DAQ Commissioning

Installation Workshop LS2

16.5.2018

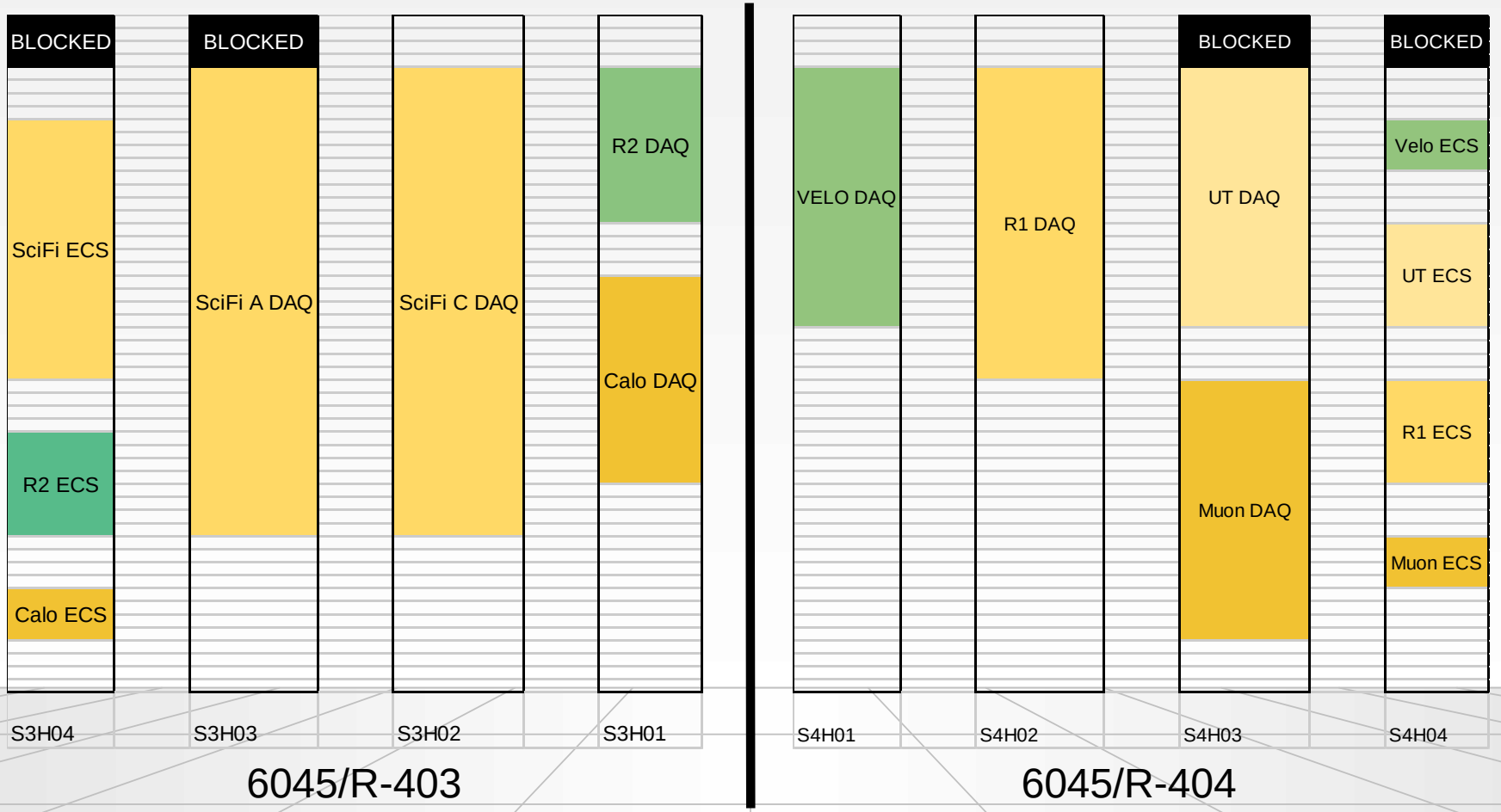
Topics

- Fiber Infrastructure
- ECS/TFC
- Read-out/Event-builder Machines
- HLT Farm

Fiber Infrastructure - Timeline

- Some Numbers:
  - > 18.000 individually pluggable fiber connections
  - 5000 km of fiber
- Installation of Long Distance Fibers after installation of second batch of DC containers
- April - June 2019
- Installation of patch cords between LD Fibers and TELL40 racks after
  - Have to see how much overlap we can have between LD and patch installation
- Full detector connectivity + Tell40 installation latest by Sept. 2019
  - Does not mean full read-out bandwidth!
- Installation in stages
  - ECS/TFC first stage
  - Order of installation of sub-det specific patch cords TBD

Fiber Infrastructure - Organisation



- Planned ODF layout in containers
- 4 Optical Distribution Frames per container

Fiber Infrastructure - Installation

- Differences to current Tell1 setup in D2
  - A LOT more connections
  - Sacrificed additional break-point in DAQ Machine racks for long distance read-out + cost savings (~100 kCHF)

  →"Patch cords" are much longer (8-12m)
- Installation of patch cords will be done by Online or external company
- Sub Det will need to provide connection plan for which FE link connects to which TELL40 port
  - For some we already received this as part of the fiber tender
  - The sooner you provide us with this plan, the sooner we can cable your detector
  - Please continue filling in Laurent's spread sheets
- A priori the fibers in the data center will be off-limits and re-patching will be done by Online, if necessary

TFC/ECS

- ECS computing infrastructure
  - Keep current server room in SX8 for controls, user computing clusters
  - 6 future proof, high BW links between SX8 and every container, to be installed mid. 2019
- TFC/SOL40s
  - Installation as soon as long distance fibers are installed
  - Use machines similar to TELL40 acceptance test systems

Read-out installation

- Thanks to PCIe solution we are now blessed/cursed with technology options
- Currently considering two installation scenarios
  - Initial minimal/dense system
  - Full installation of read-out system from day 1 (Sept. 2019)
- Decision about which way we go by the end of this year

Read-out Installation – minimal readout

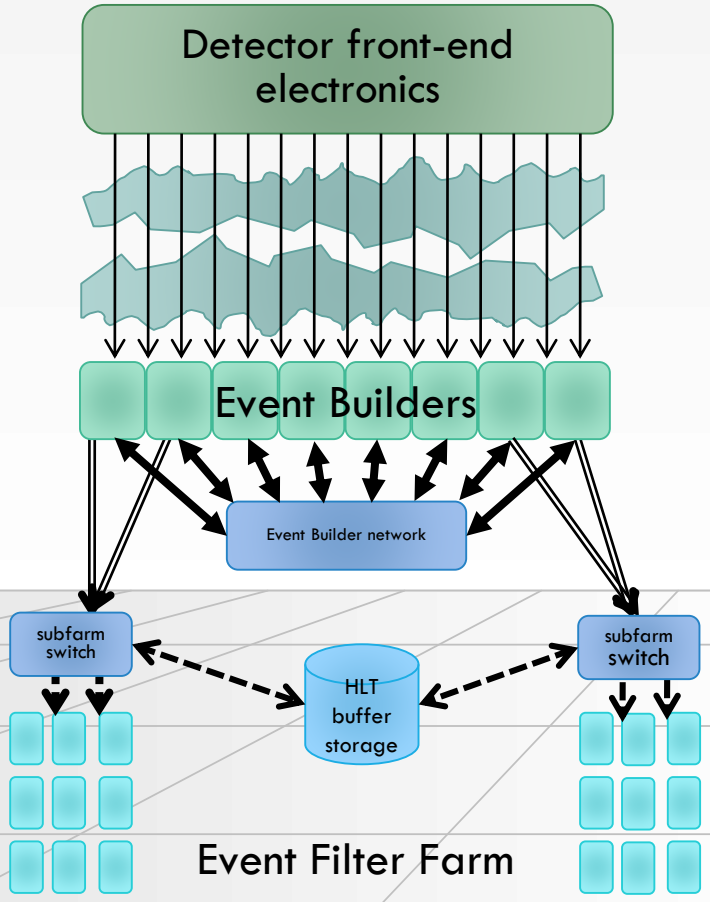
- Goals
  - Provide enough PCIe slots to seat all Tell40s
  - Very limited network output bandwidth (10 Gbit/s per 3 or 4 Tell 40s)
  - The machines themselves will support full/half Tell40 bandwidth to internal memory
- Pros:
  - Delay technology choice for EB network for at least another 6 months
  - Commissioning of EB network in parallel, without interfering with Sub-det. Commissioning
- Cons:
  - Need to purchase additional hardware and find a use case for re-using it later
    - Use as EB server (depending on network choice)
    - Use as dedicated accelerator boxes (GPUs in the farm)
  - Transform temporary to final system: 2-3 months of sporadic interruptions of parts of DAQ during transition period

Read-out Installation – full installation

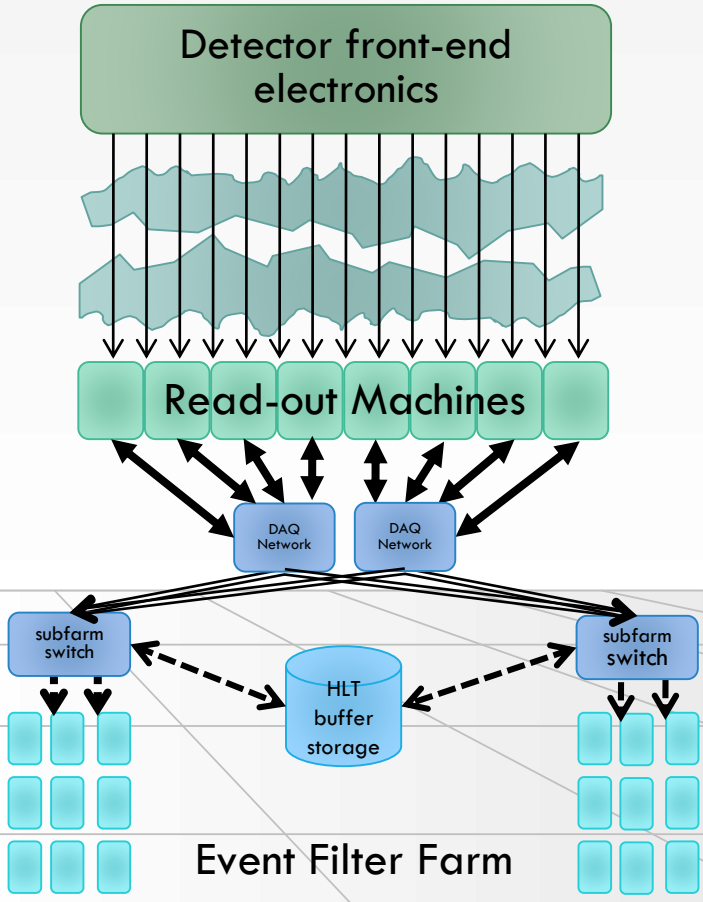
- Goals:
  - Provide enough PCIe slots to seat all Tell40s
  - Full Network bandwidth available (but not farm capacity)
  - More time to commission the final system
- Pros:
  - Starting with the final system immediately
  - No transition period later on
- Cons:
  - Have to buy final hardware a year earlier than necessary
  - Operational conflicts between Sub-Det. usage of machines and Online usage for network commissioning
  - Lock out of potential technology developments

Event Builder Installation - Architectures

Current Upgrade Baseline



Run 1, 2 like network



Farm installation

- Old farm nodes
  - Move to new DC eventually
  - Date yet unclear
  - Current plan: MC production/offline processing as long as possible
  - use parts for commissioning of Sub-Dets. when necessary
- New farm nodes
  - Start procurement in 2020 with installation late 2020
  - Depends a lot on ongoing developments in HLT software
- Two options currently discussed for scale up
  - Start with many, small sub-farms
  - Start with few, big sub-farms
  - Strong dependency on HLT and EB network development