

Volatile Environments with Virtualization Technologies

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About Me

Imperial College
London



SOFTWARE RELIABILITY
GROUP

- **PhD in N-Version Execution**
- **GRID, IT and CMS**
- **OpenStack**
- **Kubernetes Project**

Outline

- **Problems during developing, testing and setup**
- **Vagrant + Demos!**
- **Docker + Demos too!**

This is going to be a technical session
with a lot of examples!

Motivation (aka problems)

- **Three kinds of problems (IMHO):**
 - Project switching
 - Project transferring
 - Project testing

Project switching

- **Dependencies**
 - make sure they don't conflict with something you have
- **Requirements**
 - Sorry your platform is not supported!
- **Interlinking components**
 - Start the DB and Server (plz no port conflicts!)

Project transferring

- **Sharing with a friend**
- **Sharing with a team**
- **Sharing with the world**
- **Deploy in production**

Project testing

- **Various configurations**
 - This option and this option and this option should fail
- **Different components**
 - MySQL + MariaDB + Postgresql
- **Different topologies**
 - M-M, M-S, what about this ActiveMQ...

Local VM lifecycle

- **Download a VM image**
- **Configure resources: RAM, CPUs, network connections, and shared folders**
- **Boot the VM and install OS**
- **Install additional software**
- **User's configuration**

History of Vagrant

- **Initial release: March 8, 2010, 5 years ago**
- **Mitchell Hashimoto and John Bender**
- **HashiCorp**
- **<https://www.vagrantup.com>**

What Is Vagrant?

- **Simplifies the workflow necessary to run VMs locally**
 - Offers a very simple CLI
 - Supports: VirtualBox, VMWare, and Hyper-V...
 - Supports: Ansible, Chef, Puppet, and Salt
 - Distribute and share virtual environments

Demo 1

- **Basic commands**
- **vagrant init && vagrant up**
- **Shared folders**
- **nginx server**
- **vagrant share**

Demo 2

- **Various web projects**
- **Port forwarding**

Demo 3

- **Multiple VMs**
- **Private networking**
- **Redis Server-Client Benchmark!**

Further Reading

- **Provisioners!**
- **<https://www.vagrantup.com/docs/>**
- **<https://atlas.hashicorp.com>**
- **<https://github.com/mitchellh/vagrant/wiki/Available-Vagrant-Plugins>**

Enter Docker

History of Docker

- **Initial release: 13 March 2013, 2 years ago**
- **Solomon Hykes**
- **dotCloud, now: Docker, Inc.**
- **www.docker.com**

Extra features from VMs

- **Fast**
- **Small memory footprint**
- **It's disposable**

Demo 1

- **LXC example**
- **chroot on steroids**

Demo 2

- **Redis**
- **docker tunnels**

Further Reading

- <https://www.docker.com>
- <https://docs.docker.com>
- **Vagrant Docker Provisioner**

Recap

- **Use the virtualization!**
- **Helps you to keep track of development**
- **Helps you to share your work**
- **Keeps complexity and overhead low**
- **Enforces good practices**
- **Special treatment == You done something wrong (usually)**

Some Personal Thoughts

- **Dockfile/Vagrantfile vs the build?**
 - Users vs Developers ???
- **Think about Reproducibility?**
- **Open source code + Open source environment?**
- **This topic should become a course**
- **Question?**