CHAPTER 6

CONCLUSION AND FUTURE WORK

6.1 CONCLUSION

This research work investigated three key areas in grid computing and security. In the first part of the work, a hypothetical campus grid network was established by creating a Virtual organization based on four member colleges. In the static snapshot of the hypothetical grid 14 computers are totally available. Business policies for resource sharing were formed for each individual college. Each policy was implemented to find the advantage of using grid to the individual college by running 200 tasks of computational size 100000 and communication size of 5000000. Simple Discretionary Access Control mechanism was implemented for security. Based on the business policy the computational time reduced by a value of 2.22 to 5.66 seconds as investigated in Figure 3.11. This is an evidence for the merit of grid computing for a large number of small tasks in a campus grid environment.

In the second stage of the work, Role Based Access Control (RBAC) was implemented using XACML for the above stated campus grid environment to study the time taken to execute a large number of small tasks. DAC policies were replaced RBAC policies. Executing the same 200 tasks with the initial set of business policies, the time taken to complete the tasks increases from 1.34 to 2.79 seconds as shown in Figure 4.5 more than the time taken by DAC. Though RBAC provides various additional features to
manage security easily and inherit features from previous well tested policies, the timing issue may not be acceptable for scenarios where a large number of small jobs have to be executed by the grid.

To overcome the above timing issues, a novel framework Low Resource Access Control (LRAC) was proposed. In the proposed model a novel authentication mechanism based on Local CAS avoiding proxy credentials was introduced. The proposed authentication model is proved to be fast and efficient with strong security features as proven using the crypt analysis. The assertion between the various entities is achieved using SAML and access policies implemented based on RBAC. The proposed architecture reduced the timing related to security by a factor of 15% to 34% for different policies.

From the above discussion it is seen that the proposed LRAC mechanism improves the timing factor when the tasks in the grid consists of a large number of small tasks. The average reduction of timing related to security of 24.5% is significant especially in scenarios where bandwidth also becomes a constraint.

6.2 FUTURE WORK

This work investigated and proposed a novel grid security mechanism and also investigated the timing performance of some access control mechanisms. This work concentrated on a large number of small tasks being executed by the members of the grid. This work focused on the three major areas:

- Authentication
- Authorization (Access control)
- Assertion.
Integrity and trust play a very important role in grid and this work does not address on integrity of the data. Further investigations need to be carried out in the areas of trust management and integrity.

Further research needs to be done in the areas of finer granularity and in the areas of small number of small tasks which are inter related. To achieve finer granularity Attribute Based Access Control mechanisms need to be investigated in addition to the proposed security architecture.