

# VPN Connections

- [VPN Connection](#)
- [Authorization by PPTP](#)
- [Authorization by PPPoE](#)
- [IPSec IKEv2](#)
- [SSTP](#)
- [L2TP IPSec](#)
- [User's Personal Account](#)
- [Features of Routing and Access Organization](#)
- [Instructions for running PowerShell scripts](#)

# VPN Connection

To gain access from outside (from home, hotel, or another office) to the enterprise's local network located behind SafeUTM, you can connect via VPN from this machine (computer or mobile device) to the SafeUTM server.

For client-to-site VPN, our server supports four tunneling protocols: **IKEv2**, **SSTP**, **L2TP/IPsec**, and **PPTP**.

For security reasons, it is not recommended to use the PPTP protocol (it is left for compatibility with outdated operating systems and equipment, as well as for authorization in a local network where there are no requirements for strict traffic encryption).

**IKEv2 protocol is recommended in terms of speed and security.**

You can use the **user's personal account** to distribute instructions on creating custom VPN connections.

# Authorization by PPTP

Do not use this type of connection. This connection method is EXTREMELY insecure and has been left solely for compatibility with older solutions. Use **IPsec-IKEv2**.

Authorization by PPTP protocol involves authorization via a secure network tunnel between the user's network device and the SafeUTM internet gateway.

- A login/password bundle is used for user authorization and Active Directory users.
- To authenticate by PPTP protocol you need to assign an IP address to a network device, as well as configure a connection using the PPTP protocol, specifying the SafeUTM gateway IP address as the PPTP server address.

Upon successful authorization and establishment of a network tunnel, an additional IP address will automatically be assigned to the network device to gain access to internet resources. Using authorization by PPTP does not affect the ability of a network device to access LAN resources in any way.

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## Configuring SafeUTM Global Settings

To set up authorization by PPTP protocol you need to perform the following actions:

1. Go to **Users -> VPN connections**.

2. Select **PPTP Authorization** and click **Save**.

VPN connections ▾

Stopped

General

Fixed VPN IP addresses

General settings

Network for VPN connections

192.168.0.0/16

- ☒ PPTP connection
- ☐ PPPoE connection
- ☐ IKEv2/IPSec Connection

Domain

safeutm.com

- ☐ SSTP Connection

Domain

Port

1443 ▾

- ☐ L2TP/IPSec Connection

PSK

.....

Save

You can edit your login and password in the tab **Users -> User & Group** upon selection of a necessary user.

**General**    Quota    IP and MAC authorization

Username

Ryan Howard

Login

howard

Found in a group

Sales

### Operations

Change password

Delete

### Additional settings

- ☐ Deny access
- ☐ Allow remote access via VPN


Save

The user is assigned an IP address automatically from the pool of addresses for VPN configured in the section **Users -> VPN connections** (for example, 10.128.0.0/16).

In order to set up a **static** binding of addresses issued via VPN to certain users, go to **Users -> VPN connections -> Fixed VPN IP Addresses**, click "+ Add" and specify the intended user and IP address. An example of a fixed VPN IP address can be seen below:

VPN connections

Working

General

Fixed VPN IP addresses

Network for VPN connections: 192.168.0.0/16

+ Add

User	IP address	Operations
 Ryan Howard	192.168.150.55	

When connecting from the internet, we recommend using IPSec IKEv2, L2TP IPSec, or SSTP for more reliable traffic encryption.

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## Configuring Users in SafeUTM

Allow the user to connect via VPN from the Internet by checking in the user settings (**Users -> User & Group -> General tab**) in the box **Allow remote access via VPN**.

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## Possible Problems

- The provider from the gateway's side or from the connected client's side blocks the GRE protocol with which the PPTP connection takes place. In this case, when trying to connect to an external SafeUTM address, error 619 will occur. You can determine on which side the problem is by connecting from different places and from different providers. If it is possible to connect from some places, it means that the problem is on the side of those clients who cannot connect. When the provider is determined, you need to try to solve the problem with them or use **IPsec-IKEv2** or **SSTP**.
  - TCP port 1723 is blocked. You can check the port availability using standard network utilities such as telnet. If there is no connection to this port, then the tunnel cannot be established.
  - The user's username or password is incorrect. If this happens, it is often suggested to specify the domain when reconnecting. Try to create alphanumeric passwords, preferably in Latin, for your accounts. If the password is entered incorrectly more than 6 times, the user's IP address will be blocked by the password attack protection service.
  - If the connection is made with Windows OS, then in order for the packets to go through it, you need to make sure that the following box is checked in the connection settings **Use default gateway on the remote network** in the section **VPN connection properties -> Network tab -> Internet Protocol Version 4 (TCP/IPv4) properties -> Advanced**. If it is not necessary to route all packets to this interface, then the route must be written manually.
  - When the error **The connection was terminated by the remote computer** occurs, it is necessary to enable MPPE 128-bit support (In Windows this option is enabled by default) and only check MSCHAPV2 among authorization protocols.
- 

## If a VPN connection is established but it is not possible to access local network resources

Follow the recommendations in the article **Features of Routing and Access Organization**.

# Authorization by PPPoE

Authorization by PPPoE protocol involves authorization via a secure network tunnel between the user's network device and the SafeUTM server. A login/password bundle is used for user authorization. With this type of authorization, the assignment of the workstation IP address is not required, since an IP address will be assigned automatically upon successful authorization and creation of a secure network tunnel.

To set up authorization by PPPoE protocol you need to perform the following actions:

1. Go to **Users -> VPN connections**.

2. Select **PPPoE Authorization** and click **Save**.

## VPN connections ▾

Working

General

Fixed VPN IP addresses

### General settings

Network for VPN connections

192.168.0.0/16

☐ PPTP connection

☒ PPPoE connection

☐ IKEv2/IPSec Connection

Domain

safeutm.com

☐ SSTP Connection

Domain

Port

1443

☐ L2TP/IPSec Connection

PSK

.....



Save



You can edit your login and password in the tab **Users -> User & Group** upon selection of a necessary user.

**General**    Quota    IP and MAC authorization

Username

Ryan Howard

Login

howard

Found in a group

Sales

**Operations**

Change password

Delete

**Additional settings**

☐ Deny access

☐ Allow remote access via VPN

Save

The user is assigned an IP address automatically from the pool of addresses for VPN configured in the section **Users -> VPN connections** (for example, 10.128.0.0/16).

In order to set up a **static** binding of addresses issued via VPN to certain users, go to **Users -> VPN connections -> Fixed VPN IP Addresses**, click and specify the intended user and IP address. An example of a fixed VPN IP address can be seen below:

VPN connections

Working

2

General

Fixed VPN IP addresses

Network for VPN connections: 192.168.0.0/16

+ Add

User	IP address	Operations
<div><div></div>Ryan Howard</div>	192.168.150.55	<div></div>

Authorization by PPPoE is possible only in one Ethernet segment with local SafeUTM interfaces.

# IPSec IKEv2

This VPN protocol is preferable and recommended for all usage scenarios. Instructions for setting up VPN connections on different operating systems are available [here](#).

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## Setting up VPN Server in SafeUTM

1. To enable authorization by IKEv2, check the corresponding box **Connection via IKEv2/IPsec** in the Web interface section **Users -> VPN connections**.
2. Routes are transmitted to clients to your local networks automatically. To control access to networks, use **Firewall**.

3. Connection is possible only by domain name (not by IP address), therefore it is necessary to have a domain name that resolves to the IP address of the SafeUTM external interface. In the **Domain** field, this DNS name must be specified. It is necessary to issue a Let's Encrypt certificate.

## VPN connections ▾

Working

General

Fixed VPN IP addresses

### General settings

Network for VPN connections

192.168.0.0/16

☐ PPTP connection

☐ PPPoE connection

☒ IKEv2/IPSec Connection

Domain

safeutm.com

☐ SSTP Connection

Domain

Port

1443

☐ L2TP/IPSec Connection

PSK

.....



Save

4. For users who need to connect from outside via VPN, check the box **Allow remote access via VPN** in the user tree. The username and password specified here will be used to connect.

## IPsec IKEv2 Support in Client OS

- Microsoft **Windows 7** (2009). Requires installation of a Let's Encrypt root certificate
- Apple **MacOS X 10.11** "El Capitan" (2015)
- Linux **NetworkManager plugin** (since 2008)
- Google **Android 11** (2020). On older versions, you can use the **StrongSwan** application
- Apple **iOS 9** (iPhone 4S) (2015)
- **KeeneticOS 3.5**
- Mikrotik
- Cisco routers

# SSTP

SSTP (Secure Socket Tunneling Protocol) is a protocol of secure traffic tunneling based on SSL/TLS. It is supported by Windows OS Vista and above, as well as Mikrotik, Keenetic routers, and others.

If possible, do not use this type of connection. This connection method passes through NAT better than others, but with unstable communication quality, it works much worse than other VPNs (especially when transmitting audio/video), since it encapsulates all data inside TCP. It is recommended to use IPsec-IKEv2 instead of SSTP.

UTM does not support Mikrotik connection over SSTP because Mikrotik uses an old and insecure SHA-1 algorithm.

## Setting up SafeUTM

It is not recommended to use SSTP for VPN connections from the local network.

VPN connections

Working

General

Fixed VPN IP addresses

General settings

Network for VPN connections

192.168.0.0/16

☐

PPTP connection

☐

PPPoE connection

☐

IKEv2/IPSec Connection

Domain

safeutm.com

☒

SSTP Connection

Domain

Port

1443

in **Users -> VPN**

external interface should  
field, you need to  
use it is necessary for  
443).

connect from outside via VPN, check the box **Allow remote access via VPN** in the user tree. The specified username and password will be used for the connection.

VPN setup instructions for different operating systems can be found [here](#).

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## If a VPN connection is established but it is not possible to access local network resources

Follow the recommendations in the article [Features of Routing and Access Organization](#).

# L2TP IPsec

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If possible, do not use this type of connection. This connection method can be unstable, has huge redundancy, has low performance, and does not support the strongest encryption. IPsec-IKEv2 is recommended instead. All modern operating systems support IKEv2, or there are applications for them.

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## Configuring SafeUTM Global Settings



1. Go to **Users -> VPN connections.**
2. Check the box **L2TP/IPsec Connection.**
3. Enter the secret phrase (PSK key).
4. Click on **Save.**

## VPN connections ▾

Working

General

Fixed VPN IP addresses

### General settings

Network for VPN connections

192.168.0.0/16

☐ PPTP connection

☐ PPPoE connection

☐ IKEv2/IPSec Connection

Domain

safeutm.com

☐ SSTP Connection

Domain

Port

1443

☒ L2TP/IPSec Connection

PSK

.....



[PowerShell - script for configuring connections](#)

Save

## Configuring Users in SafeUTM

Allow the user to connect via VPN from the Internet by checking in the user settings (**Users -> User & Group -> General tab**) in the box **Allow remote access via VPN**.

L2TP IPsec clients behind the same NAT may experience connectivity issues if there is more than one client. [\*\*Instructions\*\*](#) can help solve the problem. We recommend using [\*\*IKEv2 IPSec\*\*](#) instead of L2TP IPsec.

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## If a VPN connection is established, but you cannot access local network resources

Follow the recommendations in the article [\*\*Features of Routing and Access Organization\*\*](#).

# User's Personal Account

To quickly configure user connections, you can enable access to the SafeUTM web interface.

In the personal account accessible with the use of SafeUTM accounts details (local or domain, in case of **integration with Active Directory**), users will be able to download ready-made PowerShell scripts to create user connections and a link to instructions for setting up a VPN and running scripts.

You can enable access from the Internet to your personal account and SafeUTM administration web interface in the section **Server Management -> Administrators** by enabling the setting **Access to the web interface from external network**. After enabling the parameter, the personal account and the web administration interface will be accessible by the IP address of the SafeUTM external interface.

If the external IP address of SafeUTM is not included in the "white" networks, then you need to forward port 8443 on the upstream device.

## Administrators





For SSH access, use the administrator's login and password. SSH is available only to administrators with the "Administrator" role.

☒ Access to the web interface from external network

☐ Access via SSH from the local network

☐ Access via SSH from the external network

+ Add

Name ↑	Login	Role	Operations
Administrator	testadmin	Administrator	 

When logging in under a user account (including those imported from Active Directory), it will be possible to download scripts for creating VPN connections and a link to instructions for their implementation.

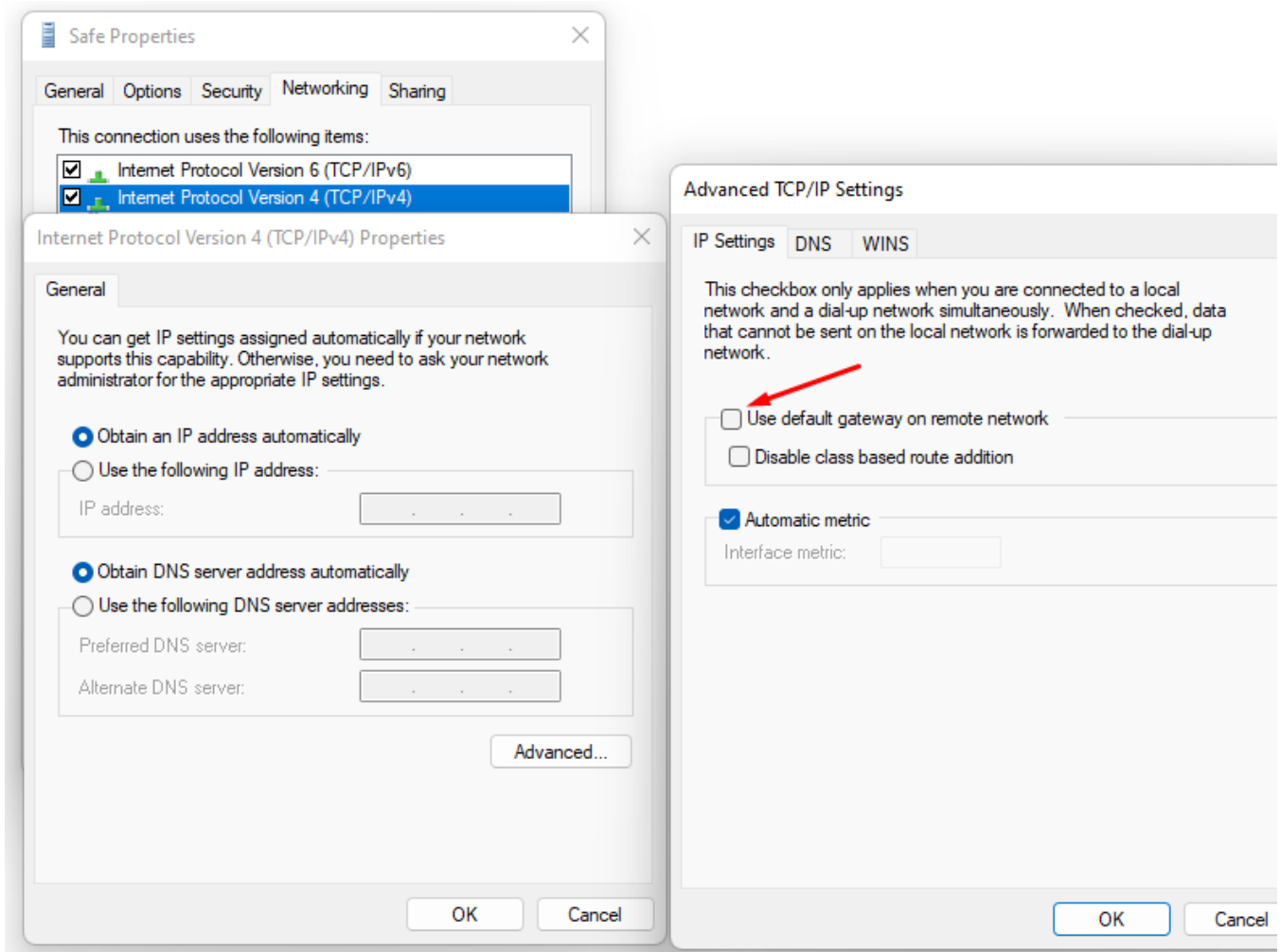
Users will also be able to remotely administer the SafeUTM server.

# Features of Routing and Access Organization

## If VPN is required only to access local network resources

If you need to access the Internet directly through your provider, and you need to use a VPN only to access corporate network resources on computers connected via VPN, you need to configure the following settings.

- In the VPN connection properties, uncheck the box **Use primary gateway on remote network**. Tab **Network** -> **Internet Protocol version 4** -> **Advanced** -> **IP Settings**.



- Create a route to the corporate network (in Windows 7, 8, 8.1, and 10, a route based on the class will be automatically created, depending on the address that the connection will receive via VPN. For example, a route will be added for the 10.0.0.0/8 network if the VPN server receives an address from the 10.128.0.0/16

**network**). For IPsec-IKEv2, you can configure automatic route acquisition.

Route example: if the corporate network is `172.16.0.0/16`, and the network for VPN connections is configured to SafeUTM `10.128.0.0/16` (and the IP address is issued to the VPN connection from the same network), then the route will be: `route -p add 172.16.0.0 mask 255.255.0.0 10.128.0.1`

- In some cases, the route may not work, then there is a ping to the protected interface (`10.128.0.1`), but there is no ping to the hosts in the LAN. In this case, when creating a route, you need to specify the number of the VPN connection interface. The final route will be as follows: `route -p add 172.16.0.0 mask 255.255.0.0 10.128.0.1 if nn` where **nn** is the number of the VPN connection interface which can be viewed when the VPN connection is active in the output of the route print command in the console section **List of Interfaces**.
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## If it is not possible to access computers in the local SafeUTM network

- Make sure that the local network (or the address on the network card) on the remote machine does not intersect with your organization's LAN, if it intersects, then there will be no access to your organization's network (traffic on the routing table will go to the physical interface, and not to VPN). **Addressing must be changed.**
- SafeUTM must be registered as the main gateway on LAN computers. If this is not the case, then you need to register the appropriate route manually on the devices, so that network packets go to SafeUTM for the VPN network.

**Example:** `route -p add 10.128.0.0 mask 255.255.0.0 10.1.1.1`

where `10.128.0.0/16` is the address of the SafeUTM VPN network (configured in **Users -> VPN connections**), and `10.1.1.1` is the IP address of the local SafeUTM interface.

- Check the firewall settings (**FORWARD table**) in SafeUTM for prohibiting rules.
- Computers and servers on Windows OS can restrict access to network folders using network profile settings rules (both on the side of the computer connecting via VPN, and on the side of computers and servers in LAN):

## Change sharing options for different network profiles

Windows creates a separate network profile for each network you use. You can choose specific options for each profile.

Private ▼

Guest or Public (current profile) ▲

Network discovery ▼

When network discovery is on, this computer can see other network computers and devices and is visible to other network computers.

☐ Turn on network discovery

☒ Turn off network discovery

File and printer sharing ▼

When file and printer sharing is on, files and printers that you have shared from this computer can be accessed by people on the network.

☐ Turn on file and printer sharing

☒ Turn off file and printer sharing

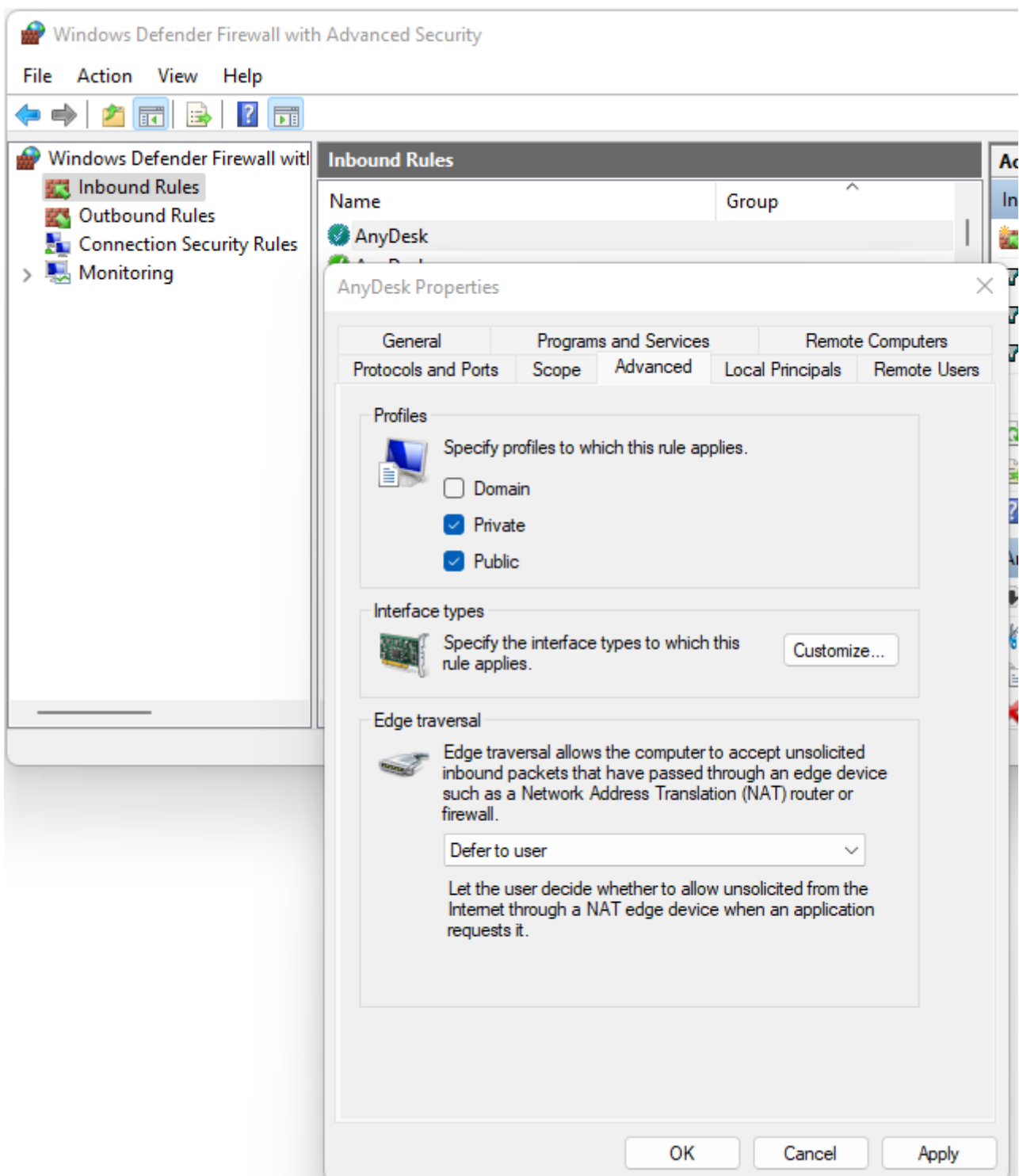
All Networks ▼

### Enable access to files and printers for All Networks and Private Networks profile.

You can do this using PowerShell (launched with rights elevated to the administrator) by running the command:

```
Enable-NetFirewallRule -Group "@FirewallAPI.dll,-28502"
```

- Windows Defender Firewall may block access to certain programs or services (including RDP) to external networks. Check it in the settings of incoming and outgoing connections (you need to allow access from frequent and local networks):



- Antivirus software on the computer may block access to it from non-local networks. Or block access to specific programs.  
For example, for some antiviruses, it is necessary to add a network for VPN connections (10.128.0.0/16 by default ) to exceptions.

# Instructions for running PowerShell scripts

Use ready-made scripts downloaded from your server to create a VPN connection in Windows versions 8.1 and 10.

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If you are using Windows 7, you must create the connection manually (see [Manually create user-side VPN connections](#)).

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## Which VPN protocol should I choose?

With several options for possible VPN connections, choose protocols according to the following criteria:

1. **IKEv2/IPsec** is the best protocol in terms of performance and connection reliability.
  2. **SSTP** is a protocol based on TCP and SSL. Choose it if the IKEv2 connection does not go through your provider.
  3. **L2TP/IPsec** is reliable in terms of encryption, but not the most optimal in terms of speed and performance.
- 

## How do I run a PowerShell script?

1. Download the script:

### From SafeUTM:

- By navigating to the section **Users -> VPN connections**
- Set the flag for the required connection protocol, if required, fill in the fields and click **Save**
- Click on the link **PowerShell - script to configure connections**



## VPN connections ▾

Stopped

General

Fixed VPN IP addresses

### General settings

Network for VPN connections

192.168.0.0/16

☐ PPTP connection

☐ PPPoE connection

☐ IKEv2/IPSec Connection

Domain

safeutm.com

☐ SSTP Connection

Domain

Port

1443

☒ L2TP/IPSec Connection

PSK

.....

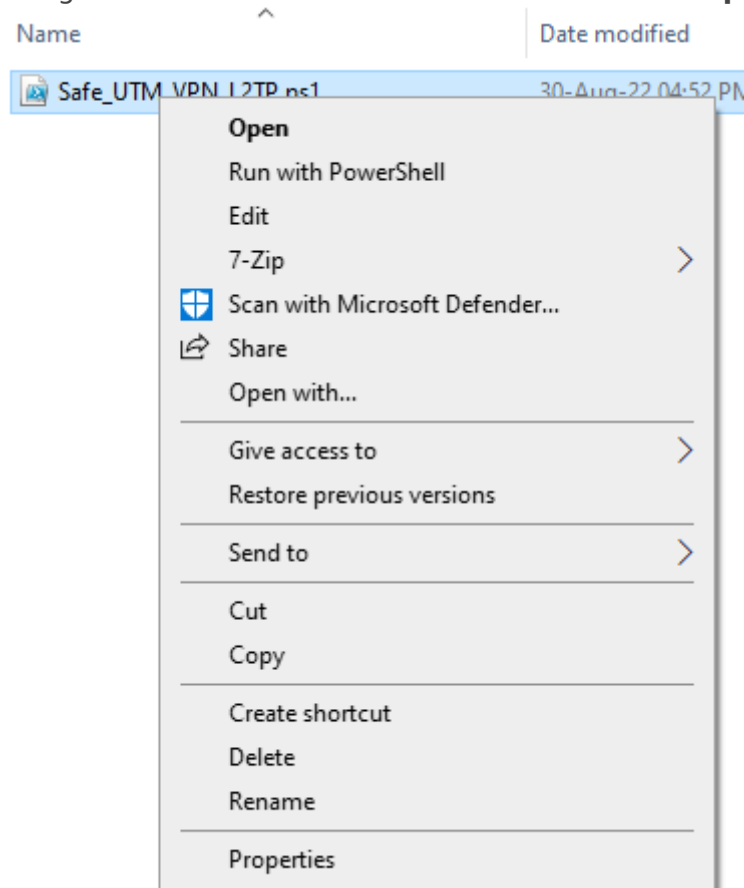


[PowerShell - script for configuring connections](#)

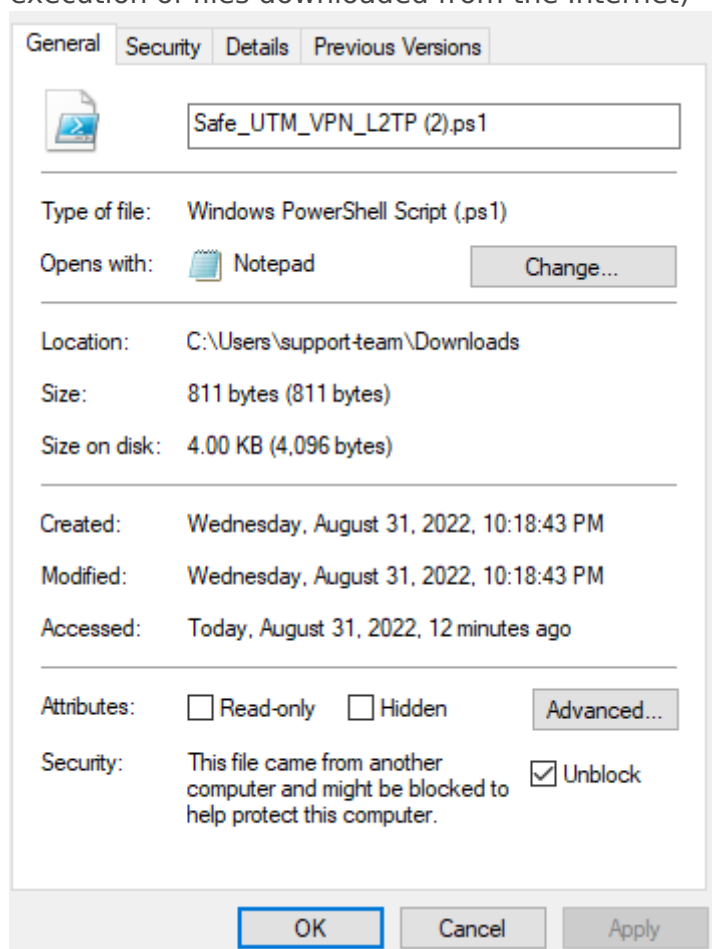
Save

- Transfer the downloaded file to the device where you want to create a VPN connection.

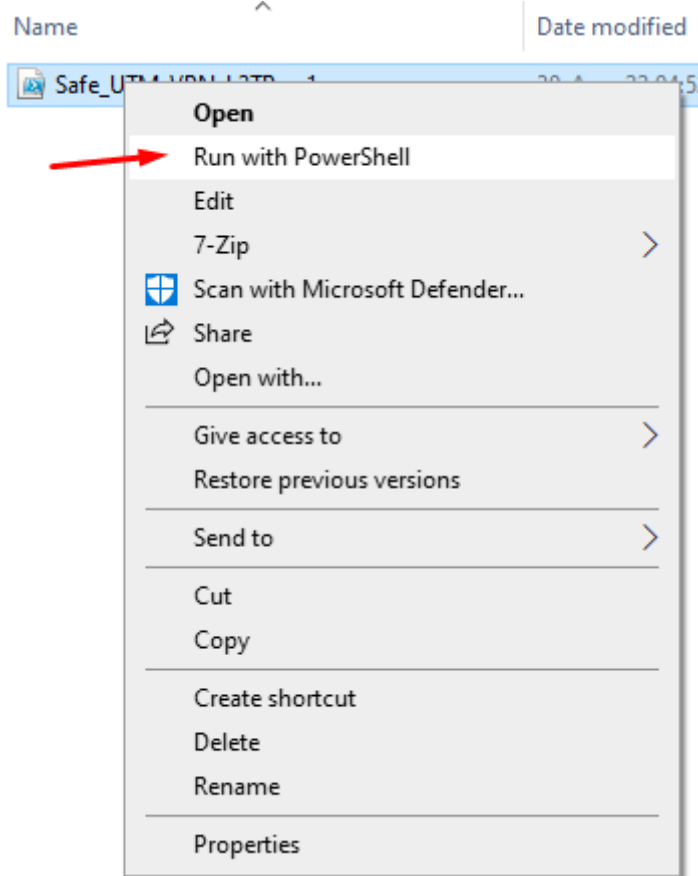
2. Right-click on the downloaded file and select **Properties** from the context menu.



3. Check the box **Unblock** in the lower right corner of file properties (by default, the OS blocks the execution of files downloaded from the Internet)



4. Right-click on the file again and select **Run in PowerShell** in the context menu.



If the error "Script execution is disabled on this system" appears, you need to enable script execution by running the command in PowerShell (call it up from the Start menu): `Set-ExecutionPolicy Unrestricted`

5. Answer **Yes** to the question about making changes to your computer.

6. The connection is created. Click **Connect** in the list of your networks.

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## What should I do if I can't run the script?

You may not have enough rights to run scripts or PowerShell is not installed on the system.

Use the instructions for creating a connection in **Windows 10** and **Windows 7**.