# Trigger Operations Review: Offline Monitoring

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# Trigger Offline Monitoring

Task of the offline monitoring:

- Assess the quality of data taken by the ATLAS Trigger
  - Analyse debug stream in CERN Analysis Facility (CAF) – identify frequent errors/bugs/problems
  - Analyse monitoring histograms from Tier0 and correlate them with the online histograms
  - Produce an assessment of the trigger Data Quality to be used to guide later analysis

But also:

- Processing/reprocessing stored data to test new software and menus
  - Using the CAF to run AthenaMT/PT on recent data to test new menus or algorithms before they go online
  - Producing HLT data when high level trigger not active in the run
  - Produce ESD's and monitoring output from jobs that failed Tier0 or where the HLT was not available
  - Special monitoring jobs that cannot run at Tirer0
  - Etc…

- Especially important during commissioning:
  - Needs to provide a way to react quickly to changes in the menu etc
  - Essential tool to inform decisions (new menu/algorithms safe for online running) and produce data for slice commissioning studies

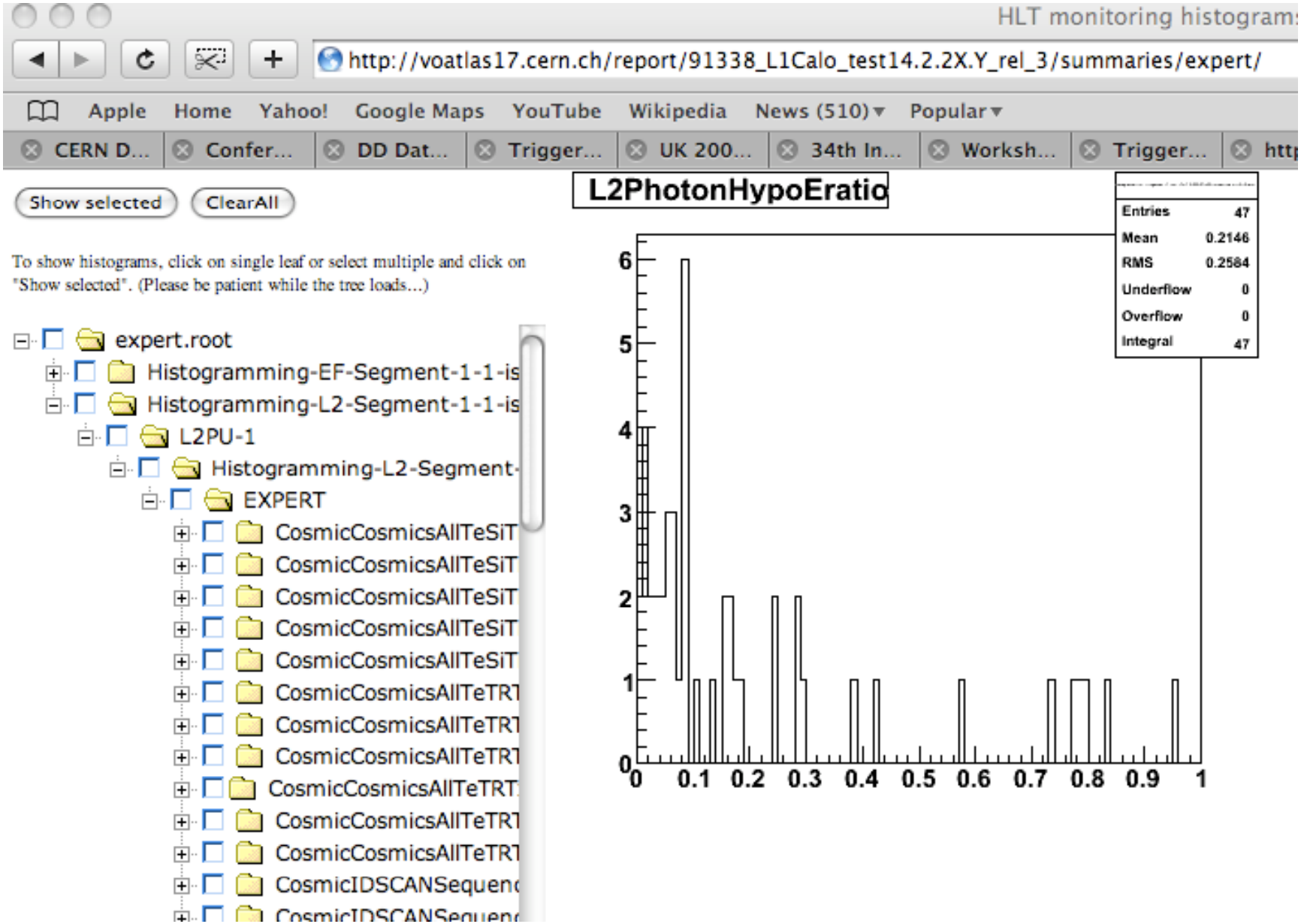
# Tools and organisation

**Organisation:**

- Monitoring shifter – verify histograms; launch monitoring jobs
- Offline trigger expert – understand current operational issues; report findings; route problem reports; … act as glue between trigger operations side and monitoring

**Tools:**

- CAF: account: trigcomm
  - Dedicated batch queue with 64 CPUs
  - Access to castor and t0atlas (express and debug streams)
- HDEBUG package (Hegoi Garitaonandia)
  - Wrapper around AthenaMT/PT, based on GANGA, to launch batch jobs in the CAF
    - https://twiki.cern.ch/twiki/bin/view/Atlas/OfflineHLT
- Set of scripts to analyse and publish debug stream HLT errors (Anna Sfyrla)
    - https://twiki.cern.ch/twiki/bin/view/Atlas/IsolateEventsDEBUG
- Monitoring package TrigHLTMonitoring (Martin Zur Nedden) to produce monitoring histograms from bytestream files (w/trigger)
- Set of scripts (Aart Heijboer) to run TrigHLTMonitoring on the CAF
    - https://twiki.cern.ch/twiki/bin/view/Atlas/OfflineHLTMonitoring


HLT monitoring histograms
http://voatlas17.cern.ch/report/91338_L1Calo_test14.2.2X.Y_rel_3/summaries/expert/
Apple
Home
Yahoo!
Google Maps
YouTube
Wikipedia
News (510)
Popular
CERN D...
Confer...
DD Dat...
Trigger...
UK 200...
34th In...
Worksh...
Trigger...
Show selected
ClearAll
To show histograms, click on single leaf or select multiple and click on "Show selected". (Please be patient while the tree loads...)
expert.root
Histogramming-EF-Segment-1-1-is
Histogramming-L2-Segment-1-1-is
L2PU-1
Histogramming-L2-Segment-
EXPERT
CosmicCosmicsAllTeSiT
CosmicCosmicsAllTeTRT
CosmicIDSCANSequen
L2PhotonHypoEratio
Entries 47
Mean 0.2146
RMS 0.2584
Underflow 0
Overflow 0
Integral 47
0 1 2 3 4 5 6
0 0.1 0.2 0.3 0.4 0.5 0.6 0.7 0.8 0.9 1

# Review of the Offline Monitoring

- Analyse:
  - Monitoring procedures in 2008 run
  - Existing tools, together with experts, and find what should be improved
  - Existing hardware resources and possible needs
  - Roles of trigger expert and shifter, together with people who recently filled this role: how are findings communicated? What are the needs of documentation and training?

- Expected outcomes:
  - List of areas that need to be improved
    - Software, computing resources, documentation, etc
  - Description of tasks for shifter and expert with clear list of responsabilities
    - Including what information is needed from/for each, how this is transmitted, and expected workload

# First thoughts…

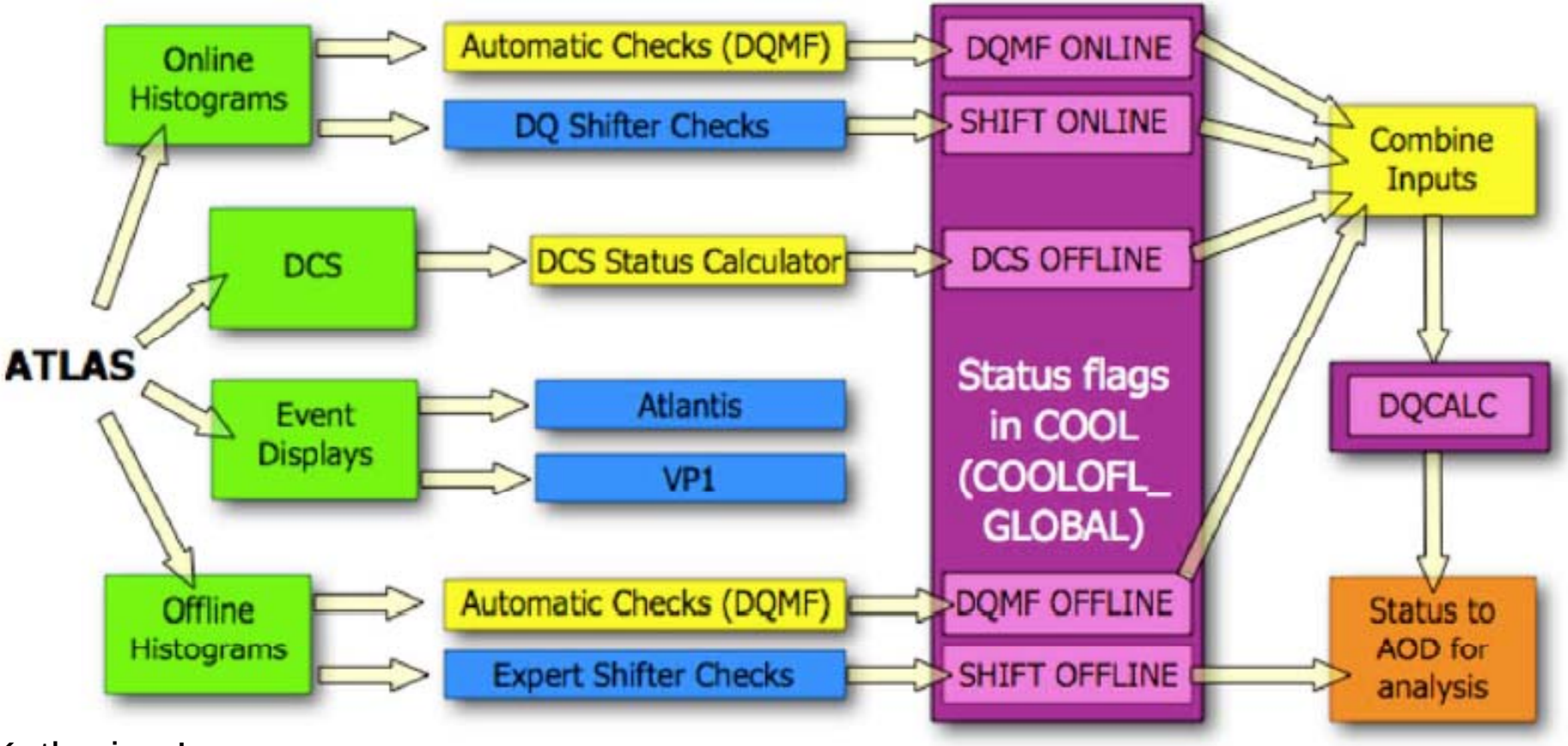
- Shifter should spend most of her time checking data quality
  - Increase automatisation as much as possible
  - Interpretation of histograms needs to be addressed – eventually an (automatic) comparison with reference histogram, but first…
  - Possible improvements to both documentation and training
  - Infrastructure and procedure used for testing new menus may be further improved

- Shifter can safely be a remote task; not expert, for now
  - Significant workload for both roles during 2008 run – both are needed

- Take advantage of commonality with offline monitoring whenever possible
  - Address filling of Data Quality flags in conditions DB , etc…

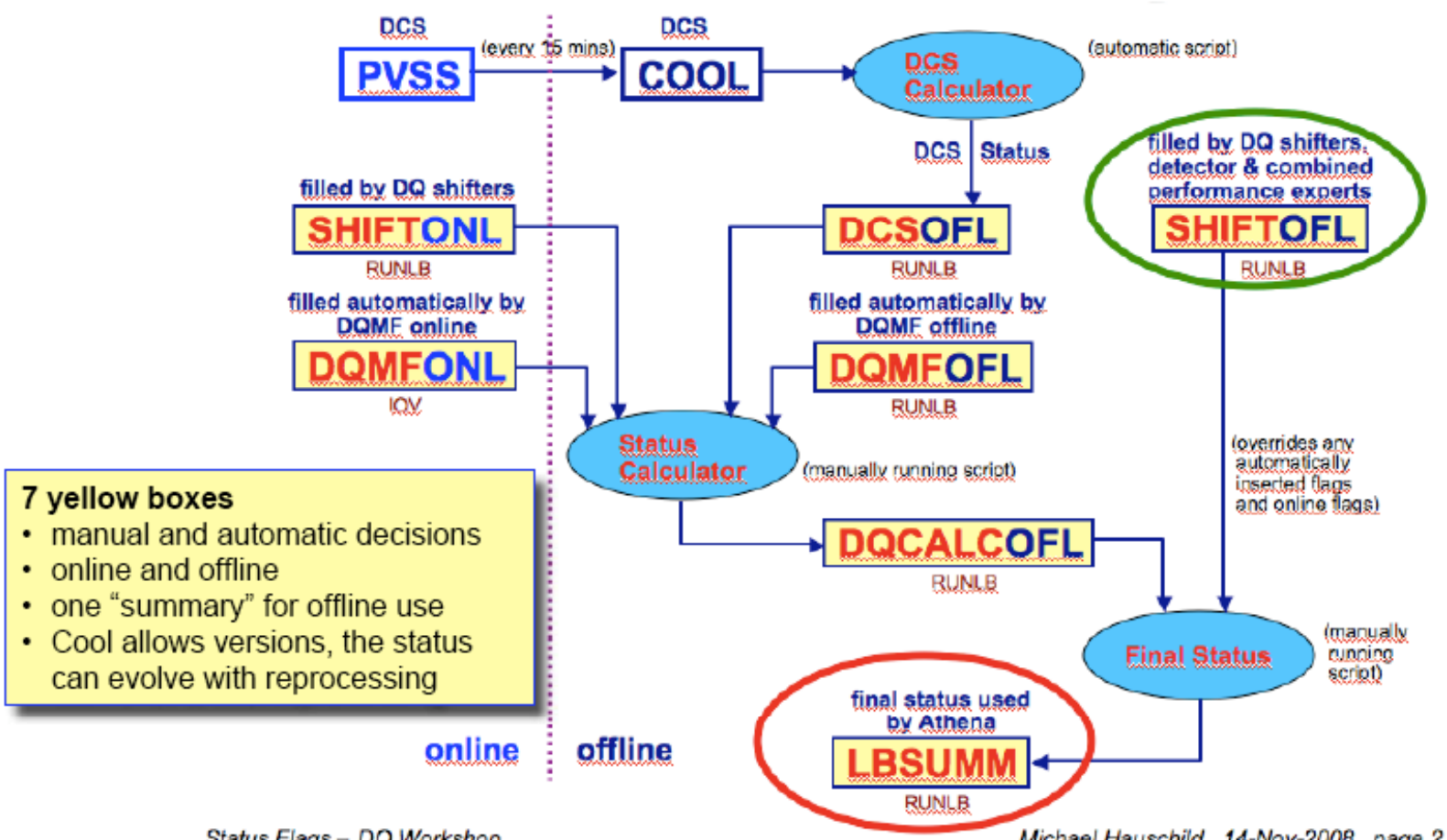
# Communicating results: DQ flags

- There are Status flags reserved for DQ information in the Conditions database (already being filled by some detector groups)
- This is the obvious place to keep DQ information
  - Not yet clear how this info will be accessed by the physics users
- Existing trigger flags are a first guess: L1CAL, L1MU, L1CTP, HLTL2, HLTEF
  - Would be good to converge on a new proposal from the trigger before the next open meeting (10th December)
- Even more important than having a set of flags: we need to guarantee that they will be filled for every potentially interesting run
  - Will be used by trigger, physics, and combined performance to decide which runs to use
  - Current solution of Wiki filled by hand will not scale
- See Szymon's talk in last Core SW & Slices meeting: http://indico.cern.ch/conferenceDisplay.py?confId=27835




Katharine Leney

# The DQ flags exist multiple times




S. Gadomski, "Trigger status flags in Cool", Nov 17th 2008 7

# Conclusions & Outlook

- The offline trigger monitoring tools and procedures were successfully exercised in the 2008 run
  - Needs to mature further for 2009 run
  - Review will try to help with that

- Design and use of Data Quality flags needs input from trigger and to be included in the on/offline monitoring procedure

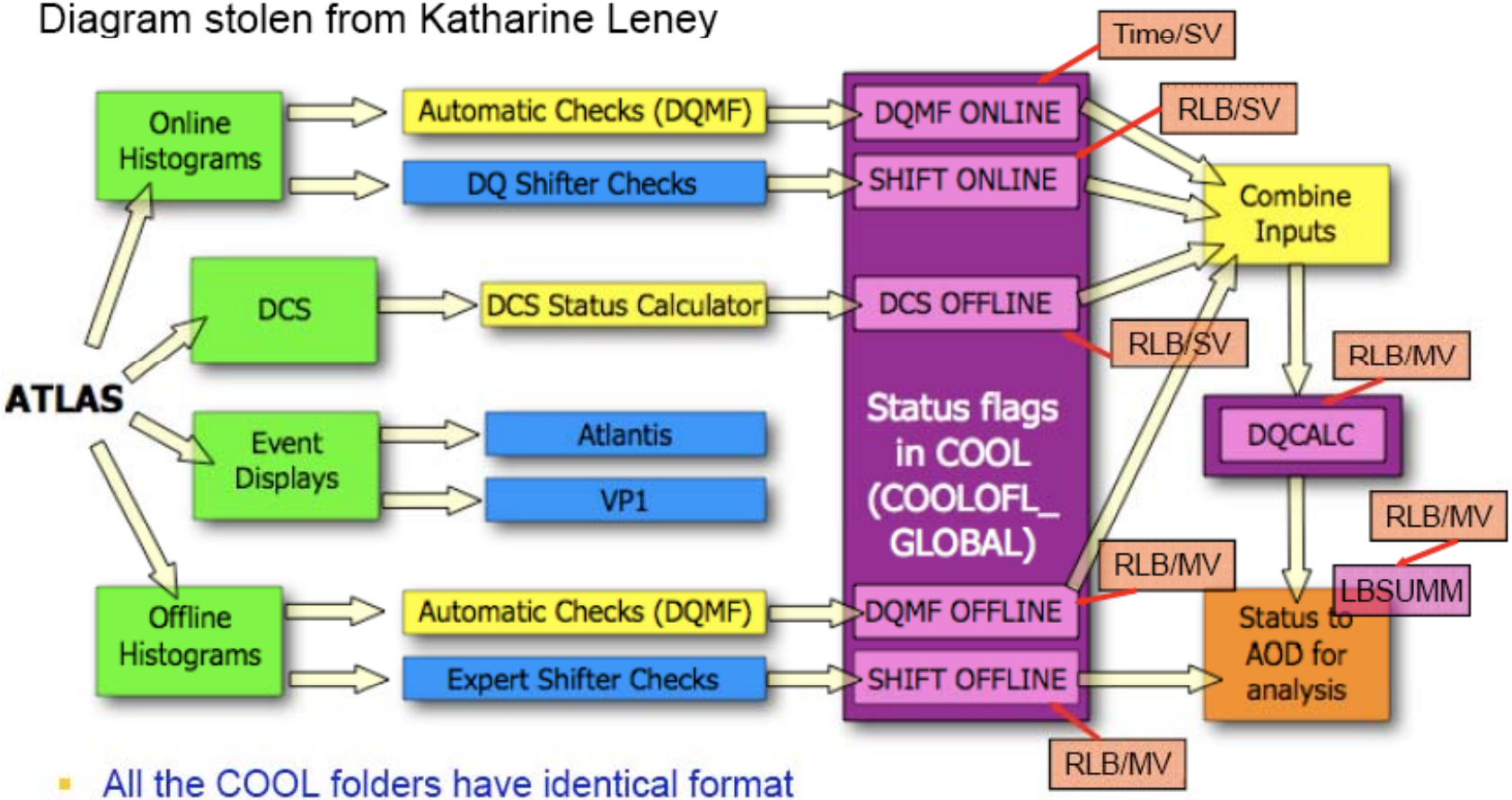
# Backup

# Open questions…

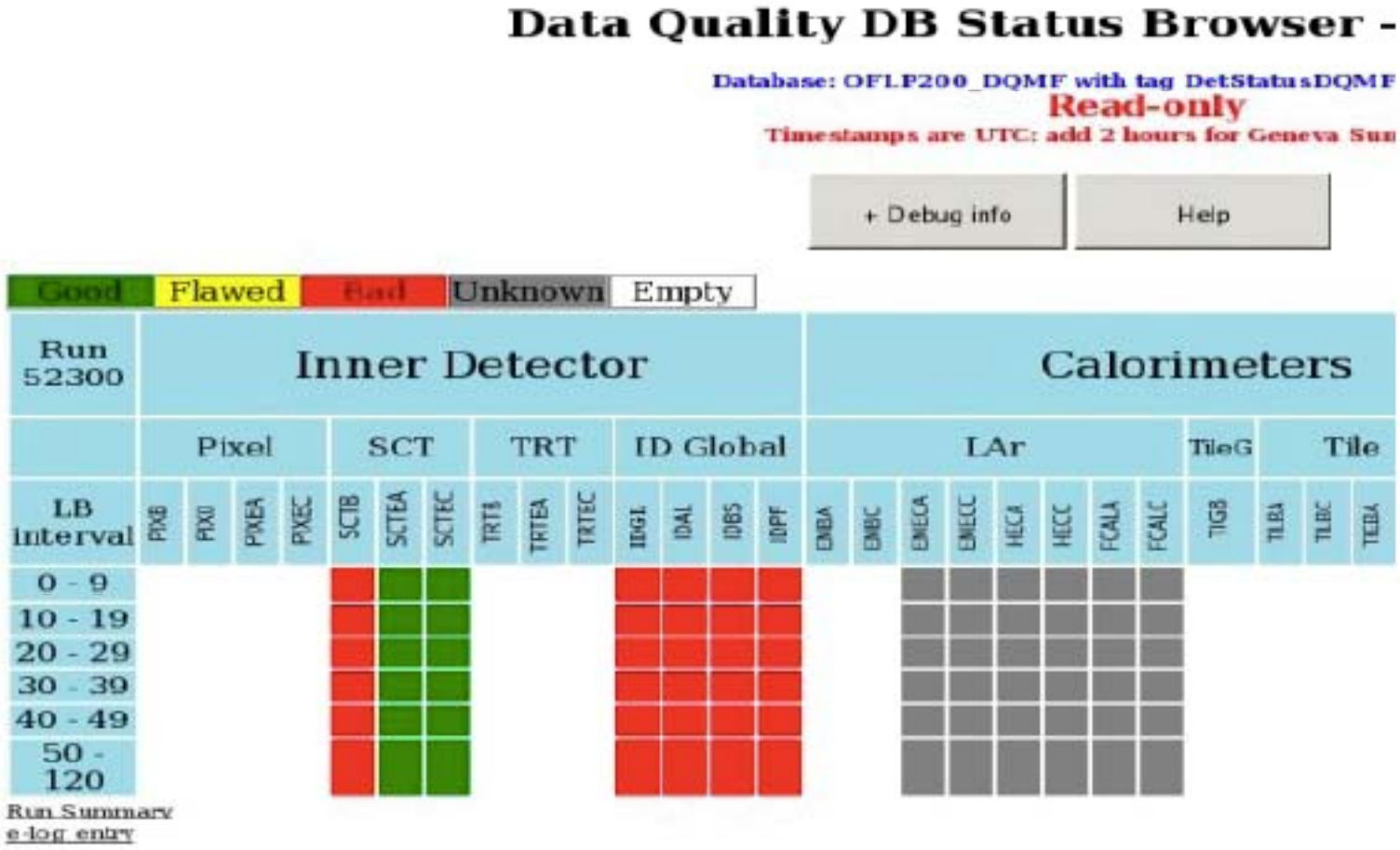
- How are jobs submitted? It is automatic enough?
- What tools exist and which are still needed?
- Where and how the log files and other data is stored?
- How is the run information stored? (configuration, conditions, DCS)
- How results are published and documented?
- Is the infrastructure for testing fast/prepared enough?
- How should the histograms checking work?
- What should be the interaction with the slice experts? (I believe this will improve when we are in beam)
- How the report of the shifter per run should be given?
- What other tools/system do we need?. For example, a system to merge events from different streams removing duplicated events to recheck the streaming part
- etc….

# Detector status data-flow

- Diagram stolen from Katharine Leney




- All the COOL folders have identical format
  - Timestamp/RLB single/multi-version)


Data Quality DB Status Browser -
Database: OFLP200_DQMF with tag DetStatusDQMF
Read-only
Timestamps are UTC: add 2 hours for Geneva Sun
+ Debug info
Help
Good
Flawed
Bad
Unknown
Empty
Run 52300
Inner Detector
Calorimeters
Pixel
SCT
TRT
ID Global
LAr
TileG
Tile
LB interval
PIXB
PIXI
PIXEA
PIXEC
SCTB
SCTEA
SCTEC
TRTB
TRTEA
TRTEC
IDGL
IDAL
IDBS
IDPF
EMBA
EMBC
EMECA
EMECC
HECA
HECC
FCALA
FCALC
TIGB
TILBA
TILBC
TEBA
0 - 9
10 - 19
20 - 29
30 - 39
40 - 49
50 - 120
Run Summary
e-log entry

# Options for the Trigger flags

1. We keep the status quo because we are happy with it.
   - We start providing the information.
2. We keep the status quo because we can't decide yet. We need experience with data. We decide after some data taking takes place.
   - We provide the information at least when it is trivial. e.g. on/off.
3. We introduce flags per slice (10 or 11).
   - Large correlation between slices due to common issues related to detectors, e.g. calorimeter calibration or Inner Detector alignment.
   - We can establish who is responsible.
4. We introduce Trigger flags per subdetector used by the Trigger (ID, Calo, Muon).
   - Correlated with subdetector status flags.
   - Responsibility is less clear to start with.
5. Other?