Trigger Path Timing
What are the current settings
what are the constraints

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Introduction

- <u>2 constraints</u> exist on the L0 Calo trigger path that are affected when changing calorimeter timings settings:

  - The **total duration** of the trigger computation must not exceed 160 clock cycles.

  - Data has to be **exchanged** correctly between boards.

- For a given configuration, correct settings for the trigger path can always be found but it takes a lot of time to determine and implement them (up to 1 or 2 days).

- What is shown here is what can be changed ***without changing the configuration of the L0 path***.

L0Calo Timings

- They are affected when moving CROC TTC settings, but not when moving timings at the FEB level.
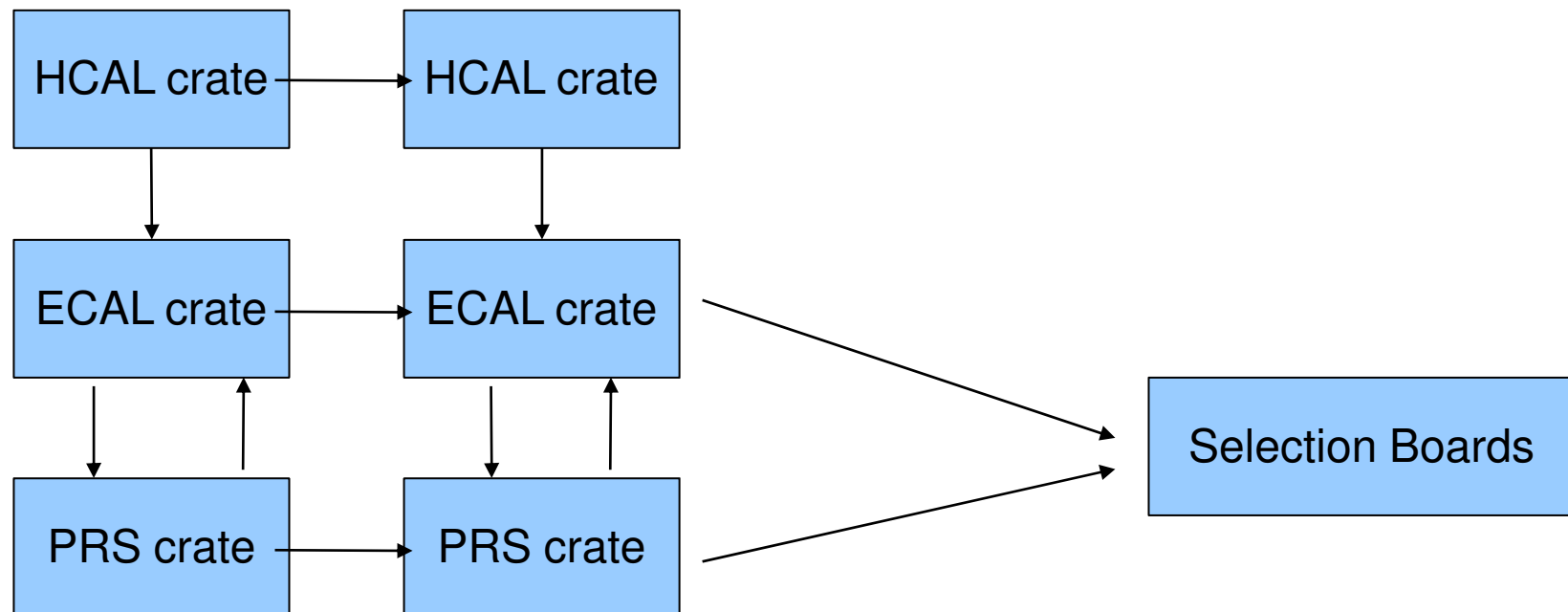
« Global » constraints

- Current TTC settings are:
  - <u>ECAL</u>: **2** (Coarse)/ **120** (Fine)
  - <u>HCAL</u>: **3** (Coarse)/ **140** (Fine)
  - <u>PRS</u>: **0** (Coarse)/ **120** (Fine)

- ECAL cannot be moved *more than +13 ns*, otherwise the total latency of 160 clock cycles cannot be respected.

- (And PRS cannot be moved more than -12 ns).

Relative Constraints

- Allowed variations:

  - <u>ECAL – ECAL</u> (neighbours): **+/- 8 ns**

  - <u>HCAL – HCAL</u> (neighbours): **+/- 8 ns**

  - <u>PRS – PRS</u> (neighbours): **+/- 5 ns**

  - <u>HCAL – ECAL</u>: **+/- 7 ns**

  - <u>ECAL – PRS</u>: **+/- 3 ns**

- These values don't affect *SPD multiplicity* L0 path which has no constraint from the trigger side.

Conclusion

- If all crates are moved all together using CROC TTC settings, they cannot be moved more than **+13 ns** with respect to the LHCb clock.

- If crates are moved independantly, ECAL crates should not be moved more than **+/- 3 ns** from PRS crates.

- Even if not all L0Calo trigger lines are used in the LHCb trigger, we are interested in testing them as soon as possible, and to keep them functional as much as possible (photon, electron, ...)

- It would also be much easier if the final CROC settings are the same than the current CROC settings, after all parameters have been determined.