

Modellistica Medica

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Anno Accademico 2002-2003

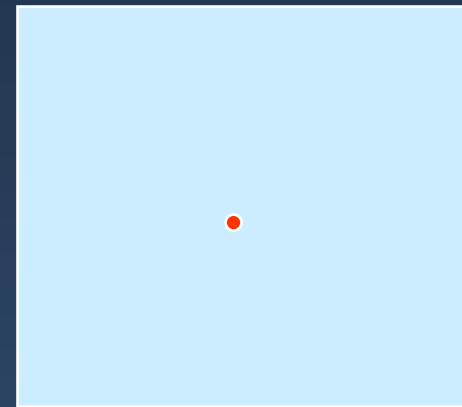
Lezione 5

Case study

Functionality

The problem to study

- A radioactive source inside a box of water
- We want to study the energy deposit in the water



What do we need?

Modeling

- The experimental set up
 - Geometry
 - Materials
- The primary event
 - The decay spectrum of the radioactive source
- The physics interactions of particles with matter
 - The physics processes
 - Their cross-sections
 - The secondary particles generated
 - ...

Dealing with the details of the simulation

- Handling the tracking of particles through matter
 - stepping
- Handling the transportation of particles
 - Navigation through volumes
- A mechanism to collect the physically interesting information
 - and register it for future analysis
- Handling the chunks of the simulation
 - Runs, events, tracks, steps...

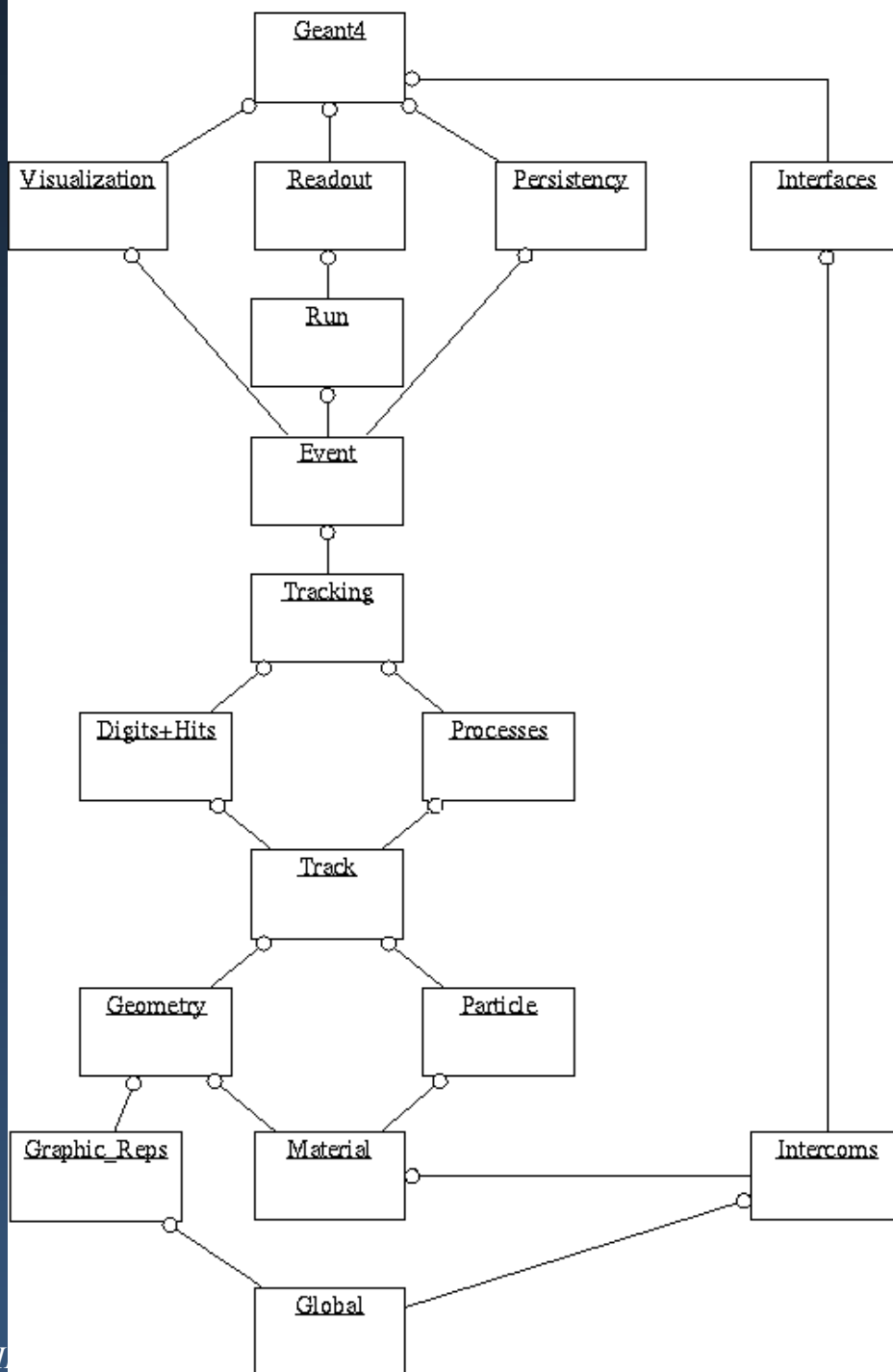
Looking at what happens

- Visualisation
 - Experimental set-up
 - Tracks produced, energy deposit
 - Etc.
- Analysis of the results
 - Histograms of the relevant physical quantities
 - Collection of significant info for each event (track)
 - Etc.
- Saving the events generated for future re-elaboration
 - persistency

The toolkit

- Putting all things together
- Making them work together
- Interacting with external systems

Geant4 architecture

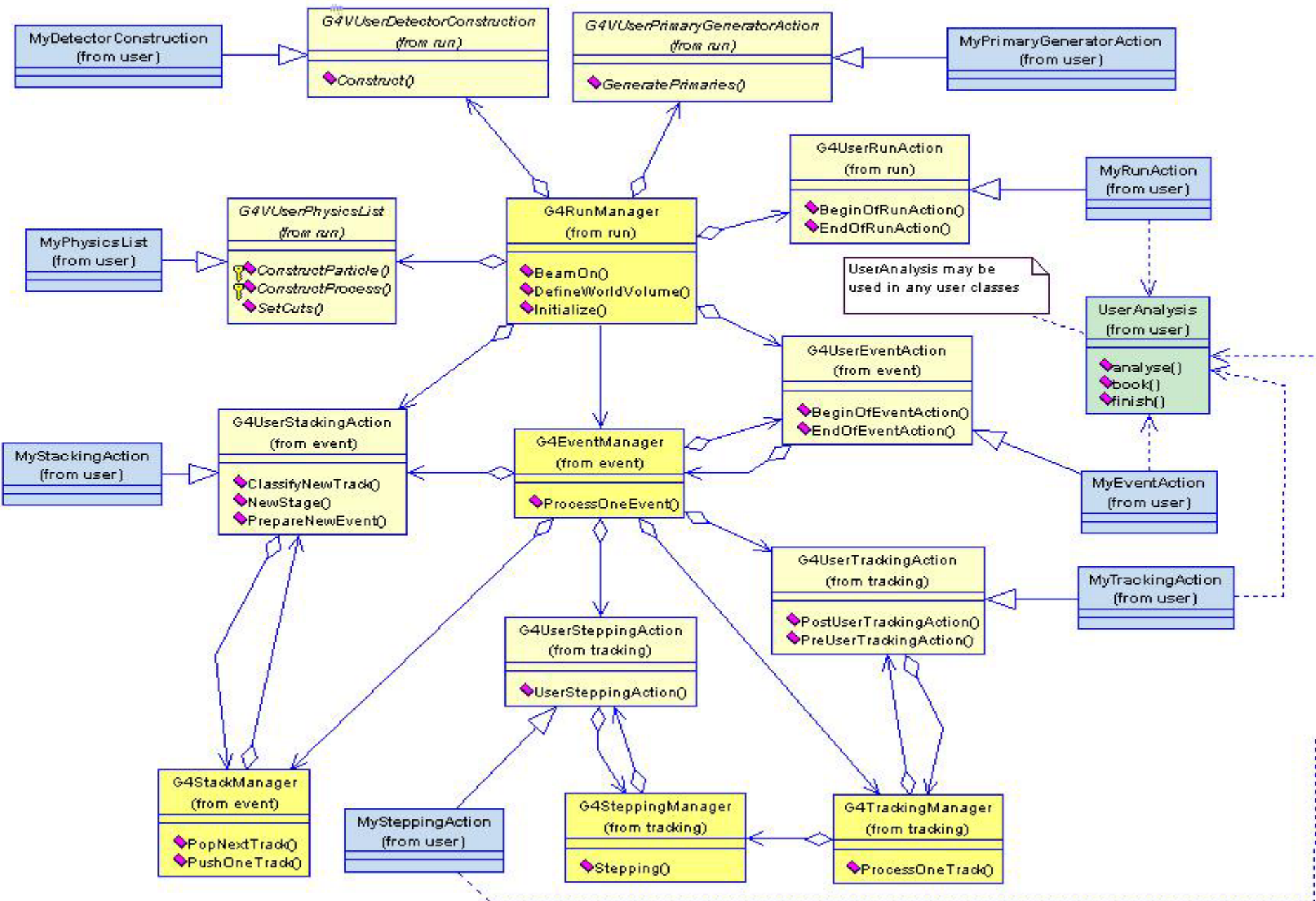


The users

- Letting the user
 - Specify what he/she wants
 - Interact with the processing
 - Change parameters, select alternatives

Overview of Geant4 advanced examples

MGP
26 October 2001



From a small exercise with a
radioactive source like this one...

to...

HEP software & the
GRID: a breakthrough in
the fight against cancer

CHEP Conference, 2003