

# NBG-418N

*Wireless N Home Router*

## User's Guide



### Default Login Details

LAN IP Address	http://192.168.1.1
User Name	admin
Password	1234

Version 1.00  
Edition 1, 4/2012

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**IMPORTANT!**

**READ CAREFULLY BEFORE USE.**

**KEEP THIS GUIDE FOR FUTURE REFERENCE.**

Graphics in this book may differ slightly from the product due to differences in operating systems, operating system versions, or if you installed updated firmware/software for your device. Every effort has been made to ensure that the information in this manual is accurate.

### **Related Documentation**

- Quick Start Guide

The Quick Start Guide shows how to connect the NBG-418N and configure it using the Web Configurator wizard.

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# **PART I**

## **User's Guide**

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# Introduction

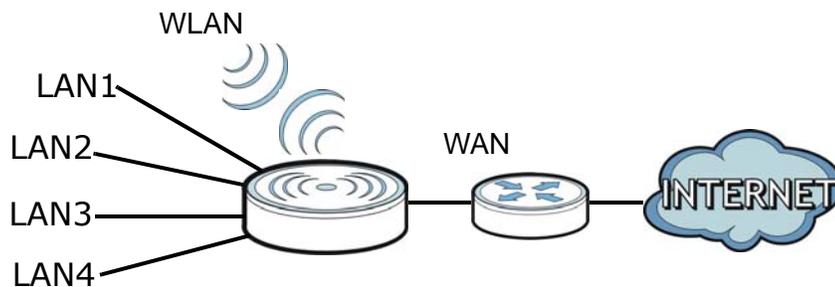
## 1.1 Overview

The NBG-418N extends the range of your existing wired network without additional wiring, providing easy network access to mobile users.

You can create the following connections using the NBG-418N:

- **LAN.** You can connect network devices via the Ethernet ports of the NBG-418N so that they can communicate with each other and access the Internet.
- **WLAN.** Wireless clients can connect to the NBG-418N to access network resources.
- **WAN.** Connect to a broadband modem/router for Internet access.

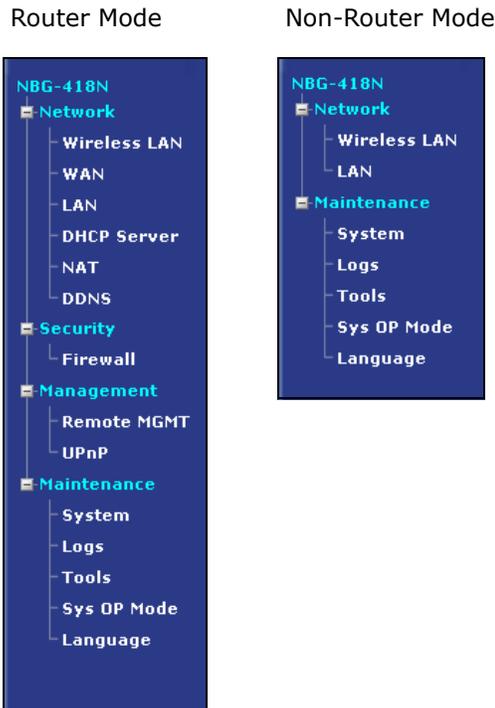
**Figure 1** NBG-418N Network



You can set up the NBG-418N with other IEEE 802.11b/g/n compatible devices in one of the following device modes:

- Router
- Access Point
- Universal Repeater
- Client Bridge

Use a (supported) web browser to manage the NBG-418N. Menus vary according to which mode you're using.



See [Chapter 4 on page 35](#) for more information on these modes.

## 1.2 Securing the NBG-418N

Do the following things regularly to make the NBG-418N more secure and to manage the NBG-418N more effectively.

- Change the password. Use a password that's not easy to guess and that consists of different types of characters, such as numbers and letters.
- Write down the password and put it in a safe place.
- Back up the configuration (and make sure you know how to restore it). Restoring an earlier working configuration may be useful if the device becomes unstable or even crashes. If you forget your password, you will have to reset the NBG-418N to its factory default settings. If you backed up an earlier configuration file, you would not have to totally re-configure the NBG-418N. You could simply restore your last configuration.

## 1.3 LEDs

Figure 2 Front Panel



The following table describes the LEDs and the WPS button.

Table 1 Front Panel LEDs and WPS Button

LED	COLOR	STATUS	DESCRIPTION
POWER 	Green	On	The NBG-418N is receiving power and functioning properly.
		Off	The NBG-418N is not receiving power.
LAN 1-4 	Green	On	The NBG-418N has a successful 10/100MB LAN connection.
		Blinking	The NBG-418N is sending/receiving data through the LAN.
		Off	The LAN is not connected.
WAN 	Green	On	The NBG-418N has a successful 10/100MB WAN connection.
		Blinking	The NBG-418N is sending/receiving data through the WAN.
		Off	The WAN connection is not ready, or has failed.
WLAN 	Green	On	The NBG-418N is ready, but is not sending/receiving data through the wireless LAN.
		Blinking	The NBG-418N is sending/receiving data through the wireless LAN.  The NBG-418N is negotiating a WPS connection with a wireless client.
		Off	The wireless LAN is not ready or has failed.
WPS 	Green	On	WPS status is configured.
		Blinking	The NBG-418N is negotiating a WPS connection with a wireless client.
		Off	The WPS status is not configured or disabled.

## 1.4 The WPS Button

Your NBG-418N supports WiFi Protected Setup (WPS), which is an easy way to set up a secure wireless network. WPS is an industry standard specification, defined by the WiFi Alliance.

WPS allows you to quickly set up a wireless network with strong security, without having to configure security settings manually. Each WPS connection works between two devices. Both devices must support WPS (check each device's documentation to make sure).

Depending on the devices you have, you can either press a button (recommended) on the device itself, or in its configuration utility or enter a PIN (a unique Personal Identification Number that

allows one device to authenticate the other) in each of the two devices. When WPS is activated on a device, it has two minutes to find another device that also has WPS activated. Then, the two devices connect and set up a secure network by themselves.

For more information on using WPS, see [Section 5.2.1 on page 57](#).

## 1.5 Wall Mounting

You may need screw anchors if mounting on a concrete or brick wall.

**Table 2** Wall Mounting Information

Distance between holes	12 cm
M4 Screws	Two
Screw anchors (optional)	Two

- 1 Select a position free of obstructions on a wall strong enough to hold the weight of the device.
- 2 Mark two holes on the wall at the appropriate distance apart for the screws.

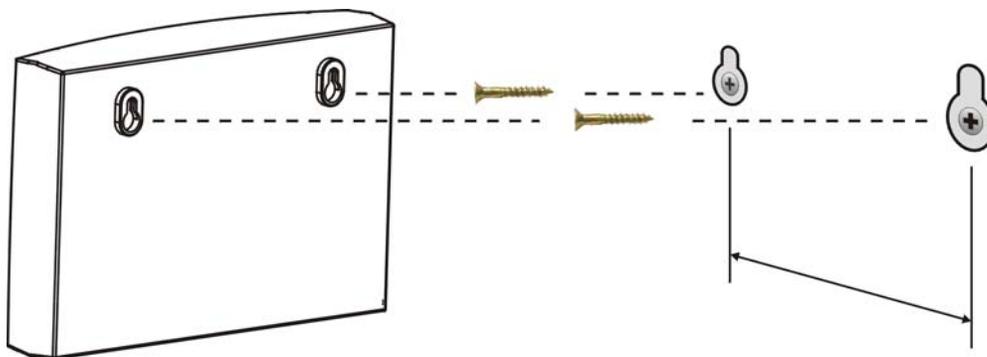
**Be careful to avoid damaging pipes or cables located inside the wall when drilling holes for the screws.**

- 3 If using screw anchors, drill two holes for the screw anchors into the wall. Push the anchors into the full depth of the holes, then insert the screws into the anchors. Do not insert the screws all the way in - leave a small gap of about 0.5 cm.

If not using screw anchors, use a screwdriver to insert the screws into the wall. Do not insert the screws all the way in - leave a gap of about 0.5 cm.

- 4 Make sure the screws are fastened well enough to hold the weight of the NBG-418N with the connection cables.
- 5 Align the holes on the back of the NBG-418N with the screws on the wall. Hang the NBG-418N on the screws.

**Figure 3** Wall Mounting Example



# The Web Configurator

## 2.1 Overview

This chapter describes how to access the NBG-418N Web Configurator and provides an overview of its screens.

The Web Configurator is an HTML-based management interface that allows easy setup and management of the NBG-418N via Internet browser. Use Internet Explorer 6.0 and later versions, Mozilla Firefox 3 and later versions, or Safari 2.0 and later versions. The recommended screen resolution is 1024 by 768 pixels.

In order to use the Web Configurator you need to allow:

- Web browser pop-up windows from your device. Web pop-up blocking is enabled by default in Windows XP SP (Service Pack) 2.
- JavaScript (enabled by default).
- Java permissions (enabled by default).

Refer to [Chapter 20 Troubleshooting](#) to see how to make sure these functions are allowed in Internet Explorer.

## 2.2 Accessing the Web Configurator

- 1 Make sure your NBG-418N hardware is properly connected and prepare your computer or computer network to connect to the NBG-418N (refer to the Quick Start Guide).
- 2 Launch your web browser.
- 3 Type "http://192.168.1.1" as the website address in your web browser. This is the default LAN IP address in router mode, the default device mode (192.168.1.2 is the default IP address in non-router mode).

Your computer must be in the same subnet in order to access this website address. In router mode, the NBG-418N can assign your computer an IP address, so you must set your computer to get an IP address automatically (computer factory default) or give it a fixed IP address in the range between 192.168.1.3 and 192.168.1.254 (see the appendices).

- 4 Type **admin** (default) as the user name and **1234** (default) as the password and click **OK**.

Figure 4 Login Screen



Note: The management session automatically times out when the time period set in the **Administrator Inactivity Timer** field expires (default five minutes). Simply log back into the NBG-418N if this happens.

- 5 Select the setup type you want to use.
  - Click **Go to Wizard Setup** to use the Configuration Wizard for basic Internet and Wireless setup.
  - Click **Go to Advanced Setup** to view and configure all the NBG-418N's settings.
  - Select a language to go to the basic Web Configurator in that language. To change to the advanced configurator see [Chapter 19 on page 139](#).

Figure 5 Selecting the setup mode



## 2.3 Resetting the NBG-418N

If you forget your password or IP address, or you cannot access the Web Configurator, you will need to use the **RESET** button at the back of the NBG-418N to reload the factory-default configuration file. This means that you will lose all configurations that you had previously saved, the username will be reset to **admin** and password will be reset to **1234**. The IP address will be reset to "192.168.1.1".

### 2.3.1 Using the RESET Button

- 1 Make sure the power LED is on.
- 2 Press the **RESET** button for longer than 1 second to restart/reboot the NBG-418N.
- 3 Press the **RESET** button for longer than five seconds to set the NBG-418N back to its factory-default configurations.



# Connection Wizard

## 3.1 Wizard Setup

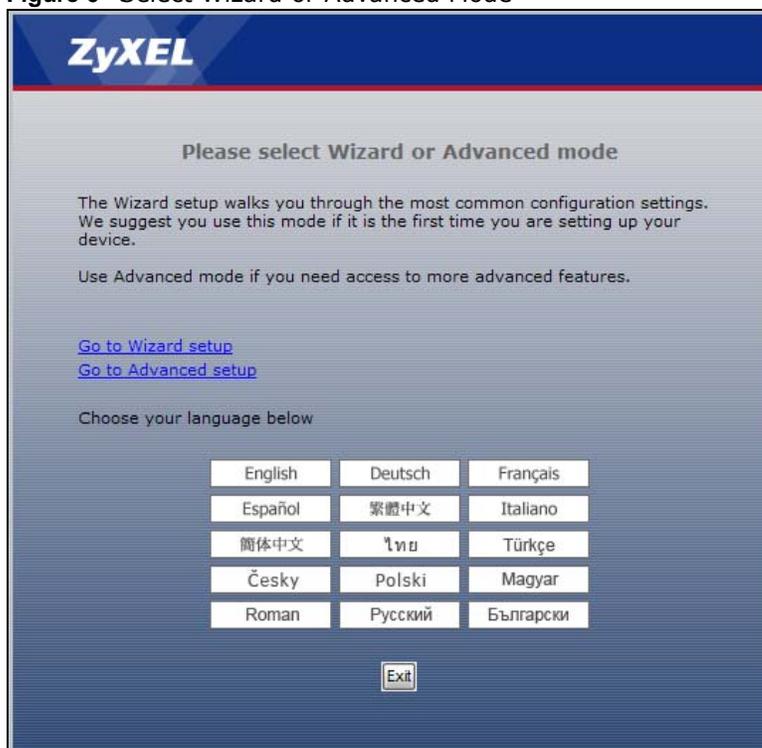
This chapter provides information on the wizard setup screens in the Web Configurator.

The Web Configurator's wizard setup helps you configure your device to access the Internet. Refer to your ISP (Internet Service Provider) checklist in the Quick Start Guide to know what to enter in each field. Leave a field blank if you don't have that information.

- 1 After you access the NBG-418N Web Configurator, click **Go to Wizard setup**.

You can click **Go to Advanced setup** to skip this wizard setup and configure basic or advanced features accordingly.

**Figure 6** Select Wizard or Advanced Mode



- 2 Choose a language by clicking on the language's button. The screen will update. Click the **Next** button to proceed to the next screen.

Figure 7 Select a Language



- 3 Read the on-screen information and click **Next**.

Figure 8 Welcome to the Connection Wizard



## 3.2 Connection Wizard: STEP 1: System Information

**System Information** contains administrative and system-related information.

### 3.2.1 System Name

**System Name** is for identification purposes. However, because some ISPs check this name you should enter your computer's "Computer Name".

- In Windows 95/98 click **Start > Settings > Control Panel > Network**. Click the Identification tab, note the entry for the **Computer Name** field and enter it as the **System Name**.
- In Windows 2000, click **Start > Settings** and **Control Panel** and then double-click **System**. Click the **Network Identification** tab and then the **Properties** button. Note the entry for the **Computer name** field and enter it as the **System Name**.
- In Windows XP, click **Start > My Computer > View system information** and then click the **Computer Name** tab. Note the entry in the **Full computer name** field and enter it as the NBG-418N **System Name**.

### 3.2.2 Domain Name

The **Domain Name** entry is what is propagated to the DHCP clients on the LAN. If you leave this blank, the domain name obtained by DHCP from the ISP is used. While you must enter the host name (System Name) on each individual computer, the domain name can be assigned from the NBG-418N via DHCP.

Click **Next** to configure the NBG-418N for Internet access.

**Figure 9** Wizard Step 1: System Information

The following table describes the labels in this screen.

**Table 3** Wizard Step 1: System Information

LABEL	DESCRIPTION
System Name	System Name is a unique name to identify the NBG-418N in an Ethernet network. Enter a descriptive name. This name can be up to 30 alphanumeric characters long. Spaces are not allowed, but dashes "-" and underscores "_" are accepted.
Domain Name	Type the domain name (if you know it) here. If you leave this field blank, the ISP may assign a domain name via DHCP. The domain name entered by you is given priority over the ISP assigned domain name.
Back	Click <b>Back</b> to display the previous screen.
Next	Click <b>Next</b> to proceed to the next screen.
Exit	Click <b>Exit</b> to close the wizard screen without saving.

## 3.3 Connection Wizard: STEP 2: Wireless LAN

Set up your wireless LAN using the following screen.

**Figure 10** Wizard Step 2: Wireless LAN

The following table describes the labels in this screen.

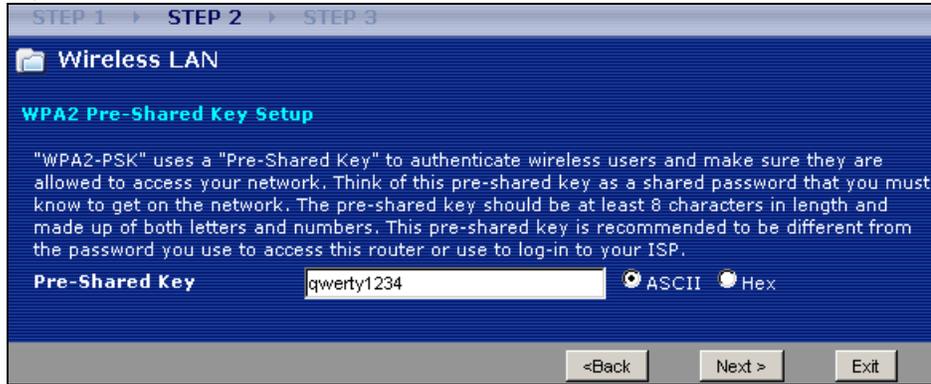
**Table 4** Wizard Step 2: Wireless LAN

LABEL	DESCRIPTION
Name (SSID)	Enter a descriptive name (up to 32 printable 7-bit ASCII characters) for the wireless LAN. If you change this field on the NBG-418N, make sure all wireless stations use the same SSID in order to access the network.
Security	Select a <b>Security</b> level from the drop-down list box.  Choose <b>None</b> to have no wireless LAN security configured. If you do not enable any wireless security on your NBG-418N, your network is accessible to any wireless networking device that is within range. If you choose this option, skip directly to <a href="#">Section 3.4 on page 25</a> .  Choose <b>WPA-PSK</b> or <b>WPA2-PSK</b> security to configure a Pre-Shared Key. Choose this option only if your wireless clients support WPA-PSK or WPA2-PSK respectively. If you choose this option, skip directly to <a href="#">Section 3.3.1 on page 24</a> .
Channel Selection	The range of radio frequencies used by IEEE 802.11b/g/n wireless devices is called a channel.  Set the operating frequency/channel depending on your particular region. Select a channel from the drop-down list box. The options vary depending on the frequency band and the country you are in.  This option is only available if <b>Auto Channel Selection</b> is disabled.
Auto Channel Selection	Select this option for the NBG-418N to automatically choose the channel with the least interference. Deselect this option if you wish to manually select the channel using the <b>Channel Selection</b> field.
Back	Click <b>Back</b> to display the previous screen.
Next	Click <b>Next</b> to proceed to the next screen.
Exit	Click <b>Exit</b> to close the wizard screen without saving.

Note: The wireless stations and NBG-418N must use the same SSID, channel ID, WPA-PSK (if WPA-PSK is enabled) or WPA2-PSK (if WPA2-PSK is enabled) for wireless communication.

### 3.3.1 WPA-PSK or WPA2-PSK Security

Choose **WPA-PSK** or **WPA2-PSK** security in the **Wireless LAN** setup screen to set up a **Pre-Shared Key**.

**Figure 11** Wizard Step 2: WPA-PSK or WPA2-PSK Security

The following table describes the labels in this screen.

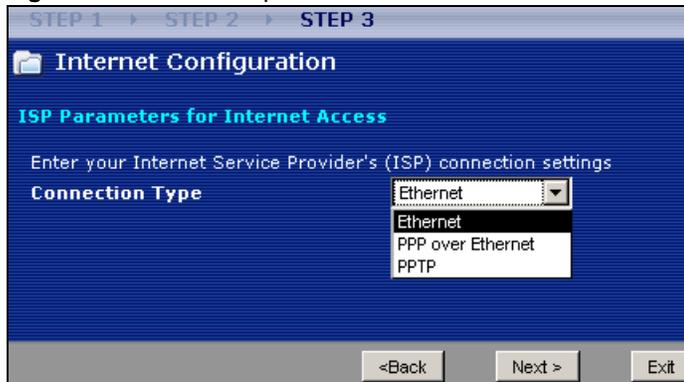
**Table 5** Wizard Step 2: WPA-PSK or WPA2-PSK Security

LABEL	DESCRIPTION
Pre-Shared Key	Type from 8 to 63 case-sensitive <b>ASCII</b> characters or 64 <b>HEX</b> characters. You can set up the most secure wireless connection by configuring WPA in the wireless LAN screens. You need to configure an authentication server to do this.
Back	Click <b>Back</b> to display the previous screen.
Next	Click <b>Next</b> to proceed to the next screen.
Exit	Click <b>Exit</b> to close the wizard screen without saving.

## 3.4 Connection Wizard: STEP 3: Internet Configuration

The NBG-418N offers three Internet connection types. They are **Ethernet**, **PPP over Ethernet** or **PPTP**. The wizard attempts to detect which WAN connection type you are using. If the wizard does not detect a connection type, you must select one from the drop-down list box. Check with your ISP to make sure you use the correct type.

This wizard screen varies according to the connection type that you select.

**Figure 12** Wizard Step 3: ISP Parameters.

The following table describes the labels in this screen,

**Table 6** Wizard Step 3: ISP Parameters

CONNECTION TYPE	DESCRIPTION
Ethernet	Select the <b>Ethernet</b> option when the WAN port is used as a regular Ethernet.
PPPoE	Select the <b>PPP over Ethernet</b> option for a dial-up connection. If your ISP gave you an IP address and/or subnet mask, then select <b>PPTP</b> .
PPTP	Select the <b>PPTP</b> option for a dial-up connection.

### 3.4.1 Ethernet Connection

Choose **Ethernet** when the WAN port is used as a regular Ethernet. Continue to [Section 3.4.4 on page 28](#).

**Figure 13** Wizard Step 3: Ethernet Connection



### 3.4.2 PPPoE Connection

Point-to-Point Protocol over Ethernet (PPPoE) functions as a dial-up connection. PPPoE is an IETF (Internet Engineering Task Force) standard specifying how a host personal computer interacts with a broadband modem (for example DSL, cable, wireless, etc.) to achieve access to high-speed data networks.

For the service provider, PPPoE offers an access and authentication method that works with existing access control systems (for instance, RADIUS).

One of the benefits of PPPoE is the ability to let end users access one of multiple network services, a function known as dynamic service selection. This enables the service provider to easily create and offer new IP services for specific users.

Operationally, PPPoE saves significant effort for both the subscriber and the ISP/carrier, as it requires no specific configuration of the broadband modem at the subscriber's site.

By implementing PPPoE directly on the NBG-418N (rather than individual computers), the computers on the LAN do not need PPPoE software installed, since the NBG-418N does that part of the task. Furthermore, with NAT, all of the LAN's computers will have Internet access.

**Figure 14** Wizard Step 3: PPPoE Connection

STEP 1 > STEP 2 > STEP 3

Internet Configuration

ISP Parameters for Internet Access

Enter your Internet Service Provider's (ISP) connection settings

Connection Type: PPP over Ethernet

Service Name: \_\_\_\_\_ (optional)

User Name: \_\_\_\_\_

Password: \_\_\_\_\_

<Back    Next >    Exit

The following table describes the labels in this screen.

**Table 7** Wizard Step 3: PPPoE Connection

LABEL	DESCRIPTION
ISP Parameter for Internet Access	
Connection Type	Select the <b>PPP over Ethernet</b> option for a dial-up connection.
Service Name	Type the name of your service provider.
User Name	Type the user name given to you by your ISP.
Password	Type the password associated with the user name above.
Back	Click <b>Back</b> to return to the previous screen.
Next	Click <b>Next</b> to continue.
Exit	Click <b>Exit</b> to close the wizard screen without saving.

### 3.4.3 PPTP Connection

Point-to-Point Tunneling Protocol (PPTP) is a network protocol that enables transfers of data from a remote client to a private server, creating a Virtual Private Network (VPN) using TCP/IP-based networks.

PPTP supports on-demand, multi-protocol, and virtual private networking over public networks, such as the Internet.

Refer to the appendix for more information on PPTP.

Note: The NBG-418N supports one PPTP server connection at any given time.

**Figure 15** Wizard Step 3: PPTP Connection

The following table describes the fields in this screen

**Table 8** Wizard Step 3: PPTP Connection

LABEL	DESCRIPTION
ISP Parameters for Internet Access	
Connection Type	Select <b>PPTP</b> from the drop-down list box. To configure a PPTP client, you must configure the <b>User Name</b> and <b>Password</b> fields for a PPP connection and the PPTP parameters for a PPTP connection.
User Name	Type the user name given to you by your ISP.
Password	Type the password associated with the User Name above.
PPTP Configuration	
Server IP Address	Type the IP address of the PPTP server.
Get automatically from ISP	Select this radio button if your ISP did not assign you a fixed IP address.
Use fixed IP address	Select this radio button, provided by your ISP to give the NBG-418N a fixed, unique IP address.
My IP Address	Type the (static) IP address assigned to you by your ISP.
My IP Subnet Mask	Type the subnet mask assigned to you by your ISP (if given).
My IP Gateway	Type the gateway IP address assigned to you by your ISP (if given).
Back	Click <b>Back</b> to return to the previous screen.
Next	Click <b>Next</b> to continue.
Exit	Click <b>Exit</b> to close the wizard screen without saving.

### 3.4.4 Your IP Address

The following wizard screen allows you to assign a fixed IP address or give the NBG-418N an automatically assigned IP address depending on your ISP.

**Figure 16** Wizard Step 3: Your IP Address

The following table describes the labels in this screen

**Table 9** Wizard Step 3: Your IP Address

LABEL	DESCRIPTION
Get automatically from your ISP	Select this option If your ISP did not assign you a fixed IP address. This is the default selection. If you choose this option, skip directly to <a href="#">Section 3.4.9 on page 31</a> .
Use fixed IP address provided by your ISP	Select this option if you were given IP address and/or DNS server settings by the ISP. The fixed IP address should be in the same subnet as your broadband modem or router.
Back	Click <b>Back</b> to return to the previous screen.
Next	Click <b>Next</b> to continue.
Exit	Click <b>Exit</b> to close the wizard screen without saving.

### 3.4.5 WAN IP Address Assignment

Every computer on the Internet must have a unique IP address. If your networks are isolated from the Internet, for instance, only between your two branch offices, you can assign any IP addresses to the hosts without problems. However, the Internet Assigned Numbers Authority (IANA) has reserved the following three blocks of IP addresses specifically for private networks.

**Table 10** Private IP Address Ranges

10.0.0.0	-	10.255.255.255
172.16.0.0	-	172.31.255.255
192.168.0.0	-	192.168.255.255

You can obtain your IP address from the IANA, from an ISP or have it assigned by a private network. If you belong to a small organization and your Internet access is through an ISP, the ISP can provide you with the Internet addresses for your local networks. On the other hand, if you are part of a much larger organization, you should consult your network administrator for the appropriate IP addresses.

**Note:** Regardless of your particular situation, do not create an arbitrary IP address; always follow the guidelines above. For more information on address assignment, please refer to RFC 1597, Address Allocation for Private Internets and RFC 1466, Guidelines for Management of IP Address Space.

### 3.4.6 IP Address and Subnet Mask

Similar to the way houses on a street share a common street name, so too do computers on a LAN share one common network number.

Where you obtain your network number depends on your particular situation. If the ISP or your network administrator assigns you a block of registered IP addresses, follow their instructions in selecting the IP addresses and the subnet mask.

If the ISP did not explicitly give you an IP network number, then most likely you have a single user account and the ISP will assign you a dynamic IP address when the connection is established. The Internet Assigned Number Authority (IANA) reserved this block of addresses specifically for private use; please do not use any other number unless you are told otherwise. Let's say you select 192.168.1.0 as the network number; which covers 254 individual addresses, from 192.168.1.1 to 192.168.1.254 (zero and 255 are reserved). In other words, the first three numbers specify the network number while the last number identifies an individual computer on that network.

Once you have decided on the network number, pick an IP address that is easy to remember, for instance, 192.168.1.1, for your NBG-418N, but make sure that no other device on your network is using that IP address.

The subnet mask specifies the network number portion of an IP address. Your NBG-418N will compute the subnet mask automatically based on the IP address that you entered. You don't need to change the subnet mask computed by the NBG-418N unless you are instructed to do otherwise.

### 3.4.7 DNS Server Address Assignment

Use DNS (Domain Name System) to map a domain name to its corresponding IP address and vice versa, for instance, the IP address of [www.zyxel.com](http://www.zyxel.com) is 204.217.0.2. The DNS server is extremely important because without it, you must know the IP address of a computer before you can access it.

The NBG-418N can get the DNS server addresses in the following ways.

- 1 The ISP tells you the DNS server addresses, usually in the form of an information sheet, when you sign up. If your ISP gives you DNS server addresses, enter them in the **DNS Server** fields in the **Wizard** and/or **WAN > Internet Connection** screen.
- 2 If the ISP did not give you DNS server information, leave the **DNS Server** fields set to **0.0.0.0** in the **Wizard** screen and/or set to **From ISP** in the **WAN > Internet Connection** screen for the ISP to dynamically assign the DNS server IP addresses.

### 3.4.8 WAN IP and DNS Server Address Assignment

The following wizard screen allows you to assign a fixed WAN IP address and DNS server addresses.

**Figure 17** Wizard Step 3: WAN IP and DNS Server Addresses

The screenshot shows a configuration window titled 'Internet Configuration' with a progress bar at the top indicating 'STEP 3'. Under the heading 'WAN IP Address Assignment', there are three input fields: 'My WAN IP Address', 'My WAN IP Subnet Mask', and 'Gateway IP Address', each containing the value '0.0.0.0'. Below this, under 'DNS Server Address Assignment', there are two input fields: 'First DNS Server' and 'Second DNS Server', both containing '0.0.0.0'. At the bottom of the window are three buttons: '<Back', 'Next >', and 'Exit'.

The following table describes the labels in this screen

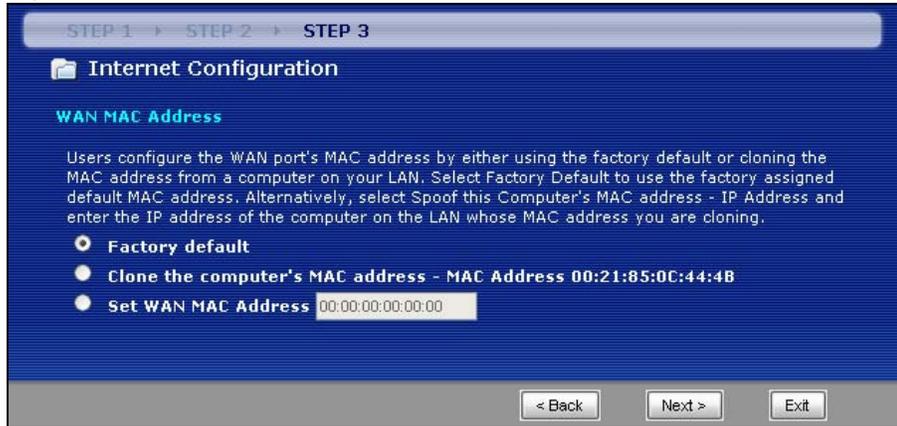
**Table 11** Wizard Step 3: WAN IP and DNS Server Addresses

LABEL	DESCRIPTION
WAN IP Address Assignment	
My WAN IP Address	Enter your WAN IP address in this field. The WAN IP address should be in the same subnet as your DSL/Cable modem or router.
My WAN IP Subnet Mask	Enter the IP subnet mask in this field.
Gateway IP Address	Enter the gateway IP address in this field.
System DNS Server Address Assignment (if applicable)	
DNS (Domain Name System) is for mapping a domain name to its corresponding IP address and vice versa. The DNS server is extremely important because without it, you must know the IP address of a computer before you can access it. The NBG-418N uses a system DNS server (in the order you specify here) to resolve domain names for DDNS and the time server.	
First DNS Server	Enter the DNS server's IP address in the fields provided.
Second DNS Server	If you do not configure a system DNS server, you must use IP addresses when configuring DDNS and the time server.
Back	Click <b>Back</b> to return to the previous screen.
Next	Click <b>Next</b> to continue.
Exit	Click <b>Exit</b> to close the wizard screen without saving.

### 3.4.9 WAN MAC Address

Every Ethernet device has a unique MAC (Media Access Control) address. The MAC address is assigned at the factory and consists of six pairs of hexadecimal characters, for example, 00:A0:C5:00:00:02.

This screen allows users to configure the WAN port's MAC address by either using the NBG-418N's MAC address, copying the MAC address of the computer from which you are configuring the NBG-418N or manually entering a MAC address. Once it is successfully configured, the address will be copied to configuration file. It is advisable to clone the MAC address from a computer on your LAN even if your ISP does not presently require MAC address authentication.

**Figure 18** Wizard Step 3: WAN MAC Address

The following table describes the fields in this screen.

**Table 12** Wizard Step 3: WAN MAC Address

LABEL	DESCRIPTION
Factory Default	Select <b>Factory Default</b> to use the factory assigned default MAC address.
Clone the computer's MAC address - MAC Address	Select this option to clone the MAC address of the computer (displaying in the screen) from which you are configuring the NBG-418N. It is advisable to clone the MAC address from a computer on your LAN even if your ISP does not presently require MAC address authentication.
Set WAN MAC Address	Select this option and enter the MAC address you want to use.
Back	Click <b>Back</b> to return to the previous screen.
Next	Click <b>Next</b> to continue.
Exit	Click <b>Exit</b> to close the wizard screen without saving.

## 3.5 Connection Wizard Complete

Click **Apply** to complete the wizard setup.

**Figure 19** Connection Wizard Complete

Well done! You have successfully set up your NBG-418N to operate on your network and access the Internet.



## 4.1 Overview

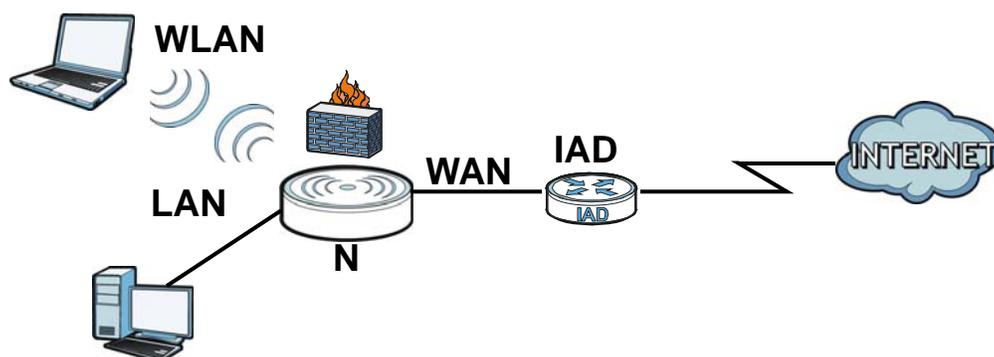
You can set up the NBG-418N with other IEEE 802.11b/g/n compatible devices in different device modes.

Note: Choose your device mode carefully to avoid having to change it later. The NBG-418N automatically restarts when you change modes.

The default LAN IP address of the NBG-418N in Router mode is 192.168.1.1. The default IP address of the NBG-418N in other modes is 192.168.1.2.

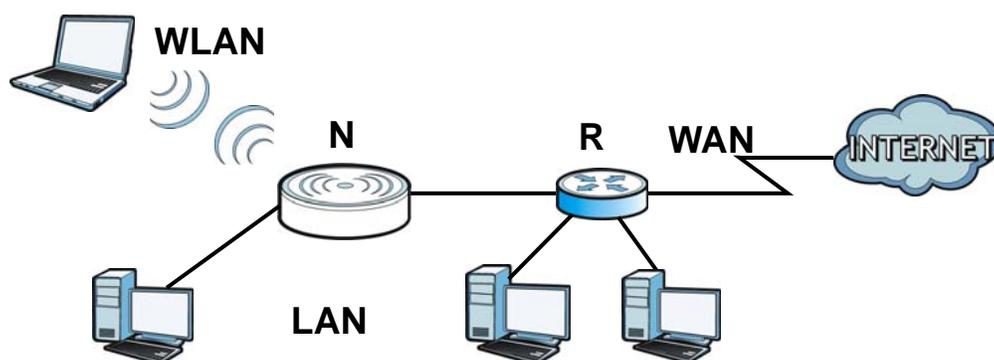
- **Router:** Use this mode if you want to use routing functions such as LAN DHCP, NAT, firewall and so on on the NBG-418N (N). The NBG-418N has separate LAN and WAN network IP addresses. Connect the WAN port to an Internet Access Device (IAD) such as a broadband modem.

Figure 20 Router



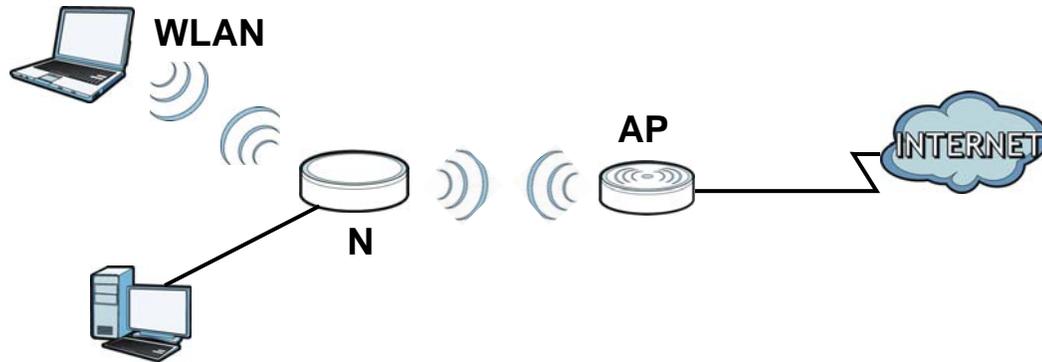
- **Access Point:** Use this mode if you already have a Router (R) in your network and you want to set up a wireless network and bridge the wired and wireless connections on the NBG-416N.

Figure 21 AP Mode



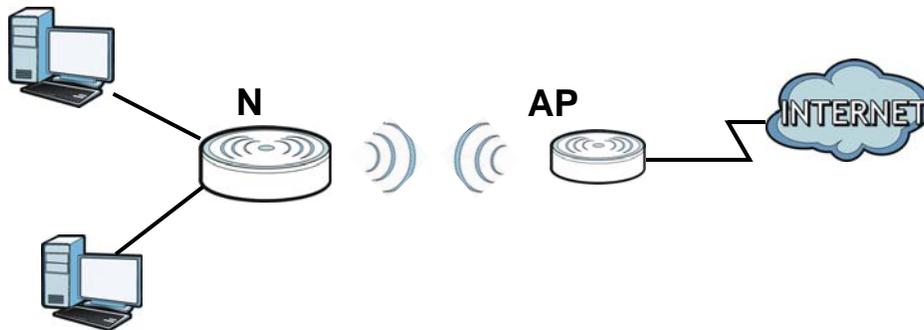
- **Universal Repeater:** In this mode, the NBG-418N (N) can be an access point and a wireless client at the same time. Use this mode if there is an existing wireless router or access point in your network and you want the NBG-418N (N) to wirelessly relay communications from its wireless clients to the access point.

Figure 22 Universal Repeater



- **Client Bridge:** Use this mode if there is an existing wireless router or access point (AP) in the network to which you want to connect your NBG-418N (N) wirelessly. You should know the SSID and wireless security details of the wireless router or access point to which you want to connect.

Figure 23 Client Bridge



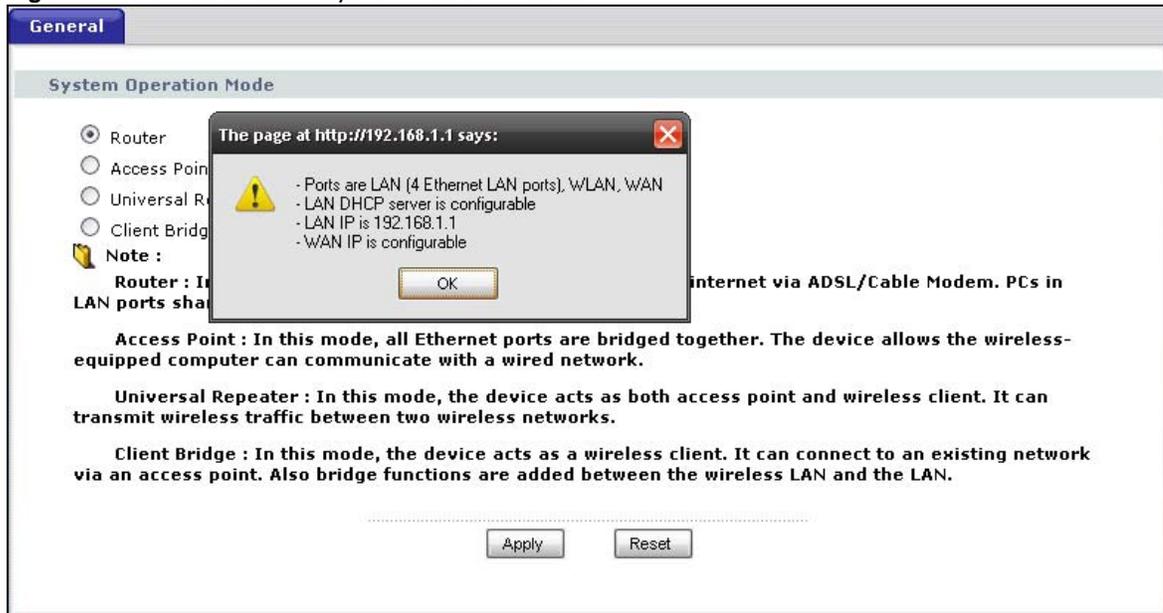
## 4.2 Setting your NBG-418N to Router Mode

The NBG-418N is set to wireless router mode by default. If it was changed and now you want to set it back, do the following procedure.

- 1 Connect your computer to the LAN port of the NBG-418N.
- 2 The default LAN IP address of the NBG-418N is 192.168.1.1 in router mode (192.168.1.2 by default in non-router mode). In router mode, the NBG-418N can assign your computer an IP address, so you must set your computer to get an IP address automatically (computer factory default) or give it a fixed IP address in the range between 192.168.1.3 and 192.168.1.254.
- 3 After you've set your computer's IP address, open a web browser such as Internet Explorer and type the IP address of the NBG-418N as the web address in your web browser.
- 4 Log into the Web Configurator. See the [Chapter 2 on page 17](#) for instructions on how to do this.

- 5 Go to **Maintenance > Sys OP Mode > General** and select **Router**.

**Figure 24** Maintenance > Sys OP Mode > Router



- 6 A pop-up window appears providing information on this mode. Click **OK** in the pop-up message window. Click **Apply**.

Note: Wait while the NBG-418N restarts, then log in to the Web Configurator again. The NBG-418N IP address is now 192.168.1.1.

## 4.2.1 Status Screen (Router Mode)

The screen below shows the status screen in **Router** mode.

**Figure 25** Status Screen (Router Mode)



The following table describes the icons shown in the **Status** screen.

**Table 13** Status Screen Icon Key

ICON	DESCRIPTION
	Click this icon to open the setup wizard.
	Click this icon to view copyright and a link for related product information.
	Click this icon at any time to exit the Web Configurator.
	Select a number of seconds or <b>None</b> from the drop-down list box to refresh all screen statistics automatically at the end of every time interval or to not refresh the screen statistics.
	Click this button to refresh the status screen statistics.

The following table describes the labels shown in the **Status** screen in **Router** mode.

**Table 14** Web Configurator Status Screen (Router Mode)

LABEL	DESCRIPTION
Device Information	
System Name	This is the <b>System Name</b> you enter in the <b>Maintenance &gt; System &gt; General</b> screen. It is for identification purposes.

**Table 14** Web Configurator Status Screen (Router Mode) (continued)

LABEL	DESCRIPTION
Firmware Version	This is the current firmware version of the NBG-418N.
WAN Information	
- MAC Address	This shows the WAN Ethernet adapter MAC Address of your device.
- Connection Type	This shows the current connection type.
- IP Address	This shows the WAN port's IP address.
- IP Subnet Mask	This shows the WAN port's subnet mask.
- Gateway	This shows the WAN port's gateway IP address.
- DNS	This shows the IP address of your DNS server.
LAN Information	
- MAC Address	This shows the LAN Ethernet adapter MAC Address of your device.
- IP Address	This shows the LAN port's IP address.
- IP Subnet Mask	This shows the LAN port's subnet mask.
- DHCP	This shows the LAN port's DHCP role - <b>Server</b> or <b>None</b> .
WLAN Information	
- MAC Address	This shows the wireless adapter MAC Address of your device.
- Status	This shows the current status of the Wireless LAN - <b>On</b> , <b>Off</b> or <b>Off by scheduler</b> .
- Name (SSID)	This shows a descriptive name used to identify the NBG-418N in the wireless LAN.
- Channel	This shows the channel number which you select manually or the NBG-418N automatically scans and selects.
- Operating Channel	This shows the channel number which the NBG-418N is currently using over the wireless LAN.
- Security Mode	This shows the level of wireless security the NBG-418N is using.
- 802.11 Mode	This shows the wireless standard.
- WPS	This displays <b>Configured</b> when the WPS has been set up. This displays <b>Unconfigured</b> if the WPS has not been set up. Click the status to display <b>Network &gt; Wireless LAN &gt; WPS</b> screen.
System Status	
Operation Mode	This field shows the device operation mode: <b>Router</b> , <b>Access Point</b> , <b>Client Bridge</b> or <b>Universal Repeater</b> .
System Up Time	This is the total time the NBG-418N has been on.
Current Date/Time	This field displays your NBG-418N's present date and time.
System Resource	
- CPU Usage	This displays what percentage of the NBG-418N's processing ability is currently used. When this percentage is close to 100%, the NBG-418N is running at full load, and the throughput is not going to improve anymore. If you want some applications to have more throughput, you should turn off other applications.
- Memory Usage	This shows what percentage of the heap memory the NBG-418N is using.
System Setting	
- Firewall	This shows whether the firewall is active or not.
- UPnP	This shows whether UPnP is active or not.
Interface Status	

**Table 14** Web Configurator Status Screen (Router Mode) (continued)

LABEL	DESCRIPTION
Interface	This displays the NBG-418N port types. The port types are: <b>WAN</b> , <b>LAN</b> and <b>WLAN</b> .
Status	For the LAN and WAN ports, this field displays <b>Down</b> (line is down) or <b>Up</b> (line is up or connected).  For the WLAN, it displays <b>Up</b> when the WLAN is enabled or <b>Down</b> when the WLAN is disabled.
Rate	For the LAN ports, this displays the port speed and duplex setting or <b>NA</b> when the line is disconnected.  For the WAN port, it displays the port speed and duplex setting if you're using Ethernet encapsulation and <b>Idle</b> (line (ppp) idle), <b>Dial</b> (starting to trigger a call) and <b>Drop</b> (dropping a call) if you're using PPPoE or PPTP encapsulation. This field displays <b>NA</b> when the line is disconnected.  For the WLAN, it displays the maximum transmission rate when the WLAN is enabled and <b>NA</b> when the WLAN is disabled.
Summary	
DHCP Table	Use this screen to view current DHCP client information.
Packet Statistics	Use this screen to view port status and packet specific statistics.
WLAN Station Status	Use this screen to view the wireless stations that are currently associated to the NBG-418N.

#### 4.2.1.1 Summary: DHCP Table

DHCP (Dynamic Host Configuration Protocol, RFC 2131 and RFC 2132) allows individual clients to obtain TCP/IP configuration at start-up from a server. You can configure the NBG-418N's LAN as a DHCP server or disable it. When configured as a server, the NBG-418N provides the TCP/IP configuration for the clients. If DHCP service is disabled, you must have another DHCP server on that network, or else the computer must be manually configured.

Click the **DHCP Table (Details...)** hyperlink in the **Status** screen. Read-only information here relates to your DHCP status. The DHCP table shows current DHCP client information (including **IP Address**, **Host Name** and **MAC Address**) of all network clients using the NBG-418N's DHCP server.

**Figure 26** Summary: DHCP Table

DHCP Table			
#	IP Address	Host Name	MAC Address
1	192.168.1.33	TWPC12731	00:19:cb:04:80:1e
2	192.168.1.35	twpc12116	00:02:e3:56:16:9d

Refresh

The following table describes the labels in this screen.

**Table 15** Summary: DHCP Table

LABEL	DESCRIPTION
#	This is the index number of the host computer.
IP Address	This field displays the IP address relative to the # field listed above.
Host Name	This field displays the computer host name.

**Table 15** Summary: DHCP Table (continued)

LABEL	DESCRIPTION
MAC Address	This field shows the MAC address of the computer with the name in the <b>Host Name</b> field.  Every Ethernet device has a unique MAC (Media Access Control) address which uniquely identifies a device. The MAC address is assigned at the factory and consists of six pairs of hexadecimal characters, for example, 00:A0:C5:00:00:02.
Refresh	Click <b>Refresh</b> to renew the screen.

#### 4.2.1.2 Summary: Packet Statistics

Click the **Packet Statistics (Details...)** hyperlink in the **Status** screen. Read-only information here includes port status, packet specific statistics and the "system up time". The **Poll Interval(s)** field is configurable and is used for refreshing the screen.

**Figure 27** Summary: Packet Statistics

Packet Statistics						
Port	Status	TxPkts	RxPkts	Collisions	Tx B/s	Rx B/s
WAN	100M	876235	809818	0	0	150
LAN	100M	810753	886992	0	821	1676
WLAN	N/A	958	3019	0	0	0

System Up Time : 1:41:47

Poll Interval :  sec

The following table describes the labels in this screen.

**Table 16** Summary: Packet Statistics

LABEL	DESCRIPTION
Port	This is the NBG-418N's port type.
Status	For the LAN ports, this displays the port speed and duplex setting or <b>Down</b> when the line is disconnected.  For the WAN port, it displays the port speed and duplex setting if you're using Ethernet encapsulation and <b>Idle</b> (line (ppp) idle), <b>Dial</b> (starting to trigger a call) and <b>Drop</b> (dropping a call) if you're using PPPoE or PPTP encapsulation. This field displays <b>Down</b> when the line is disconnected.  For the WLAN, it displays the maximum transmission rate when the WLAN is enabled and <b>Down</b> when the WLAN is disabled.
TxPkts	This is the number of transmitted packets on this port.
RxPkts	This is the number of received packets on this port.
Collisions	This is the number of collisions on this port.
Tx B/s	This displays the transmission speed in bytes per second on this port.
Rx B/s	This displays the reception speed in bytes per second on this port.
System Up Time	This is the total time the NBG-418N has been on.
Poll Interval(s)	Enter the time interval for refreshing statistics in this field.
Set Interval	Click this button to apply the new poll interval you entered in the <b>Poll Interval(s)</b> field.
Stop	Click <b>Stop</b> to stop refreshing statistics.

### 4.2.1.3 Summary: WLAN Station Status

Click the **WLAN Station Status (Details...)** hyperlink in the **Status** screen. View the wireless stations that are currently associated to the NBG-418N in the **Association List**. Association means that a wireless client (for example, your network or computer with a wireless network card) has connected successfully to the AP (or wireless router) using the same SSID, channel and security settings.

**Figure 28** Summary: WLAN Station Status

Association List		
#	MAC Address	Association Time
1	00:19:cb:04:80:1e	03:52:42 2000/01/01

Refresh

The following table describes the labels in this screen.

**Table 17** Summary: WLAN Station Status

LABEL	DESCRIPTION
#	This is the index number of an associated wireless station.
MAC Address	This field displays the MAC address of an associated wireless station.
Association Time	This field displays the time a wireless station first associated with the NBG-418N's WLAN network.
Refresh	Click <b>Refresh</b> to reload the list.

## 4.2.2 Router Mode Navigation Panel

Use the menu in the navigation panel menus to configure NBG-418N features in **Router Mode**.

Figure 29 Menus: Router Mode



The following table describes the sub-menus.

Table 18 Menus: Router Mode

LINK	TAB	FUNCTION
Status		This screen shows the NBG-418N's general device, system and interface status information. Use this screen to access the wizard, and summary statistics tables.
Network		
Wireless LAN	General	Use this screen to configure wireless LAN.
	MAC Filter	Use the MAC filter screen to configure the NBG-418N to block access to devices or block the devices from accessing the NBG-418N.
	Advanced	This screen allows you to configure advanced wireless settings.
	QoS	Use this screen to configure Wi-Fi Multimedia Quality of Service (WMM QoS). WMM QoS allows you to prioritize wireless traffic according to the delivery requirements of individual services.
	WPS	Use this screen to configure WPS.
	WPS Station	Use this screen to add a wireless station using WPS.
	Scheduling	Use this screen to schedule the times the Wireless LAN is enabled.
WAN	Internet Connection	This screen allows you to configure ISP parameters, WAN IP address assignment, DNS servers and the WAN MAC address.
LAN	IP	Use this screen to configure LAN IP address and subnet mask.
DHCP Server	General	Use this screen to enable the NBG-418N's DHCP server.
	Advanced	Use this screen to assign IP addresses to specific individual computers based on their MAC addresses and to have DNS servers assigned by the DHCP server.
	Client List	Use this screen to view current DHCP client information and to always assign an IP address to a MAC address (and host name).

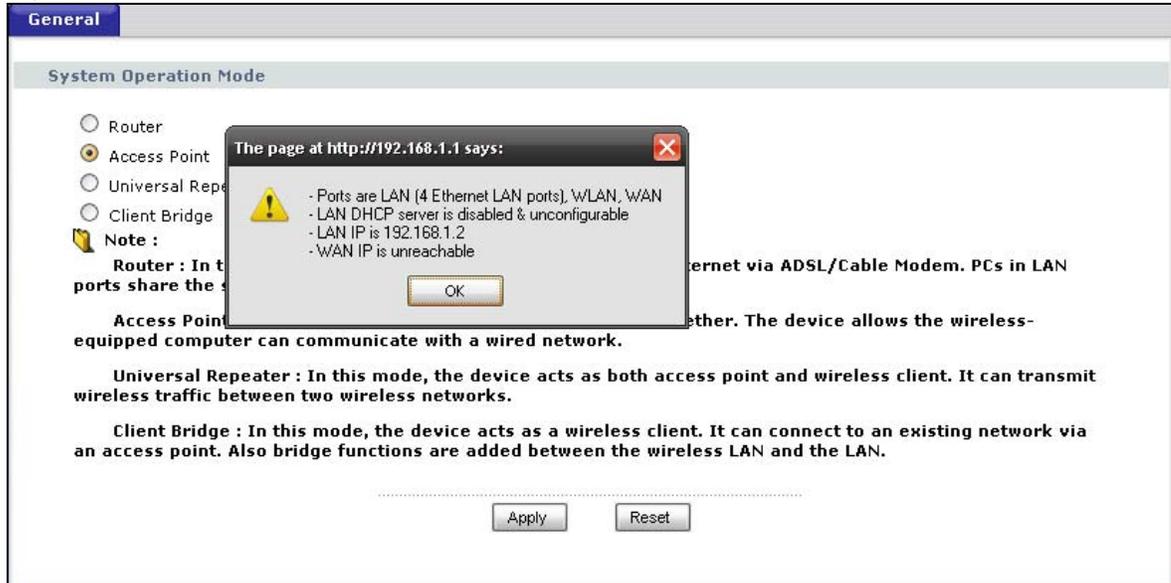
**Table 18** Menus: Router Mode (continued)

LINK	TAB	FUNCTION
NAT	General	Use this screen to enable NAT.
	Application	Use this screen to configure servers behind the NBG-418N.
DDNS	General	Use this screen to configure Dynamic DNS, a service that allows you to map a fixed domain name to a non-fixed IP address.
Security		
Firewall	General	Use this screen to activate/deactivate the firewall.
	Services	Use this screen to enable or disable ICMP and VPN passthrough features.
Management		
Remote MGMT	WWW	Use this screen to configure through which interface(s) and from which IP address(es) users can use HTTP to manage the NBG-418N.
UPnP	General	Use this screen to enable UPnP on the NBG-418N.
Maintenance		
System	General	Use this screen to view and change administrative settings such as system and domain names, password and inactivity timer.
	Time Setting	Use this screen to change your NBG-418N's time and date.
Logs	View Log	Use this screen to view the logs for the categories that you selected.
Tools	Firmware	Use this screen to upload firmware to your NBG-418N.
	Configuration	Use this screen to backup and restore the configuration or reset the factory defaults to your NBG-418N.
	Restart	This screen allows you to reboot the NBG-418N without turning the power off.
Sys OP Mode	General	This screen allows you to select the device operation mode.
Language	Language	This screen allows you to select the language you prefer.

## 4.3 Setting your NBG-418N to AP Mode

- 1 Connect your computer to the LAN port of the NBG-418N.
- 2 The default LAN IP address of the NBG-418N is 192.168.1.1 in router mode (192.168.1.2 by default in non-router mode). In router mode, the NBG-418N can assign your computer an IP address, so you must set your computer to get an IP address automatically (computer factory default) or give it a fixed IP address in the range between 192.168.1.3 and 192.168.1.254.
- 3 After you've set your computer's IP address, open a web browser such as Internet Explorer and type the IP address of the NBG-418N as the web address in your web browser.
- 4 Log into the Web Configurator. See the [Chapter 2 on page 17](#) for instructions on how to do this.
- 5 Go to **Maintenance > Sys OP Mode > General** and select **Access Point**.

Figure 30 Maintenance &gt; Sys OP Mode &gt; AP



- 6 A pop-up window appears providing information on this mode. Click **OK** in the pop-up message window. Click **Apply**. Your NBG-418N is now in **AP Mode**.

Note: Wait while the NBG-418N restarts, then log in to the Web Configurator again.

### 4.3.1 Status Screen (AP Mode)

Click on **Status**. The screen below shows the status screen in **AP Mode**.

Figure 31 Status Screen (AP Mode)



The following table describes the labels shown in the **Status** screen.

**Table 19** Status Screen (AP Mode)

LABEL	DESCRIPTION
Device Information	
System Name	This is the <b>System Name</b> you enter in the <b>Maintenance &gt; System &gt; General</b> screen. It is for identification purposes.
Firmware Version	This is the current firmware version of the NBG-418N.
LAN Information	
- MAC Address	This shows the LAN Ethernet adapter MAC Address of your device.
- IP Address	This shows the LAN port's IP address.
- IP Subnet Mask	This shows the LAN port's subnet mask.
- DHCP	This shows the LAN port's DHCP role - <b>None</b> .
WLAN Information	
- MAC Address	This shows the wireless adapter MAC Address of your device.
- Status	This shows the current status of the Wireless LAN - <b>On</b> , <b>Off</b> , or <b>Off by scheduler</b> .
- Name (SSID)	This shows a descriptive name used to identify the NBG-418N in the wireless LAN.
- Channel	This shows the channel number which you select manually or the NBG-418N automatically scans and selects.
- Operating Channel	This shows the channel number which the NBG-418N is currently using over the wireless LAN.
- Security Mode	This shows the level of wireless security the NBG-418N is using.
- 802.11 Mode	This shows the IEEE 802.11 standard that the NBG-418N supports. Wireless clients must support the same standard in order to be able to connect to the NBG-418N
- WPS	This shows the WPS (WiFi Protected Setup) Status. Click the status to display <b>Network &gt; Wireless LAN &gt; WPS</b> screen.
System Status	
Operation Mode	This field shows the device operation mode: <b>Router</b> , <b>Access Point</b> , <b>Client Bridge</b> or <b>Universal Repeater</b> .
System Up Time	This is the total time the NBG-418N has been on.
Current Date/Time	This field displays your NBG-418N's present date and time.
System Resource	
- CPU Usage	This displays what percentage of the NBG-418N's processing ability is currently used. When this percentage is close to 100%, the NBG-418N is running at full load, and the throughput is not going to improve anymore. If you want some applications to have more throughput, you should turn off other applications.
- Memory Usage	This shows what percentage of the heap memory the NBG-418N is using.
Interface Status	
Interface	This displays the NBG-418N port types. The port types are: <b>LAN</b> and <b>WLAN</b> .
Status	For the LAN port, this field displays <b>Down</b> (line is down) or <b>Up</b> (line is up or connected).  For the WLAN, it displays <b>Up</b> when the WLAN is enabled or <b>Down</b> when the WLAN is disabled.
Rate	For the LAN ports, this displays the port speed and duplex setting or <b>N/A</b> when the line is disconnected.  For the WLAN, it displays the maximum transmission rate when the WLAN is enabled and <b>N/A</b> when the WLAN is disabled.
Summary	

**Table 19** Status Screen (AP Mode) (continued)

LABEL	DESCRIPTION
Packet Statistics	Use this screen to view port status and packet specific statistics.
WLAN Station Status	Use this screen to view the wireless stations that are currently associated to the NBG-418N.

### 4.3.2 AP Navigation Panel

Use the menu in the navigation panel to configure NBG-418N features in **AP Mode**.

The following screen and table show the features you can configure in **AP Mode**.

**Figure 32** Menu: AP Mode

The following table describes the sub-menus.

**Table 20** Menu: AP Mode

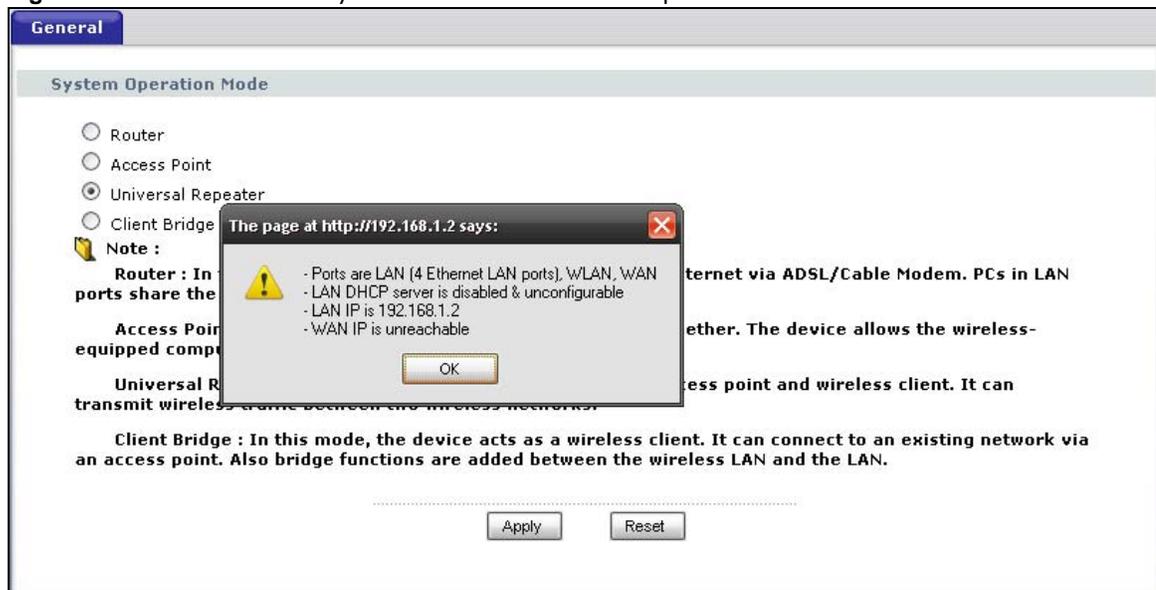
LINK	TAB	FUNCTION
Status		This screen shows the NBG-418N's general device, system and interface status information. Use this screen to access the wizard, and summary statistics tables.
Network		
Wireless LAN	General	Use this screen to configure wireless LAN.
	MAC Filter	Use the MAC filter screen to configure the NBG-418N to block access to devices or block the devices from accessing the NBG-418N.
	Advanced	This screen allows you to configure advanced wireless settings.
	QoS	Use this screen to configure Wi-Fi Multimedia Quality of Service (WMM QoS). WMM QoS allows you to prioritize wireless traffic according to the delivery requirements of individual services.
	WPS	Use this screen to configure WPS.
	WPS Station	Use this screen to add a wireless station using WPS.
	Scheduling	Use this screen to schedule the times the Wireless LAN is enabled.
LAN	IP	Use this screen to configure LAN IP address and subnet mask.
Maintenance		
System	General	Use this screen to view and change administrative settings such as system and domain names, password and inactivity timer.
	Time Setting	Use this screen to change your NBG-418N's time and date.

**Table 20** Menu: AP Mode (continued)

LINK	TAB	FUNCTION
Logs	View Log	Use this screen to view the logs for the categories that you selected.
Tools	Firmware	Use this screen to upload firmware to your NBG-418N.
	Configuration	Use this screen to backup and restore the configuration or reset the factory defaults to your NBG-418N.
	Restart	This screen allows you to reboot the NBG-418N without turning the power off.
Sys OP Mode	General	This screen allows you to select the device operation mode: <b>Router, Access Point, Client Bridge or Universal Repeater.</b>
Language	Language	This screen allows you to select the language you prefer.

## 4.4 Setting your NBG-418N to Universal Repeater Mode

- 1 Connect your computer to the LAN port of the NBG-418N.
- 2 The default LAN IP address of the NBG-418N is 192.168.1.1 in router mode (192.168.1.2 by default in non-router mode). In router mode, the NBG-418N can assign your computer an IP address, so you must set your computer to get an IP address automatically (computer factory default) or give it a fixed IP address in the range between 192.168.1.3 and 192.168.1.254.
- 3 After you've set your computer's IP address, open a web browser such as Internet Explorer and type the IP address of the NBG-418N as the web address in your web browser.
- 4 Log into the Web Configurator. See the [Chapter 2 on page 17](#) for instructions on how to do this.
- 5 Go to **Maintenance > Sys OP Mode > General** and select **Universal Repeater**.

**Figure 33** Maintenance > Sys OP Mode > Universal Repeater

- 6 A pop-up window appears providing information on this mode. Click **OK** in the pop-up message window. Click **Apply**. Your NBG-418N is now in **Universal Repeater** mode.

Note: Wait while the NBG-418N restarts, then log in to the Web Configurator again.

### 4.4.1 Status Screen (Universal Repeater Mode)

Click on **Status**. The screen below shows the status screen in Universal Repeater **Mode**.

**Figure 34** Status Screen (Universal Repeater Mode)



The following table describes the labels shown in the **Status** screen.

**Table 21** Status Screen (Universal Repeater Mode)

LABEL	DESCRIPTION
Device Information	
System Name	This is the <b>System Name</b> you enter in the <b>Maintenance &gt; System &gt; General</b> screen. It is for identification purposes.
Firmware Version	This is the current firmware version of the NBG-418N.
LAN Information	
- MAC Address	This shows the LAN Ethernet adapter MAC Address of your device.
- IP Address	This shows the LAN port's IP address.
- IP Subnet Mask	This shows the LAN port's subnet mask.
- DHCP	This shows the LAN port's DHCP role.

**Table 21** Status Screen (Universal Repeater Mode) (continued)

LABEL	DESCRIPTION
WLAN AP Information	
- MAC Address	This shows the wireless adapter MAC Address of your device.
- Status	This shows the current status of the Wireless LAN - <b>On</b> , <b>Off</b> , or <b>Off by scheduler</b> .
- SSID	This shows a descriptive name used to identify the NBG-418N in the wireless LAN.
- Channel	This shows the channel number which you select manually or the NBG-418N automatically scans and selects.
- Operating Channel	This shows the channel number which the NBG-418N is currently using over the wireless LAN.
- Security Mode	This shows the level of wireless security the NBG-418N is using.
- 802.11 Mode	This shows the IEEE 802.11 standard that the NBG-418N supports. Wireless clients must support the same standard in order to be able to connect to the NBG-418N
- WPS	This shows the WPS (WiFi Protected Setup) Status. Click the link to display <b>Network &gt; Wireless LAN &gt; WPS</b> screen.
WLAN STA Information	
- SSID	This is the name of the selected AP that the NBG-418N is associating with.
- Security Mode	This shows the wireless security the NBG-418N is using to connect to the AP.
- Connection Status	This shows whether the NBG-418N is currently associated with the selected AP.
System Status	
Operation Mode	This field shows the device operation mode: <b>Router</b> , <b>Access Point</b> , <b>Client Bridge</b> or <b>Universal Repeater</b> .
System Up Time	This is the total time the NBG-418N has been on.
Current Date/Time	This field displays your NBG-418N's present date and time.
System Resource	
- CPU Usage	This displays what percentage of the NBG-418N's processing ability is currently used. When this percentage is close to 100%, the NBG-418N is running at full load, and the throughput is not going to improve anymore. If you want some applications to have more throughput, you should turn off other applications.
- Memory Usage	This shows what percentage of the heap memory the NBG-418N is using.
Interface Status	
Interface	This displays the NBG-418N port types. The port types are: <b>LAN</b> and <b>WLAN</b> .
Status	For the LAN port, this field displays <b>Down</b> (line is down) or <b>Up</b> (line is up or connected).  For the WLAN, it displays <b>Up</b> when the WLAN is enabled or <b>Down</b> when the WLAN is disabled.
Rate	For the LAN ports, this displays the port speed and duplex setting or <b>N/A</b> when the line is disconnected.  For the WLAN, it displays the maximum transmission rate when the WLAN is enabled and <b>N/A</b> when the WLAN is disabled.
Summary	
Packet Statistics	Use this screen to view port status and packet specific statistics.
WLAN Station Status	Use this screen to view the wireless stations that are currently associated to the NBG-418N.

## 4.4.2 Universal Repeater Navigation Panel

Use the menu in the navigation panel to configure NBG-418N features in **Universal Repeater Mode**.

The following screen and table show the features you can configure in **Universal Repeater Mode**.

**Figure 35** Menu: Universal Repeater Mode



The following table describes the sub-menus.

**Table 22** Menu: Universal Repeater Mode

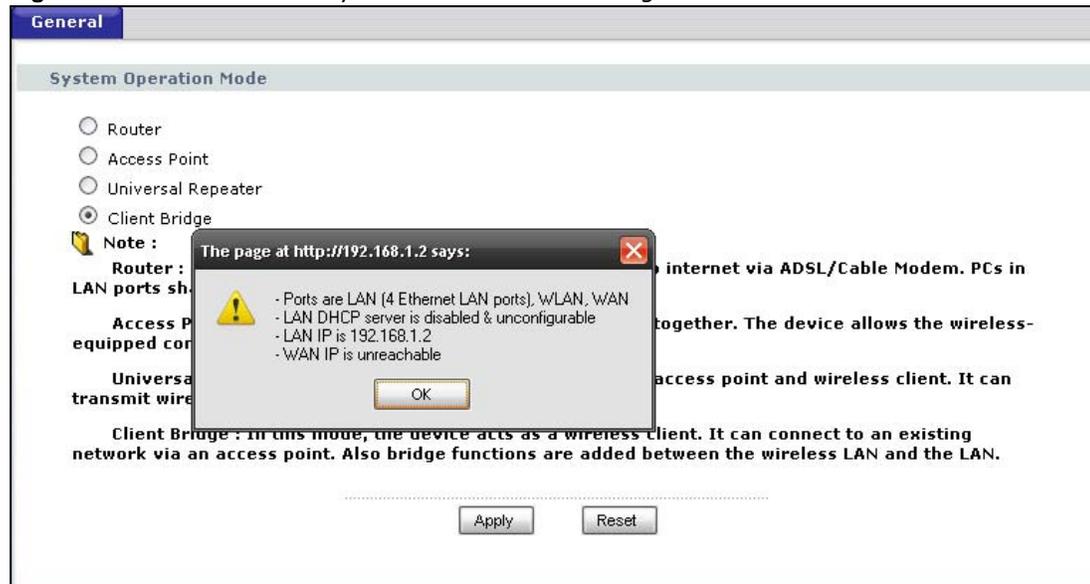
LINK	TAB	FUNCTION
Status		This screen shows the NBG-418N's general device, system and interface status information. Use this screen to access the wizard, and summary statistics tables.
Network		
WLAN	AP Select	Use this screen to choose an access point that you want the NBG-418N to connect to. You should know the security settings of the target AP.
	General	Use this screen to configure wireless LAN.
	MAC Filter	Use the MAC filter screen to configure the NBG-418N to block access to devices or block the devices from accessing the NBG-418N.
	Advanced	This screen allows you to configure advanced wireless settings.
	QoS	Use this screen to configure Wi-Fi Multimedia Quality of Service (WMM QoS). WMM QoS allows you to prioritize wireless traffic according to the delivery requirements of individual services.
	WPS	Use this screen to configure WPS.
	WPS Station	Use this screen to add a wireless station using WPS.
	Scheduling	Use this screen to schedule the times the Wireless LAN is enabled.
LAN	IP	Use this screen to configure LAN IP address and subnet mask.
Maintenance		
System	General	Use this screen to view and change administrative settings such as system and domain names, password and inactivity timer.
	Time Setting	Use this screen to change your NBG-418N's time and date.
Logs	View Log	Use this screen to view the logs for the categories that you selected.

**Table 22** Menu: Universal Repeater Mode (continued)

LINK	TAB	FUNCTION
Tools	Firmware	Use this screen to upload firmware to your NBG-418N.
	Configuration	Use this screen to backup and restore the configuration or reset the factory defaults to your NBG-418N.
	Restart	This screen allows you to reboot the NBG-418N without turning the power off.
Sys OP Mode	General	This screen allows you to select the device operation mode: <b>Router</b> , <b>Access Point</b> , <b>Client Bridge</b> or <b>Universal Repeater</b> .
Language	Language	This screen allows you to select the language you prefer.

## 4.5 Setting your NBG-418N to Client Bridge Mode

- 1 Connect your computer to the LAN port of the NBG-418N.
- 2 The default LAN IP address of the NBG-418N is 192.168.1.1 in router mode (192.168.1.2 by default in non-router mode). In router mode, the NBG-418N can assign your computer an IP address, so you must set your computer to get an IP address automatically (computer factory default) or give it a fixed IP address in the range between 192.168.1.3 and 192.168.1.254.
- 3 After you've set your computer's IP address, open a web browser such as Internet Explorer and type the IP address of the NBG-418N as the web address in your web browser.
- 4 Log into the Web Configurator. See the [Chapter 2 on page 17](#) for instructions on how to do this.
- 5 Go to **Maintenance > Sys OP Mode > General** and select **Client Bridge**.

**Figure 36** Maintenance > Sys OP Mode > Client Bridge

- 6 A pop-up window appears providing information on this mode. Click **OK** in the pop-up message window. Click **Apply**. Your NBG-418N is now in **Client Bridge** mode.

Note: Wait while the NBG-418N restarts, then log in to the Web Configurator again.

## 4.5.1 Status Screen (Client Bridge Mode)

Click on **Status**. The screen below shows the status screen in **Client Bridge Mode**.

**Figure 37** Status Screen (Client Bridge Mode)



The following table describes the labels shown in the **Status** screen.

**Table 23** Status Screen (Client Bridge Mode)

LABEL	DESCRIPTION
Device Information	
System Name	This is the <b>System Name</b> you enter in the <b>Maintenance &gt; System &gt; General</b> screen. It is for identification purposes.
Firmware Version	This is the current firmware version of the NBG-418N.
WLAN Information	
- SSID	This is the name of the selected AP that the NBG-418N is associating with.
- Operating Channel	This shows the channel that is used to connect to the selected AP.
- Security Mode	This shows the wireless security the NBG-418N is using to connect to the AP.
- Connection Status	This shows whether the NBG-418N is currently associated with the selected AP.
LAN Information	
- MAC Address	This shows the LAN Ethernet adapter MAC Address of your device.
- IP Address	This shows the LAN port's IP address.
- IP Subnet Mask	This shows the LAN port's subnet mask.
- DHCP	This shows the LAN port's DHCP role - <b>None</b> .
System Status	
Operation Mode	This field shows the device operation mode: <b>Router, Access Point, Client Bridge</b> or <b>Universal Repeater</b> .
System Up Time	This is the total time the NBG-418N has been on.

**Table 23** Status Screen (Client Bridge Mode) (continued)

LABEL	DESCRIPTION
Current Date/Time	This field displays your NBG-418N's present date and time.
System Resource	
- CPU Usage	This displays what percentage of the NBG-418N's processing ability is currently used. When this percentage is close to 100%, the NBG-418N is running at full load, and the throughput is not going to improve anymore. If you want some applications to have more throughput, you should turn off other applications.
- Memory Usage	This shows what percentage of the heap memory the NBG-418N is using.
Interface Status	
Interface	This displays the NBG-418N port types. The port types are: <b>LAN</b> and <b>WLAN</b> .
Status	For the LAN port, this field displays <b>Down</b> (line is down) or <b>Up</b> (line is up or connected).  For the WLAN, it displays <b>Up</b> when the WLAN is enabled or <b>Down</b> when the WLAN is disabled.
Rate	For the LAN ports, this displays the port speed and duplex setting or <b>N/A</b> when the line is disconnected.  For the WLAN, it displays the maximum transmission rate when the WLAN is enabled and <b>N/A</b> when the WLAN is disabled.
Summary	
Packet Statistics	Use this screen to view port packet statistics.

## 4.5.2 Client Bridge Navigation Panel

Use the menu in the navigation panel to configure NBG-418N features in **Client Bridge Mode**.

The following screen and table show the features you can configure in **Client Bridge Mode**.

**Figure 38** Menu: Client Bridge Mode

The following table describes the sub-menus.

**Table 24** Menu: Client Bridge Mode

LINK	TAB	FUNCTION
Status		This screen shows the NBG-418N's general device, system and interface status information. Use this screen to access the wizard, and summary statistics tables.
Network		
WLAN	AP Select	Use this screen to choose an access point that you want the NBG-418N to connect to. You should know the security settings of the target AP.
	WLAN Information	Use this screen to view the SSID and security of the selected AP wireless network.
	Advanced	Use this screen to configure advanced wireless settings.
LAN	IP	Use this screen to configure LAN IP address and subnet mask.
Maintenance		
System	General	Use this screen to view and change administrative settings such as system and domain names, password and inactivity timer.
	Time Setting	Use this screen to change your NBG-418N's time and date.
Logs	View Log	Use this screen to view the logs for the categories that you selected.
Tools	Firmware	Use this screen to upload firmware to your NBG-418N.
	Configuration	Use this screen to backup and restore the configuration or reset the factory defaults to your NBG-418N.
	Restart	This screen allows you to reboot the NBG-418N without turning the power off.
Sys OP Mode	General	This screen allows you to select whether your device acts as a <b>Router, Access Point, Client Bridge</b> or <b>Universal Repeater</b> .
Language	Language	This screen allows you to select the language you prefer.



## 5.1 Overview

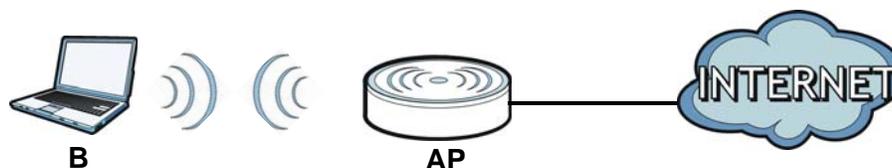
This chapter provides tutorials for your NBG-418N as follows:

- [How to Connect to the Internet from an AP](#)
  - [Configure Wireless Security Using WPS on both your NBG-418N and Wireless Client](#)
- [Enable and Configure Wireless Security without WPS on your NBG-418N](#)

## 5.2 How to Connect to the Internet from an AP

This section gives you an example of how to set up an access point (**AP**) and wireless client (a notebook, **B** in this example) for wireless communication. **B** can access the Internet through the AP wirelessly.

**Figure 39** Wireless AP Connection to the Internet



### 5.2.1 Configure Wireless Security Using WPS on both your NBG-418N and Wireless Client

This section gives you an example of how to set up wireless network using WPS. This example uses the NBG-418N as the AP and NWD210N as the wireless client which connects to a notebook.

Note: The wireless client must be a WPS-aware device (for example, a WPS USB adapter or PCI card).

There are two WPS methods for creating a secure connection. This tutorial shows you how to do both.

- **Push Button Configuration (PBC)** - create a secure wireless network simply by pressing a button. See [Section 5.2.1.1 on page 58](#). This is the easier method.
- **PIN Configuration** - create a secure wireless network simply by entering a wireless client's PIN (Personal Identification Number) in the NBG-418N's interface. See [Section 5.2.1.2 on page 59](#). This is the more secure method, since one device can authenticate the other.

### 5.2.1.1 Push Button Configuration (PBC)

- 1 Make sure that your NBG-418N is turned on and that it is within range of your computer.
- 2 Make sure that you have installed the wireless client (this example uses the NWD210N) driver and utility in your notebook.
- 3 In the wireless client utility, find the WPS settings. Enable WPS and press the WPS button (**Start** or **WPS** button)
- 4 Log into NBG-418N's Web Configurator and press **Push Button** in the **Network > Wireless LAN > WPS Station** screen.

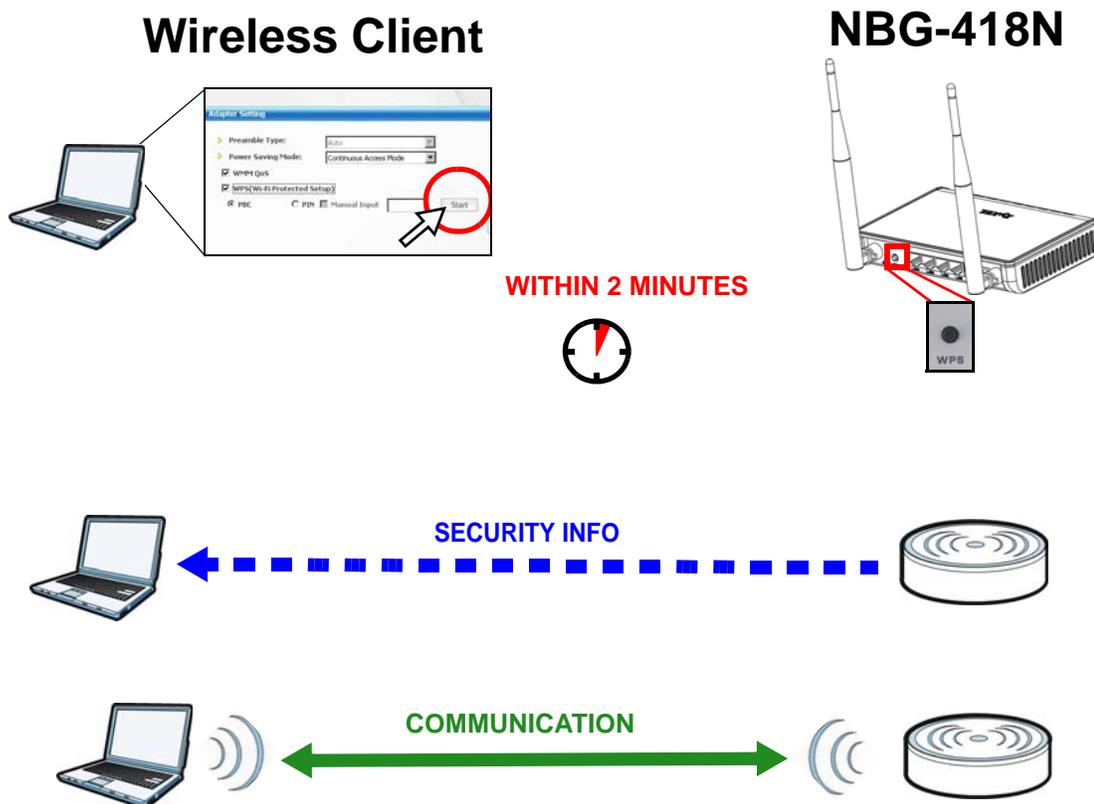
Note: Your NBG-418N has a WPS button located on its panel, as well as a WPS button in its configuration utility. Both buttons have exactly the same function; you can use one or the other.

Note: It doesn't matter which button is pressed first. You must press the second button within two minutes of pressing the first one.

The NBG-418N sends the proper configuration settings to the wireless client. This may take up to two minutes. Then the wireless client is able to communicate with the NBG-418N securely.

The following figure shows you an example to set up wireless network and security by pressing a button on both NBG-418N and wireless client (the NWD210N in this example).

Figure 40 Example WPS Process: PBC Method



### 5.2.1.2 PIN Configuration

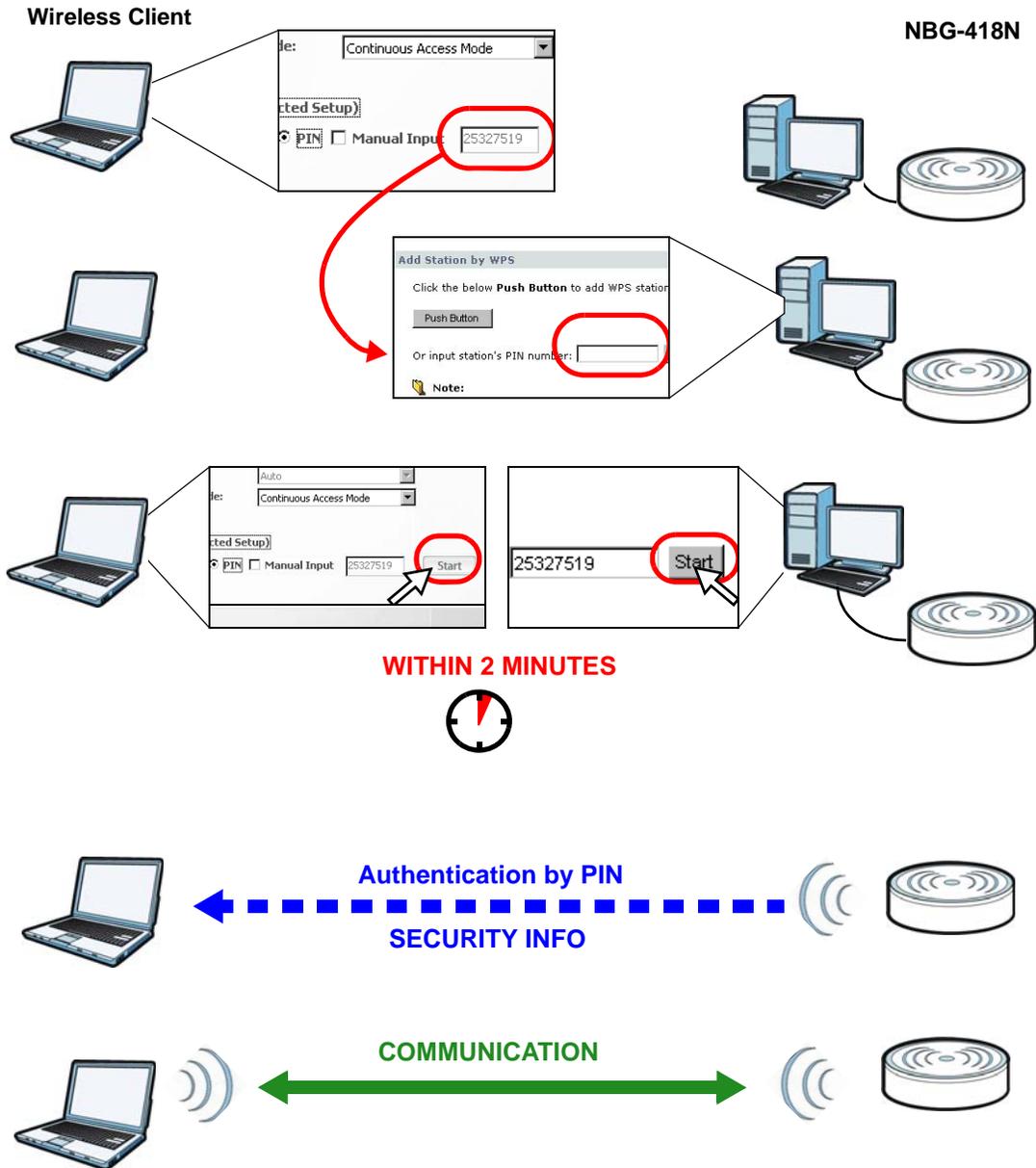
When you use the PIN configuration method, you need to use both NBG-418N's configuration interface and the client's utilities.

- 1 Launch your wireless client's configuration utility. Go to the WPS settings and select the PIN method to get a PIN number.
- 2 Enter the PIN number to the **PIN** field in the **Network > Wireless LAN > WPS Station** screen on the NBG-418N.
- 3 Click the **Start** buttons (or button next to the PIN field) on both the wireless client utility screen and the NBG-418N's **WPS Station** screen within two minutes.

The NBG-418N authenticates the wireless client and sends the proper configuration settings to the wireless client. This may take up to two minutes. Then the wireless client is able to communicate with the NBG-418N securely.

The following figure shows you the example to set up wireless network and security on NBG-418N and wireless client (ex. NWD210N in this example) by using PIN method.

Figure 41 Example WPS Process: PIN Method



## 5.3 Enable and Configure Wireless Security without WPS on your NBG-418N

This example shows you how to configure wireless security settings with the following parameters on your NBG-418N.

<b>SSID</b>	SSID_Example3
<b>Channel</b>	6
<b>Security</b>	WPA-PSK (Pre-Shared Key: ThisismyWPA-PSKpre-sharedkey)

Follow the steps below to configure the wireless settings on your NBG-418N.

The instructions require that your hardware is connected (see the Quick Start Guide) and you are logged into the Web Configurator through your LAN connection (see [Section 2.2 on page 17](#)).

- 1 Open the **Wireless LAN > General** screen in the NBG-418N's Web Configurator.
- 2 Make sure the **Enable Wireless LAN** check box is selected.
- 3 Enter **SSID\_Example3** as the SSID and select a channel.
- 4 Set security mode to **WPA-PSK** and enter **ThisismyWPA-PSKpre-sharedkey** in the **Pre-Shared Key** field. Click **Apply**.

**Figure 42** Tutorial: Network > Wireless LAN > General

The screenshot displays the 'WLAN Setup' and 'Security' configuration pages. In the 'WLAN Setup' section, the 'Enable Wireless LAN' checkbox is checked and circled in red. Below it, the 'Name(SSID)' field contains 'SSID\_Example3' and is also circled in red. The 'Channel Selection' is set to 'Channel-01 2412Mhz' and 'Auto Channel Selection' is checked. In the 'Security' section, the 'Security Mode' is set to 'WPA-PSK', 'Cipher Type' is 'TKIP+AES', and the 'Pre-Shared Key' field contains 'ThisismyWPA-PSKpre-sharedkey' with 'ASCII' selected. This entire security configuration area is circled in red. A note at the bottom states: 'Note: WPA-PSK and WPA2-PSK can be configured when WPS enabled'. 'Apply' and 'Reset' buttons are visible at the bottom.

- 5 Open the **Status** screen. Verify your wireless and wireless security settings under **Device Information** and check if the WLAN connection is up under **Interface Status**.

Figure 43 Tutorial: Status Screen

The screenshot displays the ZyXEL NBG-418N Status Screen. The left sidebar shows navigation options: Status, Network (Wireless LAN, WAN, LAN, DHCP Server, NAT, DDNS, Static Route), Security, Management, and Maintenance. The main content area is divided into several sections:

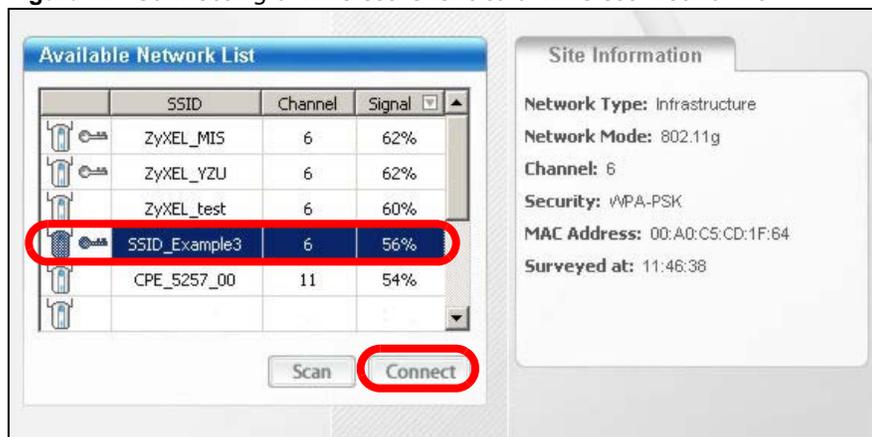
- Device Information:** System Name: NBG-418N, Firmware Version: V1.00(AADZ.0)b0.
- WAN Information:** MAC Address: 50:67:F0:32:80:A4, Connection Type: Ethernet, IP Address: 0.0.0.0, IP Subnet Mask: 0.0.0.0, Gateway: 0.0.0.0, DNS: 0.0.0.0.
- LAN Information:** MAC Address: 50:67:F0:32:80:A3, IP Address: 192.168.1.1, IP Subnet Mask: 255.255.255.0, DHCP: Server.
- WLAN Information (highlighted):** MAC Address: 50:67:F0:32:80:A5, Status: On, Name(SSID): SSID\_Example3, Channel: Auto, Operating Channel: 1, Security Mode: WPA-PSK, 802.11 Mode: 802.11 b/g/n, WPS: Configured.
- System Status:** Operation Mode: Router, System Up Time: 00:04:57, Current Date/Time: 1976-11-30/00:04:52. System Resource: CPU Usage: 3%, Memory Usage: 41%. System Setting: Firewall: Enable, UPnP: Enable.
- Interface Status:** A table showing the status of WAN, LAN, and WLAN interfaces. The WLAN row is highlighted with a red circle.
- Summary:** Links to DHCP Table, Packet Statistics, and WLAN Station Status.

Interface	Status	Rate
WAN	Down	NA
LAN	Down	NA
WLAN	Up	150M

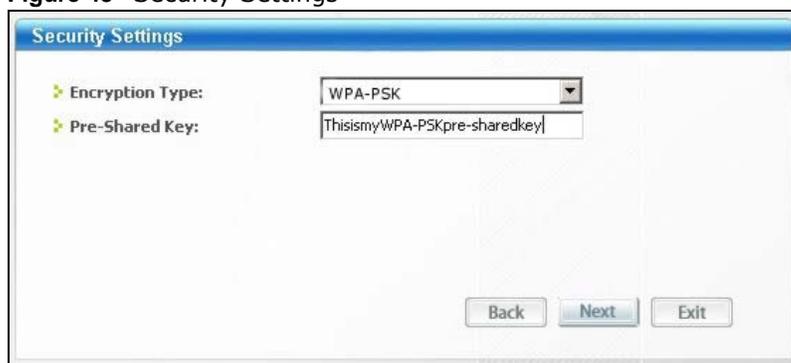
### 5.3.0.1 Configure Your Notebook

Note: We use the ZyXEL M-302 wireless adapter utility screens as an example for the wireless client. The screens may vary for different models.

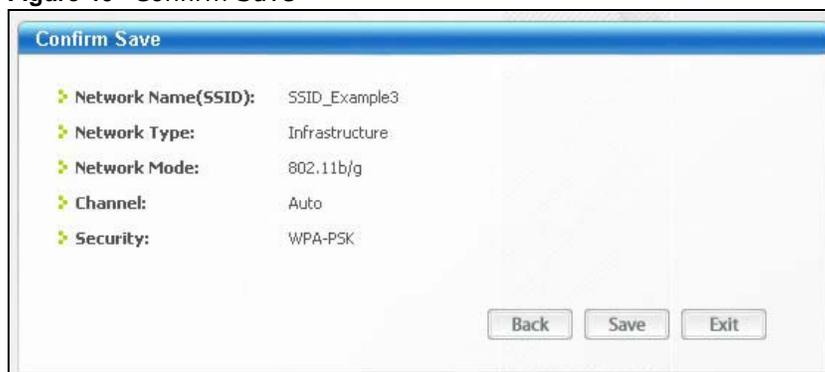
- 1 The NBG-418N supports IEEE 802.11b, IEEE 802.11g and IEEE 802.11n wireless clients. Make sure that your notebook or computer's wireless adapter supports one of these standards.
- 2 Wireless adapters come with software sometimes called a "utility" that you install on your computer. See your wireless adapter's User's Guide for information on how to do that.
- 3 After you've installed the utility, open it. If you cannot see your utility's icon on your screen, go to **Start > Programs** and click on your utility in the list of programs that appears. The utility displays a list of APs within range, as shown in the example screen below.
- 4 Select **SSID\_Example3** and click **Connect**.

**Figure 44** Connecting a Wireless Client to a Wireless Network

- 5 Select WPA-PSK and type the security key in the following screen. Click **Next**.

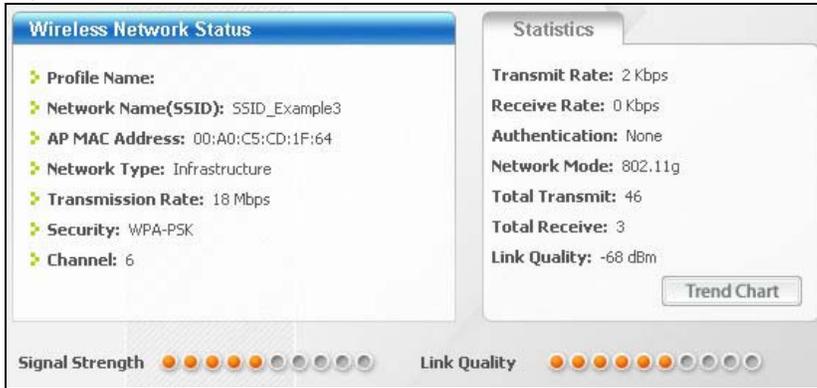
**Figure 45** Security Settings

- 6 The **Confirm Save** window appears. Check your settings and click **Save** to continue.

**Figure 46** Confirm Save

- 7 Check the status of your wireless connection in the screen below. If your wireless connection is weak or you have no connection, see the [Troubleshooting](#) section of this User's Guide.

**Figure 47** Link Status



If your connection is successful, open your Internet browser and enter <http://www.zyxel.com> or the URL of any other web site in the address bar. If you are able to access the web site, your wireless connection is successfully configured.

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# **PART II**

## **Technical Reference**

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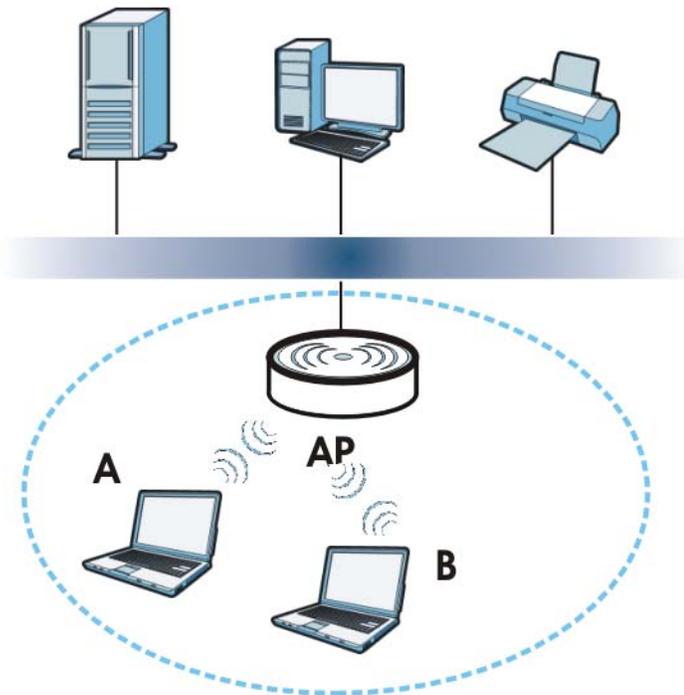
# Wireless LAN

## 6.1 Overview

This chapter discusses how to configure the wireless network settings in your NBG-418N. See the appendices for more detailed information about wireless networks.

The following figure provides an example of a wireless network.

**Figure 48** Example of a Wireless Network



The wireless network is the part in the blue circle. In this wireless network, devices **A** and **B** are called wireless clients. The wireless clients use the access point (**AP**) to interact with other devices (such as the printer) or with the Internet. Your NBG-418N is the AP in the above example.

## 6.2 What You Can Do

Wireless screens vary according to the device mode you are using.

Wireless Screen	Router	Access Point	Universal Repeater	Client Bridge
General	✓	✓	✓	
MAC Filter	✓	✓	✓	
Advanced	✓	✓	✓	✓
QoS	✓	✓	✓	
WPS	✓	✓	✓	
WPS Station	✓	✓	✓	
Scheduling	✓	✓	✓	
AP Select			✓	✓
WLAN Info				✓

See [Chapter 4 on page 35](#) for more information on device modes.

- Use the **General** screen to enable the Wireless LAN, enter the SSID and select the wireless security mode ([Section 6.4 on page 70](#)).
- Use the **MAC Filter** screen to allow or deny wireless stations based on their MAC addresses from connecting to the NBG-418N ([Section 6.5 on page 75](#)).
- Use the **Advanced** screen to allow intra-BSS networking and set the RTS/CTS Threshold ([Section 6.6 on page 76](#)).
- Use the **QoS** screen to enable Wifi MultiMedia Quality of Service (WMMQoS). This allows the NBG-418N to automatically set priority levels to services, such as e-mail, VoIP, chat, and so on ([Section 6.7 on page 78](#)).
- Use the **WPS** screen to quickly set up a wireless network with strong security, without having to configure security settings manually ([Section 6.8 on page 79](#)).
- Use the **WPS Station** screen to add a wireless station using WPS ([Section 6.9 on page 80](#)).
- Use the **Scheduling** screen to set the times your wireless LAN is turned on and off ([Section 6.10 on page 81](#)).
- Use the **AP Select** screen to choose an access point that you want the NBG-418N (in universal repeater or client bridge mode) to connect to. You should know the security settings of the target AP.
- Use the **WLAN Info** screen to view the SSID and security of the selected AP wireless network.

## 6.3 What You Should Know

Every wireless network must follow these basic guidelines.

- Every wireless client in the same wireless network must use the same SSID.  
The SSID is the name of the wireless network. It stands for Service Set IDentity.
- If two wireless networks overlap, they should use different channels.  
Like radio stations or television channels, each wireless network uses a specific channel, or frequency, to send and receive information.
- Every wireless client in the same wireless network must use security compatible with the AP.  
Security stops unauthorized devices from using the wireless network. It can also protect the information that is sent in the wireless network.

### 6.3.1 Wireless Security Overview

The following sections introduce different types of wireless security you can set up in the wireless network.

#### 6.3.1.1 SSID

Normally, the AP acts like a beacon and regularly broadcasts the SSID in the area. You can hide the SSID instead, in which case the AP does not broadcast the SSID. In addition, you should change the default SSID to something that is difficult to guess.

This type of security is fairly weak, however, because there are ways for unauthorized devices to get the SSID. In addition, unauthorized devices can still see the information that is sent in the wireless network.

#### 6.3.1.2 MAC Address Filter

Every wireless client has a unique identification number, called a MAC address.<sup>1</sup> A MAC address is usually written using twelve hexadecimal characters<sup>2</sup>; for example, 00A0C5000002 or 00:A0:C5:00:00:02. To get the MAC address for each wireless client, see the appropriate User's Guide or other documentation.

You can use the MAC address filter to tell the AP which wireless clients are allowed or not allowed to use the wireless network. If a wireless client is allowed to use the wireless network, it still has to have the correct settings (SSID, channel, and security). If a wireless client is not allowed to use the wireless network, it does not matter if it has the correct settings.

This type of security does not protect the information that is sent in the wireless network. Furthermore, there are ways for unauthorized devices to get the MAC address of an authorized wireless client. Then, they can use that MAC address to use the wireless network.

---

1. Some wireless devices, such as scanners, can detect wireless networks but cannot use wireless networks. These kinds of wireless devices might not have MAC addresses.

2. Hexadecimal characters are 0, 1, 2, 3, 4, 5, 6, 7, 8, 9, A, B, C, D, E, and F.

### 6.3.1.3 Encryption

Wireless networks can use encryption to protect the information that is sent in the wireless network. Encryption is like a secret code. If you do not know the secret code, you cannot understand the message.

**Table 25** Types of Encryption for Each Type of Authentication

	<b>NO AUTHENTICATION</b>
Weakest	No Security
↕	Static WEP
↕	WPA-PSK
Strongest	WPA2-PSK

For example, if users do not log in to the wireless network, you can choose no encryption, **Static WEP**, **WPA-PSK**, or **WPA2-PSK**.

Usually, you should set up the strongest encryption that every wireless client in the wireless network supports. Suppose the wireless network has two wireless clients. Device A only supports WEP, and device B supports WEP and WPA-PSK. Therefore, you should set up **Static WEP** in the wireless network.

**Note:** It is recommended that wireless networks use WPA-PSK, or stronger encryption. IEEE 802.1x and WEP encryption are better than none at all, but it is still possible for unauthorized devices to figure out the original information pretty quickly.

When you select **WPA2-PSK** in your NBG-418N, you can also select an option (**WPA Compatible**) to support WPA-PSK as well. In this case, if some wireless clients support WPA-PSK and some support WPA2-PSK, you should set up **WPA2-PSK** and select the **WPA Compatible** option in the NBG-418N.

Many types of encryption use a key to protect the information in the wireless network. The longer the key, the stronger the encryption. Every wireless client in the wireless network must have the same key.

### 6.3.1.4 WPS

WiFi Protected Setup (WPS) is an industry standard specification, defined by the WiFi Alliance. WPS allows you to quickly set up a wireless network with strong security, without having to configure security settings manually. Depending on the devices in your network, you can either press a button (on the device itself, or in its configuration utility) or enter a PIN (Personal Identification Number) in the devices. Then, they connect and set up a secure network by themselves. See how to set up a secure wireless network using WPS in the [Section 5.2.1 on page 57](#).

## 6.4 General Wireless LAN Screen

Use this screen to enable the Wireless LAN, enter the SSID and select the wireless security mode.

Note: If you are configuring the NBG-418N from a computer connected to the wireless LAN and you change the NBG-418N's SSID, channel or security settings, you will lose your wireless connection when you press **Apply** to confirm. You must then change the wireless settings of your computer to match the NBG-418N's new settings.

Click **Network > Wireless LAN** to open the **General** screen.

**Figure 49** Network > Wireless LAN > General (Router or Access Point Mode)

**General** | MAC Filter | Advanced | QoS | WPS | WPS Station | Scheduling

**Wireless Setup**

Enable Wireless LAN

Name(SSID)

Hide SSID

Channel Selection   Auto Channel Selection

Operating Channel

Channel Width

**Security**

Security Mode

Note:WPA-PSK and WPA2-PSK can be configured when WPS enabled

**Figure 50** Network > Wireless LAN > General (Universal Repeater Mode)

AP Select | **General** | MAC Filter | Advanced | QoS | WPS | WPS Station | Scheduling

**WLAN STA Information**

SSID

Security Mode

Operating Channel

**WLAN AP Information**

Enable Wireless LAN

Name(SSID)

Hide SSID

Channel Width

**Security**

Security Mode

Note:WPA-PSK and WPA2-PSK can be configured when WPS enabled

The following table describes the general wireless LAN labels in this screen.

**Table 26** Network > Wireless LAN > General

LABEL	DESCRIPTION
WLAN STA Information	This section is available only when the NBG-418N is in universal repeater mode. This shows the wireless and security settings of the selected AP wireless network.
SSID	This displays the Service Set IDentity of the wireless device to which you are connecting.
Security Mode	This displays the type of security configured on the wireless device to which you are connecting.
Operating Channel	This displays the channel used by the wireless device to which you are connecting.
WLAN AP Information / Wireless Setup	Use this section to configure the wireless settings between the NBG-418N and its wireless clients.
Enable Wireless LAN	Click the check box to activate wireless LAN.
Name(SSID)	(Service Set IDentity) The SSID identifies the Service Set with which a wireless station is associated. Wireless stations associating to the access point (AP) must have the same SSID. Enter a descriptive name (up to 32 printable 7-bit ASCII characters) for the wireless LAN.
Hide SSID	Select this check box to hide the SSID in the outgoing beacon frame so a station cannot obtain the SSID through scanning using a site survey tool.
Channel Selection	Set the operating frequency/channel depending on your particular region.  Select a channel from the drop-down list box. The options vary depending on the frequency band and the country you are in.  Refer to the <a href="#">Connection Wizard</a> chapter for more information on channels. This option is only available if <b>Auto Channel Selection</b> is disabled.
Auto Channel Selection	Select this option for the NBG-418N to automatically choose the channel with the least interference. Deselect this option if you wish to manually select the channel using the <b>Channel Selection</b> field.
Operating Channel	This displays the channel the NBG-418N is currently using.
Channel Width	Select whether the NBG-418N uses a wireless channel width of <b>20MHz</b> , <b>40MHz</b> or <b>Auto 20/40MHz</b> . A standard 20MHz channel offers transfer speeds of up to 150Mbps whereas a 40MHz channel uses two standard channels and offers speeds of up to 300 Mbps. Because not all devices support 40MHz channels, select <b>Auto 20/40MHz</b> to allow the NBG-418N to adjust the channel bandwidth automatically.
Security	Use this section to configure the wireless security between the NBG-418N and its wireless clients.
Security Mode	Select <b>Static WEP</b> , <b>WPA-PSK</b> or <b>WPA2-PSK</b> to add security on this wireless network. The wireless clients which want to associate to this network must have same wireless security settings as this device. After you select to use a security, additional options appears in this screen. See <a href="#">6.4.2</a> and <a href="#">6.4.3</a> sections. Or you can select <b>No Security</b> to allow any client to associate this network without authentication.
Apply	Click <b>Apply</b> to save your changes back to the NBG-418N.
Reset	Click <b>Reset</b> to reload the previous configuration for this screen.

See the rest of this chapter for information on the other labels in this screen.

### 6.4.1 No Security

Select **No Security** to allow wireless stations to communicate with the access points without any data encryption.

Note: If you do not enable any wireless security on your NBG-418N, your network is accessible to any wireless networking device that is within range.

**Figure 51** Network > Wireless LAN > General: No Security

The screenshot shows the 'Security' configuration page. At the top, 'Security Mode' is set to 'No Security' in a dropdown menu. Below this, there is a note: 'Note: WPA-PSK and WPA2-PSK can be configured when WPS enabled'. At the bottom of the page, there are two buttons: 'Apply' and 'Reset'.

The following table describes the labels in this screen.

**Table 27** Network > Wireless LAN > General: No Security

LABEL	DESCRIPTION
Security Mode	Choose <b>No Security</b> from the drop-down list box.
Apply	Click <b>Apply</b> to save your changes back to the NBG-418N.
Reset	Click <b>Reset</b> to reload the previous configuration for this screen.

## 6.4.2 WEP Encryption

WEP encryption scrambles the data transmitted between the wireless stations and the access points to keep network communications private. It encrypts unicast and multicast communications in a network. Both the wireless stations and the access points must use the same WEP key.

Your NBG-418N allows you to configure up to four 64-bit or 128-bit WEP keys but only one key can be enabled at any one time.

In order to configure and enable WEP encryption; click **Network > Wireless LAN** to display the **General** screen. Select **Static WEP** from the **Security Mode** list.

**Figure 52** Network > Wireless LAN > General: Static WEP

The screenshot shows the 'Security' configuration page for 'Static WEP'. 'Security Mode' is set to 'Static WEP'. Below it, 'WEP Encryption' is set to '64-bit WEP' and 'Authentication Method' is set to 'Open System'. A note states: 'Note: 64-bit WEP: Enter 5 ASCII characters or 10 hexadecimal characters ("0-9", "A-F") for each Key (1-4). 128-bit WEP: Enter 13 ASCII characters or 26 hexadecimal characters ("0-9", "A-F") for each Key (1-4). (Select one WEP key as an active key to encrypt wireless data transmission.)'. There are radio buttons for 'ASCII' (selected) and 'Hex'. Below this, there are four rows for 'Key 1', 'Key 2', 'Key 3', and 'Key 4', each with a radio button and a text input field. At the bottom, there is another note: 'Note: WPA-PSK and WPA2-PSK can be configured when WPS enabled'. At the very bottom, there are 'Apply' and 'Reset' buttons.

The following table describes the wireless LAN security labels in this screen.

**Table 28** Network > Wireless LAN > General: Static WEP

LABEL	DESCRIPTION
Security Mode	Choose <b>Static WEP</b> from the drop-down list box.
WEP Encryption	Select <b>64-bit WEP</b> or <b>128-bit WEP</b> to enable data encryption.
Authentication Method	Select <b>Auto</b> , <b>Open System</b> or <b>Shared Key</b> from the drop-down list box.  This field specifies whether the wireless clients have to provide the WEP key to login to the wireless client. Keep this setting at <b>Auto</b> or <b>Open System</b> unless you want to force a key verification before communication between the wireless client and the ZyXEL Device occurs. Select <b>Shared Key</b> to force the clients to provide the WEP key prior to communication.
ASCII	Select this option in order to enter ASCII characters as WEP key.
Hex	Select this option in order to enter hexadecimal characters as a WEP key.  The preceding "0x", that identifies a hexadecimal key, is entered automatically.
Key 1 to Key 4	The WEP keys are used to encrypt data. Both the NBG-418N and the wireless stations must use the same WEP key for data transmission.  If you chose <b>64-bit WEP</b> , then enter any 5 ASCII characters or 10 hexadecimal characters ("0-9", "A-F").  If you chose <b>128-bit WEP</b> , then enter 13 ASCII characters or 26 hexadecimal characters ("0-9", "A-F").  You must configure at least one key, only one key can be activated at any one time. The default key is key 1.
Apply	Click <b>Apply</b> to save your changes back to the NBG-418N.
Reset	Click <b>Reset</b> to reload the previous configuration for this screen.

### 6.4.3 WPA-PSK/WPA2-PSK

Click **Network > Wireless LAN** to display the **General** screen. Select **WPA-PSK** or **WPA2-PSK** from the **Security Mode** list.

**Figure 53** Network > Wireless LAN > General: WPA-PSK/WPA2-PSK

The screenshot shows the 'Security' configuration page. The 'Security Mode' dropdown is set to 'WPA2-PSK'. There is an unchecked checkbox for 'WPA Compatible'. The 'Cipher Type' dropdown is set to 'TKIP'. The 'Pre-Shared Key' text field contains 'ThisismyWPA-PSKpre-sharedkey'. The 'Group Key Update Timer' is set to '86400 (In Seconds)'. There are two radio buttons: 'ASCII' (selected) and 'Hex'. A note with a yellow icon says 'Note: WPA-PSK and WPA2-PSK can be configured when WPS enabled'. At the bottom, there are 'Apply' and 'Reset' buttons.

The following table describes the labels in this screen.

**Table 29** Network > Wireless LAN > General: WPA-PSK/WPA2-PSK

LABEL	DESCRIPTION
Security Mode	Choose <b>WPA-PSK</b> or <b>WPA2-PSK</b> from the drop-down list box.
WPA Compatible	This option is available only when you select <b>WPA2-PSK</b> in the <b>Security Mode</b> field. Select this option to have both WPA2 and WPA wireless clients be able to communicate with the NBG-418N even when the NBG-418N is using WPA2-PSK.
Cipher Type	Select the encryption type ( <b>TKIP</b> , <b>AES</b> or <b>TKIP+AES</b> ) for data encryption. Select <b>AES</b> if your wireless clients can all use AES. Otherwise, select <b>TKIP</b> or select <b>TKIP+AES</b> to allow the wireless clients to use either TKIP or AES.
Pre-Shared Key	<b>WPA-PSK/WPA2-PSK</b> uses a simple common password for authentication. Type a pre-shared key from 8 to 63 case-sensitive <b>ASCII</b> characters (including spaces and symbols). Type a pre-shared key less than 64 case-sensitive <b>HEX</b> characters ("0-9", "A-F").
Group Key Update Timer	The <b>Group Key Update Timer</b> is the rate at which the AP (if using <b>WPA-PSK/WPA2-PSK</b> key management) or RADIUS server (if using <b>WPA/WPA2</b> key management) sends a new group key out to all clients. The re-keying process is the WPA/WPA2 equivalent of automatically changing the WEP key for an AP and all stations in a WLAN on a periodic basis. Setting of the <b>Group Key Update Timer</b> is also supported in <b>WPA-PSK/WPA2-PSK</b> mode.
Apply	Click <b>Apply</b> to save your changes back to the NBG-418N.
Reset	Click <b>Reset</b> to reload the previous configuration for this screen.

## 6.5 MAC Filter

The MAC filter screen allows you to configure the NBG-418N to give exclusive access to up to 16 devices (Allow) or exclude up to 16 devices from accessing the NBG-418N (Deny). Every Ethernet device has a unique MAC (Media Access Control) address. The MAC address is assigned at the factory and consists of six pairs of hexadecimal characters, for example, 00:A0:C5:00:00:02. You need to know the MAC address of the devices to configure this screen.

To change your NBG-418N's MAC filter settings, click **Network > Wireless LAN > MAC Filter**. The screen appears as shown.

**Figure 54** Network > Wireless LAN > MAC Filter

Set	MAC Address
1	<input type="text"/>
2	<input type="text"/>
3	<input type="text"/>
4	<input type="text"/>
5	<input type="text"/>
6	<input type="text"/>
7	<input type="text"/>
8	<input type="text"/>
9	<input type="text"/>
10	<input type="text"/>
11	<input type="text"/>
12	<input type="text"/>
13	<input type="text"/>
14	<input type="text"/>
15	<input type="text"/>
16	<input type="text"/>

The following table describes the labels in this menu.

**Table 30** Network > Wireless LAN > MAC Filter

LABEL	DESCRIPTION
Active	Select <b>Yes</b> from the drop down list box to enable MAC address filtering.
Filter Action	Define the filter action for the list of MAC addresses in the <b>MAC Address</b> table.  Select <b>Deny</b> to block access to the NBG-418N, MAC addresses not listed will be allowed to access the NBG-418N.  Select <b>Allow</b> to permit access to the NBG-418N, MAC addresses not listed will be denied access to the NBG-418N.
Set	This is the index number of the MAC address.
MAC Address	Enter the MAC addresses of the wireless station that are allowed or denied access to the NBG-418N in these address fields. Enter the MAC addresses in a valid MAC address format, that is, six hexadecimal character pairs, for example, 12:34:56:78:9a:bc.
Apply	Click <b>Apply</b> to save your changes back to the NBG-418N.
Reset	Click <b>Reset</b> to reload the previous configuration for this screen.

## 6.6 Wireless LAN Advanced Screen

Use this screen to allow intra-BSS networking and set the RTS/CTS Threshold.

Click **Network > Wireless LAN > Advanced**. The screen appears as shown.

Figure 55 Network &gt; Wireless LAN &gt; Advanced (Universal Repeater Mode)

The screenshot shows the 'WLAN Advanced Setup' configuration page. The 'Advanced' tab is active. The settings are as follows:

- 802.11 Mode: 802.11 b/g/n
- RTS/CTS Threshold: 2347 (range 0 ~ 2347)
- Fragment Threshold: 2346 (range 256 ~ 2346)
- Beacon Interval: 100 (range 20 ~ 1024 ms)
- DTIM Period: 1 (range 1 ~ 10)
- Preamble Type:  Long Preamble  Short Preamble
- CTS Protection:  Auto  None
- Tx Power: 100%
- Extension Channel (40Mhz only): None
- Aggregation:  Enable  Disable
- Short GI:  Enable  Disable
- Enable Intra-BSS Traffic:  Enable  Disable
- WLAN STA setting overwrites WLAN AP setting:  Enable  Disable

Buttons: Apply, Reset

The following table describes the labels in this screen.

Table 31 Network &gt; Wireless LAN &gt; Advanced

LABEL	DESCRIPTION
Wireless Advanced Setup	
RTS/CTS Threshold	Data with its frame size larger than this value will perform the RTS (Request To Send)/CTS (Clear To Send) handshake.  Enter a value between <b>0</b> and <b>2347</b> .
Fragmentation Threshold	The threshold (number of bytes) for the fragmentation boundary for directed messages. It is the maximum data fragment size that can be sent. Enter an even number between <b>256</b> and <b>2346</b> .
Beacon Interval	When a wirelessly networked device sends a beacon, it includes with it a beacon interval. This specifies the time period before the device sends the beacon again. The interval tells receiving devices on the network how long they can wait in low-power mode before waking up to handle the beacon. This value can be set from <b>20</b> to <b>1024</b> ms. A high value helps save current consumption of the access point.
DTIM Period	Delivery Traffic Indication Message (DTIM) is the time period after which broadcast and multicast packets are transmitted to mobile clients in the Active Power Management mode. A high DTIM value can cause clients to lose connectivity with the network. This value can be set from <b>1</b> to <b>10</b> .
Preamble Type	A preamble affects the timing in your wireless network. There are two preamble modes: long and short. If a device uses a different preamble mode than the NBG-418N does, it cannot communicate with the NBG-418N.
CTS Protection	When set to <b>None</b> , the NBG-418N protects wireless communication against interference.  Select <b>Auto</b> to let the NBG-418N determine whether to turn this feature on or off in the current environment.
Tx Power	This field controls the transmission power of the NBG-418N. When using the NBG-418N with a notebook computer, select a lower transmission power level when you are close to the AP in order to conserve battery power.

**Table 31** Network > Wireless LAN > Advanced (continued)

LABEL	DESCRIPTION
Extension Channel	If you select <b>40 MHz</b> or <b>Auto 20/40MHz</b> as your <b>Channel Bandwidth</b> in the <b>Wireless LAN &gt; General</b> screen, the extension channel enables the NBG-419N to get higher data throughput. This also lowers radio interference and traffic.
Aggregation	Message Protocol Data Unit (MPDU) aggregation collects Ethernet frames along with their 802.11n headers and wraps them in a 802.11n MAC header. This method is useful for increasing bandwidth throughput in environments that are prone to high error rates.  Mac Service Data Unit (MSDU) aggregation collects Ethernet frames without any of their 802.11n headers and wraps the header-less payload in a single 802.11n MAC header. This method is useful for increasing bandwidth throughput. It is also more efficient than A-MPDU except in environments that are prone to high error rates.
Short GI	Select <b>Enable</b> to use Short GI (Guard Interval). The guard interval is the gap introduced between data transmission from users in order to reduce interference. Reducing the GI increases data transfer rates but also increases interference. Increasing the GI reduces data transfer rates but also reduces interference.
Enable Intra-BSS Traffic	A Basic Service Set (BSS) exists when all communications between wireless clients or between a wireless client and a wired network client go through one access point (AP).  Intra-BSS traffic is traffic between wireless clients in the BSS. When Intra-BSS is enabled, wireless client <b>A</b> and <b>B</b> can access the wired network and communicate with each other. When Intra-BSS is disabled, wireless client <b>A</b> and <b>B</b> can still access the wired network but cannot communicate with each other.
WLAN STA setting overwrites WLAN AP setting	This field is available only when the NBG-418N is in universal repeater mode.  Select <b>Enabled</b> to have the NBG-418N copy the SSID and wireless security settings of the associated AP, and use them for wireless connections between the NBG-418N and its wireless clients.  Otherwise, select <b>Disabled</b> to configure different wireless and security settings for wireless connections between the NBG-418N and its wireless clients.
Apply	Click <b>Apply</b> to save your changes to the NBG-418N.
Reset	Click <b>Reset</b> to reload the previous configuration for this screen.

## 6.7 Quality of Service (QoS) Screen

Use the **QoS** screen to enable Wifi MultiMedia Quality of Service (WMMQoS). This allows the NBG-418N to automatically set priority levels to services, such as e-mail, VoIP, chat, and so on.

Click **Network > Wireless LAN > QoS**. The following screen appears.

**Figure 56** Network > Wireless LAN > QoS

The following table describes the labels in this screen.

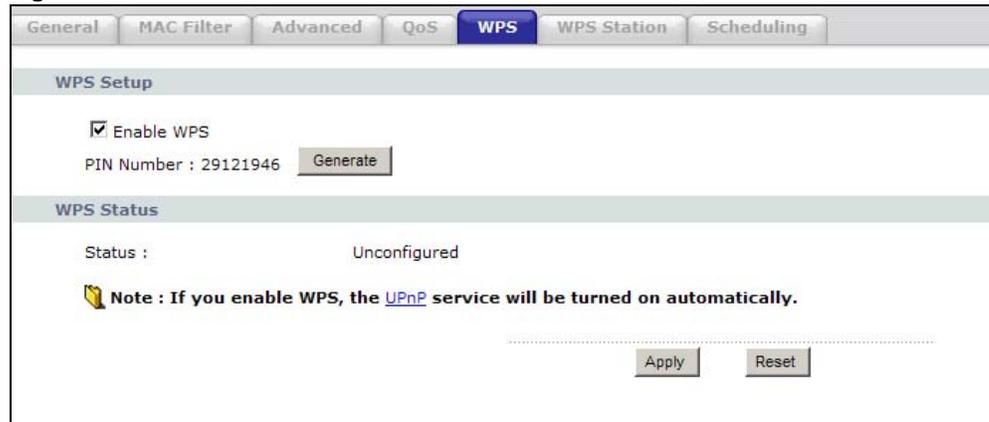
**Table 32** Network > Wireless LAN > QoS

LABEL	DESCRIPTION
Enable WMM QoS	Check this to have the NBG-418N automatically give a service a priority level according to the ToS value in the IP header of packets it sends. WMM QoS (Wifi MultiMedia Quality of Service) gives high priority to voice and video, which makes them run more smoothly.
Apply	Click <b>Apply</b> to save your changes to the NBG-418N.
Reset	Click <b>Reset</b> to reload the previous configuration for this screen.

## 6.8 WPS Screen

Use this screen to enable/disable WPS, view or generate a new PIN number and check current WPS status. To open this screen, click **Network > Wireless LAN > WPS** tab.

**Figure 57** Network > Wireless LAN > WPS



The following table describes the labels in this screen.

**Table 33** Network > Wireless LAN > WPS

LABEL	DESCRIPTION
WPS Setup	
Enable WPS	Select this to enable the WPS feature.
PIN Number	This displays a PIN number last time system generated. Click <b>Generate</b> to generate a new PIN number.
WPS Status	
Status	This displays <b>Configured</b> when the NBG-418N has connected to a wireless network using WPS or when <b>Enable WPS</b> is selected and wireless or wireless security settings have been changed. The current wireless and wireless security settings also appear in the screen.  This displays <b>Unconfigured</b> if WPS is disabled and there are no wireless or wireless security changes on the NBG-418N or you click <b>Release_Configuration</b> to remove the configured wireless and wireless security settings.

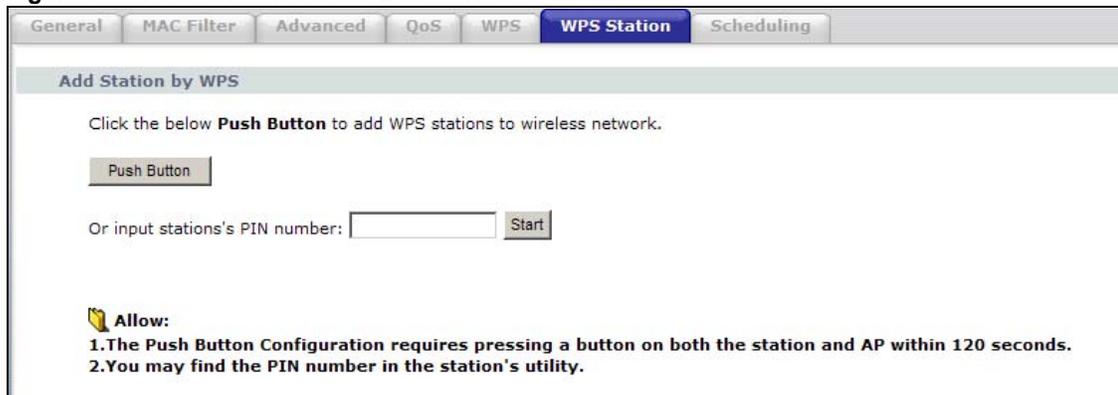
**Table 33** Network > Wireless LAN > WPS (continued)

LABEL	DESCRIPTION
Release Configuration	This button is only available when the WPS status displays <b>Configured</b> . Click this button to remove all configured wireless and wireless security settings for WPS connections on the NBG-418N.
Apply	Click <b>Apply</b> to save your changes back to the NBG-418N.
Refresh	Click <b>Refresh</b> to get this screen information afresh.

## 6.9 WPS Station Screen

Use this screen when you want to add a wireless station using WPS. To open this screen, click **Network > Wireless LAN > WPS Station** tab.

Note: Note: After you click **Push Button** on this screen, you have to press a similar button in the wireless station utility within 2 minutes. To add the second wireless station, you have to press these buttons on both device and the wireless station again after the first 2 minutes.

**Figure 58** Network > Wireless LAN > WPS Station

The following table describes the labels in this screen.

**Table 34** Network > Wireless LAN > WPS Station

LABEL	DESCRIPTION
Push Button	Use this button when you use the PBC (Push Button Configuration) method to configure wireless stations's wireless settings. See <a href="#">Section 5.2.1.1 on page 58</a> . Click this to start WPS-aware wireless station scanning and the wireless security information synchronization.
Or input station's PIN number	Use this button when you use the PIN Configuration method to configure wireless station's wireless settings. See <a href="#">Section 5.2.1.2 on page 59</a> . Type the same PIN number generated in the wireless station's utility. Then click <b>Start</b> to associate to each other and perform the wireless security information synchronization.

## 6.10 Scheduling Screen

Use this screen to set the times your wireless LAN is turned on and off. Wireless LAN scheduling is disabled by default. The wireless LAN can be scheduled to turn on or off on certain days and at certain times. To open this screen, click **Network > Wireless LAN > Scheduling** tab.

**Figure 59** Network > Wireless LAN > Scheduling

Action	Day	Except for the following times			
<input checked="" type="radio"/> On <input type="radio"/> Off	<input type="checkbox"/> Everyday	00 (hour)	00 (min)	~	00 (hour) 00 (min)
<input checked="" type="radio"/> On <input type="radio"/> Off	<input type="checkbox"/> Monday	00 (hour)	00 (min)	~	00 (hour) 00 (min)
<input checked="" type="radio"/> On <input type="radio"/> Off	<input type="checkbox"/> Tuesday	00 (hour)	00 (min)	~	00 (hour) 00 (min)
<input checked="" type="radio"/> On <input type="radio"/> Off	<input type="checkbox"/> Wednesday	00 (hour)	00 (min)	~	00 (hour) 00 (min)
<input checked="" type="radio"/> On <input type="radio"/> Off	<input type="checkbox"/> Thursday	00 (hour)	00 (min)	~	00 (hour) 00 (min)
<input checked="" type="radio"/> On <input type="radio"/> Off	<input type="checkbox"/> Friday	00 (hour)	00 (min)	~	00 (hour) 00 (min)
<input checked="" type="radio"/> On <input type="radio"/> Off	<input type="checkbox"/> Saturday	00 (hour)	00 (min)	~	00 (hour) 00 (min)
<input checked="" type="radio"/> On <input type="radio"/> Off	<input type="checkbox"/> Sunday	00 (hour)	00 (min)	~	00 (hour) 00 (min)

The following table describes the labels in this screen.

**Table 35** Network > Wireless LAN > Scheduling

LABEL	DESCRIPTION
Enable Wireless LAN Scheduling	Select this to enable Wireless LAN scheduling.
Action	Select <b>On</b> or <b>Off</b> to specify whether the Wireless LAN is turned on or off. This field works in conjunction with the <b>Day</b> and <b>Except for the following times</b> fields.
Day	Select <b>Everyday</b> or the specific days to turn the Wireless LAN on or off. If you select <b>Everyday</b> you can not select any specific days. This field works in conjunction with the <b>Except for the following times</b> field.
Except for the following times	Select a begin time using the first set of <b>hour</b> and minute ( <b>min</b> ) drop down boxes and select an end time using the second set of <b>hour</b> and minute ( <b>min</b> ) drop down boxes. If you have chosen <b>On</b> earlier for the WLAN Status the Wireless LAN will turn off between the two times you enter in these fields. If you have chosen <b>Off</b> earlier for the WLAN Status the Wireless LAN will turn on between the two times you enter in these fields.  Note: Entering the same begin time and end time will mean the whole day.
Apply	Click <b>Apply</b> to save your changes back to the NBG-418N.
Reset	Click <b>Reset</b> to reload the previous configuration for this screen.

## 6.11 AP Select Screen

Use this screen to choose an access point that you want the NBG-418N (in universal repeater or client bridge mode) to connect to. You should know the security settings of the target AP.

To open this screen, click **Network > Wireless LAN > AP Select** tab.

**Figure 60** Network > Wireless LAN > AP Select

	Select	SSID	BSSID	Channel	Mode	Security Mode	Strength
1	<input type="radio"/>	ZyXEL_MIS_WPA	50:67:F0:37:A0:85	11	bgn	WPAWPA211X	97%
2	<input type="radio"/>	5200-TUN24G-OUT-WPA2	42:4A:03:79:ED:A3	11	bgn	WPA211X	94%
3	<input type="radio"/>	ZyXEL_ESBU_MAC_AUTH	72:67:F0:37:A0:85	11	bgn	OPEN	91%
4	<input type="radio"/>	ZyXEL_GUEST	62:67:F0:37:A0:85	11	bg	WEP	91%
5	<input type="radio"/>	5200-TUN24G-OUT-OPEN	72:4A:03:79:ED:A3	11	bgn	OPEN	91%
6	<input type="radio"/>	5200-TUN24G-IN-PSK	62:4A:03:79:ED:A3	11	bgn	WPA2-PSK	91%
7	<input type="radio"/>	5200-LOC24G-WPA2	02:4A:03:79:ED:A3	11	bgn	WPA211X	91%
8	<input type="radio"/>	ZyXEL_MIS_WPA_PSK	02:67:F0:37:A0:7C	6	bgn	WPA2-PSK	91%
9	<input type="radio"/>	ZyXEL_MIS_WPA	50:67:F0:37:A0:7C	6	bgn	WPAWPA211X	91%
10	<input type="radio"/>	ZyXEL_MIS_WPA_PSK	02:67:F0:37:A0:85	11	bgn	WPA2-PSK	91%
11	<input type="radio"/>	ZyXEL_GUEST	62:67:F0:37:A0:7C	6	bg	WEP	91%
12	<input type="radio"/>	TUL24G_OUT_MAC_AUTH	52:4A:03:79:ED:A3	11	bgn	OPEN	91%
13	<input type="radio"/>	ZyXEL_MIS	52:67:F0:37:A0:85	11	bg	WEP	91%
14	<input type="radio"/>	ZyXEL_ESBU_MAC_AUTH	72:67:F0:37:A0:7C	6	bgn	OPEN	88%
15	<input type="radio"/>	5200-TUN24G-IN-WPA2	40:4A:03:79:ED:A3	11	bgn	WPA211X	88%

The following table describes the labels in this screen.

**Table 36** Network > Wireless LAN > AP Select

LABEL	DESCRIPTION
Select	Use the radio button to select the wireless device to which you want to connect.
SSID	This displays the Service Set IDentity of the wireless device. The SSID is a unique name that identifies a wireless network. All devices in a wireless network must use the same SSID.
BSSID	This displays the MAC address of the wireless device.
Channel	This displays the channel number used by this wireless device.
Mode	This displays which IEEE 802.11b/g/n wireless networking standards the wireless device supports.
Security Mode	This displays the type of security configured on the wireless device. <b>OPEN</b> means no security is configured and you can connect to it without a password.
Strength	This displays the strength of the wireless signal. The signal strength mainly depends on the antenna output power and the distance between your NBG-418N and this device.

**Table 36** Network > Wireless LAN > AP Select (continued)

LABEL	DESCRIPTION
Refresh	Click this button to search for available wireless devices within transmission range and update this table.
Connect	Click this button to associate to the selected wireless device.

## 6.12 WLAN Info Screen

Use this screen to view the SSID and security of the selected AP wireless network when the NBG-418N is in client bridge mode. To open this screen, click **Network > Wireless LAN > WLAN Info** tab.

**Figure 61** Network > Wireless LAN > WLAN Info

The screenshot shows a web interface with three tabs: 'AP Select', 'WLAN Information' (which is selected and highlighted in blue), and 'Advanced'. Below the tabs, there is a section titled 'WLAN'. Under this section, the SSID is displayed as 'ZyXEL' and the Security Mode is displayed as 'OPEN'.

WLAN	
SSID	ZyXEL
Security Mode	OPEN

The following table describes the labels in this screen.

**Table 37** Network > Wireless LAN > WLAN Info

LABEL	DESCRIPTION
WLAN	
SSID	This displays the Service Set IDentity of the selected wireless device.
Security Mode	This displays the type of security configured on the selected wireless device.

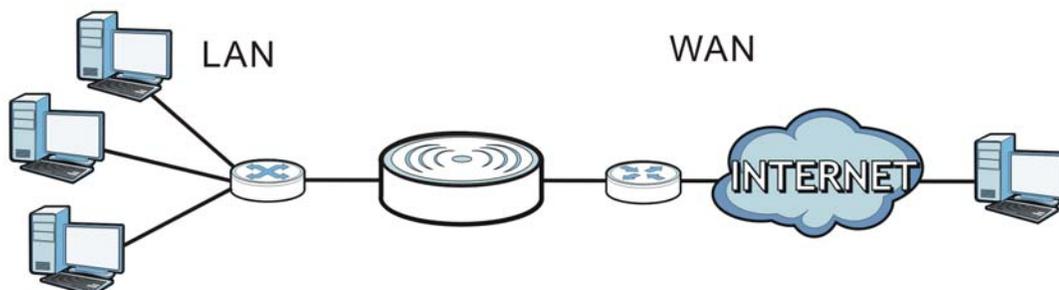


## 7.1 Overview

This chapter discusses the NBG-418N's **WAN** screens. Use these screens to configure your NBG-418N for Internet access.

A WAN (Wide Area Network) connection is an outside connection to another network or the Internet. It connects your private networks (such as a LAN (Local Area Network) and other networks, so that a computer in one location can communicate with computers in other locations.

**Figure 62** LAN and WAN



See the chapter about the connection wizard for more information on the fields in the WAN screens.

## 7.2 What You Need To Know

The information in this section can help you configure the screens for your WAN connection, as well as enable/disable some advanced features of your NBG-418N.

### 7.2.1 Configuring Your Internet Connection

#### Encapsulation Method

Encapsulation is used to include data from an upper layer protocol into a lower layer protocol. To set up a WAN connection to the Internet, you need to use the same encapsulation method used by your ISP (Internet Service Provider). If your ISP offers a dial-up Internet connection using PPPoE (PPP over Ethernet) or PPTP (Point-to-Point Tunneling Protocol), they should also provide a username and password (and service name) for user authentication.

## WAN IP Address

The WAN IP address is an IP address for the NBG-418N, which makes it accessible from an outside network. It is used by the NBG-418N to communicate with other devices in other networks. It can be static (fixed) or dynamically assigned by the ISP each time the NBG-418N tries to access the Internet.

If your ISP assigns you a static WAN IP address, they should also assign you the subnet mask and DNS server IP address(es) (and a gateway IP address if you use the Ethernet or ENET ENCAP encapsulation method).

## DNS Server Address Assignment

Use Domain Name System (DNS) to map a domain name to its corresponding IP address and vice versa, for instance, the IP address of [www.zyxel.com](http://www.zyxel.com) is 204.217.0.2. The DNS server is extremely important because without it, you must know the IP address of a computer before you can access it.

The NBG-418N can get the DNS server addresses in the following ways.

- 1 The ISP tells you the DNS server addresses, usually in the form of an information sheet, when you sign up. If your ISP gives you DNS server addresses, manually enter them in the DNS server fields.
- 2 If your ISP dynamically assigns the DNS server IP addresses (along with the NBG-418N's WAN IP address), set the DNS server fields to get the DNS server address from the ISP.

## WAN MAC Address

The MAC address screen allows users to configure the WAN port's MAC address by either using the factory default or cloning the MAC address from a computer on your LAN. Choose **Factory Default** to select the factory assigned default MAC Address.

Otherwise, click **Clone the computer's MAC address - IP Address** and enter the IP address of the computer on the LAN whose MAC you are cloning. Once it is successfully configured, the address will be copied to configuration file. It is recommended that you clone the MAC address prior to hooking up the WAN Port.

## 7.3 Internet Connection

Use this screen to change your NBG-418N's Internet access settings. Click **Network > WAN**. The screen differs according to the encapsulation you choose.

### 7.3.1 Ethernet Encapsulation

This screen displays when you select **Ethernet** encapsulation.

**Figure 63** Network > WAN > Internet Connection: Ethernet Encapsulation

The following table describes the labels in this screen.

**Table 38** Network > WAN > Internet Connection: Ethernet Encapsulation

LABEL	DESCRIPTION
ISP Parameters for Internet Access	
Connection Type	You must choose the <b>Ethernet</b> option when the WAN port is used as a regular Ethernet.
WAN IP Address Assignment	
Get automatically from ISP	Select this option if your ISP did not assign you a fixed IP address. This is the default selection.
Use fixed IP Address	Select this option if the ISP assigned a fixed IP address.
IP Address	Enter your WAN IP address in this field if you selected <b>Use Fixed IP Address</b> .
IP Subnet Mask	Enter the <b>IP Subnet Mask</b> in this field.
Gateway IP Address	Enter a <b>Gateway IP Address</b> (if your ISP gave you one) in this field.
MTU Auto	Select <b>Auto</b> if you want to have the Maximum Transmission Unit (MTU) automatically configured. Select <b>Manual</b> if you want to enter the MTU manually in the field below.
MTU	Enter the MTU or the largest packet size per frame that your NBG-418N can receive and process.
DNS Servers	

**Table 38** Network > WAN > Internet Connection: Ethernet Encapsulation (continued)

LABEL	DESCRIPTION
First DNS Server Second DNS Server	Select <b>From ISP</b> if your ISP dynamically assigns DNS server information (and the NBG-418N's WAN IP address). The field to the right displays the (read-only) DNS server IP address that the ISP assigns.  Select <b>User-Defined</b> if you have the IP address of a DNS server. Enter the primary and secondary DNS server's IP address in the fields to the right.
WAN MAC Address	The MAC address section allows users to configure the WAN port's MAC address by either using the NBG-418N's MAC address, copying the MAC address from a computer on your LAN or manually entering a MAC address.
Factory default	Select <b>Factory default</b> to use the factory assigned default MAC Address.
Clone the computer's MAC address - MAC Address	Select this option to clone the MAC address of the computer (displaying in the screen) from which you are configuring the NBG-418N. Once it is successfully configured, the address will be copied to the rom file. It will not change unless you change the setting or upload a different ROM file.
Set WAN MAC Address	Select this option and enter the MAC address you want to use.
Apply	Click <b>Apply</b> to save your changes back to the NBG-418N.
Reset	Click <b>Reset</b> to begin configuring this screen afresh.

## 7.3.2 PPPoE Encapsulation

The NBG-418N supports PPPoE (Point-to-Point Protocol over Ethernet). PPPoE is an IETF standard (RFC 2516) specifying how a personal computer (PC) interacts with a broadband modem (DSL, cable, wireless, etc.) connection. The **PPP over Ethernet** option is for a dial-up connection using PPPoE.

For the service provider, PPPoE offers an access and authentication method that works with existing access control systems (for example Radius).

One of the benefits of PPPoE is the ability to let you access one of multiple network services, a function known as dynamic service selection. This enables the service provider to easily create and offer new IP services for individuals.

Operationally, PPPoE saves significant effort for both you and the ISP or carrier, as it requires no specific configuration of the broadband modem at the customer site.

By implementing PPPoE directly on the NBG-418N (rather than individual computers), the computers on the LAN do not need PPPoE software installed, since the NBG-418N does that part of the task. Furthermore, with NAT, all of the LANs' computers will have access.

This screen displays when you select **PPPoE** encapsulation.

**Figure 64** Network > WAN > Internet Connection: PPPoE Encapsulation

The following table describes the labels in this screen.

**Table 39** Network > WAN > Internet Connection: PPPoE Encapsulation

LABEL	DESCRIPTION
ISP Parameters for Internet Access	
Connection Type	Select <b>PPP over Ethernet</b> if you connect to your Internet via dial-up.
Service Name	Type the PPPoE service name provided to you. PPPoE uses a service name to identify and reach the PPPoE server.
User Name	Type the user name given to you by your ISP.
Password	Type the password associated with the user name above.
Retype to Confirm	Type your password again to make sure that you have entered is correctly.
MTU Size	Enter the MTU or the largest packet size per frame that your NBG-418N can receive and process.
Nailed-Up Connection	Select <b>Nailed-Up Connection</b> if you do not want the connection to time out.
Idle Timeout	This value specifies the time in minutes that elapses before the router automatically disconnects from the PPPoE server.
DNS Servers	

**Table 39** Network > WAN > Internet Connection: PPPoE Encapsulation (continued)

LABEL	DESCRIPTION
First DNS Server Second DNS Server	If you do not configure a DNS server, you must know the IP address of a computer in order to access it.  Select <b>From ISP</b> if your ISP dynamically assigns DNS server information (and the NBG-418N's WAN IP address). The field to the right displays the (read-only) DNS server IP address that the ISP assigns.  Select <b>User-Defined</b> if you have the IP address of a DNS server. Enter the primary and secondary DNS server's IP address in the fields to the right.
WAN MAC Address	The MAC address section allows users to configure the WAN port's MAC address by using the NBG-418N's MAC address, copying the MAC address from a computer on your LAN or manually entering a MAC address.
Factory default	Select <b>Factory default</b> to use the factory assigned default MAC Address.
Clone the computer's MAC address - MAC Address	Select this option to clone the MAC address of the computer (displaying in the screen) from which you are configuring the NBG-418N. Once it is successfully configured, the address will be copied to the rom file. It will not change unless you change the setting or upload a different ROM file.
Set WAN MAC Address	Select this option and enter the MAC address you want to use.
Apply	Click <b>Apply</b> to save your changes back to the NBG-418N.
Reset	Click <b>Reset</b> to begin configuring this screen afresh.

### 7.3.3 PPTP Encapsulation

Point-to-Point Tunneling Protocol (PPTP) is a network protocol that enables secure transfer of data from a remote client to a private server, creating a Virtual Private Network (VPN) using TCP/IP-based networks.

PPTP supports on-demand, multi-protocol and virtual private networking over public networks, such as the Internet.

This screen displays when you select **PPTP** encapsulation.

**Figure 65** Network > WAN > Internet Connection: PPTP Encapsulation

The following table describes the labels in this screen.

**Table 40** Network > WAN > Internet Connection: PPTP Encapsulation

LABEL	DESCRIPTION
ISP Parameters for Internet Access	
Connection Type	Point-to-Point Tunneling Protocol (PPTP) is a network protocol that enables secure transfer of data from a remote client to a private server, creating a Virtual Private Network (VPN) using TCP/IP-based networks. PPTP supports on-demand, multi-protocol, and virtual private networking over public networks, such as the Internet. The NBG-418N supports only one PPTP server connection at any given time.  To configure a PPTP client, you must configure the <b>User Name</b> and <b>Password</b> fields for a PPP connection and the PPTP parameters for a PPTP connection.
User Name	Type the user name given to you by your ISP.
Password	Type the password associated with the <b>User Name</b> above.
Retype to Confirm	Type your password again to make sure that you have entered correctly.
MTU Size	Enter the MTU or the largest packet size per frame that your NBG-418N can receive and process.

**Table 40** Network > WAN > Internet Connection: PPTP Encapsulation (continued)

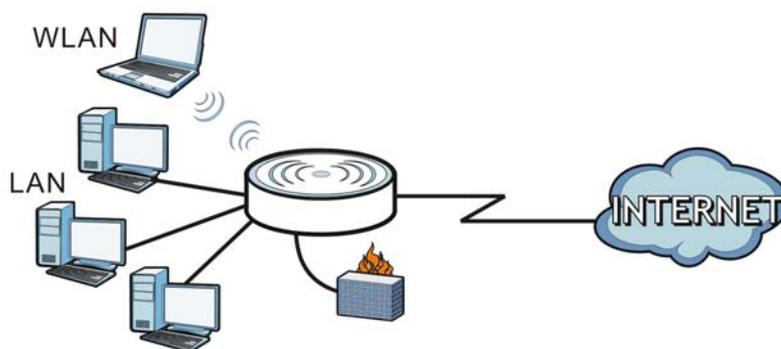
LABEL	DESCRIPTION
Nailed-up Connection	Select <b>Nailed-Up Connection</b> if you do not want the connection to time out.
Idle Timeout	This value specifies the time in minutes that elapses before the NBG-418N automatically disconnects from the PPTP server.
PPTP Configuration	
Server IP Address	Type the IP address of the PPTP server.
Get automatically from ISP	Select this option If your ISP did not assign you a fixed IP address. This is the default selection.
Use fixed IP Address	Select this option If the ISP assigned a fixed IP address.
My WAN IP Address	Enter your WAN IP address in this field if you selected <b>Use Fixed IP Address</b> .
My IP Subnet Mask	Your NBG-418N will automatically calculate the subnet mask based on the IP address that you assign. Unless you are implementing subnetting, use the subnet mask computed by the NBG-418N.
My IP Gateway	Enter a Gateway IP Address (if your ISP gave you one) in this field.
DNS Servers	
First DNS Server Second DNS Server	If you do not configure a DNS server, you must know the IP address of a computer in order to access it.  Select <b>From ISP</b> if your ISP dynamically assigns DNS server information (and the NBG-418N's WAN IP address). The field to the right displays the (read-only) DNS server IP address that the ISP assigns.  Select <b>User-Defined</b> if you have the IP address of a DNS server. Enter the primary and secondary DNS server's IP address in the fields to the right.
WAN MAC Address	The MAC address section allows users to configure the WAN port's MAC address by either using the NBG-418N's MAC address, copying the MAC address from a computer on your LAN or manually entering a MAC address.
Factory default	Select <b>Factory default</b> to use the factory assigned default MAC Address.
Clone the computer's MAC address - MAC Address	Select this option to clone the MAC address of the computer (displaying in the screen) from which you are configuring the NBG-418N. Once it is successfully configured, the address will be copied to the rom file. It will not change unless you change the setting or upload a different ROM file.
Set WAN MAC Address	Select this option and enter the MAC address you want to use.
Apply	Click <b>Apply</b> to save your changes back to the NBG-418N.
Reset	Click <b>Reset</b> to begin configuring this screen afresh.

## 8.1 Overview

This chapter describes how to configure LAN settings.

A Local Area Network (LAN) is a shared communication system to which many computers are attached. A LAN is a computer network limited to the immediate area, usually the same building or floor of a building. The LAN screens can help you configure a LAN DHCP server, manage IP addresses, and partition your physical network into logical networks.

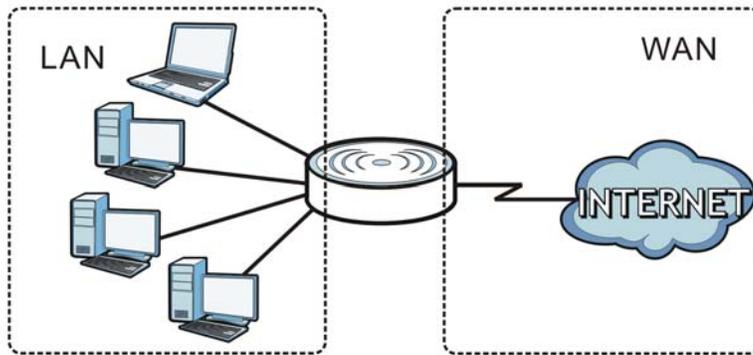
**Figure 66** LAN Setup



The LAN screens can help you configure a LAN DHCP server and manage IP addresses.

## 8.2 What You Need To Know

The actual physical connection determines whether the NBG-418N ports are LAN or WAN ports. There are two separate IP networks, one inside the LAN network and the other outside the WAN network as shown next.

**Figure 67** LAN and WAN IP Addresses

The LAN parameters of the NBG-418N are preset in the factory with the following values:

- IP address of 192.168.1.1 with subnet mask of 255.255.255.0 (24 bits)
- DHCP server enabled with 32 client IP addresses starting from 192.168.1.33.

These parameters should work for the majority of installations. If your ISP gives you explicit DNS server address(es), read the embedded Web Configurator help regarding what fields need to be configured.

## 8.2.1 IP Pool Setup

The NBG-418N is pre-configured with a pool of 32 IP addresses starting from 192.168.1.33 to 192.168.1.64. This configuration leaves 31 IP addresses (excluding the NBG-418N itself) in the lower range (192.168.1.2 to 192.168.1.32) for other server computers, for instance, servers for mail, FTP, TFTP, web, etc., that you may have.

Refer to [Section 3.4.6 on page 30](#) for information on IP Address and Subnet Mask.

## 8.2.2 LAN TCP/IP

The NBG-418N has built-in DHCP server capability that assigns IP addresses and DNS servers to systems that support DHCP client capability.

Refer to the [Section 3.4.7 on page 30](#) section for information on System DNS Servers.

## 8.3 LAN IP Screen

Use this screen to change your basic LAN settings. Click **Network** > **LAN**.

**Figure 68** Network > LAN > IP

The screenshot shows a web-based configuration interface. At the top, there is a blue header with the text 'IP'. Below this is a light green sub-header 'LAN TCP/IP'. The main area contains two rows of configuration fields. The first row is labeled 'IP Address' and has a text input field containing '192.168.1.1'. The second row is labeled 'IP Subnet Mask' and has a text input field containing '255.255.255.0'. Below these fields, there is a horizontal line of dots, and then two buttons: 'Apply' and 'Reset'.

The following table describes the labels in this screen.

**Table 41** Network > LAN > IP

LABEL	DESCRIPTION
IP Address	Type the IP address of your NBG-418N in dotted decimal notation 192.168.1.1 (factory default).
IP Subnet Mask	The subnet mask specifies the network number portion of an IP address. Your NBG-418N will automatically calculate the subnet mask based on the IP address that you assign. Unless you are implementing subnetting, use the subnet mask computed by the NBG-418N.
Apply	Click <b>Apply</b> to save your changes back to the NBG-418N.
Reset	Click <b>Reset</b> to begin configuring this screen afresh.



# DHCP Server

## 9.1 Overview

DHCP (Dynamic Host Configuration Protocol, RFC 2131 and RFC 2132) allows individual clients to obtain TCP/IP configuration at start-up from a server. You can configure the NBG-418N's LAN as a DHCP server or disable it. When configured as a server, the NBG-418N provides the TCP/IP configuration for the clients. If DHCP service is disabled, you must have another DHCP server on your LAN, or else the computer must be manually configured.

## 9.2 What You Can Do

- Use the **General** screen to enable the DHCP server ([Section 9.4 on page 97](#)).
- Use the **Advanced** screen to assign IP addresses on the LAN to specific individual computers based on their MAC Addresses ([Section 9.5 on page 98](#)).
- Use the **Client List** screen to view the current DHCP client information ([Section 9.6 on page 100](#)).

## 9.3 What You Need To Know

Every Ethernet device has a unique MAC (Media Access Control) address. The MAC address is assigned at the factory and consists of six pairs of hexadecimal characters, for example, 00:A0:C5:00:00:02. Find out the MAC addresses of your network devices if you intend to add them to the DHCP Client List screen.

Refer to [Section 3.4.6 on page 30](#) for information on IP Address and Subnet Mask.

Refer to the [Section 3.4.7 on page 30](#) section for information on System DNS Servers.

## 9.4 General Screen

Use this screen to enable the DHCP server. Click **Network > DHCP Server**. The following screen displays.

**Figure 69** Network > DHCP Server > General

The screenshot shows a web-based configuration interface for a DHCP server. At the top, there are three tabs: 'General' (selected), 'Advanced', and 'Client List'. Below the tabs is a section titled 'DHCP Setup'. Inside this section, there is a checkbox labeled 'Enable DHCP Server' which is checked. Below the checkbox are two input fields: 'IP Pool Starting Address' with the value '192.168.1.33' and 'Pool Size' with the value '32'. At the bottom of the section, there are two buttons: 'Apply' and 'Reset'.

The following table describes the labels in this screen.

**Table 42** Network > DHCP Server > General

LABEL	DESCRIPTION
Enable DHCP Server	Enable or Disable DHCP for LAN.  DHCP (Dynamic Host Configuration Protocol, RFC 2131 and RFC 2132) allows individual clients (computers) to obtain TCP/IP configuration at startup from a server. Leave the <b>Enable DHCP Server</b> check box selected unless your ISP instructs you to do otherwise. Clear it to disable the NBG-418N acting as a DHCP server. When configured as a server, the NBG-418N provides TCP/IP configuration for the clients. If not, DHCP service is disabled and you must have another DHCP server on your LAN, or else the computers must be manually configured. When set as a server, fill in the following four fields.
IP Pool Starting Address	This field specifies the first of the contiguous addresses in the IP address pool for LAN.
Pool Size	This field specifies the size, or count of the IP address pool for LAN.
Apply	Click <b>Apply</b> to save your changes back to the NBG-418N.
Reset	Click <b>Reset</b> to begin configuring this screen afresh.

## 9.5 Advanced Screen

This screen allows you to assign IP addresses on the LAN to specific individual computers based on their MAC addresses. You can also use this screen to configure the DNS server information that the NBG-418N sends to the DHCP clients.

To change your NBG-418N's static DHCP settings, click **Network > DHCP Server > Advanced**. The following screen displays.

Figure 70 Network &gt; DHCP Server &gt; Advanced

The following table describes the labels in this screen.

Table 43 Network &gt; DHCP Server &gt; Advanced

LABEL	DESCRIPTION
Static DHCP Table	
#	This is the index number of the static IP table entry (row).
MAC Address	Type the MAC address (with colons) of a computer on your LAN.
IP Address	Type the LAN IP address of a computer on your LAN.
DNS Server	
DNS Servers Assigned by DHCP Server	The NBG-418N passes a DNS (Domain Name System) server IP address (in the order you specify here) to the DHCP clients. If you do not configure the DNS server, the DHCP service is disabled and you must have another DHCP sever on your LAN, or else the computers must have their DNS server addresses manually configured.
First DNS Server Second DNS Server	<p>Select <b>From ISP</b> if your ISP dynamically assigns DNS server information (and the NBG-418N's WAN IP address). The field to the right displays the (read-only) DNS server IP address that the ISP assigns.</p> <p>Select <b>User-Defined</b> if you have the IP address of a DNS server. Enter the DNS server's IP address in the field to the right. If you chose <b>User-Defined</b>, but leave the IP address set to 0.0.0.0, <b>User-Defined</b> changes to <b>None</b> after you click <b>Apply</b>. If you set a second choice to <b>User-Defined</b>, and enter the same IP address, the second <b>User-Defined</b> changes to <b>None</b> after you click <b>Apply</b>.</p> <p>Select <b>DNS Relay</b> to have the NBG-418N act as a DNS proxy. The NBG-418N's LAN IP address displays in the field to the right (read-only). The NBG-418N tells the DHCP clients on the LAN that the NBG-418N itself is the DNS server. When a computer on the LAN sends a DNS query to the NBG-418N, the NBG-418N forwards the query to the NBG-418N's system DNS server (configured in the <b>WAN &gt; Internet Connection</b> screen) and relays the response back to the computer. You can only select <b>DNS Relay</b> for one of the three servers; if you select <b>DNS Relay</b> for a second or third DNS server, that choice changes to <b>None</b> after you click <b>Apply</b>.</p>
Apply	Click <b>Apply</b> to save your changes back to the NBG-418N.
Reset	Click <b>Reset</b> to begin configuring this screen afresh.

## 9.6 Client List Screen

The DHCP table shows current DHCP client information (including **IP Address**, **Host Name** and **MAC Address**) of network clients using the NBG-418N's DHCP servers.

Configure this screen to always assign an IP address to a MAC address (and host name). Click **Network > DHCP Server > Client List**.

Note: You can also view a read-only client list by clicking the **DHCP Table (Details...)** hyperlink in the **Status** screen.

The following screen displays.

**Figure 71** Network > DHCP Server > Client List

#	IP Address	Host Name	MAC Address	Reserve
1	192.168.1.33	TWPC13262-01	00:1C:C4:84:E0:4B	<input type="checkbox"/>

The following table describes the labels in this screen.

**Table 44** Network > DHCP Server > Client List

LABEL	DESCRIPTION
#	This is the index number of the host computer.
IP Address	This field displays the IP address relative to the # field listed above.
Host Name	This field displays the computer host name.
MAC Address	The MAC (Media Access Control) or Ethernet address on a LAN (Local Area Network) is unique to your computer (six pairs of hexadecimal notation).  A network interface card such as an Ethernet adapter has a hardwired address that is assigned at the factory. This address follows an industry standard that ensures no other adapter has a similar address.
Reserve	Select this check box in the <b>DHCP Setup</b> section to have the NBG-418N always assign the IP address(es) to the MAC address(es) (and host name(s)). After you click <b>Apply</b> , the MAC address and IP address also display in the <b>Advanced</b> screen (where you can edit them).
Apply	Click <b>Apply</b> to save your settings.
Refresh	Click <b>Refresh</b> to reload the DHCP table.

# Network Address Translation

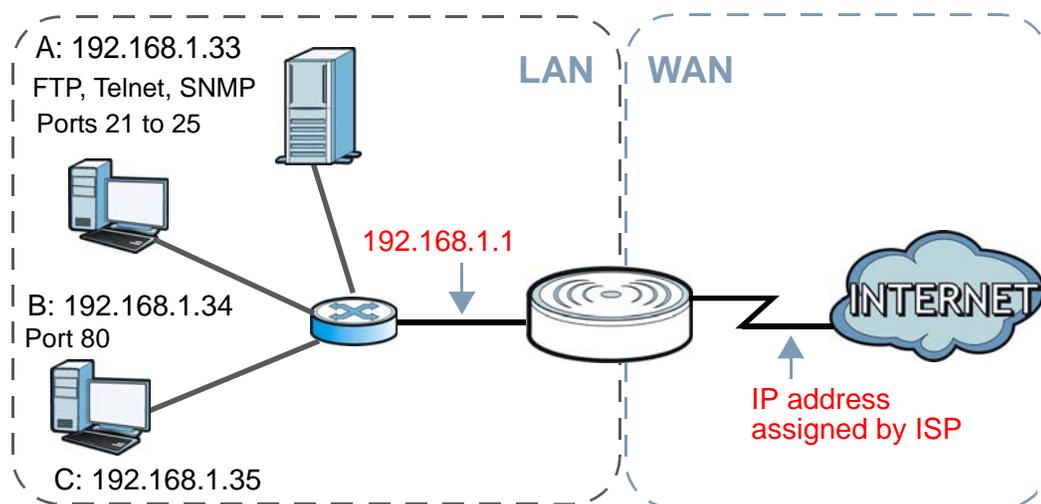
## 10.1 Overview

This chapter discusses how to configure NAT on the NBG-418N.

NAT (Network Address Translation - NAT, RFC 1631) is the translation of the IP address of a host in a packet. For example, the source address of an outgoing packet, used within one network is changed to a different IP address known within another network.

Each packet has two addresses – a source address and a destination address. For outgoing packets, NAT maps private (local) IP addresses to globally unique ones required for communication with hosts on other networks. It replaces the original IP source address in each packet and then forwards it to the Internet. The NBG-418N keeps track of the original addresses and port numbers so incoming reply packets can have their original values restored. The following figure illustrates this.

**Figure 72** NAT Example



For more information on IP address translation, refer to *RFC 1631, The IP Network Address Translator (NAT)*.

**Note:** You must create a firewall rule in addition to setting up NAT, to allow traffic from the WAN to be forwarded through the NBG-418N.

## 10.2 What You Can Do

- Use the **General** screen to enable NAT and set a default server ([Section 10.3 on page 103](#)).
- Use the **Application** screen to change your NBG-418N's port forwarding settings ([Section 10.4 on page 104](#)).

### 10.2.1 What You Need To Know

The following terms and concepts may help as you read through this chapter.

#### Inside/Outside

This denotes where a host is located relative to the NBG-418N, for example, the computers of your subscribers are the inside hosts, while the web servers on the Internet are the outside hosts.

#### Global/Local

This denotes the IP address of a host in a packet as the packet traverses a router, for example, the local address refers to the IP address of a host when the packet is in the local network, while the global address refers to the IP address of the host when the same packet is traveling in the WAN side.

**Note:** Inside/outside refers to the location of a host, while global/local refers to the IP address of a host used in a packet.

An inside local address (ILA) is the IP address of an inside host in a packet when the packet is still in the local network, while an inside global address (IGA) is the IP address of the same inside host when the packet is on the WAN side. The following table summarizes this information.

**Table 45** NAT Definitions

ITEM	DESCRIPTION
Inside	This refers to the host on the LAN.
Outside	This refers to the host on the WAN.
Local	This refers to the packet address (source or destination) as the packet travels on the LAN.
Global	This refers to the packet address (source or destination) as the packet travels on the WAN.

**Note:** NAT never changes the IP address (either local or global) of an outside host.

#### What NAT Does

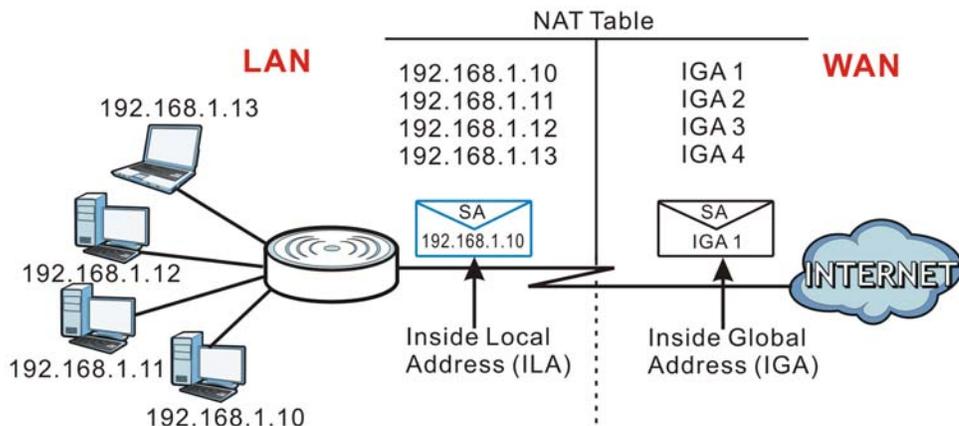
In the simplest form, NAT changes the source IP address in a packet received from a subscriber (the inside local address) to another (the inside global address) before forwarding the packet to the WAN side. When the response comes back, NAT translates the destination address (the inside global address) back to the inside local address before forwarding it to the original inside host. Note that the IP address (either local or global) of an outside host is never changed.

The global IP addresses for the inside hosts can be either static or dynamically assigned by the ISP. In addition, you can designate servers, for example, a web server and a telnet server, on your local network and make them accessible to the outside world. If you do not define any servers, NAT offers the additional benefit of firewall protection. With no servers defined, your NBG-418N filters out all incoming inquiries, thus preventing intruders from probing your network. For more information on IP address translation, refer to *RFC 1631, The IP Network Address Translator (NAT)*.

## How NAT Works

Each packet has two addresses – a source address and a destination address. For outgoing packets, the ILA (Inside Local Address) is the source address on the LAN, and the IGA (Inside Global Address) is the source address on the WAN. For incoming packets, the ILA is the destination address on the LAN, and the IGA is the destination address on the WAN. NAT maps private (local) IP addresses to globally unique ones required for communication with hosts on other networks. It replaces the original IP source address in each packet and then forwards it to the Internet. The NBG-418N keeps track of the original addresses and port numbers so incoming reply packets can have their original values restored. The following figure illustrates this.

Figure 73 How NAT Works



## 10.3 General NAT Screen

Use this screen to enable NAT and set a default server. Click **Network > NAT** to open the **General** screen.

Figure 74 Network > NAT > General

The following table describes the labels in this screen.

**Table 46** Network > NAT > General

LABEL	DESCRIPTION
NAT Setup	
Enable Network Address Translation	Network Address Translation (NAT) allows the translation of an Internet protocol address used within one network (for example a private IP address used in a local network) to a different IP address known within another network (for example a public IP address used on the Internet).  Select the check box to enable NAT.
Default Server Setup	
Server IP Address	In addition to the servers for specified services, NAT supports a default server. A default server receives packets from ports that are not specified in the <b>Application</b> screen.  If you do not assign a <b>Default Server IP address</b> , the NBG-418N discards all packets received for ports that are not specified in the <b>Application</b> screen or remote management.
Apply	Click <b>Apply</b> to save your changes back to the NBG-418N.
Reset	Click <b>Reset</b> to begin configuring this screen afresh.

## 10.4 NAT Application Screen

Use the **Application** screen to forward incoming service requests to the server(s) on your local network. You may enter a single port number or a range of port numbers to be forwarded, and the local IP address of the desired server. The port number identifies a service; for example, web service is on port 80 and FTP on port 21. In some cases, such as for unknown services or where one server can support more than one service (for example both FTP and web service), it might be better to specify a range of port numbers.

In addition to the servers for specified services, NAT supports a default server. A service request that does not have a server explicitly designated for it is forwarded to the default server. If the default is not defined, the service request is simply discarded.

**Note:** Many residential broadband ISP accounts do not allow you to run any server processes (such as a Web or FTP server) from your location. Your ISP may periodically check for servers and may suspend your account if it discovers any active services at your location. If you are unsure, refer to your ISP.

Port forwarding allows you to define the local servers to which the incoming services will be forwarded. To change your NBG-418N's port forwarding settings, click **Network > NAT > Application**. The screen appears as shown.

**Note:** If you do not assign a **Default Server IP address** in the **NAT > General** screen, the NBG-418N discards all packets received for ports that are not specified in this screen or remote management.

Refer to [Appendix E on page 209](#) for port numbers commonly used for particular services.

**Figure 75** Network > NAT > Application

The following table describes the labels in this screen.

**Table 47** Network > NAT > Application

LABEL	DESCRIPTION
Add Application Rule	
Active	Select the check box to enable this rule and the requested service can be forwarded to the host with a specified internal IP address.  Clear the checkbox to disallow forwarding of these ports to an inside server without having to delete the entry.
Service Name	Type a name (of up to 31 printable characters) to identify this rule in the first field next to <b>Service Name</b> . Otherwise, select a predefined service in the second field next to <b>Service Name</b> . The predefined service name and port number(s) will display in the <b>Service Name</b> and <b>Port</b> fields.
Local Port Range	Type a port number(s) to be forwarded.
Public Port Range	To specify a range of ports, enter a hyphen (-) between the first port and the last port, such as 10-20.  To specify two or more non-consecutive port numbers, separate them by a comma without spaces, such as 123,567.
Protocol	Select the transport layer protocol supported by this server. Choices are <b>TCP</b> , <b>UDP</b> , or <b>TCP&amp;UDP</b> .

**Table 47** Network > NAT > Application (continued)

LABEL	DESCRIPTION
Server IP Address	Type the inside IP address of the server that receives packets from the port(s) specified in the <b>Port</b> field.
Apply	Click <b>Apply</b> to save your changes to the <b>Application Rules Summary</b> table.
Reset	Click <b>Reset</b> to not save and return your new changes in the <b>Service Name</b> and <b>Port</b> fields to the previous one.
Application Rules Summary	
#	This is the number of an individual port forwarding server entry.
Active	This icon is turned on when the rule is enabled.
Name	This field displays a name to identify this rule.
Local Start/End Port	This field displays the port number(s).
Public Start/End Port	
Protocol	This is the transport layer protocol used for the service.
Server IP Address	This field displays the inside IP address of the server.
Modify	Click the <b>Edit</b> icon to display and modify an existing rule setting in the fields under <b>Add Application Rule</b> . Click the <b>Remove</b> icon to delete a rule.

## 10.5 Technical Reference

The following section contains additional technical information about the NBG-418N features described in this chapter.

### 10.5.1 NAT Port Forwarding: Services and Port Numbers

A port forwarding set is a list of inside (behind NAT on the LAN) servers, for example, web or FTP, that you can make accessible to the outside world even though NAT makes your whole inside network appear as a single machine to the outside world.

Use the **Application** screen to forward incoming service requests to the server(s) on your local network. You may enter a single port number or a range of port numbers to be forwarded, and the local IP address of the desired server. The port number identifies a service; for example, web service is on port 80 and FTP on port 21. In some cases, such as for unknown services or where one server can support more than one service (for example both FTP and web service), it might be better to specify a range of port numbers.

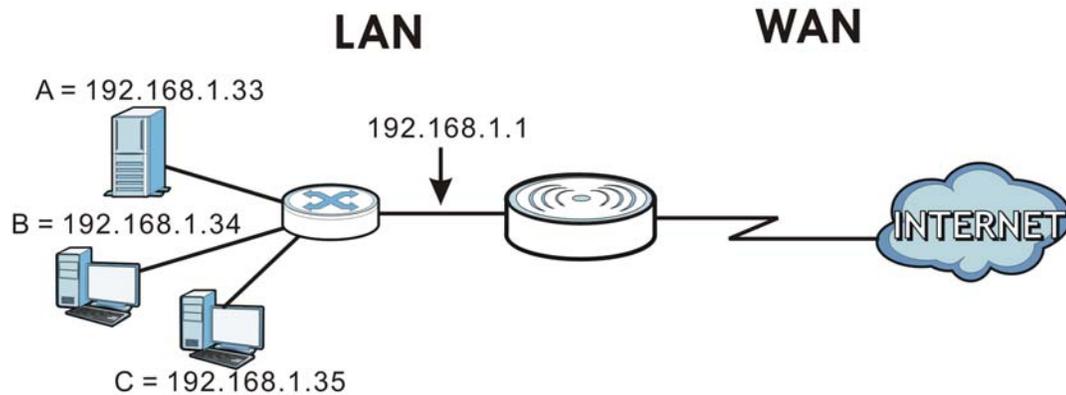
In addition to the servers for specified services, NAT supports a default server. A service request that does not have a server explicitly designated for it is forwarded to the default server. If the default is not defined, the service request is simply discarded.

**Note:** Many residential broadband ISP accounts do not allow you to run any server processes (such as a Web or FTP server) from your location. Your ISP may periodically check for servers and may suspend your account if it discovers any active services at your location. If you are unsure, refer to your ISP.

## 10.5.2 NAT Port Forwarding Example

Let's say you want to assign ports 21-25 to one FTP, Telnet and SMTP server (**A** in the example), port 80 to another (**B** in the example) and assign a default server IP address of 192.168.1.35 to a third (**C** in the example). You assign the LAN IP addresses and the ISP assigns the WAN IP address. The NAT network appears as a single host on the Internet.

**Figure 76** Multiple Servers Behind NAT Example





## Dynamic DNS

### 11.1 Overview

Dynamic Domain Name Service (DDNS) services let you use a fixed domain name with a dynamic IP address. Users can always use the same domain name instead of a different dynamic IP address that changes each time to connect to the NBG-418N or a server in your network.

Note: The NBG-418N must have a public global IP address and you should have your registered DDNS account information on hand.

### 11.2 Dynamic DNS Screen

To configure your NBG-418N's DDNS, click **Network > DDNS**.

**Figure 77** Network > DDNS

The following table describes the labels in this screen.

**Table 48** Network > DDNS

LABEL	DESCRIPTION
Enable Dynamic DNS	Select this check box to use DDNS.
Service Provider	Select the name of your DDNS service provider.
Dynamic DNS Type	This field is only available if you use the DynDNS service provider. Select the type of service that you are registered for from your Dynamic DNS service provider.

**Table 48** Network > DDNS

LABEL	DESCRIPTION
Host Name	The host name is the domain name that the DDNS service will map to your dynamic global IP address. Type the host name fully qualified, for example, 'yourhost.mydomain.net'. You can specify up to two host names in the field separated by a comma (",").
User Name	Type the user name that you used when you registered with the DDNS service.
Password	Type the password associated with the DDNS user name.
Timeout	This is the length of time in hours between updates to the DDNS service. If the update fails, the NBG-418N will disable DDNS.
Enable Wildcard Option	Select this if your DDNS service provider supports use of a wildcard (*) that will allow '*.yourhost.dyndns.org' (where * may be the name of a web, mail, FTP etc. server in your network) to be mapped to the same IP address as 'yourhost.dyndns.org'. This feature is useful when there are multiple servers in your network and you want users to be able to use different domain names to reach them.
Apply	Click <b>Apply</b> to save your changes back to the NBG-418N.
Reset	Click <b>Reset</b> to begin configuring this screen afresh.

## 12.1 Overview

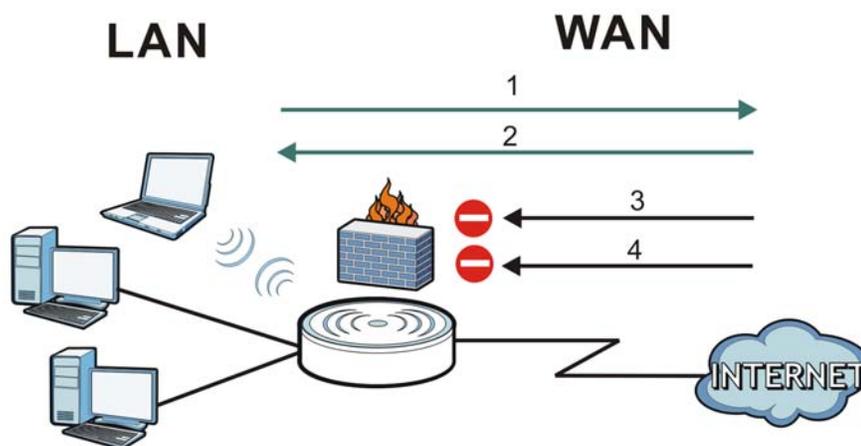
Use these screens to enable and configure the firewall that protects your NBG-418N and your LAN from unwanted or malicious traffic.

Enable the firewall to protect your LAN computers from attacks by hackers on the Internet and control access between the LAN and WAN. By default the firewall:

- allows traffic that originates from your LAN computers to go to all of the networks.
- blocks traffic that originates on the other networks from going to the LAN.

The following figure illustrates the default firewall action. User **A** can initiate an IM (Instant Messaging) session from the LAN to the WAN (1). Return traffic for this session is also allowed (2). However other traffic initiated from the WAN is blocked (3 and 4).

Figure 78 Default Firewall Action



## 12.2 What You Can Do

- Use the **General** screen to enable or disable the NBG-418N's firewall ([Section 12.4 on page 112](#)).
- Use the **Services** screen to enable or disable ICMP and VPN passthrough features ([Section 12.5 on page 113](#)).

## 12.3 What You Need To Know

The NBG-418N's firewall feature physically separates the LAN and the WAN and acts as a secure gateway for all data passing between the networks.

### 12.3.1 About the NBG-418N Firewall

The NBG-418N firewall is a stateful inspection firewall and is designed to protect against Denial of Service attacks when activated (click the **General** tab under **Firewall** and then click the **Enable Firewall** check box). The NBG-418N's purpose is to allow a private Local Area Network (LAN) to be securely connected to the Internet. The NBG-418N can be used to prevent theft, destruction and modification of data, as well as log events, which may be important to the security of your network.

The NBG-418N is installed between the LAN and a broadband modem connecting to the Internet. This allows it to act as a secure gateway for all data passing between the Internet and the LAN.

The NBG-418N has one Ethernet WAN port and four Ethernet LAN ports, which are used to physically separate the network into two areas. The WAN (Wide Area Network) port attaches to the broadband (cable or DSL) modem to the Internet.

The LAN (Local Area Network) port attaches to a network of computers, which needs security from the outside world. These computers will have access to Internet services such as e-mail, FTP and the World Wide Web. However, "inbound access" is not allowed (by default) unless the remote host is authorized to use a specific service.

### 12.3.2 VPN Pass Through Features

A Virtual Private Network (VPN) is a way to securely connect two networks over the Internet. For example a home network and one in a business office. This requires special equipment on both ends of the connection.

The NBG-418N is not one of the endpoints but it does allow traffic from those endpoints to pass through. The NBG-418N allows the following types of VPN traffic to pass through:

- IP security (IPSec)
- Point-to-Point Tunneling Protocol (PPTP)

## 12.4 General Firewall Screen

Use this screen to enable or disable the NBG-418N's firewall, and set up firewall logs. Click **Security > Firewall** to open the **General** screen.

**Figure 79** Security > Firewall > General

The following table describes the labels in this screen.

**Table 49** Security > Firewall > General

LABEL	DESCRIPTION
Enable Firewall	Select this check box to activate the firewall. The NBG-418N performs access control and protects against Denial of Service (DoS) attacks when the firewall is activated.
Apply	Click <b>Apply</b> to save the settings.
Reset	Click <b>Reset</b> to start configuring this screen again.

## 12.5 Services Screen

Use the **Services** screen to enable or disable ICMP and VPN passthrough features.

Click **Security > Firewall > Services**. The screen appears as shown next.

**Figure 80** Security > Firewall > Services

The following table describes the labels in this screen.

**Table 50** Security > Firewall > Services

LABEL	DESCRIPTION
ICMP	Internet Control Message Protocol is a message control and error-reporting protocol between a host server and a gateway to the Internet. ICMP uses Internet Protocol (IP) datagrams, but the messages are processed by the TCP/IP software and directly apparent to the application user.
Respond to Ping on WAN	The NBG-418N will not respond to any incoming Ping requests when <b>Disable</b> is selected. Select <b>Enable</b> to reply to incoming WAN Ping requests.

**Table 50** Security > Firewall > Services (continued)

LABEL	DESCRIPTION
VPN Passthrough	Select the checkbox to enable the advanced pass through features: <ul style="list-style-type: none"><li>• <b>PPTP Passthrough:</b> Select this option to allow the NBG-418N to pass through VPN traffic using PPTP.</li><li>• <b>L2TP Passthrough:</b> Select this option to enable computers on your LAN to make L2TP VPN connections to servers on the Internet.</li><li>• <b>IPSEC Passthrough:</b> Select this option to allow the NBG-418N to pass through VPN traffic using the IPsec protocol.</li></ul>
Apply	Click <b>Apply</b> to save the settings.
Reset	Click <b>Reset</b> to start configuring this screen again.