

Introduction

Telecommunications networks, and in particular cellular networks, are poised to become the single most important vehicle for communication on earth. From farmers in Mongolia to CEOs in Manhattan, these networks have become essential to business and social interaction. Instantaneous and inexpensive global-scale communication has not only improved our ability to interact with each other, but has also served as the catalyst for new industry, research and discovery. As a result, our standard of living, quality of life and understanding of the world around us have all been improved.

Sadly, as telecommunications networks and the services they support continue to expand and connect greater numbers of people, so too grow the opportunities and motivations for subverting them. It is precisely the essential nature of these networks that make them such an attractive target—adversaries seek to exploit user dependency on the communication media and services to maliciously extracting value and disrupt legitimate activities. The challenge before the technical community is to ensure that these networks operate well in the face of often sophisticated, motivated and well funded adversaries. Tragically, such ends will not be easily achieved. Secure systems and network design is a emerging field whose basic principles are still being defined.

This book documents the still emerging state of security in telecommunications networks. The following chapters focus on the identification and analysis of vulnerabilities in current networks, and explore the underlying causes of these problems. In particular, we focus on the interactions between traditional voice networks (the phone system) and the Internet. We find that such interactions introduce unintended consequences that can effect the fidelity and availability of the network. The latter chapters further detail the state of the art of security solutions for telecommunications networks. However, as a community, we know less about solutions to security. Detailed herein, there are a number of open problems that must be answered before the network will provide the kinds of safety that is needed for users and applications to reach their full potential as a trustworthy global medium. The techniques and solutions identified throughout can serve as a starting point for this analysis.