# Table of Contents

- HltLine
  - Concept
  - HltLine in Python
  - HltLine in C++
**HltLine**

Most of this section is stolen from Gerhard Raven's presentation. (LHCb Software Week Thursday, March 19, 2009)

**Concept**

- An Hlt decision involves more than a single algorithm
  - one might pick some L0 candidates
  - another (sequence) may do some VELO reconstruction
  - a third may match the above two
  - ....

- In addition, it has some ‘standard’ pre/post processing:
  - ‘entry’ filters (ODIN, and/or L0, and/or other HLT decision(*))
  - Prescale
  - “The algorithm (sequence) which most people think of as the decision”
  - Postscale

- And it needs to record the final yes/no result
- And possibly catch errors in the ‘hosted’ algorithms
- Let’s call this entire structure an ‘HltLine’

**HltLine in Python**

HltLines are created by calling some dedicated python code

- Enforces uniform naming convention
  - might add some additional rules!
- Makes it easier to write HltLines
  - Can ‘copy-and-modify’ entire lines to easily changes create variations:
    - eg. clone, decrease threshold and increase prescale
    - For an example of cloning a line, see the section on Hlt2Lines.
  - re-use pre-defined sequences (of sequences, of ... ) through ‘bindMembers’
    - Useful, as each line SHOULD BE independent, and SHOULD not rely on the results of other lines.
    - This last comment applies in Hlt2 as well as Hlt1. The decision of an Hlt2Line should be independent of that of any other Hlt2Line.
    - Caveats:
      - It might of course make sense to create an Hlt2 line which only runs on the output of an Hlt1 line, and hence depends on the decision of that Hlt1Line.
      - You may wish to add heavily prescaled 'lines' to monitor the intermediate steps in an Hlt2Line.
    - For an example of bindMembers, see the Hlt2SharedParticles page.
- Registers the existence of a line -- this is used to actually configure Hlt1/Hlt2.

**HltLine in C++**

- Invokes the various stages
  - Each stage is an independent algorithm, HltLine only relies on ‘FilterPassed’
- Updates an entry in HltDecReports ‘as it goes along’
Catches exceptions and errors in the ‘hosted’ algorithms, updates HltDecReport entry accordingly, and recovers (hopefully)

As a result, the status is recorded in TES (in HltDecReports) in uniform and reliable way:

- convention: all configured Hlt1 decisions appear in HltDecReports, regardless of their result
- at some point we may remove negative decision before conversion to rawbank -- but only after it has been shown that on readback we can reliably recreate the (relevant) missing information from the configuration

Accept/Reject is recorded separately from ‘how far we got’: even if the event ‘fails’, it could be accepted, eg. because HltLine caught an exception: a (limited!) number of such errors will/could result in an ‘accept’.

-- StephanNies - 12 Apr 2009