Computing Performance

Simple summary of requests

Discussion points

Requests / needs

- HEP users
  - Massive production runs
  - Resources limit number of events
  - Strong pressures
  - Wish to use better physics – but CPU limits it
    - ‘Must’ regain 20%, wish to have x2
      - Combination user changes, kernel
- Medical users
  - GATE reports comparisons to other tools
    - Need/wish for a factor 10-100 (~)
    - Regular navigation, biasing

HEP ‘history’

- Large HEP users
  - Old comparisons (vs G3)
    - Last numbers were $t_{G4} / t_{G3} \sim= 1.5$
  - Cost of new Mul. Scat. (v 8.0) with improved stability, physics performance
  - Even with ‘_EMV’, simpler MS, time increase factor ~ 1.2
    - Due to improved treatment of stopping particles

GATE/Medical

- Performance is very important
  - After accuracy achieved
- Memory and CPU cost of very large number of volumes (voxel/lattice geometry)
  - Existing & emerging solutions for speeding up navigation
    - Factor of 5 versus best G4 navigation (nested parameterisations) for few materials reported
      - (at a precision cost ~ 2%)

Missed ?

Benchmarks

- Tatiana's talk on Friday
  - 5 programs, ~10 configurations tested
  - Simple setups
- To Dos
  - Adding complex geometry via GDML
  - Enable wide use (see Parallel session)
  - Identify other key toolkit aspects or 'typical' applications to monitor for CPU performance

Ideas for improvements

- Existing capabilities (user, kernel)

- To consider for future