

Status Update

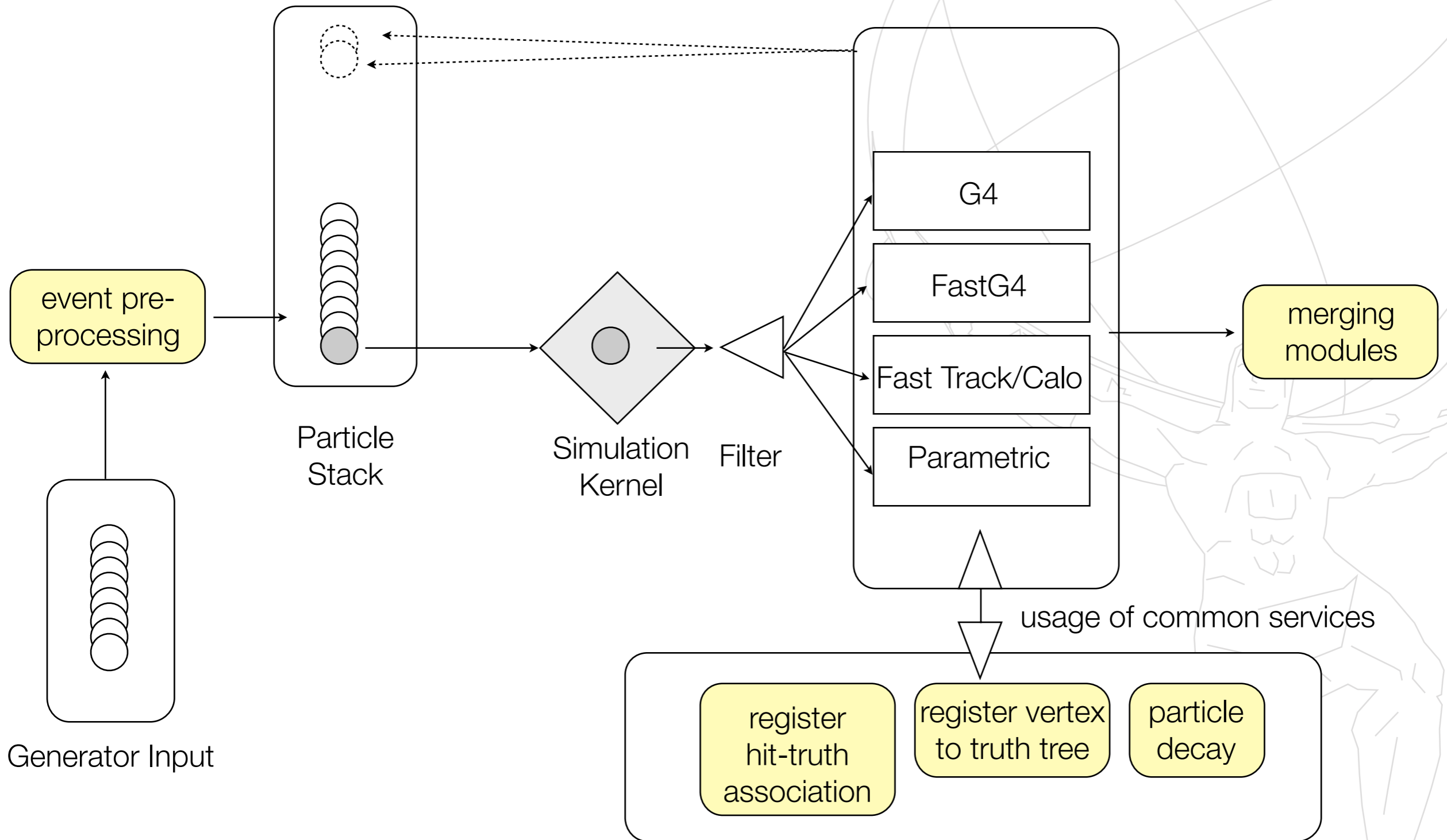
Towards a Gaudi integration of fast and full simulation

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ATLAS ISF

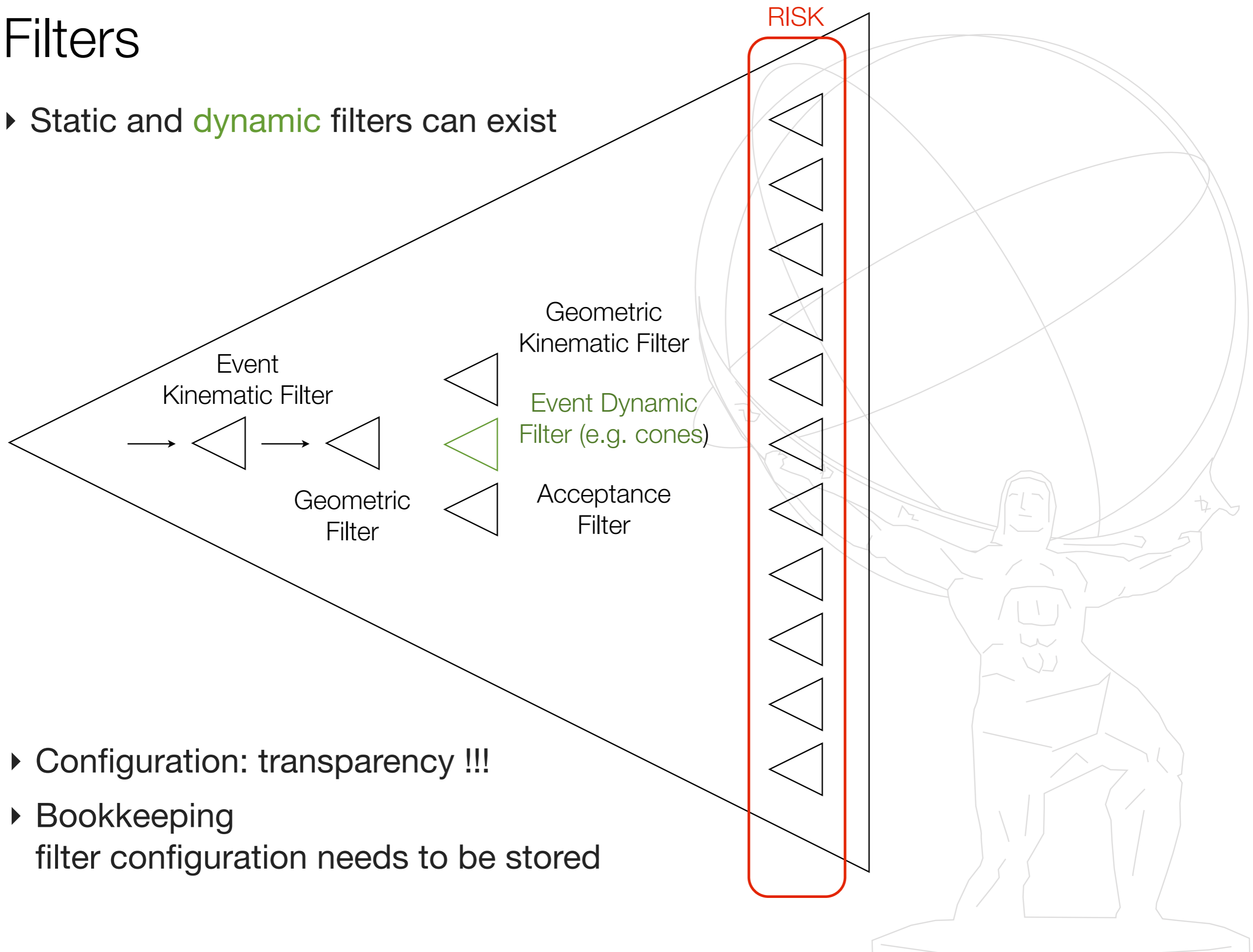
from a first design talk I gave in 2011

Towards a multi-flavor simulation



Filters

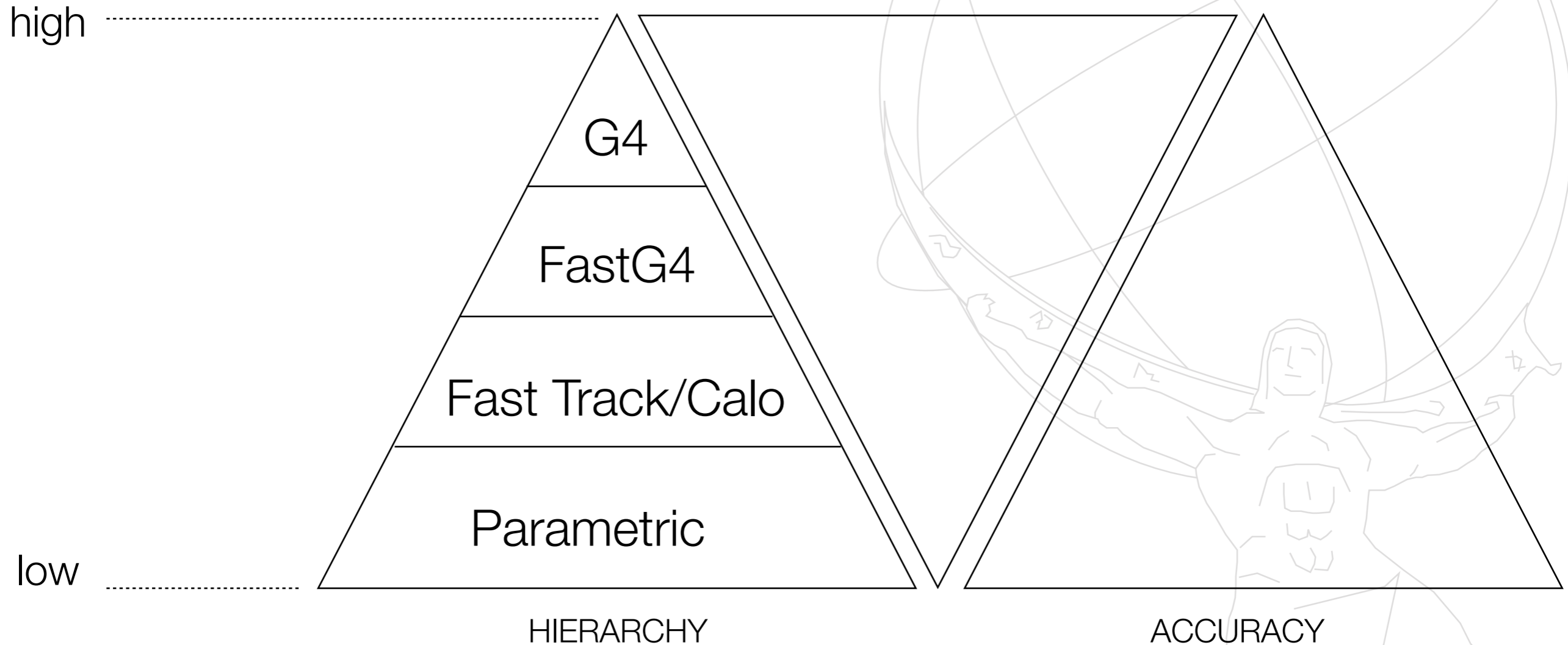
- ▶ Static and **dynamic** filters can exist



- ▶ Configuration: transparency !!!
- ▶ Bookkeeping
filter configuration needs to be stored

Filters and Hierarchy

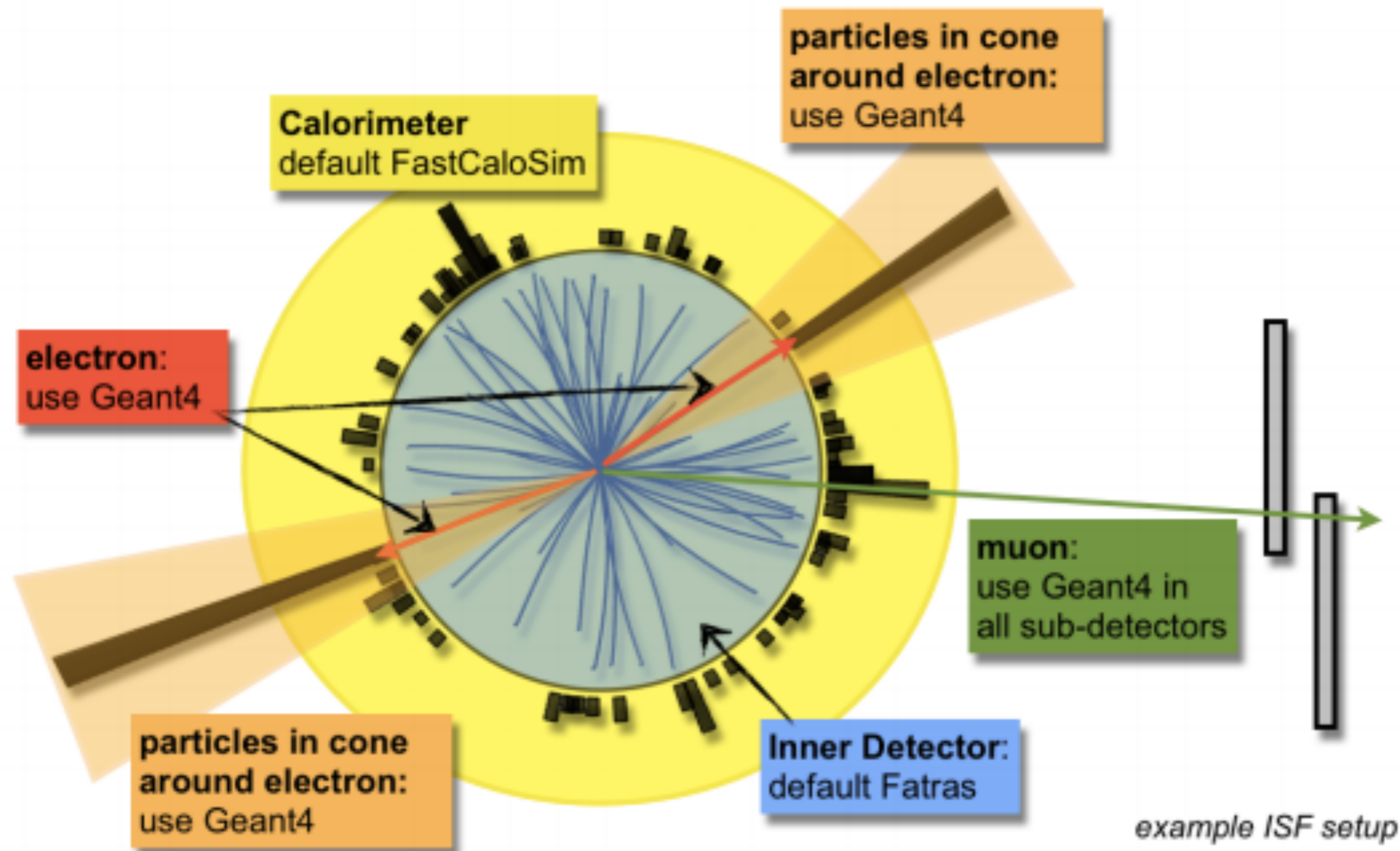
- ▶ there will be certainly filtering conflicts
 - hierarchy approach

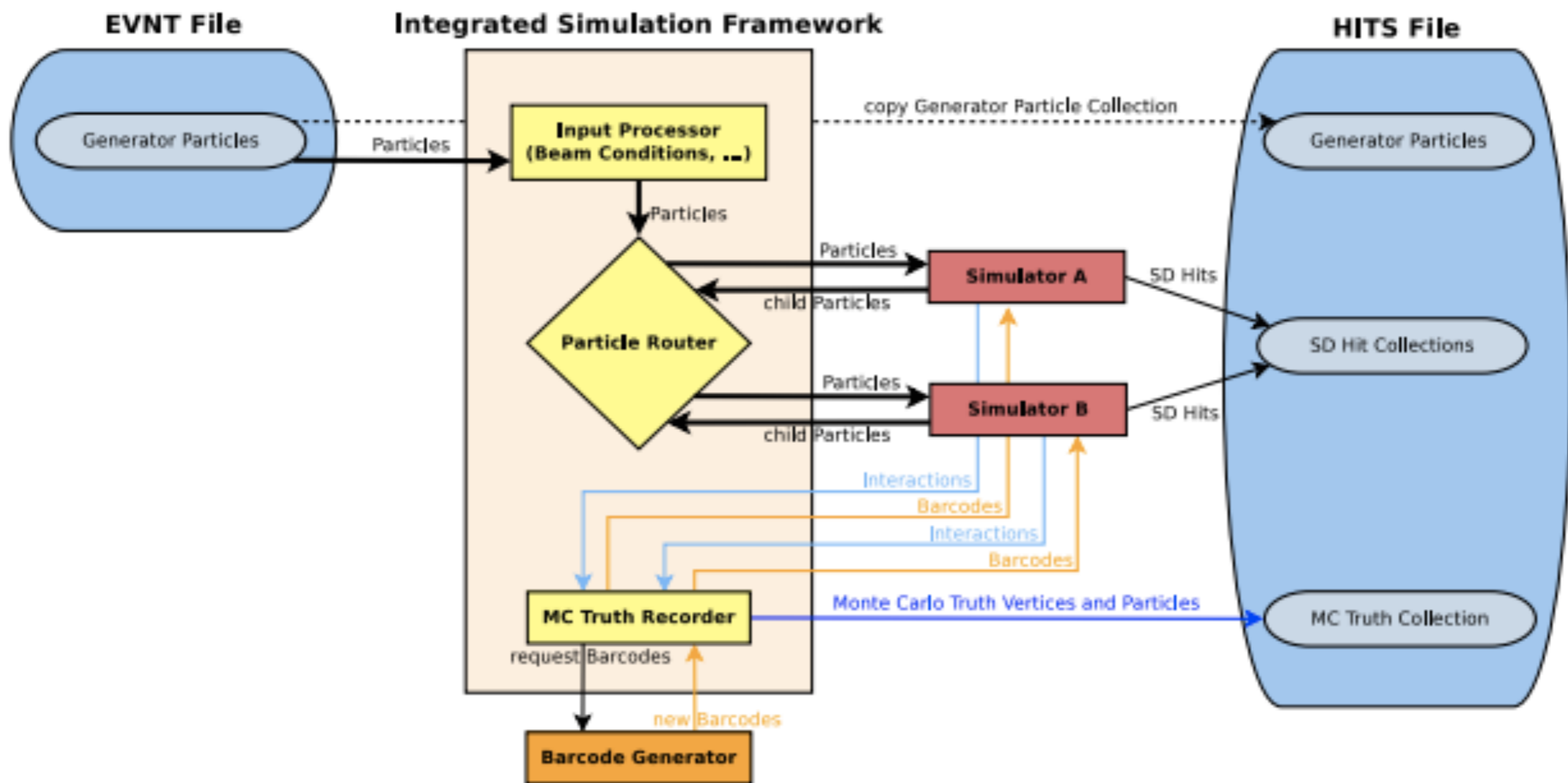


- if one filter decided a higher hierarchy, this overrules the previous decisions

> 3 years later

ISF is now default simulation framework in ATLAS,
mixing simulations even within a event in different regions



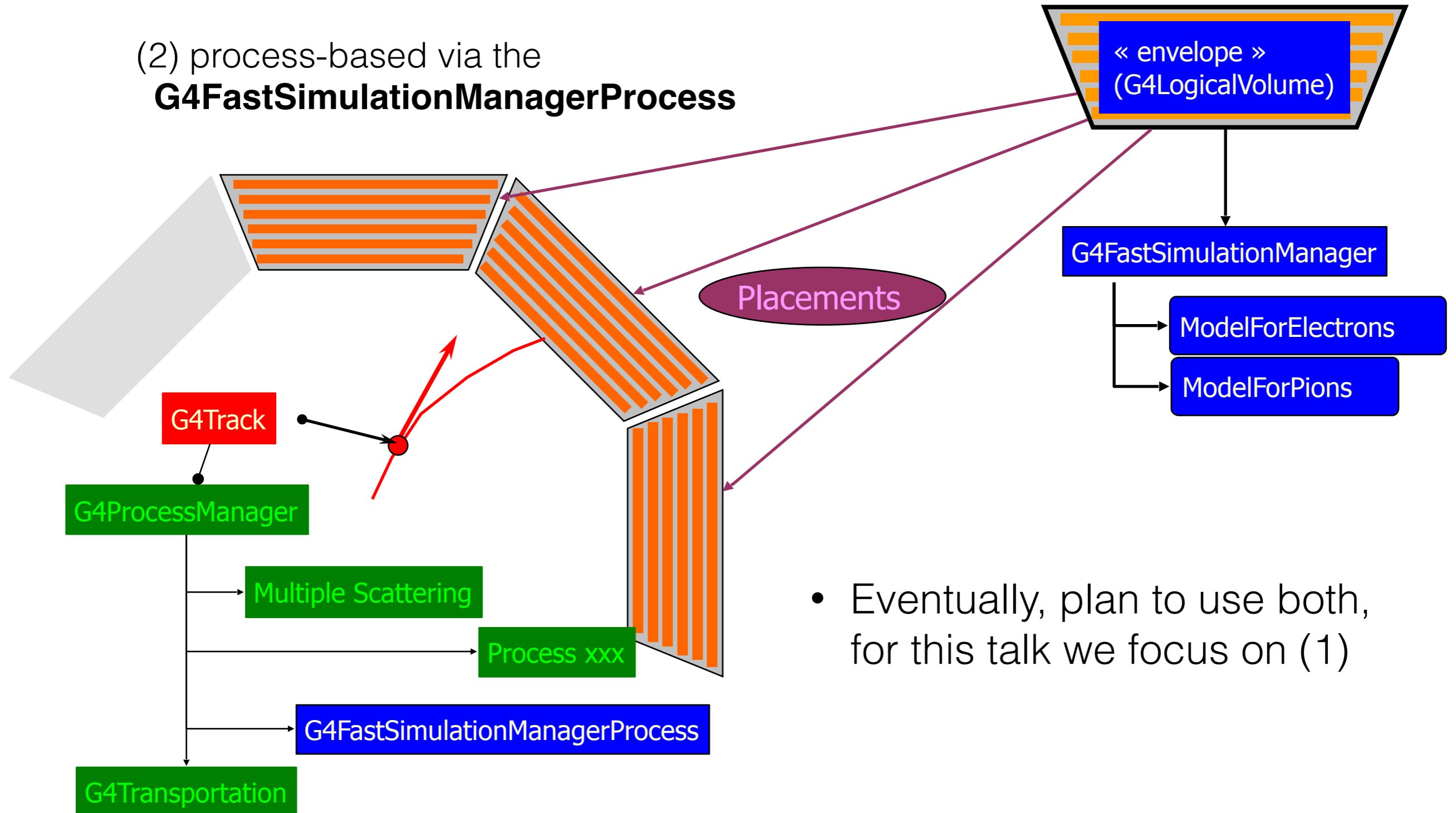


Integrate that into Geant4

- ISF was always meant as a prototype
- feedback of our prototype into Geant4 was always planned

Fast Simulation in Geant4

- Geant4 supports two sort of fast simulation hooks
 - (1) region-based via the **G4FastSimulationManager**
 - (2) process-based via the **G4FastSimulationManagerProcess**



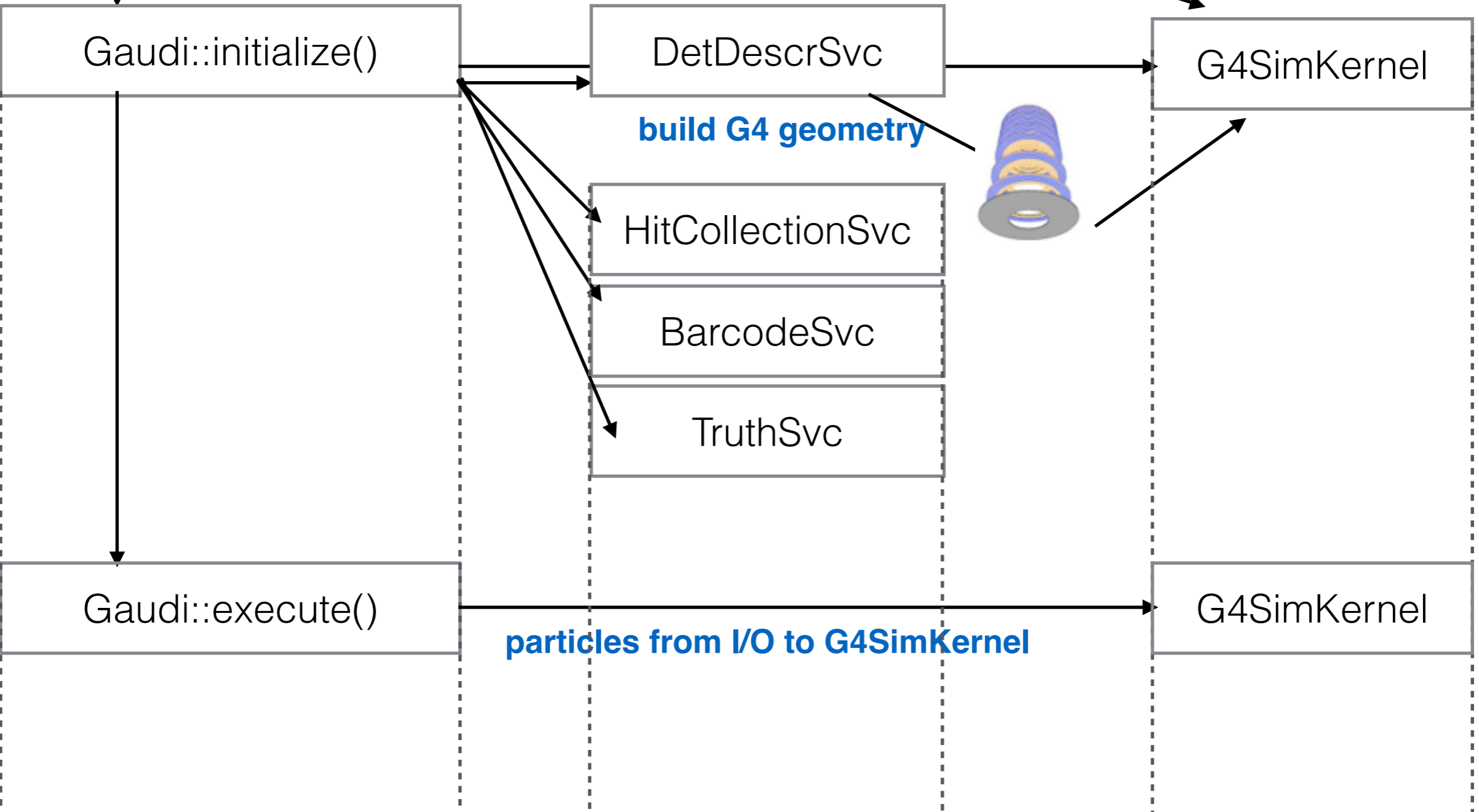
- Eventually, plan to use both, for this talk we focus on (1)

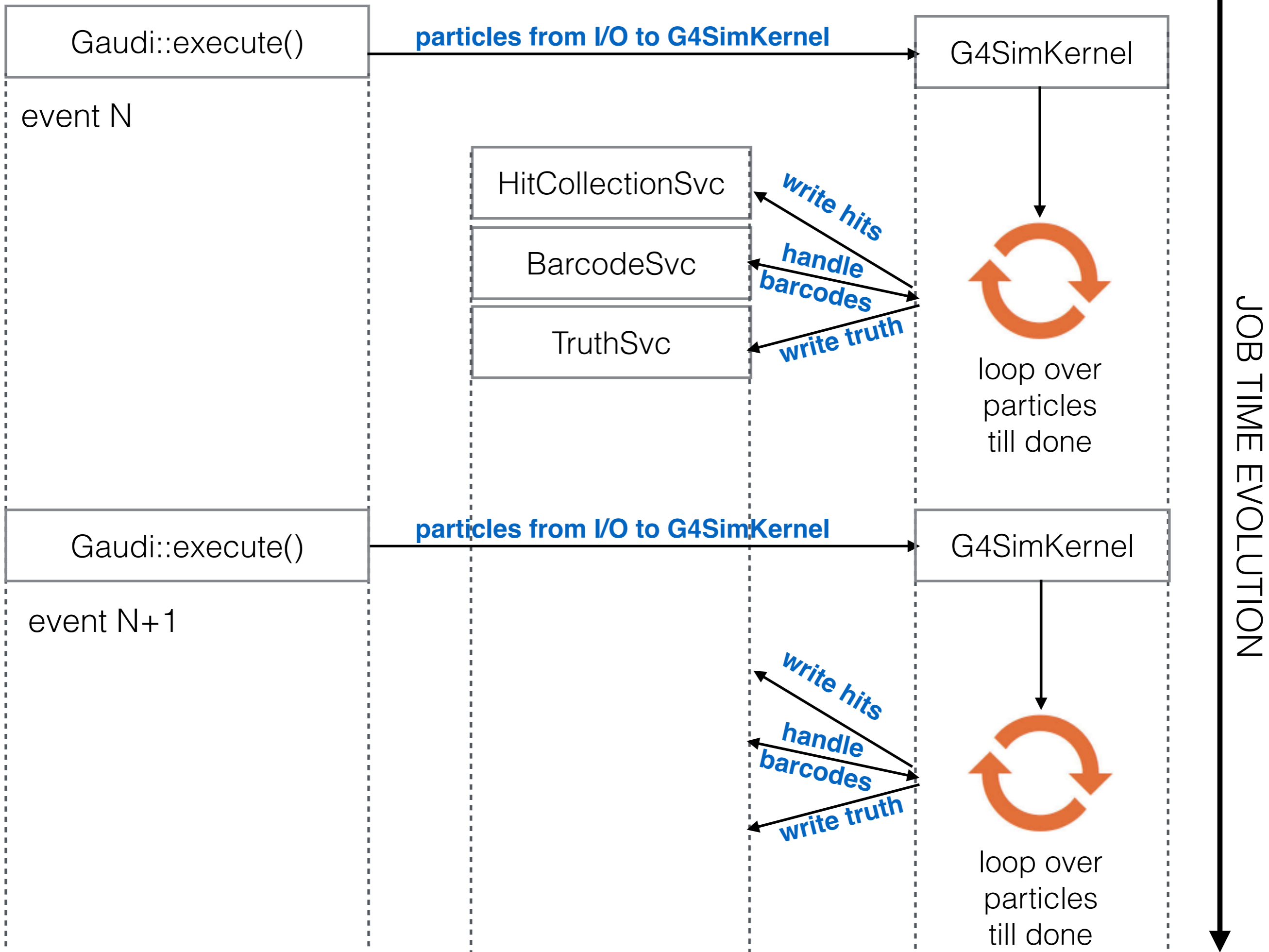
Running Geant 4



launches Gaudi simulation job

Configuration:
-> Input file : HepMC, etc.
-> Geometry : DD4Hep
-> Flavour: Full Simulation (Geant4)





Running Parametric simulation

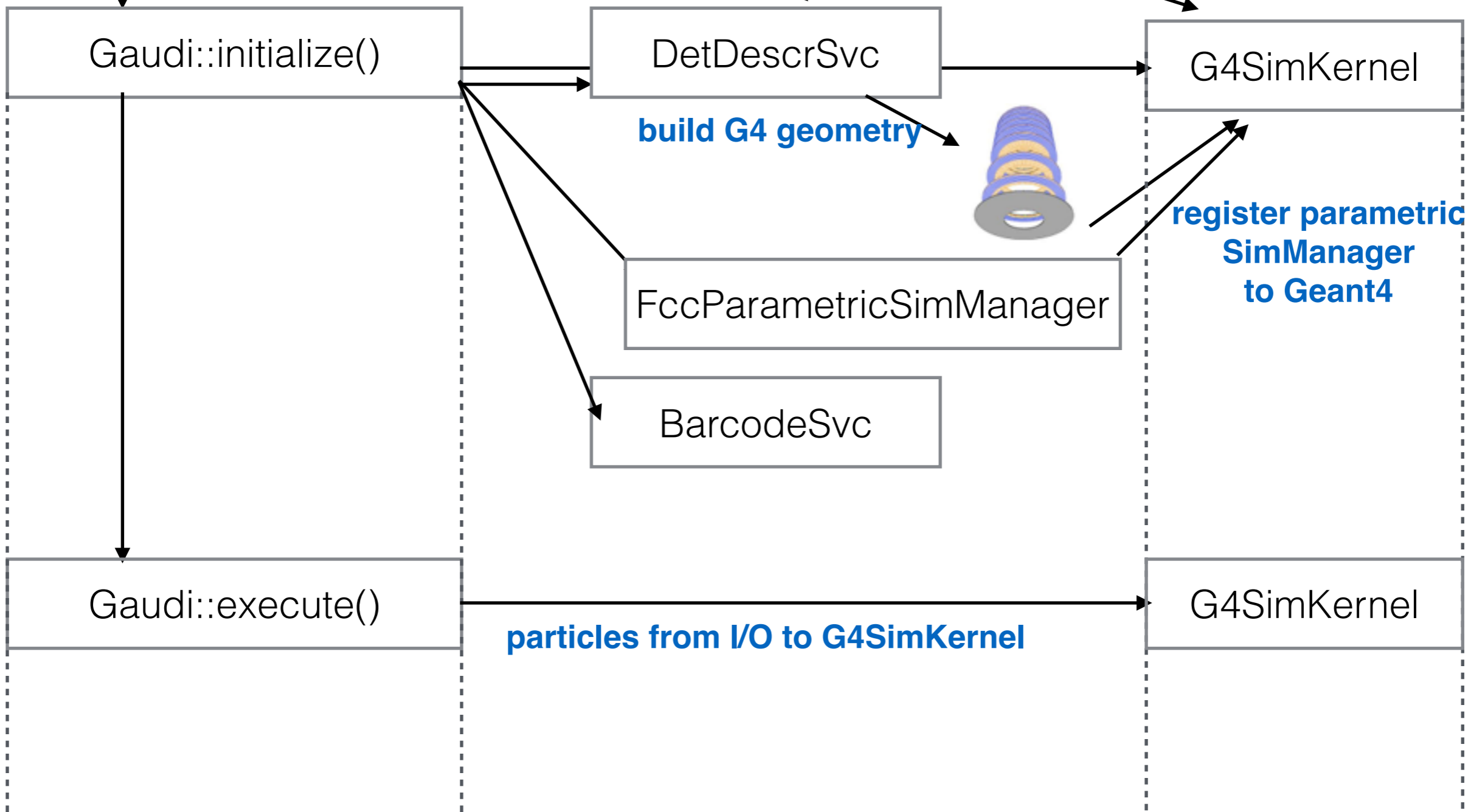
in this example we have a simple parametric simulation that only needs a truth service for bookkeeping

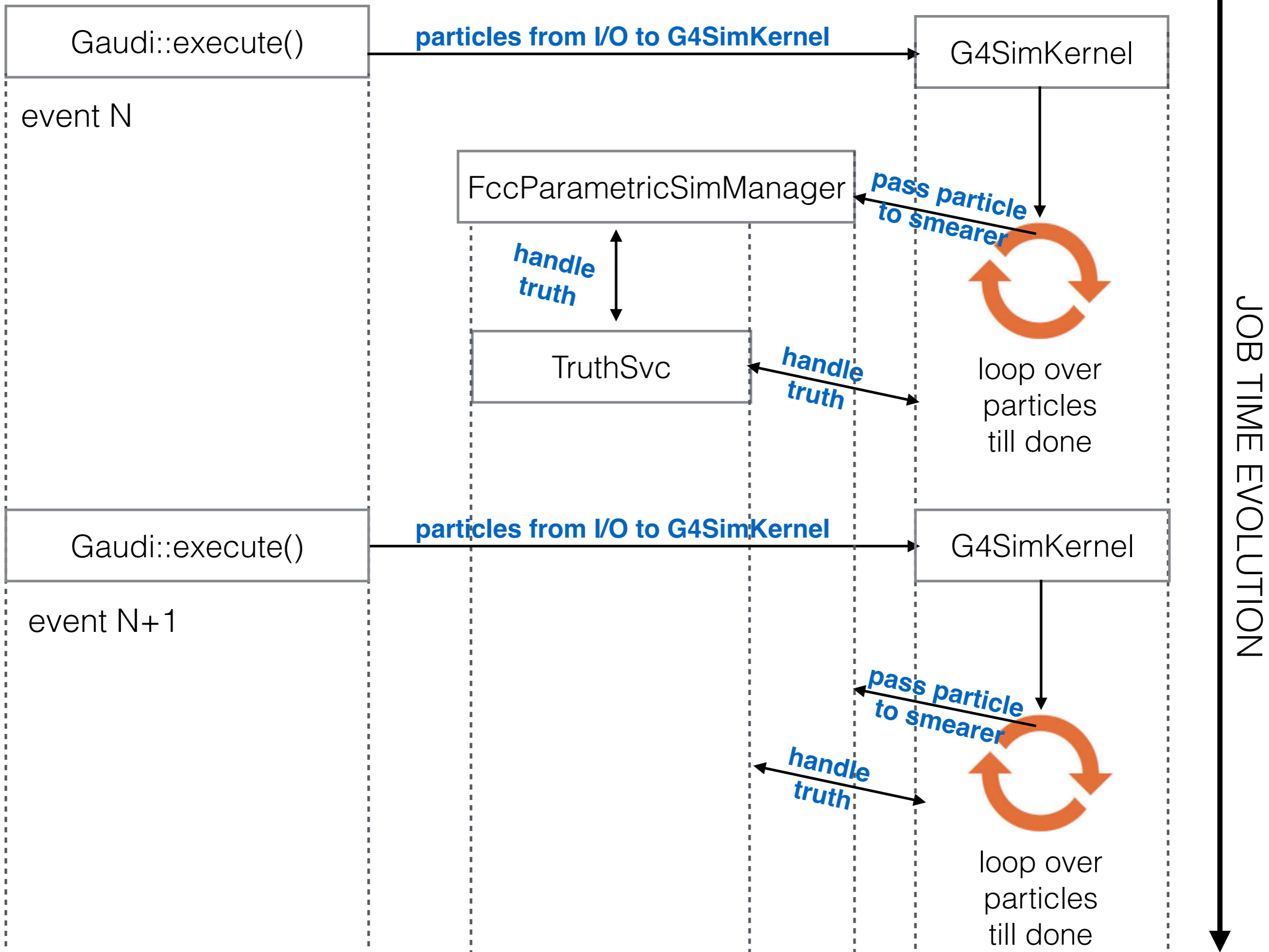


**launches Gaudi
simulation job**

Configuration:

- > Input file : HepMC, etc.
- > Geometry : DD4Hep
- > Flavour: Fast Simulation (Parametric)





Running Fast/Alternative simulation

in this example we have a fast track simulation of style ATLAS/CMS using the reconstruction geometry, but producing proper hits, truth tree and new particles that need barcodes



launches Gaudi simulation job

Configuration:
-> Input file : HepMC, etc.
-> Geometry : DD4Hep
-> Flavour: Fast Simulation (Alternative)

Gaudi::initialize()

read DD4Hep

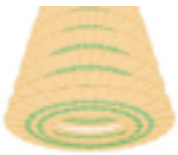
DetDescrSvc

initialize Geant4

G4SimKernel

build G4 geometry

build reco geometry



register parametric
SimManager
to Geant4

FccFastSimManager

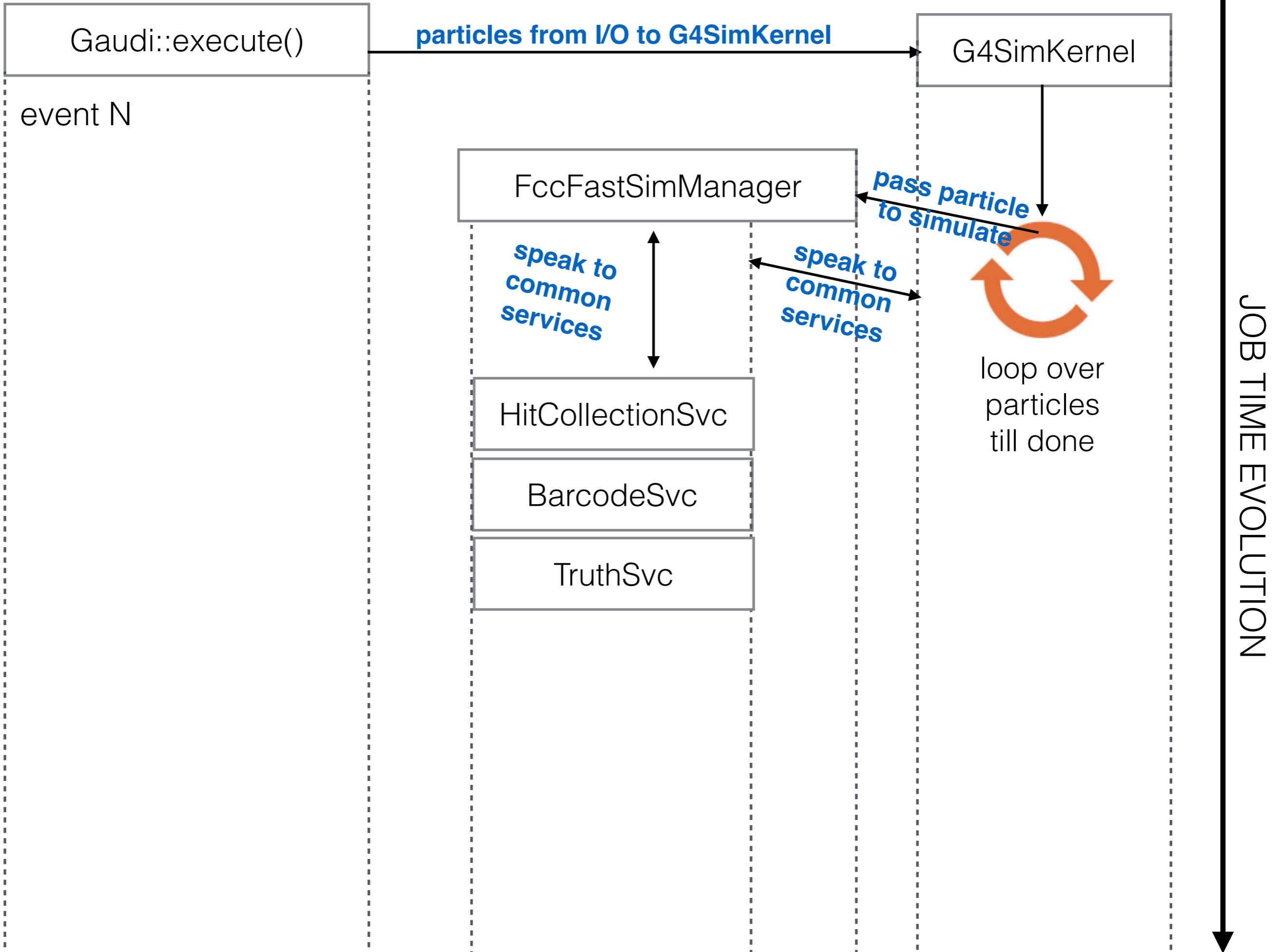
HitCollectionSvc

BarcodeSvc

TruthSvc

JOB TIME EVOLUTION





Running a mixed simulation

in this situation we want to run Geant4 and a fast simulation in one single job (e.g. ATLFAST2 in ATLAS)

—————→ go back to previous example,
just needs registering fast/full in different regions