Task 8: VPN Analysis and Security Report

Introduction

This report documents the practical execution and observations of **Task 8: Working and Understanding VPNs**. The main goal of this task was to gain hands-on experience with a Virtual Private Network (VPN), understand how it secures user privacy, and evaluate its impact on internet connectivity.
For this purpose, we used **Windscribe VPN**, a reliable and user-friendly VPN provider. The key activities included:

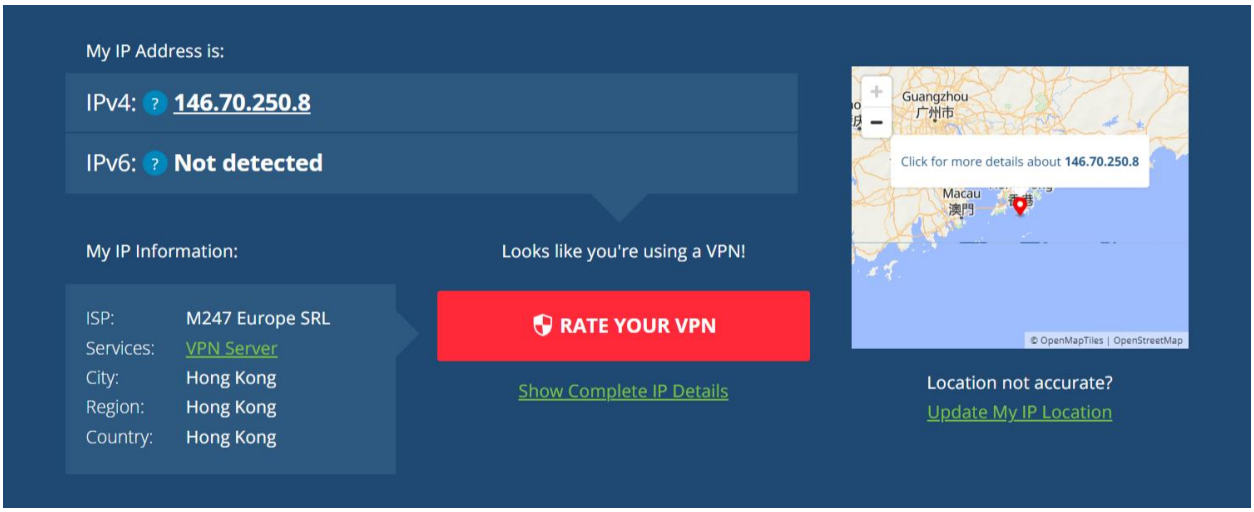
- **Masking the IP address** to hide the user's real location
- **Conducting a DNS leak test** to ensure secure DNS resolution
- **Comparing internet speed** before and after connecting to the VPN

VPN Setup and Connection Status

Windscribe was used as the VPN client. The VPN was set to 'Best Location' using the WireGuard protocol. The assigned location was Victoria, Hong Kong. The VPN successfully masked the actual IP address.

IP Address Verification

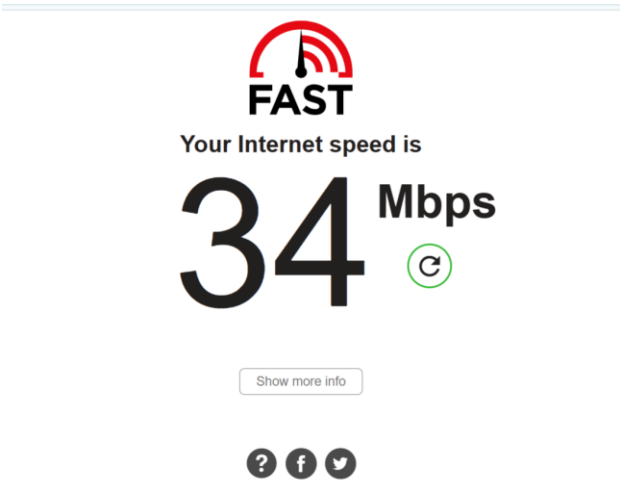
The IP address was checked using WhatIsMyIPAddress.com to ensure it was masked.



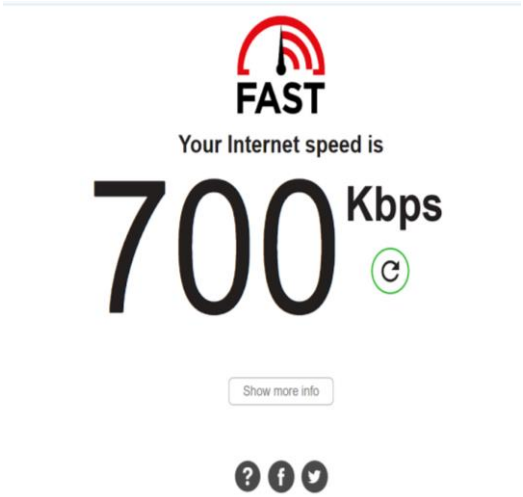
Internet Speed Test (With & Without VPN)

Two speed tests were conducted using Fast.com to compare the network speed.

VPN OFF:



VPN ON:



DNS Leak Test Result

A full DNS leak test was performed and no leaks were detected. This means the VPN is correctly routing DNS queries through the encrypted tunnel.

What Is My IP Address

My IP Address :			
IP Address	146.70.250.8		
Hostname	n/a		
IP Address Location :			
Country	Hong Kong (HK)		
State/Region	Hong Kong Island		
City	Hong Kong		
ISP	M247 Europe SRL		
Organization	M247 Ltd HONG KONG		
Network	AS9009 M247 Europe SRL (VPN, VPSH, TOR, BIZNET, ANYCAST)		
Usage Type	Corporate / Hosting		
Timezone	Asia/Hong_Kong (HKT)		
Local Time	Mon, 09 Jun 2025 23:31:50 +0800		
Coordinates	22.2825,114.1620		
IPv6 Leak Test :			
IPv6 Address	n/a		
WebRTC Leak Test :			
Local IP Address	n/a		
Public IP Address	146.70.250.8		
DNS Leak Test :			
Test Results	Found 2 Servers, 2 ISP, 2 Locations		
Your DNS Servers	IP Address :	ISP :	Location :
	146.70.250.2	M247 Europe SRL	Hong Kong, Hong Kong
	2403:2500:8000:1::f91	HOSTVIRTUAL	Hong Kong, Mid Levels

Windscribe VPN Protocols

Windscribe offers multiple VPN protocols tailored to different user needs and network conditions:

1. **WireGuard**
    - A **next-generation VPN protocol** known for **speed, security, and efficiency**.
    - Utilizes modern cryptographic primitives (e.g., ChaCha20, Poly1305).
    - Faster connection setup and better battery usage—ideal for all platforms.
    - Strongly recommended for most users due to its performance and low overhead.
2. **OpenVPN (UDP/TCP)**
    - **Most widely used and trusted** open-source protocol.
    - **UDP mode** is faster and ideal for streaming.
    - **TCP mode** is more stable and reliable on poor networks.
    - Highly configurable, used in corporate and personal VPNs alike.
3. **IKEv2/IPSec**
    - Known for **resilience during network changes** (like switching from Wi-Fi to mobile data).
    - Best suited for **mobile devices** due to its speed and auto-reconnect capabilities.
    - Offers strong encryption and seamless roaming support.

4. Stealth/Custom Modes

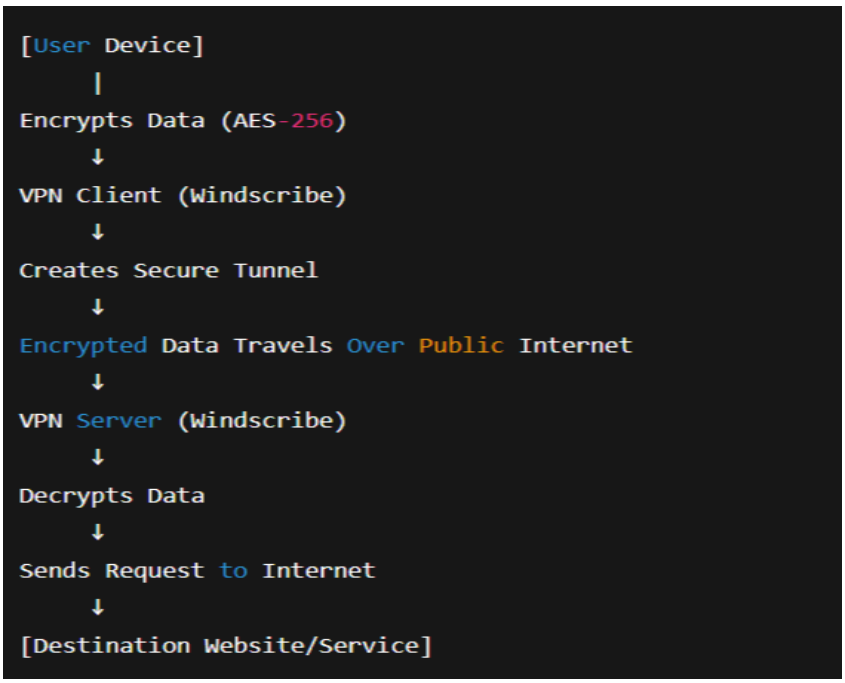
- Designed for users in **censored countries** where VPN traffic is blocked.
- Obfuscates VPN traffic to bypass **Deep Packet Inspection (DPI)**.
- Essential for countries like China, Iran, or UAE where standard protocols are restricted.

Benefits vs Limitations of Using a VPN

Benefits	Limitations
Hides your real IP address	Can reduce internet speed due to encryption
Encrypts internet traffic to secure data	Some websites and services may block VPN usage
Allows access to geo-blocked streaming content	Free version often has bandwidth limitations
Protects against data theft on public Wi-Fi	Requires trust in the VPN provider
Prevents ISP tracking and throttling	Initial configuration may be confusing to some

VPN Encryption Flowchart

Here's a **simple visual flow of how VPN encryption works** (add this as a graphic in your Word document):



Use-Cases Where VPN Is Critical

1. **Public Wi-Fi Protection**
    - Prevents eavesdropping and data interception in cafes, airports, hotels, etc.
2. **Remote Work Access**
    - Enables secure connection to corporate intranets and internal apps from home or abroad.
3. **Streaming Geo-Blocked Content**
    - Bypass regional restrictions on platforms like Netflix, Hulu, or BBC iPlayer.
4. **Censorship Circumvention**
    - Helps access free internet in countries with strict censorship laws by bypassing firewalls.
5. **Privacy from ISP Tracking**
    - Prevents Internet Service Providers from logging your browsing history and selling data.
6. **Avoid Price Discrimination**
    - Airlines, e-commerce sites may show different prices based on region—VPN helps avoid this.

Conclusion

This task underscored the **crucial role of VPNs** in ensuring online safety and privacy.
Using Windscribe VPN:

- I explored different **VPN protocols** like WireGuard and OpenVPN.
- Experienced **encryption in action** through IP masking and DNS leak protection.
- Noted how VPNs can **bypass censorship, unlock content, and protect sensitive data**.

Windscribe proved to be a **reliable, easy-to-use VPN solution**, offering the core privacy tools needed in today's surveillance-heavy internet landscape.