Monitoring of the DAQ2 system

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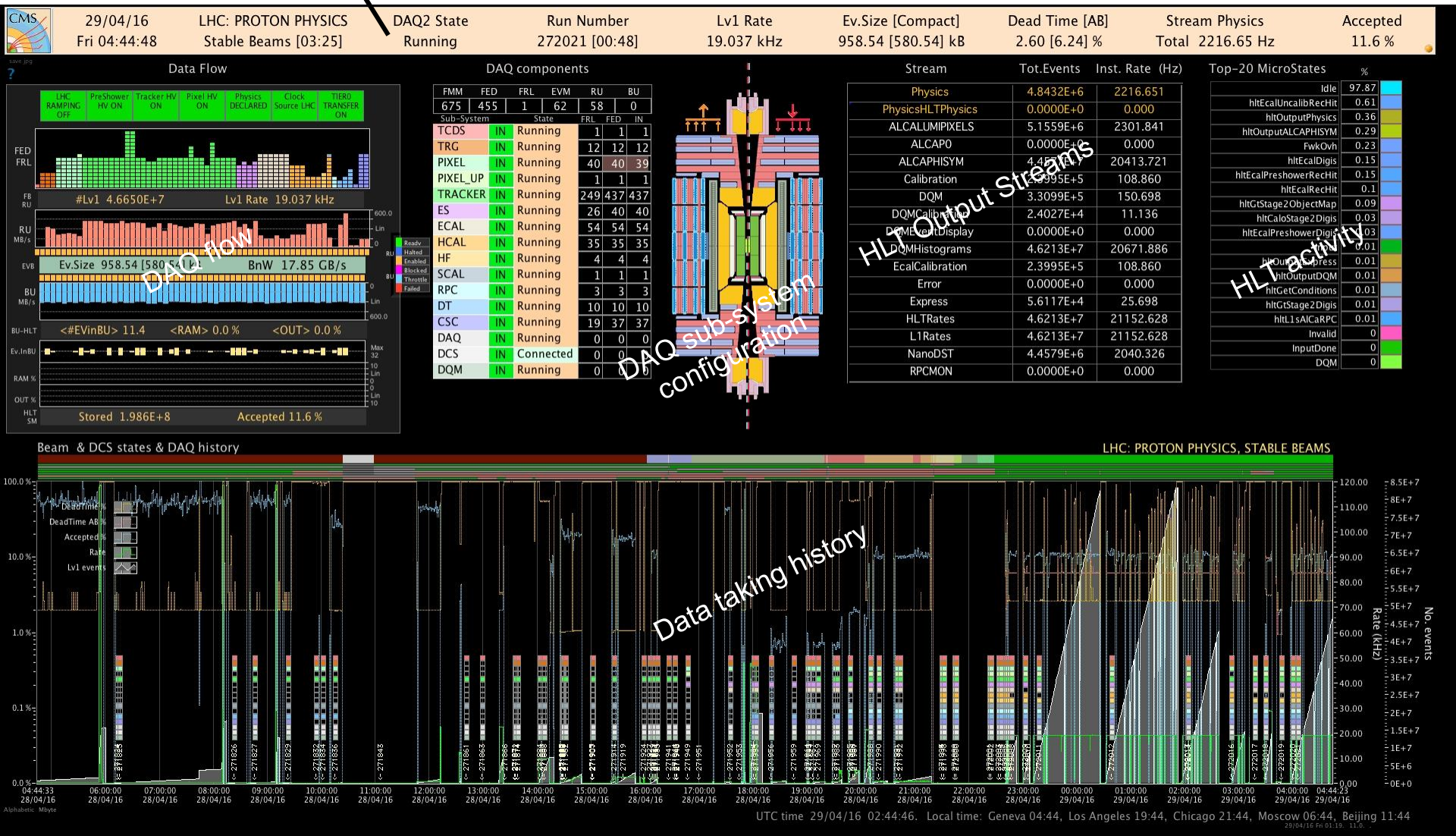
Monitoring tools

- RCMS/LVL0 interface
  - Has been covered by Hannes
- aDAQMon
  - Overview screen to see at a glance the CMS running configuration and rates.
- DAQView
  - Most comprehensive monitoring tool for issues with data flow. Here you can monitor the data from FEDs to BUs.
- DAQ Expert application
  - automatic detection of error conditions and displaying of instructions how to get the run going again
  - replacement of the DAQ doctor
- Elastic Search / Filter Farm monitoring (HLT, File Merging & Transfers)
  - Shows state of HLT processing. Important monitor of file-based filter farm (FFF).
- CPM controller
  - Central Partition Manager for the TCDS system. Good place to see rates, state of detector inputs, etc.
- HotSpot
  - Central display for sentinel messages for errors from all processes.
- Handsaw
  - Scrolling display of error messages

aDAQmon – DAQ Status Display

Status bar gives a quick overview of the DAQ

http://cmsonline.cern.ch/daqStatusSCX/DAQstatusGre.html



Main systems (LHC, DCS,...) status

FED-RU data stream

DAQ Sub-Sys configuration

Box color: Sub-Sys ID

FED IN

FED OUT

FED RU configuration

RU bandwidth plot

BU bandwidth plot

Ev. in BU

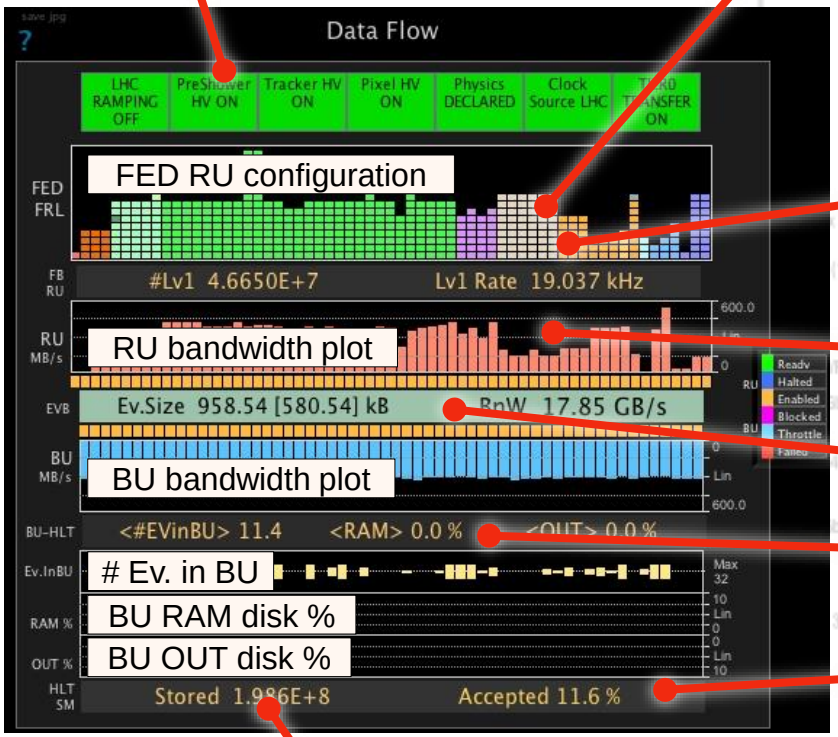
BU RAM disk %

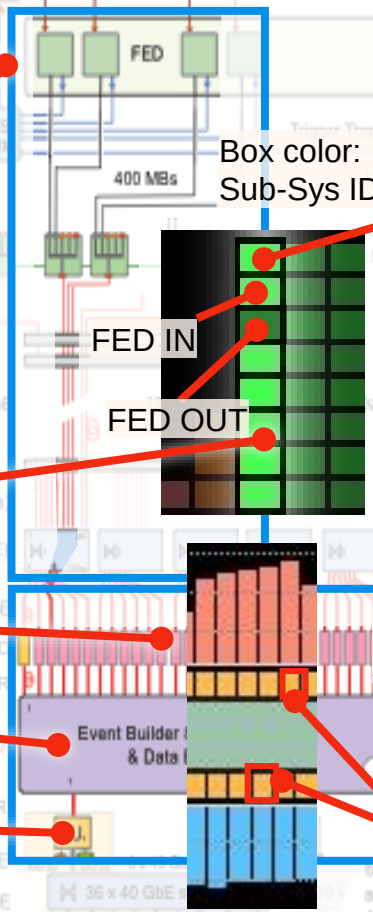
BU OUT disk %

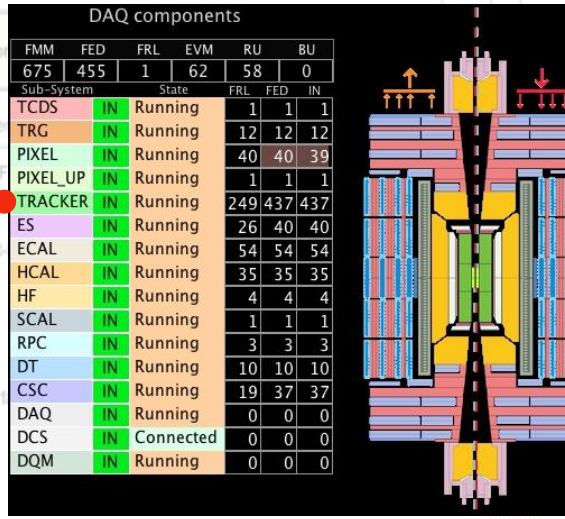
RU/BU box color: Application state

RU/BU box RED frame: flash data not updated

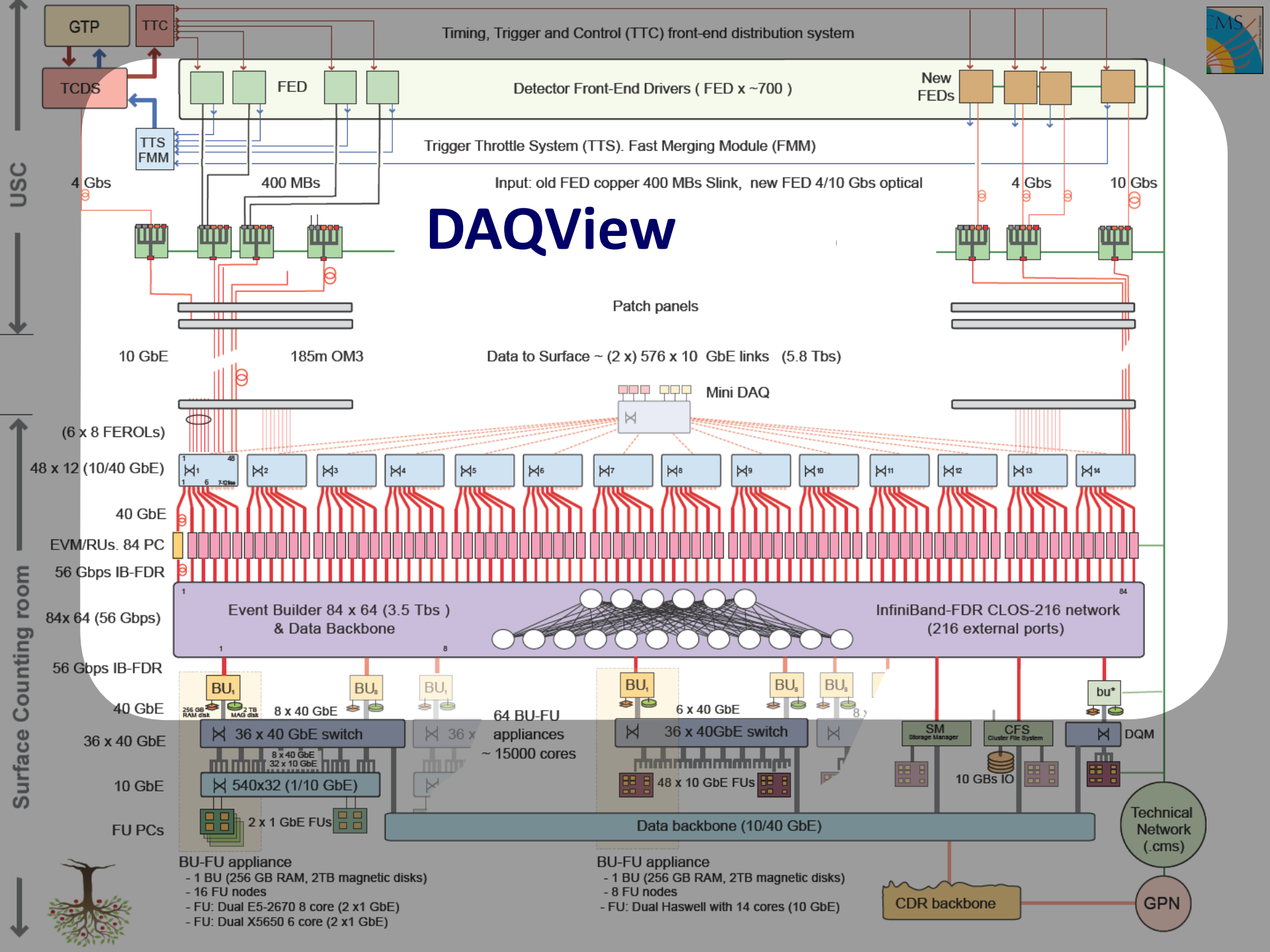
Event storage summary





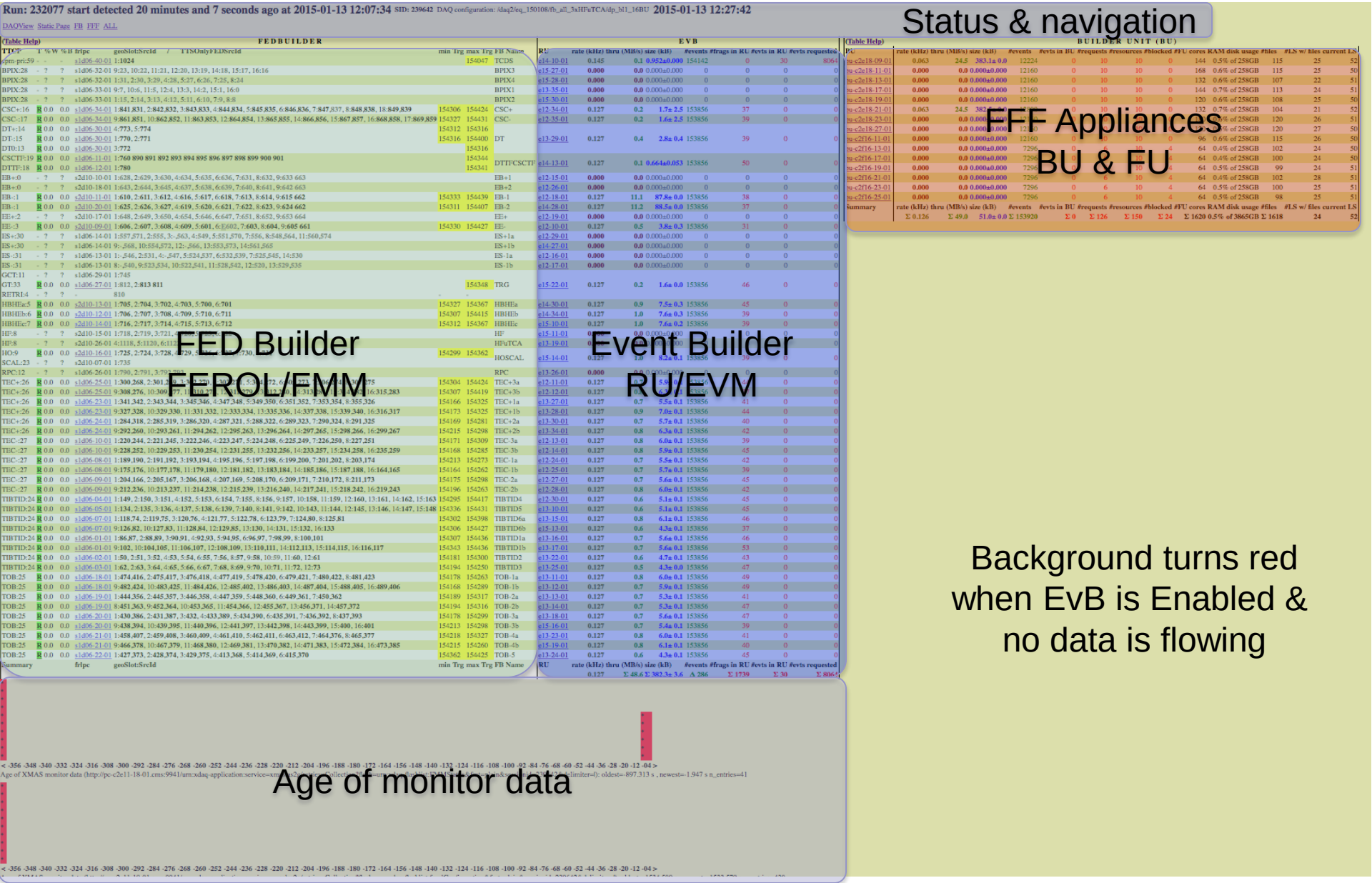


Stream	Tot.Events	Inst. Rate (Hz)
Physics	4.8432E+6	2216.651
PhysicsHLTPhysics	0.0000E+0	0.000
ALCALUMIPIXELS	5.1559E+6	2301.841
ALCAP0	0.0000E+0	0.000
ALCAPHISYM	4.4577E+7	20413.721
Calibration	2.3995E+5	108.860
DQM	3.3099E+5	150.698
DQMCalibration	2.4027E+4	11.136


GTP
TTC
Timing, Trigger and Control (TTC) front-end distribution system
TCDS
FED
Detector Front-End Drivers (FED x ~700)
New FEDs
TTS FMM
Trigger Throttle System (TTS). Fast Merging Module (FMM)
4 Gbs
400 MBs
Input: old FED copper 400 MBs Slink, new FED 4/10 Gbs optical
4 Gbs
10 Gbs
DAQView
Patch panels
10 GbE
185m OM3
Data to Surface ~ (2 x) 576 x 10 GbE links (5.8 Tbs)
Mini DAQ
(6 x 8 FEROLs)
48 x 12 (10/40 GbE)
40 GbE
EVM/RUs. 84 PC
56 Gbps IB-FDR
Event Builder 84 x 64 (3.5 Tbs) & Data Backbone
InfiniBand-FDR CLOS-216 network (216 external ports)
84x 64 (56 Gbps)
56 Gbps IB-FDR
40 GbE
8 x 40 GbE
64 BU-FU appliances ~ 15000 cores
6 x 40 GbE
36 x 40 GbE
36 x 40 GbE switch
36 x 40GbE switch
8 x 40 GbE 32 x 10 GbE
10 GbE
540x32 (1/10 GbE)
48 x 10 GbE FUs
FU PCs
2 x 1 GbE FUs
Data backbone (10/40 GbE)
SM Storage Manager
CFS Cluster File System
10 GBs IO
DQM
Technical Network (.cms)
GPN
CDR backbone
BU-FU appliance
- 1 BU (256 GB RAM, 2TB magnetic disks)
- 16 FU nodes
- FU: Dual E5-2670 8 core (2 x1 GbE)
- FU: Dual X5650 6 core (2 x1 GbE)
BU-FU appliance
- 1 BU (256 GB RAM, 2TB magnetic disks)
- 8 FU nodes
- FU: Dual Haswell with 14 cores (10 GbE)
USC
Surface Counting room

DAQView

http://cmsdaqweb.cms/local/daqview/cdaq/DAQ.html



Background turns red when EvB is Enabled & no data is flowing

DAQView - Navigation

Current run

Duration and start time of run
(or last restart of DAQView)

Run: 232077 start detected 43 minutes and 37 seconds ago at 2015-01-13 12:07:34

DAQView Static Page FB FFF ALL

2015-01-13 12:51:12

Stop refreshing page

Switch pages between
FEDbuilder, FFF, and all

Last update of page must be current!
If it is stale, you need to restart DAQView

Welcome to CMS DAQ2 View

setup	remark	status (pid)	action	link
cdaq	Reserved for running Public Global Run from toppro	running (29275)	stop	fb, fff, all
daqdev	configurations from daqdev tomcat	running (29215)	stop	fb, fff, all
daqpro	configurations from daqpro tomcat	stopped (0)	start	fb, fff, all
daqdev_daqval	daqval configs running from daqvaldev tomcat	stopped (0)	start	fb, fff, all
dt	Setup for DT miniDAQ	stopped (0)	start	fb, fff, all

You only need cDAQ
Start DAQView if it is not running

DAQView – FED builder

Confused? Try the table help button!

%warning, %busy in TTS partition

FED builder name

(Table Help)	TTS					FEDBUILDER			
TTCP	P	A	F	%W	%B	frlpc	geoSlot:SrcId / TTSOnlyFEDSrcId	min Trg	max Trg	FB Name
CPM-PRI:59	-	-	-	-	-	s1d06-40-01	1:**1024**		14954825	TCDS
HO:9	-	x	-	-	-	s2d10-16-01	1:**725**, 2:**724**, 3:**728**, 4:**729**, 5:**726**, 6:**727**, 7:**730**, 8:**731**			HOSCAL
SCAL:23	R	x	R	0.0	0.0	s2d10-07-01	1:**735**		14955454	
MUTFUP:67	R	x	x	x	x	s1d06-35-01	1:**1384**, 2:**1385**, 6:**1380**, 7:**1381**			EMTFOMTF
MUTFUP:67	R	x	x	x	x	s1d06-36-01	10:**1376**, 11:**1377**	14956312	14956325	BMTF
GTUP:65	R	x	x	x	x	s1d06-36-01	13:**1404**		14955558	GMTGT
MUTFUP:67	R	x	x	x	x	s1d06-36-01	12:**1402**		14956293	

TTC partition name & no.

Current TTS state of partition

P: TTS state from TCDS
F: TTS state from FMM
A: APVE emulator TTS state

FEROL PC
(link to hyperdaq page)

FED information
(see next page)

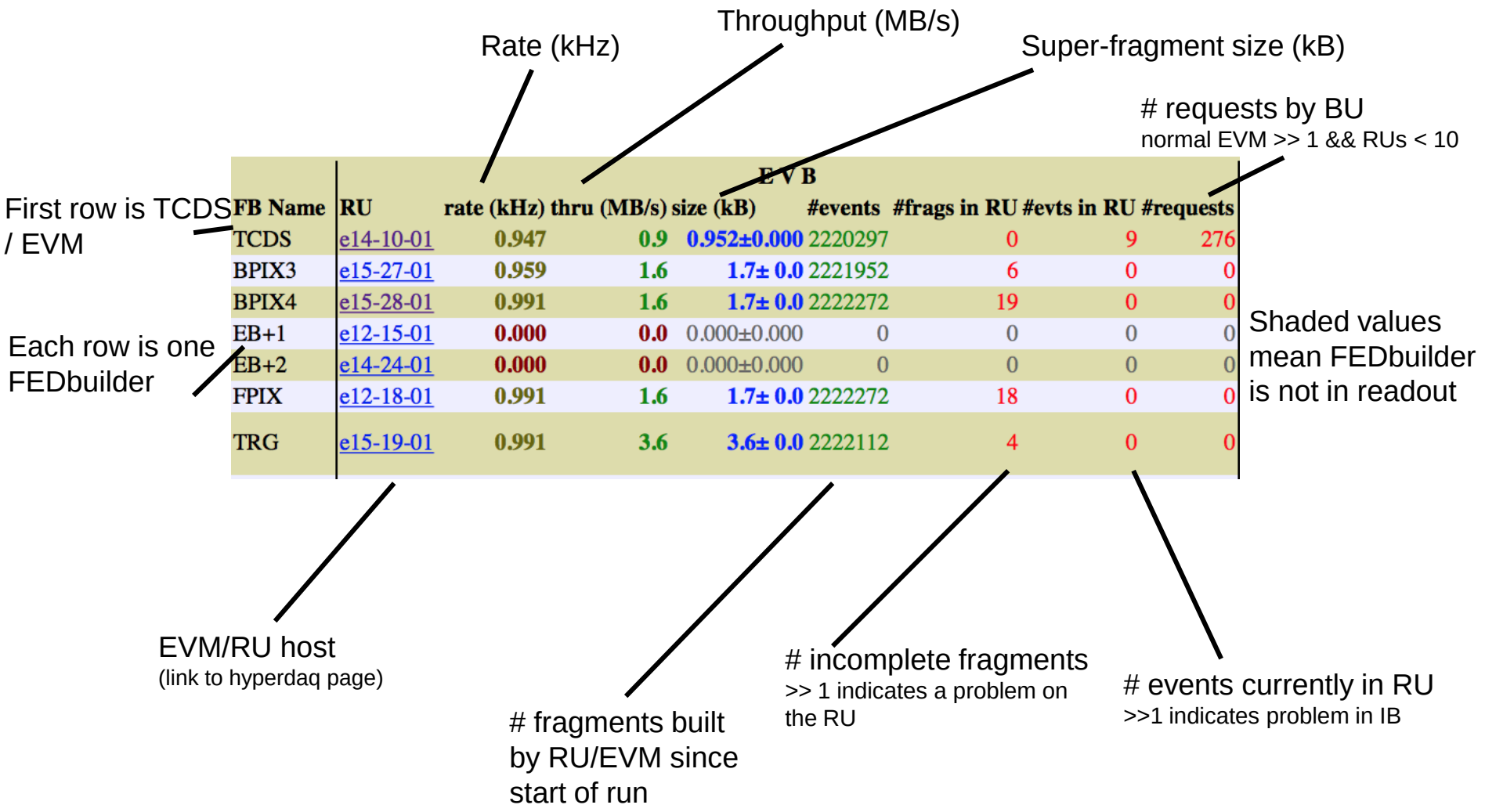
min/max # fragments received by FEROL.
Highlighted in yellow if different to trigger.
Min is only displayed if not equal to max.

DAQView – FEROL and FMM

- Entries are of form 1:606, 2:607, 3:608, 4:609, 5:601, 6:W:100.0% W602<80.0% 9605, 7:603, 8:604, 9:605 661
  - FRL_geoslot: **FEDSourceID** or
  - FRL_geoslot: **FEDSourceID1, FEDSourceID2** or
  - **FEDSourceID**

    For a pseudo-FED (=TTS link only, but no data is read out by DAQ)
- Additional info may be displayed next to the **FEDSourceID** (from left to right)
  - Percentage of time during which FED was in Warning (**W:9.9%**) or Busy (**B:0.2%**) during the last 3 seconds (if non-zero)
  - Current state of TTS if other than Ready **W**
  - FEDSourceID (expected) **601**
    - Grey if FRL input not enabled (FMM not enabled in case of pseudo-FED)
    - Highlighted in color of current TTS state if other than Ready
  - Percentage of time with DAQ backpressure during last update interval (5s) if non-zero **<6.9%** ← **Use this to judge whether a FED is creating dead-time because of a FED problem or because of DAQ-backpressure**
  - Warnings
    - Received source ID different to expected
    - FED or SLINK CRC errors **#FCRC=69**
    - Number of fragments received by FRL if no data is flowing and this FRL is lagging “behind” **9605**
- uTCA FEDs (FED id >= 1024) do not have an FMM
  - Busy/warning in column ‘P’ DAQView

DAQView – RU/EVM Information



EVB

FB Name	RU	rate (kHz)	thru (MB/s)	size (kB)	#events	#frags in RU	#evts in RU	#requests
TCDS	e14-10-01	0.947	0.9	0.952±0.000	2220297	0	9	276
BPIX3	e15-27-01	0.959	1.6	1.7± 0.0	2221952	6	0	0
BPIX4	e15-28-01	0.991	1.6	1.7± 0.0	2222272	19	0	0
EB+1	e12-15-01	0.000	0.0	0.000±0.000	0	0	0	0
EB+2	e14-24-01	0.000	0.0	0.000±0.000	0	0	0	0
FPIX	e12-18-01	0.991	1.6	1.7± 0.0	2222272	18	0	0
TRG	e15-19-01	0.991	3.6	3.6± 0.0	2222112	4	0	0

DAQView – FFF/BU

Confused? Try the table help button!

LS queued on output disk on FUs

Event size (kB)

Current LS number

BU host
(link to hyperdaq page)

Events built since start of run

(Table Help)						BUILDER UNIT (BU)													
BU	rate (kHz)	thru (MB/s)	size (kB)	#events	#evts in BU	priority	#req. sent	#req. used	#req. blocked	#FUs HLT	#FUs crash	#FUs stale	#FUs cloud	RAM disk usage	#files	#LS w/ files	current LS	#LS for HLT	#LS out HLT
bu-c2f16-21-01	0.031	16.4	511.2± 0.0	20288	0	0	20	0	0	512	0	0	0	0.1% of 235GB	283	56	57	1	0
bu-c2f16-23-01	0.000	0.0	0.000±0.000	20256	0	0	20	0	0	480	0	0	0	0.1% of 235GB	282	56	57	1	0
bu-c2f16-25-01	0.031	16.2	506.8± 0.0	20288	0	0	20	0	0	448	0	0	0	0.1% of 235GB	283	56	57	1	0
bu-c2f16-27-01	0.000	0.0	0.000±0.000	20256	0	0	20	0	0	384	0	0	0	0.1% of 235GB	282	56	57	1	0
bu-c2f16-29-01	0.028	14.7	508.3± 0.0	20253	3	0	19	1	0	432	0	0	0	0.1% of 235GB	282	56	57	1	0
bu-c2f16-31-01	0.000	0.0	0.000±0.000	20256	0	0	20	0	0	432	0	0	0	0.1% of 235GB	282	56	57	1	0
bu-c2f16-35-01	0.031	16.2	507.2± 0.0	20256	0	0	20	0	0	408	0	0	0	0.1% of 235GB	282	56	57	1	0
bu-c2f16-37-01	0.000	0.0	0.000±0.000	20256	0	0	20	0	0	408	0	0	0	0.1% of 235GB	282	56	57	1	0
bu-c2f16-39-01	0.031	16.2	507.0± 0.0	20256	0	0	20	0	0	432	0	0	0	0.1% of 235GB	282	56	57	1	0
bu-c2f16-41-01	0.000	0.0	0.000±0.000	20256	0	0	20	0	0	432	0	0	0	0.1% of 235GB	282	56	57	1	0
bu-c2f16-43-01	0.031	16.3	510.6± 0.0	20256	0	0	20	0	0	432	0	0	0	0.1% of 235GB	282	56	57	1	0
Summary	rate (kHz)	thru (MB/s)	size (kB)	#events	#evts in BU	priority	#req. sent	#req. used	#req. blocked	#FUs HLT	#FUs crash	#FUs stale	#FUs cloud	RAM disk usage	#files	#LS w/ files	current LS	#LS for HLT	#LS out HLT
Σ BUs = 21 / 50	Σ 0.618	Σ 324.8	508.2± 0.0	Σ 1012541	Σ 3	0	Σ 999	Σ 1	Σ 0	Σ 24160	Σ 0	Σ 0	Σ 0	0.1% of 11757GB	Σ 14091	56	57	1	0

Each line is one Appliance

Throughput (MB/s)

Resource information (see next page)

LS queued for FUs

events being built

LS for which there is a file

Rate per BU (kHz)

files written

DAQView – BU Resources

- BUs have use a fixed number of requests (20 in the current configuration)
  - Each request corresponds to multiple events (32 in the current configuration)
- The number of active requests may vary during a run
  - Load balancing between independent appliances
  - Backpressure mechanism if FFF/HLT cannot keep up
- A request is sent to the EVM (#req. sent) when all events of the request have been handled
  - If #req sent > 0, the BU is able to accept new events
- When the BU got at least one fragment for the request, the request is 'used' (#req. used)
  - The more request are used, the busier is the BU (either building events or waiting for data)
- Resources can be blocked (#req. blocked)
  - RAM disk becomes full
  - Not enough FU CPU cores are available to process data
  - FU processing lags behind
- Requests have a priority depending on the load of the BU appliance
  - BUs with lower priority number get events first

(Table Help) BUILDER UNIT (BU)

BU	rate (kHz)	thru (MB/s)	size (kB)	#events	#evts in BU	priority	#req. sent	#req. used	#req. blocked	#FUs HLT	#FUs crash	#FUs stale	#FUs cloud	RAM disk usage	#files	#LS w/ files	current LS	#LS for HLT	#LS out HLT
bu-c2f16-21-01	0.031	16.4	511.2± 0.0	20288	0	0	20	0	0	512	0	0	0	0.1% of 235GB	283	56	57	1	0
bu-c2f16-23-01	0.000	0.0	0.000±0.000	20256	0	0	20	0	0	480	0	0	0	0.1% of 235GB	282	56	57	1	0
bu-c2f16-25-01	0.031	16.2	506.8± 0.0	20288	0	0	20	0	0	448	0	0	0	0.1% of 235GB	283	56	57	1	0
bu-c2f16-27-01	0.000	0.0	0.000±0.000	20256	0	0	20	0	0	384	0	0	0	0.1% of 235GB	282	56	57	1	0
bu-c2f16-29-01	0.028	14.7	508.3± 0.0	20253	3	0	19	1	0	432	0	0	0	0.1% of 235GB	282	56	57	1	0
bu-c2f16-31-01	0.000	0.0	0.000±0.000	20256	0	0	20	0	0	432	0	0	0	0.1% of 235GB	282	56	57	1	0
bu-c2f16-35-01	0.031	16.2	507.2± 0.0	20256	0	0	20	0	0	408	0	0	0	0.1% of 235GB	282	56	57	1	0
bu-c2f16-37-01	0.000	0.0	0.000±0.000	20256	0	0	20	0	0	408	0	0	0	0.1% of 235GB	282	56	57	1	0
bu-c2f16-39-01	0.031	16.2	507.0± 0.0	20256	0	0	20	0	0	432	0	0	0	0.1% of 235GB	282	56	57	1	0
bu-c2f16-41-01	0.000	0.0	0.000±0.000	20256	0	0	20	0	0	432	0	0	0	0.1% of 235GB	282	56	57	1	0
bu-c2f16-43-01	0.031	16.3	510.6± 0.0	20256	0	0	20	0	0	432	0	0	0	0.1% of 235GB	282	56	57	1	0
Summary	rate (kHz)	thru (MB/s)	size (kB)	#events	#evts in BU	priority	#req. sent	#req. used	#req. blocked	#FUs HLT	#FUs crash	#FUs stale	#FUs cloud	RAM disk usage	#files	#LS w/ files	current LS	#LS for HLT	#LS out HLT
Σ BUs = 21 / 50	Σ 0.618	Σ 324.8	508.2± 0.0	Σ 1012541	Σ 3	0	Σ 999	Σ 1	Σ 0	Σ 24160	Σ 0	Σ 0	Σ 0	0.1% of 11757GB	Σ 14091	56	57	1	0

DAQView – Running, or not?

Subsystem	HCAL	DT	CSC	TCDS	TRG	DAQ	DQM
State	Running	Running	Running	Running	Running	Running	Running
Time	00:10.0	00:06.2	00:09.3	00:00.1	00:10.2	00:02.0	00:00.0
Enabled Slices							
Current Run Key	ZS	N/A	N/A	N/A	Automatic	TIER0_TRANSFER_OFF	N/A
New Run Key	ZS				Automatic	TIER0_TRANSFER_OFF	
Commander	select	select	select	select	select	select	select

LVL0:
DAQ is running

No, rate is 0 kHz

(Table Help) FEDBUILDER EVB

TTCP	T	%W	%B	frlpc	geoSlot:SrcId / TTSOnlyFEDSrcId	min Trg	max Trg	FB Name	RU	rate (kHz)	thru (MB/s)	size (kB)	#events	#frags in RU	#evts in RU	#evts requested
cpm-pri:59	-	-	-	s1d06-40-01	1:**1024**		15948	TCDS	e14-10-01	0.000	0.0	0.000±0.000	8064	512	0	0
GCT:11	-	?	?	s1d06-29-01	1:745											
GT:33	R	0.0	0.0	s1d06-27-01	1:812, 2:**813 811**		16198	TRG	e15-22-01	0.000	0.0	0.000±0.000	8064	512	0	0
RETRI:4	-	?	?	-	810	-	-									
HF:8	-	?	?	s2d10-26-01	4:**1118**, 5:**1120**, 6:**1122**		0	HFuTCA	e13-19-01	0.000	0.0	0.000±0.000	0	0	0	8064
Summary				frlpc	geoSlot:SrcId	min Trg	max Trg	FB Name	RU	rate (kHz)	thru (MB/s)	size (kB)	#events	#frags in RU	#evts in RU	#evts requested
										0.000	Σ 0.0	Σ 0.000±0.000	Δ 8064	Σ 1024	Σ 0	Σ 8064

None of the HF FEDs has sent any events

No fragments in RU

Many events requested

No data flow as HF has not sent any data ➔ Talk to HCAL expert

DAQView – Who Blocks the Run?

ECAL is 100% in Warning

FED 602 is in warning and last event is 9605

There's backpressure from DAQ

Rate is 0 kHz

(Table Help) FEDBUILDER

TTCP	T	%W	%B	frlpc	geoSlot:SrcId / TTSOnlyFEDSrcId	min Trg	max Trg	FB Name	RU	rate (kHz) thru
cpm-pri:59	-	-	-	s1d06-40-01	1:1024		9632	TCDS	e14-10-01	0.000
CSC+:16	R	0.0	0.0	s1d06-34-01	1:841,831, 2:842,832, 3:843,833, 4:844,834, 5:845,835, 6:846,836, 7:847,837, 8:848,838, 18:849,839		9632	CSC+	e12-34-01	0.000
CSC-:17	R	0.0	0.0	s1d06-34-01	9:861,851, 10:862,852, 11:863,853, 12:864,854, 13:865,855, 14:866,856, 15:867,857, 16:868,858, 17:869,859		9632	CSC-	e12-35-01	0.000
EB+:0	-	?	?	s2d10-10-01	1:628, 2:629, 3:630, 4:634, 5:635, 6:636, 7:631, 8:632, 9:633 663			EB+1	e12-15-01	0.000
EB+:0	-	?	?	s2d10-18-01	1:643, 2:644, 3:645, 4:637, 5:638, 6:639, 7:640, 8:641, 9:642 666			EB+2	e12-26-01	0.000
EB-:1	R	0.0	0.0	s2d10-11-01	1:610, 2:611, 3:612, 4:616#FCRC=1, 5:617, 6:618, 7:613, 8:614, 9:615 662		9632	EB-1	e12-18-01	0.000
EB-:1	R	0.0	0.0	s2d10-20-01	1:625, 2:626, 3:627, 4:619, 5:620#FCRC=1, 6:621, 7:622, 8:623, 9:624 662		9632	EB-2	e14-28-01	0.000
EE+:2	-	?	?	s2d10-17-01	1:648, 2:649, 3:650, 4:654, 5:646, 6:647, 7:651, 8:652, 9:653 664			EE+	e12-19-01	0.000
EE-:3	W	100.0	0.0	s2d10-09-01	1:606, 2:607, 3:608, 4:609, 5:601, 6:W:100.0%W602<80.0%9605, 7:603, 8:604, 9:605 661	9605	9632	EE-	e12-10-01	0.000
GCT:11	-	?	?	s1d06-29-01	1:745					
GT:33	R	0.0	0.0	s1d06-27-01	1:812, 2:813 811		9632	TRG	e15-22-01	0.000
RETRI:4	-	?	?	-	810	-	-			
TIBTID:24	R	0.0	0.0	s1d06-04-01	1:149, 2:150, 3:151, 4:152, 5:153, 6:154, 7:155, 8:156, 9:157, 10:158, 11:159, 12:160, 13:161, 14:162, 15:163		9632	TIBTID4	e12-30-01	0.000
TIBTID:24	R	0.0	0.0	s1d06-05-01	1:134, 2:135, 3:136, 4:137, 5:138, 6:139, 7:140, 8:141, 9:142, 10:143, 11:144, 12:145, 13:146, 14:147, 15:148		9632	TIBTID5	e13-10-01	0.000
TIBTID:24	R	0.0	0.0	s1d06-07-01	1:118,74, 2:119,75, 3:120,76, 4:121,77, 5:122,78, 6:123,79, 7:124,80, 8:125,81		9632	TIBTID6a	e13-15-01	0.000
TIBTID:24	R	0.0	0.0	s1d06-07-01	9:126,82, 10:127,83, 11:128,84, 12:129,85, 13:130, 14:131, 15:132, 16:133		9632	TIBTID6b	e15-13-01	0.000
TIBTID:24	R	0.0	0.0	s1d06-01-01	1:86,87, 2:88,89, 3:90,91, 4:92,93, 5:94,95, 6:96,97, 7:98,99, 8:100,101		9632	TIBTID1a	e13-16-01	0.000
TIBTID:24	R	0.0	0.0	s1d06-01-01	9:102, 10:104,105, 11:106,107, 12:108,109, 13:110,111, 14:112,113, 15:114,115, 16:116,117		9632	TIBTID1b	e13-17-01	0.000
TIBTID:24	R	0.0	0.0	s1d06-02-01	1:50, 2:51, 3:52, 4:53, 5:54, 6:55, 7:56, 8:57, 9:58, 10:590, 11:60, 12:61	0	9632	TIBTID2	e13-22-01 [59]	0.000
TIBTID:24	R	0.0	0.0	s1d06-03-01	1:62, 2:63, 3:64, 4:65, 5:66, 6:67, 7:68, 8:69, 9:70, 10:71, 11:72, 12:73		9632	TIBTID3	e13-25-01	0.000
Summary				frlpc	geoSlot:SrcId	min Trg	max Trg	FB Name	RU	rate (kHz) thru
										0.000

FED 59 has not sent any data

RU waits for data from FED 59

FED 59 is the culprit ➔ Talk to Tracker expert

DAQView – DAQ backpressure

ECAL is 50% in Warning

There's backpressure from DAQ

The rate is 10 kHz

Very few events requested by BUs

(Table Help) FEDBUILDER EVB

TTCP	T	%W	%B	frlpc	geoSlot:SrcId / TTSOnlyFEDSrcId	min Trg	max Trg	FB Name	RU	rate (kHz)	#evts requested
cpm-pri:59	-	-	-	s1d06-40-01	1:1024		9632	TCDS	e14-10-01	9.796	10
EB-:1	R	0.0	0.0	s2d10-11-01	1:610, 2:611, 3:612, 4:616, 5:617, 6:618, 7:613, 8:614, 9:615 662		9632	EB-1	e12-18-01	9.796	0
EB-:1	R	0.0	0.0	s2d10-20-01	1:625, 2:626, 3:627, 4:619, 5:620, 6:621, 7:622, 8:623, 9:624 662		9632	EB-2	e14-28-01	9.796	0
EE+:2	-	?	?	s2d10-17-01	1:648, 2:649, 3:650, 4:654, 5:646, 6:647, 7:651, 8:652, 9:653 664			EE+	e12-19-01	9.796	0
EE-:3	W	50.0	0.0	s2d10-09-01	1:606, 2:607, 3:608, 4:609, 5:601, 6:W:50.0%W602<50.0%9605, 7:603, 8:604, 9:605 661	9605	9632	EE-	e12-10-01	9.796	0
GCT:11	-	?	?	s1d06-29-01	1:745						
GT:33	R	0.0	0.0	s1d06-27-01	1:812, 2:813 811		9632	TRG	e15-22-01	9.796	0
RETRI:4	-	?	?	-	810	-	-				
Summary				frlpc	geoSlot:SrcId	min Trg	max Trg	FB Name	RU	rate (kHz)	#evts requested
										9.796	Σ 10

Some BUs have Failed

Resources blocked

Many FUs are stale

Data queued on HLT output

(Table Help) BUILDER UNIT (BU)

BU		rate (kHz)	thru (MB/s)	size (kB)	#events	#evts in BU	priority	#req. sent	#req. used	#req. blocked	#FUs HLT	#FUs crash	#FUs stale	#FUs cloud	RAM disk usage	#files	#LS w/ files current LS	#LS for HLT	#LS out HLT
bu-c2d31-10-01	Failed	0.000	0.0	0.000±0.000	258336	0	1	0	0	20	144	0	240	0	10.4% of 235GB	2759	82	82	0	0
bu-c2d33-30-01	Failed	0.000	0.0	0.000±0.000	264544	64	1	0	0	20	432	0	96	0	9.5% of 235GB	2825	83	83	1	0
bu-c2d34-30-01		0.040	23.8	455.9± 0.0	216032	32	0	0	0	20	144	0	0	0	0.2% of 235GB	2334	83	83	0	4
bu-c2d35-10-01		0.053	20.3	455.9± 0.0	248672	0	1	7	0	13	48	0	336	0	7.8% of 235GB	2659	83	84	3	0
bu-c2d36-10-01	Failed	0.000	0.0	0.000±0.000	263040	0	1	0	0	20	48	0	336	0	9.8% of 235GB	2810	83	83	1	0
Summary		rate (kHz)	thru (MB/s)	size (kB)	#events	#evts in BU	priority	#req. sent	#req. used	#req. blocked	#FUs HLT	#FUs crash	#FUs stale	#FUs cloud	RAM disk usage	#files	#LS w/ files current LS	#LS for HLT	#LS out HLT	
Σ BUs = 2 / 5		Σ 0.093	Σ 43.8	455.9± 0.0	Σ 12876893	Σ 96	1	Σ 7	Σ 0	Σ 93	Σ 8112	Σ 0	Σ 8176	Σ 0	8.2% of 11757GB	Σ 137563	83	84	3	4

Data queued for HLT

FFF output bandwidth is too high ➔ HLT is accepting too many events
➔ Check with trigger shifter for high L1 rates or call HLT DOC

- DAQ FM goes into 'Running Degraded' when BUs fail
- After massive failures on the FFF/HLT, DAQ oncall has to be called

DAQ Expert

- Automatic detection of problems in the event builder
  - and instructions to fix the problem
- Web application
- Two main components:
  - Dashboard
    - current status/problem and instructions how to fix it
    - recent problems
    - recent sound messages and state changes
  - Browser
    - timeline of error conditions and other information
    - mainly for DAQ DOC
- Replaces the Run I DAQ Doctor
- Core logic: classic 'flow chart' (see backup slides)
  - https://twiki.cern.ch/twiki/pub/CMS/ShiftNews/DAQStuck5.pdf
  - more conditions and solutions to be added as we encounter new error modes
- it's a new system: your feedback is important !

the first place to look at when triggers stop unexpectedly !

DAQ expert

- introduction/documentation at: http://daq-expert.cern.ch/

What is DAQ Expert?

The main goal is to increase data taking efficiency.

The main tasks are to perform automatic recovery and to automate routine actions in CMS currently done by the operator.

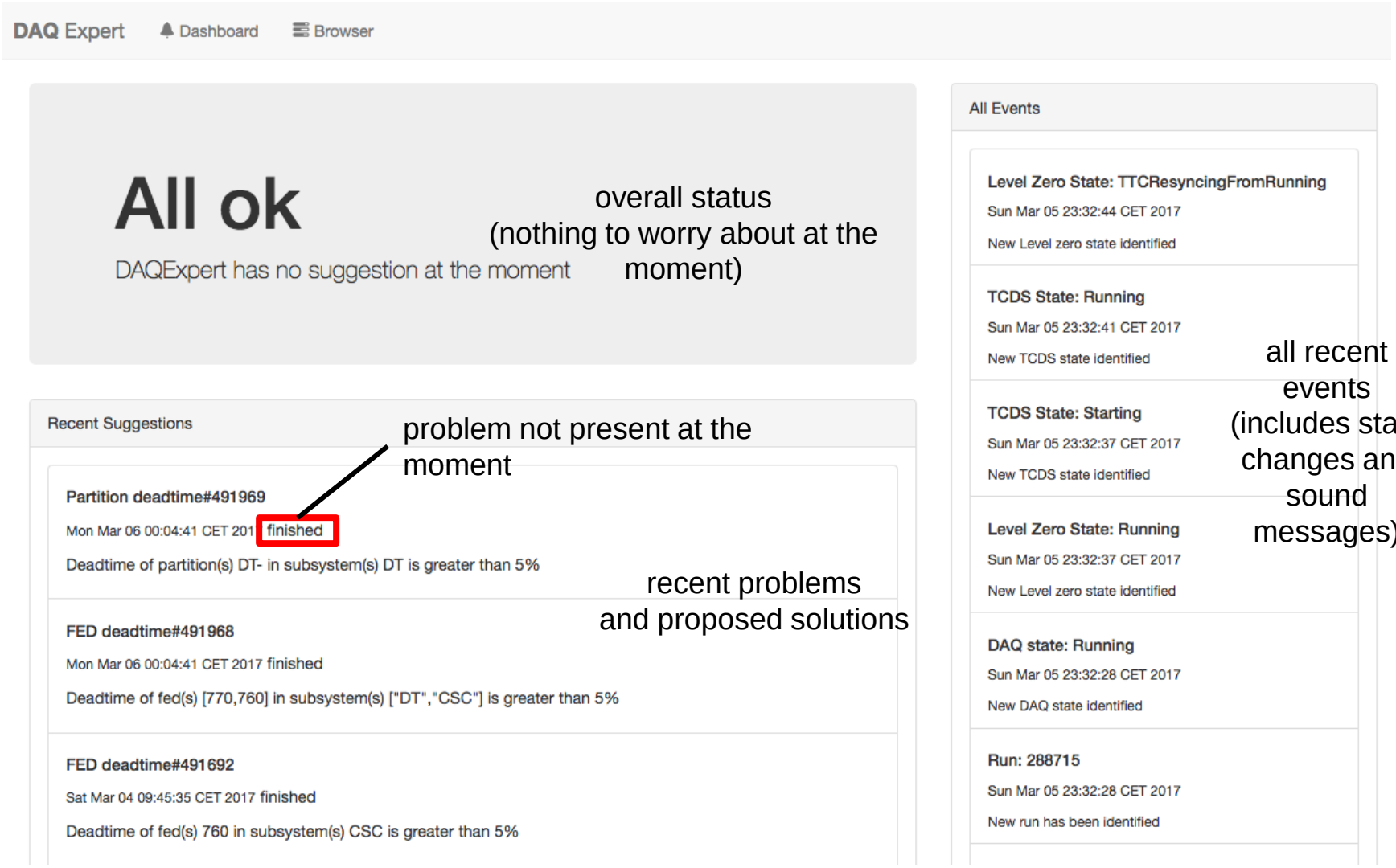
First version is suggesting the actions to shifters.

See what expert suggests

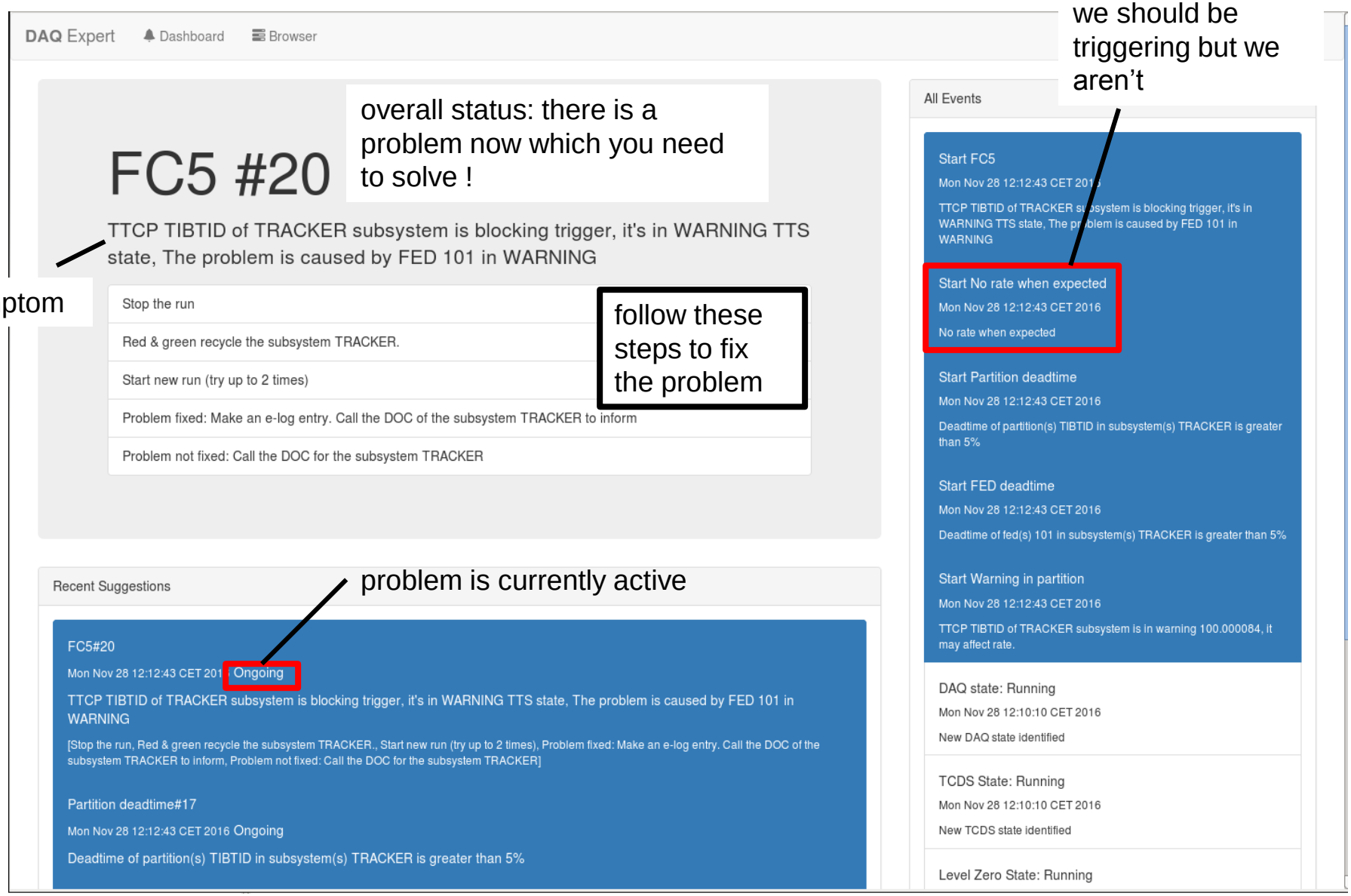
tunnel to CMS cluster necessary

DAQ Expert dashboard

http://daq-expert.cms/nm/dashboard.jsp

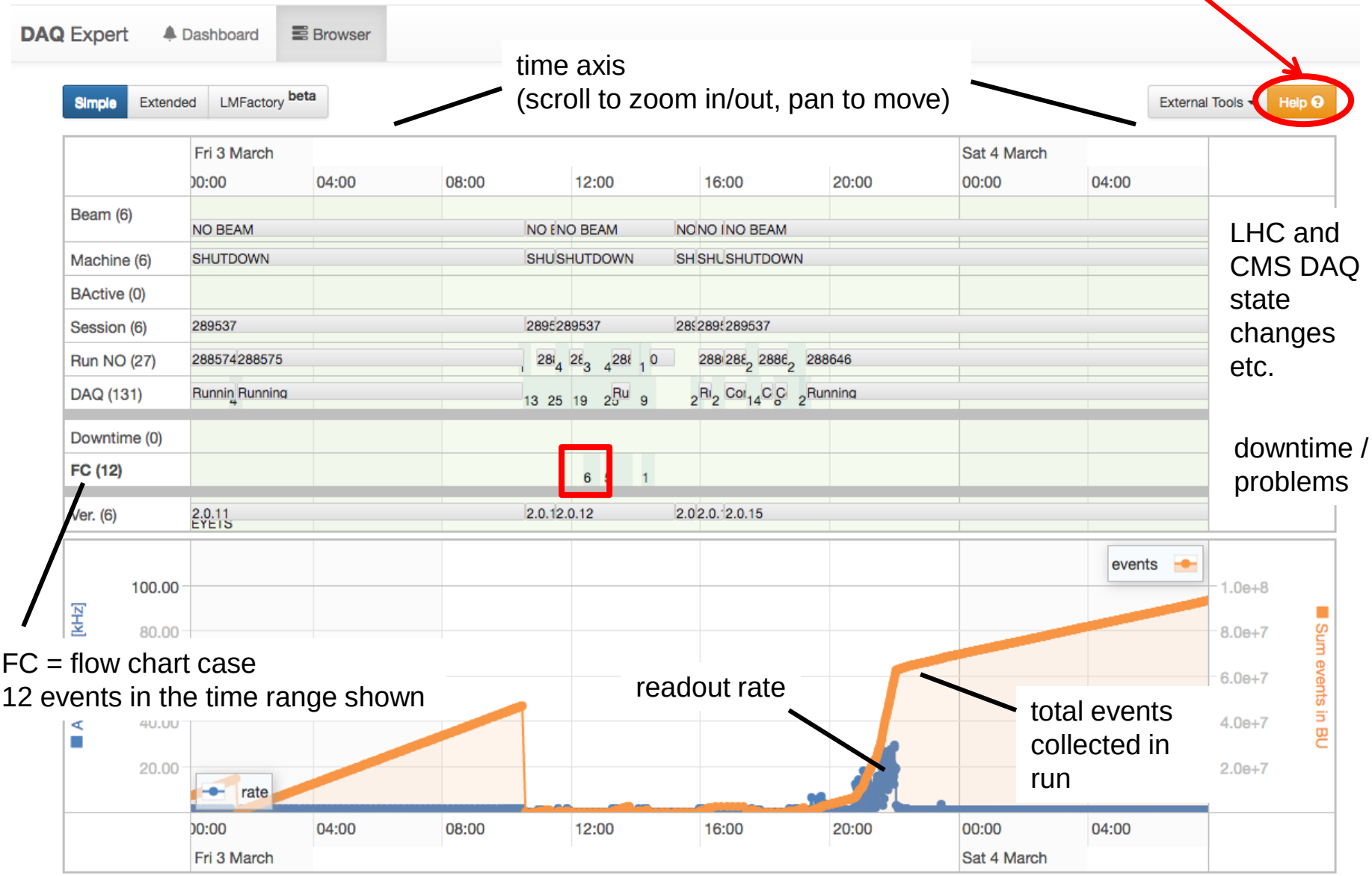


DAQ Expert dashboard



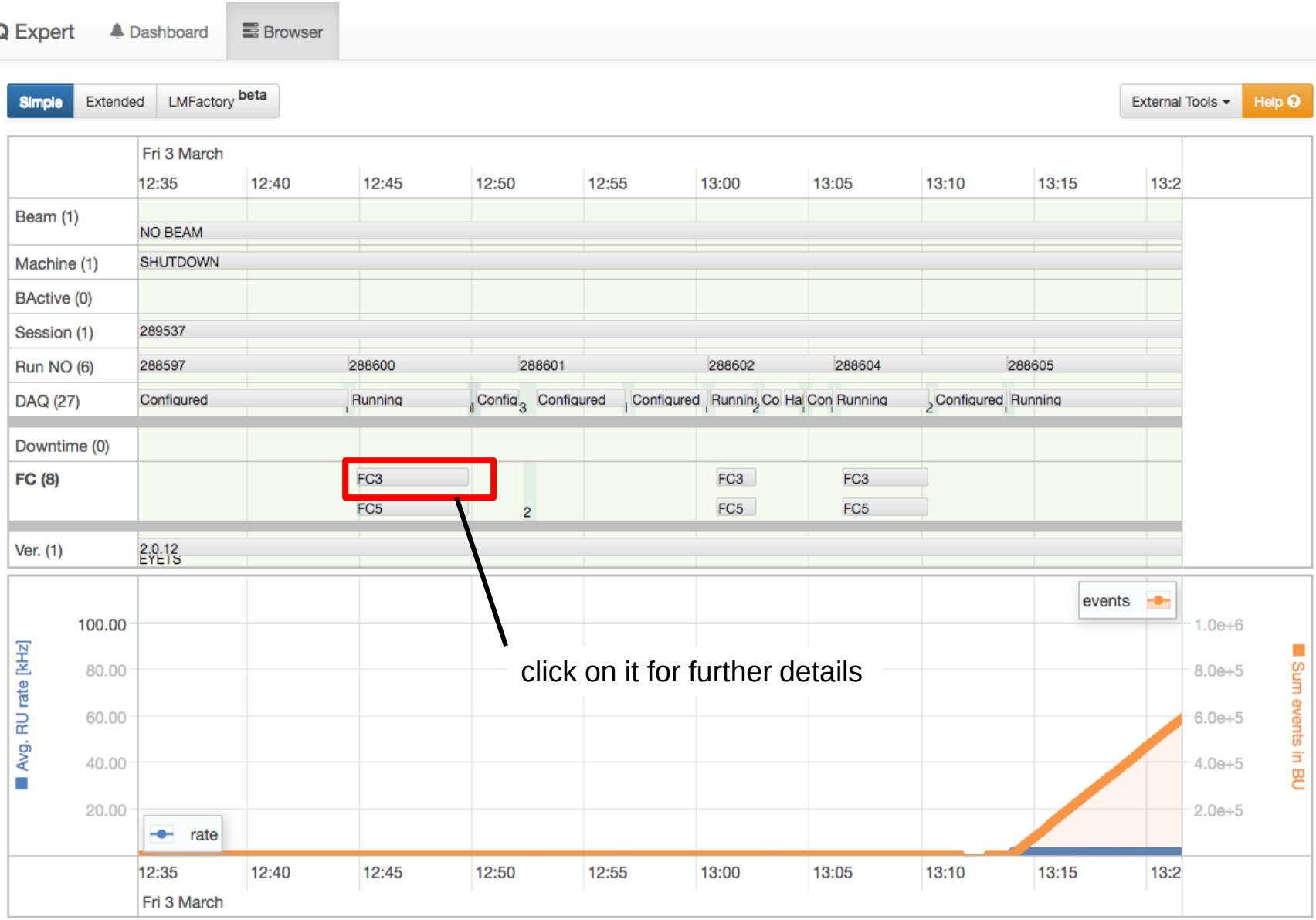
DAQ Expert browser

Confused? Try the help button!

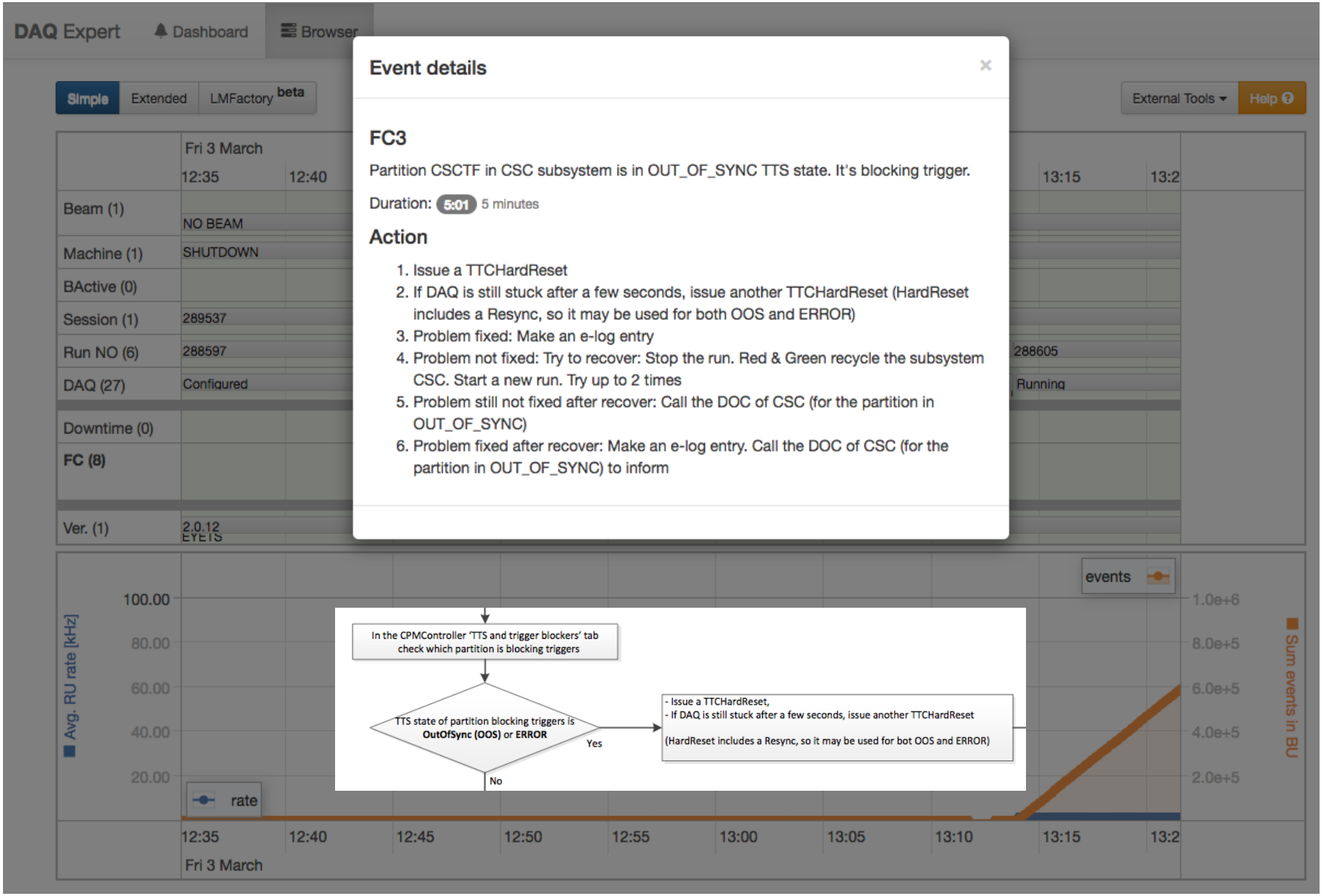


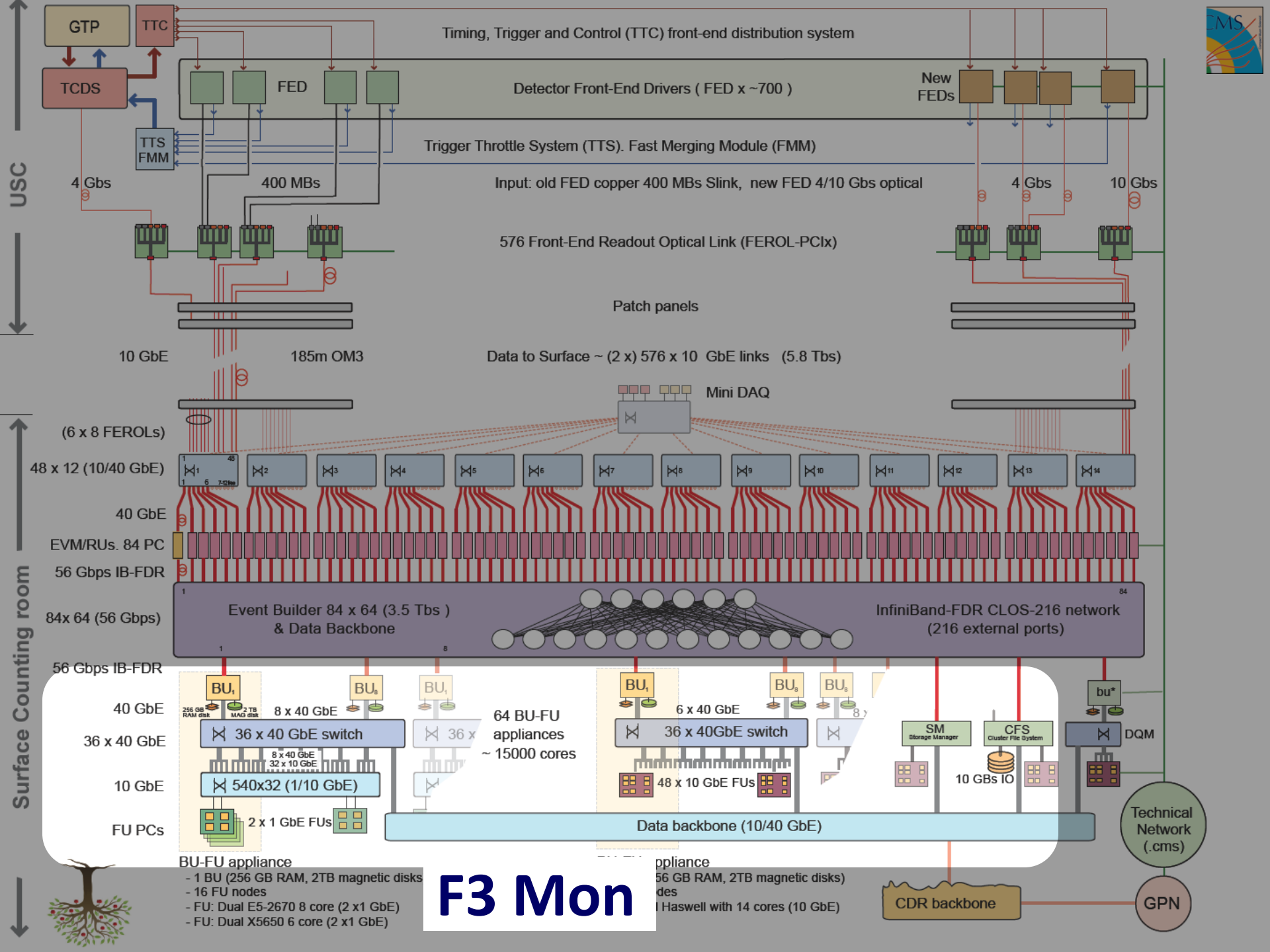
FC = flow chart case
12 events in the time range shown

DAQ Expert browser



DAQ Expert browser




GTP
TTC
TCDS
TTS
FMM
Timing, Trigger and Control (TTC) front-end distribution system
FED
Detector Front-End Drivers (FED x ~700)
New
FEDs
Trigger Throttle System (TTS). Fast Merging Module (FMM)
4 Gbs
400 MBs
Input: old FED copper 400 MBs Slink, new FED 4/10 Gbs optical
4 Gbs
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576 Front-End Readout Optical Link (FEROL-PCIx)
Patch panels
10 GbE
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Data to Surface ~ (2 x) 576 x 10 GbE links (5.8 Tbs)
Mini DAQ
(6 x 8 FEROLs)
48 x 12 (10/40 GbE)
40 GbE
EVM/RUs. 84 PC
56 Gbps IB-FDR
84x 64 (56 Gbps)
Event Builder 84 x 64 (3.5 Tbs)
& Data Backbone
InfiniBand-FDR CLOS-216 network
(216 external ports)
56 Gbps IB-FDR
40 GbE
36 x 40 GbE
10 GbE
FU PCs
BU
8 x 40 GbE
36 x 40 GbE switch
8 x 40 GbE
32 x 10 GbE
540x32 (1/10 GbE)
2 x 1 GbE FUs
64 BU-FU
appliances
~ 15000 cores
6 x 40 GbE
36 x 40GbE switch
48 x 10 GbE FUs
SM
Storage Manager
CFS
Cluster File System
10 GBs IO
bu*
DQM
Data backbone (10/40 GbE)
Technical
Network
(.cms)
GPN
CDR backbone
BU-FU appliance
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- 16 FU nodes
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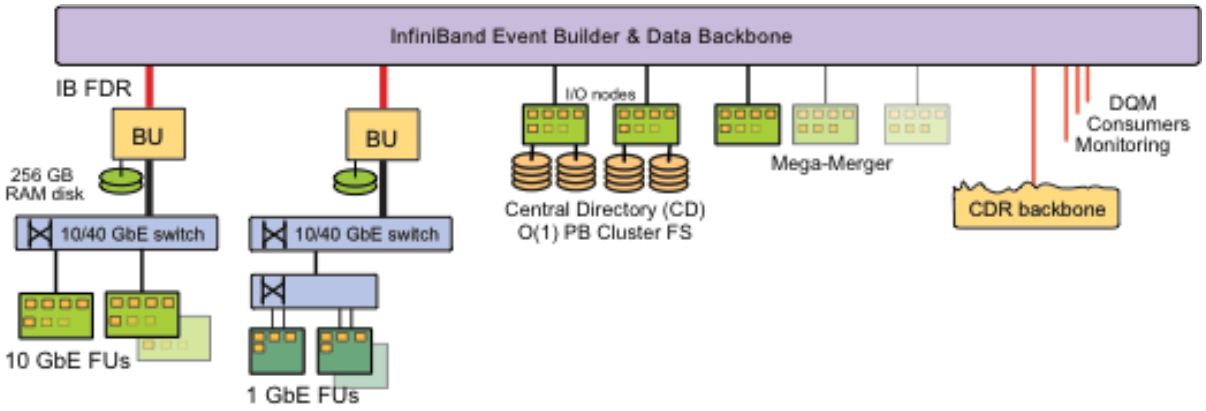
- FU: Dual X5650 6 core (2 x1 GbE)
56 GB RAM, 2TB magnetic disks)
des
Haswell with 14 cores (10 GbE)
USC
Surface Counting room
F3 Mon

File-based Filter Farm (FFF/F3)



- Filter Units (FUs) run the CMSSW processes selecting events for permanent storage
  - Each FU runs multiple, multi-threaded CMSSW instances
  - Accepted events are written to the local disk
- The Storage and Transfer System aggregates files (event data, DQM histograms & metadata)
  - Micro-merger on each FU aggregates the data from all processes on the FU
  - Mini-merger on the BU aggregates the data from all FUs
  - Macro-merger(s) aggregate the data from all BUs
  - Data are aggregated per stream and luminosity section
  - DQM data might suffer delays when merging is lagging behind
- Error stream contains events which crashed the CMSSW process
  - Backtrace is available from F3 mon (see next slide)
  - CMSSW processes are restarted after a crash a few times, after that they are “quarantined”
    - DAQ oncall needs to clean up the FFF when this happens
  - If there is a low rate of crashes, the HLT DOC should be notified

F3 Mon

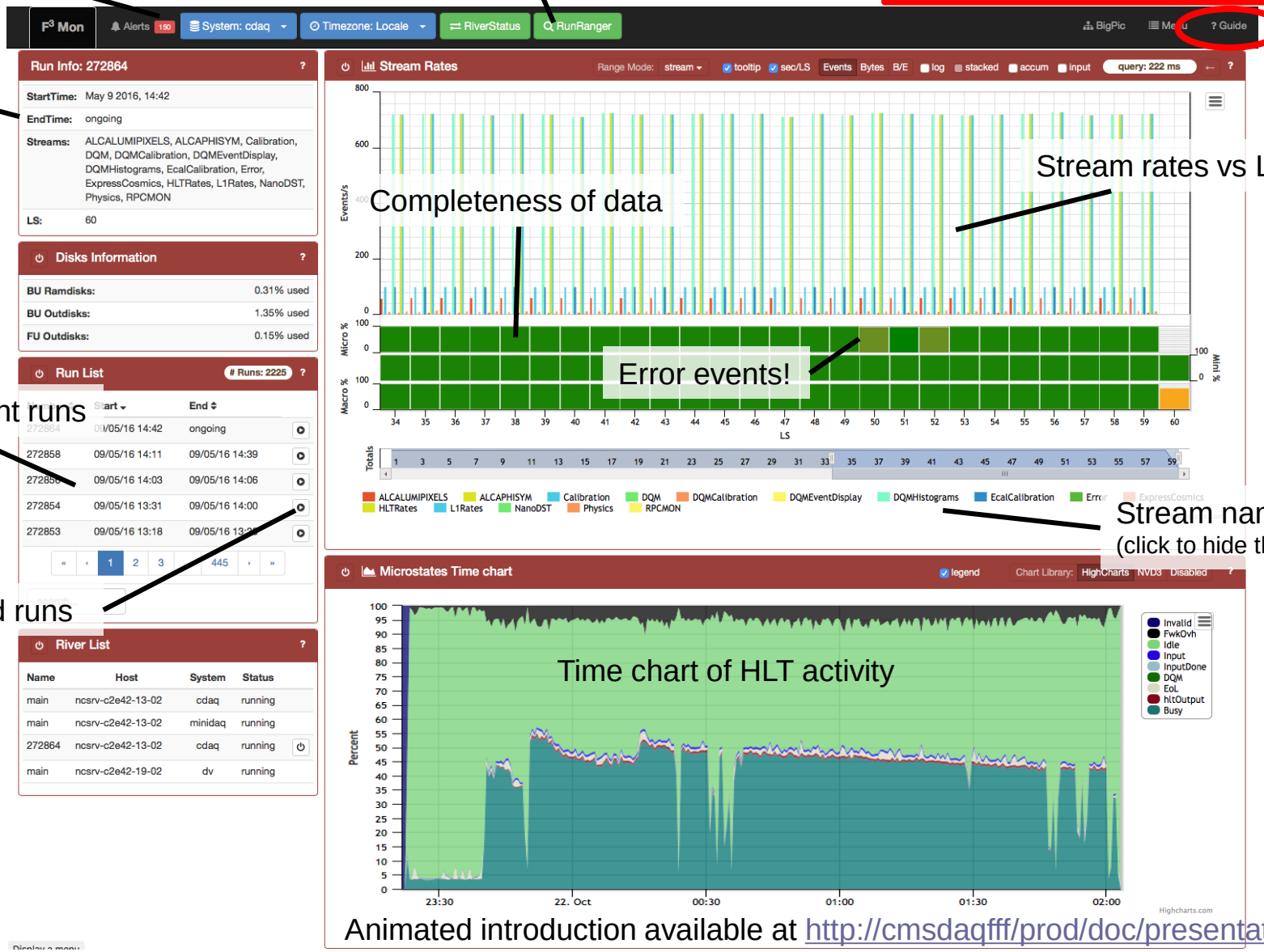
http://es-cdaq.cms/f3mon

Errors from HLT

Both boxes must be green

Confused? Try the guide!

Active run



Completeness of data

Stream rates vs LS

Error events!

List of recent runs

Stream names
(click to hide them)

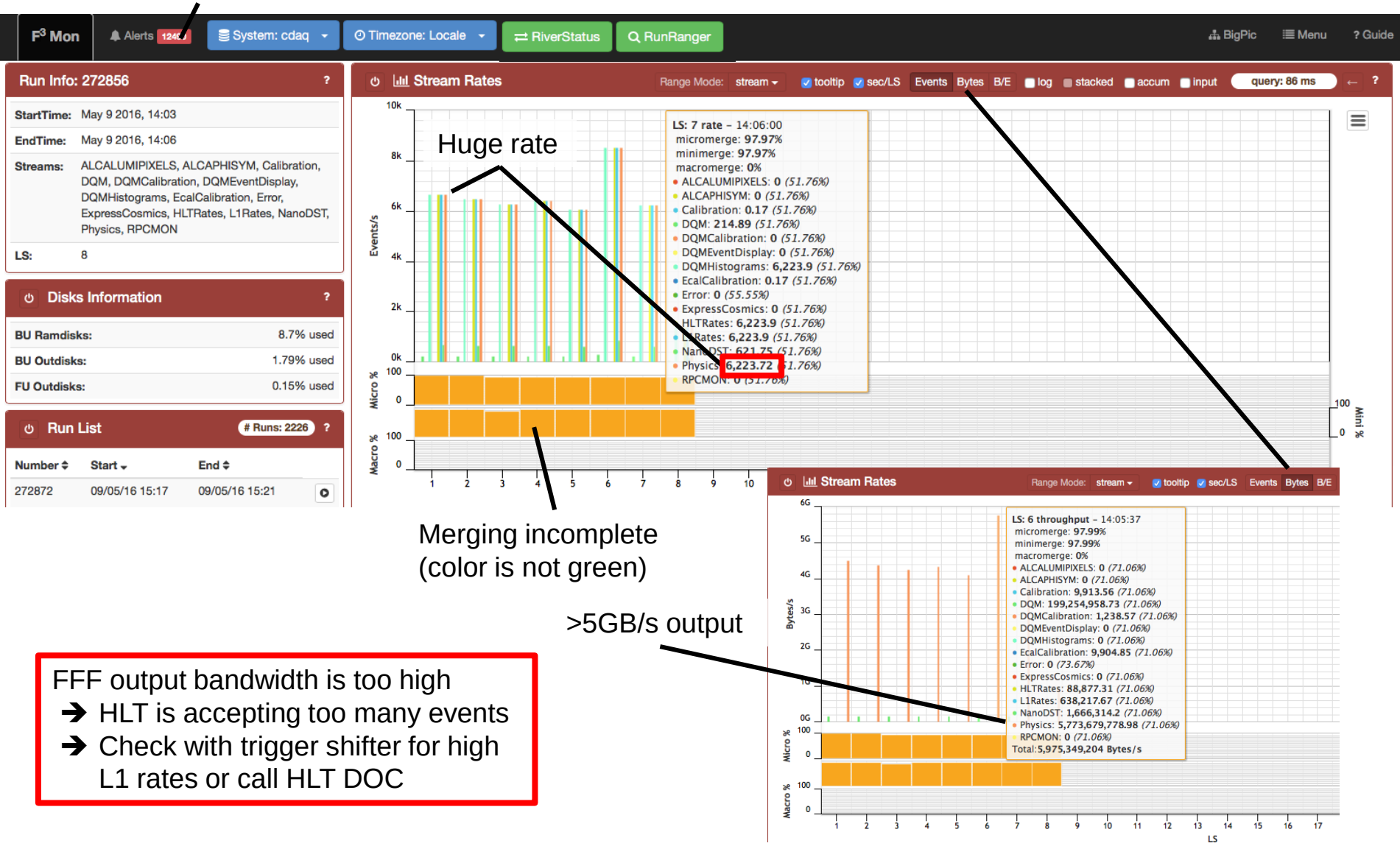
Access old runs

Time chart of HLT activity

Animated introduction available at http://cmsdaqfff/prod/doc/presentation/

F3 Mon – Bad Situation

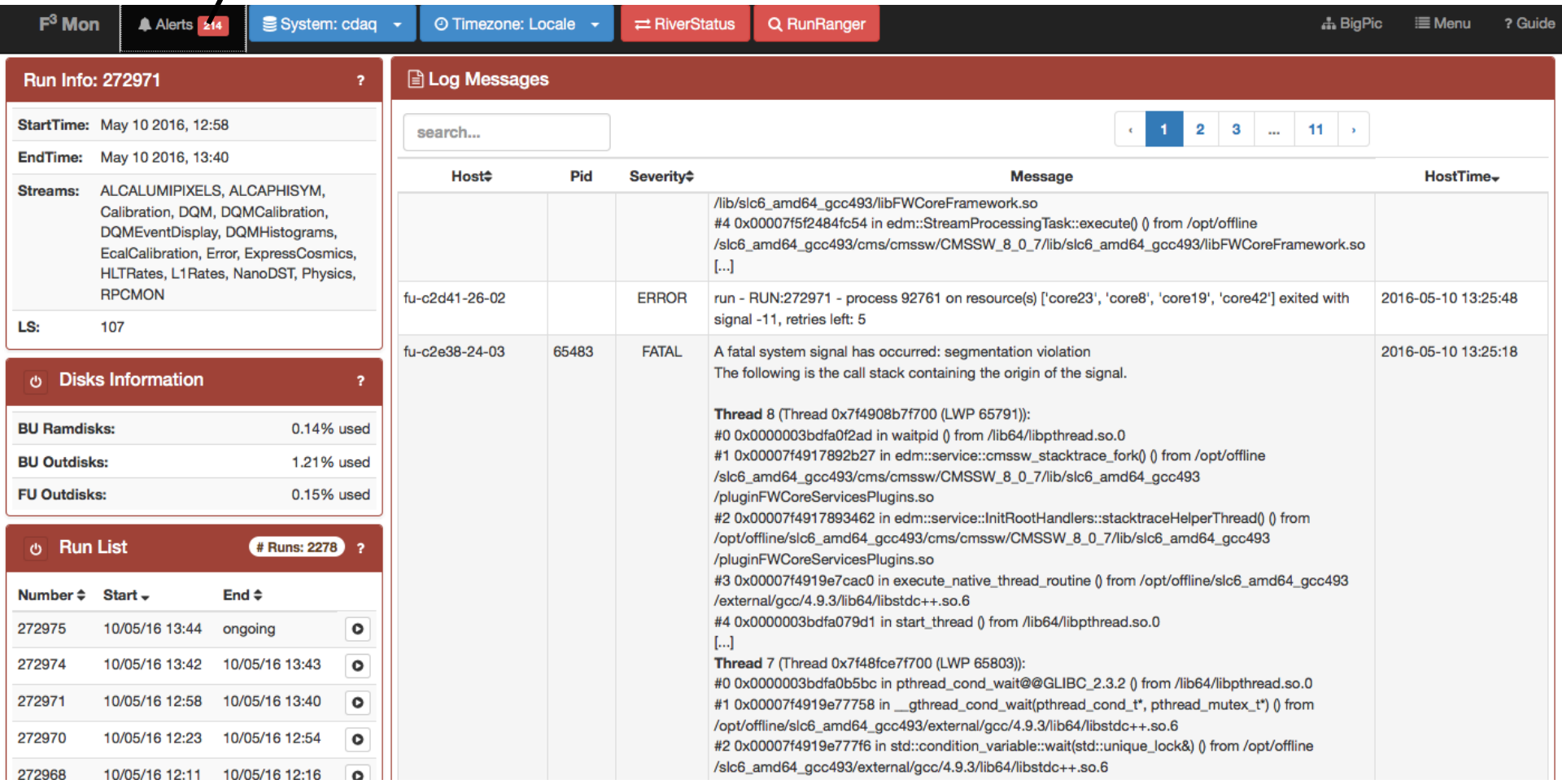
Many alerts



FFF output bandwidth is too high
- ➔ HLT is accepting too many events
- ➔ Check with trigger shifter for high L1 rates or call HLT DOC

F3 Mon – Alerts Panel

Click here to open alerts panel



Storage Manager Page 1

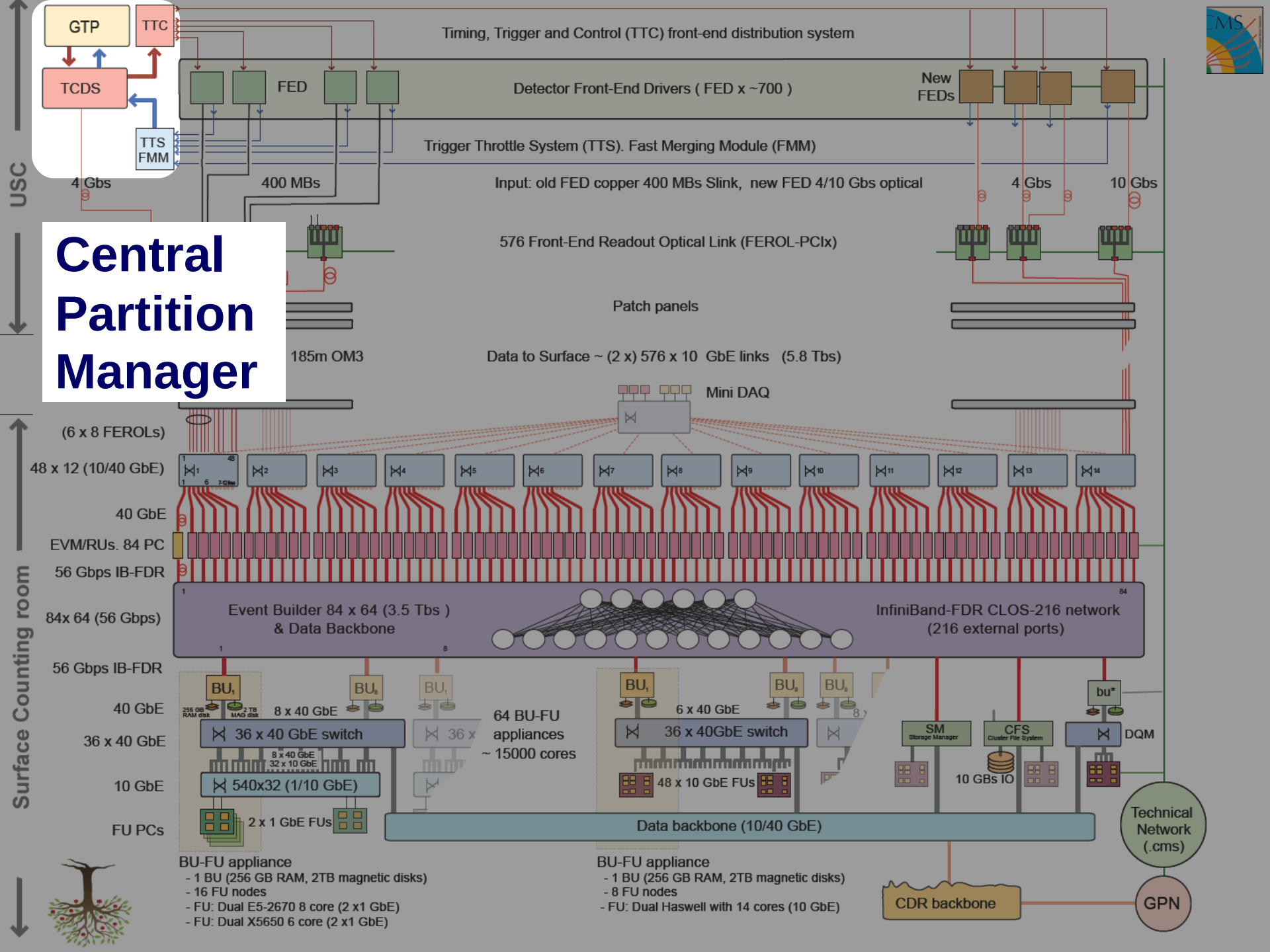
https://cmsonline.cern.ch/webcenter/portal/cmsonline/pages_common/storagemanager

- Gives an overview of the data transfer to tier 0 for recent runs
  - Number of files, sizes and event rates per stream
  - Totals per run
- Check that files are injected, transferred and checked
  - Suspicious values are color coded
  - Make an elog entry and send an email to cms-storagemanager-alerting@cern.ch in case of error

Key: blue: active/differs from preceeding file count brownish: count differs for Tier0 steps magenta: suspicious red: probable error Help!

Last Runs

Run	Start Time	Last Update	Label	#SM	Size [GB]	Files	Events	Disk MB/s	Tier0 MB/s	Open	Close	Inject	Transfr	Check	Repack	Delete
272878	09.05.2016 16:13:31	09.05 16:14	Data	1	155.44	23	15554	3060.96	NA	0	23	16	0	0	0	0
272877	09.05.2016 16:09:39	09.05 16:13	Data	1	134.05	40	12863	1782.75	629.69	0	40	40	40	40	0	0
272872	09.05.2016 15:18:23	09.05 16:14	Data	1	1.37	65	43965	6.58	5.12	0	65	65	65	65	49	0
272864	09.05.2016 14:42:53	09.05 16:14	Data	1	10.56	500	355695	5.63	5.54	0	500	500	500	500	235	0
272858	09.05.2016 14:12:28	09.05 15:36	Data	1	9.03	424	305655	5.61	5.56	0	424	424	424	424	352	0
272854	09.05.2016 13:32:01	09.05 15:36	Data	1	9.34	446	315888	5.6	5.43	0	446	446	446	446	446	0
272853	09.05.2016 13:19:04	09.05 15:30	Data	1	7.17	186	160591	10.7	10.55	0	186	186	186	186	186	3
272850	09.05.2016 12:26:14	09.05 15:30	Data	1	30.13	786	687450	10.21	10.05	0	786	786	786	786	786	379
272849	09.05.2016 12:22:29	09.05 15:30	Data	1	.53	18	11461	23.79	7.5	0	18	18	18	18	18	18
272848	09.05.2016 11:51:05	09.05 15:30	Data	1	17.11	426	373479	10.89	10.63	0	426	426	426	426	426	426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84x 64 (56 Gbps)
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InfiniBand-FDR CLOS-216 network (216 external ports)
56 Gbps IB-FDR
40 GbE
36 x 40 GbE
10 GbE
FU PCs
8 x 40 GbE
36 x 40 GbE switch
8 x 40 GbE
32 x 10 GbE
540x32 (1/10 GbE)
2 x 1 GbE FUs
64 BU-FU appliances ~ 15000 cores
6 x 40 GbE
36 x 40GbE switch
48 x 10 GbE FUs
SM Storage Manager
CFS Cluster File System
10 GBs IO
bu*
DQM
Data backbone (10/40 GbE)
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BU-FU appliance
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- FU: Dual Haswell with 14 cores (10 GbE)

TCDS

- Combines the pre-LS1:
  - Trigger Control System (TCS)
    The conductor of all CMS triggering and data-taking
  - Trigger Timing and Control (TTC)
    The distributor of clock, L1As, and synchronisation signals
  - Trigger Throttling System (TTS)
    The feedback of readiness states from FEDs to TCS
- Many-legged creature:
  - The ‘head’ is the Central Partition Manager (controlled by central DAQ)
  - Many different legs (i.e., partitions) across the different subsystems (controlled by the subsystems)

TCDSCentral

http://tcds-control-central.cms:2000/urn:xdaq-application:lid=100

XDAQ online

tcdsp5

TCDSCentral 'tcds-central'

Dump system state

Configuration | Application status | TCDS 'tcds_central' applications | TCDS 'tcds_ttcmi' applications | TCDS 'tcds_pri' applications | TCDS 'tcds_sec' applications

Application status

Application information

Application state

Info on the state of the XDAQ application

Application FSM state	n/a
Application status	All OK
Problem description	-
RunControl session in charge	n/a
Application mode	Operations mode
Uptime	0:21:18:51:35
Latest monitoring update time	2016-05-09 14:56:00 UTC
Latest monitoring update duration (s)	0.502

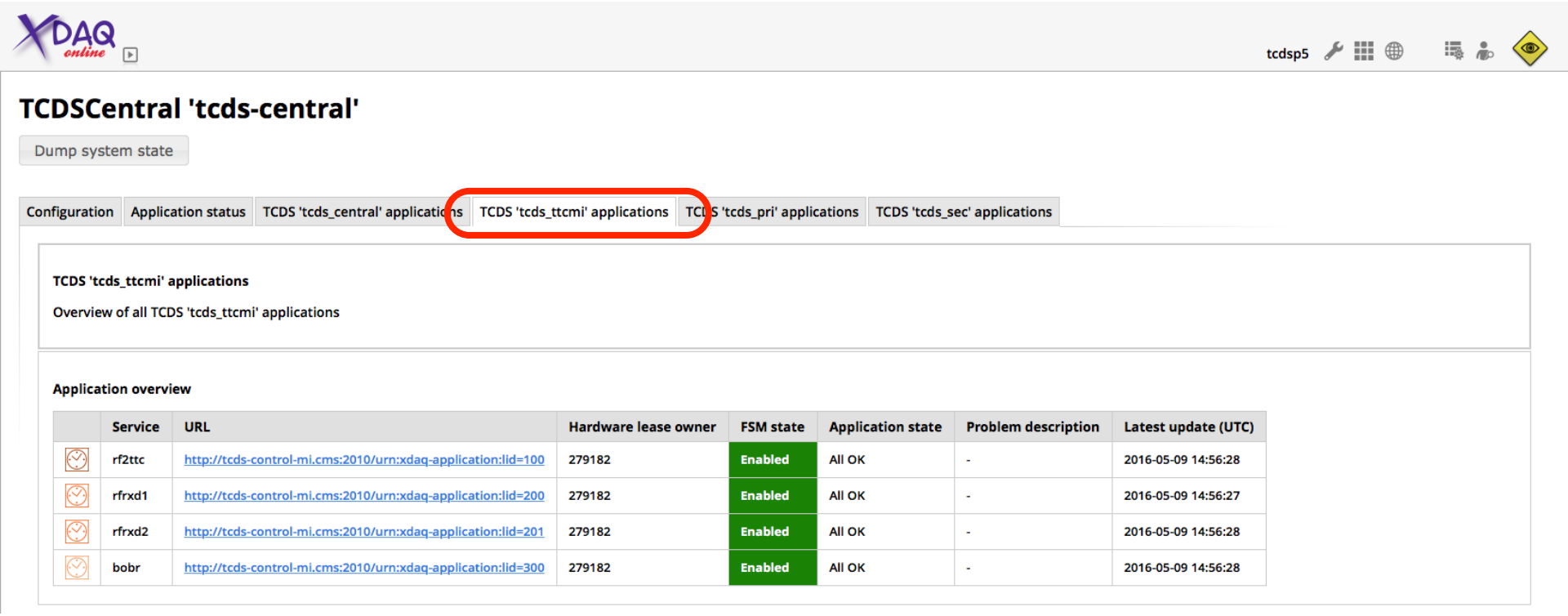
History

Application status and command history

Timestamp	Message
2016-04-26 10:47:16 UTC	Revoking 'MonitoringAlarm_lid100' alarm
2016-04-26 10:44:49 UTC	Raising 'MonitoringAlarm_lid100' alarm
2016-04-17 20:22:35 UTC	Revoking 'MonitoringAlarm_lid100' alarm
2016-04-17 20:21:46 UTC	Raising 'MonitoringAlarm_lid100' alarm
2016-04-17 20:04:44 UTC	Revoking 'MonitoringAlarm_lid100' alarm

TCDSCentral

http://tcds-control-central.cms:2000/urn:xdaq-application:lid=100



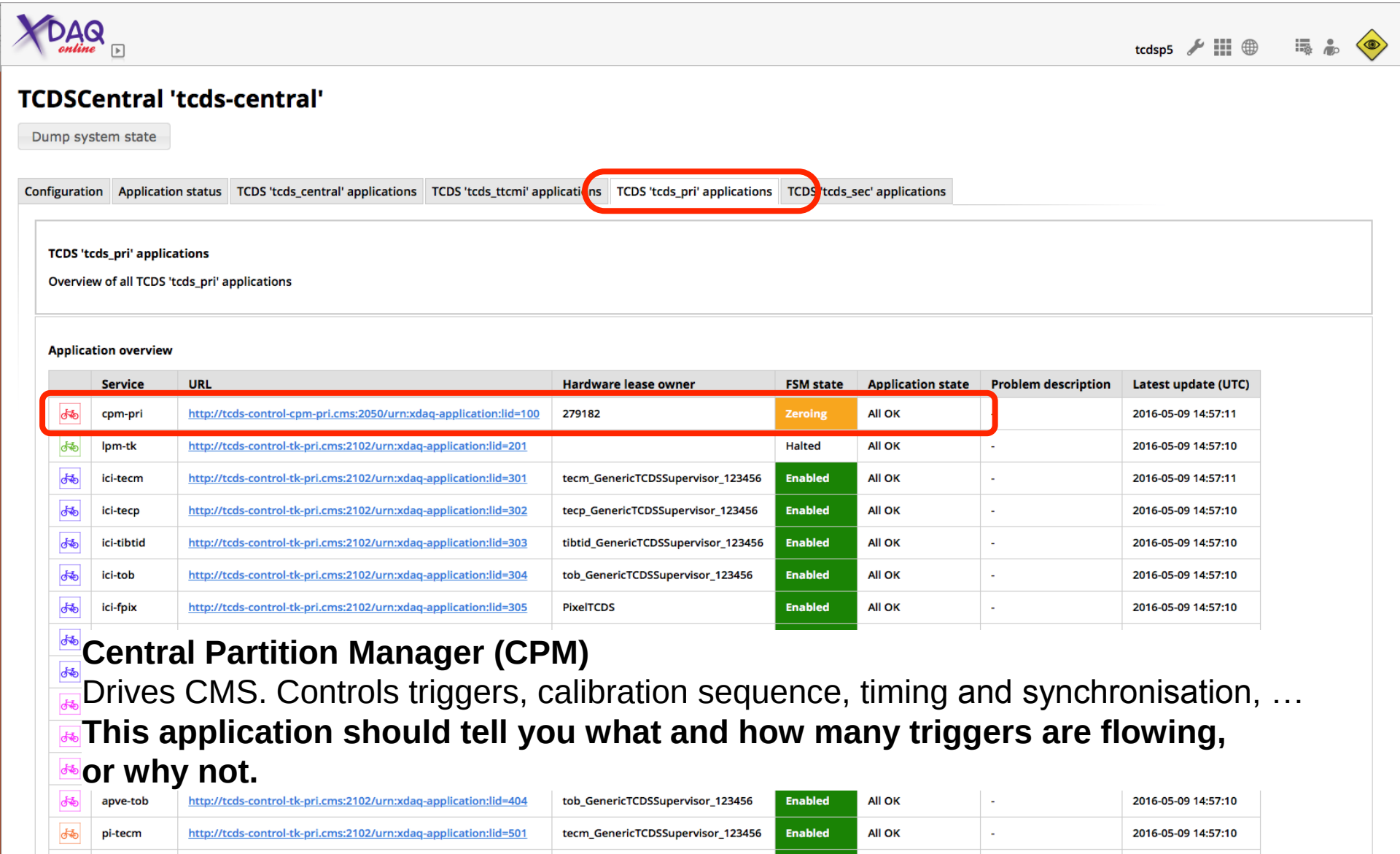
	Service	URL	Hardware lease owner	FSM state	Application state	Problem description	Latest update (UTC)
	rf2ttc	http://tcds-control-mi.cms:2010/urn:xdaq-application:lid=100	279182	Enabled	All OK	-	2016-05-09 14:56:28
	rfrxd1	http://tcds-control-mi.cms:2010/urn:xdaq-application:lid=200	279182	Enabled	All OK	-	2016-05-09 14:56:27
	rfrxd2	http://tcds-control-mi.cms:2010/urn:xdaq-application:lid=201	279182	Enabled	All OK	-	2016-05-09 14:56:28
	bobr	http://tcds-control-mi.cms:2010/urn:xdaq-application:lid=300	279182	Enabled	All OK	-	2016-05-09 14:56:28

TTC machine interface applications

Provide the connection between the LHC RF and timing signals and CMS.

TCDSCentral

http://tcds-control-central.cms:2000/urn:xdaq-application:lid=100



Service	URL	Hardware lease owner	FSM state	Application state	Problem description	Latest update (UTC)
cpm-pri	http://tcds-control-cpm-pri.cms:2050/urn:xdaq-application:lid=100	279182	Zeroing	All OK	-	2016-05-09 14:57:11
lpm-tk	http://tcds-control-tk-pri.cms:2102/urn:xdaq-application:lid=201		Halted	All OK	-	2016-05-09 14:57:10
ici-tecm	http://tcds-control-tk-pri.cms:2102/urn:xdaq-application:lid=301	tecm_GenericTCDSSupervisor_123456	Enabled	All OK	-	2016-05-09 14:57:11
ici-tecp	http://tcds-control-tk-pri.cms:2102/urn:xdaq-application:lid=302	tecp_GenericTCDSSupervisor_123456	Enabled	All OK	-	2016-05-09 14:57:10
ici-tibtid	http://tcds-control-tk-pri.cms:2102/urn:xdaq-application:lid=303	tibtid_GenericTCDSSupervisor_123456	Enabled	All OK	-	2016-05-09 14:57:10
ici-tob	http://tcds-control-tk-pri.cms:2102/urn:xdaq-application:lid=304	tob_GenericTCDSSupervisor_123456	Enabled	All OK	-	2016-05-09 14:57:10
ici-fpix	http://tcds-control-tk-pri.cms:2102/urn:xdaq-application:lid=305	PixelTCDS	Enabled	All OK	-	2016-05-09 14:57:10
apve-tob	http://tcds-control-tk-pri.cms:2102/urn:xdaq-application:lid=404	tob_GenericTCDSSupervisor_123456	Enabled	All OK	-	2016-05-09 14:57:10
pi-tecm	http://tcds-control-tk-pri.cms:2102/urn:xdaq-application:lid=501	tecm_GenericTCDSSupervisor_123456	Enabled	All OK	-	2016-05-09 14:57:10

Central Partition Manager (CPM)

Drives CMS. Controls triggers, calibration sequence, timing and synchronisation, …

This application should tell you what and how many triggers are flowing, or why not.

CPMController

http://tcds-control-cpm-pri.cms:2050/urn:xdaq-application:lid=100

XDAQ online

tcdsp5

CPMController 'cpm-pri'

(Enabled)

Configuration | Application status | Hardware ID | Hardware status | Input sources | Scheduling | Sequences | Actions | Cyclic generators | ReTri | APVE | TTS and trigger blockers | TTS link status | TTS counters | Counters | L1A histos | Rates and deadtimes | NibbleDAQ | DAQ

Configuration

Configuration parameters

Application configuration

Application configuration parameters

Run number	272887
Monitoring update interval	PT1S
Hardware lease duration	PT1M
Path to default hardware configuration file	${XDAQ_ROOT}/etc/tcds/cpm/hw_cfg_default_cpm.txt
IPbus connections file	${XDAQ_SETUP_ROOT}/${XDAQ_ZONE}/etc/tcds_connections.xml
T1 IPbus connection name	cpmt1-pri
T2 IPbus connection name	cpmt2-pri
FED id	1024
	0&3%1&3%2&3%3&3%4&3%5&3%6&3%7&3%8&3%9&3%10&3%11&3%12&3%13&3%14&3%15&3%16&3%17&3%18&3%19&3%20&3%21&3%22&3%23&3%24&3%25&3%26&3%27&3%28&3%29&3%30&3%31&3%32&3%33&3%34&3%35&3%36&3%37&3%38&3%39&3%40&3%50&3%51&3%52&3%53&3%54&3%55&3%56&3%57&3%58&3%60&3%61&3%62&3%63&3%64&3%65&3%66&3%67&3%68&3%69&3%70&3%71&3%72&3%73&3%74&3%75&3%76&3%77&3%78&3%79&3%80&3%81&3%82&3%83&3%84&3%85&3%86&3%87&3%88&3%89&3%90&3%91&3%92&3%93&3%94&3%95&3%96&3%97&3%98&3%99&3%100&3%101&3%102&3%104&3%105&3%106&3%107&

BRILDAQ configuration

BRILDAQ eventing configuration parameters

BRILDAQ eventing bus name	brildata
BRILDAQ eventing topic name	tcds_brildaq_data

CPMController

http://tcds-control-cpm-pri.cms:2050/urn:xdaq-application:lid=100

XDAQ online

tcdsp5

CPMController 'cpm-pri'

(Enabled)

TTS and trigger blockers tab

Configuration | Application status | Hardware ID | Hardware status | Input sources | Scheduling | Sequences | Actions | Cyclic generators | ReTri | APVE | TTS and trigger blockers | TTS link status | TTS counters | Counters | L1A histos | Rates and deadtimes | NibbleDAQ | DAQ

TTS and trigger blockers

Information on TTS and other trigger-blocking sources affecting the running state

Running state

Firmware PM running state

Running state	triggers blocked by TTS
Top-level TTS state	Warning

Trigger-blo

Trigger-bloc

TTS
DAQ back
ReTri trigg
PM APVE t
Bunch-ma

Running state shows if triggers are flowing or why not:

- Stopped
- Running
- Blocked by TTS
- Blocked by DAQ backpressure
- etc.

LPM 5 (DT) TTS values

iCI1 (DTTF)	Ignored
iCI2 (DT-)	Ready
iCI3 (DT0)	Ready
iCI4 (DT+)	Ready
iCI5 (TWINMUX)	Warning
iCI6 (Unused)	Ignored
iCI7 (Unused)	Ignored

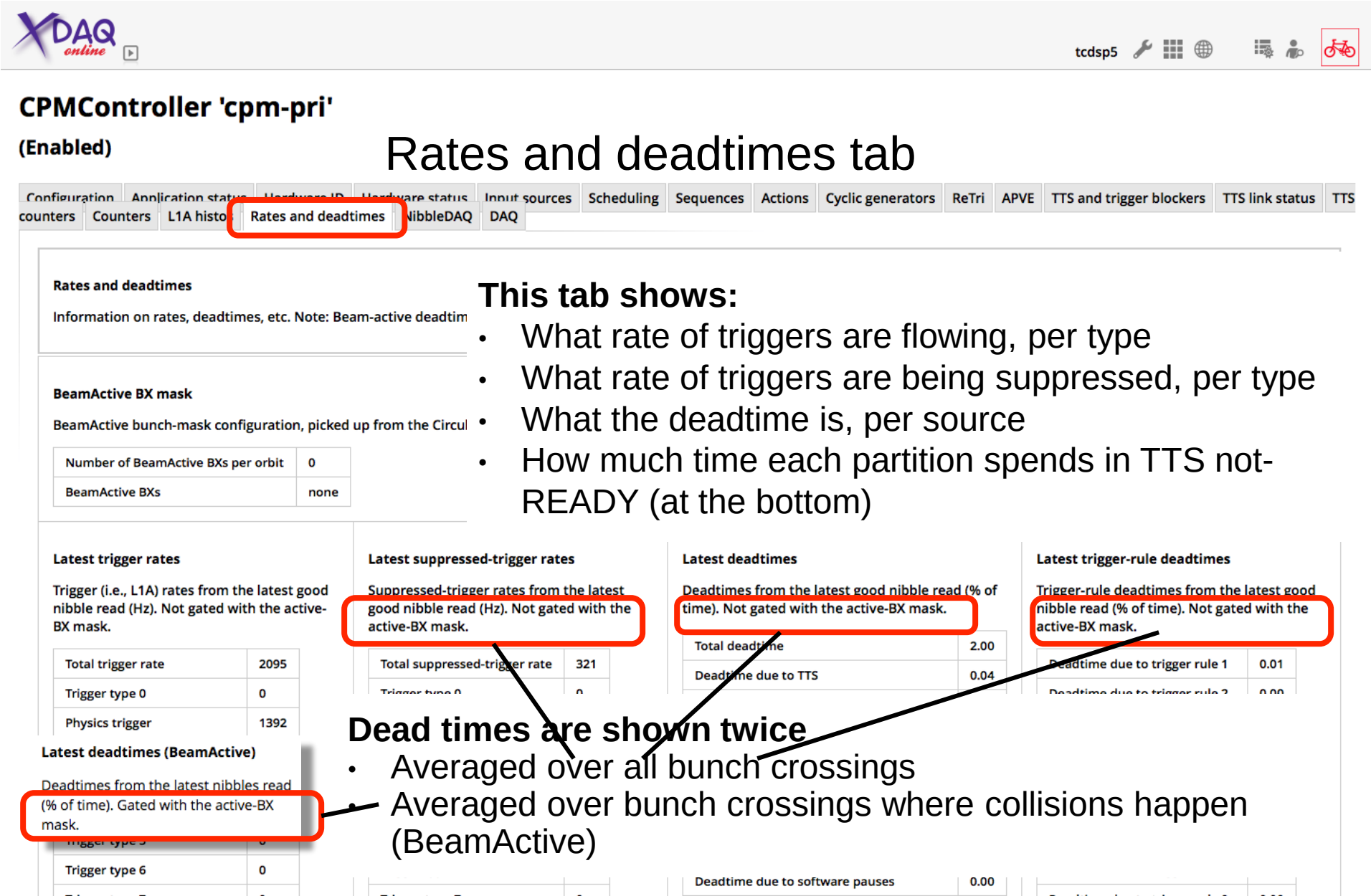
rigger rules

rigger rules configuration. If set to zero, the trigger rule is isabled.

N for trigger rule 'not more than one L1A in N BXs'	3
N for trigger rule 'not more than two L1As in N BXs'	25
N for trigger rule 'not more than three L1As in N BXs'	100
N for trigger rule 'not more than four L1As in N BXs'	240
N for trigger rule 'not more than five L1As in N BXs'	0
N for trigger rule 'not more than six L1As in N BXs'	0
N for trigger rule 'not more than seven L1As in N BXs'	0
N for trigger rule 'not more than eight L1As in N BXs'	0
N for trigger rule 'not more than nine L1As in N BXs'	0
N for trigger rule 'not more than ten L1As in N BXs'	0
N for trigger rule 'not more than eleven L1As in N BXs'	0
N for trigger rule 'not more than twelve L1As in N BXs'	0
N for trigger rule 'not more than thirteen L1As in N BXs'	0
N for trigger rule 'not more than fourteen L1As in N BXs'	0
N for trigger rule 'not more than fifteen L1As in N BXs'	0

CPMController

http://tcds-control-cpm-pri.cms:2050/urn:xdaq-application:lid=100



This tab shows:

- What rate of triggers are flowing, per type
- What rate of triggers are being suppressed, per type
- What the deadtime is, per source
- How much time each partition spends in TTS not-READY (at the bottom)

Dead times are shown twice

- Averaged over all bunch crossings
- Averaged over bunch crossings where collisions happen (BeamActive)

CPMController

http://tcds-control-cpm-pri.cms:2050/urn:xdaq-application:lid=100

XDAQ online

tcdsp5

CPMController 'cpm-pri'

(Configured)

Input Sources

Configuration | Application status | Hardware ID | Hardware status | Input sources | Scheduling | Sequences | Actions | Cyclic generators | ReTri | APVE | TTS and trigger blockers | TTS link status | TTS counters | Counters | L1A histos | Rates and deadtimes | NibbleDAQ | DAQ

Input sources

General CPM information

Orbit source

Orbit source selection and configuration

Orbit source: CPM	disabled
Orbit source: TTCmi	enabled
Orbit offset (BX)	3334

Trigger/B-go inputs

Trigger and B-go source selection and configuration

Front-panel GT trigger input	enabled
Front-panel GT trigger input delay (BX)	0
Front-panel NIM trigger input	disabled
Front-panel NIM trigger input delay (BX)	0
IPbus/SOAP-based triggers and B-gos	enabled
TTS state-driven triggers and B-gos	enabled
Cyclic triggers	disabled
BX-mask trigger generator	disabled
Random-trigger generator	enabled

BX-mask trigger

Bunch-mask trigger configuration

Prescale	1
Initial prescale value	0
Number of forced-trigger BXs per orbit	0
Forced-trigger BXs	none

Random trigger

Random-trigger configuration

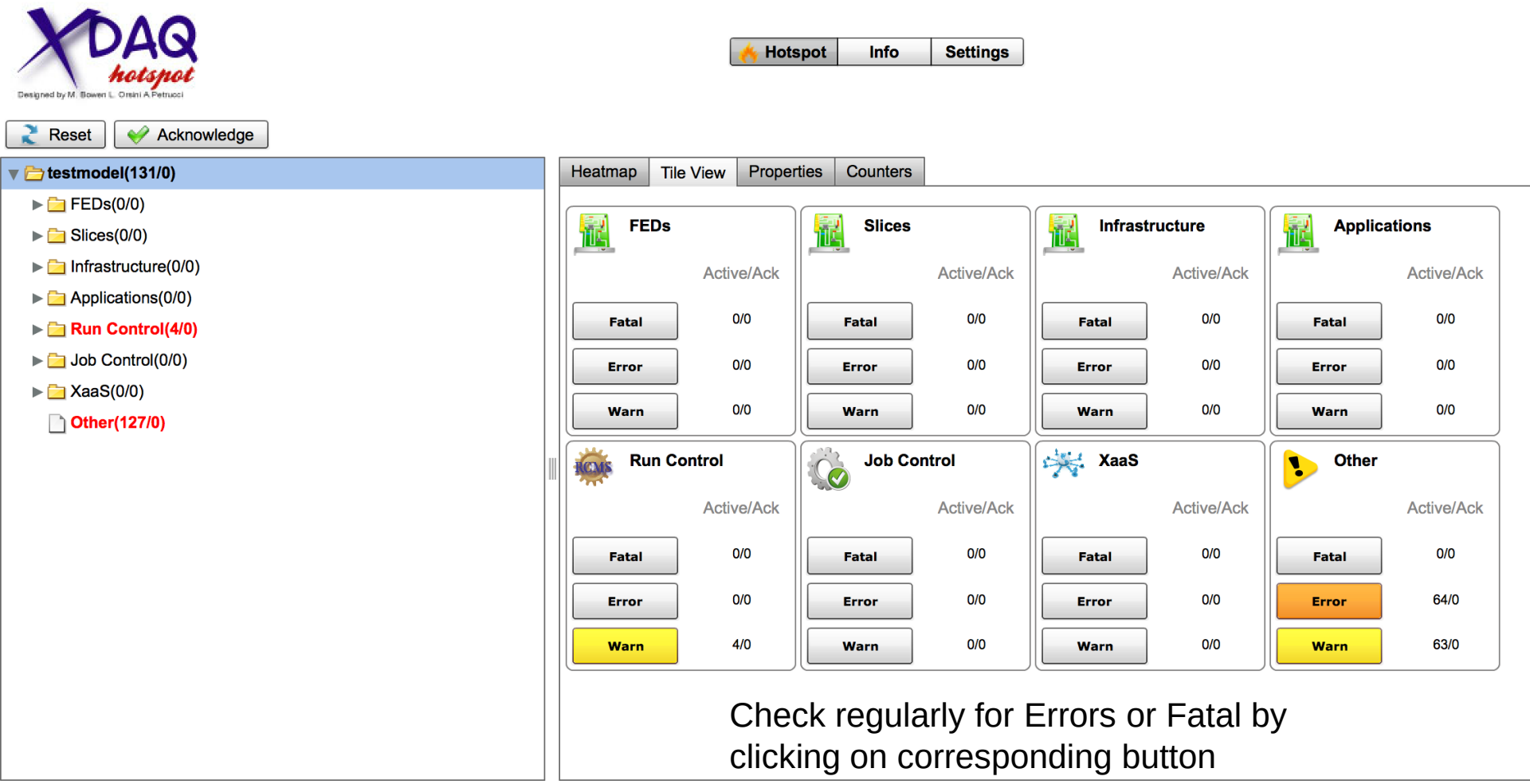
Modify random-trigger rate

Requested random-trigger rate (Hz)	600

Click here to change the random trigger rate

HotSpot

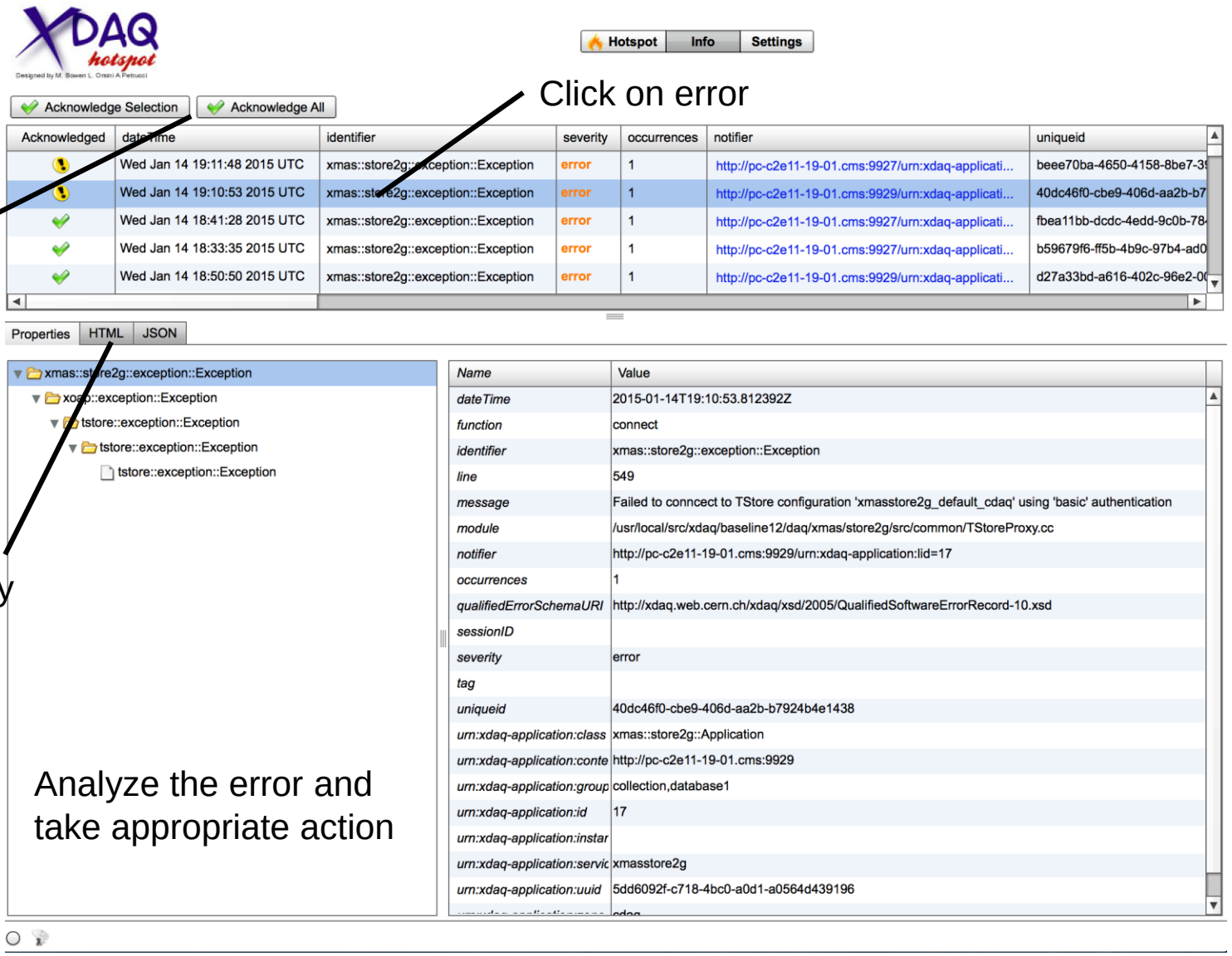
https://xdaq.web.cern.ch/xdaq/xmas/12/hotspot/hotspot.swf



Check regularly for Errors or Fatal by clicking on corresponding button

Make sure that it updates (pulsates)

HotSpot


XDAQ hotspot
Hotspot
Info
Settings
Acknowledge Selection
Acknowledge All
Click on error
Acknowledge understood errors
Acknowledged
dateTime
identifier
severity
occurrences
notifier
uniqueid
Wed Jan 14 19:11:48 2015 UTC
Wed Jan 14 19:10:53 2015 UTC
Wed Jan 14 18:41:28 2015 UTC
Wed Jan 14 18:33:35 2015 UTC
Wed Jan 14 18:50:50 2015 UTC
xmas::store2g::exception::Exception
error
1
http://pc-c2e11-19-01.cms:9927/urn:xdaq-applicati...
http://pc-c2e11-19-01.cms:9929/urn:xdaq-applicati...
Properties
HTML
JSON
xmas::store2g::exception::Exception
tstore::exception::Exception
tstore::exception::Exception
tstore::exception::Exception
Name
Value
dateTime
2015-01-14T19:10:53.812392Z
function
connect
identifier
xmas::store2g::exception::Exception
line
549
message
Failed to conncect to TStore configuration 'xmasstore2g_default_cdaq' using 'basic' authentication
module
/usr/local/src/xdaq/baseline12/daq/xmas/store2g/src/common/TStoreProxy.cc
notifier
http://pc-c2e11-19-01.cms:9929/urn:xdaq-application:lid=17
occurrences
1
qualifiedErrorSchemaURI
http://xdaq.web.cern.ch/xdaq/xsd/2005/QualifiedSoftwareErrorRecord-10.xsd
sessionID
severity
error
tag
uniqueid
40dc46f0-cbe9-406d-aa2b-b7924b4e1438
urn:xdaq-application:class
xmas::store2g::Application
urn:xdaq-application:group
collection,database1
urn:xdaq-application:id
17
urn:xdaq-application:uuid
5dd6092f-c718-4bc0-a0d1-a0564d439196
You can use HTML to copy it into the elog
Analyze the error and take appropriate action

Handsaw

```
2015-01-14 18:12:53 and 765 ms : cms.daqdev.rcms.fm.levelZeroFM.util.Lv0GlobalModeHandler
    ERROR Caught Nullpointerexception
2015-01-14 18:13:04 and 721 ms : cms.daqdev.rcms.fm.levelZeroFM.util.Lv0GlobalModeHandler
    ERROR Caught Nullpointerexception
2015-01-14 18:13:14 and 31 ms : cms.daqdev.rcms.fm.levelZeroFM.util.Lv0GlobalModeHandler
    ERROR Caught Nullpointerexception
2015-01-14 18:13:14 and 837 ms : cms.daqdev.rcms.fm.app.rubuilder.RUBuilderFM
    ERROR CMSSW_7_2_3
2015-01-14 19:26:34 and 948 ms : cdaq.cms.ru-c2e15-26-01.p:31100.evb::EVM.instance(0)
    ERROR Caught exception: exception::CRCerror 'Received 1 events with wrong CRC checksum from FED 814: FED trailer claims 0xd479, but recalculation gives 0xa
752' raised at checkIntegrity(/usr/local/src/xdaq/baseline12/daq/evb/src/common/FedFragment.cc:245)
2015-01-14 20:35:22 and 57 ms : cdaq.cms.ru-c2e15-26-01.p:31100.evb::EVM.instance(0)
    ERROR Caught exception: exception::CRCerror 'Received 2 events with wrong CRC checksum from FED 814: FED trailer claims 0x3c76, but recalculation gives 0x4
f5d' raised at checkIntegrity(/usr/local/src/xdaq/baseline12/daq/evb/src/common/FedFragment.cc:245)
2015-01-14 20:47:31 and 91 ms : cdaq.cms.ru-c2e15-12-01.p:31100.evb::RU.instance(43)
    ERROR Caught exception: exception::CRCerror 'Received 1 events with wrong CRC checksum from FED 486: FED trailer claims 0xd8fd, but recalculation gives 0xf
67d' raised at checkIntegrity(/usr/local/src/xdaq/baseline12/daq/evb/src/common/FedFragment.cc:245)
2015-01-14 21:17:55 and 724 ms : cdaq.cms.ru-c2e15-12-01.p:31100.evb::RU.instance(43)
    ERROR Caught exception: exception::CRCerror 'Received 2 events with wrong CRC checksum from FED 486: FED trailer claims 0x40dd, but recalculation gives 0x6
e5d' raised at checkIntegrity(/usr/local/src/xdaq/baseline12/daq/evb/src/common/FedFragment.cc:245)
2015-01-14 21:36:02 and 258 ms : cdaq.cms.ru-c2e15-12-01.p:31100.evb::RU.instance(43)
    ERROR Caught exception: exception::CRCerror 'Received 3 events with wrong CRC checksum from FED 486: FED trailer claims 0x7368, but recalculation gives 0x5
de8' raised at checkIntegrity(/usr/local/src/xdaq/baseline12/daq/evb/src/common/FedFragment.cc:245)
```

- Running in a terminal on the shifter console
  - You need an account in the online cluster to start it
- Scrolling display of error messages from DAQ
  - All messages (and more) are in HotSpot or LVL0
  - Handsaw is often quicker to find the most relevant message

What to do if it does not work

- Don’t panic! Keep cool.
  - Not always easy, especially during stable beams
  - Think before clicking!
  - GUIs are sometimes slow in reacting. Be patient…
- Look at what the **DAQ expert application suggests**
  - suggestions are equivalent to the ‘DAQ stuck’ flow chart
- Look for error messages (LVL0, HotSpot, Handsaw)
- Look at DAQView for anything suspicious
  - Figure out what subsystem is causing problems
  - Be aware that one subsystem might get backpressure from DAQ due to other issues
- Talk to the shift leader and other shifters
  - They might be aware of problems affecting DAQ
  - E.g. if a subsystem lost power, DAQ will go into error (you might be the first to realize it!)
- If you are unsure or stuck, don’t hesitate to call the DAQ oncall anytime (76600)

Thank you for your attention

HAPPY SHIFTING…

BACKUP

Trouble Shooting Flow Chart

https://twiki.cern.ch/twiki/pub/CMS/ShiftNews/DAQStuck5.pdf

the DAQ Expert application suggestions are based on this flowchart !