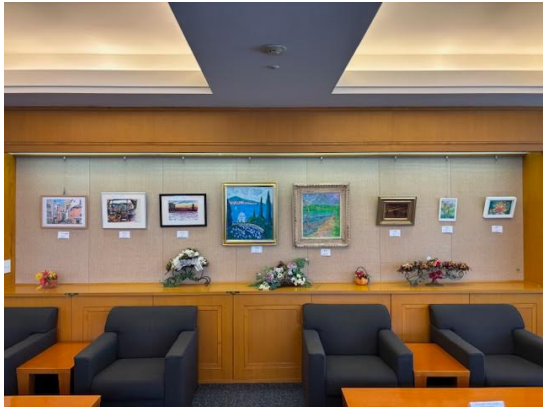
Closing Remarks

R.Itoh, KEK
(for Yamada-san)



Koga-san's slide in opening:

-Our situation has been updated since 2022:

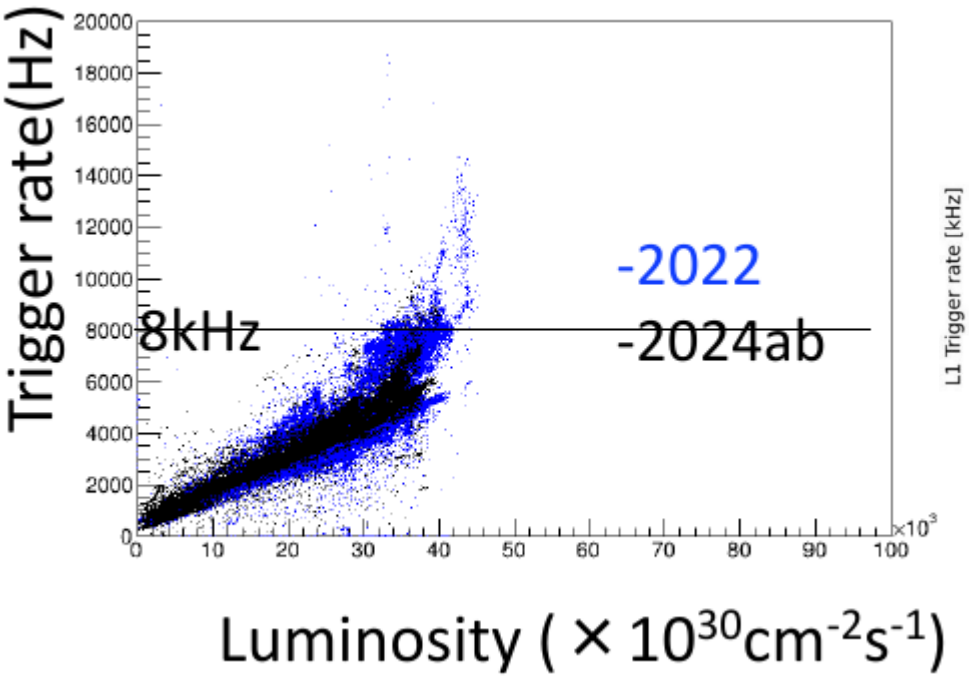
-RUN2 operation has started.
High luminosity of $O(10^{35})cm^{-2}s^{-1}$ will come soon.
Are you ready for the high luminosity ?
How will you improve present system ?

-LS2 is postponed to 2032.
Detector/TRG/DAQ upgrade at LS2 becomes realistic and important.
How will you upgrade your system ?

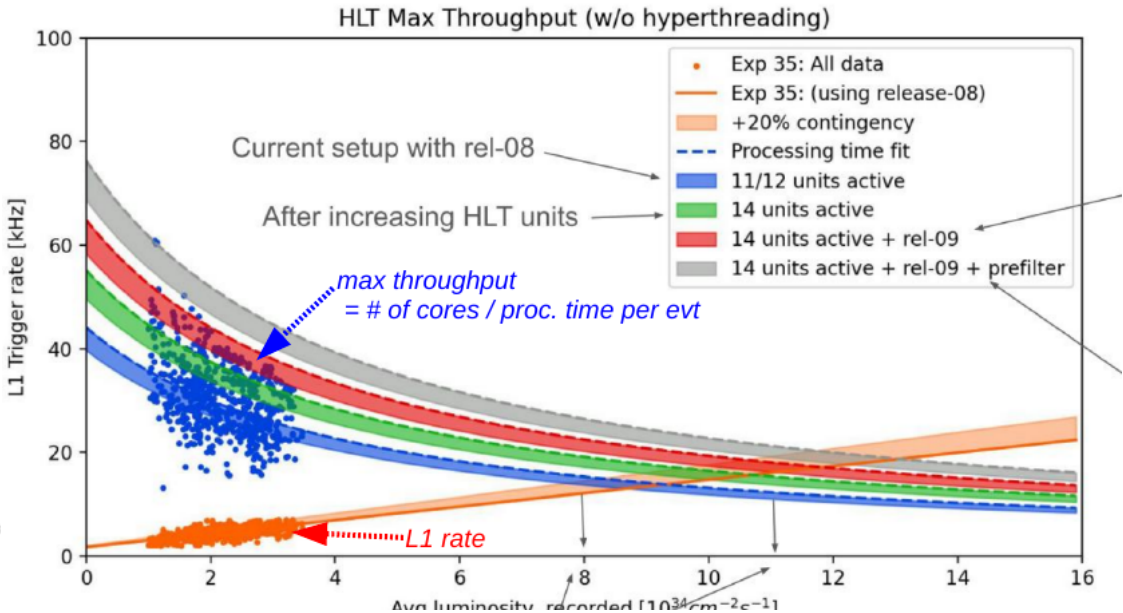
Key issues:

* TRG : Reduce L1 late as much as possible w/o sacrificing physics
* DAQ : Raise "DAQ limit" as high as possible
* Detector/TRG/DAQ : Reduce dead time as much as possible

L1 rate vs. Luminosity



DAQ limit vs. Luminisoty



TRG side effort: When trigger rate reach DAQ limit

Koga-san

-When trigger rate reach DAQ limit, we will change trigger condition. plan is here .

-agreed with physics group in 2021, but most of you might forget..

-①Activate new DNN 3D trigger

-~30% CDCTrigger rate reduction with better z resolution

-track trigger efficiency is same or ~1% smaller

-②Change prescale of physics trigger bits at next pages

-30~40% total trigger rate reduction

-endcap photon efficiency decrease, but no physics impact for most of channel

-③Change prescale of prescaled calibration bits in backup proportional to luminosity.

-present prescales were set when Luminosity was ~2×10^{34}

-for example, increase prescale 5times, if Luminosity will be ~1×10^{35}

HLT improvement to raise DAQ limit

DAQ side effort

[Hardware]
* Adding more servers in 15 HLT units : **baseline upgrade**
  + Possible to increase the no. of servers twice at least.
  - Very high cost and difficult to prepare a large CPU power in a short period with a given budget.
    (max: up to 5-10% performance increase per year)

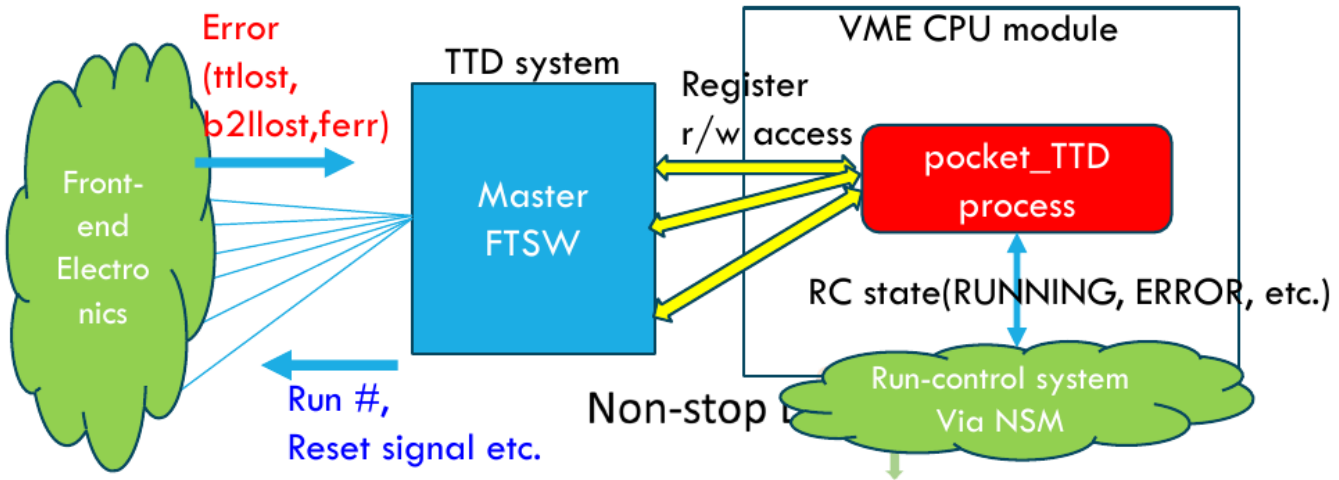
[Software]
* Signal “cleaning/filtering” (Rahul)
* Implementation of Level 3 software trigger (Seokhee)
  - CPU power may still be insufficient!

Auto-restart for TTD detectable errors(e.g. ttlost, b2llost) (JW.Park)

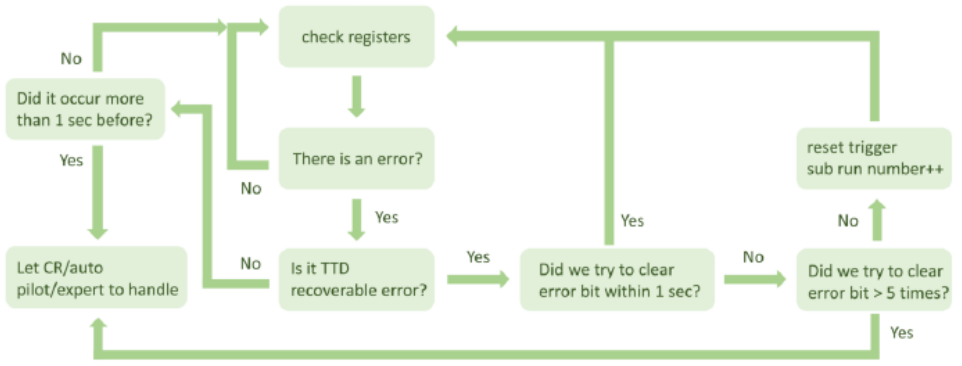
- Instead of going though SALS, the TTD system will quickly clear the error and resume data-taking with an incremented subrun number.

  - Full restart(SALS) w/ HLT : around 90 sec.
  - Partial restart(SALS) w/o HLT : in the 20sec. Range
  - auto-restart w/ a new subrun : O(seconds)

Detector/TRG/DAQ: Dead time reduction effort



- When the auto-restart fails, CR shifters can notice BUSY or ERROR as usual DAQ stop and resume data-taking by SALS.



1st step toward true "non-stop DAQ"

+ Many efforts by everyone
  * FTSW4
  * New /improved det. readout
  * Trigger improvement
  .....

“LS2 and Beyond”

We need to prepare for
- the further luminosity improvement and background increase resulting in a much higher L1 rate, and

- the drastic reconfiguration of detector structure resulting in a large increase in the event size.
  * PXD+SVD will be replaced with new VTX
  * New CDC(?) with new readout.
  * Addition of ITT?
  .....

LS2 is scheduled in 2032 : 7 years from now!

- Mandate:
  To manage up to a 100kHz L1 rate with a 300kB/ev data size!
- Option:
  Transition to “Triggerless DAQ”?

Detector :
* 100kHz FEE+readout
  -> Some detectors are already ready, but some are not....
* Inclusion of new deteectors (VTX, ITT....)

TRG:
* New DNN trigger, UT5->6?? .....

DAQ:
* PCIe40 -> PCIe400. Hardware HLT (FPGA/GPU); Renovation of b2tt, Further “merging” of NSM and EPICS, Load balanced distribution of events by Event Builder 1 .....

History of TRG/DAQ workshop

- TRG/DAQ workshop series has been started from 1997 in Nara and workshops were annually held until 2006 at various places in Japan. After 3-year intermission, the WS series was restarted from 2010.
- History:

2010 : Seoul (Korea Univ. hosted by E.Won)
2011 : Beijing (Peking Univ. hosted by Z.-A.Liu)
2012 : Hawaii (U. of Hawaii hosted by G.Varner)
2013 : Seoul (Hanyang Univ. hosted by B.G.Cheon)
2014 : Taipei (NTU hosted by J.G Shiu)
2015 : Osaka (OCU hosted by E.Nakano)
2016 : Novosibirsk (BINP hosted by A.Kuzmin)
2017 : Taipei (NTU hosted by J.G.Shiu)
2018 : Karlsruhe (KIT hosted by S.Bauer)
2019 : Seoul (Yonsei U. hosted by YJ.Kwon)
2022 : Nara (NWU, hosted by K.Miyabayashi)
2025 : Osaka (OMU) hosted by Iwasaki-san

Next Workshop. Where and When?

- Our tradition is to have workshop somewhere in Asia.

- Recent venue:
  Seoul (2019) -> Nara (2022) -> Osaka (2025)

- So, where and when for next workshop?
  My personal idea:

How about having next workshop in Vienna just before the next summer B2GM?

* Venue different from that for B2GM?

Let's thank M.Iwasaki-san,
E.Nakano-san,
and students
for organizing this great workshop!

The Workshop adjourns.

Thank you very much for joining,
and have a safe trip to home.

See you again soon in February B2GM.