ABSTRACT

ATTACK TREE IMPLEMENTATION AND ANALYSIS ON TOPPO:1 VULNERABLE MACHINE BASED ON TIME METRIC, COST METRIC, AND FREQUENCY METRIC

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This research implements and analyzes the attack tree on the Toppo: 1 vulnerable machine based on time, cost, and frequency metrics. This metric calculation uses three metrics: time, cost, and frequency. Time, cost, and frequency values are obtained after exploiting several walkthroughs to access the privileged environment from Toppo: 1 vulnerable machine. The exploitation scenario contained in the walkthrough has several stages, namely, information gathering, scanning, gaining access, exploitation, and privileged escalation. The final result that will be obtained after completing the exploitation stages on the Toppo vulnerable machine: 1 is to get privileged environment access by accessing the root of the target machine. The walkthrough can be described with an activity diagram, which can be used to explain the stages of exploiting the target machine. Analysis and formulation of an attack tree are prepared using the CubeSat Security Attack Tree Analysis and SAND gate approach. The attack tree represents various stages of exploitation and can be ranked based on metrics. The metrics are analyzed to get the attack tree ranking. Attack tree 1 is the fastest path compared to other attack trees, with a real-time value of 167.868s. The data obtained is based on cost metric; attack tree 1 has a relatively low-cost value compared to other attack trees with a cost value of 21. The data obtained is based on frequency metric, attack tools Dirb and Arp-scan have the most significant percentage of their use in the five attack trees by 40% and 30%. This research can be continued by adding a vulnerability factor by performing a vulnerability scanning on the system.

Keywords: *Attack Tree, Time, Cost, Frequency,* Toppo: 1