# ABSTRACT

Cloud computing is one of the most increasing technologies in the computing industry today. Cloud computing allows users to share their data and computation to a remote location with smallest impact on system performance. Cloud Computing attains a wide attention in recent period with the benefit of dynamic services in large scales and virtualized features over the internet.

The cloud computing requires effective management of resources allocated to complete the user requested task/services. The cloud computing schedulers assign resources to user tasks based on the availability. Cloud servers require high communication cost to identify the known resource for the corresponding task in large scale distributed environment. Resource allocation in cloud computing, needs to have knowledge on load conditions, memory and bandwidth requirement for providing reliable and scalable services for cloud users. In recent, resource allocation techniques of cloud computing is focused on optimizing the primary physical resources. However, the resource allocation for the client requests at different instances is not satisfactory in the cloud service applications.

Specifically, the cloud computing platform also needs to balance the load in multiple cloud servers to avoid hotspot, congestion and optimize resource utilization. Collaborative provable data possession scheme adopt Homomorphic verifiable responses and hash index hierarchy. However hash index structure was bit ambiguous in handling different type of task with multiple subtasks. The cluster model will be more suited to group similar type of task and formulate sub cluster for multiple sub tasks. Different levels of power required for processing user requests arise, due to changing load demands of the cloud servers. Service Level Agreements on specific

user request is one of the key factor in deciding whether loads can be moved in or out of cloud server. However, cluster model update load and demand of the cloud servers for efficient service provisioning to cloud users with minimal energy consumption.

Furthermore, existing Cooperative Provable Data Possession (CPDP) scheme based on homomorphism give reliability by means of automatically maintaining the multiple photocopy of information. But, CPDP scheme in particular was complex to handle huge files, in that case, cluster network model is more useful to dynamically update the CPDP parameters according to user specific requirements. On performing multi-task on the cloud servers, workload gets increased and affect the computational time, which inhibits the requirement of adapting dynamic scheduling and multi-tasking workloads. In order to overcome the above limitations in cloud environment, the following methods are proposed in this research work.

First Interference Aware Resource Allocation (IARA) technique is developed to allocate the resources in the cloud computing environment with lesser communication cost. In IARA technique, Interference is introduced for allocating the resources to attain the sub-optimization for the cloud computing interference problem. Then, priority is combined with the interference to reduce the communication cost by using the priority rule based heuristic in IARA technique. IARA technique in cloud computing is a representation of a suitable, on-demand network access for the dissimilar collective pool of computing resources. The IARA technique is designed with support for multiple hardware in localizing the resource-constrained cloud environment.

Second an Adaptive Load Balancing Approach (ALB) is designed to overcome the issue in energy consumption on load handling of multiple cloud servers. ALB approach balances the load from every cluster group for minimizing the bandwidth and energy consumption. ALB approach gathers the information about the current

load of other group by a repetitive query messaging. After that, it measures the average energy and bandwidth consumption. The main objective of ALB Approach is to balance energy consumption and to enhance utilization of the resources with minimal bandwidth usage.

Finally, Genetic Clustering with Workload Multi-task (GCWM) Scheduler Scheme is developed to increase the performance of multi-tasking in cloud service provisioning. GCWM Scheduler depends on clustering of workload using the genetic concepts. Initially, GCWM Scheme is applied to cluster the 'n' tasks with initial population (i.e.,) as tasks, and generate new population by carrying out gene operation such as selection, crossover and mutation for efficient workload management in the cloud servers. The GCWM Scheme clusters the task in cloud zone by using the fitness function and communicates each other efficiently. Genetic Clustering Based Workload Multi-task scheduling employs the distributed computing resources. Then, GCWM continuously update scheduling periods with multiple tasks for every instances. Finally, GCWM Scheduler ensures the multi tasking operation with efficient users' communication.

Analytical evaluation and experimental analysis is conducted for the proposed techniques in the cloud simulator. The results show that the IARA technique significantly improves the resource efficiency and reduces the communication cost. The resource allocation efficiency in IARA technique is improved by 5-15% compared to the existing works. In addition, the proposed ALB approach improves the clustering efficiency and reduces the energy consumptions. ALB approach effectively reduces the energy consumptions by 14-26%. Furthermore, GCWM Scheduler efficiently improves the Workload Management Efficiency and multi-task cluster effect. GCWM Scheduler improves the Workload Management Efficiency by 5-25% as compared to the state of the art works.