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QoS management in Grids

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The grids are opening towards new application scenarios, embracing not only the e-science field but also business, financial and educational ones.

This evolution requires that the grids have to be able to supply resources and services in a flexible manner, offering them on-demand to several different typologies of users, each one characterized by specific "Quality of Service (QoS)" requirements. This work treats these new challenges and proposes an innovative resources reservation policy.

Impact

This work proposes a resources reservation policy able to manage both immediate and advanced reservation. This policy is characterized by two important features.

The first one regards the ability to allow the agreement renegotiation: each user can request, at run time, to modify the amount of time and resources needed for service.

The second feature regards the ability to use a "resource-job" association instead of "resource-user" one.

The "resource-user" association, e.g. adopted by LSF scheduler, consists of reserving resources for a single user, where it can allocate own jobs. Using this technique, there are not differences among the user's jobs: the agreement is taken for the whole set, making too complex the renegotiation for a single job.

The use of "resource-task" association, instead, makes the reservation very flexible: it allows to discern the requirements and constraints of each job from the others, giving the ability to manage selectively the agreements for each job.

URL for further information

http://ant.diit.unict.it/SLAM

Conclusions and Future Work

The results of this work have been collected in a framework, called SLAM, that allows the SLA life-cycle and resource reservation management.

This work have several implications for future practices: the most important regards the ability (i) to check the service execution state in order to detect whether some QoS parameter has a value that violates the negotiated agreements and, in this case, (ii) to adopt some strategies to correct execution using a run time QoS adaptation technique.

Keywords

advanced reservation QoS management gLite

Detailed analysis

The present implementations of grid middleware manage their underlying resources respecting the policies imposed by the Virtual Organizations (VO). These policies are static and cannot be modified at "run time". In order to improve the grid resources management, this work proposes an innovative strategy that gives to each VO user the ability to require a set of QoS parameter, customizing the service execution based on its

expectations. To support this feature, it is necessary to make the grids able to establish an specific agreement (SLA) with each user and to reserve the resources needed for the execution of considered service. The resource reservation is a fundamental support to guarantee that the service has what it needs, in terms of hardware and software requirements, at the proper time; the ability to manage and check the SLA is fundamental to establish all the parameters involved in the agreement, and the rules and conditions for the proper use of the service.

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