

NETGEAR®

Hardware Installation Guide

10G/Multi-Gigabit Dual WAN Pro Router with Insight Cloud Management

Model PR460X

August 2023
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Introduction

This hardware installation guide is for the NETGEAR 10G/Multi-Gigabit Dual WAN Pro Router with Insight Cloud Management Model PR460X. In this manual, this model is referred to as the *router*, unless we mention otherwise.

The router is designed for small-to-medium sized businesses and provides features such as WAN redundancy, a basic firewall with the option to set up multiple traffic rules, IPSec site-to-site VPN, and VLAN capabilities with a DHCP server for each VLAN.

The router provides the following ports:

- One dedicated 1G/2.5G Ethernet WAN port
- Three dedicated 1G/2.5G Ethernet LAN ports
- One dedicated 1G/10G SFP+ fiber LAN port
- One 1G/2.5G/5G/10G multi-gigabit port that you can use as a LAN port or configure as a second WAN port.

You can place the router on a desktop or in a rack. The system LEDs are on both the front and back panels. The ports, port LEDs, and AC power receptacle are on the back panel.

This hardware installation guide complements the installation guide that came with your router.

This chapter serves as an introduction to the router and includes the following sections:

- [Overview](#)
- [Key hardware features](#)
- [Safety instructions and warnings](#)

Note: For more information about the topics that are covered in this manual, visit the support website at netgear.com/support/.

Note: For more documentation about the router, including the data sheet with technical specifications, visit netgear.com/support/download/.

Overview

The LAN ports (three 1G/2.5G Ethernet ports and one 1G/10G SFP+ fiber port) let you add switches, access points, and other devices to the router network. In addition, the router provides a 1G/2.5G/5G/10G multi-gigabit LAN port that you can either use for a high-speed LAN connection or configure as a second WAN port, allowing the router to support dual-WAN for failover. With two WAN ports, the router can accommodate two Internet connections to maintain a reliable link. One WAN connection functions as the active connection and the other WAN connection as the backup connection.

The router integrates a Stateful Packet Inspection (SPI) firewall, lets you configure multiple traffic rules, and provides Virtual Private Network (VPN) technology for office-to-office (site-to-site) connectivity. You can configure up to eight VLANs, each with a dedicated DHCP server.

Note: For information about application examples, see [Applications](#) on page 16.

The router provides management options that let you discover the router on the network and configure, monitor, and control the router:

- **Netgear Insight:** For NETGEAR Insight Premium and Insight Pro subscribers, the router supports the NETGEAR Insight Cloud Portal and Insight app:
 - **Insight Cloud Portal:** Lets you configure and manage the router through the portal of the Insight cloud-based management platform.
 - **Insight app:** Lets you configure and manage the router from your iOS or Android mobile device and connects to the Insight cloud-based management platform.
- **Device user interface (UI):** You must access the device UI to set up the WAN (Internet) connection and basic settings of the router. You can also configure and manage the router using the device UI.

For more information about these management options, see the user manual, which you can download by visiting netgear.com/support/download/.

You can place the router freestanding (on a desktop) or rack-mount it in a standard 19-inch rack, using the rack-mount kit that is supplied with the router.

Key hardware features

The router provides the following key hardware features:

- One dedicated 1G/2.5G Ethernet WAN port (WAN1)
- One 1G/2.5G/5G/10G multi-gigabit port that you can configure as a LAN port (LAN5) or a second WAN port (WAN2)
- Three dedicated 1G/2.5G Ethernet LAN ports (LAN1, LAN2, and LAN3)
- One dedicated 10G/1G SFP+ fiber LAN port (LAN4)
- Quad Core ARM A73 processor @ 2.2 GHz
- 2 GB DDR4 RAM and 4 GB eMMC flash memory
- The following mounting hardware:
 - Four rubber footpads for desktop installation
 - Rack-mount brackets and screw kit for rack-mount installation in a standard 19-inch rack
- Per-port status LEDs and system status LEDs:
 - Power LED
 - Internet LED
 - Cloud LED
 - SFP+ LED
 - Per-port link, speed, and activity LEDs

Safety instructions and warnings

Use the following safety guidelines to ensure your own personal safety and to help protect your system from potential damage.

To reduce the risk of bodily injury, electrical shock, fire, and damage to the equipment, observe the following precautions:

- This product is designed for indoor use only in a temperature-controlled and humidity-controlled environment. Note the following:
 - For more information about the environment in which this product must operate, see the environmental specifications in the appendix or the data sheet.
 - If you want to connect the product to a device located outdoors, the outdoor device must be properly grounded and surge protected, and you must install an Ethernet surge protector inline between the indoor product and the outdoor device. Failure to do so can damage the product.
 - Before connecting the product to outdoor cables or devices, see <https://kb.netgear.com/000057103> for additional safety and warranty information.

Failure to follow these guidelines can result in damage to your NETGEAR product, which might not be covered by NETGEAR's warranty, to the extent permissible by applicable law.

- Observe and follow service markings:
 - Do not service any product except as explained in your product documentation. Some devices should never be opened.
 - If applicable to your product, opening or removing covers that are marked with the triangular symbol with a lightning bolt can expose you to electrical shock. We recommend that only a trained technician services components inside these compartments.
- If any of the following conditions occur, unplug the product from the power outlet, and then replace the part or contact your trained service provider:
 - Depending on your product, the power adapter, power adapter cable, power cable, extension cable, or plug is damaged.
 - An object fell into the product.
 - The product was exposed to water.
 - The product was dropped or damaged.
 - The product does not operate correctly when you follow the operating instructions.
- Keep the product away from radiators and heat sources. Also, do not block cooling vents.

- Do not spill food or liquids on your product components, and never operate the product in a wet environment. If the product gets wet, see the appropriate section in your troubleshooting guide, or contact your trained service provider.
 - Do not push any objects into the openings of your product. Doing so can cause fire or electric shock by shorting out interior components.
 - Use the product only with approved equipment.
 - If applicable to your product, allow the product to cool before removing covers or touching internal components.
 - Operate the product only from the type of external power source indicated on the electrical ratings label. If you are not sure of the type of power source required, consult your service provider or local power company.
 - To avoid damaging your system, if your product uses a power supply with a voltage selector, be sure that the selector is set to match the power at your location:
 - 115V, 60 Hz in most of North and South America and some Far Eastern countries such as South Korea and Taiwan
 - 100V, 50 Hz in eastern Japan and 100V, 60 Hz in western Japan
 - 230V, 50 Hz in most of Europe, the Middle East, and the Far East
 - Be sure that attached devices are electrically rated to operate with the power available in your location.
 - Depending on your product, use only a supplied power adapter or approved power cable:
If your product uses a power adapter:
 - If you were not provided with a power adapter, contact your local NETGEAR reseller.
 - The power adapter must be rated for the product and for the voltage and current marked on the product electrical ratings label.
If your product uses a power cable:
 - If you were not provided with a power cable for your system or for any AC-powered option intended for your system, purchase a power cable approved for your country.
 - The power cable must be rated for the product and for the voltage and current marked on the product electrical ratings label. The voltage and current rating of the cable must be greater than the ratings marked on the product.
 - To help prevent electric shock, plug the system and peripheral power cables into properly grounded power outlets.
-

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- If applicable to your product, the peripheral power cables are equipped with three-prong plugs to help ensure proper grounding. Do not use adapter plugs or remove the grounding prong from a cable. If you must use an extension cable, use a three-wire cable with properly grounded plugs.
- Observe extension cable and power strip ratings. Make sure that the total ampere rating of all products plugged into the extension cable or power strip does not exceed 80 percent of the ampere ratings limit for the extension cable or power strip.
- To help protect your system from sudden, transient increases and decreases in electrical power, use a surge suppressor, line conditioner, or uninterruptible power supply (UPS).
- Position system cables, power adapter cables, or power cables carefully. Route cables so that they cannot be stepped on or tripped over. Be sure that nothing rests on any cables.
- Do not modify power adapters, power adapter cables, power cables or plugs. Consult a licensed electrician or your power company for site modifications.
- Always follow your local and national wiring rules.

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Hardware Overview

This chapter describes the router hardware features.

The chapter includes the following sections:

- Front panel with system LEDs
- Back panel with ports, port LEDs, and system LEDs
- Dual-function Reset button
- RJ-45 ports for multi-gigabit connectivity
- Fiber transceiver modules and cables for the SFP+ port
- Speed and cables

Front panel with system LEDs

The following figure shows the front panel of the router.



Figure 1. Front panel

The following table describes the LEDs.

Table 1. LEDs on the front panel

LED	Description
Power LED	<p>Solid green: The router is ready.</p> <p>Solid amber: The router is starting. (Solid amber lasts for about one minute.)</p> <p>Blinking amber: The firmware is being updated.</p> <p>Off: Power is not supplied to the router.</p>
Internet LED	<p>Solid green: The Internet connection is established.</p> <p>Solid amber: No Internet connection is established.</p> <p>Blinking amber: The Internet connection is in the process of being set up.</p> <p>Off: No link is established on the WAN1 port, or if you set up dual WAN connections and a failover occurred, on the WAN2 port.</p>
Cloud LED	<p>Off: The router functions in standalone mode or, if deployed in Insight mode, it is not connected to the Insight Cloud.</p> <p>Solid blue: The router functions in Insight mode and is connected to the Insight cloud.</p>
SFP+ LED	<p>Solid green. The SFP or SFP+ link is up.</p> <p>Off. No SFP or SFP+ link is established.</p>

Back panel with ports, port LEDs, and system LEDs

The following figure shows the back panel of the router.



Figure 2. Back panel

From left to right, the back panel contains the following components:

- **System LEDs:** The same system LEDs that are on the front panel (see [Front panel with system LEDs](#) on page 11).
- **Reset button:** Recessed dual-function **Reset** button (see [Dual-function Reset button](#) on page 13).
- **LAN4 port:** One independent 1G/10G SFP+ fiber LAN port (LAN4, see [Fiber transceiver modules and cables for the SFP+ port](#) on page 14) for connection to a high-speed LAN device such as a high-speed switch. For information about the LED, see the SFP+ LED (see [Front panel with system LEDs](#) on page 11).
- **LAN5 WAN2 port:** One dual-function 1G/2.5G/5G/10G multi-gigabit RJ-45 port (see [RJ-45 ports for multi-gigabit connectivity](#) on page 14) that you can configure as a LAN port (LAN5) or a second WAN port (WAN2). For information about the two port LEDs, see the table below.
By default, the port functions as a LAN port. For information about how to change the function to a second WAN port, see the user manual, which you can download by visiting netgear.com/support/download/.
- **WAN1 port:** One independent 1G/2.5G RJ-45 WAN (Internet) port (see [RJ-45 ports for multi-gigabit connectivity](#) on page 14) for connection to a cable or DSL modem. This port is the primary WAN port (WAN1) and has a yellow label. For information about the two port LEDs, see the table below.
- **LAN1, LAN2, and LAN3 ports:** Three independent 1G/2.5G RJ-45 LAN ports (LAN1, LAN2, and LAN3, see [RJ-45 ports for multi-gigabit connectivity](#) on page 14) for connections to devices such as a switch, access point, NAS, and other devices. For information about the two port LEDs for each port, see the table below.
- **Power receptacle:** AC power receptacle to be used with the power adapter that is provided with the router. The AC input is rated at 100-240V ~ 50/60 Hz, 1.3 A.
- **Slot:** Security slot for an optional Kensington security cable lock.

The following table describes the port LEDs.

Table 2. Port LEDs on the back panel

LED	Description
LAN5 WAN2	<p>Left LED solid amber: The port detects a speed of 10 Gbps, 5 Gbps, or 2.5 Gbps.</p> <p>Left LED off: The port detects a speed of 1 Gbps or 100 Mbps.</p> <p>Right LED solid green: The port link is up but idle.</p> <p>Right LED blinking green: The port is processing traffic.</p> <p>Both LEDs off: No link is established on the LAN5 WAN2 port.</p>
WAN1 LEDs	<p>Left LED solid amber: The port detects a speed of 2.5 Gbps.</p> <p>Left LED off: The port detects a speed of 1 Gbps or 100 Mbps.</p> <p>Right LED solid green: The port link is up but idle.</p> <p>Right LED blinking green: The port is processing traffic.</p> <p>Both LEDs off: No link is established on the WAN1 port.</p>
LAN1, LAN2, and LAN3 LEDs	<p>Left LED solid amber: The port detects a speed of 2.5 Gbps.</p> <p>Left LED off: The port detects a speed of 1 Gbps or 100 Mbps.</p> <p>Right LED solid green: The port link is up but idle.</p> <p>Right LED blinking green: The port is processing traffic.</p> <p>Both LEDs off: No link is established on the LAN1, LAN2, or LAN3 port.</p>

Dual-function Reset button

The router provides a recessed, dual-function **Reset** button on the back panel. Depending on how long you press the button (for details, see the following procedure), this button lets you perform the following tasks:

- **Restart (power-cycle) the router:** The router restarts. All saved settings are retained. We recommend that you save the settings before you press the **Reset** button to restart the router.
- **Reset the router to factory default settings:** All settings are erased and the router restarts with factory default settings.

To restart or reset the router using the Reset button:

1. Insert a device such as a straightened paper clip into the opening.
2. Do one of the following:
 - **Restart the router:** Press the **Reset** button for 2 seconds and then release the button. (Do not press the button for more than 5 seconds!) When you press the **Reset** button, the Power LED lights solid amber, and the router restarts.

- **Reset the router to factory default settings:** Press the **Reset** button for at least 5 seconds or until the Power LED starts blinking amber. Then, release the button. The router returns to factory default settings.

RJ-45 ports for multi-gigabit connectivity

All RJ-45 copper (Ethernet) ports support autosensing. When you insert a cable into an RJ-45 port, the router automatically ascertains the maximum speed (100 Mbps, 1 Gbps, or 2.5 Gbps, and in addition for the LAN5 WAN2 port, 5 Gbps or 10 Gbps) and duplex mode (half-duplex or full-duplex) of the attached device:

All ports support a Category 5e (Cat 5e) cable (or higher-rated Ethernet cable) terminated with an 8-pin RJ-45 connector.

To simplify the procedure for attaching devices, all RJ-45 ports support Auto Uplink technology. This technology allows you to attach devices to the RJ-45 ports with either straight-through or crossover cables.

When you insert a cable into one of the router's RJ-45 ports, the router automatically performs the following actions:

- Senses whether the cable is a straight-through or crossover cable.
- Determines whether the link to the attached device requires a normal connection (such as when you are connecting the port to a computer) or a downlink connection (such as when you are connecting the port to a switch or WiFi access point).
- Automatically configures the RJ-45 port to enable communications with the attached device. The Auto Uplink technology compensates for setting uplink connections while eliminating concern about whether to use crossover or straight-through cables when you attach devices.

Fiber transceiver modules and cables for the SFP+ port

To enable high-speed fiber and Gigabit Ethernet, short- and long-distance connections on the router, SFP+ ports can accommodate standard 1G SFP and 10G SFP+ transceiver modules and direct attach cables (DACs), all of which are sold separately. The router also supports third-party, high-speed fiber transceiver modules and DACs.

The router supports the following NETGEAR SFP and SFP+ transceiver modules and cables:

- Short-reach fiber transceiver modules:
 - **AGM731F**: SFP transceiver 1000BASE-SX, SFP multimode LC GBIC
 - **AXM761**: SFP+ transceiver 10GBASE-SR, SFP+ multimode LC GBIC
- Long-reach fiber transceiver module:
 - **AXM763**: SFP+ transceiver 10GBASE-LRM, SFP+ multimode LC GBIC
- Direct attach cables:
 - **AGC761**: SFP+ 1 m (about 3.3 ft) direct attach cable, with support of 1G only
 - **AXC761**: SFP+ 1 m (about 3.3 ft) direct attach cable
 - **AXC763**: SFP+ 3 m (about 10 ft) direct attach cable

For more information about NETGEAR SFP and SFP+ transceiver modules and cables, visit netgear.com/business/wired/switches/accessories. If purchased, transceiver modules and cables are shipped separately from the switch.

Speed and cables

The following table describes the network cables that you can use for the router connections and the speeds that these cables can support, up to 100 meters (328 feet).

Table 3. Speed and cables

Speed	Cable Type
100 Mbps	Category 5e (Cat 5e) or higher rated Note: In most business networks, Cat 5e cables superseded Cat 5 cables.
1 Gbps or 2.5 Gbps	Category 5e (Cat 5e) or higher rated
5 Gbps or 10 Gbps	Category 6a (Cat 6a) or higher rated

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Applications

The router is designed to provide flexibility in configuring network connections. You can use the router as a high-speed router with failover in a small to medium-sized business network and for site-to-site VPN connections with another router, for example, between a main office and a remote sales office.

This chapter includes the following sections:

- [Routing with failover and VLAN networks](#)
- [Site-to-site VPN connectivity](#)

Routing with failover and VLAN networks

You can use the router with failover functionality in a business network that gives users high-speed access to network devices and the Internet.

The following figure shows a router functioning in a small business network with a dual WAN failover connection to two modems, each one connected to the Internet over a separate ISP connection. If one WAN connection goes down (for example, the ISP connection goes down), the router can remain connected to the Internet through the other WAN connection.

If NETGEAR Insight is enabled, you can use the Insight Cloud Portal or Insight app to manage your network.

A switch (model MS324TXUP) is connected to the router. This model supports high-speed Ethernet and fiber connections and can supply PoE++ power to connected devices.

Both the router and the switch can support multiple VLANs, each with their own DHCP server. In this use case, the network includes three VLANs:

- VLAN 10: Finance network
- VLAN 20: Marketing and Sales network
- VLAN 30: Management network. The following devices are connected to this network:
 - WAX628 access point, which receives PoE+ power from the switch
 - VoIP conference phone, which receives PoE+ power from the switch
 - PTZ camera, which receives PoE+ power from the switch
 - Server with a regular Ethernet connection to the switch

Depending on the security settings that you configure on the router, each VLAN can function as a separate network in the larger entity of the business network.

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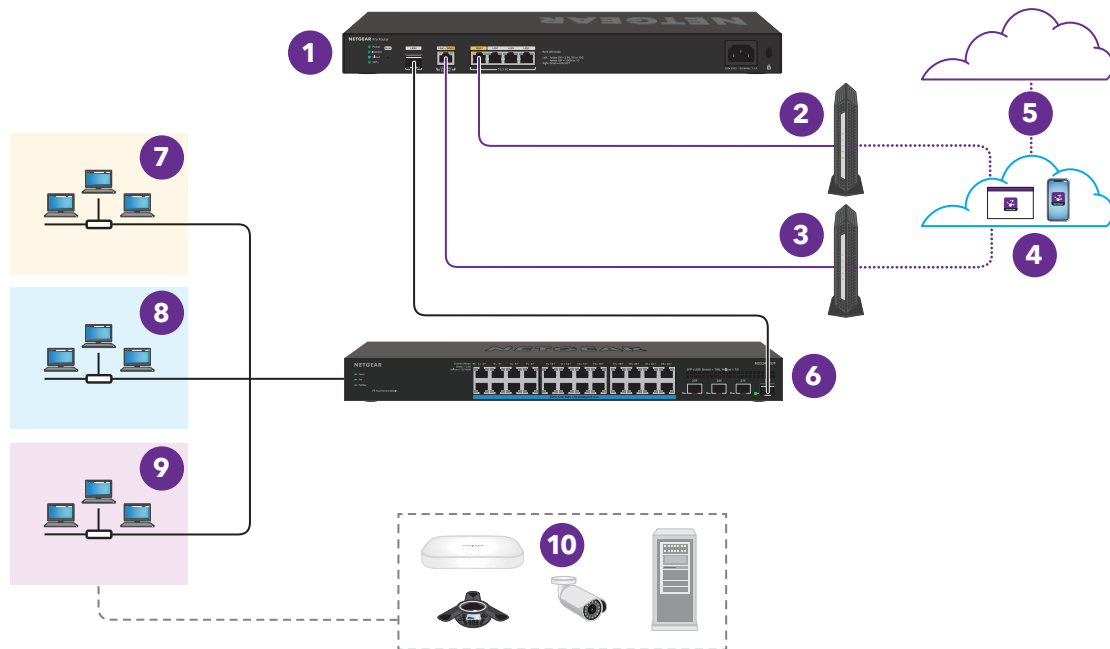


Figure 3. Sample use case: Routing with WAN failover and VLAN networks

Number	Description	Number	Description
1	Model PR460X router	2	Primary WAN connection from the WAN1 port to a modem
3	Secondary WAN connection from the WAN2 port to a second modem	4	Internet cloud If Insight is enabled, a computer or tablet with access to the Insight Cloud Portal and a mobile device with the Insight app can access the Insight cloud over the Internet
5	If Insight is enabled, a connection to the Insight cloud	6	Fiber connection from the router to switch model MS324TXUP
7	VLAN 10: Finance network (yellow background)	8	VLAN 20: Marketing and Sales network (blue background)
9	VLAN 30: Management network (purple background)	10	Devices connected to the Management network, including PoE+ connections to a WAX628 access point, VoIP conference phone, and PTZ camera, and a regular Ethernet connection to a server

Site-to-site VPN connectivity

With two routers, each at a different site, you can create a site-to-site virtual private network (VPN), which means that you can connect two local LANs and separate networks together as if they were physically connected and colocated.

The following figure shows two routers, each with failover configured, and site-to-site VPN connectivity. The left side of the figure represents the main office (for more details about this setup, see [Routing with failover and VLAN networks](#) on page ?). The right side of the figure represents a remote office.

If NETGEAR Insight is enabled, you can use the Insight Cloud Portal or Insight app to manage your network at both sites.

VPN

A site-to-site VPN network that consists of two routers allows users at each site access to both sites. Depending on the type of VPN access, VLANs, and security configured, these users could access all resources that are connected to each router, for example, file servers, NAS systems, security cameras, and so on. Because of the VPN connection between the routers, the network at the main office and the network at the remote office function as if they are a single network.

WAN failover

Each router has a dual WAN failover connection to two modems, each one connected to the Internet over a separate ISP connection. If one WAN connection of a router goes down (for example, the ISP connection goes down), the router remains connected to the Internet through the second WAN connection.

Remote office and VLAN access

At the remote office, a switch (model MS510TXUP) is connected to the router. This model supports high-speed Ethernet and fiber connections and can supply PoE++ power to connected devices.

Both the router and the switch can support multiple VLANs, each with their own DHCP server. In this use case, the network at the remote office is limited to the Sales and Marketing VLAN (VLAN 20 with a blue background), which is also one of the VLANs that is active at the main office.

The following devices at the remote office have access to the Sales and Marketing VLAN at both the remote office and the main office:

- WAX628 access point, which receives PoE+ power from the switch
- PTZ camera, which receives PoE+ power from the switch
- Desktop computer with a regular Ethernet connection to the switch

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Depending on the security settings that you configure on the routers, the Sales and Marketing VLAN can function as a separate network in the larger entity of the small business network.

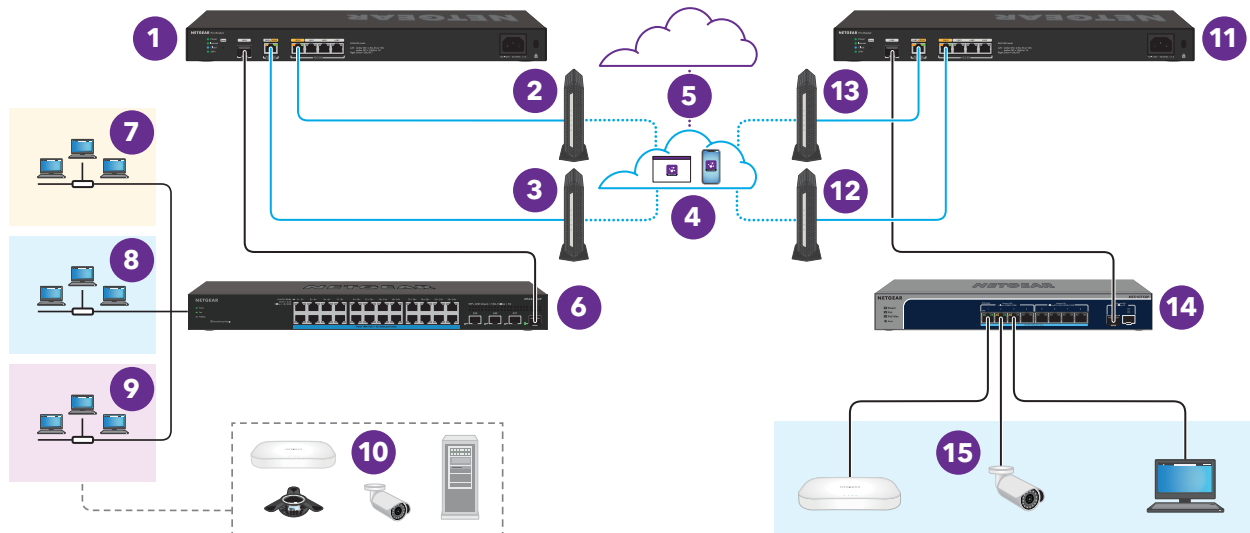


Figure 4. Sample use case: Site-to-site VPN connectivity with WAN failover and VLAN networks

Number	Description	Number	Description
1	At the main office, model PR460X router	2	At the main office, the primary WAN connection from the WAN1 port to a modem. This connection can carry VPN traffic (blue line).
3	At the main office, the secondary WAN connection from the WAN2 port to a second modem. After a failover, this connection can carry VPN traffic (blue line).	4	Internet cloud If Insight is enabled, a computer or tablet with access to the Insight Cloud Portal and a mobile device with the Insight app can access the Insight cloud over the Internet
5	If Insight is enabled, a connection to the Insight cloud	6	At the main office, a fiber connection from the router to a switch model MS324TXUP
7	At the main office, VLAN 10: Finance network (yellow background)	8	At the main office, VLAN 20: Marketing and Sales network (blue background)
9	At the main office, VLAN 30: Management network (purple background)	10	At the main office, the devices that are connected to the Management network, including PoE+ connections to a WAX628 access point, VoIP conference phone, and PTZ camera, and a regular Ethernet connection to a server
11	At the remote office, model PR460X router	12	At the remote office, the primary WAN connection from the WAN1 port to a modem. This connection carries VPN traffic (blue line) as well as regular Internet traffic.

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(Continued)

- | | | | |
|----|---|----|--|
| 13 | At the remote office, the secondary WAN connection from the WAN2 port to a second modem. After a failover, this connection carries VPN traffic (blue line) as well as regular Internet traffic. | 14 | At the remote office, a fiber connection from the router to switch model MS510TXUP |
| 15 | At the remote office, the devices that are connected to the Marketing and Sales network (VLAN 20 with a blue background), including PoE+ connections to a WAX628 access point and a PTZ camera, and a regular Ethernet connection to a desktop computer | | |

4

Installation

This chapter describes the installation procedures for the router.

Router installation involves the steps that are described in the following sections:

- [Step 1: Prepare the site](#)
- [Step 2: Protect against electrostatic discharge](#)
- [Step 3: Unpack the router](#)
- [Step 4: Place the router](#)
- [Step 5: Connect the router to a modem](#)
- [Optional Step 6: Connect the router to a second modem for WAN failover](#)
- [Step 7: Connect LAN Ethernet devices to the router](#)
- [Optional Step 8: Install an SFP transceiver module or cable](#)
- [Step 9: Check the installation](#)
- [Step 10: Apply power and check the LEDs](#)
- [Step 11: Configure and manage the router](#)

Step 1: Prepare the site

Before you install the router, make sure that the operating environment meets the site requirements that are listed in the following table.

Table 4. Site requirements

Characteristics	Requirements
Mounting	<p>Desktop installations. Provide a flat table or shelf.</p> <p>Rack-mount installations. Use a 19-inch (48.3-centimeter) EIA standard equipment rack that is grounded and physically secure. You also need the rack-mount kit that is supplied with the router.</p>
Access	Install the router in a position that allows you to access the ports and power connector on the back panel and view the LEDs on the front panel.
Power source	Use the AC power cable that is supplied with the router. Make sure that the AC outlet in which you plug the power cable is not controlled by a wall switch, which can accidentally turn off power to the outlet and the router.
Cabling	Route cables to avoid sources of electrical noise such as radio transmitters, broadcast amplifiers, power lines, and fluorescent lighting fixtures.
Environmental	<p>Temperature. Install the router in a dry area with an ambient temperature between 32°F and 104°F (0°C and 40°C). Keep the router away from heat sources such as direct sunlight, warm-air exhausts, hot-air vents, and heaters.</p> <p>Operating humidity. The maximum relative humidity of the installation location must not exceed 90 percent, noncondensing.</p> <p>Ventilation. Do not restrict airflow by covering or obstructing air inlets on the sides of the router. Keep at least 2 inches (5.08 centimeters) free on all sides for cooling. The room or wiring closet in which you install the router must provide adequate airflow.</p> <p>Operating conditions. Keep the router at least 6 feet (1.83 meters) away from the nearest source of electromagnetic noise, such as a photocopy machine.</p>

Step 2: Protect against electrostatic discharge

WARNING: Static electricity can harm delicate components inside your system. To prevent static damage, discharge static electricity from your body before you touch any of the electronic components, such as the microprocessor. You can do so by periodically touching an unpainted metal surface on the router.

You can also take the following steps to prevent damage from electrostatic discharge (ESD):

- When unpacking a static-sensitive component from its shipping carton, leave it in the antistatic package until you are ready to install it. Just before unwrapping the antistatic package, discharge static electricity from your body.
- Before moving a sensitive component, place it in an antistatic container or package.
- Handle all sensitive components in a static-safe area. If possible, use antistatic floor pads, antistatic workbench pads, and an antistatic grounding strap.

Step 3: Unpack the router

The following figure shows the package contents for the router.

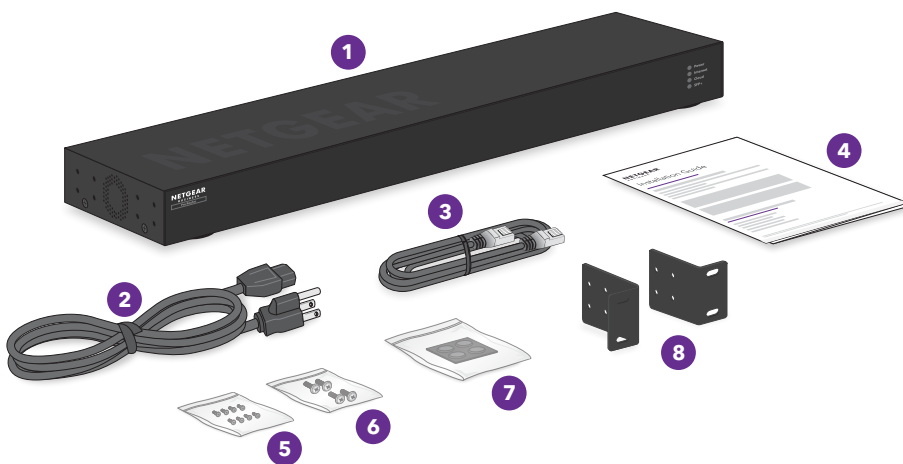


Figure 5. Router package

Check the contents of the boxes to make sure that all items are present before installing the router.

To check the package contents:

1. Place the container on a clean flat surface, and cut all straps securing the container.
2. Unpack the hardware from the boxes by carefully removing the hardware and placing it on a secure and clean surface.
3. Remove all packing material.
4. Verify that the package contains the following items:

Number	Item
1	Router
2	AC power cable (varies by region)
3	Ethernet cable
4	Installation guide
5	Small bag with 8 small screws to attach the brackets to the router
6	Small bag with 4 screws to attach the brackets to the rack
7	Small bag with rubber footpads for desktop installation
8	Brackets for mounting the router to a rack

5. If any item is missing or damaged, contact NETGEAR or your local NETGEAR reseller for replacement.

Step 4: Place the router

You can place the router on a flat surface or place it in a standard 19-inch (48.26-centimeter) network equipment rack.

Place the router in a rack

To place the router in a rack, you need the rack-mount kit (brackets and screws) supplied with the router.

You can mount the router with its front panel facing the front of the rack (as shown in the first figure in this section) or with its back panel facing the front of the rack (as shown in the second figure in this section).

To place the router in a rack:

1. Attach the supplied mounting brackets to the side of the router.

2. Insert the small screws provided in the product package through each bracket and into the bracket mounting holes in the router.
The package provides eight small screws, four for each side.
3. Tighten the screws with a No. 2 Phillips screwdriver to secure each bracket.
4. Align the mounting holes in the brackets with the holes in the rack, and insert two pan-head screws through each bracket and into the rack.
The package provides four pan-head screws, two for each side.
5. Tighten the screws with a No. 2 Phillips screwdriver to secure mounting brackets to the rack.

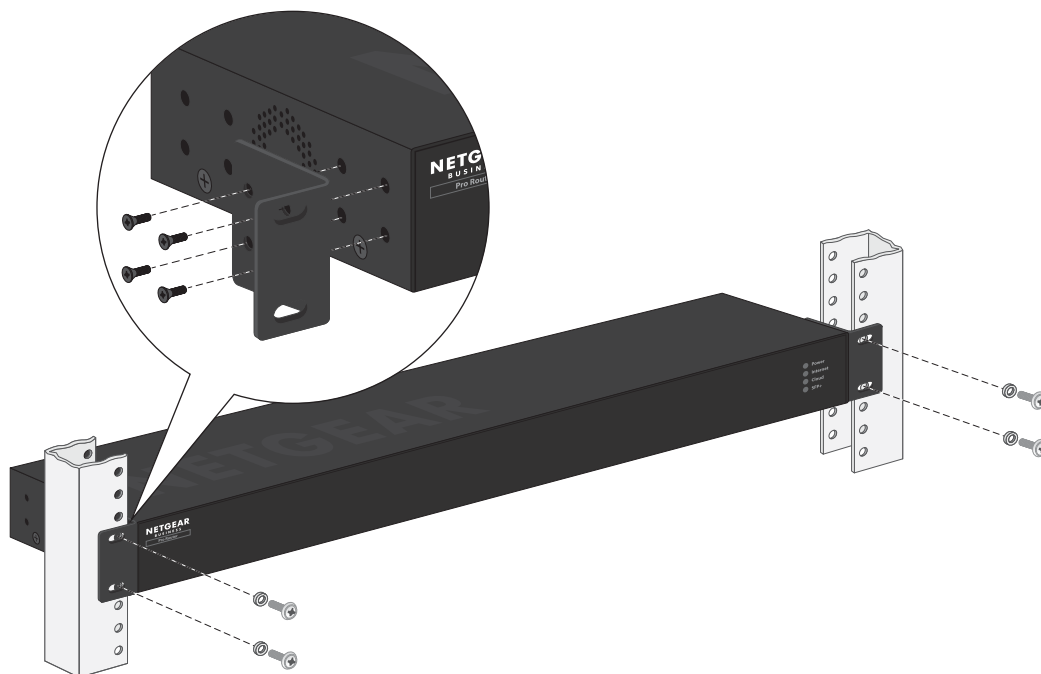


Figure 6. Front panel of the switch facing the front of the rack

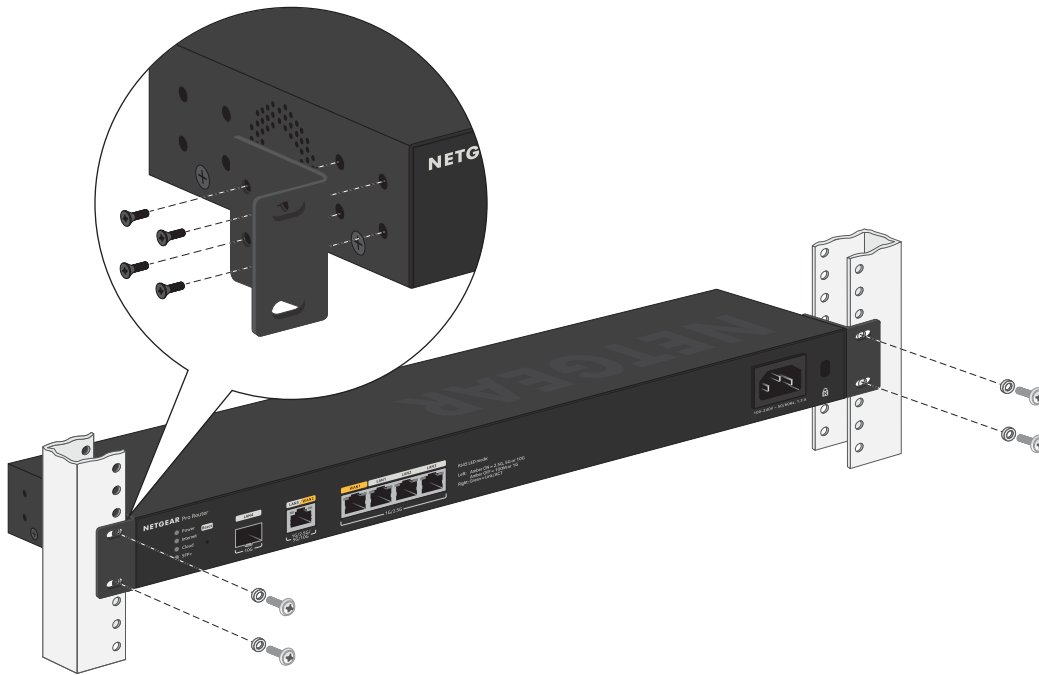


Figure 7. Back panel of the switch facing the front of the rack

Place the router on a flat surface

The router ships with four self-adhesive rubber footpads.

To place the router on a flat surface:

Stick one rubber footpad on each of the four concave spaces on the bottom of the router.

The rubber footpads cushion the router against shock and vibrations. They also provide ventilation space between stacked routers.

Step 5: Connect the router to a modem

The following procedure describes how to connect the router to a modem such as a DSL or cable modem that provides Internet connectivity. The router's RJ-45 WAN1 (Internet) port supports a speed up to 2.5G. To let the router function at 2.5G speed, both your modem and ISP must support 2.5G speed. For example, if your modem or ISP supports only 1G speed, the WAN1 connection of your router also functions at 1G speed.

The WAN1 port supports Auto Uplink technology, which allows you to attach devices using either straight-through or crossover cables. Use a Category 5e (Cat 5e), or Cat 6 cable that is terminated with an RJ-45 connector.

Note: Instead of a modem, you can also use an existing LAN that provides Internet connectivity through another router in your network. In that case, connect the cable from the existing LAN to the WAN1 port on the router. The router then functions as a secondary router. For more information, see the user manual, which you can download by visiting netgear.com/support/download/.

To connect a modem to the router's RJ-45 WAN1 port:

1. Unplug the modem's power, leaving the modem connected to the wall jack for your Internet service.
If the modem uses a battery backup, remove the battery.
2. Connect the modem to the RJ-45 WAN1 port on the router.
Ethernet specifications limit the cable length between the router and the Internet modem to 328 feet (100 meters).
3. Verify that the cable is installed correctly.
4. If the modem uses a battery backup, put the battery back in the modem.
5. Plug in and turn on the modem.

Optional Step 6: Connect the router to a second modem for WAN failover

The following procedure describes how to connect the router to a second modem such as a DSL or cable modem that provides failover Internet connectivity.

By default, the LAN5 WAN2 port functions as a high-speed LAN5 port. You can use the device UI to change the function of the LAN5 WAN2 port to a WAN2 port and manually configure your second ISP connection. For more information, see the user manual, which you can download by visiting netgear.com/support/download/.

In a dual WAN setup, one WAN port functions as the primary or active interface, and the other WAN port as the secondary or backup interface. (You can configure which WAN port functions as the primary interface.) If the primary interface goes down (for example, your ISP has an outage), the router can automatically switch (that is, failover) to the secondary WAN interface. When the primary WAN interface comes back up again, the router can automatically switch back from the secondary WAN interface to the primary WAN interface. Only one WAN connection is up at any time.

Ideally, each WAN port is connected to a different ISP. For example, connect the WAN1 port over a cable modem to one ISP and connect the WAN2 port over another cable modem (or 5G mobile hotspot) to another ISP.

The router's RJ-45 WAN2 port supports speeds up to 10G. The speed of the WAN2 connection is determined by the lowest speed of your modem or ISP. For example, if your modem or ISP supports only 1G speed, the WAN2 connection of your router also functions at 1G speed.

To connect a modem to the router's RJ-45 WAN2 port:

1. Unplug the modem's power, leaving the modem connected to the wall jack for your Internet service.
If the modem uses a battery backup, remove the battery.
2. Connect the modem to the RJ-45 WAN2 port on the router.
Ethernet specifications limit the cable length between the router and the Internet modem to 328 feet (100 meters).
3. Verify that the cable is installed correctly.
4. If the modem uses a battery backup, put the battery back in the modem.
5. Plug in and turn on the modem.

Step 7: Connect LAN Ethernet devices to the router

The following procedure describes how to connect LAN Ethernet devices such as a switch, access point, or computer to the router's RJ-45 LAN ports. (The router's WAN1 port is reserved for the primary Internet connection.) You can use the LAN1, LAN2, LAN3, and LAN5 ports, all of which supply RJ-45 connectors:

- The LAN1, LAN2, and LAN3 ports support speeds up to 2.5G.
- The LAN5 port is a high-speed LAN port that supports speeds up to 10G.

The LAN4 port is an SFP+ port for a fiber connection (see [Optional Step 8: Install an SFP transceiver module or cable](#) on page 30).

The router supports Auto Uplink technology, which allows you to attach devices using either straight-through or crossover cables. Use a Category 5e (Cat 5e) or Cat 6 cable that is terminated with an RJ-45 connector.

To connect devices to the router's LAN RJ-45 ports:

1. Connect a device to an RJ-45 LAN port on the router.

Ethernet specifications limit the cable length between the router and the attached device to 328 feet (100 meters).

2. Verify that all cables are installed correctly.

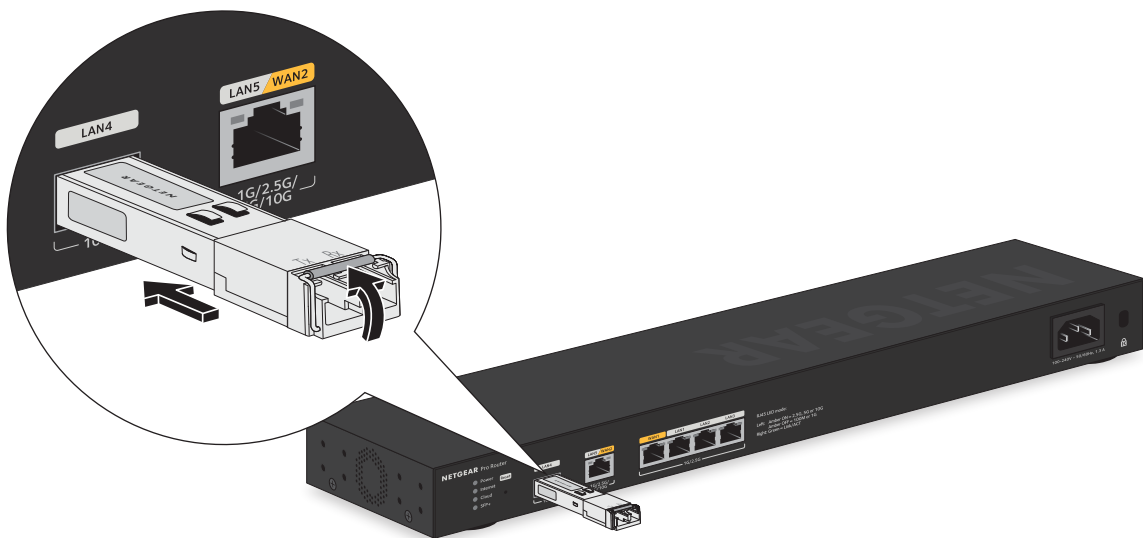
Optional Step 8: Install an SFP transceiver module or cable

The following optional procedure describes how to install an optional SFP transceiver module or cable into the LAN4 SFP+ port of the router. For more information, see [Fiber transceiver modules and cables for the SFP+ port](#) on page 14.

Note: Contact NETGEAR or your NETGEAR reseller to purchase these modules. If you do not want to install an SFP module, skip this procedure.

To install an SFP transceiver module or cable:

1. Insert the transceiver module into the SFP+ port.
Be sure that you insert the module the correct way into the port. There is only one way to insert the module. If it does not fit, you might be holding the module upside down. Do not force the module into the port.
2. Once correctly inserted, press firmly on the flange of the module to seat it securely into the connector.



Step 9: Check the installation

Before you apply power to the router, perform the following steps.

To check the installation:

1. Inspect the equipment thoroughly.
2. Verify that all cables are installed correctly.
3. Check cable routing to make sure that cables are not damaged or creating a safety hazard.
4. Make sure that all equipment is mounted properly and securely.

Step 10: Apply power and check the LEDs

Before connecting the AC power cable to the AC receptacle on the router, select an AC outlet. Make sure that the AC outlet is not controlled by a wall switch, which can turn off power to the router.

To apply power:

1. Connect the AC power cable to the AC receptacle on the back of the router.
2. Plug the AC power cable into a power source such as a wall socket or power strip. The router starts. (The router does not have an on/off button.)
3. Check to see that the LEDs on the router light correctly.
When you apply power, the Power LED on the router front panel lights solid amber and the port LEDs for attached devices light. After about one minute, the router completes its startup process and the Power LED lights solid green.
If the Power LED does not light, check to see that the AC power cable is plugged in correctly and that the power source is good.

Step 11: Configure and manage the router

By default, the Insight management mode of the router is enabled so that you can add the router to an Insight network location and manage the router with the Insight app, and as an Insight Premium or Pro user, with the Insight Cloud Portal. You can also still use the device UI to manage the router. That is, these management methods are not mutually exclusive but complement each other. Changes to Insight are synchronized

to the device UI, and the other way around, changes to the device UI are synchronized to Insight.

The NETGEAR Insight Cloud Portal and Insight app let you perform pre-onboarding, remote management, and remote monitoring tasks from your smartphone, tablet, or computer. For more information about Insight, visit netgear.com/insight and see the NETGEAR knowledge base articles at kb.netgear.com/000065774.

For more information about the device UI, see the user manual, which you can download by visiting netgear.com/support/download/.

You can use the router without creating an Insight-managed topology (using the Insight Cloud Portal or Insight app), but in that situation you cannot remotely pre-onboard, monitor, manage, and troubleshoot the router, nor receive push notifications from the router, and the router operates in standalone mode only, like a traditional router.

Using the Insight Cloud Portal or Insight app, as well as network-based policies and zero-touch configuration, you can configure and manage the router, along with Insight-managed switches and access points, at the network level. Also, using the Insight Cloud portal or Insight app, you can improve the efficiency of the router, which results in the improvement of its overall performance as well as the performance of the network.

Note: The router's default IP address is 192.168.1.1 and its default subnet mask is 255.255.255.0. With a direct connection to the router, you can always use <https://routerlogin.net> or <https://routerlogin.com> to access the device UI.

5

Troubleshooting

This chapter provides information about troubleshooting the router. The chapter includes the following sections:

- [Hardware troubleshooting chart](#)
- [Additional hardware troubleshooting suggestions](#)

Hardware troubleshooting chart

The following table lists symptoms, possible causes, and possible solutions for hardware problems that might occur.

Table 5. Troubleshooting chart

Symptom	Possible Cause	Possible Solution
Power LED is off.	Power is not supplied to the router.	Check the power cable connections at the router and the power source. Make sure that all cables are used correctly and comply with the Ethernet specifications.
A combined speed and activity LED is off when the port is connected to a device.	Port connection is not working.	Check the crimp on the connectors and make sure that the plug is properly inserted and locked into the port at both the router and the connecting device. Make sure that all cables are used correctly and comply with the Ethernet specifications. Check for a defective port, cable, or module by testing them in an alternate environment where all products are functioning.
File transfer is slow or performance is degraded.	One possible cause is that a broadcast storm occurred and that a network loop (redundant path) was created.	Break the loop by making sure that only one path exists from any networked device to any other networked device.
A segment or device is not recognized as part of the network.	One or more devices are not properly connected, or cabling does not meet Ethernet guidelines.	Verify that the cabling is correct. Make sure that all connectors are securely positioned in the required ports. It is possible that equipment was accidentally disconnected.
A combined speed and activity LED is blinking continuously on all connected ports and the network is disabled.	A network loop (redundant path) was created.	Break the loop by making sure that only one path exists from any networked device to any other networked device.

Additional hardware troubleshooting suggestions

If the suggestions in the troubleshooting chart do not resolve the problem, see the following troubleshooting suggestions:

- **Network adapter cards:** Make sure that the network adapters that are installed in the computers are in working condition and the software driver was installed.
- **Configuration:** If problems occur after you alter the network configuration, restore the original connections and determine the problem by implementing the new changes one step at a time. Make sure that cable distances, repeater limits, and other physical aspects of the installation do not exceed the Ethernet limitations.
- **Autonegotiation:** The multi-gigabit Ethernet ports negotiate the correct speed, duplex mode, speed, and flow control if the device at the other end of the link supports autonegotiation. If the device does not support autonegotiation, the router determines only the speed correctly.
- **Router integrity:** If necessary, verify the integrity of the router by restarting it. If the problem continues, contact NETGEAR technical support. For more information, visit the support website at netgear.com/support.