Learning Guide Unit 5

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Description

Learning Guide Unit 5

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Overview

UNIT 5: Wireless Routing Protocols

Topics

- Routing in wireless networks.
- Vulnerabilities in wireless routing protocols.
- Introduction to ICMP packet analysis in Wireshark.

Learning Objectives

By the end of this Unit, you will be able to:

1. Differentiate proactive and reactive wireless routing protocols.
2. Explain the possible security threats in the wireless routing protocol.
3. Analyze the ICMP traffic flow in a network.

Tasks

- Peer assess Unit 4 Written Assignment
- Read the Learning Guide and Reading Assignments
- Complete the Discussion Assignment by posting in the Discussion Forum
- Respond to three of your fellow classmates' posts in the Discussion Forum
- Complete and submit the Written Assignment
- Complete and submit the Learning Journal
- Take the Self-Quiz

Introduction

In the last unit, we studied link layer wireless protocols. However, it is important to note that different wireless protocols have different use cases, and implementing them in a different use case may not work optimally. In this Unit, we consider wireless routing protocols. We shall take a closer look at their peculiar requirements and in what circumstances are best for their use. We shall then delve into security issues associated with wireless routing protocols.

Finally, we shall explore the analysis of the Internet Control Message Protocol (ICMP) traffic in Wireshark, with specific attention to the traffic generated by PING and TRACEROUTE commands.

Reading Assignment

As you read through the learning resource consider the following:

- *How do you plan on using the traceroute tool to diagnose network issues in your future career?*
- *How do you plan on using Wireshark to analyze network traffic and troubleshoot network issues in your future career?*
- *What do you think is the most important factor to consider when choosing a routing algorithm for a mobile ad hoc network, and why?*

Read

1. Dancuk, M. (2021, August 16). *How to run a traceroute on Linux, Windows and MACOS*. phoenixNAP.

    - This resource provides a step-by-step guide on how to perform a traceroute on various operating systems.

2. Ghosh, B. (2021, September 12). *Packet filter analysis for ICMP in Wireshark*. linuxhint.

    - Read this to learn about ICMP packet analysis in Wireshark.

3. Jatwani, R. (2018). Routing algorithm in MANET: A survey. *International Journal of Research in Engineering, Science and Management*, *1*(11), 154-156.

    - Read this for an overview of wireless routing algorithms.

4. Kalime, S., & Sagar, K. (2020). A review: Secure routing protocols for mobile adhoc networks (Manets). *Journal of Critical Reviews*, *7*(19), 8385-8393.

    - From this article, read section III “VULNERABILITIES ON ROUTING PROTOCOLS” and section IV “VARIOUS SECURE ROUTING PROTOCOLS”.

5. Noviantika, G. (2023, January 4). *How to ping an IP on Windows, MACOS, and Linux*. Hostinger Tutorials.

    - This resource provides a step-by-step guide on how to perform a ping test on various operating systems.

Discussion Assignment

Compare and contrast proactive and reactive wireless routing protocols. In your opinion, what are the best circumstances to deploy either proactive or reactive wireless routing protocols?

In your responses to your peers, compare and contrast your answer to those of your peers.

Your Discussion should be a minimum of 200 words in length.

Written Assignment

Your organization has recently become aware of potential ICMP related attacks on its network and has tasked you with investigating this issue. As part of your investigation, you are to analyze ICMP traffic patterns in the network to gain a better understanding of the situation. One aspect of this investigation will involve looking at ICMP messages generated by Ping programs. In particular, you will be tasked with answering the following questions:

1. Choose the first ICMP request packet that you come across and answer the following questions:

    a. What is the packet protocol and protocol number?

    b. What are the type and code number values of the ICMP packet?

    c. What is the checksum number and status?

2. Examine the corresponding ICMP reply packet and answer the following questions:

    d. What type and code number values do the ICMP packets have?

    e. How many bytes are the checksum and identifier fields?

3. Another aspect of this investigation will involve looking at ICMP messages generated by Traceroute programs. In particular, you will be tasked with answering the following questions:

    f. What is the IP address of your host PC (from the traceroute result)?

    g. What is the IP address of the target destination host (from the traceroute result)?

4. Additionally, as part of your investigation, you will need to save and submit two Wireshark capture files (one for the ping command capture and one for the traceroute command capture).

5. Finally, you will need to take screenshots of the relevant information for all of the questions outlined above (a-g), along with their answers, and include them in an MS Word or PDF file. This file should then be submitted as your assignment.

Refer to this manual for step by step instruction on the assignment.

You will be assessed on:

- Your submission of both appropriate capture files.
- Your screenshot of the ping test on google.com.
- Your screenshot showing the packet protocol and protocol number.
- Your screenshot showing the type and code number values of the ICMP request packet.
- Your screenshot showing the appropriate checksum number and status.
- Your screenshot showing the type and code number values of the ICMP ping reply/response packets.
- Your screenshot showing the byte value of checksum and identifier fields in Wireshark.
- Your screenshot showing the traceroute test results.
- Your submission of the appropriate screenshot showing the IP address of your host PC.
- Your submission of the appropriate screenshot showing the IP address of the target destination host.

Learning Journal

Wireless routing protocols play a crucial role in connecting devices, but they also come with a number of security risks. Your assignment is to list at least 5 possible security threats (vulnerabilities) in wireless routing protocol and briefly discuss any two of them.

NOTE: Your submission should not be more than 300 words.

Use APA citations and references if you use ideas from the readings or other sources.

Self-Quiz

The Self-Quiz gives you an opportunity to self-assess your knowledge of what you have learned so far.

The results of the Self-Quiz do not count towards your final grade, but the quiz is an important part of the University's learning process and it is expected that you will take it to ensure understanding of the materials presented. Analyzing your results will help you perform better on future Graded Quizzes and the Final Exam.

Please access the Self-Quiz on the main course homepage; it will be listed inside the Unit.

Checklist

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