



# Software and Computing Status

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# Section 1:



## Software and Computing Infrastructure

- Version Control

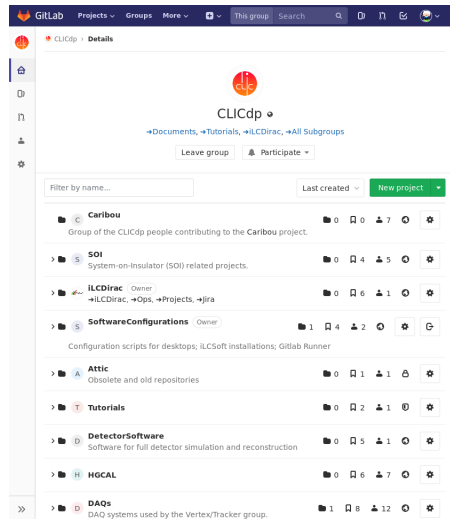
- Continuous Integration (CI)

- Collaborative Editing

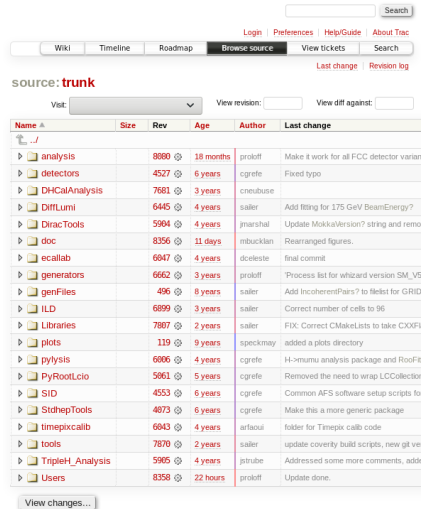
- Shared Storage



- ▶ GitLab group for CLICdp <https://gitlab.cern.ch/clicdp>
- ▶ Usable for all types of software projects, websites, and documents



- ▶ **CERN subversion is slowly being made read-only and will disappear when AFS does**
- ▶ All in-active repositories were migrated from SVN to GitLab: <https://gitlab.cern.ch/CLICdp/CLICDetSVN>
  - ▶ including their history
- ▶ Split folders in SVN into many repositories
- ▶ Each user in their own repository

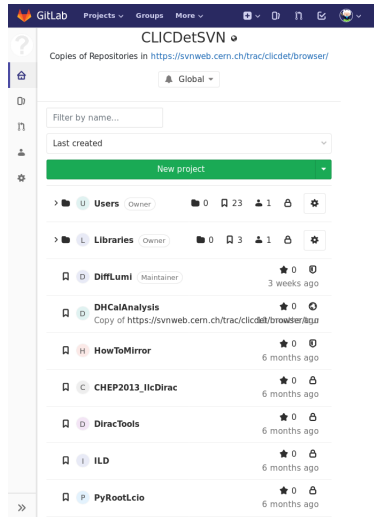


The screenshot shows the Subversion repository interface for CLICDetSVN. At the top, there is a search bar and navigation links: Login, Preferences, Help/Guide, About Trac. Below this, there are tabs for Wiki, Timeline, Roadmap, Browse source (selected), View tickets, and Search. The source is set to 'trunk'. Below the tabs, there are fields for 'Visit', 'View revision', and 'View diff against'. The main content is a table listing the repository structure and recent changes.

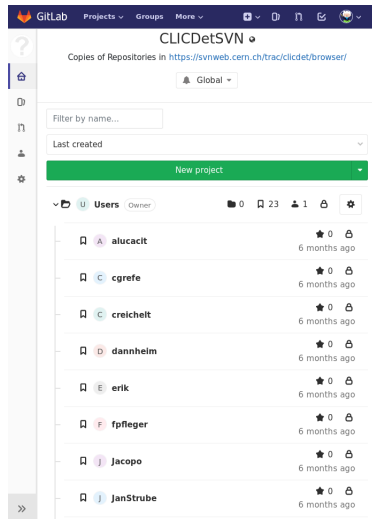
Name	Size	Rev	Age	Author	Last change
analysis		8080	18 months	proloff	Make it work for all FCC detector varian
detectors		4527	6 years	cgreffe	Fixed typo
DHCalAnalysis		7681	3 years	cneubuse	
DiffLumi		6445	4 years	sailer	Add fitting for 175 GeV BeamEnergy?
DiracTools		5904	4 years	jmarshar	Update MokkaVersion? string and remo
doc		8356	11 days	mbucklan	Rearranged figures.
ecallab		6047	4 years	dceleste	final commit
generators		6662	3 years	proloff	*Process list for whizard version SM_V5
genFiles		496	8 years	sailer	Add IncoherentPairs? to filelist for GRID
ILD		6899	3 years	sailer	Correct number of cells to 96
Libraries		7807	2 years	sailer	FIX: Correct CMakeLists to take CXXFI
plots		119	9 years	speckmay	added a plots directory
pylvis		6006	4 years	cgreffe	H->mumu analysis package and RooFit
PyRootLcio		5061	5 years	cgreffe	Removed the need to wrap LCCollector
SID		4553	6 years	cgreffe	Common AFS software setup scripts fo
StdhepTools		4873	6 years	cgreffe	Make this a more generic package
timepixcalib		6043	4 years	arfaoui	folder for Timepix calib code
tools		7870	2 years	sailer	update covery build scripts, new git ve
TripleH_Analysis		5905	4 years	jstrube	Addressed some more comments, add
Users		8358	22 hours	proloff	Update done.

At the bottom of the table, there is a button labeled 'View changes...'.

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# Continuous Integration



Using GitLab-CI beyond testing pull requests (but also for that of course!)

- ▶ “Single Click” to compile and deploy software release on CVMFS, automatic nightly releases
- ▶ Deploy websites with auto-generated content: ILCDIRAC documentation, DD4HEP
- ▶ Compile software for use on the grid using a fixed environment

The screenshot shows the GitLab web interface for creating a new tag. The top navigation bar includes the GitLab logo, 'Projects', 'Groups', 'More', and a search bar. The left sidebar contains icons for home, projects, and other features. The main content area is titled 'Create tag' and includes the following fields:

- Tag name:** 2018-08-28
- Create from:** master
- Message:** Existing branch name, tag, or commit SHA
- Release notes:** A section with 'Write' and 'Preview' tabs. The 'Write' tab is active, showing a text area for release notes and a 'Create tag' button at the bottom.

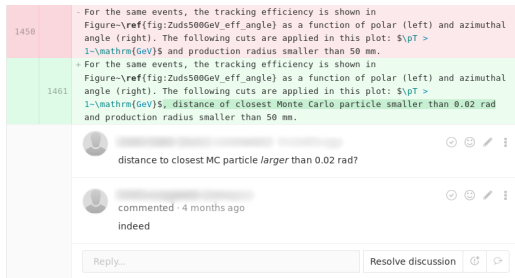
Below the 'Release notes' section, there is a note: 'Markdown is supported' and 'Optionally, add release notes to the tag. They will be stored in the Git repository and displayed on the tags page.'



GitLab offers all the tools for collaborative editing, even just with a web browser

- ▶ Versioning, access control, automatic builds, web IDE
- ▶ <https://gitlab.cern.ch/CLICdp/Publications>
- ▶ You can find all the figures for the publications here

OVERLEAF is also available collaborative editing, but not clear how well the versioning helps when things go wrong.



1450 - For the same events, the tracking efficiency is shown in Figure-\ref{fig:Zuds500GeV\_eff\_angle} as a function of polar (left) and azimuthal angle (right). The following cuts are applied in this plot:  $p_T > 1-\mathrm{GeV}$  and production radius smaller than 50 mm.

1461 + For the same events, the tracking efficiency is shown in Figure-\ref{fig:Zuds500GeV\_eff\_angle} as a function of polar (left) and azimuthal angle (right). The following cuts are applied in this plot:  $p_T > 1-\mathrm{GeV}$ , distance of closest Monte Carlo particle smaller than 0.02 rad and production radius smaller than 50 mm.

distance to closest MC particle *larger* than 0.02 rad?

commented · 4 months ago  
indeed

Reply... Resolve discussion

Discuss changes before merging. Only read the phrases that are actually changed



# AFS



- ▶ AFS is being phased out at CERN at the end of LS2
- ▶ `/afs/cern.ch/eng/clic/*` has mostly been archived to Castor
- ▶ Some harder to relocate software has so-far remained
  - ▶ Sentaurus TCAD (needs access protection)
  - ▶ legacy SLIC and lcsim



# CVMFS



All new software is provided via CVMFS: `/cvmfs/clicdp.cern.ch`

- ▶ compilers (gcc 6, 7, 8, llvm), iLCSoft, iLCDirac, git, Emacs, WHIZARD2
- ▶ Mounted on desktops, lxplus, lxbatch, and grid sites around the world
- ▶ For SL6 and CentOS7, and a few things for macOS



- ▶ Shared storage on EOS `/eos/experiment/clicdp/*`: grid, data, phys
  - ▶ grid: equal to CERN-DST-EOS iLCDirac Storage Element, allow direct **read** access for grid files: both central production and user output
  - ▶ data: test beam data
  - ▶ phys: Lumi spectra, background files, MC samples
- ▶ Personal storage (1TB) under `/eos/user/u/username/`, also connected to `cernbox.cern.ch`



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- ▶ Upcoming configuration change for fuse mounts on Desktop PCs



## Section 2:



### Simulation and Reconstruction

Geometry and Simulation

$\gamma\gamma \rightarrow$  hadron Background

Installations and Configurations



# Simulation and Reconstruction Software



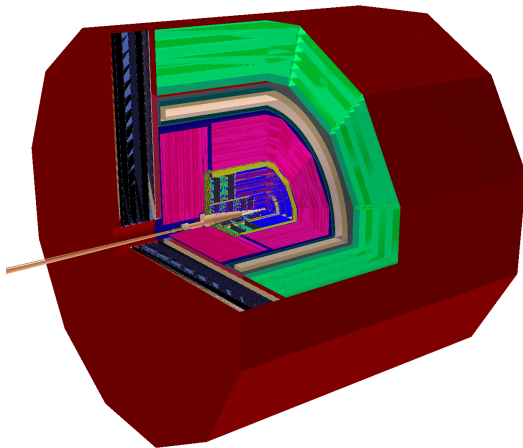
- ▶ Many improvements and detailed studies for the reconstruction
- ▶ See presentations by Emilia, Erica, and Matthias later today





Current detector model CLIC\_o3\_v14,  
unchanged for 9 months

- Only change: fix offset in LumiCal segmentation



- ▶ So far mostly focused on reconstruction with toughest backgrounds from 3 TeV
- ▶ Now simulating 380 GeV  $\gamma\gamma \rightarrow$  hadron backgrounds
- ▶ 350 GeV and 3 TeV  $\gamma\gamma \rightarrow$  hadron events already available
- ▶ clicReconstruction.xml contains configuration for different background conditions, e.g.,  
-Config.Overlay=380GeV
- ▶ Information, backgrounds, spent beams for different accelerator configurations (Energy,  $L^*$ , bunch charge) kept up-to-date by D. Arominski (CERN, Warsaw UT)

## CLIC 380 GeV with $L^* = 6$ m

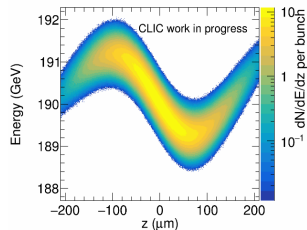
### Summary information about CLIC at 380 GeV with $L^* = 6$ m

The following results have been obtained using the longer  $L^*$  option of 380 GeV Beam Delivery System running at the nominal conditions. In this design the last quadrupole of the final doublet - QD0 is placed outside of the CLIC detector.

Electron and positron beams have been separately generated, then transported through the BDS using Placet and collided in GuineaPig++ software, assuming a perfect beam feedback system.

The beams are generated taking into account the following energy spread contributions:

- energy spread shape coming from the Main Linac
- uncorrelated energy spread of 0.1% of the post-linac beam energy (190 GeV), assuming Gaussian distribution
- uncorrelated energy spread of 1.6% of the pre-linac beam energy (9 GeV), assuming Gaussian distribution



<http://clic-beam-beam.web.cern.ch/clic-beam-beam/>



# Simulation and Reconstruction Configurations



- ▶ Software installations on CVMFS `/cvmfs/clicdp.cern.ch/iLCSoft/builds/`
  - ▶ Latest build from 2018-08-10
- ▶ Configurations: `https://github.com/iLCSoft/CLICPerformance,`  
`/cvmfs/clicdp.cern.ch/iLCSoft/builds/<date>/CLICPerformance/HEAD`
- ▶ Frequent installations for large scale production with ILCDIRAC

Let us know if you would like to study anything with the new detector model and reconstruction

Thanks to all the contributors to the  
software effort