

Migrating Constrained Connections in Mobile Wireless/Wired Systems

Ko-Shung Chen and Chiao Yu

Department of Information Management
St. John's and St. Mary's Institute of Technology
Tamshui, Taipei, Taiwan 25135 R. O. C.
Email: kschen{jo}@mail.sjsmit.edu.tw

Abstract. This paper investigates the constrained connection migration problem in mobile wireless/wired systems for maximizing the resources utilization and providing QoS guarantee as well. We proposed a Constrained Paths Migration Scheme (CPMS) for finding lower cost paths on which still satisfy the end-to-end delay constraint over the integrated wireless and wired networks. Instead of directly using the shortest path approach, CPMS adopts progressive approach through path extension and feasible-search optimization to overcome the mobile dynamics and to gain fast handoff. The QoS constraints may be satisfied beforehand but violated afterward due to users' movement in mobile wireless systems. As a result, the system becomes to an intolerant situation in which communication with high cost and/or low QoS. CPMS can automatically recognize inefficient paths and migrates them to the better ones, if any. CPMS operates in a branch-and-bound manner to reduce the overhead caused by control messages. CPMS always gradually maintains lower-cost paths satisfied the QoS constraint and selects one of them to replace the current inefficient path during the user roaming. Simulation results reveal that CPMS can significantly reduce the resources used per path and thus accommodate a larger number of users in mobile wireless/wired systems. Besides, the synchronization of new and old data flows is also considered in CPMS and controlled properly.

Keywords. Mobile Constrained Connection, Path Migration, QoS Routing, Wireless/Wired System

AMS (MOS) subject classification: 68M10

1 Introduction

Multimedia applications for packet- or cell-switched networks are emerging at a fast rate, at the same time, mobile wireless services are worldwide deployed rapidly. The migration to integrate wired and wireless networks for multimedia applications introduces a set of new challenges such as guaranteeing a variety of quality of services (QoS). Delay, delay-jitter, cost and/or other QoS metrics are stringent requirements for next-generation mobile multimedia applications. QoS routing, which identifies paths that meet the QoS requirement and selects one that leads to high overall resource efficiency, is the first step toward achieving end-to-end QoS guarantees. However, the QoS