The Inevitability of Failure: The Flawed Assumption of Security in Modern Computing Environments

Peter A. Loscocco, Stephen D. Smalley, Patrick A. Muckelbauer, Ruth C. Taylor, S. Jeff Turner, John F. Farrell (National Security Agency)

Abstract

Although public awareness of the need for security in computing systems is growing rapidly, current efforts to provide security are unlikely to succeed. Current security efforts suffer from the flawed assumption that adequate security can be provided in applications with the existing security mechanisms of mainstream operating systems. In reality, the need for secure operating systems is growing in today's computing environment due to substantial increases in connectivity and data sharing. The goal of this paper is to motivate a renewed interest in secure operating systems so that future security efforts may build on a solid foundation. This paper identifies several secure operating system features which are lacking in mainstream operating systems, argues that these features are necessary to adequately protect general application-space security mechanisms, and provides concrete examples of how current security solutions are critically dependent on these features.