

UniUD Meeting

Friday 6th June 2025

Coral Izquierdo Muñiz



Coral Izquierdo Muñiz

- From Asturias (Spain)
- Finishing Computer Science – **Software Engineering** Bachelor's degree at the University of Oviedo

Experience at CERN

- (February 2025 - Now) **CERN Technical Student** – Software and Data Engineer
- (Last summer 2024) **CERN Summer Student** – Software Engineer

Some hobbies

- Drawing, painting, programming and hiking



Don't hesitate to ask me anything!

 [in/coral-izquierdo](https://www.linkedin.com/in/coral-izquierdo)

 coral.izquierdo.muniz@cern.ch

ATLAS Experiment

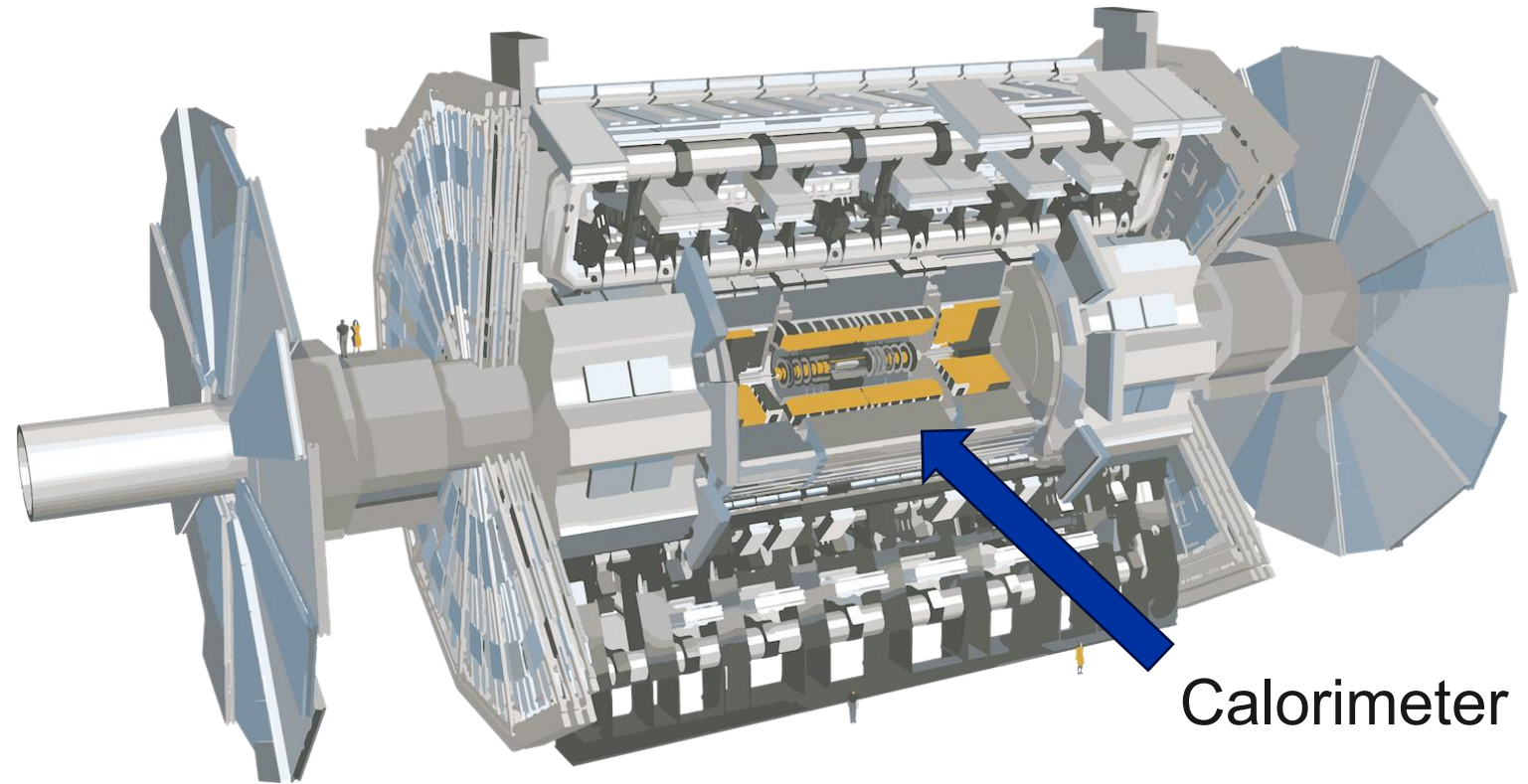
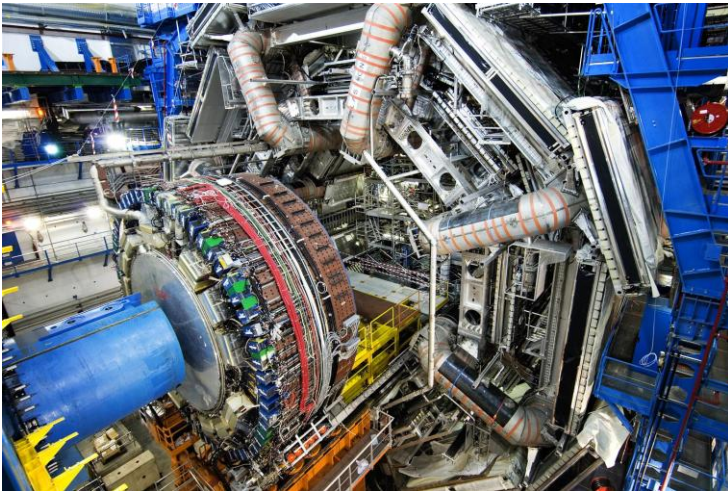
I'm working in the **ATLAS Experiment** in the Liquid Argon (LAr) Calorimeter team as a **Technical Student** as a Software and Data Engineer

- One of CERN's four main experiments and one of the detectors in the **Large Hadron Collider (LHC)**
- Investigates from the Higgs boson to dark matter particles generating a **huge amount of data** that needs to be processed and analysed



LAr Calorimeter

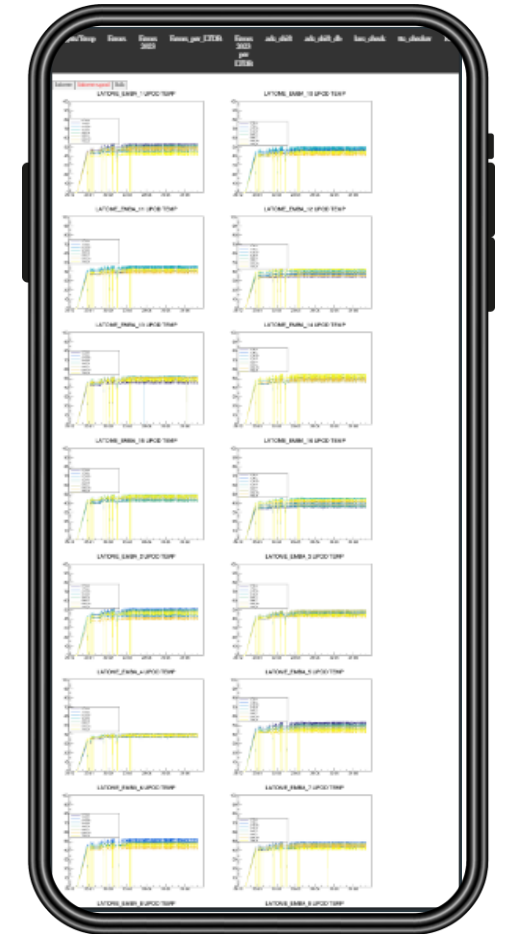
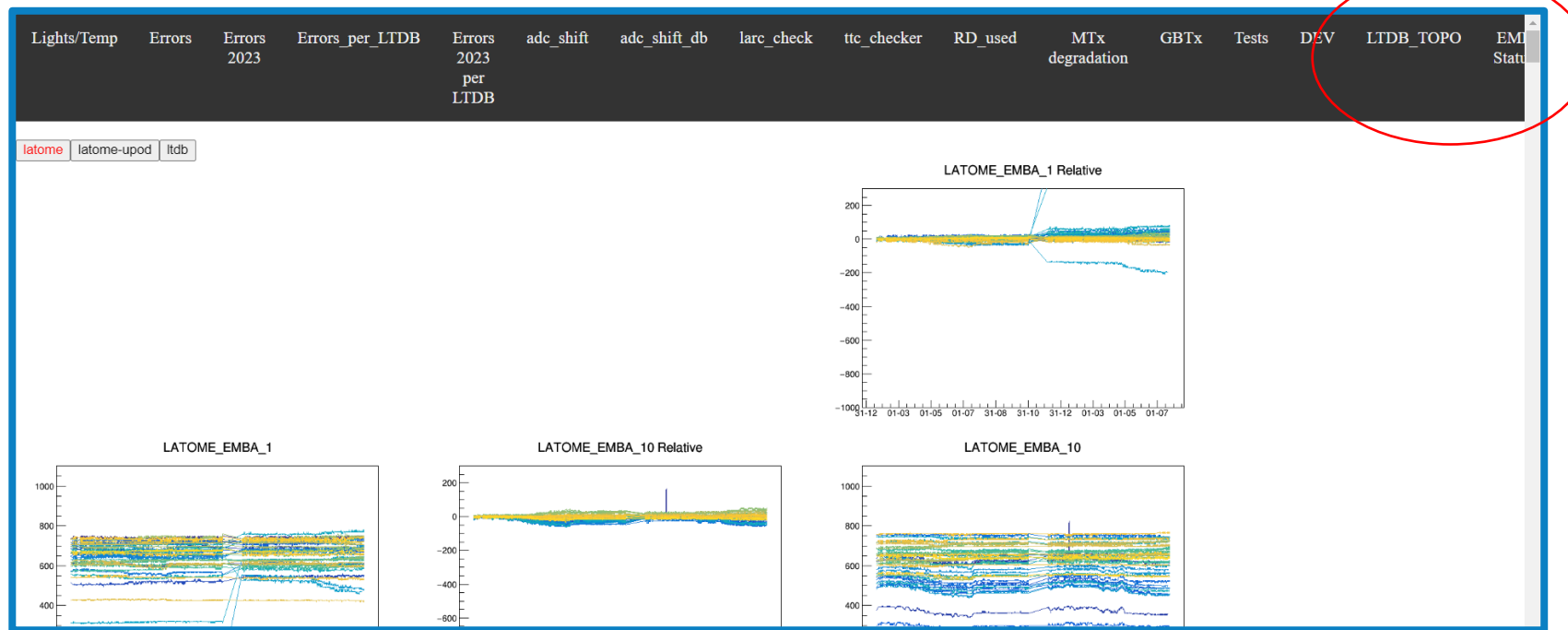
- Surrounds the **inner** surface of the **ATLAS detector**
- Measures the energy of **electrons**, **protons** and **hadrons** allowing physicists to determine the original energy of the particle colliding



My Experience at CERN – Summer 2024

Initial problems and limitations

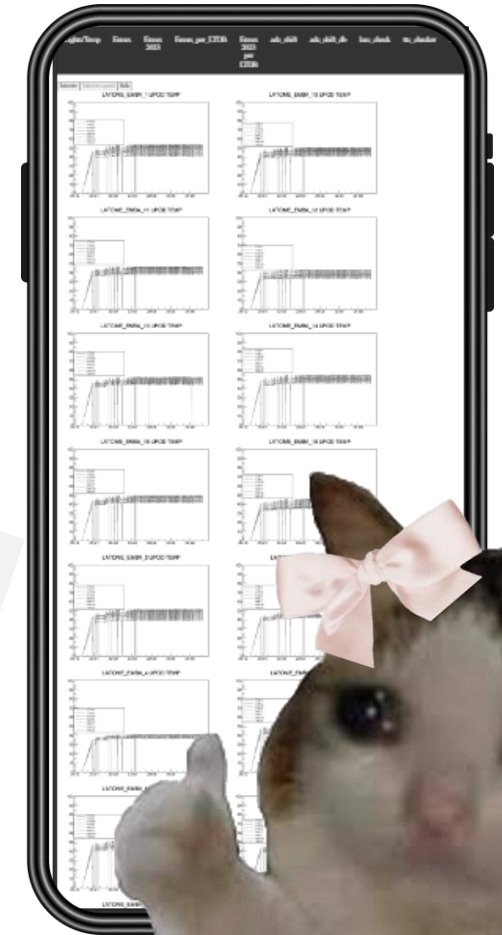
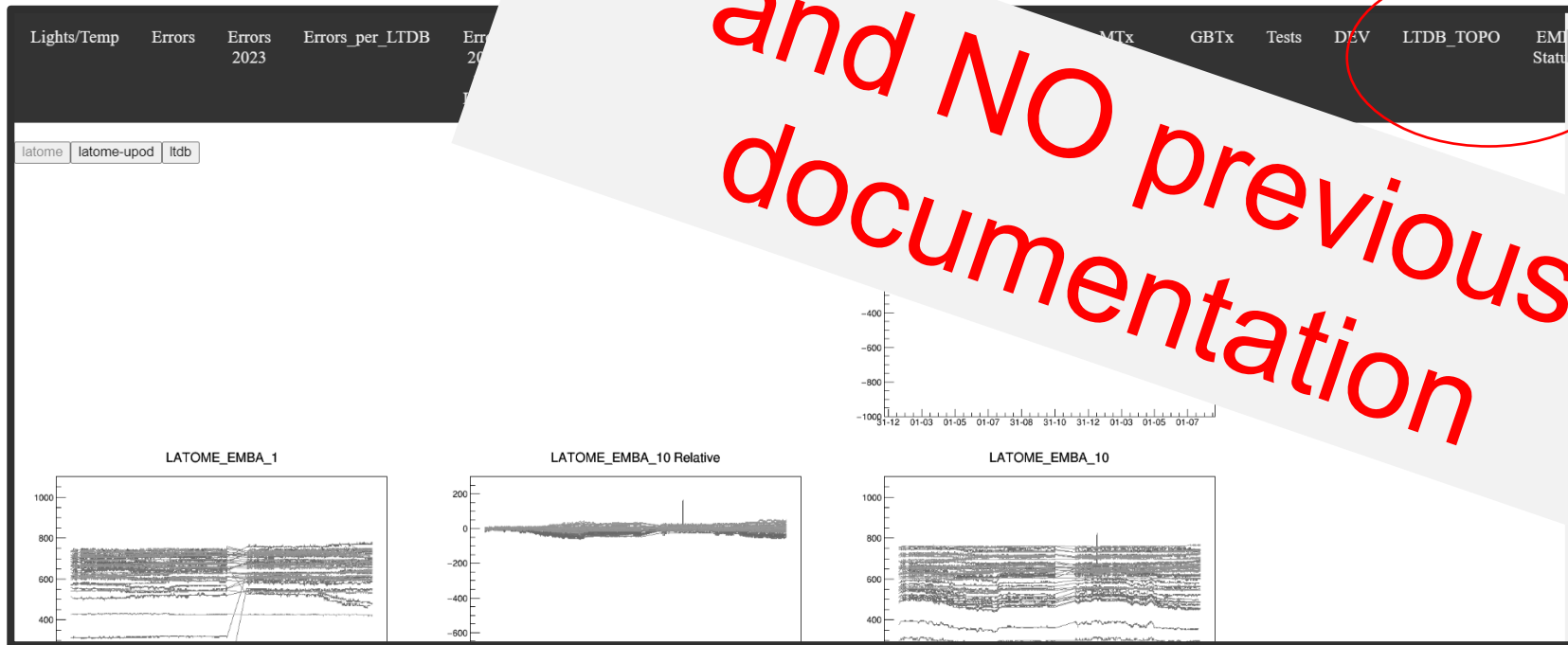
- Very old **PHP** website
- **Not user-friendly and not responsive**
- **Difficulties** to incorporate new data



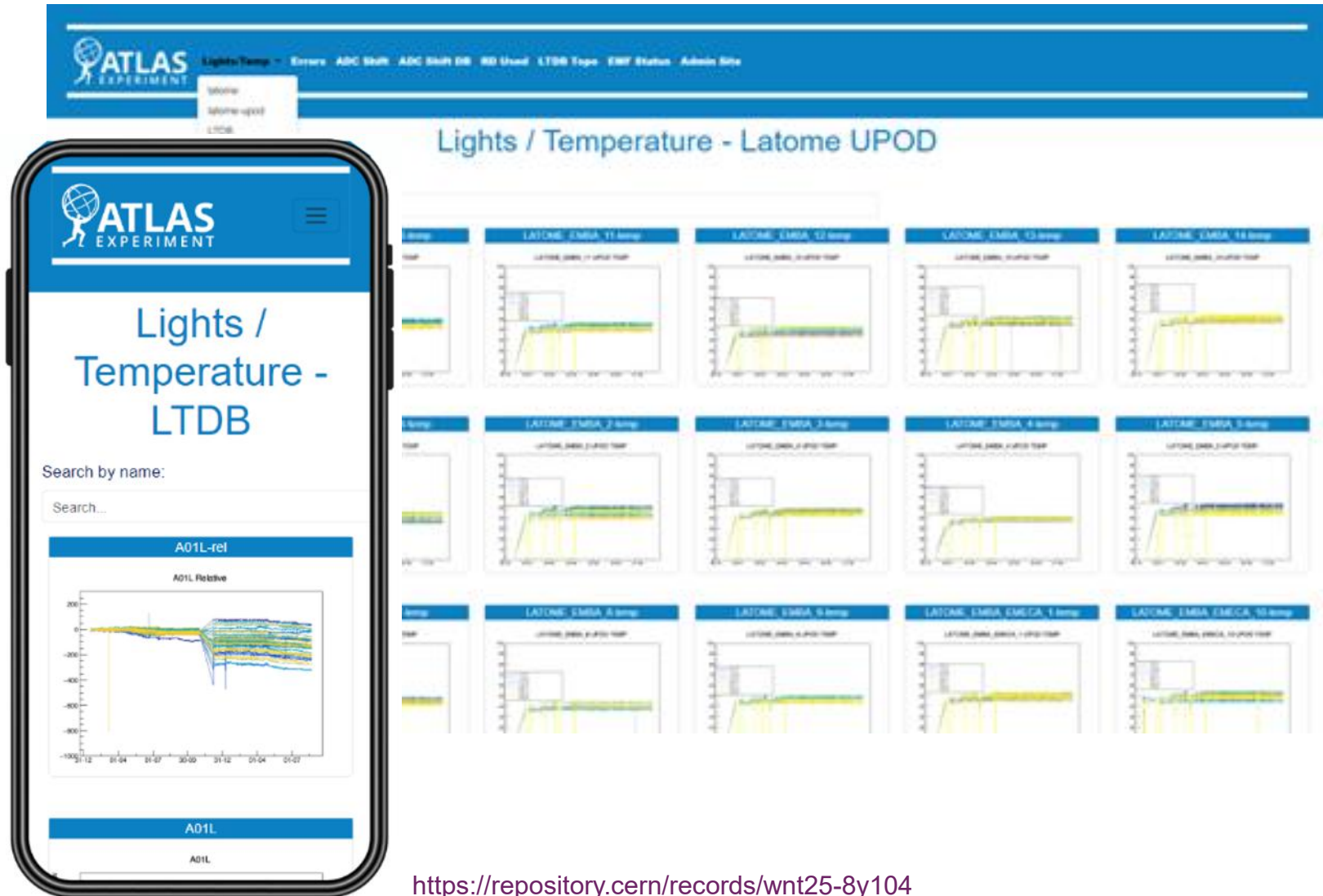
My Experience at CERN – Summer 2024

Initial problems and limitations

- Very old **PHP** website
- **Not user-friendly and not responsive**
- **Difficulties** to incorporate new data



My Experience at CERN – Summer 2024



<https://repository.cern/records/wnt25-8y104>

Improvements

- **User-friendly** and **responsive** (mobile-compatible)
- **Real-time** display and better loading **speed**
- **Advanced search filters** (by year, by board name, ATLAS status...)
- Easy to **modify**

Back-end: Django (Python) and AJAX

My Experience at CERN – Technical Student (now)

Implement statistics in the LTDB components to identify the **most problematic**

- **LTDB** are **electronic boards** for the numerization of the signals from the detector

Statistics

Some **LTDB components** sometimes have **errors** when they are configured

- In this case the server will **try again several times**

Refactoring

This code needs a refactoring

- Server code is **old** and **poorly optimized**
- Some functions are **not used**

This work is a **continuation** of a PhD student's project

My Experience at CERN – Technical Student (now)

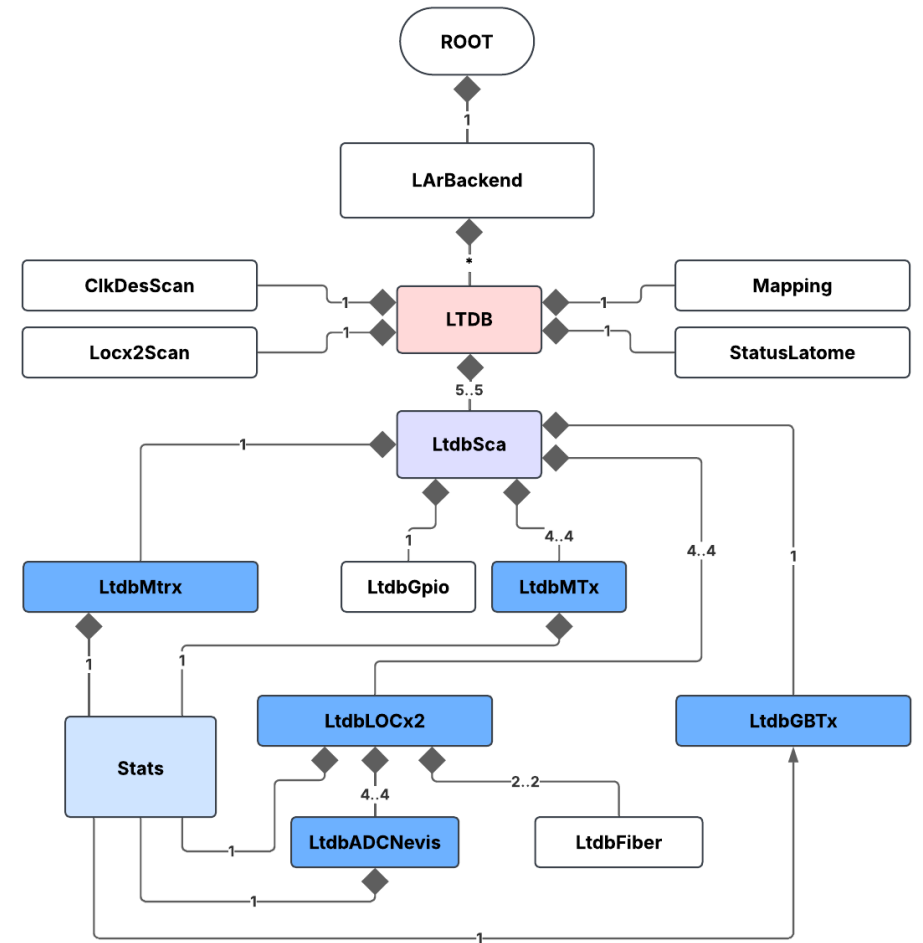
Stats class added according to the following diagram:

Components with Stats:

- LtdbGBTx
- LtdbMTRx
- LtdbMTx
- LtdbLOCx2
- LtdbADCNevis

6 Stats cache-variables:

- | | |
|--------------------|---------------------|
| • write_numbers | • write_failures |
| • read_numbers | • read_failures |
| • readback_numbers | • readback_failures |

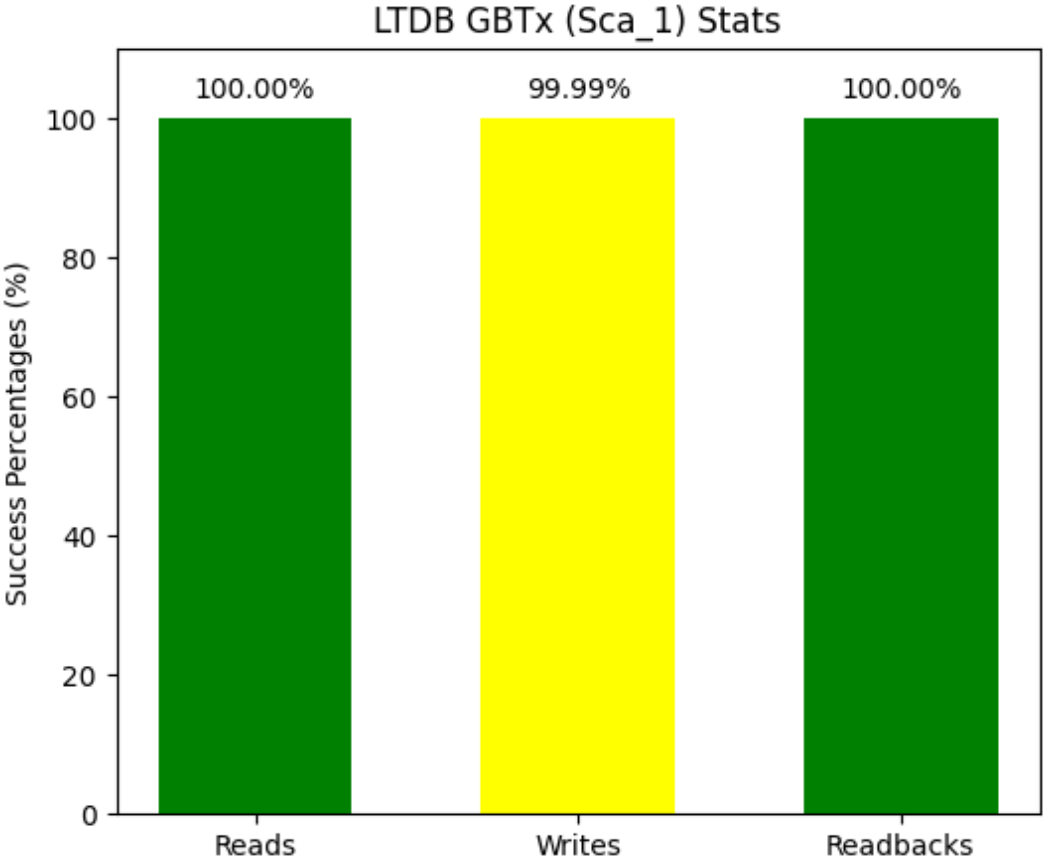


My work

Plots generated from to analyse each component

Here is an example of **GBTx** (SCA_1):

```
*** GBTx (Sca_1) Stats ***
* Successful Reads: 100.0%
* Successful Writes: 99.998%
* Successful Readbacks: 100.0%
*** Creating plot for LTDB GBTx (Sca_1)... ***
```



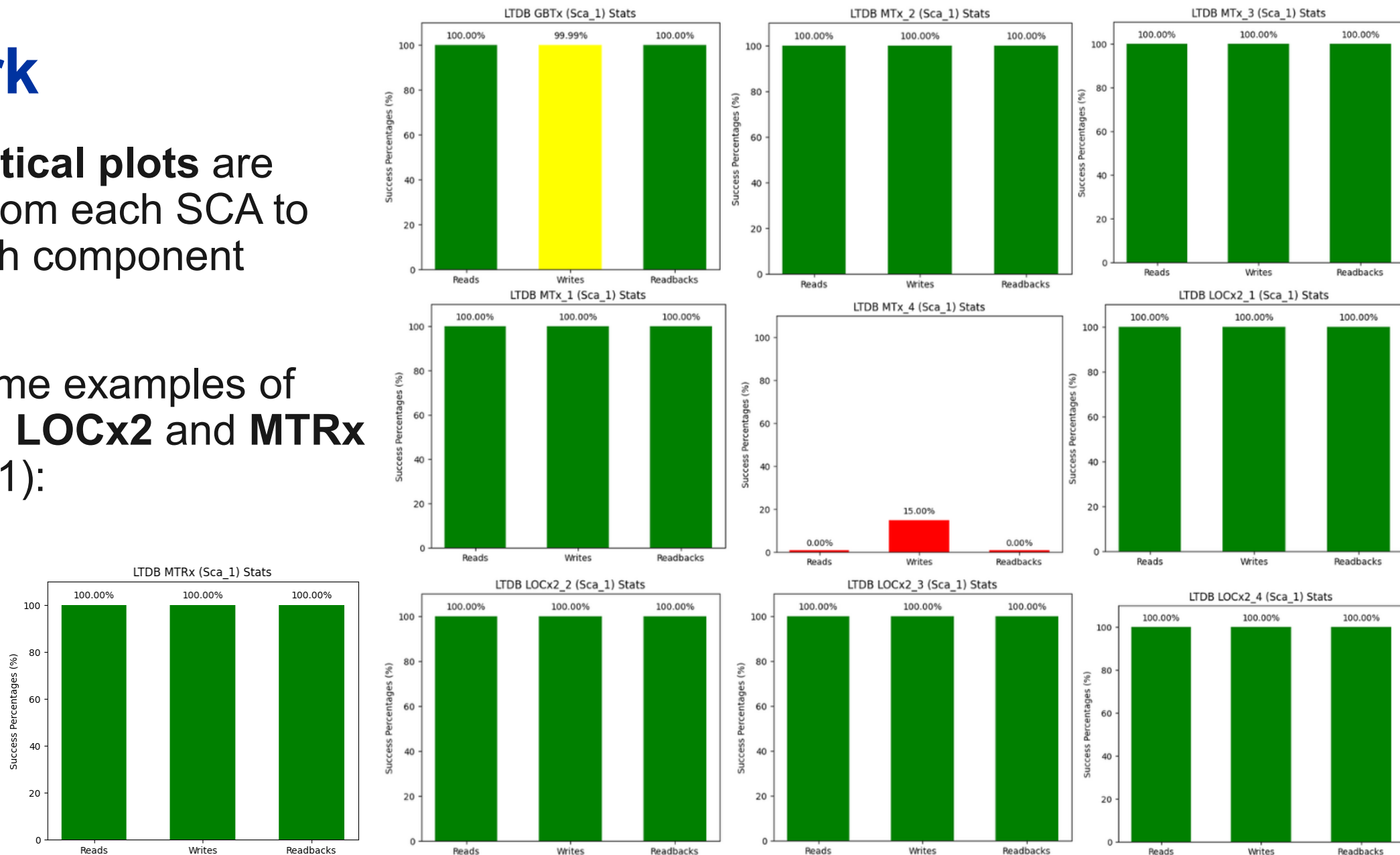
Example of plot stats for GBTx (Sca_1)

Data Access View									
#	Server	Node Id	Display Name	Value	Datatype	Source Timestamp	Server Timestamp	Statuscode	
1	NS2	String larbackend.ltdb_i01L.Sca_1.GBTx.Stats_GBTx.read_failures	read_failures	0	Int32	17:01:27.481	09:11:42.539	Good	
2	NS2	String larbackend.ltdb_i01L.Sca_1.GBTx.Stats_GBTx.read_numbers	read_numbers	398255	Int32	10:30:07.568	10:30:07.568	Good	
3	NS2	String larbackend.ltdb_i01L.Sca_1.GBTx.Stats_GBTx.readback_failures	readback_failures	0	Int32	17:01:27.481	09:11:42.539	Good	
4	NS2	String larbackend.ltdb_i01L.Sca_1.GBTx.Stats_GBTx.readback_numbers	readback_numbers	16	Int32	17:10:38.228	09:11:42.539	Good	
5	NS2	String larbackend.ltdb_i01L.Sca_1.GBTx.Stats_GBTx.write_failures	write_failures	6	Int32	06:04:52.711	09:11:42.539	Good	
6	NS2	String larbackend.ltdb_i01L.Sca_1.GBTx.Stats_GBTx.write_numbers	write_numbers	397844	Int32	10:30:07.565	10:30:07.565	Good	

My work

+ 130 statistical plots are generated from each SCA to analyse each component

Here are some examples of **GBTx**, **MTx**, **LOCx2** and **MTRx** plots (SCA_1):



and of course...

NOT EVERYTHING IS WORK...



Lots of Events, Clubs and Parties

- More than 40 clubs at CERN (climbing, yoga, photography, ski, music, astronomy...) (<https://staff-association.web.cern.ch/unite/clubs>)
- Events almost everyday



Opportunities at CERN (for students)

Students:

- Summer programmes
 - **Summer Student Programme:** during summer, MS/AMS nationals + NMS, **8 to 13 weeks**
 - **Openlab Summer Student Programme:** during summer, advanced IT project, **9 weeks**
- **Technical Student Programme:** 3 selection committees per year, **4 to 12 months** placement, MS/AMS nationals
- **Doctorate Student Programme:** 3 selection committees per year, **6 to 36 months** placement, MS/AMS nationals + NMS
- **Short-Term Internship Programme:** **1 to 6 months**, MS/AMS nationals

<https://careers.cern/alljobs>

Opportunities at CERN (for graduates)

Graduates:

- **ORIGIN:** 6 to 36 months contract, MS/AMS nationals
- **QUEST:** for those who have a Master's degree and 2-6 years of professional experience or a PhD with less than 3 years of experience. 24 to 36 months contract, MS/AMS nationals
- **Research Fellowship:** for PhD graduates with up to 6 years of professional experience

<https://careers.smartrecruiters.com/CERN/entry-levels>

<https://careers.cern/alljobs>



Thank you!

Any question?



home.cern



in/coral-izquierdo



coral.izquierdo.muniz@cern.ch