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Calorimeter trigger offline simulation

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- Jet/Energy Triggers

- LVL1/LVL2 integration

- ROD algorithm

- Output summary

- Outlook & Timing

Jet & Energy Triggers

JetTrigger:

- Finished (but not tested/debugged yet)
  - reads in TriggerTowers and produces JetElements (again, stored in SG)
  - *Produces JetRoIs*

Energy Trigger

- not yet operating

- … but work has started on it, and it is closely linked to JetTrigger (so hopefully development will be swift).

LVL1/LVL2 Integration

Latest Commitments:

- Produce 'ROD' Athena Algorithm which produces correctly formatted Slink data (ROD to RoIB) and CMM to CTP data.
- Provide 'hardware coordinate' decoder to convert RoI crate number etc. into an eta/phi coordinate.
- Provide Slink decoder (to be used as basis of code by Thomas SS and Thorsten)

Status

- **See following ROD slides, but briefly for the rest:**
  - **Hardware decoder : almost finished for EmTauRoIs**
  - **Slink decoder : not finished yet**
  - **Integration with Thomas' TriggerMenu : not started yet**

ROD Algorithm Status:

Function

- Take RoIs and create Slink words.
- Also produce CP CMM to CTP output (i.e. For the CP system 16 3bit theshold multiplicities)

8 bit

Status

- CP CMM to CTP objects produced (Thomas and I plan to test this later this week)
- CP Slink data produced, but not properly tested yet (if anyone has any examples -text files of RoI ROD output?- I'd be interested)
- Need to finish JEP CTP CMM and JEP RoI ROD output.

ROD Algorithm: Slink output

Slink words stored in following format:

- One `ObjectVector<SlinkWord>` for each Slink cable.

- ... where `SlinkWord` is a lightly wrapped `unsigned int`, with methods to integrate with StoreGate.

Beginning of fragment	B0F00000x
Start of header marker	EEEEEEEEx
Header size	8
Format	1
Source_ID	
ROD_L1ID	24bit Lvl1 ID (may be 32bit soon)
ROD_BCID	12bit bunch crossing ID (not available yet)
L1 Trigger Type	0
Det. specific event type	0
RoI words	(see RoI word definitions)
Status word 1	0 (I'm not simulating errors yet)
Status word 2	0
Number of data elements	
Status block position	
End of fragment	E0F00000x

8 bit

Sub det. ID	Crate #	Sub det. ID	ROD serial #
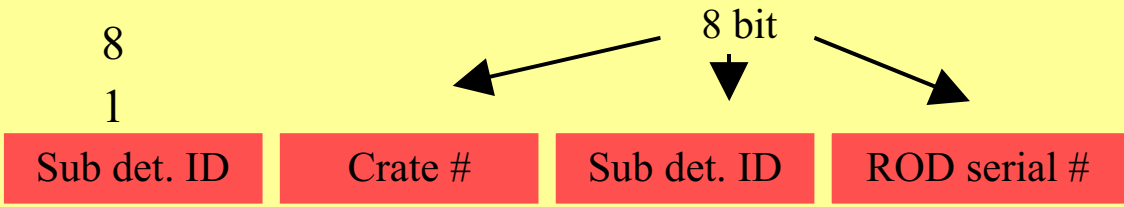
Output summary

Following on from LVL1 integration meeting,
object interfaces have been reviewed.

All objects will return a "data word" that mimics data
transmitted by hardware.

EmTau Trigger:
- EmTauRoIs
- TriggerTowers

JetTrigger
- JetRoIs
- JetElements

EnergyTrigger
- (EnergyRoIs)

ROD
- CP CMM to CTP
- (JEP CMM to CTP)
- CP Slink
- (JEP Slink)

EmTauROI

m_TriggerTowers: SmartRefVector<TriggerTower>
m_eta: double
m_phi: double
m_ROIword: unsigned int

ROIword(): unsigned int
thresholdPassed(threshold_number:int): bool
eta(): double
phi(): double
Towers(): SmartRefVector<LVL1::Towers> &
saturated(): bool

TriggerTower

-m_eta: double
-m_phi: double
-m_emEnergy: double
-m_hadEnergy: double

+eta(): double
+phi(): double
+emEnergy(): int
+hadEnergy(): int
+emEnergyFull(): double
+hadEnergyFull(): double
+containedCells(): SmartRefVector<Cell> &

Brackets = not fully implemented yet

Outlook and Timing

Todo:

- Integrate with Thomas' Trigger Menu
- Finalise & test all Slink related code
- Finish Energy Trigger
- Validate by reproducing TDR plots

Timing

- **I hope to integrate with Thomas this week and finish Slink code the following week**
- **The Energy trigger will take longer but I aim to finish within a month**
- **TDR plots .... ?**