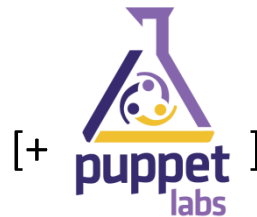
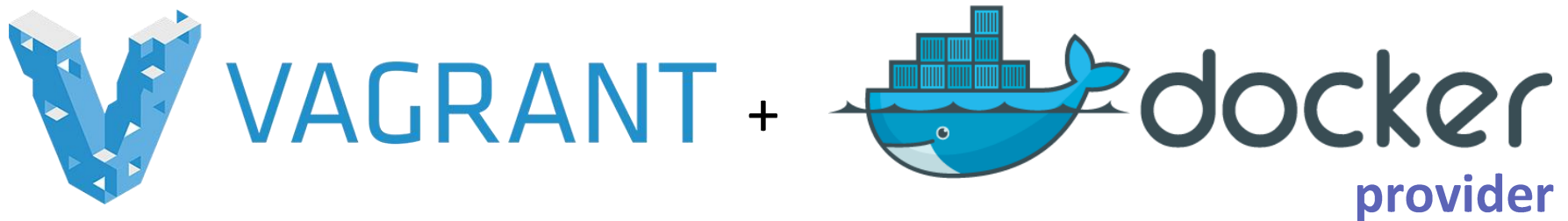


Docker Barcelona:



By Nicolas Poggi @ni_po

Sources: <https://github.com/npoggi/vagrant-docker>

About Nicolas Poggi @ni_po



Previous:



ATRAPALO.COM

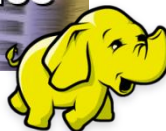
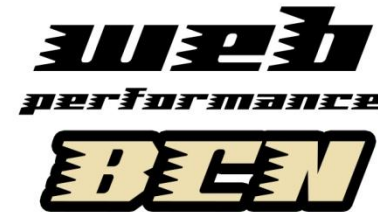


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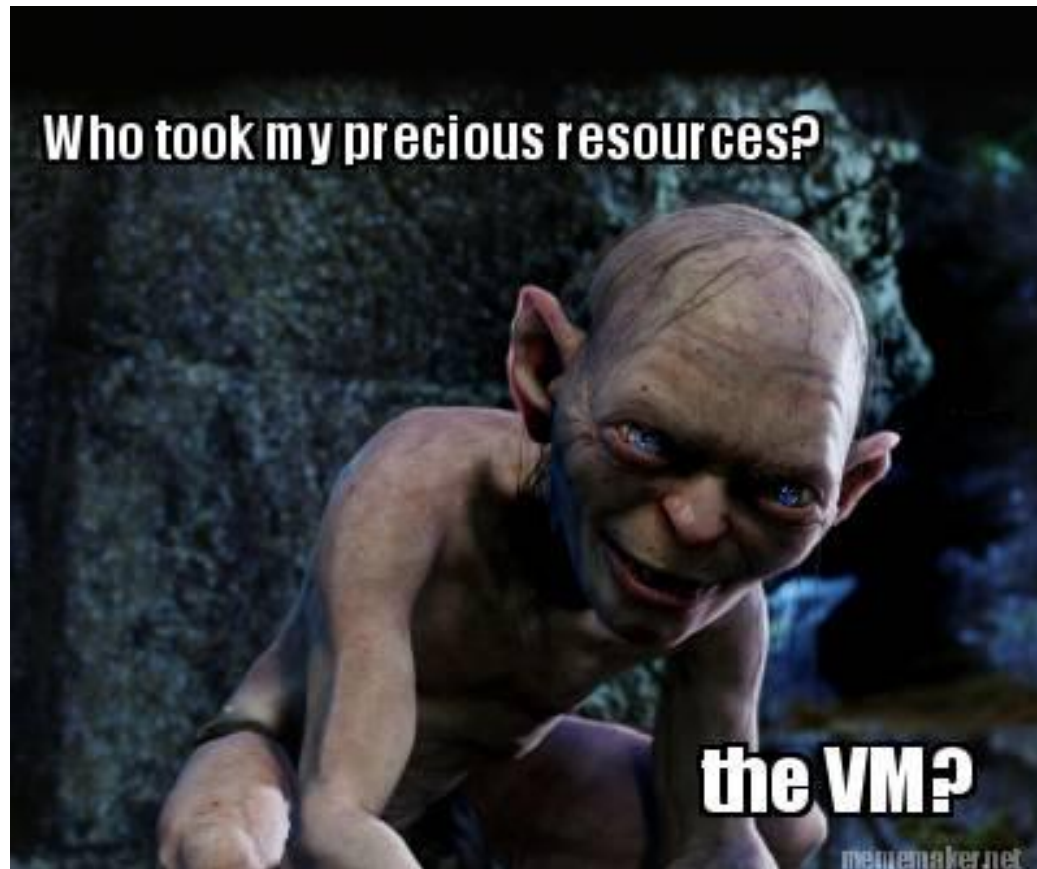
Current:



Organizing



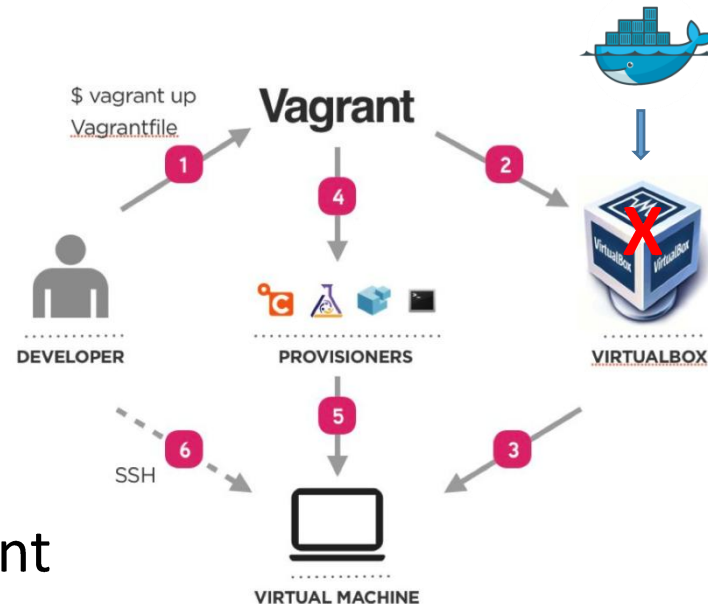
Motivation



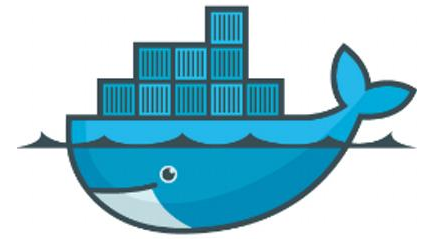
About Vagrant [+ puppet]



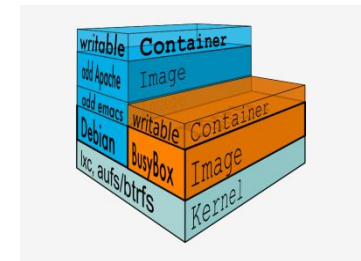
- It's all about AUTOMATION
- Designed to build and setup replicable, isolated, [DEV] envs
- Isolation (similar to docker)
 - Package code + environment
- Multiplatform
- Multiple Dev Envs
- Distributable
 - Avoids having a central DEV server/s
- Keep different versions
- Simplifies Configuration Management
 - (Also Docker's)
 - About puppet
 - World's favorite Configuration Management tool



About Docker

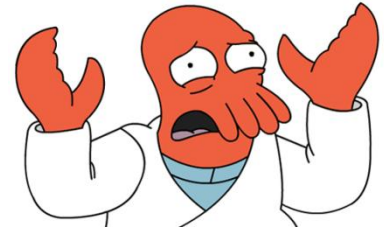


- Light-weight replacement for VMs in several scenarios
 - Also for Vagrant
- Based on Linux containers
 - Adds abstraction layer
- GIT like for OS images
 - Every step creates a different image
 - Docker hub integrates with github [and bitbucket]
- Similar to Vagrant
 - `Vagrantfile` \sim `Docker file`
- CONS
 - Complex commands



Why Vagrant + Docker provider?

- Same reason on “why Docker”
 - **Get rid of the VM**
 - Free system resources
 - No reserved RAM memory or CPU/s
 - Get back control of your own machine!
- Same reasons on “**why Vagrant**”
 - Best way to learn **puppet**, so a good way to learn **docker**
 - Vagrant takes care of many manual chores
 - ...
- **Makes sense!**
 - You are dealing with DEV environments
 - Fewer security concerns
 - Limited resources on laptops
 - Keep active tens of different DEV environments
- ...and vagrant up anything!
 - Including docker



vagrant up vs. `sudo docker run -d -name image_name -p 8080:80 -t user/repo`

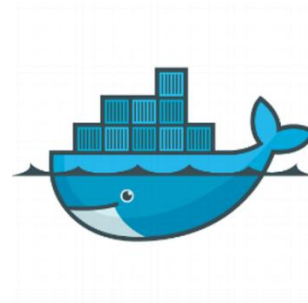
Requirements

- 1.) Get a real open-source GNU OS
 - ...With the latest kernel, i.e., Archlinux
 - Sorry **Mac** and **Windows**...
 - Don't cry, boot2docker to the rescue
 - You can use it within a VM to share your Vagrantfile
- Latest Vagrant version
 - v1.6 >
- Latest Docker version
 - v1.0 >
- **Root access** (for Docker)



Vagrant providers

- Official providers
 - Virtualbox (DEFAULT)
 - VMWare
 - Amazon
 - ...
- Docker
 - YES!
- Other providers



Basic Vagrant commands



Vagrant

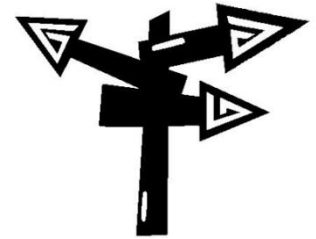
- vagrant
 - up
 - provision
 - ssh
 - halt/suspend

Docker provider

- vagrant
 - docker-logs
 - docker-run

NOTE: You can still use all of docker commands!

Docker provider for Vagrant



Two alternative routes

1.) Docker images

- Use a pre-built docker image
- **Pros**
 - Easy
 - Faster to deploy
 - No need to deal with the Docker file
- **Cons**
 - Less control
 - Public images

2.) Dockerfile

- Build your own (w/ Vagrant)
- **Cons**
 - More complex
 - Slow to start
 - (then is cached)
- **Pros**
 - Custom made
 - Privately managed
 - For free

Building a docker image in Vagrant

The hard way



Dockerfile, the requisites for Vagrant

1. Import image FROM repo:tag
2. Create vagrant user
 1. create password
 2. sudo permissions and password-less
3. Configure SSH
 1. Setup keys
4. Install base packages
5. Install Configuration Management system
 1. Puppet, etc...
6. Expose SSH port
7. Run SSH as a daemon

Sample Docker file for vagrant

- <https://github.com/npoggi/vagrant-docker/blob/master/Dockerfile>

```
1  # Base Vagrant box
2
3  #Had problems with rpcbind https://github.com/dotcloud/docker/issues/1024
4  #FROM ubuntu-upstart:precise
5
6  FROM ubuntu:12.04
7  MAINTAINER Fabio Rehm "fgrehm@gmail.com"
8
9  # Create and configure vagrant user
10 RUN useradd --create-home -s /bin/bash vagrant
11 WORKDIR /home/vagrant
12
13 # Configure SSH access
14 RUN mkdir -p /home/vagrant/.ssh
15 RUN echo "ssh-rsa AAAAB3NzaC1yc2EAAAABIwAAAQEA6NF8iallvQVp22WDkTkyrtvp9eWW6A8YVr+kz4TjGYe7gHzIw+niN1tGEFHxD8+v1I2YJ6oXevct1Ye"
16 RUN chown -R vagrant: /home/vagrant/.ssh
17 RUN adduser vagrant sudo
18 RUN echo -n 'vagrant:vagrant' | chpasswd
19
```

The Vagrantfile

- Optional: Setup docker as a default provider

- Select

- If to build from a Dockerfile
- Or use a prebuilt docker image
- Set has.ssh to true

- Rest as usual in a Vagrantfile

- Ports, mounts
- Config management i.e., puppet

- Example

- <https://github.com/npoggi/vagrant-docker/blob/master/Vagrantfile>

```
VAGRANTFILE_API_VERSION = '2'
#avoids having to $ vagrant provider=docker
ENV['VAGRANT_DEFAULT_PROVIDER'] ||= 'docker'

#print 'Loading the Vagrantfile...\n'

Vagrant.configure(VAGRANTFILE_API_VERSION) do |config|

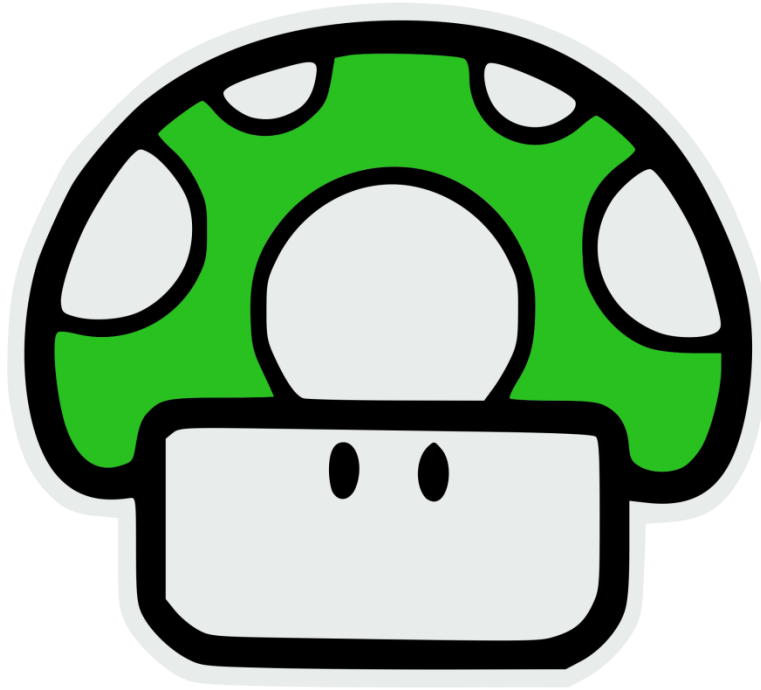
  #sample web server host
  config.vm.define 'web' do |web|
    web.vm.provider 'docker' do |d|

      #use a prebuilt image ie 'npoggi/vagrant-docker:latest'
      if ENV['DOCKER_IMAGE'] then
        print 'Using docker image ' + ENV['DOCKER_IMAGE'] + ' (downloads if necessary)\n'
        d.image = ENV['DOCKER_IMAGE']
      else
        #build from the Dockerfile
        print 'Building from the Dockerfile (if necessary)\n'
        d.build_dir = '.'
        d.name = 'vagrant-docker'
      end

      #the docker image must remain running for SSH (See the Dockerfile)
      d.has_ssh = true
    end
  end
end
```

Building, running, setting up, deploying, etc.

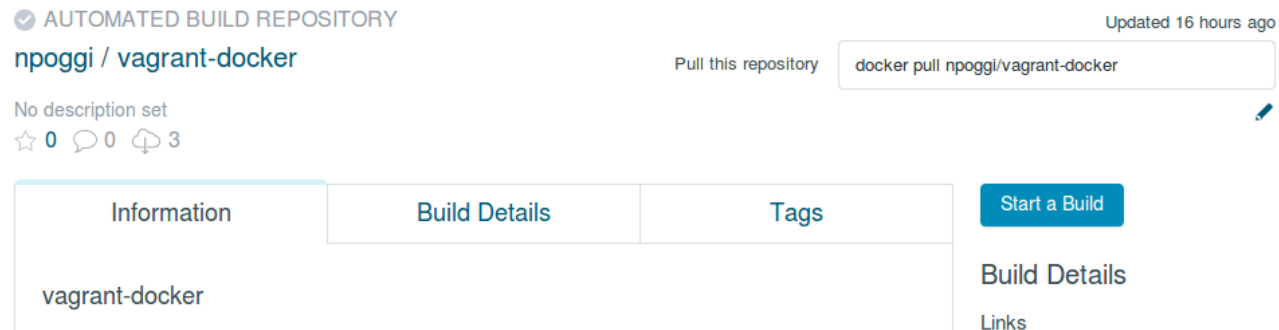
just



vagrant up

Use prebuilt docker images for Vagrant

The easy way



A screenshot of a Docker Hub repository page for 'npoggi / vagrant-docker'. The page is titled 'AUTOMATED BUILD REPOSITORY' and shows the repository name 'npoggi / vagrant-docker'. It indicates 'No description set' and shows 0 stars, 0 comments, and 3 forks. A 'Pull this repository' button is present, with a dropdown menu showing the command 'docker pull npoggi/vagrant-docker'. The page is updated '16 hours ago'. Below the repository name, there are tabs for 'Information', 'Build Details', and 'Tags'. The 'Information' tab is selected, showing the repository name 'vagrant-docker'. On the right side, there is a 'Start a Build' button and links for 'Build Details' and 'Links'.

✓ AUTOMATED BUILD REPOSITORY

npoggi / vagrant-docker

No description set

☆ 0 💬 0 📦 3

Pull this repository

docker pull npoggi/vagrant-docker

Updated 16 hours ago

Information Build Details Tags

vagrant-docker

Start a Build

Build Details

Links

Examples at:

<https://hub.docker.com/u/npoggi/>

<https://registry.hub.docker.com/search?q=vagrant>

Other ways to create images

1. Use docker
2. Docker Hub
 1. Link your github project (public or private (at a cost))
 2. Select Automate build
 3. Point to your Docker file
 4. And ... Wait for the build to complete!

The screenshot shows the Docker Hub interface for the repository `npoggi / vagrant-docker`. The page is titled "AUTOMATED BUILD REPOSITORY" and indicates it was updated 16 hours ago. It features a search bar, navigation links for "Browse Repos", "Documentation", "Community", and "Help", and a user profile for "npoggi". The repository page includes a "Pull this repository" button with the command `docker pull npoggi/vagrant-docker`. Below the repository name, there are statistics for stars (0), forks (0), and pulls (3). The main content area is divided into three tabs: "Information", "Build Details", and "Tags". The "Information" tab is active, displaying the repository's description: "Use docker instead of a VM (i.e., virtualbox) in Vagrant as a provider to save system resources (and be more fashionable)". It also provides sample code for building and running the image. The "Build Details" tab is visible on the right, showing links to "Build Details", "Links", "Source Project Page", "Source Repository", "Files", "Build Bundle", "Dockerfile", "Settings", and "Description".

Search...

[Browse Repos](#) [Documentation](#) [Community](#) [Help](#) npoggi

AUTOMATED BUILD REPOSITORY Updated 16 hours ago

npoggi / vagrant-docker Pull this repository `docker pull npoggi/vagrant-docker`

No description set
☆ 0 💬 0 📄 3

Information	Build Details	Tags
<p>vagrant-docker</p> <p>Use docker instead of a VM (i.e., virtualbox) in Vagrant as a provider to save system resources (and be more <i>fashionable</i>)</p> <p>Use this sample code to build your own boxes.</p> <p>It features Puppet [Chef is optional] and a sample NginX web Server</p> <p>Simple usage:</p> <p>Builds your own docker image from the Dockerfile</p> <pre>cd vagrant-docker vagrant up</pre>	<p>Build Details</p> <p>Links</p> <p>Source Project Page</p> <p>Source Repository</p> <p>Files</p> <p>Build Bundle</p> <p>Dockerfile</p> <p>Settings</p> <p>Description</p>	

Saving state [and time] - Docker Hub

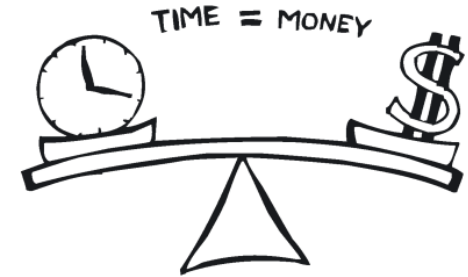
- Get container `CONTAINER_ID`
 - `docker ps`
- Commit image
 - `docker commit [-m "my comment"] CONTAINER_ID user/repo[:tag]`
 - (had permissions problems to the main repo)
- Push image
 - `docker push user/repo[:tag]`

Try it yourself

- Install requirements (latest vagrant and docker)
- Basic usage:
 1. `git clone https://github.com/npoggi/vagrant-docker.git`
 2. `cd vagrant-docker`
 3. `vagrant up`
- Test: <http://localhost:8080/>
- Advanced usage:
 - For a vanilla image built using the same docker file:
 - `DOCKER_IMAGE='npoggi/vagrant-docker' vagrant up provision`
 - For a pre-provisioned image with the puppet config (saves time)
 - `DOCKER_IMAGE='npoggi/vagrant-docker-provisioned' vagrant up`

```
npoggi@darchi:~/workspace/vagrant-docker$ vagrant up
Building from the Dockerfile (if necessary)~Bringing machine 'web' up with 'docker' provider...
==> web: Build image no longer exists. Rebuilding...
==> web: Building the container from a Dockerfile...
web: Image: a6be155ed789
==> web: Vagrant has noticed that the synced folder definitions have changed.
==> web: With Docker, these synced folder changes won't take effect until you
==> web: destroy the container and recreate it.
==> web: Starting container...
==> web: Waiting for machine to boot. This may take a few minutes...
web: SSH address: 172.17.0.12:22
web: SSH username: vagrant
web: SSH auth method: private key
web: Warning: Connection refused. Retrying...
==> web: Machine booted and ready!
==> web: Machine already provisioned. Run 'vagrant provision' or use the '--provision'
==> web: to force provisioning. Provisioners marked to run always will still run.
npoggi@darchi:~/workspace/vagrant-docker$
```

Time improvements



Vagrant virtualbox (default)

- vagrant up: 30.6s
- vagrant halt: 7.1s

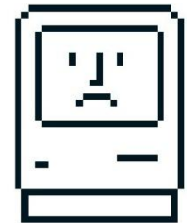
Vagrant docker

- vagrant up: 2.6s
- Vagrant halt: 2.3



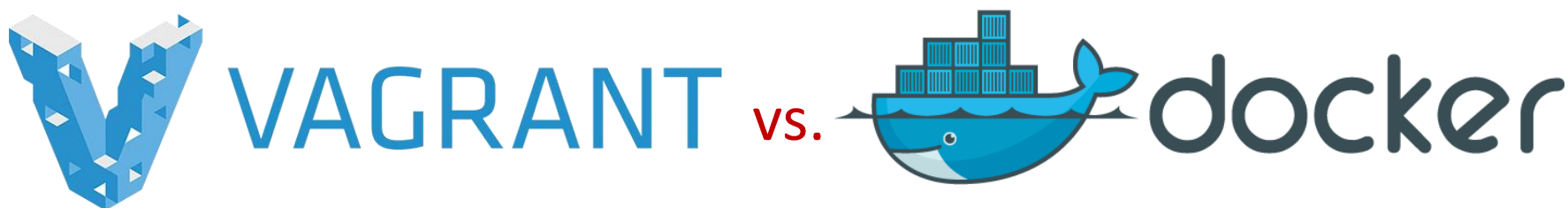
Gotchas! ...and annoyances

- Docker by default requires root permissions!
- Be ready for **BUGS!!!**
 - Vagrant Docker provider *less stable*
 - Doesn't save to run docker commands occasionally
 - **Docker too...**
 - Renames in machines are a problem (manual work)
 - Delete orphaned images with complex commands
 - ...
- Vagrant **package** command only for virtualbox
- Docker image downloads quite slow...
- ...there is still Mac and Windows



Other considerations

- Can Docker replace vagrant use?
 - Yes, but...



- Alternatives to Docker in Vagrant
 - **vagrant-lxc** plugin (not official)

Future steps for the source code

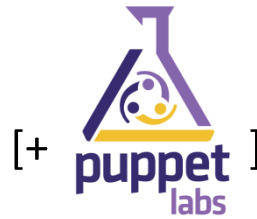
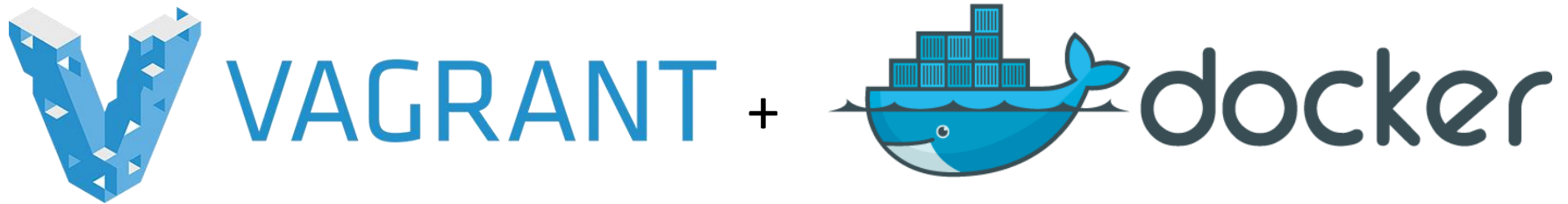
- Multiple Vagrant-Docker machines
- Light-weight OS
 - Boot2Docker
 - CoreOS
- **Vagrant + Docker provider + Docker**
 - Inception kick!



Tips and tricks

- Update to the latest versions (i.e., github)
- Docker by default requires **root permissions!**
 - Add your user to the docker group
 - `sudo usermod -a -G docker your_user; newgrp docker;`
- Change the default image dir
 - Edit the service description add
 - `-g /home/user/docker_images`
- Delete “untagged/orphaned images”
 - `docker rmi $(docker images -a | grep "^<none>" | awk '{print $3}')`
- Enable IPv4 forwarding to allow internet connections inside the containers

Final notes



- Get back you DEV ENV!
- Speedup development
- R&D
- Code
 - <https://github.com/npoggi/vagrant-docker>
- Docker images
 - <https://registry.hub.docker.com/u/npoggi/>

Credits and References

- Vagrant specific
 - Main site: <http://www.vagrantup.com/>
 - Alternative to Docker:
<https://github.com/fgrehm/vagrant-lxc>
- Docker specific
 - Docker: <https://www.docker.com/>
 - Docker hub: <https://registry.hub.docker.com>
 - Light-weight VM:
<https://github.com/boot2docker/boot2docker>
- Puppet labs: <http://puppetlabs.com/>