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New developments in the Italian Grid Infrastructure services offered via web for the ANSYS engineering suite

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Impact

The porting of legacy applications onto the Grid infrastructure, together with the development of the related workflows and gateways, is being carried out as part of a more general effort to build a solid platform, to be offered to the users as a service assembling accurate multi scale realistic simulations.
The solutions designed and adopted in the present work enable the user to check the consistency of the output at runtime, evaluating possible strategies aimed at saving time, computing resources and at avoiding waste of license usage. Moreover, the license handling mechanism allows a deep control of the application usage in compliance with the license terms.
The implemented case study demonstrates the validity of this approach providing an example reusable by other groups interested in porting their applications to production Grid systems.

Summary

Software packages simulating complex engineering models require an non trivial amount of computer power. Grid Infrastructures represents at present a cost-effective mean to carry out massive calculations in a reasonable time. An added value can be provided by appropriate visual interfaces and tools aiming to minimize the effort and the skills requested to the user. This is the case of the IGI web portal used as Scientific Gateway to support the activities of the SPES community in Italy (located at INFN-Legnaro National Laboratories) whose activity is strongly focused on the electro-thermal design of high temperature devices for the production of Radioactive Ion Beams. The web interface developed for ANSYS via the IGI Portal has been extended in order to support different kind of analysis. Moreover, a license handling mechanism has been designed and implemented to solve the issue of accessing commercial licenses stored in a FLEX server.

Description

ANSYS is an engineering simulation software (computer-aided engineering, or CAE) that offers a comprehensive range of engineering simulation solution sets providing access to virtually any field of engineering simulation that a design process requires. As a result of the collaboration between the User Support Unit of the Italian Grid Initiative (IGI) and the SPES community, the ANSYS commercial suite has been ported to the IGI infrastructure.
A specialized web interface has been designed and implemented in the IGI web portal (a powerful and easy to use gateway to distributed computing and storage resources) to gather the user requirements.
The web GUI has been designed to tackle the following important aspects:
- limited granted amount of CPU time on grid sites queues: an automatic checkpointing mechanism has been developed and implemented in the web GUI. The mechanism supports also the automatic resubmission (as a workflow) of the job relieving the user of the manual submission of further step(s). As an added value the mechanism has been modified to support different kind of analysis.
- checking the evolution audit of the calculations at runtime: it was created a facility that exploits Grid Storage Elements, to make temporary files and partial output available for runtime inspection.
- license handling mechanism: typically commercial applications come with a set of restrictions such the number of license made available to the users. As this is the case of ANSYS commercial suite, we tackled this aspect by implementing a license control mechanism managed by the web GUI and making it available as a service to the SPES community.

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