

PREFACE

Welcome to the *Network Simulation Experiments Manual, Third Edition*. As networking systems have become more complex and enormous, hands-on experiments based on networking simulation have become essential for teaching the key computer networking topics to students and professionals. The simulation approach is highly useful because it provides a virtual environment for a variety of desirable features such as modeling a network based on specified criteria and analyzing its performance under different scenarios.

This, the third edition of this manual, has 15 laboratory experiments in addition to two old experiments that have been moved to the appendices. The experiments discuss a variety of networking designs and protocols. They do not require programming skills as a prerequisite. They are generic and can be easily expanded to utilize new technologies and networking standards. With the free, easy-to-install software, the OPNET IT Guru Academic Edition, networking students and professionals can implement the experiments from the convenience of their homes or workplaces. The manual is suitable for a single-semester course on computer networking at the undergraduate or beginning graduate level. Instructors can pick the experiments that are appropriate to their course contents. The sequence of the experiments matches the order in which the corresponding topics appear in the textbook, *Computer Networks: A Systems Approach, Fifth Edition*. However, instructors can assign the experiments in any sequence that matches their syllabus.

The new materials in the third edition of the manual include two new experiments: the virtual local area networks (VLANs) experiment and the Web caching and data compression experiment. In the VLANs experiment, students will learn how to divide a physical network into a number of separate logical networks using VLANs, with the benefit of decreasing collision domain and adding more security. In the Web caching and data compression experiment, students will study the effect of Web caching and data compression on the response time of accessing Web pages and on the load on the Web server. Two old experiments have been moved to the appendices. The token ring experiment is now in Appendix A and the ATM experiment is in Appendix B. The topics of these two experiments are outdated. They were kept in the manual for instructors who need to cover the principles of the protocols involved those experiments.

The references to animations from the Net-SEAL project (www.net-seal.net)¹ are included in this edition. These animations are intended to reinforce the student's understanding of the concepts related to the topics discussed in the laboratory.

I would like to extend my appreciation to Professor Larry Peterson and Dr. Bruce Davie for giving me the opportunity to associate the laboratory experiments of this manual with their valuable textbook. I want to thank the folks at Morgan Kaufmann who have helped to bring this project to life. Finally, I want to thank you for choosing the manual. I welcome your e-mails to report bugs or to suggest improvements.

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