



## Cyber Security Review on VPN

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### ABSTRACT

Security becomes important in to day life. And network security becomes major consideration in modern era. Network provides various tasks like banking, shopping, communications and organizations. For this type of task it requires privacy and security. Hackers are the main threat for security, which they steal the information from the users and blackmails the user. This may happen while the user using his original IP address. To overcome this threat many users approaches VPN – Virtual Private Network. The function is to give private and safe search to the users by changing the user's IP address simultaneously, which does not reveal the original IP address. VPN provide various platforms like VPN browser and VPN application. VPN provides different type of security such as authenticity, confidentiality and data integrity. VPNs are more famous because of their low cost and easy to use. VPNs are available for various device such as computers, smartphones, tablets, laptops. Other functions of VPNs are to access the blocked pages. VPN acts like tunnel between organizations network and employees interface. Every different device has a different IP address. This research paper explains more about VPN and IP address

**Keywords:** IP – Internet Protocol, VPN – Virtual Private network, Interface – Connection between two place, Autenticity – Verified, Data Integrity - Overall accuracy, completeness and consistency of data

### INTRODUCTION:-

This article give the review about VPN. It provides the knowledge about function of VPN, use of VPN, about IP address and types of IP address. Nowadays, the market place is very competitive and doing business without the help of IT is impossible. Companies are always in the hunt for latest technologies to help them obtain smooth processes and to create a competitive edge. One of the most useful technologies in that sense is virtual privates networks (VPNs). It enables various secure connections through public networks, mostly WANs, and creates private channels. IT departments including network administrators, and IS professionals can adapt this technology in their organizations and have knowledge of its implementations, protocols, and troubleshot.

The main idea of VPN and why it become popular is that it uses the internet as a global medium which grants global accessibility. However, the internet is a shared medium and everyone is using it, so the data is highly vulnerable to various breaches. Those breaches includes unauthorized access, eavesdropping, and damage, which could turn into a disadvantages to the organization instead of benefiting them. Nevertheless, the goal of VPN is to provide reliable, secure, and stated networks within the stated budget of implementation. The user can come over the disadvantages by implementing various security measures, in the end, he or she can balance if this technology is appropriate to their organization/use scope and if benefits exceed the drawbacks.

#### Consist of

IP ADDRESS

IPV4 ADDRESS

IPV6 ADDRESS

FUNCTIONS OF VPN

USES OF VPN

#### 1.1 IP ADDRESS:-

IP stands for "Internet Protocol," which is a set of rules that define how data is transmitted over the internet. The IP protocol enables communication between devices connected to the internet by assigning unique numerical addresses to each device, called an IP address. This address is used to route data packets from the source device to the destination device over the internet. There are two main versions of the IP protocol: IPv4 and IPv6. IPv4 uses 32-bit addresses, which limits the number of available addresses, while IPv6 uses 128-bit addresses, allowing for a virtually unlimited number of unique

addresses. IP is one of the core protocols in the internet protocol suite (TCP/IP), which also includes protocols for routing, transport, and application-layer functions.

There two types of IP address that are

IPV4 Address

IPV6 Address

### 1.1.1. IPV4 Address:-

IP stands for Internet Protocol and v4 stands for Version Four (IPv4). IPv4 was the primary version brought into action for production within the ARPANET in 1983. IP version four addresses are 32-bit integers which will be expressed in decimal notation.

Example:- IPv4 address of this computer:- 157.46.121.249

Parts of IPv4:-

- 1) Network Part
- 2) Host Part
- 3) Subnet Number

#### 1.1.1.1. NETWORK PART:-

*The network part indicates the distinctive variety that's appointed to the network. The network part conjointly identifies the category of the network that's assigned.*

#### 1.1.1.2. HOST PART:-

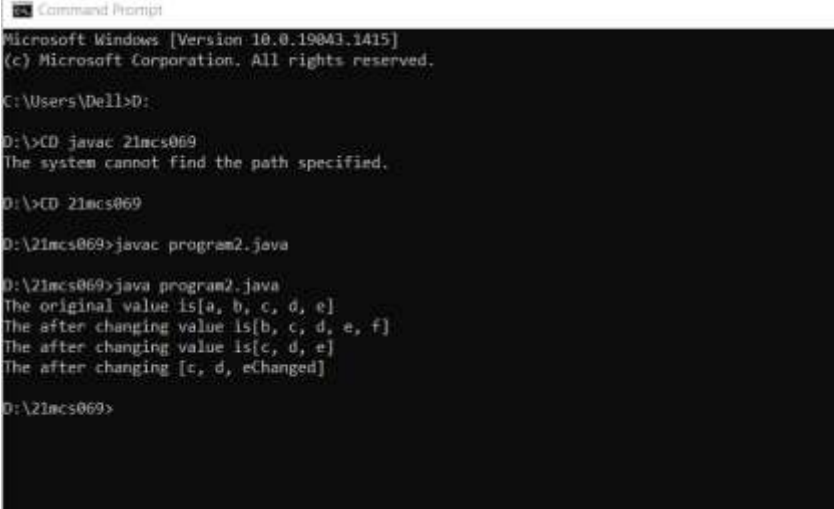
The host part uniquely identifies the machine on your network. This part of the IPv4 address is assigned to every host. For each host on the network, the network part is the same, however, the host half must vary.

#### 1.1.1.3. SUBNET PART:-

This is the nonobligatory part of IPv4. Local networks that have massive numbers of hosts are divided into subnets and subnet numbers are appointed to that.

#### 1.1.1.4. HOW TO CHECK IPV4 ADDRESS:-

Goto > Start Menu > Search Comd promp > Type "ipconfig" > Address will be shown (Fig 1.1)



```

Command Prompt
Microsoft Windows [Version 10.0.19041.1415]
(c) Microsoft Corporation. All rights reserved.

C:\Users\Dell>D:

D:\>CD javac 21mcs069
The system cannot find the path specified.

D:\>CD 21mcs069

D:\21mcs069>javac program2.java

D:\21mcs069>java program2.java
The original value is[a, b, c, d, e]
The after changing value is[b, c, d, e, f]
The after changing value is[c, d, e]
The after changing [c, d, e]changed

D:\21mcs069>

```

(Fig 1.1)

**1.1.1.5. CHARACTERISTICS OF IPV4:-**

- IPv4 could be a 32-Bit IP Address.
- IPv4 could be a numeric address, and its bits are separated by a dot.
- The number of header fields is twelve and the length of the header field is twenty.
- It has Unicast, broadcast, and multicast style of addresses.
- IPv4 supports VLSM (Virtual Length Subnet Mask).
- IPv4 uses the Post Address Resolution Protocol to map to the MAC address.
- RIP may be a routing protocol supported by the routed daemon.
- Networks ought to be designed either manually or with DHCP.
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**1.1.1.6. ADVANTAGES OF IPV4:-**

- IPv4 security permits encryption to keep up privacy and security.
- IPv4 network allocation is significant and presently has quite 85000 practical routers.
- It becomes easy to attach multiple devices across an outsized network while not NAT.
- This is a model of communication so provides quality service also as economical knowledge transfer.
- IPv4 addresses are redefined and permit flawless encoding.

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**1.1.2. IPV6 Address:-**

The Internet Engineering Task Force( IETF) created IPv6 to address the issue of IP v4 prostration.. IP v6 is a 128-bits address having an address space of  $2^{128}$ , which is way bigger than IPv4. In IPv6 we use Colon-Hexa representation. There are 8 groups and each group represents 2 Bytes.

Addressing of IPv6:-

- Unicast
- Multicast
- Anycast

**1.1.2.1. UNICAST:-**

An individual network interface is linked by a unicast address. A unicast address directs a packet to the interface that address designates.

**1.1.2.2. MULTICAST ADDRESS: -**

A multicast destination address is bought and utilised by a group of hosts inclusively appertained to as hosts. These hosts do not have to be close by geographically. All interfaces corresponding to that multicast address will admit any packet transmitted to this multicast address.

**1.1.2.3. ANYCAST ADDRESS: -**

An multifariousness of interfaces are given an Anycast Address. Any packet transmitted to an anycast address will only reach one member interface, frequently the closest host.

#### 1.1.2.4. FINDING IPV6 ADDRESS:-

Goto Start Menu > Search Comd promp > Type ipconfig/all > Address will be shown (Fig1.2)

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Wireless LAN adapter Wi-Fi:
    Connection-specific DNS Suffix . : 
    IPv6 Address. . . . . : 2009:0072:6d0f:9665:0017:9a91:e596:f0bd
    Temporary IPv6 Address. . . . . : 2009:0072:6d0f:9665:c1b:471c:5b44:32f3
    Link-local IPv6 Address . . . . . : fe80::9f4f:d0c3:d1af:ae219
    IPv4 Address. . . . . : 192.168.32.233
    Subnet Mask . . . . . : 255.255.255.0
    Default Gateway . . . . . : fe80::f848:dff:fea6:993849
    . . . . . : 192.168.32.252
  
```

Fig1.2

#### 1.1.2.5. ADVANTAGES OF IPV6 ADDRESS:-

- Reliability
- Faster Multicast is supported by IPv6 as opposed to broadcast in IPv4. This function enables contemporaneous transmission of packet flows with high bandwidth conditions, similar as multimedia aqueducts.
- Greater Security IPv6 includes IPSecurity, which offers data integrity and secretiveness.
- Routing efficiency
- Most specially, it's the last resort for the Global- network's expanding bumps.

## 1.2. Function of VPN:-

By directing the network traffic through a specifically set-up remote gateway operated by a VPN host, a VPN can conceal your IP address. In other words, if you use a VPN to surf the web, the VPN user becomes the source of your data. This implies that neither your Internet Service Provider (ISP) nor other parties may see the websites you visit or the information you enter and shoot online. All of your data is converted into "gibberish" via a VPN, which functions like a filter. Your data would be useless if someone were to get their hands on it. Various use of VPNs

### 1) Multiple Server Locations

### 2) SPI Firewall

### 3) No Log Policy

#### 1) Multiple Server Locations:-

The most common function or purpose of a VPN service is to access content worldwide. VPN technology has made it possible for people to have multiple server locations without worrying about their data security. By using a VPN, you can connect to servers in different geographic areas and access the available resources on those servers. It can be a great way to bypass geo-fence restrictions and/or censored content.

#### 2) SPI Firewall:-

The SPI firewall is a security feature that is included in most routers. It stands for Stateful Packet Inspection and is specially designed to block unauthorized network ports and protocols to access the protected network. VPN tunnels are created by encapsulating data packets in encrypted protocols such as IPsec or PPTP. This way, the SPI firewall cannot inspect these data packets, as they are hidden inside the encrypted tunnel. However, not every software of VPN service offers these features, so if you are looking for a VPN that helps you bypass SPI Firewalls, be sure to check VPN.

#### 3) No Log Policy:-

The no- log rules of VPNs are well- known. This indicates that no records of your conditioning while utilising the VPN are kept. Accordingly, it's a fantastic way to save your online sequestration. Choose VPN if you want a VPN with a no- logs policy. You should examine the terms of service before registering with a VPN because not all of them have no log programs.

## 1.3. Uses of VPN:-

1. Stop ISP Throttling - Internet throttling, or ISP strangling, is the deliberate decelerating down of internet speed by the Internet Service Provider (ISP) itself grounded on the websites you visit or the volume of data you have used.
2. P2P Safely - When you transfer data from person to person (P2P) via an relaxed network, there's a significant peril involved. relaxed networks make it possible for lines to be stolen and used erroneously. These lines could contain sanctioned paperwork, particular prints and pictures, etc.

3. Public Wi- Fis are largely unsafe to use and may beget you to lose your particular and fiscal data in a jiff. Using Public Wi- Fi hotspots can beget great fiscal damage. But this does n't help druggies from using Wi- Fis at Cafes, Transports, hospices,etc.

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