CHAPTER 6

CONCLUSION AND FUTURE WORK

6.1 CONCLUSION

The research work had its main focus in the profit maximization and performance enhancement of private cloud provider in the hybrid cloud environment.

In the first part of the research work, improvement of profit for a cloud provider was considered mainly in the hybrid cloud setup. A novel ACO-PSO hybrid algorithm was proposed for task scheduling, while handling dynamic user requests. This hybrid algorithm combines two meta-heuristic algorithms namely ACO and PSO, since both are inspired by the social behavior of birds, insects and animals. The proposed hybrid algorithm assigns the resources of private cloud, to the submitted tasks, when its own resources are sufficient. Otherwise resources of EC with minimum cost is assigned, so that the profit of private cloud is well increased. Along with task scheduling, assured QoS is also delivered to the end users. The proposed hybrid algorithm also improves the CPU and memory utilization of private cloud. Profit, runtime, CPU and memory utilization are evaluated using ACO, PSO, SLPSO and proposed ACO-PSO algorithms and also compared. Results obtained proved that the efficiency of proposed hybrid algorithm for all size of tasks are better than the other algorithms in terms of profit maximization.
In the second part of the research work profit is further improved with the same hybrid cloud setup, by employing a novel OLPSO-CS hybrid algorithm. Extended version of PSO algorithm namely, OLPSO is combined with CS algorithm to form OLPSO-CS hybrid algorithm, for efficient task scheduling in hybrid cloud. OLPSO, CS and OLPSO-CS hybrid algorithm are implemented and results are arrived. Experimental results are compared with the previous ACO-PSO hybrid algorithm to prove the effectiveness of OLPSO-CS algorithm. The proposed hybrid algorithm achieves better profit and efficient CPU and memory utilization for private cloud compared to previous ACO-PSO algorithm.

In the third part of the research work, performance in terms of throughput, average response time, standard deviation, error percentage, etc., of a private cloud is well enhanced by replacing traditional VMs with Docker containers for executing the user requests. Apache JMeter was employed for simulating the user requests. Initially AWS public cloud was utilized for comparing the performance of VM and Docker containers. The performance of a private cloud is also enhanced in hybrid cloud environment using Docker containers instead of VM. Arrived results proved that the performance enhancement can be achieved in both public cloud and hybrid cloud environment by using Docker containers in place of VMs.

It is concluded that the profit maximization as well performance enhancement of private cloud could be achieved by means of various proposed hybrid algorithms and replacing the underlying VMs by Docker container, and could be evaluated in this thesis.
6.2 FUTURE WORK

Apart from CPU and memory, other resources like network can also be considered for profit maximization. SLA violation may also be considered while performing task scheduling and resource allocation. Other meta-heuristic algorithms like genetic algorithm (GA), Bee algorithm may also be considered for task scheduling while handling different workloads and applications.

The profit solution can further be improved by having the history of the user requests and an algorithm to check whether similar request types are available in the historical queue which maintains top frequently arrived requests. This approach may help in the quick and effective scheduling of tasks and cloud could manage large amount of varying loads that are arrived during the peak hours. Cost of power consumption could be taken into account for evaluating the profit.

Performance analysis of VM and Docker container in public and hybrid cloud may be carried out for other applications. Since Docker container performs OS level virtualization, there may be security issues. These issues can be eliminated by running containers inside VM i.e., by container based IaaS implementation.