Service Managed Gateway™

Configuring a Multiple Ethernet Connection

Issue   1.3

Date   21 August 2008

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1 About this document

1.1 Scope

This document explains:

- what an Ethernet switch is,
- the benefits of an Ethernet switch, and
- how to configure multiple LANs with an Ethernet switch.

This document also gives an example of a simple Ethernet switch configuration and a complex Ethernet switch configuration.

1.2 Readership

This document is for end users or engineers who need to configure LANs on the Service Managed Gateway (SMG).

1.3 More information

For information on how to configure firewalls on a LAN, read the guide '**Configuring a Firewall**'.

2 Introduction

2.1 Security and multiple LANs

The GW4000 and GW5000 Series Gateways support up to 4 separate Ethernet LANs and can route data packets between these LANs. You can apply firewall rules to the traffic routing between each LAN, which allows for each of the LANs to have a different function, and for security to be applied between these functions.

2.2 The physical configuration of the Ethernet ports

Your Service Managed Gateway features four-port Fast Ethernet ports. This enables the SMG to interconnect and control the traffic between up to four local area networks (LANs) and the Internet.

Figure 1: The four-port Ethernet interface on the back of the GW4000 Series SMG
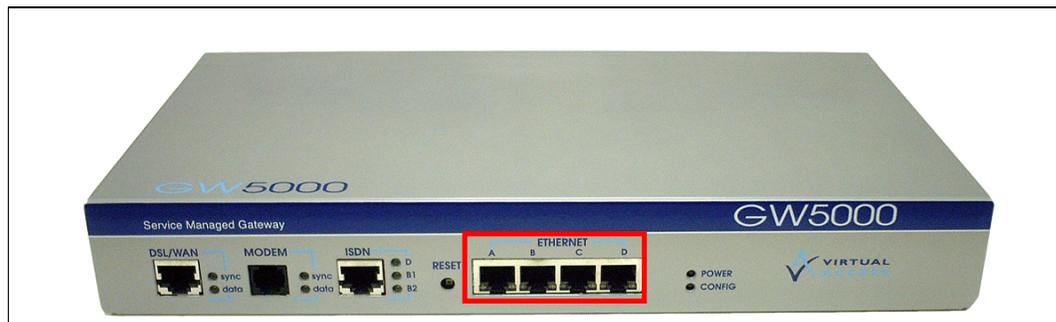
Figure 2: The four-port Ethernet interface on the front of the GW5000 Series SMG

The interface for the Ethernet switch in the web of your SMG enables you to assign different LANs and public servers to the Ethernet interface ports. You can assign any port to any Ethernet interface. Figure 3 shows the factory configuration of the Ethernet switch.
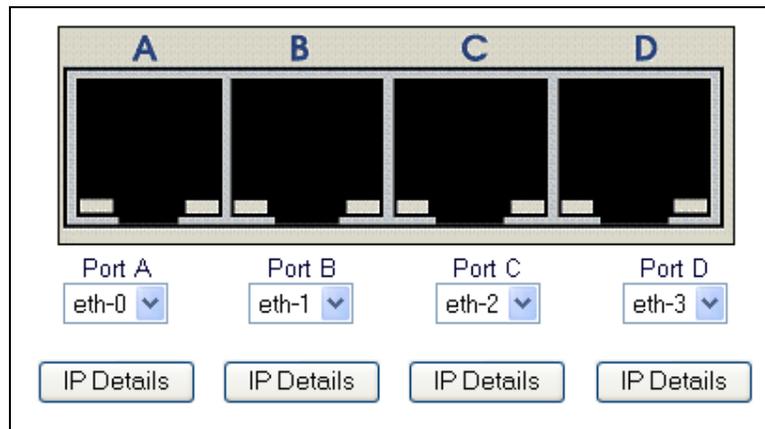

Figure 3: The Ethernet switch in the SMG web.

If you need help using the Ethernet switch in the web, read section 3.0, How to use the multiple Ethernet switch to configure Ethernet interfaces.

2.3 The benefits of the Ethernet switch

If two or more ports are on the same LAN, then there is Ethernet switching between the ports, using the features that are listed below.

- **Address matching**: every time a new packet arrives into one of the ports that are on the same LAN, the switch searches an internal table to match the physical port number to the packet's destination MAC address. When it finds a match, the switch forwards the packet only through the port that it matched to the packet. It does not send the packet to other ports on the same LAN, including the SMG processor. Address matching results in faster performance.

- **Learning**: After the switch forwards the packet, it records the packet's source MAC address and the port that the packet was received from into the table. When response packets come from other ports, the switch already knows where to forward them. Learning results in faster performance.

- **Aging**: users can dynamically change cables into different ports at any time. To allow for cables that change ports, the switch clears its internal routing table after a certain amount of inactivity.

3 Configuring Ethernet interfaces

3.1 Open the LAN configuration window

To configure multiple Ethernet connections, first type **fast.start** in the Address field of your browser.

You may need a password to log in to your SMG. If you do, type the password into the Password field that appears. Then click **Login**.

Figure 4: The Password field in the SMG web
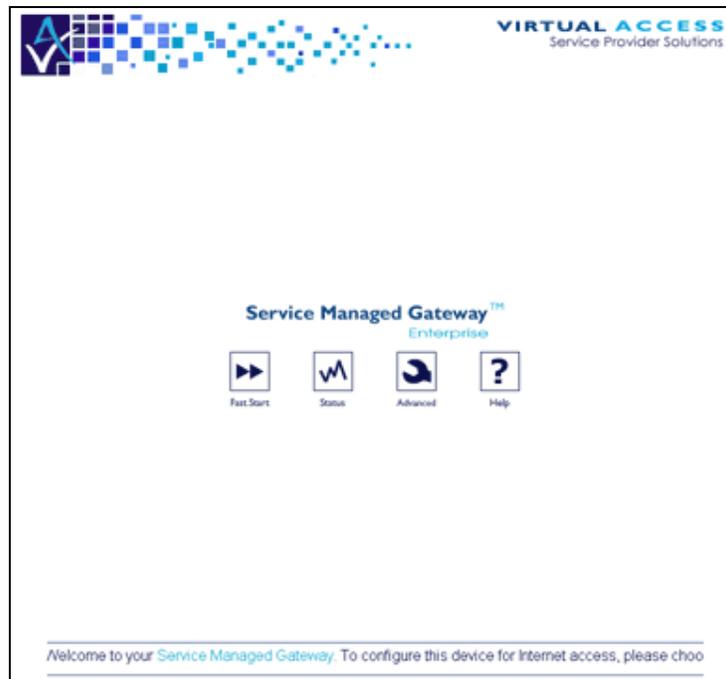
The home page of your SMG appears.

Figure 5: The home page of the SMG

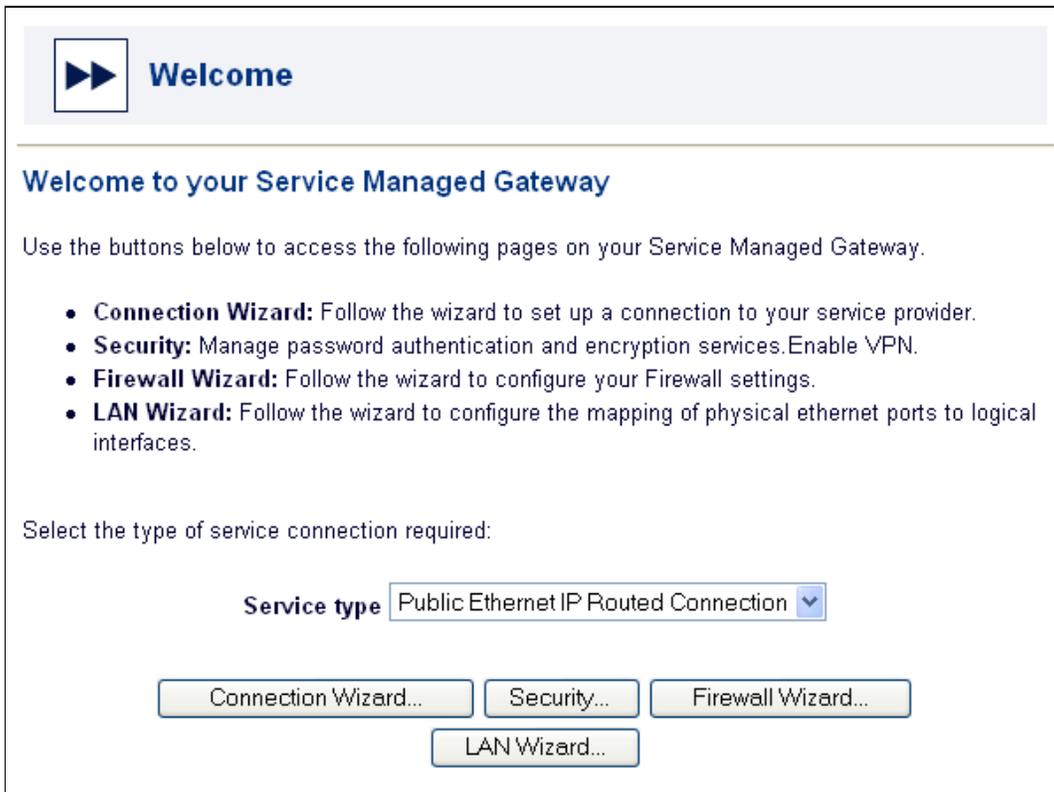Click the **Fast.Start** icon. The Fast.Start Welcome page appears.

Figure 6: The Fast.Start Welcome page

3.2 Ensure that the service type is correct

Make sure that the service type is correct before you configure the Ethernet switch.

Look at the **Service type** field. It should show the correct connection type for your SMG. If it does not, select the correct connection type from the Service type drop-down list.

If you need to configure the Ethernet connections on an ADSL or T1/E1 SMG, please read section 3.3, How to configure the Ethernet connections on an ADSL or T1/E1 SMG.

If you need to configure the Ethernet connections on an Ethernet SMG, please read section 3.4, How to configure the Ethernet connections on an Ethernet SMG.

3.3 Configure the Ethernet connections on an ADSL or T1/E1 SMG

To configure your Ethernet connections, click **LAN Wizard** on the Welcome page. The LAN Configuration page appears, which contains the Ethernet switch.

Figure 7: The LAN Configuration window

You can configure any port to any Ethernet interface.

To assign an Ethernet interface to a port, click the down-pointing arrow next to the Port drop-down list and select the interface you want to assign.

Figure 8: How to select the Ethernet interface that you want to assign to a port

Please go to section 2.5, How to configure local address settings for an Ethernet interface.

3.4 Configure the Ethernet connections on an Ethernet SMG

To configure your Ethernet connections, click **LAN Wizard** on the Welcome page. The LAN Configuration page appears which contains the Ethernet switch.
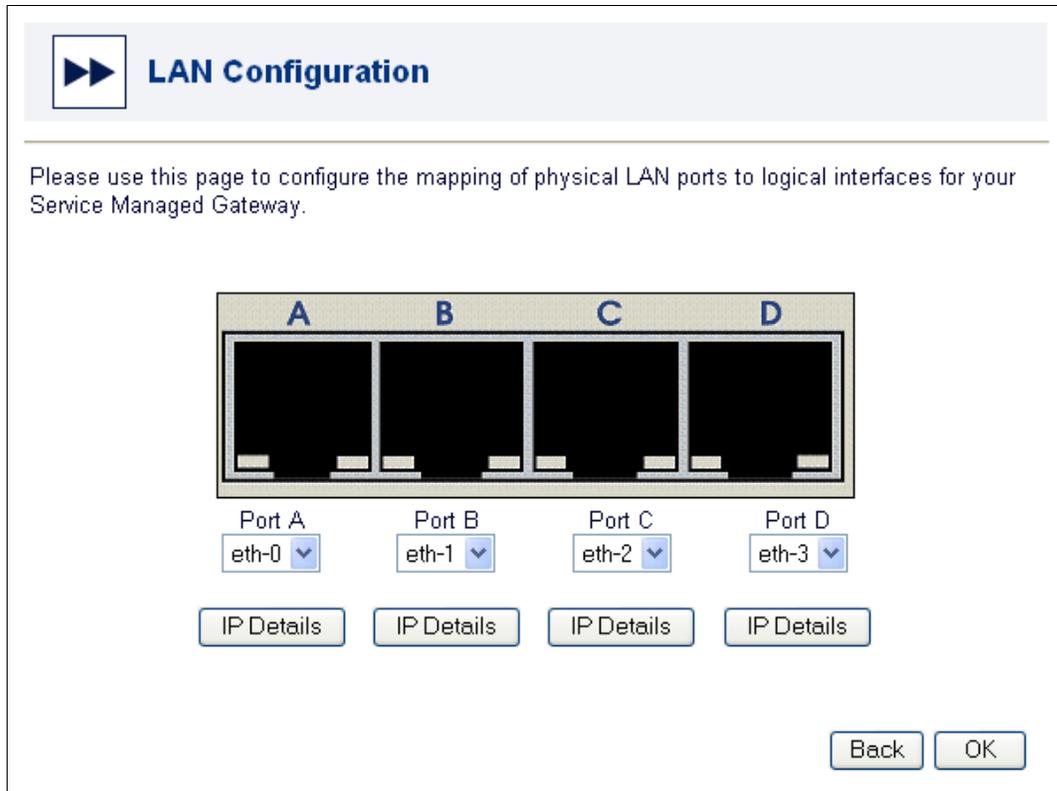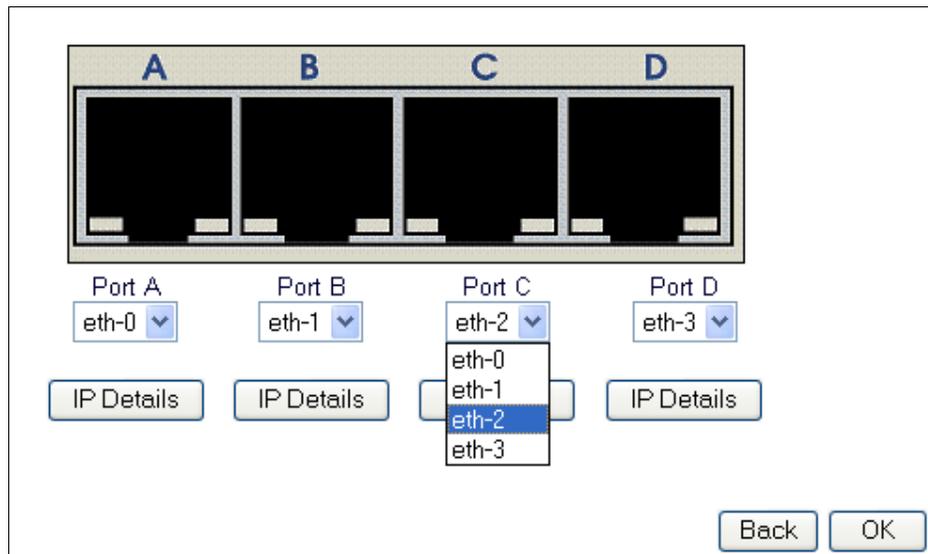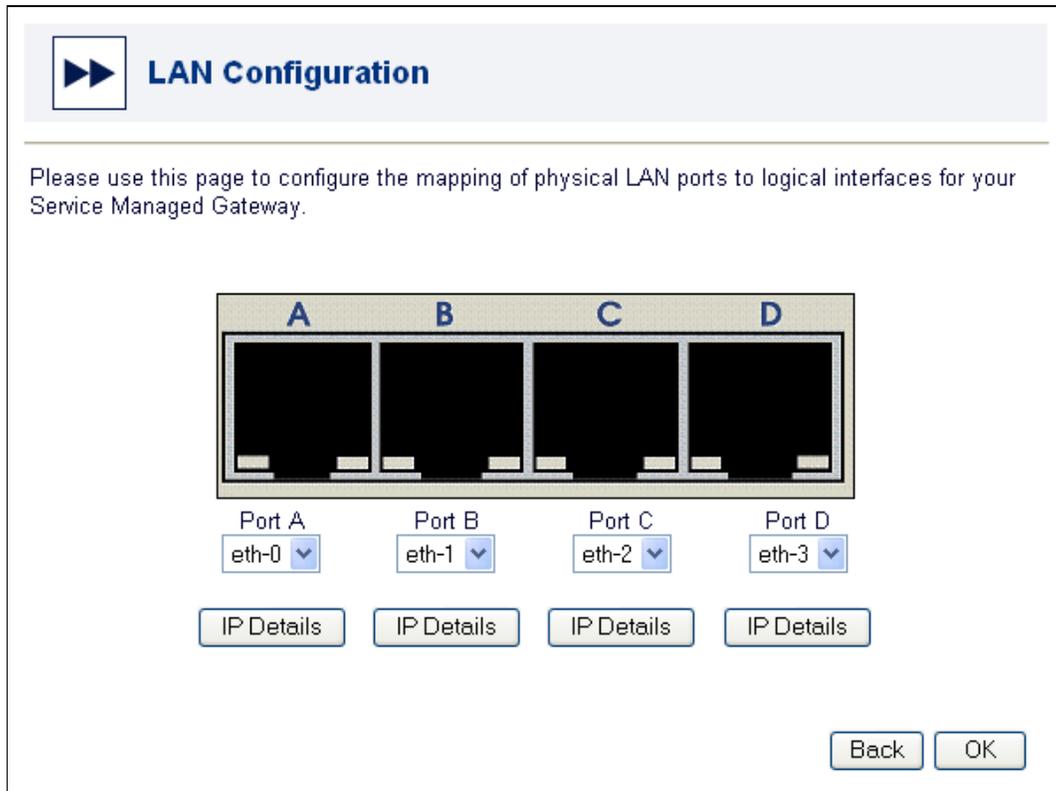

Figure 9: The LAN Configuration window

You can configure any port to any Ethernet interface, but we recommend that you use the configurations in Table 1.

The number of LAN connections you need	Port A is configured as	Port B is configured as	Port C is configured as	Port D is configured as	Your WAN connection is
1	Eth-0	Eth-0	Eth-0	Eth-1	Port D
2	Eth-0	Eth-0	Eth-1	Eth-2	Port C
3	Eth-0	Eth-1	Eth-2	Eth-3	Port B

Table 1: The Ethernet port configurations that we recommend for an Ethernet SMG

If your SMG was automatically activated, Eth-1 was assigned to the WAN Internet connection. This assignment automatically applies WAN firewall rules to Eth-1. If you manually activate your SMG, we recommend that you assign Eth-1 to the WAN Internet connection. For more information about manually activating your SMG, please read the configuration guide that is relevant to your type of connection.

To configure an Ethernet interface on a port, click the down-pointing arrow next to the Port drop-down list and select the interface you want.
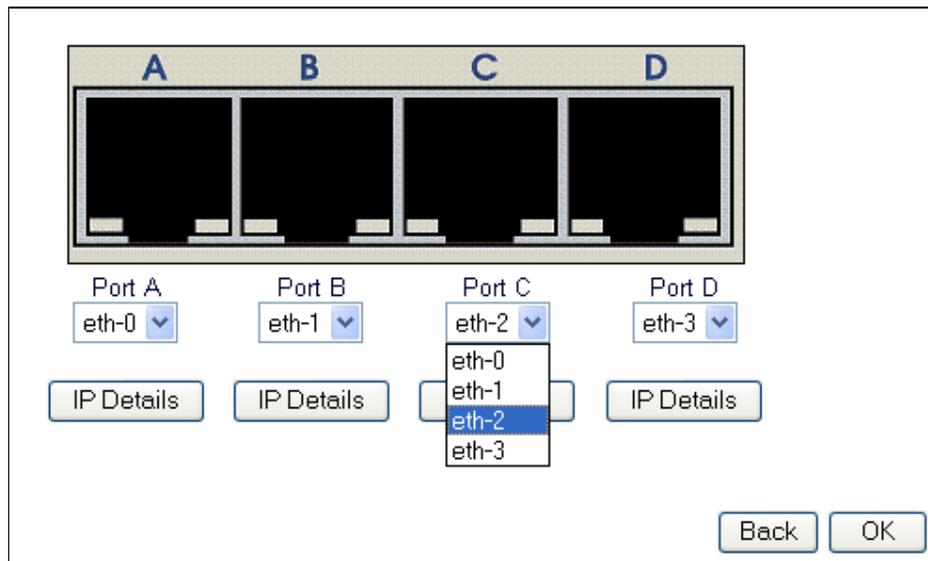
Figure 10: How to select the Ethernet interface that you want to configure on a port

3.5 Configure local address settings for an Ethernet interface

You may need to configure local address settings for the Ethernet interfaces that you assigned to ports. On the LAN Configuration page, click **IP Details** under the port that you need to specify address settings for.
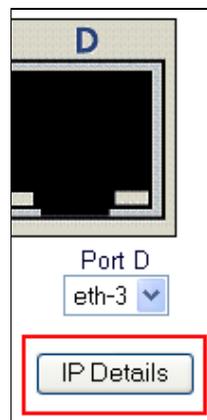

Figure 11: The IP Details button, which opens the Ethernet LAN Configuration window

Figure 12: The Ethernet LAN Configuration window

Type the IP address for the Ethernet interface in the **IP address** field. Type the IP address mask in the **IP address mask** field.

To prevent the Dynamic Host Configuration Protocol from automatically assigning addresses to devices on the LAN, select **no** from the **Enabled** drop-down list in the Provide DHCP Addresses section of the window. No is the default setting.

To automatically assign dynamic IP addresses to the devices on the LAN, select **yes** from the **Enabled** drop-down list. Specify the range of addresses to be used in **the Addresses from** and **to** fields.

Click **OK** to return to the LAN Configuration window.

3.6 Save the Ethernet switch configuration

To save the changes you made using the Ethernet switch, click **OK** in the LAN Configuration window.
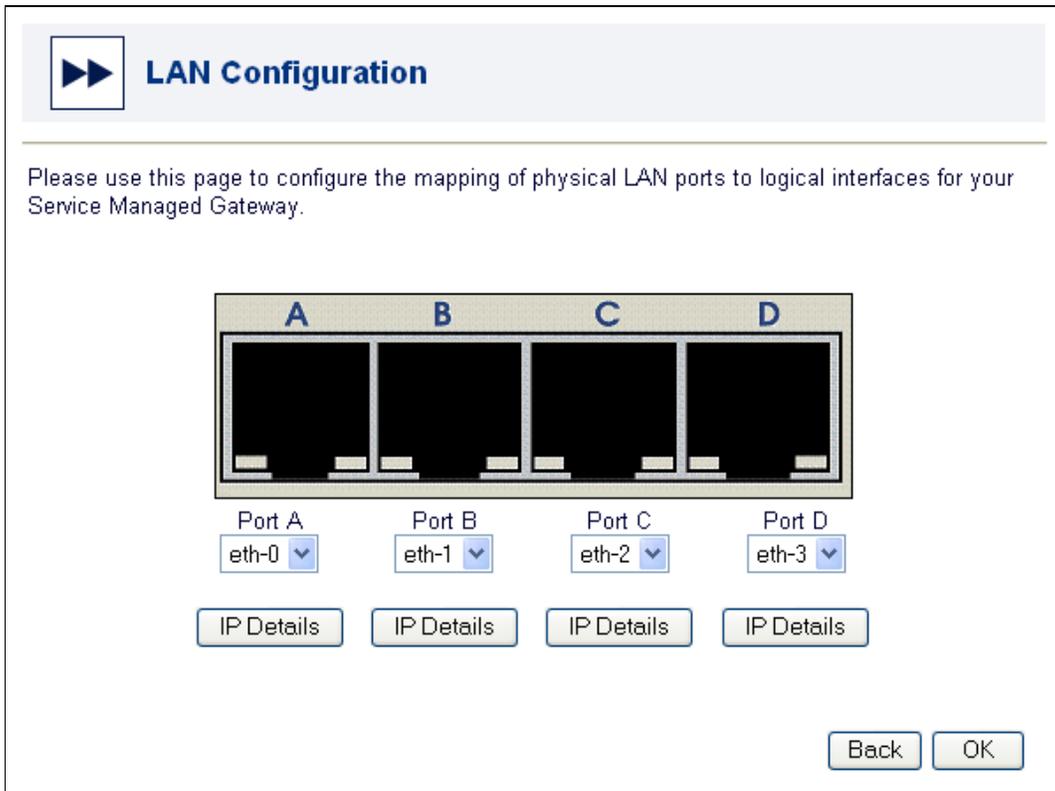
Figure 13: The LAN Configuration window

A dialog box appears.
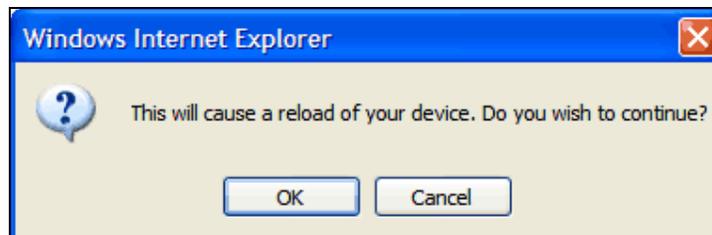
Figure 14: The dialog box that appears when you click OK in the LAN Configuration window

Click **OK** to update the configuration of your SMG. Click **Cancel** to return to the LAN Configuration window.

If you decide that you do not want to change your Ethernet configuration, click the **Back** button in the LAN Configuration window to return to the Fast.Start Welcome window.

4 Configuring firewall rules for each Ethernet interface

We recommend that you configure firewall rules for each Ethernet interface after you configure the Ethernet switch.

Use the Fast.Start Firewall Wizard to configure firewall rules. For more information, please read **Configuring a Firewall**.

5 Examples of LAN configurations using an Ethernet switch

5.1 A simple Ethernet configuration on an ADSL or T1/E1 SMG

Suppose that you must configure an Ethernet connection on an ADSL or T1/E1 GW4000 Series SMG, and you have a single LAN. You need to connect to the Internet and configure only one Ethernet interface.

Figure 15: The DSL/WAN port and the Ethernet ports on a GW4000 Series

When you assemble the SMG, you connect the black DSL/WAN cable to the DSL/WAN port. This is your Internet connection. You can connect the cream-colored Ethernet cable to any of the four Ethernet ports. Let's suppose that you put the Ethernet cable into Ethernet port A. Figure 16 shows these physical connections, which are the connections that we recommend for an ADSL or T1/E1 connection with one LAN.
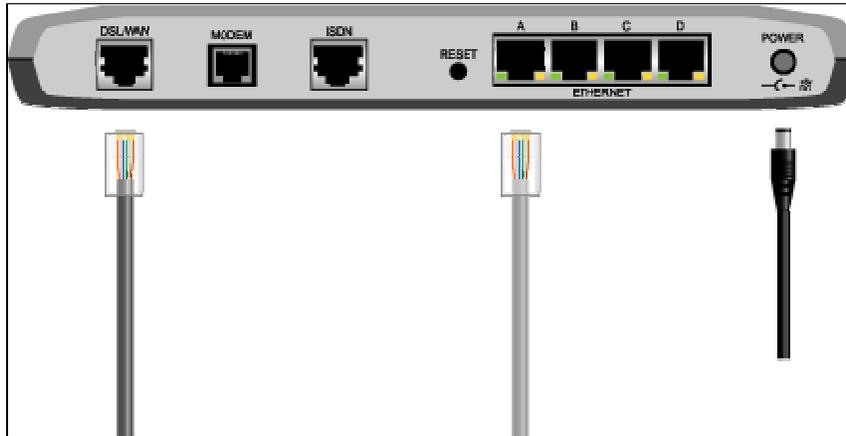

**Figure 16: An ADSL or T1/E1 GW4000 with an Internet connection
and one Ethernet connection**

The default settings for port A is Eth-0. When you have only one LAN, it is a good idea to assign the same Ethernet interface to all the Ethernet ports on the SMG. Figure 17 shows this configuration. This configuration means that you can connect your Ethernet cable to any port and your LAN connection will function.
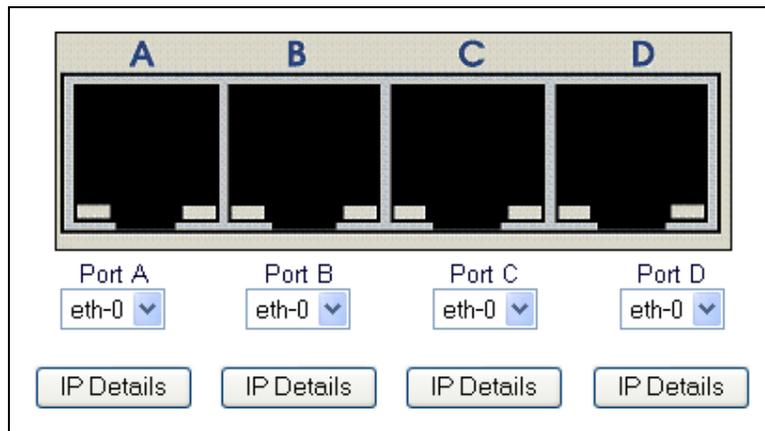

Figure 17: All the ports are configured as Eth-0

After you configure the Ethernet connections, you may need to configure IP details for the private Ethernet interface and Dynamic Host Configuration Protocol (DHCP). For more information, read section 2.5, **How to configure local address settings for an Ethernet interface**.

After you configure Ethernet connections, you may want to configure or modify your firewall rules. You can read about this in the guide **Configuring a Firewall**.

To configure the Ethernet connections for a GW5000 ADSL or T1/E1 SMG, follow the procedure that is explained in this section.

To read a step-by-step explanation of how to use the Ethernet switch, read section 3.0, How to use the multiple Ethernet switch to configure Ethernet interfaces.

5.2 A simple Ethernet configuration on an Ethernet SMG

Suppose that you must configure an Ethernet SMG for an office with a single LAN. One of the Ethernet ports must be configured as a WAN connection for the Internet. The other three ports can be configured as LANs.

When you assemble the SMG, you connect the cream-colored Ethernet cable to port A. You connect the black WAN cable to port D. Figure 18 shows these physical connections, which are the connections that we recommend for an Ethernet connection with one LAN.
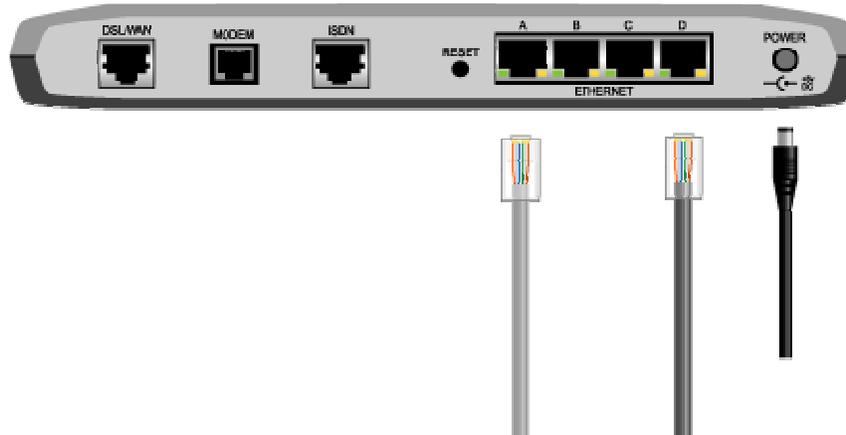
Figure 18: An Ethernet GW4000. The cable below port A is the Ethernet connection. The cable below port D is the WAN Internet connection.

The default setting for port A is Eth-0. When you have only one LAN, it is a good idea to configure the ports that you do not use with the same Ethernet interface that you use for your LAN. This means that you can connect the LAN cable to any of these ports and the LAN will function. So, in this example, you configure port B and C as Eth-0.

If the SMG was automatically Activated, Eth-1 was automatically configured as a WAN connection. You decided to configure port D as the Internet connection. So you configure port D as Eth-1. Figure 19 shows this configuration. We recommend that you configure your switch this way if you have only one LAN and you are using an Ethernet SMG.
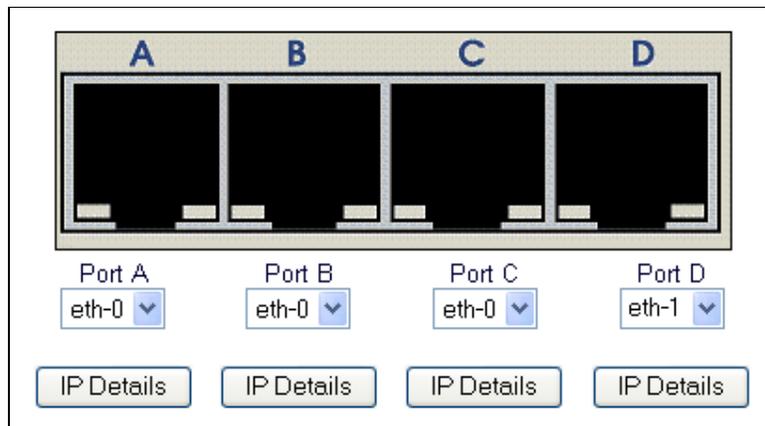
Figure 19: Ports A, B, and C are configured as Eth-0 for the LAN. Port D is configured as Eth-1 for the Internet WAN connection

After you configure the Ethernet connections, you may need to configure IP details for the private Ethernet interface and Dynamic Host Configuration Protocol (DHCP). For more information, read section 2.5, **How to configure local address settings for an Ethernet interface**.

After you assign Ethernet ports, you should configure your firewall using the Firewall Wizard. Please read the guide **Configuring a Firewall**.

To configure the Ethernet connections for a GW5000 Ethernet SMG, follow the procedure that is explained in this section.

To read a step-by-step explanation of how to use the Ethernet switch, read section 2.0, How to use the multiple Ethernet switch to configure Ethernet interfaces.

5.3 An example of a complex Ethernet configuration

Suppose that you must configure multiple Ethernet connections on an Ethernet SMG for a school. Your school maintains three LANs:

- a secure LAN for teachers and administrative staff, where they share resources, administrative materials, and student reports;
- a LAN for students that includes Internet filtering software and WAN firewall settings; and
- a LAN for the library that has WAN firewall settings because there are publicly accessible servers, such as a web server, on that LAN.

The multiple Ethernet switch enables you to connect these three LANs to the Internet through a single SMG. The switch ensures that:

- the teachers' LAN is secure,
- the students' LAN is safe from inappropriate material, and
- the entire school network is less open to outside attacks.

There is also an Internet connection that uses one of the Ethernet ports.

You decide that

- the teachers' LAN is on Eth-0,
- the Internet WAN connection is on Eth-1,
- the library LAN is on Eth-2, and
- the students' LAN is on Eth-3.

When you assemble the SMG, you connect cream-colored Ethernet cables to ports A, C, and D. You connect a black WAN cable to port B. Figure 20 shows this physical configuration. We recommend these connections when you have three LANs connecting to an Ethernet SMG.
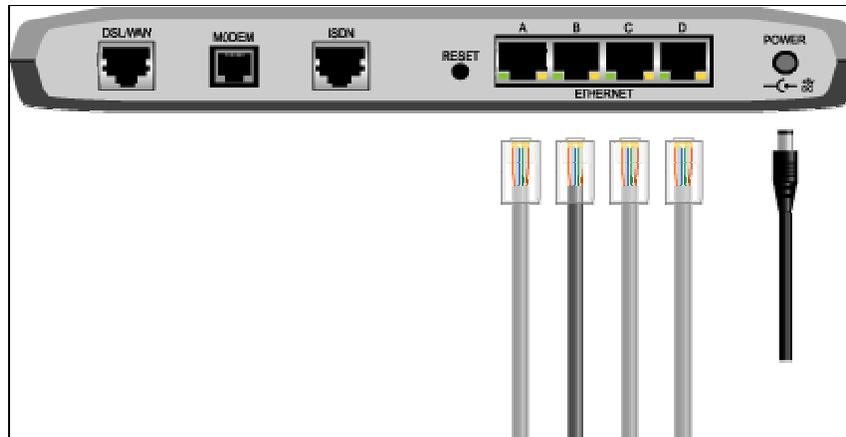
**Figure 20: An Ethernet GW4000. Ports A, C, and D are LAN connections.
Port B is the WAN connection for the Internet**

After the SMG is activated, you must configure interfaces on all the ports. You use the Ethernet switch in the SMG web to configure the interfaces on the ports.

The default settings are the same as what you need for your network configuration, so you do not need to change the settings in the Ethernet switch.
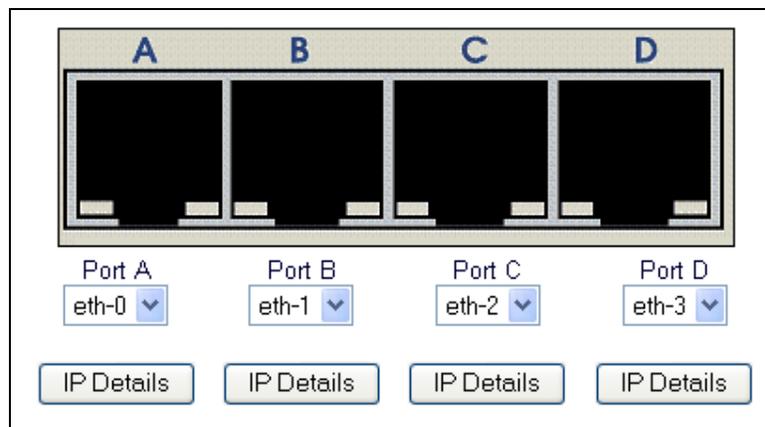

Figure 21: Port 1 is assigned to the teachers' LAN; Port 2 is assigned to the Internet; Port 3 is assigned to the LAN that has publicly accessible servers; and Port 4 is assigned to the students' LAN

In this example, you must also assign IP addresses to the different Ethernet interfaces.

You click **IP Details** under Port 1 to assign an IP address to the teachers' LAN. Suppose that the address is **10.1.1.141**. You type this into the **IP address** field of the Eth-0 LAN Configuration window. The information for the subnet mask and DHCP addressing is correct, so you click **OK** and return to the LAN Configuration window.

Figure 22: Assigning an IP address to the teachers' LAN

Eth-1 is your Internet connection. If your SMG was automatically activated, the correct IP address was assigned to Eth-1 and you do not need to specify IP details in the Eth-1 LAN Configuration window.

There are public servers on Eth-2, so you want to apply WAN firewall rules to this connection. Your service provider gives you an IP address for this connection. You click **IP Details** under port C. Then you type the IP address that your service provider gives you into the **IP address** field of the Eth-2 LAN Configuration window. You do not need to change anything else, so you click **OK** and return to the LAN Configuration window.

The students' LAN is on Eth-3. You click **IP Details** under Port 4 to assign an IP address to the students' LAN. Suppose that the address is **10.1.1.0**. You type this into the **IP address** field of the Eth-3 LAN Configuration window. The information for the subnet mask and DHCP addressing is correct, so you click **OK** and return to the LAN Configuration window.

Next you click **OK** to save your new Ethernet configuration. The SMG reloads and then closes the web. We recommend that you reopen the SMG web and use the Fast.Start Firewall Wizard to assign firewall rules. Please read the guide '**Configuring a Firewall**'.

To configure the Ethernet connections for a GW5000 Ethernet SMG, follow the procedure that is explained in this section.

To read a step-by-step explanation of how to use the Ethernet switch, read section 3.0, How to use the multiple Ethernet switch to configure Ethernet interfaces.