

Learning Guide Unit 2

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Description

Learning Guide Unit 2

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Overview

UNIT 2: Computer Network Operations

Topics

- Traffic Engineering
- Virtual Private Networks (VPNs)
- Security concerns in Virtual Private Networks (VPNs)
- Wireshark's advanced user interface and Configurations

Learning Objectives

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

1. Explain Virtual Private Networks (VPNs) and security concerns in implementing VPNs.
2. Explain the use of Software Defined Networking (SDN) as a network traffic engineering technique with its merits and demerits.
3. Identify the types of network packet protocols using Wireshark's advanced user interface.

Tasks

- Peer assess Unit 1 Written Assignment.
- 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

Introduction

No network can boast of having endless bandwidth. Just like the traffic lights that help manage the flow of traffic on the highway, the flow of network traffic in a network can scale and function when it is rightly managed. Managing network traffic is called network traffic engineering.

In this unit, you shall delve into the intricate workings of network traffic engineering. You will also explore the concept of Virtual Private Networks (VPNs) and the security concerns associated with implementing and using VPNs. Finally, we shall take a closer look at Wireshark's advanced user interface and carry out our first network packet filter and analysis task.

Watch

Reference:

- CBT Nuggets. (2022, September 8). *VPN types options and protocols explained* [Video]. YouTube. <https://www.youtube.com/watch?v=8HbTNPZKeoU>

Reading Assignment

As you read through the learning resource consider the following:

- What is the Wireshark user interface and how is it used for capturing and analyzing data packets?
 - What are virtual private networks (VPNs), and what are their benefits and risks?
 - What is software-defined networking (SDN), and how does it differ from traditional networking approaches?
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Read

1. Angelo, R. (2019). [Secure protocols and virtual private networks: An evaluation](#). *Issues in Information Systems*, 20(3), 37-46.
 - Read this journal article for a detailed overview of VPNs.
2. [How to perform a ping test in windows, mac OS, and linux](#). (2020, August 9). ChemiCloud.
 - Read this article to know how to do a ping test.
3. Jadhav, R. R., & Sheth, P. S. (2021). [VPN: Overview and security risks](#). *International Journal of Advanced Research in Science, Communication and Technology*, 7(1), 305-309.
 - Read this journal article to learn about the risks associated with using virtual private networks.
4. Sharpe, R., Ed Warnicke ., & Lamping, U. (n.d.). [Wireshark user's guide version 4.1.0](#). Wireshark.
 - Read Chapter 3: User Interface, to get acquainted with the Wireshark user interface, including capturing, viewing, and filtering captured data packets.
5. Swyx. (2020a, February 23). [Networking essentials: Software defined networking](#). DEV.
 - Read this document for an overview on SDN.
6. Swyx. (2020b, February 23). [Networking essentials: Traffic engineering](#). DEV.
 - Read this document for an overview on traffic engineering.

Discussion Assignment

Explain the meaning of a Virtual Private Network. Are VPNs truly secure? Comment.

Your Discussion should be a minimum of 200 words in length. Please include a word count.

Written Assignment

A customer organization (assume it is UoPeople) has just called in, complaining of a very slow network. The senior network engineer has run some remote tests and suspects that the problems may be related to the protocols on the network. You have been sent to the Organization to scope the network and check the different types of protocols running on the network.

Your tasks are as listed below:

1. Capture network packets while you interact with the Uopeople student portal.
2. Open the command prompt on your PC and run a ping test on google.com.
3. Stop the packet capture and study the packets captured to answer the following questions:
 - a. What is the total number of network packet protocols seen in the packet capture? Name at least five of them with relevant screenshots.
 - b. Filter for HTTP packets. How many HTTP packets can you see (take screenshot)?
 - c. Filter for DNS packets. How many DNS packets can you see (take screenshot)?
 - d. Filter for ARP packets. How many ARP packets can you see (take screenshot)?
 - e. Filter for TCP packets. How many TCP packets can you see (take screenshot)?

Refer to [this manual](#) for step by step instruction on the assignment.

Submit all the required information and screenshots for this assignment in a single MS Word or PDF format.

You will be assessed on:

- Your list of five different protocols with relevant screenshots.
- Your count of HTTP packets with the screenshot taken after applying a filter on http packets.
- Your count of DNS packets with the screenshot taken after applying a filter on dns packets.
- Your count of ARP packets with the screenshot taken after applying a filter on arp packets.
- Your count of TCP packets with the screenshot taken after applying a filter on tcp packets.

Submit a paper that is at least 2 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.

Learning Journal

As a network engineer, you have just been assigned the task of managing a new Data Centre for a client. Your senior colleague has advised the use of Software Defined Networking (SDN) as a suitable technique for network traffic engineering at this site due to its numerous advantages. Before you start managing the client's new Data Centre, your senior colleague wants you to do some research. You are to briefly describe the use of Software Defined Networking (SDN) as a network traffic engineering technique with the merits and possible drawbacks of this technique.

The Learning Journal entry should be a minimum of 200 words and not more than 750 words. Use APA citations and references if you use ideas from the readings or other sources. For assistance with APA formatting, view the [Learning Resource Center: Academic Writing](#).

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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