Tracker Shifts Overview

- **Online Shifts at P5** (3/day for 24 hours coverage)
  - One Pixel shifter and one SiStrip shifter for 8h shifts
  - One Pixel shift leader and one SiStrip shift leader covering an entire week

- **Offline Shifts** (CMS CENTRE and at FNAL ROC)
  - One combined Pixel + SiStrip shifter for a CERN day shift and one remote for a FNAL day shift
  - One Pixel + SiStrip shift leader at CMS-Center covering an entire week

- A shifter can do either 3 weeks online shifts, or 2 weeks online + 1 week offline (5 days/week)

- Before first shift: make sure to share an overlap shift with previous shifter!

- DQM expert on-call at CERN

- Daily short planning meetings between P5 and CMS-CEN

- Monday commissioning meetings
Summary of Shifter Tasks for DQM

• P5 shifter will watch online DQM GUI (central and expert), as well as TrackerMap
  – Checks pre-defined set of plots in central online GUI and TrackerMap, uses expert GUI for debugging of problems
  – Has help of DQM on-call expert
  – Communicates with online and offline shift leaders

• Offline shifter tasks:
  – Use central DQM offline GUI to:
    • Checks a pre-defined set of plots
    • Checks results of automated data certification (good run flags). In case of bad runs, tries to understand the reason.
  – Runs root macro (either once per shift or per week, tbd.) to fill trend plots from CondDB (historical DQM info)
  –Maybe additional work flows from calibrations group
  – Communicates with offline shift leader

• Overlap with central shifters avoided as much as possible. Expert shifters need to be able to respond quickly to questions by central shifters!
Main tool: central DQM GUI

- [link](https://cmsweb.cern.ch/dqm/tier-0)
- ‘Workspace’: choose *Everything*
- ‘Dataset’: choose applicable dataset name, ask shift leader
- ‘Run’: choose the run number to investigate, start off where previous shifter has stopped
- ‘00 Shift’: layouts for central shifter, basic plots
- ‘Pixel & SiStrip – Quick Collection’: layouts for Tracker shifters, more detailed. Always check!
- ‘Pixel & SiStrip – Detector folders’: navigate these to debug problems.
Central GUI snapshot: start page

CMS data quality  CERN Tier-0: 98'534  8  40'474'152  Summary, 1/1

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<thead>
<tr>
<th>Subsystem</th>
<th>Summary</th>
<th>Run section</th>
<th>Event Last update</th>
<th>Last event</th>
<th>Processed Event rate elements</th>
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</tbody>
</table>

Pixel Summary Map

Please file any feature requests and any bugs you find in Savannah. Find shift instructions here.

(QUANA DOM GUI) @ vooms34@cern.ch; Jun 11, 2009 at 17:02.34 UTC; session is modifiable.
The monitorables – Pixels

Data corruption

- Errors from FEDs and data unpacking (raw2digi) → NErrors plotted for each FED crate/Ladder/Blade
- ReportSummaryMap on front page shows modules with errors at a glance.
- Summary plots should be empty. If not, error codes give more information (linked from shift instructions)
The monitorables – Pixels
Raw charge

• Digis → uncalibrated single pixel charge, amount, occupancy and location

Results from QTests and/or reference plots will be superimposed
The monitorables – Pixels Clusters

• Clusters $\rightarrow$ gain calibrated and clustered charge deposits, amount, size, occupancy, location
The monitorables – Pixels
Reconstructed Hits

- RecHits → Lorentz angle corrected, weighted hits, occupancy and errors

Sorry, don't have example plots at the moment.
The monitorables – Pixels Tracks

- Tracks $\rightarrow$ combined SiStrip + Pixel tracks, hit residuals and OnTrack/OffTrack cluster info, track multiplicities
The monitorables – SiStrips 
ReportSummaryMaps
• Overview maps reflecting input for data certification

<table>
<thead>
<tr>
<th>SiStrip Part</th>
<th>Status</th>
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<tr>
<td>SiStrip_TECB</td>
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</table>

Two additional maps detailing S/N quality and fraction of modules with errors.
The monitorables – SiStrips S/N

- Signal-to-Noise for clusters on tracks, for TIB/TOB/TID/TEC

A lower cut is applied to ensure good quality data.
The monitorables – Trend Plots

- The offline shifter will have to run a root macro either once per day or per week needs to be seen, to fill trend plots for some key variables.
- For the Pixels:
  - #Digis, #Clusters, cluster size, #barrel tracks/#endcap tracks, mean charge of OnTrack clusters.
- For the Strips:
  - #tracks (CKF and CosTF), #RecHits per track (CKF and CosTF), MPV of corrected S/N, #Clusters OffTrack, #Clusters OnTrack (CKF and CosTF), Chi2/ndof for tracks (CKF and CosTF).
Offline TrackerMaps - Pixels

- Static TrackerMap plots of some selected monitorables, viewable with the GUI
Offline TrackerMaps - SiStrips

• Together with the trend plots a couple of static TrackerMaps can be created for the strips:
  – NDigis distribution for all modules
  – FED error distribution for all modules
• These will allow for an additional overview of the whole system at one glance.
When something seems wrong

• If you spot a problem in one of the plots, or you follow up on a problem reported by the online shifter, etc. report your findings in twiki with DB interface (currently under development)
• In addition talk to your offline shift leader
• Try to understand from online elog if something went obviously wrong.
• If the automatic good run flag is bad, investigate why, what cut failed, what fraction of the modules failed, etc. Discuss with offline shift leader your findings.
• Make sure to communicate with following shifters via the twiki/DB tool and via the elog if necessary, so not everybody has to re-discover the same problem.
Data Certification

• Verifying this will mainly be duty of shift leader, but everybody should understand the principles...

• The DQM process at Tier-0 is automatically applying a certain set of cuts to some of the histograms. Then an algorithm is combining the cut results to define an overall good run flag (good or bad) for FPIX, BPIX, TIB, TOB, TID, TEC separately.

• The intermediate and final results of this process are stored in the DQM root files, accessible through the DQM GUI under:
  – Pixel(SiStrip)/EventInfo/reportSummaryContents
  – Additional useful input can be found under Pixel(SiStrip)/EventInfo/DAQContents and DCSCContents
Data Certification - Pixels

• We check what fraction of all barrel or endcap modules passes a certain cut. The quantities we cut on are:
  – Any FED errors?
  – #Digis
  – Digi charge (raw charge in ADC)
  – Cluster size, #Clusters, cluster charge (OnTrack and OffTrack)
  – Mean and RMS for X and Y residuals
  – RecHit errors in X and Y
Data Certification - SiStrips

• Module level certification based on
  – Any FED errors?
  – #Digis
  – #Clusters

• Layer level certification based on
  – S/N fraction of good layers (per sub system TIB/TOB/TID/TEC)

• Combine the module and layer level results per sub system
Run Registry

- CMS central DQM Run Registry contains all important info on all runs, filled automatically and by hand by the shifters:
  - http://pccmsdqm04.cern.ch/runregistry/index.jsp
Signing up for shifts

• Reminder: only one week of offline shifts possible per person, rest should be online at P5!
• If possible we would like to cover one remote offline shift per day from Fermilab.
• Sign up for 5 shifts in a 7 day week (not one day here and there...)
• Sign up for shifts using official CMS shift tool: http://cmsonline.cern.ch/portal/page/portal/CMS online system/Shiftlist/ShiftSelection
• Choose “Shift selection” tab (top right), select Shift type “TRK – Off line FNAL” and the Month you are interested in and click on the “Show” button. Then check the blue boxes on the days of your availability; Lino DeMaria will eventually assign the shifts.