

Preface

Next-generation wireless systems have been envisioned to be supported by heterogeneous wireless access technologies. The popular cellular networks and wireless local area networks (WLANs) present perfectly complementary characteristics in terms of service capacity, mobility support, and quality of service (QoS) provisioning. An essential aspect of the interworking is call admission control with effective access selection to achieve efficient resource utilization, QoS assurance, and load balancing. An incoming call needs to choose the overlay cell or WLAN according to an access selection strategy and follows an admission control policy in the target network. In this book, we investigate three interworking schemes for the cellular/WLAN integrated network.

In [Chap. 2](#), we present an in-depth analysis of a simple *WLAN-first* resource allocation scheme, in which WLANs are always preferred whenever the WLAN access is available, so as to take advantage of the low cost and large bandwidth of WLANs. The analysis reveals important insights on the impact of admission regions. In [Chap. 3](#), we introduce an admission scheme with randomized access selection to enable distributed implementation. Based on an analytical approach with moment generating functions (MGFs), we examine the impact of user mobility and data traffic variability on overall QoS satisfaction and resource utilization. In [Chap. 4](#), a size-based load sharing scheme further takes into account heavy-tailed data call size to enhance QoS provisioning. Dynamic vertical handoff is considered to pool the available bandwidths of the two systems to improve the multiplexing gain.

This book presents an overview of the state-of-the-art solutions to cellular/WLAN interworking. It not only reveals important observations but also offers useful tools for performance evaluation. The unique traffic and network characteristics are exploited to enhance interworking effectiveness. Theoretical analysis and simulation validation demonstrate benefits of cellular/WLAN interworking in real networks. Last but not the least, this book highlights promising future research directions to guide interested readers.

Interworking of Wireless LANs and Cellular Networks

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