ABSTRACT

Distributed systems have the potential to meet the needs of the modern systems. The capacity of the distributed systems is often underutilized since in most of the cases we cannot deal with complexity and load imbalance in an effective way. In such systems some of the nodes are heavily loaded while some are lightly loaded. Load sharing or load balancing is the technique employed to deal with this problem.

But load balancing always comes with lot of overheads. There are already a number of algorithms proposed in the literature for load balancing. These algorithms can be broadly classified into two types: centralized and distributed. In our work we have proposed two centralized and one distributed load balancing algorithms.

One of our proposed centralized policy is based on *differential load measurements*, while the other one is based on centralized *load balancer*. In differential load measurement load difference attracts load to lightly loaded host. In centralized load balancer approach, load balancing is based on load of centralized node and all task transfers take place through it.

The distributed approach is based on load graph named as *load graph based transfer method*. This approach is token based and tries to find out a lightly loaded node in proximity of a heavily loaded node. Dual token based load balancing is an extension to load graph based transfer method where local minimas along with local maximas can initiate tokens. In multiple token based approach local maximas and minimas can generate multiple tokens.

These distributed approaches give good performance for large size networks with less graph density. These approaches can be used for real time systems also. Centralized

approaches can be used for smaller networks. The combination of these algorithms can be used for networks irrespective of network sizes.

There is no unique load balancing solution and the performance of the algorithms is different for different networks. The algorithms have been compared with respect to various network parameters which include the connectivity, the task arrival rate, etc. These algorithms can meet our goal of avoiding starvation of a node when few other nodes are heavily loaded.

Keywords:

Distributed systems, network of workstations, load balancing, load sharing, task transfer, heavily loaded, lightly loaded, LWM, HWM, token.