# Basic IPv6 WAN and LAN Configuration

This quick start guide provides basic IPv6 WAN and LAN configuration information for the ProSafe Wireless-N 8-Port Gigabit VPN Firewall FVS318N. For complete IPv6 configuration information, see the *Reference Manual*. This quick start guide contains the following sections:

- Set Up an IPv6 Internet Connection
- Configure the Basic IPv6 LAN Settings
- IPv6 Connection Troubleshooting Tips

**Note:** For more information about the topics covered in this guide, visit the FVS318N support website at <a href="http://support.netgear.com">http://support.netgear.com</a>. You will also find the *Reference Manual* at the support website.

## Set Up an IPv6 Internet Connection

- Default IPv6 Settings and Required ISP Information
- Configure the IPv6 Routing Mode
- Use a DHCPv6 Server to Configure an IPv6 Internet Connection
- Configure a Static IPv6 Internet Connection
- Enable 6to4 Automatic Tunneling
- Configure ISATAP Automatic Tunnelling

## Default IPv6 Settings and Required ISP Information

Table 1. Default IPv6 WAN settings

Item	Default Setting
WAN IPv6 mode	Disabled (IPv4 mode only)
WAN MAC address	Use default MAC address of the wireless VPN firewall
WAN MTU size	1500 bytes; 1492 bytes for PPPoE connections
Port speed	AutoSense

If you intend to configure a static IPv6 address, before you start the configuration process, use the following table to list the information that you need to have collected from your ISP. If you use an external DHCPv6 server to configure a dynamic IPv6 Internet address, you do not need to collect any information.

Table 2. ISP information required to configure a static IPv6 Internet connection

Item	Collected information from your ISP
IPv6 address	
IPv6 prefix length	
Default IPv6 gateway	
Primary DNS server address	
Secondary DNS server address	

## Configure the IPv6 Routing Mode

By default, the wireless VPN firewall supports IPv4 only. To use IPv6, you need to enable the wireless VPN firewall to support both devices with IPv4 addresses and devices with IPv6 addresses.

#### > To configure the IPv6 routing mode:

- 1. Select **Network Configuration > WAN Settings**. The WAN Mode screen displays.
- Select the IPv4 / IPv6 mode radio button to enable the wireless VPN firewall to communicate with both devices that have IPv4 addresses and devices that have IPv6 addresses.
- **3.** Click **Apply** to save your changes. The wireless VPN firewall reboots.

## Use a DHCPv6 Server to Configure an IPv6 Internet Connection

The wireless VPN firewall can autoconfigure its ISP settings through a DHCPv6 server by using either stateless or stateful address autoconfiguration. These options are explained in the following procedure.

- > To automatically configure the WAN port for an IPv6 connection to the Internet:
  - 1. Select Network Configuration > WAN Settings > Broadband ISP Settings.
  - 2. In the upper right of the screen, select the **IPv6** radio button. The ISP Broadband Settings screen displays the IPv6 settings:

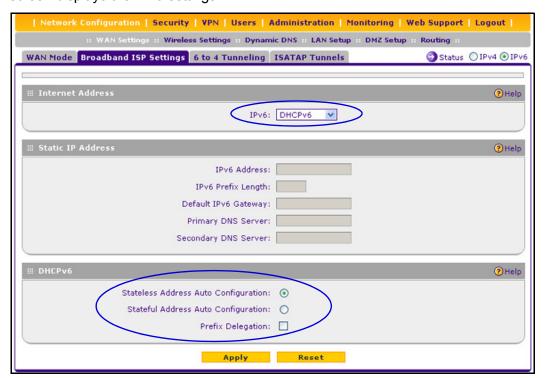


Figure 1.

- 3. In the Internet Address section of the screen, from the IPv6 drop-down list, select **DHCPv6**.
- 4. In the DHCPv6 section of the screen, select one of the following radio buttons:
  - Stateless Address Auto Configuration. The wireless VPN firewall generates its
    own IP address by using a combination of locally available information and router
    advertisements, but receives DNS server information from a DHCPv6 server. The IP
    address is a dynamic address.
  - Stateful Address Auto Configuration. The wireless VPN firewall obtains an interface address, configuration information such as DNS server information, and other parameters from a DHCPv6 server. The IP address is a dynamic address.

- 5. As an optional step: If you have selected the Stateless Address Auto Configuration radio button, you can select the Prefix Delegation check box:
  - Prefix delegation check box is selected. A prefix is assigned by the ISP's stateful DHCPv6 server through prefix delegation. For example, 2001:db8:: /64. The wireless VPN firewall's stateless DHCPv6 server can assign this prefix to its IPv6 LAN clients.
    - For information, see the "Stateless DHCPv6 Server With Prefix Delegation" section in Chapter 3, "LAN Configuration," of the *Reference Manual*.
  - Prefix delegation check box is cleared. Prefix delegation is disabled. This is the
    default setting.
- **6.** Click **Apply** to save your changes.
- 7. To verify the connection, click the **Status** option arrow in the upper right of the screen to display the Connection Status pop-up screen (the following figure contains examples):



Figure 2.

The Connection Status screen should show a valid IP address and gateway, and you are connected to the Internet. If the configuration was not successful, see *IPv6 Connection Troubleshooting Tips* on page 12.

## Configure a Static IPv6 Internet Connection

To configure a static IPv6 Internet connection, you need to enter the IPv6 address information that you should have received from your ISP (see *Table 2* on page 2).

- > To configure static IPv6 broadband ISP settings:
  - 1. Select Network Configuration > WAN Settings > Broadband ISP Settings.
  - In the upper right of the screen, select the IPv6 radio button. The ISP Broadband Settings screen displays the IPv6 settings:

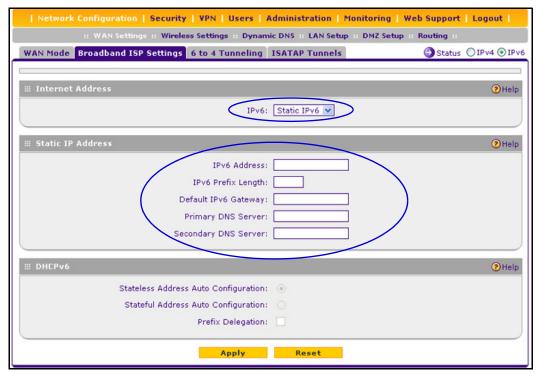


Figure 3.

- 3. In the Internet Address section of the screen, from the IPv6 drop-down list, select **Static** IPv6.
- In the Static IP Address section of the screen, enter the settings as explained in the following table.

Table 3. Broadband ISP Settings screen settings for a static IPv6 connection

Setting	Description
IPv6 Address	The IP address that your ISP assigned to you. Enter the address in <i>one</i> of the following formats (all four examples specify the same IPv6 address):  • 2001:db8:0000:0000:020f:24ff:febf:dbcb  • 2001:db8:0:0:20f:24ff:febf:dbcb  • 2001:db8:0:0:20f:24ff:128.141.49.32
IPv6 Prefix Length	The prefix length that your ISP assigned to you, typically 64.
Default IPv6 Gateway	The IPv6 IP address of the ISP's default IPv6 gateway.
Primary DNS Server	The IPv6 IP address of the ISP's primary DNS server.
Secondary DNS Server	The IPv6 IP address of the ISP's secondary DNS server.

- 5. Click **Apply** to save your changes.
- **6.** To verify the connection, click the **Status** option arrow in the upper right of the screen to display the Connection Status pop-up screen (the following figure contains examples):

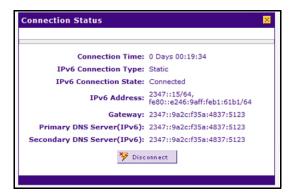


Figure 4.

## **Enable 6to4 Automatic Tunneling**

If your network is an isolated IPv6 network that is not connected to an IPv6 ISP, you need to make sure that the IPv6 packets can travel over the IPv4 Internet backbone by enabling automatic 6to4 tunneling.

There are two requirements for 6to4 tunnelling:

- If the wireless VPN firewall functions as the endpoint for 6to4 tunnels in your network: Make sure that the wireless VPN firewall has a static IPv4 address. A dynamic IPv4 address can cause routing problems on the 6to4 tunnels.
- If you do not use a stateful DHCPv6 server in your LAN:
   Configure the Router Advertisement Daemon (RADVD), and set up 6to4 advertisement prefixes for 6to4 tunneling to function correctly. For information, see the "Configure the IPv6 Router Advertisement Daemon and Advertisement Prefixes for the LAN" section in Chapter 3, "LAN Configuration," of the Reference Manual.

Typically, 6to4 tunnel addresses start with a 2002 prefix (decimal notification). On the wireless VPN firewall, a 6to4 tunnel is indicated by sit0-WAN1.

#### > To enable 6to4 automatic tunneling:

- 1. Select Network Configuration > WAN Settings > 6 to 4 Tunneling.
- 2. Select the **Enable Automatic Tunneling** check box.
- 3. Click **Apply** to save your changes.

#### Configure ISATAP Automatic Tunnelling

If your network is an IPv4 network or IPv6 network that consists of both IPv4 and IPv6 devices, you need to make sure that the IPv6 packets can travel over the IPv4 intranet by enabling and configuring Intra-Site Automatic Tunnel Addressing Protocol (ISATAP) tunneling.

If you do *not* use a stateful DHCPv6 server in your LAN: Configure the Router Advertisement Daemon (RADVD), and set up ISATAP advertisement prefixes (which are referred to as Global/Local/ISATAP) for ISATAP tunneling to function correctly. For information, see the "Configure the IPv6 Router Advertisement Daemon and Advertisement Prefixes for the LAN" section in Chapter 3, "LAN Configuration," of the Reference Manual.

- > To configure an ISATAP tunnel:
  - Select Network Configuration > WAN Settings > ISATAP Tunnels. The ISATAP Tunnels screen displays. (The following figure shows some examples.)

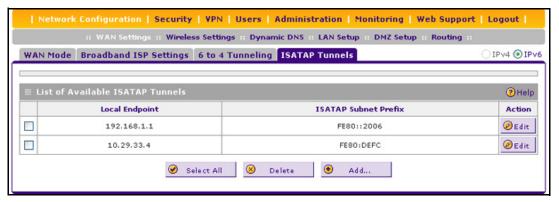


Figure 5.

Click the Add table button under the List of Available ISATAP Tunnels table. The Add ISATAP Tunnel screen displays:

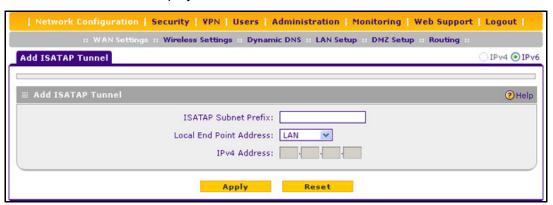


Figure 6.

3. Specify the tunnel settings as explained in the following table.

Table 4. Add ISATAP Tunnel screen settings

Setting	Description
ISATAP Subnet Prefix	The IPv6 prefix for the tunnel.
Local End Point Address	From the drop-down list, select the type of local address:  • LAN. The local end point address is the address of the default VLAN.  • Other IP. The local end point address is another LAN IP address that you need to specify in the IPv4 Address fields.

Table 4. Add ISATAP Tunnel screen settings (continued)

Setting	Description
IPv4 Address	If you select Other IP from the Local End Point Address drop-down list, enter the IPv4 address.

4. Click **Apply** to save your changes.

#### View the Tunnel Status

> To view the status and IP addresses of the 6to4 and ISATAP tunnels:

Select Monitoring > Router Status > Tunnel Status. The Tunnel Status screen displays:

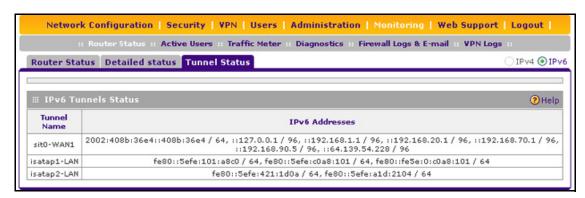


Figure 7.

The IPv6 Tunnel Status table shows the following fields:

- **Tunnel Name**. The tunnel name for the 6to4 tunnel is always sit0-WAN1 (SIT stands for simple Internet transition); the tunnel name for an ISATAP tunnel is isatapx-LAN, in which x is an integer.
- IPv6 Address. The IPv6 address of the local tunnel endpoint.

## Configure the Basic IPv6 LAN Settings

If you want to use the IPv6 functionality of the wireless VPN firewall, you need to configure the IPv6 LAN settings. Other than the default LAN IPv6 address (FEC0::1) and prefix length (64), there are no default IPv6 LAN settings. This section explains how to configure the DHCPv6 server for the IPv6 LAN and how to configure an IPv6 LAN pool.

- Configure the Stateful DHCPv6 Server
- Configure IPv6 LAN Address Pools
- For More Information

## Configure the Stateful DHCPv6 Server

Use one of the following two methods to provide IPv6 clients in the LAN with an IP address:

- Stateful DHCPv6 server. Using a stateful DHCPv6 server is the easiest way to provide IPv6 clients in the LAN with an IP address. The IPv6 clients in the LAN obtain an interface IP address, configuration information such as DNS server information, and other parameters from the DHCPv6 server. The IP address is a dynamic address. For stateful DHCPv6, you need to configure IPv6 address pools (see Configure IPv6 LAN Address Pools on page 11).
- Stateless DHCPv6 server. The IPv6 clients in the LAN generate their own IP address by
  using a combination of locally available information and router advertisements, but
  receive DNS server information from the DHCPv6 server. For stateless DHCPv6, you
  need to configure the Router Advertisement Daemon (RADVD) and advertisement
  prefixes. For information, see the "Manage the IPv6 LAN" section in Chapter 3, "LAN
  Configuration," of the Reference Manual.

As an option for a stateless DHCPv6 server, you can enable prefix delegation. The ISP's *stateful* DHCPv6 server assigns a prefix that is used by the wireless VPN firewall's *stateless* DHCPv6 server to assign to its IPv6 LAN clients. For information, see the "Stateless DHCPv6 Server With Prefix Delegation" section in Chapter 3, "LAN Configuration," of the *Reference Manual*.

- > To configure the IPv6 LAN settings through a stateful DHCP server:
  - 1. Select Network Configuration > LAN Setup.
  - 2. In the upper right of the screen, select the **IPv6** radio button. The LAN Setup screen displays the IPv6 settings. (The following figure contains some examples.)

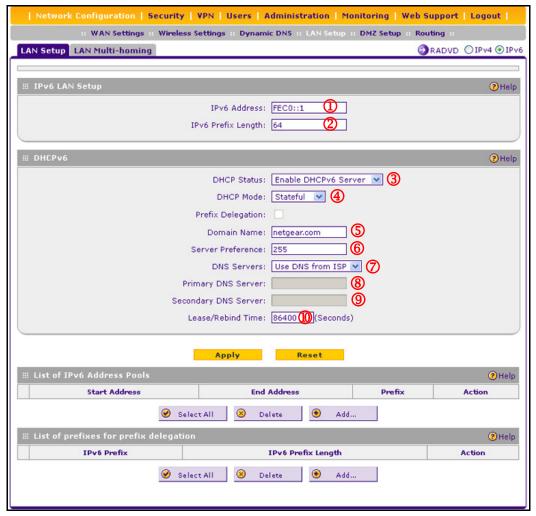


Figure 8.

3. Enter the settings as explained in the following table:

Table 5. LAN Setup screen settings for IPv6

Setting		Description	
IPv6	IPv6 LAN Setup		
1	IPv6 Address	Enter the LAN IPv6 address, or keep the default address (FEC0::1).	
2	2 IPv6 Prefix Length Enter the IPv6 prefix length, or keep the default prefix length (64).		
DHC	DHCPv6		
3	DHCP Status	From the drop-down list, select Enable the DHCPv6 Server.	
4	DHCP Mode	From the drop-down list, select <b>Stateful</b> .	
	Prefix Delegation	This is not applicable to a configuration with a stateful DHCP server.	
(5)	Domain Name	Enter the domain name of the DHCP server.	

Table 5. LAN Setup screen settings for IPv6 (continued)

Setting Description			
6	Server Preference	Enter the DHCP server preference value. The possible values are 0–255, with 255 as the default setting.  This is an optional setting that specifies the server's preference value in a server advertise message. The client selects the server with the highest preference value as the preferred server.	
7	DNS Server	Select one of the DNS server options from the drop-down lists:  • Use DNS Proxy. The wireless VPN firewall acts as a proxy for all DNS requests and communicates with the ISP's DNS servers that you configured on the Broadband ISP Settings (IPv6) screen (see Configure a Static IPv6 Internet Connection on page 4).  • Use DNS from ISP. The wireless VPN firewall uses the ISP's DNS servers that you configured on the Broadband ISP Settings (IPv6) screen (see Configure a Static IPv6 Internet Connection on page 4).  • Use below. When you select this option, the DNS server fields become available for you to enter IP addresses:	
8		Primary DNS Server	Enter the IP address of the primary DNS server.
9		Secondary DNS Server	Enter the IP address of the secondary DNS server.
10	Lease/Rebind Time	Enter the period after which the DHCP lease is renewed with the original DHCP server or rebound with another DHCP server to extend the existing DHCP lease. The default period is 86400 seconds (24 hours).	

**4.** Click **Apply** to save your changes.

## Configure IPv6 LAN Address Pools

If you configure a stateful DHCPv6 server for the LAN, you need to add local DHCP IPv6 address pools so the DHCPv6 server can control the allocation of IPv6 addresses in the LAN.

#### > To add an IPv6 LAN address pool:

 On the LAN Setup screen for IPv6 (see the previous screen), under the List of IPv6 Address Pools table, click Add. The LAN IPv6 Config screen displays:

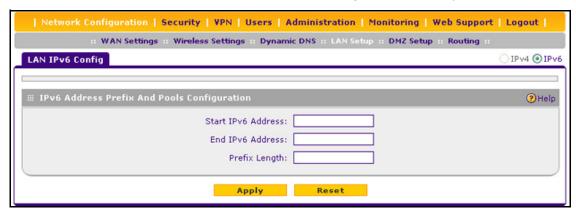


Figure 9.

2. Enter the settings as explained in the following table:

Table 6. LAN IPv6 Config screen settings

Setting	Description
Start IPv6 Address	Enter the start IP address. This address specifies the first of the contiguous addresses in the IP address pool.
End IPv6 Address	Enter the end IP address. This address specifies the last of the contiguous addresses in the IP address pool.
Prefix Length	Enter the IPv6 prefix length, for example, 10 or 64.

3. Click **Apply** to save your changes and add the new IPv6 address pool to the List of IPv6 Address Pools table on the LAN Setup (IPv6) screen.

#### For More Information

Chapter 3, "LAN Configuration," of the *Reference Manual* provides information about the following IPv6 LAN topics:

- DHCPv6 server options
- Configuring the IPv6 LAN
- Configuring the IPv6 Router Advertisement Daemon (RADVD) and advertisement prefixes for the LAN
- Configuring IPv6 multihome LAN IP addresses on the default VLAN
- Enabling and configuring the DMZ port for IPv6 traffic
- Managing static IPv6 routing

## IPv6 Connection Troubleshooting Tips

#### Check the WAN IPv6 address:

- Launch your browser and navigate to an external site such as www.netgear.com.
- 2. Access the web management interface of the wireless VPN firewall's configuration at https://192.168.1.1.
- 3. Select Network Configuration > WAN Settings > Broadband ISP Settings. The Broadband ISP Settings screen for IPv4 displays.
- 4. In the upper right of the screen, select the IPv6 radio button. The ISP Broadband Settings screen displays the IPv6 settings. Then, click the Status option arrow. The Connection Status pop-up screen for IPv6 displays.
- 5. Check that an IP address is shown for the WAN port. If no IP address is shown, your wireless VPN firewall has not obtained an IP address.

#### ProSafe Wireless-N 8-Port Gigabit VPN Firewall FVS318N

If you have difficulty connecting over an IPv6 connection, there might be an incorrect configuration on the wireless VPN firewall or the computer from which you are trying to connect to the wireless VPN firewall:

#### Check the wireless VPN firewall:

- By default, the wireless VPN firewall is set to IPv4-only mode. Make sure that the wireless VPN firewall is set to IPv4/IPv6 mode (see *Configure the IPv6 Routing Mode* on page 2).
- Make sure that the ISP settings are correct (see Configure a Static IPv6 Internet Connection on page 4). The wireless VPN firewall cannot receive a valid IPv6 address if the Internet connection is not correctly configured.
- Make sure that the wireless VPN firewall can provide IPv6 addresses to the computers on the LAN (see *Configure the Stateful DHCPv6 Server* on page 9). Check the settings on the LAN Setup (IPv6) screen.

#### > Check the computer:

- Make sure that the operating system supports IPv6. Normally, the following operating systems support IPv6:
  - Windows 7, all 32- and 64-bit versions
  - Windows Vista, all 32- and 64-bit versions
  - Windows XP Professional SP3 (32- and 64-bit)
  - Windows Server 2008, all versions
  - Windows Server 2008 R2, all versions
  - Windows Server 2003, all versions
  - Windows Server 2003 R2, all versions
  - Linux and other UNIX-based systems with a correctly configured kernel
  - MAC OS X
- Make sure that IPv6 is enabled on the computer.
- Make sure that the computer has an IPv6 address. If the computer has a link-local address only, it cannot reach the wireless VPN firewall or the Internet.

If your wireless VPN firewall can obtain an IP address, but an attached computer is unable to load any web pages from the Internet, check the following:

- Your computer might not recognize any DNS server addresses.
- Your computer might not have the wireless VPN firewall configured as its TCP/IP gateway.