

F2F Tracking Meeting: RAVE Refactoring

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INSTITUT FÜR EXPERIMENTELLE KERNPHYSIK (IEKP)

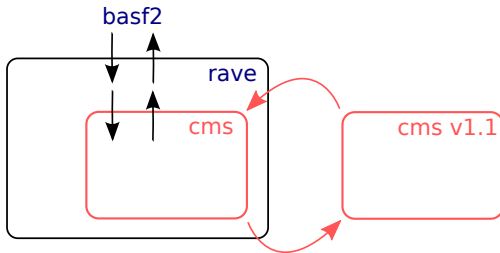


What is RAVE?

- RAVE = **R**econstruction (of vertices) in **A**bstract **V**ersatile **E**nvironments
- Toolkit for reconstruction of interaction vertices
- Vertex finding and fitting
- Designed for ILC
- No active development for long a time
- Maintained by W.Waltenberger
- Used by Belle 2, SHiP

What is RAVE?

- RAVE = CMS vertexing code (CMSSW) + interface classes



- Different Algorithms are available:
 - Vertex reconstruction (Kalman filter, adaptive technique, iterative adaptive technique, trimmed Kalman filter, multivertex fit, Gaussian-sum fitting, adaptive Gaussian-sum fitting)
 - Flavor tagging (of jets)
 - Kinematic fitting

Issues

- Memory leaks
- Memory management
- Time consumption
- Code complexity
- Conversion between RAVE and CMS objects
- Missing documentation
- ...

Status I

- Project is now on github: <https://github.com/rave-package/rave/>
- Automatic builds and tests: <https://travis-ci.org/rave-package/rave>
- Fixed memory leaks
- Switch from autotools to cmake
- Removal of CLHEP

Travis

```
sudo: required
language: cpp
notifications:
  email:
    on_success: change # default: change
    on_failure: always # default: always
compiler:
  - gcc
addons:
  apt:
    sources:
      - ubuntu-toolchain-r-test
    packages:
      - gcc-4.8
      - g++-4.8
      - clang
#   - libboost1.54-all-dev
#   - libclhep-dev
#   - root-system-bin
#   - root-system-common
- build-essential
#   - automake1.11
#   - autoconf2.64
- cmake

























before_install:
  - if [ "$CXX" = "g++" ]; then export CXX="g++-4.8" CC="gcc-4.8"; fi
  - sudo add-apt-repository --yes ppa:boost-latest/ppa
  - sudo apt-get -qq update
  - sudo apt-get install libboost1.54-all-dev
  - wget http://proj-clhep.web.cern.ch/proj-clhep/DISTRIBUTION/tarFiles/clhep-2.1.3.1.tgz
  - tar xzf clhep-2.1.3.1.tgz
  - cd 2.1.3.1/
  - mkdir build/
  - cd build/
  - cmake ../CLHEP
  - make
  - sudo make install
  - cd ../../
  - wget http://www-ekp.physik.uni-karlsruhe.de/~sieber/root_5.34.07-1_amd64.deb || exit 1
  - sudo dpkg -i root_5.34.07-1_amd64.deb || exit 1
  - echo "/usr/local/lib" | sudo tee -a /etc/ld.so.conf
  - echo "/usr/local/lib/root" | sudo tee -a /etc/ld.so.conf
  - sudo ldconfig || exit 1
install:
  - cmake -DHAS_MVF=ON -DHAS_KINEMATICS=ON .
  - make VERBOSE=1
script:
  - ./tests/kinematics01
  - ./tests/kinematics02
  - ./tests/kinematics03
  - ./tests/propagator0tests
  - ./UnitTests/raveunittests
```

Travis

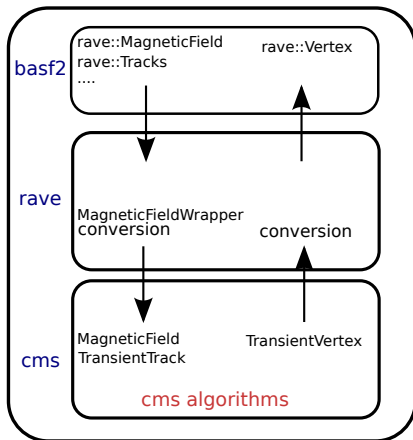
rave-package / rave  build passing

Current Branches Build History Pull Requests

 Settings ▾

 	tmp_refactor Changed functions in AnalyticalPropagator to return a rave::Track  Moritz Gelb committed	# 21 passed  270d543	 18 min 33 sec  a day ago
 	tmp_refactor Added temporary propagatortest  Moritz Gelb committed	# 20 passed  9ba8e91	 27 min 7 sec  6 days ago
 	tmp_refactor Add missing tests for last commit  Moritz Gelb committed	# 19 errored  74b7f15	 17 min 26 sec  6 days ago
 	tmp_refactor Vacuumpropagator inherits from Analyticalpropagator  Moritz Gelb committed	# 18 errored  6d3b77e	 13 min 54 sec  6 days ago

Changes



Example 1: MagneticField

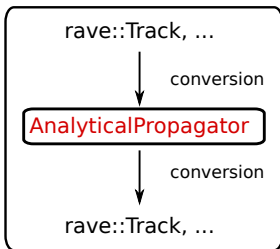
- Two (identical) magnetic field classes
- Removal of `MagneticFieldWrapper`/ CMS `MagneticField`

Changes

Example 2: rave::VacuumPropagator

- Wrap-around with no additional functionality
→ Modification of CMS classes

rave::VacuumPropagator



Changes

Example 3: `rave::Track`

- Tracks are now saved in CMS data formats (covariance matrix, vectors, ...)
- no conversion necessary
- CMS algorithms work directly with `rave::Track`
 - minor changes in `basf2 ravelInterface` are necessary

Outlook

- Clean up the memory management
- Integration of refactored version back to basf2 - first test
- Reduction of time consumption