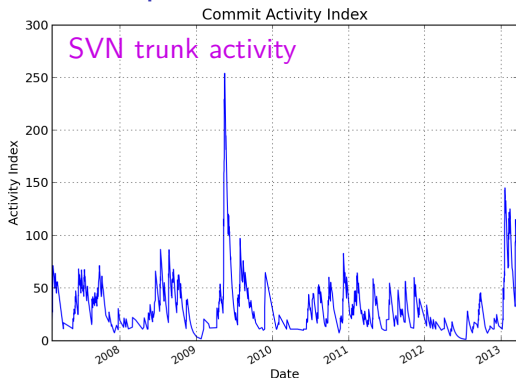


Features of the new EUTelescope release 0.8 and the plans for future development

Hanno Perrey

- 1 Motivation
 - EUTelescope development goals
- 2 The EUTelescope release 0.8
 - Overview
 - Revised job submission
 - New central web pages
 - Regression tests
- 3 Plans for future development

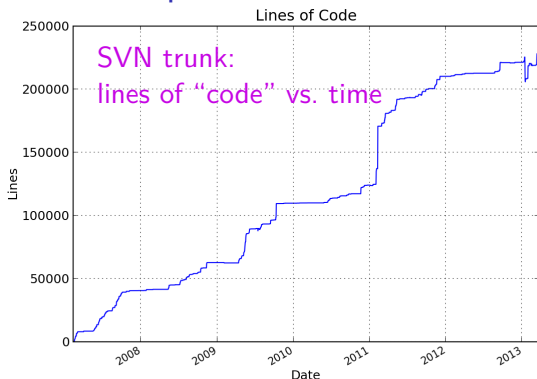
EUTelescope: A look back



EUTelescope has been...

- **actively developed** for over 6 years by several authors
- extended in features and sensor-support
- **successfully used by many groups** in various testbeam studies

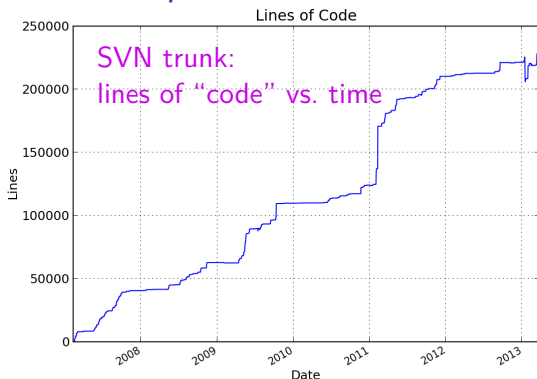
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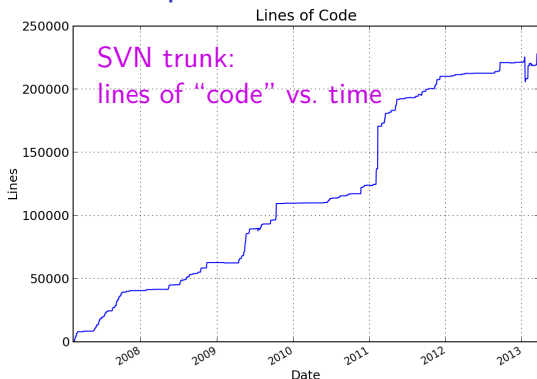
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- **complexity increasing** (new sensors, more elaborate alignment, ...)
- documentation didn't keep up, **knowledge transfer by word of mouth**
- steep learning curve, potential **pitfalls for new users & developers**

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Aside from new features: **establish testing, refactorize & document!**

Important features for users

- centralized documentation
- easy installation
- working examples
- stable releases
- a place to ask questions

Goal: Easier start/smooth learning curve/better usage experience

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Partially already addressed with **EUTelescope release 0.8!**

Important features for users

- centralized documentation → new web page
- easy installation → verified installation on various platforms
- working examples → early stage/examples = test cases
- stable releases → will maintain releases through bug fixes
- a place to ask questions → new online forum

Goal: Easier start/smooth learning curve/better usage experience

Partially already addressed with EUTelescope release 0.8!

Important features for developers

- combining efforts
- communication and coordination
- maintainability & stability

Goal: Close & productive collaboration between developers

Important features for developers

- combining efforts
 - ▶ merging of diverged branches (ongoing)
 - ▶ SVN accounts available for everyone interested!
- communication and coordination
 - ▶ web page modifiable for everyone with CERN account and registered
 - ▶ bug/issue tracker
 - ▶ forum
- maintainability & stability
 - ▶ automated nightly builds and tests (→ more stable trunk)
 - ▶ removed old “cruft”
 - ▶ started code review (ongoing)
 - ▶ fixed *many* warnings and errors (compiler/static code analysis)

Goal: Close & productive collaboration between developers

Partially addressed with EUTelescope release 0.8!

Changes with EU Telescope 0.8

Change log for release 0.8.0:

Maintenance and stability release;

New lean and flexible job submission tool `jobsub`;

all examples now use CTest framework for `automated regression tests`;

includes processors for CMS Pixel chips (PSI46xxx)

removed legacy code, fixed various bugs and improved code quality (e.g. fixed compiler warnings);

revised producer console output messages and verbosity

updated and improved `documentation`;

also: already `new point release 0.8.1` with a couple of fixes
(installation/updating will be covered in the tutorial tomorrow)

New features: *jobsub*, a versatile job submission tool

job submission: generating run-specific steering files based on generic templates and executing them through Marlin

out go *pysub* and *simplesub*...

- pysub*:
- code base with > 30k LoC (!), difficult to maintain/extend
 - inflexible, often required additional scripting on top
 - inconsistencies between various scripts
- simplesub*: ● functional but a bit too simple; configuration cumbersome

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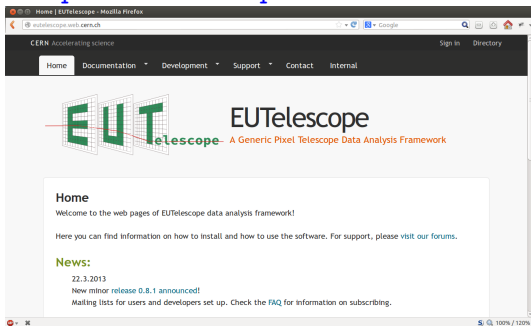
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... enter *jobsub*!

- **simple**: lean & well commented python code (~ 500 LoC)
- **flexible**: steering templates filled with **any information** from **config file**, **table** (csv text file), and/or **command line**
- **consistent**: the same tool for every analysis step
- only **missing feature** (w.r.t. *pysub*): direct grid support/submission

New features: Central Web Pages

<http://eutelescope.web.cern.ch>



central location for...

- announcements
- documentation
 - ▶ installation/updating
 - ▶ jobsub with examples
 - ▶ *getting started* with development
 - ▶ ...
- support forums
- issue tracker


- CERN-hosted, using **drupal** content management system
- **directly editable** by registered users (with CERN-account)
- forum & tracker open to anybody (if CERN user, please log in!)



great tool for **documentation and collaboration!**


New features: full-featured examples = test cases

From examples ...

- **example analyses** consist of all steering template & configuration files
- they provide a good **starting point** for new users
- add **real-life data** & **output validation**  **data-driven regression tests!**

New features: full-featured examples = test cases

From examples ...

- example analyses consist of all steering template & configuration files
- they provide a good starting point for new users
- add real-life data & output validation  data-driven regression tests!

... to automated nightly tests

- CTest provides framework to define and execute tests
 - fail/pass conditions determined from **exit status & shell output**
 - **complex output** (e.g. ROOT or LCIO files) validated through external tools running as test in CTest
- test not only ability to execute analysis but also **ensure consistency with known-good results**
- nightly run: SVN checkout, configure, build, tests → **submit to server**

New features: CDash test results monitoring

CDash: provides web-based access and monitoring of test results

My CDash All Dashboards Log Out Saturday, March 23 2013 22:38:54 CET

 **AIDA** Dashboard Advanced European Accelerators **EuTelescope** Calendar Project Settings

No file changed as of **Saturday, March 23 2013 - 03:00 CET** Show Filters Advanced View Auto-refresh Help

Nightly												
Site	Build Name	Update			Configure		Build		Test			Build Time
		Files	Error	Warn	Error	Warn	Not Run	Fail	Pass			
desy-cms010	Linux-g++	18	0	0	0	150	0	2	80		17 hours ago	
eutesting	Linux-g++	18	0	0	0	150	0	2	81		17 hours ago	

Experimental												
Site	Build Name	Update			Configure		Build		Test			Build Time
		Files	Error	Warn	Error	Warn	Not Run	Fail	Pass			
eutesting	Linux-g++	0	0	0	0	150					16 hours ago	
desy-cms010	Linux-g++	0	0	0	0	150					16 hours ago	

Dynamic Analysis				
Site	Build Name	Checker	Defect Count	Date
desy-cms010	Linux-g++	Valgrind	4091	16 hours ago
eutesting	Linux-g++	Valgrind	4006	16 hours ago

 **Kitware**  CDash 2.0.2 © Kitware | Report problems | 0.016s

records & visualizes:

- compilation messages
- **fail/pass conditions**
- console output
- test duration
- numeric & graphical test results

- available to all interested developers of EUTelescope
- links to SVN revisions → easily identify problematic commits
- email warnings to developers if tests should fail

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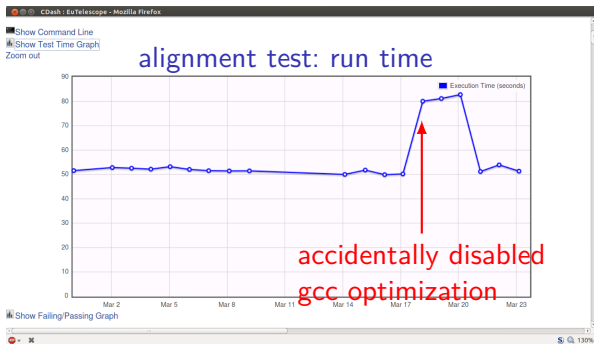
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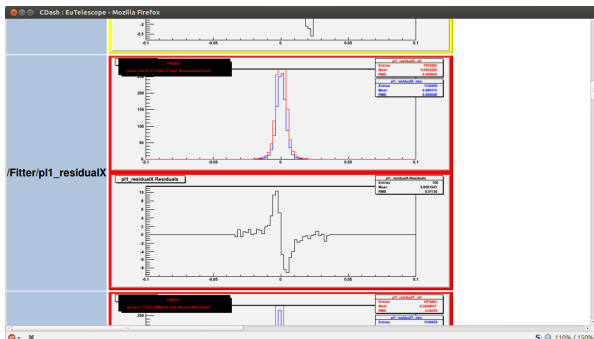
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New features: running tests locally

- run CTest to **verify code changes before committing** to SVN
- prerequisites:
 - ▶ data & known-good results (currently on DESY AFS)
 - ▶ tests enabled and test files included in CMakeLists.txt
- available tests:
 - ▶ static code analysis using cppcheck
 - ▶ analysis chain for Datura telescope @DESY w/o DUT
 - ▶ analysis chain for Anemone telescope with ATLAS FEI4
 - ▶ check of output files with LCIO tools
 - ▶ verification of results (e.g. residuals) with statest (from GEANT4)
- configure & modify tests through
 - ▶ example configs & steering files
 - ▶ testing.cmake file in example directory

- example CTest commands:

```
cd $EUTELESCOPE/build # output will be in ./Testing
ctest -N # list available tests
ctest -I 2,6 # run tests 2 to 6
ctest -V # run all tests, show output
```

The Road Ahead: plans/tasks/issues

planned next FEATURES

- GBL for fitting & alignment
- merging of asynchronous data streams (on trigger id/time stamp)
- full telescope simulation chain

known ISSUES (a.k.a. skeletons in the closet)

- need to refactorize geometry description & coordinate transformations
 - ▶ important for track fits using e.g. GBL
 - ▶ makes producers easier to maintain, extend and exchange
- need to clean-up further
 - ▶ refactorize historic structures/dependencies, drop obsolete functionality, re-structure processors (e.g. for consistency), fix compiler warnings, manage external dependencies
- need to fix EUDAQ circular-dependency
- need to provide more documentation
- need more examples/test cases (→ code coverage)
- does jobsub need grid functionality (?)

Contributions are appreciated!

- let us know of any bug/issue you are aware of! (→ bug tracker)
- send us bug fixes you have developed
- send in hints, documentation & feedback
- make your data & analysis templates available for automated regression tests
- commit improvements to code, optimizations or new features to the SVN trunk

let's stay in touch!

- sign-up to become SVN developer
- sign-up to devel-mailing list
- want to keep up to date with releases, workshops and forum activity?
→ sign up to users-mailing list!

Summary

- EUTelescope is a versatile data analysis framework, constantly being extended and improved
- EUTelescope release 0.8 was a big step forward, but more tasks are ahead
- Igor and I feel responsible for coordination of development
 - ▶ let us know when features are needed or problems occur!
- you are welcome to join in developing EUTelescope!

Some further points to discuss over the next days

- who currently maintains/uses a branch on EUTelescope (non-trunk/release)
- who is interested in working on EUTelescope (e.g. technical task PhD)
- is there interest for a next workshop?
or infrequent but regular developer meetings?