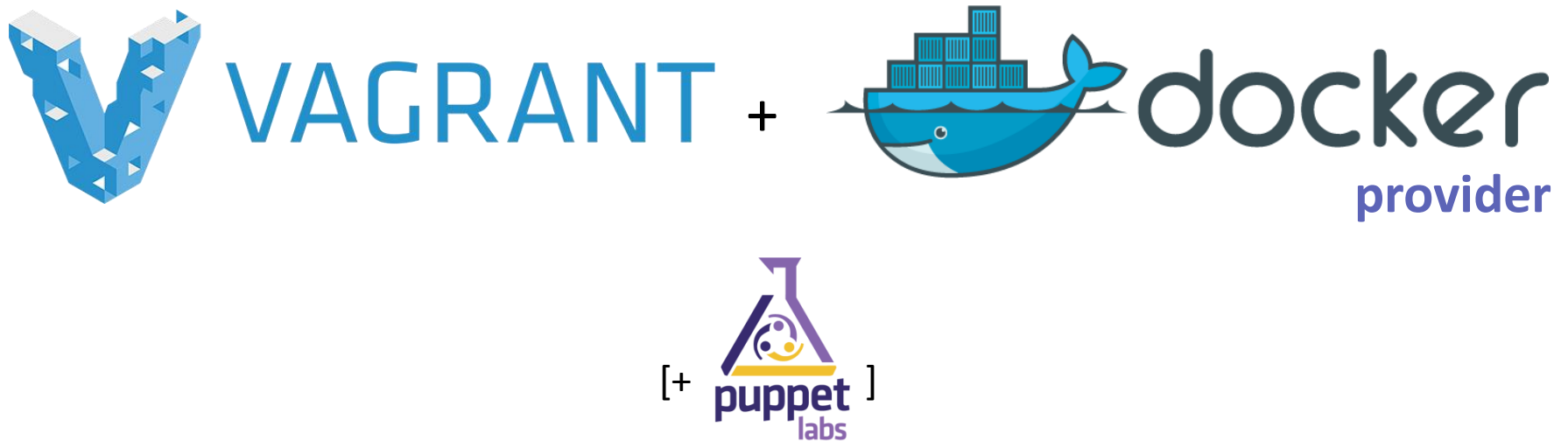


Docker Barcelona:



By Nicolas Poggi @ni_po

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

About Nicolas Poggi @ni_po



Previous:



ATRAPALO.COM

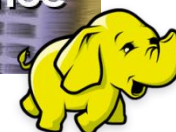
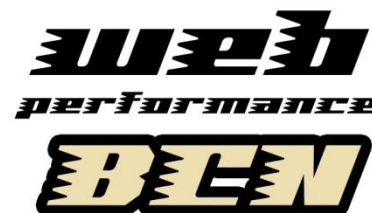


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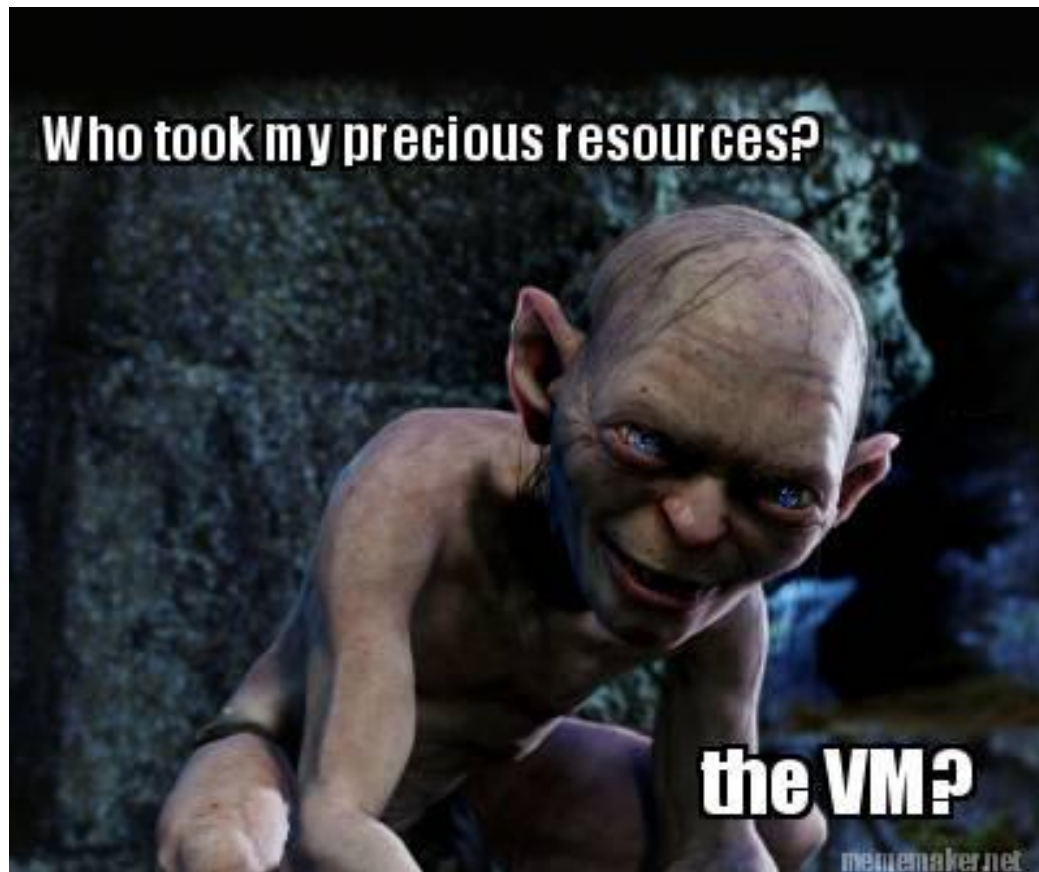
Current:



Organizing



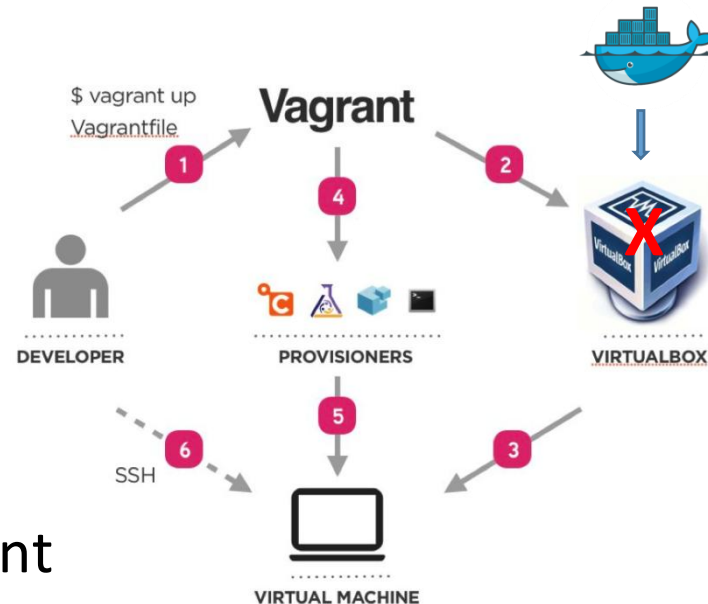
Motivation



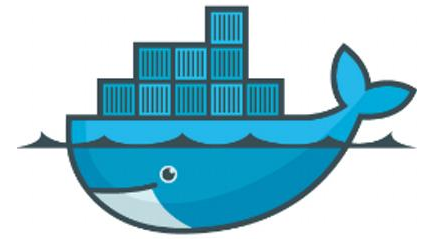
About Vagrant [+ puppet]



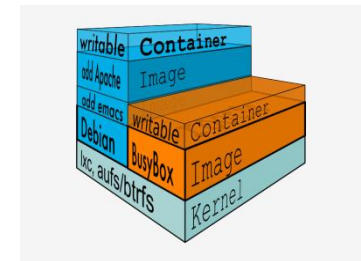
- It's all about AUTOMATION
- Designed to build and setup replicable, isolated, [DEV] envs
- Isolation (similar to docker)
 - Package code + environment
- Multiplatform
- Multiple Dev Envs
- Distributable
 - Avoids having a central DEV server/s
- Keep different versions
- Simplifies Configuration Management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



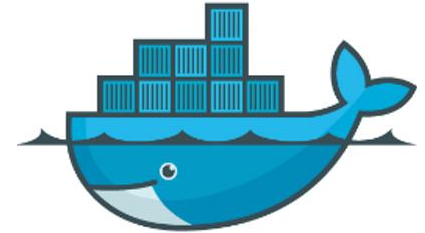
About Docker



- 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 `Dockerfile`
- CONS
 - Complex commands



Docker basics



Command

- `docker`
- `docker pull`
- `docker images`
- `docker ps`
- `docker run`
- `docker rm/rmi`

Description

- Lists commands
- Downloads container images
- Lists available images
- Lists running containers
- Executes a command in a container
- Deletes images

Docker tutorial

- <https://github.com/harbur/docker-workshop>
 - By Dimitris Kapanidis @spiddy

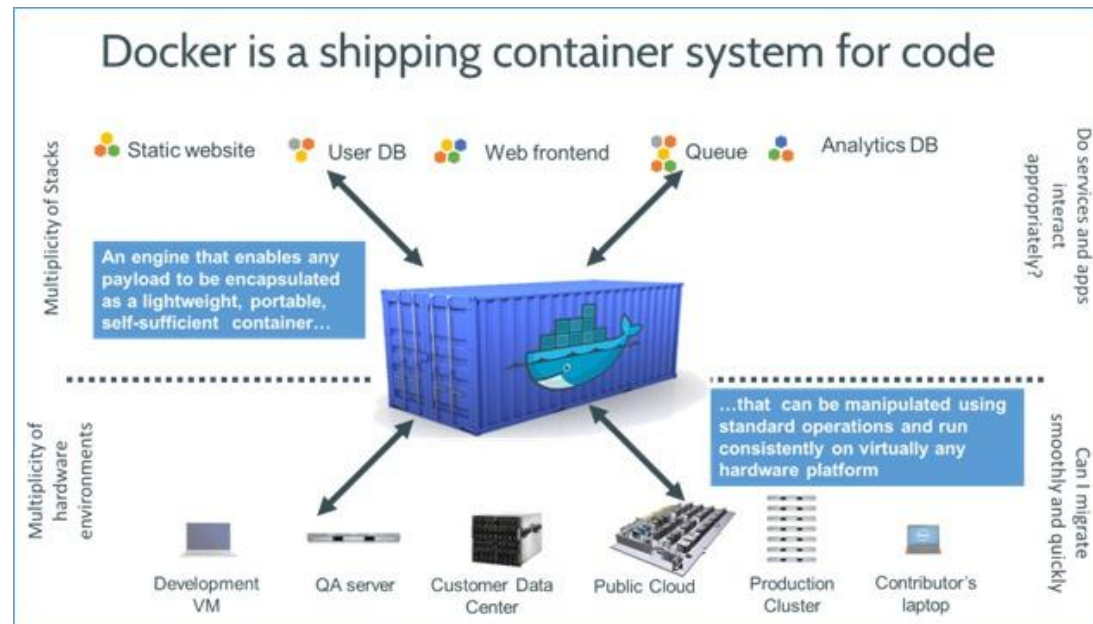
- Initial Steps:

1. `docker version`
2. `docker pull ubuntu`
3. `docker pull nginx`
4. `git clone https://github.com/harbur/docker-workshop`

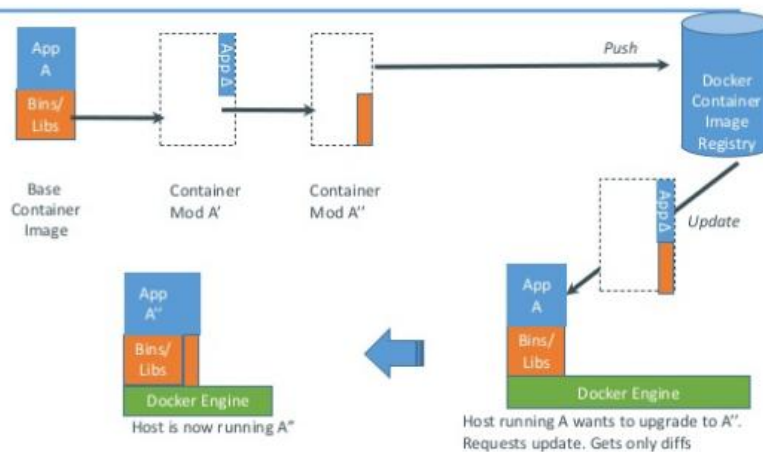


Docker advantages

- Speed
 - lightweight
- Isolation
- Automation
- Portability
- Migration
- ... more to come

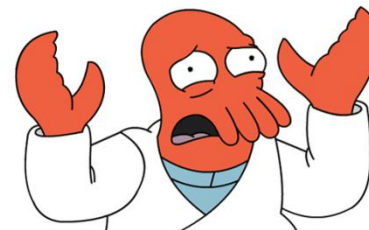


Changes and Updates



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`

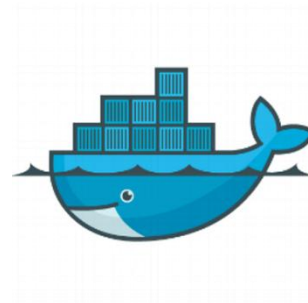
Requirements

- 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
 - Vagrant fires up the VM on non supported platforms
- 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

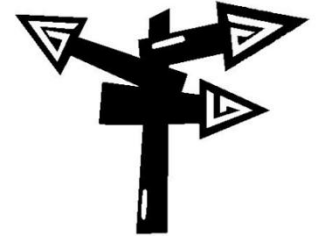
- vagrant
 - **up**
 - provision
 - ssh
 - halt/suspend

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 AAAAB3NzaC1yc2EAAAABIwAAAQEA6NF8ia1lvQVp22WDkTkyrtvp9eWW6A8YVr+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|

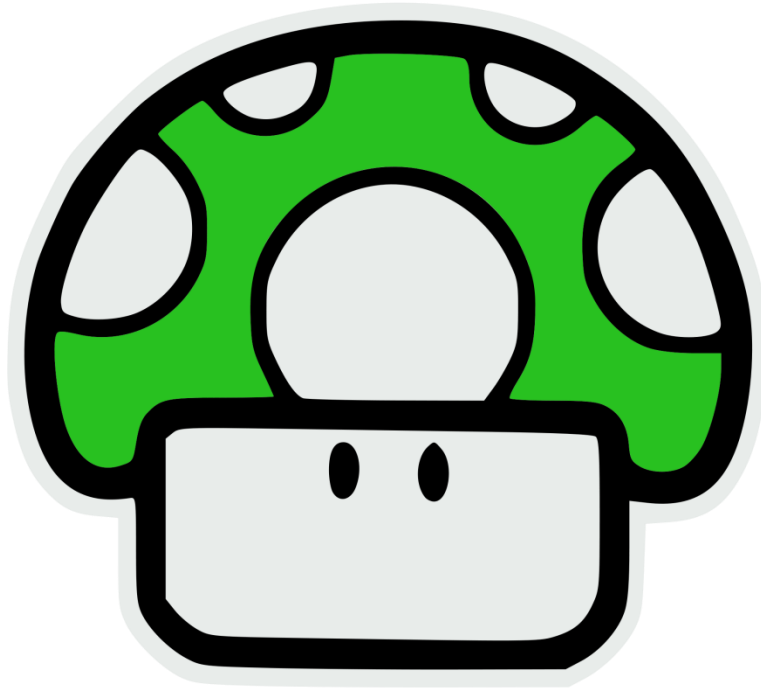
  #sample web server host
  config.vm.define 'web' do |web|
    web.vm.provider 'docker' do |d|

      #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.

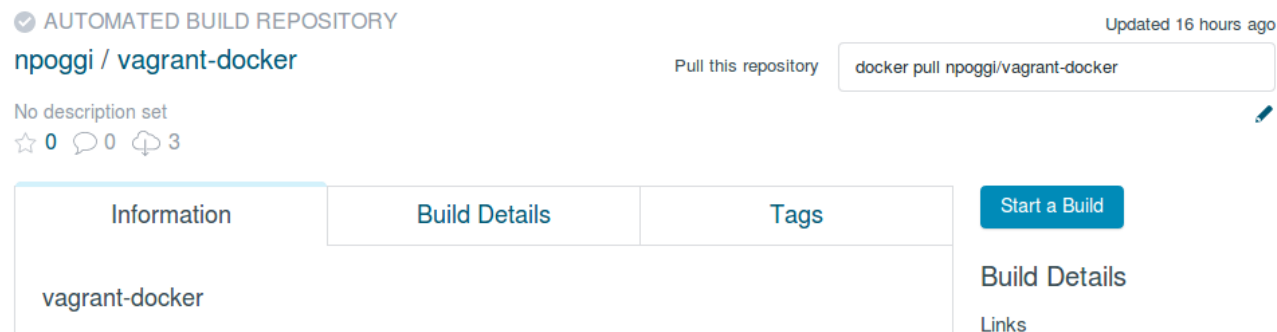
just



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 shows it is an 'AUTOMATED BUILD REPOSITORY' updated 16 hours ago. It includes a 'Pull this repository' button and a code snippet 'docker pull npoggi/vagrant-docker'. Below the repository name, it says 'No description set' and shows 0 stars, 0 comments, and 3 forks. There are tabs for 'Information', 'Build Details', and 'Tags'. The 'Information' tab is active, showing 'vagrant-docker'. On the right, 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

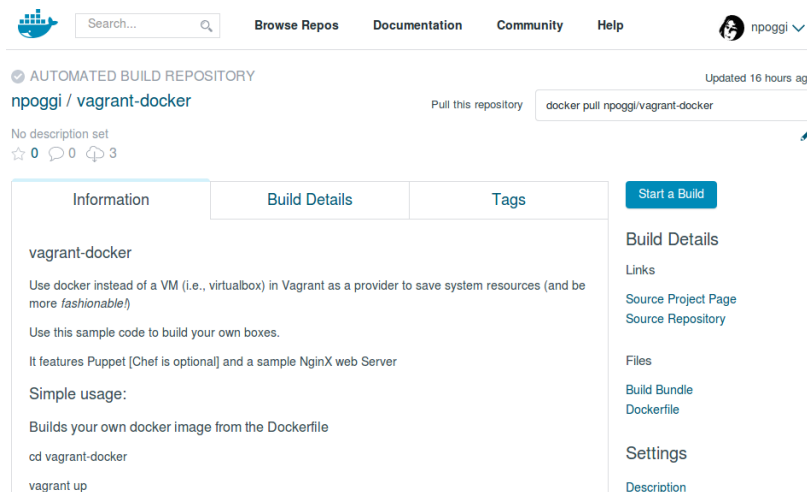
Examples at:

<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 has 0 stars, 0 comments, and 3 forks. A "Pull this repository" button is available with the command `docker pull npoggi/vagrant-docker`. The main content area is divided into three tabs: "Information", "Build Details", and "Tags". The "Information" tab is active, displaying the repository name, a description of the project (using Docker instead of a VM in Vagrant), sample code for building and running the image, and a "Simple usage" section. The "Build Details" tab is also visible, showing a "Start a Build" button and a list of links including "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

npoggi / vagrant-docker

Updated 16 hours ago

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

No description set

☆ 0 0 3

Information Build Details Tags

vagrant-docker

Use docker instead of a VM (i.e., virtualbox) in Vagrant as a provider to save system resources (and be more *fashionable*)

Use this sample code to build your own boxes.

It features Puppet [Chef is optional] and a sample NginX web Server

Simple usage:

Builds your own docker image from the Dockerfile

`cd vagrant-docker`

`vagrant up`

Start a Build

Build Details

Links

Source Project Page

Source Repository

Files

Build Bundle

Dockerfile

Settings

Description

Saving state [and time] - Docker Hub

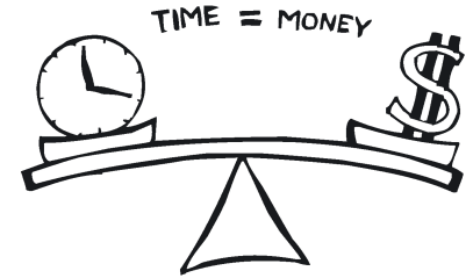
- Get container `CONTAINER_ID`
 - `docker ps`
- Commit image
 - `docker commit [-m "my comment"] CONTAINER_ID user/repo[:tag]`
 - (had permissions problems to the main repo)
- Push image
 - `docker push user/repo[:tag]`

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. `sudo vagrant up`
- Test: <http://localhost:8080/>
- Advanced usage:
 - For a vanilla image built using the same docker file:
 - `DOCKER_IMAGE='npoggi/vagrant-docker' sudo vagrant up --provision`
 - For a pre-provisioned image with the puppet config (saves time)
 - `DOCKER_IMAGE='npoggi/vagrant-docker-provisioned' sudo vagrant up --provision`

```
npoggi@darchi:~/workspace/vagrant-docker$ vagrant up
Building from the Dockerfile (if necessary)\nBringing machine 'web' up with 'docker' provider...
==> web: Build image no longer exists. Rebuilding...
==> web: Building the container from a Dockerfile...
web: Image: adbe1556d709
==> 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



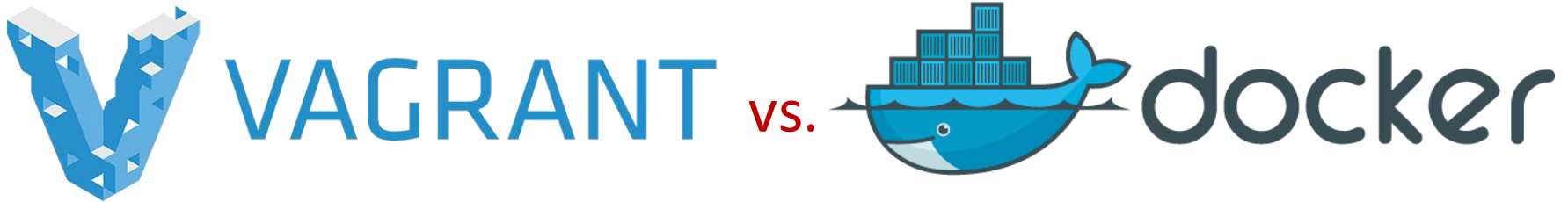
Gotchas! ...and annoyances

- 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 and Alternatives

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



- Docker abstraction alternative to Vagrant:
 - FIG <http://orchardup.github.io/fig/>
- 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, Project Atomic
- **Vagrant + Docker provider + Docker**
 - Inception kick!
- Docker patterns
- Terraform (for PROD)

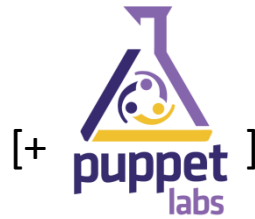
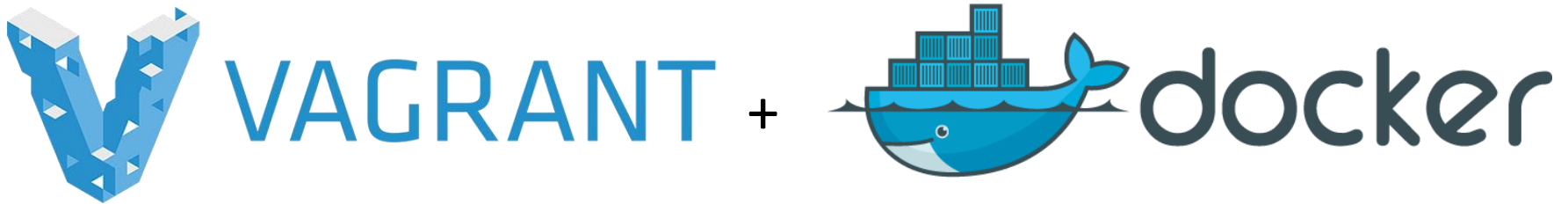


Tips and tricks



- 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; #or relogin`
- Change the default image dir (to control repo size)
 - 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>
 - PROD Vagrant-like: <http://www.terraform.io/>
- Docker specific
 - Docker: <https://www.docker.com/>
 - Docker hub: <https://registry.hub.docker.com>
 - Light-weight VM:
<https://github.com/boot2docker/boot2docker>
 - Fig (Vagrant alternative): <http://orchardup.github.io/fig/>
- Puppet labs: <http://puppetlabs.com/>