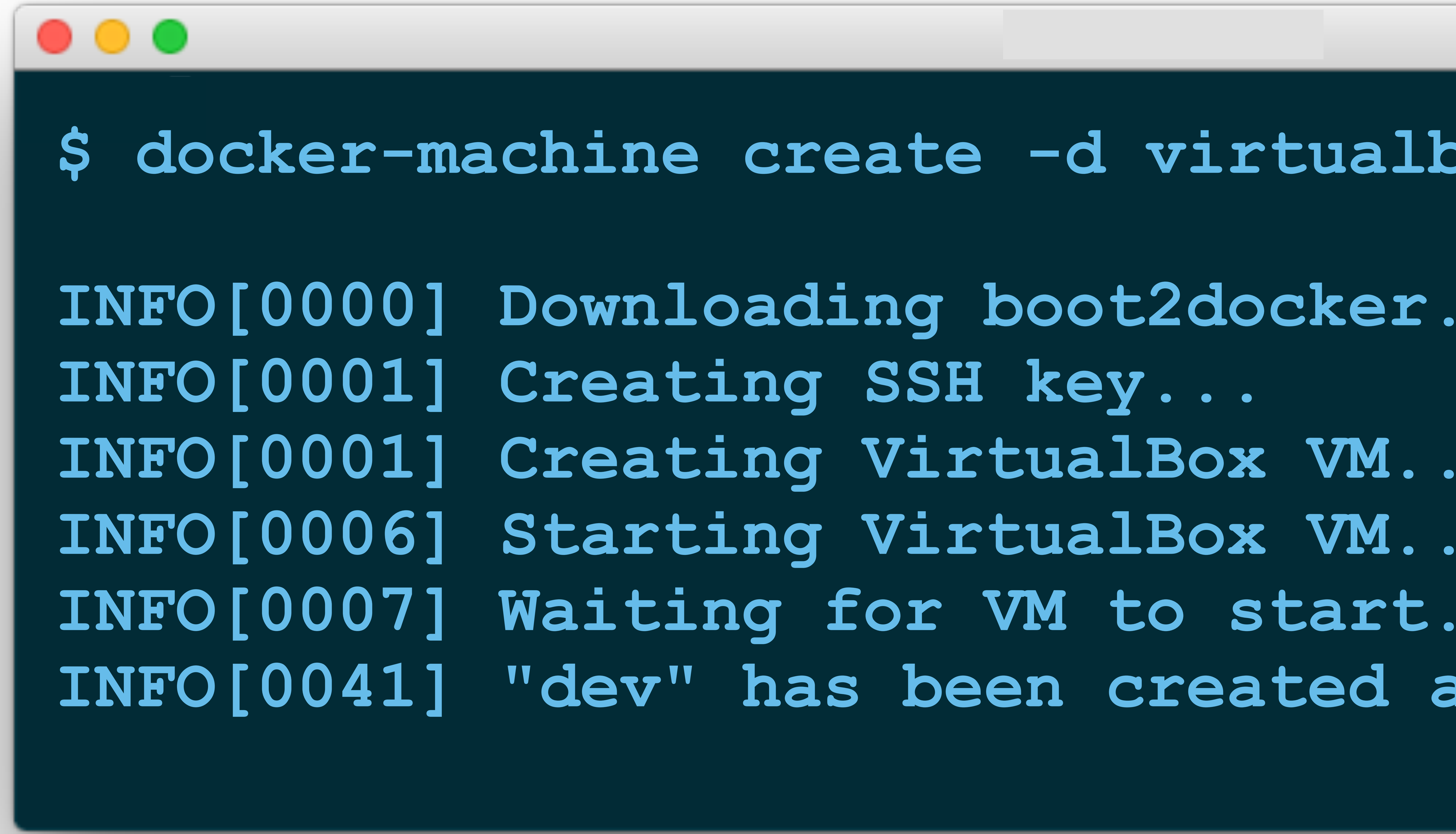
Simple command line tool to provision local and remote hosts with Docker installed. Fantastic to get up and running fast. It has drivers for many Internet service providers and PaaS.



```
$ docker-machine create -d v

INFO[0000] Downloading boot2
INFO[0001] Creating SSH key.
INFO[0001] Creating VirtualB
INFO[0006] Starting VirtualB
INFO[0007] Waiting for VM to
INFO[0041] "dev" has been cr
```

Docker machine DEMO

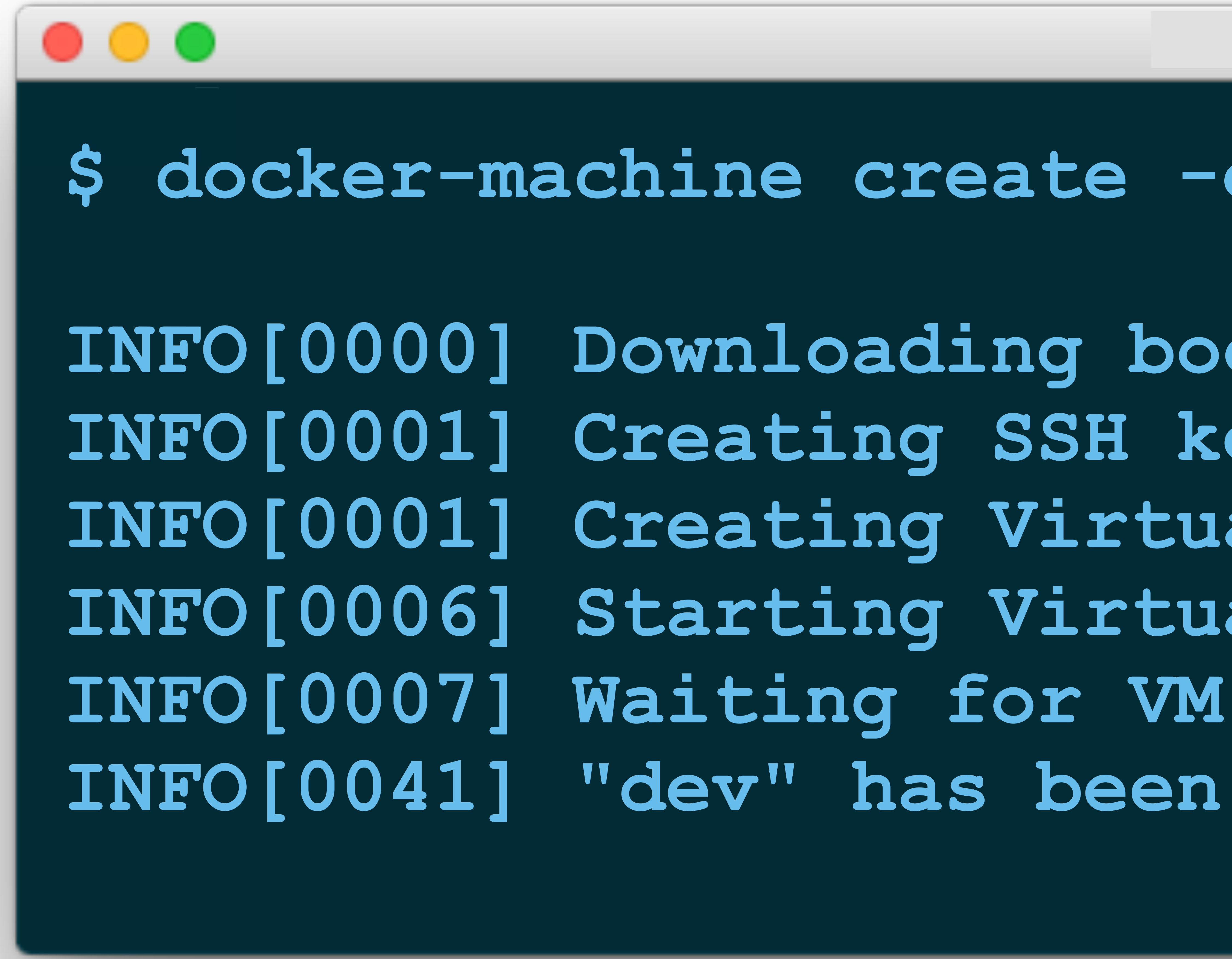
- Provision a machine with Docker installed and ready
- Pull a minimal image
- Run a few docker commands
- Tear down the machine



```
$ docker-machine create -d virtualb

INFO[0000] Downloading boot2docker.
INFO[0001] Creating SSH key...
INFO[0001] Creating VirtualBox VM..
INFO[0006] Starting VirtualBox VM..
INFO[0007] Waiting for VM to start.
INFO[0041] "dev" has been created a
```

Recap of what you saw

- “docker-machine create” to provision the host, locally or remotely
- “docker-machine ls” to list the machines
- “docker-machine stop/rm” to stop and remove



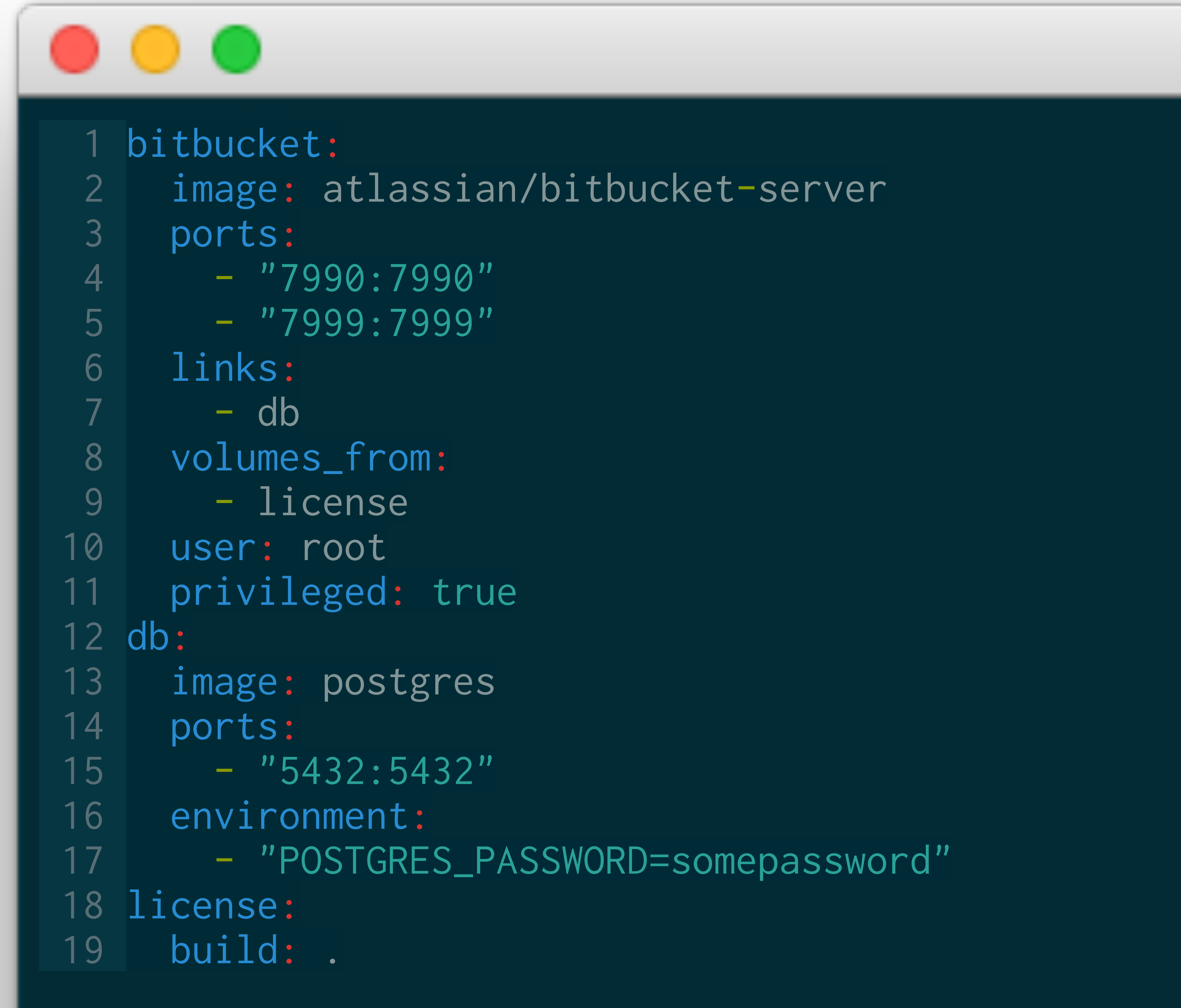
```
$ docker-machine create -

INFO[0000] Downloading boo
INFO[0001] Creating SSH ke
INFO[0001] Creating Virtu
INFO[0006] Starting Virtu
INFO[0007] Waiting for VM
INFO[0041] "dev" has been
```

TOOL NR.2

Docker compose

Docker compose

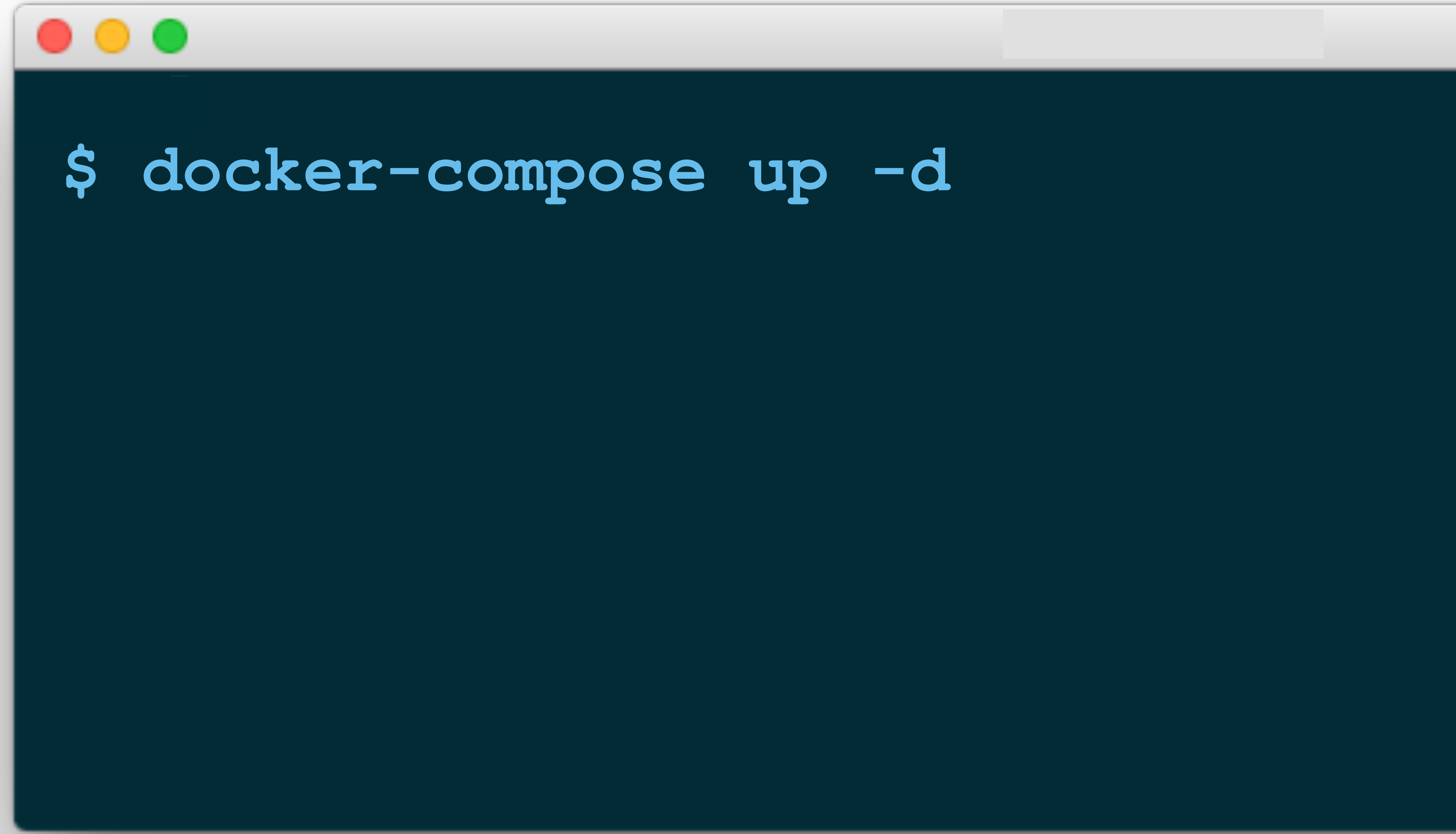
Describe the relation of your components in a simple YAML file called **docker-compose.yml** and docker-compose takes care of starting them and linking them in order.



```yaml
bitbucket:
  image: atlassian/bitbucket-server
  ports:
    - "7990:7990"
    - "7999:7999"
  links:
    - db
  volumes_from:
    - license
  user: root
  privileged: true
db:
  image: postgres
  ports:
    - "5432:5432"
  environment:
    - "POSTGRES_PASSWORD=somepassword"
license:
  build: .
```

Docker compose DEMO

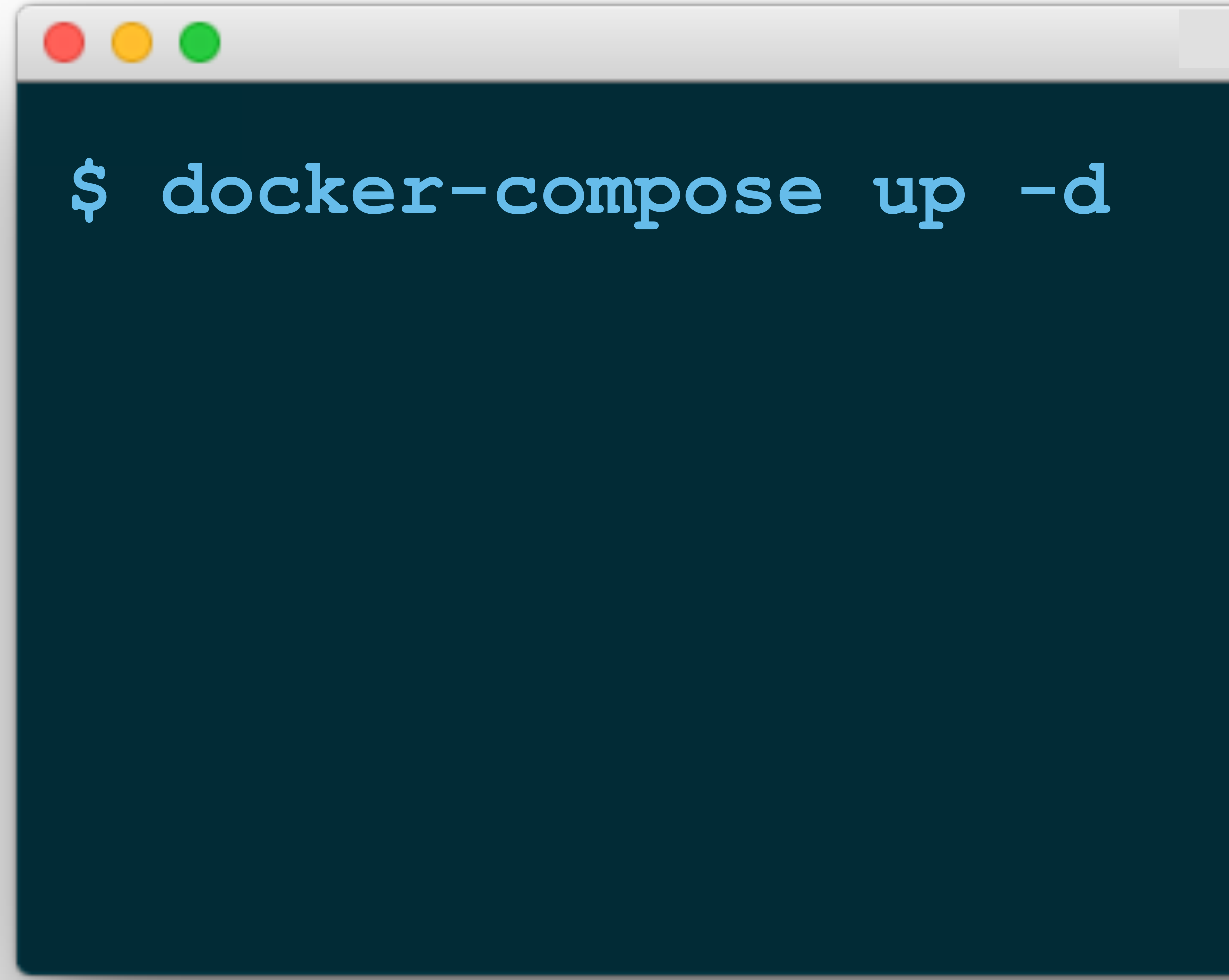
- Provision a machine on a PaaS
- Pull PostgreSQL and a Java app from the Registry
- Use Compose to start the app
- Tear down the machine



```
$ docker-compose up -d
```

Recap of what you saw

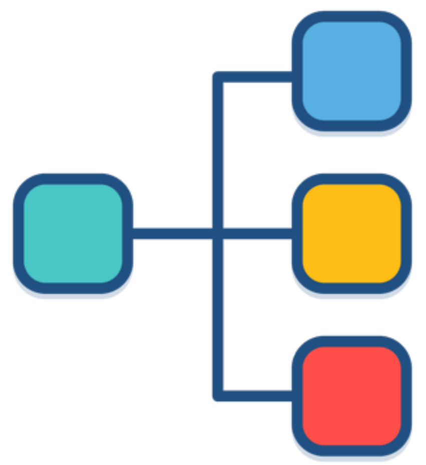
- “docker-machine create” to provision the host
- Edit “docker-compose.yml” to describe our app
- “docker-compose up -d” to start our application
- “docker-machine rm compose-demo“ to remove it



```
$ docker-compose up -d
```

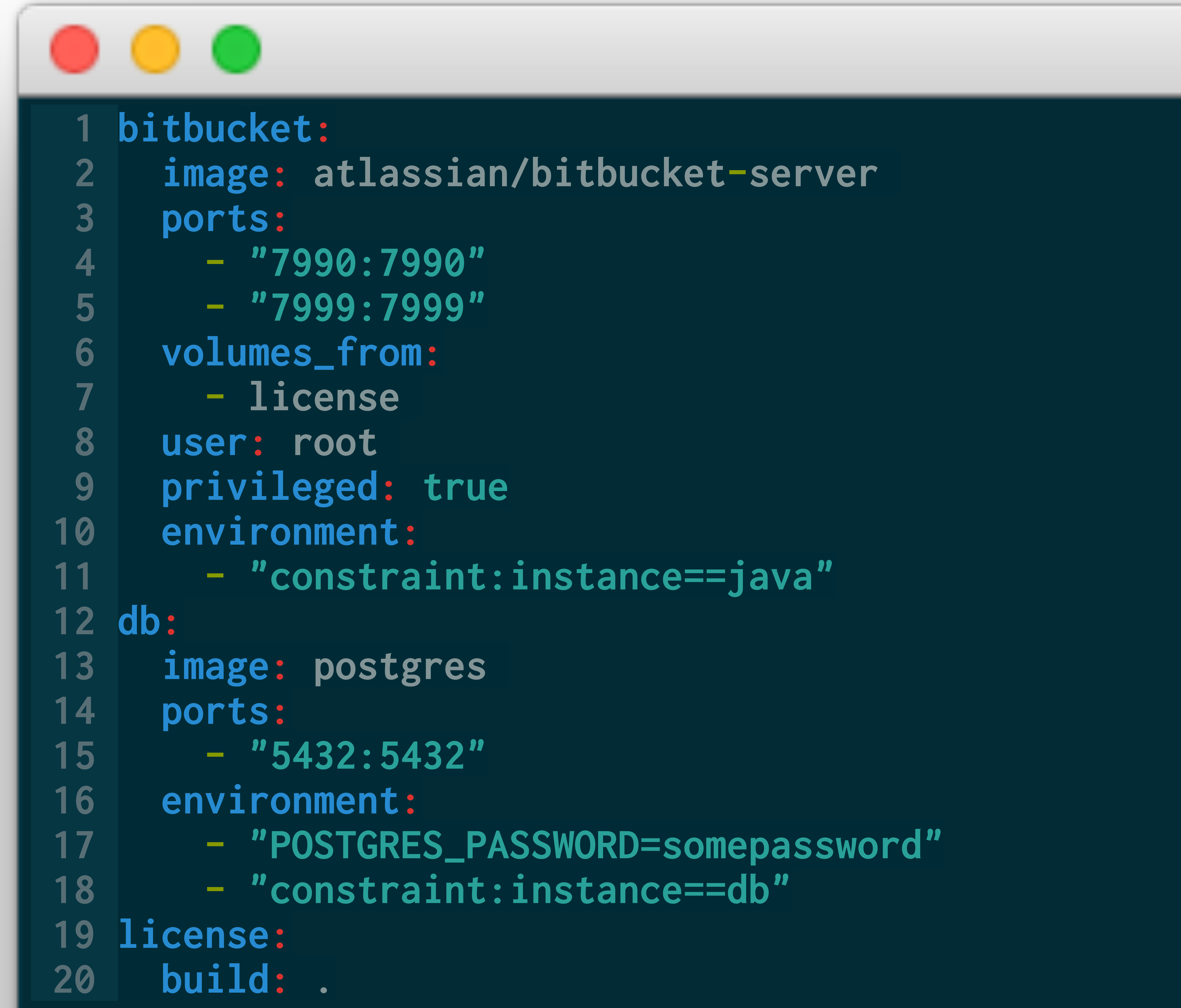
TOOL NR.3

Docker swarm



Docker swarm

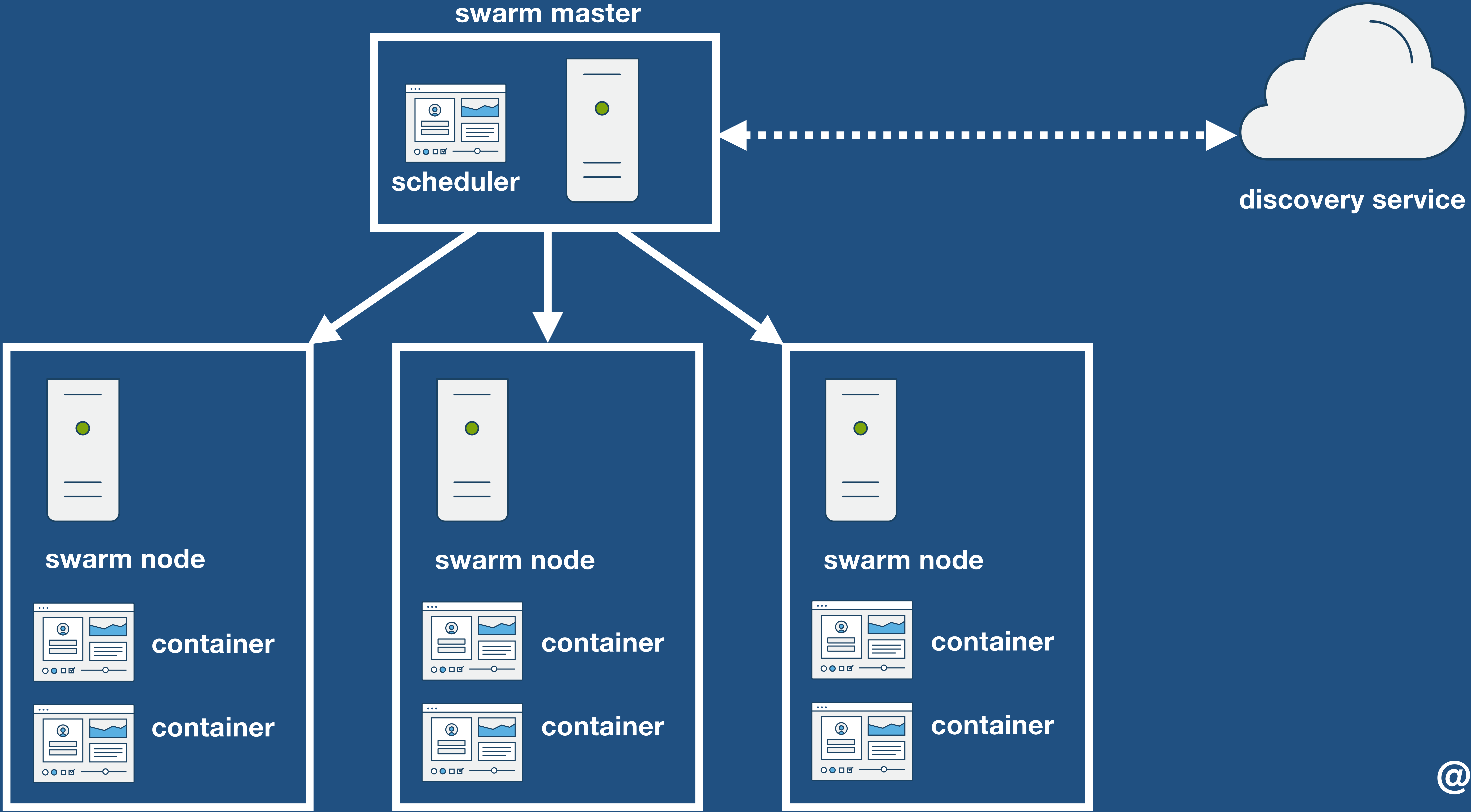
Deploy images and run containers on a full clusters as if you're handling a single machine



```
bitbucket:
  image: atlassian/bitbucket-server
  ports:
    - "7990:7990"
    - "7999:7999"
  volumes_from:
    - license
  user: root
  privileged: true
  environment:
    - "constraint:instance==java"
db:
  image: postgres
  ports:
    - "5432:5432"
  environment:
    - "POSTGRES_PASSWORD=somepassword"
    - "constraint:instance==db"
license:
  build: .
```

Docker swarm

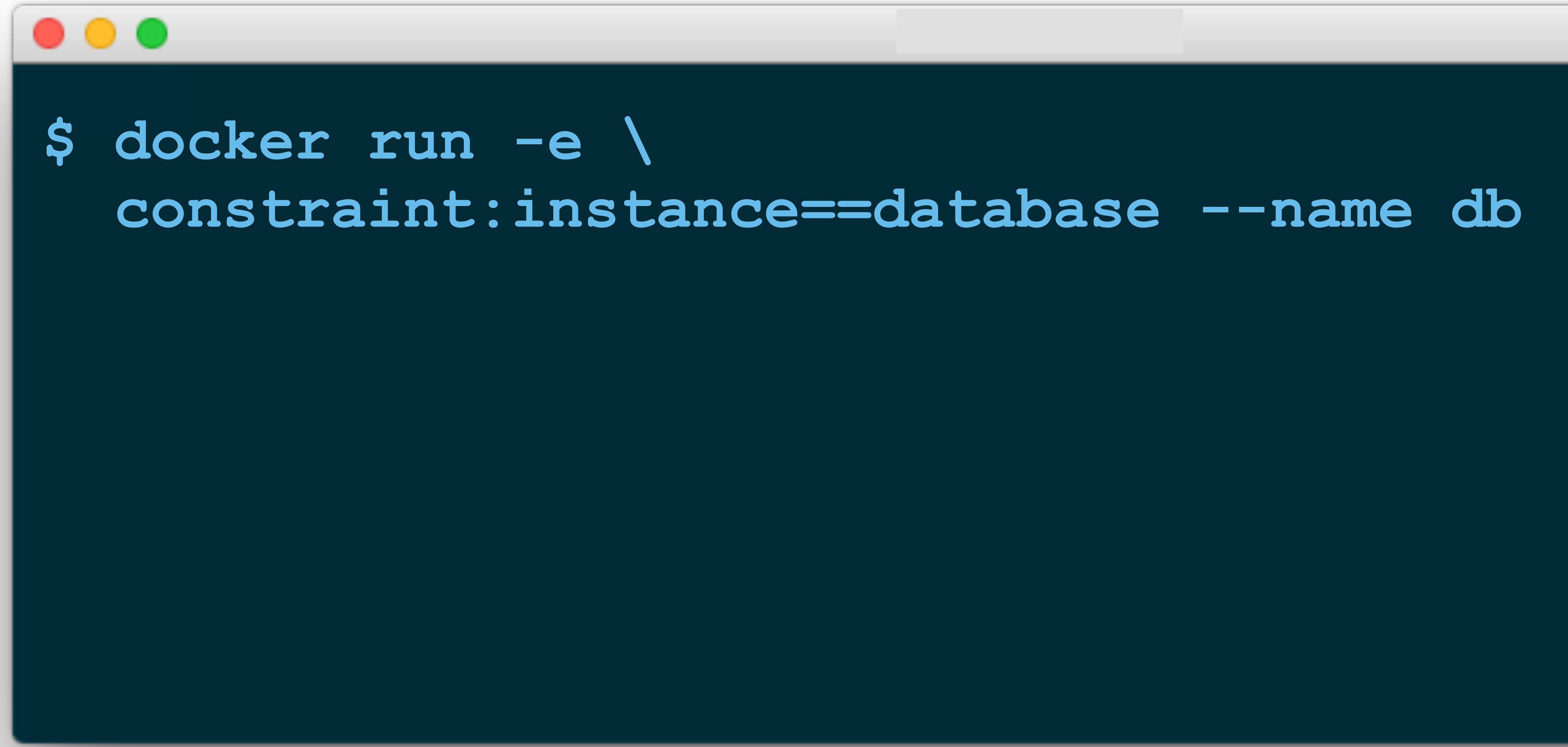
High level architecture



@durdn

Swarm comes with strategies and filters

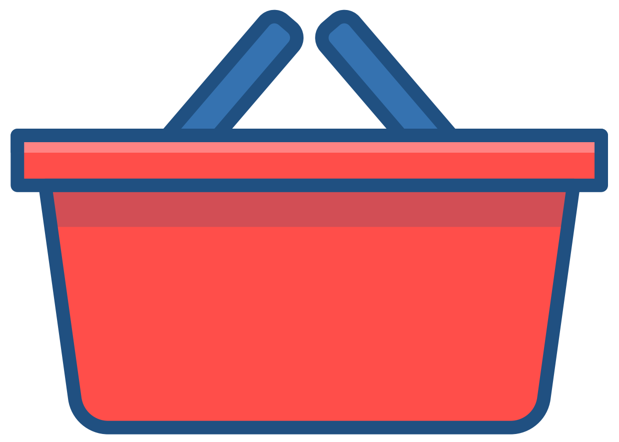
- Strategies
  - Spread
  - Binpack
  - Random
- Filters
  - Constraint
  - Affinity
  - Port
  - Dependency
  - Health



```
$ docker run -e \
  constraint:instance==database --name db
```

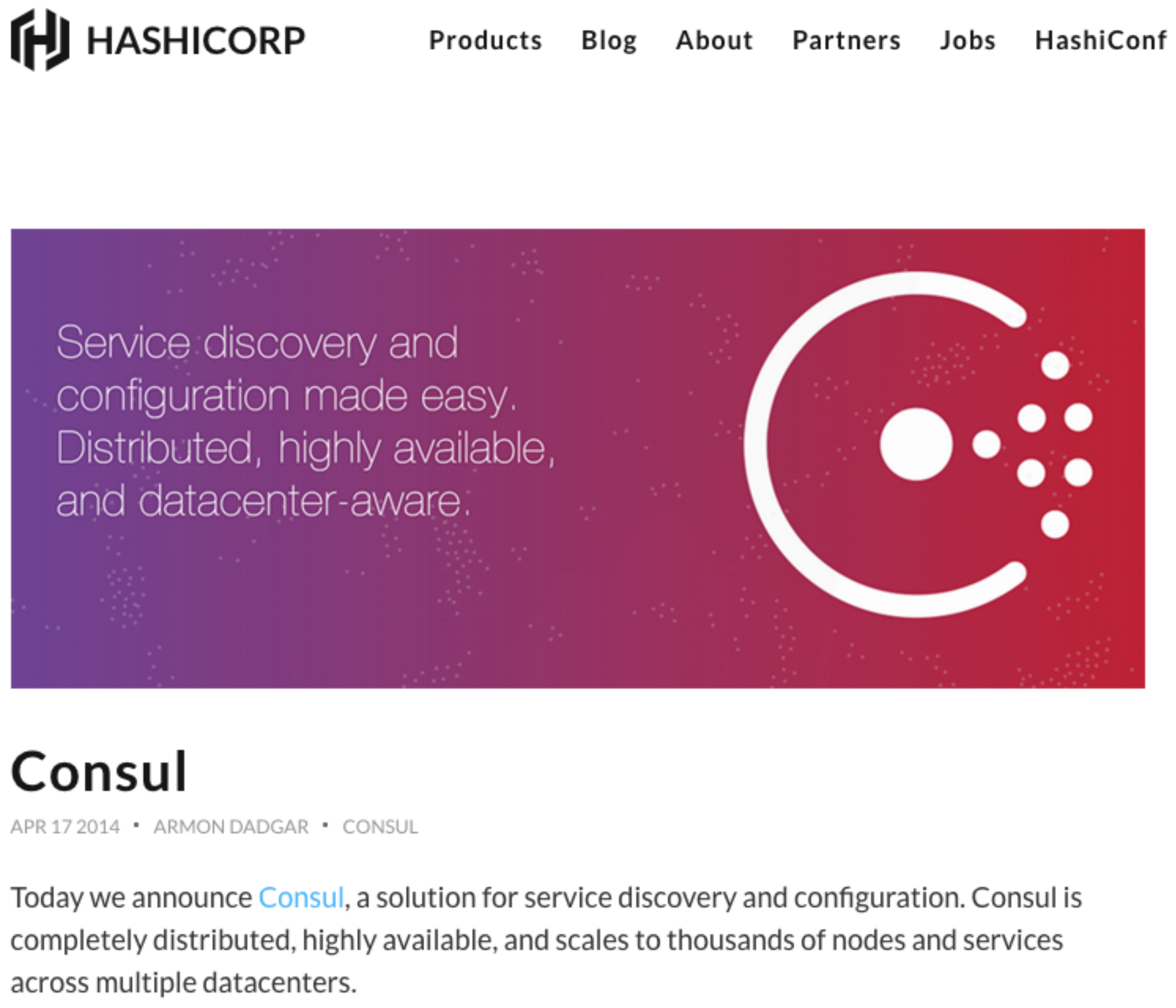
HELPER TOOL

Discovery Service



Consul from HashiCorp

For our Swarm to know which nodes are added to the infrastructure and store information about them we need to use a key-value discovery service, like Consul.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Service discovery and configuration made easy. Distributed, highly available, and datacenter-aware.

Consul

APR 17 2014 • ARMON DADGAR • CONSUL

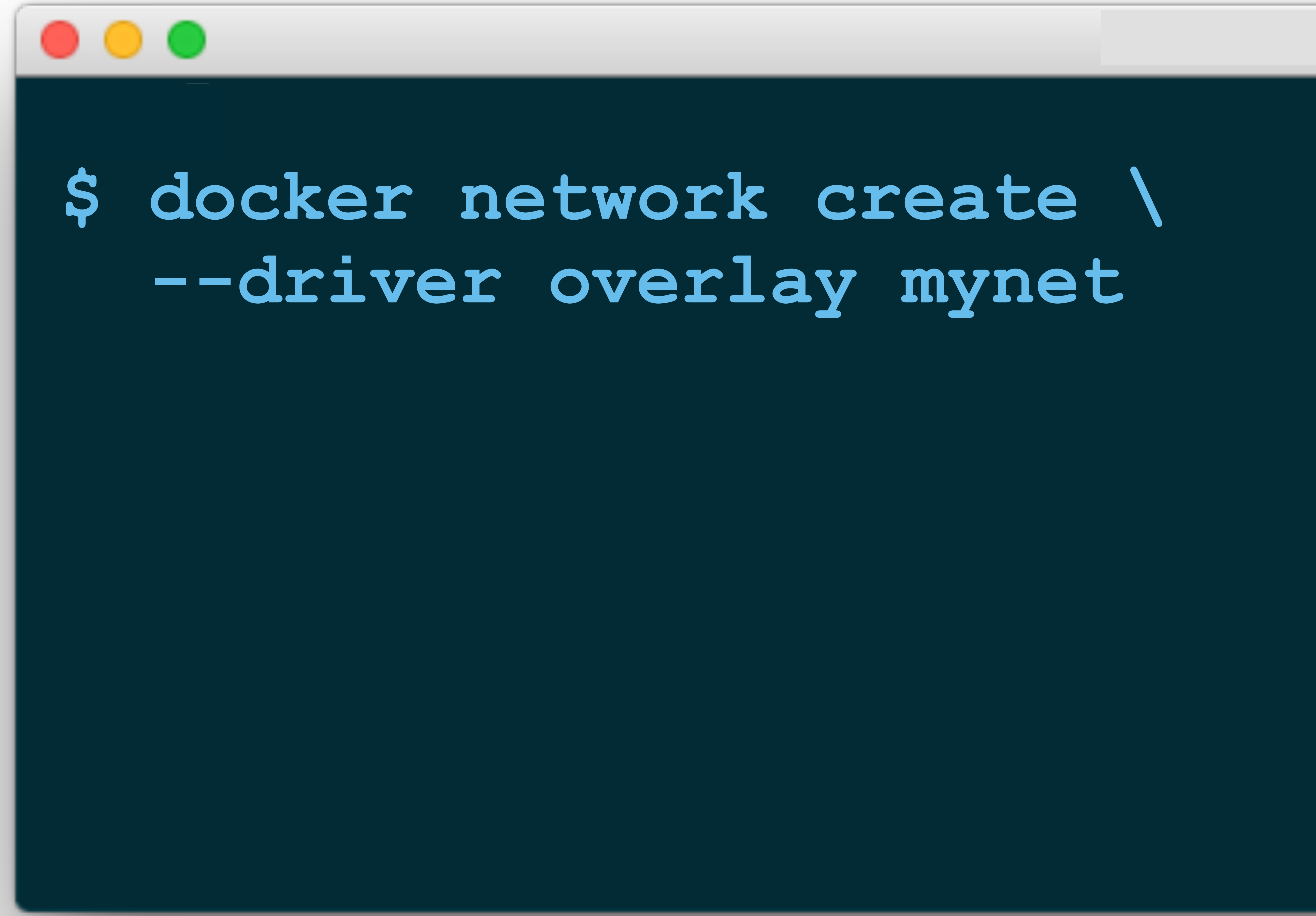
Today we announce Consul, a solution for service discovery and configuration. Consul is completely distributed, highly available, and scales to thousands of nodes and services across multiple datacenters.

TOOL NR.4

Docker network

Docker network

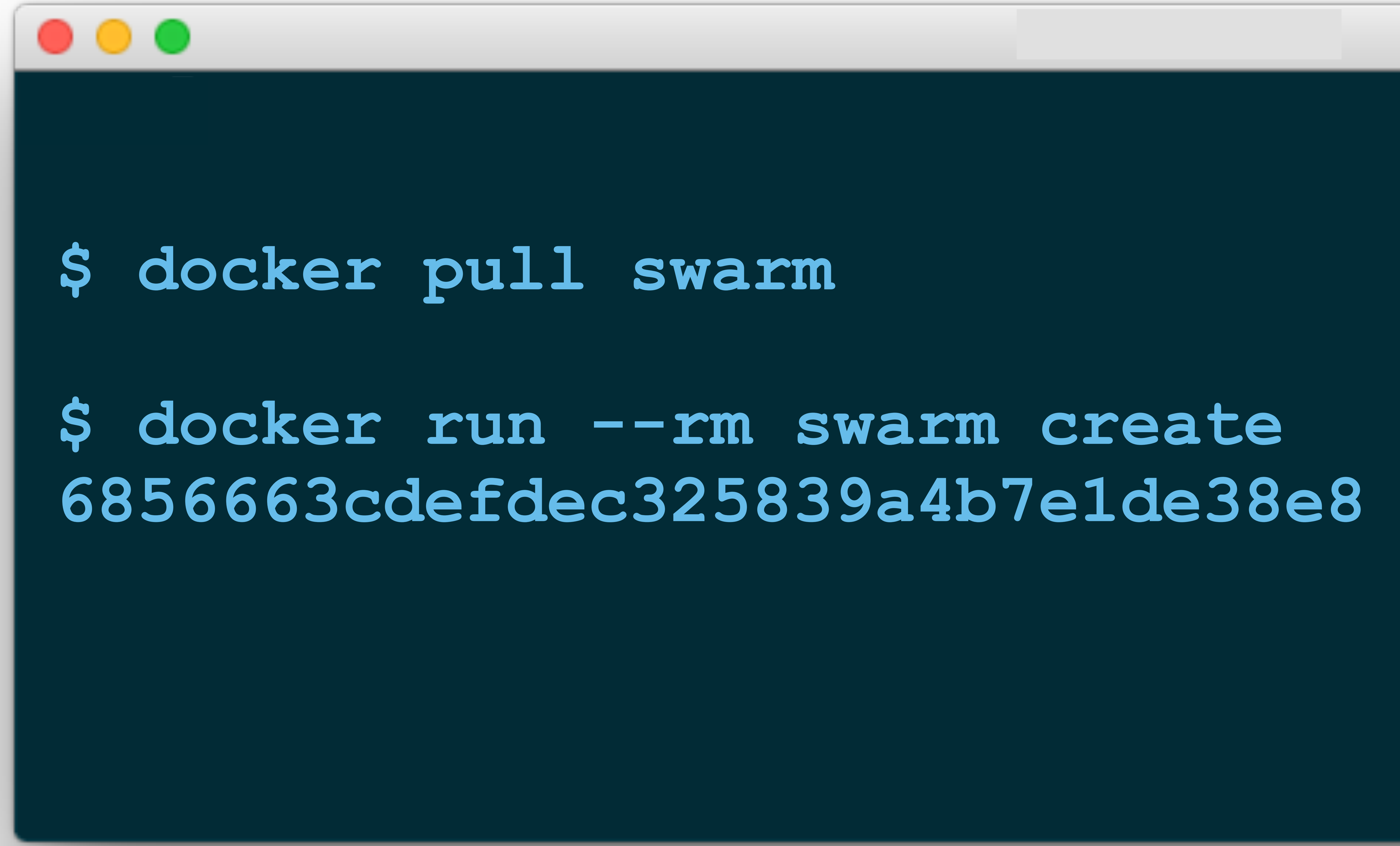
New Docker command to manage advanced and transparent networking, like creating VXLAN-based overlay networks that span across data centers.



```
$ docker network create \
  --driver overlay mynet
```

The plan for the Swarm DEMO

- Provision a Docker swarm
- Made up of three hosts
  - Master node
  - Node with 2gb of RAM
  - simple Node
- Use labels to deploy to nodes
- Run Java app and PostgreSQL on different nodes

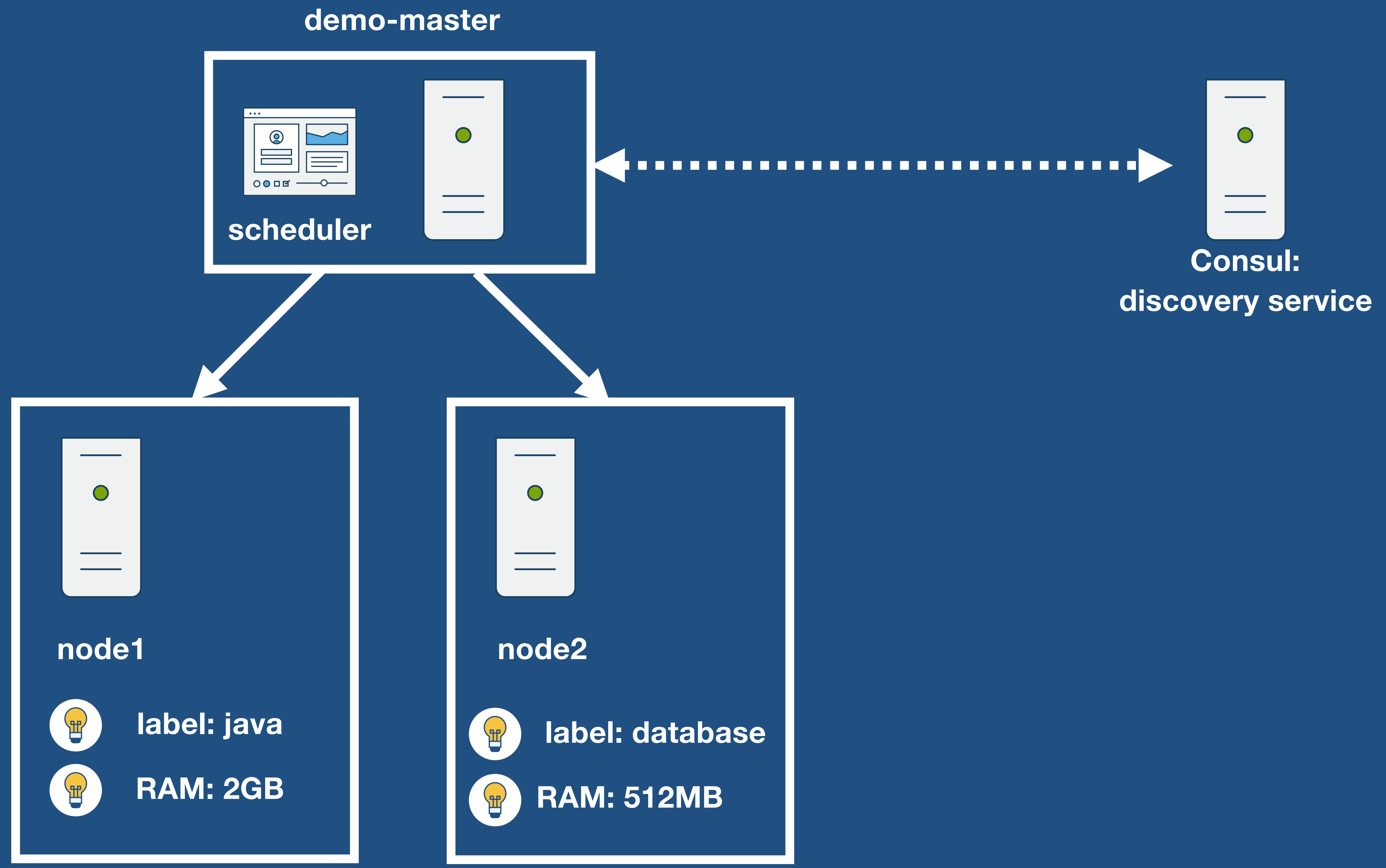


```
$ docker pull swarm

$ docker run --rm swarm create
6856663cdefdec325839a4b7e1de38e8
```

After Part 1

Current Architecture



docker-compose.yml

```yaml
bitbucket:
  image: atlassian/bitbucket-server
  ports:
    - "7990:7990"
    - "7999:7999"
  volumes_from:
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  user: root
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  image: postgres
  ports:
    - "5432:5432"
  environment:
    - "POSTGRES_PASSWORD=somepassword"
    - "constraint:instance==db"
license:
  build: .
```
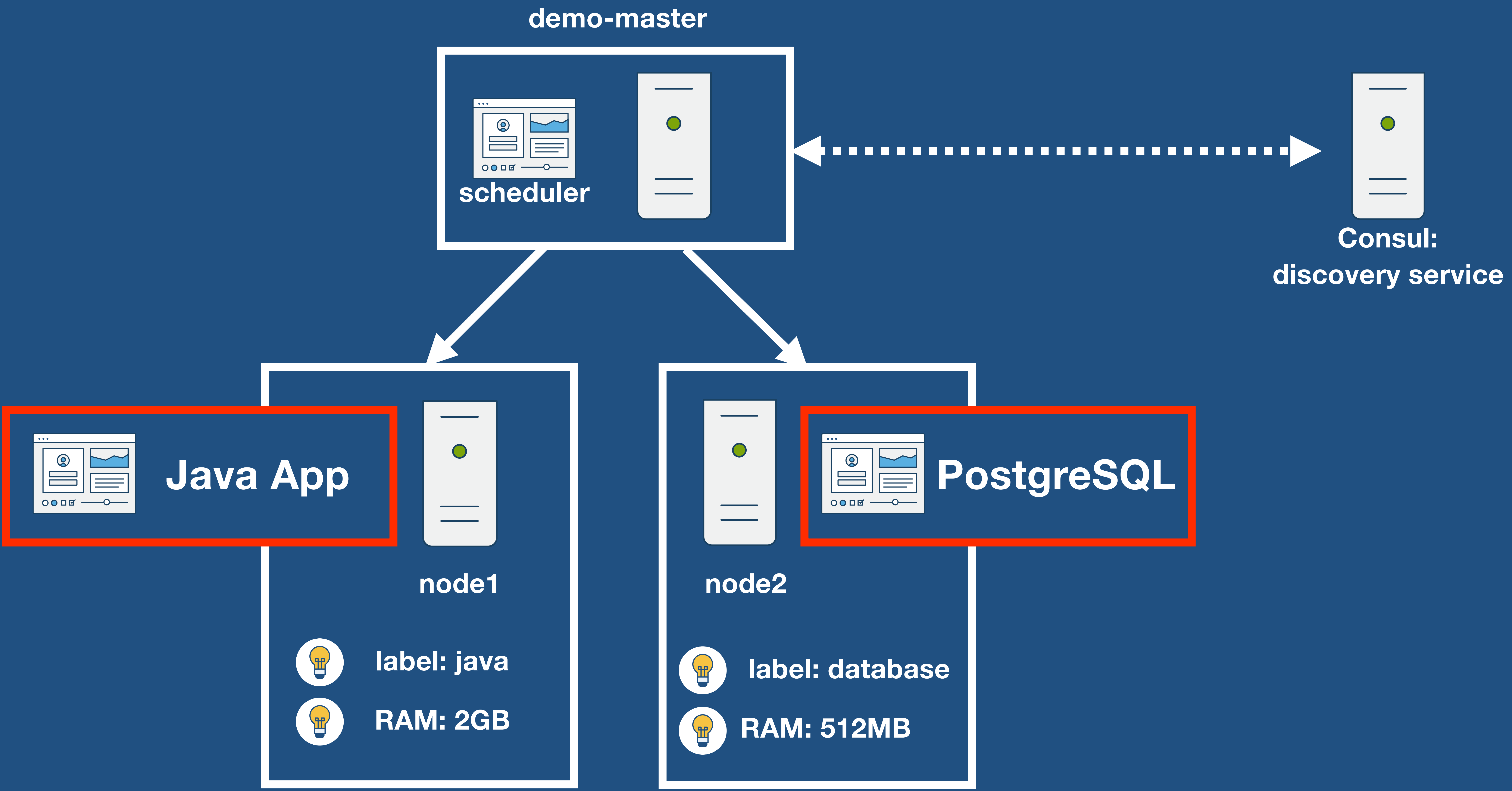

What we did

Final Architecture



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Recap of Swarm DEMO

- We created a 3-node cluster with "docker-machine"
- We tagged the nodes with labels
- We started our components using label constraints and not IP addresses

I hope you are hyped as I am for all this coolness, come talk to me afterwards!

Twitter: @durdn

goto; conference

Please

Remember to rate session

Thank you!