Learning Guide Unit 1

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Description

Learning Guide Unit 1

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Overview

UNIT 1: Introduction to Network Security

Topics

- Fundamentals of Network Security
- Network Protocols
- Introduction to Wireshark

Learning Objectives

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

1. Explain the main objectives of network security.
2. Choose and describe different types of network protocols and their interactions within the layers of the OSI model.
3. Record the network activity using Wireshark Software Environment.

Tasks

- Read through the Learning Guide and the Reading Assignment
- 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 and submit the Self-Quiz

Introduce Yourself

While this assignment is not required, you are strongly encouraged to post your introduction and respond to a few introductions to meet your classmates this week. People are inherently social, and forming a learning community is an important way to connect - both to your class and to what you're learning. You will find a discussion forum located on the main course page in the General Information and Forums called **Class Introductions.** Take a moment and tell us about yourself:

- Where are you from?
- What's your favorite hobby?
- Do you have any pets?
- How will the knowledge you gain in this course help you attain your career goals?

As you can see - there are no rules for what makes a "good" introduction. Instead, your goal is to start class with a smile and find out how you can connect with your classmates. Perhaps someone is from the same area, or you share the same hobby - or have the same type of pet! Respond to a few of your peers' posts and share things you may have in common.

Introduction

Network security is a cardinal consideration in the design of any network. In this unit, you will be introduced to the basics of network security including an introduction to information security terminologies, types of network security, and major risks considerations while designing the logical security of a network. We shall also explore the intriguing world of network protocols and how they interact.

Wireshark is a powerful network protocol analyzer, which is used for network troubleshooting and analysis. It achieves this by capturing (sniffing) packets being transmitted on a target network and gives you a clear view of these packets, down to the microscopic/granular level of the network. Wireshark is a very useful tool in the hands of network engineers (for instance, network troubleshooting), network administrators (monitor network traffic, analyze dropped packets and latency issues, and so on), and network security engineers (monitor malicious activities on the network, examine security problems amongst others). You will also be introduced to this popular and powerful network packet analyzer called Wireshark.

Watch

Reference:

- Cybersecurity Guy. (2022, January 29). *What is network security | Network security* [Video]. YouTube. https://www.youtube.com/watch?v=rG02r5y2Fdo

Reading Assignment

As you read through the learning resource consider the following:

- *What are the impacts of security breaches and how can they be prevented?*
- *What is the role of network protocols in ensuring network security?*

For readings that need LIRN Access:

- Log into the UoPeople library and go to LIRN. Click on **Access to Library and Information Resource Network**, go to Education and click on EBook Central. Search for the complete name of the book.

Read

1. kmbh. (2021, November 24). *Types of network protocols and their uses*. GeeksforGeeks. Retrieved December 15, 2022.

- Read this article on the types of network protocols and their uses.

2. Sadiqui, A. (2020). Fundamentals of Network Security. In *Computer network security* (pp. 1-15). John Wiley & Sons.

- Access through LIRN.
- Read pages 1-15 in Chapter 1: Fundamentals of Network Security.

3. *What is a network protocol, and how does it work?* (n.d.). Comptia.

- Read this article for an overview of network protocols.

Video

1. NetworkTutor. (2022, October 1). *Wireshark - Beginners guide - 101 | How to install and capture packets | How to filter ICMP | TCP* [Video]. YouTube. https://www.youtube.com/watch?v=Ud0QK0TPu4U

- This video gives a general guide on installing Wireshark and introduces the basic Wireshark environment and interfaces.

Discussion Assignment

Network protocols could be classified into three broad groups: communication protocols, management protocols, and security protocols. In your opinion, which of these groups of protocols should be given the highest priority/consideration while designing a network? Justify your answer with detailed reasoning.

Your Discussion should be a minimum of 300 words in length.

Written Assignment

You have just been recruited as an associate network engineer by AXY Systems Inc., and you were assigned to a senior engineer who will supervise and mentor you. Your supervisor has issued you a brand new laptop (consider this as a PC if you are using a PC) and has instructed that you need to set up the laptop, install the Wireshark network analyzer tool on it, and familiarize yourself with the tool.

Install and explore Wireshark:

Use the Wireshark User's Guide:

- Determine your system type (hardware specifications, OS, etc). *Refer 1.2 of the user guide.*
- Download and install the appropriate version of Wireshark. *Refer 2.3; 2.5; and 2.6 of the user guide.*
- Launch Wireshark.
- Explore the Wireshark environment. Refer to What is Wireshark?

For this assignment, once you have succeeded in installing and familiarizing yourself with the Wireshark environment, complete the following tasks:

i. Close all open web browsers.

ii. Relaunch Wireshark (Take a screenshot).

iii. Once the Wireshark is open and running, it will display all network interfaces on your computer. Choose the appropriate interface (WiFi for the wireless interface and Local LAN for the wired interface). Please pay close attention to the interface and choose only the interface with network activity (indicated by the graph lines in front of the interface).

iv. Double-click on the chosen network interface (card). Network capture begins automatically. Notice that there is no activity recorded/displayed by Wireshark.

v. Open a new web browser and browse the UoPeople student portal.

vi. Login with your username and password.

vii. Open the Course forum and the Announcement forum from the UoPeople student portal.

viii. Go back to Wireshark and you will see too much information being displayed. This information shows the activities that have been carried out on your network. This information could be overwhelming at first, but not to worry, we shall begin analyzing them in the next unit (Take a screenshot of the information).

ix. After about 30 seconds, go to the menu bar and click on capture, then navigate to the stop option and click on it. This ends the capture process.

x. Go to the menu bar and click on File. Then navigate to the save option and click on it. Save it with a name of your choice.

xi. You have successfully generated and stored your first Wireshark capture. Congratulations!

xii. Now go to the menu bar and click on the File menu. Navigate to open, and locate the file you just saved. Once located, double-click on it. This will display the file in Wireshark.

Submit the screenshots in a single MS Word or PDF. Upload the capture file from step x.

Submit a paper that is at least 3 pages in length exclusive of the reference page, double-spaced using 12-point Times New Roman font. The paper must cite a minimum of two sources in APA format and be well-written. Check all content for grammar and spelling, and be sure that you have properly cited all resources (in APA format) used. Refer to the UoPeople APA Tutorials in the LRC for help with APA citations.

You will be assessed on:

- Your screenshots for steps ii, viii, and ix.

    - Your submission of the capture file from step x.

Reference

- Sharpe. R, Warnicke. E, Lamping. U. (n.d.). *Wireshark User's Guide*. Wireshark. https://www.wireshark.org/docs/wsug_html_chunked/index.html

Learning Journal

Describe the concepts of confidentiality, integrity, and availability as it pertains to network security. Which of these concepts do you think should be given the greatest consideration while designing your network? Explain.

The Learning Journal entry should be a minimum of 200 words and not more than 500 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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