Storage
Data transfer and quick analysis

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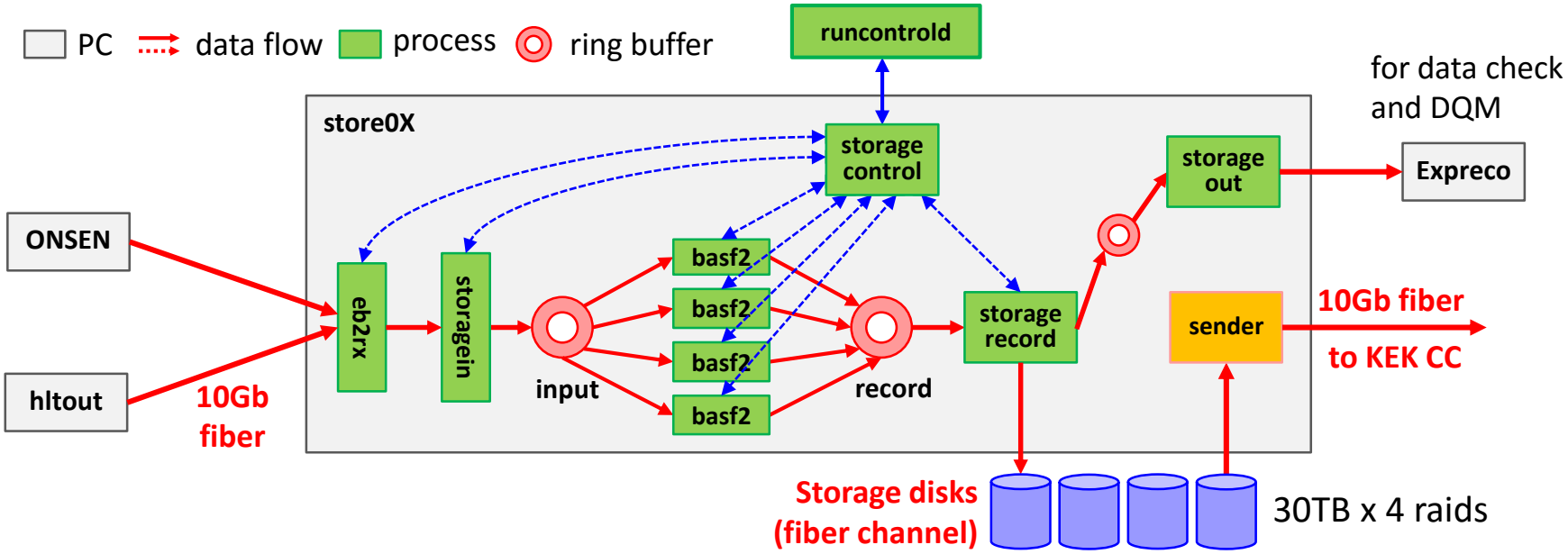
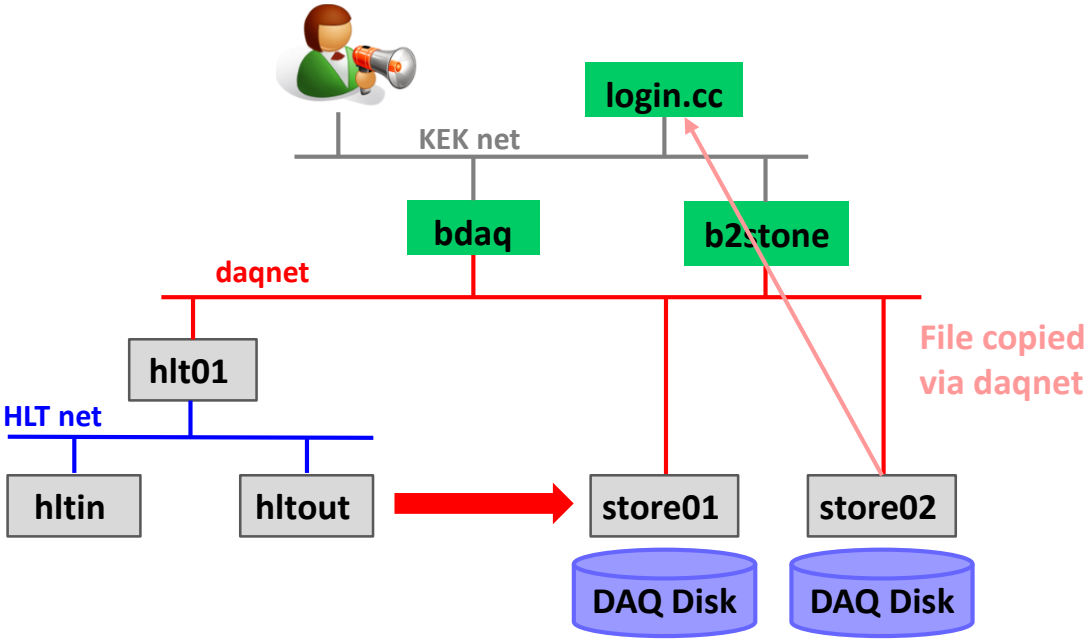
Conceptual view of storage system



- The storage system has responsibility to record data from all detector
  - Sequential ROOT file (.sroot files) is stored in the DAQ online disks
  - eb2rx merges data stream from ONSEN and HLT(=all 6 detectors)
  - basf2 process converts ONSEN data to Raw data object (RawPXD)
- A storage system in a HLT unit => 10 systems in total
- Optical fiber is connected to KEKCC but not available yet up to now

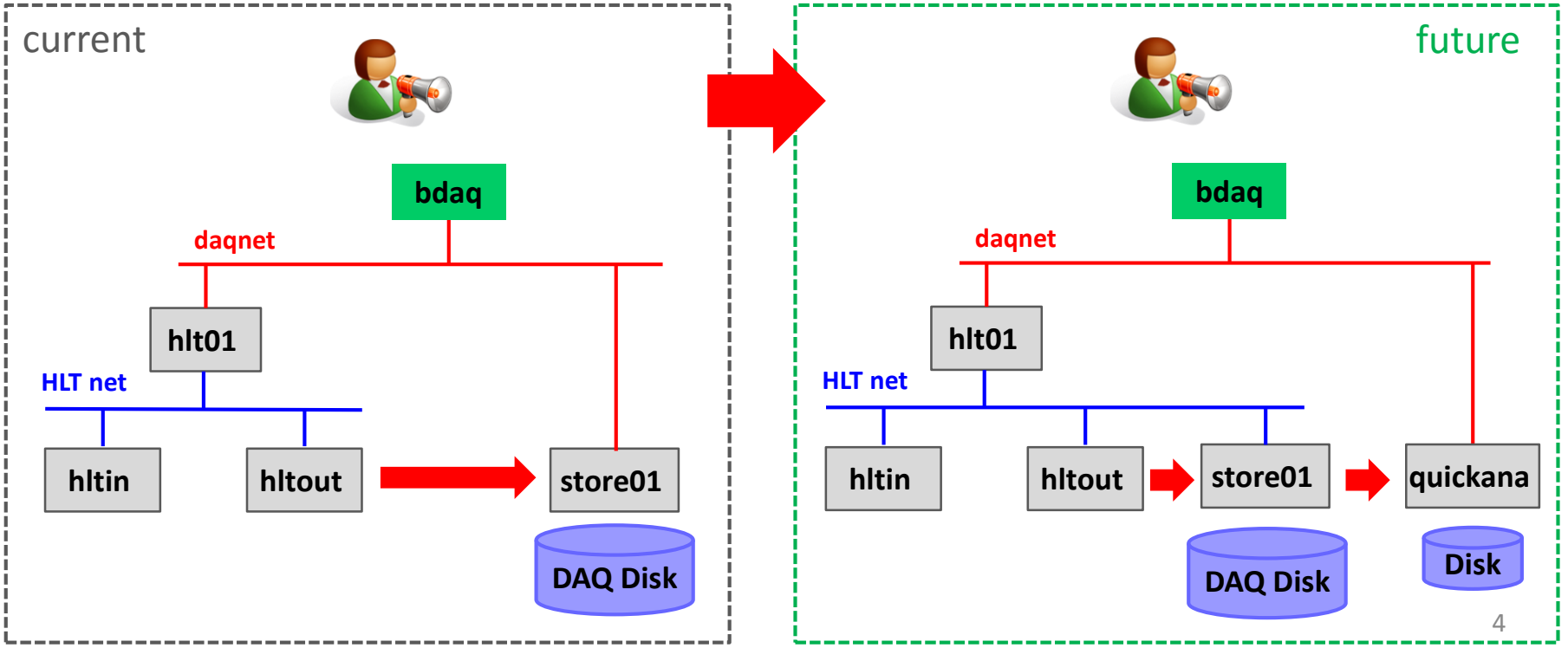
Status of storage system

- No big changes since last year : Storage system itself is working properly
- Direct and fast connection to KEKCC is not open yet
  - Yamagata-san made great efforts to negotiate with KEKCC
- CRT Files are copied by hand (Thanks to CDC and TOP experts)
  - scp via b2stone (redirects to login.cc.kek.jp)
    - scp -P 2022 <srootfile> <youraccount>@b2stone.daqnet.kek.jp:<yourdirectory>/
  - Automatic file copy via login.cc is not allowed due to security reasons



Security issues

- Due to security concerns from KEKCC, DAQ storage has to be secure and accept connections from DAQ experts only in order to open KEKCC gateway
  - We decided to move storage servers to HLT local network
    => Non DAQ experts will not be able to access data file in the disks
- Instead of direct access to storages, we will prepare another machine open for bdaq users to analyze or copy the data files



File naming rule

- No discussion about file names before the VXD beam test
- Current: **<run_label>.<exp_no>.<run_no>.sroot-<file_index>**
  - ex) pxd.001.000101.sroot-10
  - run_label : label to identify detectors (and run type?)
  - exp_no, run_no : experiment and run numbers in data headers
  - file_index : sequential number of files in a run
    - Data files are spilt by 2GB
- In the VXD beam test, naming rule of run label is completely nothing
  => Made confusion and inconvenience in offline people
  - Run label shows which detector is used and which kind of run type
    - ex) pxd.calibration, pxd_svd.physics, daq.test ...
- Someone confused file index as sub run # in the beam test
  => Numbers after .sroot is not sub run number!

Missed events in the VXD test

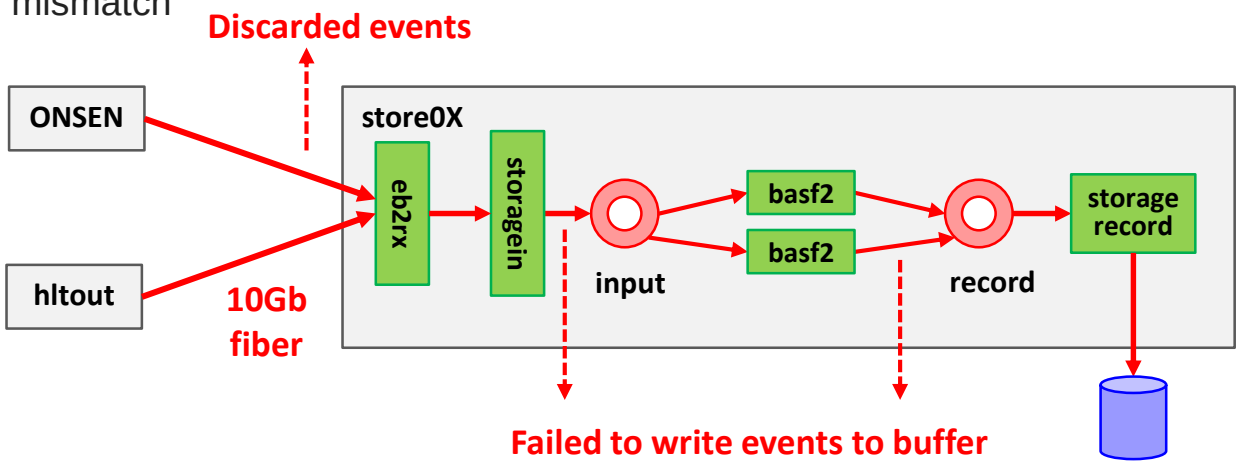
- Katsuro-san found 2events (evt#6 and 7) in run#133 were missed in files
- Logs did not say who missed but two possibilities:
  - **eb2rx** discarded or missed these events
  - **storager** processes failed to pass these events to downstream

both are very rare!

- We will add logging scheme to check what happens when event missing

Logs said event mismatch was detected and successfully recovered

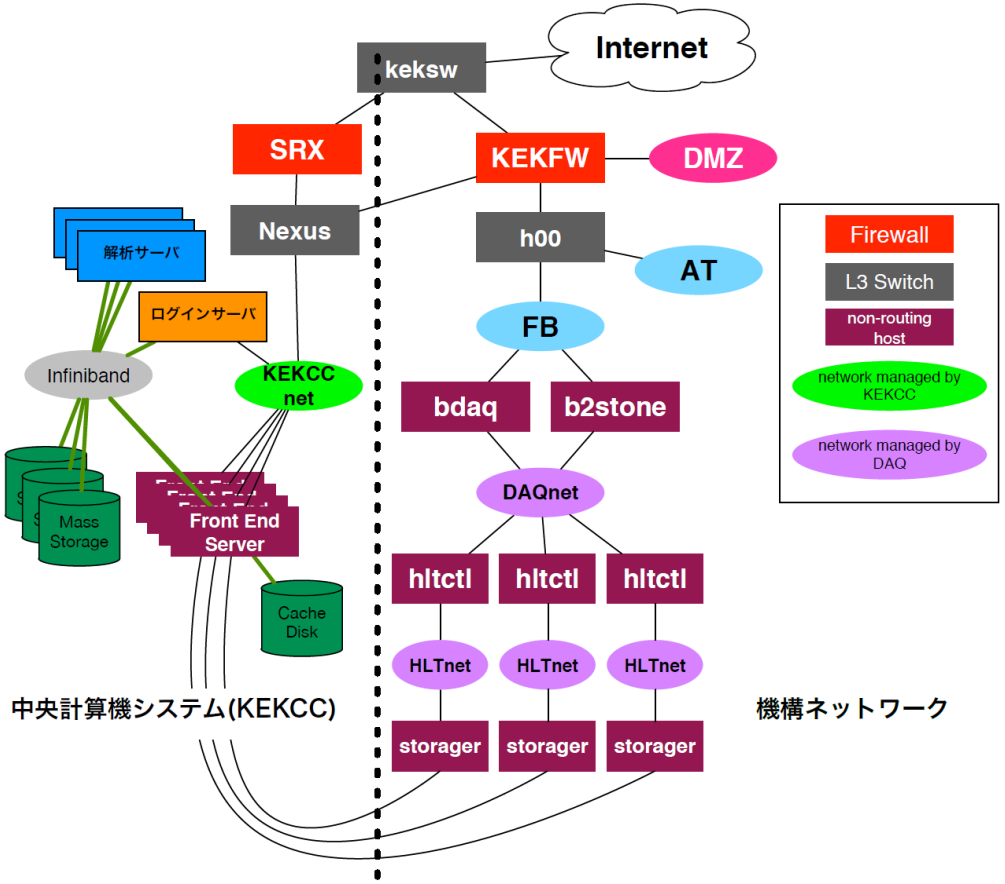
got event 2 from HLT
event number from ONSEN[0] = 004098000003b47e, but that from HLT is 0040990000000002
skip bogus event from onsen:24 exp_run:0x00409800 event:0x0003b47e < expected 0x0040990000000002
skip bogus event from onsen:24 exp_run:0x00409800 event:0x0003b47f < expected 0x0040990000000002
skip bogus event from onsen:24 exp_run:0x00409800 event:0x0003b482 < expected 0x0040990000000002
skip bogus event from onsen:24 exp_run:0x00409800 event:0x0003b481 < expected 0x0040990000000002
recovered from mismatch



Data transfer to KEKCC

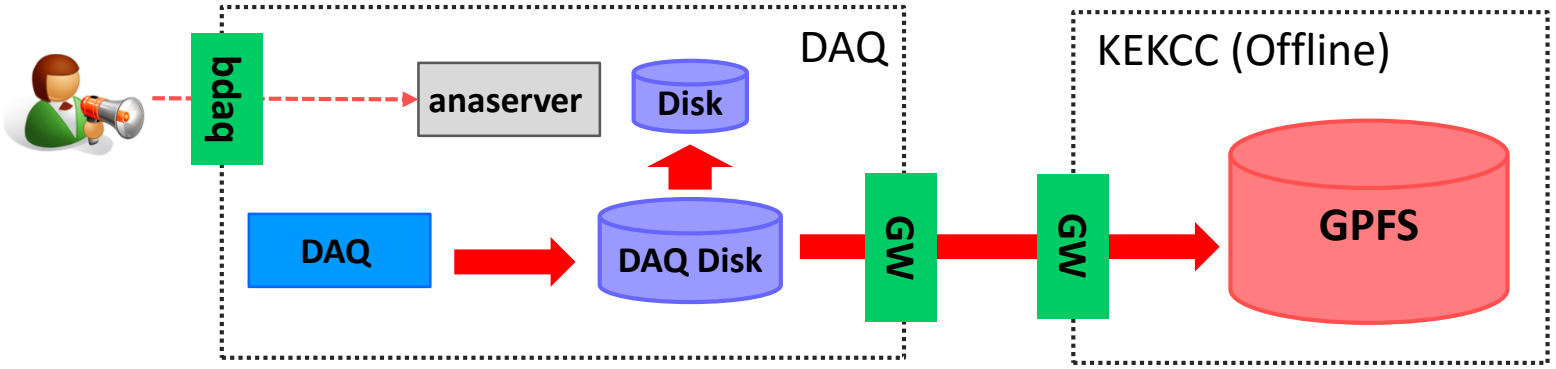
- Yamagata-san ana T.Hara-san are negotiating with KEKCC to connect DAQ storage to KEKCC mass storage
- **Front end server** accepts data files from DAQ storage via a dedicated network path
  - Infiniband to Mass storage
  - Control network in KEKCC
- DAQ storage is under hlt local net
  - Closed from non-expert
- System is still under discussion and not ready yet

from yamagata-san



Quick analysis server

- Data file transfer to KEKECC takes time after run finishes
  - We have now limited access to KEKCC from daqnet but it is still slow even after official way is ready
  - Files are until now copied to KEKCC by experts' hands
- Extra PCs in daqnet are being prepared to analyze data just after run
  - Detector experts can login in via bdaq to work proceeding to file transfer
  - HLT test bench is reused since there are enough CPUs (we hope)
  - Files are copied to quick ana PCs periodically (every several minutes?)



Reuse of HLT test bench

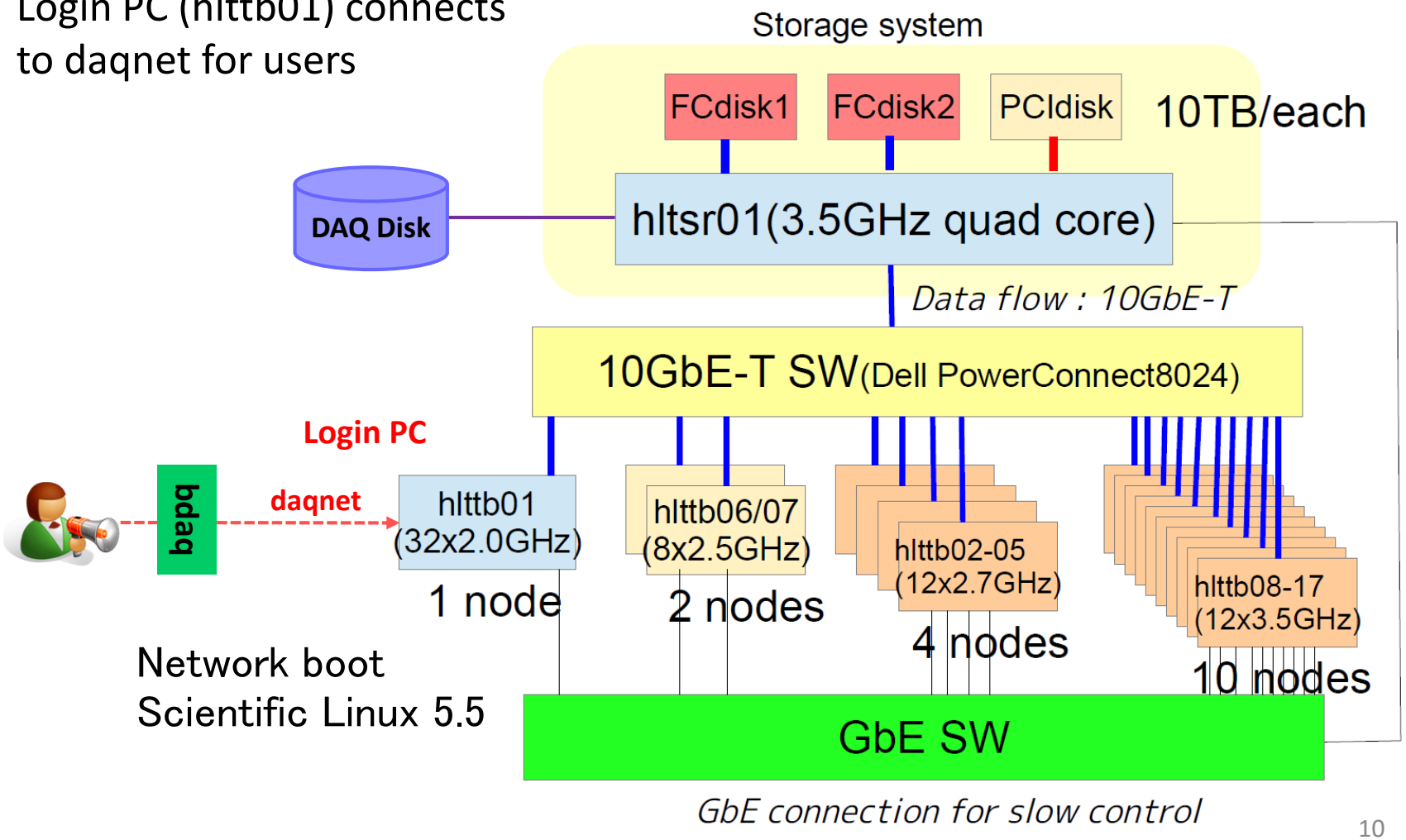
(photos from Itoh-san)

Machines are placed at the server room next to HLT units
Now network configuration is being setup ...

Quick analysis PC cluster

- Dedicated network between DAQ disk and analysis server
- Login PC (hlttb01) connects to daqnet for users

(from Itoh-san)



Summary

- Storage system is working properly since last year
- Event missing was found in the VXD beam test
- For security reason, storage will be moved to HLT net from daqnet
  - No direct access from storage to KEKCC is not established yet
  - Direct access by non-DAQ experts will be prohibited
- Quick analysis server will be setup to study with data before transfer
  - Data files is transfer periodically
  - HLT test bench is reused and now moved to the server room
  - Network connections is still under construction