World Academy of Science, Engineering and Technology
International Journal of Information and Communication Engineering
Vol:10, No:01, 2016

SIP Flooding Attacks Detection and Prevention Using Shannon, Renyi and Tsallis Entropy

Authors : Neda Seyyedi, Reza Berangi

Abstract : Voice over IP (VOIP) network, also known as Internet telephony, is growing increasingly having occupied a large part of the communications market. With the growth of each technology, the related security issues become of particular importance. Taking advantage of this technology in different environments with numerous features put at our disposal, there arises an increasing need to address the security threats. Being IP-based and playing a signaling role in VOIP networks, Session Initiation Protocol (SIP) lets the invaders use weaknesses of the protocol to disable VOIP service. One of the most important threats is denial of service attack, a branch of which in this article we have discussed as flooding attacks. These attacks make server resources wasted and deprive it from delivering service to authorized users. Distributed denial of service attacks and attacks with a low rate can mislead many attack detection mechanisms. In this paper, we introduce a mechanism which not only detects distributed denial of service attacks and low rate attacks, but can also identify the attackers accurately. We detect and prevent flooding attacks in SIP protocol using Shannon (FDP-S), Renyi (FDP-R) and Tsallis (FDP-T) entropy. We conducted an experiment to compare the percentage of detection and rate of false alarm messages using any of the Shannon, Renyi and Tsallis entropy as a measure of disorder. Implementation results show that, according to the parametric nature of the Renyi and Tsallis entropy, by changing the parameters, different detection percentages and false alarm rates will be gained with the possibility to adjust the sensitivity of the detection mechanism.

Keywords : VOIP networks, flooding attacks, entropy, computer networks
Conference Title : ICCCN 2016 : International Conference on Communications and Computer Networks
Conference Location : Singapore, Singapore
Conference Dates : January 07-08, 2016