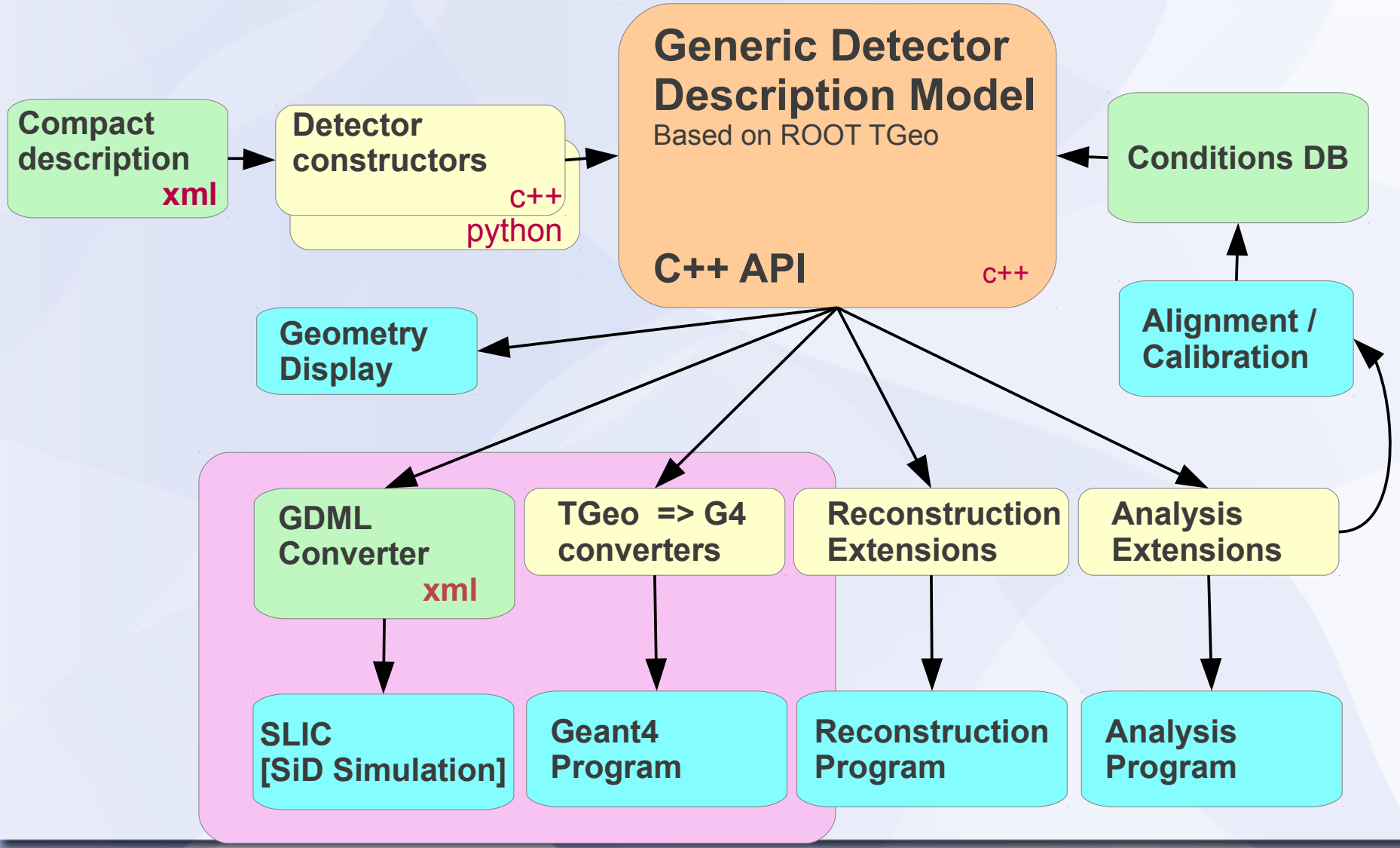
DD4hep

Simulation Issues

A few thoughts to start the discussion

DD4Hep - The Big Picture



Geant 4 Gateway

- Idea:
  - walk through the geometry starting from “world”
  - convert the geometry from ROOT to Geant4
  - all runs by magic
- Geometry is automatically converted to Geant4
  - Materials, Solids, Limit sets, Regions
  - Logical volumes, Placed volumes / physical volumes
  - Fields
  - Sensitive detectors

In Memory Translation to Geant 4

- Unfortunately this was a little bit naïve
- Unresolved issue with sensitive detectors
  - Coupled to the detector construction
  - Coupled to the reconstruction, MC truth and Hit production

Translation to Geant 4 with lcdd

- The SiD simulation application SLIC solves these issues with bravour
  - But it requires a XML input file in 'lcdd' format with some 'gdml' section
  - Technique to generate such a file is similar to 'in-memory' conversion

In Memory Translation to Geant 4

- How many different sensitive detector types are necessary?
  - Mokka/Geometry/Tesla has 17
  - SLIC has ~ 3
- DD4hep has picked up many concepts from the SiD framework(s)
  - SiD also picked up many concepts from Gaudi (Collaboration between Jeremy, Witek, Rado)
  - Simple, but powerful concepts (lccdd, …)
- If it works, why not use SLIC for all simulation?