S&C Bits of protoDUNE/SP TDR

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DUNE S&C
27 Jun 2016

Outline

Document Mechanics

Overall Structure

Software and Computing parts

Repository

TDR is written in LaTeXand kept in `git` in DUNE's GitHub org:

`https://github.com/DUNE/protodune-tdr`

Ask me or Anne Heavey if you want added to the list of editors for `git push` access.

PDF Document Builds

- The TDR document builds in usual way with any reasonably recent version of LaTeX.
- ShareLaTeX is ceasing their auto-building service.
- I developed a new, **self-hosted** replacement.
  - Instance running at BNL. You can run our own.
- A build is **immediately triggered** by each push.

  bad push email sent to me and the commit "pusher".
  → ask me if you to be notified of all bad pushes

  good push the updated PDF is uploaded to:
  `https://dune.bnl.gov/docs/`

Note: this makes use of GitHub webhooks which are new to me. Expect some brittleness in this until the bugs are worked out. Please report problems.

Chapters

1. Introduction (Flavio,Christos) (5 pages)
2. Scientific and technical motivations (Jarek,Thomas)(10 pages)
3. ProtoDUNE detector overview (Flavio,Christos,Thomas)(15 pages)
4. Detector components (Tim, Jim)(5-10 p. per sub-system = 60 - 120 p.)
5. ProtoDUNE computing and software (Tom, Amir)(15 - 20 pages)
6. Space and infrastructure requirements (Maria)(10 pages)
7. Test beam specifications (Paola, Cheng-Ju)(10 pages)
8. Organization, cost estimate and schedule (Maria, Jolie)(5-10 pages)
9. Summary (2 pages)

S&C Chapter 5 sections

1. Overview
2. Data storage and management system
   - The ProtoDUNE Data Characteristics
   - Interface of the DAQ to the online storage
   - Raw Data Flow in ProtoDUNE
3. Offline Processing of the Experimental and MC Data
   - Prompt Processing
   - Workload Management
4. LArSoft framework
5. Event simulation
6. Event reconstruction algorithms and performance

Some stats:

- Currently consumes 10 of the 15-20 page allocation.
- 4 authors(lines): Maxim(636), Xin(98), Anne(23), Tom(4)

Data Rates and Volumes

- Based on "Data Scenarios Spreadsheet" DocDB 1086v6
  - Recently updated by Tom and others at FNAL.
  - No more "Goldilocks".
    - → "**Central**", "**Low compression**" and "**High rate**"
  - Rates: 25-50 Hz, 6 APAs, 2-4× comp, 1.5-3GByte/sec inst.
  - Volumes: 25M-50M triggers, 1.5-3PB total, 75-150TB buffer.
- TDR not yet totally updated to reflect this change! Section 5.2

Offline

Prompt processing / "express lane"

- QA/QC, possible long running process, but minimum bias sampling.
- Rough estimate based on old "Goldilocks", 1% data, and 10s of minutes/event $\Rightarrow$ 300 cores

Workload Management

- Requirements (integ with DM, monitoring, workflow complexity, error handling)
- List of options (Dirac, PanDA, GlideinWMS, Alien)

Section 5.6

Event reconstruction algorithms and performance

- At most one page for text and figures for each major reconstruction technique
- Currently blurbs on PANDORA and Wire Cell.
- Noise removal and wire waveform signal extraction in chapter 3.

Chapter 3 - ProtoDUNE detector overview

Chapter 3 has ties to S&C chatper 5.

- 3.3 TPC Signal Formation. Physics of the signal formation. A simulation section in chapter 5 need not reproduce this but refer to it.
- 3.4 TPC Charge Extraction. Describes how to get deconvolved waveforms using method pioneered for MicroBooNE. Was in chapter 5 but moved here because it's important and it's also not S&C per se.
- 3.5 Space charge effects. Still empty (M. Mooney). Fixmes calling for figures in section 5.5 should be replaced with references to section 3.5.

That's it.