Abstract

In recent years the use of mobile devices for communication has increased. The mobile users now expect a variety of services from a mobile communication network that include unimodal data and voice services to multimodal multimedia services. The mobile users often demand the same QoS available to the fixed users. In practice, voice services are sensitive to delay but can allow some loss. On the other hand, data services like E-mail and web browsing etc. are tolerant to delay but are very sensitive to data loss. The multimedia services require specified QoS but can gracefully degrade and also upgrade their QoS depending upon the congestion in the network.

QoS provisioning over wireless networks becomes difficult due to users' mobility, finite resource limitations, and widely varying resource requirements. To provide uninterrupted service to delay sensitive applications, it is required to determine the users' mobility profile for resource reservation. Admission control is required to handle congestion and to guarantee QoS to the admitted calls in a wireless network. In this regard, we have proposed some techniques for admission control and resource reservation. One of the schemes is a partitioned-cell based scheme for wireless networks. This scheme reserves bandwidth for an active mobile host only in the nearest neighbor cell site. This scheme improves the handoff call blocking rate. But, when the mobility rate of the mobile users is low, it results in wastage of scarce wireless bandwidth. So, admission control and reservation scheme need adaptation based on users' mobility.

To consider users' mobility, we have proposed a mobility adaptive bandwidth reservation scheme. This scheme partitions the real time into discrete time slots called control periods. It keeps track of the handoffs made over the duration of a control period. It uses an exponential smoothing technique to estimate the handoff arrivals for the forth coming control period. We find that by tuning the control period this scheme gives better new and handoff call blocking rates compared to the optimal static guard channel reservation scheme irrespective of the mobility pattern. This proposed mobility adaptive bandwidth reservation scheme guarantees connection level QoS in the wireless segment. This proposed scheme requires low computation, space and signaling overhead.

Next, we have extended the mobility adaptive reservation scheme to support heterogeneous services. We segregate services into classes based on their QoS requirements.

Depending on to which class the service belongs to, it contributes to the reservation pool. Also, it incorporates features such as graceful service degradation and upgradation upon congestion in the wireless network. We find that when we consider mobility adaptive bandwidth reservation it improves the handoff call blocking rate. When compared with the non-reservation based scheme the decrease in handoff call blocking rate is much higher than the increase in new call blocking rate.