

Insuring of the Resilience Against Denial of Service Attacks in Ad Hoc Networks

Constantin Alin COPACI, Dorina Luminița COPACI

ANRCTI, București, România; Tribunalul Gorj, Târgu Jiu, România
acopaci@yahoo.com, lcopaci@yahoo.com

Abstract

Resilience generally means the ability to recover from some shock, insult, or disturbance. However, it is used quite differently in different fields. In this paper, we will focus on studying resilience of ad hoc network. Thus, we will study DoS attacks in order to assess the damage that difficult-to-detect attackers can cause. The first attack we study, called the JellyFish attack, is targeted against closed-loop flows such as TCP. The second is the Black Hole attack, which has effects similar to the JellyFish, but on open-loop flows.

References:

- [1] F. M. Anjum, TCP algorithms and multiple paths: Considerations for the future of the Internet, *Information Systems Frontiers*, 1:91-104, March 2004.
- [2] S. Bohacek, J. Hespanha, J. Lee, C. Lim and K. Obraczka, TCP-PR: TCP for persistent packet reordering, in *Proceedings of the 23rd IEEE International Conference on Distributed Computing Systems*, May 2003.
- [3] L. Buttyan and J. P. Hubaux, Enforcing Service Availability in Mobile Ad-Hoc WANs, in *Proceedings of IEEE/ACM Workshop on Mobile Ad Hoc Networking and Computing (MobiHoc)*, Boston, MA, USA, August 2000.
- [4] K. Fall and S. Floyd, Simulation-based comparison of Tahoe, Reno and SACK TCP, *ACM Computer Communications Review*, July 1996.
- [5] S. Floyd, M. Handley, J. Padhye, and J. Widmer, Equation-based congestion control for unicast applications, in *Proceedings of ACM SIGCOMM '00*, Stockholm, Sweden, August 2000.
- [6] V. Gupta, S.V. Krishnamurthy and M. Faloutsos, Denial of Service Attacks at the MAC Layer in Wireless Ad Hoc Networks, in *Proceedings of MILCOM*, 2002.
- [7] Yih-Chun Hu, Adrian Perrig and David B. Johnson, Ariadne: A secure on-demand routing protocol for ad hoc networks, in *Proceedings of the Eighth ACM International Conference on Mobile Computing and Networking (MobiCom 2002)*, September 2002.
- [8] Yih-Chun Hu, David B. Johnson and Adrian Perrig, SEAD: Secure Efficient Distance Vector Routing for Mobile Wireless Ad Hoc Networks, *Ad Hoc Networks*, 2003.
- [9] Yih-Chun Hu, Adrian Perrig and David B. Johnson, Efficient security mechanisms for routing protocols, in *Network and Distributed System Security Symposium, NDSS '03*, February 2003.
- [10] Yih-Chun Hu, Adrian Perrig and David B. Johnson, Rushing attacks and defense in wireless ad hoc network routing protocols, in *Proceedings of WiSe 2003*, September 2003.
- [11] David B. Johnson and D. Maltz, The dynamic source routing protocol for mobile ad hoc networks (DSR), April 2003.
- [12] V. Kawadia and P. R. Kumar, Power control and clustering in ad hoc networks, in *Proceedings of IEEE Infocom*, 2003.

- [13] A. Kuzmanovic and E. Knightly, Low-Rate TCP-Targeted Denial of Service Attacks, in Proceedings of ACM SIGCOMM 2003, Karlsruhe, Germany, August 2003.
- [14] P. Michiardi and R. Molva, CORE: A Collaborative Reputation Mechanism To Enforce Node Cooperation In Mobile Ad Hoc Networks, in Proceedings of The 6th IFIP Communications and Multimedia Security Conference, Portoroz, Slovenia, September 2002.
- [15] P. Papadimitratos and Z. Haas, Secure data transmission in mobile ad hoc networks, in Proceedings of WiSe, 2003.
- [16] V. Paxson and M. Allman, Computing TCP's retransmission timer, November 2000, Internet RFC 2988.
- [17] N. Sadagopan, F. Bai, B. Krishnamachari and A. Helmy, PATHS: analysis of path duration Statistics and their impact on reactive MANET routing protocols, in Proceedings of MobiHoc, 2003.
- [18] M. Zhang, B. Karp, S. Floyd and L. Peterson, RR-TCP: A reordering robust TCP with DSACK, in Proceedings of IEEE ICNP 2003, Atlanta, GA, November 2003.
- [19] I. Aad, J.P. Hubaux, E. W. Knightly, Denial of service resilience in ad hoc networks, in Proceedings of the 10th annual international conference on Mobile computing and networking, September 2004.