

A fair and optimal mechanism is required for allocating bandwidth to virtual machine migration in a WAN environment. In this thesis, we propose a dynamic resource allocation algorithm running in either centralized or distributed environments. The centralized version of our algorithm collects information from individual users and dynamically allocates bandwidth according to their demands. The distributed version of our algorithm is running on the internal nodes (e.g. routers) in the network. In the distributed case, we show that even when the routers and the users do not exchange allocation information, the allocation is still stable and optimal if the users are elastic users. Another interesting problem we solved is emergency handling, which is also critical in virtual machine live migration.