STATUS OF COPPER READOUT SYSTEM

S. Yamada (KEK)
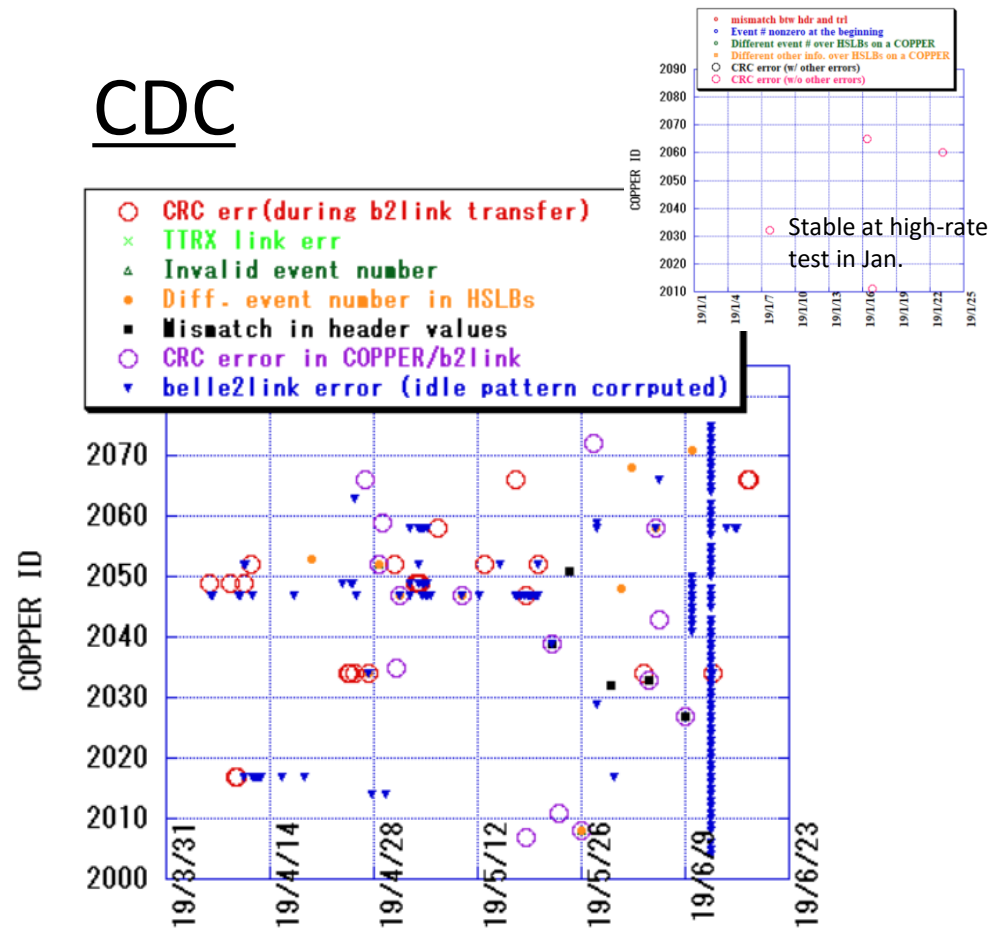
Detected errors

SVD
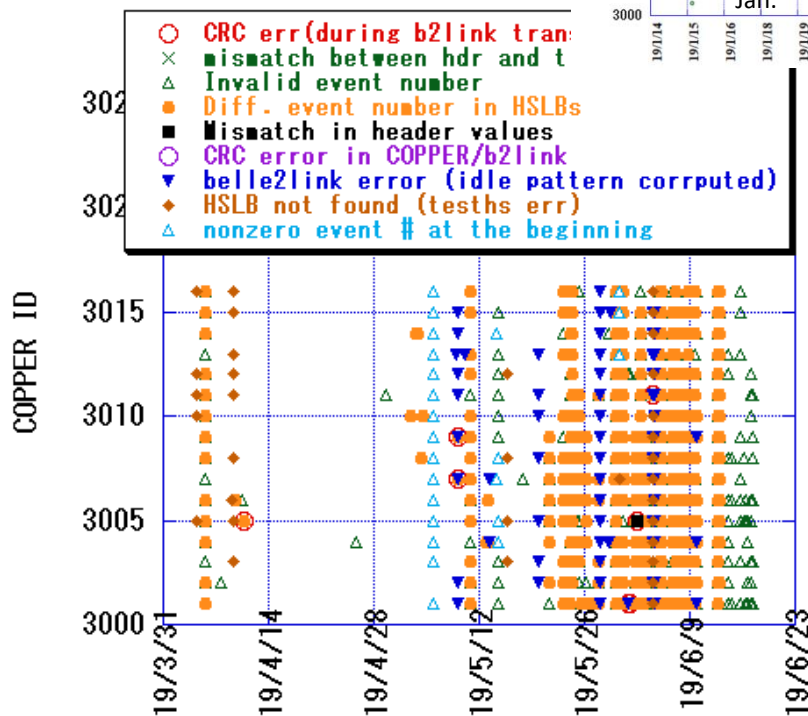

Legend:
- ○ CRC err(during b2link transfer)
- × mismatch between hdr and trl
- △ Invalid event number
- ● Diff. event number in HSLBs
- ■ Mismatch in header values
- ○ CRC error in COPPER/b2link
- ▼ belle2link error (idle pattern corrputed)
- ◆ HSLB not found (tesths err)
- △ nonzero event # at the beginning
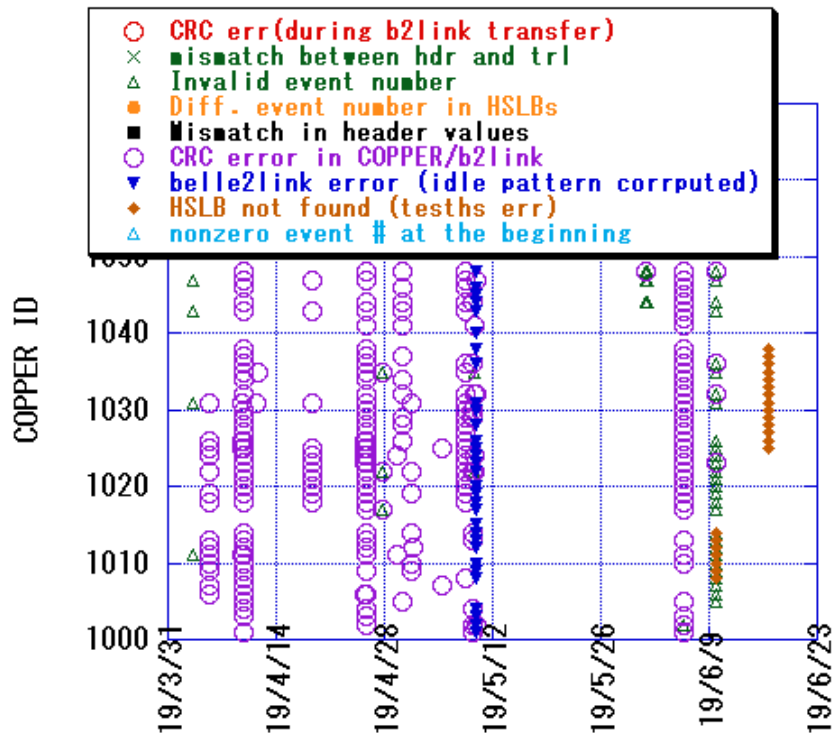
- CRC errors happened in many COPPERs simultaneously.
  - Possibly, related with large-event-size issue. (Katsuro-san's talk yesterday)

CDC

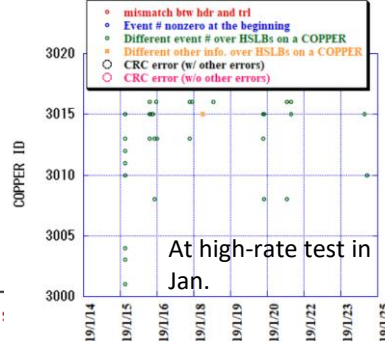Legend:
- ○ CRC err(during b2link transfer)
- × TTRX link err
- △ Invalid event number
- ● Diff. event number in HSLBs
- ■ Mismatch in header values
- ○ CRC error in COPPER/b2link
- ▼ belle2link error (idle pattern corrputed)

Upper-right plot legend:
- ● mismatch btw hdr and trl
- ○ Event # nonzero at the beginning
- ● Different event # over HSLBs on a COPPER
- ● Different other info. over HSLBs on a COPPER
- ○ CRC error (w/ other errors)
- ○ CRC error (w/o other errors)

Stable at high-rate test in Jan.

- Belle2link seems unstable for some links.
- CDC experts sometimes reprogram those FEEs when the error repeatedly occurs.

TOP

At high-rate test in Jan.

CRC err(during b2link trans
mismatch between hdr and t
Invalid event number
Diff. event number in HSLBs
Mismatch in header values
CRC error in COPPER/b2link
belle2link error (idle pattern corrputed)
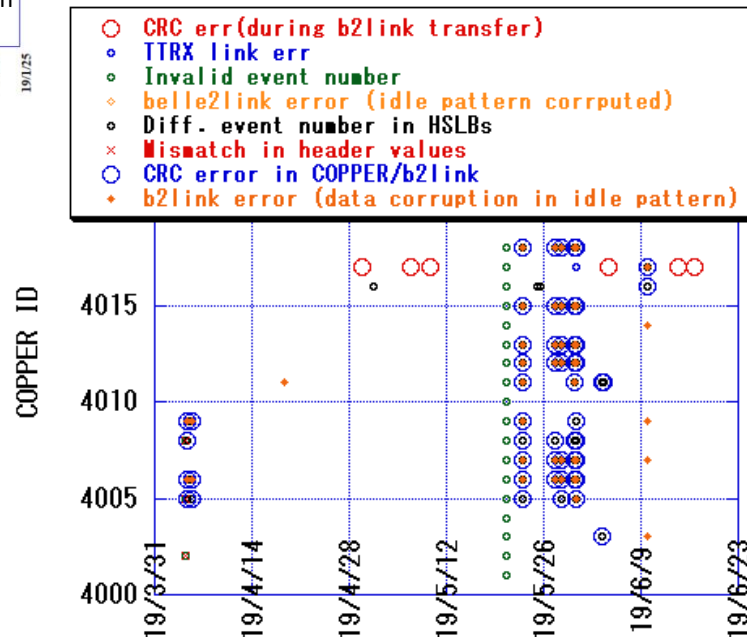HSLB not found (tesths err)
nonzero event # at the beginning

- A lot of event # jump
- B2link errors simultaneously in many links
- "HSLB not found" happened simultaneously in many links
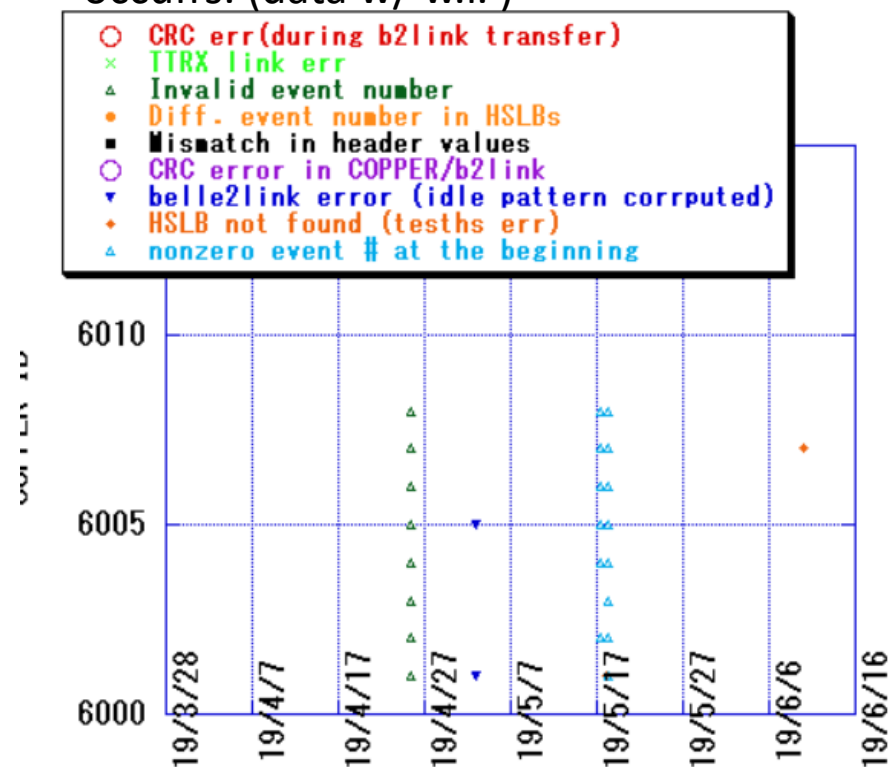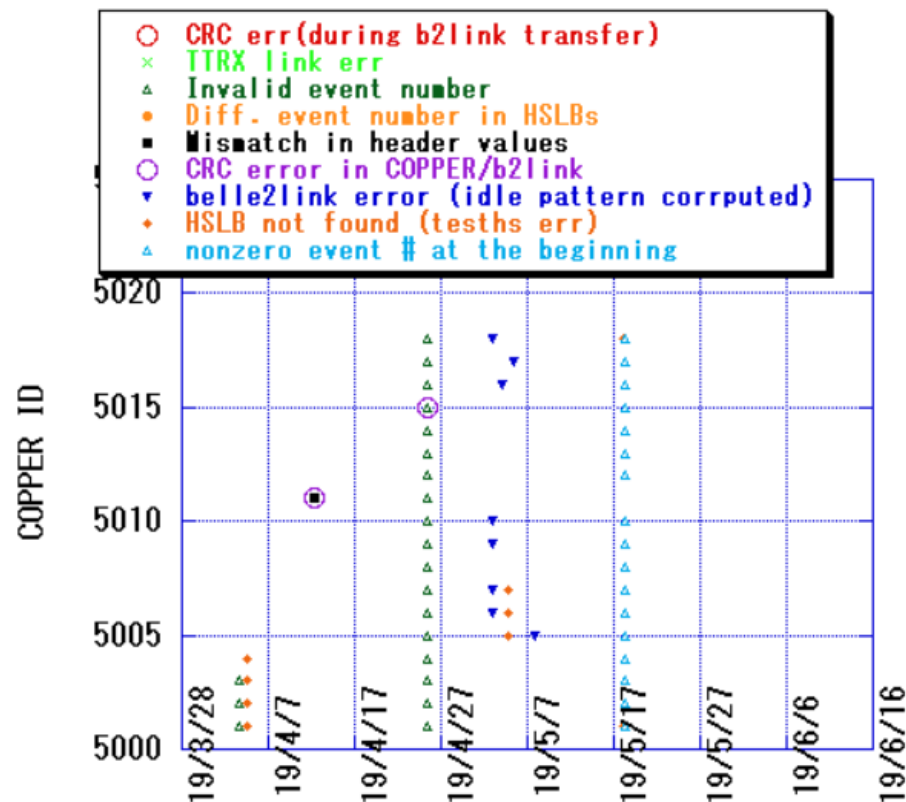-> FTSW clock trouble ? (one FTSW for TOP COPPERs)

ARICH

CRC err(during b2link transfer)
TTRX link err
Invalid event number
belle2link error (idle pattern corrputed)
Diff. event number in HSLBs
Mismatch in header values
CRC error in COPPER/b2link
b2link error (data corruption in idle pattern)

- Several CRC errors during b2link for cpr4017
- B2link errors simultaneously in many links. (Two FTSWs for ARICH COPPERs)

ECL

- Belle2link seems stable for ECL
- Sometimes, event # issue happened for all input links
- Not recorded as FATAL/ERROR in log, no events arrival problem frequently occufrs. (data w/ w.f.)

○ CRC err(during b2link transfer)
× TTRX link err
△ Invalid event number
• Diff. event number in HSLBs
■ Mismatch in header values
○ CRC error in COPPER/b2link
▼ belle2link error (idle pattern corrputed)
◆ HSLB not found (tesths err)
△ nonzero event # at the beginning

COPPER ID

5020
5015
5010
5005
5000

19/3/28 19/4/7 19/4/17 19/4/27 19/5/7 19/5/17 19/5/27 19/6/6 19/6/16

○ CRC err(during b2link transfer)
× TTRX link err
△ Invalid event number
• Diff. event number in HSLBs
■ Mismatch in header values
○ CRC error in COPPER/b2link
▼ belle2link error (idle pattern corrputed)
◆ HSLB not found (tesths err)
△ nonzero event # at the beginning

6010
6005
6000

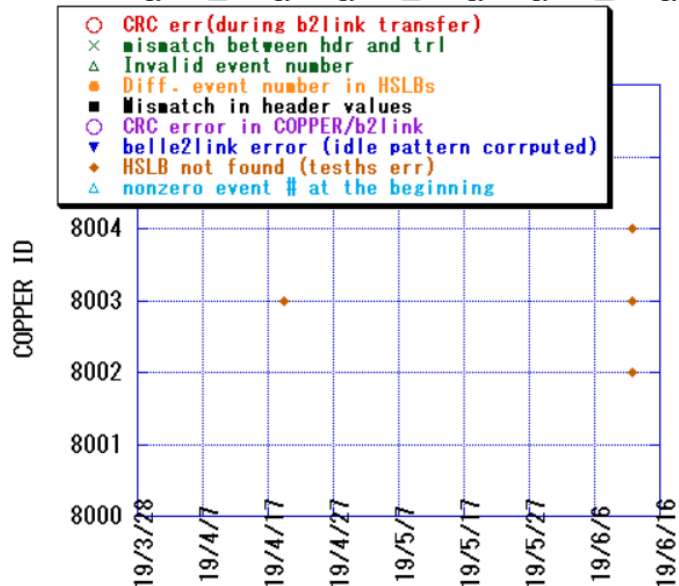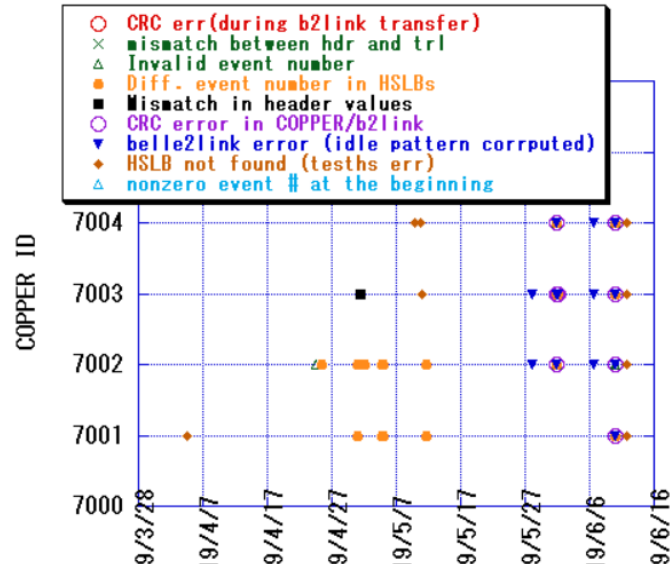19/3/28 19/4/7 19/4/17 19/4/27 19/5/7 19/5/17 19/5/27 19/6/6 19/6/16

KLM

- Event # jump was observed
- Belle2link error occurred simultaneously in bKLM COPPERs
- Fee errors in eKLM ?

TRG

- Event # jump was observed
- Belle2link error in some COPPERs
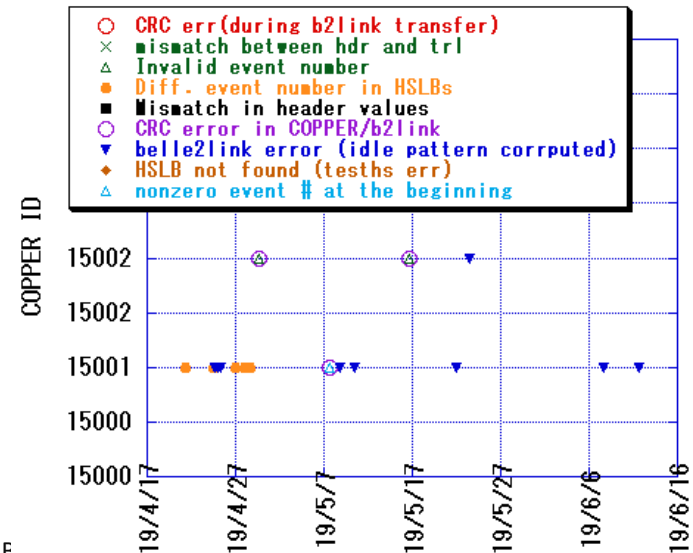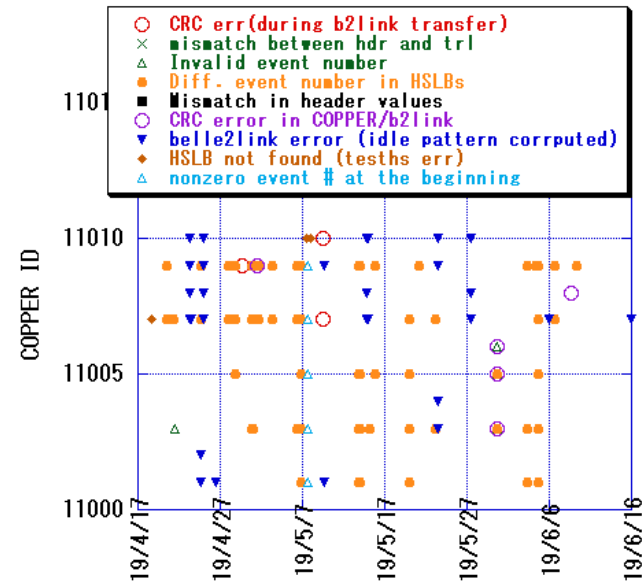
Other issues

Recovery of HSLB from large event error

- FTB setup is now available at B3 with help of Katsuro-san.
- The problem can be reproduced with FTB at B3
- I simply cut the input to FIFO above the certain size limit and it did work at B3 test bench. But, with this new firmware, every reset signal from FTSW makes COPPER FIFOs completely full.
    - Investigation ongoing.

COPPER CPU freezes

- Still happens in CDC, TOP, KLM.
- I connected the power-cable of one CDC crate in a rack to another vacant rack to reduce power-consumption in the rack.
    - Seems fine but other CDC crates also shows few COPPER stuck problem.
    - KLM and TOP racks consumes less power but COPPERs in it got stuck.

Event size

Current event size on COPPER (including DAQ overhead)
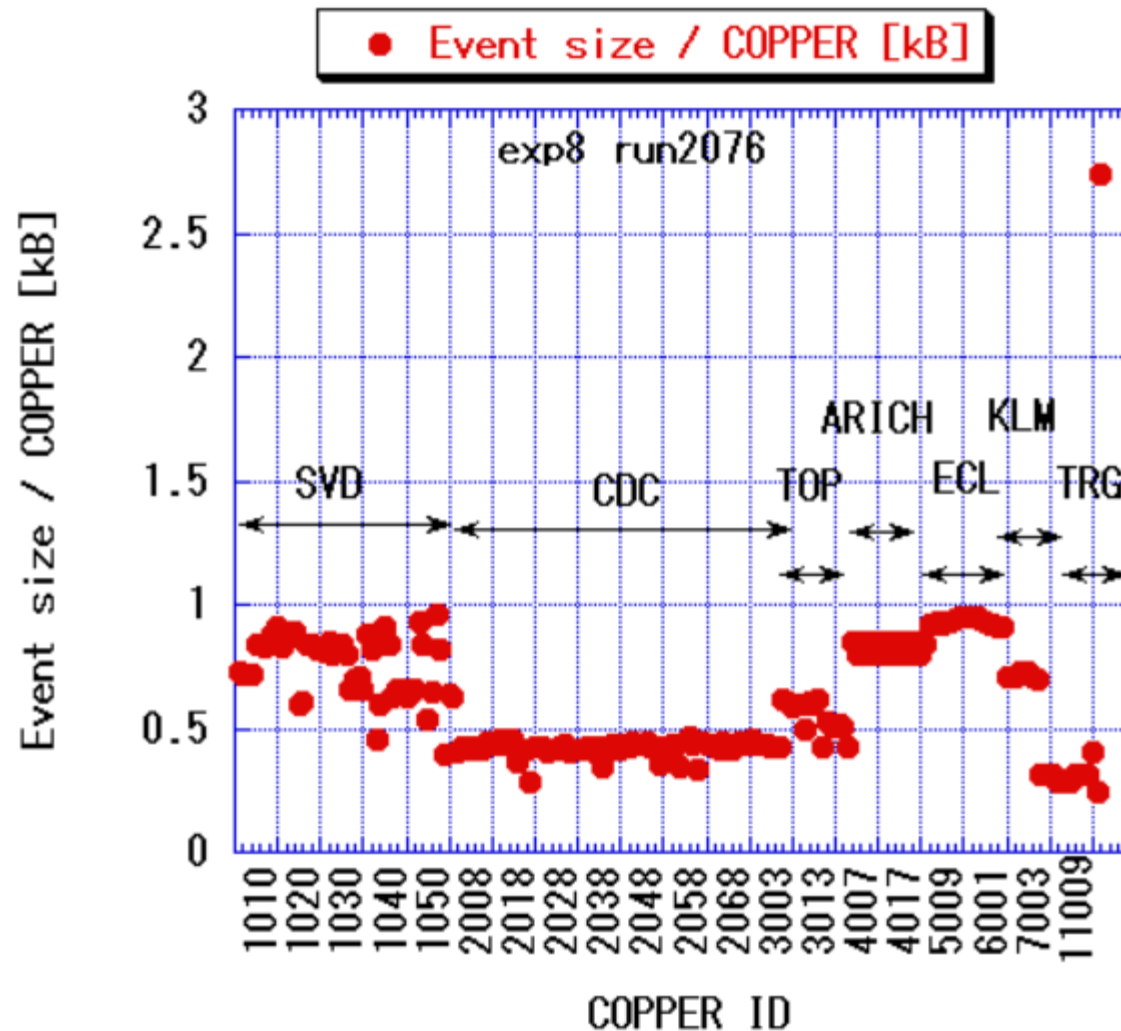
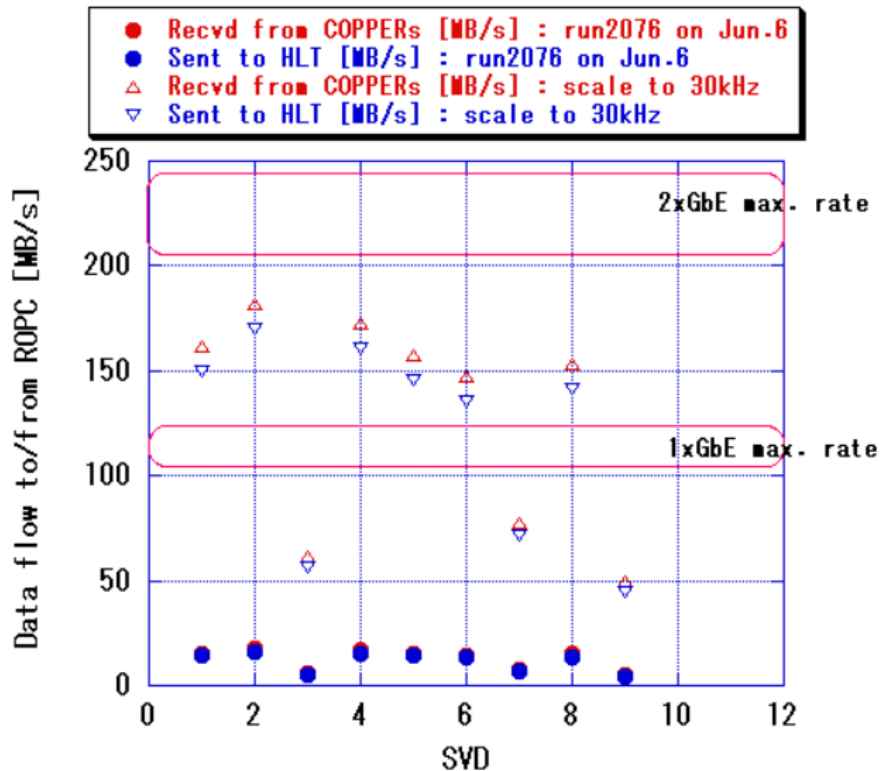| Event size/COPPER	max. rate w/o loss
1 kB	75kHz
2 kB	40kHz
3 kB	25kHz
4 kB	20kHz

DATA FLOW TO/FROM ROPC (JUN.6) AND SCALE TO 30KHZ (1)
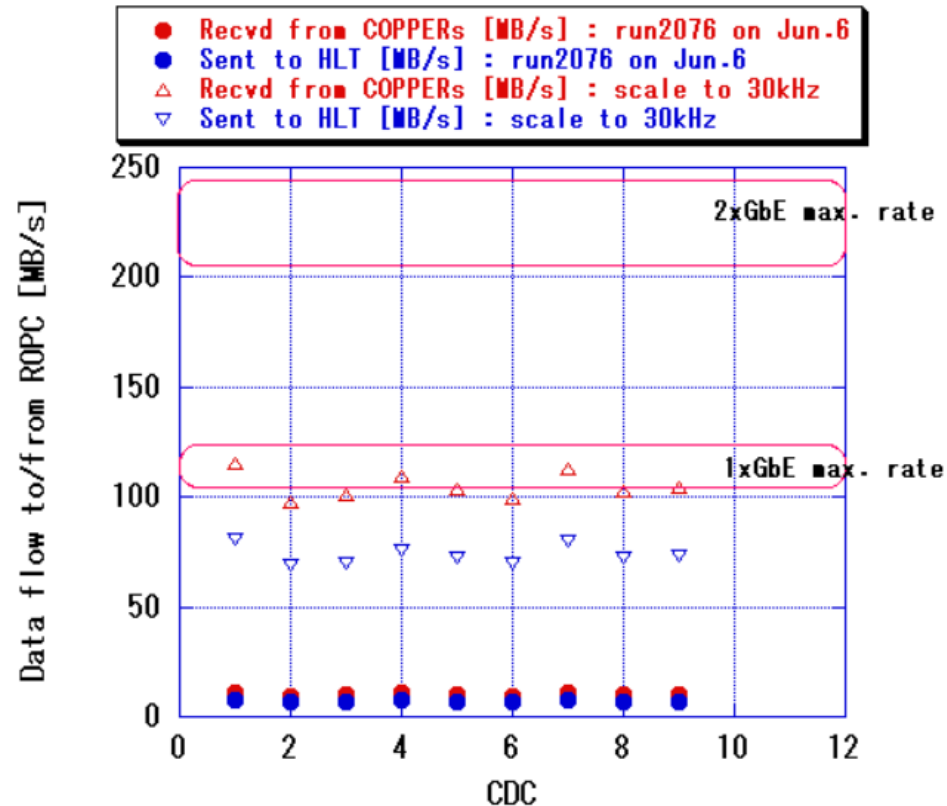
Exp8 run2076 on Jun.6 : event rate = 2.9kHz

➢ SVD experts expect large increase in event size in future. -> 350MB/s/ROPC

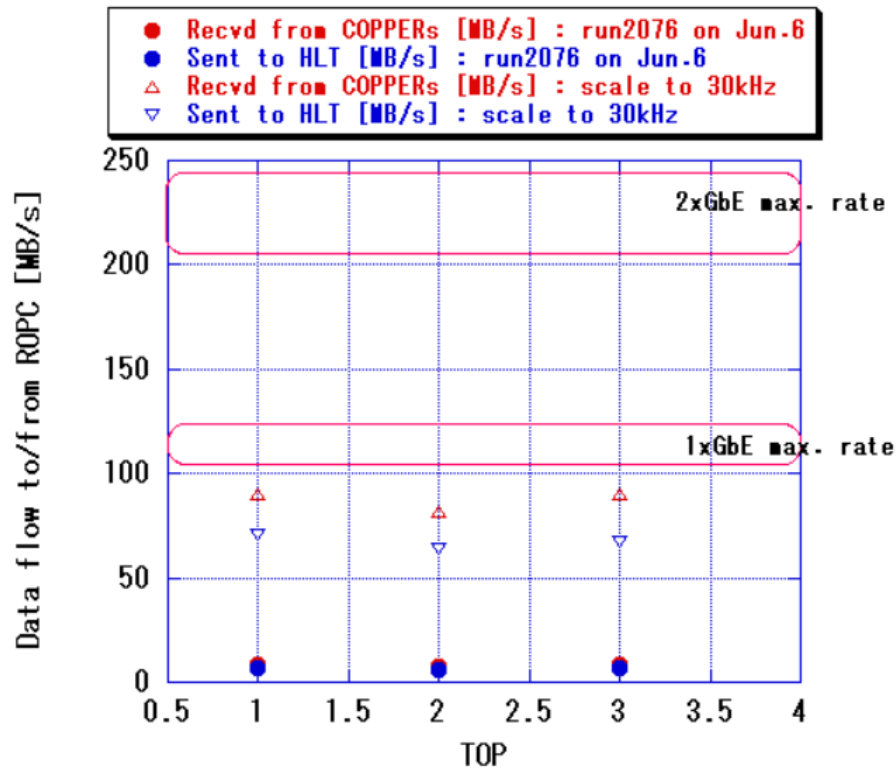| SVD data rate @ 15kHz [MB/s]	SVD data rate @ 30kHz [MB/s]
max. ~ 35	max. ~ 70
max. ~ 170	max. ~ 350
~ 1200	~ 2500
	(Katsuro)

SVD

CDC
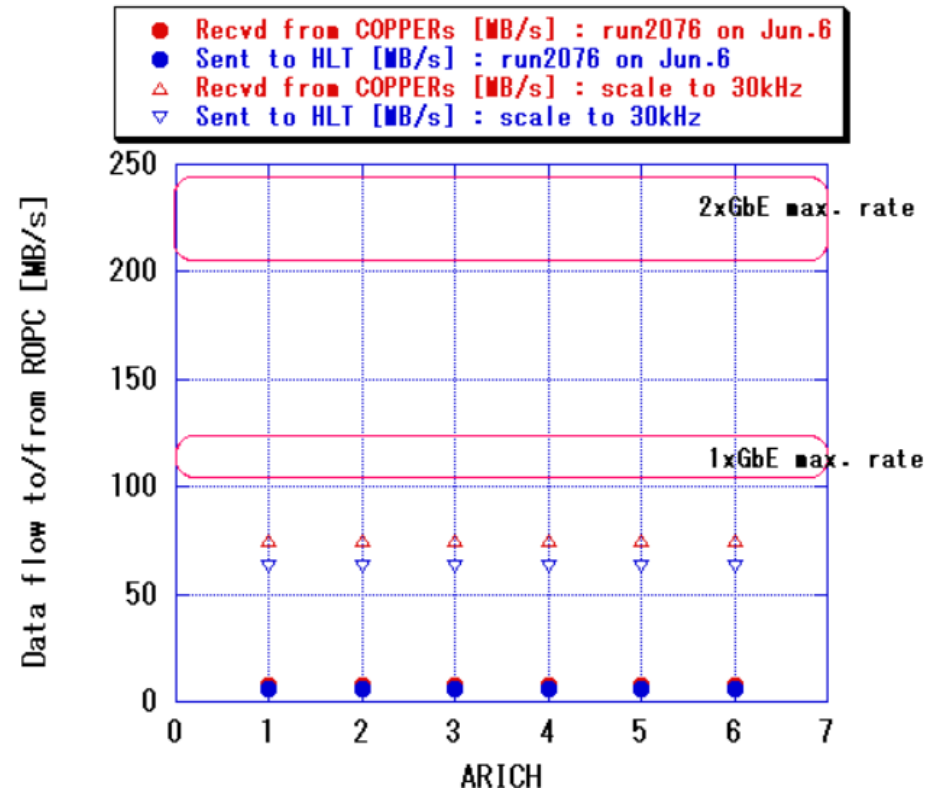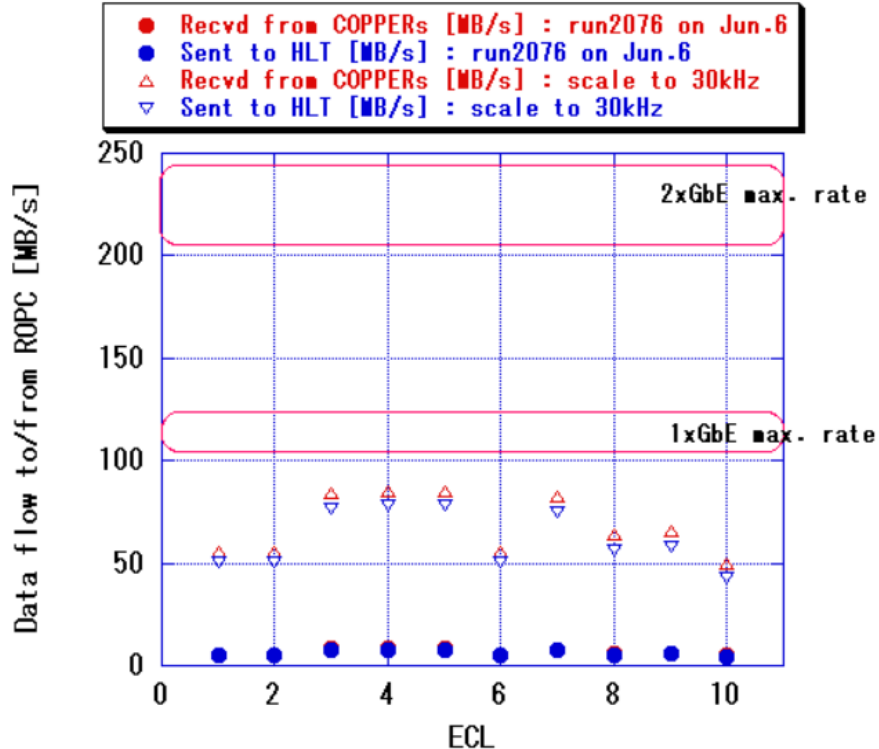
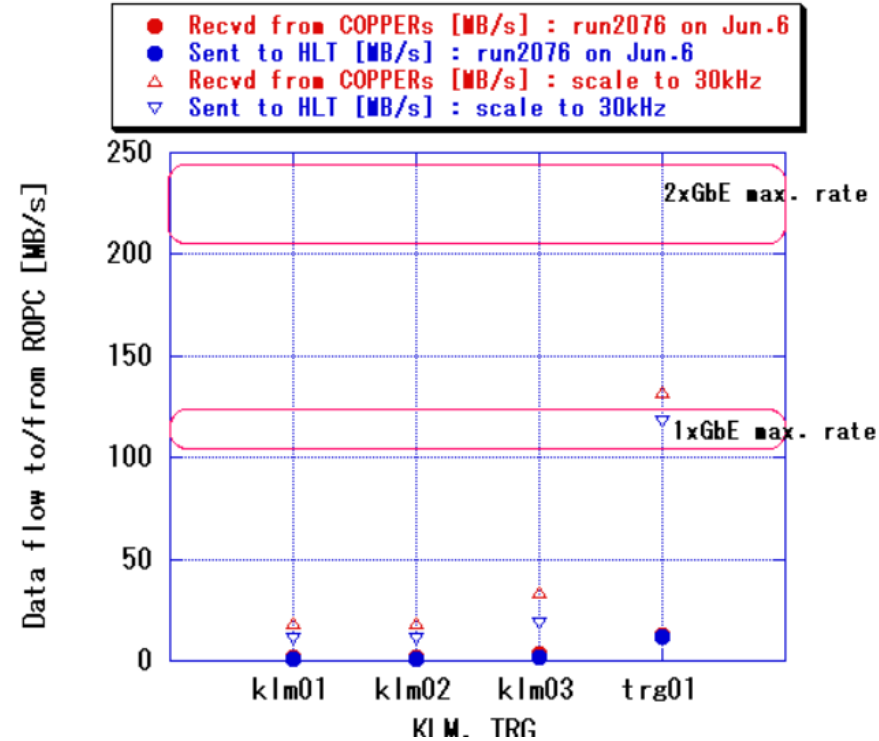# DATA FLOW TO/FROM ROPC (JUN.6) AND SCALE TO 30KHZ (2)

TOP

ARICH

DATA FLOW TO/FROM ROPC (JUN.6) AND SCALE TO 30KHZ (3)

ECL

KLM

Hardware task : todo before the fall run

Additional nodes
- TRG COPPER : 2 COPPERs(4 links)
    - Installation was done.
- TRG ROPC : Add trg03 (+trg04)
    - Installation of trg03 was done.
-> SLC setup is not yet done.

Network throughput
- SVD : Done before phase 3 (x2GbE)

- ECL : to do before the fall run

Replacement
- Cdc06 : frequent disk? Trouble
    - Replace with a new server

Summary

- ERRORs detected by COPPER and ROPCs
  - SVD : mainly after receiving large events
  - CDC : belle2link seems unstable in some links
  - TOP : event # jumps. FW work by TOP experts is ongoing.
  - ARICH : Stable. B2link errors in several COPPERs at the same time.
  - ECL : b2link is stable. Sometimes no events arrives at some COPPERs
  - KLM : Stable.
  - TRG : Event # jump.

- Event size
  - Currently, the event size is within the expectation. (except for SVD with larger occupancy.)