

The test farm and its evolution

J-M Beuken

¹ *Université catholique de Louvain
Institute of Condensed Matter and Nanosciences
Louvain-la-Neuve, Belgium.*

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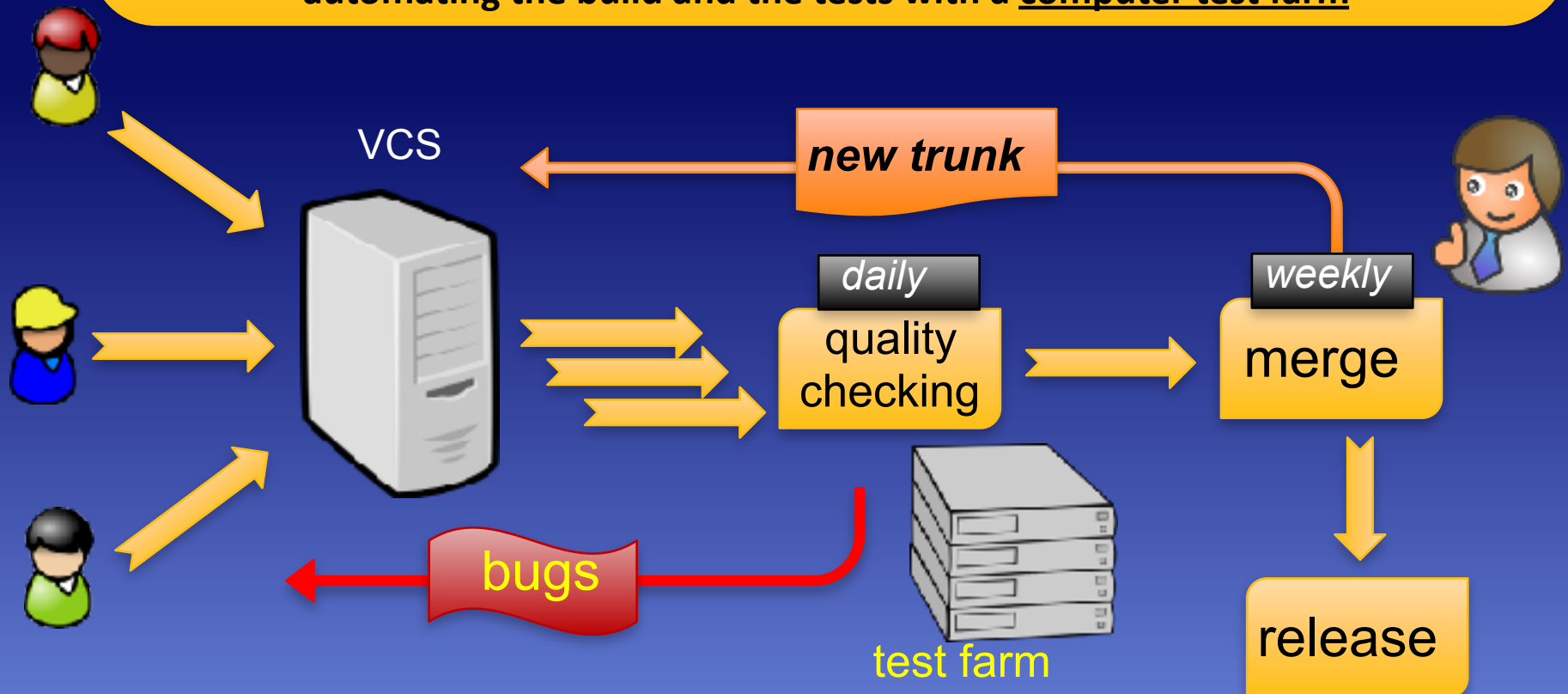
Outline

- ◇ The test farm
 - ◇ Quick reminder concerning buildbot infrastructure
 - ◇ Current state (update since Liège 2015)
 - ◇ Future developments
- ◇ Git and GitLab
- ◇ BBportal : buildbot and GitLab integration
- ◇ New Abinit website : pre-release

ABINIT must follow the practice of Continuous Integration (CI) because it prevents integration problems.

To achieve that, it relies on the following principles :

- maintaining of code repository with a Version Control System (VCS)
- daily reviewing and, at least, weekly merging of contributions
- using of extensive test suites -> reliability/portability
- automating the build and the tests with a computer test farm

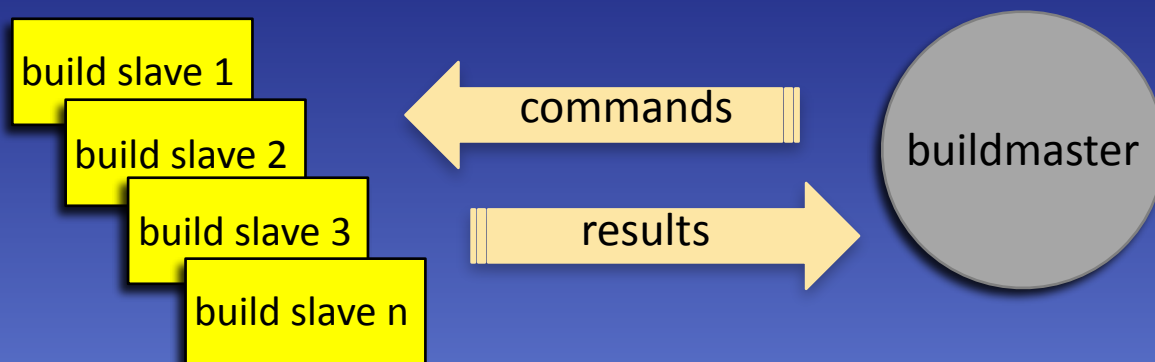


Name	Brand	CPU / Freq	# cores	RAM	OS	misc
abiref	HP DL360 gen9	Xeon E5-2670v3/ 2.30	2 x 24	32GB	CentOS 7.2	Ref
bob	Dell R430	Xeon E5-2603v3/ 1.60	2 x 6	8GB	Fedora 23	
buda	SuperMicro	Xeon X5570/ 2.7	2 x 4	12GB	CentOS 6.8	2xGPU K40 2xGPU C1060
coba2	HP Z400	Xeon W3520/ 2.7	4	12GB	CentOS 6.5	
cronos	HP DL185 G7	AMD Opteron 6276/ 2.3	2 x 16	16GB	Debian 5.0	
graphene	Apple MacPro	Xeon E5-2697/ 2.7	1 x 12	64GB	MacOS X 10.12	
ibm8	IBM Power S824	Power8/ 3.0	4	8GB	AIX 7.2	
inca	virtual machine	Opteron 6276/ 2.3	12	30GB	CentOS 6.9	
max2	HP DL185	Opteron 6140/ 2.6	2 x 8	12GB	Slinux 6.1	
petrus	Intel	Core i7 3930/ 3.2	6	16GB	openSUSE 12.1	
testf	Bull Novascale	Xeon X5570/ 2.9	2 x 4	12GB	CentOS 5.11	
tikal	Dell T5500	Xeon X5647/ 3.0	8	8GB	Slinux 6.9	
ubu	HP DL360 gen9	Xeon E5-2670v3/ 2.30	2 x 24	32GB	Ubuntu 16.04	

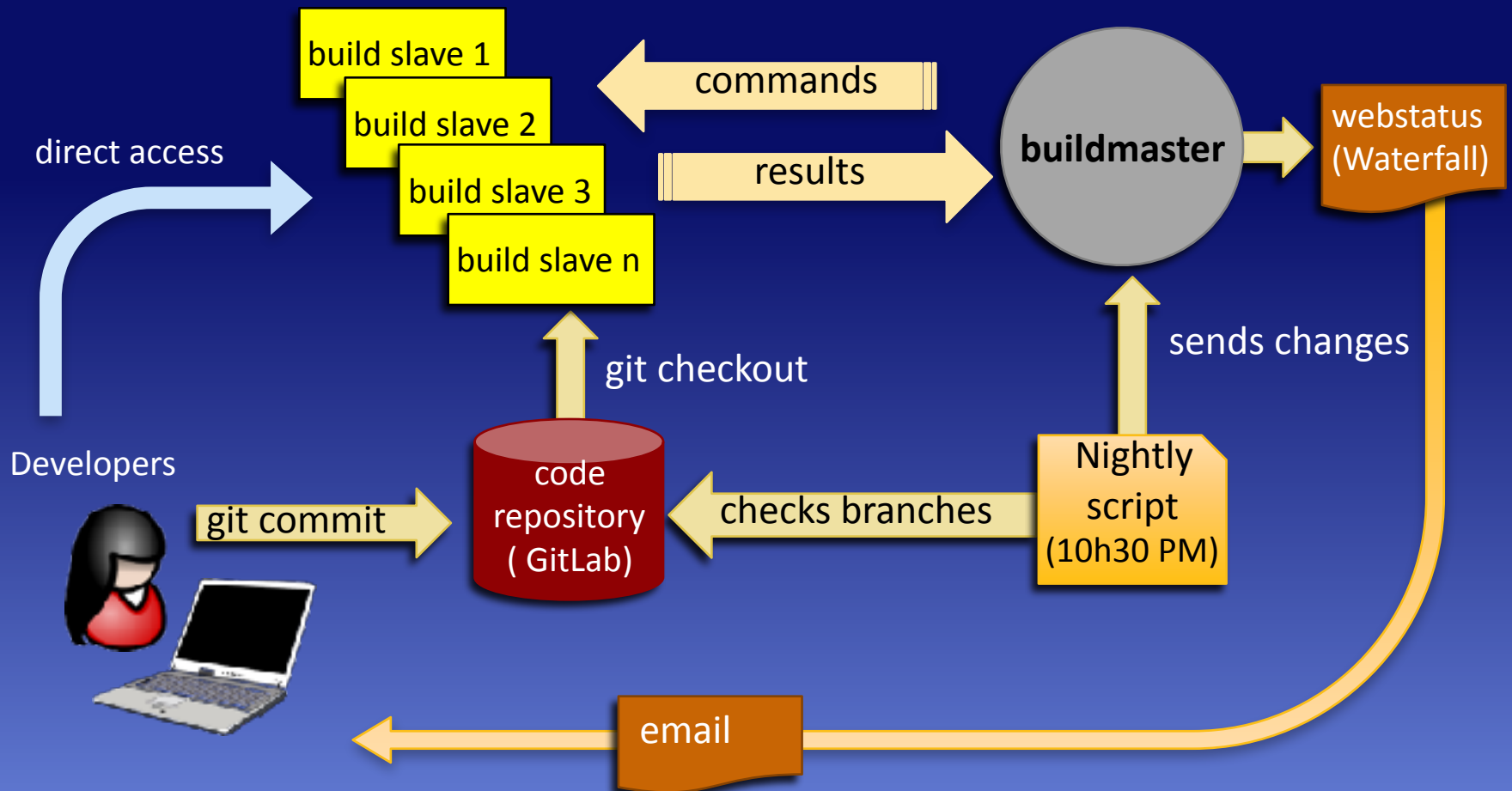
BuildBot (<http://buildbot.net>) is a **powerful python framework** that can automate all aspects of the software development cycle (Continuous Integration, Continuous Deployment, Release Management, ...)

It consists of a **buildmaster** and a set of computer (**buildslaves**) connected in a star topology :

- The **buildmaster** is the central point of control : it makes all decisions about what, when, and how to build.
- The **builder**, associated to **buildslaves**, is an element that is in charge of performing sequence of actions (**buildsteps**) normally something related to building software (checking, configure, make, ...), but it can also run arbitrary commands (shell command,...) .



- **Nightly**, buildbot checks all new “merge requests” submitted to GitLab
- During build cycle, status informations are saved and are used to update the status on the web pages : “waterfall” (chronological logs of events).
- The completion of a build will cause **email** to be sent to the developer.



Name	Compiler	MPI	MATH	misc	nightly
abiref_gnu_5.3_openmpi	GNU 5.3	Open MPI 1.10.2	OpenBLAS	Reference	yes
abiref_gnu_5.3_serial	GNU 5.3		OpenBLAS	Reference	yes
abiref_nag_6.1_openmpi	NAG 6.1	Open MPI 1.10.2	OpenBLAS		no
bob_gnu_5.3_openmp	GNU 5.3		ATLAS	OpenMP n=2	yes
buda_intel_14.0_mpich	INTEL 14	MPICH 3.1.2	MKL11/FFTW3		yes
coba2_intel_13.1_openmpi	INTEL 13.1	Open MPI 1.6.5	MKL11/FFTW3		yes
cronos_gnu_5.3_paral	GNU 5.3	Open MPI 1.10.2	MKL11/FFTW3		yes
graphene_gnu_6.3_macports	GNU 6.3	Open MPI 1.10.2	Open BLAS	MacPorts	yes
ibm8_ibm_15.1_serial	IBM 15.1		Netlib	XLF	yes
max2_gnu_5.3_mpich	GNU 5.3	MPICH 3.2.1	ACML 6	memory leak	yes
petrus_nag_5.3_openmpi	NAG 5.3	Open MPI 1.6.5	Netlib		yes
tikal_intel_15.0_serial	INTEL 15.0		MKL11//FFTW3		yes
ubu_gnu_4.9_mpich	GNU 4.9		Netlib	NetCDF4/HDF5	yes
ubu_intel_15.0_mpich	INTEL 15.0	MPICH 3.2.1	MKL11//FFTW3		yes
ubu_intel_16.0_mpich	INTEL 16.0	MPICH 3.2.1	MKL11//FFTW3		yes
ubu_intel_16.0_openmp	INTEL 16.0		MKL11//FFTW3	Open MP n=2	yes
ubu_intel_17.0_openmpi	INTEL 17.0	Open MPI 2.0.2	MKL11//FFTW3	NetCDF4/HDF5	no

Name	Compiler	MPI	MATH	misc	nightly
abiref_gnu_5.3_debug	GNU 5.3				yes
<ul style="list-style-type: none"> ○ tests less used options (e.g. omp, exports, cclock) ○ tests robodoc ○ tests infos (e.g. doc) ○ tests parents ○ tests abiauty ○ checks the html links (in doc/) ○ checks 12 abirules (“defined but not used”, “Unused variable”, “Unused dummy argument”) ○ checks 10 buildsys (“check-build-examples”, “check-cpp-options”,...) ○ tests the “Build system” (e.g. make distcheck) 					
buda_gnu_47_cuda	GNU 4.7.4	Open MPI 1.6.5	MKL		yes
<ul style="list-style-type: none"> ○ build with MAGMA 1.5 & MKL & CUDA 6.5 ○ tested with NVIDIA GPU 2 x K40 + 2 TESLA C1060 					
inca_gnu_6.3_py3k	GNU 6.3	Open MPI 2.0.1	Netlib		yes
<ul style="list-style-type: none"> ○ check Python 3 on various scripts as runtest.py, buildsys check scripts, ... 					
testf_gnu_6.1_fb	GNU 6.1	Open MPI 1.10.2	Netlib		yes
<ul style="list-style-type: none"> ○ check internal fallbacks : <i>netcdf 4.1.1/libxc 2.2.3/atompaw 4.0.0.14/wannier90 2.0.1.1/bigdft 1.7.1.24/psml 0.8</i> 					
tikal_gnu_5.4_mpich	GNU 5.4	MPICH 3.2.1	MKL11/FFTW3		yes
<ul style="list-style-type: none"> ○ compilation options : -Wall -fpe-trap=invalid,zero,overflow -fbacktrace -pedantic -fcheck=all 					
tikal_gnu_4.9_cov	GNU 4.9	MPICH 3.1.3	MKL11/FFTW3		no
<ul style="list-style-type: none"> ○ generation of a code coverage report (-fprofile-arcs -ftest-coverage) 					

	<u>F2003</u> *	F2008	OpenMP			OpenACC		MIC
			3.1	4.0	4.5	2.0a	2.5	
gcc 4.7	P	P	F					
gcc 4.9	P	P		P				
gcc 5.3	P	P		F		F		√
gcc 6.3	P	P		F		F		√
gcc 7.1	P	P		F	P			√
ifort 15	P	P		F				√
ifort 16	F	P		F				√
ifort 17	F	P			F			√
NAG 6.1	F	P						
xlf 15.1	F	F	F	P				
PGI 17.4	F	P	F				F	√

* at least ISO C BINDING

P=Partial, F=almost FULL or Full support

What has been accomplished in 2 years since our last meeting :

- Installation of three new servers :
 - 2 x HP DL 360 G6 (48 cores Haswell)
 - 1 x DELL PowerEdge R430 (12 cores Haswell)
 - 1 x IBM Power S824 (4 cores Power 8)
- Upgrade the version of buildbot to 0.8.12
- Rewriting scripts for buildmaster (better organisation of builders)
- Use of a DB (mongo) to centralize all configurations/status of buildbot
- Use of Environment Modules on buildslaves to define the test environment (module load “name_of_builder”)
- New portal to access to results

ToDo list :

- Upgrade the version of buildbot to 0.9.x and bbportal (AngularJS 2)
- Finalize an “HPC” builder (based on ifort 17 and impi)
- Save the execution time of tests to detect a regression
(at each new trunk/develop ?)
- keyword

Remarks/Questions for Organisation/Setup of test farm:

- need more tests at level of librairies
- test ELPA and scalapack (MKL) in the testfarm : need tests
- need quickly fallbacks for Netcdf4/HDF5 [serial and paral]
- vectorization problems with new processors (Haswell and later)
- keep watch on **excluded** tests (put status on Dashboard ?)
 - in Input files with “exclude_hosts” and “exclude_builders” keywords
 - in `__init__.py`
- automatic detection of decreased code coverage after a Merge Resquest ?
- declared compilers GCC 4.X “deprecated” starting with version 8.4 ?
(only two bots : `buda_gnu_4.7_cuda` and `tikal_gnu_4.9_cov`)

Git

Reminder :

- at the beginning , use of CVS privately
- in 2004, we adopted GNU arch (tla) for the first public version 4.x
- from 2005, Bazaar-NG (baz) from version 5.0 to 5.6.x
- in 2009, switch to Bazaar (bzz) from version 5.7 to 8.1.2.

In 2015, the ABINIT core developer team decided to migrate from bazaar to git.

Git is a free and open source distributed version control system designed to handle everything from small to very large projects with speed and efficiency especially for history

In the wiki, a topic describes the ABINIT specificities related to git (such as branch naming, configurations, workflow) :

https://wiki.abinit.org/doku.php?id=developers:git:specificities_git_abinit

GitLab

GitLab CE (Community Edition)

- web-based [Git](#) repository manager
- [wiki](#) and [issue tracking](#) features
- using an [open source](#) license
- launched 2011.
- the code is written in [Ruby](#) and [Go](#).

Used by : IBM, Sony, Jülich Research Center,
NASA, Alibaba, O'Reilly Media, SpaceX, CERN....

Unlike GitHub.com, GitLab.com offers free :

- unlimited **private/internal** repositories (only public with github)
- 10 GB disk space per project (1GB per project with github)

gitlab.abint.org is hosted on our own server running the gitlab CE to facilitate the **integration** with our buildbot infrastructure.

Technical infos and Statistics

Server Dell PowerEdge R430

- 6 cores / 8GB RAM / 1.3 TB

After one year of operation :

- 48 users for abinit project
- 26 active contributors (1 commit or more)
- 10 contributors with > 20 commits :

`git shortlog -ns`

503 Matteo Giantomassi

367 Xavier Gonze

167 Marc Torrent

142 Matthieu Verstraete

94 Alexandre Martin

- 196GB used for repositories

BBportal : builbot and GitLab integration



Login page



Login

Login

Password

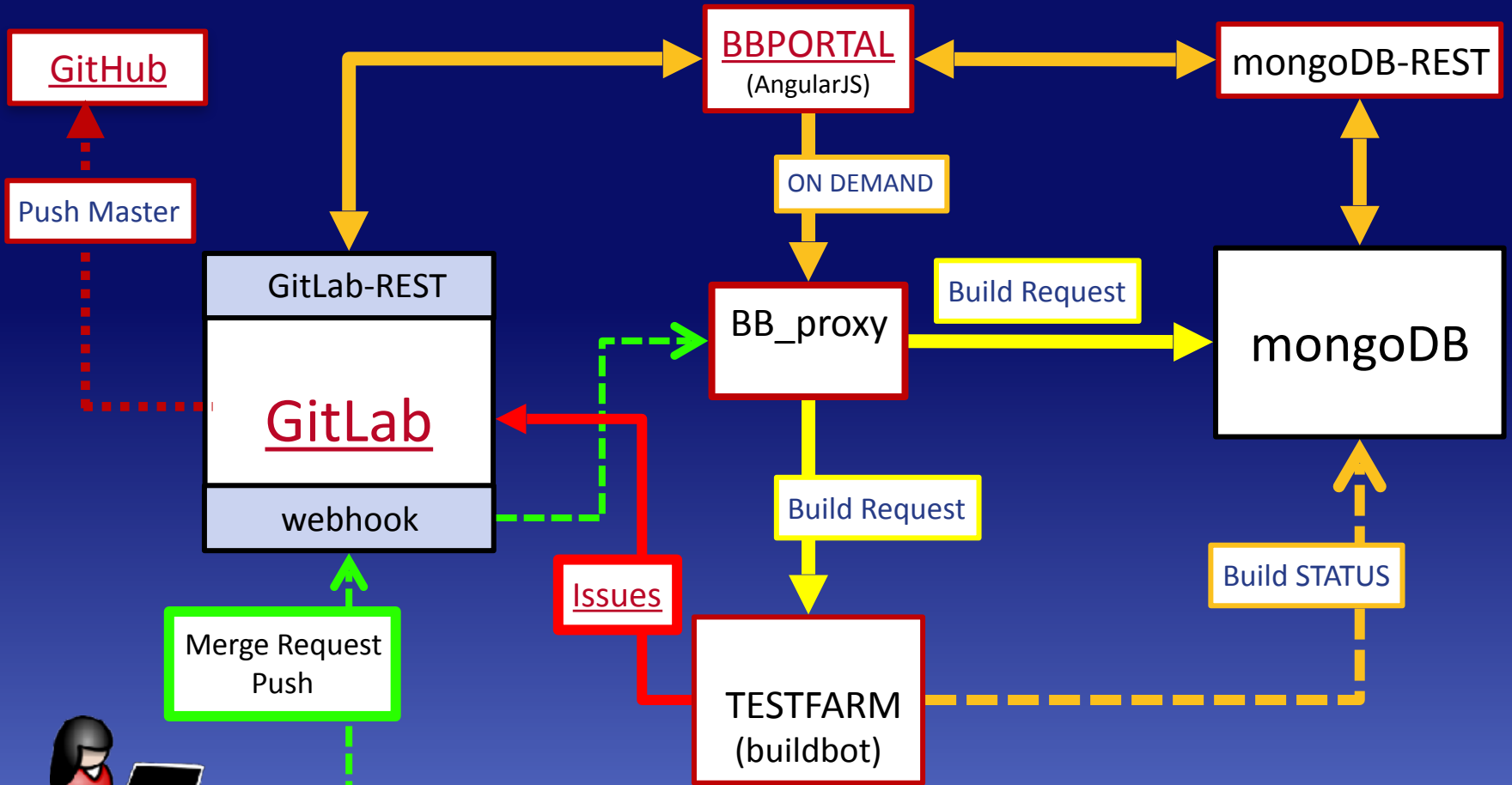
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This page is maintained by Jean-Michel Beuken
Academic responsibility : Xavier Gonze

BBportal : buildbot and GitLab integration

Block diagram of infrastructure



Developers

> former website

> new website : www.abinit.org

- Drupal 8
- theme based from bootstrap 4
- responsive web design
- beta release !

Thank you for your attention