

DATA RECOVERY ACTION ITEM

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- Data that is not declared good for physics could become a substantial fraction of total.
 - What we see now is that in many cases these data are still very good for some or all analyses.
- Need several good run/LS definitions (JSON files)
 - With instructions/recipes for how to use “imperfect data”
 - Small corrections e.g. for inefficiencies , and/or special selection criteria and or special MC
 - Thinking/preparations began in early 2008
 - Approached Tevatron experts about methodology and tools for run-dependent MC or weighted MC to match running conditions. These tools are now mostly available in CMS.



Activity in 2010

- 3 campaigns were, or are, being carried out
 - see talk by L. Malgeri at XC meeting:
<http://indico.cern.ch/conferenceDisplay.py?confId=99430>
- 1. Validating lumi numbers for “certified” data accounting
 - All pp data now accounted to the level of few μb^{-1} !
- 2. Tracking all losses (in all steps)
 - In order to see where things can be Improved
 - Now have a very detailed understanding!
- 3. Have defined “failure scenarios” that have been applied to data and MC to study effects on physics analyses
 - Many subsystems participating with studies in progress
 - Also allows us to better understand what to do when a subsystem problem occurs in a run.



2010 data certification

- Recorded: 43107 nb^{-1} so why only 36098 nb^{-1} “good” and 7009 nb^{-1} “bad” ?
 - Definition of “good”: RunRegistry quality flags from DQM plots and HV status for all partitions for each LS:
 - DQM flags: L1t, Hlt, Pix, Strip, Ecal, Hcal, Dt, Rpc, Es, Csc, Track, Egam, Muon, Jmet, Lumi
 - DCS status: Bpix, Fpix, Tibtid, TecM, TecP, Tob, Ebminus, Ebplus, EeMinus, EePlus, EsMinus, EsPlus, HbheA, HbheB, HbheC, Ho, Hf, Dtminus, Dtplus, Dto, CscMinus, CscPlus, Rpc
- Total (15 DQM+23 DCS) \times 84538 LS
 - Remarkably we get 83.7% of LS with ALL flags ok!



Losses in many categories

- HV Losses = 2340 nb^{-1} leaving 40767 nb^{-1}
 - $830 \text{ (TRK)} + 720 \text{ (ECAL)} + 300 \text{ (DT)} + 380 \text{ (CSC)} + 130 \text{ (RPC)}$
 - Some losses are not exactly real but in general the granularity of HV info needs to be improved
 - E.g. TRK has 6 HV partitions and all must be above 98% (i.e. the "alarm" level for ops)
 - Action Item: All subsystems to provide %ON in addition to flag for 2011 run (to optimize offline certification criteria)
 - Endorsed this past week in XEB and will be followed in XC
- Status losses = 4669 nb^{-1} leaving 36098 nb^{-1}
 - ECAL: 3009 nb^{-1} (EE+ HV failure, FED integrity error: HB)
 - HCAL: 801 nb^{-1} (DLL unlock)
 - Remainder are small items and widely distribute



Summary & classification of losses

In a nutshell (switching to pb^{-1}):

Delivered	Tracker ON	All others ON	ECAL	Everything else	Total
43.1	-0.8	-1.5	-2.8	-1.9	~36.1 pb ⁻¹

Γ + Data cert. group- XC-data recovery - 26/10/10

Reason	runs	losses in pb ⁻¹
ECAL: EE+ HV failure	148819,147754,147755,148031	2.26
ECAL: FED integrity error in HB	147451,148953	0.83
HCAL: DLL unlock	148862	0.81
50ns run (BPTX inefficiency)	149942	0.43
DT wheel out (+rpc)	147206	0.30
CSC partly off	148864	0.26
TrOFF before beam unstable	149182	0.17
HLT rate drop (maybe beam bkg)	148862	0.17
RPC excluded	147753	0.14
RPC+Tr OFF	146807	0.10
ECAL: EE FED out	146728	0.10

From Luca's talk at the XC meeting

Major detector parts off. Even if reproducible in MC, worth? → 5pb⁻¹
 Most likely reproducible with no large effect on physics. → 0.5pb⁻¹



Work underway

- Recovery steps
 - Physics groups asked to look at bad data for possible use
 - As feedback is received JSON is adapted and/or criteria relaxed
 - Imagine/derive failure scenarios (FED's out, HV failing etc.) and reproduce them both on real data and MC:
 - <https://twiki.cern.ch/twiki/bin/viewauth/CMS/CMSFailureScenariosStudies>
- Preparation for 2011
 - Action item: Subsystem HV info accessibility (mentioned earlier)
 - Include more data for some analyses
 - Exercise recovery methods: Corrections, Run-dependent MC etc.
- Will be followed regularly at XC.