

# *Software tutorial*

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# ***From the DAQ to hits***



# Preface

- All the files mentioned in this tutorial are available on the web ([http://www-zeus.desy.de/~roloff/eudet\\_tutorial/](http://www-zeus.desy.de/~roloff/eudet_tutorial/))
  - You can have further information about all the packages from the ILCSoft web portal (<http://ilcsoft.desy.de/portal>)
  - The most effective way to get help is to post a well described request on the linear collider forum (<http://forum.linearcollider.org>). Eutelescope has its own dedicated area.
  - Publishing questions on the forum may help also other users!
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# *First install the software*

- Quite a complicated procedure make trivial by the use of a installation script!
    - 1) Download the installation script: ilcinstall from the ilcsoft web site (<http://ilcsoft.desy.de/portal>).
    - 2) Customize the configuration information contained into the install.cfg file. We suggest to start from our standard install-tutorial.cfg available on the web site and modify it according to your needs.
    - 3) Launch the installation script typing:

```
./ilcsoft-install -i install-tutorial.cfg
```
    - 4) In case of problem contact one of us or use the forum (very effective!)
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## *Second getting the data!*

- The easiest way is having a GRID access and being a member of the ILC Virtual Organization.
- How to get a personal certificate depends on your organization!

To browse the data repository:

```
lfc-ls <directory>
```

To get a file:

```
lcg-cp -v --vo ilc lfn:<full_path_and_filename>  
file:<full_path_and_filename>
```

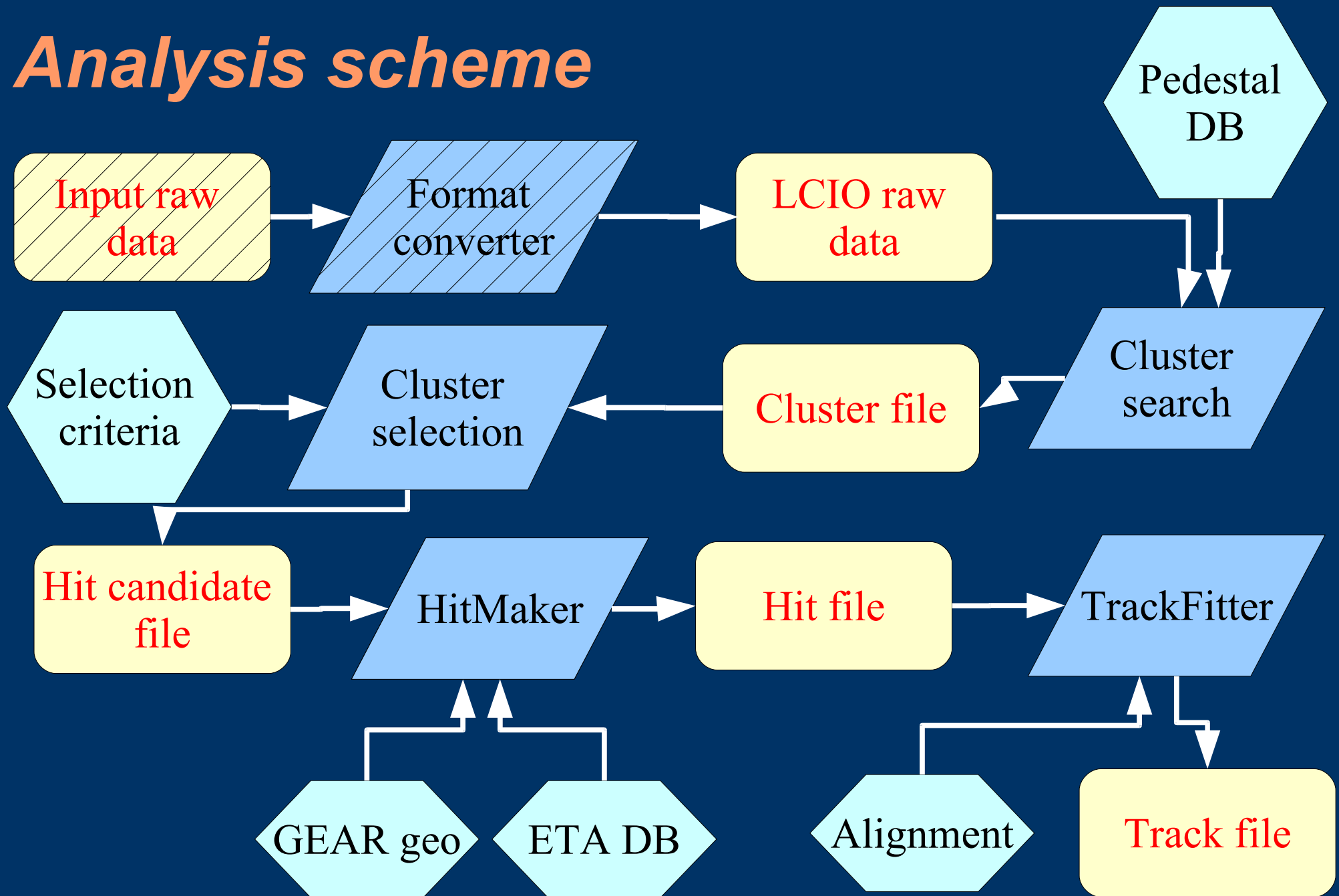
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# Getting ready to start

- Marlin is a general purpose modular analysis framework.
    - It executes a list of processors in the order and with the parameters the user specify into a steering file.
    - Steering files are written in XML and even if they are human readable, they not always are human understandable.
    - To create, modify and fix steering files, use MarlinGUI.
  - To process your steering file you just have to type:  
`Marlin my-steer-file.xml`
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# Analysis scheme



# Preparing pedestal / noise files

- For this purpose we use an empty run
  - Have a look at a typical steering file for this operation  
`pedestal-tutorial.xml`
  - As an output you get:
    - A slcio file containing pedestal / noise / mask for each sensor plane
    - An ASCII file for each plain containing the same information that can be used by other analysis program
    - A ROOT file containing standard histos showing pedestal / noise distributions and maps.
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# *Look for clusters*

- You need one or more input files with particles and a pedestal / noise / status file
- Have a look at the steering example in `analysis-filter-tutorial.xml`
- As an output you get:
  - A slcio file containing all the clusters found
  - A ROOT file with DQM histograms concerning SNR, event multiplicity, hit maps.



# *Prepare eta functions*

- You need one or more files with clusters. You can even filter this clusters on-the-fly according to you wishes.
  - Use the steering example file `etacalculator-tutorial.xml`
  - As an output you get:
    - A slcio file containing the eta function along x and y for each sensor plane
    - A ROOT file with DQM histograms showing the eta functions
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# *Transform hits*

- You need
    - One or more clusters file,
    - The geometry description contained into a GEAR xml file, see for example  
`gear_telescope_5planes.xml`
    - An Eta file
  - Use the steering example file  
`hitmaker-tutorial.xml`
  - As an output you get:
    - A slcio file with the hit position in the global FoR
    - A ROOT file with DQM histograms and 3D reconstruction
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# Alignment

- Based on MILLEPEDE II
- Two steps:

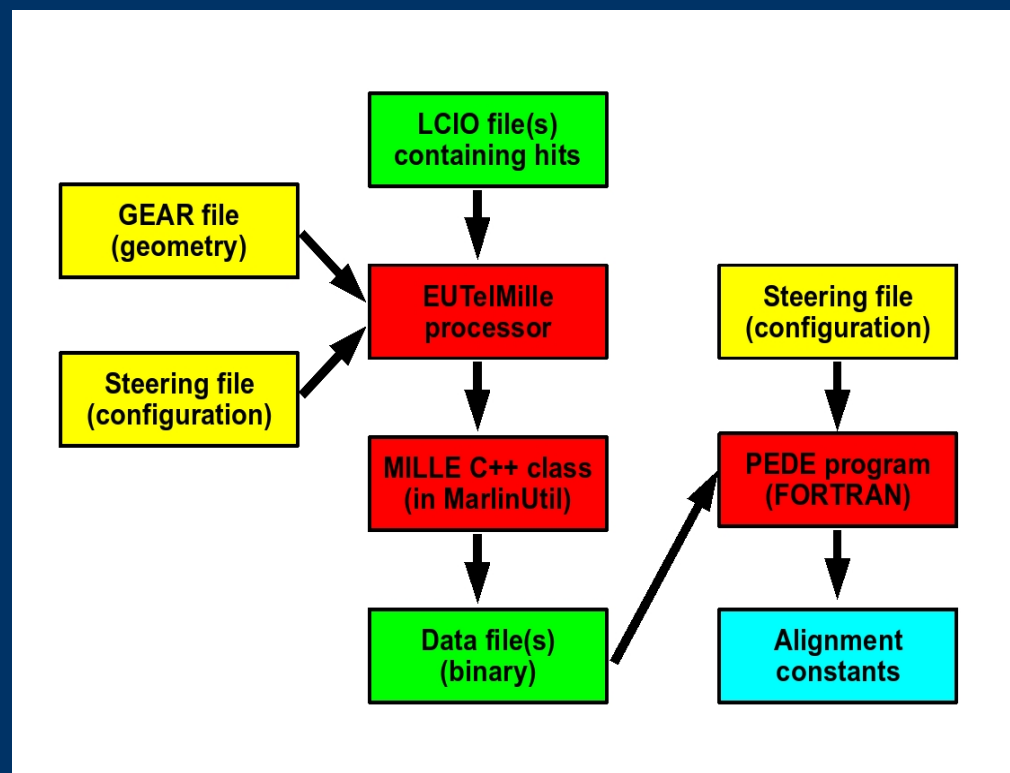
- Run the EUTelMille processor on the slcio file containing hits:

`mille_processor.xml`

- The binary file is input to the pede program (<http://www.desy.de/~blobel/Mptwo.tgz>)

Example steering file:

`steer_mille.txt`



# Track fitting

- Input: hits in LCIO file
  - Output: track information in LCIO file (can be converted to ROOT)
  - Two options:
    - Fitting of straight lines (very simple):  
`line-fitter-tutorial.xml`
    - Analytic fit considering MS:  
`track-fitter-tutorial.xml`
- Very nice documentation:  
`EUTelTestFitter.tgz`

