Ivan Belyaev

ITEP Moscow

Service for managing transport through materials of teh detector

- "use case"

- solution
  - $\mathcal{S}$olids
  - $\mathcal{LV}$

- *first estimation of performance*

Service for managing transport through materials of teh detector

- estimation of distance between 2 points in the units of radiation length is essential for correct error proparation & track fitting

- results must be *quite* precise

- It is not a right idea to design a "good" tool, which is called half a million times per event. Even in the limit of "no-time-consumption" it will be VERY time-consuming

- Common solution: use "simplified" geometry

- One need to be sure that simplified geometry is able to describe the reality with a good precision!

Service for managing transport through materials of the detector

Use another idea:

- use the specifics features of sequence calls

- get the *"exact"* results

- calculate intersection history path between 2 points

- significantly remove number of calls

Additional features which could improved performance

- use cache

- use external knowledge and guesses

- delegate right questions to right guys

Modifications in Solid and Logical Volumes objects. Now they are able to answer about intersection points with given line

- simple for simple solids

- reqursive for complex solid

- delegation from LV to Solid and reqursive calls

Service for managing transport through materials of the detector

- The number of calls must be minimised along the track.

- One could expect a factor of 2-10-100 reduced number of calls

- Use Chrono & Stat Service to measure the performance and profile:

  - *(preliminary!)* 17μs per FIRST call

  - *(preliminary!)* 0μs per next calls with the same parameters

  - *(preliminary!)* $\sim 2\mu$s per next calls in the saturated mode with right guess

  - *(preliminary!)* $\sim 2 - 3\mu$s per next calls in the saturated mode with usage of cached information