Preface

This book is about wireless local area networks (WLANs) based upon the IEEE 802.11 standards. It has three primary objectives:

- To introduce the principles of 802.11 wireless networks and show how to configure equipment in order to implement various network solutions.
- To provide an understanding of the security implications of wireless networks and demonstrate how vulnerabilities can be mitigated.
- To introduce the underlying 802.11 protocols and build mathematical models in order to analyse performance in a WLAN environment.

The book is aimed at industry professionals as well as undergraduate and graduate level students. It is intended as a companion for a university course on wireless networking.

A practical approach is adopted in this book; examples are provided throughout, supported by detailed instructions. We cover a number of wireless vendors; namely, Cisco’s Aironet, Alcatel-Lucent’s Omniaccess and Meru Networks. While separate vendors, all three systems have a Cisco IOS-like command-line interface.

The GNU/Linux operating system is used extensively throughout this book. GNU/Linux systems have gained considerable popularity in the server and embedded system market (indeed, both Alcatel-Lucent and Meru Network’s wireless equipment are based upon GNU/Linux). As well as the core GNU/Linux software we also use a number of open source applications. Wireless equipment does not operate in isolation. There are times when other network services are required, such as RADIUS. FreeRADIUS, in conjunction with a MySQL database server, is used to demonstrate an enterprise security WLAN. For convenience, the Xen virtualisation application is employed to emulate a multi-server environment. We show how to build and configure these systems.

There are many GNU/Linux distributions available. In this book, we use Debian and its derivative, Ubuntu. Debian and Debian like distributions have APT, a powerful package management application that greatly simplifies software installation and maintenance. Other distributions will have their advocates and supporters and if you wish to replicate the examples in this book we suggest you use the distribution with
which you are most familiar. However, you will have to translate the instructions to suit your distribution where they differ from Ubuntu/Debian.

We present a number of mathematical models in this book for analysing the performance of 802.11. We show how to build these models using the commercial application computer algebra, Maple. The examples presented in this book were developed on Maple version 11, but all the examples should work on older versions.

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