

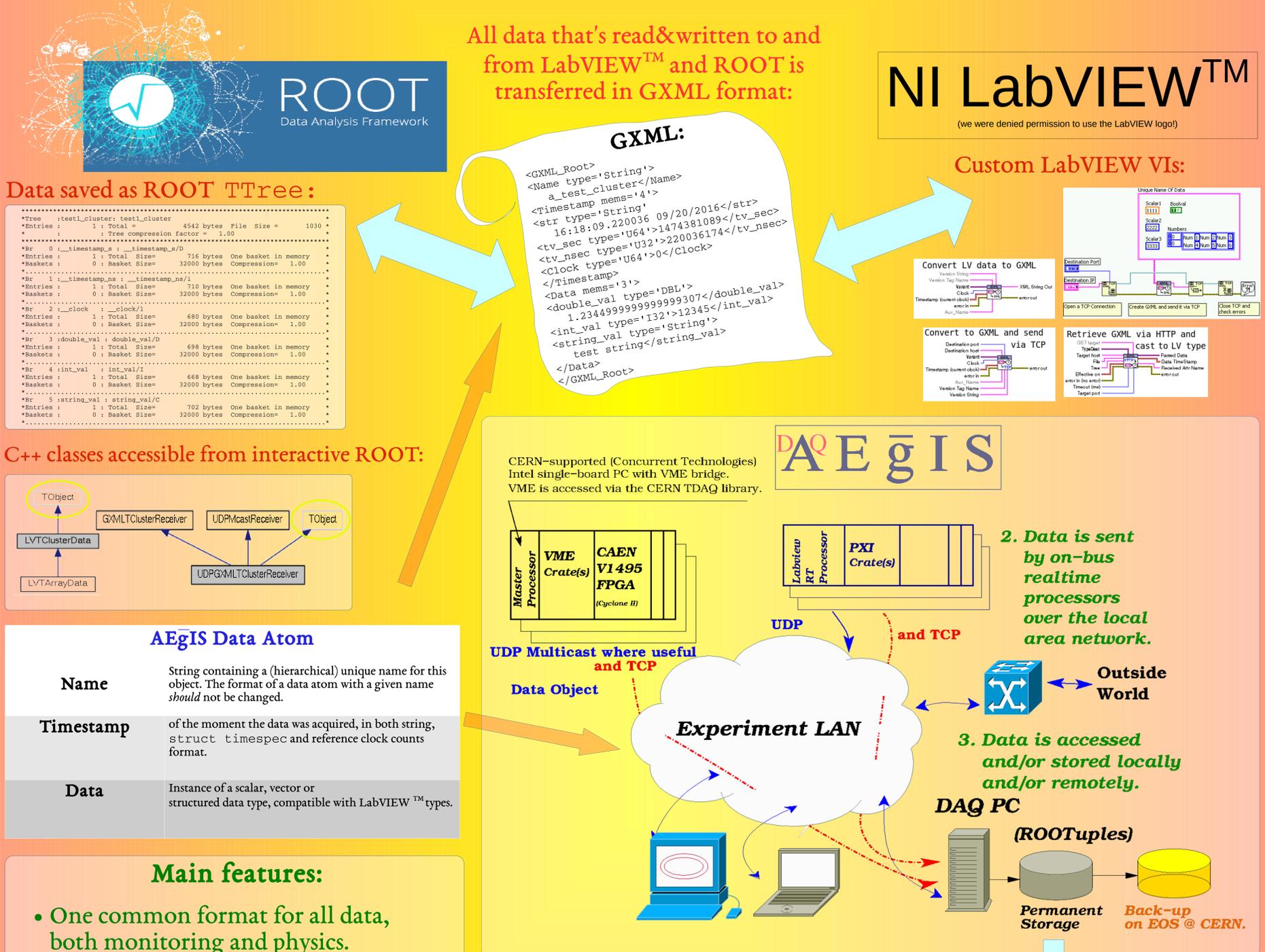
The DAQ system for the AEGIS experiment

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In the sociology of small- to mid-sized ($O(100)$) collaborators experiments the issue of data collection and storage is sometimes felt as a residual problem for which well-established solutions are known. Still, the DAQ system can be one of the few forces that drive towards the integration of otherwise loosely coupled detector systems. As such it may be hard to complete with off-the-shelf components only. LabVIEW and ROOT are the (only) two software systems that were assumed to be familiar enough to all collaborators of the AEGIS (AD6) experiment at CERN: working out of the GXML representation of LabVIEW Data types, a semantically equivalent representation as ROOT Ttrees was developed for permanent storage and analysis. All data in the experiment is cast into this common format and can be produced and consumed on both systems and transferred over TCP and/or multicast over UDP for immediate sharing over the experiment LAN. We describe the setup that has been able to cater to all run data logging and long term monitoring needs of the AEGIS experiment so far.



- Main features:**
- One common format for all data, both monitoring and physics.
 - Easy to interface with LabVIEW™ - reference library provided by NI.
 - Data can be distributed/shared via UDP multicasting.
 - Data can be received and handled in interactive ROOT.
 - Long term storage as ROOT Ttrees.

- What didn't work as expected:**
- The custom memory allocator in 32-bit LabVIEW™ makes array copies *very* slow and painful. Had to move GXML generation from the reference VIs to ad-hoc DLLs.
 - $O(10^7)$ -member arrays started appearing in the lifetime of the experiment. Had to move away from a wasteful XML representation and allow base64 transfer of array data.
 - Had to switch XML engine en-route from `Root::TDOMParser` to `RapidXML` because of stability and performance issues.

