GLAST and ROOT

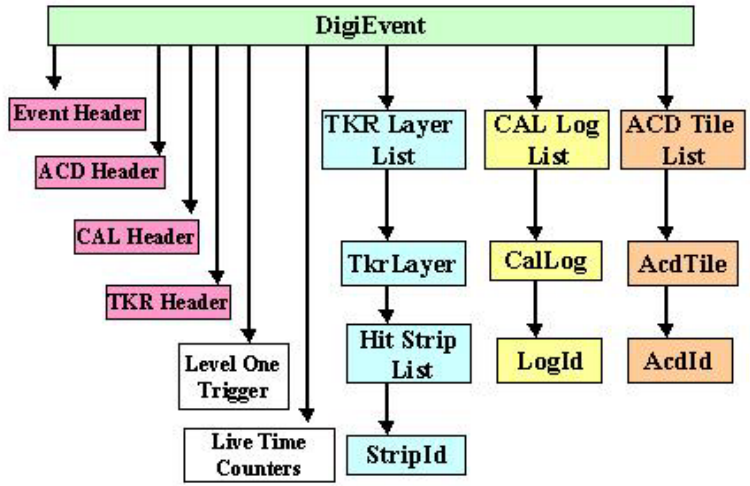
An Introduction for those purely interested in analyzing data.

GLAST's use of ROOT

- **We use ROOT as an I/O package.**
  - **All data is stored in ROOT files.**
  - **We use the same ROOT file structure for both BFEM and PDR.**
  - **Currently, we have 3 types of data files:**
    - **Raw/Digi ROOT files**
      - **Stores detector data.**
    - **Recon ROOT files**
      - **Stores detailed reconstruction output - including tracks.**
      - **The SAME reconstruction routines are used for both BFEM and PDR.**
    - **Summary ntuple ROOT files.**
      - **Simple ROOT file, in tabular format.**

digiRootData

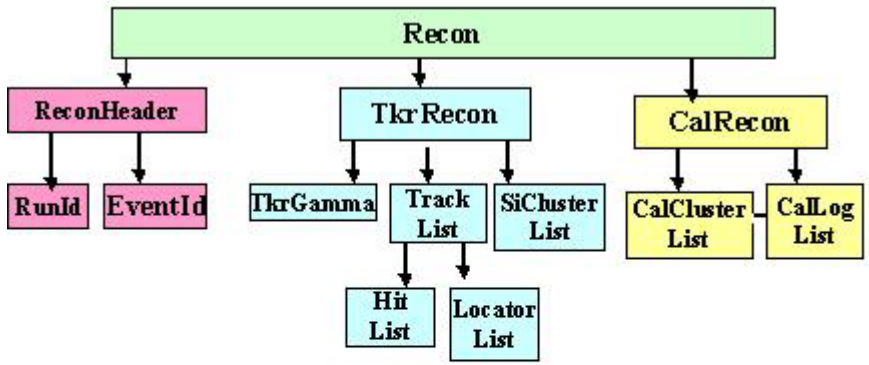
- Stores detector data.
  - list of Tkr Layers, list of Cal Logs, list of ACD/XGT tiles
- These files are useful can be ingested into the standard reconstruction routines for processing - producing the recon ROOT file, and the summary ntuple.
- Documentation:
  http://www-glast.slac.stanford.edu/software/root/digiRootData/



Logical structure for the raw digitization data

reconRootData

- **Stores reconstruction data.**
  - **TKR tracks**
  - **CAL energy reconstruction**



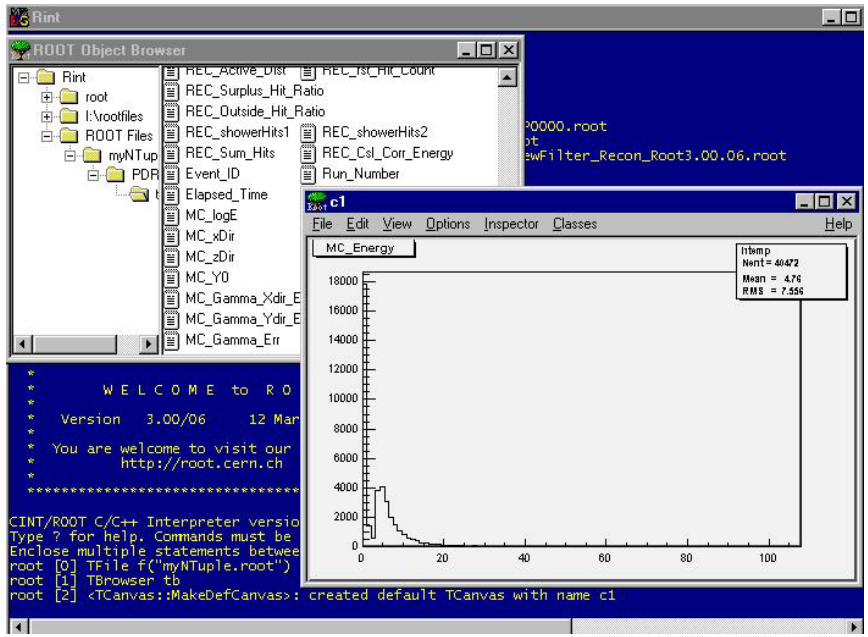
Logical structure for the reconstruction data

Summary Ntuple

- **Same structure that was in use for the AO:**

Run_Number	Event_Id	Tkr_No_Tracks
5	1	2
5	2	0

- **Now the data is stored in a ROOT file.**
- **This is the easiest type of ROOT file to manipulate.**
  - **However, it contains limited information.**
- http://www-glast.slac.stanford.edu/software/PDR/ntuples/root_ntuple2.htm



RootAnalysis

- Provides a standard set of macros and utilities.
- Setup script to automatically load macros and libraries: .rootrc
- Available as a tarball and in the SLAC CVS repository: ftp-glast.slac.stanford.edu/glast.u05/RootAnalysis
- Documentation is available in the RootAnalysis package - start here: http://www-glast.slac.stanford.edu/software/root/howto/#RootAnalysis