CHAPTER 7

CONCLUSION AND FUTURE WORK

7.1 OUTLINE

This chapter describes the conclusion and further scope of this research work. The impact of resource usage policies and the methodology to incorporate the SLAs at the Meta-scheduler level has been analyzed. Finally, the future scopes for research based on this work are given at the end of this chapter.

7.2 CONTRIBUTIONS

Grid is a dynamic framework where a number of resource providers seek to share their resources to meet a common objective. Since the resources belong to different administrative domains may have different allocation policies, it is mandatory to express and enforce these policies for proper functioning of these collaborative environments. Hence a mechanism to express and enforce resource usage policies is mandatory to realize a controlled grid sharing. This research work proposes one such mechanism that supports resource usage policies and SLAs in both physical as well as virtual environments. The proposed architecture is integrated with our GVF (i.e. CRB) and is evaluated with the help of real-time application execution by varying the number of resources available in the test-bed and the number of policies per resource. With this SLA enabled CRB, it is assured that the resource providers’ desired usage scenarios are always obeyed. Further, these resource usage policies are taken into account, while selecting the resources for submitting the job. Moreover, we replaced the scheduling algorithm of
CRB with DRS, which provides a pluggable support to scheduling parameters that leads CRB to enhance the resource selection based on user preference. Moreover, the SLAs are generated for every job and maintained in the repository by considering the resource usage policies. The proposed SLA negotiation framework reduces both the average negotiation time, which in turn reduces the overall SLA creation time. It also reduces the number of communications between the provider and the client by eliminating the template request time and template finding time. In addition, it also maximizes the client’s satisfaction and SLA acceptance rate since the client initiated framework. The SLA monitoring and enforcement modules are used to maintain the desired usage scenario and punish the user / resource provider in case of violation of objective respectively. The additional overhead due to the inclusion of policies, varying the number of policies and varying the number of resources are also evaluated.

Due to the above mentioned characteristics, it is evident that the SLA enabled CRB architecture will be a stepping stone in realizing a controlled grid resource sharing. This SLA enhanced broker is evaluated with the help of real-time application execution by varying the number of resources available in the test-bed and the number of policies per resource. The results conclude that the inclusion of SLA affects the resource selection behaviour of broker. In addition, the overall performance of the system is increased in terms of job throughput with an extra minimal overhead in request processing due to usage policy matching, while realizing a controlled grid resource sharing environment. These effects that are presented may be useful, while new designs are proposed to take the advantage of SLAs at the meta-scheduler level.
7.3 FUTURE WORK

The proposed research work can be further enhanced by incorporating batch job support in DRS, generic schema for resource usage policies that includes compute, storage and network resources, success predictability model to negotiation manager, security support in SLA monitoring and penalty function in SLA enforcement engine.