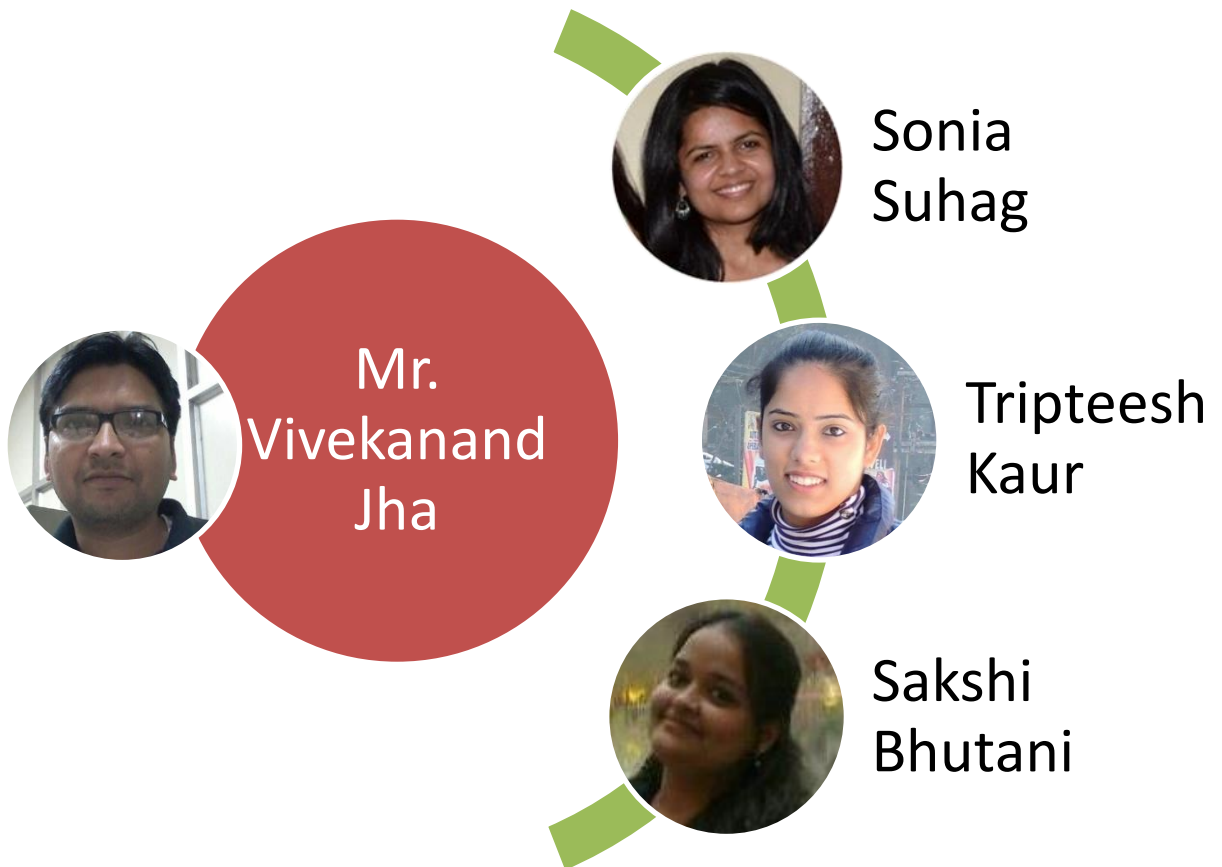


Project Title:

# Energy Aware Adaptive Threshold (EAAT) Load Balancing in Clouds

Project Guide and Team Members:



Position in Competition:

**First** position

10,000/- INR Prize Money

## Abstract:

This rapid growth in computational power demand along with the paradigm shift towards Cloud Computing have led to the creation of large- scale datacenters. These datacenters consume a considerable amount of electrical energy leading to greater carbon dioxide emissions and high operation costs. With the users and the types of application on the cloud computing platform increasing, it becomes a critical problem about how to use the resources in the system effectively to ensure service level agreements (SLA). Due to the dynamic workload inherent to a cloud, it becomes necessary to optimize the virtual machine (VM) placements in such a manner that response time is reduced posing minimum overhead costs. Optimization of resource utilization and reduction in energy consumption can be achieved by live migration and switching idle nodes to the sleep mode, thereby moving towards green computing. We propose an energy aware adaptive threshold (EAAT) approach that is an improvement upon the existing Central Load Balancing Algorithm over Virtual Machines (CLBVM). Our approach makes use of two thresholds, whose values are adjusted dynamically according to the load variations of incoming application requests and current resource utilization of hosts, which has not been done in any of the existing algorithms. Also, policies for selection of which VM to migrate and the destination node selection have been provided which were not clearly specified in CLBVM. The proposed algorithm significantly reduce energy consumption, while ensuring a high level of adherence to the Service Level Agreements (SLA). We validate the high efficiency of the proposed algorithms by extensive simulations using real-world workload traces provided by CoMon PlanetLab project testbeds. The results of the simulation show 12.28% reduction in power Consumption (kWh) and 77.3% reduction in the number of migrations, which is in accordance to our main aim of green computing. Also, the reduction in SLA violations percentage shows an overall improvement in performance.

## About the Competition:

University School of Engineering and Technology, GGSIPU announced this year's "Inter College B.Tech Project Competition 2014" in May 2014. The final year Project in B.Tech plays an important role in shaping the overall career of a student. The student applies their entire conceptual ideas for developing a practical and innovative model. To encourage the students, GGSIPU held an Inter college project competition last year in several disciplines. This practice was started way back in 2003 with the first batch and continued since then. Some of the projects got appreciated and awarded at All India level in National Design Competitions organized by Institute of Engineers (India). The project competition gives an opportunity to such students to showcase their talent, research orientation and untapped potential. The goal of this competition is to prepare the future generation of engineers to be innovative leaders, responsible citizens and problem solvers. Thus, there is need of recognition of the amount of hard work done by the students. Every year, various affiliated colleges organize Inter College B.Tech Project Competition in coordination with the university. Cash prizes of Rs. 10,000/-, Rs. 7,500/- and Rs.5,000/- will be given to 1st , 2nd and 3<sup>rd</sup> rank projects for each branch.