

Evaluating Various Security Techniques for Virtual Private Network

Introduction

A comparison between open-source and commercial VPNs are made through the use of testing as well as research gathered by the author of the project.

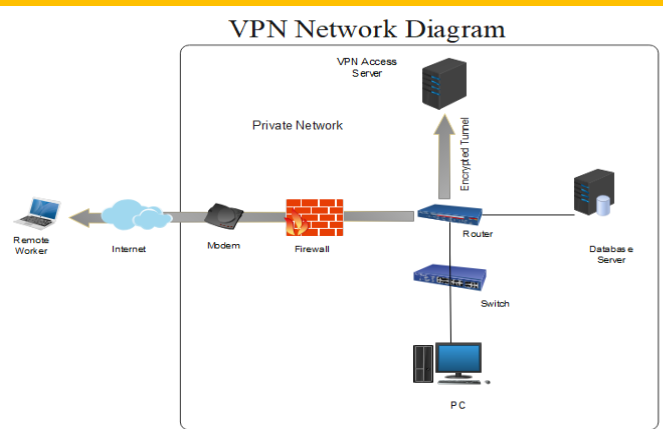
Aims

The aim of this project is to assess the vulnerabilities within virtual private networks based on the security techniques being implemented

Objectives

- Construct a literature review to understand the problem and gain information.
- Explore different VPN tools which are available
- Test the VPN services and their security capabilities
- Implement and test the security techniques provided by a VPN
- Analysis the results based on the VPN services provides and VPN standards

Topology of Virtual Private Network that will be Used For Testing



Literature Review

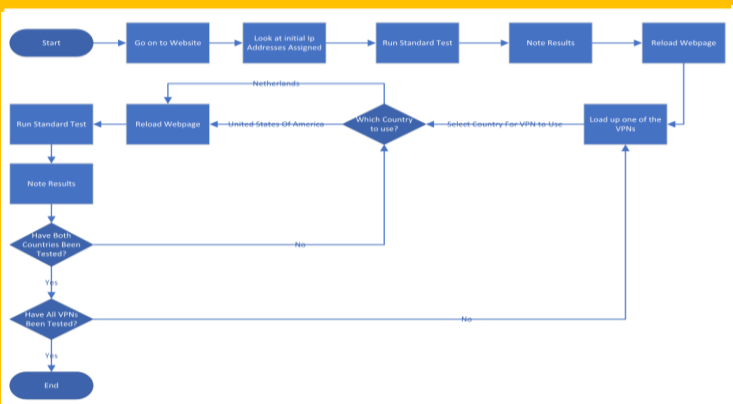
The different types of VPN provides this being commercial and open-source VPN are being tested for users use. [12]

A comparison between using a VPN or not using a VPN is explored through the construction of a basic model. [32]

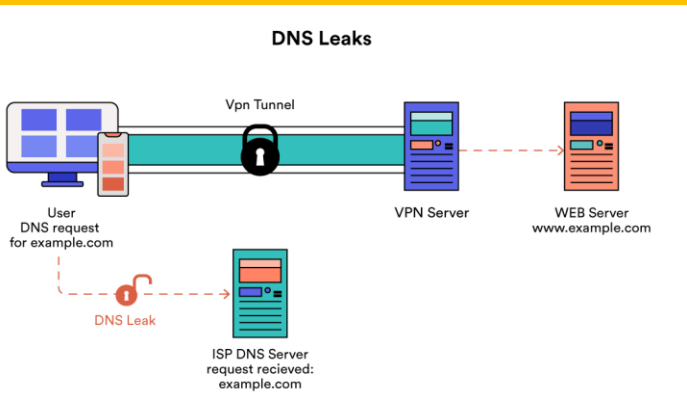
Design and Implementation

The design of the flowcharts and diagrams for the WebRTC and DNS Leak testing for phase one were constructed with the help of research. The topology for phase two was able to be constructed with the use of the previous diagrams.

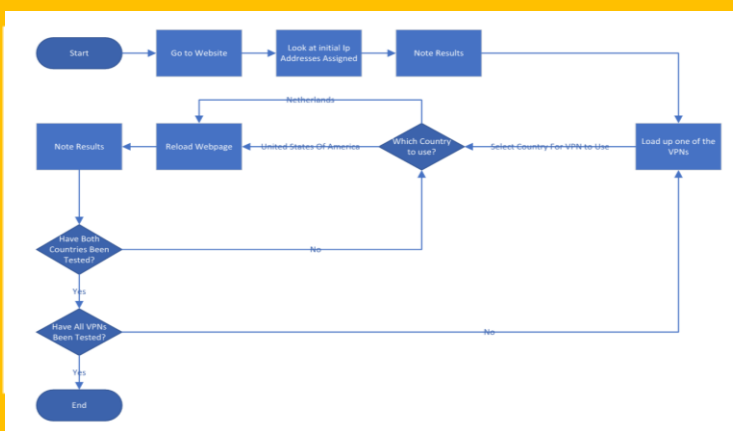
DNS Leak Test Flowchart



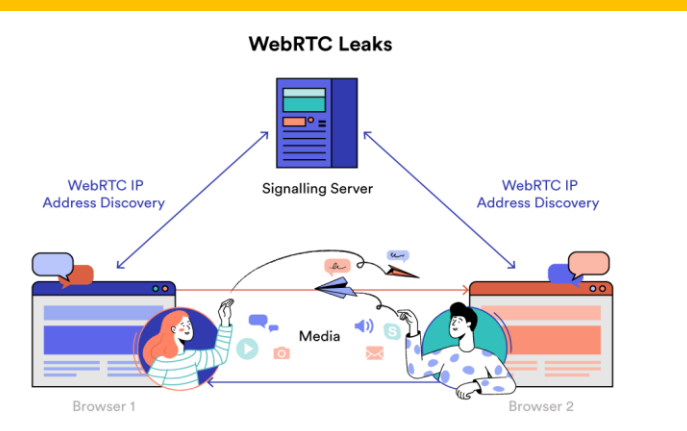
DNS Leak Test Diagram



WebRTC Leak Test Flowchart



WebRTC Leak Test Diagram



Results

From the area in which testing was able to be done e.g. phase one no signs of vulnerabilities were shown.

Conclusion

All the commercial and open-source VPNs which had been tested can be recommended for use by the author. However other VPNs might perform differently then the ones tested.

Reference

- [12] M. T. Khan, J. Deblasio, G. M. Voelker, A. C. Snoeren, C. W. Kanich and N. Vallina-Rodriguez, "An Empirical Analysis of the Commercial VPN Ecosystem," in *IMC '18: Proceedings of the Internet Measurement Conference 2018*, 2018.
- [32] R. Nigmatullin, A. Ivchenko and S. Dorokhin, "Differentiation of Sliding Rescaled Ranges: New Approach to Encrypted and VPN Traffic Detection," in *2020 International Conference Engineering and Telecommunication (En&T)*, 2020.
- [34] Top10VPN, "Do I Leak? IP, WebRTC & DNS Leak Test: VPN & Torrent IP Check," 2022. [Online]. Available: <https://www.top10vpn.com/tools/do-i-leak/>. [Accessed 4 May 2022].

Figure

Figure 4 – WebRTC Leak Process Diagram

Figure 5 – WebRTC Leak Flowchart Diagram

Figure 12 – DNS Leak Process Diagram

Figure 13 – DNS Leak Flowchart Diagram

Figure 28 – Topology of Virtual Private Network that will be Used for Testing