

Many-core experience with HEP software at CERN openlab

Benchmarks

- HEPSPC06 – GENERAL C++ WORKLOAD
- Multi-threaded Geant4 prototype (parallelized) – SIMULATION
- ROOT minimization (parallelized, vectorized) – ANALYSIS

Hardware

- Standard 2-socket: 32 vs. 24 threads (Intel “Sandy Bridge-EP” vs. older “Westmere-EP”)
- Enterprise 4-socket: 80 vs. 64 threads (Intel “Westmere-EX” vs. older “Nehalem-EX”)
- Accelerators – not discussed here, but thoroughly investigated

Complexity

- Platform: SMT, turbo, firmware, power saving
- CPU: stepping, frequency, power saving, TDP, vector width
- Memory: cache sizes, memory size and configuration

Results

- Small scattered improvements in HW compound to large increases in raw performance
- Good scaling is promising in view of future architectures, SMT matters
- Substantial improvements in power efficiency (the OS plays a role)