CMS DQM

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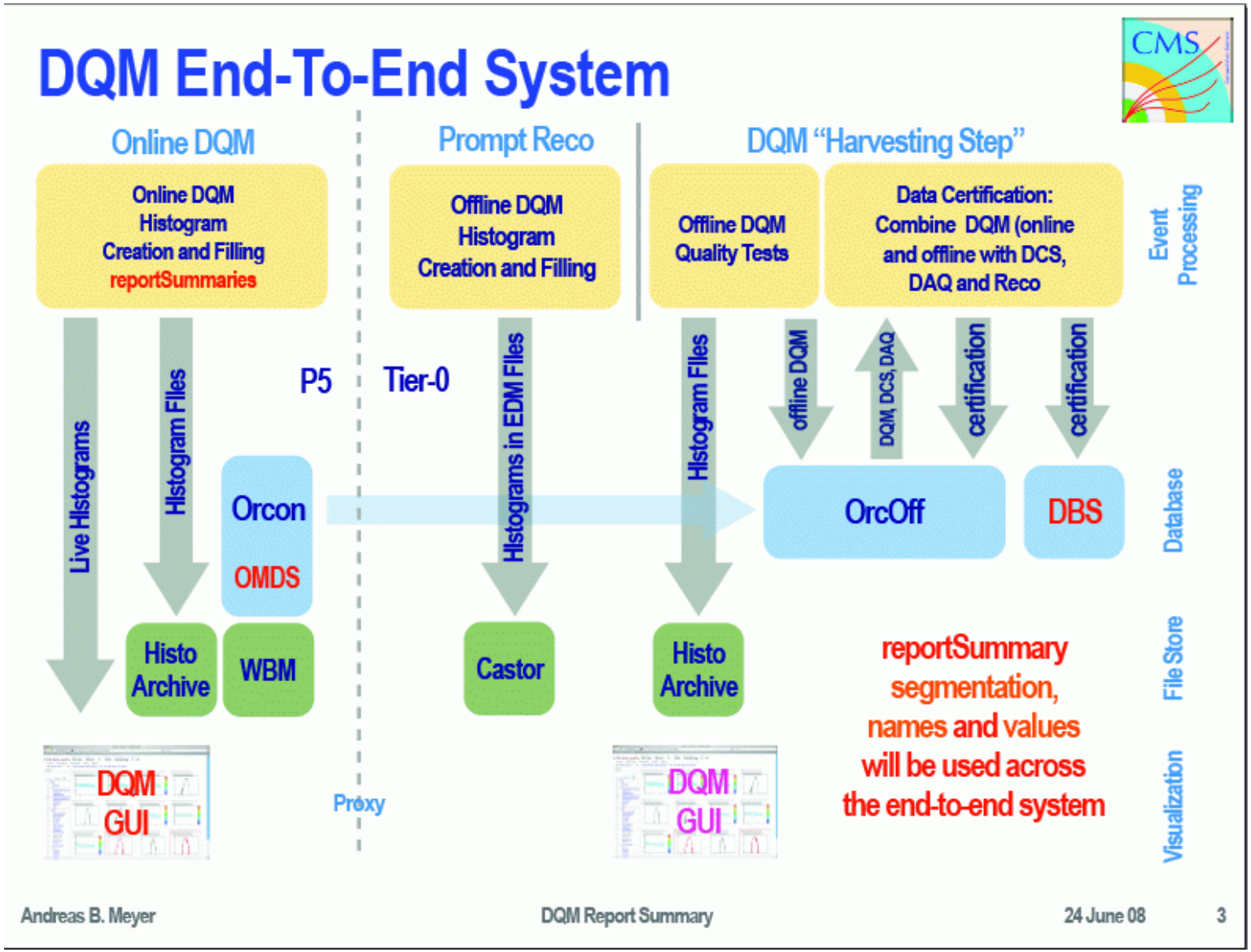
June 25, 2008

Outline

- **Online DQM**
  - ***Summary***
  - ***Shifter Histograms***
  - ***Expert Histograms***
  - ***Documentation***

- **HLT histograms**
- **Prompt Analysis**
- **Offline DQM**
- **Bad Cell Treatment**
- **Data Certification**

Overview of CMS DQM



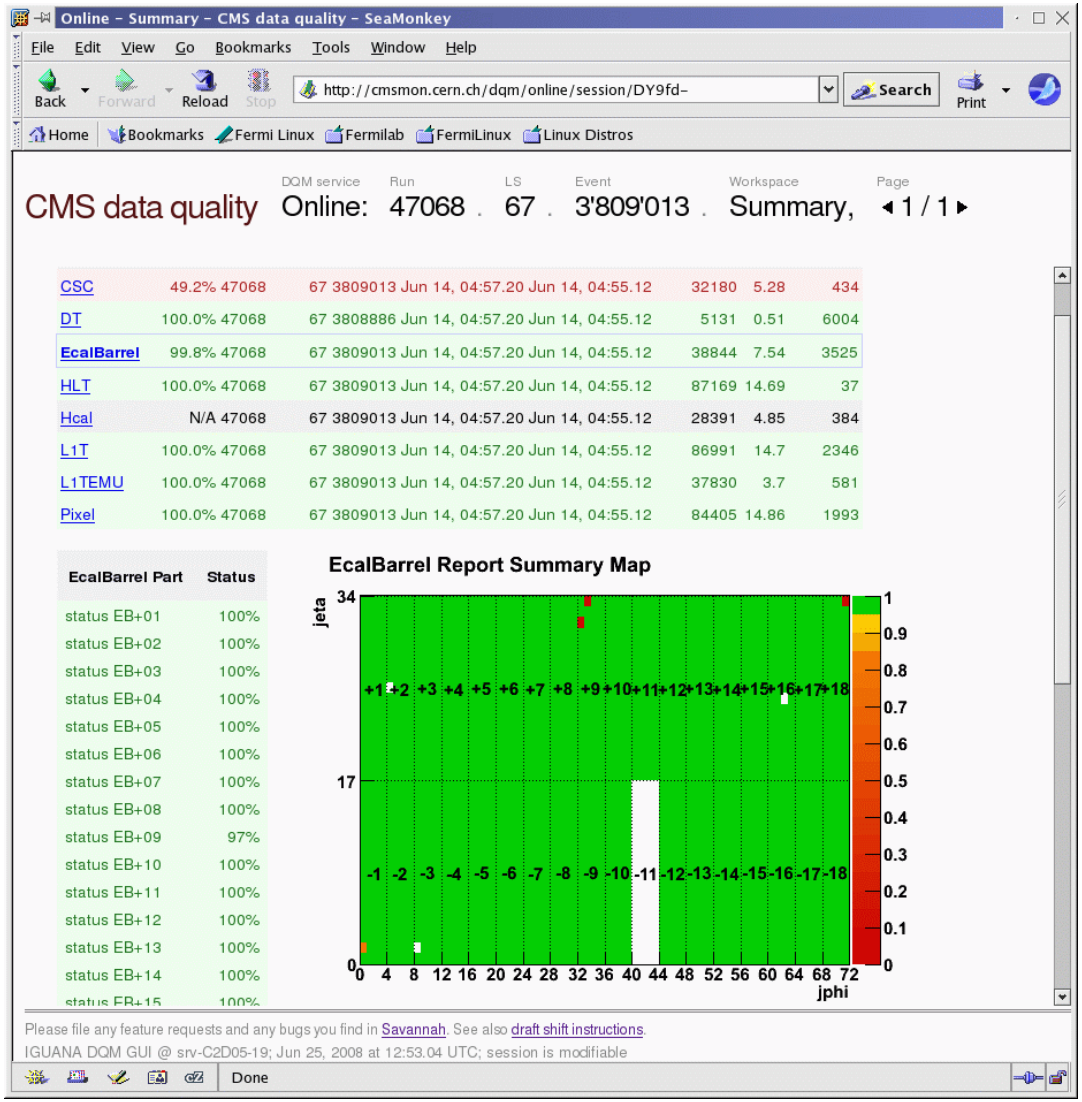
Online DQM Report Summary

One global quality flag (floating point [0,1])

Collection of quality flags per subdetector

2D summary histogram with bin contents

Report summary is written and archived in root files, once per run (or every 30s)



Shifter Histograms

Browser Online DQM histograms using DQM GUI

Small number of shifter histograms

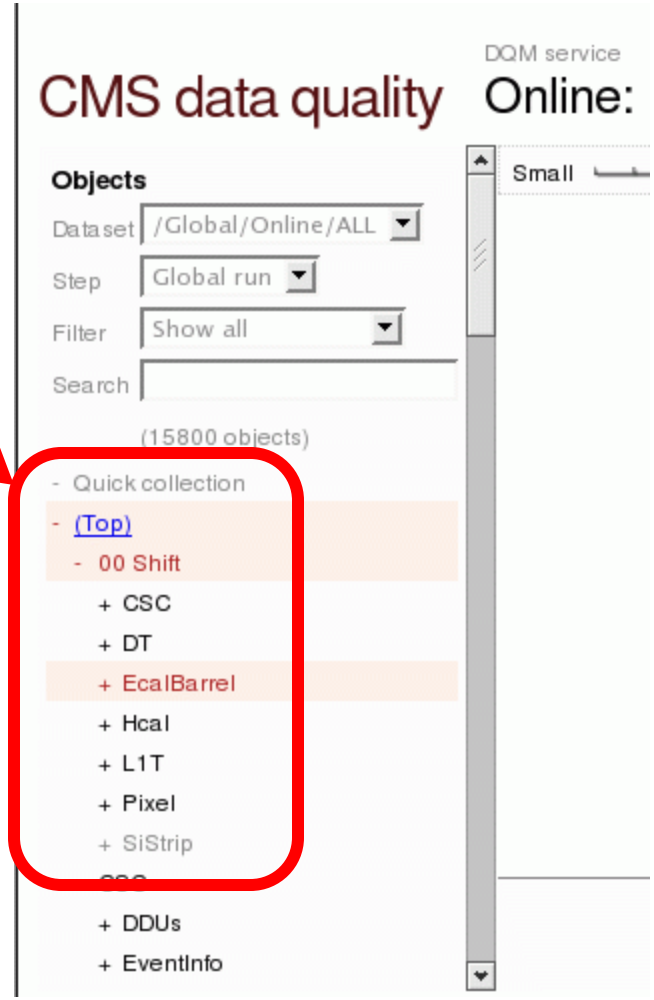
Easy to find

Detector granularity

(HB,HO,HE,HF…)

Allows non-expert to quickly identify problem

Clear documentation to guide shifter



Shifter Histograms

The purpose of the shifter histograms is to allow the shift crew to quickly identify problems and take action

Meaningful histograms
Not overwhelmed with information
Clear instructions

Online DQM will also provides input to Data Certification

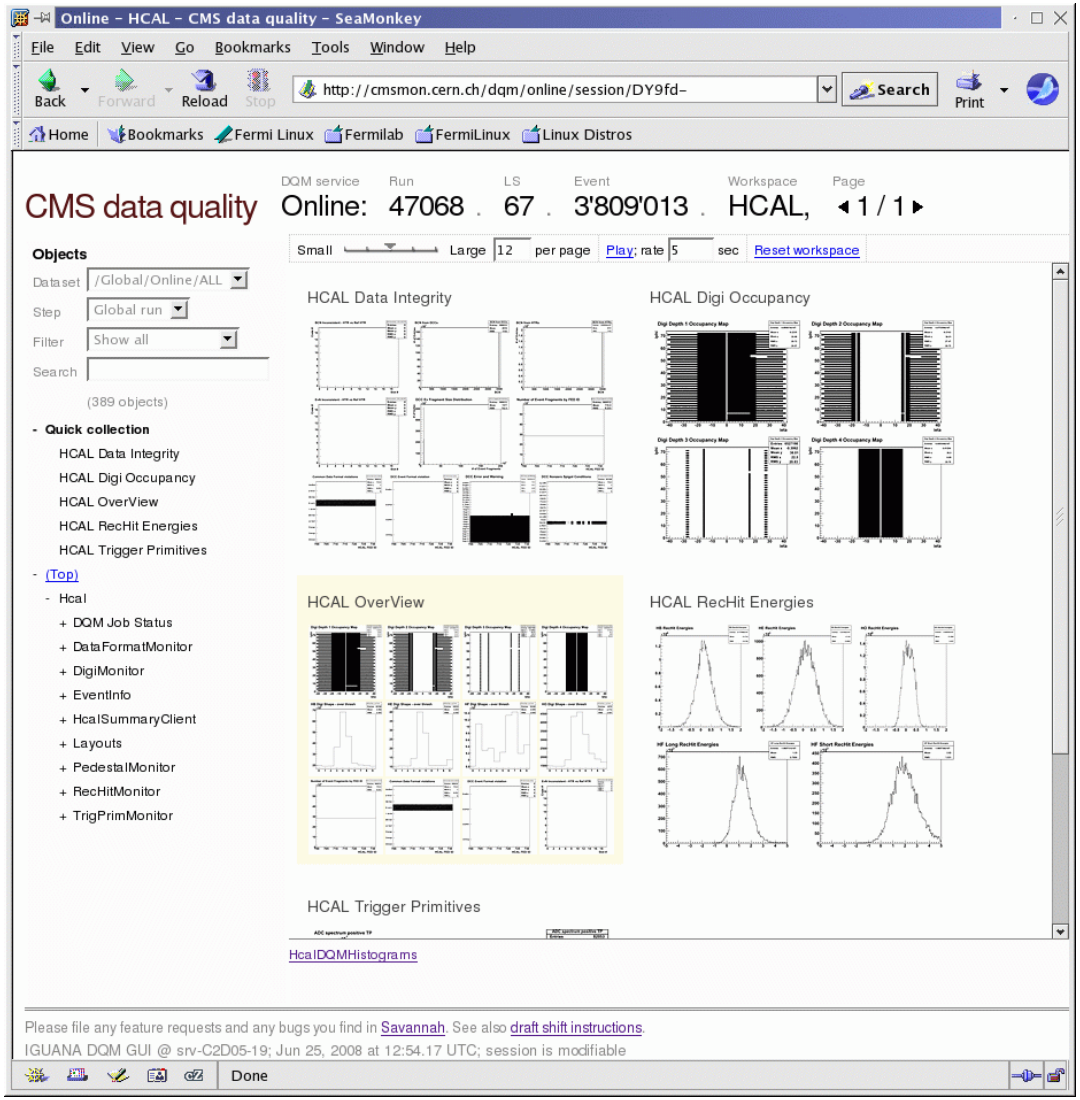
Needs to provide the online quality flags…

Expert Histograms

Many more expert histograms are available

Response can be very slow if there are too many bins

Try to book only what is useful…



Online DQM Documentation

Easy to navigate documentation with same look and feel across detectors

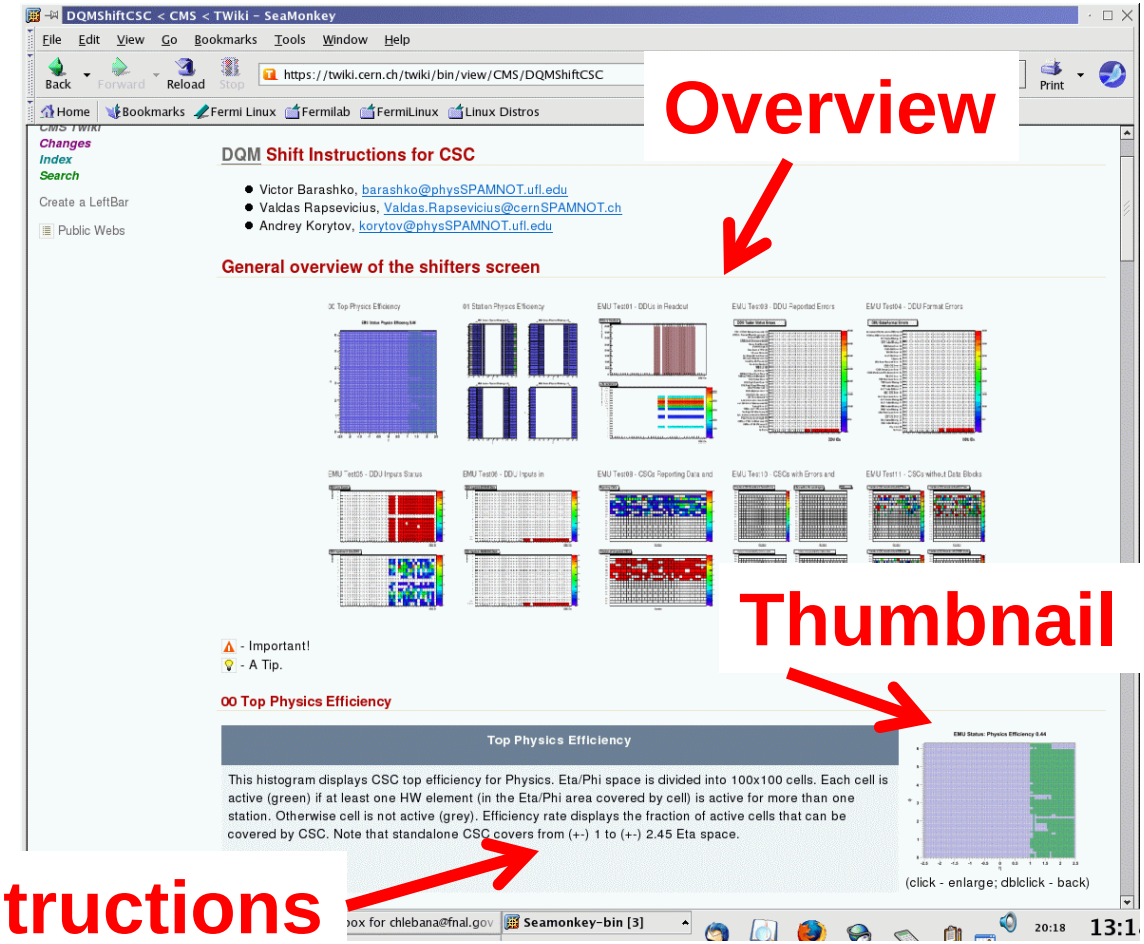
Nice example: CSC

Separate shifter histograms from expert histograms

Same color scheme

Same layout

…

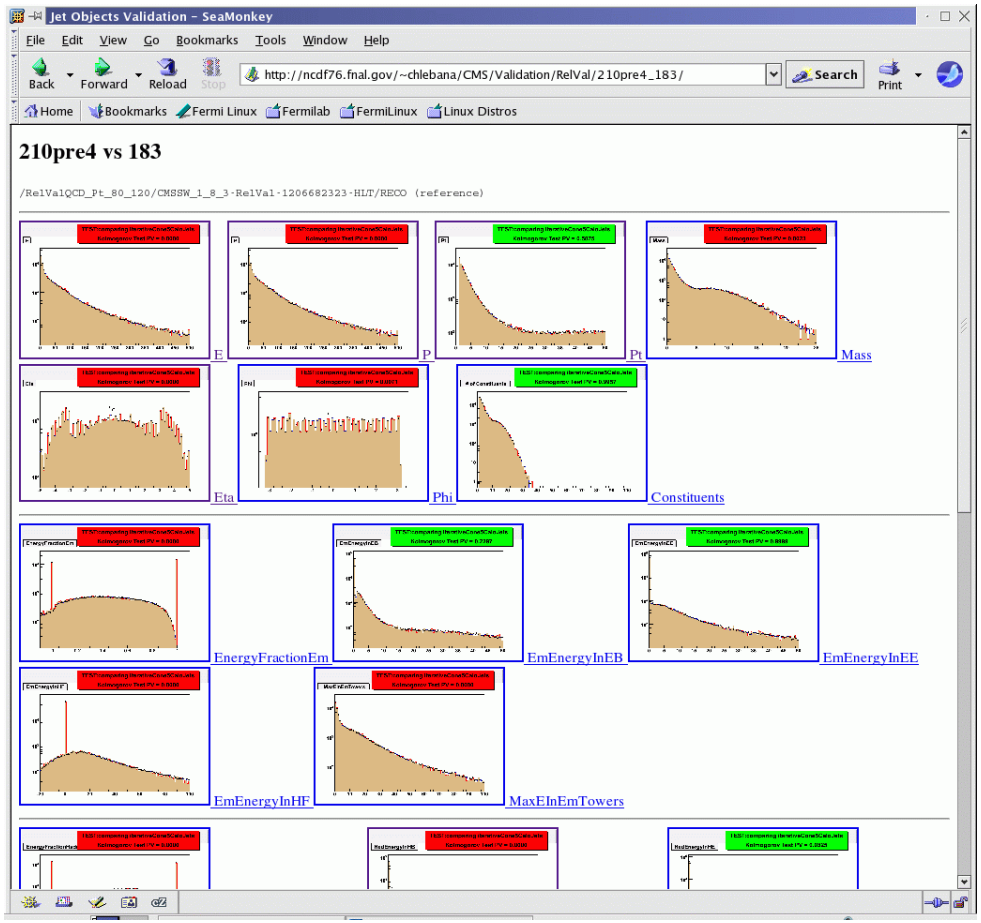


Offline DQM (POG Monitoring)

RelVal monitoring looks at Jet and MET reconstructed quantities

Compares standard distributions between releases

Ported the relval histograms to the offline framework

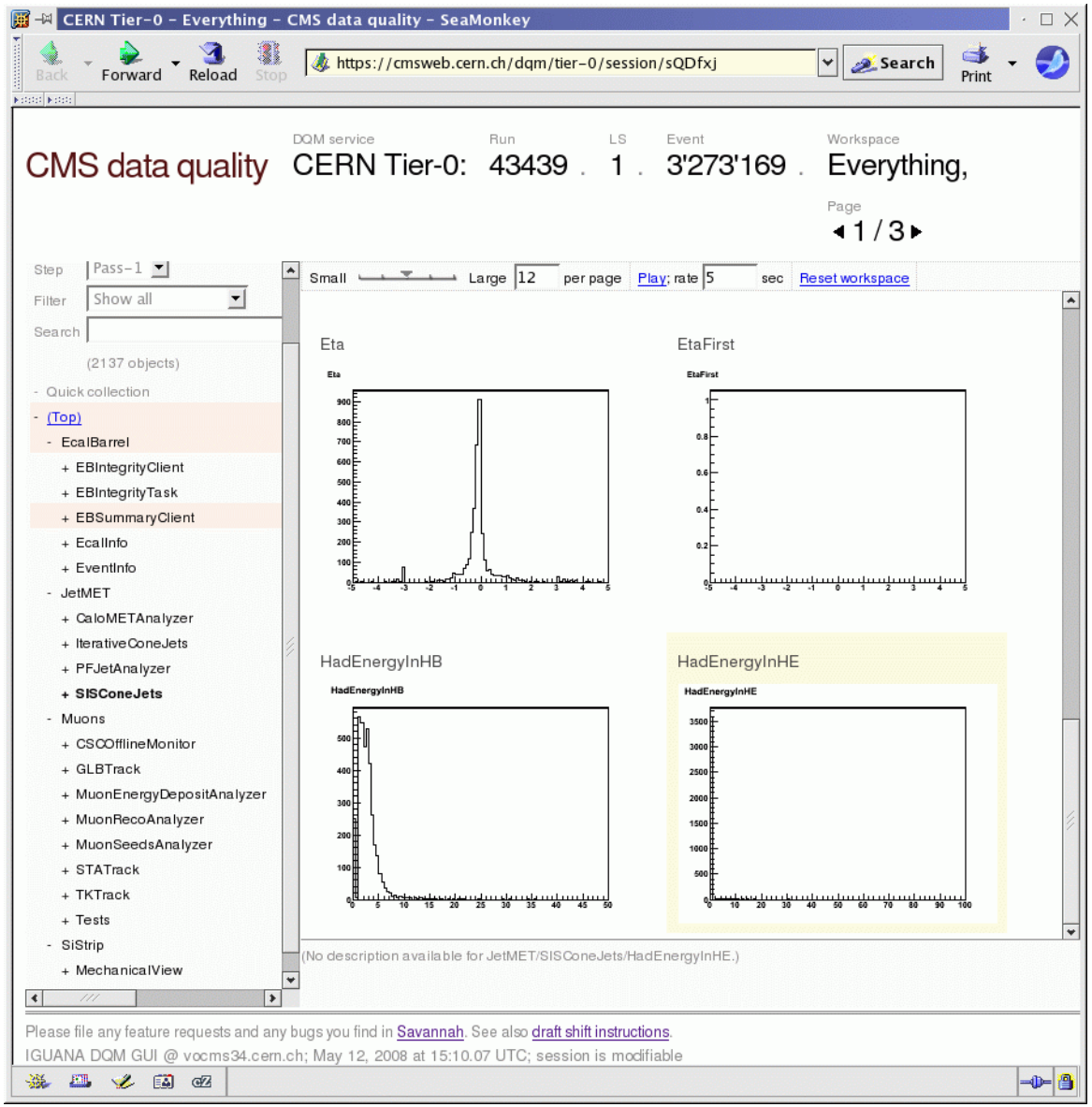


Offline DQM

Offline POG monitoring run during Cruzet I and II

Can browse results with DQM GUI

Only provides some basic histograms



Offline DQM

Offline DQM code needs to be built up…

Look at data within a lumi section

Write result to database

Provide additional histograms
Set bin edges…

Provide shift instructions

Data Certification

Combine information from DQM+DCS+DAQ

```
    Run          |--------------1---------------
    File         |-----1-----|---2---|---3---|-
    Run Section|-1-|-2-|-3-|-4-|-5-|-6-|-7-|-

    DAQ          |-1-|-1-|-1-|-1-|-1-|-1-|-1-|-

    DCS-HB       |-1-|-1-|-1-|-1-|-0-|-0-|-1-|-
    HB           |-1-|-1-|-1-|-1-|-1-|-1-|-1-|-

    DCS-HO       |-1-|-1-|-0-|-0-|-0-|-1-|-1-|-
    HO           |-1-|-1-|-0-|-0-|-0-|-1-|-1-|-

    DCS-EB       |-1-|-1-|-1-|-1-|-1-|-1-|-1-|-
    EB           |-1-|-1-|-1-|-1-|-0-|-1-|-1-|-

Returns

    Files        |-----1-----|       |---3---|-
    Run Section|-1-|-2-|-0-|       |-0-|-7-|-
```

One run in many files

Many lumi sections in one file

DCS has finer time granularity

Setting Data Quality

Online DQM quality flag
Offline DQM quality flag

Used as input to Data Certification

Where is the data quality set?

From expert to shifter operation

PromptReco run to determine detector quality?
Entered by hand… develop automated procedure

Bad Cell Treatment

A proposal is being circulated on bad cell treatment which would allow for the possibility of redoing the recovery algorithm at the RECO level

Write collection of "bad rechits" in RECO data

Contains unmodified rechits

Save "bad CaloTowers" in the AOD

Modified to include associated cells

Recovery algorithm may use adjacent cells….

Where is this done???

Accessing Good Runs

User specifies sub detectors (HB, EB, HO, …)

Data handling returns files and list of bad lumi sections

User analysis skips over bad lumi sections

Summary

Much of this is not very well defined…

Specifications and example being developed

- ***Specify criteria to define online DQM flags***
- ***Provide DQM flags for the separate detectors (HB, EB,…)***
- ***Provide online DQM objects***
- ***Location to run DQM (prompt reco or offline DQM)***
- ***Build up offline DQM (look at lumi sections)***
- ***Provide offline DQM objects***
- ***Example to access DCS***
- ***Migration from expert to shifter operation***
- ***…***