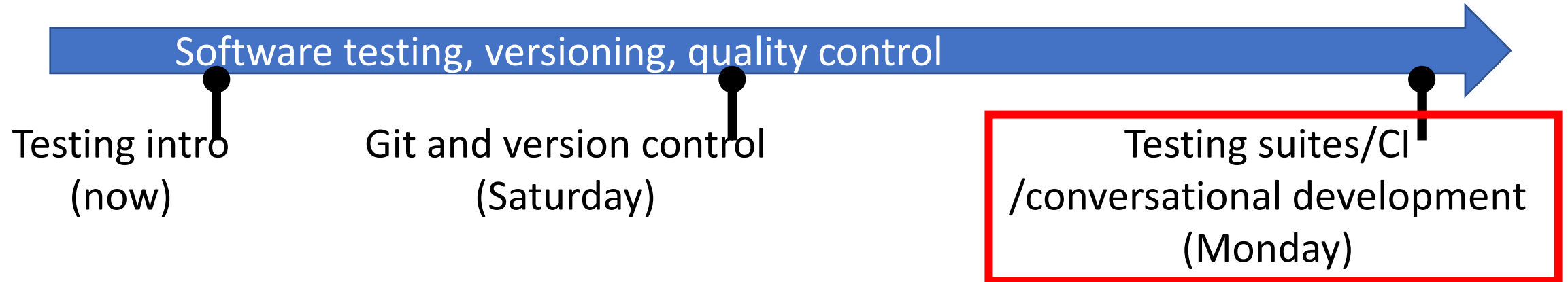


# Collaborative coding: conversational development and Continuous Integration

Alessandro Corbetta

# My Lectures

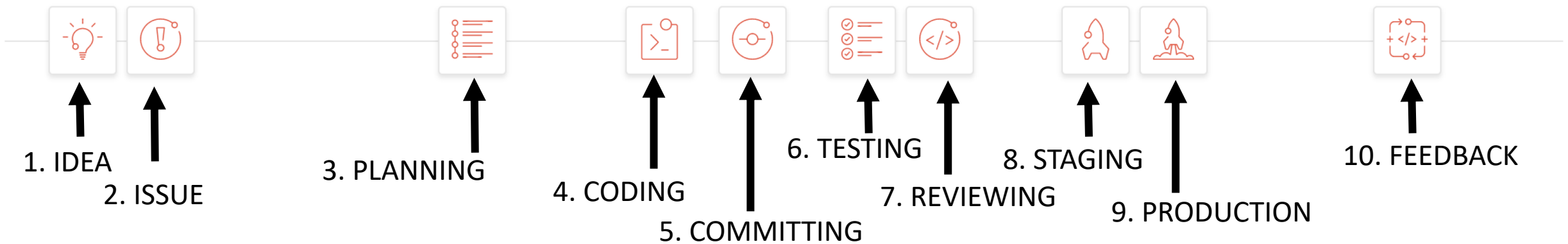


# The conversational development pipeline

Conversational development:

Development model => content & conversations between developers

Fosters collaborations w/o centralized entities



Gitlab (and github) are meant to support  
this development pipeline

# Super-structure to a Git repository

The screenshot shows the GitLab interface for the repository 'lbe-direct'. The main content area displays the repository details, including a merge request 'Merge branch 'develop-ISSUE283' into 'master'' by Federico Toschi. Below this is a table of repository folders and their last commit details.

Name	Last commit	Last update
Auxiliary	issue #211	3 years ago
Infrastructure	Added	2 years ago
Tools	[ISSUE #208] -- MM tools updates	5 months ago
doc	report Fluctuations update issue #259	4 years ago
http	Issue #181: sources for backend	4 years ago
performance	Resolved merge conflicts, thor cannot find H5. Tha...	4 years ago
scripts	[ISSUE #225] hacked problem possibly crashing te...	4 months ago
src	[ISSUE #283] 3DMAYO PRACE proposal init included	2 weeks ago
.cvsignore	*** empty log message ***	6 years ago

Annotations on the right side of the image explain the super-structure:

- What others developer did?** points to the **Activity** tab in the left sidebar.
- Content/commits** points to the **Repository** tab in the left sidebar.
- Issues** points to the **Issues** tab in the left sidebar, which shows a count of 132.
- Merging your contribution** points to the **Merge Requests** tab in the left sidebar, which shows a count of 0.
- Testing** points to the **CI / CD** tab in the left sidebar.

# Issue at first

- I have an idea
- There is a bug
- I want to propose a new feature

The screenshot shows the GitLab interface for the 'kinectWebserver' project. The top navigation bar includes 'GitLab', 'Projects', 'Groups', 'Activity', 'Milestones', 'Snippets', and a search bar. The left sidebar shows the project's navigation menu with 'Issues' (28) selected. The main content area displays the 'Issues' page for 'Alessandro C > kinectWebserver > Issues'. It features a filter bar with 'Open 28', 'Closed 86', and 'All 114'. A search bar and a 'Created date' dropdown are also present. The 'New issue' button is highlighted with a red box. Below the search bar, a list of issues is shown:

Issue Title	Issue ID	Opened	By	Updated	Comments
test failing	#114	opened a week ago	Alessandro C	updated a week ago	0
Detections are made but not retained if tracking is turned off	#113	opened 3 months ago	Werner Kroneman	updated 3 months ago	0
Integrate new cylinder-on-head tracking method into kinectWebserver	#112	opened 4 months ago	Werner Kroneman	updated 4 months ago	0
Suspicious code in prune_and_undistort					1

# Issue at first

- Case of a bug --> the issue got ticket number #113

The screenshot shows the GitLab interface for issue #113. The issue title is "Detections are made but not retained if tracking is turned off". The issue is open and was created 3 months ago by Werner Kroneman. The description includes a code snippet and a comment explaining a contradiction in the code logic.

**Issue #113**

Open Opened 3 months ago by Werner Kroneman

## Detections are made but not retained if tracking is turned off

df\_json is empty list if global\_tracking is 0, despite the detection step being carried out and detection dots being visible on the merged image when global\_detection is 1.

I suspect this code in pedestrian\_vision is to blame:

```
## we need to produce this json just if there is no tracking. Otherwise it will be produced
if external_parameters.get_parameter("global_tracking",1) == 1:
    df_json = ret_merged['loc_df'].reset_index().to_dict(orient='records')
    print time_mark_pr.get_time_marked_string_prof("[ %s merge_and_show ] -
```

The comment contradicts the condition: it says it should only run if there is no tracking, yet the if-statement checks for a 1.

Not a high-priority issue on my side, though it was a bit confusing since I saw detection dots but no entries in the JSON.

Todo: Add to

Assignee: No assignee - assign yourself

Milestone: None

Time tracking: No estimate or time spent

Due date: No due date

Labels: None

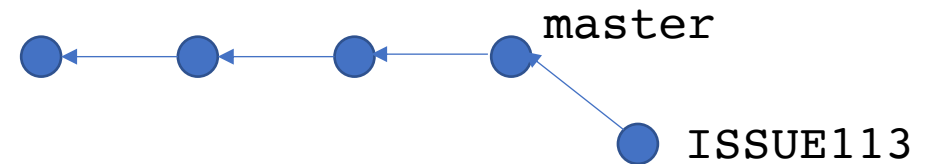
Confidentiality: Not confidential

Lock issue

# From issue to code

- If Ivan is in charge of fixing #113:

- [Clones the code – if he does not have already]
- Branches master -> e.g. into branch ISSUE113 (for trackability)
- `git checkout -b ISSUE113`



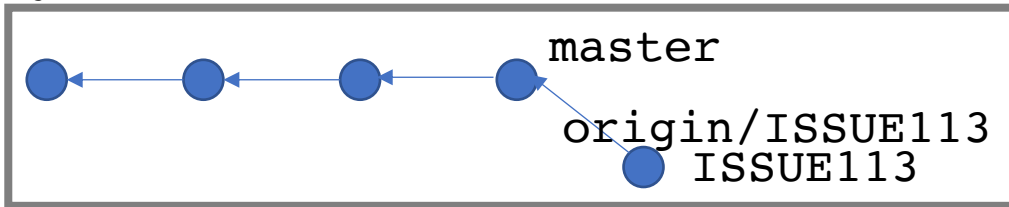




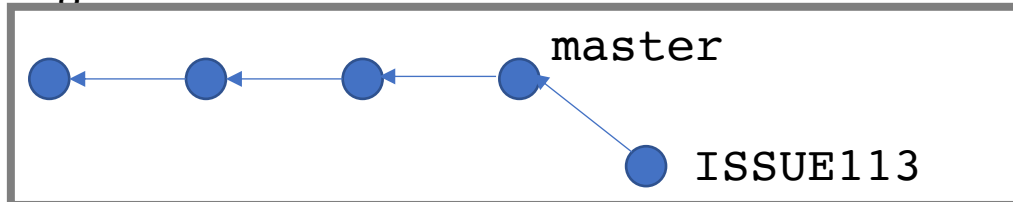
# From issue to code

- If Ivan is in charge of fixing #113:
  - `git commit -m '[ISSUE #113] - how code and tests have been changed'`
  - `git push origin ISSUE113`

Ivan



Origin

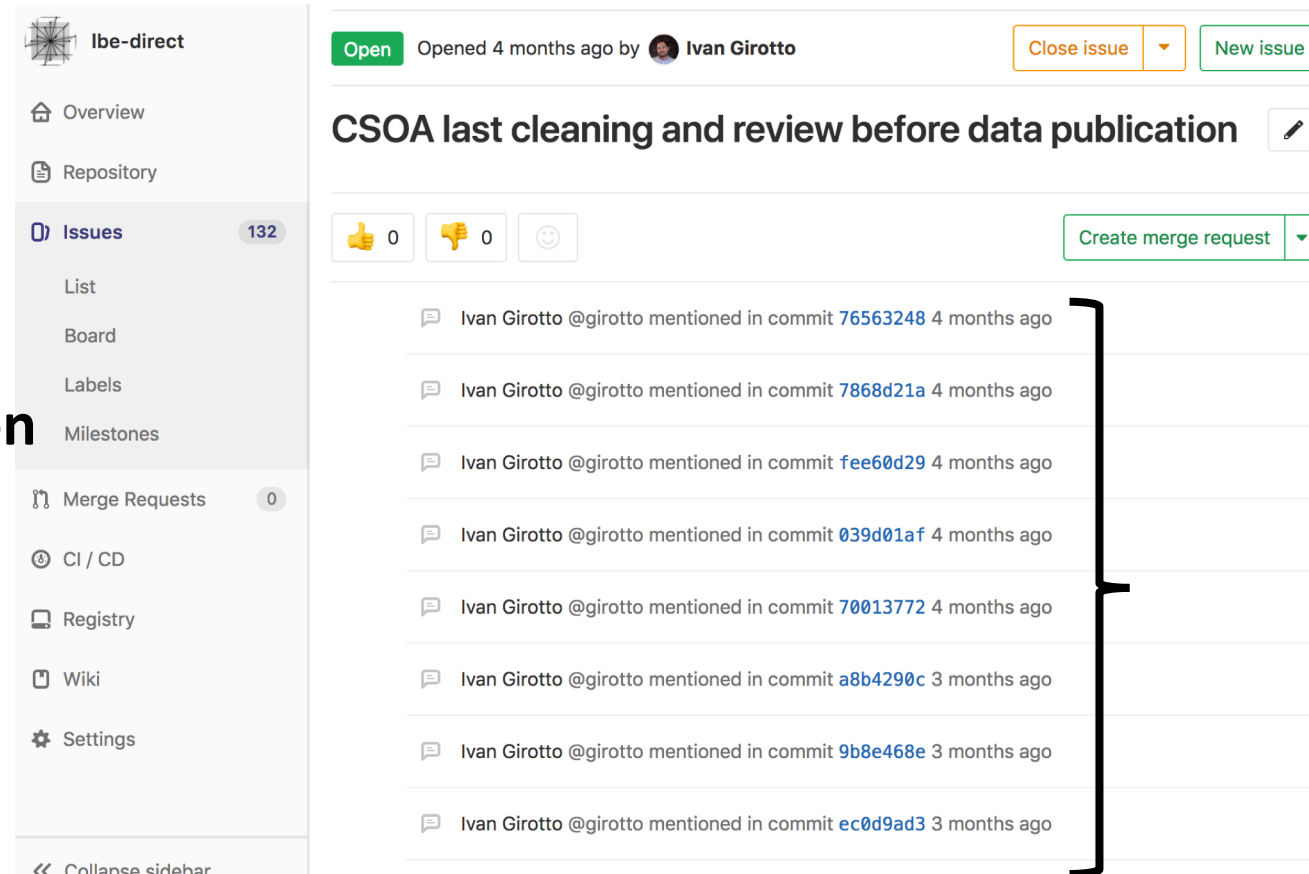


The screenshot shows a GitHub issue page for the repository 'Ibe-direct'. The issue title is 'CSOA last cleaning and review before data publication', opened 4 months ago by Ivan Girotto. The page includes a sidebar with navigation options like Overview, Repository, Issues (132), Merge Requests (0), CI/CD, Registry, Wiki, and Settings. The main content area shows the issue title, a 'Create merge request' button, and a list of commit mentions by Ivan Girotto, such as 'Ivan Girotto @girotto mentioned in commit 76563248 4 months ago'.

# From issue to code

- If Ivan is in charge of fixing #113:
  - `git commit -m '[ISSUE #113] - how code and tests have been changed'`
  - `git push origin ISSUE113`

**ALWAYS DO** specify the issue number in the commit message. This will **link** each **contribution** to the related **motivation**

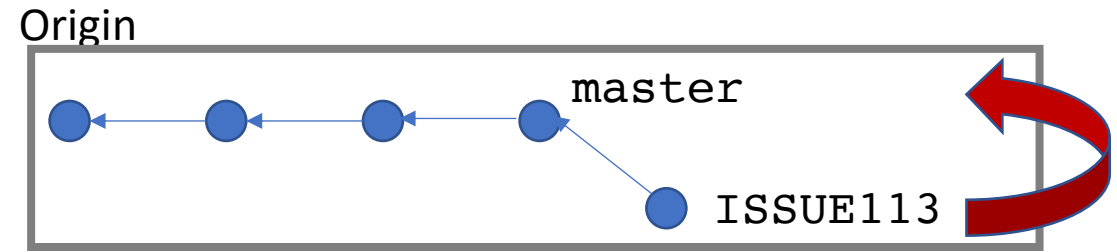


The screenshot shows the GitHub interface for the repository 'lbe-direct'. The left sidebar contains navigation links: Overview, Repository, Issues (132), List, Board, Labels, Milestones, Merge Requests (0), CI / CD, Registry, Wiki, and Settings. The main content area displays an issue titled 'CSOA last cleaning and review before data publication' opened 4 months ago by Ivan Girotto. Below the issue title are thumbs up (0) and thumbs down (0) buttons, and a 'Create merge request' button. A list of commit messages is shown, each mentioning the issue: 'Ivan Girotto @girotto mentioned in commit 76563248 4 months ago', 'Ivan Girotto @girotto mentioned in commit 7868d21a 4 months ago', 'Ivan Girotto @girotto mentioned in commit fee60d29 4 months ago', 'Ivan Girotto @girotto mentioned in commit 039d01af 4 months ago', 'Ivan Girotto @girotto mentioned in commit 70013772 4 months ago', 'Ivan Girotto @girotto mentioned in commit a8b4290c 3 months ago', 'Ivan Girotto @girotto mentioned in commit 9b8e468e 3 months ago', and 'Ivan Girotto @girotto mentioned in commit ec0d9ad3 3 months ago'. A large black bracket on the right side of the commit list groups these messages together.



# Code review merge request

```
git push origin ISSUE113
```



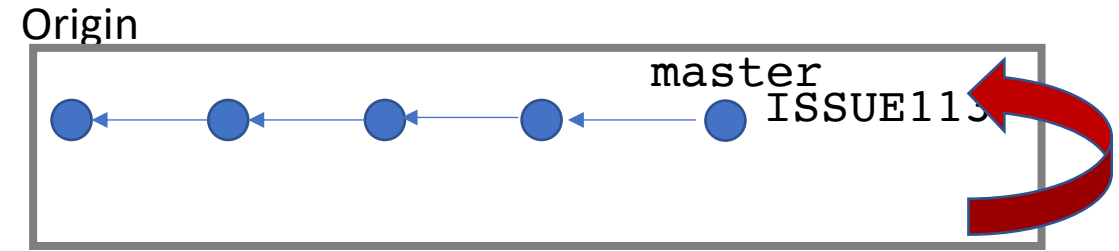
**master is a privileged branch. Developers must not push directly! (generally is also prohibited)**

- **Code review from authoritative parties is required**
- **Ask the authoritative part to merge your contribution through a merge request**

The screenshot shows the 'Merge Requests' page for a repository named 'lbe-direct'. The page header includes the repository name and a breadcrumb trail: 'codes > lbe-direct > Merge Requests'. Below the header, there are statistics for merge requests: 'Open 0', 'Merged 87', 'Closed 35', and 'All 122'. A search bar with the placeholder text 'Search or filter results...' is visible. On the right side, there are two buttons: 'Edit merge requests' and a green 'New merge request' button, which is highlighted with a red rectangular box. The left sidebar contains navigation links: 'Overview', 'Repository', 'Issues 132', 'Merge Requests 0', 'CI / CD', and 'Registry'.



# Code review merge request



GitLab Projects Groups Activity Milestones Snippets This project Search 75 32

ftmake

- Overview
- Repository
- Issues 29
- Merge Requests 0**
- CI / CD
- Wiki
- Settings

Merged Opened a week ago by Gianluca Di Staso Edit Close merge request

## Issue 102

Modification to make the `dsmc_indirect` code run under ftmake.

**Request to merge ISSUE\_102 into master**

- ✓ Pipeline #13356 passed for e99181e7. ✓ ✓
- ✓ Merged by Federico Toschi 2 days ago Revert Cherry-pick

The changes were merged into **master**

You can remove source branch now Remove Source Branch

👍 0 👎 0 😊

Discussion 0 Commits 4 Pipelines 4 Changes 4

- Gianluca Di Staso @gianluca added 1 commit 4 days ago
  - e99181e7 - [ISSUE #102] -- Add new names of cartesianus

Compare with previous version

Todo Add todo >>

Assignee Edit  
Federico Toschi @toschi

Milestone Edit  
None

Time tracking ⓘ  
No estimate or time spent

Labels Edit  
None

Lock merge request Edit  
Unlocked

2 participants

Notifications

Reference: toschi/ftmake!71

# Code review merge request

Code can (should) be reviewed  
before merging by an authority

Discussion 0 Commits 4 Pipelines 4 Changes 4

Changes between latest version and master

Showing 4 changed files with 22 additions and 1 deletion

Hide whitespace changes Inline Side-by-side

▼ CMakeLists.txt Edit View file @ e99181e7

...	@@ -182,7 +182,7 @@	...	@@ -182,7 +182,7 @@
	include(\${FTMAKE_SOURCE_DIR}/cmake/aux.cmake)		include(\${FTMAKE_SOURCE_DIR}/cmake/aux.cmake)
182	#####	182	#####
183	set(CMAKE_MODULE_PATH \${CMAKE_MODULE_PATH} "\${FTMAKE_SOURCE_DIR}/cmake")	183	set(CMAKE_MODULE_PATH \${CMAKE_MODULE_PATH} "\${FTMAKE_SOURCE_DIR}/cmake")
184	set(CMAKE_MODULE_PATH \${CMAKE_MODULE_PATH} "\${PROJECT_SOURCE_DIR}/cmake")	184	set(CMAKE_MODULE_PATH \${CMAKE_MODULE_PATH} "\${PROJECT_SOURCE_DIR}/cmake")
185	- #message(STATUS \${PROJECT_SOURCE_DIR})	185	+ message(STATUS \${PROJECT_SOURCE_DIR})
186		186	
187	#####	187	#####
188	# Here I invoke the loading of machine specific hooks	188	# Here I invoke the loading of machine specific hooks
...	@@ -769,6 +769,11 @@	...	@@ -769,6 +769,11 @@
	ADD_EXECUTABLE(\${TARGET_NAME} main.F90)		ADD_EXECUTABLE(\${TARGET_NAME} main.F90)
769	SET_TARGET_PROPERTIES(\${TARGET_NAME} PROPERTIES LINKER_LANGUAGE Fortran)	769	SET_TARGET_PROPERTIES(\${TARGET_NAME} PROPERTIES LINKER_LANGUAGE Fortran)
770	endif(EXISTS "\${PROJECT_SOURCE_DIR}/main.F90")	770	endif(EXISTS "\${PROJECT_SOURCE_DIR}/main.F90")

Assignee: Federico Toschi (@toschi)

Milestone: None

Time tracking: No estimate or time spent

Labels: None

Lock merge request: Unlocked

2 participants

Notifications

Reference: toschiftr

# Automated testing

- We want to merge codes only if they **pass tests!**
- **Continuous integration**  
each commit that we push to the origin is tested

Request to merge **ISSUE\_102** into **master**

✓ Pipeline #13356 passed for e99181e7. ✓ ✓

✓ Merged by  **Federico Toschi** 2 days ago Revert Cherry-pick


The changes were merged into **master**

You can remove source branch now Remove Source Branch

**I can merge safely: tests are passed**

16 Apr, 2018 2 commits

 Merge branch 'develop-ISSUE283' into 'master' ... ✓ 25285389    
Federico Toschi authored 2 weeks ago




 [ISSUE #283] 3DMAYO PRACE proposal init included 035f96ea    
Ivan Giroto authored 2 weeks ago

04 Apr, 2018 1 commit

 Merge branch 'develop-ISSUE279' into 'master' ... ✓ a5167bdf    
Federico Toschi authored a month ago

03 Apr, 2018 2 commits

 [ISSUE #279] hacked new init for PRACE-CSOA version 97be4f06    
Ivan Giroto authored a month ago

 [ISSUE #279] Working version of CSOA for PRACE project. Still not working... 332d16bb    
Ivan Giroto authored a month ago

20 Mar, 2018 3 commits

 Merge branch 'develop-ISSUE279' into 'master' ... ✓ 85de5d29    
Federico Toschi authored a month ago

 Merge branch 'develop\_ISSUE\_255\_new' into 'master' ... ✓ 8e0f1dc0    
Federico Toschi authored a month ago

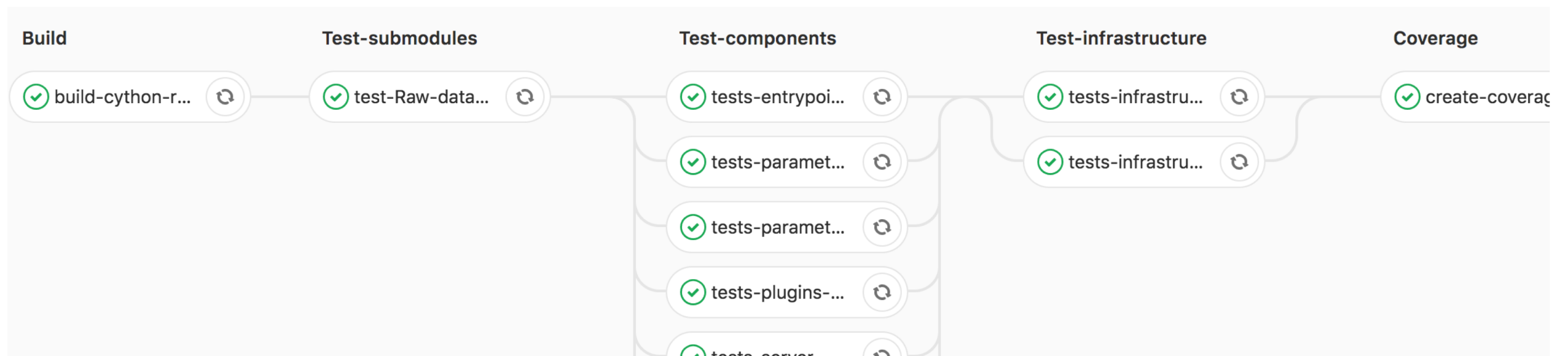


# Continuous integration

- Each push undergoes automated remote testing
- All the users know in which state the committed code is
  
- If testing is quick, the development cycle until the merge to master can be done very frequently
  - Many github repos: hundreds merge per day after remote testing
- Continuous integration --> continuous deployment
  - clients receive frequently the updated code as soon as it is merged

# Continuous integration in gitlab/python

- a file in the repo root  
    `.gitlab-ci.yml`  
tells the server how to run tests and in which environment
- Can be one **single test** case or a very complicated testing pipeline with cross-test dependence.



# Building continuous integration pipelines

## Case of our python exercise

```
image: python:latest

variables:
  PIP_CACHE_DIR: "${CI_PROJECT_DIR}/.cache"

cache:
  paths:
    - .cache/pip
    - venv/

before_script:
  - python -V          # Print out python version for debugging
  - pip install virtualenv
  - virtualenv venv
  - source venv/bin/activate
  - pip install numpy nose

test:
  script:
    - cd binary_str_2_float
    - nosetests -v
```

`.gitlab-ci.yml`

# Building continuous integration pipelines

## Case of our python exercise

`.gitlab-ci.yml`

**image: python:latest**

variables:

```
PIP_CACHE_DIR: "${CI_PROJECT_DIR}/.cache"
```

cache:

paths:

- .cache/pip
- venv/

before\_script:

- python -V # Print out python version for debugging
- pip install virtualenv
- virtualenv venv
- source venv/bin/activate
- pip install numpy nose

test:

script:

- cd binary\_str\_2\_float
- nosetests -v

We will run the tests in a “virtual linux machine” which runs the latest python version. (Docker container)

# Building continuous integration pipelines

## Case of our python exercise

```
image: python:latest
```

.gitlab-ci.yml

```
variables:
```

```
  PIP_CACHE_DIR: "${CI_PROJECT_DIR}/.cache"
```

```
cache:
```

```
  paths:
```

- .cache/pip
- venv/

```
before_script:
```

- python -V # Print out python version for debugging
- pip install virtualenv
- virtualenv venv
- source venv/bin/activate
- **pip install numpy nose**

The machine is empty. We need to configure it from scratch every time. (good for reproducibility)/

```
test:
```

```
  script:
```

- cd binary\_str\_2\_float
- nosetests -v

# Building continuous integration pipelines

## Case of our python exercise

```
image: python:latest
```

```
variables:
```

```
  PIP_CACHE_DIR: "$CI_PROJECT_DIR/.cache"
```

```
cache:
```

```
  paths:
```

- .cache/pip
- venv/

```
before_script:
```

- python -V # Print out python version for debugging
- pip install virtualenv
- virtualenv venv
- source venv/bin/activate
- pip install numpy nose

```
test:
```

```
  script:
```

- cd binary\_str\_2\_float
- nosetests -v

```
.gitlab-ci.yml
```

Calls the tests and captures the value fail/pass return value

Result is sent back to the server.

# Best practices

- Edits always follow issues
- Pull/commit/push/merge request often.
  - You don't want your version to diverge
- Make meaningful commit message
- Commit message should include ticket number
- NEVER commit products, just source.
  - (products can be made in cloud by continuous integration)
  - E.g. documentation can be generated by CI
- Never commit large binary files. Git does not properly understand those