



Status of CMS Full Simulation

Geant4 Technical Forum

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Status of CMSSW Full Simulation



- **Legacy FullSim (re-production for 7 -8 TeV data analysis):**
 - Geant4 9.4p03 (+ few fixes)
 - Slc5_amd64_gcc462
- **Development version for 2013 :**
 - Geant4 9.6p02
 - Slc5_amd64_gcc481
 - Slc5_amd64_gcc481
- **Developement version for 2014**
 - Geant4 10.0p0X
 - Slc6_amd64_gcc481
- **Physics List QGSP_FTFP_BERT_EML**



Geant4 10.0 in CMSSW

- CMS start test Geant4 10.0 from beginning of November
 - Dedicated git branch was used
 - Geant4-09-06-ref-10
 - Geant4-10-00-cand-00
 - All compilation problems are resolved
- Build problems were resolved (D.Abdurachmanov)
 - '-ftls-model=global-dynamic' is mandatory
 - Geant4 is using '-ftls-model=initial-exec'
 - First estimate of CPU performance – ~3% gain (very preliminary number) compared with Geant4 9.6
 - Study on CPU performance as a function of build option in the next slide

Sampling Calorimeter Pb/Sc electron beam 10 GeV

Build type	Method	Build option	CPU
Static MT	Gmake	-ftls-model=initial-exec -pthread	1.0
Static MT	Cmake	-ftls-model=initial-exec -pthread	1.06
Static Sequential	Gmake	-	1.01
Static Sequential	Cmake	-	1.06
Shared Sequential	Cmake	-	1.17
Shared MT	Cmake	-ftls-model=initial-exec -pthread	1.21
Shared MT	Cmake	-ftls-model=global-dynamic -pthread	1.32
Shared MT	Cmake	-ftls-model=global-dynamic -pthread -fPIC	1.33

**The 1st result from CMSSW with 10.0 3%
speedup compared to 9.6p02 using red options from the table**



CMS requirements



- Would it be possible to optimise structure of Geant4 libraries
 - Current Geant4 consists of 23 shared libraries of different size
 - Process library is 10 times larger than any other library
 - It be possible to consider alternatives and evaluate their performance:
 - Merge Geant4 into one library
 - Split process library in few peaces
- Would it be possible to reduced TLS below 3.7 kB – estimated current limit from glibc for static TLS allocation
 - Current TLS memory used in Geant4 is ~400 kB
- Would it be possible to have first patch Geant4 10.0 before the end of February 2014