

INTENSE Monthly Meeting - Sep/2022

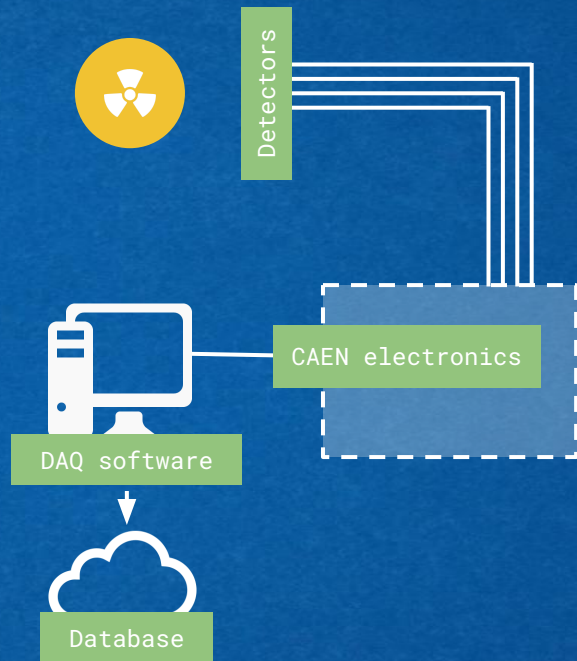
Development of a data acquisition platform based on CAEN digital electronics: Cloud database support

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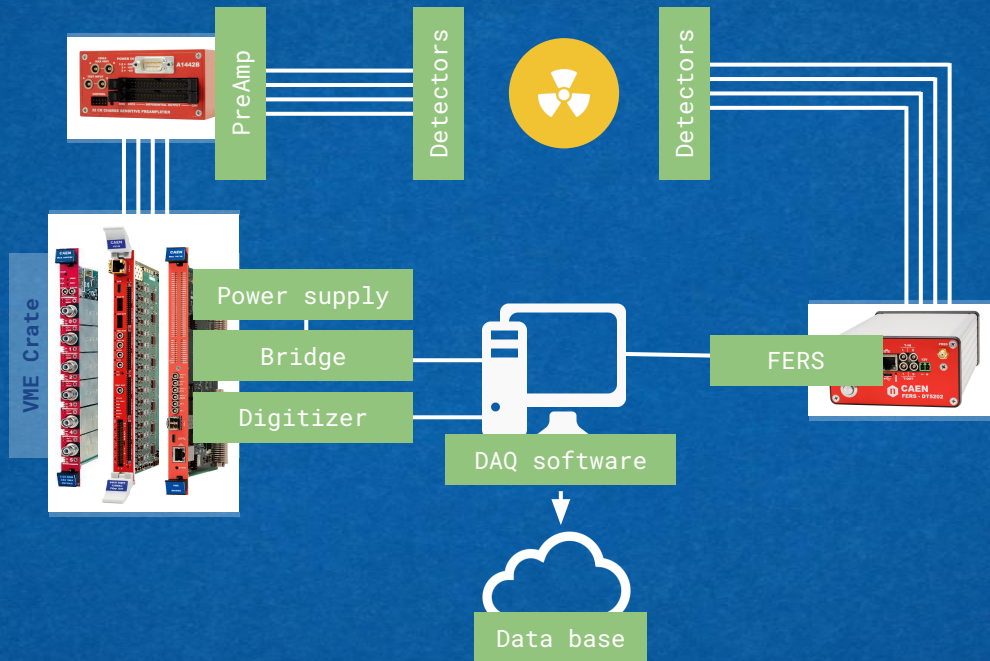
Data acquisition platform

- From detectors to data storage.
- CAEN electronics
 - Power supply.
 - Signal conditioning.
 - Digitize.
 - Communication.
- DAQ software
 - Device configuration and control.
 - Data readout and storage (eventually in a cloud database).
 - Integrated, versatile, high performance and easy-to-use.



< Digitizer-based ASIC-based >

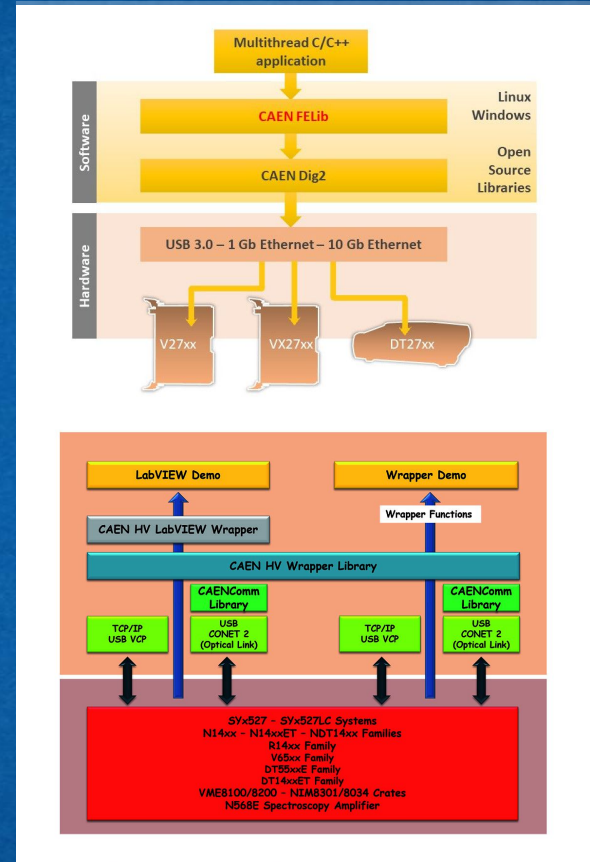
- *Signal conditioning*
CAEN A1442
16/32 Channel charge sensitive preamplifier.
- *Power supply*
CAEN V6519
6 Channel 500 V/3 mA VME
- *Communication*
CAEN V4718
VME to USB 3.0/Ethernet/Optical Link Bridge
- *Digitizer*
CAEN V2740
64 Channel 16 bit 125 MS/s.



- **CAEN FERS 5202: Front-End Readout System**
 - Citiroc 1A 32-channel front-end ASIC (x2), working in conjunction with a ADC.
 - Onboard power supply: CAEN A7585D +85 V/10 mA.
 - Several communication interfaces: USB, Ethernet and TDlink.

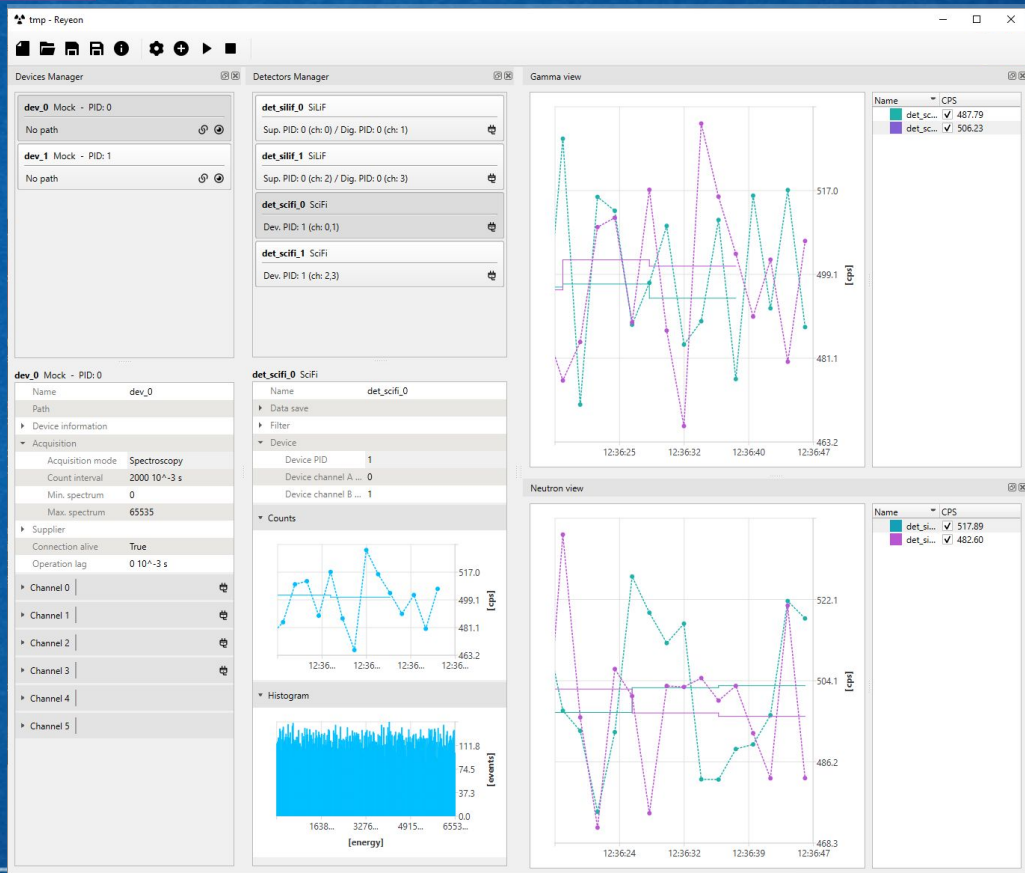
DAQ software

- Requirements
 - Device configuration and control.
 - Data readout and storage (eventually in a cloud database).
 - Integrated, versatile, high performance and easy-to-use.
- Current CAEN GUI softwares
 - Geco, Compass, WaveDump, Janus.
 - Communication (device control and data readout) in a simple and complete way with the *different* components of an acquisition system.
- CAEN intermediate level libraries
 - FELib library, HV Wrapper Library, FERSLib.
 - Easy development of application softwares.



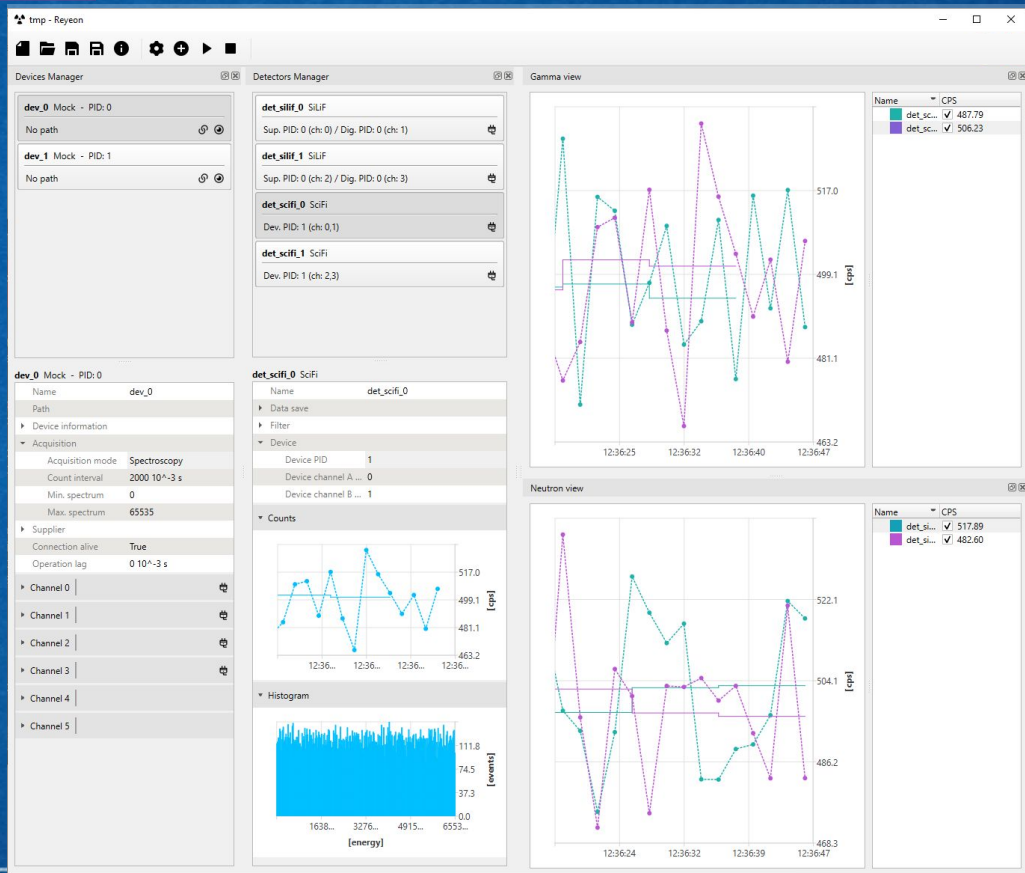
New DAQ software

- Developed in C++.
- GUI built using Qt Framework.
- Using CAEN intermediate level libraries.



New DAQ software

- **Modular design**
 - Detectors and devices of different type can be easily added/removed.
- **Device management**
 - All devices of the platform can be configured and controlled from within the software. No need of additional programs.
 - Configurations are saved and properly reapplied on each run.
- **Detector management**
 - Simple and clear identification of the detectors and their relations with the devices.
 - Straightforward visualization and saving of the read data.



(Previous) Future work

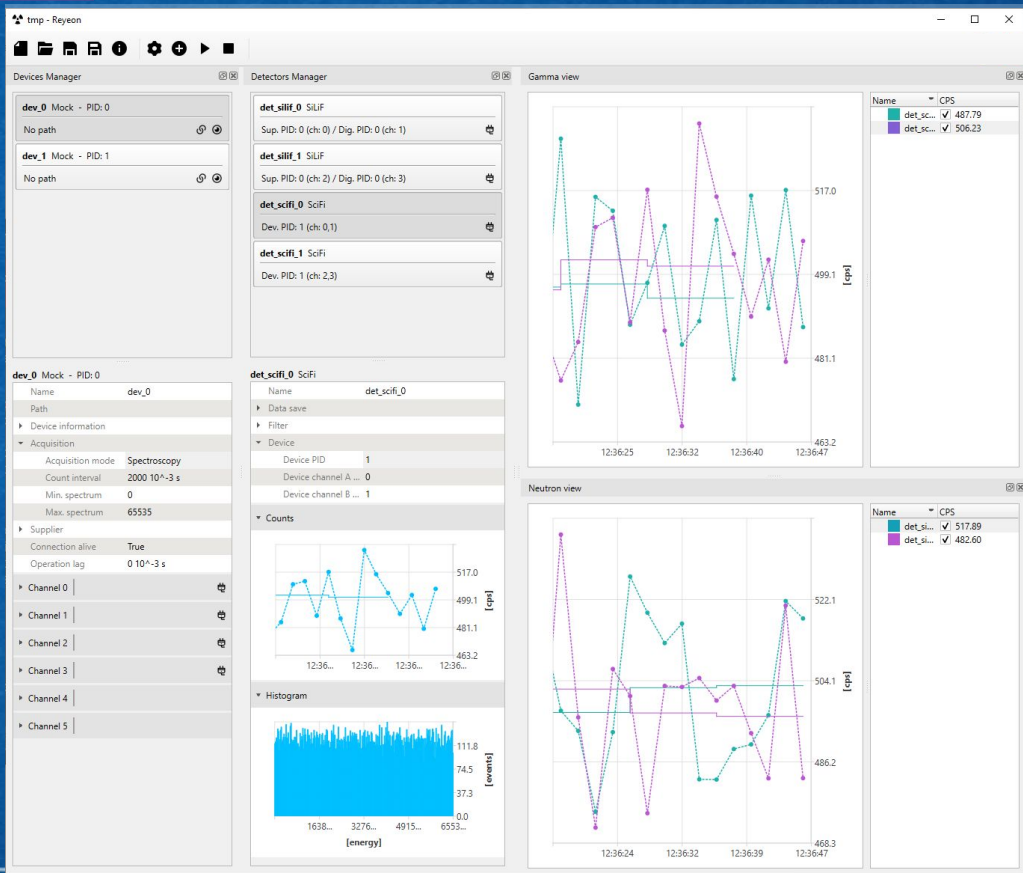
Bug fix

- New DAQ software.
- Underlying libraries. (Including Qt)

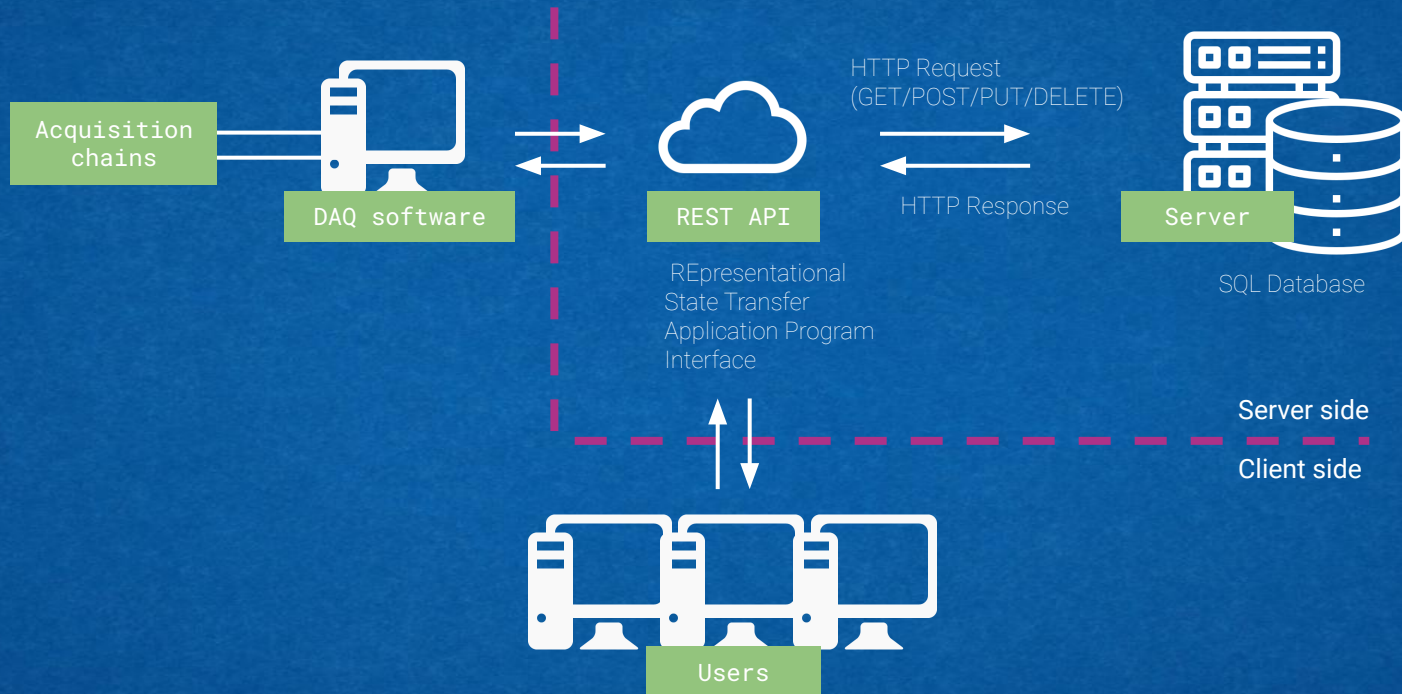
Finish implementations

- Cloud database communication.
- Alarms.

Improve user experience.



Database communication



Database communication

- Client side (DAQ Software):
 - HTTP client capabilities: implemented using Qt Network module.
 - Added support for authentication.
- Server side:
 - Starting point: RadBASE.
 - Java (Spring framework).
 - REST API endpoints (including authentication).
 - Web application.
 - Added features necessary for the platform.

RadBASE Accounts Items Locations Devices Utils Profile Logout

List of Items

Name: Any Category: Any Status: Any Creator: Any
 RFID tag: Enter RFID tag text Container: -Any -Yes -No Filter All

ID	NAME	CATEGORY	STATUS	CREATOR	CONTAINED ITEMS	RFID TAG
1	aaa	drums	created	admin	1	X
2	bbb	bags	created	admin	0	X
3	ccc	boxes	created	technician	0	X
4	ddd	B-25	created	technician	0	X
5	eee	drums	measured	admin	0	X
6	fff	bags	measured	admin	0	X
7	ggg	boxes	measured	technician	0	X
8	hhh	B-25	measured	technician	0	X

Spectrum #1

Item: E2806D12000000021F4727EC

Radio nuclides: Cesium-137

Creator: admin
 Device: Model: F300 SN: P3001