RootIo and DC1

Heather Kelly
GSFC/SSAI
What’s New?

♦ Memory Leak
  2 problems fixed by Ursula (in2p3)
    Slow down of reads due to memory fragmentation
    Memory leak while re-processing (pruning) in ROOT

♦ Input of Chains
  RootIo now accepts a list of input ROOT files for mc, digi, recon, and relations

♦ Fixes
  New RootIoSvc to control event loop
  AcdDigi LowDiscrim PMT B output fixed
  TkrDigi LastC0Strip output fixed – thanks Leon!
Memory Leak (Part 1)

- Slow down of reads were linked to memory fragmentation – too many small objects
  After corresponding with Rene Brun, Ursula introduced a fix where the small objects are allocated in buffers and deleted in heaps.

- Leak was traced to use of TRef in MC files (TRefs allow use to link McParticles and hits)
  A TObjArray is associated with the TRef and was growing too large – Ursula fixed this.

RootIo can now read back multiple mc, digi, recon, relation Root files.

New jobOption parameter:
mcRootReaderAlg.mcRootFileList = {"$(ROOTIOROOT)/mc.root“,
“$(ROOTIOROOT)/mc2.root”};

Mods are backward compatible
You can still use the old style:
mcRootReaderAlg.mcRootFile = "$(ROOTIOROOT)/src/test/mc.root";
New RootIoSvc

- Controls the event loop when reading from ROOT files.
- Reads the min(maxEvents, num events in ROOT files)
- Avoids annoying segmentation fault at the end of a run
- Nicer, cleaner, and it makes Toby happy

Could one ask for more?
Recent Fixes

- Leon found and fixed an error concerning the TkrDigis – where the LastC0Strip was always set to –1.
- Thanks to JJ – Heather fixed a bug when writing AcdDigis – where the LowDiscrim for PMT B was set to the value of the HighDiscrim for that same PMT.
Yet..There Is More To Do

♦ Fix Memory Leak when reading
♦ Random Event Access in GUI
♦ Read/Write Exposure
♦ Ntuple Issues
Memory Leak Part 2

♦ Yet...a problem persists...reading back MC into Gleam eats up memory – the working assumption is related to TRefs again.

♦ Ursula and Heather will be looking for a solution.
Random Event Access

- Have you ever wanted to replay a particular event?
- Soon you will be able to.
- ROOT allows random access
- Typical read uses the event’s seq num in the file – while we identify events using run num/evt id (and soon event time)
- Could provide a map of Root seq num and actual event identifiers.
Exposure I/O

- A new Toby TDS class for exposure is in the works.
- New routines will be added for reading/writing
- Event Time will be stored in the mc, digi, recon files

- Due: This week
Did we forget the ntuples?

- **ntupleWriterSvc**
  
  Fix tree name in RootHistCnv
  
  Allow for multiple trees in the same Root file
Any other requests?