How to Build a CI/CD Pipeline

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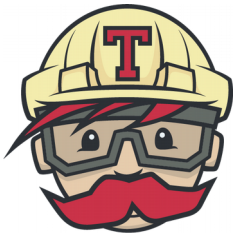
Overview

- Introduction to Gitlab
- Gitlab CI Configuration file
- (CI/CD) Pipeline
- Immutable AWS Deployments
- Creating Image by Packer
- Testing Image by ServerSpec
- Configuration Management Tools
- Terraform infrastructure as code
- Blue-Green and Canary Deployment

Introduction to Gitlab

- A git-based code like github.
- A (CI/CD) platform like Jenkins , Travis and others.



- Gitlab components:

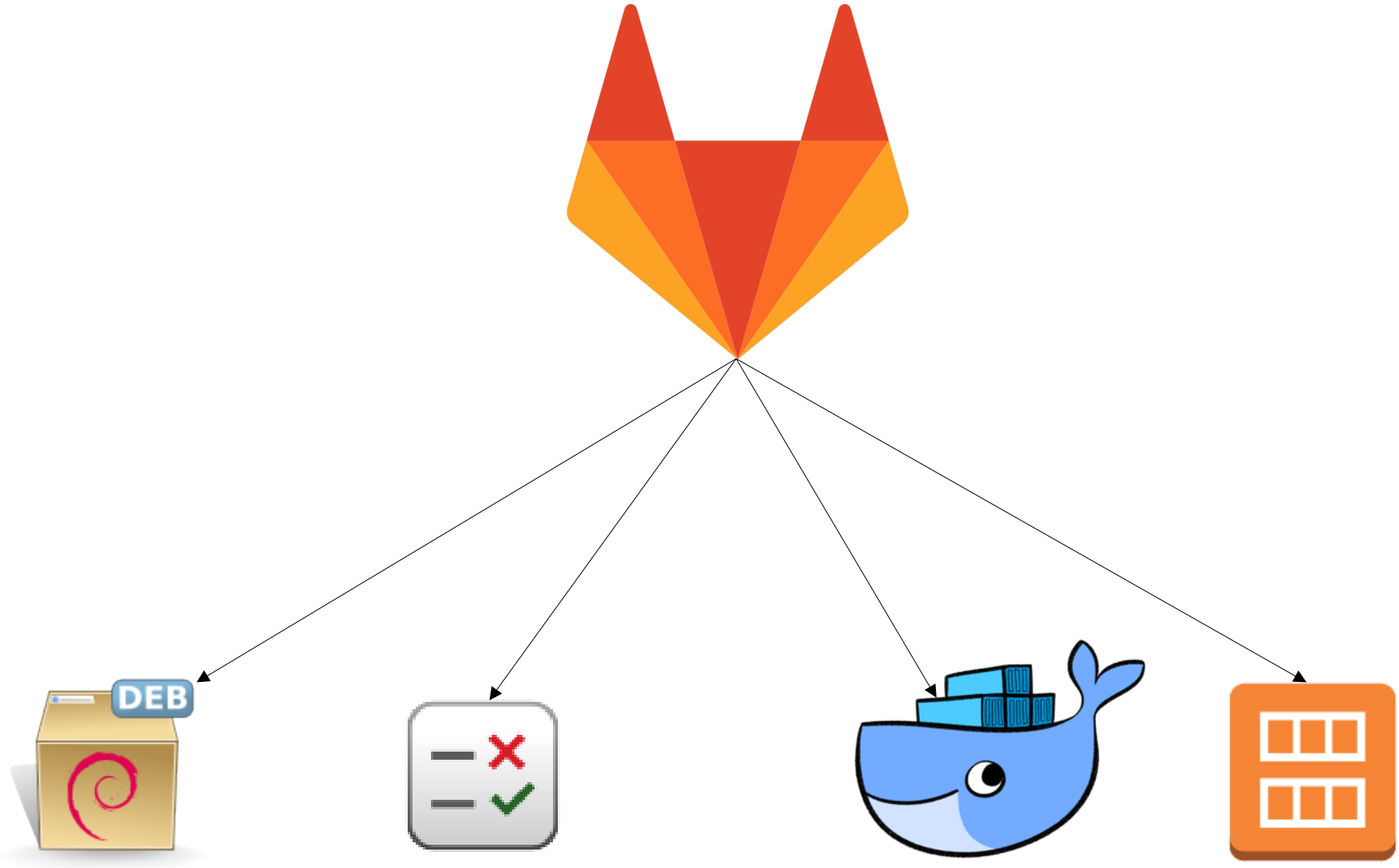
  1- Gitlab server : hosting service, CI build system management

  2- Gitlab runners: User-space that execute builds.

  - Highly configurable you can have multiple runners per repo.

  - It can run anywhere:laptop , AWS ..etc

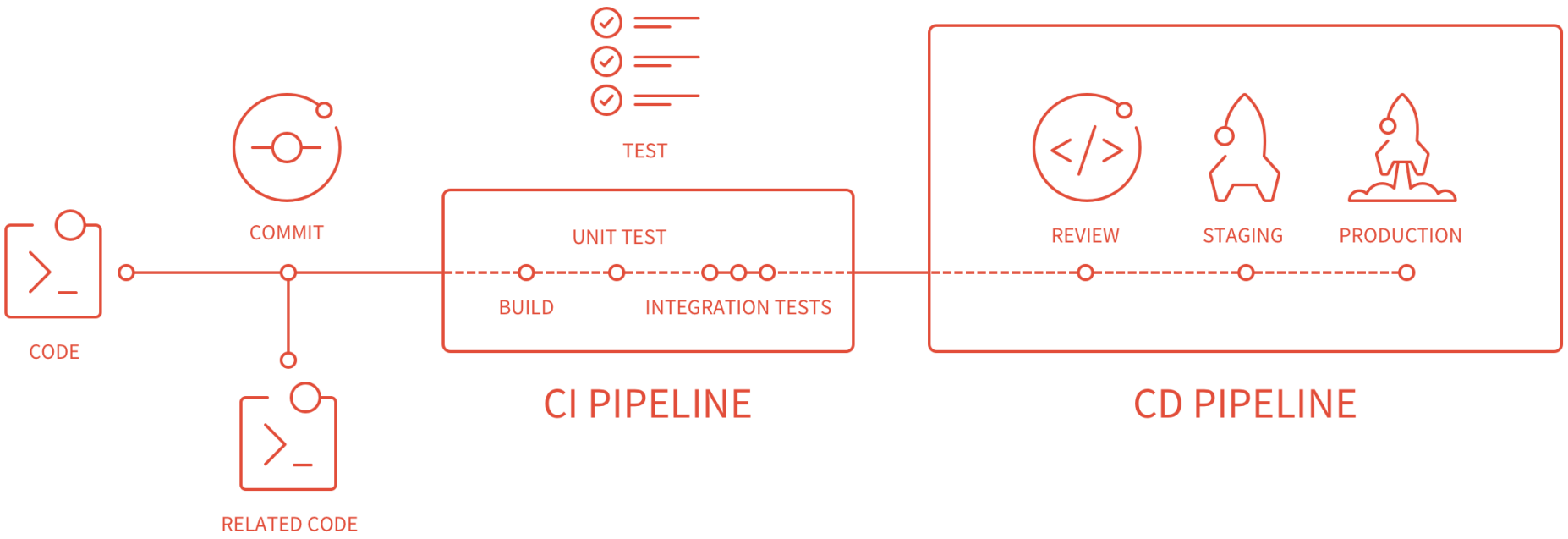
Introduction to Gitlab



Gitlab CI configuration file

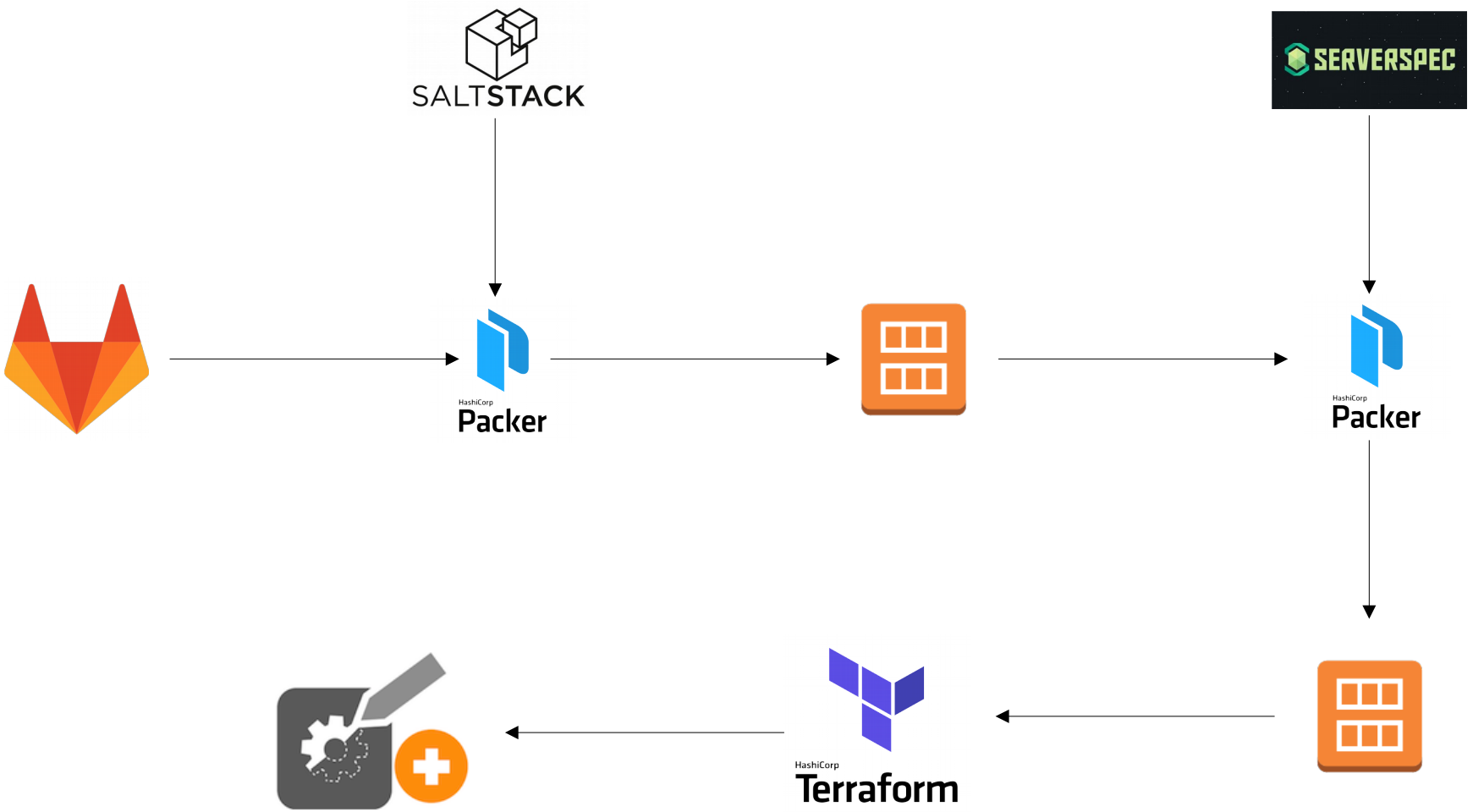
- **Standard YAML**
  - **Very human-friendly**
  - **.gitlab-ci.yml, in the top directory of your git repository**
  - **Describes pipelines which consist of stages**
  - **Each stage has a specific function: build, test, deploy…**
  - **Each stage can have its own tags.**
  - **Each stage can produceartifacts re-usefrom other stages**
  - **Stages can run in parallel**

(CI/CD) Pipeline



Immutable AWS Deployments

- **Automate the setup and deployment for every part and every layer of your infrastructure.**
- **Never change any part of your system once it is deployed. If you need to change it, deploy a new system.**



Creating Image

- **Packer is an open source tool for creating images for multiple platforms from a single source configuration.**
- **Packer does not replace configuration management like Chef , Puppet, SaltStack and Ansible .**
- **Packer is able to use tools like Chef or Puppet to install software onto the image.**
- **Machine image formats examples: Ami for EC2, VMDK/VMX files for VMware, OVF exports for VirtualBox**

Testing Image

- **Serverspec is the name of a Ruby tool which allows you to write simple tests, to validate that a server is correctly configured**
- **With Serverspec, you can write RSpec tests for checking your servers are configured correctly.**

Resource Types:

bond | bridge | cgroup | command | cron | default_gateway | docker_container | docker_image | file | group | host | 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

```
describe package('nginx') do
  it { should be_installed }
end
```

```
describe port(80) do
  it { should be_listening }
end
```

```
describe cron do
  it { should have_entry '* * * * * /usr/local/bin/foo' }
end
```

Configuration Management Tools

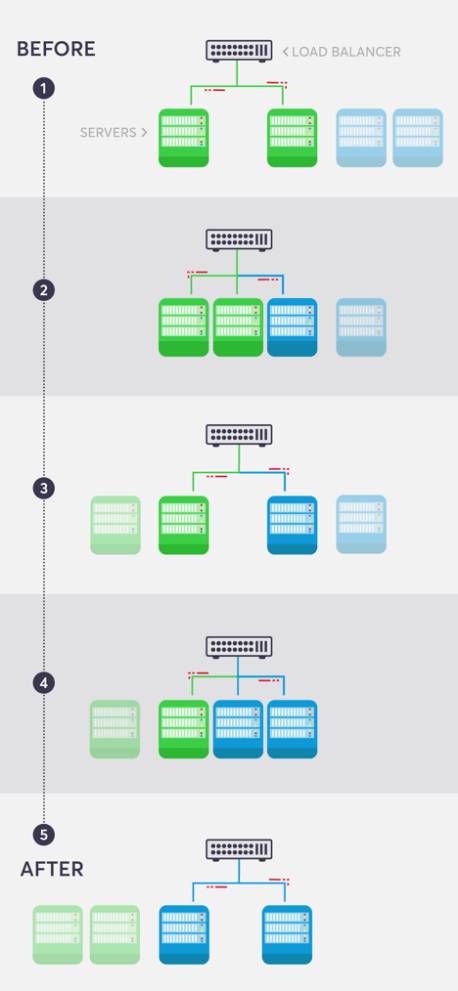
- **Puppet, Chef, Ansible and SaltStack present different paths to achieve a common goal of managing large-scale server infrastructure .**
- **Configuration Management capabilities offers the following :**
  - **Orchestration**
  - **Automated provisioning**
  - **Configuration automatio**
  - **Code management**
  - **Reporting**

Deploy Image

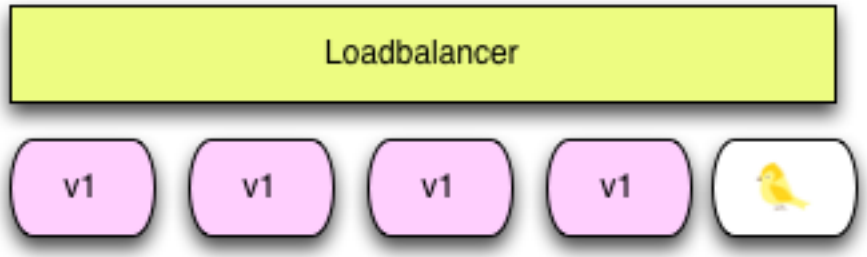
- **Terraform is a tool for building, changing, and versioning infrastructure safely and efficiently.**
- **Infrastructure as Code : can be shared and re-used.**
- **Change Automation : Complex changesets can be applied to your infrastructure with minimal human interaction.**

• Blue-Green & Canary Deployment

- Blue Green



Canary deployment



Q & A