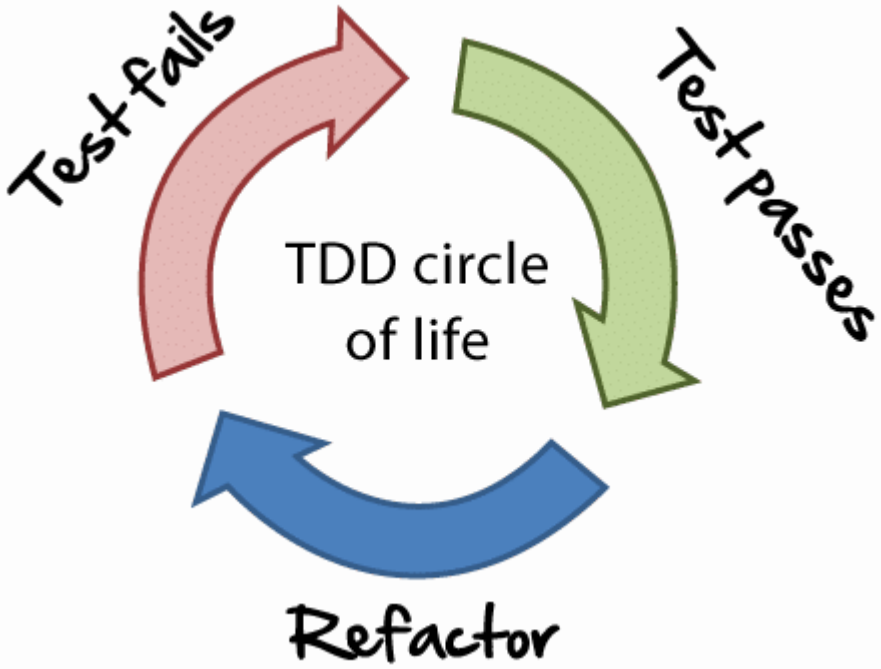
TDD for Infrastructure

Mario Fernandez

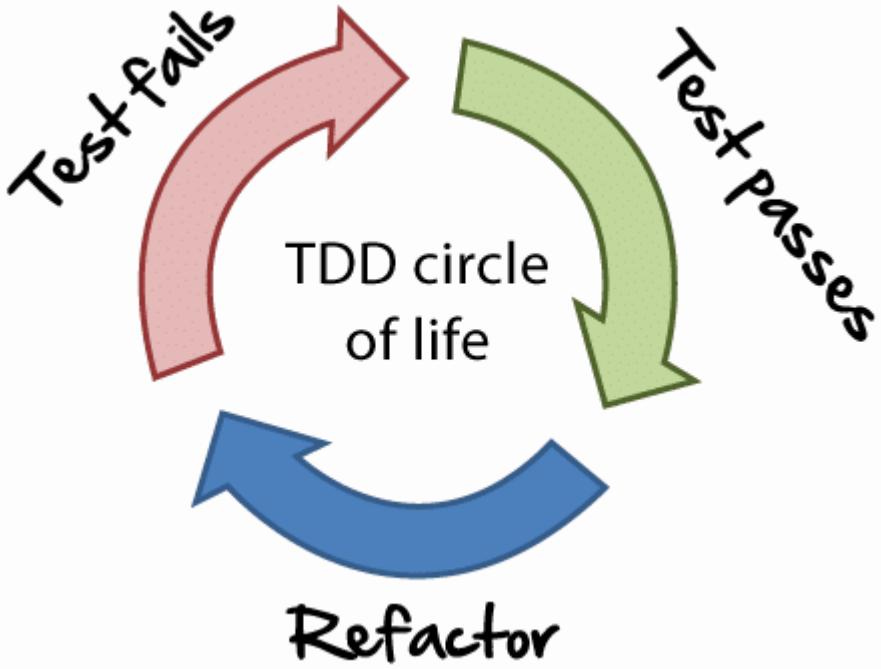
TDD: Test Driven Development

Part of *Extreme Programming*, started in 1999

TDD in a nutshell



TDD in a nutshell



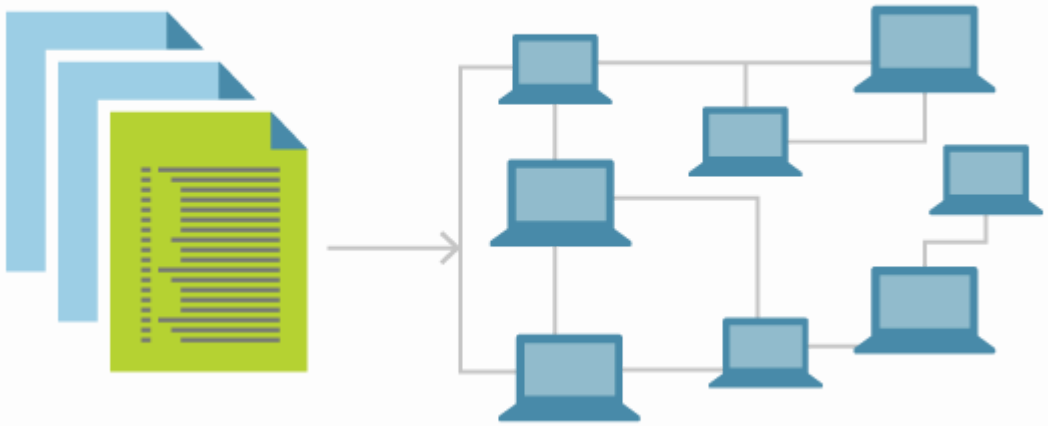
1. Write the only the code that is needed
2. Get quick feedback
3. Build a modular design

You knew that already

Infrastructure as Code

IaC means writing code to manage configurations and automate provisioning

Infrastructure as Code



How to make sure everything works as expected?

How to make sure everything works as expected?

Enter **ServerSpec**

How to make sure everything works as expected?

Enter **ServerSpec**

ServerSpec is a tool to write tests for infrastructure based on RSpec

Show me the code

Straightforward configuration

spec/spec_helper.rb

```
require 'serverspec'
require 'net/ssh'

set :backend, :ssh
host = ENV['TARGET_HOST']

options = Net::SSH::Config.for(host)
set :host,        options[:host_name] || host
set :ssh_options, options
```

Users & Groups

spec/hostname/users_spec.rb

```
describe user('travis') do
  it { is_expected.to exist }
  it { is_expected.to belong_to_group 'docker' }
end

describe group('docker') do
  it { is_expected.to exist }
end
```

Files

spec/hostname/files_spec.rb

```
  describe file('/vault/file') do
    it { is_expected.to be_directory }
    it { is_expected.to be_owned_by 'vault' }
  end

  describe file('/bin/vault') do
    it { is_expected.to be_executable }
    it { is_expected.to be_owned_by 'root' }
  end
```

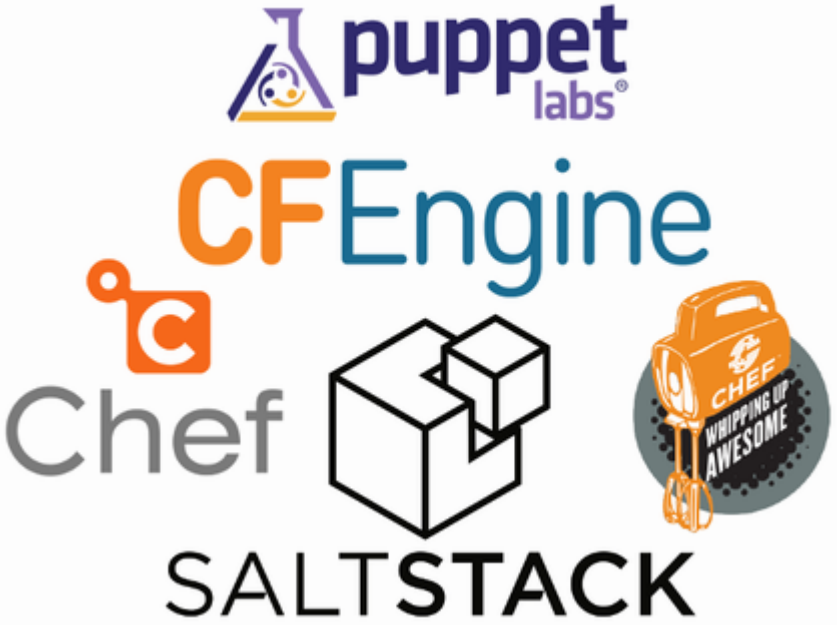
And many others

Resource Types

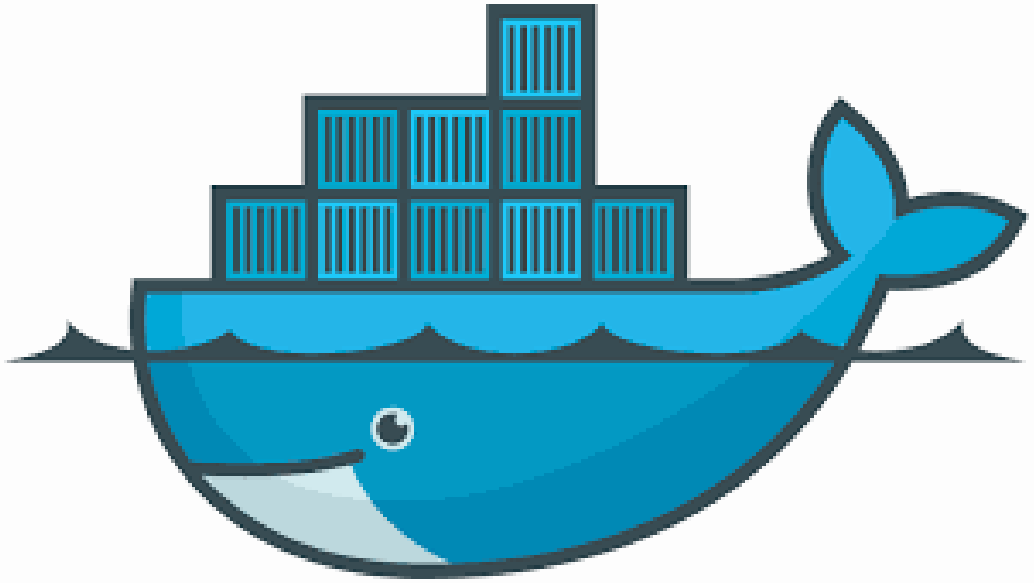
bond | bridge | cgroup | command | cron | default_gateway | docker_container | docker_image | file | group | host | iis_app_pool | iis_website | interface | ip6tables | ipfilter | ipnat | iptables | kernel_module | linux_audit_system | linux_kernel_parameter | lxc | mail_alias | mysql_config | package | php_config | port | ppa | process | routing_table | selinux | selinux_module | service | user | x509_certificate | x509_private_key | windows_feature | windows_registry_key | yumrepo | zfs

But wait ...

Isn't this covered by provisioning tools?



Testing Docker images



A sample Dockerfile

```
FROM java-openjdk-build-image as builder

WORKDIR /app
COPY . /app/

RUN gradle assemble

FROM java-openjdk-base-image

ENV PROFILE="in-memory"
COPY --from=builder /app/build/libs/*.jar .
EXPOSE 8080

CMD java -jar -Dspring.profiles.active=${PROFILE} app.jar
```

Basic packages

```
describe 'OpenJDK Image' do
  describe package(:openjdk) do
    it { is_expected.to be_installed }
  end

  describe file("/usr/bin/java") do
    it { is_expected.to be_executable }
  end

  describe command("java -version") do
    its(:stderr) { is_expected.to match(/8.151.12/) }
  end
end
```

Running Application

```
describe 'SpringBoot Applicationn' do
  describe file('/app/application.jar') do
    it { is_expected.to be_file }
  end

  describe process('java') do
    it { is_expected.to be_running }
    its(:args) { is_expected.to match(%r{/app/application.jar}) }
  end

  describe 'port of the app' do
    it { wait_for(port(8080)).to be_listening.with('tcp') }
  end
end
```

You can go crazy with this stuff

External dependencies via docker-compose

```
describe 'SpringBoot Application' do
  set :docker_container, 'app-springboot'

  before(:all) do
    compose.up(VAULT_CONTAINER_NAME, detached: true)
    vault.logical.write('secret/app/worspace', foo: :bar)
    compose.up('app-springboot', detached: true)
  end

  describe process('java') do
    it { is_expected.to be_running }
  end
end
```

Summary

ServerSpec

ServerSpec is a good way to automate the process of testing infrastructure

Available backends

- local
- ssh
- Docker
- Even *Windows*

Links

- http://infrastructure-as-code.com/
- http://serverspec.org
- Alternative: https://github.com/aelsabbahy/goss

Thank you

Questions?