What You Need to Know About VPNs

<table>
<thead>
<tr>
<th>VPN</th>
<th>Service Layer</th>
<th>Topology</th>
<th>Security</th>
<th>Key Advantages</th>
<th>Key Limitations</th>
</tr>
</thead>
<tbody>
<tr>
<td>SSL/OpenVPN</td>
<td>Secure Sockets Layer</td>
<td>Layer 3</td>
<td>Protocol</td>
<td>Facilitates secure data transfer over the internet</td>
<td>Requires endpoint software or appliance. Tunnel is coupled to service, and difficult to scale.</td>
</tr>
<tr>
<td>IPSec</td>
<td>Internet Protocol Security</td>
<td>Layer 3</td>
<td>Protocol</td>
<td>Supports secure communication over IP networks</td>
<td>Facilitates secure communication over IP networks, and needs GPE to support IP Multicast.</td>
</tr>
<tr>
<td>GRE/IP-in-IP Generic Routing Encapsulation</td>
<td>Tunneling</td>
<td>Layer 3 (IP or IPv6)</td>
<td>Tunneling</td>
<td>Provides no security and does not connect across Web proxies.</td>
<td>Provides no security and does not connect across Web proxies.</td>
</tr>
<tr>
<td>MPLS IP VPN Multiprotocol Label Switching</td>
<td>Transport tunnels for Layer 2: Unicast are P2P (PE-to-PE). Multicast are P2MP (one-PE-to-several-PEs).</td>
<td>Layer 3 (IPv4 or IPv6)</td>
<td>Tunneling</td>
<td>Facilitates secure communication over IP networks</td>
<td>Provides no security and does not connect across Web proxies.</td>
</tr>
<tr>
<td>EVPN Extensible LAN</td>
<td>Service Layer</td>
<td>Layer 2</td>
<td>Protocol</td>
<td>Enables Ethernet services over MPLS</td>
<td>Requires endpoint software or appliance. Tunnel is coupled to service, and difficult to scale.</td>
</tr>
<tr>
<td>VPLS Virtual Private LAN Service</td>
<td>Service Layer</td>
<td>Layer 2</td>
<td>Protocol</td>
<td>Enables Ethernet services over MPLS</td>
<td>Requires endpoint software or appliance. Tunnel is coupled to service, and difficult to scale.</td>
</tr>
<tr>
<td>EVPN Ethernet VPN</td>
<td>Service Layer</td>
<td>Layer 2</td>
<td>Protocol</td>
<td>Enables Ethernet services over MPLS</td>
<td>Requires endpoint software or appliance. Tunnel is coupled to service, and difficult to scale.</td>
</tr>
</tbody>
</table>

**Related Protocols/VPNs**
- SSL: TLS, HTTP
- IPSec: ESP, GRE, IPIP
- GRE/IP-in-IP
- MPLS IP VPN
- BGP/MPLS VPLS
- BGP/MPLS VPLS
- VRF (the IPv4-Unicast, IPv4-Multicast, IPv6-Unicast, IPv6-Multicast)
- CCC and TCC
- MPLS VPLS
- MPLS Ethernet PVC
- GRE/IP-in-IP
- VPLS
- IPv6 Ethernet PVC
- VRF
- MC Service
- Security

**Legend**
- P2P = point-to-point
- P2MP = point-to-multipoint

**Postconcept**
Susan McCoy
Aravind Srinivasan
Antonio Gargiulo-Mingo

**References**
- [SSL](https://www.juniper.net/documentation/en_us/junos/topics/concept/vpn-security-overview.html)
- [IPSec](http://www.juniper.net/documentation/en_us/junos/topics/concept/vpn-security-overview.html)
- [GRE/IP-in-IP](http://www.juniper.net/documentation/en_us/junos/topics/concept/vpn-security-overview.html)
- [MPLS IP VPN](http://www.juniper.net/documentation/en_us/junos/topics/concept/vpn-security-overview.html)
- [EVPN](http://www.juniper.net/documentation/en_us/junos/topics/concept/vpn-security-overview.html)
- [VPLS](http://www.juniper.net/documentation/en_us/junos/topics/concept/vpn-security-overview.html)
- [EVVPN](http://www.juniper.net/documentation/en_us/junos/topics/concept/vpn-security-overview.html)