



# Specification

## Basic Capabilities of SoftEther VPN Server

### Maximum Concurrent [VPN Sessions](#)

- 4,096 Sessions

### Maximum [Virtual Hubs](#)

- 4,096 Virtual Hubs

### Remote Access VPN

- [Layer-2 \(Ethernet Bridging\)](#)
- [Layer-3 \(IP Routing\)](#)

### Site-to-Site VPN

- [Layer-2 \(Ethernet Bridging\)](#)
- [Layer-3 \(IP Routing\)](#)

### Traffic Control

- [VoIP / QoS Priority Control](#)
- [Traffic Shaping for Per Users or Groups](#)

### Maximum Objects in a Virtual Hub

- [Users](#): 10,000
- [Groups](#): 10,000
- [Access List Entries](#): 32,768
- [MAC Address Table Entries](#): 65,536
- [IP Address Table Entries](#): 65,536
- [Cascade Connections](#): 128

### SecureNAT Function

- [Virtual NAT Function](#): Maximum 4,096 Dynamic Mapping
- User-mode NAT
- Kernel-mode NAT
- [Virtual DHCP Function](#)

## High Availability and Clustering

- [Maximum Cluster Members](#): 64
- [Load Balancing](#)
- Load Balancing Weight Control
- Dynamic Mode Virtual Hub Mapping over Cluster Members
- Static Mode Virtual Hub Mapping over Cluster Members
- [Fault Tolerance](#)

## Security Features

- [External User-authentication Methods](#): [RADIUS](#) / [NT Domain](#) / [Active Directory](#)
- [Security Policy Settings](#) for Per User / Per Group
- [Security Logs](#) Isolation for Each Virtual Hubs
- [Works as System-mode Background Service](#)
- [Works as User-mode Program](#)
- DoS Attacks Detection and Protection (SYN Flood)

## Management Functions

- [VPN Server Manager GUI for Windows](#)
- [Command-line Management Utility \(vpncmd\)](#)
- [Listener Ports Dynamic Add / Delete](#)

## VPN Protocols Supported by SoftEther VPN Server

- [SoftEther VPN Protocol \(Ethernet over HTTPS\)](#)
- [OpenVPN \(L3-mode and L2-mode\)](#)
- [L2TP/IPsec](#)
- [MS-SSTP \(Microsoft Secure Socket Tunneling Protocol\)](#)
- [L2TPv3/IPsec](#)
- EtherIP/IPsec

## SoftEther VPN Protocol Specification

- Supported Payload Protocols: [Any Protocols in Ethernet](#)
- Upper Underlying Protocol: TLS (Transport Layer Security) 1.0, 1.1, 1.2, 1.3
- Lower Underlying Protocol: TCP/IP and UDP/IP Hybrid (on IPv4 and IPv6)
- Ciphers:
  - TLS 1.3-based strong ciphers
- Data Compression: zlib
- Session-key: 128bit
- Based Standards: Extended HTTPS over SSL Protocol (RFC2818, RFC 5246)

- WAN Optimization: [1-32 Parallel TCP Connection to Construct a Logical VPN Session](#)
- Persistent Link: Infinite Auto-reconnect Function
- Proxy Support: [HTTP Proxy Server and SOCKS Proxy Server](#)
- TCP Ports: 443, 992 and 5555 is Listening by Default.  
[You can add/delete listening TCP ports.](#)
- Behind NAT Solution:  
[NAT-Traversal Function](#) is enabled by default. No need to open any TCP/UDP ports on the NAT for accepting VPN connections which are initiated from Internet-side.
- Anti-restricted Firewall Solution:  
[VPN over ICMP](#) (Encapsulate all Ethernet packets over ICMP packets)  
[VPN over DNS](#) (Encapsulate all Ethernet packets over DNS packets)
- [User-authentication](#):
  - Anonymous
  - Standard Password Authentication
  - Password Authentication for RADIUS
  - Password Authentication for NT Domain and Active Directory
  - X.509 RSA PKI Certification Authentication (Key file on Disk)
  - X.509 RSA PKI Certification Authentication (PKCS#11 Smart-cards or USB Tokens)
- VPN Encapsulation Payload:  
Ethernet (IEEE802.3) Frames (Up to 1,514bytes or 1,518bytes for IEEE802.1Q VLAN Tags)
- Supported VPN Clients: [SoftEther VPN Client](#)
- Supported Client OS: Windows and Linux
- Supported VPN Topologies: [Remote-access VPN](#), [Site-to-Site VPN \(L2-Bridging\)](#) and [Site-to-Site VPN \(L3-Routing\)](#)

### **L2TP/IPsec Sever Function Specifications on SoftEther VPN Server**

- User-authentication Methods: PAP and MS-CHAPv2
- NAT-Traversal: RFC3947 IPsec over UDP Encapsulation
- Transport UDP Ports:  
UDP 500 and 4500  
(Allow both ports on the firewall. Add UDP port forwarding for both 500 & 4500 on the NAT.)
- Supported Hashes:
  - MD5 and SHA-1
- Supported Diffie-Hellman Groups:  
MODP 768 (Group 1), MODP 1024 (Group 2) and MODP 1536 (Group 5)
- Compatible VPN Clients: Built-in VPN Clients on [Windows](#), [Mac](#), [iOS](#) and [Android](#)

- Compatible Client OS: [Windows](#), [Mac](#), [iOS](#), [Android](#) and other L2TP-supported VPN Client OS
- Supported VPN Topologies: [Remote-access VPN](#)

### **OpenVPN Server Function Specifications on SoftEther VPN Server**

- OpenVPN Clone Function for Compatibility with [OpenVPN Technologies, Inc.'s implementation](#).
- Default Ports:  
TCP 443, 992 and 5555  
UDP: 1194
- Supported Ciphers:  
AES-128-CBC, AES-192-CBC, AES-256-CBC, BF-CBC, CAST-CBC, CAST5-CBC, DES-CBC, DES-EDE-CBC, DES-EDE3-CBC, DESX-CBC, RC2-40-CBC, RC2-64-CBC and RC2-CBC
- Supported Hashes:  
SHA, SHA1, MD5, MD4 and RMD160
- Operational Mode: L2 (Bridging) and L3 (Routing)
- Compatible VPN Clients: [OpenVPN for PC \(Windows, Mac, Linux\)](#) and [OpenVPN Connect](#) by OpenVPN Technologies, Inc.
- Compatible Client OS: [Windows](#), [Linux](#), [Mac](#), [iOS](#) and [Android](#)
- Supported VPN Topologies: Remote-access VPN, Site-to-Site VPN (L2-Bridging) and Site-to-Site VPN (L3-Routing)

### **SSTP Server Function Specifications on SoftEther VPN Server**

- Clone Function for [SSTP-VPN Server of Microsoft's Windows Server 2008 R2 / 2012](#).
- User-authentication Methods: PAP and MS-CHAPv2
- Supported Ciphers and Hashes on TLS:  
TLS-1.3 based strong ciphers
- Compatible VPN Clients: Built-in VPN Clients on Windows Vista, 7, 8, 10, 11, RT
- Compatible Client OS: Windows Vista, 7, 8, 10, 11, RT, Server 2008, Server 2008 R2, Server 2012
- Supported VPN Topologies: Remote-access VPN

### **L2TPv3 Server Function Specifications on SoftEther VPN Server**

- Clone Function for [Cisco's L2TPv3 Site-to-Site VPN Server](#)
- NAT-Traversal: RFC3947 IPsec over UDP Encapsulation
- Transport UDP Ports:  
UDP 500 and 4500

(Allow both ports on the firewall. Add UDP port forwarding for both 500 & 4500 on the NAT.)

- Supported Ciphers:  
DES-CBC, 3DES-CBC, AES-CBC
- Supported Hashes:  
MD5 and SHA-1
- Supported Diffie-Hellman Groups:  
MODP 768 (Group 1), MODP 1024 (Group 2) and MODP 1536 (Group 5)
- Supported VPN Topologies: Site-to-Site VPN (L2-Bridging)
- Compatible VPN Clients: Cisco IOS's L2TPv3 VPN Client
- Compatible Client OS: Cisco IOS or other compatible O

### **EtherIP Server Function Specifications on SoftEther VPN Server**

- NAT-Traversal: RFC3947 IPsec over UDP Encapsulation
- Supported Ciphers:  
DES-CBC, 3DES-CBC, AES-CBC
- Transport UDP Ports:  
UDP 500 and 4500  
(Allow both ports on the firewall. Add UDP port forwarding for both 500 & 4500 on the NAT.)
- Supported Hashes:  
MD5 and SHA-1
- Supported Diffie-Hellman Groups:  
MODP 768 (Group 1), MODP 1024 (Group 2) and MODP 1536 (Group 5)
- Supported VPN Topologies: Site-to-Site VPN (L2-Bridging)
- Compatible VPN Clients: EtherIP VPN Client
- Compatible Client OS: EtherIP compatible OS

## **Requirements**

### **Supported Operating Systems**

- **Windows (32bit, 64bit)**  
Windows 98 / 98 SE / ME / NT 4.0 SP6a / 2000 SP4 / XP SP2, SP3 / Server 2003 SP2 / Vista SP1, SP2 / Server 2008 SP1, SP2 / Hyper-V Server 2008 / 7 SP1 / Server 2008 R2 SP1 / Hyper-V Server 2008 R2 / 8 / Server 2012 / Hyper-V Server 2012 / 8.1 / Server 2012 R2 / 10 / Server 2016 / Server 2019 / Server 2022 / 11
- **Linux (32bit, 64bit)**  
Linux 2.4, 2.6, 3.x, 4.x

- **Mac OS X (32bit, 64bit)**  
Mac OS X 10.4 Tiger or later
- **FreeBSD (32bit, 64bit) (Stable Edition: Server and Bridge only, Developer Edition: Client is also supported)**
- **NetBSD (32bit, 64bit) (Developer Edition only, Client is also supported)**
- **OpenBSD (32bit, 64bit) (Developer Edition only, Client is also supported)**
- **Solaris (32bit, 64bit) (Server and Bridge only)**  
Solaris 8, 9, 10, 11

### Supported CPUs

- **Windows**  
Intel x86 (32bit), Intel x64 (64bit)
- **Linux**  
Intel x86 (32bit), Intel x64 (64bit), PowerPC (32bit), ARM EABI (32bit), ARM legacy ABI (32bit), MIPS Little-Endian (32bit), Arm64 (64bit)
- **Mac OS X**  
Intel x86 (32bit), Intel x64 (64bit), PowerPC (32bit), PowerPC G5 (64bit)
- **FreeBSD**  
Intel x86 (32bit), Intel x64 (64bit)
- **Solaris**  
Intel x86 (32bit), Intel x64 (64bit), SPARC (32bit), SPARC (64bit)

### Hardware Requirements for SoftEther VPN Server

- **Free RAM**  
Minimum: 32Mbytes + 0.5Mbytes \* (Number of Concurrent VPN Sessions)  
Recommended: 128Mbytes + 0.5 Mbytes \* (Number of Concurrent VPN Sessions)
- **Free Disk Space**  
Minimum: 100Mbytes  
Recommended: 2Gbytes (for daily VPN connection logs)

## **Hardware Requirements for SoftEther VPN Client**

- **Free RAM**  
Minimum: 16Mbytes  
Recommended: 32Mbytes