Chapter IX

Teaching and Learning Wi-Fi Networking Fundamentals Using Limited Resources

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Abstract

Wi-Fi networking has been becoming increasingly popular in recent years, both in terms of applications and as the subject of academic research papers and articles in the IT press. It is important that students grasp the basic concepts of both Wi-Fi networking and wireless propagation measurements. Unfortunately, the underlying concepts of wireless networking often intimidate students with their apparently overwhelming complexity, thereby discouraging the students from learning in-depth this otherwise exciting and rewarding subject. This chapter provides a tutorial on Wi-Fi networking and radio propagation measurements using wireless laptops and access points. Various hands-on learning activities are also discussed.
Learning Objectives

After completing this chapter, you will be able to:

• Describe the architecture of Wi-Fi networks.
• Discuss the evolution of IEEE 802.11 standards.
• Set up Wi-Fi networks for class demonstration.
• Suggest future enhancements to the practical activities described in the chapter.

Introduction

In recent years, Wi-Fi networks (also called IEEE 802.11b) have been gaining in popularity, both in business and in home networking applications. With the growing proliferation of mobile equipment, this trend is likely to continue in the future. It is therefore important for students of information and telecommunication technologies to cover the fundamentals of wireless networking technologies as part of their curriculum.

Many people find that networking technology in general is somewhat arcane and difficult to understand. Similarly, the apparently overwhelming complexity of the underlying concepts of wireless networking often intimidates students. This perception can easily discourage the students from learning in-depth this otherwise exciting and rewarding subject.

This chapter attempts to overcome these problems by providing a hands-on introduction to Wi-Fi networking. A tutorial is also included to guide learners on how to set up Wi-Fi networks using relatively few computing resources. Although a host of problems are to be expected, given the technical limitations of commercially available hardware, students are encouraged to gain a hands-on learning experience in setting up Wi-Fi networks. The chapter also discusses the effectiveness, measured by student feedback, of Wi-Fi projects.