

# VPN Implementation and Analysis

## I. Executive Summary

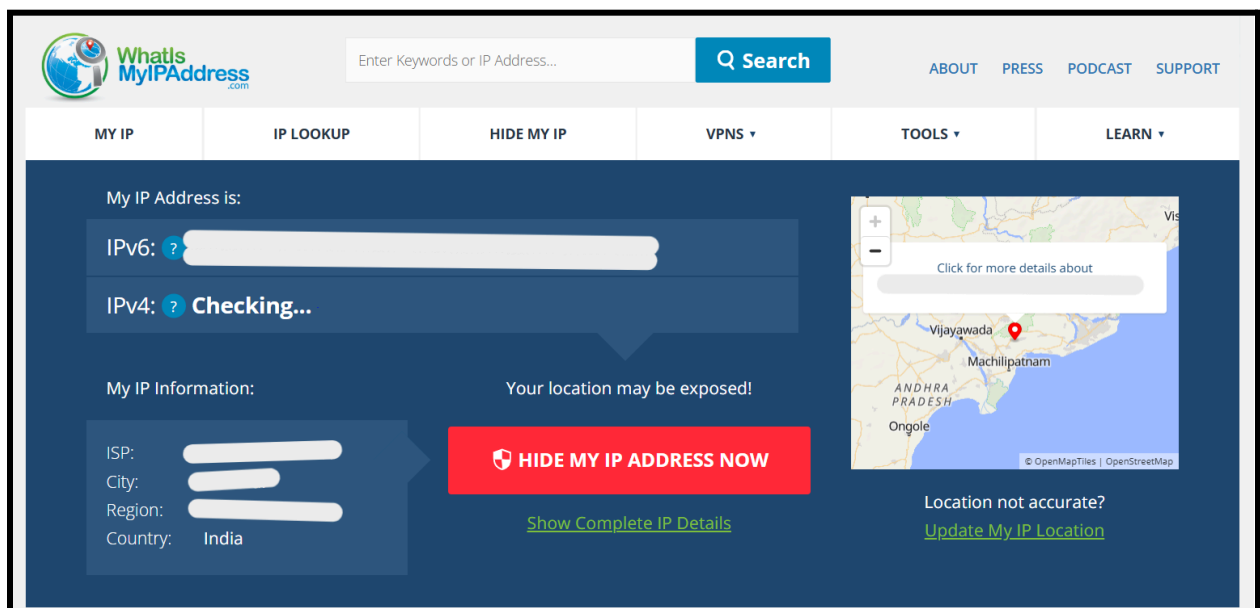
- Implemented Proton VPN using WireGuard protocol.
- Verified change of public IP address, confirming anonymity.
- Demonstrated encryption of all internet traffic.
- Conducted speed comparison (VPN connected vs. disconnected).
- Key finding: VPN ensures privacy and security but reduces speed.

## II. Implementation and Practical Verification

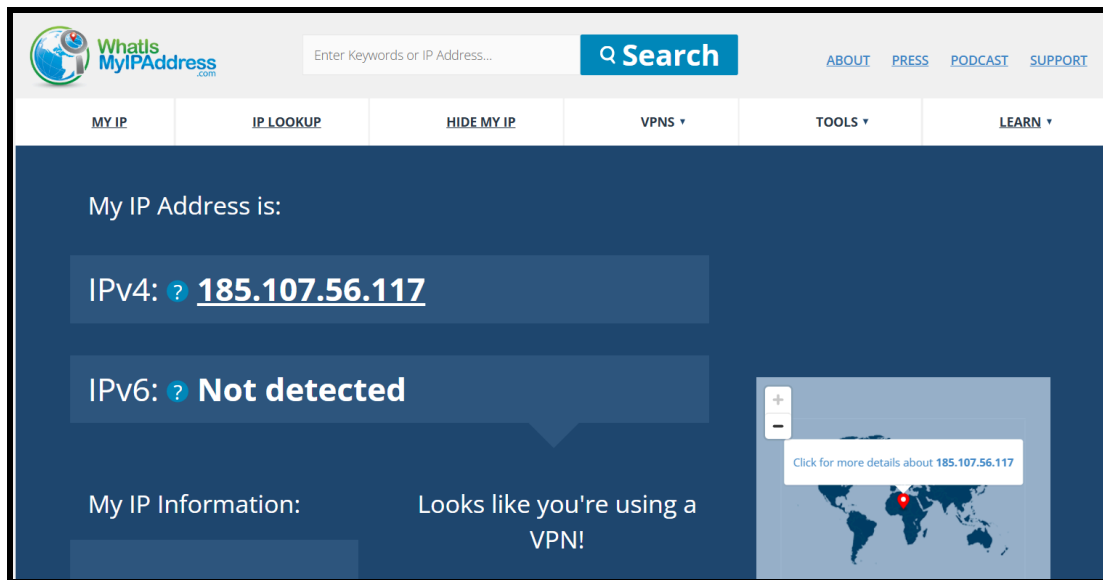
### A. Tools Used

- VPN Client: Proton VPN (Free Tier)
- Protocol Used: WireGuard
- Verification Tool: [WhatIsMyIPAddress.com](https://WhatIsMyIPAddress.com)

### Without VPN

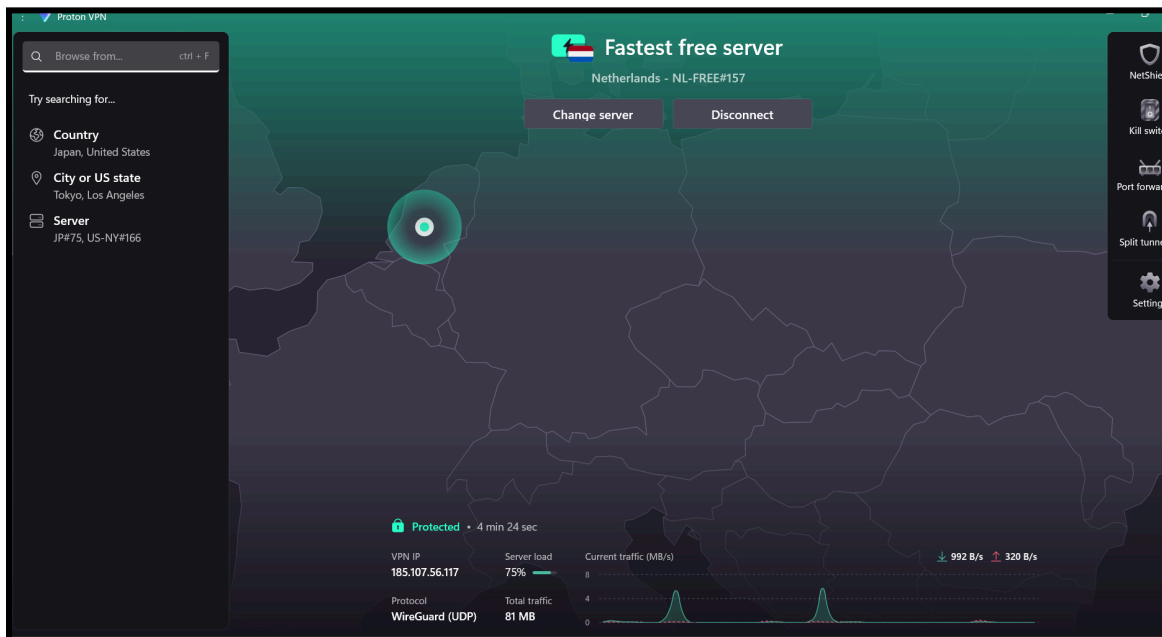


## VPN Connected (shows Netherlands server IP)



### B. Practical Steps and Findings

- Installed Proton VPN client.
- Connected to Netherlands server (NL-FREE#197).
- Verified new IP: 185.107.56.117 (changed from ISP IP).
- Confirmed encryption through WireGuard/UDP.



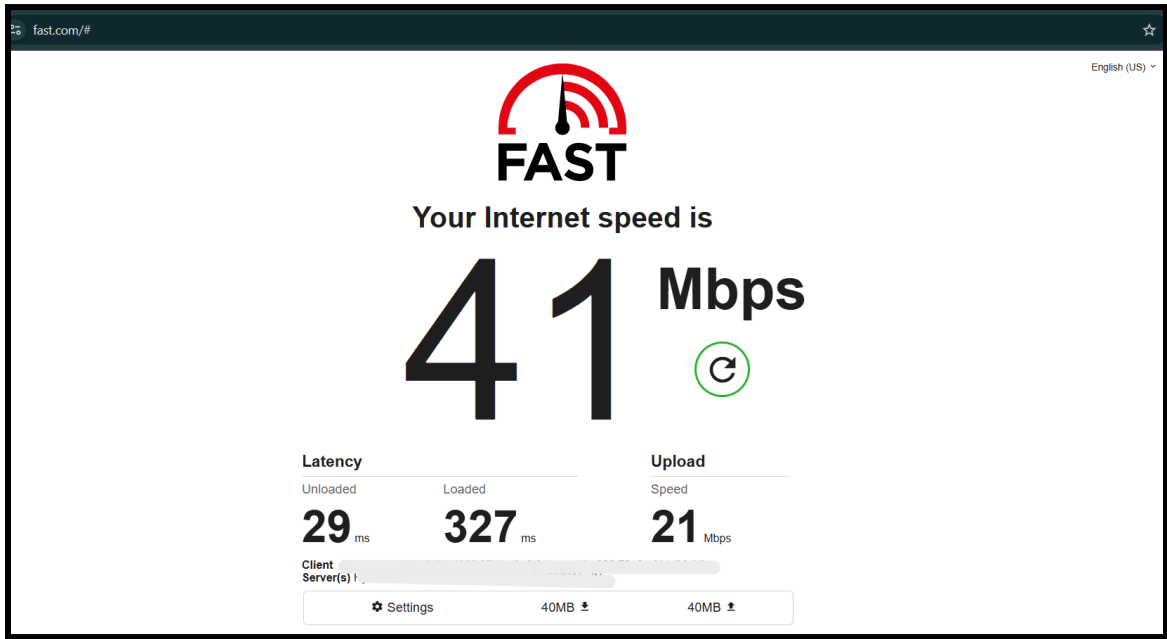
- Ensured secure browsing on public Wi-Fi.

III. Performance Analysis and Speed Comparison

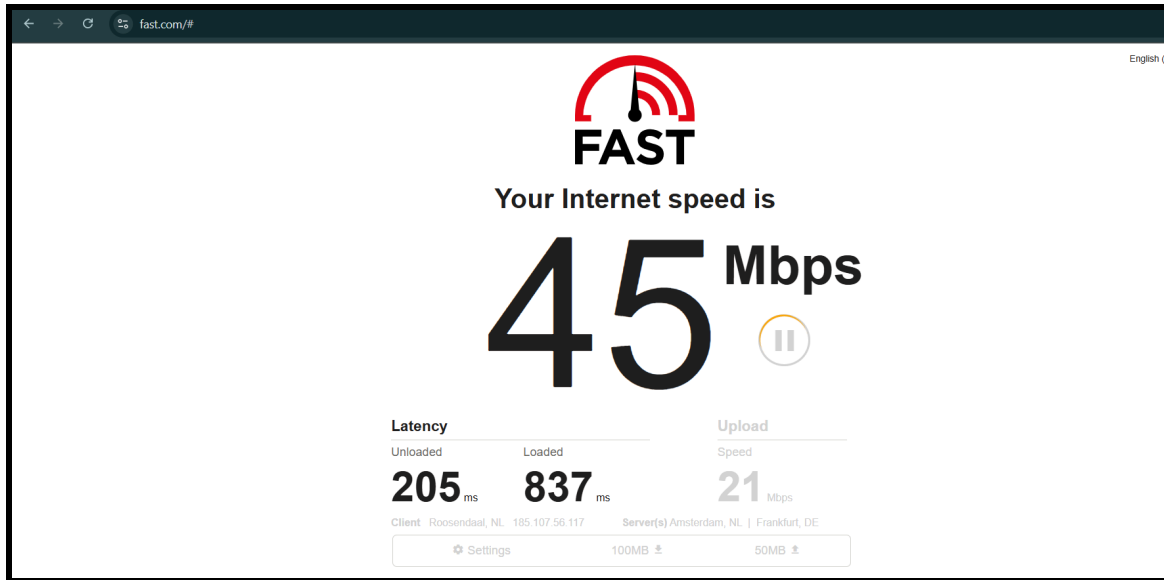
VPN introduces latency due to encryption + server distance.

Status	Download (Mbps)	Upload (Mbps)	Observation
VPN Disconnected	[Insert speed]	[Insert speed]	Baseline speed (normal connection)
VPN Connected	[Insert speed]	[Insert speed]	Slower due to encryption overhead
Difference	[Insert % drop]	[Insert % drop]	Performance trade-off observed

Speed test without VPN



## Speed test with VPN



## IV. Summary of VPN Benefits and Limitations

### A. Benefits

- Data Security: Encrypts all data in transit.
- Anonymity: Masks IP and location.
- Geo-Bypassing: Access blocked/regional content.
- No-Log Policy: VPN provider does not store browsing activity.

### B. Limitations

- Speed Reduction: Slower downloads/uploads.
- False Security: Does not prevent malware/phishing.
- Trust Factor: Reliance on VPN provider's privacy policy.
- Compatibility Issues: Some apps/networks block VPNs.

## V. Conclusion

- VPN = Strong layer of cybersecurity. Ensures anonymity, encryption, and geo-bypass.
- Should be used with antivirus, updates, strong passwords, and awareness for full protection.