Considerations on E-hut layout

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- In Belle II, most of detector front-end electronics are placed near detector, and signals are transferred to COPPERs via optical fibers.

- COPPERs are supposed to be placed in E-hut together with Readout PCs.

- Event builder is also supposed to be placed in E-hut.

- However, HLT is housed in B3 server room apart from E-hut.

- (Some part of) HV and power supply equipments for detectors could be placed in E-hut.

Grand policy of E-hut layout

1F : Dedicated to TRG and DAQ data flow
2F : Utility for detector groups + Monitor-related

1F: Dedicated to Trigger and DAQ data flow

Trigger : Subtrigger logics, GDL, Accelerator interface (RF clock etc.)
DAQ : COPPERs, Readout PCs, Event Builder 1, Slow control PCs
Detectors : SVD->PXD data separator

2F: Detector utility + Monitor space

- Detector HV, LV, various utility
  - PXD:
  - SVD:
  - CDC:
  - PID:
  - ECL:
  - KLM:
- Monitor equipments : detector environment, E-hut rack power, etc.

1F:

- Mainly COPPERs and Readout PCs.
- COPPERs :

	#ch	occ [%]	#link	/link [B/s]	FNS	#CPR	ch sz [B]	ev sz [B]	total [B/s]	/CPR [B/s]
PXD	8M	2	40	600M/DHH	—	—	4	800k	24G	—
SVD	243456	1.9	40	13.8M	HSLB	40	4	18.5k	555M	13.8M
CDC	15104	10	302	0.6M	HSLB	75	4	6k	175M	2.3M
BPID	8192	2.5	128	7.5M	DSP	16	16	4k	120M	8M
EPID	77760	1.3	138	0.87M	HSLB	35	0.5	4k	120M	15M
ECL	8736	33	52	7.7M	HSLB	26	4	12k	360M	15M
BKLM	21696	1	86	9.7M	HSLB	6	8	2K	60M	10M
EKLM	16800	2	66	19.5M	HSLB	5	4	1.4k	42M	5.3M
TRG					HSLB	~10				

~ 300 COPPERs in total

-> ~30 9U VME crates + ~30 Readout PCs
+ ~30 network switches

-> 10 racks (3 crates in a rack) for COPPERs
+ 5-10 racks for Readout PCs and switches

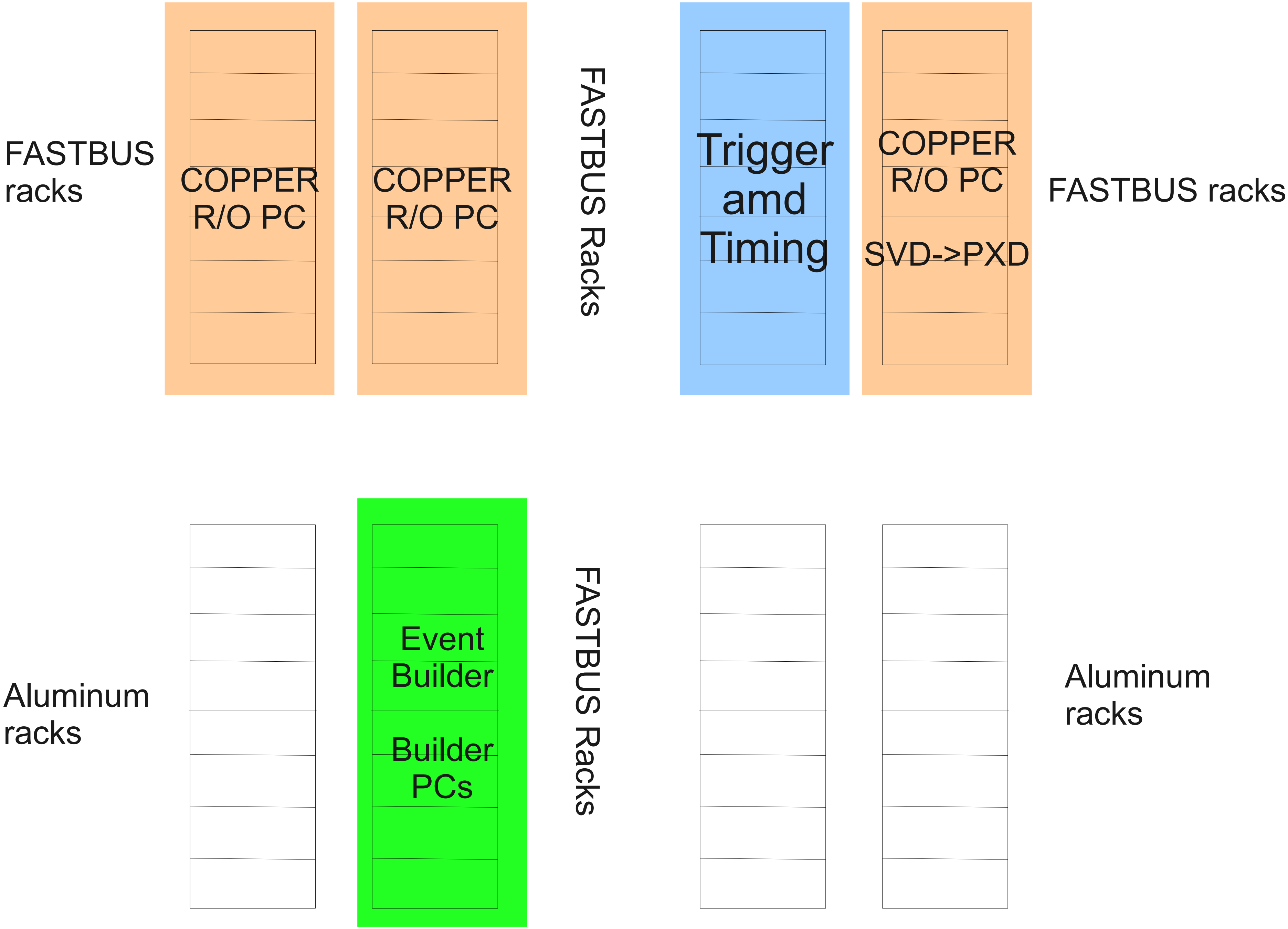
- Event Builder
  * O(10) box switches + O(10) builder PCs
    -> 4 racks?

- Trigger and Timing :
  * 1 row? (= 5-8 racks)

- SVD->PXD data separator
  * 1 rack

- Other equipments??

1F: 0th version layout

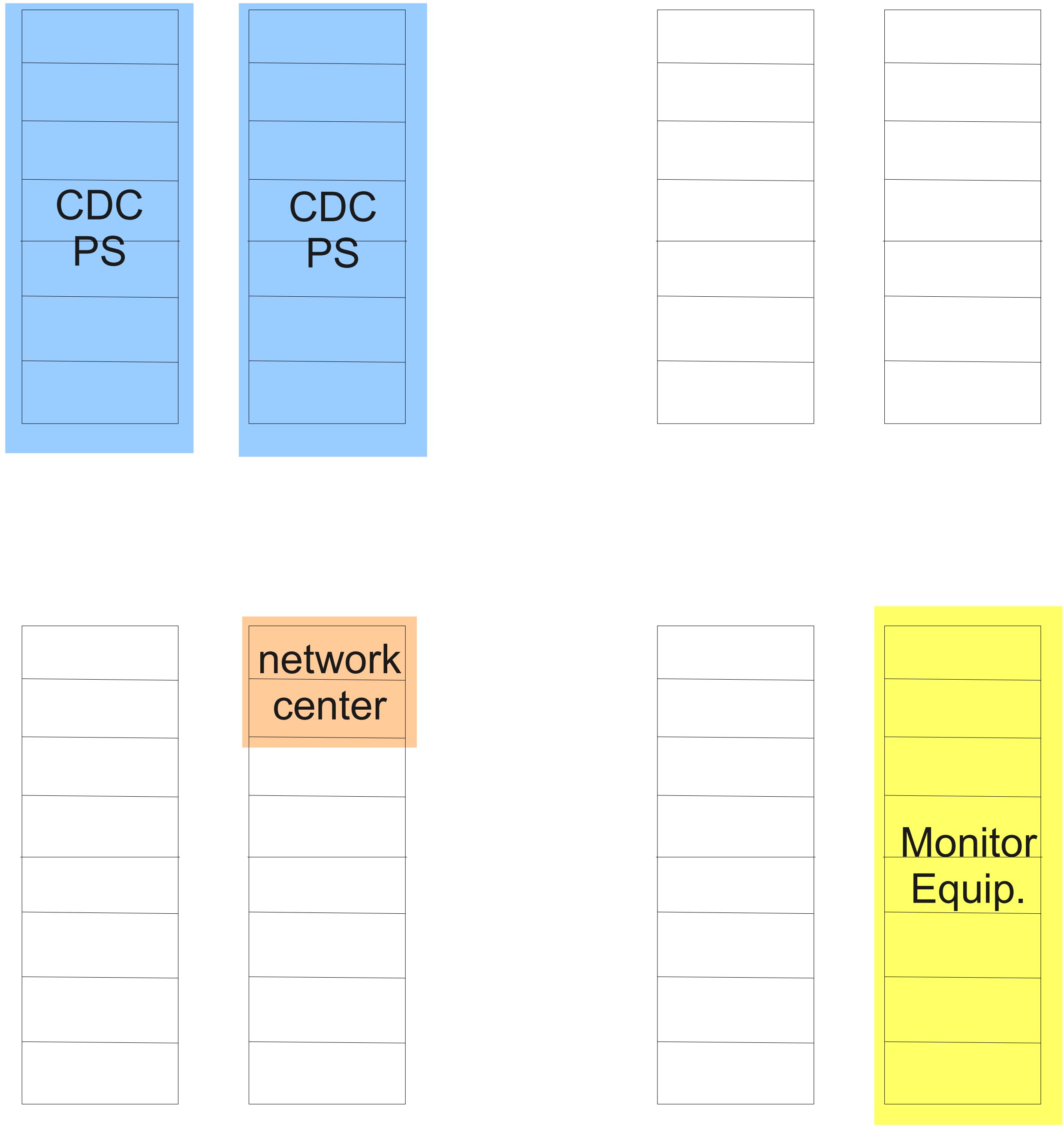


2F:

- CDC LV power supply -> ~ 2 rows? (~15 racks)
- Monitor related equipments -> 1 row
- Network center -> 2 racks

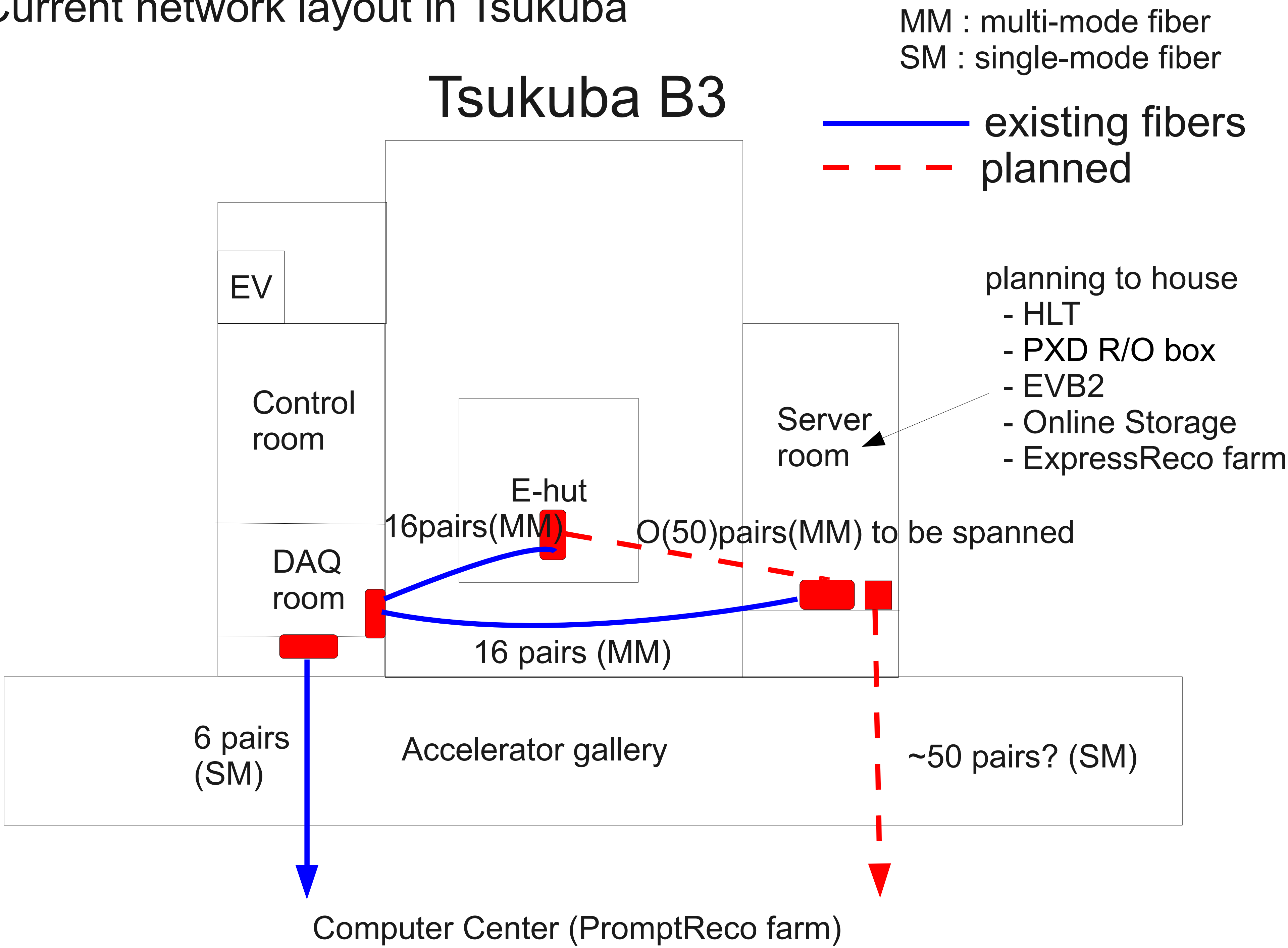
- Other Detectors? -> Discussed later

2F: 0th version layout



All low-profile aluminum racks

Current network layout in Tsukuba



2) Server room

- Belle's afarm and HSM (Petasite) are currently placed.
  -> Will be removed this year. (HSM will be kept, though.)

- Infrastructure (air-conditioning, power, racks) to house DAQ equipments is well prepared (although over-haul of air-conditioner might be necessary).

- Planning to place
  1) HLT
  2) Event builder 2 (network switches)
  3) PXD readout box (ATCA crates)
  4) HLT<->PXD R/O interface (PC + network switches)
  5) Online storage
  6) Express Reco Farm
  7) Database Cache server

- Anything else? Prompt Reco??

3) Control room

- Place where you sit and take exp. shift.
- Monitor equipment for shifters will be placed.

- No plan for now.
  --> Will be furnished in JFY2013-14 before BEAST era.

- Hopefully nice to have a fancy shift room like LHC experiments'

- If you have nice idea of the layout, please let us know.

4) DAQ room (next to control room) : reserved for DAQ group

- DAQ slow control servers
- Network equipments
- Various monitoring PCs

          +

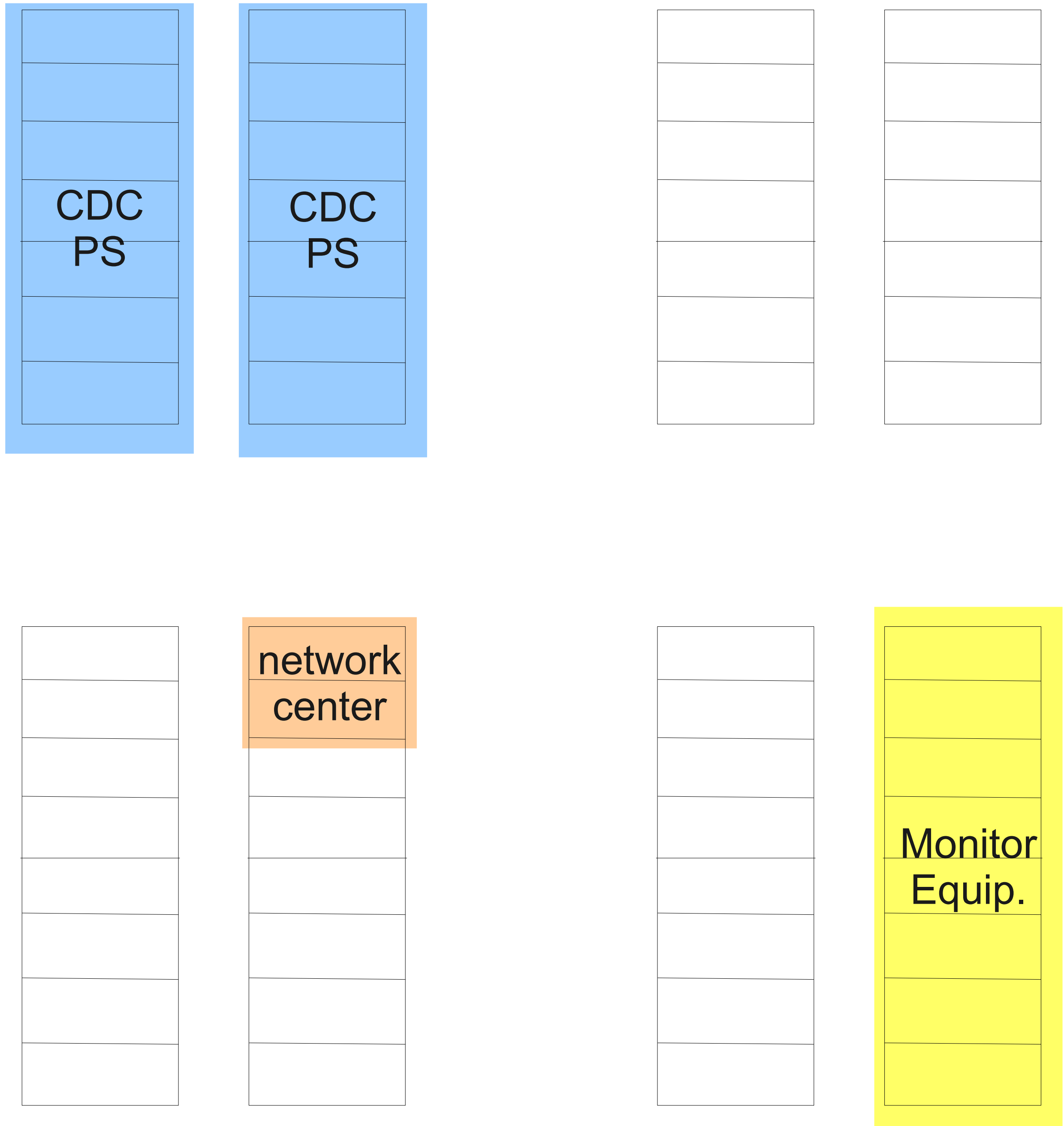
- DAQ R&D equipments

Discussion

1) Which detector electronics are supposed to be placed inside E-hut F2? and which part outside?
<- heavily related to “heat dissipation” discussion by Uehara-san.

	E-hut F2	Outside E-hut
PXD:		
SVD:		
CDC:	HV, PS for FEE	
TOP:		
A-RICH:		
ECL:		
KLM:		

2) Requests on the place in E-hut F2



All aluminum racks

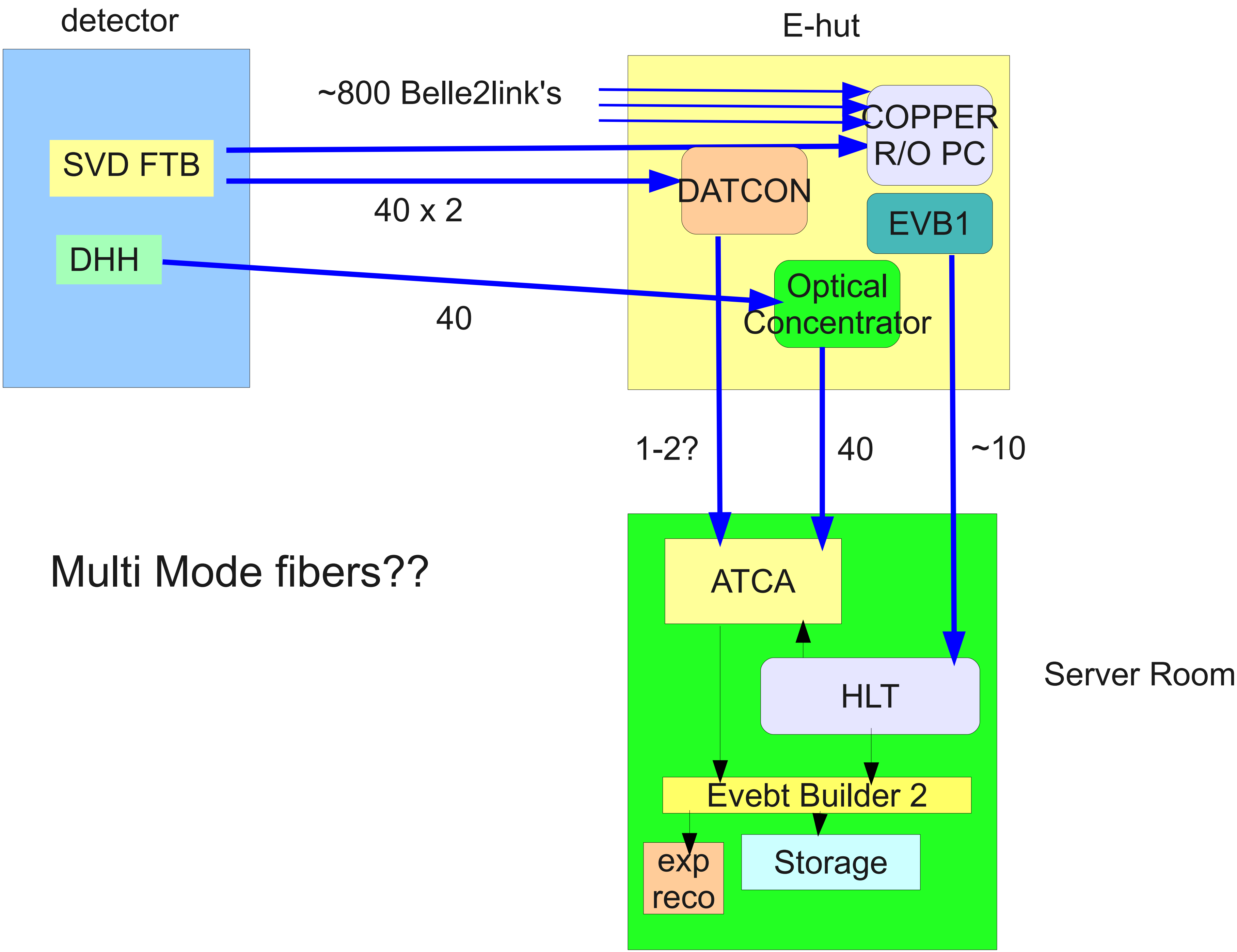
FBPS : FASTBUS power

3) Cabling between E-hut F2 and outside

[Signal]
- Signal fibers are all fed into E-hut F1 to COPPERs.
  (~ 800 Belle2link fibers)
- PXD fibers are also supposed to be first fed into F1 and then optically relayed to “server room”.

[Utility: HV, LV, Monitor.....]
- Cables between E-hut F2 and outside are basically for power supply and monitor related.
- What kind of cables, and how many, are supposed to be spanned?
    * PXD
    * SVD
    * CDC
    * TOP
    * A-RICH
    * ECL
    * KLM

SVD and PXD



Multi Mode fibers??