



Function/Diagnosis/Triage of Global Trigger List Operations

DAQ Shifter Tutorial

Terry Toole
University of Maryland

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Introduction

- Function of the Trigger List is to configure D0-DAQ for data taking
- Trigger list contains
 - Physics triggers
 - Monitoring triggers
 - Commissioning triggers
- Online examines provide a finer look at quality of data
- This talk provides info and debugging tips on how to tell:
 - Is the system OK ?
 - If not, how to focus in on the source of the problem via triggers
 - Trigger rates, XS are good first indicators of something gone awry



What's Normal: Rate Limits

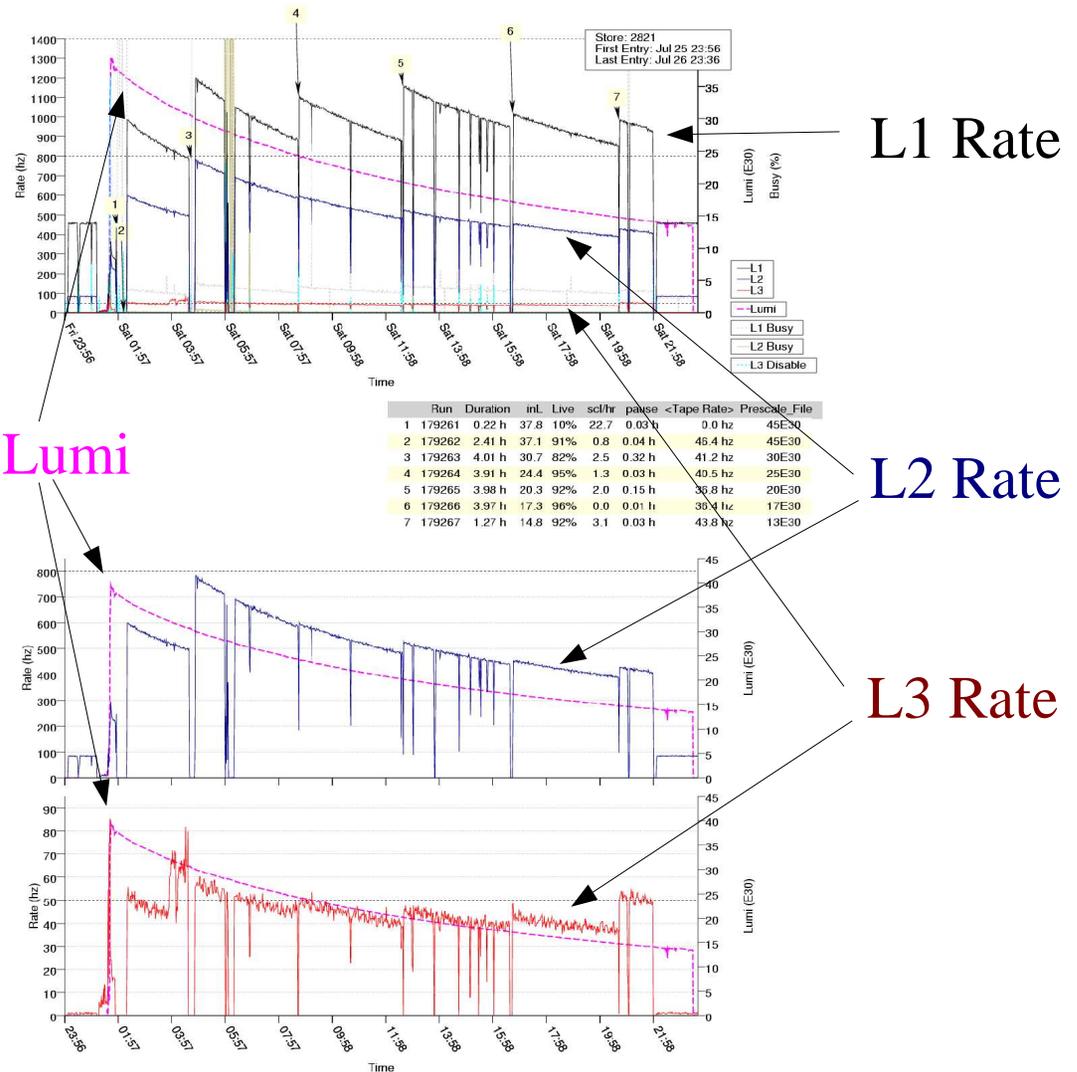


- L1 Rate: 1.4kHz current 2.5kHz max 6kHz design
 - Current limit imposed by 5% FEB from SMT readout
 - Max limit imposed by SVX chip -- L1Busy
- L2 Rate: 800hz current 1kHz max 1kHz design
 - Current limit imposed by muon FE crates
 - Max limit imposed by Calorimeter readout
- L3 Rate: 50hz current 75hz max design
 - Reprocessing time -> 50hz chosen as 16M events/week average
 - Running near max limit, L3 Disables may affect data can affect Lumi determination
- Note: Rates are matched to rate limits via prescales.
 - At the present time, tuning prescales is an iterative process.
 - Not always possible to hit L1, L2, L3 target rates with desired mix of triggers.



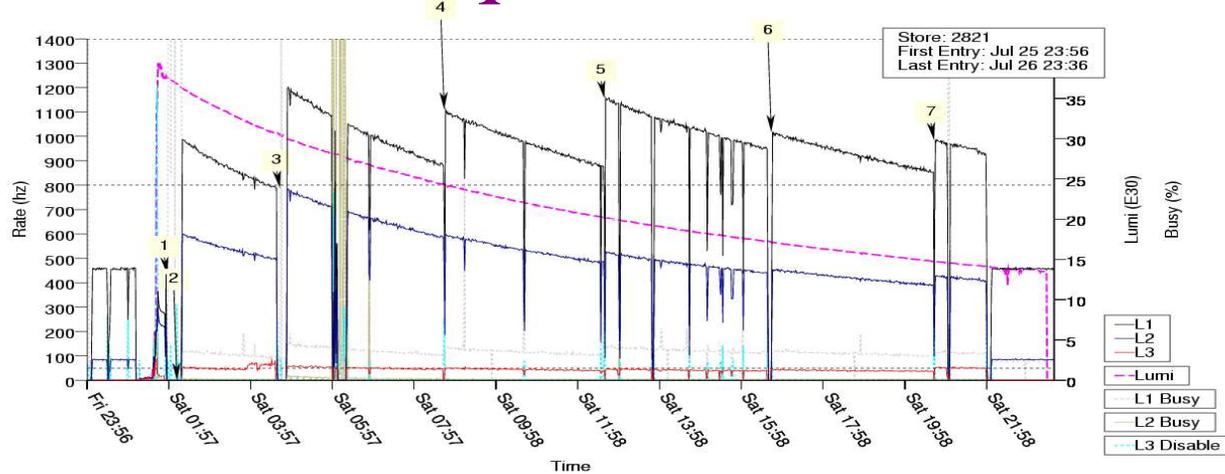
Daq Rate Plots

- By Design:
 - Quick means of monitoring current online conditions from outside CR
 - Created to collect data used to monitor, maintain prescales
- Collects info from different sources (not necessarily in sync)
 - Trigmon (P.Laurens): L1 & L2 rates, L1busy, L2busy, L3 disable
 - Beams Div. Current Status: lumi, store number
 - Lumi reports (M.Begel): average rate to tape, pauses, scl inits
 - Runs database: Runs collected, prescale file





Daq Rate Plots



Run	Duration	inL	Live	scl/hr	pause	<Tape Rate>	Prescale_File
1	179261	0.22 h	37.8	10%	22.7	0.03 h	45E30
2	179262	2.41 h	37.1	91%	0.8	0.04 h	46.4 hz
3	179263	4.01 h	30.7	82%	2.5	0.32 h	41.2 hz
4	179264	3.91 h	24.4	95%	1.3	0.03 h	40.5 hz
5	179265	3.98 h	20.3	92%	2.0	0.15 h	36.8 hz
6	179266	3.97 h	17.3	96%	0.0	0.01 h	36.4 hz
7	179267	1.27 h	14.8	92%	3.1	0.03 h	43.8 hz

Ideally:

Tuned prescale sets will give saw-toothed pattern at L1, L2, L3

Trigger rate should:

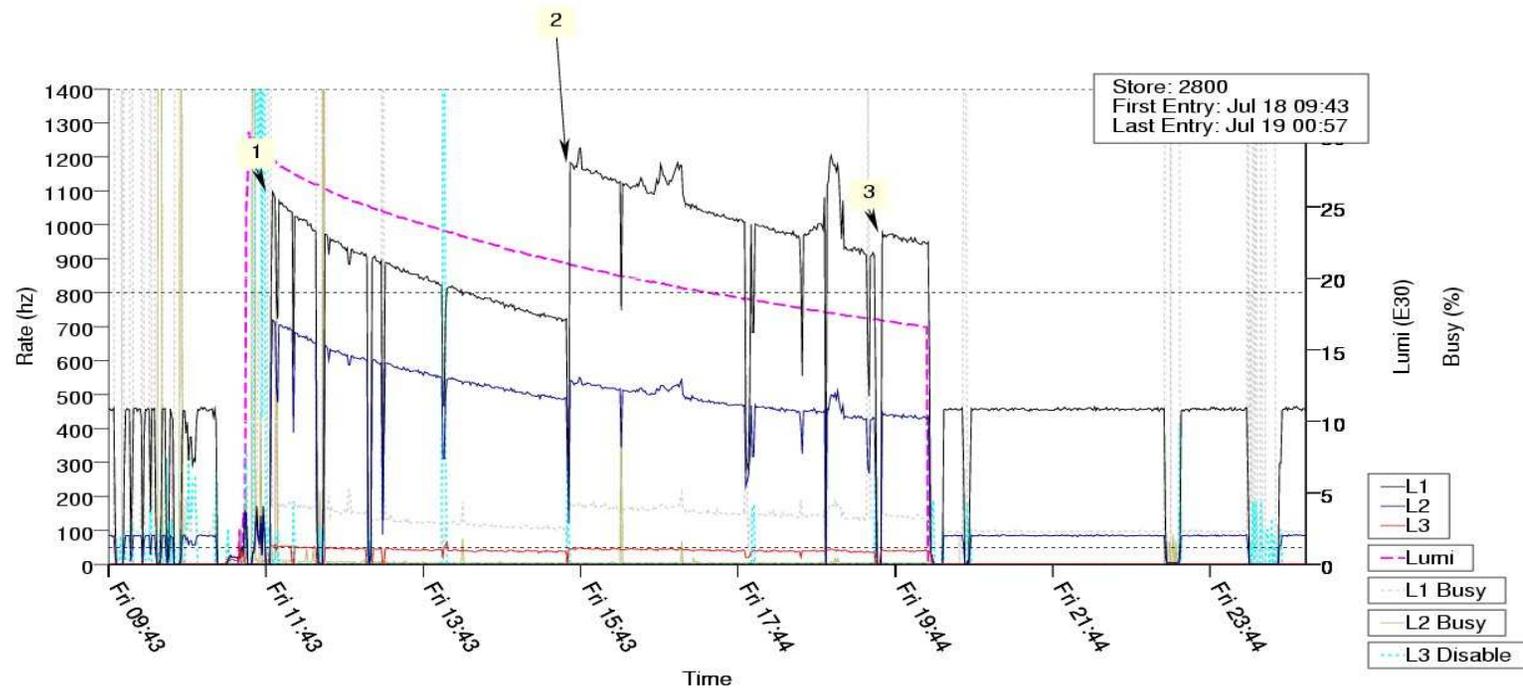
- smoothly decrease over time
- should ~follow lumi

Instability Indicators

- High # scl inits/hour
- Presence of **L2Busy**, **L3 Disable**
- High L1Busy
- Sudden drop or rise in rates that are not at start of a run.
- Usually obvious in real time, good to remember if looking at older plots



Example of Noisy Rate Plot



Run	Duration	inL	Live	scl/hr	pause	<Tape Rate>	Prescale_File	
1	179038	3.81 h	29.2	89%	5.5	0.11 h	37.7 hz	30E30
2	179039	3.92 h	21.2	94%	2.8	0.01 h	37.5 hz	20E30
3	179040	0.66 h	17.1	93%	1.5	0.01 h	33.7 hz	17E30



Possible Rate Problem?

Possible Crosscheck:

Compare to run taken with same prescale set:

- Get list of runs, stores, prescale files for trigger list from:
http://www-d0.fnal.gov/trigger_meister/private/www/tl_desc/global.html
Linked from TriggerMeister and TriggerBoard homepage
- Change.log file in [official/trigname-prescales](#) to check prescale file has not changed
- Archived daq rate plots are at: <http://www-d0online.fnal.gov/www/groups/tm/daqrates/>
Linked from TriggerMeister homepage

Global Trigger List Descriptions

[global_CMT-12.20 -- Runs using this TriggerList !](#)

Global trigger list requested by the Trigger Board to place corrections in:
Changes from global_CMT-12.10:
Have separated the 11-specific bits for the following paired triggers:
MT3_L2M0_2TK3_MM and MT3_L2M0_MM3_IP
MU_JT15_L3M0 and MU_JT20_L3M0
Have adjusted the L3-IP tool to correct previous version.
Adjusted the pass fractions for the following triggers:-
JT_65TT (75 to 300)
JT_95TT (180 to 400)
JT_125TT (50 to 100)
MUW_W_L2M3_TRK10 (1000 to 2000)
MU_JT15_L3M0 (150 to 500)
MU_JT20_L3M0 (150 to 500)
MU_JT20_L2M0 (150 to 500)
MU_JT25_L2M0 (150 to 500)

Runs Major revision of global_CMT_test-12.01 including all changes summarized in official email from Nikos to the TB on 11-Jun-2003 global_CMT_test-12.01 Runs First major revision of global_CMT_test-12.00, including removal of triggers using L3 electron tool ELE_NLV_NC/1 causing crash of p15 so that a rate test can be performed. global_CMT_test-12.00 Runs 254 new triggers !!!

click on this link to get to

RUN_NUMBER	Store	StartTime	RunDuration	PrescaleFile	SolOnPolCurr	TorOnPolCurr	DAQShifter	RunComment	EndComment	ConfigName
179558 179558	2847	2003 AUG 01 21:02 CDT	.88 hours	10E30	1- 1-- 4750.6	1- 1-- 1499.5	Mikhail Arov			official/global_CMT
179557 179557	2847	2003 AUG 01 15:58 CDT	5.05 hours	13E30	1- 1-- 4750.6	1- 1-- 1499.8	Brigitte Vachon			official/global_CMT
179556 179556	2847	2003 AUG 01 11:55 CDT	3.97 hours	17E30	1- 1-- 4750.3	1- 1-- 1499.1	Brigitte Vachon	4 hours		official/global_CMT
179552 179552	2847	2003 AUG 01 09:34 CDT	2.22 hours	20E30	1- 1-- 4750.3	1- 1-- 1499.5	Brigitte Vachon	adding x3a		official/global_CMT
179551 179551	2847	2003 AUG 01 06:11 CDT	3.35 hours	25E30	1- 1-- 4750.3	1- 1-- 1499.8	Arnd Meyer	new prescale		official/global_CMT
179550 179550	2847	2003 AUG 01 05:02 CDT	1.09 hours	30E30	1- 1-- 4750.3	1- 1-- 1499.8	Arnd Meyer			official/global_CMT
179549 179549	2847	2003 AUG 01 04:14 CDT	.74 hours	30E30	1- 1-- 4750.3	1- 1-- 1499.5	Arnd Meyer			official/global_CMT
179548 179548	2847	2003 AUG 01 03:53 CDT	.33 hours	35E30	1- 1-- 4750.6	1- 1-- 1499.5	Arnd Meyer	1st run in store	Muon triggers fixed	official/global_CMT
179547 179547		2003 AUG 01 03:38 CDT	.19 hours	scraping	1- 1-- 4750.3	1- 1-- 1499.8	Arnd Meyer			official/global_CMT
179545 179545		2003 AUG 01 03:21 CDT	.20 hours	scraping	1- 1-- 4750.3	1- 1-- 1499.5	Arnd Meyer			official/global_CMT



Daq Rate Plots -- Some details

- Runs on d0o115:
- Data collected once/minute
 - Data written to 2 text files → one per store
 - Text files available back to Fall, 2002 → continuous
 - Currently, files at `/scratch2/d0tm/TMtools/daqrates/TMtools/py/daq_rates`
- Plots updated once/minute until store number changes

• Sample text file:

Date	L1	L2	L3	Lumi	L1Bz	Store	L2Bz	L3Dis		
Sat Jul 26 07:28:02 2003	956.86	633.96	47.63	25.89	2224	0	3.40	2821	-1.00	0.00
Sat Jul 26 07:29:02 2003	956.86	633.96	48.75	25.88	2224	0	3.40	2821	-1.00	0.00
Sat Jul 26 07:30:01 2003	961.82	637.40	48.75	25.86	2348	0	3.50	2821	0.20	0.00
Sat Jul 26 07:31:02 2003	964.44	641.48	47.12	25.83	2410	0	3.60	2821	0.20	0.00
Sat Jul 26 07:32:01 2003	959.34	633.72	49.60	25.88	2477	0	3.50	2821	0.20	0.00

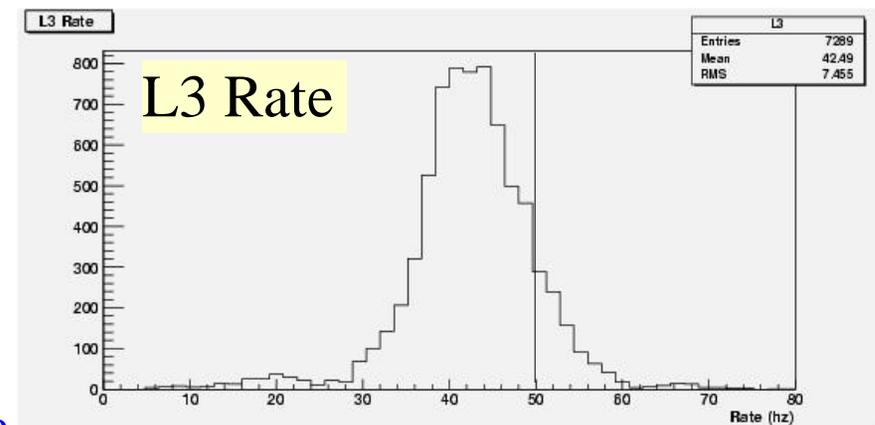
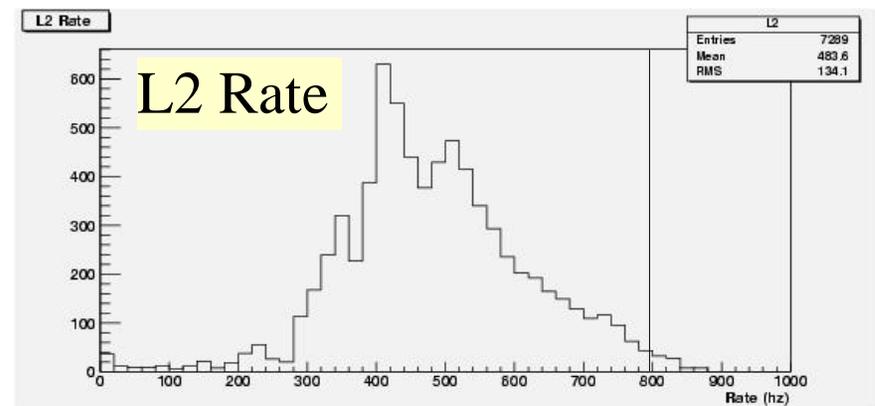
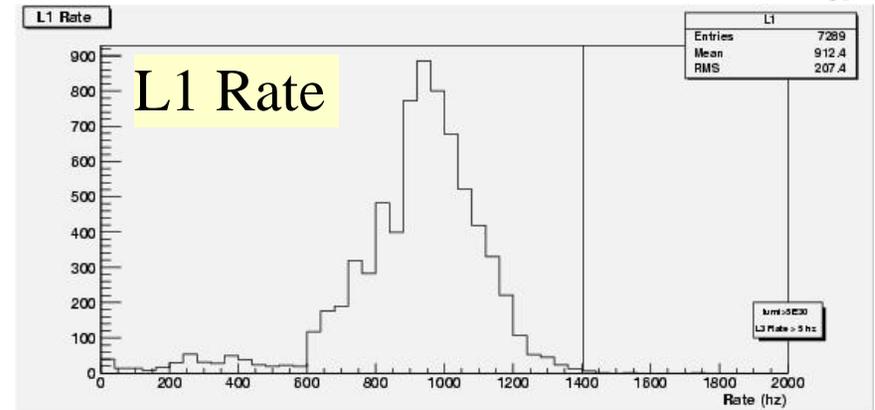
store2821.txt lines 453-457/1421 32%

- Can read file(s) into roottuple for different look at data



Example plots from daq_rates data

- L1, L2, and L3 rates during period July 22-29, 2003.
 - Lumi $> 5E30 \text{ cm}^{-2} \text{ sec}^{-1}$
 - i.e, we are in a store
 - L3 rate $> 5 \text{ hz}$
 - i.e., we are running





If the system is broken
(or bleeding slightly)
How to determine
where put the bandage
(or what to amputate)





Individual Trigger Rates: What's a Normal rate?



ImTrigger: Ratio of rates (by Han Do)

- Compare current XS to value obtained during reference run
- Easy to spot problem trigger -- All bars should be at 1

by Trigger

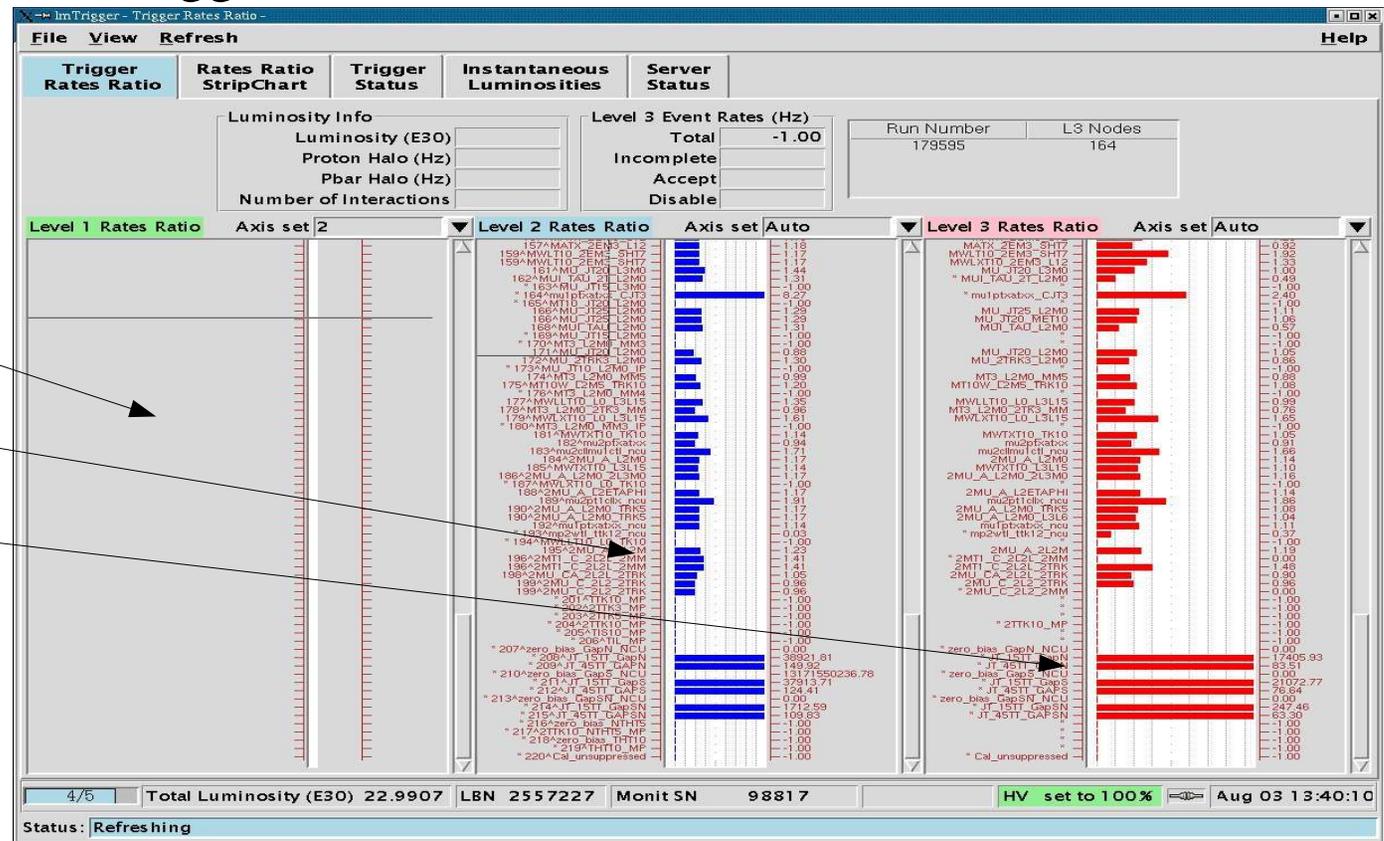
- L1 Ratio
- L2 Ratio
- L3 Ratio

Ideally, this is what we want!

We need to make it more robust

4 August 2003

T. Toole





ImTrigger: Ratio of Rates

- Not-So-Good Points
 - Program is undergoing shakedown, needs polishing
 - Ratio is sensitive to:
 - quality of reference run
 - sampling period of data (?)
 - tracking triggers have non-linear increase with lumi
- For example, if ratio is x10 for a trigger, is it real or a fluke?
 - To answer such a question, a nice complementary program to Imtrigger could be *stripmon* (suggestion by Michiel)
 - More about *stripmon* later



ImTrigger: Trigger Status Page

(also available on ImExpert gui)

Select on exposure group

Select combination of L1, L2, L3 (buttons toggle on/off)

File View Refresh Help

Norm. Trigger Rates Trigger Status Server Status

Exposure Group: 0

Luminosity Info

Luminosity (E30)	23.68
Proton Halo (Hz)	46944.46
Pbar Halo (Hz)	3119.64
Number of Interactions	0.13

Level 3 Event Rates (Hz)

Total	580.63
Incomplete	0.00
Accept	
Disable	0.00

Exposure Group	Run Number	L3 Nodes
0	179595	164
1	179595	164
2	179595	164

Incomplete threshold: Any

L1 L2 L3 Ax's set Auto

L1 Bit	L2 Bit	L3 Bit	L3 Trigger	L1 Prescale	L1 Accept (Hz)	L2 Accept (Hz)	L3 Accept (Hz)	L1 Lum	L1 XS	L2 XS
17	17	119	E8_5_T1_SH5_T4L5	1	41.71	41.71	0.13	21.53	1.94	1.94
17	17	120	E8_2L8_T8L8	1	41.71	41.71	0.08	21.53	1.94	1.94
18	18	121	JT_8TT	12243	1.10	1.10	0.46	0.00	-1.00	-1.00
19	19	122	JT_15TT	3024	2.49	2.49	0.57	0.01	-1.00	-1.00
20	20	123	JT_25TT_NG	311	1.10	1.10	0.42	0.07	15.86	15.86
21	21	124	3JT10	277	0.27	0.27	0.08	0.08	3.42	3.42
22	22	125	JT_45TT	31	11.22	11.22	0.46	0.69	16.16	16.16
23	23	126	3CJT5	1015	0.08	0.08	0.08	0.02	3.92	3.92
24	24	127	4JT12	1	88.88	35.32	1.32	21.53	4.13	1.64
25	25	128	MHT20_L2L0_PVZ	1	88.88	12.27	2.66	21.53	4.13	0.57
26	26	129	JT_65TT	3	29.67	26.68	0.88	7.18	4.13	3.72
27	27	130	3J15_2J25_PVZ	1	88.88	35.32	3.29	21.53	4.13	1.64
28	28	131	MHT30_3CJT5	1	88.88	16.24	1.55	21.53	4.13	0.75
29	29	132	3JT15_PVZ	1	88.88	15.18	3.11	21.53	4.13	0.70
30	30	133	3CJT5_JT20_L2M0	1	88.88	1.91	1.87	21.53	4.13	0.09

4/5 Total Luminosity (E30) 23.7130 LBN 2557202 Monit SN 98527 HV set to 100% Aug 03 13:15:09

Status: Refreshing

Get relative rates here

Get Absolute rates here

- sensitive to sampling?
- Can compare these rates to predicted ones in prescale files



Prescale Files

- Contain expected:
 - trigger rates at target luminosities
 - L2, L3 rejections
- Uses same reference run as ImTrigger

```

***
###
###
### L1BitName
### Priority
### TriggerName
### Prescale
### L2Rej
### L3Rej
### Expected Rates
### at_40E30
### L1
### L2
### L3
### (tgt 0,85)
### TapeRt
### Unprescaled Rates
### L1_at
### L1_at
### L3_at
### L3_at
#####
AFastz_ncu 2200000 ##f min_bias_NCU 1.00 1.00 0.61 0.61 0.61 0 0.00 3.36e+04 1.34e+06 1.34e+06 0
ALiveBX_ncu 3400001 ##f zero_bias_NCU 1.00 1.00 20.00 20.00 20.00 0 0.00 1.70e+06 1.70e+06 6.80e+07 0
L1Mu_download 0 ##p L1MU_DOWNLOAD 1.00 1.00 0.00 0.00 0.00 0 0.00 0.00 0.00 0.00 0
L1CTT_download 0 ##p L1CTT_DOWNLOAD 1.00 1.00 0.00 0.00 0.00 0 0.00 0.00 0.00 0.00 0
CEM(1,3)_ncu 438328 ##v80-130 EM5 1.00 5.74 0.06 0.06 0.01 0 0.00 629.00 2.52e+04 4383.28 0
CEM(1,6)_ncu 160400 ##v80-130 E456_ELE_MP 1.00 1.00 0.01 0.01 0.01 2500 0.00 40.10 1604.00 1604.00 0
##v80-130 CEM6 1.00 1.00 0.01 0.01 0.01 0 0.00 40.10 1604.00 1604.00 0
##v80-130 EM9 1.00 3.75 0.01 0.01 0.00 0 0.00 40.10 1604.00 427.73 0
CEM(1,11)_ncu 5152 ##v80-130 EM15 1.00 3.09 0.03 0.03 0.01 0 0.00 3.98 159.20 51.52 0
CEM(1,9)_ncu 11482 ##v80-130 EM12 1.00 3.01 0.03 0.03 0.01 0 0.00 8.64 345.60 114.82 0
TTK(2,3,)_CEM(2,3)_ncu 97200 ##v80-q30 E78_ELE_MP 1.00 1.00 0.01 0.01 0.01 2500 0.00 24.30 972.00 972.00 0
##v80-q30 2CEM3_2TK3 1.00 1.00 0.01 0.01 0.01 0 0.00 24.30 972.00 972.00 0
CEM(1,11)_ncu^2 1 ##u E1_ELE_MP 1.00 2484.85 154.00 154.00 0.06 2500 0.06 3.85 154.00 0.06 0
##u E1_SHT20 1.00 33.90 154.00 154.00 4.54 0 0.00 3.85 154.00 4.54 0
##u E1_SH30 1.00 72.90 154.00 154.00 2.11 0 0.00 3.85 154.00 2.11 0
##u E1_L50 1.00 364.00 154.00 154.00 0.42 0 0.00 3.85 154.00 0.42 0
##u E1_VL70 1.00 938.00 154.00 154.00 0.16 0 0.00 3.85 154.00 0.16 0
##u E1_SHT15_M15 1.00 92.10 154.00 154.00 1.67 0 0.00 3.85 154.00 1.67 0
##u E1_L20_M25 1.00 172.00 154.00 154.00 0.90 0 0.00 3.85 154.00 0.90 0
##u E1_SHT15_TK13 1.00 261.00 154.00 154.00 0.59 0 0.00 3.85 154.00 0.59 0

```

L1 Name

Trigger Name



Daq_Monitor -- L1 Rates

Info from prescale files useful when used in conjunction with daq_monitor

File Options Help

Overview | L1 Trigger | Col/Router | DataLogger | SDAQ | Distributor | DSM | L3 Filter

L1 Trigger Monitor Sun Aug 3 12:48:54 2003 Display Mode natural unit

Spec Trigger | Trig Details | Exp Group | Global | L1 Qualifiers | And/Or Term | Geo Sector | Strip Charts

Specific Trigger Display

Trig#	Trig Name	Fired (Hz)	And/Or Fired (Hz)	Exposed (Hz)	Prescaler Ratio	FE Busy Disable (%)	L3 Disable (%)
0	Afastz_ncu	0.0	760111.179	0.769	1375000	4.658	0.0
1	ALiveBX_ncu	0.577	1711221.908	0.577	3400001	4.658	0.0
2	L1Mu_download	0.0	0.0	0.0	1	4.658	0.0
3	L1CTT_download	0.0	0.0	0.0	1	4.658	0.0
4	CEM(1,3)_ncu	0.577	16067.064	146.764	10958	4.658	0.0
5	CEM(1,6)_ncu	0.385	999.07	397.012	4010	4.658	0.0
6	CEM(1,11)_ncu	0.962	100.022	12659.761	129	4.658	0.0
7	CEM(1,9)_ncu	1.154	210.047	5711.28	287	4.658	0.0
8	IK(2,3)_CEM(2,3)_ncu	0.0	635.142	284.487	6075	4.658	0.0
9	CEM(1,11)_ncu^2	96.945	100.022	1635841.932	1	4.658	0.0
10	CEM(2,6)_ncu	66.553	67.9	1635841.932	1	4.658	0.0
11	CEM(2,3)CEM(1,9)_ncu	113.679	115.988	1635841.932	1	4.658	0.0
12	K(1,10)_CEM(1,9)_ncu	48.088	48.857	1635841.932	1	4.658	0.0
13	CEM(2,3)CEM(1,6)_ncu	77.133	78.287	1635841.932	1	4.658	0.0
14	S(1,10)_CEM(1,6)_ncu	35.393	36.354	1635841.932	1	4.658	0.0
15	CEM(2,3)CEM(1,6)_ncu	159.459	162.921	1635841.932	1	4.658	0.0
16	M(2,3)CEM(1,6)_ncu^2	159.459	162.921	1635841.932	1	4.658	0.0
17	IS(1,5)_CEM(1,6)_ncu	49.819	50.973	1635841.932	1	4.658	0.0
18	CJT(1,5)_ncu	1.154	22636.998	135.223	12243	4.658	0.0
19	CJT(2,3)_ncu	2.501	20822.938	542.045	3024	4.658	0.0
20	CJT(2,5)_ncu	1.346	5760.33	5238.482	311	4.658	0.0
21	CJT(3,5)_ncu	0.192	3473.279	5890.936	277	4.658	0.0
22	CJT(2,5)_ncu^2	10.387	5760.33	52731.245	31	4.658	0.0

L1 Name

Measured L1 Rate



Trigstripmon



- By I.Hall and R.Schwienhorst
- Online monitoring gui
- Part of a collection of tools that are configurable
 - Can plot any quantity in L3MonServer vs time.

- Easy to run. On an online machine type:

```
[toole@d0ol15 ~]$ setup d0online
[toole@d0ol15 ~]$ setup l2monitor_displays
Word too long.
[toole@d0ol15 ~]$ setup l2monitor_displays
[toole@d0ol15 ~]$ trigstripmon
[toole@d0ol15 ~]$ █
```

- Opens 2 GUIs, a manager and a display
- Triggers only available by spec_trig number.
 - spec_trig <--> L1 name map in daq_monitor
 - Ability to select on trigger names in the works



Trigstripmon

1. Click box in upper manager to select chart in display

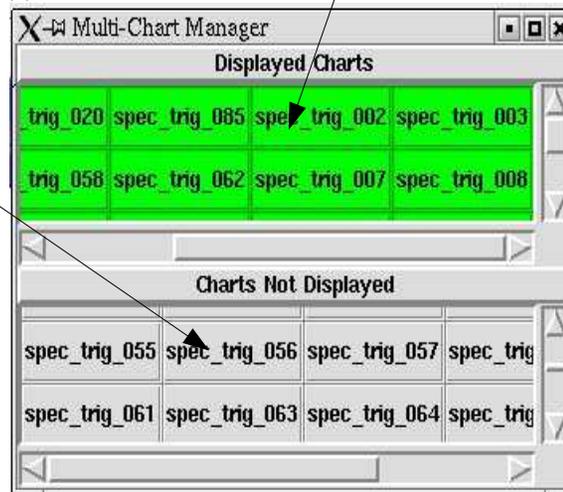
2. Select trigger info to be displayed in that chart by clicking on box in lower window

Plots:

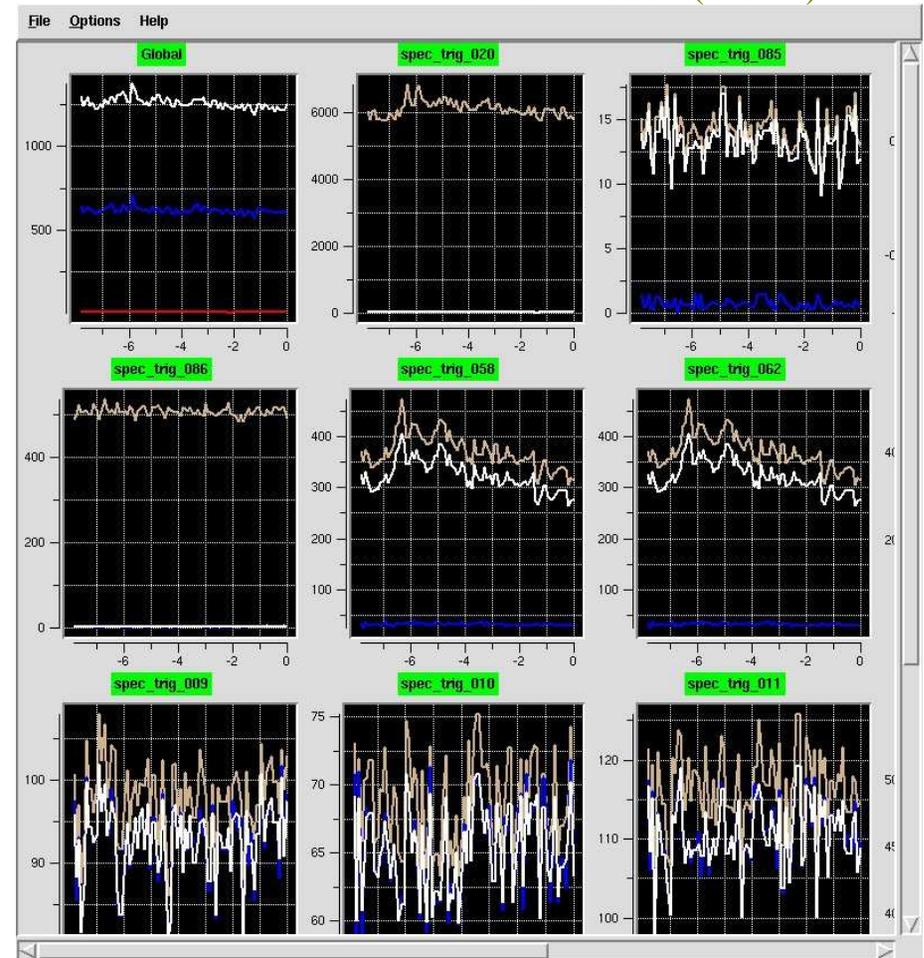
L1 Accept rate (white)

L2 Accept rate (blue)

AOR rate (brown)



Manager



Display

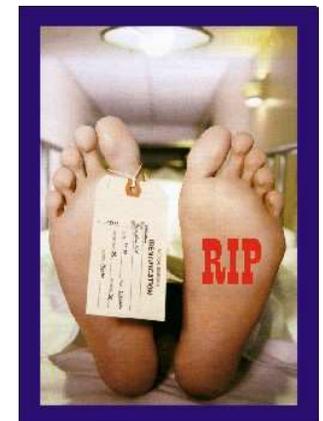


PostMortem Digging up Trigger Info after a run has expired



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T. Toole



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Run DB

- First place to look to determine
 - What trigger list was run
 - Time of run
 - Store number
 - Prescale for each trigger
 - Run Quality ratings
 - Magnet values

<http://d0db.fnal.gov/run/>

Linked from
TriggerMeister homepage



More Info on Run: Luminosity Reports



- Provided by Luminosity ID group

[http://www-d0online.fnal.gov/
www/groups/lum/reports/runs/](http://www-d0online.fnal.gov/www/groups/lum/reports/runs/)

Linked from:

- TriggerMeister homepage
- Lumi ID homepage
- Each global physics run has one
- Available ~15 minutes after run has ended
- Top part of page contains info pertaining to whole run
 - Configuration
 - Time, Duration
 - Lumi
 - Live Fraction
 - Number of events

Run: 178150

Start [2003 JUN 16 15:57:36 CDT \(LBN#2436213\)](#)
 End [2003 JUN 16 19:57:31 CDT \(LBN#2436468\)](#)
 Duration 4.00 hours
 Config [official/global_CMT-11.04 \(Physics\)](#)
 Crate List 10,13-14,16-19,1f-23,30-3b,40-4c,50-53,60-6b
 Store 2692
[Run Comments](#) [Trigger Bit Map](#)

Integrated Luminosity

Type	Amount (nb ⁻¹)	Fraction of Delivered	Comment
Delivered	283.83		
Down	4.79	1.7%	global disables or bad data in this run
Lost in DAQ	0.00	0.0%	including all concurrent runs
Recorded	265.89	93.7%	including concurrent normalizable runs

Live Fraction by Exposure Group

Fraction	Normalizable	Unnormalizable	Comments
Live	94%	51% / 50% / 46%	
Decorrelated Dead	2%	2% / 3% / 3%	L2/L3/COOR disables
Correlated Dead	4%	48% / 48% / 53%	FEB, SkipNextN

Events

Lost in DAQ	0.00%	
Rate to Tape	40.0 Hz	
Stream	Events	Files
TOTAL	578880	235
all	578880	235
monitor	0	0

Transitions

SCL inits	6
Pauses	3 (0.06 hours)



Lumi Reports II

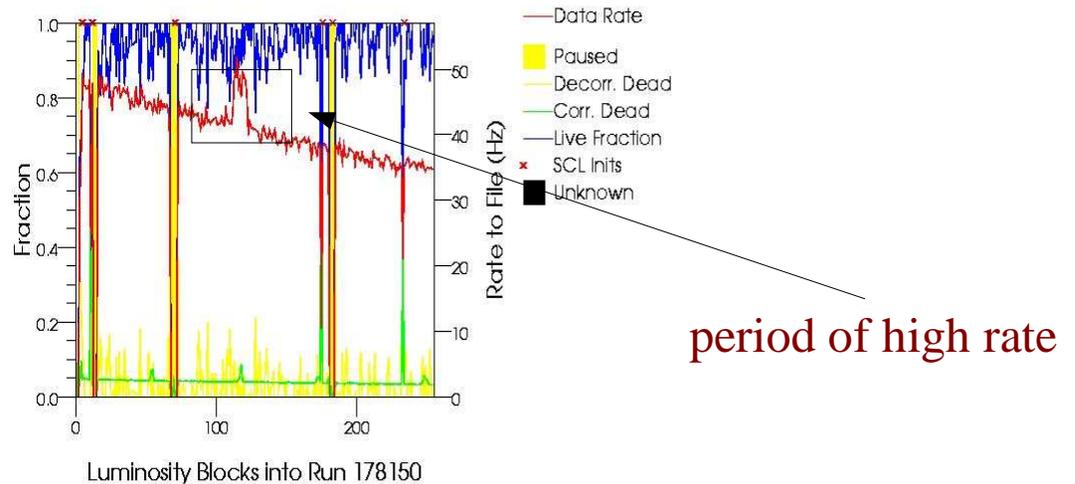
Further down in Report



- Plot of rate to tape vs lbn (time)
- List of normalizable triggers in this run

- L1 XS
- L2 XS
- L3 XS
- # of events
(really high number could indicate problem)
- Plot of XS vs lbn

- For quick debugging: I copy directory of pics to another machine and use gthumb (linux)
- `/luminosity/data/www/runs/178k/plots/178150`

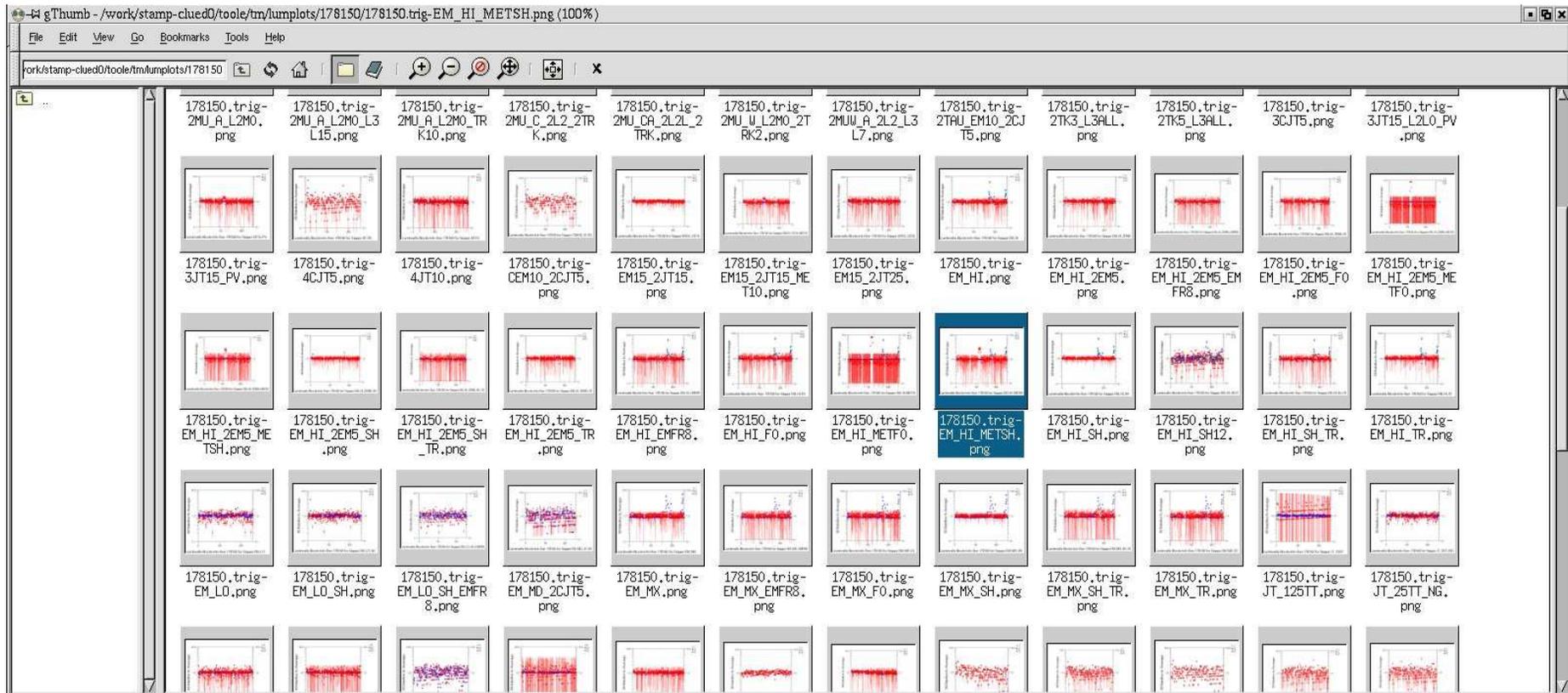


Normalizable Triggers

Trigger	L1 Name	Status	L1 XS (nb)	L2 XS (nb)	L2 Rejection	L3 XS (nb)	L3 Rejection	Events all	Graph
min_bias_NCU	Afastz_ncu	Status	$(3.38 \pm 0.51) \times 10^7$	$(3.38 \pm 0.51) \times 10^7$	1.00±0.00	$(3.38 \pm 0.51) \times 10^7$	1.00±0.00	8167	XS plot
zero_bias_NCU	ALiveBX_ncu	Status	$(8.81 \pm 1.34) \times 10^7$	$(8.81 \pm 1.35) \times 10^7$	1.00±0.00	$(8.81 \pm 1.34) \times 10^7$	1.00±0.00	6897	XS plot
EM_LO_SH_EMFR8	CEM(1.5)_ncu	Status	$(8.09 \pm 1.70) \times 10^4$	$(8.09 \pm 1.70) \times 10^4$	1.00±0.00	$(2.07 \pm 0.85) \times 10^4$	3.90±0.02	1311	XS plot
2EM_2MD7	CEM(2.5)_ncu	Status	$(5.53 \pm 0.16) \times 10^3$	$(3.43 \pm 0.11) \times 10^3$	1.61±0.02	$(3.11 \pm 0.20) \times 10^2$	$(1.10 \pm 0.06) \times 10^1$	82638	XS plot
EM_LO	CEM(1.5)_ncu^2	Status	$(8.03 \pm 0.71) \times 10^4$	$(8.03 \pm 0.72) \times 10^4$	1.00±0.00	$(6.18 \pm 1.99) \times 10^3$	$(1.30 \pm 0.02) \times 10^1$	2340	XS plot
EM_LO_SH	CEM(1.5)_ncu^2	Status	$(8.03 \pm 0.71) \times 10^4$	$(8.03 \pm 0.72) \times 10^4$	1.00±0.00	$(7.65 \pm 1.99) \times 10^3$	$(1.05 \pm 0.01) \times 10^1$	2898	XS plot
2EM_2MD12	CEM(2.5)_ncu^2	Status	$(5.53 \pm 0.16) \times 10^3$	$(3.43 \pm 0.11) \times 10^3$	1.61±0.02	$(5.05 \pm 0.74) \times 10^1$	$(6.79 \pm 0.95) \times 10^1$	13429	XS plot
EM_HI_2EM5_EMFR8	CEM(2.5)_ncu^3	Status	$(5.53 \pm 0.16) \times 10^3$	$(2.80 \pm 0.09) \times 10^3$	1.97±0.03	$(4.13 \pm 0.63) \times 10^1$	$(6.78 \pm 1.05) \times 10^1$	10988	XS plot
EM_HI_2EM5	CEM(2.5)_ncu^3	Status	$(5.53 \pm 0.16) \times 10^3$	$(2.80 \pm 0.09) \times 10^3$	1.97±0.03	$(7.43 \pm 0.84) \times 10^1$	$(3.77 \pm 0.43) \times 10^1$	19768	XS plot
EM_HI_2EM5_SH	CEM(2.5)_ncu^3	Status	$(5.53 \pm 0.16) \times 10^3$	$(2.80 \pm 0.09) \times 10^3$	1.97±0.03	$(1.26 \pm 0.10) \times 10^2$	$(2.22 \pm 0.19) \times 10^1$	33625	XS plot
EM_HI_2EM5_SH_TR	CEM(2.5)_ncu^3	Status	$(5.53 \pm 0.16) \times 10^3$	$(2.80 \pm 0.09) \times 10^3$	1.97±0.03	$(3.39 \pm 0.57) \times 10^1$	$(8.27 \pm 1.41) \times 10^1$	9011	XS plot
EM_HI_2EM5_TR	CEM(2.5)_ncu^3	Status	$(5.53 \pm 0.16) \times 10^3$	$(2.80 \pm 0.09) \times 10^3$	1.97±0.03	$(8.04 \pm 0.92) \times 10^1$	$(3.49 \pm 0.38) \times 10^1$	21374	XS plot
EM_HI_2EM5_F0	CEM(2.5)_ncu^3	Status	$(5.53 \pm 0.16) \times 10^3$	$(2.80 \pm 0.09) \times 10^3$	1.97±0.03	$(5.00 \pm 0.67) \times 10^1$	$(5.61 \pm 0.79) \times 10^1$	13292	XS plot
EM_HI_METF0	CEM(1.10)_ncu	Status	$(5.79 \pm 0.77) \times 10^3$	$(4.74 \pm 0.74) \times 10^3$	1.22±0.01	$(5.76 \pm 8.21) \times 10^1$	$(8.23 \pm 1.08) \times 10^1$	15326	XS plot
EM_HI_METSH	CEM(1.10)_ncu	Status	$(5.79 \pm 0.77) \times 10^3$	$(4.74 \pm 0.74) \times 10^3$	1.22±0.01	$(8.13 \pm 2.97) \times 10^1$	$(5.83 \pm 0.64) \times 10^1$	21625	XS plot
EM_HI_2EM5_METF0	CEM(2.5)_ncu^4	Status	$(5.53 \pm 0.16) \times 10^3$	$(2.80 \pm 0.09) \times 10^3$	1.97±0.03	$(4.43 \pm 6.78) \times 10^1$	$(6.33 \pm 0.94) \times 10^1$	11771	XS plot

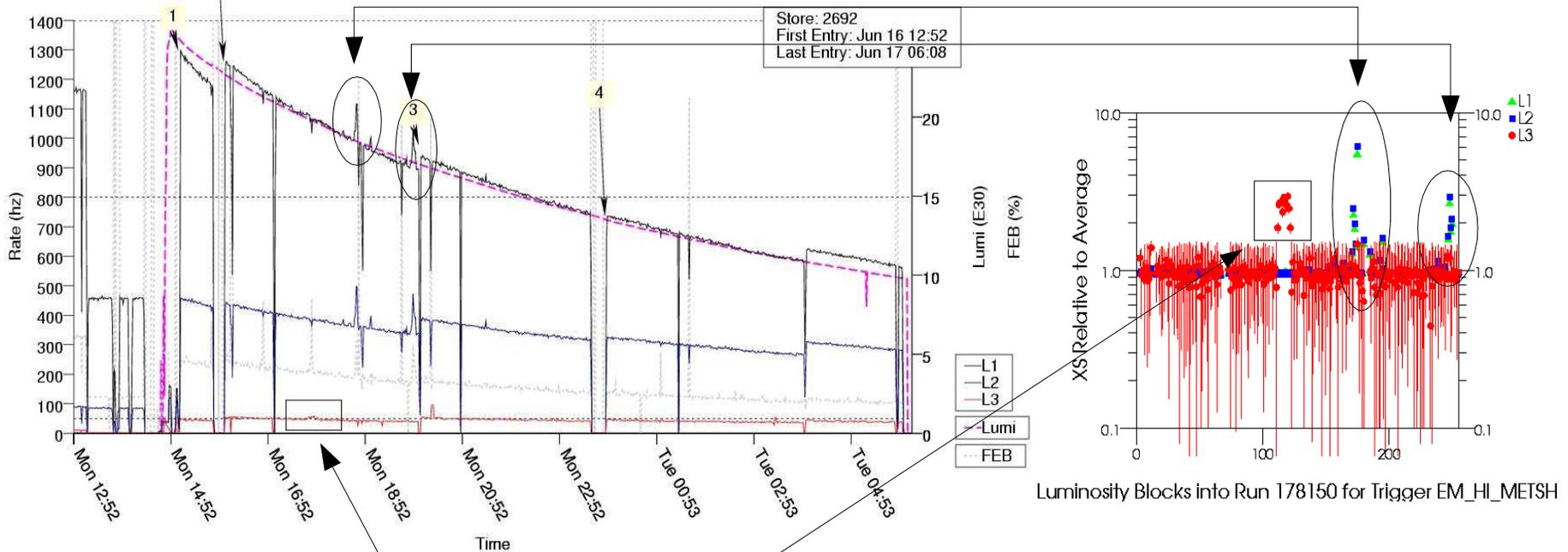


gthumb snapshot of Run 178150 Triggers

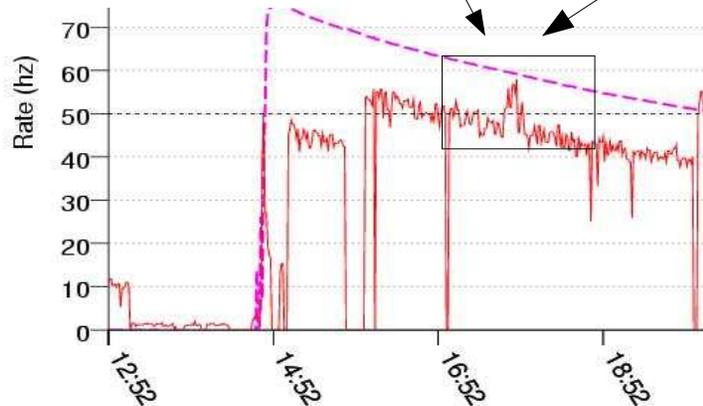




Tying Peak in Rate Plot to a Trigger



Run	Duration	inL	Live	scl/hr	pause	<Tape Rate>	Prescale_File	
1	178148	0.84 h	25.3	68%	6.0	0.09 h	31.8 hz	25E30
2	178150	4.00 h	23.0	94%	1.5	0.06 h	40.0 hz	20E30
3	178151	3.68 h	17.1	90%	1.4	0.13 h	38.8 hz	15E30
4	178152	4.11 h	13.6	97%	0.2	0.00 h	35.6 hz	13E30



Hot Cal Tower?
Hot Cal Cells?



What is a Normal Rate for a Trigger?



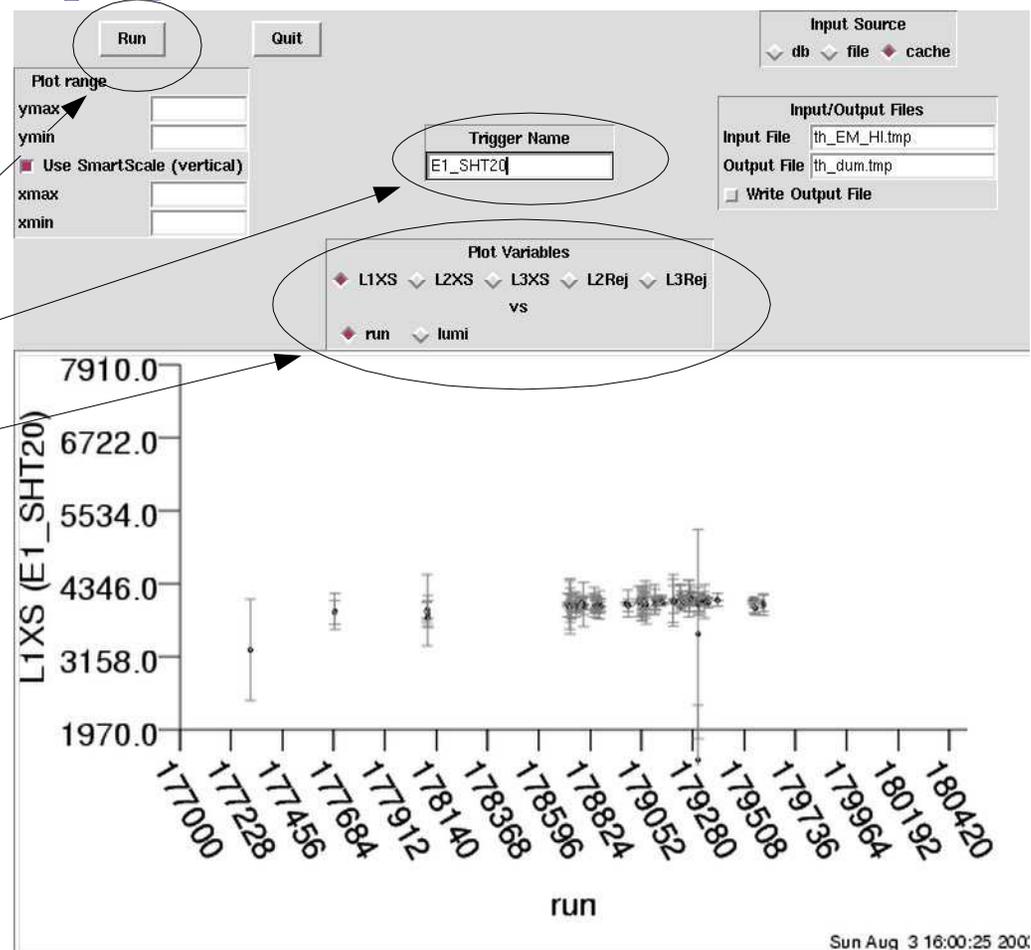
- Could look at XS vs run number for a trigger
- Use *THIS* in TMtools package
 - Newer, but usable --> Work in progress

- To run on clued0:

```
toole@stamp-clued0:> mkdir test
toole@stamp-clued0:> cd test
toole@stamp-clued0:> setup d0cvs
toole@stamp-clued0:> cvs co TMtools
toole@stamp-clued0:> setup DORunII
toole@stamp-clued0:> cd TMtools/py/trig_history/
toole@stamp-clued0:> ./this &
```

- Type in trigger name
- Select plot variables
- Click *Run*

- *THIS* plots XS values from lumi reports
- Note: *THIS* is slow





XS vs Run webpage

- Newer, but usable --> Work in progress
- **THIS** is run for all triggers in list, output is posted on a website:

	Pages with Plots	Pages with Links to plots (loads faster)
General:	Most Triggers in global_CMT-12.10	Most Triggers in global_CMT-12.10
	Most Triggers in global_CMT-11.04	Most Triggers in global_CMT-11.04
Groupings for Physics Groups:	WZ Electron Triggers (12.10)	WZ Electron Triggers (12.10)
	Top Triggers (12.10)	Top Triggers (12.10)
	WZ Electron Triggers (11.04)	WZ Electron Triggers (11.04)
	WZ Muon Trigger (11.04)	WZ Muon Trigger
	Top Triggers (11.04)	Top Triggers (11.04)
Groupings for Detector Groups:		

Subsets of plots based on interests



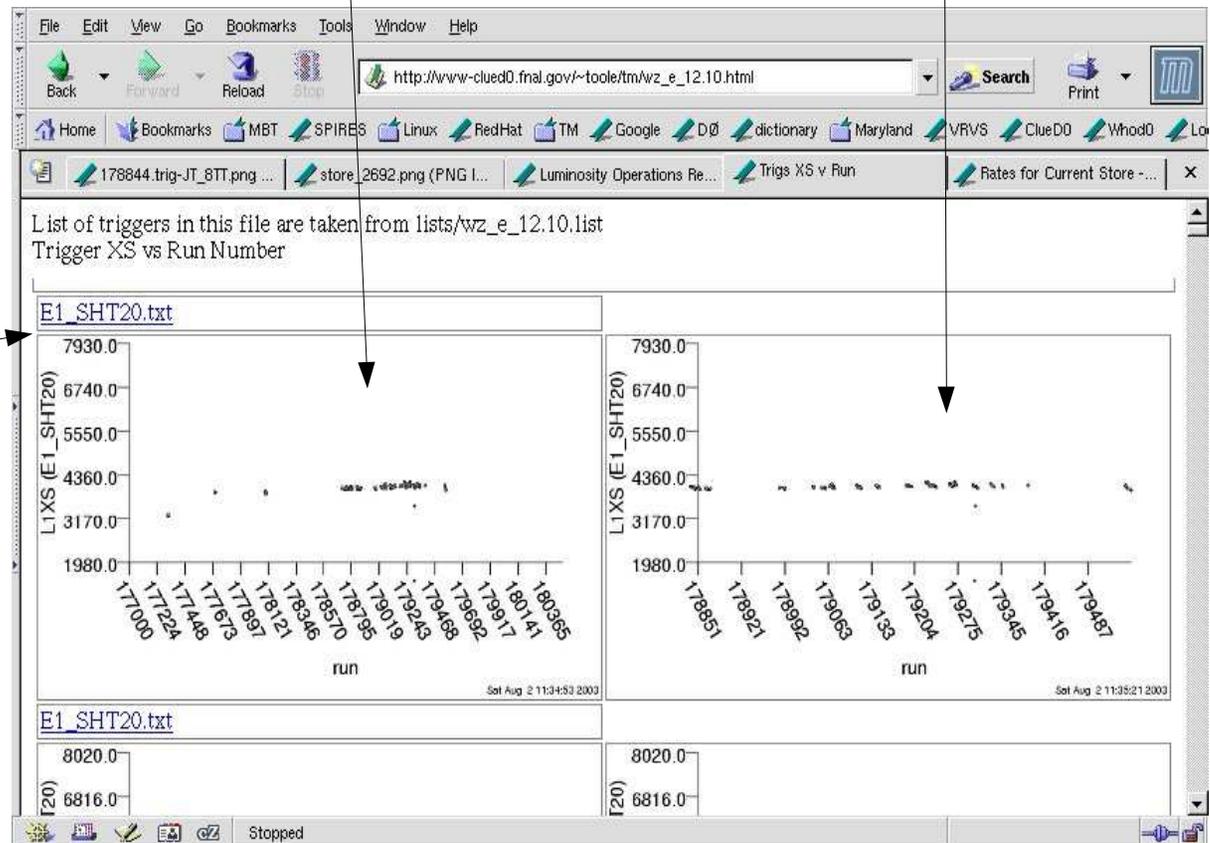
XS vs Run Webpage

• For each trigger, plot of

- L1XS vs. Run
- L2XS vs. Run
- L3XS vs. Run
- text file of data

Plot of all runs

Plot of last 100 runs





More Run-based Info on a Trigger

- GetRuns.py script (E. Gallas)
 - For a given trigger, returns:
 - List of runs
 - run number
 - start time,
 - duration of run
 - store number
 - Trigger list
 - other things
 - To run, type:

```
toole@stamp-clued0:> mkdir test
toole@stamp-clued0:> cd test
toole@stamp-clued0:> setup d0cvs
toole@stamp-clued0:> cvs co TMtools
toole@stamp-clued0:> setup D0RunII
toole@stamp-clued0:> cd TMtools/py/GetX
toole@stamp-clued0:> ./GetRuns.py -tnname E1_SHT20 -file
█
```

Typing GetRuns.py w/o any arguments returns a help file



GetRuns Output

```
#####
## TASK: finding all Runs that use Trigger Lists containing this Trigger Name ...
#####
```

Results: These 141 Official Runs contained triggers with Trigger Name/Version = E1_SHT20 / 0

RUN_NUMBER	START_TIME	DURATION	STORE	PRESNAME	RECORDING	TRIG_CONFIG (NAME) (VERS)	TL (NAME)-(VERSION)	TN (NAME)-(VERSION)	BIT (NUM)(NAME)	L2_BIT (NUM)(NAME)	L1_BIT (NUM)(NAME)	L1_PRESCALE	EG_NUM
177314	2003-MAY-26 23:48	.12	2614	10E30	1	official/special/global_CMT_test-12,00	global_CMT_test-12,00	E1_SHT20 / 1	8 E1_SHT20	8 9^E1_SHT20	8 CEM(1,11)_ncu^2	1	
177689	2003-JUN-02 21:05	.26	2636	10E30	1	official/special/global_CMT_test-12,01	global_CMT_test-12,01	E1_SHT20 / 1	10 E1_SHT20	9 11^E1_SHT20	9 CEM(1,11)_ncu^2	1	
177690	2003-JUN-02 21:23	.10	2636	10E30	1	official/special/global_CMT_test-12,01	global_CMT_test-12,01	E1_SHT20 / 1	10 E1_SHT20	9 11^E1_SHT20	9 CEM(1,11)_ncu^2	1	
178098	2003-JUN-14 12:57	.51	2684	25E30	1	official/global_CMT-12,10	global_CMT-12,10	E1_SHT20 / 1	13 E1_SHT20	9 13^E1_ELE_MP	9 CEM(1,11)_ncu^2	1	0
178099	2003-JUN-14 13:33	.01	2684	28E30	1	official/global_CMT-12,10	global_CMT-12,10	E1_SHT20 / 1	13 E1_SHT20	9 13^E1_ELE_MP	9 CEM(1,11)_ncu^2	1	0
178100	2003-JUN-14 13:38	.04	2684	28E30	1	official/global_CMT-12,10	global_CMT-12,10	E1_SHT20 / 1	13 E1_SHT20	9 13^E1_ELE_MP	9 CEM(1,11)_ncu^2	1	0
178101	2003-JUN-14 13:43	.06	2684	28E30	1	official/global_CMT-12,10	global_CMT-12,10	E1_SHT20 / 1	13 E1_SHT20	9 13^E1_ELE_MP	9 CEM(1,11)_ncu^2	1	0
178102	2003-JUN-14 13:50	.13	2684	28E30	1	official/global_CMT-12,10	global_CMT-12,10	E1_SHT20 / 1	13 E1_SHT20	9 13^E1_ELE_MP	9 CEM(1,11)_ncu^2	1	0
178103	2003-JUN-14 14:02	1.70	2684	28E30	1	official/global_CMT-12,10	global_CMT-12,10	E1_SHT20 / 1	13 E1_SHT20	9 13^E1_ELE_MP	9 CEM(1,11)_ncu^2	1	0
178722	2003-JUL-07 19:07	2.92	2768	25E30	1	official/global_CMT-12,10	global_CMT-12,10	E1_SHT20 / 1	13 E1_SHT20	9 13^E1_ELE_MP	9 CEM(1,11)_ncu^2	1	0
178723	2003-JUL-07 22:02	4.00	2768	20E30	1	official/global_CMT-12,10	global_CMT-12,10	E1_SHT20 / 1	13 E1_SHT20	9 13^E1_ELE_MP	9 CEM(1,11)_ncu^2	1	0
178724	2003-JUL-08 02:03	2.28	2768	17E30	1	official/global_CMT-12,10	global_CMT-12,10	E1_SHT20 / 1	13 E1_SHT20	9 13^E1_ELE_MP	9 CEM(1,11)_ncu^2	1	0
178733	2003-JUL-08 11:10	3.61	2770	30E30	1	official/global_CMT-12,10	global_CMT-12,10	E1_SHT20 / 1	13 E1_SHT20	9 13^E1_ELE_MP	9 CEM(1,11)_ncu^2	1	0
178734	2003-JUL-08 14:48	1.20	2770	30E30	1	official/global_CMT-12,10	global_CMT-12,10	E1_SHT20 / 1	13 E1_SHT20	9 13^E1_ELE_MP	9 CEM(1,11)_ncu^2	1	0
178735	2003-JUL-08 16:01	1.50	2770	20E30	1	official/global_CMT-12,10	global_CMT-12,10	E1_SHT20 / 1	13 E1_SHT20	9 13^E1_ELE_MP	9 CEM(1,11)_ncu^2	1	0
178736	2003-JUL-08 17:32	3.99	2770	20E30	1	official/global_CMT-12,10	global_CMT-12,10	E1_SHT20 / 1	13 E1_SHT20	9 13^E1_ELE_MP	9 CEM(1,11)_ncu^2	1	0
178737	2003-JUL-08 21:32	3.93	2770	17E30	1	official/global_CMT-12,10	global_CMT-12,10	E1_SHT20 / 1	13 E1_SHT20	9 13^E1_ELE_MP	9 CEM(1,11)_ncu^2	1	0
178738	2003-JUL-09 01:29	3.86	2770	13E30	1	official/global_CMT-12,10	global_CMT-12,10	E1_SHT20 / 1	13 E1_SHT20	9 13^E1_ELE_MP	9 CEM(1,11)_ncu^2	1	0
178742	2003-JUL-09 06:32	.48	2770	13E30	1	official/global_CMT-12,10	global_CMT-12,10	E1_SHT20 / 1	13 E1_SHT20	9 13^E1_ELE_MP	9 CEM(1,11)_ncu^2	1	0
178760	2003-JUL-09 12:07	2.44	2772	30E30	1	official/global_CMT-12,10	global_CMT-12,10	E1_SHT20 / 1	13 E1_SHT20	9 13^E1_ELE_MP	9 CEM(1,11)_ncu^2	1	0
178761	2003-JUL-09 14:40	4.27	2772	25E30	1	official/global_CMT-12,10	global_CMT-12,10	E1_SHT20 / 1	13 E1_SHT20	9 13^E1_ELE_MP	9 CEM(1,11)_ncu^2	1	0
178762	2003-JUL-09 18:58	3.95	2772	25E30	1	official/global_CMT-12,10	global_CMT-12,10	E1_SHT20 / 1	13 E1_SHT20	9 13^E1_ELE_MP	9 CEM(1,11)_ncu^2	1	0
178763	2003-JUL-09 22:56	4.01	2772	17E30	1	official/global_CMT-12,10	global_CMT-12,10	E1_SHT20 / 1	13 E1_SHT20	9 13^E1_ELE_MP	9 CEM(1,11)_ncu^2	1	0
178764	2003-JUL-10 02:57	.84	2772	13E30	1	official/global_CMT-12,10	global_CMT-12,10	E1_SHT20 / 1	13 E1_SHT20	9 13^E1_ELE_MP	9 CEM(1,11)_ncu^2	1	0
178765	2003-JUL-10 04:04	3.87	2772	13E30	1	official/global_CMT-12,10	global_CMT-12,10	E1_SHT20 / 1	13 E1_SHT20	9 13^E1_ELE_MP	9 CEM(1,11)_ncu^2	1	0
178788	2003-JUL-10 20:39	3.48	2774	35E30	1	official/global_CMT-12,10	global_CMT-12,10	E1_SHT20 / 1	13 E1_SHT20	9 13^E1_ELE_MP	9 CEM(1,11)_ncu^2	1	0
178789	2003-JUL-11 00:08	4.01	2774	25E30	1	official/global_CMT-12,10	global_CMT-12,10	E1_SHT20 / 1	13 E1_SHT20	9 13^E1_ELE_MP	9 CEM(1,11)_ncu^2	1	0
178790	2003-JUL-11 04:10	4.14	2774	20E30	1	official/global_CMT-12,10	global_CMT-12,10	E1_SHT20 / 1	13 E1_SHT20	9 13^E1_ELE_MP	9 CEM(1,11)_ncu^2	1	0
178791	2003-JUL-11 08:19	4.29	2774	17E30	1	official/global_CMT-12,10	global_CMT-12,10	E1_SHT20 / 1	13 E1_SHT20	9 13^E1_ELE_MP	9 CEM(1,11)_ncu^2	1	0
178795	2003-JUL-11 12:45	1.39	2774	13E30	1	official/global_CMT-12,10	global_CMT-12,10	E1_SHT20 / 1	13 E1_SHT20	9 13^E1_ELE_MP	9 CEM(1,11)_ncu^2	1	0
178796	2003-JUL-11 14:13	3.42	2774	13E30	1	official/global_CMT-12,10	global_CMT-12,10	E1_SHT20 / 1	13 E1_SHT20	9 13^E1_ELE_MP	9 CEM(1,11)_ncu^2	1	0
178797	2003-JUL-11 17:42	.21	2774	13E30	1	official/global_CMT-12,10	global_CMT-12,10	E1_SHT20 / 1	13 E1_SHT20	9 13^E1_ELE_MP	9 CEM(1,11)_ncu^2	1	0
178840	2003-JUL-12 01:44	4.14	2780	35E30	1	official/global_CMT-12,10	global_CMT-12,10	E1_SHT20 / 1	13 E1_SHT20	9 13^E1_ELE_MP	9 CEM(1,11)_ncu^2	1	0
178841	2003-JUL-12 06:00	2.98	2780	25E30	1	official/global_CMT-12,10	global_CMT-12,10	E1_SHT20 / 1	13 E1_SHT20	9 13^E1_ELE_MP	9 CEM(1,11)_ncu^2	1	0
178842	2003-JUL-12 09:07	2.43	2780	20E30	1	official/global_CMT-12,10	global_CMT-12,10	E1_SHT20 / 1	13 E1_SHT20	9 13^E1_ELE_MP	9 CEM(1,11)_ncu^2	1	0
178843	2003-JUL-12 11:37	3.80	2780	20E30	1	official/global_CMT-12,10	global_CMT-12,10	E1_SHT20 / 1	13 E1_SHT20	9 13^E1_ELE_MP	9 CEM(1,11)_ncu^2	1	0



Some of the things available for monitoring, debugging, reviewing the performance of a trigger list

During the Run:

- Daq Rate plots
- Daq monitor
- Prescale files
- LmTrigger/lmExpert
- Trigstripmon

After the Run:

- RunDB, scripts
- Luminosity reports, and trigger plots
- XS vs run number plots