Ideas for improving a general purpose analysis

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The Idea

- Take existing package
  - “hopefully” simplify, add functionality
- The problem
  - how to do this
- After much discussion and deliberation take a standard approach from HEP and use an “event framework” – provided by Sergey
- Utilize as much of Josef’s program as possible, especially the physics!
  - Keep existing functionality, external structure, input commands, and steering (xml) files, along with the physics routines.
  - This allows ~90% of the existing documentation to be reused

What a framework is…

- Its "top-down" approach allows the user (you) to create or change low-level code without harming the overall structure of the code.

- code is built from well defined objects called modules. Technically, a module is a C++ class that inherits from a generic module class called AppModule. Any analysis code written to interface to the Framework must be written as a module.

- The framework passes data from module to module. Each module uses the data to perform one well-defined task. There are many types of modules. There are general-purpose modules that perform tasks like reconstruction, and special-function modules exist; these are input modules and output modules to control the input and output of data and filter modules to control subsequent data processing.

- In addition to the "ready made" modules, users can, and will need to, write or modify their own analysis modules. User-defined modules are made in a user's own version.

http://www.slac.stanford.edu/BFROOT/www/doc/workbook/framework1/framework1.html

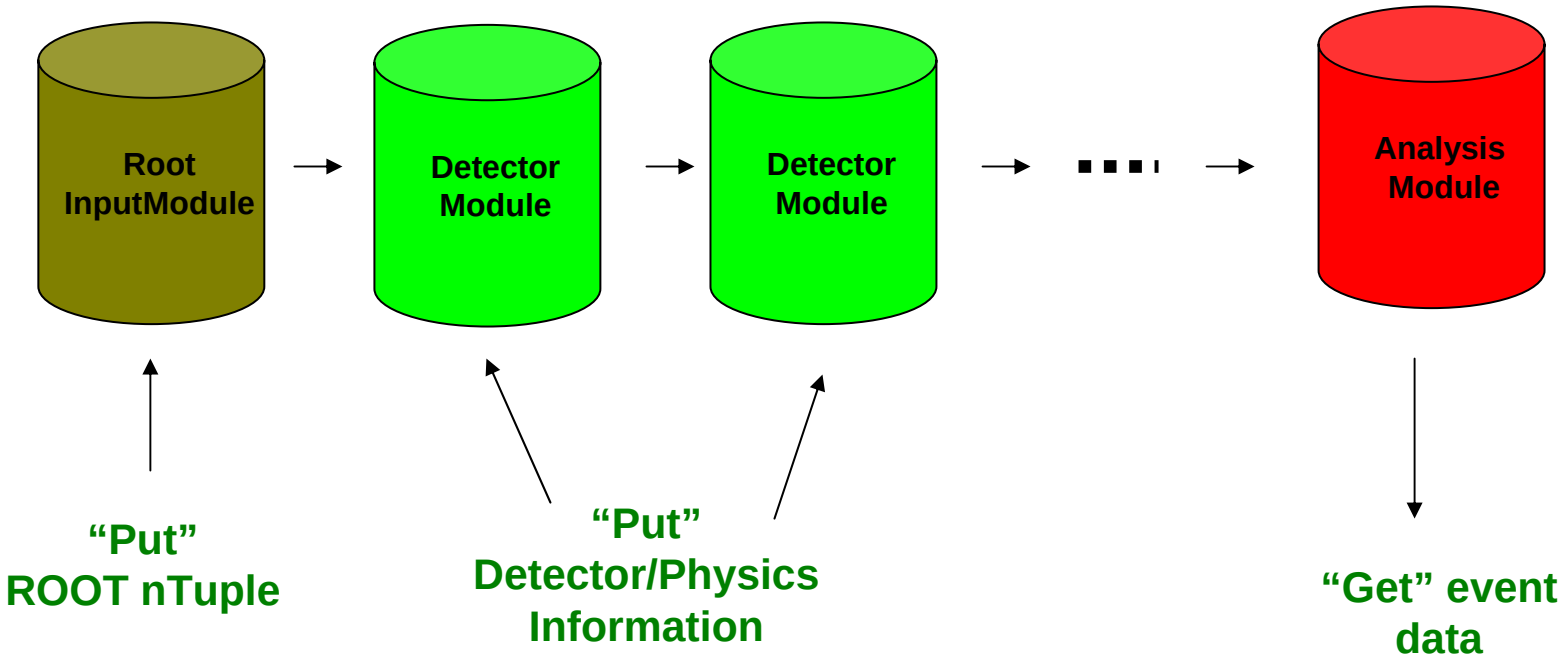
Pro’s and con’s

- Disadvantages:
  - The word framework conjures horrific images of BaBar Software!
  - User doesn’t necessarily know or understand the internal workings of the program
- Advantages:
  - The user doesn’t need to understand the internals and can take advantage of the functionality, or work around it…(many examples of this)
  - Standard, and documented, has been thought thru by other individuals, and provides a template to work from.
  - Easy to add and remove code, without destructive interference of the progam.

It’s Standard

- therefore, any time invested in learning is not wasted, as nearly all modern experiments have a very similar frameworks
  - BaBar
  - Belle
  - CDF
  - VEPP
  - LHC experiments
- Learning time, is relatively short, and once you learn how a single module works, you pretty much know how to use them all
- This may not be the best solution, but at least it is a standard one
  - Open to suggestions

Data Flow


Root
InputModule
Detector
Module
Detector
Module
Analysis
Module
“Put”
ROOT nTuple
“Put”
Detector/Physics
Information
“Get” event
data

Analysis Module

A front-end interface:

- **beginJob ()** - initialization of analysis tools, e.g. histograms.
- **beginRun ()** - allows loading constants for particular run periods
- **event (AppEvent&)** - the place where user does his own event analysis, event rejection, histogram filling, etc. The user has access via **AppEvent** to all the data produced up to this point.
- **endRun ()** - results of run analysis
- **endJob ()** - print/plot resulting distributions, start interactive analysis session

Doxygen documentation for AppModule

Overview of framework:

http://kedr.inp.nsk.su/~skononov/AppFramework/

An Simple introduction to the code would be from the analysis interface:

http://www.slac.stanford.edu/~coleman/doc/AnalysisModule_8cc-source.html

The Situation & Work in Progress

- program can read present schema of XML files and set appropriate branches from the Root Ntuple.
- All data is read in and made available to the user in the analysis module, at the moment only Raw ADC and TDC quantities, these will be manipulated to give physics in the appropriate detector modules
- Extract calibrations and correction procedures and place into relevant detector modules
- Implementation of Physics class from Jose

Concluding Remarks

- All input is welcome!

  -is this useful?

  -is this overly complicated for the functionality that it provides?

  My Guess is that time will tell