DQ Rate Monitoring

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Overview

1. Short description
2. The DQM Framework
3. The Tool
4. Status and Outlook

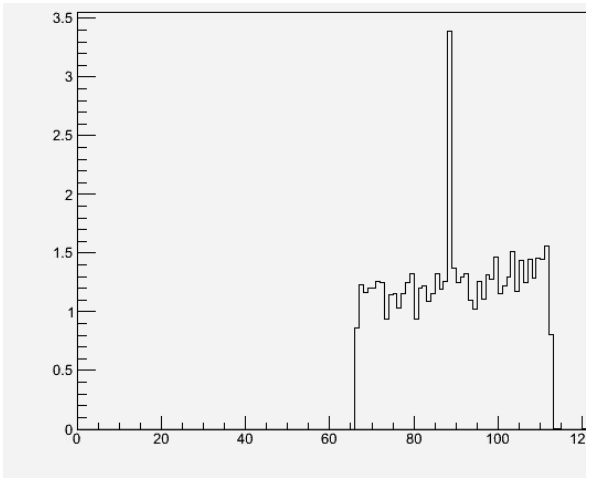
Short description

Simplify for non-experts

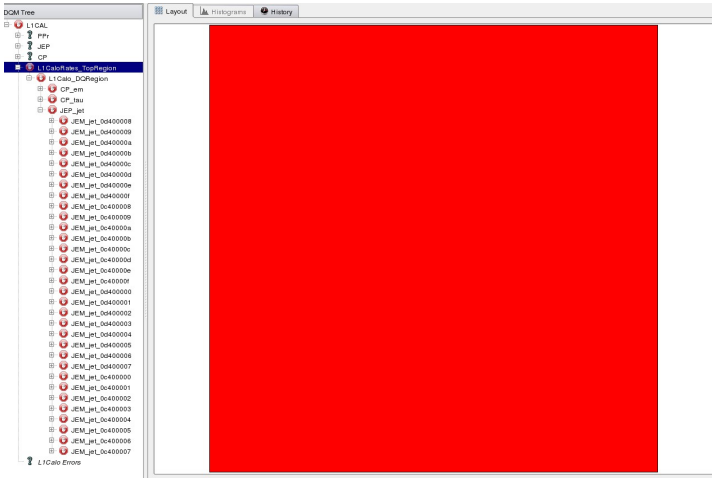
- monitoring of L1Calo trigger rates

- identification of problematic channels

Instead of ~7200 histograms...



...monitor the color of 1 box!



Also make it easy to find rate histograms, COOL ID, etc.

Short description

Implementation

- part of the DQM framework

- periodic checks of rate histograms for spikes at PPM and CPM/JEM level

- tree-like structure summarizing the results of these checks

- DQM Display allows easy access to summaries, rate histograms, COOL ID, current and past check results

Status

- testing phase

The DQM Framework

- designed by A. Corso-Radu, S. Kolos, H. Hadavand, R. Kehoe, M. Hauschild
- distributed software system
- widely used in ATLAS online and offline monitoring
- provides
    - automated application of analysis algorithms
    - summary and archiving of results
    - graphical user interface for shifter
- easily configurable by subsystems:
    - algorithms and parameters (ROOT)
    - summary tree and layout (OKS)

The Tool: Rate monitoring

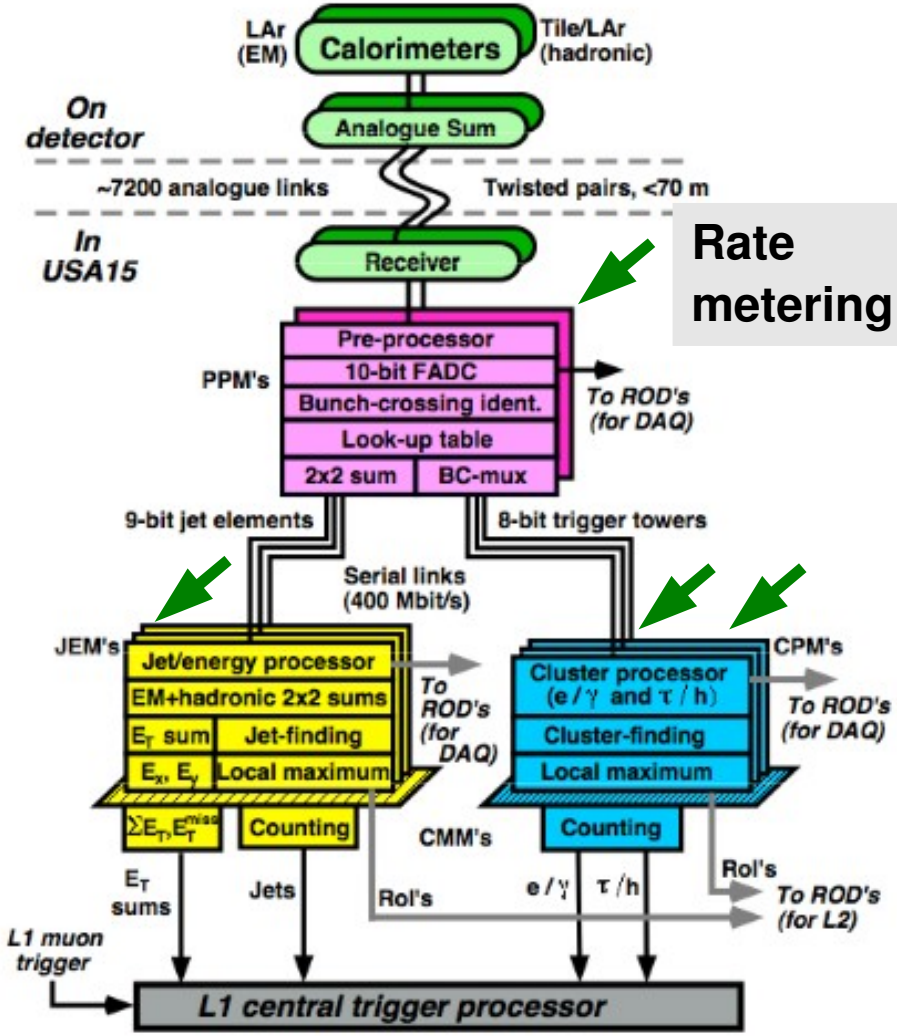
- monitor rate histograms for spikes
  - for each trigger tower
  - for each CPM (tau, em) and JEM output

- only interested in spikes

  which show up at CPM/JEM level

  (PPM rate metering threshold lower than physics threshold)

-> flag problem only if CPM/JEM sees spike (regardless of trigger tower results)



The Tool: Rate histograms & Spike algorithm

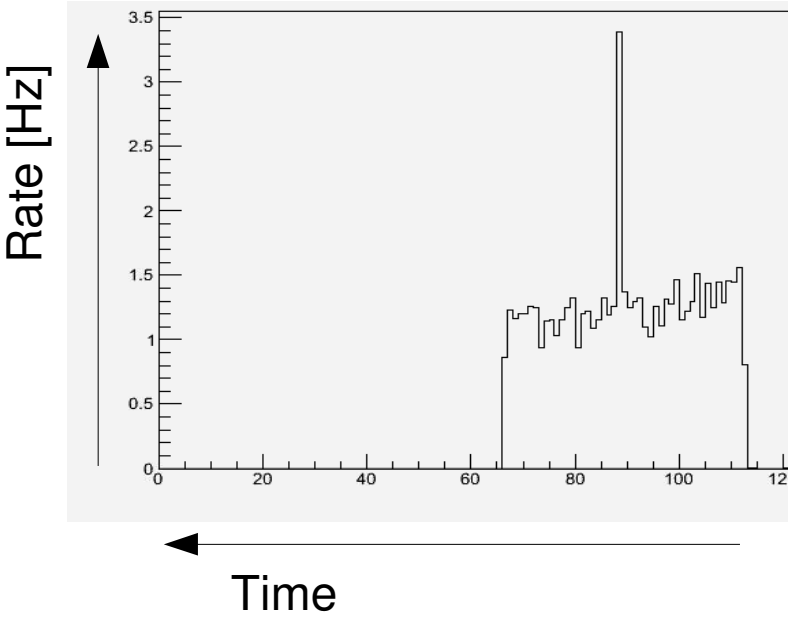
Rate histograms

- from L1Calo rate metering

- published on IS

- x-axis binning:
60 bins of 10s each, then coarser

- decided to monitor first 10 min

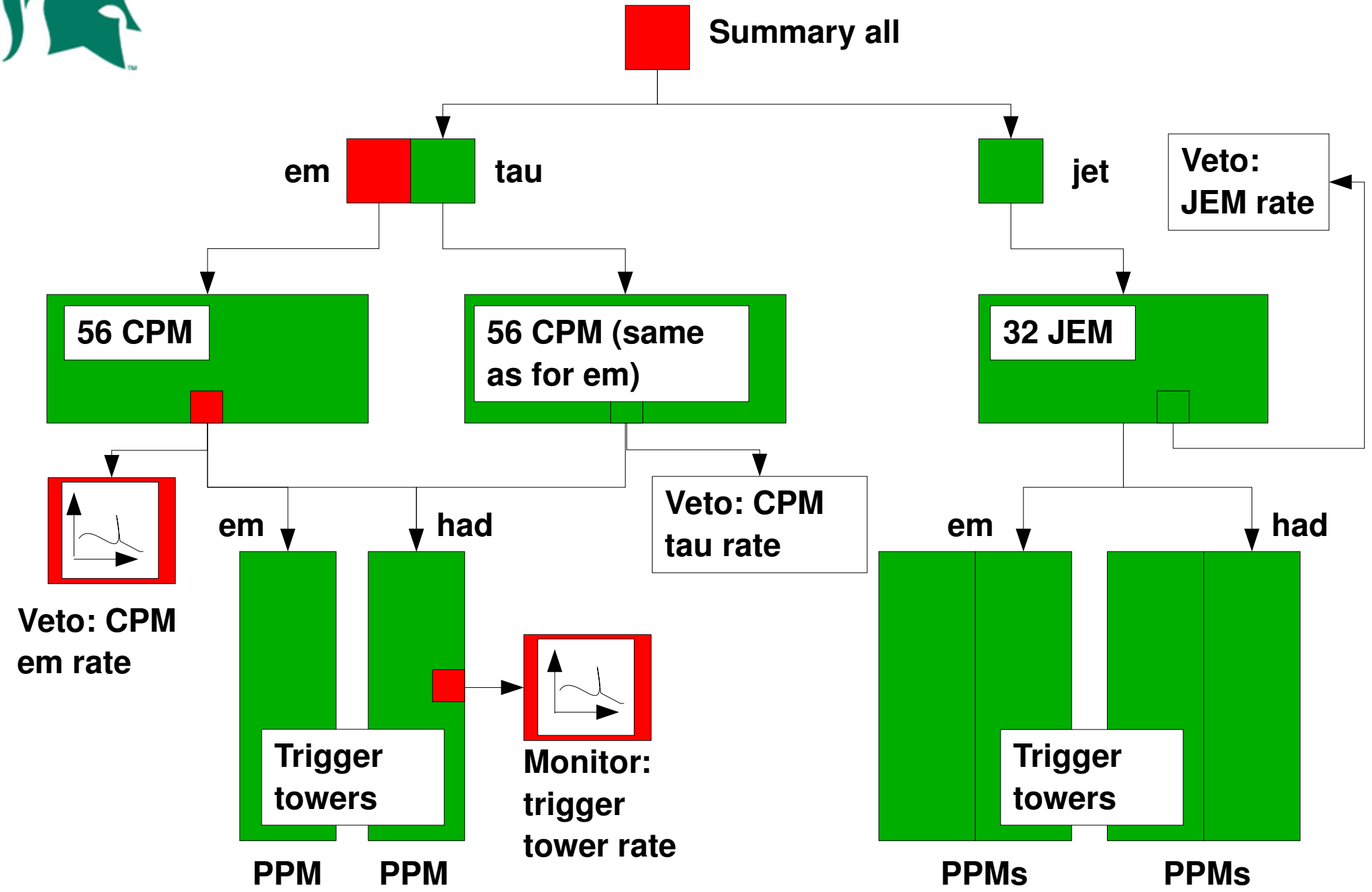


Spike finding algorithm

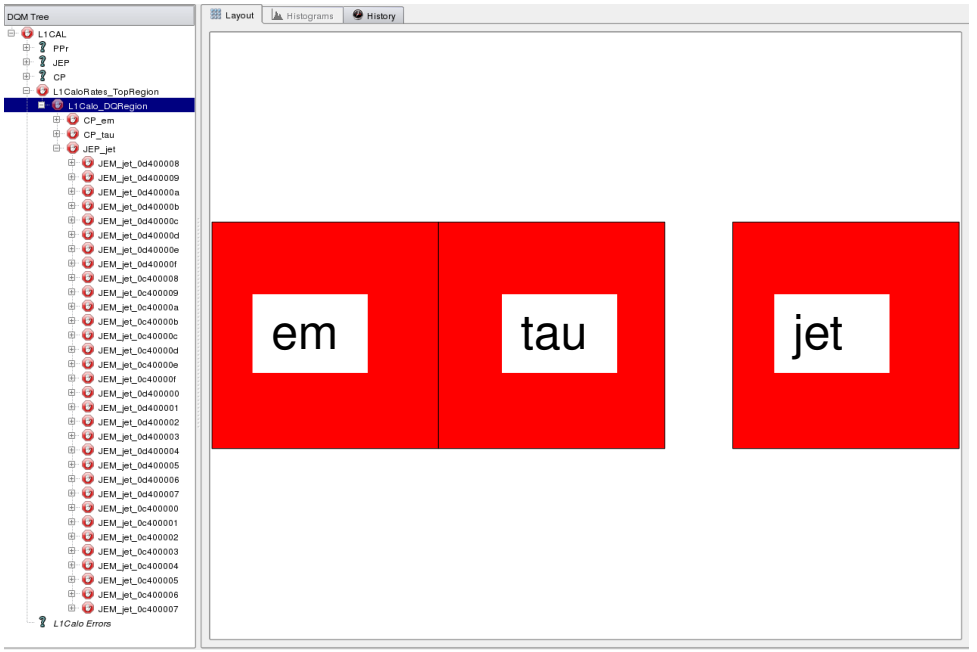
- flags red if there is a bin with deviation of X sigma from average
(X configurable)

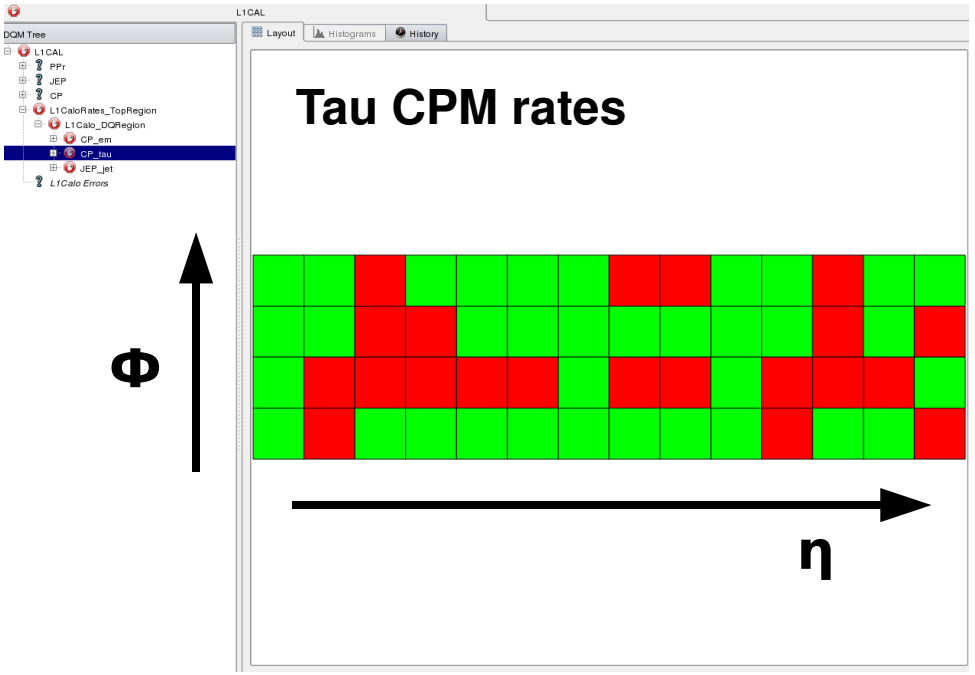
- doesn't consider empty bins

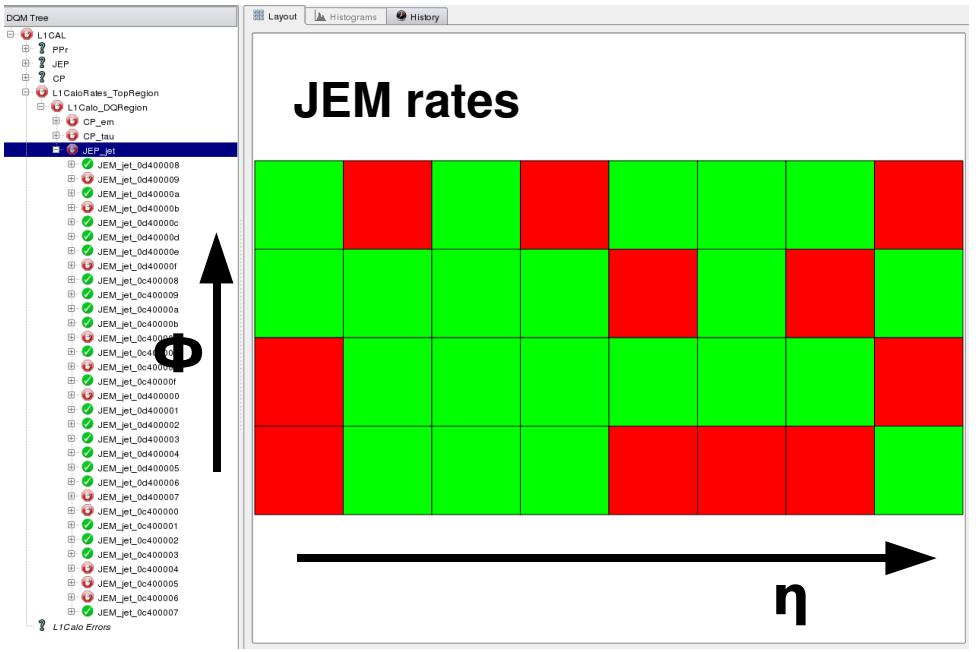
The Tool: Result tree



The Tool: Layout



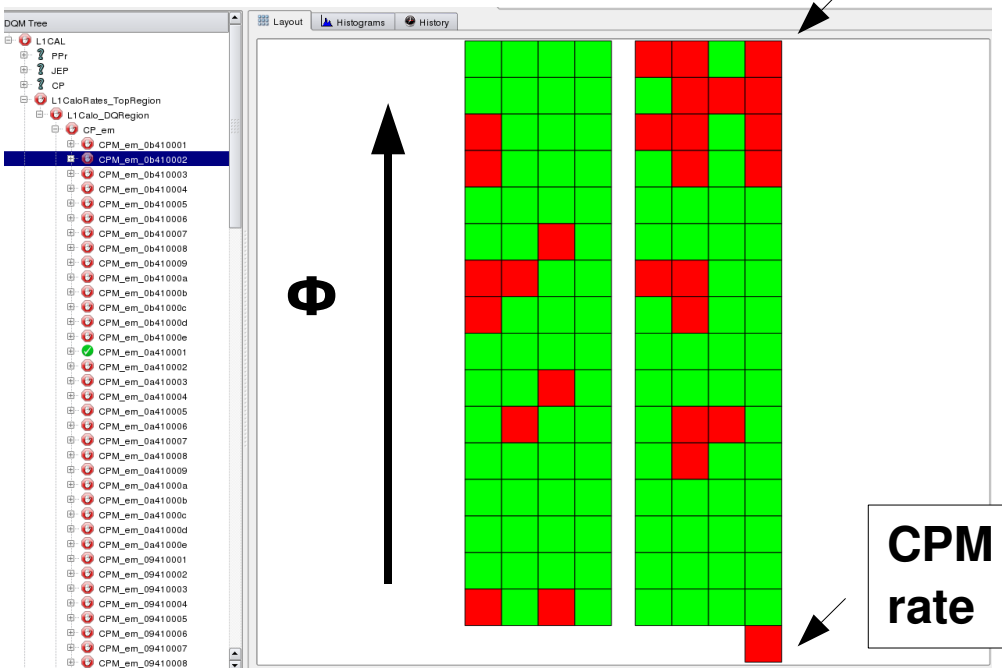




The Tool: Layout

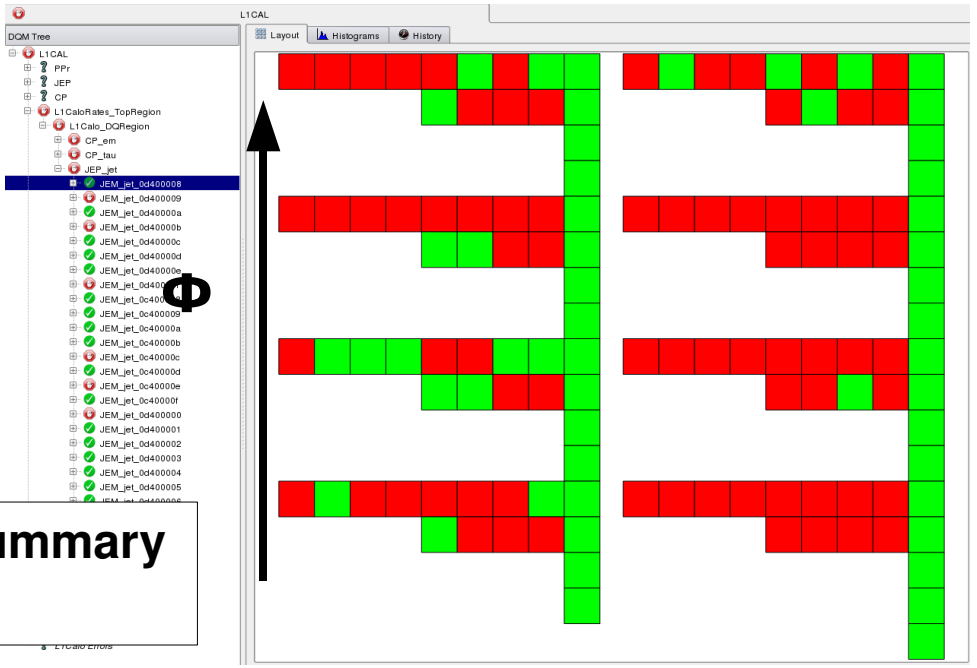
Hovering over box: COOL ID

em had



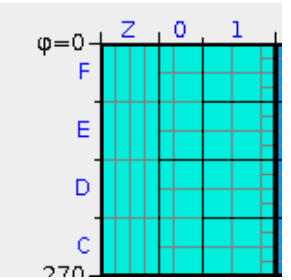
CPM summary rate

em had



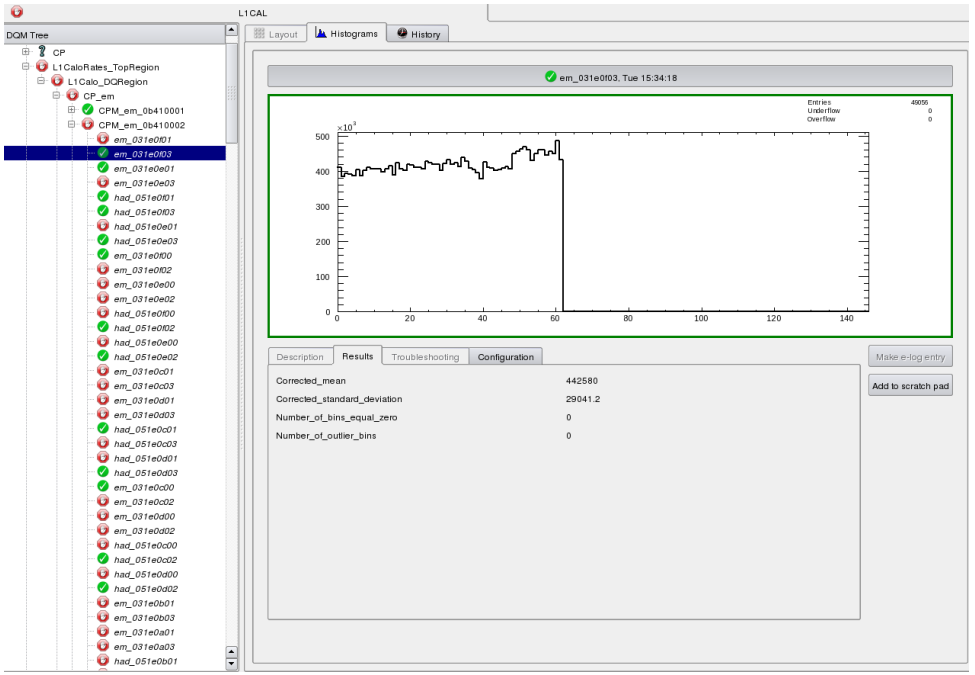
Trigger tower rates (central region)

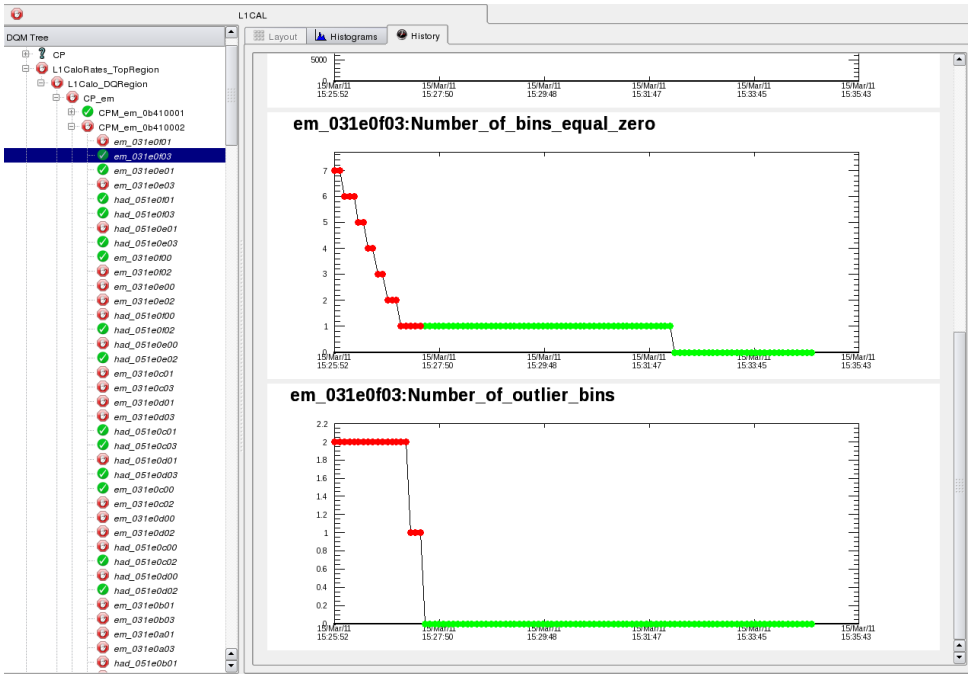
Trigger tower rates (forward region) -> compare mapping tool



The Tool: Histograms and Results

- displays each checked histogram
- provides information about algorithm
- lists results and history
  - number of outlier bins
  - mean
  - standard deviation
  - bins without entry





Status and Outlook

Status

- DQM tree, layout implemented

- currently doing tests with L1Calo Standalone Partition at Point 1

- once testing complete:

- import xml configuration to OKS

- optimize algorithm cuts using physics runs

Outlook

- add η, Φ labels

- change time span in which spiky trigger tower flags red? (currently 10 min)

- straightforward to implement further checks

-> look into flagging slowly increasing rates