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LHCb trigger twiki pages

General information

- **Meetings**: We have our weekly trigger meeting on Friday afternoon at 15:00 in 2-R-30. See the indico listing.
- **Organisation**: See the HltOrganisation page, the The HLT WG database (admin instructions), the list of WG liaisons, and the operations twiki.
- **Mailing lists**: Search the archives of lhcb-hlt-software, lhcb-trigger-software, lhcb-hlt-piquet, lhcb-hlt-operations, and lhcb-hlt2-development.
- **Conferences**: See the presentation section of the HLT WG database. For presentations before 2016, see this page. Approved HLT plots for conferences are on this page.
- **Documentation**: See the lhcb-note section of the HLT WG database. There is also a page listing commissioning notes in preparation.
- **Deadlines**: Jump to this section of the current page.
- **Run 2 trigger changes for analysts**: See the Run 2 trigger changelog

Planning

- **LHC Schedule**: Latest 2018 LHC schedule.
- **LHC Coordination**: Coordination info page.
- **Deadlines**: Release deadlines
- **JIRA**: The LBHLT JIRA project.
- **2018 Commissioning**: The 2018 commissioning epic LBHLT-378.

Information for Hlt Piquets and WG liaisons

The HLT piquets should refer to the HLT Piquet Guide

Moore testing

It is expected that anybody developing HLT code, including Hlt2 line authors, should keep an eye on these automatic tests, and report any issues.

<table>
<thead>
<tr>
<th>Nightly qmtests</th>
<th>Look here under lhcb-head (Moore and MooreOnline). In order to run all tests, you can do: make test ARGs =&quot;-j 12&quot;</th>
</tr>
</thead>
<tbody>
<tr>
<td>Throughput tests with a farm node</td>
<td>Pick the latest entry from here. See also LBCORE-1007, and these instructions to test Moore in the online environment on a dedicated node.</td>
</tr>
<tr>
<td>HLT rates</td>
<td>See these instructions to use the Moore_RateTest script yourself. Tests are run on a daily basis within the lhcbpr framework, using 30k L0 filtered events from the TestFileDB. Tests are run on samples corresponding to a few different L0 TCKs, and on different nightly build slots. The results are published here. See also gitlab-repo, and these slides. The test runs over 30k events by default to run over more events specify the --evtmax option.</td>
</tr>
<tr>
<td>Hlt1 independence test</td>
<td>Under MooreOnline in the nightlies There is some older documentation here.</td>
</tr>
</tbody>
</table>
Developing Hlt2 lines

**2018 startup deadlines:** presentation of new lines to be included in 2018 is **February 2nd.** Deadline for committing new lines will be ~**6 weeks later** (March 16th, subject to changes in the LHC schedule).

If you wish to introduce a new Hlt2 line, or retune an existing one, please follow the steps listed in the table below.

The aim is to have a turnaround time of a few weeks for a new or updated Hlt2 line to enter the data taking. This means there are no specific dead lines and we try to be as flexible as possible. This turnaround time does not apply at the beginning of a year when potentially many new lines are added at once.

<table>
<thead>
<tr>
<th>Step</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Contact your WG liason</td>
</tr>
<tr>
<td>2</td>
<td>Determine the signal rate in the LHCb acceptance</td>
</tr>
<tr>
<td>3</td>
<td>Carefully consider need for Turbo(++) or FULL</td>
</tr>
<tr>
<td>4</td>
<td>Get signal MC</td>
</tr>
<tr>
<td>5</td>
<td>Read the general guidelines</td>
</tr>
<tr>
<td>6</td>
<td>First HLT ops presentation</td>
</tr>
<tr>
<td>7</td>
<td>Create an LBHLT JIRA task</td>
</tr>
<tr>
<td>8</td>
<td>Write your trigger line</td>
</tr>
<tr>
<td>9</td>
<td>Instrument your line with at least one monitoring histogram</td>
</tr>
<tr>
<td>10</td>
<td>Measure the rates of your line(s)</td>
</tr>
<tr>
<td>11</td>
<td>Measure the efficiency of your lines(s)</td>
</tr>
<tr>
<td>12</td>
<td>Estimate the purity of your line(s)</td>
</tr>
<tr>
<td>13</td>
<td>Independence test</td>
</tr>
<tr>
<td>14</td>
<td>Tuning knobs</td>
</tr>
<tr>
<td>15</td>
<td>Second HLT ops presentation</td>
</tr>
<tr>
<td>16</td>
<td>Merge request</td>
</tr>
<tr>
<td>17</td>
<td>Create JIRA subtask for new TCK</td>
</tr>
<tr>
<td>18</td>
<td>Check the next nightly tests</td>
</tr>
<tr>
<td>19</td>
<td>Release manager accepts merge request</td>
</tr>
</tbody>
</table>
20 Update Tesla configuration

In case a new Turbo or TurCal line is updated, the Tesla production step needs to be updated to know about the new line, otherwise the productions will crash. The HLT should inform the production team about this change in advance.

21 HLT piquet to prepare new HLT2 TCK

22 PPG/OPG sign off for deployment

23 TCK deployment

24 Validation of data

Line authors are expected to look at the monitoring histograms for the lines, and at the output data, and report back to HLT ops within 1-2 weeks of first data with the new TCK.

The Tesla project

- Tesla project
- Turbo++

HLT Monitoring

- RunII Monitoring -- Monitoring in RunII
- Hlt2LinesNewTemplate#Monitoring
- Hlt2AnalysisTasks -- Analysis of histograms produced in HLT2.

Level-0

- TCKs: All released ones as listed here. See also slide-9.
- Bandwidth division: More details on this page
- Testing L0 TCKs: See these instructions to run L0App and print the rates.
- Software: See this page on the L0App application, and these details on L0Muon emulation.

Trigger performance studies

- Timing Studies: Checking the impact of increasing the number of Kalman iterations on Hlt execution time
- Hlt2Rates: Rates of Hlt2 lines
- HltCorrelations: Correlations of L0, Hlt and Stripping lines

Upgrade Trigger development

- Upgrade Monte Carlo Samples: Samples for development of the Upgrade Trigger
- GPU Studies: Studies of running (part of) HLT1 on GPUs

Physics working group specific pages

- Charm WG

About the HLT

- HltFAQ
- How do I run the HLT2 without PID selections?
HltLine -- Basic Structural Unit of the HLT
Facts about the Event Filter Farm
TCKs -- Trigger Configuration Keys
MCTCKs -- How to make a 'MC' version of a TCK
How to create a TCK
PrivateTCK -- Using a private TCK for running on MC with special settings (deprecated)
whichTCK -- How to find out which TCK was used for a given dataset
seeTCK -- How to see if a given TCK exists in the software
Update TCK -- How to change algorithm properties and make a new TCK based on an existing one
updateL0TCK - Updating the L0 part of a TCK
Hlt triggers naming convention
MDF files -- Creating and running on them
Tracking in HLT
Running the upgrade HLT emulation
Legacy Trigger --- discussions and plans for rerunning older trigger code in the future, 2015+
HltRunOnePerformanceRev -- WG feedback on the trigger performance in Run-1
Summary and description of HLT routing bits
HLT Developers Checklist
LHCbTCK: Pages describing the complete (L0+HLT) procedure for modifying an existing TCK
RunningMooreOnMC: How to (re)run the HLT on MC
HltEfficiency: How to measure the Hlt efficiency] and how not to measure it
HltDSTOutput: How to look at DSTs produced by Moore
TriggerTisTos: Trigger TisTos Tool
EmulatingPrescales: How to emulate Prescales in MC
TCKsh: How to find out what's contained in a TCK
MuFromFill: How to find out the value of mu in given data for a given run/fill
DataSets: Data sets for trigger studies
RawEventJuggler: Moving around the raw event for processing, A description of the framework in place for moving around the raw event.
How to run FEST from your office (link to the online twiki)
Configuring FEST for benchmarks
Hlt piquet 2015 tutorial
Hlt discussion drop box -- for sharing tables, plots etc.

Old pages

A list of historic, and probably obsolete, pages on the LHCbTrigger is here.