



Establishing Communication Between MTD DAQ Software and Integrated xDAQ Services

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SUMMER STUDENT SESSIONS

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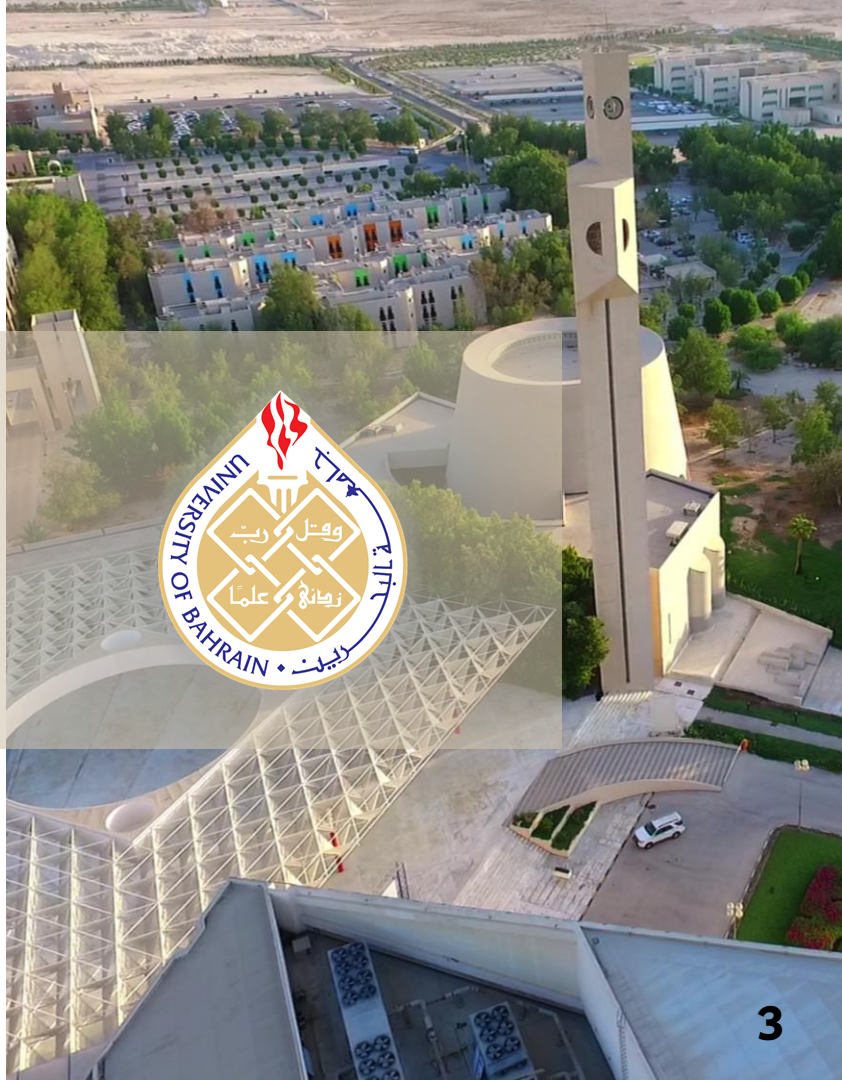
Open for any questions.

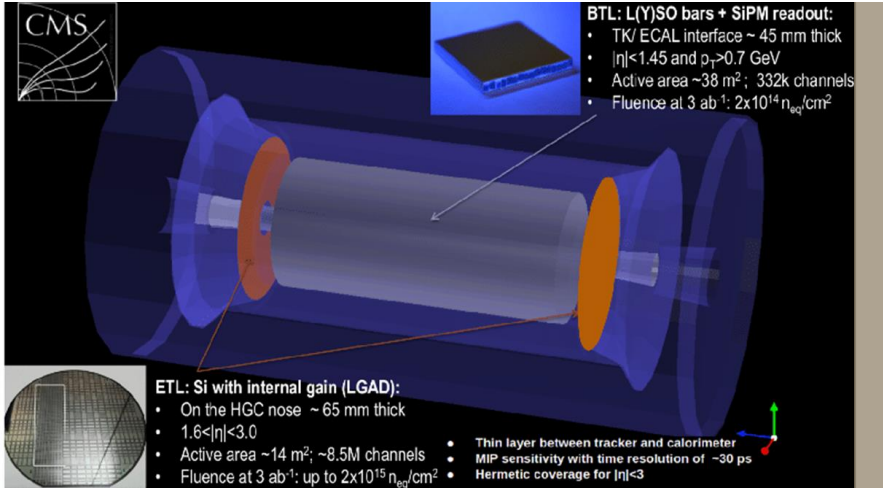


Who Am I ?

Maryam Kamashki

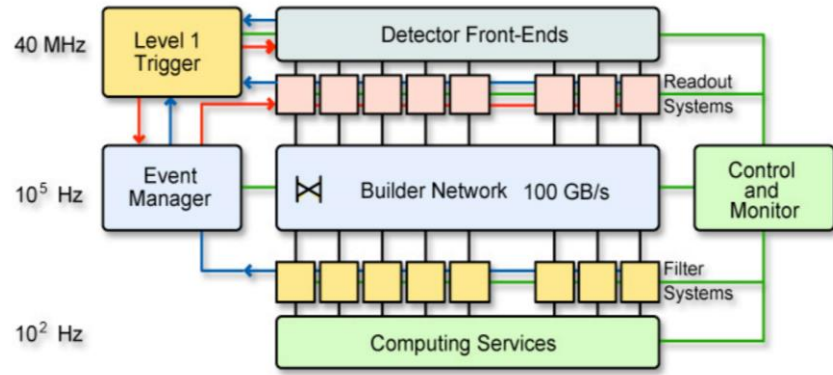
I am a 21 years old graduate with a Bachelor's degree in Computer Science – Cloud Computing at the university of Bahrain. Currently, I am a summer student at CERN, where I focus on integrating MTD DAQ software with xDAQ services.





MTD


MIP timing detector, a vital component of the CMS that provide enhanced timing resolution that is essential for precise event reconstruction and particle identification.



DAQ

Collection, process and storage of data generated by the particle detection during the experiment.

Why Integrate the MTD DAQ?



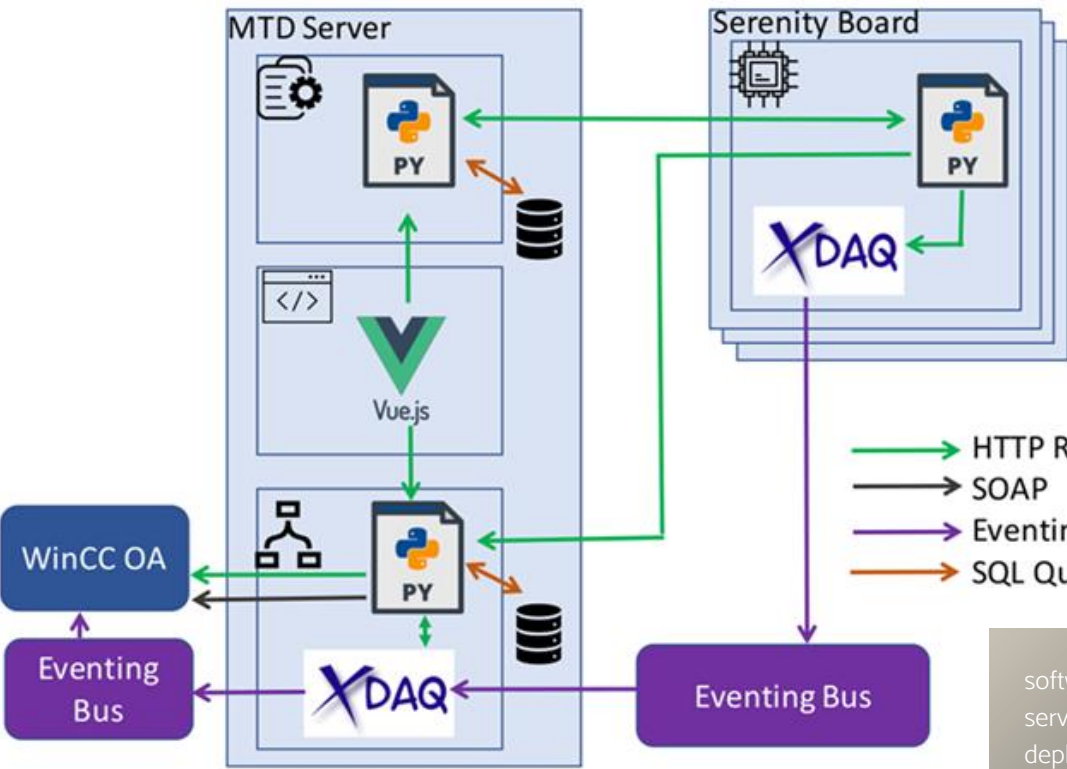
The MTD DAQ and control system will be a part of the extensive CMS ecosystem, where each sub-detector has its own unique DAQ development and connection to the central DAQ system. My project ensures that these components connect seamlessly and operate in harmony to achieve precise timing, effective data management, and real-time event processing.

XDAQ Services

- MTD Configurator
- MTD Controller
- MTD Collector
- MTD GUI



software framework that provide a suite of services and tools to aid the development, deployment, and operation of distributed DAQ systems.



MTD CONTROLLER

Uses the two interfaces to execute the commands received from the MTD configurator then implements these configurations to control various aspects of the muon detection modules, such as LpGBT controllers.



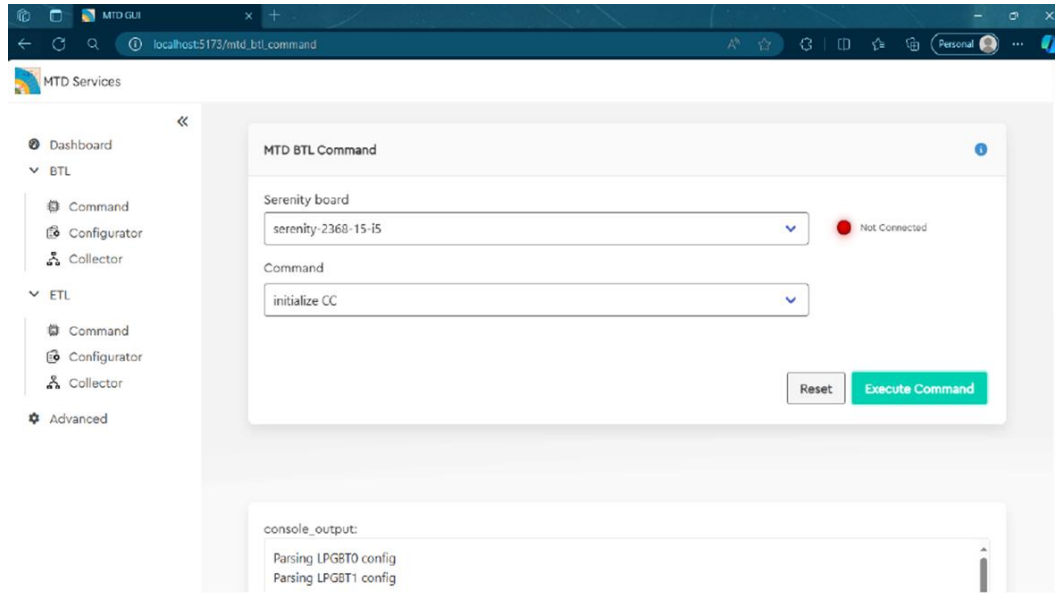
Python Interface

Receives configurations and commands from configurator, transmits monitoring data to other components through the event bus.

xDAQ Interface



Sends monitor data to the event bus, enabling communication with external systems.



MTD GUI

The MTD graphical user interface enables interaction with the MTD DAQ services through a web application using RESTful APIs.

It contains a command page where the users can perform certain actions like executing commands and viewing outputs.



ADC

- Analog-to-Digital Converter
- Reads analog sensor data from various ports (such as temperature sensors).
- Converts analog signals to digital values (bits of 0s and 1s).

GPIO

- General-Purpose Input/Output
- Has 16 Input/Output pins divided into Low and High ports.
- Performs Synchronous operations.

LpGBT

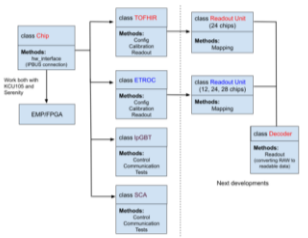
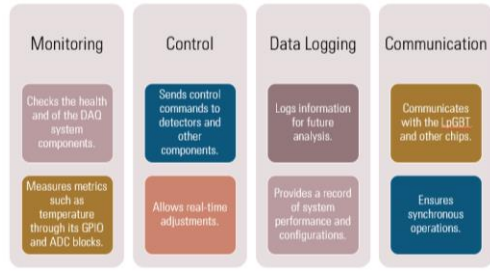
Low Power Giga-Bit Transceiver

A bidirectional radiation tolerant application-specific integrated circuit (ASIC).

SCA

Slow Control Adapter

an ASIC dedicated to slow control functions such as monitoring, control, data logging and communication.



- TOFHR and ETROC :**
 - process signals from the MTD detector and ensure accurate data handling.
- LpGBT (transmission) :**
 - handles high-speed data transfer when connecting the detector electronics to the DAQ system.
- SCA (slow control) :**
 - manages the overall system's configuration, monitoring, and control.

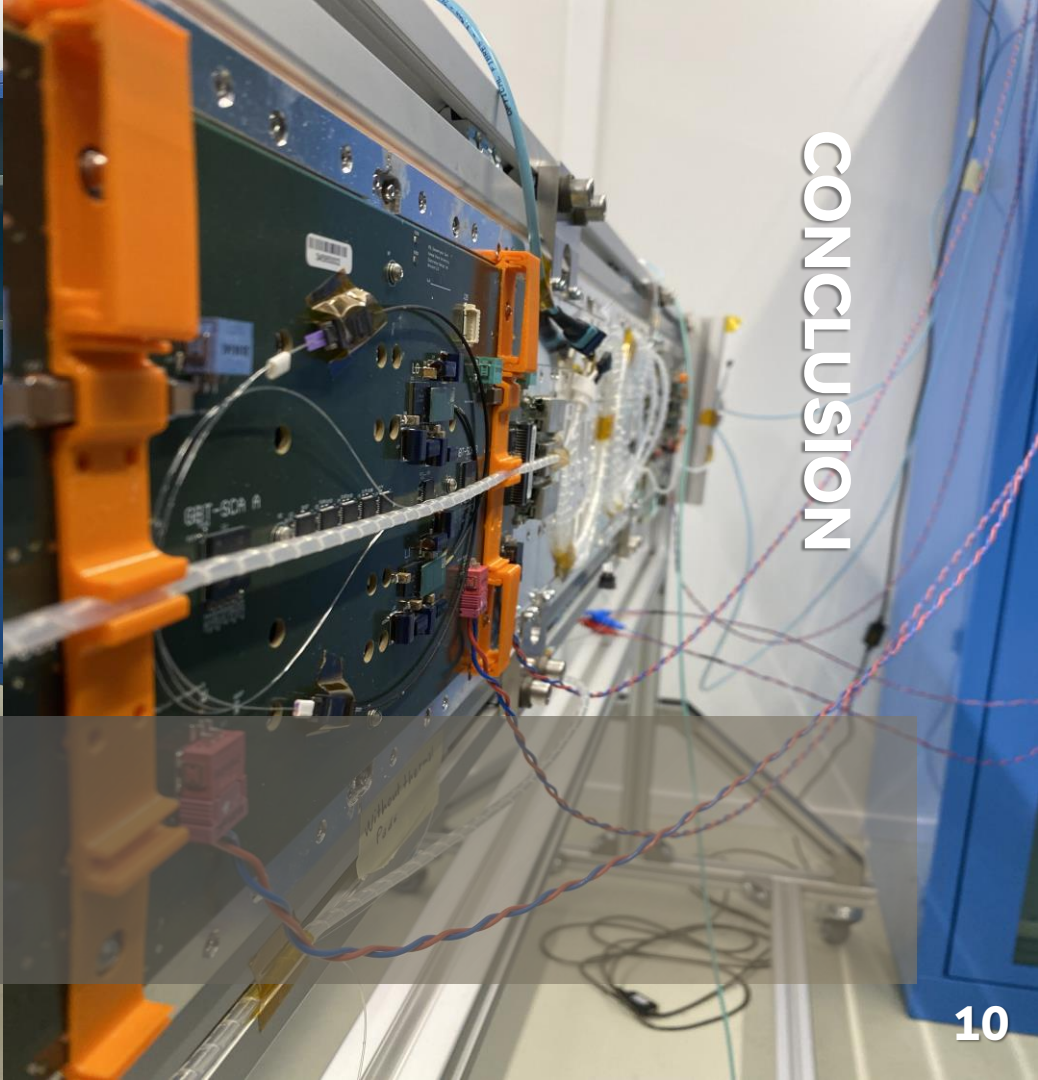
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Chip classes

The different types of chips used in the MTD DAQ system, categorized by their functionality, application, and architecture



There's one step left..
And that is Testing.



CONCLUSION



THANK YOU

Any questions?

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