

**CHENNAI – PONDICHERRY**

**TOWARDS GREEN CLOUD COMPUTING: DEMAND ALLOCATION AND PRICING POLICIES FOR CLOUD SERVICE BROKERAGE**

**ABSTRACT:**

Functioning as an intermediary between tenants and cloud providers, cloud service brokerages (CSBs) can bring about great benefits to the cloud market. CSBs buy the cloud resources, i.e., servers, with lower prices from cloud providers and sell the resources to the tenants with higher prices. To maximize its own profit, a CSB may distribute tenants' requests to the clouds that waste energy resources. However, as energy costs of cloud computing have been increasing rapidly, there is a need for cloud providers to optimize energy efficiency while maintain high service level performance to tenants, not only for their own benefit but also for social welfares (e.g., protecting environment). Thus, for green cloud companies, two questions have arisen: 1) under what pricing policies from the cloud providers to the CSB, a profit-driven CSB is willing to minimize the total cloud energy cost while satisfy tenant demands and 2) how should a CSB distribute tenants' demands to achieve this objective? To address question 1), we find a pricing policy for cloud providers such that maximizing CSB's profit is equivalent to minimizing cloud providers' energy cost. To address question 2), we first devise a greedy solution, and then propose an approximation algorithm with a constant approximation ratio. Both simulation and real-world Amazon EC2 experimental results demonstrate the effectiveness of our pricing policy to incentivize CSBs to save energy for cloud providers and the superior performance of our algorithms in energy efficiency and resource utilizations in comparison with the previous algorithms.