Analysis Tools in Geant4 10.2

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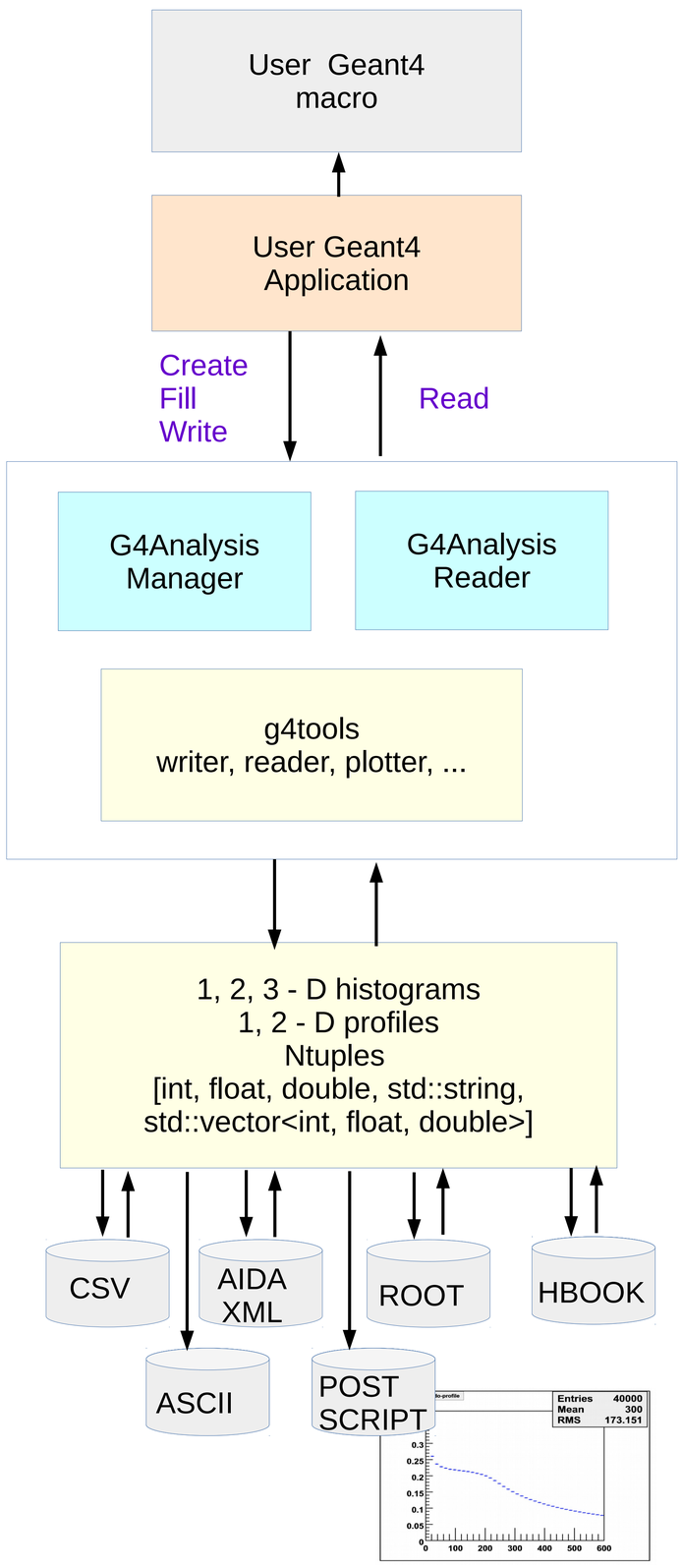
Geant4 Analysis

- The analysis category provides users with a "light" analysis tool available directly with an installation of Geant4
- Uniform, user-friendly interface to g4tools, hiding the differences between selected output formats
- High level management of g4tools objects: memory management, access
- Integration in the Geant4 framework: Interactive commands, units, (in)activation of selected objects

g4tools

- Provides histograms, profiles, ntuples, plots and code to write/read using various formats: CSV, ROOT, AIDA. XML, HBOOK, Postscript (for plots).
- Pure header code, easily embeddable (no "config.h" or specific build tool required).
- Strongly OO. No implicit global management.
- Thread safe (no writable statics).
- See: http://softinex.lal.in2p3.fr



New Features

Since our contributions at CHEP 2013

10.1.

- **3D histograms** and **1D, 2D profiles**
- Support for **histograms with CSV** output
  - Each histogram/profile is written in its own CSV output file.
- **Analysis Reader**
  - Allows reading in g4tools objects from the files generated by the analysis manager(s) during processing Geant4 application.

10.2.

- Added **"batch plotting"** facility
  - Users can activate plotting of selected histograms and profiles.
  - A single plot Postscript file, possibly with multiple pages, is generated.
  - The plotting style, page layout and the viewer dimensions can be set via UI commands
- Added classes for management of **users parameters**
  - Users can define their parameters objects as named parameters registered to the parameter manager, which then provides the access to them and performs their merging in multi-threading mode.(See basic examples B1 or B3a.)

Multithreading & Multiprocessing

10.0.

- The analysis code supports multithreading since the first Geant4 release (10.0) in this way:
  - Histograms produced on thread workers are automatically merged on Write() call and the result is written in a master file.
  - Ntuples produced on thread workers are written on separate files, no merging of ntuples is performed.

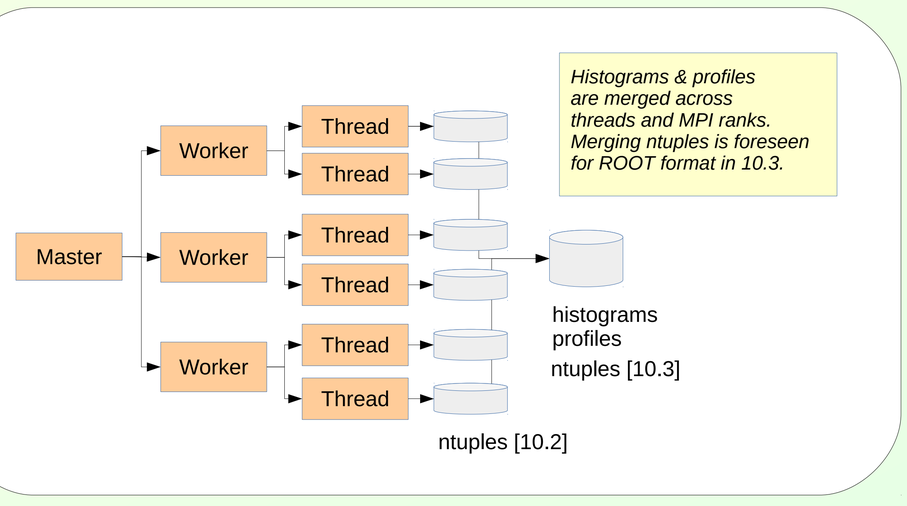
10.2.

- The ability to **send/receive histograms & profiles through MPI** is available since 10.2
  - The `tools::histo::hmpi` interface to MPI, separated from the MPI-dependent implementation (`tools::mpi::hmpi`) allows to keep the analysis category in Geant4 independent from MPI libraries.
  - The `G4MPIhistoMerger` class is provided in Geant4 extended/parallel/MPI example with no need to access the g4tools/analysis internals.

Upcoming New Features for 10.3

10.3.

- **Parallel ntuple writing in MT/MPI in ROOT format**
  - In 10.2: one ntuple output file produced by each worker/thread.
  - In 10.3: enabling merging of ntuples into a single (or a desired number) of output files.
- Further improvements to **parameters** framework.
- Drop support for HBOOK output.



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