Monitoring Tools for the Future

Adjustment of COOOL and MurphyTV to the new FriDAQ protocol

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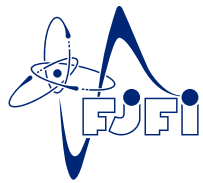
DAQFEET



Introduction

MurphyTV

Presents organized tables of data acquisition error statistics.
Scope: ≈ 5 000 lines
Tools: C++, ROOT (GUI), qmake
Repository: RCCARS

COOOL

Creates and displays detector-specific histograms of physical data.
Scope: ≈ 30 000 lines
Tools: C++, ROOT, bash, make
Repository: CORAL (standalone)

DaqDataDecoding

Converts raw bit streams into maps of objects suitable for subsequent processing. Identifies data errors.
Scope: ≈ 20 000 lines
Tools: C++, Expat, bash, make/cmake
Repository: CORAL

Goals

1. Analyze data quality monitoring tools MurphyTV and COOOL.
2. Design a way to adapt these tools to the new FriDAQ protocol.
3. Improve their original functionality whenever possible.
4. Implement, test and deploy proposed changes.

Feasibility

MurphyTV

Focuses on service data → decoding physical data is unnecessary.
Impacted: ≈ 10 000 lines
Result: Nothing to save, ok scale
⟶ **Reimplement completely**

Needed resources:

- FriDAQ format description
- FriDAQ data samples
- Original MurphyTV
- User consultations

State: In Progress

COOOL

Analyzes physical data → interpretation of all data words is essential.
Impacted: ?? (up to 50 000 lines)
Result: Full rewrite very demanding
⟶ **Reuse whatever possible**

Needed resources:

- Data input definition (post-HLT?)
- Identified detector-specific changes
- Original COOOL
- Detector expert involvement

State: Postponed

FriMurphyTV - Requirements

- **Functional** $\rightarrow$ **Restore**
  - Decode, analyse and visualize error information from FriDAQ headers.
  - Enable asynchronous and continuous data processing.
- **Technological** $\rightarrow$ **Update**
  - Drop unnecessary dependencies (DaqDataDecoding, ROOT).
  - Use uniform technologies with the rest of the RCCARS.
  - Support Linux-based OS exclusively.
- **User Experience** $\rightarrow$ **Preserve**
  - Keep consistent UI whenever possible.
  - Extend focus on a specific detector.
- **Other** $\rightarrow$ **Streamline**
  - Ensure high performance of both data decoding and analysis.

Contact us in case of a request exceeding the original functionality.

FriMurphyTV - Infrastructure

Technologies

Core: C++, Qt Objects
GUI: QML, Qt Widgets
Build: qmake, GCC
Tests: GoogleTest
Version control: Git, GitLab
Platform: CentOS 7

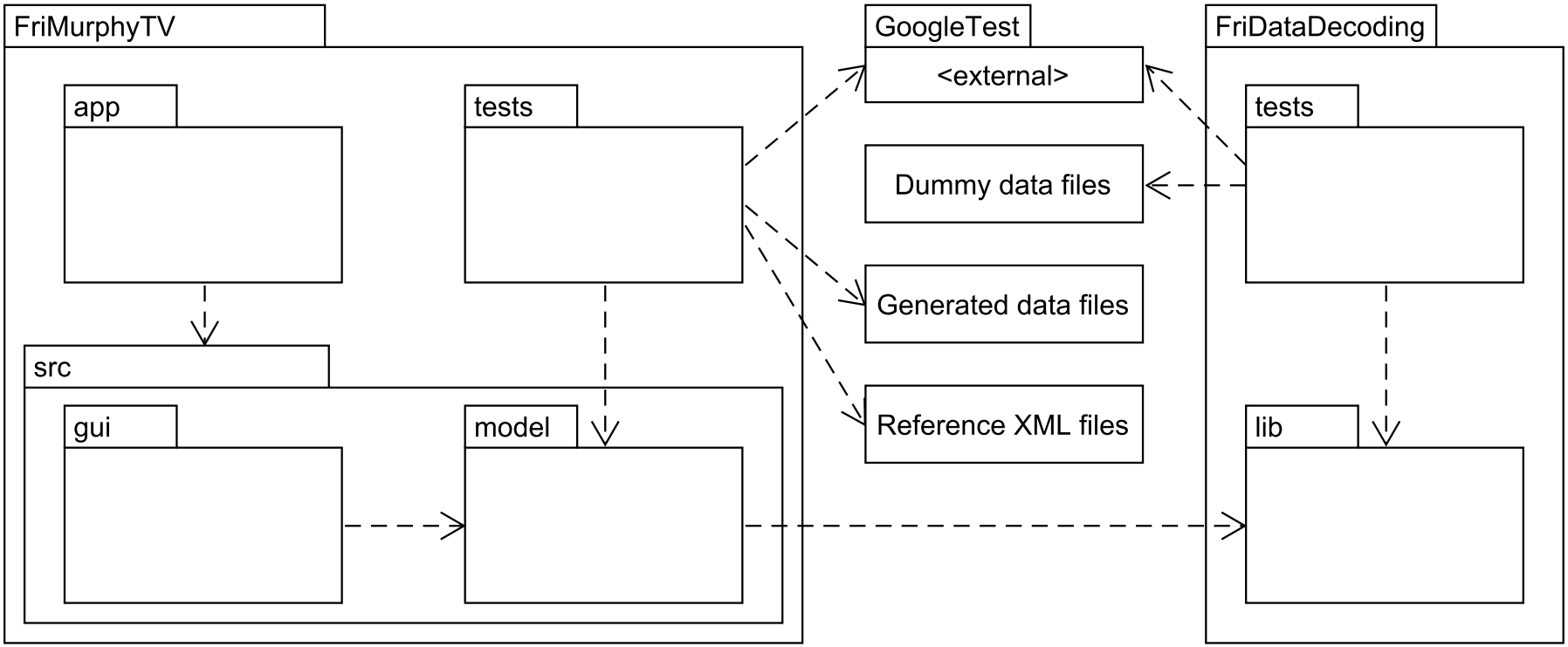
Dependencies

- Lightweight FriDAQ decoder
- FriDAQ data generator
- DIALOG

Other

- FriDAQ protocol description

FriMurphyTV – Architecture Design



Conclusion

- **MurphyTV**
  - Should be rewritten to the new FriDAQ protocol within this project.
- **COOOL**
  - Problematic as it requires decoding and interpretation of all detector-specific data. More clarification is needed.
  - Reimplementation would be very demanding. Transforming new data into DaqDataDecoding API whenever possible seems more feasible.

Thank you for your attention!

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