Queen Mary
University of London

07/11/2002

Calorimeter trigger offline simulation

Edward Moyse

e.moyse@qmul.ac.uk

- Update on progress
- LVL1/LVL2 Integration
- Persistancy
- Outlook & Timing

Progress:

- **Em/Tau Trigger:**
  - Alan has found several bugs, mostly due to rounding problems at boundaries. One unresolved “quirk” - which I'm investigating – has been delayed by a problem with SmartRefVectors (see later)
- **JetTrigger:**
  - Finished
    - Linked with CTP Config (reads in Trigger Menu)
    - Produces RoIs
    - Needs validation
- **Energy Trigger**
  - Linked to CTP (for missing E_T – rest to follow).
  - Creates “JEM” objects but summation not complete...

Progress(2):

- **ROD:**
  - Now reads Jet RoIs and produces Jet Slinks
  - Jet CTP info not yet produced....
  - Slink format updated to follow latest version of DAQ-98-129
  - Module ID currently set to be crate number (seemed sensible?)
- **JEMRoIDecoder:**
  - New addition, in the same vein as CPRoIDecoder. Used for RDO<->ByteStream conversion.
    - Returns crate number, thresholds passed from RoIword
    - CoordinateRange not returned yet but will be soon.
- **Example**
  - Now shows how to use persistancy classes
  - ... and CPRoIDecoder.

Progress(3):

- **JobOptions:**
  - There was a problem with the jobOptions file setting up the LAr simulation incorrectly (LArRec structure had changed)
  - To avoid this in future, TrigT1Calo JobOptions is now a jobOptions fragment, to be included in a top-level file.
  - I suggest users take jobOptions files from RecExample (which is almost guaranteed to be correct) and modify as necessary.
- **Documentation:**
  - Webpages have been updated, and the first draft of the TrigT1Calo doc. is almost finished.
- **Overall:**
  - Significant amounts of code have been altered to work in the latest release of Athena, 4.5.0

LVL1/LVL2 Integration

- **RDOs**
  - There's been lots of discussion about the format of “RDOs” which I've been involved in, and lots (!) of debate about persistancy. More later ...
- **Status**
  - Hardware decoder : finished for EmTauRoIs, and tested. Jet version isn't complete.
  - EmTau completely integrated.
  - Jet and Energy mostly integrated, at least at my end and it should be fairly easy for Thomas to add the Jet and Energy RoIs
- **As an aside ...**
  - Currently the information is passed from TrigT1Calo to RoIB via several DataVector<SlinkWord> objects. Since the hardware is still changing I think it would make more sense to provide one large collection, and use headers etc. to sort out where they come from.

Persistancy

- **Requirements**
  - We need to be able to save RoIs etc, and then load them back into Athena
  - L2 requires that RoIs be able to return threshold values
- **Solution**
  - Suggested solution was that each RoI has vectors of the values of the thresholds they pass. This leads to lots of duplication though (i.e. If 5000 Em/Tau RoIs all pass thresholds 1,2,3 we have 15 numbers duplicated 5000 times.
  - My solution was RoIs contain a pointer to Thomas' config object, and return thresholds by querying this
  - ... however pointers are invalid once an object is “persistified”

Persistancy(2)

- **SmartRefs**
  - The persistance issue is not new and I had always planned to use SmartRefs.
  - These behave like pointers but are in fact much more intelligent.
    - They understand the underlying StoreGate “database” technology.
    - When called a SmartRef searches SG for its object, and returns a pointer to it wherever it is in memory.
  - SmartRefs and SmartRefVectors are the preferred solution, as documented in the latest versions of the “Athena Users Guide”, the “Athena Developer's Guide” and the “Gaudi Developer's Guide”
- **However**
  - ... they are not supported any more. After discussion, I was told to try DataLinks.

Persistancy(3)

- **DataLinks**
  - There's a family of DataLinks: SequenceLinks, MapLinks etc.
  - Very similar to SmartRef – behave like pointers, but provide a “persistable” link to other StoreGate objects.
  - Part of a new (& much better) version of StoreGate which no longer requires stored objects to inherit from DataObject i.e. My RoI and TriggerTower classes no longer need to have any Athena dependency.
  - DataLinks are the preferred solution, as documented in the latest StoreGate tutorial and the “ATLAS Data Model Users Guide”
- **However**
  - .... SequenceLinks etc are being phased out!

Persistancy(4)

- **ElementLinks**
  - New type of DataLink that replaces SequenceLink, MapLink etc. with one class.
  - Not documented anywhere
  - Not currently compatible with the output of Atlfast.
- **Summary**
  - It's been a frustrating couple of weeks.
  - Really, really frustrating.
  - I now use ElementLinks and at the same time, old code for Atlfast. Not elegant but it seems to work!
  - Final point: Paolo and Srini were very helpful, and seem to be working hard to fix the documentation.

Outlook and Timing

- **Todo:**
  - Test and finish Jet/Energy Triggers
  - Continue validation
  - ...get a PhD
- **Timing**
  - Highly dependant on bugs, and Athena staying fairly constant but hopefully by all code will be written and obvious bugs found within a fortnight.
  - Validation – this really depends on how busy Alan is.
  - PhD – might be finished before ATLAS starts. Possibly.