Cal Digi/Trigger Data Flow – October 2007

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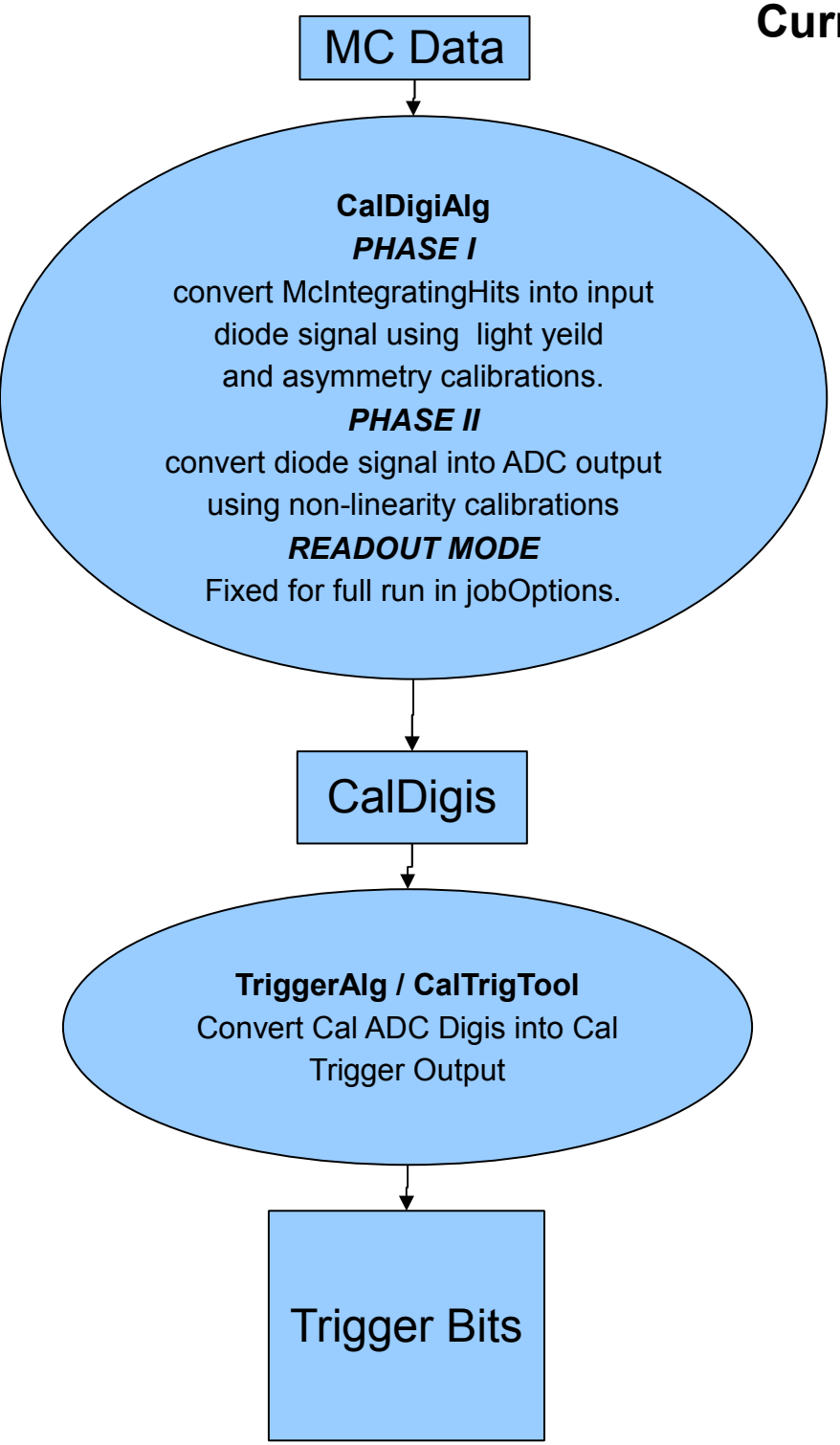
Current CalDigi Data Flow



Definitions

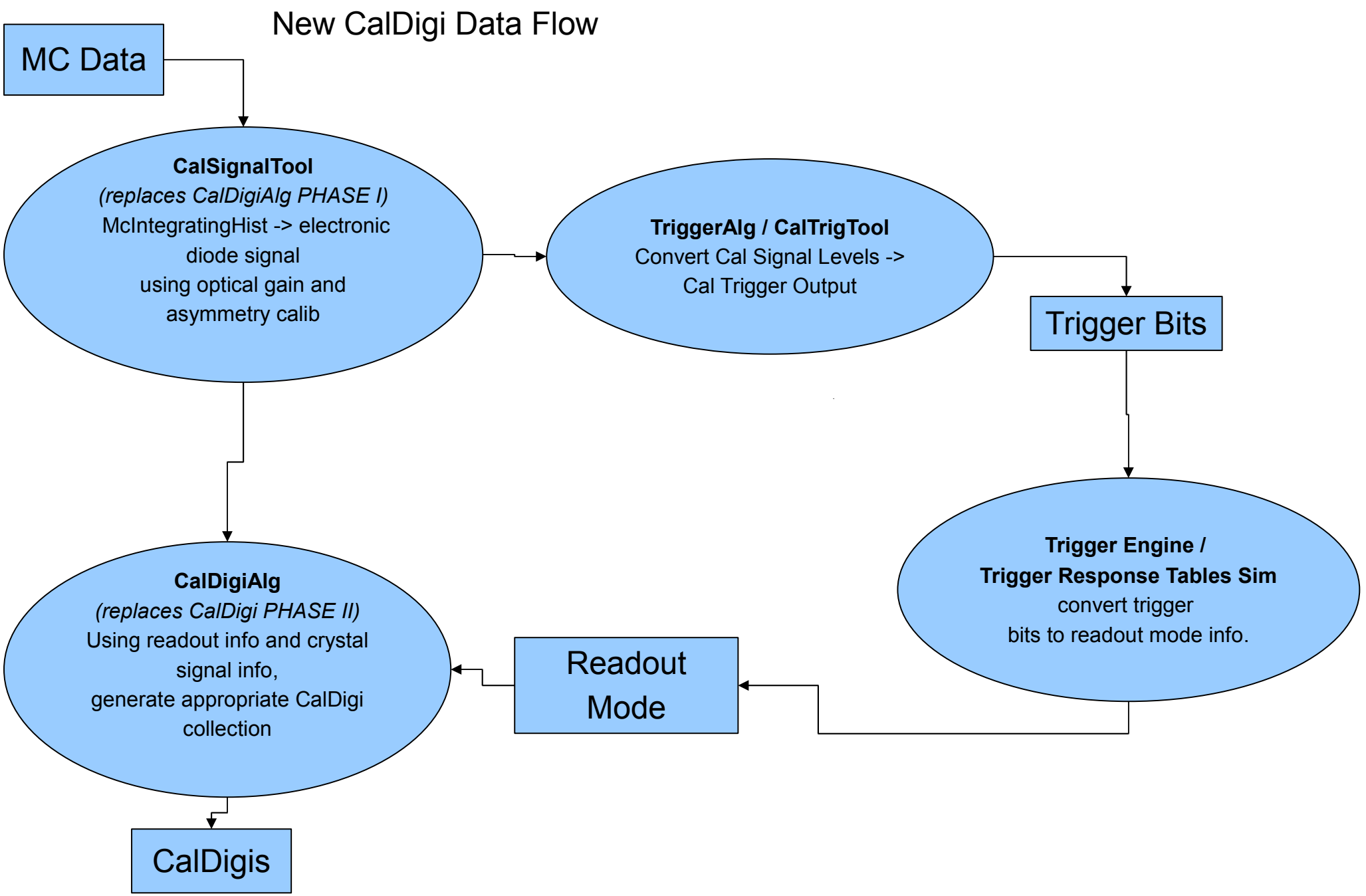
- Cal Readout Mode – (4range vs best range, zero suppression)

Initial Problems

- Real LAT varies readout per event based on trigger word.
  - Current CalDigi readout mode fixed @ jobOptions level
- TriggerAlg dependent on CalDigi ADCs
  - Cal Trigger discriminators and ADC readouts have different shaper electronics / different response characteristics
    - difficult to simulate this w/ current scheme.
  - Zero suppression and best-range give less accurate trigger sim. as less information is retained
    - e.g. FHE inducing small diode direct deposits may be ignored.

Technical Hurdles to Solution

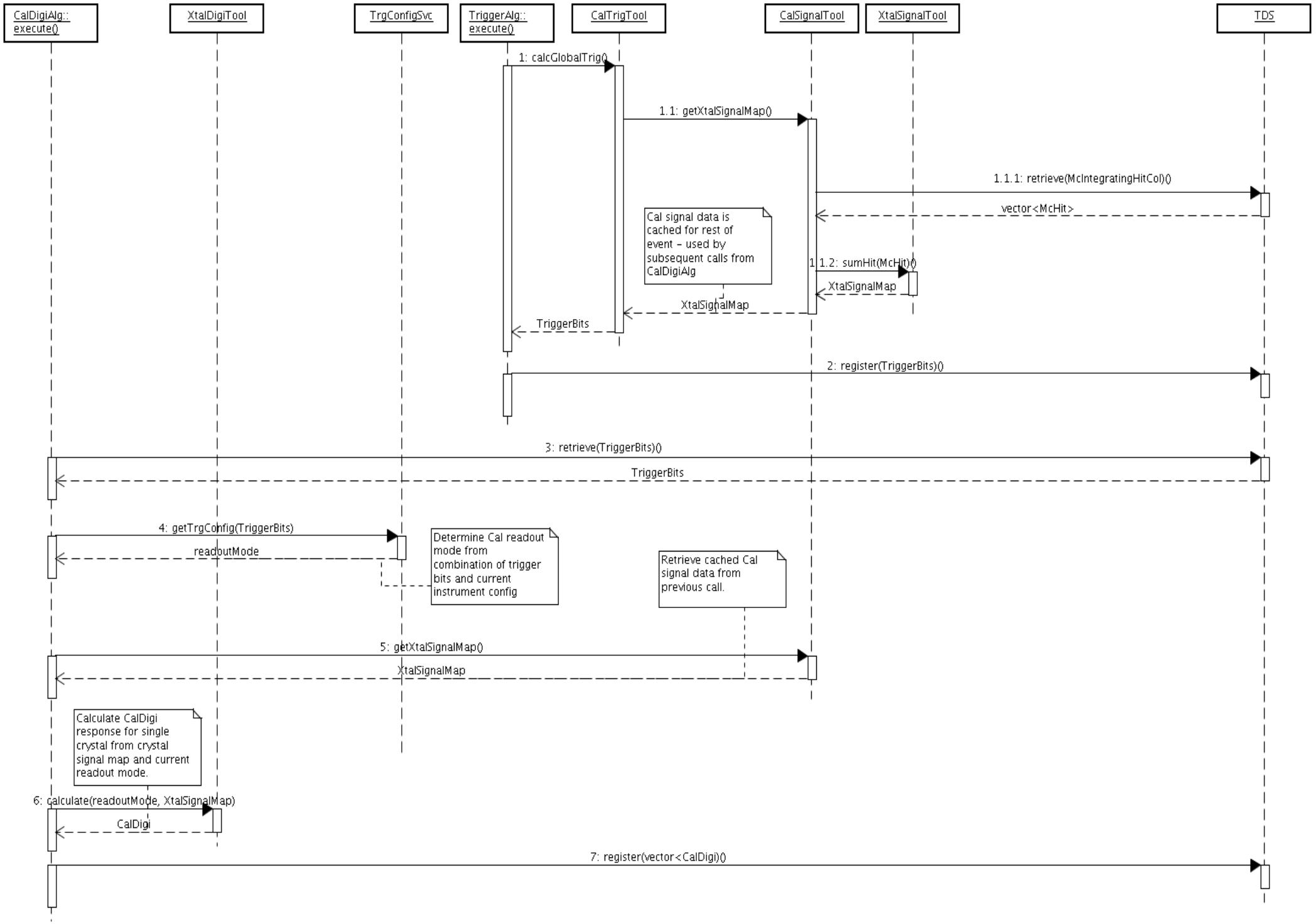
- Cal Readout Mode dependent on trigger bits from TriggerAlg.
- TriggerAlg in turn dependent on CalDigiAlg
  - circular dependency.
- CalDigiAlg is CPU intensive - avoid redundant processing.


New CalDigi Data Flow
MC Data
CalSignalTool
(replaces CalDigiAlg PHASE I)
McIntegratingHist -> electronic diode signal using optical gain and asymmetry calib
TriggerAlg / CalTrigTool
Convert Cal Signal Levels -> Cal Trigger Output
Trigger Bits
Trigger Engine /
Trigger Response Tables Sim
convert trigger bits to readout mode info.
Readout Mode
CalDigiAlg
(replaces CalDigi PHASE II)
Using readout info and crystal signal info, generate appropriate CalDigi collection
CalDigis

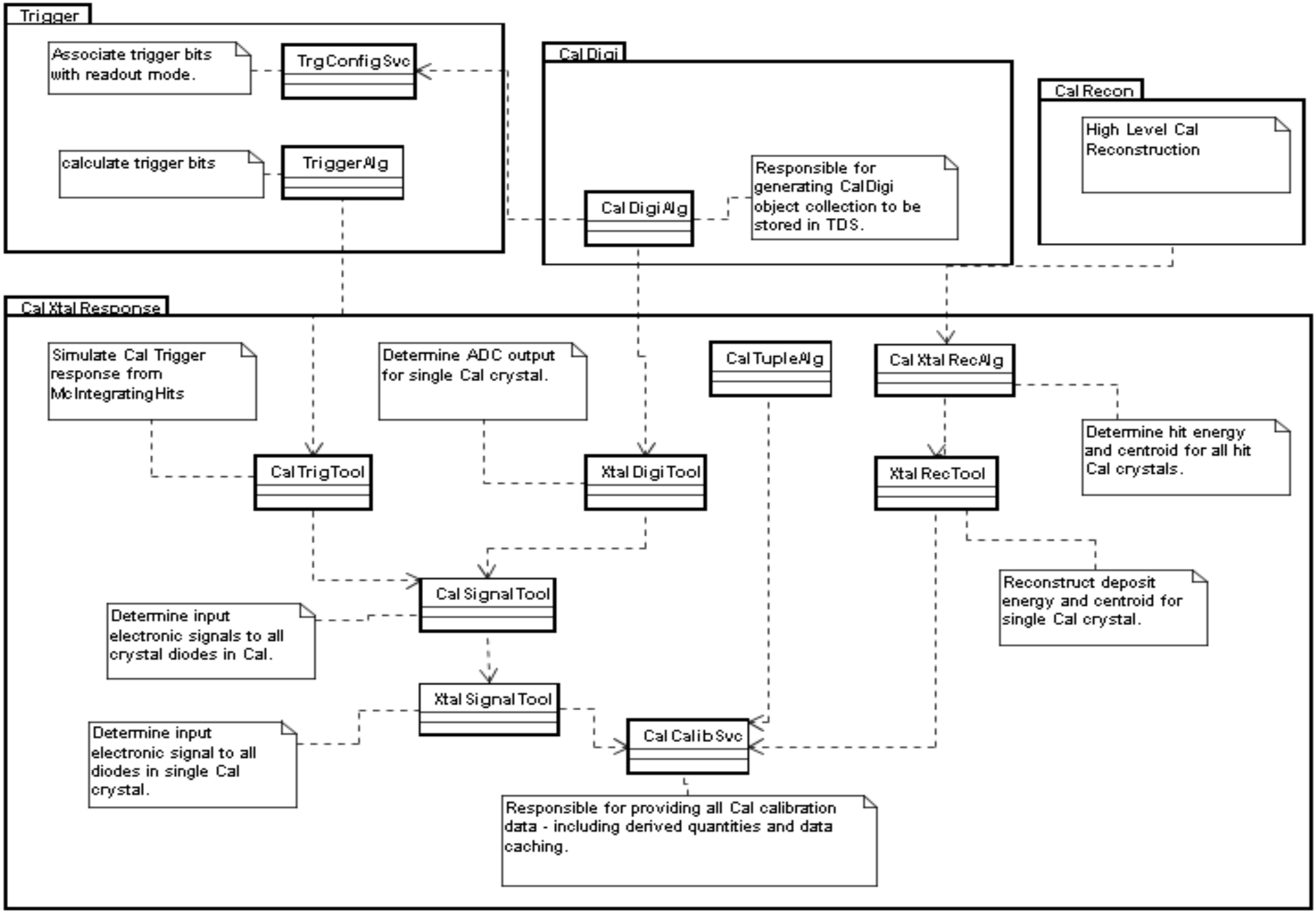
Solution

- Break *CalDigiAlg* into 2 parts
  - *CalSignalTool* – (Part I) calculate diode input signal level from Mc deposits
  - *CalDigiAlg* - (Part II) determine ADC readout from signal levels
- *TriggerAlg* will also be a client of *CalSignalTool*
  - *CalSignalTool* - calculate signal levels once per event and cache results for for remainder of event
- No more circular dependency
- *TriggerAlg* no longer dependent on CalDigis
- Easier to simulate Trigger shaper electronics separately from ADC channels in the future.

Cal Digi and Trigger – Sequence Diagram



CalXtalResponse TopLevel Class Diagram



Status / Effects

- Code is written, tested and checked into CVS
  - CalUtil – v3r5p1
  - CalXtalResponse – v0r15p1
  - CalDigi – v3r1
  - Trigger – v5r5
- Requires integration with GlastRelease
  - Order of algorithm calls must change (TriggerAlg *before* CalDigiAlg)
    - Requires change of all jobOptions files
      - Sorry, I don't think this was avoidable.

Alternate Modes

- CalDigiAlg can still run w/out Trigger info
  - Simply falls back to default readout mode (specified in jobOptions)
- TriggerAlg can still run off of ADC data
  - Will do so if MC data is not available
  - This options is still used for processing 'real' data.
- So basically, old jobOptions will work as they used to