

examples/extended/ parallel/MPI

Responsible: K. Murakami (KEK), A. Dotti (SLAC)

Goal of examples:

Showing how integrate MPI with Geant4

- control application passing UI commands via MPI
- show merging of user-data via MPI, histograms, command-line scorers, G4Run derived class **NEW**

Examples come with a new G4 library (libG4mpi)

- cmake config file created: G4mpiConfig.cmake
- allows user to use **cmake -DG4mpi_DIR=...**

Three examples available

- exMPI01 : basic example showing G4mpi functionalities
- exMPI02 : example showing use of ROOT, more realistic medical type example
- exMPI03 : same geometry of 02, using g4analysis and showing merging of results **NEW**

Testing/usage

Examples are executed in cdash, but on special runs where MPI is available

To compile examples mpiexec binary should be available in PATH

Compatible with many flavors of MPI. Tested with openMPI

- To compile library: `cmake -DGeant4_DIR=... <g4>/examples/extended/parallel/MPI/source`
- To compile library+examples: `cmake -DGeant4_DIR=... <g4>/examples/extended/parallel/MPI`
- To compile examples or user code against installed G4mpi: `cmake -DGeant4_DIR=... -DG4mpi_DIR=... <g4>/examples/extended/parallel/examples/exMPI03`

New for 10.2 and plans for 10.3

Improve merging strategy

- following report from users of low communication performances
 - use binary-tree merging of results instead of point-to-point communications (10.2)
 - evaluate use of MPI collective operations (MPI_Gather, MPI_Merge) (10.3)

Simplify integration in HPC systems

- provide *module* file

Evaluate merging of ntuple to reduce local I/O on HPC systems

- to be discussed with g4analysis/g4tools authors