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RESEARCH ARTICLE

Container-Hiding Methods for Preventing Discriminating Blocking Attacks

R. SAILAJA¹, G. VENKATAPRASAD², E. HARI PRASAD³

M.Tech CSE Student, Sphoorthy Engineering College, JNTU Hyderabad,
Hyderabad, Andhra Pradesh, India

Assistant Professor, Department of CSE, Sphoorthy Engineering College,
Hyderabad, Andhra Pradesh, India

Head of the Department of CSE & IT, Sphoorthy Engineering College,
Hyderabad, Andhra Pradesh, India

sailuravuri@gmail.com

Abstract—The open nature of the wireless medium leaves it vulnerable to intentional interference attacks, typically referred to as Blocking. This intentional interference with wireless transmissions can be used as a Launchpad for mounting Denial-of-Service attacks on wireless networks. Typically, Blocking has been addressed under an external threat model. However, adversaries with internal knowledge of protocol specifications and network secrets can launch low-effort Blocking attacks that are difficult to detect and counter. In this work, we address the problem of discriminating Blocking attacks in wireless networks. In these attacks, the adversary is active only for a short period of time, discriminatingly targeting messages of high importance. We illustrate the advantages of discriminating Blocking in terms of network performance degradation and adversary effort by presenting two case studies; a discriminating attack on TCP and one on routing. We show that discriminating Blocking attacks can be launched by performing real-time Container classification at the physical layer. To mitigate these attacks, we develop three schemes that prevent real-time Container classification by combining cryptographic primitives with physical-layer attributes. We analyze the security of our methods and evaluate their computational and communication overhead.

Keywords—Discriminating Blocking; denial-of-service; wireless networks; Container classification

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