Defending a wireless LAN against ARP spoofing attacks using a Raspberry Pi

Hiba Imad Nasser*, **Mohammed Abdulridha Hussain**

Department of Computer Science, College of Education for Pure Science, University of Basrah, Basrah, Iraq.

A R T I C L E   I N F O

A B S T R A C T

The Address Resolution Protocol (ARP) is a protocol that converts Internet Protocol (IP) addresses to Media Access Control (MAC) addresses. Due to a security issue known as "Man in the Middle," identity theft is feasible using the ARP protocol. ARP spoofing is one of the weaknesses in wireless networks when an attacker effectively masquerades as a legitimate one. Spoofing attacks will reduce network performance and break several security measures. In networks that use MAC address-based filtering to verify clients, all a spoofer needs is an actual MAC address from an authorised client to gain an unfair advantage. The research recommends developing a security system recognising and preventing ARP spoofing attacks. This system detects ARP spoofing attempts by comparing the static MAC address of the original router to the router's MAC address in the ARP cache table. After detecting the attack using information collected from the router's MAC address in the ARP cache table, the system will conduct a de-authentication attack against the attacker's MAC address. If the attacker is disconnected from the WLAN, they cannot perform ARP spoofing attacks. This system is operated using a Raspberry Pi Model B. Most ARP spoofing attacks can be detected in 0.93 seconds, and responding takes 3.05 seconds.

1. Introduction

The Internet is necessary to create an era of information disclosure [1]. The main benefit of using the Internet is to exchange information among users. These benefits can be felt due to the existence of adequate supporting infrastructure. The Internet network infrastructure that connects Internet Service Providers (ISPs) with users is the main component of supporting facilities for internet use[2].

An internet communication network has many components, such as communication protocols, network hardware, and other supporting software[3]. Each of these components has a vital role in sending data over the network. The communication protocol is a component that regulates how communication between devices can be carried out[4].

*Corresponding author email : eduppg.hiba.amad@uobasrah.edu.iq