



# TRIVENT

## User Manuel

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# INTRODUCTION.

Trivent is composed in 2 Marlin processors take input the LCIO file with RawCalorimeterHit collection and give, ROOT file and LCIO file contain CalorimeterHit collection with selected events using the time spectrum.

Trivent have dipendancies to some modules,

- CMake <http://www.cmake.org/>
- Marlin [http://ilcsoft.desy.de/portal/software\\_packages/marlin/](http://ilcsoft.desy.de/portal/software_packages/marlin/)
- LCIO <http://lcio.desy.de/>
- ROOT <http://root.cern.ch/drupal/>

This softs are available in ILCSoft package, for more information you can see the ILCSoft web site <http://ilcsoft.desy.de/portal/>.

## 1- Get Trivent.

Trivent in available at [lyosvn.in2p3.fr/repository/ilc/Analyse/Trivent/](http://lyosvn.in2p3.fr/repository/ilc/Analyse/Trivent/)  
The documentation to use can be find in the Trivent package or in the calice wiki page <https://twiki.cern.ch/twiki/bin/view/CALICE/GrpcSwRec>

## 2- Installation.

Before installation make you sure that you have ilcsoft installed in your machine. Now, copy the CMake file configuration from the ilcsoft in Trivent directory,

```
>cp $ILCSOFT/ILCSOft.cmake .
```

Copy the bash script to initialise the ILCSOft environement,

```
>cp $ILCSOFT/init_ilcsoft.sh .  
>source init_ilcsoft.sh
```

To start the Trivent installation create a build directory and move in it,

```
>mkdir build  
>cd build/
```

Than you can generate the makefile using camke by this folowing command,

```
>cmake ../ILCSOft.cmake ..
```

Finaly compile the code.

```
>make install
```

Trivent is ready to use :)

## 3- Use Trivent.

Trivent is composed in 2 Marlin processor, the fisrt one generate the LCIO file with CalorimetreHit collection, with selected events. The selection parameters can be tuned in steering file include in the steer directory ([link to my presentation](#)). The second Processor make a rootfile based on lcio file with same select conditions.

To run the processor you need tune some parameters in `LCIO_runProcess.xml` file in `steer/` directory.

```
<execute>
  <processor name="MyTriventProc"/>
  <!--processor name="MyLCIOOutputProcessor"/-->
</execute>

<global>
  <parameter name="LCIOInputFiles">
    data/test21382.slcio
  </parameter>
  <!--parameter name="MaxRecordNumber" value="1"/-->
  <parameter name="SkipNEvents" value="0"/>
  <parameter name="SupressCheck" value="false"/>
</global>

<processor name="MyTriventProc" type="TriventProc">
  <parameter name="HitCollectionName" type="StringVec">DHCALRawHits </parameter>
  <parameter name="DIFMapping" type="string">
    ./DifGeom/mapping_cosmic.txt
  </parameter>
  <parameter name="LayerCut" type="int">10 </parameter>
  <parameter name="noiseCut" type="int">10 </parameter>
  <parameter name="timeWin" type="int">2 </parameter>
  <parameter name="LCIOOutputFile" value="output/TBEvents_21382.slcio"/>
</processor>

<processor name="MyLCIOOutputProcessor" type="LCIOOutputProcessor">

  <!--write mode for output file: WRITE_APPEND or WRITE_NEW-->
  <parameter name="LCIOWriteMode" type="string">WRITE_NEW </parameter>

</processor>
```

LCIO Input file

Dif geometry file

LCIO Output file

Parameters  
to be tuned

To run the process (after you come back in Trivent fdirectory) just load source Trivent libraries and run,

```
>source loadLDD.sh
>Marlin steer/LCIO_runProcess.xml
```

The same for ROOT process, change the input file and out put file in `ROOT_runProcess.xml` file.

```
<marlin>

<execute>
  <processor name="myrootMaker"/>
  <!--processor name="MyLCIOOutputProcessor"/-->
</execute>

<global>
  <parameter name="LCIOInputFiles">
    output/TB_cern_sps_cleaned/TB_clean21847.slcio
  </parameter>
  <!--parameter name="GearXMLFile" value="/home/llr/ilc/jeans/ILD_00_official.xml"/-->
  <!--parameter name="MaxRecordNumber" value="20"/-->
  <parameter name="SkipNEvents" value="0"/>
  <parameter name="SupressCheck" value="false"/>
</global>

<processor name="myrootMaker" type="rootMaker">
  <parameter name="HitCollectionName" type="StringVec">TCaloHitRoot </parameter>
  <parameter name="OverwriteFile" value="1"/>
  <parameter name="TreeName" value="DHCAL"/>
  <parameter name="TreeOutputFile" value="output/TB_clean21847.root"/>
</processor>

<processor name="MyLCIOOutputProcessor" type="LCIOOutputProcessor">

</processor>

</marlin>
```

LCIO Input file  
(Generated by first process)

ROOT Output file

To run

```
>Marlin steer/ROOT_runProcess.xml
```

The Dif geometry are puted on [DifGeom/mapping.txt](#) file in this configuration ;

```
Dif_id Layer DifX DifY
181, 1, 0., 64.000000, 1.,1.
94, 1, 0., 32.000000, 1.,1.
30, 1, 0., 0.000000, 1.,1.
117, 2, 0., 64.000000, 1.,1.
149, 2, 0., 32.000000, 1.,1.
115, 2, 0., 0.000000, 1.,1.
122, 3, 0., 64.000000, 1.,1.
123, 3, 0., 32.000000, 1.,1.
130, 3, 0., 0.000000, 1.,1.
129, 4, 0., 64.000000, 1.,1.
118, 4, 0., 32.000000, 1.,1.
119, 4, 0., 0.000000, 1.,1.
164, 5, 0., 64.000000, 1.,1.
152, 5, 0., 32.000000, 1.,1.
151, 5, 0., 0.000000, 1.,1.
74, 6, 0., 64.000000, 1.,1.
61, 6, 0., 32.000000, 1.,1.
75, 6, 0., 0.000000, 1.,1.
156, 7, 0., 64.000000, 1.,1.
111, 7, 0., 32.000000, 1.,1.
110, 7, 0., 0.000000, 1.,1.
102, 8, 0., 64.000000, 1.,1.
...
...
...
```

Put the path on the steering file

```
<parameter name="DIFMapping" type="string">
  Difgeom/mapping.txt
</parameter/>
```

## 4- Use Druid.

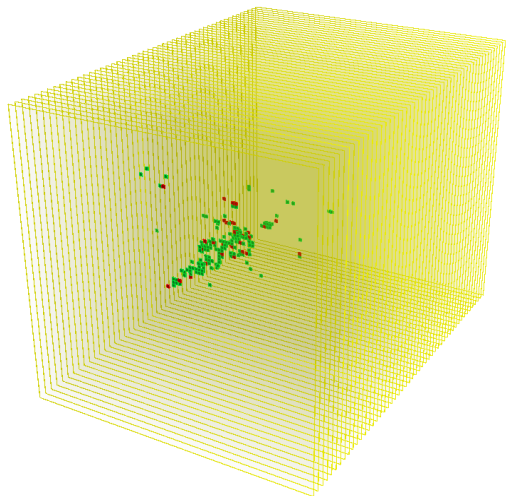
Druid is an 3D event display module on ROOT TEve class provided by Manqi Ruan. You can find more informations in Druid documetations at [http://llr.in2p3.fr/~ruan/ILDDisplay/DruidManual\\_v1.8.pdf](http://llr.in2p3.fr/~ruan/ILDDisplay/DruidManual_v1.8.pdf). Druid is available in ILCSoft you can directly use it when you initilise your ILCSoft environement.

To use Druid to display SDHCAL events, yout need LCIO file generated by Trivent and SDHCAL geometry avualeble in geometry directory,

```
>Druid output/TBEvents_21382.slcio geometry/geom_SDHCAL.root
```

You can play with data as you like :).

DRUID, RunNum = 21863, EventNum = 136



DRUID, RunNum = 21848, EventNum = 18

