Summary of the Experiments and Projects Plans Session

Fermilab, 4-6th February 2013
P. Mato/CERN

Requirements

* LHC experiments will increase Data and CPU requirements after LS1 and much more after LS2

    * Much higher demands on simulation and reconstruction applications due to the increase of trigger rates and pipe-up (non-linear effects)

    * For ALICE the LS2 upgrade will require a completely different approach

* LHC computing resources are not expected to be increase to follow the demands

    * Software must gain several factors in speed

* NOvA has stronger 'concurrency' needs in realtime data processing with guaranteed latencies

    * Also expected to increase the demands for simulation

* LC computing needs are in general modest compared to LHC

    * No urgency but interested in following and participating to concurrency developments

Strategies

* General consensus to focus first on improving the code

    * CMS has already done a big part of the homework

    * ATLAS will be revising event data model, auto-vectorization, re-implementing selected algorithms, ISF, better libraries, etc.

    * ALICE needs in addition better I/O and to optimize the turnaround cycles (new common framework)

    * Geant4 performance optimization will benefit everybody

* Multi-Threading (or Multi-Process) is next

    * CMS plans to have the MT version ready by November 2013

    * Both ATLAS and LHCb will pursuit the MP solutions and increase its participation to the development of MT solutions

    * ALICE does not plan to embrace MT until LS2

    * Making the algorithmic code thread safe will be very demanding (CMS has already started)

* Experiments need to continue investigating the 'best' solution

    * Performance balance between threads, processes, GPU implementations

    * Gaining experience with accelerators and their integration in frameworks

Concerns

* LHC experiments demand that new frameworks and toolkits are compatible with the bulk of the exiting algorithmic code

    * Guarantee as much as possible a smooth transition

* The performance of the MT application can't be worse then running several independent processes simultaneously

    * This should be application to simulation, reconstruction and analysis

* I/O is a major concern

    * Clearly identified by ALICE but foreseen bottleneck for MT applications

* Whole-Node Job Submission

    * So far not a great success, but is clearly a pre-requisite for deployment of MP and MT solutions

* Urgent need for thread-safe libraries