Software Development in modern days: DevOps methodology

Continuous Integration/Continuous Delivery/Continuous Deployment: Now the practice

Mario David

(david@lip.pt) - LIP and INCD

INCD Portuguese Distributed Computing Infrastructure

ISEL Talk - June 2021

A Walk on technologies and services

The "Code" - **you can "Code" almost anything**, not only SW, but also services, platforms, infrastructures, even documents (examples will be given later).

❖ Manage and track changes with a "**Version Control System**" (**VCS**):
  ➢ Examples: **git** and **github** or **gitlab**
  ➢ Hosted in repositories, public or private.
❖ To install, configure and run "services" and "platforms", you can use:
  ➢ **Docker** images
  ➢ **Dockerfile** and/or **Docker-compose** files
  ➢ **Ansible**
  ➢ Manage sets of docker containers with: **docker-swarm** or kubernetes (**k8s** from now on).
❖ Instantiate Virtual Machines (VMs):
  ➢ **Infrastructure as Code** (**IaC**): describe in a file how many VMs, which operating system, which networks, amount of storage and additional storage volumes, amount of RAM
  ➢ Example: **Terraform**

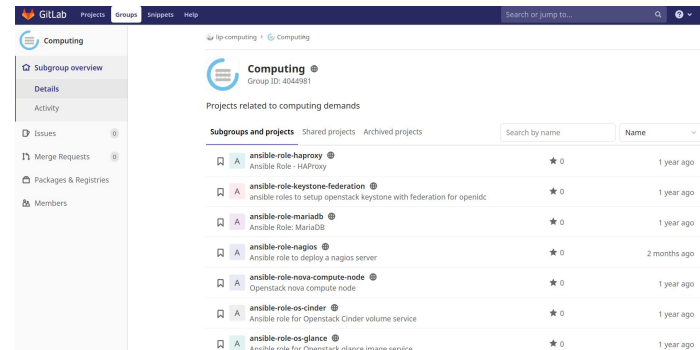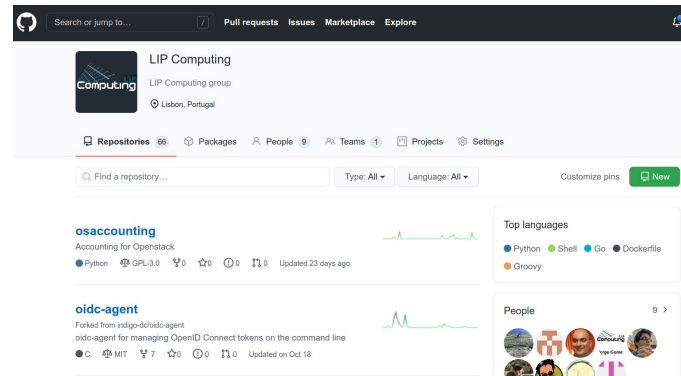# Git - Version Control System

Managing and tracking changes to your SW source code

Github or Gitlab

Public repository services with Git as underlying management of files

Tools and services: Github - Issue tracker

Issue tracker: track and follow issues, SW problems and bugs, new features, even users questions

Tools and services: Github - Commit

After "git commit"

jorge-lip committed on Jan 8 (Verified)   2 parents d82d4a2 + 96

⊞ Showing **2 changed files** with **33 additions** and **12 deletions**.

∨   26 ▮▮▮▮▯ doc/installation_manual.md 📋

```
            @@ -47,48 +47,54 @@ From the *development* branch for the latest additions and fixes:
 47    47         ./udocker install
 48    48       ```
 49    49
 50          - To get a specific released version of udocker such as *v1.1.4*:
        50   + To get a specific released version of udocker such as v1.1.4:
 51    51
 52    52       ```
 53    53         curl https://raw.githubusercontent.com/indigo-dc/udocker/v1.1.4/udocker.py > udocker
 54    54         chmod u+rx ./udocker
 55    55         ./udocker install
 56    56       ```
 57    57
 58          - ### 2.2. INSTALL FROM REPOSITORIES
        58   + ### 2.2. INSTALL FROM UDOCKERTOOLS TARBALL
 59    59
 60          - This installation method uses the udocker tarball that contains statically compiled
        60   + This installation method uses the udockertools tarball that contains statically compiled
 61    61       binaries and is built to be used across different hosts and OS distributions. Please
 62    62       check the repositories for the latest release.
 63    63
```

Tools and services: Github - Commits are signed

You can "sign" your commits - with your GPG key

Tools and services: Github - Trigger CI tests

The "git commit" **triggers CI tests**

Tools and services: Github - Pull Request (PR)

Code Review: discussion and approval of 1 or more commits

Reviewers

Request changes

Github and gitlab: examples of repositories

Examples:

- ❖ SW source code (python): https://github.com/indigo-dc/udocker
- ❖ Document: https://github.com/indigo-dc/sqa-baseline
- ❖ Dockerfile and docker-compose: https://github.com/nginx-proxy/nginx-proxy
- ❖ Ansible: https://gitlab.com/lip-computing/computing/ansible-role-nagios

Tools and services: Jenkins CI/CD

Jenkins - Automation service for CI/CD: https://jenkins.indigo-datacloud.eu/job/Pipeline-as-code/
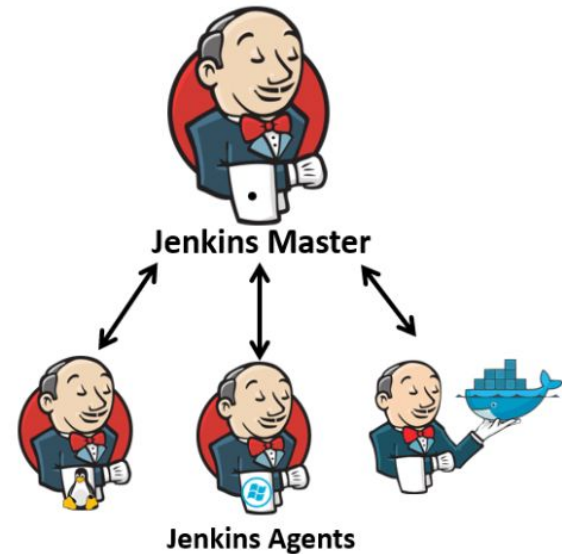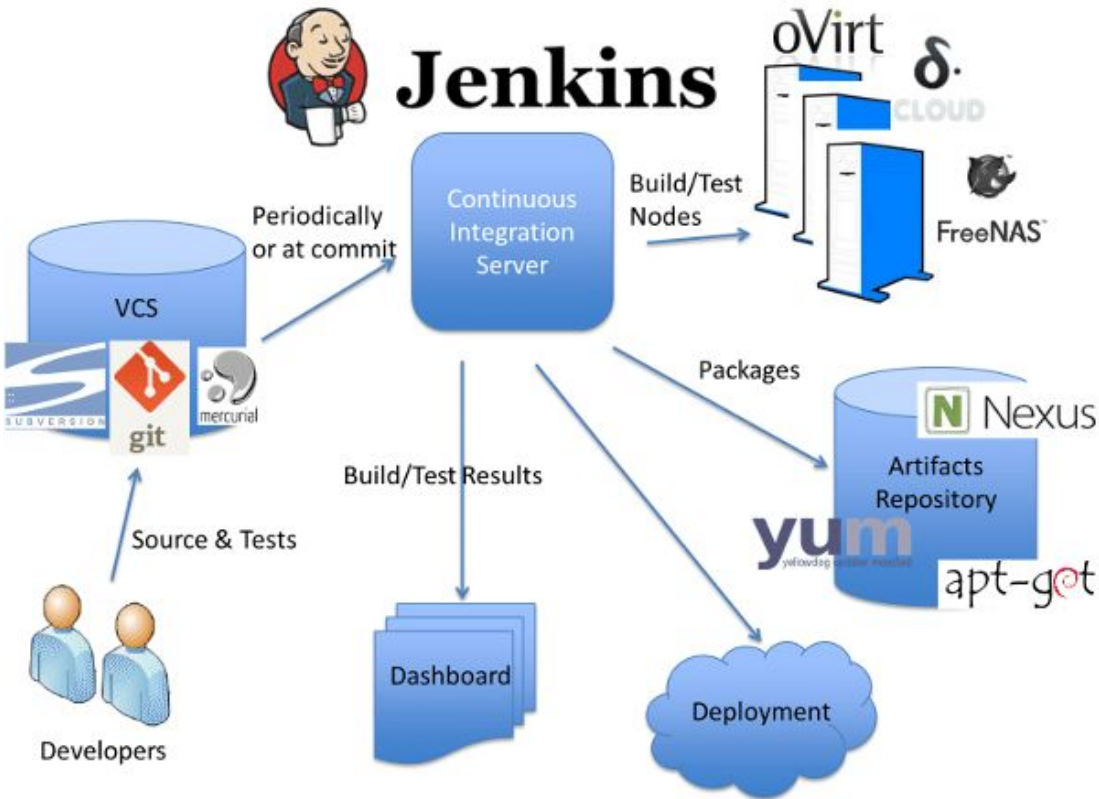
Tools and services: Jenkins pipeline

Jenkins - pipeline

Pipeline workflow

Software **Q**uality **A**ssurance **as** **a** **S**ervice

In the framework of a EU project: **EOSC-Synergy** -

https://sqaaas.eosc-synergy.eu/#/auth/select-option

Software Quality Assurance as a Service

Pipeline as a Service
Custom CI/CD pipelines based according to the quality criteria from the Software as a Service.

Online Quality Assessment
Evaluates the level of compliance of a source code repository or running service according to the quality criteria from the Software & Service baseline.

Terms of Service

News & Events

Software **Q**uality **A**ssurance **as** **a** **S**ervice

Compose a Jenkins pipeline for SQA

SQAaaS

Compose a Jenkins pipeline for SQA -
The result:
https://github.com/WORSICA/worsica-cic
d/blob/development/.sqa/config.yml

```yaml
...
sqa_criteria:
 qc_functional: #functional/unitary + coverage
   repos:
     worsica_processing:
       container: processing
       tox:
         testenv:
           - worsica-processing-unittest
         tox_file: '/usr/local/worsica_web_products/tox.ini'
     worsica-intermediate:
       container: intermediate
       tox:
         testenv:
           - worsica-intermediate-functional
         tox_file: '/usr/local/worsica_web_intermediate/tox.ini'
     worsica_frontend:
       container: frontend
       tox:
         testenv:
           - worsica-portal-functional
         tox_file: '/usr/local/worsica_web/tox.ini'
...
```

Further information and sources

- ❖ Software Development methodologies:
  - ➢ https://www.outsource2india.com/software/mobile-applications/project-methodologies.asp
  - ➢ https://xcelacore.com/how-software-development-has-changed-in-the-past-decade/
- ❖ Software Quality Assurance: https://github.com/indigo-dc/sqa-baseline
- ❖ Service Quality Assurance: https://github.com/EOSC-synergy/service-qa-baseline