Secure Routing and Medium Access Protocols in Wireless Multi-Hop Networks



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Reviews

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SECURE ROUTING AND MEDIUM ACCESS PROTOCOLS IN WIRELESS MULTI-HOP NETWORKS



GRIN Verlag. Paperback. Condition: New. 172 pages. Dimensions: 8.3in. x 5.8in. x 0.4in.Doctoral Thesis Dissertation from the year 2011 in the subject Computer Science - Internet, New Technologies, grade: -, Lille 1 University (Laboratoire dInformatique Fondamentale de Lille), course: Security in Wireless Multi-hop Networks, language: English, abstract: While the rapid proliferation of mobile devices along with the tremendous growth of various applications using wireless multi-hop networks have significantly facilitate our human life, securing and ensuring high quality services of these networks are still a primary concern. In particular, anomalous protocol operation in wireless multi-hop networks has recently received considerable attention in the research community. These relevant security issues are fundamentally different from those of wireline networks due to the special characteristics of wireless multi-hop networks, such as the limited energy resources and the lack of centralized control. These issues are extremely hard to cope with due to the absence of trust relationships between the nodes. To enhance security in wireless multi-hop networks, this dissertation addresses both MAC and routing layers misbehaviors issues, with main focuses on thwarting black hole attack in proactive routing protocols like OLSR, and greedy behavior in IEEE 802. 11 MAC protocol. Our contributions are briefly summarized as follows. As for black hole attack, we analyze two types of attack scenarios: one is launched at routing layer, and the other is cross layer. We then provide comprehensive analysis on the consequences of this attack and propose effective countermeasures. As for MAC layer misbehavior, we particularly study the adaptive greedy behavior in the context of Wireless Mesh Networks (WMNs) and propose FLSAC (Fuzzy Logic based scheme to Struggle against Adaptive Cheaters) to cope with it. A new characterization of the greedy behavior in Mobile Ad Hoc Networks (MANETs) is also introduced. Finally, we design a new backoff



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