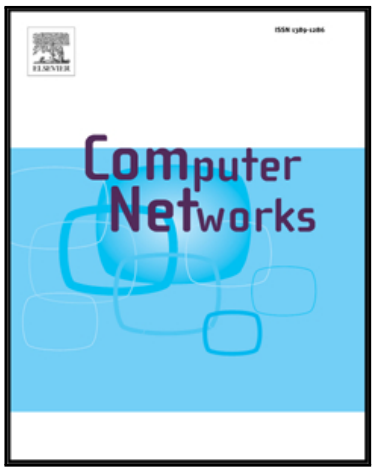

Minimizing the Impact of the Handover for Mobile Users in WLAN: A Study on Performance Optimization

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Minimizing the Impact of the Handover for Mobile Users in WLAN: A Study on Performance Optimization

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Abstract

IEEE 802.11 based Wireless LANs are an important piece in today's communication infrastructure in order to provide high speed wireless Internet access to static or quasi mobile users. For large WLAN deployments (i.e. Campus or enterprise WLAN), it is important to understand the impact of user mobility and handovers on the system performance. In this article, we have developed a performance model for a set of networked 802.11 based WLAN Access Points, which is based on a Mixed Integer Linear Program (MILP). The objective function tries simultaneously to maximize the total system rate while at the same time minimizing the number of handovers for a configurable handover signaling rate. Because of the conflicting nature of the two objective functions, such multi-objective optimization is difficult to explore. A detailed evaluation of the model using several scenarios involving both different numbers of static and mobile users shows that our formulation allows trading off those two objectives in a robust way.

Keywords: IEEE802.11, MILP, handover, multi-objective optimization

1. Introduction

Recently, the deployment of 802.11 Access Points (APs) increased in public areas such as campuses, malls, airports, etc., in order to provide better coverage and anytime anywhere Internet access to moving users. When there are multiple APs in reach, it becomes difficult to determine which is the best AP to connect to. From the user perspective, the best association strategy would be the one that guarantees the highest throughput. However, in conventional vendor implementations, a client selects the AP with the highest received signal strength indicator (RSSI) to associate with. Such association strategy may cause unbalanced distribution of the users among neighboring APs and unfair distribution of the rates among the users, thus leading to non-optimal network performance. This is also because the achievable rate depends not only on the perceived RSSI but

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