ABSTRACT

In recent years, there is a tremendous growth in mobile data demand due to several reasons -a) availability of cheap handheld devices, b) ubiquitous presence of wireless networks, c) supporting applications with very high bandwidth requirement (video streaming). According to Cisco this demand would increase 10 fold in the next 5 years. So efficient management of this enormous mobile data becomes an important research issue. In this thesis we focus on three objectives to manage mobile data traffic -1) efficient offload through data caching in WiFi network, 2) managing heterogeneity in traffic distribution, and 3) reducing congestion by restricting unauthorized traffic.

To ensure efficient offload using WiFi network, we propose to use WiFi network as a local area CDN where popular files are distributed across the network in a local cache of WiFi APs. It ensures uninterrupted streaming service for users with high mobility. Another important contribution of this work is to propose a storage efficient spatial chunk distribution strategy considering human mobility model. Simulation results show that across a wide range of speed, system does a sizeable offload and in high traffic scenario performance degrades gracefully.

Traffic distribution across network is uneven. With such traffic distribution, adhoc association may result in poor system performance. To manage heterogeneity in load, we create a global view of load distribution across network. Moreover, we reduce pressing association control protocol to classical max flow algorithm which ensures maximum device association with knowledge of load dis-

tribution. Simulation results show that our proposed protocol can accommodate more devices and provide better fairness in association compared to existing protocols.

As people do share their subscription credential with others, service providers lose their revenue and extra traffic is also introduced into already congested network. In this work, we propose an authentication scheme utilizing our daily activities which reduces shareability substantially. We have chosen a set of daily activities, which users are uncomfortable to share with others, to form authentication challenge. Simulation results show that an authentic user can successfully authenticate in 95% cases while even very close friends can not break-in in more than 5.5% cases.

Keywords: Mobile network, Traffic management, Association control, Max-Flow, Content Distribution, WiFi offloading, Activity-based password, Password sharing