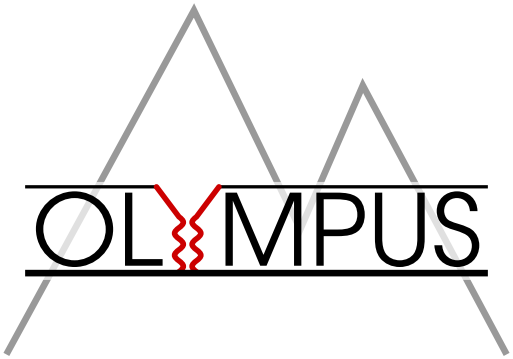
Data analysis

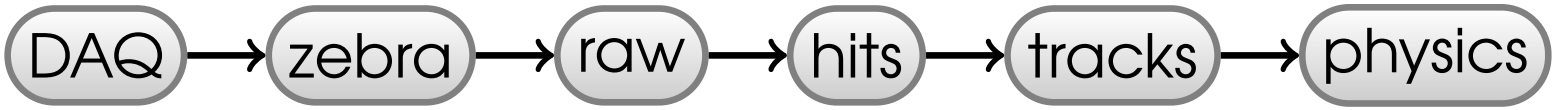
Jan C. Bernauer



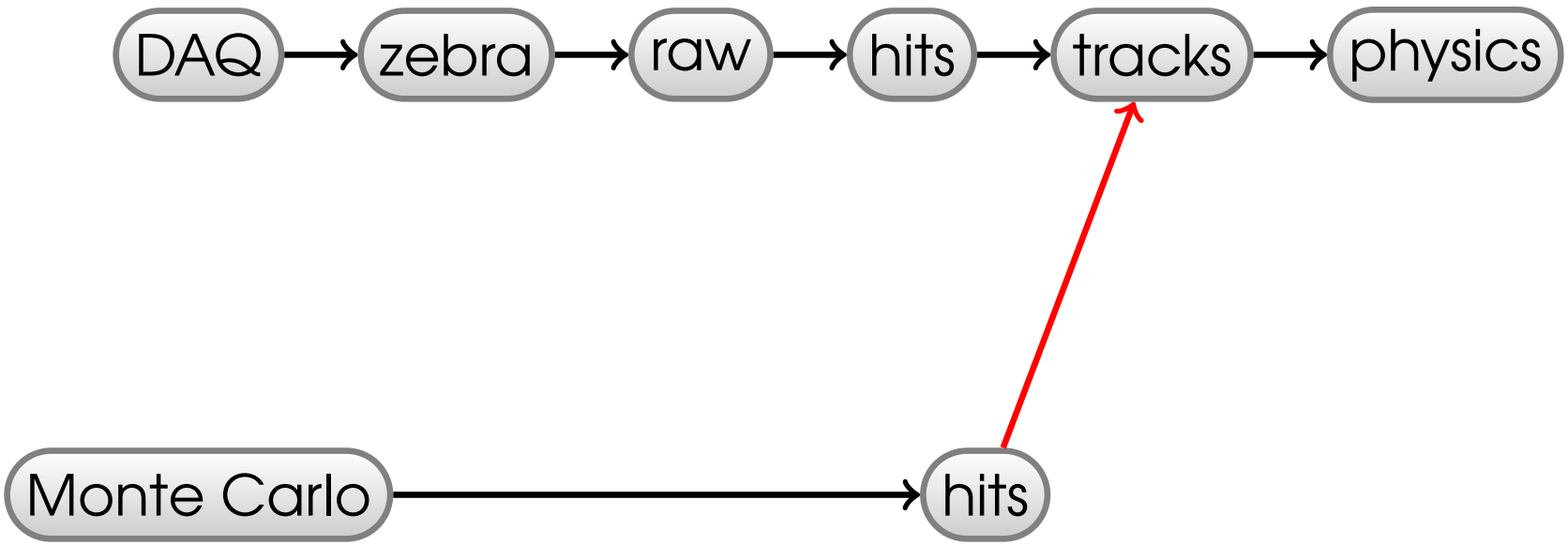
Collaboration Meeting June 2011

Massachusetts Institute of Technology

Software overview



Software overview



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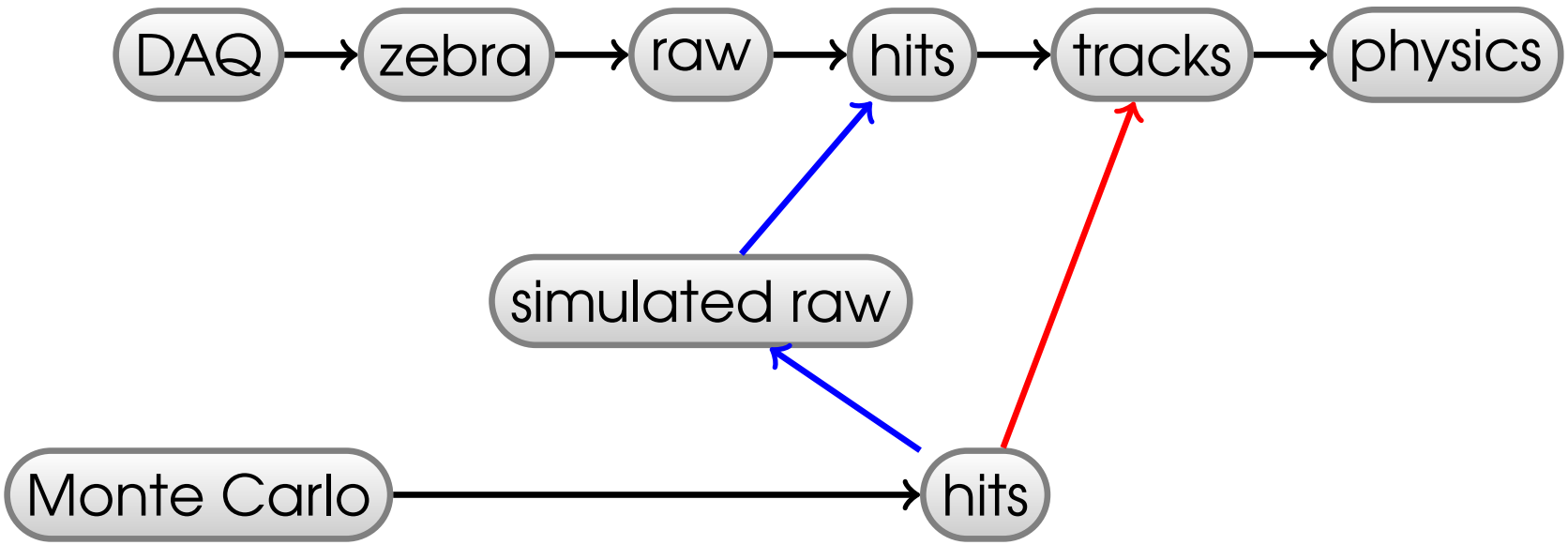
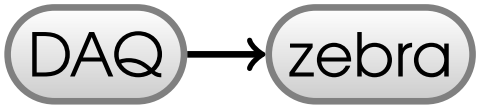


Raw data root files



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$\longrightarrow$Write Explora plugin to export to standard root file.

- Data is not changed, for most detectors: raw data block.
- But: Mapping to logical channels already performed by Explora framework.

Proposed structure

- Object hierachy, encapsulating logical detectors.
  - Chamber, ToF, Lumi, Moeller
  - Lumi will have members for MWPC and GEMs
- Chambers: Vector of {wire nr, time}
- ToF: Zero suppressed or not? Either array or vector of {bar nr, tube(2) {adc,tdc}}
- Moeller: ???
- GEMs/MWPC: for each detector, a raw data block and its size?

Detector analysis libraries

For each detector, we need software for:

- online monitoring
- data analysis

$\longrightarrow$ Need software libraries which understand raw format.

- Should be provided by the detector groups
- Standardized interface

Proposal: Library Interface

- C++ class
- *int classname::loadData(int len, unsigned char * data)* to load
- *int classname::process(int flags)* to process
- ... some functions for debugging and online monitoring, depends on detector.
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- The actual returned hit type might just inherit from G4VHit. Use the same as the Monte Carlo!

Same code can be used to analyse MC and real data!

Proposal: Initalization files

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- Don't want to reinvent the wheel x times.
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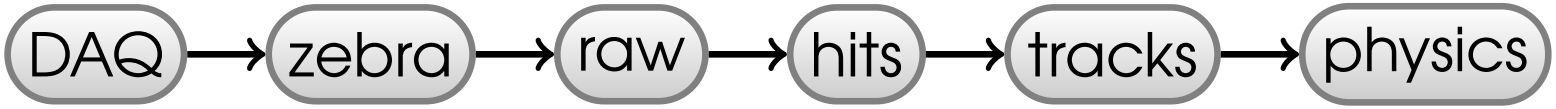
- File format: XML, json, Ini style, name your favorite!

Python, cint or compiled C++



All three have have advantages/disadvantages:

compiled C++
+ fast
- long turnaround times
- lower level language

cint
+ the usual way
+ fast turnaround
- slow execution, but prototype for compiled C++
- Does anyone like cint?

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Proposal: Do anything up to the "physics" stage with compiled C++. Do the physics stage with Python.