Analysis of Black Hole Router Attack in Network-on-Chip

Title	Analysis of Black Hole Router Attack in Network-on-Chip
Publication Type	Conference Paper
Year of Publication	2019
Authors	Daoud, Luka, Rafla, Nader
Conference Name	2019 IEEE 62nd International Midwest Symposium on Circuits and Systems (MWSCAS)
Keywords	BHR, BHR attack, Black Hole Router attack, black holes, Blak Hole, communication platform, computer network security, data packets, denial of service attack, denial-of-service, DoS., Hardware, hardware trojan, HT, HT model, infected node, Integrated circuit modeling, invasive software, malicious Hardware Trojan, malicious nodes, Metrics, multiprocessing systems, Multiprocessors System-on-Chip, network on chip security, network-on-chip, NoC, outsourcing, outsourcing design, Packet loss, processing cores, pubcrawl , resilience, Resiliency, Router Systems Security, Scalability, security, security attacks, sensitive information, System performance, telecommunication network routing, Trojan horses, very strong violent attack

Abstract

Network-on-Chip (NoC) is the communication platform of the data among the processing cores in Multiprocessors System-on-Chip (MPSoC). NoC has become a target to security attacks and by outsourcing design, it can be infected with a malicious Hardware Trojan (HT) to degrades the system performance or leaves a back door for sensitive information leaking. In this paper, we proposed a HT model that applies a denial of service attack by deliberately discarding the data packets that are passing through the infected node creating a black hole in the NoC. It is known as Black Hole Router (BHR) attack. We studied the effect of the BHR attack on the NoC. The power and area overhead of the BHR are analyzed. We studied the effect of the locations of BHRs and their distribution in the network as well. The malicious nodes has very small area and power overhead, 1.98% and 0.74% respectively, with a very strong violent attack.

DOI 10.1109/MWSCAS.2019.8884979

Citation Key daoud_analysis_2019

BHR BHR attack Black Hole Router attack black holes Blak Hole communication platform computer network security data packets denial of service attack

Denial-of-Service DoS. Hardware hardware trojan HT HT model infected node Integrated circuit modeling invasive software malicious Hardware Trojan malicious nodes Metrics multiprocessing systems Multiprocessors System-on-Chip network-on-chip network on chip security NoC outsourcing outsourcing design Packet loss processing cores pubcrawl resilience Resiliency Router Systems Security Scalability security security attacks sensitive information System performance telecommunication network routing Trojan horses very strong violent attack