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Bug fix in pixelqualityLM

- Bad: tag_pixelqualitylm_datav6.3=2025V0
  - link error rates from MIDAS meta data file not correctly incorporated
- Good: tag_pixelqualitylm_datav6.5=2025V0
- Cross-check comparison link error rate in raw JSON file and payload
  - use most conspicuous runs when comparing old and new versions
  - Table contains link counts JSON/Payload

Run	(M)asked	(S)tatus4	Diagnostic
3509	99/98	225/210	M: 102C, S: 102AB, (195,1316)ABC, 1286B top/bottom, (1281-1158)ABC deadChip
4576	99/96	62/59	M: 102C, 1126AC contaminated S: 1251ABC top/bottom
4602	99/98	0/0	M: 102C
4608	99/95	50/50	M: 102C, 1123A contamination, 1126B contamination
4725	99/98	0/0	M: 102C
4748	99/96	21/21	M: 1123B contamination, 102X, 165A contamination
5656	99/97	13/12	M: 102C S: 102X
5850	99/98	3/3	M: 102C
6157	96/95	228/220	M: 102C declBad, S: 102AB, (1158,1281)ABC empty
6158	96/95	228/220	ditto
6164	96/95	228/199	M: 102C, S: 102AB, (1158,1281,1284-6,1316-8)ABC empty
6213	96/95	1/1	M: 102C, S: confirmed same chip+link
6261	96/95	228/220	M: 102C, S: 102AB, (1158,1281)ABC empty
6263	96/95	2/2	M: 102C, S: confirmed same chips+links
6270	96/94	17/17	M: 102C, 165C contaminated

⇒ "Successful" manual validation of (a selection of) payloads

Preparation for v6.5

- mu3eUtil branch CDB-v6.5pre
  - → This must go into v6.5!
- Request to eliminate compiler warnings
  - → API change (removal of GT in cdb* instantiation)
- Can replace any tag contained in GT with another tag
  - ▷ e.g. switch easily the "alignment" or "efficiency" for studies (not yet via command line)
- Can query iov runnumber
  - ▷ to check whether it's for the current one (not yet pushed)

calEventStuff
first valid TS
last valid TS

iov_5432

analyze run 5433

Preparation for v6.5 (II)

- Scaling of file number for JSON backend
  - ▷ "payloads" directory with new subdirectories
    - tag
    - iov files arranged in blocks of maximum 1000 files
      (problem: pixelqualitylm and eventstuffv1 have $\mathcal{O}(n_{\text{runs}})$ iovs)
  - ▷ "runrecords" directories with subdirectories
    - runrecord files arranged in blocks of maximum 1000 runs
  - → code backward compatible (but old code cannot read new structure)
  - → no more hesitations to add new tag versions

Global tags for v6.5

- 2025 Data GT datav6.5=2025V0
  - not there, yet (to be sync'ed with v6.5!)
  - current test GT: datav6.5=2025V1test
- New mcidealv6.5 GT
  - now includes all tags for perfect setup (except calPixelTimCalibration)
  - for boot-strap "install" CDB (not for real analysis)
- Waiting for realization that we need mcrealistic GT
  - how else would you have the same code for analysis of data and MC?
- Need a better scheme/setup for GT/tag documentation!
  - current bitbucket doc

pixelqualityLM algorithm I

- Status enum
  - -1=ChipNotFound, 0=Good, 1=Noisy, 2=Suspect, 3=DeclaredBad
  - 4=LVDSErrorLink, 5=LVDSErrorOtherLink, 6=LVDSErrorTopBottomEdge
  - 7=DeadChip, 8=NoHits, 9=Masked
  - M-link=nhit/ovfl (derived from DQM hitmap)

$\Rightarrow$ Not all applicable on all levels, e.g. DeadChip not on pixel level

- Chips
  - DeclaredBad: hand-curated list (102)
  - Masked (chip/link): (all 3 links/1 link) masked
  - DeadChip: all 3 links have no hits
- Links
  - LVDSErrorTopBottomEdge: mean row < 10 or > 245), if not masked
  - LVDSErrorLink: unmasked link error rate > 10 Hz (midas meta data)
  - LVDSErrorOtherLink: if other unmasked link error rate > 10 Hz
  - NoHits: no hits on link
  - M-Link: (uint32)nhits/nOverFlow (1 if nOverFlow $>$ nhits)

pixelqualityLM algorithm II

- Columns
  - Dead: no hits (IFF mean column hit = 10)
  - Suspect: more than 40 noisy pixels (see below)
- Pixels (only counting pixels with hits)
  - Noisy: pixel hit count $> 10\sigma$ above mean pixel hit count