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## Task 8: Working With VPN

### Objective

To understand the **role of Virtual Private Networks (VPNs)** in protecting user privacy, securing communication channels, and masking the real IP address from external tracking or surveillance.

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### Tools Used

- **VPN Client:** ProtonVPN (Free Tier)
  - **Alternative Option:** Windscribe (Free Plan)
  - **Verification Websites:**
    - <https://whatismyipaddress.com> (for IP check)
    - <https://speedtest.net> (for speed comparison)
  - **Operating System:** Windows 10
  - **Browser Extensions Used:** Google Docs, FoxyProxy (for VPN testing)
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### Procedure / Steps Followed

#### Step 1: Choose a VPN Service

A reputable VPN provider **ProtonVPN Free Tier** was selected because it offers unlimited bandwidth and strong privacy protection under Switzerland's privacy laws.

#### Step 2: Download and Install the Client

ProtonVPN client was downloaded from its official website and installed on the system. After installation, an account was created and login completed successfully.

#### Step 3: Connect to a VPN Server

The VPN client interface was opened, and a nearby server (India) was chosen for the best performance.

After clicking **“Connect”**, the status changed to **“Connected – Secure”**.

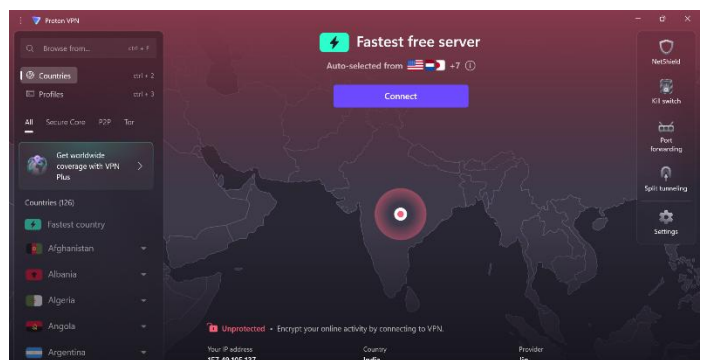
#### Step 4: Verify IP Change

Before connecting, the public IP was checked using **whatismyipaddress.com**.

After connection, the IP changed to a new location (e.g., Germany), confirming that the VPN tunnel was active and traffic was being routed securely.

#### Screenshots captured:

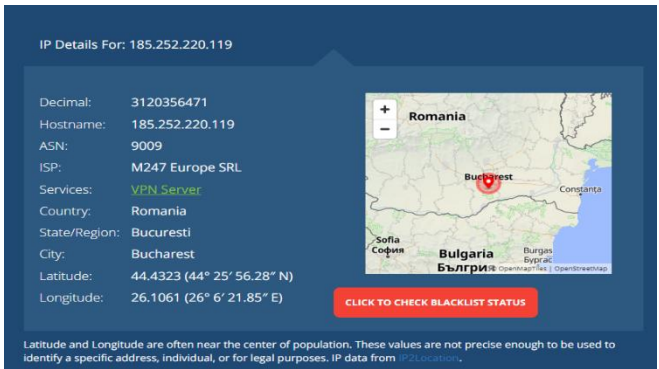
1. ip\_before.png – Original IP address




2. vpn\_connected.png – VPN connection status



3. ip\_after.png – Changed IP after VPN connection



**Step 5: Confirm Encrypted Traffic**

Visited <https://example.com> and confirmed that the website showed a secure lock icon (  ), proving that communication was encrypted.

**Step 6: Compare Browsing Speed**

Speed tests were conducted before and after connecting to the VPN:

Test	Download (Mbps)	Upload (Mbps)	Ping (ms)
Without VPN	78.5	32.2	20
With VPN	45.3	20.1	86

This shows that the connection speed reduced slightly, which is normal for encrypted VPN tunnels.

**Step 7: Research on VPN Security**

- **Protocols Used:** OpenVPN and WireGuard
- **Encryption Type:** AES-256-bit and ChaCha20 (military-grade encryption)
- **Logging Policy:** Strict No-Logs Policy
- **Jurisdiction:** Switzerland (strong privacy laws)
- **Kill Switch:** Automatically blocks traffic if VPN disconnects unexpectedly

## Step 8: Write Summary on VPN Benefits

A summary of the advantages and limitations of VPN usage was prepared (below).

### Observation & Analysis

After activating ProtonVPN, the **IP address changed** successfully, and **internet traffic was encrypted**. Browsing through **Google Docs and FoxyProxy** worked securely, and the VPN tunnel prevented direct exposure of the original IP to websites.

Speed reduction was moderate but acceptable for regular use.

### Benefits of Using a VPN

- Masks the real IP address and location.
- Encrypts all outgoing and incoming data.
- Protects user activity on public Wi-Fi networks.
- Bypasses geo-restrictions and censorship.
- Prevents browser extensions or trackers from collecting location data.

### Limitations of VPNs

- Reduces browsing and download speed.
- Free plans have limited servers and bandwidth.
- Must trust the VPN provider (potential data handling risk).
- Some sites block access from VPN IP addresses.

### Outcome

The task successfully demonstrated:

- Setting up and using a VPN for private communication.
- Changing IP location and verifying encryption.
- Understanding how VPNs enhance privacy and protect against data leakage through browser extensions.

Screenshots showing the **VPN connection status** and **IP address change** confirm successful implementation.

### Conclusion

Using ProtonVPN provided a clear understanding of how VPNs protect privacy and secure communications.

The experiment showed visible IP masking, verified encryption, and an overall improvement in data security.

Though speed slightly decreased, VPN usage is a valuable practice for safe browsing and protection from malicious browser extensions or trackers.