

Young-Tak Kim
Makoto Takano (Eds.)

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Management of Convergence Networks and Services

9th Asia-Pacific Network Operations
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Busan, Korea, September 2006, Proceedings

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Preface

We are delighted to present the proceedings of the 9th Asia-Pacific Network Operations and Management Symposium (APNOM S2006) which was held in Busan, Korea, on September 27-29, 2006.

Recently, various convergences in wired and wireless networks and convergence of telecommunications and broadcastings are taking place for ubiquitous multimedia service provisioning. For example, broadband IP/MPLS wired networks are actively converged with IEEE 802.11e wireless LAN, IEEE 802.16 Wireless MAN, 3G/4G wireless cellular networks, and direct multimedia broadcast (DMB) networks. For efficient support of service provisioning for ubiquitous multimedia services on the broadband convergence networks, well-designed and implemented network operations and management functions with QoS-guaranteed traffic engineering are essential. The Organizing Committee (OC) made the timely selection of “Management of Convergence Networks and Services” as the theme of APNOMS 2006.

Contributions from academia, industry and research institutions met these challenges with 280 paper submissions, from which 50 high-quality papers were selected for technical sessions as full papers, and 25 papers as short papers. The diverse topics in this year’s program included management of ad-hoc and sensor networks, network measurements and monitoring, mobility management, QoS management, management architectures and models, security management, E2E (end-to-end) QoS and application management, management experience, NGN (next-generation network) management, and IP-based network management.

The Technical Program Committee (TPC) Co-chairs would like to thank all those authors who contributed to the outstanding APNOMS 2006 technical program, and thank the TPC and OC members and reviewers for their support throughout the paper review and program development process. Also, we appreciate KICS KNOM, Korea, and IEICE TM, Japan, for their sponsorship, as well as IEEE CNOM, IEEE APB, TMF and IFIP WG 6.6 for their support for APNOMS 2006.

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QoS-Aware Fair Scheduling in Wireless Ad Hoc Networks with Link Errors^{*}

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Abstract. To provide scheduling in wireless ad hoc networks, that is both highly efficient and fair in resource allocation, is not a trivial task because of the unique problems in wireless networks such as location dependent and bursty errors in wireless link. A packet flow in such a network may be unsuccessful if it experiences errors. This may lead to situations in which a flow receives significantly less service than it is supposed to, while other receives more, making it difficult to provide fairness. In this paper we propose a QoS-aware fair scheduling mechanism in ad hoc networks considering guaranteed and best-effort flows in the presence of link errors. The proposed mechanism provides short-term fairness for error free sessions and long-term fairness for the erroneous sessions and allows a lagging flow to receive extra service and a leading flow to give up its extra service in a graceful way. It also maximizes the resource utilization by allowing spatial reuse of resource. We also propose a CSMA/CA based implementation of our proposed method.

1 Introduction

A wireless ad hoc network consists of a group of mobile nodes without the support of any infrastructure. Such a network is expected to support advanced applications such as communications in emergency disaster management, video conferencing in a workshop or seminar, communications in a battlefield. This class of mission-critical applications demands a certain level of quality of services (QoS) for proper operations. Also due to the distributed nature of these networks providing a fair access of resource to multiple contending nodes is an important design issue.

Fairness is an important criterion of resource sharing in the best effort Internet, especially when there is a competition for the resource among the nodes due to unsatisfied demands. In fair scheduling each flow f is allowed to share a certain percentage of link capacity based on its flow weight indicated as w_f . Let $W_f(t1, t2)$ and $W_g(t1, t2)$ denote the aggregate resources received by flows f and g respectively in time interval $[t1, t2]$ and w_f and w_g are the flow weights of the flows f and g respectively. The allocation is ideally fair if it satisfies (1)

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