Istituto Nazionale di Fisica Nucleare
LABORATORI NAZIONALI DI LEGNARO

Electronic and DAQ

AGATA Week: LNL Installation Reports

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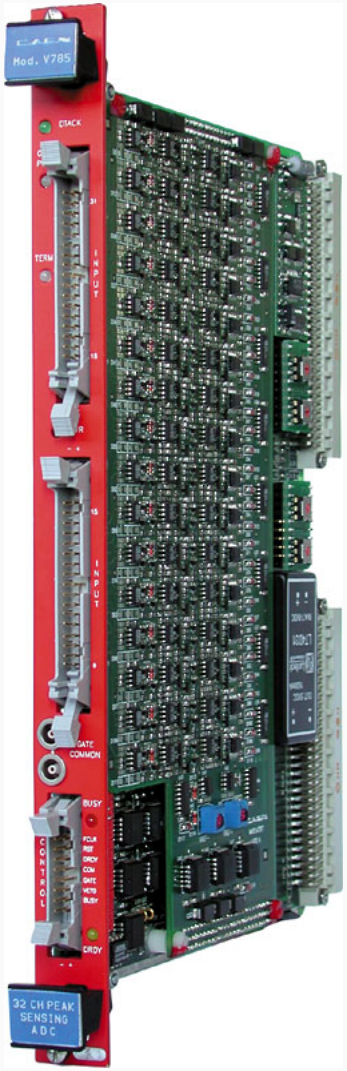
INFN - Laboratori Nazionali di Legnaro
March 17^{th}, 2021

Electronic

Ancillary detectors - Phase 0

3 types of readout:

1. "Traditional" VME (V785/V775) $\Longrightarrow$ PRISMA [a]
   - Coupling to AGATA using the AGAVA (test with IPBUS 04/21)
   - new VME bridge are beeing tested to reduce dead-time



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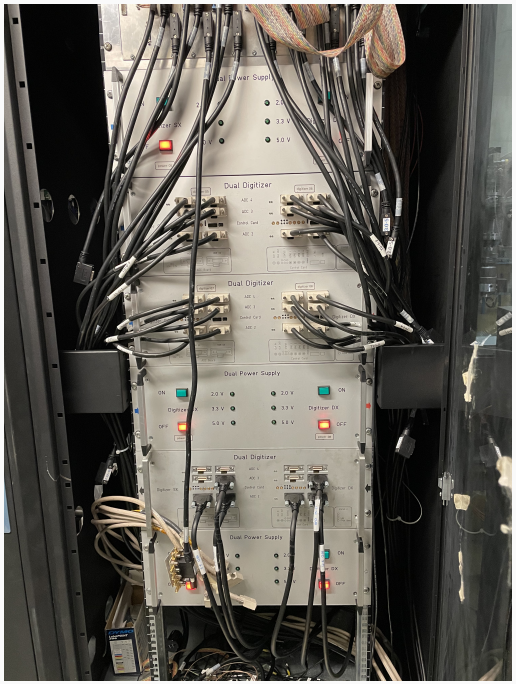

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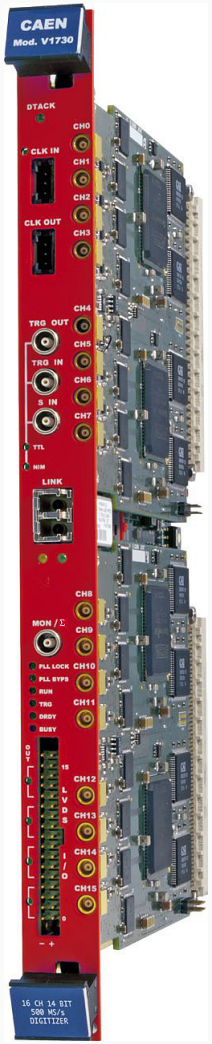
3. "Commercial" digitizers $\Longrightarrow$ PARIS[c], FATIMA, $LaBr_3$ high efficiency
   - Work in progress with the PARIS collaboration
   - Only few digitizers available at LNL.



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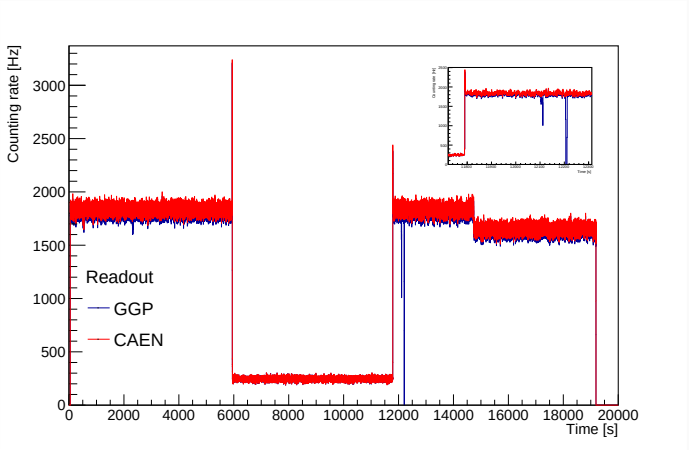
Coupling CAEN digitizers with the GGPs (Coll. PARIS - **S. Brambilla**):

- $LaBr_3$ with two parallel readouts:
  1. V1730 (500 Msps + DPP-PSD)
  2. LaBrPRO (CFD+Slow) + GGP (FW GALILEO (2 channels/domain ; 16 domain / GGP)
- Both readout triggered by the CFD of the LaBrPRO module
- Dedicated PLL for the CAEN Digitizer with:
  - 100 MHz LVDS input
  - Output to CAEN standard 62.5 MHz



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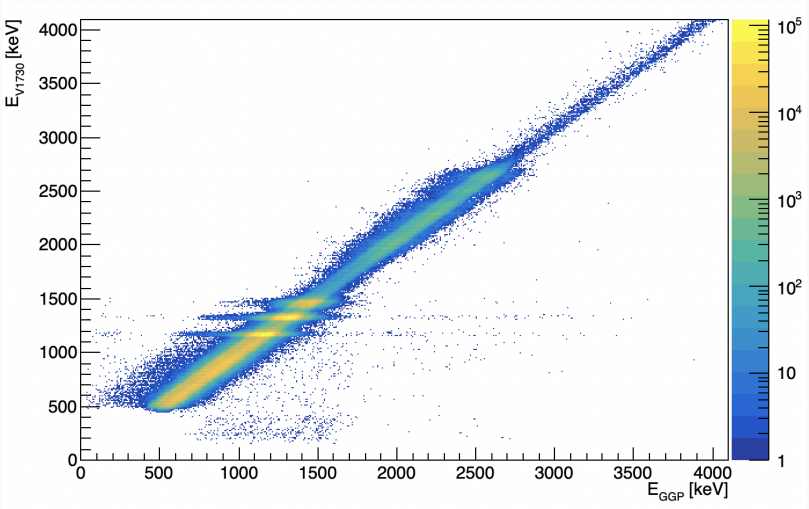

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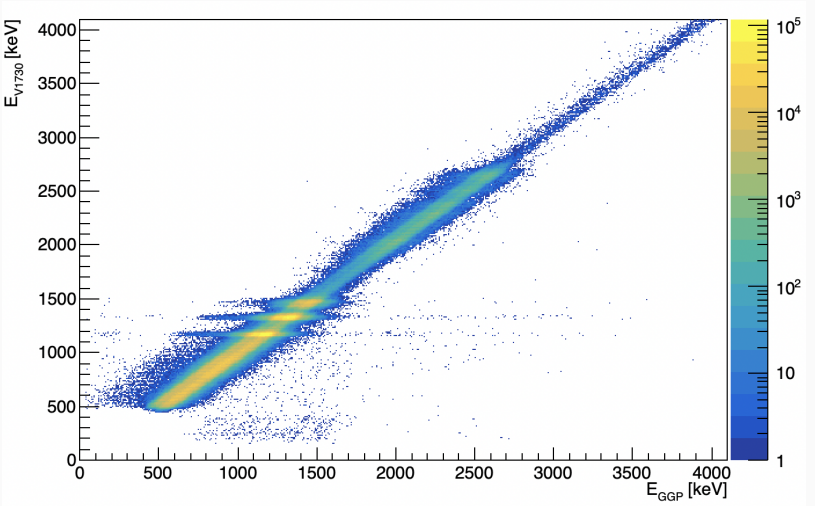

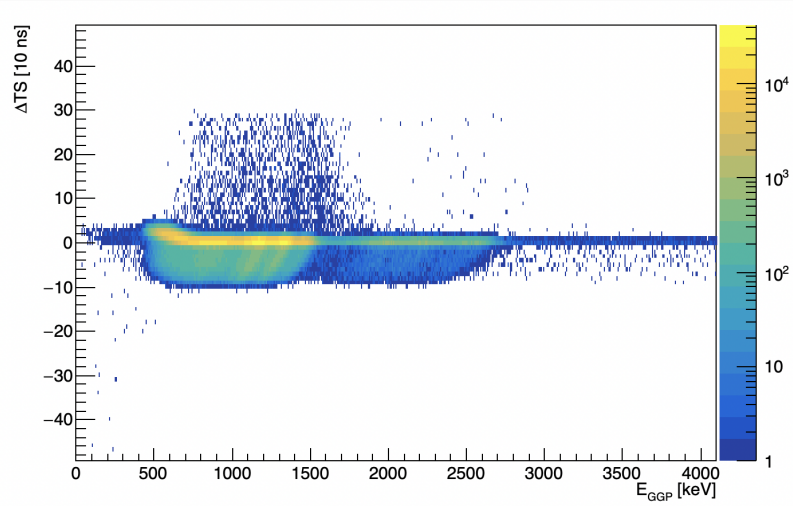

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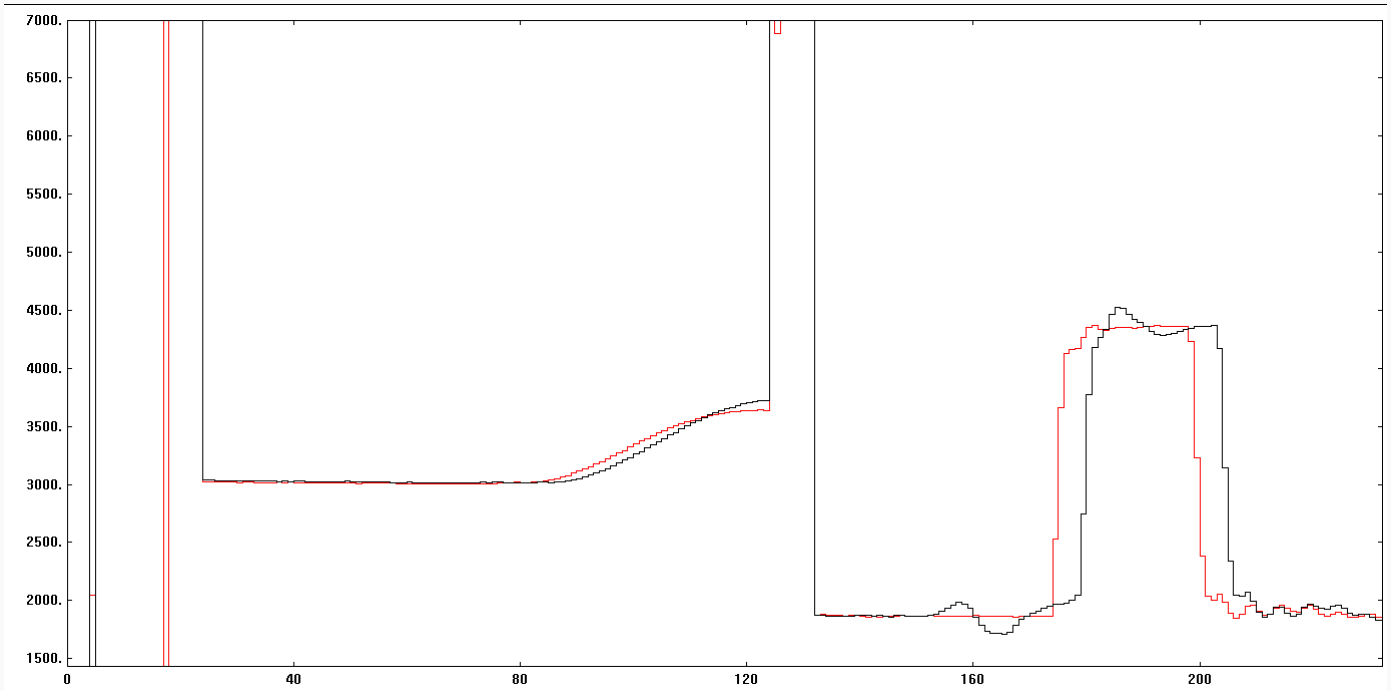

AGATA Electronics

In agreement with the AGATA collaboration:

- readout of the array with V1 and V2 electronics
- V0 dedicated for detector characterization after intervention @ LNL

Work to be done **before AGATA arrival**:

- Check of the IPBUS FW compatibility with all generation of GTS mezzanines
  if OK $\Longrightarrow$ migration of all AGATA GTS mezzanine to IPBUS
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Work to be done **when AGATA arrives**:

- GTS Root and GGPs installed in the computing room close to the DAQ box
- Uprade FW GTS mezzanine
- Check and upgrade of all GGP FW
- Installation ...

Data Acquisition

Starting from the GANIL situation

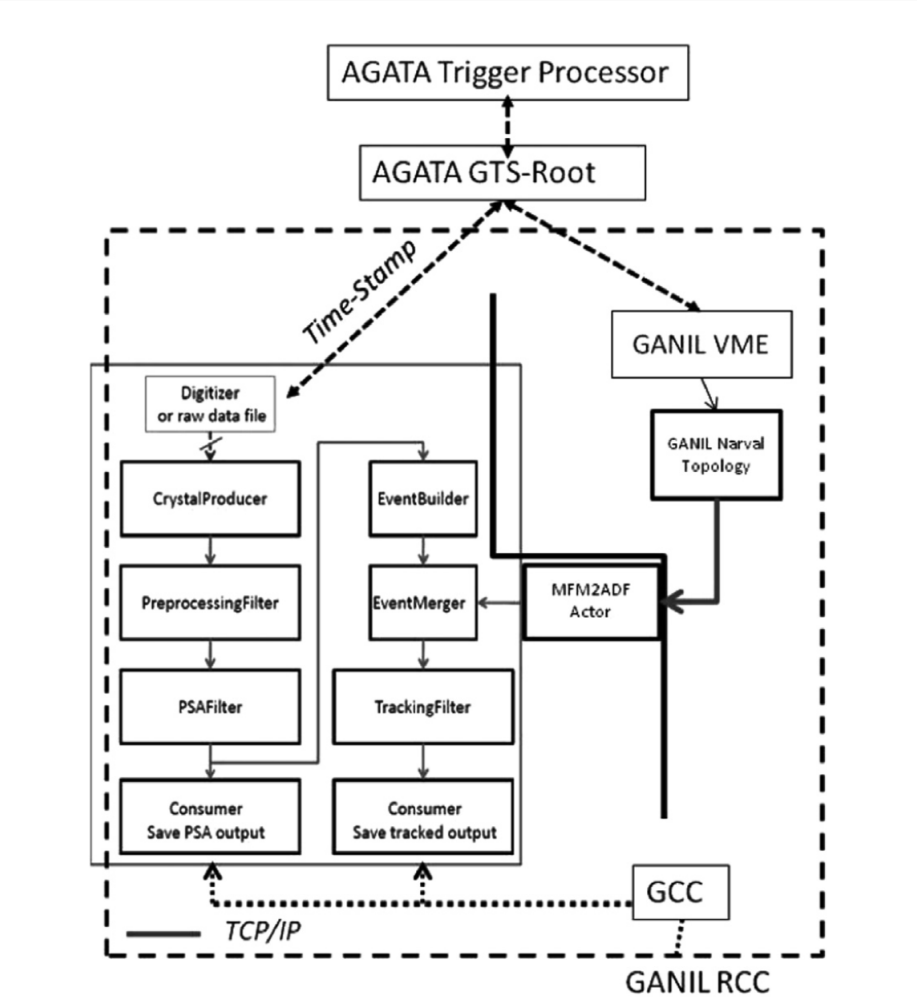
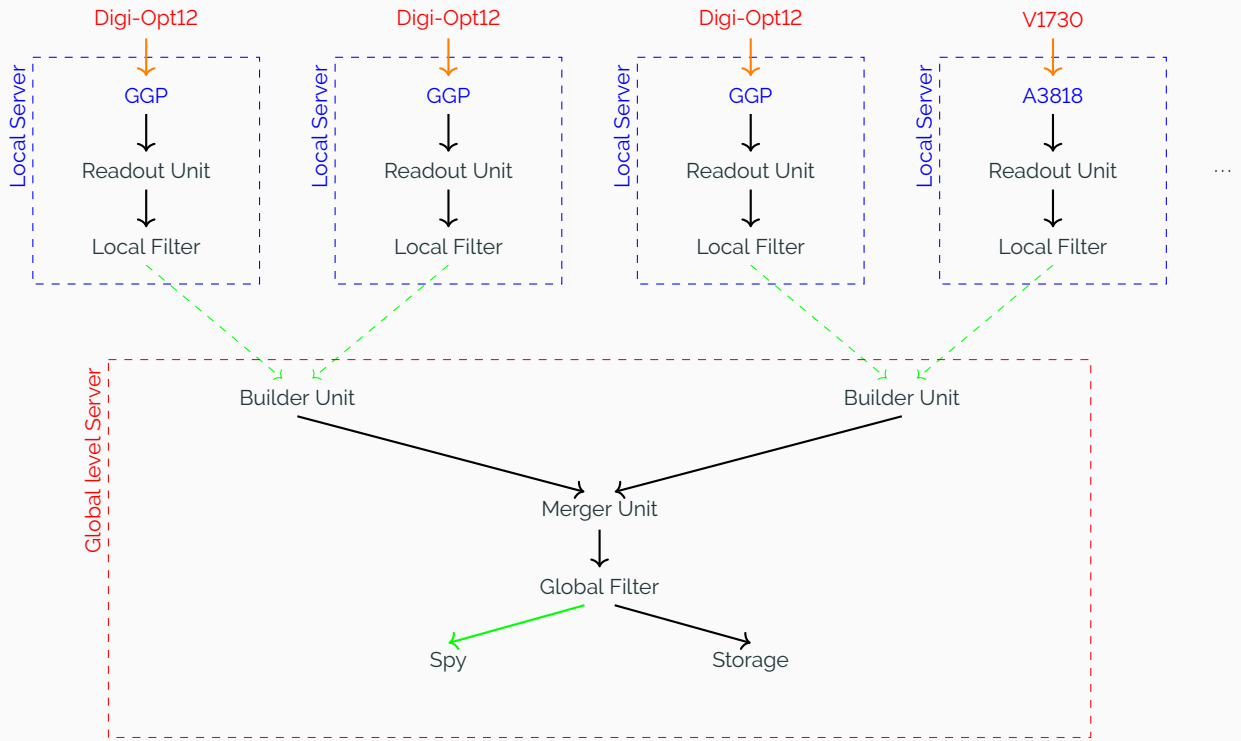


Fig. 11. AGATA data-flow topology combining both AGATA and GANIL Narval actors, Global Control Core (GCC) and Run Control Core (RCC) sub-systems.

E. Clément et al., NIM A 855 (2017) 1

Coupling XDAQ and DCOD

- Two distributed acquisition system - similar to GANIL situation
- New and centralized run control
  - Dedicated server (gal-32) for the run control + monitoring
  - Communication with the actors via SOAP/REST messaging
    - All actions (init, configure, start, stop) are done in parallel and in order
    - Direct communication with the hardware for drain / trigger enable
  - Two user interfaces:
    1. Web Server for users
    2. command line for advanced users / debug
  - Monitoring and exportation of data to CARBON time series



Monitoring HW and SW

Hardware monitoring HW:

- HV HPGe and ancillaries
- GGP
- GGP rates
- ...

Software monitoring:

- buffer rates
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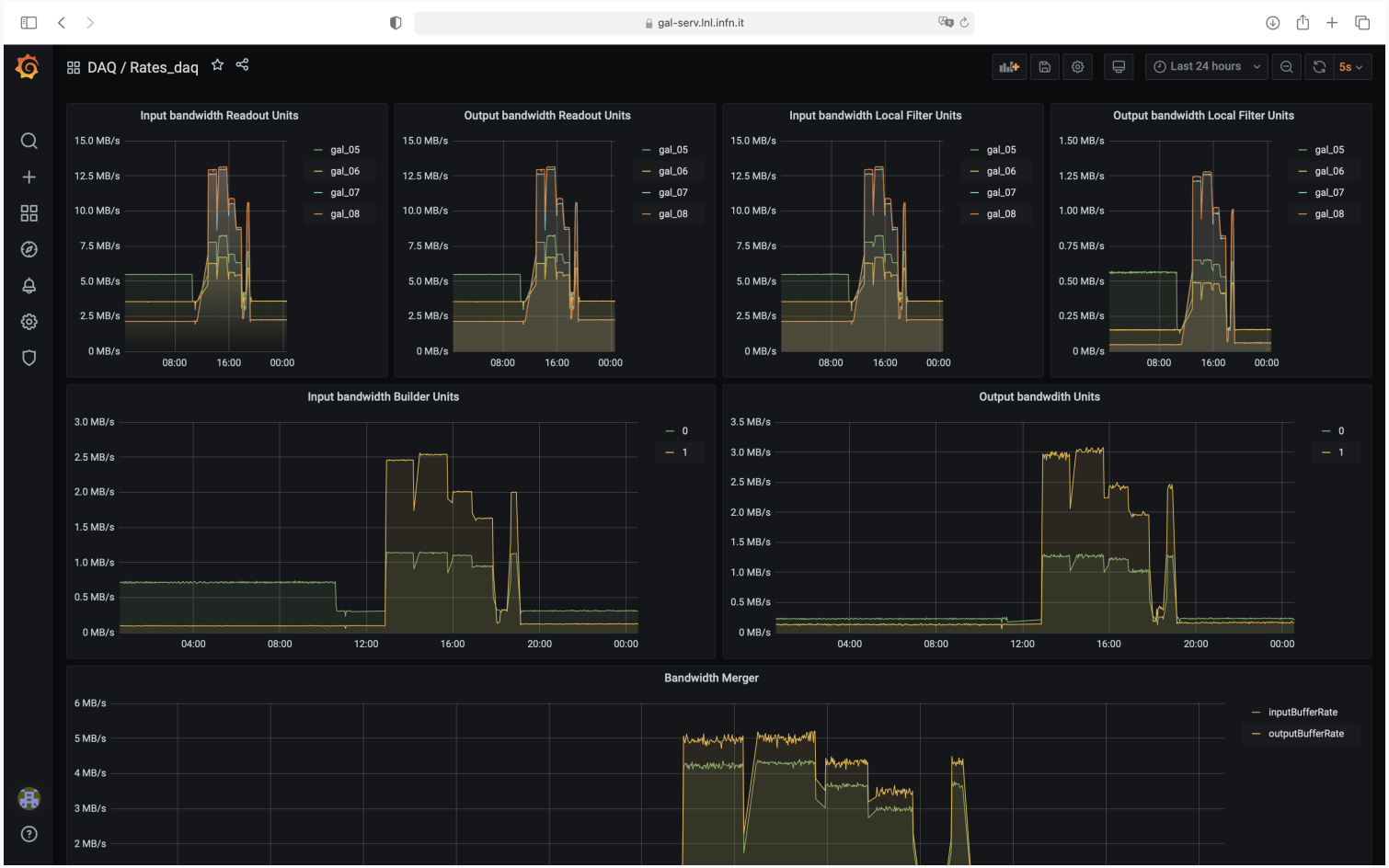

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Conclusion

- Work is on track for the electronic upgrade of the main complementary detectors
- Run control has been tested during the last GALILEO campaign:
  - XDAQ part is operational and documented
  - Based on python3 and code available on git
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- Main remaining tasks:
  - In collaboration with the DAQ team:
    - Network definition: fully isolated from LNL network (?)
    - Test RC with DCOD
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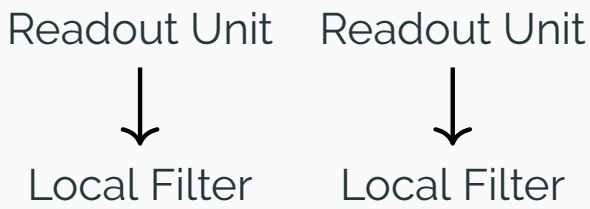
Special thanks to: D. Bazzacco, S. Brambilla, E. Clément, N. Dosme, A. Gadea, A. Gozzelino, M. Gulmini, A. Korichi, E. Legay, O. Stezowski, ...

Builder units (BU, MU)

Event reconstruction based on timestamp information



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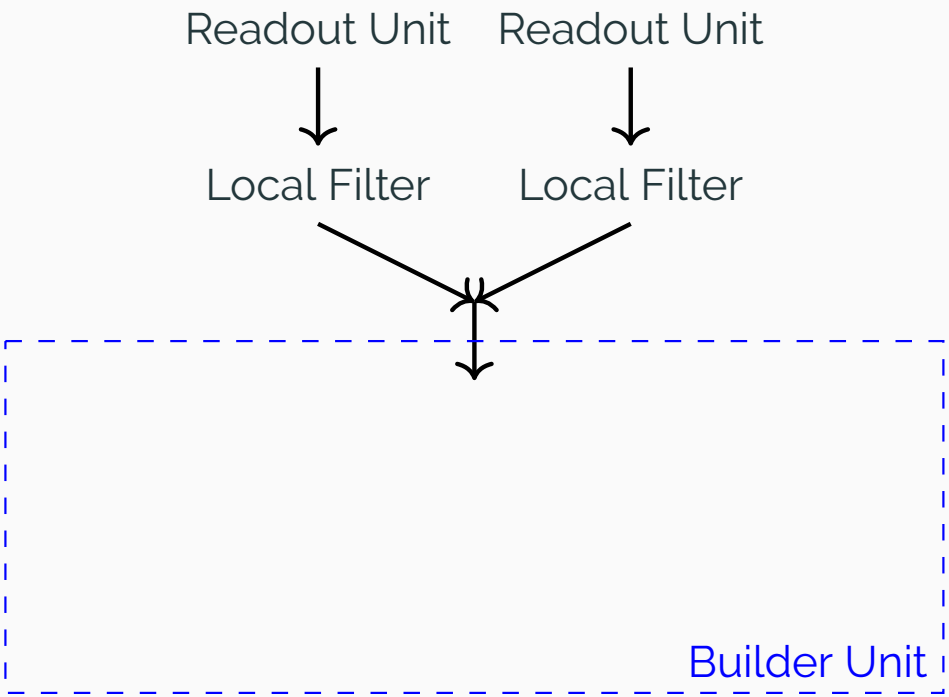

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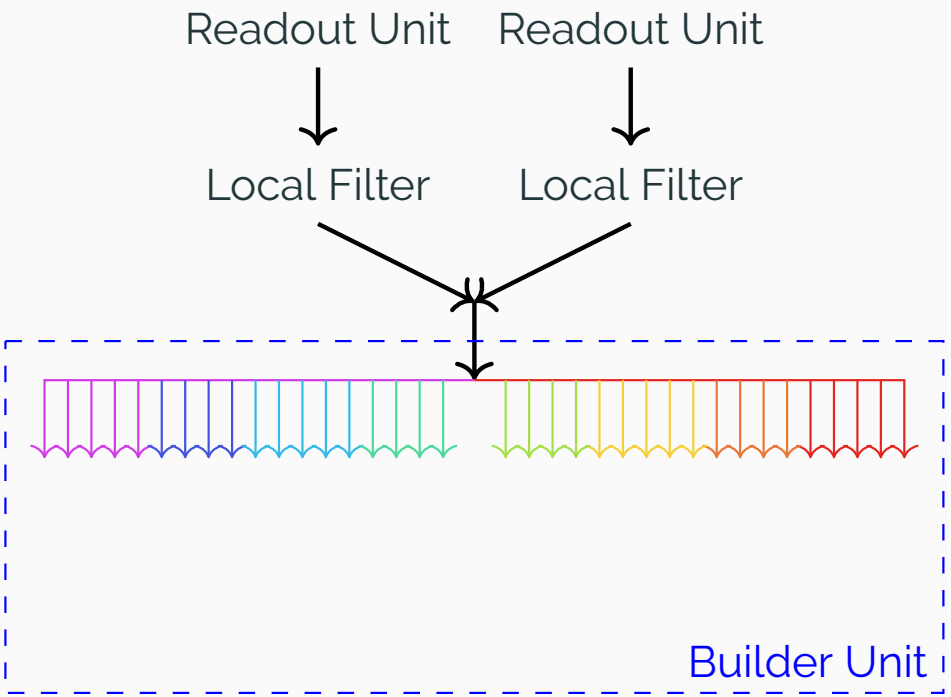

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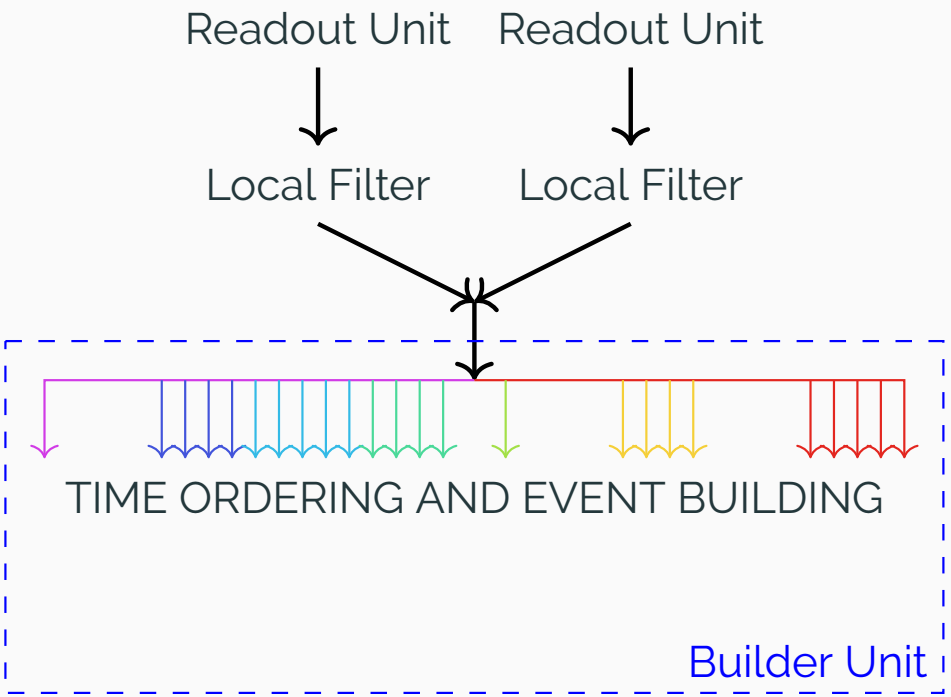

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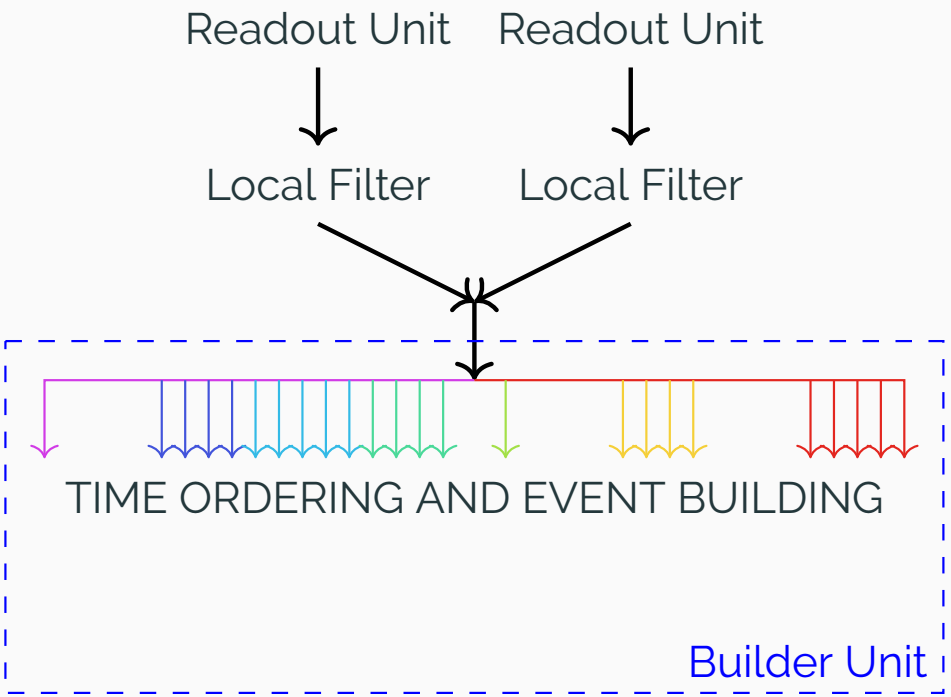

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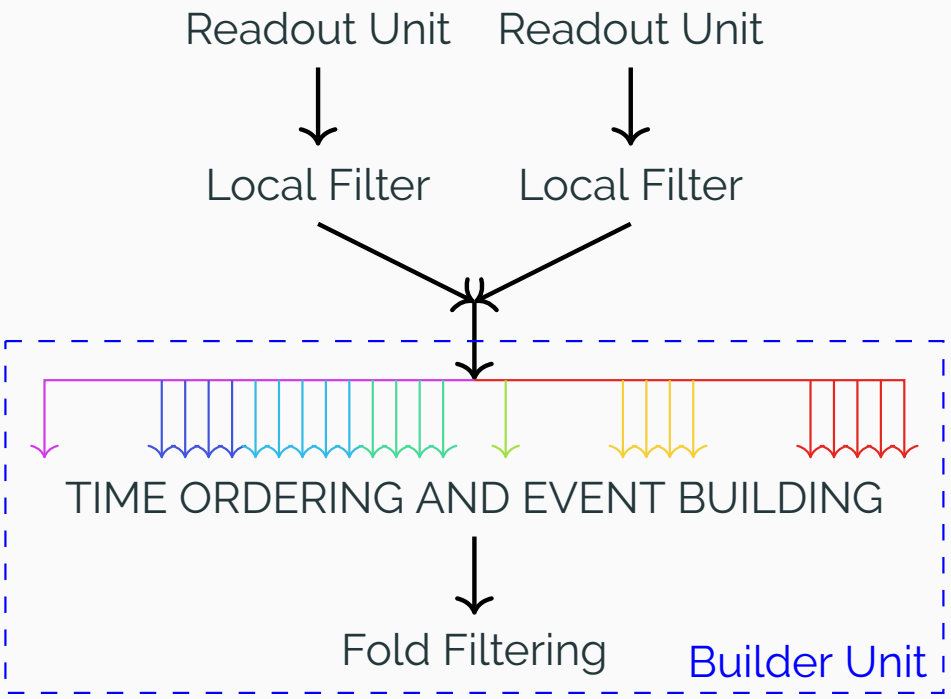

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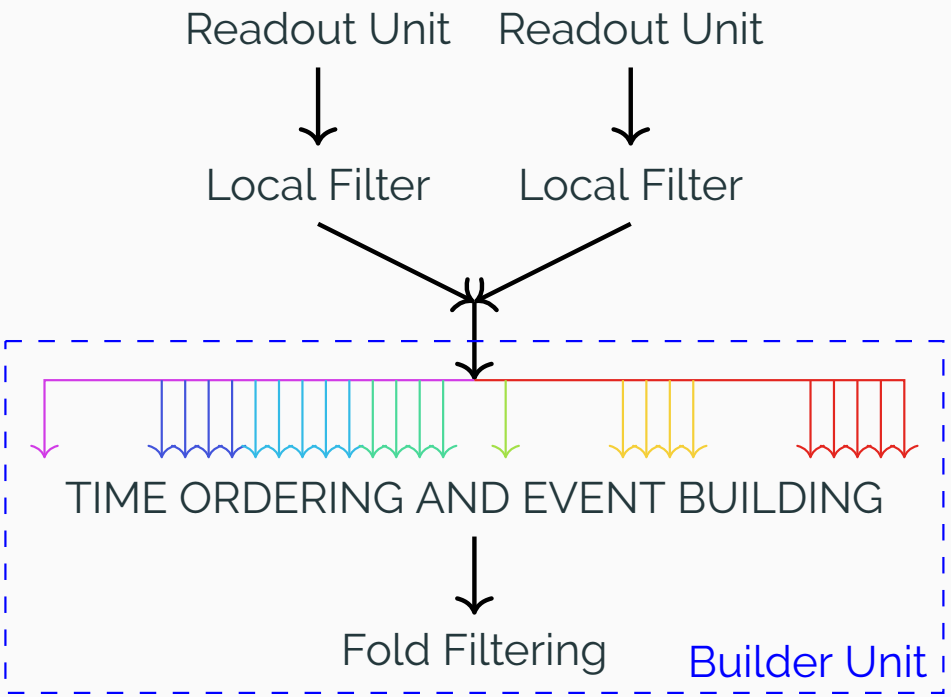

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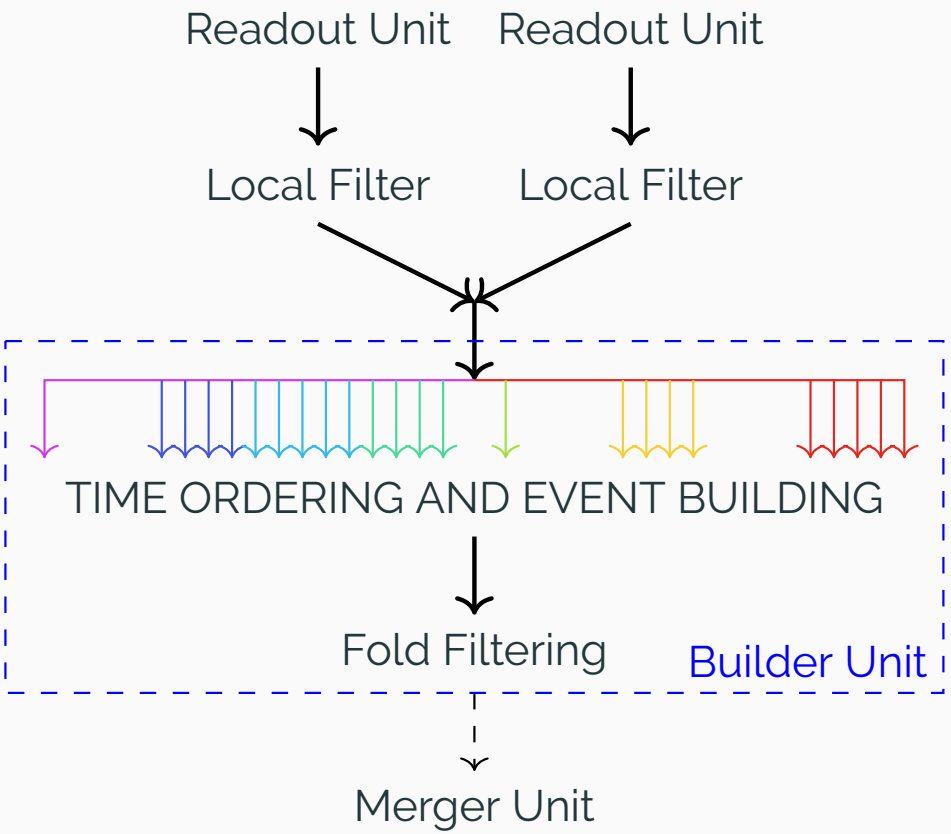

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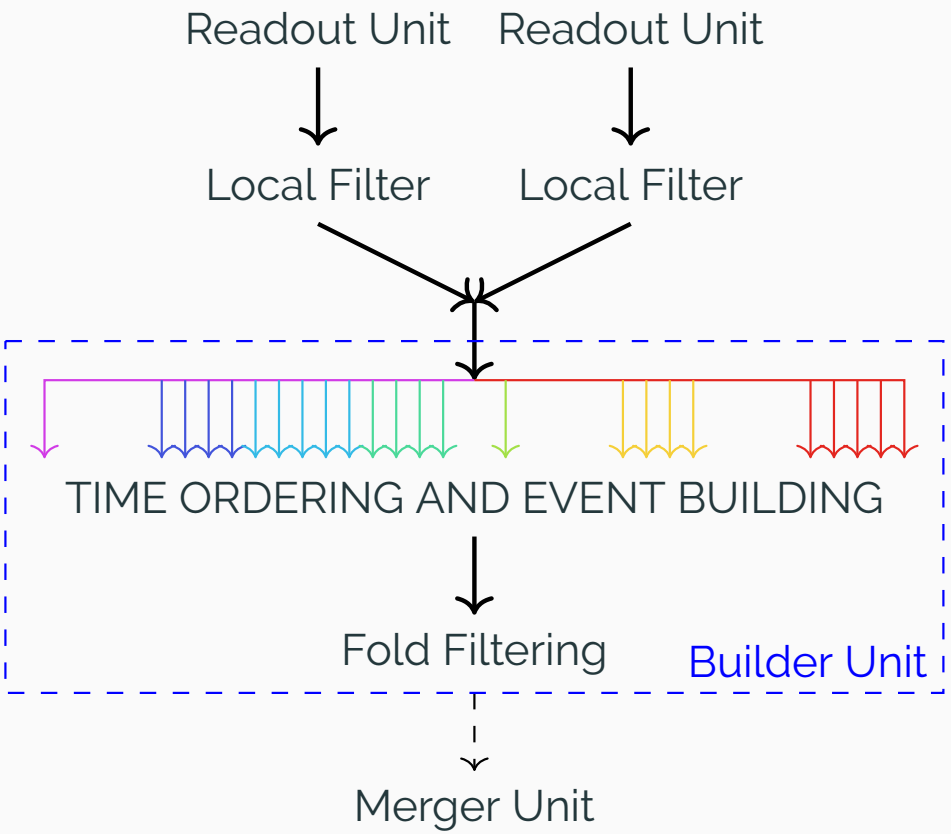

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- Composite frames with configurable keyword

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