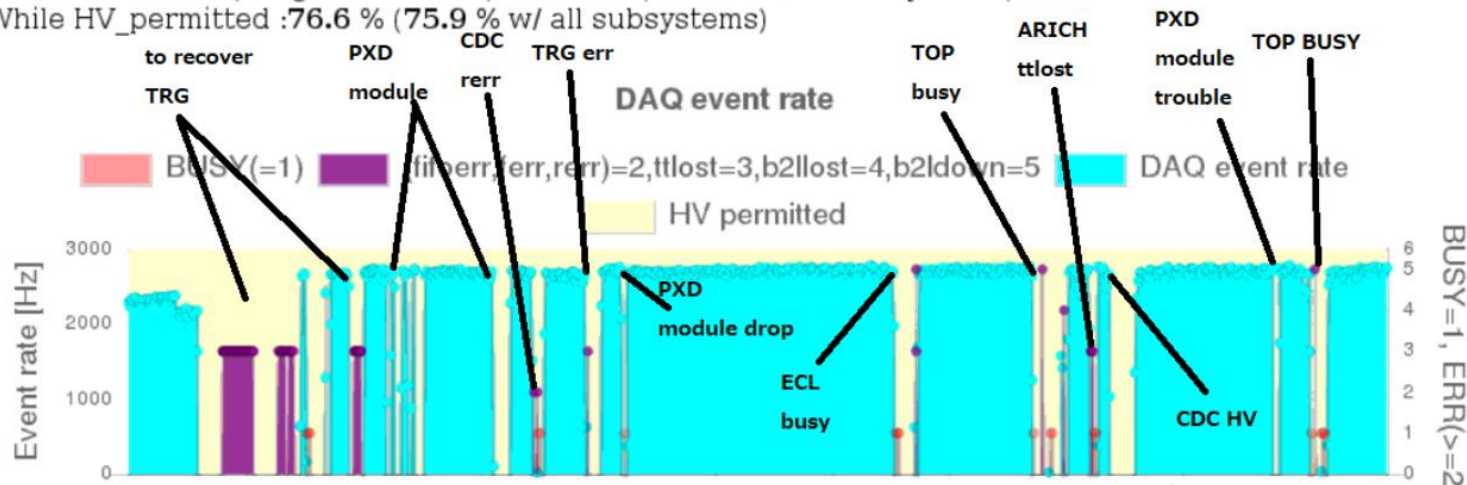




ERROR DIAGNOSIS SYSTEM (FROM LAYNE-SAN' SUMMER STUDENT REPORT)

L. Fujioka
(Univ. of Hawaii)

Livetime in 12hrs(rough estimation) = 76.6 % (75.9 % w/ all subsystems)
 While HV_permitted :76.6 % (75.9 % w/ all subsystems)



- Currently errors occurs during uptime of the detector
- This forces the people watching (shifters) to identify, contact people to fix it, then restart the system
- By automatically detecting errors and determining who the shifters should contact, we can mitigate the amount of downtime experienced
- With less downtime everyone is happy

When errors occur, currently we check;

- 1, log message from DAQ processes
- 2, output of statft
- 3, status indicator of SLC system

->

Diagnose these info. and provide shifters what to do.

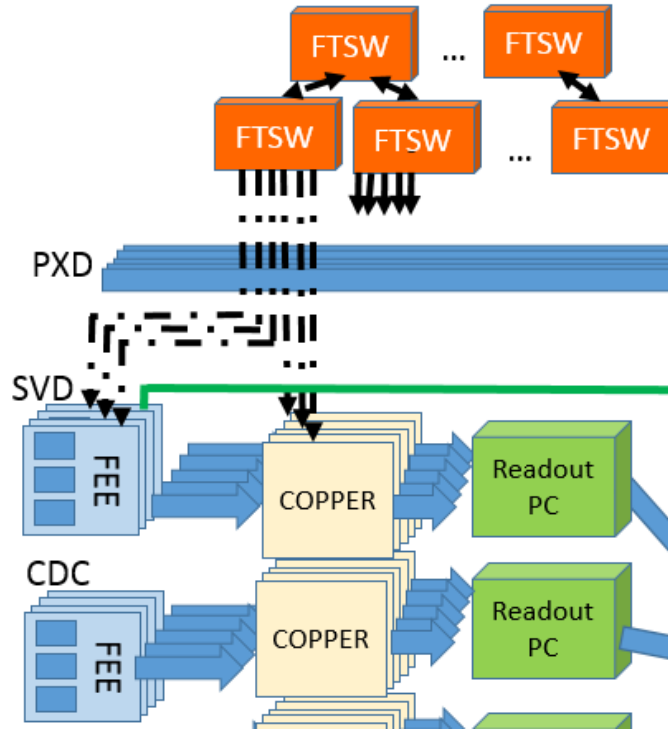
The screenshot shows the CDS Studio interface. The 'Run control for AC_CDC' section is at the top left, with buttons for 'RUNNING', 'CONFIGURE', 'STOP', and 'ABORT'. The 'Log from DAQ global' section is below it, showing a list of logs. The 'statft' output window is at the top right, showing a list of statistics. The 'Run control for AC_CDC' section is circled in red (3). The 'Log from DAQ global' section is circled in red (1). The 'statft' output window is circled in red (2). A large blue arrow points from the 'Log from DAQ global' section to the 'Run control for AC_CDC' section. A yellow cloud contains the text 'Message windows to shifters?'. A dashed blue arrow points from the yellow cloud to the 'statft' output window. A dashed blue arrow points from the 'statft' output window to the 'Run control for AC_CDC' section.

- ④ COPPER unreachable SLC daemon down
- ⑤ Network queue in serves

Notice :

- CR shifters will not check many outputs -> must be only one output
- The main purpose of the system is to ask CR shifters to do something
- > The output needs to include what to do.

Error information from statft



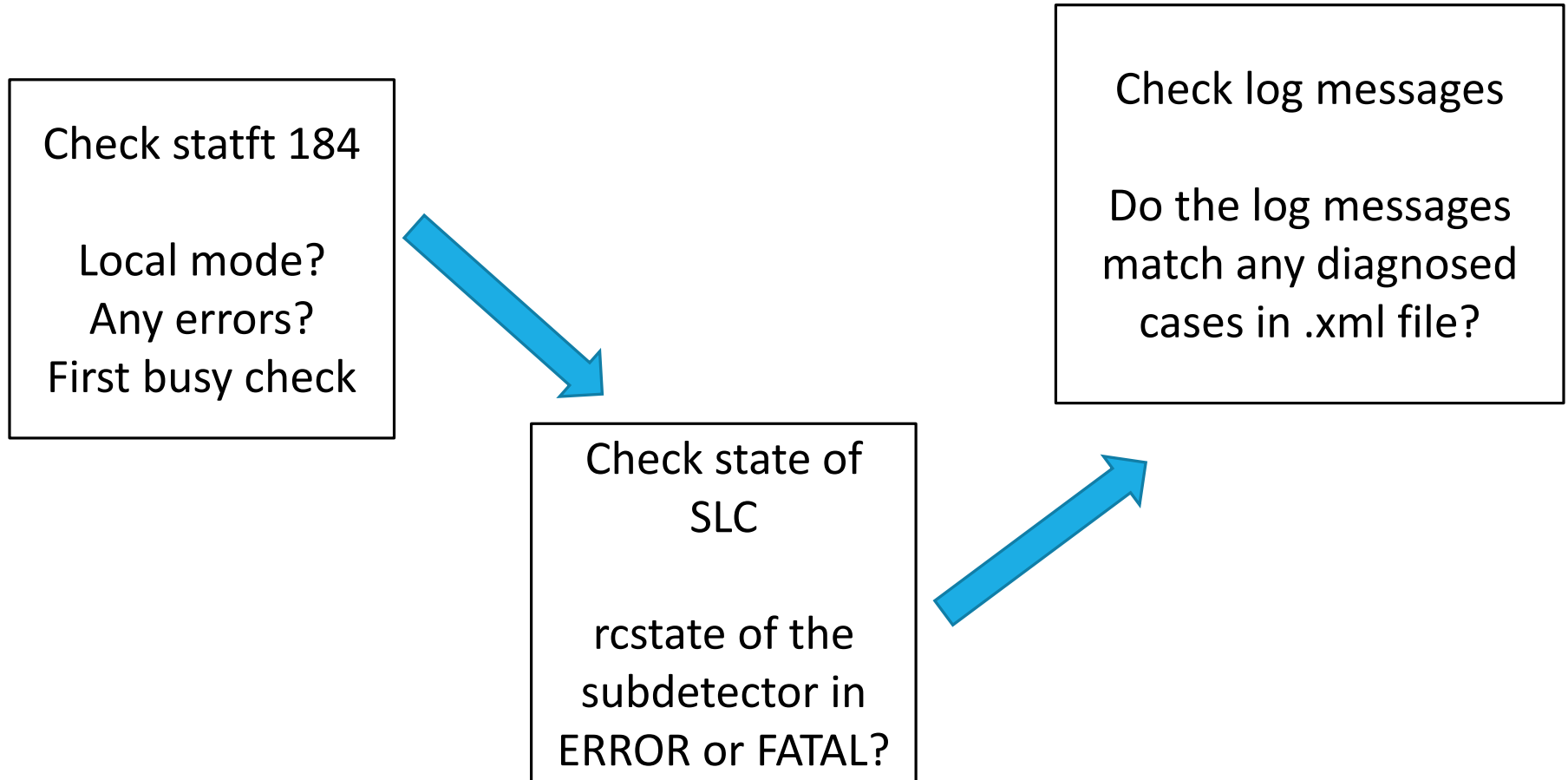
I either get BUSY or errors to deal with

There are two places, COPPER and FEE

COPPER takes information from the subdetectors to the readout PCs

FEE (front end electronics) of subdetectors for collect information

HIGH LEVEL FLOWCHART:



SLC DATA FLOW OF THE SYSTEM

```

12:36:46 CPRO INFO basf2 : run 412 sub 0 Event 31900 Rate 0.00[kHz]
12:36:46 CPRO INFO basf2 : run 412 sub 0 Event 31900 Rate 0.00[kHz]
12:36:46 CPRO INFO basf2 : run 412 sub 0 Event 31900 Rate 0.00[kHz]
12:33:33 CPRO INFO basf2 : run 412 sub 0 Event 31800 Rate 0.00[kHz]
12:33:33 CPRO INFO basf2 : run 412 sub 0 Event 31800 Rate 0.00[kHz]
12:33:33 CPRO INFO basf2 : run 412 sub 0 Event 31800 Rate 0.00[kHz]
12:33:33 CPRO INFO basf2 : run 412 sub 0 Event 31800 Rate 0.00[kHz]
12:30:07 CPRO INFO basf2 : run 412 sub 0 Event 31700 Rate 0.00[kHz]
12:30:07 CPRO INFO basf2 : run 412 sub 0 Event 31700 Rate 0.00[kHz]

```

Detector states (ABORT before you check or uncheck a subsystem)

<input type="checkbox"/> PXD	OFF	<input type="checkbox"/> TOP	OFF	<input type="checkbox"/> KLM	OFF
<input type="checkbox"/> SVD	OFF	<input type="checkbox"/> ARICH	OFF	<input type="checkbox"/> TRG	OFF
<input checked="" type="checkbox"/> CDC	RUNNING	<input type="checkbox"/> ECL	OFF	HLT	RUNNING

ttd11

rospare01

```

b2daq@ttd11:~$ statft-20190128 FTSW #184 / ft3m075a 2019.03.07-14:31:14 -> 07.25 20:38:01
-- RUNNING (about 10013.0Hz since 2019.07.25 20:38:58 for 63s)
16 exprun=02432500 exp 9 run 805 sub 0
17 omask=000080fb s3q=0 clk=0 lmask=00fb MASTER
1f jpl1=cc008000 clk=1n 6000-CLOCK
28292c trg=0000ba07 poisson 10004.404 Hz 186e0 limit -1 <=> last -1
2a2b27 cnt 643391 > 643397 > 636341 > 636341 (10212.6 > 10212.7 > 10100.7Hz)
2d stafifo=03000000 some data trg-enabled
20 reset=00100000 07.25-20:36:58.013(start) RUNNING
31 err=90800000 07.25-20:36:58.012(error) RUNNING nott
25/30 e/bs=0f000000 00000000
393a3b me=18400004 0f000000 10800004 mask=none min=2
no-pxd 0012200008 0f000000 1c800001 - LOCAL-mode anyerr d=0.00%
no-svd 0110660008 0f000000 1b800400 - LOCAL-mode anyerr d=0.00%
CDC 02=20000000 0a09b5b5 108001ff ready tag=636341 min=8.0 d=0.01%
no-top 0310650000 0f000000 108001ff - LOCAL-mode d=0.00%
no-ari 0411830008 0f000000 1c800018 - LOCAL-mode anyerr d=0.00%
no-ecl 0510640008 0f000000 1c80003f - LOCAL-mode anyerr d=0.00%
no-klm 0611810008 0f000000 17f00041 - LOCAL-mode anyerr d=0.00%
no-trg 0711850000 0f000000 1080000f - LOCAL-mode d=0.00%
9f limiter=01000100 maxtrig=1 maxtime=2.00us
a0-a7 dead 2.01% (t=0.00% c=0.00% p=2.00% f=0.00% r=0.00%)

```

```

my_test.opi
ERROR DIAGNOSIS SUPPORT SYSTEM | Thu Jul 25 20:38:15 2019
Exp #9 Run #805 Sub-Run #0

Subdetector Status

PXD: In local mode.
SVD: In local mode.
CDC: Seems healthy.
TOP: In local mode.
ARI: In local mode.
ECL: In local mode.
KLM: In local mode.
TRG: In local mode.

```

DEALING WITH ERRORS

layne@tt11:~

```
statft-20190128 FTSW #184 / ft3m075a 2019.03.07-14:31:14 -> 07.22 17:12:12
-- BUSY (2019.07.22 17:09:53 -- 2019.07.22 17:11:00 for 67s) -----
16 exprun=0242d600 exp 9 run 726 sub 0
17 omask=000080f3 s3q=0 clk=00 lmask=00f3 MASTER
1f jpll=cc008000 clk=in GOOD-CLOCK
28292c trg=00026e07 poisson 3002.927 Hz 622e0 limit 0 <-> last 0
2a2b27 cnt 422919 > 75017 > 1953 > 0 (3042.6 > 1119.7 > 29.1Hz)
2d stafifo=10000000 empty trg-DISABLED
20 reset=00000000 07.22-17:09:53.011(start)
31 err=80800000 07.22-17:11:00.526(error) nott
25/30 e/bs=0f000000 c1000004
393a3b me=18400404 0f000000 10800008 BUSY min=3
no-pxd o0!23200008 0f000000 1c800001 - LOCAL-mode anyerr d=0.00%
no-svd o1!06600008 0f000000 1b800400 - LOCAL-mode anyerr d=0.00%
CDC o2=20000400 0a0007a1 108001ff BUSY ready tag=1953 min=8..0 d=97.30%
TOP o3=06500000 0a000000 108004ff ready tag=0 min=a7..0 d=0.00%
no-ari o4!18300008 0f000000 1c800018 - LOCAL-mode anyerr d=0.00%
no-ecl o5!06400008 0f000000 1c80003f - LOCAL-mode anyerr d=0.00%
no-klm o6!19100008 0f000000 1c800003 - LOCAL-mode anyerr d=0.00%
no-trg o7!18500000 0f000000 1080000c - LOCAL-mode d=0.00%
9f limiter=01000100 maxtrig=1 maxtime=2.00us
a0-a7 dead 97.32% (t=0.00% c=0.00% p=0.02% f=0.00% r=0.00%)
```



```
no-pxd o0!23200008 0f000000 1c800001 - LOCAL-mode anyerr d=0.00%
no-svd o1!06600008 0f000000 1b800400 - LOCAL-mode anyerr d=0.00%
CDC o2=20000400 0a0007a1 108001ff BUSY ready tag=1953 min=8..0 d=97.30%
TOP o3=06500000 0a000000 108004ff ready tag=0 min=a7..0 d=0.00%
no-ari o4!18300008 0f000000 1c800018 - LOCAL-mode anyerr d=0.00%
no-ecl o5!06400008 0f000000 1c80003f - LOCAL-mode anyerr d=0.00%
no-klm o6!19100008 0f000000 1c800003 - LOCAL-mode anyerr d=0.00%
no-trg o7!18500000 0f000000 1080000c - LOCAL-mode d=0.00%
```

Parsing

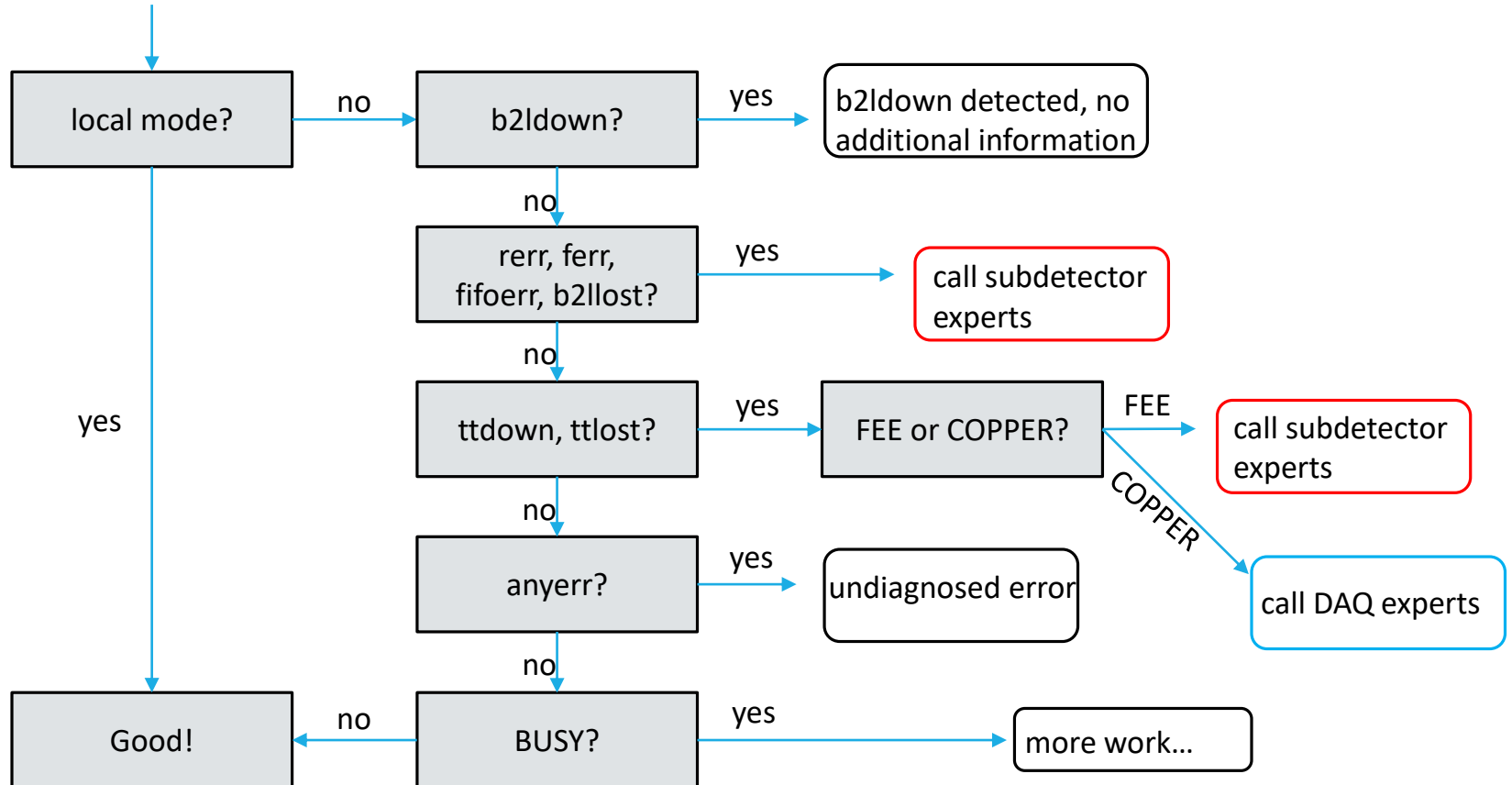
no-pxd o0!23200008 0f000000 1c800001 - LOCAL-mode anyerr d=0.00%

no-svd o1!06600008 0f000000 1b800400 - LOCAL-mode anyerr d=0.00%

CDC o2=20000400 0a0007a1 108001ff BUSY ready tag=1953 min=8..0 d=97.30%

Flow chart of diagnosis

```
no-pxd o0!23200008 0f000000 1c800001 - LOCAL-mode anyerr d=0.00%
```



EXAMPLE 1:

 b2daq@ttd11:layne

```
statft-20190128 FTSW #184 / ft3m075a 2019.03.07-14:31:14 -> 07.25 20:42:59
-- ERROR (2019.07.25 20:36:58 -- 2019.07.25 20:41:50 for 292s) -----
16 exprun=02432500 exp 9 run 805 sub 0
17 omask=000080fb s3q=0 clk=00 lmask=00fb MASTER
1f jpll=cc008000 clk=in GOOD-CLOCK
28292c trg=0000ba07 poisson 10004.404 Hz 186e0 limit -1 <-> last -1
2a2b27 cnt 3652296 > 3652298 > 2920252 > 2920252 (10117.2 > 12507.9 > 10000.9Hz)
2d stafifo=10000000 empty trg-enabled
20 reset=00100000 07.25-20:36:58.013(start) RUNNING
31 err=90800004 07.25-20:41:50.534(error) RUNNING src=2 nott
25/30 e/bs=0f800000 80000000 mask=none
393a3b me=1840000c 0f800000 1c800004 anyerr mask=none ttdown=2
no-pxd o0!23200008 0f000000 1c800001 - LOCAL-mode anyerr d=0.00%
no-svd o1!06600008 0f000000 1b800400 - LOCAL-mode anyerr d=0.00%
CDC o2=20000008 1c800010 1c800010 anyerr ttdown=4 d=0.01%
no-top o3!06500000 0f000000 108001ff - LOCAL-mode d=0.00%
no-ari o4!18300008 0f000000 1c800018 - LOCAL-mode anyerr d=0.00%
no-ec1 o5!06400008 0f000000 1c80003f - LOCAL-mode anyerr d=0.00%
no-klm o6!19100008 0f000000 17f00041 - LOCAL-mode anyerr d=0.00%
no-trg o7!18500000 0f000000 1080000f - LOCAL-mode d=0.00%
9f limiter=01000100 maxtrig=1 maxtime=2.00us
a0-a7 dead 1.63% (t=0.00% c=0.00% p=1.62% f=0.00% r=0.00%)
```

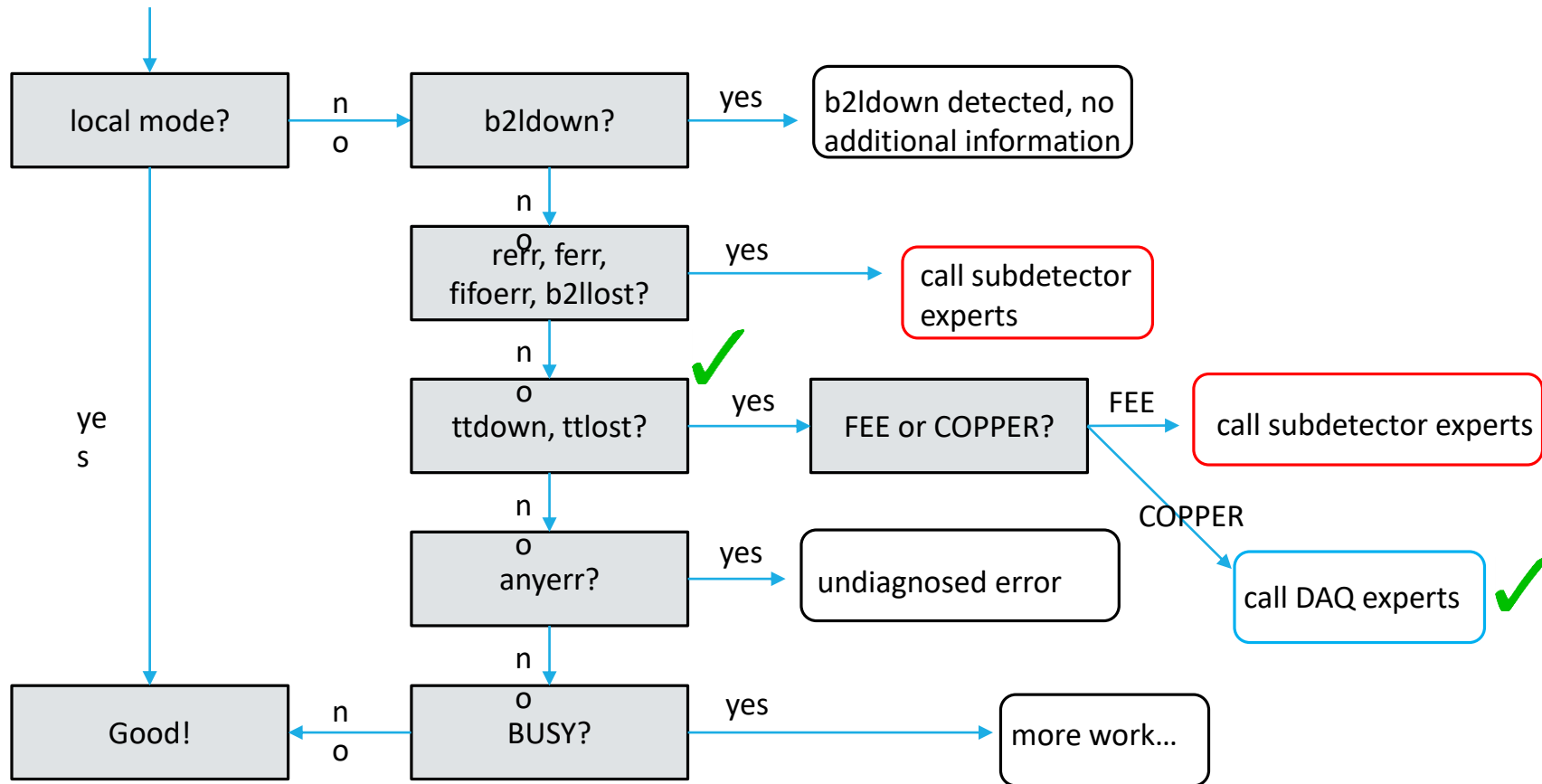
 b2daq@ttd11:layne

```
statft-20190128 FTSW #200 / ft3o075a 2019.03.07-14:31:26 -> 07.25 20:43:22
```

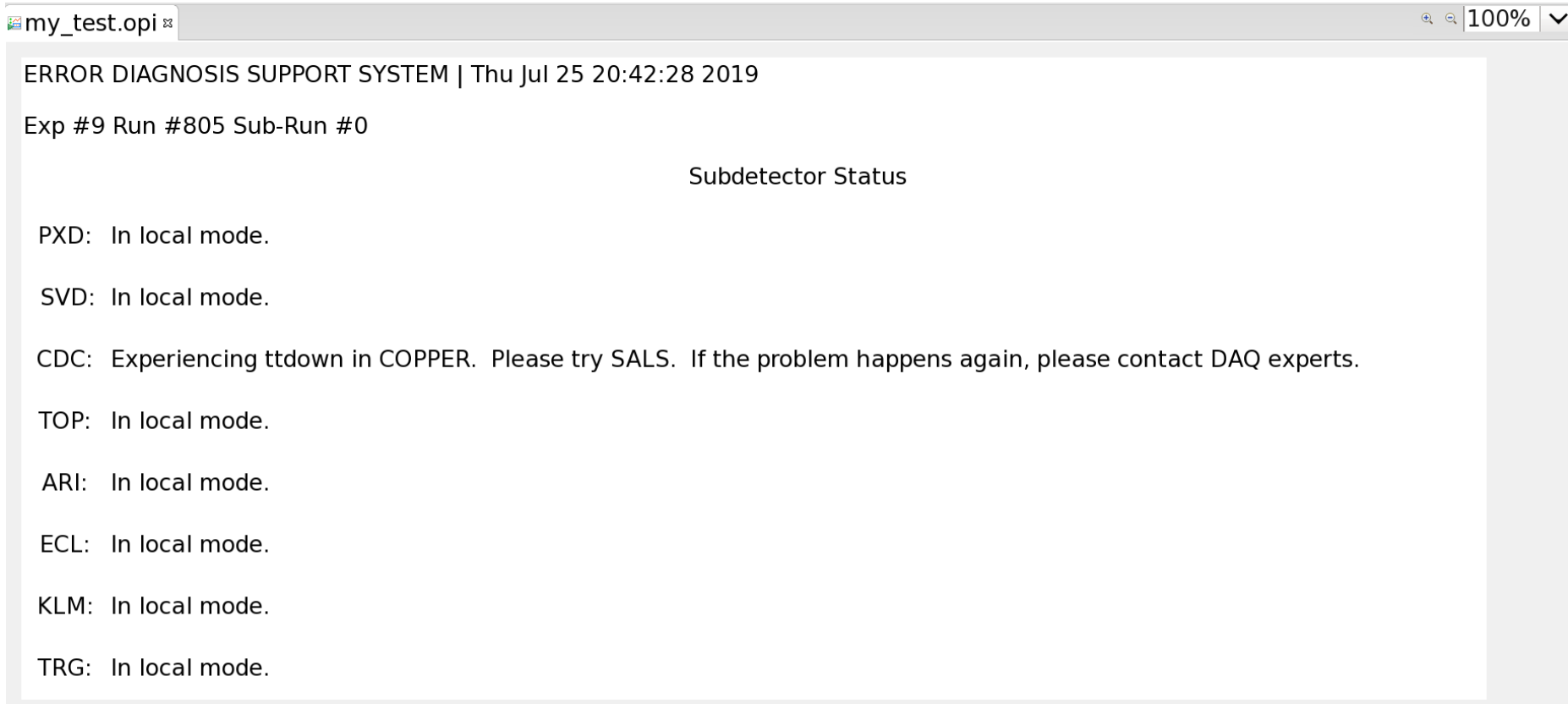
```
-- ERROR (at 2019.07.25 20:42:48 while not running) -----
```

```
16 exprun=02424000 exp 9 run 576 sub 0
17 omask=00001e00 s3q=0 clk=00 gmask=0000 GLOBAL
1f jpll=cc008000 clk=in GOOD-CLOCK
28292c trg=00029664 pulse 100.055 Hz 662e6 limit 0 <-> last 0
2a2b27 cnt 38491 > 0 > 2920252 > 2920252 (100.2 > 0.0 > 8343.6Hz)
2d stafifo=10000000 empty trg-enabled
20 reset=a0000000 07.25-20:36:58.013(start) no-FIFO
31 err=50000010 07.25-20:42:48.229(error) RUNNING src=4
25/30 e/bs=1c800010 80000000 ttdown=4
393a3b me=20000008 1c800010 1c800010 anyerr ttdown=4
405468 o0=13600000 0a2c8f3c 108000ff ready tag=2920252 min=7..0 d=0.00%
415569 o1=13700000 0a2c8f3c 1080007f ready tag=2920252 min=6..0 d=0.00%
42566a o2=13800000 0a2c8f3c 108000ff ready tag=2920252 min=7..0 d=0.00%
43576b o3=13900000 0a2c8f3c 108000ff ready tag=2920252 min=7..0 d=0.00%
44586c x4=18680008 1c800001 1c800001 anyerr ttdown=0d d=0.00%
45596d x5=18780000 0a2c8f3c 00abcdef ready tag=2920252 d=0.00%
465a6e x6=18880000 0a2c8f3c 00abcdef ready tag=2920252 d=0.00%
475b6f x7=18980000 0a2c8f3c 00abcdef ready tag=2920252 d=0.00%
485c70 x8=19080000 0a2c8f3c 00abcdef ready tag=2920252 d=0.00%
9f limiter=0c00b000 maxtrig=12 maxtime=351.44us
a0-a7 dead 0.00% (t=0.00% c=0.00% p=0.00% f=0.00% r=0.00%)
```

```
no-pxd  o0!23200008 0f000000 1c800001 - LOCAL-mode anyerr d=0.00%
```



Message to CR shifter in this example



The screenshot shows a web browser window with a single tab titled "my_test.opi". The address bar shows a magnifying glass icon, a search icon, and "100%". The main content area has a header "ERROR DIAGNOSIS SUPPORT SYSTEM | Thu Jul 25 20:42:28 2019" and a sub-header "Exp #9 Run #805 Sub-Run #0". Below this is a section titled "Subdetector Status" which lists the status of various subdetectors: PXD, SVD, CDC, TOP, ARI, ECL, KLM, and TRG. The CDC status is highlighted in red, indicating a problem.

my_test.opi

ERROR DIAGNOSIS SUPPORT SYSTEM | Thu Jul 25 20:42:28 2019

Exp #9 Run #805 Sub-Run #0

Subdetector Status

PXD: In local mode.

SVD: In local mode.

CDC: Experiencing ttdown in COPPER. Please try SALS. If the problem happens again, please contact DAQ experts.

TOP: In local mode.

ARI: In local mode.

ECL: In local mode.

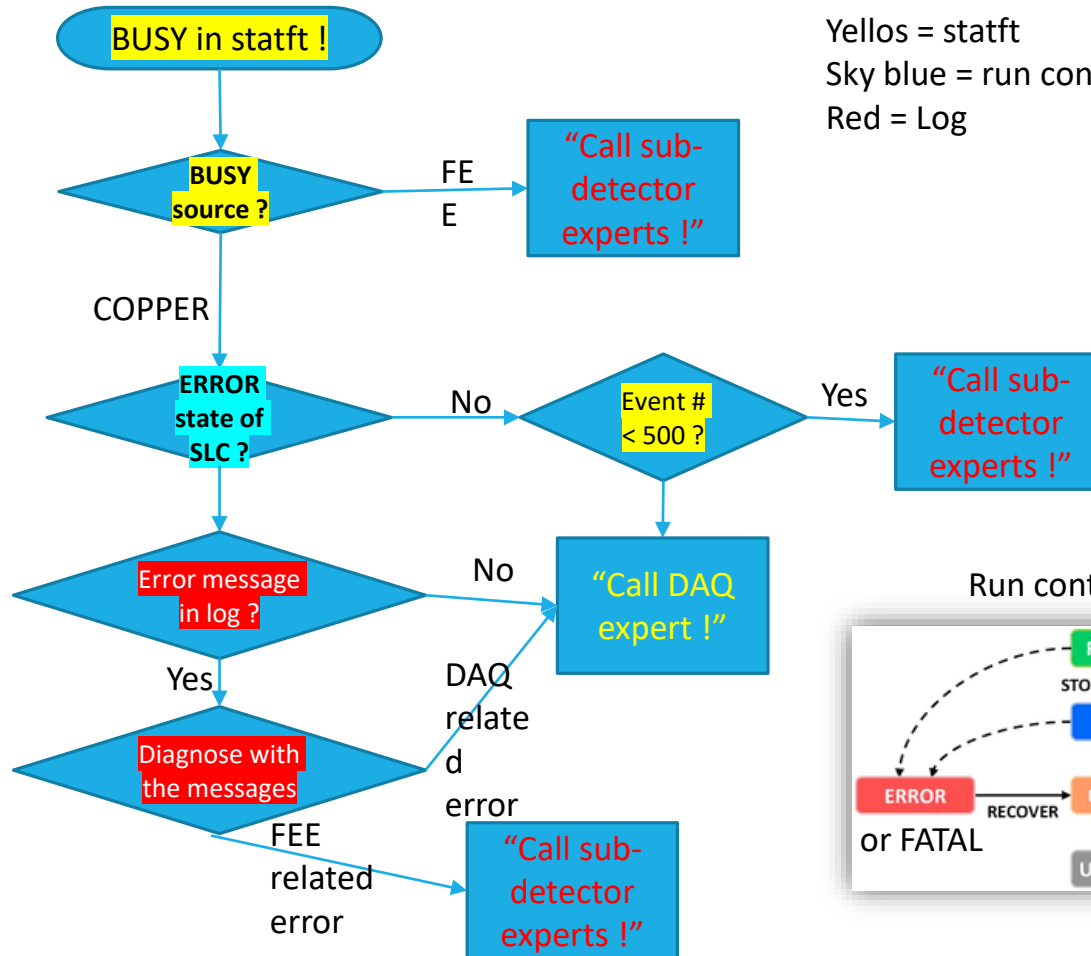
KLM: In local mode.

TRG: In local mode.

DEALING WITH BUSY

More difficult ...

Flow chart for analyzing BUSY



Source of information :
 Yellos = statft
 Sky blue = run controller state
 Red = Log

Run controller state



BUSY FROM FEE OR COPPER?

Unfortunately BUSY does not show a number like the statft case

Must parse the subdetector statft to figure out if the BUSY is from FEE or COPPER

If it is from COPPER proceed.

If it is from FEE call the subdetector expert.

EXAMPLE 2:

RCControlMain.opi

RC CDC

RC ECL

RC Command

STOP

ABORT

Run status

Exp #: 9

Run #: 804

RUNNING

BUSY

NODATA

Run control

Trigger distribution

Data flow

Detector states (ABORT before you check or uncheck a subsystem)

☐PXD

OFF

☐TOP

OFF

☐KLM

OFF

☐SVD

OFF

☐ARICH

OFF

☐TRG

OFF

☒CDC

RUNNING

☐ECL

OFF

HLT

RUNNING

Run setting

Run type : null

Trigger type : poisson

Dummy rate : 10000

HLT script : passthrough

Trigger / Data status

Trig. input

Trig. output

HLT01

HLT02

HLT03

HLT04

HLT05

events :

638965

479

0

0

0

0

0

Rate :

10.010 kHz

0

0

0

0

0

Flow :

0

0

0

0

0

PXD

Run #: 558

PXDRC

OFF

EB2TX4

NOTREADY

EB2TX9

NOTREADY

EB2TX14

NOTREADY

EB2TX19

OFF

EB2TX24

OFF

EB2TX29

OFF

HSENDER

NOTREADY

EB2TX5

NOTREADY

EB2TX10

NOTREADY

EB2TX15

NOTREADY

EB2TX20

OFF

EB2TX25

OFF

EB2TX30

OFF

EB2TX1

NOTREADY

EB2TX6

NOTREADY

EB2TX11

NOTREADY

EB2TX16

NOTREADY

EB2TX21

OFF

EB2TX26

OFF

EB2TX31

OFF

EB2TX2

NOTREADY

EB2TX7

NOTREADY

EB2TX12

NOTREADY

EB2TX17

OFF

EB2TX22

OFF

EB2TX27

OFF

EB2TX3

NOTREADY

EB2TX8

NOTREADY

EB2TX13

NOTREADY

EB2TX18

OFF

EB2TX23

OFF

EB2TX28

OFF

SVD

Run #: 3480

SVDRC

NOTREADY

SVD05

NOTREADY

SVD06

NOTREADY

SVD07

NOTREADY

SVD08

NOTREADY

SVD09

NOTREADY

NOTREADY

NOTREADY

NOTREADY

NOTREADY

NOTREADY

NOTREADY

NOTREADY

NOTREADY

CDC

Run #: 804

CDC01

RUNNING

CDC02

RUNNING

CDC03

RUNNING

CDC04

RUNNING

CDC05

RUNNING

RUNNING

RUNNING

RUNNING

RUNNING

RUNNING

RUNNING

RUNNING

RUNNING

ARICH

Run #: 563

PXDRC

NOTREADY

ARICH01

NOTREADY

ARICH02

NOTREADY

ARICH03

NOTREADY

ARICH04

NOTREADY

ARICH05

NOTREADY

NOTREADY

NOTREADY

NOTREADY

NOTREADY

NOTREADY

NOTREADY

NOTREADY

NOTREADY

TOP

Run #: 796

TOP01

NOTREADY

TOP02

NOTREADY

TOP03

NOTREADY

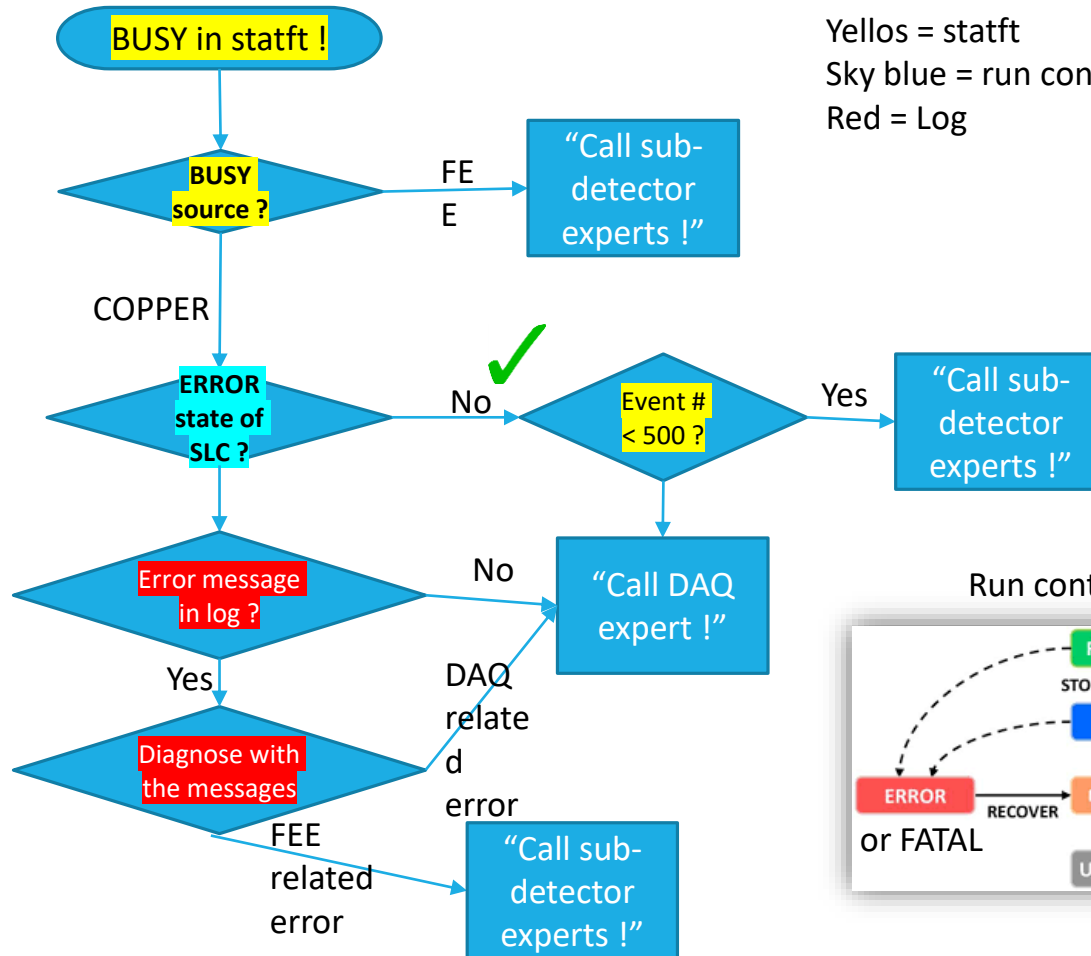
NOTREADY

NOTREADY

NOTREADY

NOTREADY

Flow chart for analyzing BUSY



Source of information :
 Yellos = statft
 Sky blue = run controller state
 Red = Log

Run controller state



EXAMPLE 2:

 b2daq@ttd11:layne

```
statft-20190128 FTSW #184 / ft3m075a 2019.03.07-14:31:14 -> 07.25 20:21:08
```

```
-- BUSY -----
16 exprun=02432400 exp 9 run 804 sub 0
17 omask=000080fb s3q=0 clk=00 lmask=00fb MASTER
1f jpll=cc008000 clk=in GOOD-CLOCK
28292c trg=0000ba07 poisson 10004.404 Hz 186e0 limit -1 <-> last -1
2a2b27 cnt 573685 > 573688 > 479 > 479 (10244.4 > 10244.4 > 8.6Hz)
2d stafifo=10000000 empty trg-enabled
20 reset=00100000 07.25-20:20:12.010(start) RUNNING
31 err=90800000 07.25-20:20:12.010(error) RUNNING nott
25/30 e/bs=0f000000 c0000004
393a3b me=18400404 0f800000 10800004 BUSY mask=none min=2
no-pxd o0!23200008 0f000000 1c800001 - LOCAL-mode anyerr d=0.00%
no-svd o1!06600008 0f000000 1b800400 - LOCAL-mode anyerr d=0.00%
CDC o2=20000400 0a0001df 108001ff BUSY ready tag=479 min=8..0 d=99.92%
no-top o3!06500000 0f000000 108001ff - LOCAL-mode d=0.00%
no-ari o4!18300008 0f000000 1c800018 - LOCAL-mode anyerr d=0.00%
no-ec1 o5!06400008 0f000000 1c80003f - LOCAL-mode anyerr d=0.00%
no-klm o6!19100008 0f000000 17f00041 - LOCAL-mode anyerr d=0.00%
no-trg o7!18500000 0f000000 1080000f - LOCAL-mode d=0.00%
9f limiter=01000100 maxtrig=1 maxtime=2.00us
a0-a7 dead 99.92% (t=0.00% c=0.00% p=0.00% f=0.00% r=0.00%)
```

Message to CR shifter in this example

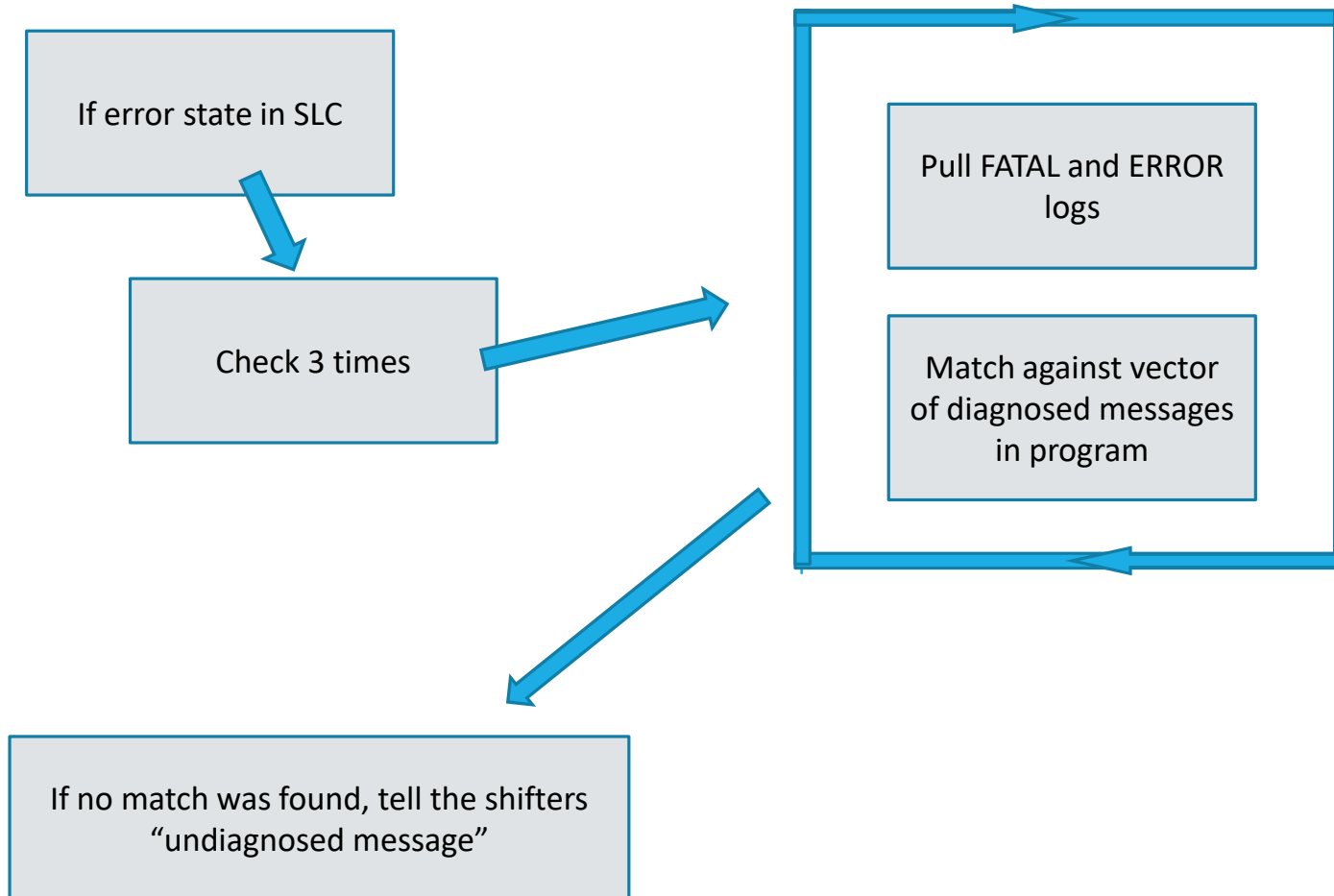
```
my_test.opi ❏  
ERROR DIAGNOSIS SUPPORT SYSTEM | Thu Jul 25 20:20:47 2019  
Exp #9 Run #804 Sub-Run #0  
  
Subdetector Status  
  
PXD: In local mode.  
SVD: In local mode.  
CDC: SLC state is RUNNING but CDC busy. Probably, no events arrived from some FEE, please contact subdetector experts.  
TOP: In local mode.  
ARI: In local mode.  
ECL: In local mode.  
KLM: In local mode.  
TRG: In local mode.
```

PARSING LOG FILES

Calling queries for log records repeatedly cause the node to get stuck

Solution: call logs during the time of the detected error and two cycles after

If no match is found in the logs database, output a default message



EXAMPLE 3:

Using two different commands, we can make two different error log messages appear in the database

des_ser_COPPER_main.invalid_evenum -> Call detector expert

des_ser_COPPER_main.COPPERmagic -> Call DAQ expert

I can use two different strings in my program to match and return different messages to the shifters

```
test_list.push_back("Invalid event_number");  
response_list.push_back("Call the sub-detector expert shifter.");  
  
test_list.push_back("Invalid Magic word");  
response_list.push_back("Call the DAQ-expert shifter.");
```

“Call DAQ
expert”

“Invalid Magic
word”

basf2 : ERROR_EVENT : Invalid Magic word 0x7FFF0008=:

“Call sub-detector
expert”

“Invalid
event_number”

basf2 : ERROR_EVENT : Invalid event_number. Exiting...:

Output for
shifters

In my
program

From DAQ
database

IN BOTH CASES:

RCControlMain.opi

RC Command	Run status	Run control	Trigger distribution	Data flow
STOP	Exp #: 9	ERROR	ERROR	RUNNING
ABORT	Run #: 816			

Run setting

Run type: null
Trigger type: poisson
Dummy rate: 10000
HLT script: passthrough

Detector states (ABORT before you check or uncheck a subsystem)

<input type="checkbox"/> PXD	OFF	<input type="checkbox"/> TOP	OFF	<input type="checkbox"/> KLM	OFF
<input type="checkbox"/> SVD	OFF	<input type="checkbox"/> ARICH	OFF	<input type="checkbox"/> TRG	OFF
<input checked="" type="checkbox"/> CDC	ERROR	<input type="checkbox"/> EC	OFF	HLT	ERROR

Trigger / Data status

	Trig. input	Trig. output	HLT01	HLT02	HLT03	HLT04	HLT05
# events:							
Rate:							
Flow:							

Recording at HLTs

PXD Run #: 558

FATAL	PXD0C OFF	EB2TX4 NOTREADY	EB2TX9 NOTREADY	EB2TX14 NOTREADY	EB2TX19 OFF	EB2TX24 OFF	EB2TX29 OFF
SENDER	EB2TX5 NOTREADY	EB2TX10 NOTREADY	EB2TX15 NOTREADY	EB2TX20 OFF	EB2TX25 OFF	EB2TX30 OFF	
RECEIVER	EB2TX6 NOTREADY	EB2TX11 NOTREADY	EB2TX16 NOTREADY	EB2TX21 OFF	EB2TX26 OFF	EB2TX31 OFF	
ADULT1	EB2TX7 NOTREADY	EB2TX12 NOTREADY	EB2TX17 OFF	EB2TX22 OFF	EB2TX27 OFF	EB2TX32 OFF	
ADULT2	EB2TX8 NOTREADY	EB2TX13 NOTREADY	EB2TX18 OFF	EB2TX23 OFF	EB2TX28 OFF		

SVD Run #: 3450

NOTREADY	SV00C NOTREADY	SV00S NOTREADY	SV006 NOTREADY	SV007 NOTREADY	SV008 NOTREADY	SV009 NOTREADY	SV004 NOTREADY	SV005 NOTREADY
SENDER								
RECEIVER								
ADULT1								
ADULT2								

CDC Run #: 816

ERROR	CDC01 ERROR	CDC06 RUNNING	CDC02 ERROR	CDC07 RUNNING	CDC03 ERROR	CDC08 RUNNING	CDC04 RUNNING	CDC09 RUNNING
SENDER								
RECEIVER								
ADULT1								
ADULT2								

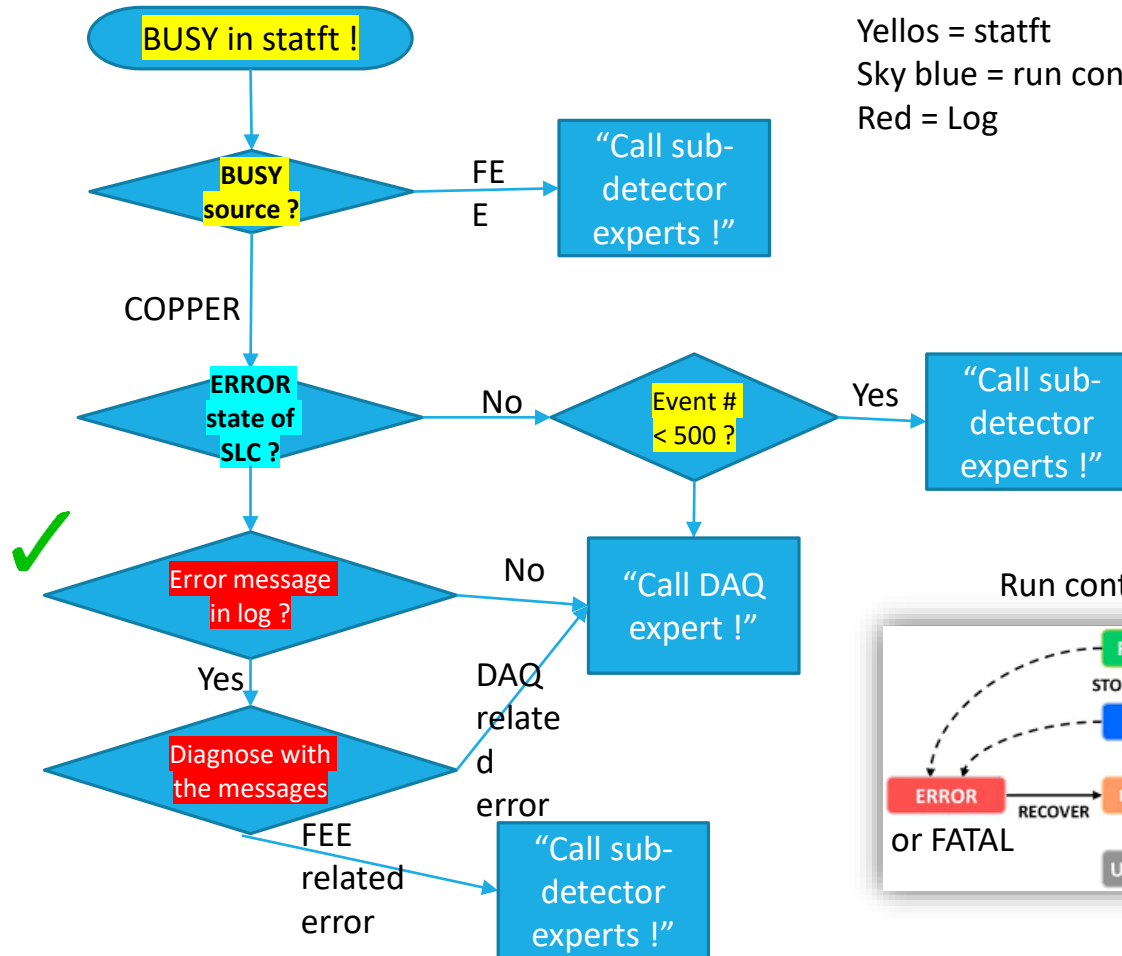
ARICH Run #: 563

FATAL	ARICH01 FATAL	ARICH06 FATAL	ARICH02 FATAL	ARICH03 FATAL	ARICH04 FATAL	ARICH05 FATAL
SENDER						
RECEIVER						
ADULT1						
ADULT2						

TOP Run #: 796

NOTREADY	TOP01 NOTREADY	TOP02 NOTREADY	TOP03 NOTREADY
SENDER			
RECEIVER			
ADULT1			
ADULT2			

Flow chart for analyzing BUSY



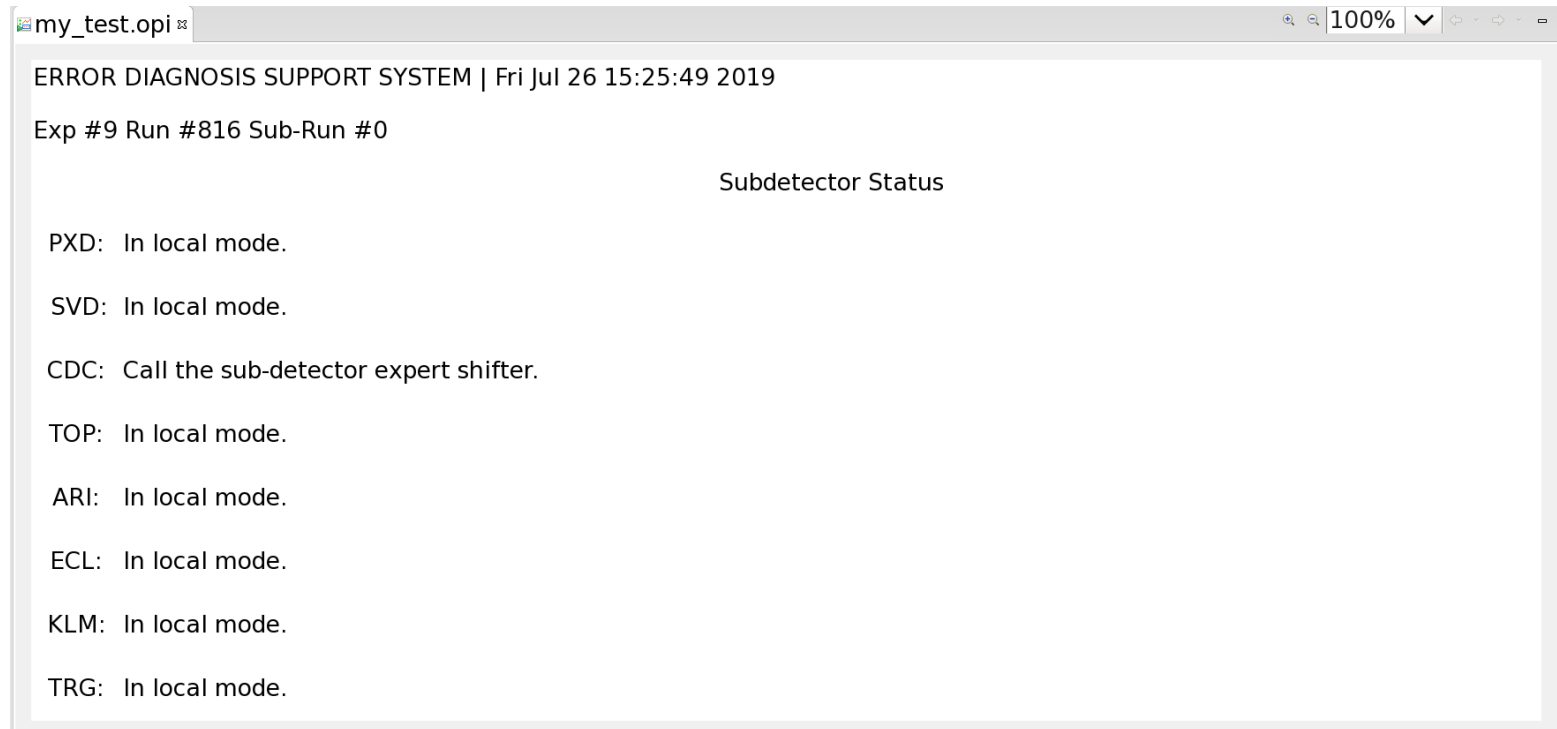
Source of information :
 Yellos = statft
 Sky blue = run controller state
 Red = Log

Run controller state



Message to CR shifter in this example

```
[layne@cdc01 bin]$ ln -s des_ser_COPPER_main.invalid_eventum des_ser_COPPER_main
```



FUTURE STEPS

Eventually things are not supposed to run on ttd11 (where statft is pulled from) so something else needs to be done for the first step

It may be helpful to record new log messages so they can be added into the program later

Still does not cover

- COPPER down
- SLC daemon down
- BUSY due to back-end DAQ (evb, HLT, storage)



Establish a way to collect information is necessary