

One User's Perspective

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Emergency Trigger/DB Review

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Experience Making Physics_0_00

- **The latest table was a complete rewrite**
 - **Renamed all triggers and options to convention**
 - **Rebuilt all paths**
 - **More time spent thinking than pointing and clicking**
 - Point-and-click was ~2 days each for L1/L2 and L3
 - Test L1/L2 first with decoupled
 - **Developed plan with Excel spreadsheet**
 - Would be helped with better reporting
 - Need some technical improvements
 - Clicked in table based on plan
 - **General assessment: the system works, but it is somewhat cumbersome. Needs evolutionary not revolutionary change.**

Database Reports

- **Need improved trigger database reports**
 - **Format of L1/L2 report needs work: text formatting, copies of triggers**
 - **There exists a path report on screen, but it does not print.**
 - **Need ability to get reports on tables that fail in order to debug.**
 - **Want path report with all L1/L2/L3 options. Want a report without.**
 - **Want a report with all bit assignments:**
 - fred, prefred, L1-cal, L1-muon, L2 bits, etc.
 - **Why not have reports generated on the fly? Accessible from web?**

GUI Issues: Trigger Names

- **Want the ability to start with an existing trigger/path and edit the name to create a new one**
 - Then edit the contents
 - Currently need to start with a new trigger and enter the contents by hand.
 - In essence this is a "copy" feature rather than "new" or "edit" since edit just bumps the version number
- **Difficult to work with long text strings in Path/dataset/table GUI**
 - **All GUIs should use consistent ordering scheme**
 - first by name (case insensitive) then by version.
 - GUI should refresh automatically to insert new trigger in proper location in list.

Trigger Table Development Problems

- **Alexei's code does not work with integration database**
 - All tests have to be done in the production database.
 - Want to develop a table in integration and move it and all its contents to production.
- **Need error reports that say which trigger failed and why.**
 - Now have to find it inside of lots of java gibberish.
 - Trap errors, report them and stop.
 - Check for errors at each level before you go to make a trigger table.
 - e.g. look for inconsistent options in L1 triggers.

GUI Structure

- **Optimize how L1 cal and muon options are created.**
 - **Move global parameters out of individual options.**
 - Include hardware/firmware configuration info in tables
 - **Muon options should include all parts of a muon object.**
 - Track, chamber, scint., hadtdc all in single menu
 - **For CMU will need to define types of muons**
 - CMU, CMUP, eta-gap, phi-gap, CMUP-only?
 - **Because of trigger limitations and to keep tables sane will want only one high and one low of each muon type**
 - **For all parameters, GUI should have a default**
 - e.g. # xft layers=4
 - **Need pull-down lists of values or operators where appropriate**
 - e.g. XFT thresholds.

Misc. Issues

- **Alexei's GUI has been slow.**
 - Was speeded up enormously by retiring old triggers.
 - Seems that GUI for L1 triggers is not looking at retired bit for options.
- **Can't use all muon options**
 - Currently java code does not allow for combining muon specific options at Fred
 - e.g. one low-pt CMU and one low-pt CMX for dimuons



Monitors

- **To know if trigger works properly, need effective monitoring**
- **Monitors for trigger are Trigmon, DAQMon and Xmon**
- **Description of what we need follows....**
 - **Sorry for core dump**

Trigmon: General Issues

- **Documentation on Web for each plot**
 - **Key by index number for each plot for easy reference**
- **Plots have as much info from Trigger DB as is needed to easily correlate between plots and with trigger rates**
 - **Must have complete access to Trigger Database**
- **Occupancy plots are first defense**
 - **Map in standardized coordinates**
 - **If simulation is slow want as much data as possible to occupancy plots**
 - **Should have standards and histories to compare to**

Trigmon: General Issues, II

- **Most errors not dumped to screen**
 - control by error level
- **Most plots should NOT have statistics boxes**
 - Except number of entries
 - Boxes should not block useful area
- **Trigger simulation**
 - Should take input at each stage from data
 - Can isolate problems to individual components
 - Comparisons to data should separately show over-efficient and under-efficient elements

Trigmon: Calorimeters

- **Global**

- **DCAS EM, HAD Trigger Towers Occupancy**

- Apply Threshold?
- weight by tower size ($\Delta\eta$)

- **Simulation: η - ϕ map of errors in E_T**

- sim vs data in TC2D
- n-tuple or text file of first 10k errors

- **Level 1**

- **DIRAC EM Triggers by # and Name (8)**

- **DIRAC HAD Triggers by # and Name (8)**

- **CRATESUM Phi Distribution 10 Single Bit, 3 Two bit**

- **Simulation: Two maps of errors over/under efficient`**

- DIRAC Eta-phi, Cratesum phi, Prefred
- MET, SUMET vs Expected (2d)

Trigmon: Calorimetry

- **Level 2**
 - **DCAS: Seed, Shoulder Occupancies (each pass)**
 - **Simulation: DCAS vs SIM seed and shoulder maps**
 - over/under efficient by pass
 - **Errors reported to n-tuple/file**
 - **Number Clusters: Sim. Vs. TL2D**
 - **Cluster E_T sim vs TL2D**
 - associate by seed

Trigmon: Muon Needs

- **Global**

- **Stubs Occupancy: CMU, CMP, CMX, BMU**
 - Hi/Low vs stack
- **Scint Occupancy: CSP, CSX, BSU, (HTDC?) vs counter**
- **PreMatch Occupancy: CSP*CMP vs Stack**

- **Level 1**

- **Occupancy of Matchbox Outputs/PreFRED inputs**
 - 2 plots
- **Simulation: Stub, Scint, PreMatch**
 - Sim vs Data
 - Plot errors vs stack
 - Report Errors in Ntuple or log file
- **Matchbox outputs sim vs data**

Trigmon: Tracking

- **XFT Segment occupancies**
- **XFT Linker Occupancy vs phi**
 - **Linkers 0-287 and wedges 0-23**
 - 0 is CDF $\phi=0$
- **XTRP Linker occupancy in same coordinates**
- **XTRP Map Occupancies Cal, CMU, CMX, Crack**
 - **bit #, Threshold from database vs Phi**

Trigmon: Tracking, II

- **Simulation:**
 - **XFT Segment errors vs phi**
 - **XFT Linker errors vs phi**
 - **XTRP Map errors**
 - Over/under efficient CAL, CMU, CMX, Crack, BMU
 - Errors to N-tuple/Logfile
 - **Two Track Trigger: Output bits, Sim vs Data**

XMON/DAQMON

- **Want plots of trigger xsec (unprescaled only) vs instantaneous luminosity for current store.**
 - **Compare to function: $\sigma = a/L + b + c*L$**
 - $L =$ inst lum
 - **a, b, c in database**
 - Now only b
 - Also need error threshold (as fraction of expected)
- **Need history of xsec vs lum**
- **Need cross sections in reports**
 - Unprescaled probably sufficient for xsec
- **Eliminate duplication between Xmon and Daqmon?**
- **Need info about L3 triggers and paths**