

ELEVATE LABS

Task 8

Project Report: Exploring Virtual Private Networks (VPNs)

1. Overview

Virtual Private Networks (VPNs) are widely used tools for ensuring private and secure online communication. This project involved choosing a VPN provider, setting up the client, validating its functionality, and reflecting on its effectiveness in strengthening online privacy. The focus was on understanding how VPNs influence security, anonymity, and browsing performance.

2. Implementation Process

For this task, ProtonVPN (Free plan) was selected. Steps taken included: - Creating an account on ProtonVPN's official platform - Installing the Windows application - Connecting to the nearest free server (Netherlands) - Verifying IP address change via online tools - Observing encrypted traffic through ProtonVPN's dashboard - Disconnecting and confirming browsing reverted to the original ISP address.

3. Findings

- IP address masking was successful - AES-256 encryption was confirmed - Browsing speed dropped by roughly 20–30% - Privacy during active VPN session improved, as ISP tracking was prevented

4. Strengths of VPNs

- Protects data from interception, especially on unsecured networks - Masks real location, useful for bypassing regional restrictions - Safeguards browsing activities from ISPs and attackers

5. Challenges & Constraints

- Free plans restrict server access and speed - VPNs cannot guarantee full anonymity since providers may keep logs - Some websites actively block VPN traffic - Performance depends heavily on server load and distance

6. Core Technical Concepts

- **VPN Tunnel:** Secure pathway for internet communication - **Encryption:** AES-256 is the industry standard for confidentiality - **Protocols:** OpenVPN, IKEv2/IPSec, WireGuard - **Network Security Role:** Reduces risks on public Wi-Fi and other unsafe networks

7. Final Reflection

This hands-on activity demonstrated the real-world benefits and trade-offs of VPN usage. While VPNs significantly enhance privacy and protect data, they should be viewed as one component in a larger security strategy. Combining VPNs with other privacy tools provides a stronger foundation for secure digital practices.