Task 8: Understanding and Using VPNs for Privacy and Secure Communication

Objective:

The objective of this task was to develop a hands-on understanding of Virtual Private Networks (VPNs), their ability to enhance online privacy, and their role in securing communication. This involved setting up a VPN client on Kali Linux, connecting to a VPN server, and verifying changes in public IP address.

Tools Used:

- VPN Client: ProtonVPN (Free Tier)
- Operating System: Kali Linux
- Web Browser: Brave (for IP verification)
- Command Line Tools: sudo apt, wget, curl, dpkg, ip, protonvpn-cli

VPN Setup and Connection Process:

1. VPN Service Selection and Account Creation:
   - Chose ProtonVPN (Free Tier) for its reputation for privacy. Created a free account on the ProtonVPN website.
2. Client Installation Process:
   - Initial Cleanup: Removed old ProtonVPN configurations and keys.
   - Download & Install Release Package using wget and dpkg.
   - Manual Configuration (if needed) to ensure correct GPG key path.
   - GPG Key Verification using key fingerprint.
   - Update and Reinstallation using apt.
3. Connecting to the VPN:
   - Used 'sudo protonvpn-cli init' and 'sudo protonvpn-cli c -f' to connect.

Connection Status Verification:

Visited whatismyipaddress.com in Brave browser. Verified IP changed to 49.43.3.21 (Mumbai,

India), confirming VPN routing.

Encrypted Traffic and Browsing Behavior:

Browsed multiple sites with no issues, confirming encrypted tunnel was active.

Optional: Disconnect and Speed Comparison:

Disconnected using 'sudo protonvpn-cli d'. IP reverted to original. Observed slight speed reduction while VPN was active.

Research Summary on VPN Encryption and Privacy Features:

- Encryption Protocols: OpenVPN, WireGuard with AES-256
- IP Masking: Conceals real IP address
- No-Logs Policy: Ensures privacy by not recording activity
- Kill Switch: Prevents data leaks if VPN drops
- DNS Leak Protection: Routes DNS requests through VPN

Summary: VPN Benefits and Limitations:

Benefits:

- Enhances online privacy
- Secures public Wi-Fi traffic
- Bypasses geo-restrictions
- Protects from ISP throttling

Limitations:

- May reduce speed
- Not fully anonymous
- Requires trust in provider
- Some services block VPN
- Reliable VPNs often require payment

Conclusion:

This task provided practical experience with VPN configuration on Kali Linux. The VPN successfully masked IP and secured communication, highlighting its benefits and limitations.