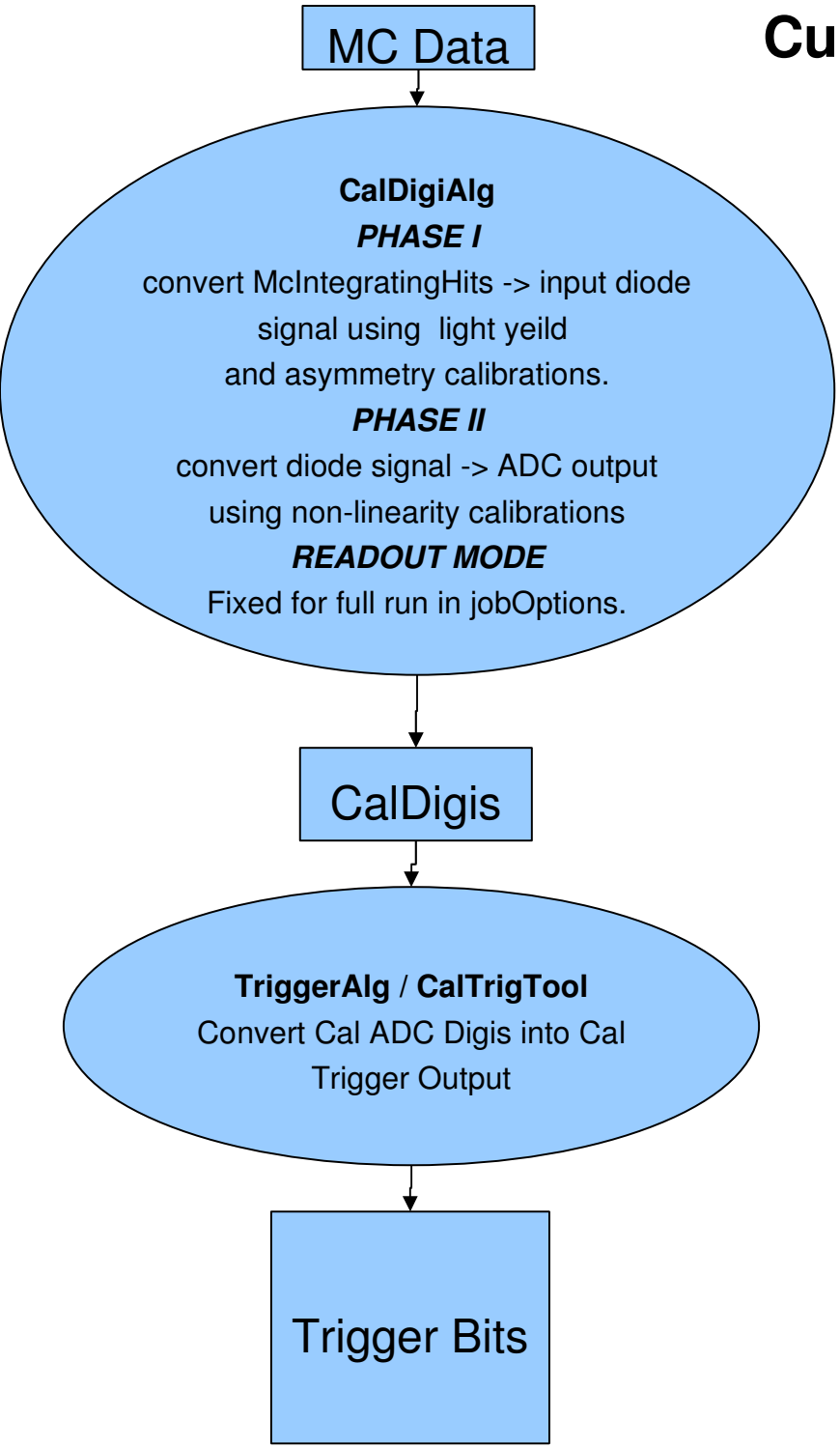
Cal Digi/Trigger Data Flow

Zach Fewtrell, November 5, 2007



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 information is lost***
  - e.g. FHE inducing small diode direct deposits may be ignored.

Technical Hurdles

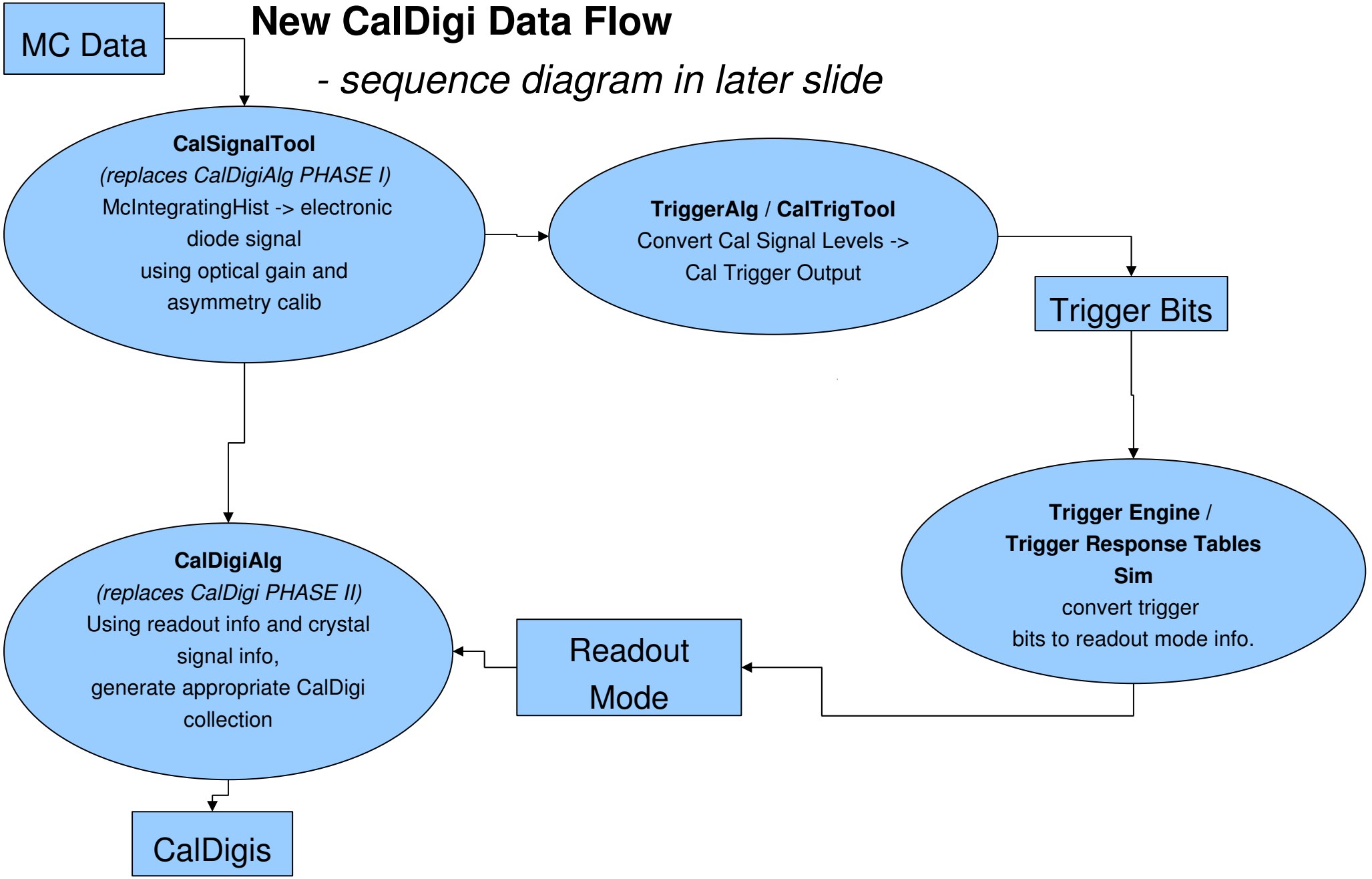
Circular Dependency.

- Cal Readout Mode depends onTriggerAlg.
- TriggerAlg depends on CalDigiAlg

CalDigiAlg is CPU intensive - avoid redundant processing.

New CalDigi Data Flow

- sequence diagram in later slide



Solutions

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

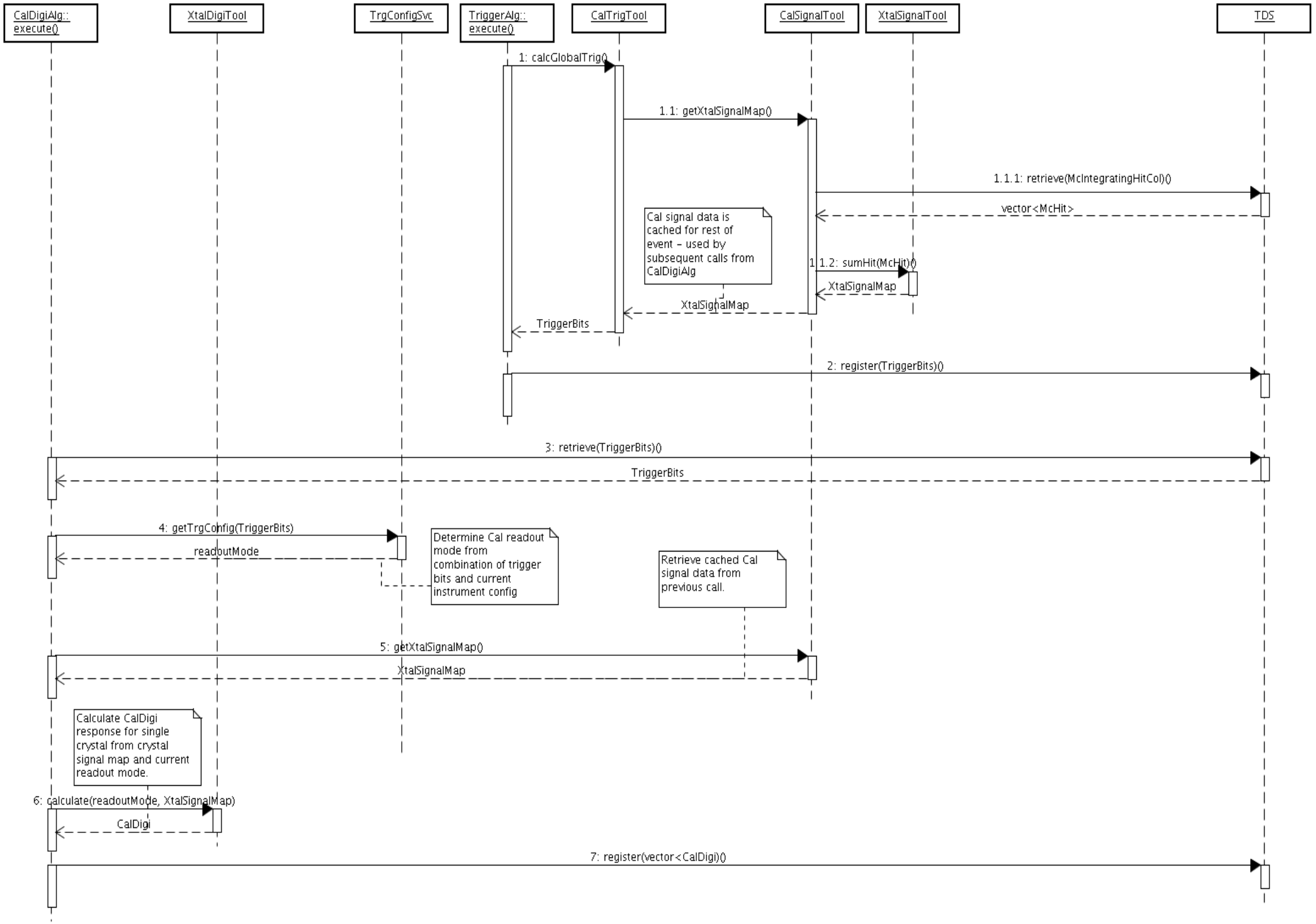
TriggerAlg* will also be a client of *CalSignalTool

- *CalSignalTool* - calculate signal levels once per event and cache results for for remainder of event

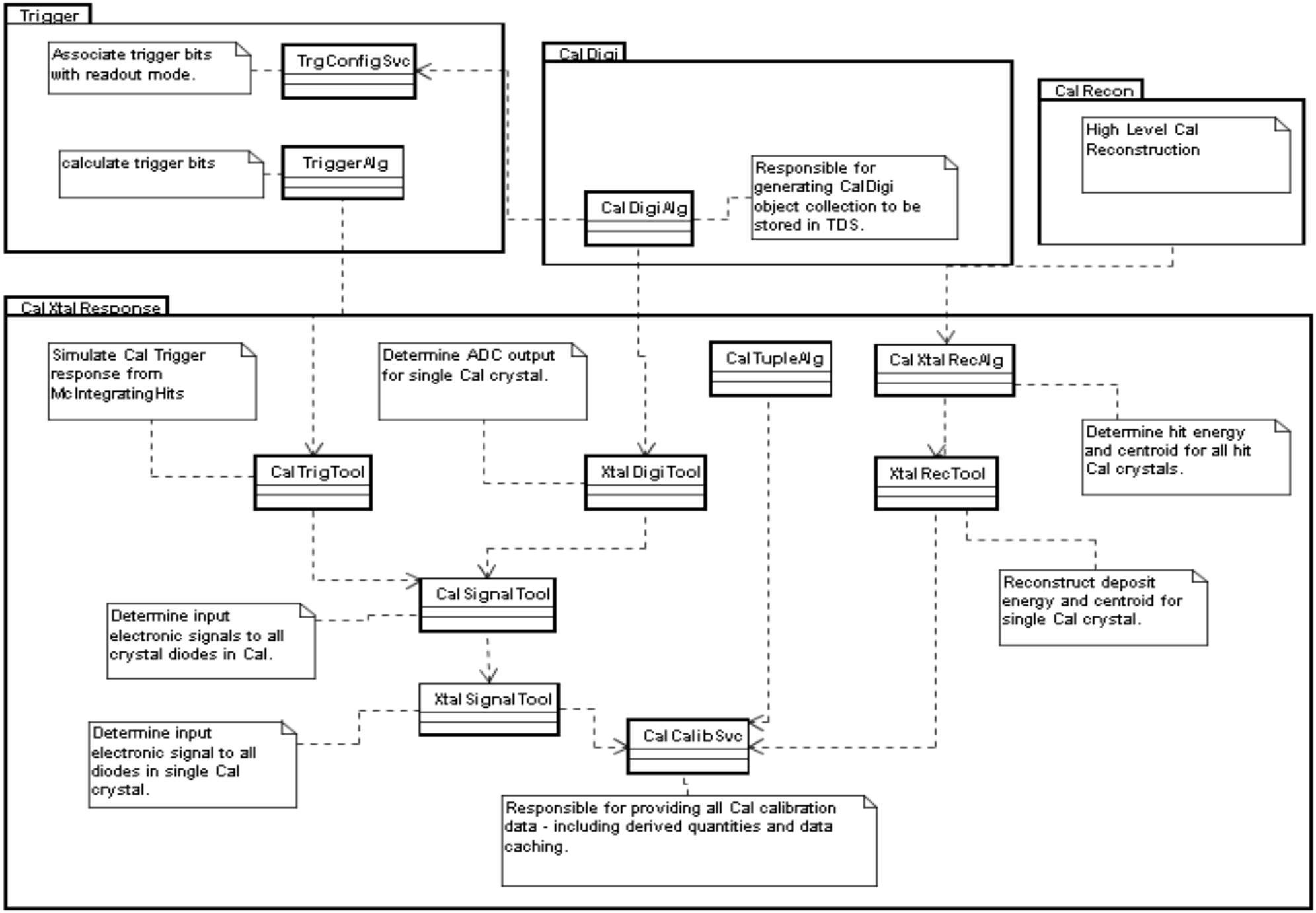
Results

- 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



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.

Status / Effects

Code is written, tested and checked into CVS

- CalUtil – v3r5p1
- CalXtalResponse – v0r15p1
- CalDigi – v3r1
- Trigger – v5r5

Currently in HEAD of GlastRelease

- Order of algorithm calls must change (TriggerAlg before CalDigiAlg)
- Requires change of all jobOptions files
- Sorry, I don't think this was avoidable.

New code to generate 4-Range CalXtalRecData has been tested and should be committed today (11/6).