FINAL REPORT

Home WiFi Security Checker

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Table of Contents

Introduction

The following document will provide an in-depth overview of the overall completion of the Home WiFi Security Checker that was undertaken. The description of the submitted project will be covered in the next section, detailing the project's functionality that was initially aimed to achieve. The description of conformance and specification design will cover the end product in relation to the initial concept.

Project Description

The WiFi Security Checker is the final year project of Thomas Hughes with guidance from Paul Barry. The project was completed using the Python programming language. The user interface is ran on the command prompt.

A home wifi security checker aims to give users full use of their network, giving them extensive of knowledge of those who are on the network and provides administrative options & information to aid the user.

The project aimed to aid users who may not typically use network scanning tools, or are unfamiliar with general router/ network security, and aids them in understanding what they are looking at/ looking for, and finally how to help improve their security with user tips based on what the scan may find.

Early on in the research phase of this project, I conducted user research by issuing a survey to various users in regard to their devices on their home network. This survey asked users about the devices they had connected to their main home WiFi. The purpose of this survey was to collect sample data of the various types of devices found on user's networks, taking into consideration the varying ages of the users (ages 21 -80) to enrich the overall scope of standard user types.

As explained in the Research Document, the program would be able to perform two type of scan, a netstat scan (as aided by the use of nmap) and a portscanner. The user interface should provide a relatively easy to understand display, showing users what they need to see. There is a feature that allows users to check what the UDP and ACK SYN scans are before performing them. This was aimed as a part of

I utilised the nmap module in python to complete specific scans. The nmap tool is particularly powerful, deriving from the application nmap, used for various scans, in my case for the port scanning and UDP + TCP scans.

Description of Learning

Python

At the start of the project, I had not even glanced at Python, only having heard of the power and accessibility it could bring to certain projects, which was partially why I chose it in the first place. However being exposed to the language and using it has shown me it's potential for use in personal projects, having me prefer it over previously used C++ and Java.

Netscan usage

I found that the netstat scanning option on my program works mostly, bar the option for an inputted IP address. This was one of the first functions when I began the project and it remained mostly intact as I built the program around it.

Portscanner usage

Portscanning is a common tool used in the security related to router/ user security. I found I understood the tool more intimately, overall improving my knowledge of how port scanners work.

Review of Project

Positive Achievements

Personally I believe the project was not entirely a success, however I was satisfied with some of the features that I did end up getting to work. For example, the netscan and portscanner are features I had spent a lot of the project time getting to a reasonable level of functionality, which I will mention later.

Overall Research

Sample Home WiFi Network #6
Router providing Home WiFi service to house devices:

Eircom

Connected Devices (where the Home WiFi is the main connection point):

Samsung a50, Android

Samsung a20e, Android

Huawei P30

HP Laptop PC, Win10

Google Home

Occasionally Connected Devices (where the Home WiFi is used temporarily as needed):

Sample Home WiFi Network #7
Router providing Home WiFi service to house devices:

Three Wifi Dongle (Huawei E5573 wireless device)

Connected Devices (where the Home WiFi is the main connection point):

Samsung J5, Android

iPhone 10s, Apple iOS

[FIG 1]

I found that the progress achieved in the research phase of this project to be rather fruitful, finding valuable information in regards to varying devices found on a network. This section opened my eyes to the possibility of varying users (age ranges taken into account) and varying devices. Unfortunately, while I was made more conscious of these possible devices, I felt I wasn't able to utilise it to the extent that I wanted.

Overall Scanning

I feel the scanning functionality in my project is at an effective level. It performs the correct scan which I set out to do. Despite the follow up of ftips and advice not being exactly what I wanted, I found that the UDP and SyN ACK scans works well, and the Portscan is effective.

Aspects Not Achieved/ Gone Wrong

The project finished didn't end where I would have hoped for it. While it had the primary search functions I had sought out for originally, I found that I had not achieved the level of user friendly-ness that was aimed for at the start of this project.

The development of the GUI was a particular milestone I didn't hit, due to inexperience with the use of the module (in this case I was to use TKInter). I found because of this, the project did not benefit from the GUI, which was an aim in terms of making the program easier to understand.

Things I Would Change

If I was to go back and redo this project, there are a couple of things I would address before jumping into the project.

Time Constraints/ Management was a huge factor to the completion of this project. Due to this year's higher workload, I was not prepared for the pace of the workload overall. Going back, I would have to be much more efficient with my time, completing drafts and snippets of code earlier on in the research phase as well as continuously throughout the rest of the year.

Another detail I would go back and improve on in retrospect is the level of **python I was learning**. Early on in the development process, I was given resources by my supervisor to aid my learning of the programming language. This evidently helped tremendously, however I still feel like up until the last days of coding, my standards of code left a lot to be desired. This was a noted possible issue when starting the project, and the calculated risk paid of partially. I feel like if I had access to resources and organised my learning earlier in the project, I would have stronger code and better functioning project overall.

Problems Encountered

As expected, this project had many problems. I, along with many of my classmates, could agree that this year was much, much harder to manage overall. Having to study from home had taken its toll on not only my other subjects, but my project too. The workload for this year has been overwhelming and difficult to manage, which has led to the time spent, motivation and overall the quality of the project to suffer. More often than not, multiple deadlines stacked closely all year meant I had to reschedule project meetings (which I am grateful my supervisor Paul Barry could accommodate often) and hindered both the progress of the learning language for this project and ultimately the overall finished project's progress.

Acknowledgements