DAQ in the CDR

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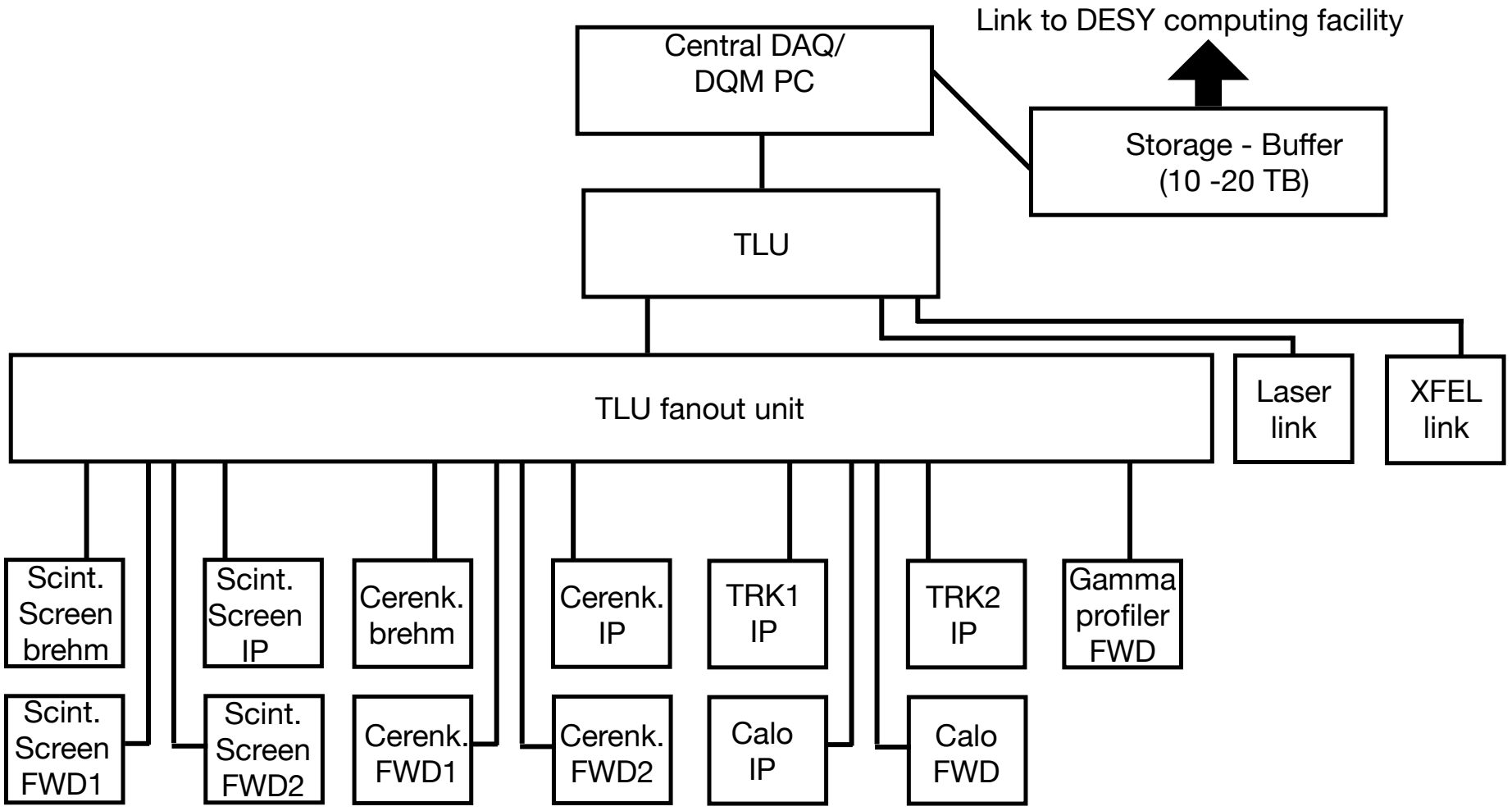
- General comments
- DAQ scheme
- Clock and control
- DAQ software
- Costs

General comments

- LUXE will not be a high rate experiment, with a maximum of *10 Hz* data-taking frequency.
- The detectors will generally be small.
  - Should not need a massive PC farm, huge data reduction, event triggering, etc.
- We need to consider timing and when to trigger data taking in the detectors.
  - There are clock and timing modules used for the other experiments — re-use.
- LUXE is more the size of detector beam test than a HEP experiment.
  - Can use software designed for this.
  - Re-use software, rather than writing our own ?
- Should not forget calibration.

DAQ scheme


Link to DESY computing facility
Central DAQ/
DQM PC
Storage - Buffer
(10 -20 TB)
TLU
TLU fanout unit
Laser
link
XFEL
link
Scint.
Screen
brehm
Scint.
Screen
IP
Cerenk.
brehm
Cerenk.
IP
TRK1
IP
TRK2
IP
Gamma
profiler
FWD
Scint.
Screen
FWD1
Scint.
Screen
FWD2
Cerenk.
FWD1
Cerenk.
FWD2
Calo
IP
Calo
FWD

Clock and control module

- Trigger and Logic Units (TLU), developed by Univ. Bristol, as part of EUDET/ AIDA EU programmes.
  - Would provide clock/timing to detectors from accelerator/laser.
  - Receive busy from detectors.
  - Used extensively in DESY and CERN test beams.
  - Links with several of the LUXE detectors.
  - Expertise and knowledge of its use at DESY.
  - Should be a relatively cheap solution (no/little development).
  - Hardware designs, firmware and software freely available.
- In some sense an example of a solution.
  - The megapixel detectors at EuXFEL have a clock and control card.
  - Other experiments have developed such modules.

DAQ software

- LUXE is not a large experiment and not high rate.
- Can use EUDAQ2 software also developed as part of EUDET/AIDA EU projects.
  - Used or links to many of the detectors under development.
  - Used in test beams so flexible and used by different detectors.
  - Expertise at DESY.
  - Has some DQM aspects but could be improved.
  - Software freely available.
- Slow control: resources from EuXFEL, e.g. DOOCS ?

Costs / resources

Item	Quantity	Price per unit (kEUR)	Price total (kEUR)	Price source
TLU	3	3	9	Mail from D. Cussans
Fanout	2	2	4	Estimate
DAQ PC	2	1	2	Estimate
Storage	1	20	20	dell.com
Total			35	

Personnel:

- 0.5 FTE/yr engineer/staff for technical work and oversight
- 1 post-doc responsible for software and running DAQ
- 2 PhD students to provide support and redundancy to the above.