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# Montera: a framework for efficient executions of Monte Carlo codes on the Grid

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Monte Carlo codes constitute a powerful tool for scientific computing. Because of their architecture their parallelization is straightforward, and they have been successfully ported to the Grid in multiple occasions. However, there is still a lack of a deep analysis on their optimization for being executed on a distributed environment. To solve this issue we present Montera, a framework that efficiently executes this kind of codes on Grid infrastructures making the most of their particularities.

## Detailed analysis

A characterization of Monte Carlo codes and Grid sites are proposed, so their behaviour can be modelled. Then we have implemented Montera (MONTE carlo RApido - Fast Monte Carlo from its Spanish acronym), a framework that implements the aforementioned modellings with a 2 step dynamic scheduling to efficiently execute Monte Carlo codes on Grid. It is coded in Java, and employs DRMAA API to manage the execution of tasks. GridWay is the chosen metascheduler to control the Grid execution of tasks and provide Montera additional information about the status of the Grid infrastructure at any given moment.

## Conclusions and Future Work

Although the aforementioned framework already fits its requirements, there is still room for further development. An additional degree of parallelization can be added in order to reduce the time employed on analyzing the Monte Carlo code to be run and the sites that constitute the Grid infrastructure. Also, the proposed modellings can be modified to fit other kind of problems, thus becoming a useful solution for an efficient execution of a wider set of codes.

## Impact

Monte Carlo codes are widely employed in many different areas of knowledge. By creating a tool that greatly simplifies their execution on Grid infrastructures and at the same time improves their performance, we expect the scientific community to benefit from it. By developing the code in a tight collaboration with the users, we are able to also guarantee its correct functionality and usability. The establishment of a direct feedback among the developing team and the final users ensures the fitting of the proposed application to the specific needs and problems of the non-expert Grid users.

## Keywords

Scheduling; Monte Carlo; Grid.

## URL for further information

http://www.ciemat.es/portal.do?IDR=1481&TR=C

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