Internet Security Router

User's Manual

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Table of Contents

List of Figures

List of Tables

1 Introduction

Congratulations on becoming the owner of the Internet Security Router. Your LAN (local area network) will now be able to access the Internet using your high-speed broadband connection such as those with ADSL or cable modem.

This User Manual will show you how to set up the Internet Security Router, and how to customize its configuration to get the most out of this product.

1.1 Features

- 10/100Base-T Ethernet router to provide Internet connectivity to all computers on your LAN
- Firewall, NAT (Network Address Translation), and IPSec VPN functions to provide secure Internet access for your LAN
- Automatic network address assignment through DHCP Server
- Services including IP route, DNS and DDNS configuration, RIP, and IP performance monitoring
- Configuration program accessible via a web browser, such as Microsoft Internet Explorer 5.5, Netscape 7.0.2 or later.

1.2 System Requirements

In order to use the Internet Security Router for Internet access, you must have the following:

- ADSL or cable modem and the corresponding service up and running, with at least one public Internet address assigned to your WAN
- One or more computers each containing an Ethernet 10Base-T/100Base-T network interface card (NIC)
- (Optional) An Ethernet hub/switch, if you are connecting the device to more than four computers on an Ethernet network.
- For system configuration using the supplied web-based program: a web browser such as Internet Explorer v5.5 or later.

1.3 Using this Document

1.3.1 Notational conventions

- Acronyms are defined the first time they appear in text and in the glossary (Appendix 16).
- For brevity, the Internet Security Router is sometimes referred to as "the router."
- The terms *LAN* and *network* are used interchangeably to refer to a group of Ethernet-connected computers at one site.

1.3.2 Typographical conventions

- *Italics* are used to identify terms that are defined in the glossary (Chapter 16).
- **Boldface** type text is used for items you select from menus and drop-down lists, and text strings you type when prompted by the program.

1.3.3 Special messages

This document uses the following icons to call your attention to specific instructions or explanations.

Note	*Provides clarification or non-essential information on the current topic.*
Definition	*Explains terms or acronyms that may be unfamiliar to many readers. These terms are also included in the Glossary.*
⚠ **WARNING**	*Provides messages of high importance, including messages relating to personal safety or system integrity.*

2 Getting to Know the Internet Security Router

2.1 Parts List

In addition to this document, your Internet Security Router should come with the following:

„ The Internet Security Router

„ Power adapter

„ Ethernet cable ("straight-through" type)

„ Optional console port cable (RJ-45)

2.2 Front Panel

The front panel contains LED indicators that show the status of the unit.

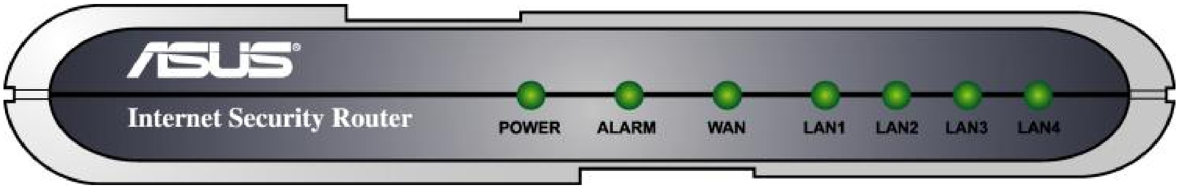


Figure 2.1. Front Panel LEDs

Table 2.1. Front Panel Label and LEDs

Label	Color	Function
POWER	green	On: Unit is powered on Off: Unit is powered off
ALARM	green	(For factory testing only)
WAN	green	On: WAN link established and active Flashing: Data is transmitted via WAN connection Off: No WAN link
LAN1 – LAN4	green	On: LAN link is established Flashing: Data is transmitted via LAN connection Off: No LAN link

2.3 Rear Panel

The rear panel contains the ports for the unit's data and power connections.

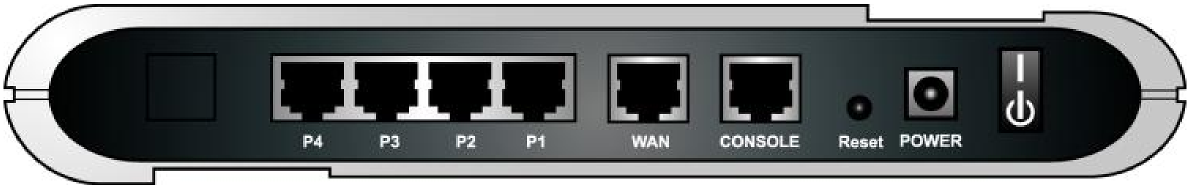


Figure 2.2. Rear Panel Connections

Table 2.2. Rear Panel Labels and LEDs

Label	Function
⏻	Switches the unit on and off
POWER	Connects to the supplied power adapter
Reset	Resets the device
CONSOLE	RJ-45 serial port for console management
WAN	Connects to your WAN device, such as ADSL or cable modem.
P1 – P4	Connects the device to your PC's Ethernet port, or to the uplink port on your LAN's hub/switch, using the cable provided

2.4 Major Features

2.4.1 Firewall Features

The Firewall as implemented in the Internet Security Router provides the following features to protect your network from being attacked and to prevent your network from being used as the springboard for attacks.

- Address Sharing and Management
- Packet Filtering
- Stateful Packet Inspection
- Defense against Denial of Service Attacks
- Application Content Filtering
- Log and Alert
- Remote Access
- Keyword based URL Filtering

2.4.1.1 Address Sharing and Management

The Internet Security Router Firewall provides NAT to share a single high-speed Internet connection and to save the cost of multiple connections required for the hosts on the LAN segments connected to the Internet Security Router. This feature conceals network address and prevents them from becoming public. It maps unregistered IP addresses of hosts connected to the LAN with valid ones for Internet access. The Internet Security Router Firewall also provides reverse NAT capability, which enables SOHO users to host various services such as e-mail servers, web servers, etc. The NAT rules drive the translation mechanism at the NAT router. The following types of NAT are supported by the Internet Security Router.

- Static NAT – Maps an internal host address to a globally valid Internet address (one-to-one). All packets are directly translated with the information contained in the map.
- Dynamic NAT – Maps an internal host address dynamically to a globally valid Internet address (m-to-n). The map usually contains a pool of internal IP addresses (m) and a pool of globally valid Internet IP addresses (n) with m usually greater than n. Each internal IP address is mapped to one external IP address on a first come first serve basis.
- NAPT (Network Address and Port Translation) – Also called IP Masquerading. Maps many internal hosts to only one globally valid Internet address. The map usually contains a pool of network ports to be used for translation. Every packet is translated with the globally valid Internet address; the port number is translated with a free pool from the pool of network ports.

- Reverse Static – This is inbound mapping that maps a globally valid Internet address to an internal host address. All packets coming to that external address are relayed to the internal address. This is useful when hosting services in an internal machine.
- Reverse NAPT – Also called inbound mapping, port mapping, and virtual server. Any packet coming to the router can be relayed to the internal host based on the protocol, port number or IP Address specified in the rule. This is useful when multiple services are hosted on different internal machines.

Note

For a complete listing of all NAT ALGs supported, refer to Appendix A "ALG Configuration" on.

2.4.1.1 ACL (Access Control List)

ACL rule is one of the basic building blocks for network security. Firewall monitors each individual packet, decodes the header information of inbound and outbound traffic and then either blocks the packet from passing or allows it to pass based on the contents of the source address, destination address, source port, destination port, protocol and other criterion, e.g. application filter, time ranges, defined in the ACL rules.

ACL is a very appropriate measure for providing isolation of one subnet from another. It can be used as the first line of defense in the network to block inbound packets of specific types from ever reaching the protected network.

The Internet Security Router Firewall's ACL methodology supports:

- Filtering based on destination and source IP address, port number and protocol
- Use of the wild card for composing filter rules
- Filter Rule priorities
- Time based filters
- Application specific filters
- User group based filters for remote access

2.4.1.2 Stateful Packet Inspection

The Internet Security Router Firewall uses "stateful packet inspection" that extracts state-related information required for the security decision from the packet and maintains this information for evaluating subsequent connection attempts. It has awareness of application and creates dynamic sessions that allow dynamic connections so that no ports need to be opened other than the required ones. This provides a solution which is highly secure and that offers scalability and extensibility.

2.4.1.3 Defense against DoS Attacks

The Internet Security Router Firewall has an Attack Defense Engine that protects internal networks from known types of Internet attacks. It provides automatic protection from Denial of Service (DoS) attacks such as SYN flooding, IP smurfing, LAND, Ping of Death and all re-assembly attacks. It can drop ICMP redirects and IP loose/strict source routing packets. For example, the Internet Security Router Firewall provides protection from "WinNuke", a widely used program to remotely crash unprotected Windows systems in the Internet. The Internet Security Router Firewall also provides protection from a variety of common Internet attacks such as IP Spoofing, Ping of Death, Land Attack, Reassembly and SYN flooding.

The type of attack protections provided by the Internet Security Router are listed in Table 2.3.

Table 2.3. DoS Attacks

Type of Attack	Name of Attacks
Re-assembly attacks	Bonk, Boink, Teardrop (New Tear), Overdrop, Opentear, Syndrop, Jolt
ICMP Attacks	Ping of Death, Smurf, Twinge
Flooders	ICMP Flooder, UDP Flooder, SYN

	Flooder
Port Scans	TCP XMAS Scan, TCP Null Scan TCP SYN Scan, TCP Stealth Scan
TCP Attacks	TCP sequence number prediction, TCP out-of sequence attacks
Protection with PF Rules	Echo-Chargen, Ascend Kill
Miscellaneous Attacks	IP Spoofing, LAND, Targa, Tentacle MIME Flood, Winnuke, FTP Bounce, IP unaligned time stamp attack

2.4.1.4 Application Command Filtering

The Internet Security Router Firewall allows network administrators to block, monitor, and report on network users access to non-business and objectionable content. This high-performance content access control results in increased productivity, lower bandwidth usage and reduced legal liability.

The Internet Security Router Firewall has the ability to handle active content filtering on certain application protocols such as HTTP, FTP, SMTP and RPC.

- HTTP – You can define HTTP extension based filtering schemes for blocking
  - ActiveX
  - Java Archive
  - Java Applets
  - Microsoft Archives
  - URLs based on file extensions.
- FTP – allows you to define and enforce the file transfer policy for the site or group of users
- SMTP – allows you to filter operations such as VRFY, EXPN, etc. which reveal excess information about the recipient.
- RPC – allows you to filter programs based on the assigned RPC program numbers.

2.4.1.5 Application Level Gateway (ALG)

Applications such as FTP, games etc., open connections dynamically based on the respective application parameter. To go through the firewall on the Internet Security Router, packets pertaining to an application, require a corresponding *allow* rule. In the absence of such rules, the packets will be dropped by the Internet Security Router Firewall. As it is not feasible to create policies for numerous applications dynamically (at the same time without compromising security), intelligence in the form of Application Level Gateways (ALG), is built to parse packets for applications and open dynamic associations. The Internet Security Router Firewall provides a number of ALGs for popular applications such as FTP, H.323, RTSP, Microsoft Games, SIP, etc.

2.4.1.6 URL Filtering

A set of keywords that should not appear in the URL (Uniform Resource Locator, e.g. www.yahoo.com) can be defined. Any URL containing one or more of these keywords will be blocked. This is a policy independent feature i.e. it cannot be associated to ACL rules. This feature can be independently enabled or disabled, but works only if firewall is enabled.

2.4.1.7 Log and Alerts

Events in the network, that could be attempts to affect its security, are recorded in the Internet Security Router System log file. Event details are recorded in WELF (WebTrends Enhanced Log Format) format so that statistical tools can be used to generate custom reports. The Internet Security Router Firewall can also forward Syslog information to a Syslog server on a private network.

The Internet Security Router Firewall supports:

- Alerts sent to the administrator via e-mail.
- Maintains at a minimum, log details such as, time of packet arrival, description of action taken by Firewall and reason for action.
- Supports the UNIX Syslog format.
- Sends log report e-mails as scheduled by the network administrator or by default when the log file is full.
- All the messages are sent in the WELF format.
- ICMP logging to show code and type.

2.4.1.8 Remote Access

The Internet Security Router Firewall allows the network administrator to segregate the user community into Access Policies per group. A user can log in using the login page (Refer to "User Login Process" on page 67). After a user is authenticated successfully, the Internet Security Router Firewall dynamically activates the user-group's set of access policies.

These policies will subsequently be enforced until the user logs out of the session or until inactivity timeout period has lapsed.

2.4.2 VPN

The introduction of broadband Internet access at an affordable price has attracted a large number of users to use the Internet for business. Large-scale use of a very open public network such as, the Internet comes with a lot of advantages and associated risks. These risks include the lack of confidentiality of data being sent and the authenticity of the identities of the parties involved in the exchange of data. The VPN supported in the Internet Security Router is intended to resolve these issues at an affordable price.

The VPN supported by the Internet Security Router is IPSec compliant. Packets sent via VPN are encrypted to maintain privacy. The encrypted packets are then tunneled through a public network. As a result, tunnel participants enjoy the same security features and facilities that are available only to members of private networks at a reduced cost.

The following table lists the VPN features supported by the Internet Security Router:

Table 2.4. VPN Features of the Internet Security Router

Features	
Transport Mode for Client-Client Connectivity	
Tunnel Mode for Network-Network Connectivity	
IP Fragmentation and Reassembly	
IPSec	**Support**
Hardware Encryption Algorithm	DES, 3DES
Hardware Authentication Algorithm	MD5, SHA-1
Transforms	ESP, AH
Key Management	IKE (Pre-shared key), Manual
Mode configuration for IKE	Main Mode, Aggressive Mode, Quick Mode

- Site-to-Site VPN connection – Site-to-Site VPN connection is an alternative WAN infrastructure that is used to connect branch offices, home offices, or business partners' sites to all or portions of a company's network.

- Remote Access VPN – Corporations use VPN to establish secure, end-to-end private network connections over a public networking infrastructure. VPN have become the logical solution for remote access connectivity. Deploying a remote access VPN enables corporations to reduce communications expenses by leveraging the local dial-up infrastructure of Internet Service Providers. At the same time, VPNs allow mobile workers, telecommuters and day extenders to take advantage of broadband connectivity.

3 Quick Start Guide

This Quick Start Guide provides basic instructions for connecting the Internet Security Router to a computer or a LAN and to the Internet.

- Part 1 provides instructions to set up the hardware.
- Part 2 describes how to configure Internet properties on your computer(s).
- Part 3 shows you how to configure basic settings on the Internet Security Router to get your LAN connected to the Internet.

After setting up and configuring the device, you can follow the instructions on page 20 to verify that it is working properly.

This Quick Start Guide assumes that you have already established ADSL or cable modem service with your Internet service provider (ISP). These instructions provide a basic configuration that should be compatible with your home or small office network setup. Refer to the subsequent chapters for additional configuration instructions.

3.1 Part 1 — Connecting the Hardware

In Part 1, you connect the device to an ADSL or a cable modem (which in turn is connected to a phone jack or a cable outlet), the power outlet, and your computer or network.

WARNING

Before you begin, turn the power off for all devices. *These include your computer(s), your LAN hub/switch (if applicable), and the Internet Security Router.*

Figure 3.1 illustrates the hardware connections. Please follow the steps that follow for specific instructions.

3.1.1 Step 1. Connect an ADSL or a cable modem.

For the Internet Security Router: Connect one end of the Ethernet cable to the port labeled WAN on the rear panel of the device. Connect the other end to the Ethernet port on the ADSL or cable modem.

3.1.2 Step 2. Connect computers or a LAN.

If your LAN has no more than 4 computers, you can use an Ethernet cable to connect computers directly to the built-in switch on the device. Note that you should attach one end of the Ethernet cable to any of the port labeled LAN1 – LAN4 on the rear panel of the device and connect the other end to the Ethernet port of a computer.

If your LAN has more than 4 computers, you can attach one end of an Ethernet cable to a hub or a switch (probably an uplink port; please refer to the hub or switch documentations for instructions) and the other to the Ethernet switch port (labeled LAN1 – LAN4) on the Internet Security Router.

Note that either the crossover or straight-through Ethernet cable can be used to connect the built-in switch and computers, hubs or switches as the built-in switch is smart enough to make connections with either type of cables.

3.1.3 Step 3. Attach the power adapter.

Connect the AC power adapter to the POWER connector on the back of the device and plug in the adapter to a wall outlet or a power strip.

3.1.4 Step 4. Turn on the Internet Security Router, the ADSL or cable modem and power up your computers.

Press the Power switch on the rear panel of the Internet Security Router to the ON position. Turn on your ADSL or cable modem. Turn on and boot up your computer(s) and any LAN devices such as hubs or switches.

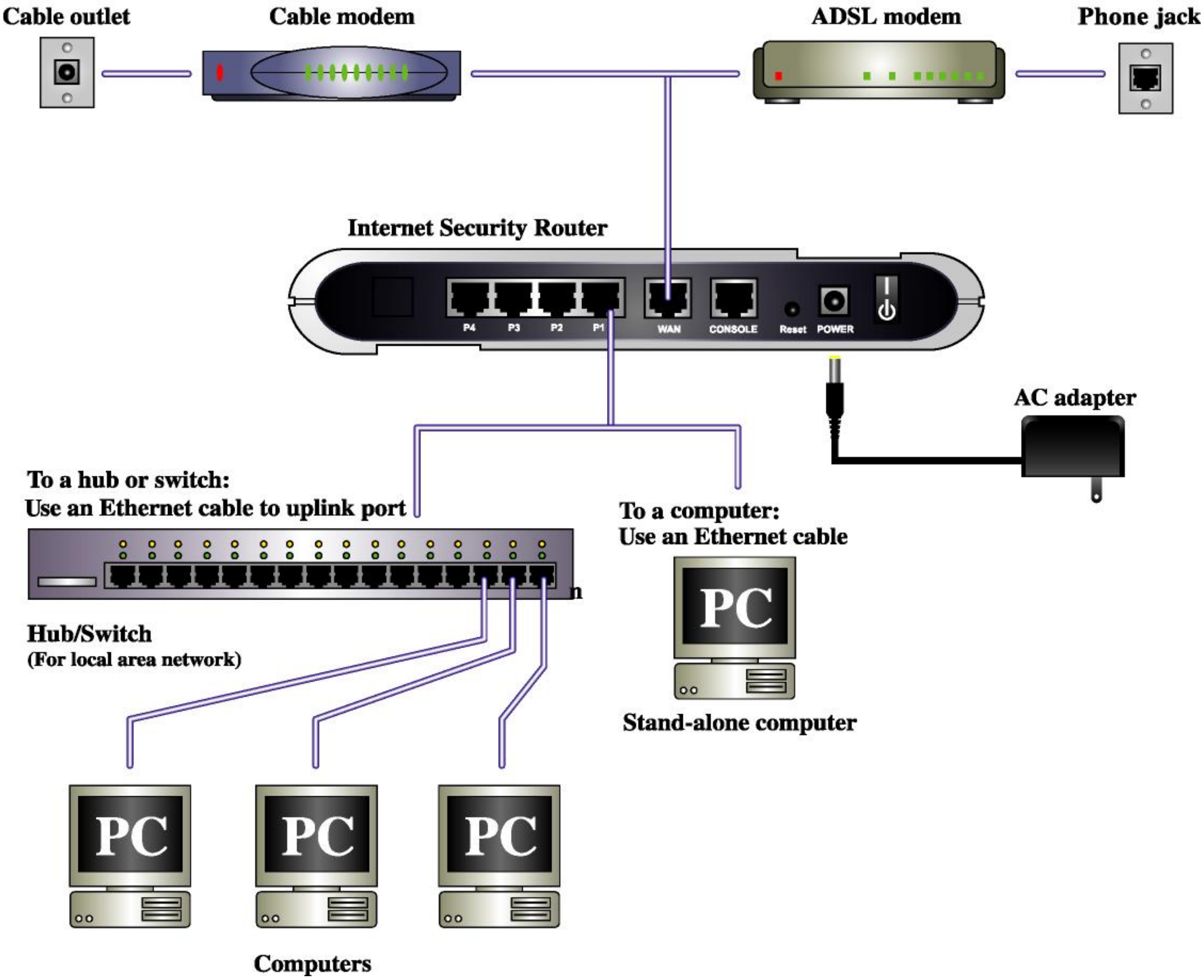


Figure 3.1. Overview of Hardware Connections

You should verify that the LEDs are illuminated as indicated in Table 3.1.

Table 3.1. LED Indicators

This LED:	...should be:
POWER	Solid green to indicate that the device is turned on. If this light is not on, check if the power adapter is attached to the Internet Security Router and if it is plugged into a power source.
LAN1 – LAN4	Solid green to indicate that the device can communicate with your LAN or flashing when the device is sending or receiving data from your LAN computer.
WAN	Solid green to indicate that the device has successfully established a connection with your ISP or flashing when the device is sending or receiving data from the Internet.

If the LEDs illuminate as expected, the Internet Security Router hardware is working properly.

3.2 Part 2 — Configuring Your Computers

Part 2 of the Quick Start Guide provides instructions for configuring the Internet settings on your computers to work with the Internet Security Router.

3.2.1 Before you begin

By default, the Internet Security Router automatically assigns all required Internet settings to your PCs. You need only to configure the PCs to accept the information when it is assigned.

Note

In some cases, you may want to configure network settings manually to some or all of your computers rather than allow the Internet Security Router to do so. See "Assigning static IP addresses to your PCs" in page 13 for instructions.

„ If you have connected your PC via Ethernet to the Internet Security Router, follow the instructions that correspond to the operating system installed on your PC.

3.2.2 Windows[CT6]® XP PCs:

1. In the Windows task bar, click the **<Start>** button, and then click **Control Panel**.
2. Double-click the Network Connections icon.
3. In the LAN or High-Speed Internet window, right-click on icon corresponding to your network interface card (NIC) and select **Properties**. (Often this icon is labeled *Local Area Connection*).

   The Local Area Connection dialog box displays with a list of currently installed network items.
4. Ensure that the check box to the left of the item labeled Internet Protocol TCP/IP is checked, and click **<Properties>** button.
5. In the Internet Protocol (TCP/IP) Properties dialog box, click the radio button labeled **Obtain an IP address automatically**. Also click the radio button labeled **Obtain DNS server address automatically**.
6. Click **<OK>** button twice to confirm your changes, and close the Control Panel.

3.2.3 Windows® 2000 PCs:

First, check for the IP protocol and, if necessary, install it:

1. In the Windows task bar, click the **<Start>** button, point to **Settings**, and then click **Control Panel**.
2. Double-click the **Network and Dial-up Connections** icon.
3. In the Network and Dial-up Connections window, right-click the **Local Area Connection** icon, and then select **Properties**.

   The Local Area Connection Properties dialog box displays a list of currently installed network components. If the list includes Internet Protocol (TCP/IP), then the protocol has already been enabled. Skip to step 10.
4. If Internet Protocol (TCP/IP) does not display as an installed component, click **<Install>** button.
5. In the Select Network Component Type dialog box, select **Protocol**, and then click **<Add>** button.
6. Select **Internet Protocol (TCP/IP)** in the Network Protocols list, and then click **<OK>** button.

You may be prompted to install files from your Windows 2000 installation CD or other media. Follow the instructions to install the files.

7. If prompted, click **<OK>** button to restart your computer with the new settings.

   Next, configure the PCs to accept IP addresses assigned by the Internet Security Router:

8. In the Control Panel, double-click the **Network and Dial-up Connections** icon.
9. In Network and Dial-up Connections window, right-click the **Local Area Connection** icon, and then select **Properties**.
10. In the Local Area Connection Properties dialog box, select **Internet Protocol (TCP/IP)**, and then click **<Properties>** button.
11. In the Internet Protocol (TCP/IP) Properties dialog box, click the radio button labeled **Obtain an IP address automatically**. Also click the radio button labeled **Obtain DNS server address automatically**.
12. Click **<OK>** button twice to confirm and save your changes, and then close the Control Panel.

3.2.4 Windows® 95, 98, and Me PCs

1. In the Windows task bar, click the **<Start>** button, point to **Settings**, and then click **Control Panel**.
2. Double-click the **Network** icon.

   In the Network dialog box, look for an entry started w/ "**TCP/IP ->**" and the name of your network adapter, and then click **<Properties>** button. You may have to scroll down the list to find this entry. If the list includes such an entry, then the TCP/IP protocol has already been enabled. Skip to step 8.

3. If Internet Protocol (TCP/IP) does not display as an installed component, click **<Add>** button.
4. In the Select Network Component Type dialog box, select **Protocol**, and then click **<Add>** button.
5. Select **Microsoft** in the Manufacturers list box, and then click **TCP/IP** in the Network Protocols list, box and then click **<OK>** button.

   You may be prompted to install files from your Windows 95, 98 or Me installation CD or other media. Follow the instructions to install the files.

6. If prompted, click **<OK>** button to restart your computer with the new settings.

   Next, configure the PCs to accept IP information assigned by the Internet Security Router:

7. In the Control Panel, double-click the Network icon.
8. In the Network dialog box, select an entry started with "**TCP/IP ->"** and the name of your network adapter, and then click **<Properties>** button.
9. In the TCP/IP Properties dialog box, click the radio button labeled **Obtain an IP address automatically**.
10. In the TCP/IP Properties dialog box, click the "**Default Gateway**" tab. Enter 192.168.1.1 (the default LAN port IP address of the Internet Security Router) in the "**New gateway**" address field and click **<Add>** button to add the default gateway entry.
11. Click **<OK>** button twice to confirm and save your changes, and then close the Control Panel.
12. If prompted to restart your computer, click **<OK>** button to do so with the new settings.

3.2.5 Windows® NT 4.0 workstations:

First, check for the IP protocol and, if necessary, install it:

1. In the Windows NT task bar, click the **<Start>** button, point to **Settings**, and then click **Control Panel**.
2. In the Control Panel window, double click the **Network** icon.
3. In the Network dialog box, click the **Protocols** tab.

   The Protocols tab displays a list of currently installed network protocols. If the list includes TCP/IP Protocol, then the protocol has already been enabled. Skip to step 9.
4. If TCP/IP does not display as an installed component, click **<Add>** button.
5. In the Select Network Protocol dialog box, select **TCP/IP**, and then click **<OK>** button.

   You may be prompted to install files from your Windows NT installation CD or other media. Follow the instructions to install the files.

   After all files are installed, a window displays to inform you that a TCP/IP service called DHCP can be set up to dynamically assign IP information.
6. Click **<Yes>** button to continue, and then click **<OK>** button if prompted to restart your computer.

   Next, configure the PCs to accept IP addresses assigned by the Internet Security Router:
7. Open the Control Panel window, and then double-click the **Network** icon.
8. In the Network dialog box, click the **Protocols** tab.
9. In the Protocols tab, select **TCP/IP**, and then click **<Properties>** button.
10. In the Microsoft TCP/IP Properties dialog box, click the radio button labeled **Obtain an IP address from a DHCP server**.
11. Click **<OK>** button twice to confirm and save your changes, and then close the Control Panel.

3.2.6 Assigning static IP addresses to your PCs

In some cases, you may want to assign IP addresses to some or all of your PCs directly (often called "statically"), rather than allowing the Internet Security Router to assign them. This option may be desirable (but not required) if:

- You have obtained one or more public IP addresses that you want to always associate with specific computers (for example, if you are using a computer as a public web server).
- You maintain different subnets on your LAN.

However, during the first time configuration of your Internet Security Router, you must assign an IP address in the 192.168.1.0 network for your PC, say 192.168.1.2, in order to establish connection between the Internet Security Router and your PC as the default LAN IP on Internet Security Router is pre-configured as 192.168.1.1. Enter 255.255.255.0 for the subnet mask and 192.168.1.1 for the default gateway. These settings may be changed later to reflect your true network environment.

On each PC to which you want to assign static information, follow the instructions on pages 11 through 13 relating only to checking for and/or installing the IP protocol. Once it is installed, continue to follow the instructions for displaying each of the Internet Protocol (TCP/IP) properties. Instead of enabling dynamic assignment of the IP addresses for the computer, DNS server, and default gateway, click the radio buttons that enable you to enter the information manually.

Note

Your PCs must have IP addresses that place them in the same subnet as the Internet Security Router's LAN port. If you manually assign IP information to all your LAN PCs, you can follow the instructions in Chapter 5 to change the LAN port IP address accordingly.

3.3 Part 3 — Quick Configuration of the Internet Security Router

In Part 3, you log into the Configuration Manager on the Internet Security Router and configure basic settings for your Internet connection. Your ISP should provide you with the necessary information to complete this step. Note the intent here is to quickly get the Internet Security Router up and running, instructions are concise. You may refer to corresponding chapters for more details.

3.3.1 Buttons Used in Setup Wizard

The Internet Security Router provides a preinstalled software program called Configuration Manager that enables you to configure the Internet Security Router via your Web browser. The settings that you are most likely to need to change before using the device are grouped onto sequence of Configuration pages guided by Setup Wizard. The following table shows the buttons that you'll encounter in Setup Wizard.

Button	***Function***
Next	Click this button to save the information and proceed to the next configuration page.
Back	Click this button to go back to the previous configuration page.

3.3.2 Setting Up the Internet Security Router

Follow these instructions to setup the Internet Security Router:

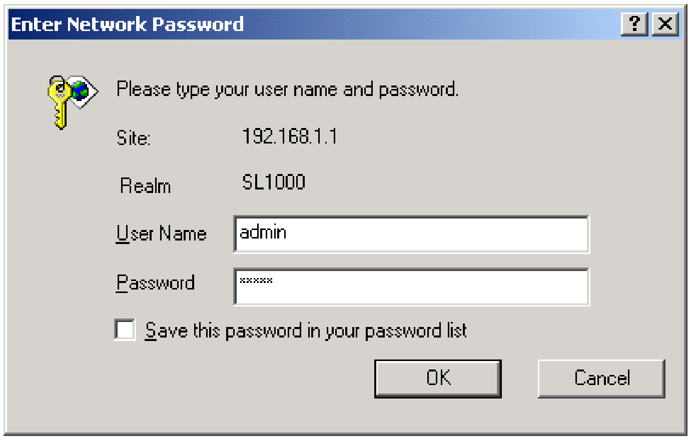
1. Before accessing the Configuration Manager in the Internet Security Router, make sure that the HTTP proxy setting is disabled in your browser. In IE, click "**Tools**" **è** "**Internet Options…**" **è** "**Connections**" tab **è** "**LAN settings…**" and then uncheck "**Use proxy server for your LAN …**"

2. On any PC connected to one of the four LAN ports on the Internet Security Router, open your Web browser, and type the following URL in the address/location box, and press **<Enter>**:

   http://192.168.1.1

   This is the predefined IP address for the LAN port on the Internet Security Router.

   A login screen displays, as shown in Figure 3.2.



Enter Network Password

Please type your user name and password.

Site: 192.168.1.1

Realm SL1000

User Name admin

Password *****

□ Save this password in your password list

Figure 3.2. Login Screen

If you have problem connecting to the Internet Security Router, you may want to check if your PC is configured to accept IP address assignment from the Internet Security Router. Another method is to set the IP address of your PC to any IP address in the 192.168.1.0 network, such as 192.168.1.2.

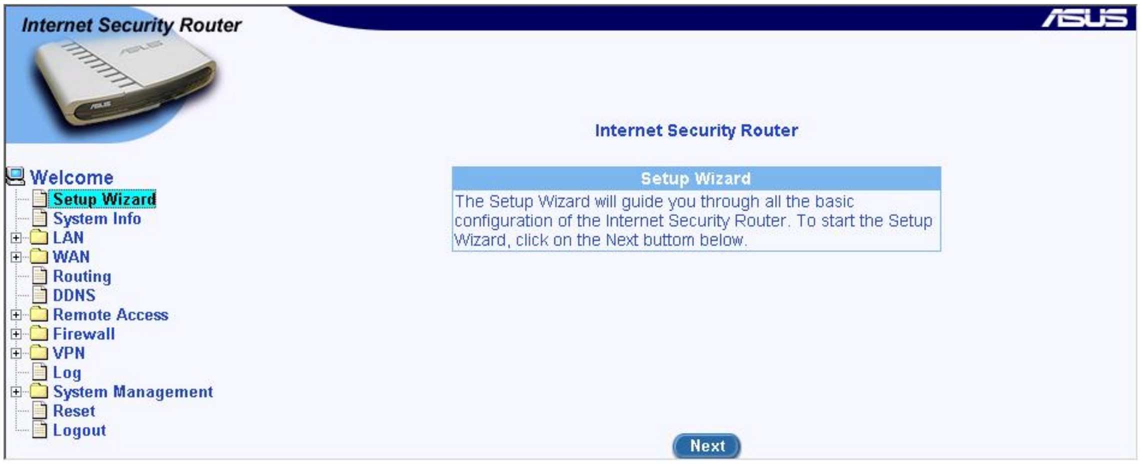
3. Enter your user name and password, and then click OK to enter the Configuration Manager. The first time you log into this program, use these defaults:

Default User Name:	admin
Default Password:	admin

Note

You can change the password at any time (see section 12.2 Change the Login Password on page 124).

The Setup Wizard home page displays each time you log into the Configuration Manager (shown in Figure 3.3 on page 15).

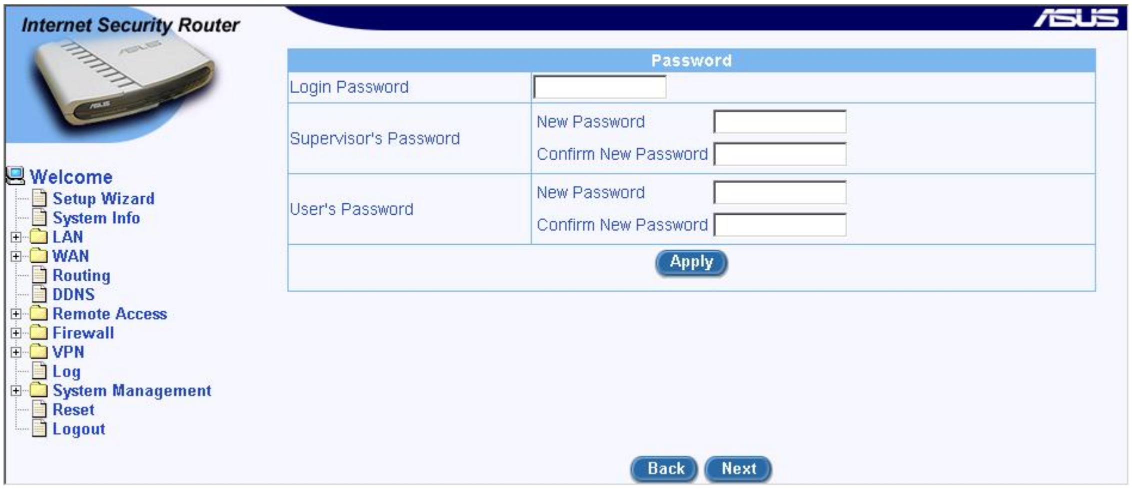


Internet Security Router

Setup Wizard

The Setup Wizard will guide you through all the basic configuration of the Internet Security Router. To start the Setup Wizard, click on the Next buttom below.

Figure 3.3. Setup Wizard Home Page



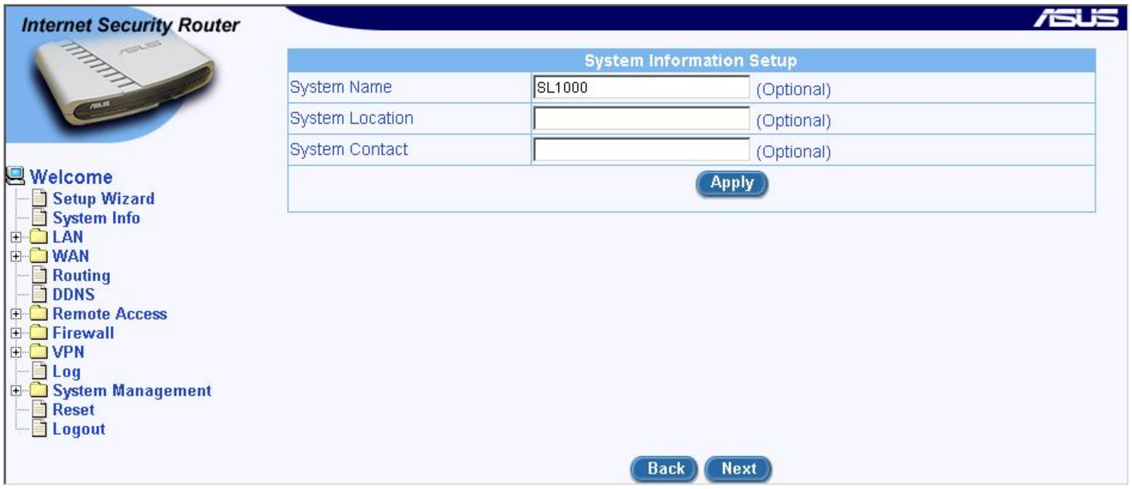
Password		
Login Password		
Supervisor's Password	New Password	
	Confirm New Password	
User's Password	New Password	
	Confirm New Password	

Figure 3.4. Setup Wizard – Password Configuration Page

4. Click on the Next button to enter the password configuration page as shown in Figure 3.4. Change the password in the spaces provided if desired. Otherwise, proceed to the next configuration page by clicking on the Next button.

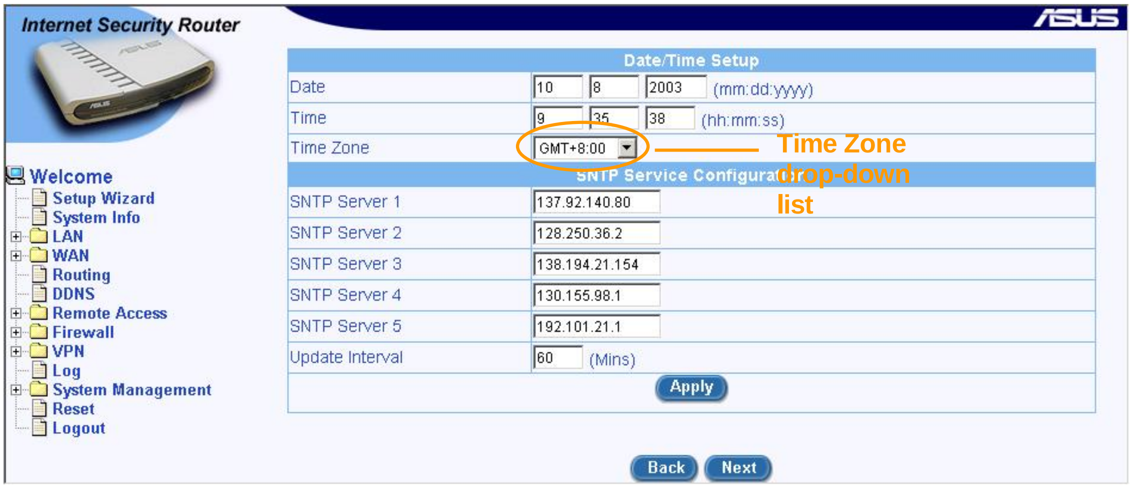
When changing passwords, make sure you enter the existing login password in the Login Password field, make any changes for the passwords and click the Apply button to save the changes.

5. Now we are at the System Information setup page; enter the requested information in the spaces provided and click the Apply button to save the changes. Otherwise, proceed to the next configuration page by clicking on the Next button.



System Information Setup		
System Name	SL1000	(Optional)
System Location		(Optional)
System Contact		(Optional)

Figure 3.5. Setup Wizard – System Identity Configuration Page



Date/Time Setup	
Date	10 8 2003 (mm:dd:yyyy)
Time	9 35 38 (hh:mm:ss)
Time Zone	GMT+8:00
SNTP Service Configuration	
SNTP Server 1	137.92.140.80
SNTP Server 2	128.250.36.2
SNTP Server 3	138.194.21.154
SNTP Server 4	130.155.98.1
SNTP Server 5	192.101.21.1
Update Interval	60 (Mins)

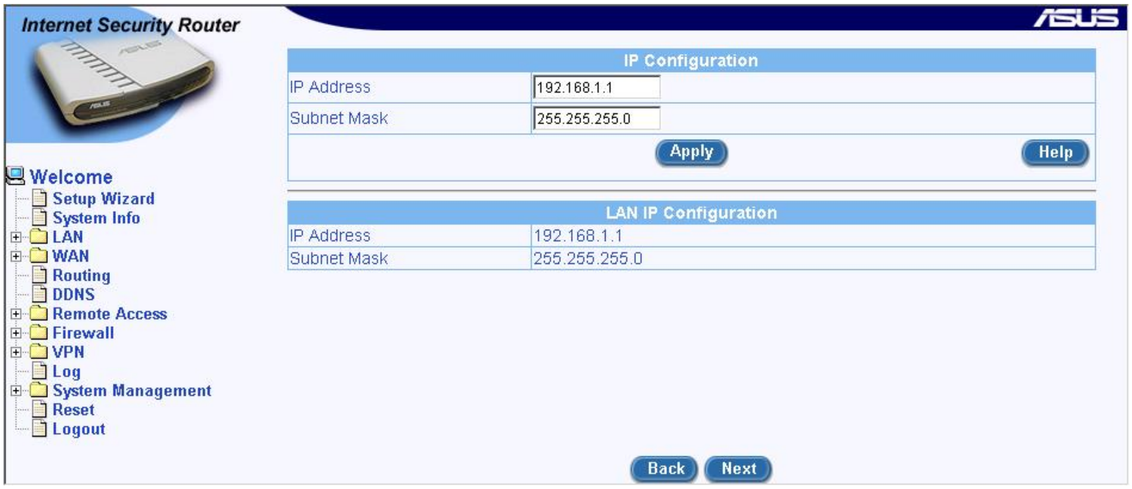
Time Zone drop-down list

Figure 3.6. Setup Wizard – Date/Time Configuration Page

6. Set the time zone for the Internet Security Router by selecting your time zone from the Time Zone drop-down list. Click Apply to save the settings and then click on the Next button to go to the next configuration page.

   There is no real time clock inside the Internet Security Router. The system date and time are maintained by the external network time server. There is no need to set the date and time here unless you don't have access to a time server and you want the Internet Security Router to maintain its own time.

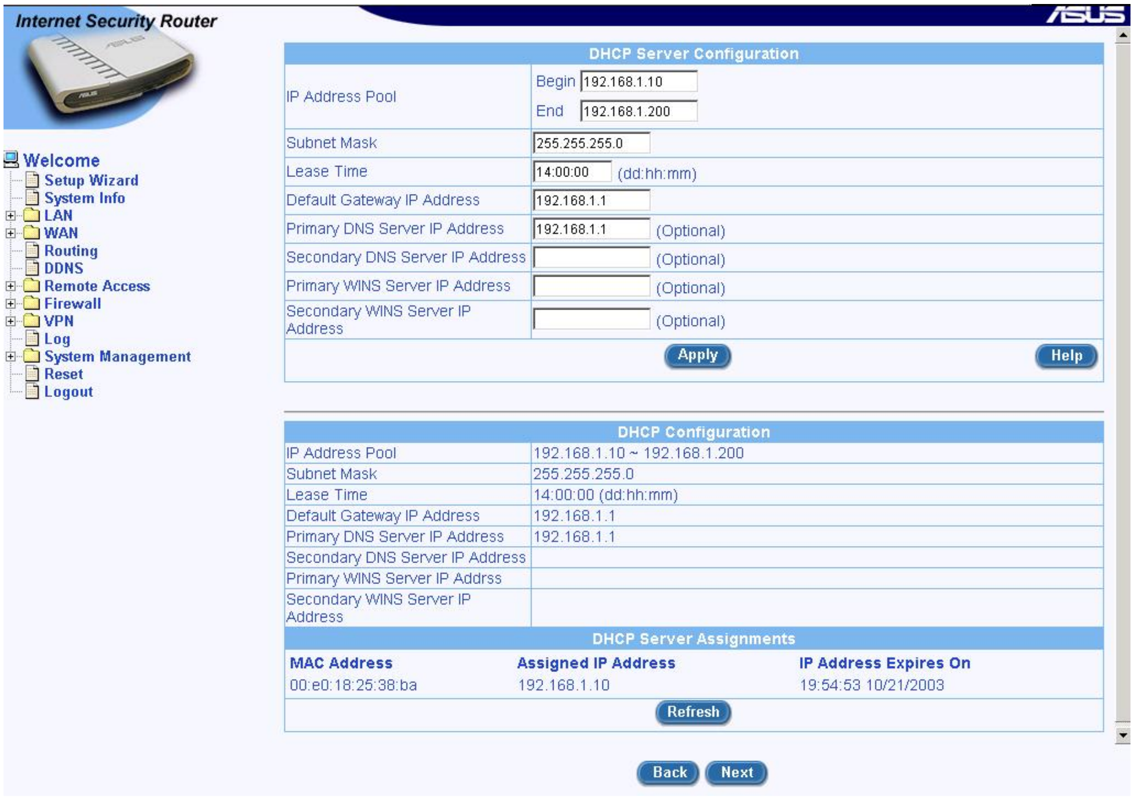
7. It is recommended that you keep the default LAN IP settings at this point until after you have completed the rest of the configurations and confirm that your Internet connection is working. Click on the Next button to proceed to the next configuration page.



IP Configuration	
IP Address	192.168.1.1
Subnet Mask	255.255.255.0

LAN IP Configuration	
IP Address	192.168.1.1
Subnet Mask	255.255.255.0

Figure 3.7. Setup Wizard – LAN IP Configuration Page



DHCP Server Configuration	
IP Address Pool	Begin 192.168.1.10 End 192.168.1.200
Subnet Mask	255.255.255.0
Lease Time	14:00:00 (dd:hh:mm)
Default Gateway IP Address	192.168.1.1
Primary DNS Server IP Address	192.168.1.1 (Optional)
Secondary DNS Server IP Address	(Optional)
Primary WINS Server IP Address	(Optional)
Secondary WINS Server IP Address	(Optional)

DHCP Configuration	
IP Address Pool	192.168.1.10 ~ 192.168.1.200
Subnet Mask	255.255.255.0
Lease Time	14:00:00 (dd:hh:mm)
Default Gateway IP Address	192.168.1.1
Primary DNS Server IP Address	192.168.1.1
Secondary DNS Server IP Address	
Primary WINS Server IP Addrss	
Secondary WINS Server IP Address	

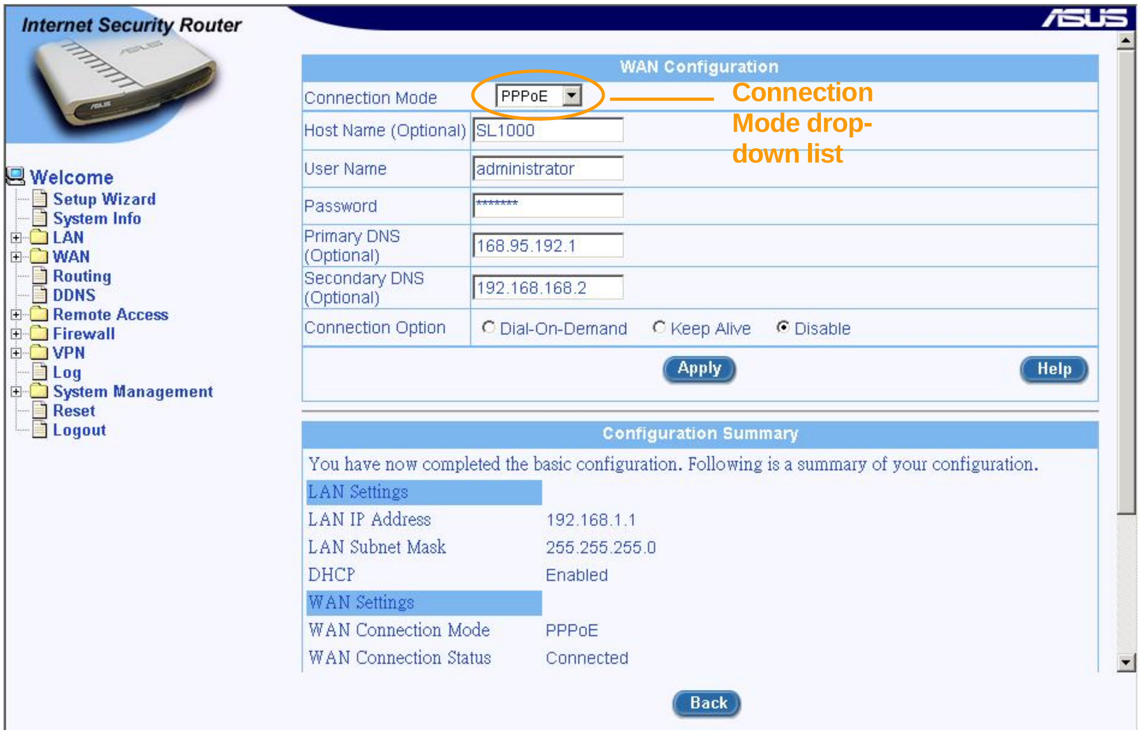
DHCP Server Assignments

MAC Address	Assigned IP Address	IP Address Expires On
00:e0:18:25:38:ba	192.168.1.10	19:54:53 10/21/2003

Figure 3.8. Setup Wizard – DHCP Server Configuration Page

8. It is recommended that you keep the default settings for DHCP server until after you have completed the rest of the configurations and confirm that your Internet connection is working. Click on the Next button to proceed to the next configuration page.

9. Now we are at the last page of the Setup Wizard, which is to configure the WAN settings for the Internet Security Router. Depending on the connection mode required for your ISP, you can select from the following three connection modes from the Connection Mode drop-down list (see Figure 3.9): PPPoE, Dynamic and Static.



WAN Configuration

Connection Mode	PPPoE
Host Name (Optional)	SL1000
User Name	administrator
Password	*******
Primary DNS (Optional)	168.95.192.1
Secondary DNS (Optional)	192.168.168.2
Connection Option	○ Dial-On-Demand ○ Keep Alive ● Disable

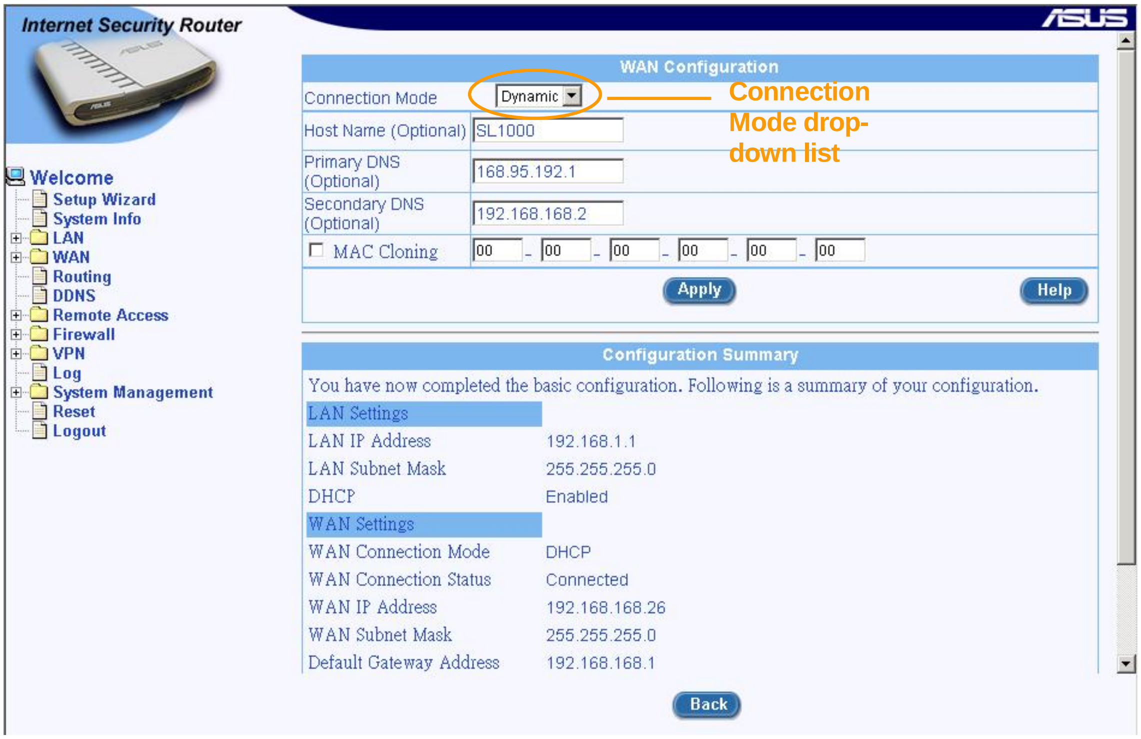
Connection Mode drop-down list

Configuration Summary

You have now completed the basic configuration. Following is a summary of your configuration.

LAN Settings	
LAN IP Address	192.168.1.1
LAN Subnet Mask	255.255.255.0
DHCP	Enabled
WAN Settings	
WAN Connection Mode	PPPoE
WAN Connection Status	Connected

Figure 3.9. Setup Wizard – WAN PPPoE Configuration Page



WAN Configuration

Connection Mode	Dynamic
Host Name (Optional)	SL1000
Primary DNS (Optional)	168.95.192.1
Secondary DNS (Optional)	192.168.168.2
☐ MAC Cloning	00 - 00 - 00 - 00 - 00 - 00

Connection Mode drop-down list

Configuration Summary

You have now completed the basic configuration. Following is a summary of your configuration.

LAN Settings	
LAN IP Address	192.168.1.1
LAN Subnet Mask	255.255.255.0
DHCP	Enabled
WAN Settings	
WAN Connection Mode	DHCP
WAN Connection Status	Connected
WAN IP Address	192.168.168.26
WAN Subnet Mask	255.255.255.0
Default Gateway Address	192.168.168.1

Figure 3.10. Setup Wizard – WAN Dynamic IP Configuration Page

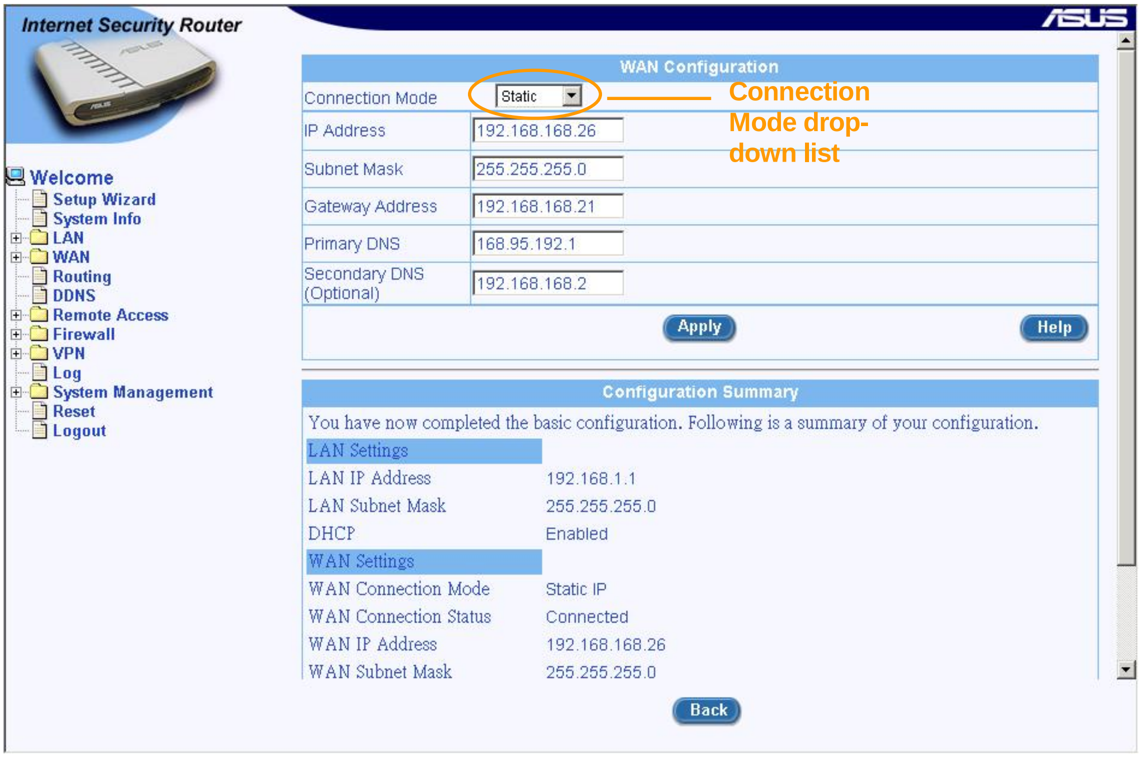
a) PPPoE Connection Mode (see Figure 3.9)

- You don't need to enter primary/secondary DNS IP addresses as PPPoE is able to automatically obtain this information for you from your ISP. However, if you prefer to use your favorite DNS servers, you may enter them in the space provided.

- Host name is optional. You may leave it empty if your ISP did not provide such information.
- Enter the user name and password provided by your ISP.
- Click on Apply button to save the PPPoE settings.

b) Dynamic IP Connection Mode (see Figure 3.10)

- You don't need to enter primary/secondary DNS IP addresses as DHCP client is able to automatically obtain this information for you from your ISP. However, if you prefer to use your favorite DNS servers, you may enter them in the space provided.
- Host name is optional. You may leave it empty if your ISP did not provide such information.
- If you had previously registered a specific MAC address with your ISP for Internet connections, enter the registered MAC address here and make sure you check the MAC cloning check box.
- Click on Apply button to save the dynamic IP settings.



WAN Configuration

Connection Mode	Static
IP Address	192.168.168.26
Subnet Mask	255.255.255.0
Gateway Address	192.168.168.21
Primary DNS	168.95.192.1
Secondary DNS (Optional)	192.168.168.2

Connection Mode drop-down list

Configuration Summary

You have now completed the basic configuration. Following is a summary of your configuration.

LAN Settings	
LAN IP Address	192.168.1.1
LAN Subnet Mask	255.255.255.0
DHCP	Enabled
WAN Settings	
WAN Connection Mode	Static IP
WAN Connection Status	Connected
WAN IP Address	192.168.168.26
WAN Subnet Mask	255.255.255.0

Figure 3.11. Setup Wizard – WAN Static IP Configuration Page

c) Static IP Connection Mode

- Enter WAN IP address in the IP Address field. This information should be provided by your ISP.
- Enter Subnet Mask for the WAN. This information should be provided by your ISP. Typically, it is 255.255.255.0.
- Enter gateway address provided by your ISP in the space provided.

- Enter at lease the primary DNS IP address provided by your ISP. Secondary DNS IP address is optional. Enter it in the space provided if you have such information from your ISP.
- Click Apply to save the static IP settings

You have now completed customizing basic configuration settings. Read the following section to determine if you have access to the Internet.

3.3.3 Testing Your Setup

At this point, the Internet Security Router should enable any computer on your LAN to use the Internet Security Router's ADSL or cable modem connection to access the Internet.

To test the Internet connection, open your web browser, and type the URL of any external website (such as http://www.asus.com). The LED labeled WAN should be blinking rapidly and may appear solid as the device connects to the site. You should also be able to browse the web site through your web browser.

If the LEDs do not illuminate as expected or the web page does not display, see Appendix 15 for troubleshooting suggestions.

3.3.4 Default Router Settings

In addition to handling the DSL connection to your ISP, the Internet Security Router can provide a variety of services to your network. The device is pre-configured with default settings for use with a typical home or small office network.

Table 3.2 lists some of the most important default settings; these and other features are described fully in the subsequent chapters. If you are familiar with network configuration settings, review the settings in Table 3.2 to verify that they meet the needs of your network. Follow the instructions to change them if necessary. If you are unfamiliar with these settings, try using the device without modification, or contact your ISP for assistance.

Before you modifying any settings, review Chapter 4 for general information about accessing and using the Configuration Manager program. We strongly recommend that you contact your ISP prior to changing the default configuration.

Table 3.2. Default Settings Summary

Option	Default Setting	Explanation/Instructions
DHCP (Dynamic Host Configuration Protocol)	DHCP server enabled with the following pool of addresses: 192.168.1.10 through 192.168.1.108	The Internet Security Router maintains a pool of private IP addresses for dynamic assignment to your LAN computers. To use this service, you must have set up your computers to accept IP information dynamically, as described in Part 2 of the Quick Start Guide. See section 5.2 for an explanation of the DHCP service.
LAN Port IP Address	Static IP address: 192.168.1.1 subnet mask: 255.255.255.0	This is the IP address of the LAN port on the Internet Security Router. The LAN port connects the device to your Ethernet network. Typically, you will not need to change this address. See section 5.1 LAN IP Address for instructions.

4 Getting Started with the Configuration Manager[CT9]

The Internet Security Router includes a preinstalled program called the *Configuration Manager*, which provides an interface to the software installed on the device. It enables you to configure the device settings to meet the needs of your network. You access it through your web browser from any PC connected to the Internet Security Router via the LAN or WAN ports.

This chapter describes the general guides for using the Configuration Manager.

4.1 Log into Configuration Manager

The Configuration Manager program is preinstalled on the Internet Security Router. To access the program, you need the following:

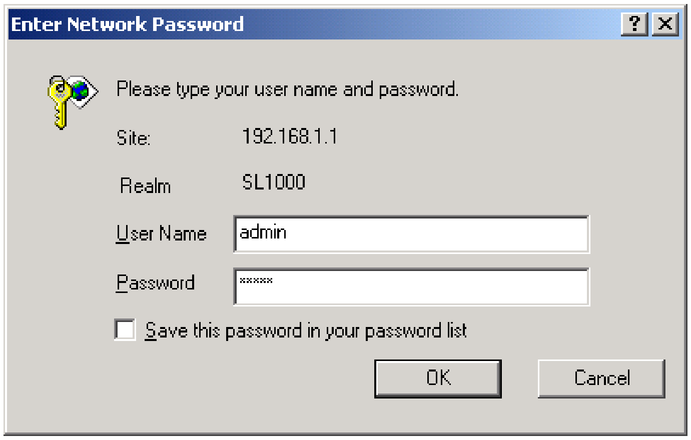
- A computer connected to the LAN or WAN port on the Internet Security Router as described in the Quick Start Guide chapter.
- A web browser installed on the computer. The program is designed to work best with Microsoft Internet Explorer® 5.5, Netscape 7.0.2 or later.

You may access the program from any computer connected to the Internet Security Router via the LAN or WAN ports. However, the instructions provided here are for computers connected via the LAN ports.

1. From a LAN computer, open your web browser, type the following in the web address (or location) box, and press **<Enter>**:

   http://192.168.1.1

   This is the predefined IP address for the LAN port on the Internet Security Router. A login screen displays, as shown in Figure 4.1.



Enter Network Password

Please type your user name and password.

Site: 192.168.1.1

Realm SL1000

User Name admin

Password *****

□ Save this password in your password list

Figure 4.1. Configuration Manager Login Screen

2. Enter your user name and password, and then click OK.

   The first time you log into the program, use these defaults:

Default User Name:	admin
Default Password:	admin

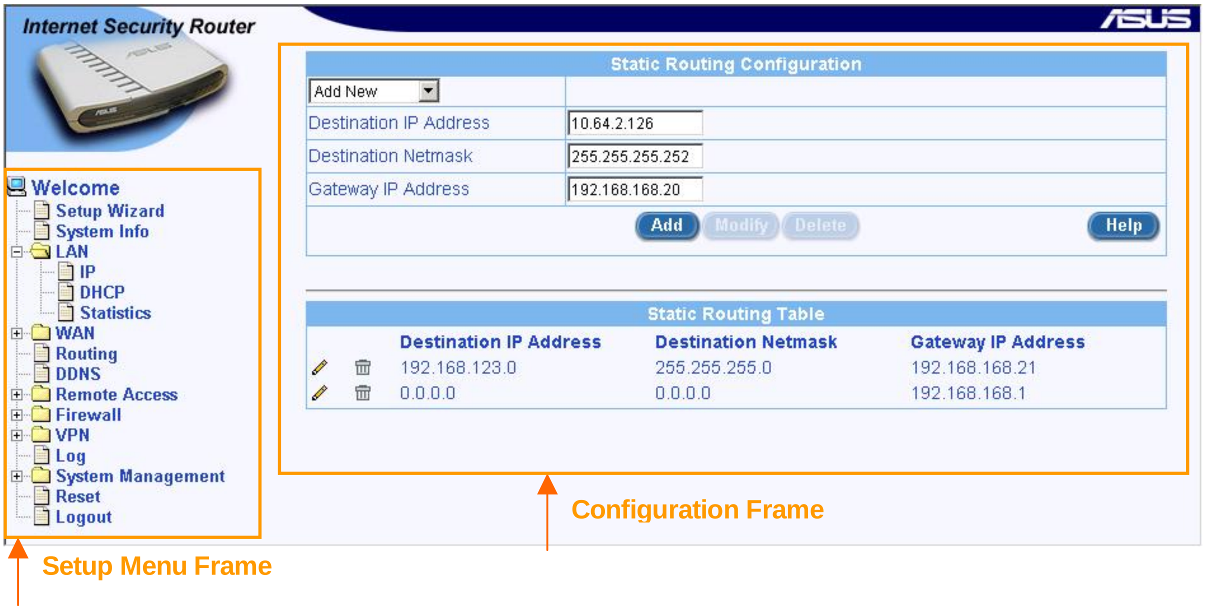
Note

You can change the password at any time (see section 12.2 Change the Login Password on page 124).

The Setup Wizard page displays each time you log into the program (shown in Figure 4.3 on page 23).

4.2 Functional Layout

Typical Configuration Manager page consists of two separate frames. The left frame, as shown in Figure 4.2, contains all the menus available for device configuration. Menus are indicated by file icons, 📄, and related menus are grouped into categories, such as LAN, WAN and etc., and indicated by folder icons, 📂 or 📁, depending on whether the group of menus are expanded or not. You can click on any of these to display a specific configuration page.



Static Routing Configuration

Add New	
Destination IP Address	10.64.2.126
Destination Netmask	255.255.255.252
Gateway IP Address	192.168.168.20

Static Routing Table

		Destination IP Address	Destination Netmask	Gateway IP Address
✎	🗑	192.168.123.0	255.255.255.0	192.168.168.21
✎	🗑	0.0.0.0	0.0.0.0	192.168.168.1

Configuration Frame

Setup Menu Frame

Figure 4.2. Typical Configuration Manager Page

A separate page displays in the right-hand-side frame for each menu. For example, the configuration page displayed in Figure 4.2 is intended for DHCP configuration.

4.2.1 Setup Menu Navigation Tips

- To expand a group of related menus: click on the + sign next to the corresponding file folder icon, 📁.
- To contract a group of related menus: click on the – sign next to the "opened" file folder icon, 📂.
- To open a specific configuration page, click on the file icons, 📄, next to the desired menu item.

4.2.2 Commonly Used Buttons and Icons

The following buttons or icons are used throughout the application. The following table describes the function for each button or icon.

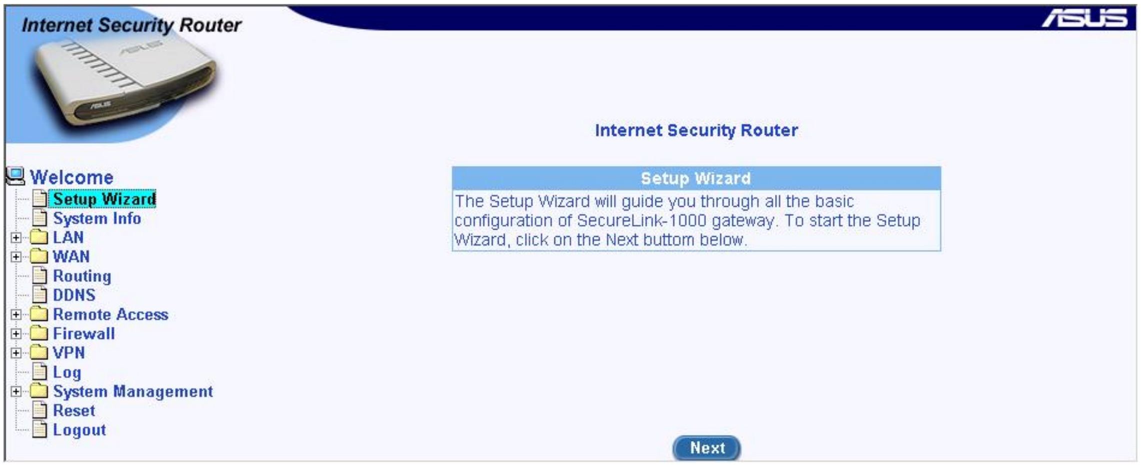
Table 4.1. Description of Commonly Used Buttons and Icons

Button/Icon	Function
Apply	Stores any changes you have made on the current page.

Button/Icon	Function
Add	Adds the existing configuration to the system, e.g. a static route or a firewall ACL rule and etc.
Modify	Modifies the existing configuration in the system, e.g. a static route or a firewall ACL rule and etc.
Delete	Deletes the selected item, e.g. a static route or a firewall ACL rule and etc.
Help	Launches the online help for the current topic in a separate browser window. Help is available from any main topic page.
Refresh	Redisplays the current page with updated statistics or settings.
✎	Selects the item for editing.
🗑	Deletes the selected item.

4.3 The Home Page of Configuration Manager

The Setup Wizard home page displays when you first access the Configuration Manager.

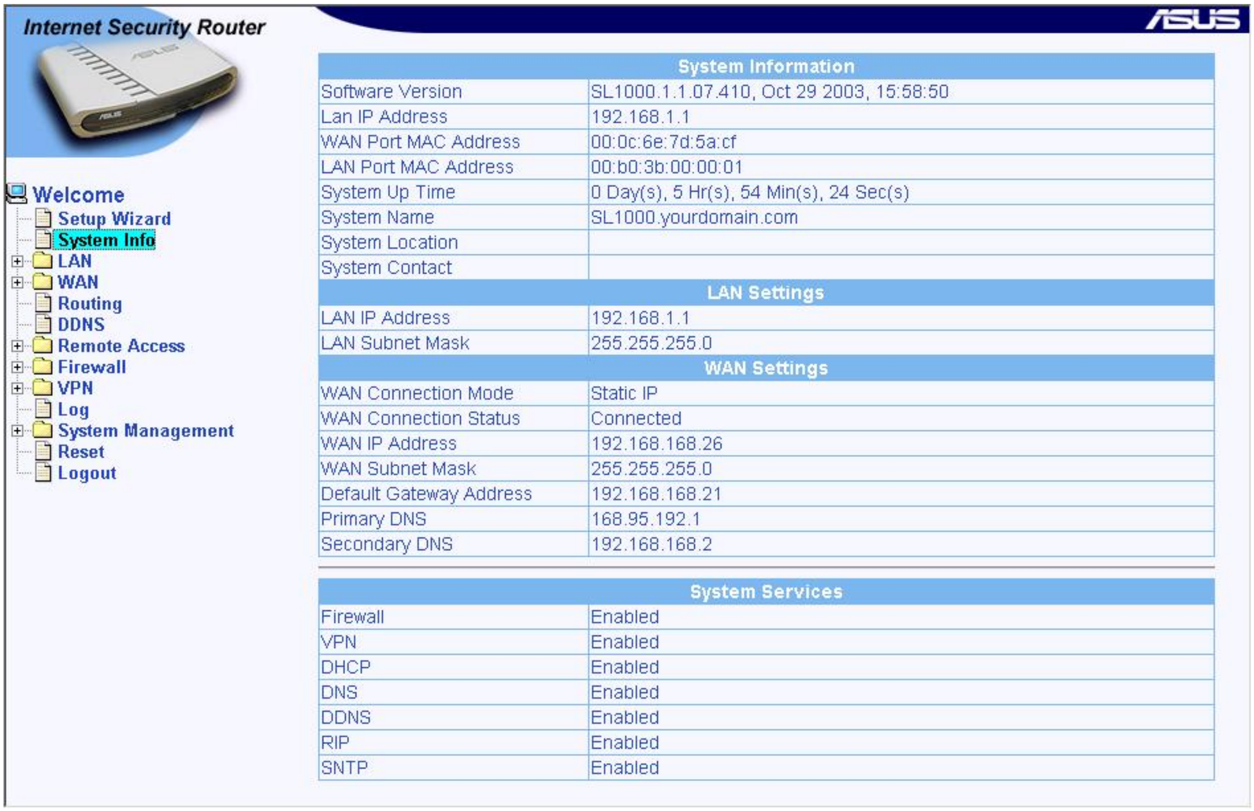


The Setup Wizard will guide you through all the basic configuration of SecureLink-1000 gateway. To start the Setup Wizard, click on the Next buttom below.

Figure 4.3. Setup Wizard Home Page

4.4 Overview of System Configuration

To view the overall system configuration, log into Configuration Manager as administrator, and then click the **System Info** menu. Figure 4.4 shows the information available in the System Info page.



System Information	
Software Version	SL1000.1.1.07.410, Oct 29 2003, 15:58:50
Lan IP Address	192.168.1.1
WAN Port MAC Address	00:0c:6e:7d:5a:cf
LAN Port MAC Address	00:b0:3b:00:00:01
System Up Time	0 Day(s), 5 Hr(s), 54 Min(s), 24 Sec(s)
System Name	SL1000.yourdomain.com
System Location	
System Contact	
LAN Settings	
LAN IP Address	192.168.1.1
LAN Subnet Mask	255.255.255.0
WAN Settings	
WAN Connection Mode	Static IP
WAN Connection Status	Connected
WAN IP Address	192.168.168.26
WAN Subnet Mask	255.255.255.0
Default Gateway Address	192.168.168.21
Primary DNS	168.95.192.1
Secondary DNS	192.168.168.2

System Services	
Firewall	Enabled
VPN	Enabled
DHCP	Enabled
DNS	Enabled
DDNS	Enabled
RIP	Enabled
SNTP	Enabled

Figure 4.4. System Information Page

5 Configuring LAN Settings

This chapter describes how to configure LAN properties for the LAN interface on the Internet Security Router that communicates with your LAN computers. You'll learn to configure IP address, DHCP and DNS server for your LAN in this chapter.

5.1 LAN IP Address

If you are using the Internet Security Router with multiple PCs on your LAN, you must connect the LAN via the Ethernet ports on the built-in Ethernet switch. You must assign a unique IP address to each device residing on your LAN. The LAN IP address identifies the Internet Security Router as a node on your network; that is, its IP address must be in the same subnet as the PCs on your LAN. The default LAN IP for the Internet Security Router is 192.168.1.1.

Definition

*A **network node** can be thought of as any interface where a device connects to the network, such as the Internet Security Router's LAN port and the network interface cards on your PCs. See Appendix 13 for an explanation of subnets.*

You can change the default to reflect the set of IP addresses that you want to use with your network.

Note

*The Internet Security Router itself can function as a DHCP server for your LAN computers, as described in section 5.2.3 Configuring DHCP Server, **but not for its own LAN port**.*

5.1.1 LAN IP Configuration Parameters

Table 5.1describes the configuration parameters available for LAN IP configuration.

Table 5.1. LAN IP Configuration Parameters

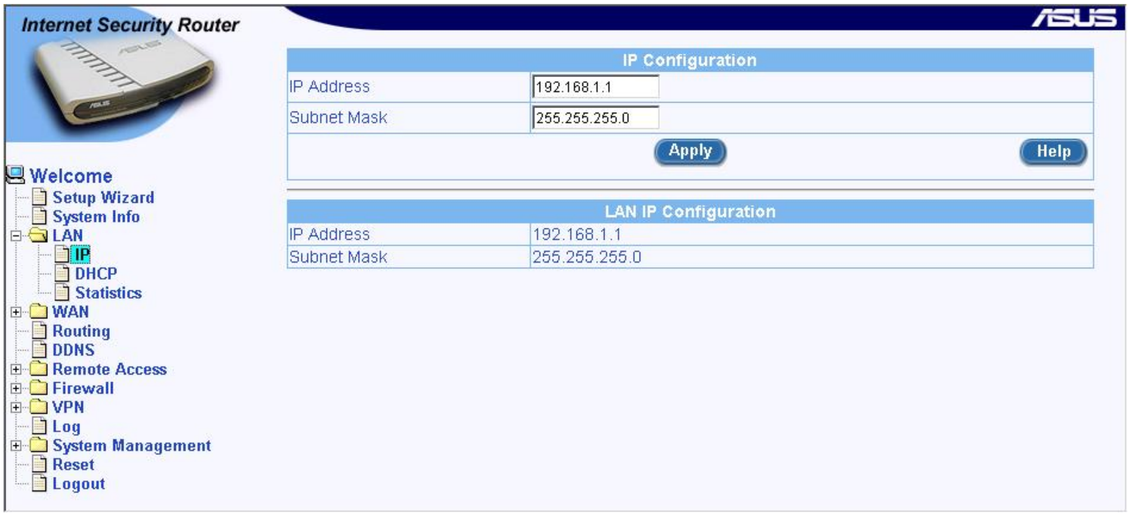
Setting	Description
IP Address	The LAN IP address of the Internet Security Router. This IP is used by your computers to identify the Internet Security Router's LAN port. Note that the public IP address assigned to you by your ISP **is not** your LAN IP address. The public IP address identifies the WAN port on the Internet Security Router to the Internet.
Subnet Mask	The LAN subnet mask identifies which parts of the LAN IP Address refer to your network as a whole and which parts refer specifically to nodes on the network. Your device is preconfigured with a default subnet mask of 255.255.255.0.

5.1.2 Configuring the LAN IP Address

Follow these steps to change the default LAN IP address.

1. Log into Configuration Manager as administrator, and then click the LAN menu.

   When the submenus of LAN Configuration displays, click IP submenu to display the IP Address configuration page as shown in Figure 5.1.



IP Configuration	
IP Address	192.168.1.1
Subnet Mask	255.255.255.0

LAN IP Configuration	
IP Address	192.168.1.1
Subnet Mask	255.255.255.0

Figure 5.1. LAN IP Address Configuration Page

2. Enter a LAN IP address and subnet mask for the Internet Security Router in the space provided.

3. Click. Apply to save the LAN IP address.

   If you were using an Ethernet connection for the current session, and changed the IP address, the connection will be terminated.

4. Reconfigure your PCs, if necessary, so that their IP addresses place them in the same subnet as the new IP address of the LAN port. See the Quick Start Guide chapter, "Part 2 — Configuring Your Computers," for instructions.

5. Log into Configuration Manager by typing the new IP address in your Web browser's address/location box.

5.2 DHCP (Dynamic Host Control Protocol)

5.2.1 What is DHCP?

DHCP is a protocol that enables network administrators to centrally manage the assignment and distribution of IP information to computers on a network.

When you enable DHCP on a network, you allow a device — such as the Internet Security Router — to assign temporary IP addresses to your computers whenever they connect to your network. The assigning device is called a *DHCP server*, and the receiving device is a *DHCP client*.

Note

If you followed the Quick Start Guide instructions, you either configured each LAN PC with an IP address, or you specified that it will receive IP information dynamically (automatically). If you chose to have the information assigned dynamically, then you configured your PCs as DHCP clients that will accept IP addresses assigned from a DCHP server such as the Internet Security Router.

The DHCP server draws from a defined pool of IP addresses and "leases" them for a specified amount of time to your computers when they request an Internet session. It monitors, collects, and redistributes the addresses as needed.

On a DHCP-enabled network, the IP information is assigned *dynamically* rather than *statically.* A DHCP client can be assigned a different address from the pool each time it reconnects to the network.

5.2.2 Why use DHCP?

DHCP allows you to manage and distribute IP addresses throughout your network from the Internet Security Router. Without DHCP, you would have to configure each computer separately with IP address and related information. DHCP is commonly used with large networks and those that are frequently expanded or otherwise updated.

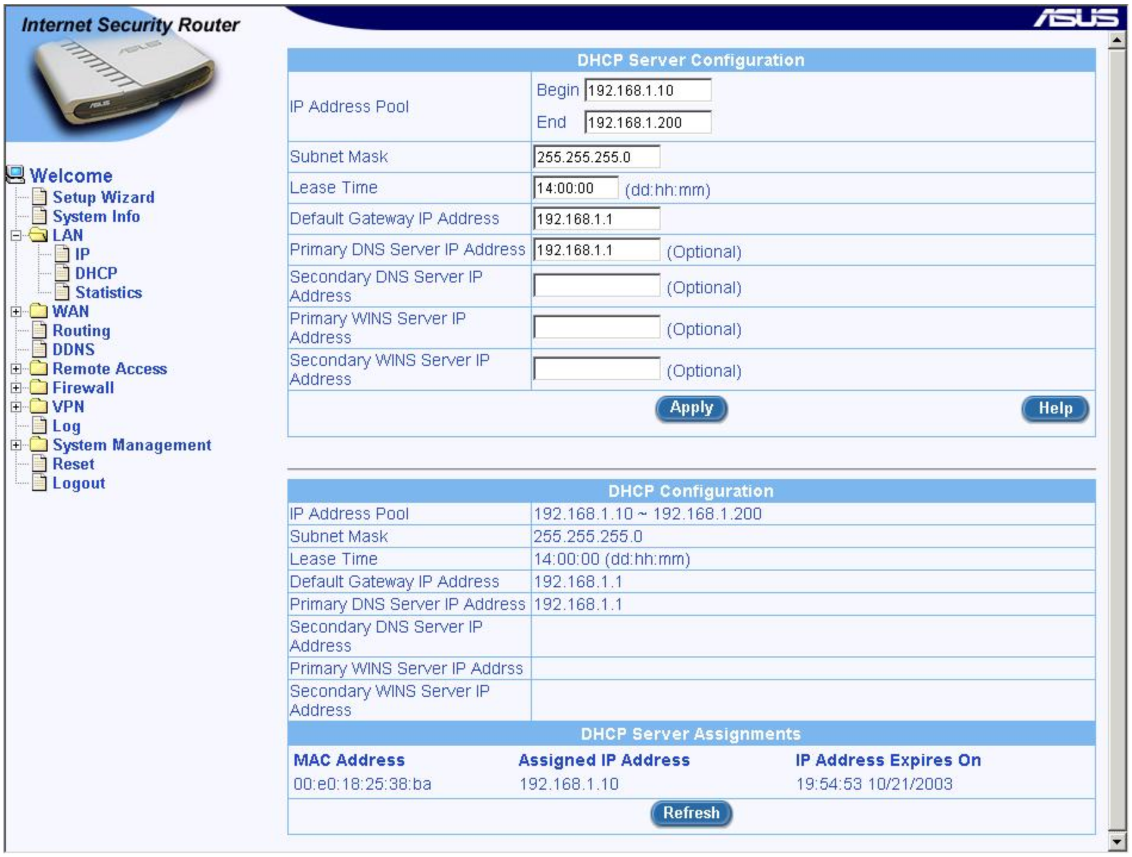
5.2.3 Configuring DHCP Server

Note

By default, the Internet Security Router is configured as a DHCP server on the LAN side, with a predefined IP address pool of 192.168.1.10 through 192.168.1.42 (subnet mask 255.255.255.0). To change this range of addresses, follow the procedures described in this section.

First, you must configure your PCs to accept DHCP information assigned by a DHCP server:

1. Log into Configuration Manager as administrator, click the LAN menu, and then click the **DHCP** submenu. The DHCP Configuration page displays as shown in Figure 5.2:



DHCP Server Configuration

IP Address Pool	Begin 192.168.1.10 End 192.168.1.200
Subnet Mask	255.255.255.0
Lease Time	14:00:00 (dd:hh:mm)
Default Gateway IP Address	192.168.1.1
Primary DNS Server IP Address	192.168.1.1 (Optional)
Secondary DNS Server IP Address	(Optional)
Primary WINS Server IP Address	(Optional)
Secondary WINS Server IP Address	(Optional)

DHCP Configuration

IP Address Pool	192.168.1.10 ~ 192.168.1.200
Subnet Mask	255.255.255.0
Lease Time	14:00:00 (dd:hh:mm)
Default Gateway IP Address	192.168.1.1
Primary DNS Server IP Address	192.168.1.1
Secondary DNS Server IP Address	
Primary WINS Server IP Addrss	
Secondary WINS Server IP Address	

DHCP Server Assignments

MAC Address	Assigned IP Address	IP Address Expires On
00:e0:18:25:38:ba	192.168.1.10	19:54:53 10/21/2003

Figure 5.2. DHCP Configuration Page

2. Enter the information for the *IP Address Pool (Begin/End Address*), Sub*net Mask*, *Lease Time* and *Default Gateway IP Address,* fields; others, such as *Primary/Secondary DNS Server IP Address* and *Primary/Secondary WINS Server IP Address* are optional. However, it is recommended that you enter the primary DNS server IP address in the space provided. You may

enter the LAN IP or your ISP's DNS IP in the primary DNS Server IP Address field. Table 5.2 describes the DHCP configuration parameters in detail.

Table 5.2. DHCP Configuration Parameters

Field	Description
IP Address Pool Begin/End	Specify the lowest and highest addresses in the DHCP address pool.
Subnet Mask	Enter the subnet mask to be used for the DHCP address pool.
Lease Time	The amount of time the assigned address will be used by a device connected on the LAN.
Default Gateway IP Address	The address of the default gateway for computers that receive IP addresses from this pool. The default gateway is the device that the DHCP client computers first contacted to communicate with the Internet. Typically, it is the Internet Security Router's LAN port IP address.
Primary/Secondary DNS Server IP Address	The IP address of the *Domain Name System* server to be used by computers that receive IP addresses from this pool. The DNS server translates common Internet names that you type into your web browser into their equivalent numeric IP addresses. Typically, the server(s) are located with your ISP. However, you may enter LAN IP address of the Internet Security Router as it will serve as DNS proxy for the LAN computers and forward the DNS request from the LAN to DNS servers and relay the results back to the LAN computers. Note that both the primary and secondary DNS servers are optional.
Primary/Secondary WINS Server IP Address (optional)	The IP address of the WINS servers to be used by computers that receive IP addresses from the DHCP IP address pool. You don't need to enter this information unless your network has WINS servers.

3. Click Apply to save the DHCP server configurations.

5.2.4 Viewing Current DHCP Address Assignments

When the Internet Security Router functions as a DHCP server for your LAN, it keeps a record of any addresses it has leased to your computers. To view a table of all current IP address assignments, just go to the DHCP Server Configuration page. A page displays similar to that shown in Figure 5.2; the bottom half of the same page shows the existing DHCP address assignments.

The DHCP Server Address Table lists any IP addresses that are currently leased to LAN devices. For each leased address, the table lists the following information:

Table 5.3. DHCP Address Assignment

Field	Description
MAC Address	A hardware ID of the device that leases an IP address from the DHCP server.
Assigned IP Address	The address that has been leased from the pool.
IP Address Expired on	The time when the leased address is to be terminated.

5.3 DNS

5.3.1 About DNS

Domain Name System (DNS) servers map the user-friendly domain names that users type into their Web browsers (e.g., "yahoo.com") to the equivalent numerical IP addresses that are used for Internet routing.

When a PC user types a domain name into a browser, the PC must first send a request to a DNS server to obtain the equivalent IP address. The DNS server will attempt to look up the domain name in its own database, and will communicate with higher-level DNS servers when the name cannot be found locally. When the address is found, it is sent back to the requesting PC and is referenced in IP packets for the remainder of the communication.

5.3.2 Assigning DNS Addresses

Multiple DNS addresses are useful to provide alternatives when one of the servers is down or is encountering heavy traffic. ISPs typically provide primary and secondary DNS addresses, and may provide additional addresses. Your LAN PCs learn these DNS addresses in one of the following ways:

- **Statically:** If your ISP provides you with their DNS server addresses, you can assign them to each PC by modifying the PCs' IP properties.
- **Dynamically from a DHCP pool:** You can configure the DHCP Server the Internet Security Router and create an address pool that specify the DNS addresses to be distributed to the PCs. Refer to the section Configuring DHCP Server on page 27 for instructions on creating DHCP address pools.

In either case, you can specify the actual addresses of the ISP's DNS servers (on the PC or in the DHCP pool), or you can specify the address of the LAN port on the Internet Security Router (e.g., 192.168.1.1). When you specify the LAN port IP address, the device performs *DNS relay*, as described in the following section.

Note

If you specify the actual DNS addresses on the PCs or in the DHCP pool, the DNS relay feature is not used.

5.3.3 Configuring DNS Relay

When you specify the device's LAN port IP address as the DNS address, then the Internet Security Router automatically performs “DNS relay”; i.e., because the device itself is not a DNS server, it forwards domain name lookup requests from the LAN PCs to a DNS server at the ISP. It then relays the DNS server's response to the PC.

When performing DNS relay, the Internet Security Router must maintain the IP addresses of the DNS servers it contacts. It can learn these addresses in either or both of the following ways:

- **Learned through PPPoE or Dynamic IP Connection:** If the Internet Security Router uses a PPPoE (see section 6.2.2 Configuring PPPoE for WAN) or Dynamic IP (see section 6.3.2 Configuring Dynamic IP for WAN) connection to the ISP, the primary and secondary DNS addresses can be learned via the PPPoE protocol. Using this option provides the advantage that you will not need to reconfigure the PCs or the Internet Security Router if the ISP changes their DNS addresses.
- **Configured on the Internet Security Router:** You can also specify the ISP's DNS addresses in the WAN Configuration page as shown in Figure 6.1. WAN PPPoE Configuration Page, Figure 6.2. WAN Dynamic IP (DHCP client) Configuration Page, or Figure 6.3. WAN Static IP Configuration Page.

Follow these steps to configure DNS relay:

1. Enter LAN IP in the DNS Server IP Address field in DHCP configuration page as shown in Figure 5.2.

2. Configure the LAN PCs to use the IP addresses assigned by the DHCP server on the Internet Security Router, or enter the Internet Security Router's LAN IP address as their DNS server address manually for each PC on your LAN.

Note

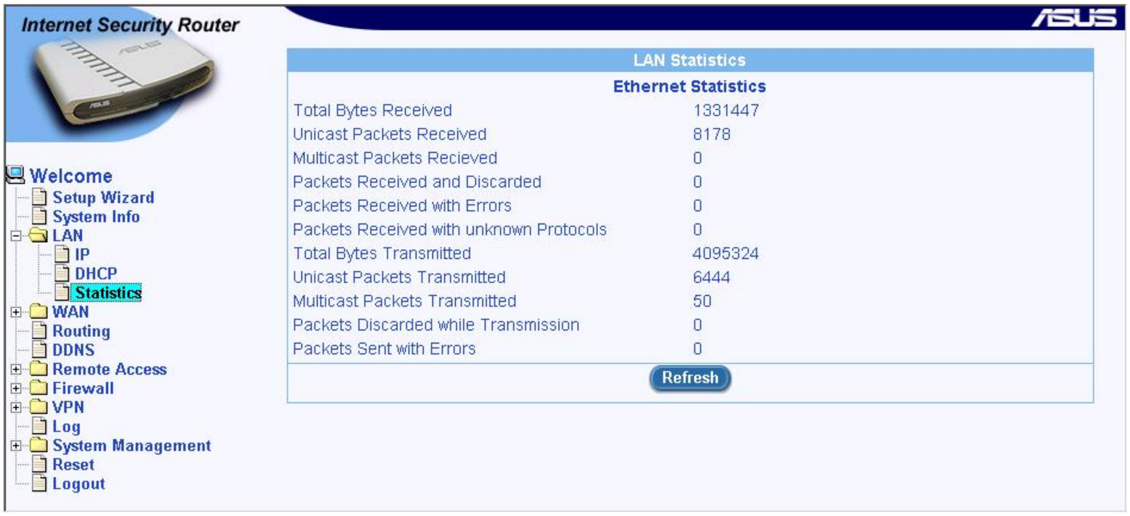
DNS addresses that are assigned to LAN PCs prior to enabling DNS relay will remain in effect until the PC is rebooted. DNS relay will only take effect when a PC's DNS address is the LAN IP address.

Similarly, if after enabling DNS relay, you specify a DNS address (other than the LAN IP address) in a DHCP pool or statically on a PC, then that address will be used instead of the DNS relay address.

5.4 Viewing LAN Statistics

You can view statistics of your LAN traffic on the Internet Security Router. You will not typically need to view this data, but you may find it helpful when working with your ISP to diagnose network and Internet data transmission problems.

To view LAN IP statistics, click Statistics on the LAN submenu. Figure 5.3 shows the LAN Statistics page:



LAN Statistics

Ethernet Statistics	
Total Bytes Received	1331447
Unicast Packets Received	8178
Multicast Packets Recieved	0
Packets Received and Discarded	0
Packets Received with Errors	0
Packets Received with unknown Protocols	0
Total Bytes Transmitted	4095324
Unicast Packets Transmitted	6444
Multicast Packets Transmitted	50
Packets Discarded while Transmission	0
Packets Sent with Errors	0

Figure 5.3. LAN Statistics Page

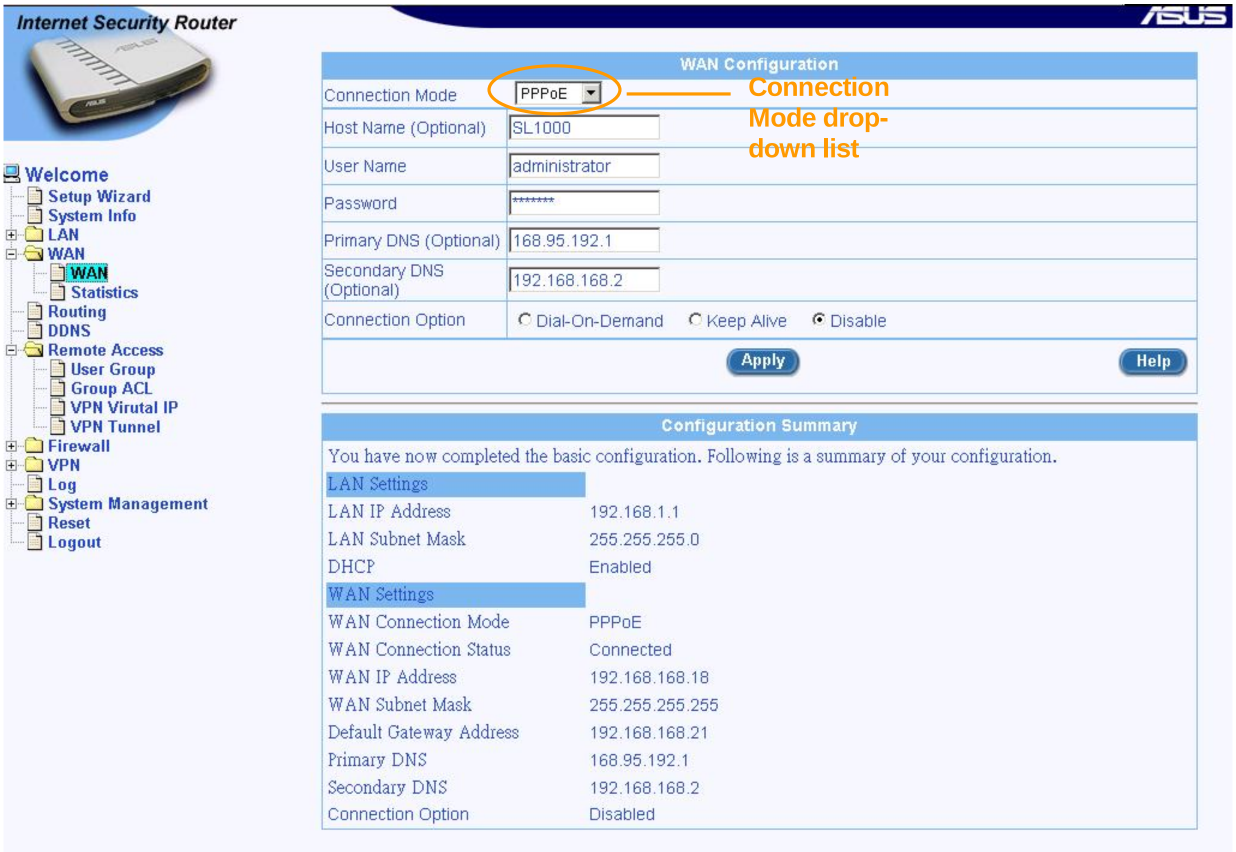
To display the updated statistics since you opened the page, click Refresh.

6 Configuring WAN Settings

This chapter describes how to configure WAN settings for the WAN interface on the Internet Security Router that communicates with your ISP. You'll learn to configure IP address, DHCP and DNS server for your WAN in this chapter.

6.1 WAN Connection Mode

Three modes of WAN connection are supported by the Internet Security Router – PPPoE, dynamic IP and static IP. You may select one of the WAN connection modes required by your ISP from the Connection Mode drop-down list in WAN Configuration page as shown in Figure 6.1.



WAN Configuration

Connection Mode	PPPoE
Host Name (Optional)	SL1000
User Name	administrator
Password	*******
Primary DNS (Optional)	168.95.192.1
Secondary DNS (Optional)	192.168.168.2
Connection Option	○ Dial-On-Demand ○ Keep Alive ● Disable

Connection Mode drop-down list

Configuration Summary

You have now completed the basic configuration. Following is a summary of your configuration.

LAN Settings	
LAN IP Address	192.168.1.1
LAN Subnet Mask	255.255.255.0
DHCP	Enabled
WAN Settings	
WAN Connection Mode	PPPoE
WAN Connection Status	Connected
WAN IP Address	192.168.168.18
WAN Subnet Mask	255.255.255.255
Default Gateway Address	192.168.168.21
Primary DNS	168.95.192.1
Secondary DNS	192.168.168.2
Connection Option	Disabled

Figure 6.1. WAN PPPoE Configuration Page

6.2 PPPoE

6.2.1 WAN PPPoE Configuration Parameters

Table 6.1describes the configuration parameters available for PPPoE connection mode.

Table 6.1. WAN PPPoE Configuration Parameters

Setting	Description
Host Name	Host name is optional but may be required by some ISP.
User Name and Password	Enter the username and password you use to log into your ISP. (Note: this is different from the information you used to log into Configuration Manager.)
Primary/ Secondary DNS	IP address of the primary and/or secondary DNS are optional as PPPoE will automatically detect the DNS IP addresses configured at your ISP. However, if there are other DNS servers you would rather use, enter the IP addresses in the spaces provided.
Connection Options	The default setting for this option is "Disable". You can also select either Dial-On-Demand or Keep-Alive if desired.
Dial-On-Demand	Enter the inactivity timeout period at which you want to disconnect the Internet connection when there is no traffic. The minimum value of inactivity timeout is 30 seconds. RIP and SNTP services may interfere with this function if there are activities from these two services. Make sure that the update interval setting of the system date and time (in the System Management / Date/Time Setup configuration page – see 12.4 Setup Date and Time for details) is greater than the inactivity timeout value.
Keep Alive	Enable this option if you wish to keep your Internet connection active, even when there is no traffic. Enter the value for the "Echo Interval" at which you want the Internet Security Router to send out some data periodically to your ISP. The default value of "Echo Interval" is 60 second.

6.2.2 Configuring PPPoE for WAN

Follow the instructions below to configure PPPoE settings:

1. Select PPPoE from the Connection Mode drop-down list as shown in Figure 6.1.
2. (Optional) Enter host name in the space provided if required by your ISP.
3. If you are connecting to the Internet using PPPoE, you probably only have to enter User Name and Password in the PPPoE Configuration page as shown in Figure 6.1 unless you want to use your preferred DNS servers.
4. (Optional) Enter the IP addresses for the primary and secondary DNS servers if you want to use your preferred DNS servers; otherwise, skip this step.
5. Choose a connection option and enter appropriate setting if desired. The default setting is "Disable".
6. Click Apply to save the PPPoE settings when you are done with the configuration. You'll see a summary of the WAN configuration at the bottom half of the configuration page. Note that if the default gateway address is not shown immediately, click on the WAN menu to open the WAN configuration page again.

6.3 Dynamic IP

6.3.1 WAN Dynamic IP Configuration Parameters

Table 6.2 describes the configuration parameters available for dynamic IP connection mode.

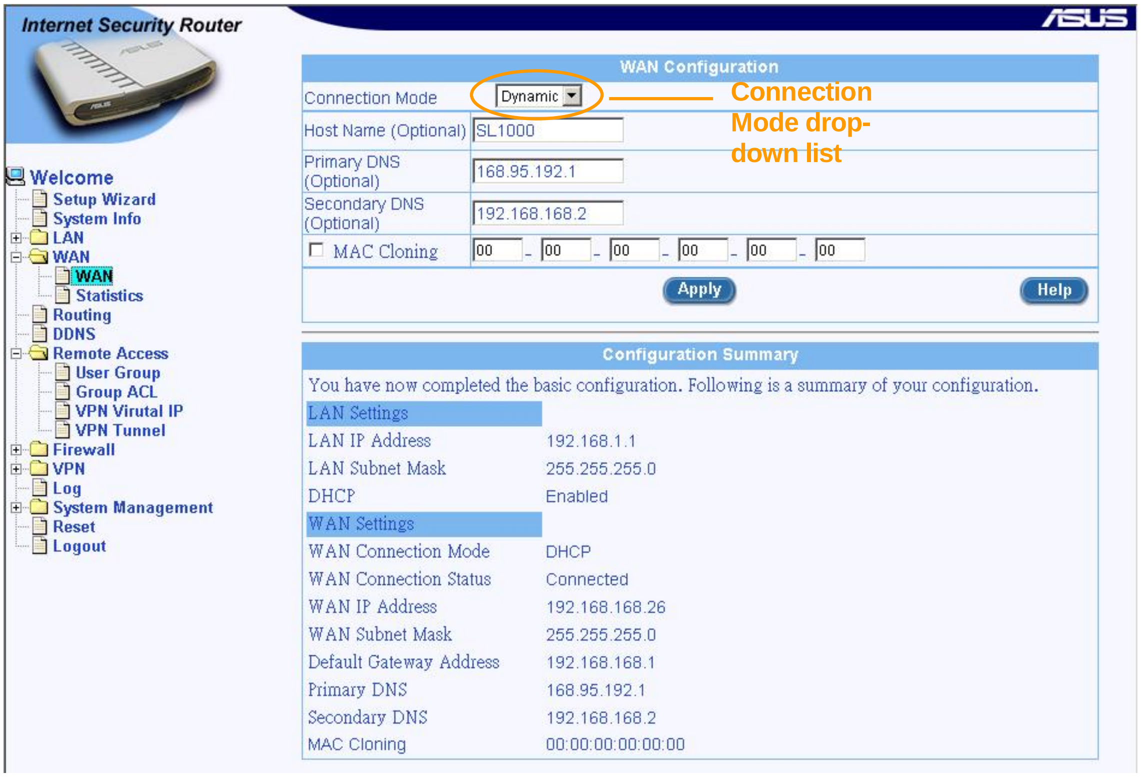
Table 6.2. WAN Dynamic IP Configuration Parameters

Field	Description
Host Name	Host name is optional but may be required by some ISP.
Primary/ Secondary DNS	IP address of the primary and/or secondary DNS are optional as DHCP client will automatically obtain the DNS IP addresses configured at your ISP. However, if there are other DNS servers you would rather use, enter the IP addresses in the spaces provided.
MAC Cloning	The default is to use the MAC address of the WAN interface. However, if you had registered a MAC address previously with your ISP, you may need to enter that MAC address here.

6.3.2 Configuring Dynamic IP for WAN

Follow the instructions below to configure dynamic IP settings:

1. Select Dynamic from the Connection Mode drop-down list as shown in Figure 6.2.
2. (Optional) Enter host name in the space provided if required by your ISP.
3. (Optional) Enter the IP addresses for the primary and secondary DNS servers if you want to use your preferred DNS servers; otherwise, skip this step.
4. If you had previously registered a specific MAC address with your ISP for Internet access, enter the registered MAC address here and make sure you check the MAC cloning check box.
5. Click Apply to save the Dynamic IP settings when you are done with the configuration. You'll see a summary of the WAN configuration at the bottom half of the configuration page. Note that if the default gateway address is not shown immediately, click on the WAN menu to open the WAN configuration page again.



WAN Configuration

Connection Mode	Dynamic
Host Name (Optional)	SL1000
Primary DNS (Optional)	168.95.192.1
Secondary DNS (Optional)	192.168.168.2
□ MAC Cloning	00 - 00 - 00 - 00 - 00 - 00

Connection Mode drop-down list

Configuration Summary

You have now completed the basic configuration. Following is a summary of your configuration.

LAN Settings	
LAN IP Address	192.168.1.1
LAN Subnet Mask	255.255.255.0
DHCP	Enabled
WAN Settings	
WAN Connection Mode	DHCP
WAN Connection Status	Connected
WAN IP Address	192.168.168.26
WAN Subnet Mask	255.255.255.0
Default Gateway Address	192.168.168.1
Primary DNS	168.95.192.1
Secondary DNS	192.168.168.2
MAC Cloning	00:00:00:00:00:00

Figure 6.2. WAN Dynamic IP (DHCP client) Configuration Page

6.4 Static IP

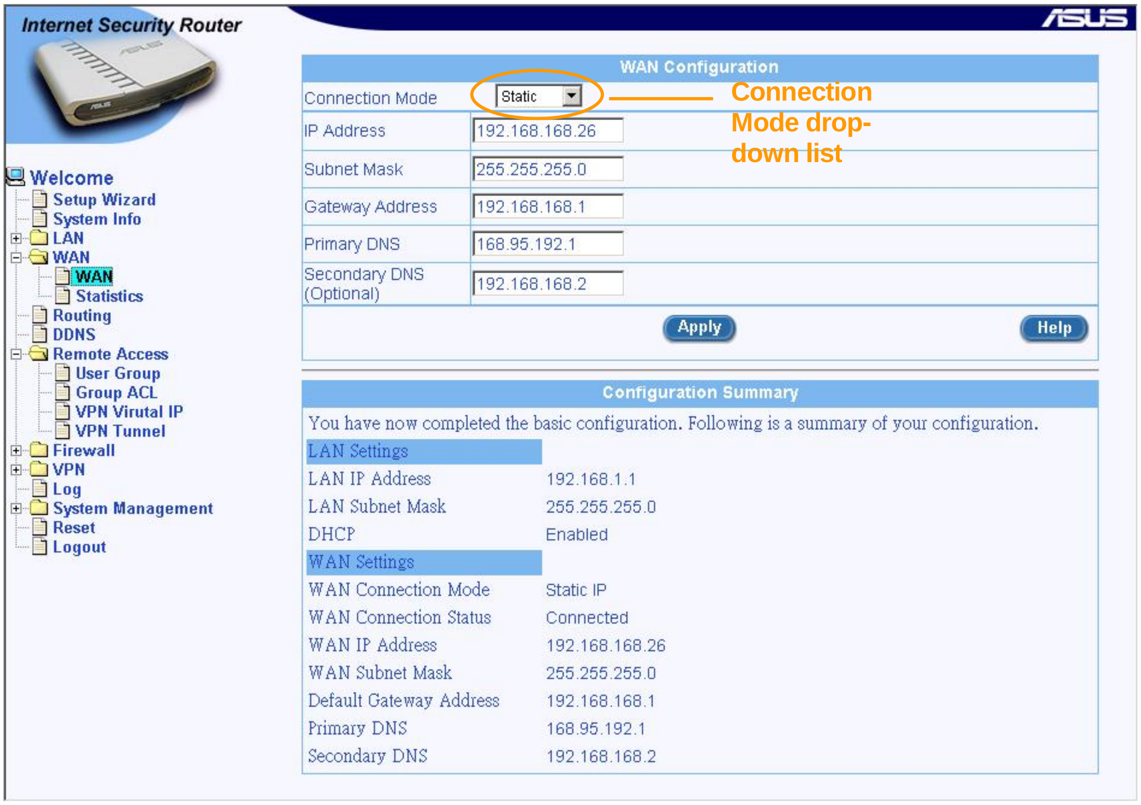
6.4.1 WAN Static IP Configuration Parameters

Table 6.3 describes the configuration parameters available for static IP connection mode.

Table 6.3. WAN Static IP Configuration Parameters

Setting	Description
IP Address	WAN IP address provided by your ISP.
Subnet Mask	WAN subnet mask provided by your ISP. Typically, it is set as 255.255.255.0.
Gateway Address	Gateway IP address provided by your ISP. It must be in the same subnet as the WAN on the Internet Security Router.
Primary/ Secondary DNS	You must at least enter the IP address of the primary DNS server. Secondary DNS is optional

6.4.2 Configuring Static IP for WAN



WAN Configuration

Connection Mode	Static
IP Address	192.168.168.26
Subnet Mask	255.255.255.0
Gateway Address	192.168.168.1
Primary DNS	168.95.192.1
Secondary DNS (Optional)	192.168.168.2

Connection Mode drop-down list

Configuration Summary

You have now completed the basic configuration. Following is a summary of your configuration.

LAN Settings	
LAN IP Address	192.168.1.1
LAN Subnet Mask	255.255.255.0
DHCP	Enabled
WAN Settings	
WAN Connection Mode	Static IP
WAN Connection Status	Connected
WAN IP Address	192.168.168.26
WAN Subnet Mask	255.255.255.0
Default Gateway Address	192.168.168.1
Primary DNS	168.95.192.1
Secondary DNS	192.168.168.2

Figure 6.3. WAN Static IP Configuration Page

Follow the instructions below to configure static IP settings:

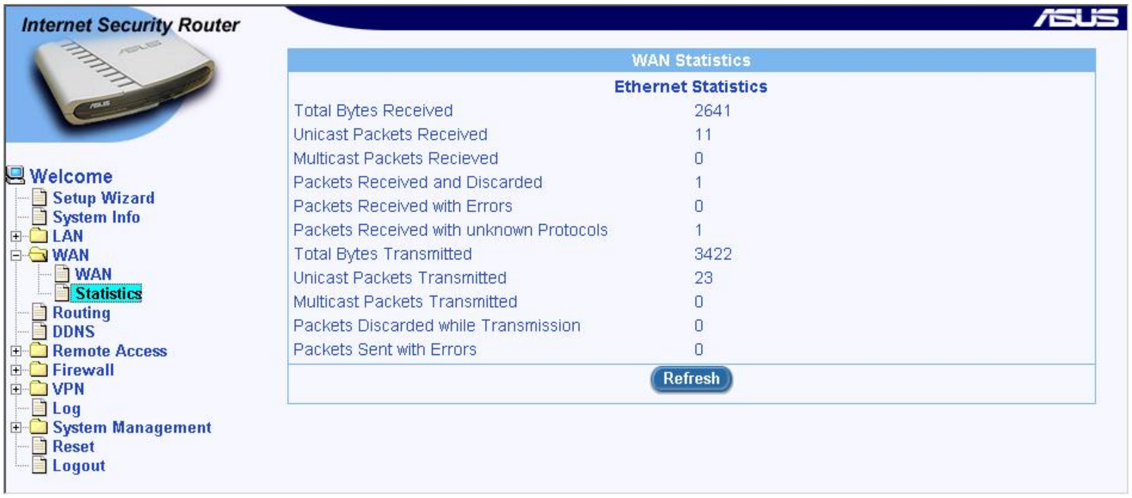
1. Select Static from the Connection Mode drop-down list as shown in Figure 6.3.
2. Enter WAN IP address in the IP Address field. This information should be provided by your ISP.
3. Enter Subnet Mask for the WAN. This information should be provided by your ISP. Typically, it is 255.255.255.0.
4. Enter gateway address provided by your ISP in the space provided.

5. Enter the IP address of the primary DNS server. This information should be provided by your ISP. Secondary DNS server is optional.
6. Click Apply to save the static IP settings when you are done with the configuration. You'll see a summary of the WAN configuration at the bottom half of the configuration page.

6.5 Viewing WAN Statistics

You can view statistics of your WAN traffic. You will not typically need to view this data, but you may find it helpful when working with your ISP to diagnose network and Internet data transmission problems.

To view WAN IP statistics, click Statistics on the WAN submenu. Figure 6.4 shows the LAN Statistics page:



WAN Statistics

Ethernet Statistics	
Total Bytes Received	2641
Unicast Packets Received	11
Multicast Packets Recieved	0
Packets Received and Discarded	1
Packets Received with Errors	0
Packets Received with unknown Protocols	1
Total Bytes Transmitted	3422
Unicast Packets Transmitted	23
Multicast Packets Transmitted	0
Packets Discarded while Transmission	0
Packets Sent with Errors	0

Figure 6.4. WAN Statistics Page

To see the updated statistics since you opened the page, simply click Refresh.

7 Configuring Routes

You can use Configuration Manager to define specific routes for your Internet and network data communication. This chapter describes basic routing concepts and provides instructions for creating routes.

Note that most users do not need to define routes.

7.1 Overview of IP Routes

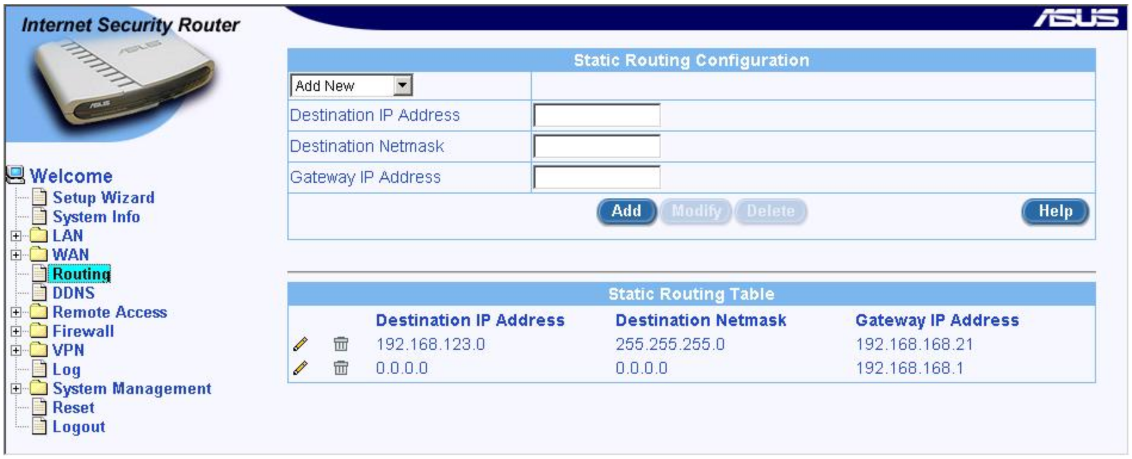
The essential challenge of a router is: when it receives data intended for a particular destination, which next device should it send that data to? When you define IP routes, you provide the rules that the Internet Security Router uses to make these decisions.

7.1.1 Do I need to define IP routes?

Most users do not need to define IP routes. On a typical small home or office LAN, the existing routes that set up the default gateways for your LAN computers and for the Internet Security Router provide the most appropriate path for all your Internet traffic.

- On your LAN computers, a default gateway directs all Internet traffic to the LAN port on the Internet Security Router. Your LAN computers know their default gateway either because you assigned it to them when you modified their TCP/IP properties, or because you configured them to receive the information dynamically from a server whenever they access the Internet. (Each of these processes is described in the Quick Start Guide instructions, Part 2.)
- On the Internet Security Router itself, a default gateway is defined to direct all outbound Internet traffic to a router at your ISP. This default gateway is assigned automatically by your ISP whenever the device negotiates an Internet connection. (The process for adding a default route is described in section 7.3.2 Adding Static Routes.)

You may need to define routes if your home setup includes two or more networks or subnets, if you connect to two or more ISP services, or if you connect to a remote corporate LAN.



Static Routing Configuration

Add New	
Destination IP Address	
Destination Netmask	
Gateway IP Address	

Static Routing Table

Destination IP Address	Destination Netmask	Gateway IP Address
192.168.123.0	255.255.255.0	192.168.168.21
0.0.0.0	0.0.0.0	192.168.168.1

Figure 7.1. Routing Configuration Page

7.2 Dynamic Routing using RIP (Routing Information Protocol)

RIP enables routing information exchange between routers; thus, routes are updated automatically without human intervention. It is recommended that you enable RIP in the System Services Configuration Page as shown in Figure 12.1.

7.2.1 Enabling/Disabling RIP

Follow these instructions to enable or disable RIP:

1. In the System Services Configuration page (as shown in Figure 12.1), click the "Enable" or "Disable" radio button depending on whether you want to enable or disable RIP.
2. Click Apply to enable or disable RIP.

7.3 Static Routing

7.3.1 Static Route Configuration Parameters

The following table defines the available configuration parameters for static routing configuration.

Table 7.1. Static Route Configuration Parameters

Field	Description
Destination IP Address	Specifies the IP address of the destination computer or an entire destination network. It can also be specified as all zeros to indicate that this route should be used for all destinations for which no other route is defined (this is the route that creates the default gateway). Note that destination IP must be a network ID. The default route uses a destination IP of 0.0.0.0. Refer to Appendix 13 for an explanation of network ID.
Destination Netmask	Indicates which parts of the destination address refer to the network and which parts refer to a computer on the network. Refer to Appendix 13, for an explanation of network masks. The default route uses a netmask of 0.0.0.0.
Gateway IP Address	Gateway IP address

7.3.2 Adding Static Routes

Follow these instructions to add a static route to the routing table.

1. In the Static Routes Configuration page (as shown in Figure 7.1), enter static routes information such as destination IP address, destination netmask and gateway IP address in the corresponding fields.

   For a description of these fields, refer to Table 7.1. Static Route Configuration Parameters.

   To create a route that defines the default gateway for your LAN, enter 0.0.0.0 in both the Destination IP Address and Destination Netmask fields.

2. Click Add to add a new route.

7.3.3 Deleting Static Routes

Follow these instructions to delete a static route from the routing table.

1. In the Static Routes Configuration page (as shown in Figure 7.1), select the route from the service drop-down list or click on the ✏ icon of the route to be deleted in the Static Routing Table.

2. Click Delete to delete the selected route.

WARNING

> *Do not remove the route for default gateway unless you know what you are doing. Removing the default route will render the Internet unreachable.*

7.3.4 Viewing the Static Routing Table

All IP-enabled computers and routers maintain a table of IP addresses that are commonly accessed by their users. For each of these *destination IP addresses*, the table lists the IP address of the first hop the data should take. This table is known as the device's *routing table*.

To view the Internet Security Router's routing table, click the Routing menu. The Static Routing Table displays at the bottom half of the Static Routing Configuration page, as shown in Figure 7.1:

The Static Routing Table displays a row for each existing route containing the IP address of the destination network, subnet mask of destination network and the IP of the gateway that forwards the traffic. Theis table shows only user-added routes.

8 Configuring DDNS

Dynamic DNS is a service that allows computers to use the same domain name, even when the IP address changes from time to time (during reboot or when the ISP's DHCP server resets IP leases). Internet Security Router connects to a Dynamic DNS service whenever the WAN IP address changes. It supports setting up the web services such as Web server, FTP server using a domain name instead of the IP address. Dynamic DNS supports the DDNS clients with the following features:

- Update DNS records (addition) when an external interface comes up
- Force DNS update

Dynamic DNS supports two modes, namely RFC-2136 DDNS Client and HTTP DDNS Client.

RFC-2136 DDNS Client

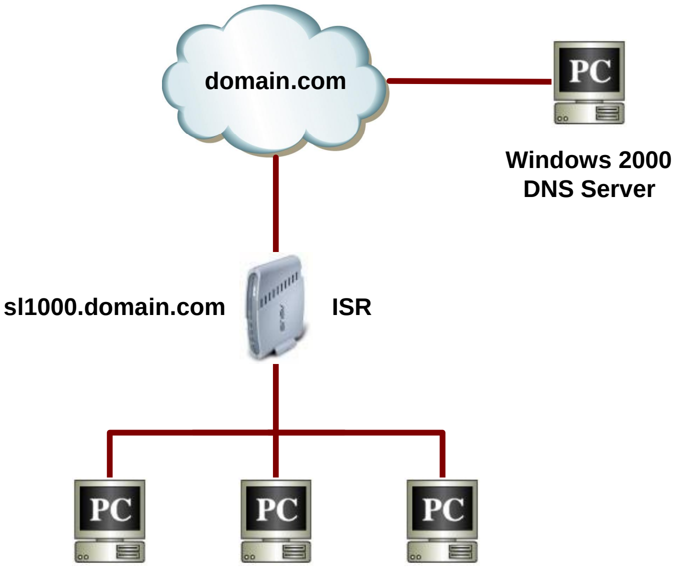


Figure 8.1. Network Diagram for RFC-2136 DDNS

Any interface status change to an external interface sends a DDNS update to the DNS server. When connection to Primary DNS server fails, the Internet Security Router updates the Secondary DNS server. When a DNS update is forced by the administrator, update is sent to the server for all active external interfaces.

HTTP Dynamic DNS Client

HTTP DDNS client uses the mechanism provided by the popular DDNS service providers for updating the DNS records dynamically. In this case, the service provider updates DNS records in the DNS. Internet Security Router uses HTTP to trigger this update.

The Internet Security Router supports HTTP DDNS update with the following service providers:

- www.dyndns.org
- www.zoneedit.com
- www.dns-tokyo.jp

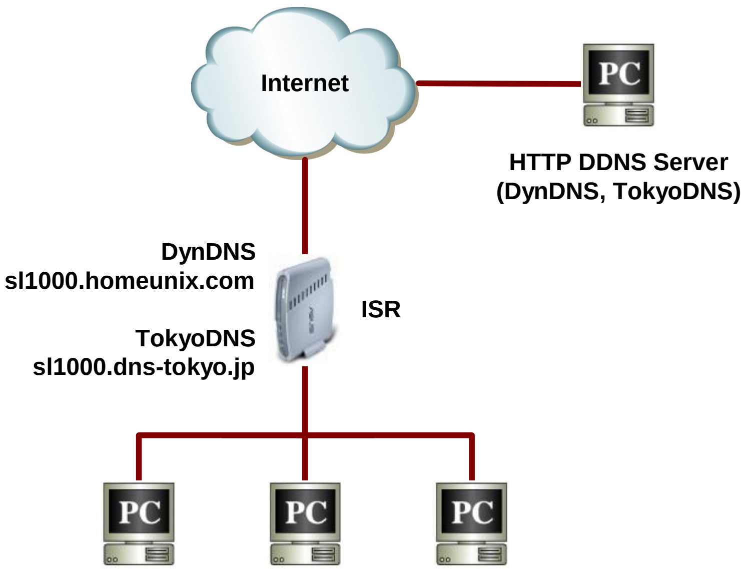


Figure 8.2. Network Diagram for HTTP DDNS

Whenever IP address of the configured DDNS interface changes, DDNS update is sent to the specified DDNS service provider. Internet Security Router should be configured with the DDNS username and password that are obtained from the DDNS service provider.

8.1 DDNS Configuration Parameters

Table 8.1 describes the configuration parameters available for DDNS service.

Table 8.1. DDNS Configuration Parameters

Field	Description
DDNS State	
Enable	Click on this radio button to enable the DDNS Service
Disable	Click on this radio button to disable the DDNS Service
DDNS Type – select a DDNS service type: HTTP or RFC-2136 DDNS	
HTTP DDNS	Click this radio button if HTTP DDNS is desired.
RFC-2136 DDNS	Click this radio button if RFC-2136 DDNS is desired.
DNS Zone Name Enter the registered domain name provided by your ISP into this field. (Note: The host name of Internet Security Router has to be configured in the System Information Setup page properly. For example, If the host name of your Internet Security Router is "host1" and the DNS Zone Name is "yourdomain.com", The fully qualify domain name (FQDN) is "host1.yourdomain.com".)	
RFC-2136 DDNS Specific Settings	
Primary/Secondary DNS Server [For RFC-2136 DDNS only] Enter the IP addresses of the Primary and secondary DNS Servers in these fields. The IP addresses of the primary and secondary DNS servers are inherited from the settings in the WAN configuration page. Unless you want to change these settings for WAN, leave them as they are.	

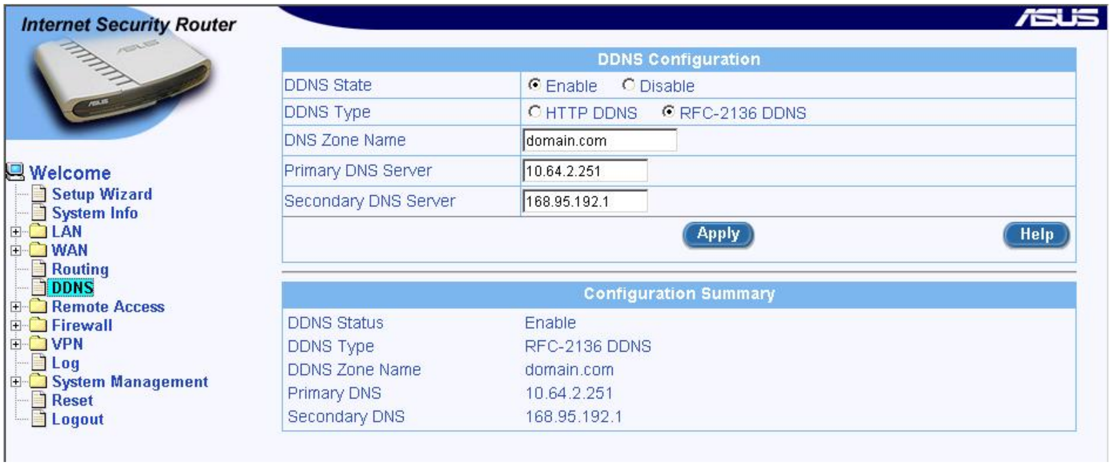
Field	Description
HTTP DDNS Specific Settings	
DDNS Service [For HTTP DDNS only]	
dyndns	Please visit http://www.dyndns.org for more details.
zoneedit	Please visit http://www.zoneedit.com for more details.
dyn-tokyo	Please visit http://www.dns-tokyo.jp for more details.
DDNS Username [For HTTP DDNS only] Enter the username provided by your DDNS service provider in this field.	
DDNS Password [For HTTP DDNS only] Enter the password provided by your DDNS service provider in this field.	

8.2 Access DDNS Configuration Page

Log into Configuration Manager as admin, and then click the **DDNS** menu. The DDNS Configuration page displays, as shown in Figure 8.3.

Note that when you open the DDNS Configuration page, a list of existing DDNS configuration is displayed at the bottom half of the configuration page such as those shown in Figure 8.3.

8.3 Configuring RFC-2136 DDNS Client



DDNS Configuration

DDNS State	● Enable ○ Disable
DDNS Type	○ HTTP DDNS ● RFC-2136 DDNS
DNS Zone Name	domain.com
Primary DNS Server	10.64.2.251
Secondary DNS Server	168.95.192.1

Configuration Summary

DDNS Status	Enable
DDNS Type	RFC-2136 DDNS
DDNS Zone Name	domain.com
Primary DNS	10.64.2.251
Secondary DNS	168.95.192.1

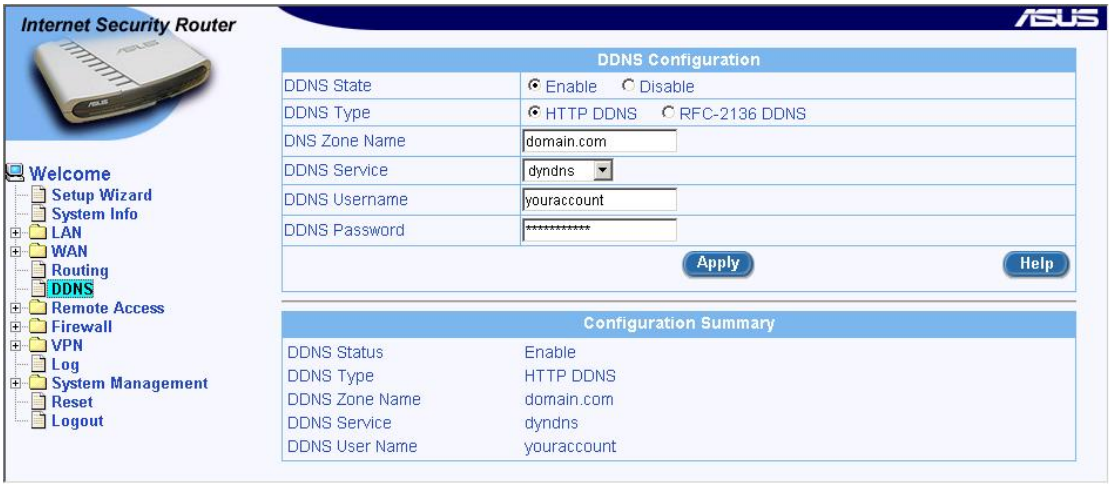
Figure 8.3. RFC-2136 DDNS Configuration Page

Follow these instructions to configure the RFC-2136 DDNS:

1. First you need to ask your system administrator to turn on the DNS dynamic update functionality on your DNS server. If you are running Windows 2000/XP/2003 DNS server, Please refer to the Microsoft Knowledge Base article "*Q317590: Configure DNS Dynamic Update in Windows 2000*", for details.
2. Make sure that you have a host name configured for the Internet Security Router; otherwise, go to the **System Information Configuration** page (System Management **è** System Identity) to configure one.
3. Open the DDNS Configuration page (see section 8.2 Access DDNS Configuration Page).

4. In the DDNS Configuration page, select "Enable" for the DDNS State and "RFC-2136 DDNS" for the DDNS Type. The RFC-2136 DDNS Configuration page is then displayed as shown in Figure 8.3.
5. Enter the domain name in the DNS Zone Name field.
6. There is no need to change the settings for the primary and secondary DNS servers as they are inherited from the settings in the WAN configuration page. Unless you want to change these settings for WAN, leave them as they are.
7. Click on Apply button to send a DNS update request to the DNS server(s) as specified in the Primary DNS and Secondary DNS fields. Note that DNS update request will also be sent to the DNS Server automatically whenever the WAN port status is changed.

8.4 Configuring HTTP DDNS Client



DDNS Configuration	
DDNS State	● Enable ○ Disable
DDNS Type	● HTTP DDNS ○ RFC-2136 DDNS
DNS Zone Name	domain.com
DDNS Service	dyndns
DDNS Username	youraccount
DDNS Password	************

Configuration Summary	
DDNS Status	Enable
DDNS Type	HTTP DDNS
DDNS Zone Name	domain.com
DDNS Service	dyndns
DDNS User Name	youraccount

Figure 8.4. HTTP DDNS Configuration Page

Follow these instructions to configure the HTTP DDNS:

1. First, you should have already registered a domain name to the DDNS service provider. If you have not done so, please visit www.dns-tokyo.jp or www.dyndns.org for more details.
2. Make sure that you have a host name configured for the Internet Security Router; otherwise, go to the **System Information Configuration** page (System Management è System Identity) to configure one.
3. Open the DDNS Configuration page (see section 8.2 Access DDNS Configuration Page).
4. In the DDNS Configuration page, select "Enable" for the DDNS State and "HTTP DDNS" for the DDNS Type. The HTTP DDNS Configuration is then displayed as shown in Figure 8.4.
5. Enter the domain name in the DNS Zone Name field.
6. Select a DDNS service from the DDNS Service drop-down list.
7. Enter the username and password provided by your DDNS service providers.
8. Click on Apply button to send a DNS update request to your DDNS service provider. Note that DNS update request will also be sent to your DDNS Service provider automatically whenever the WAN port status is changed.

9 Configuring Firewall/NAT Settings

The Internet Security Router provides built-in firewall/NAT functions, enabling you to protect the system against denial of service (DoS) attacks and other types of malicious accesses to your LAN while providing Internet access sharing at the same time. You can also specify how to monitor attempted attacks, and who should be automatically notified.

This chapter describes how to create/modify/delete ACL (Access Control List) rules to control the data passing through your network. You will use firewall configuration pages to:

„ Create, modify, delete and view inbound/outbound ACL rules.

„ Create, modify and delete pre-defined services, IP pools, NAT pools, application filters and time ranges to be used in inbound/outbound ACL configurations.

„ View firewall statistics.

Note: *When you define an ACL rule, you instruct the Internet Security Router to examine each data packet it receives to determine whether it meets criteria set forth in the rule. The criteria can include the network or internet protocol it is carrying, the direction in which it is traveling (for example, from the LAN to the Internet or vice versa), the IP address of the sending computer, the destination IP address, and other characteristics of the packet data.*

If the packet matches the criteria established in a rule, the packet can either be accepted (forwarded towards its destination), or denied (discarded), depending on the action specified in the rule.

9.1 Firewall Overview

9.1.1 Stateful Packet Inspection

The stateful packet inspection engine in the Internet Security Router maintains a state table that is used to keep track of connection states of all the packets passing through the firewall. The firewall will open a “hole” to allow the packet to pass through if the state of the packet that belongs to an already established connection matches the state maintained by the stateful packet inspection engine. Otherwise, the packet will be dropped. This “hole” will be closed when the connection session terminates. No configuration is required for stateful packet inspection; it is enabled by default when the firewall is enabled. Please refer to section 12.1 Configure System Services to enable or disable firewall service on the Internet Security Router.

9.1.2 DoS (Denial of Service) Protection

Both DoS protection and stateful packet inspection provide first line of defense for your network. No configuration is required for both protections on your network as long as firewall is enabled for the Internet Security Router. By default, the firewall is enabled at the factory. Please refer to section 12.1 Configure System Services to enable or disable firewall service on the Internet Security Router.

9.1.3 Firewall and Access Control List (ACL)

9.1.3.1 Priority Order of ACL Rule

All ACL rules have a rule ID assigned – the smaller the rule ID, the higher the priority. Firewall monitors the traffic by extracting header information from the packet and then either drops or forwards the packet by looking for a match in the ACL rule table based on the header information. Note that the ACL rule checking starts from the rule with the smallest rule ID until a match is found or all the ACL rules are examined. If no match is found, the packet is dropped; otherwise, the packet is either dropped or forwarded based on the action defined in the matched ACL rule.

9.1.3.2 Tracking Connection State

The stateful inspection engine in the firewall keeps track of the state, or progress, of a network connection. By storing information about each connection in a state table, Internet Security Router is able to quickly determine if a packet passing through the firewall belongs to an already established connection. If it does, it is passed through the firewall without going through ACL rule evaluation.

For example, an ACL rule allows outbound ICMP packet from 192.168.1.1 to 192.168.2.1. When 192.168.1.1 send an ICMP echo request (i.e. a ping packet) to 192.168.2.1, 192.168.2.1 will send an ICMP echo reply to 192.168.1.1. In the Internet Security Router, you don't need to create another inbound ACL rule because stateful packet inspection engine will remember the connection state and allows the ICMP echo reply to pass through the firewall

9.1.4 Default ACL Rules

The Internet Security Router supports three types of default access rules:

- Inbound Access Rules: for controlling incoming access to computers on your LAN.
- Outbound Access Rules: for controlling outbound access to external networks for hosts on your LAN.
- Self Access Rules: for controlling access to the Internet Security Router itself.

Default Inbound Access Rules

No default inbound access rule is configured. That is, all traffic from external hosts to the internal hosts is denied.

Default Outbound Access Rules

The default outbound access rule allows all the traffic originated from your LAN to be forwarded to the external network using NAT.

WARNING

It is not necessary to remove the default ACL rule from the ACL rule table! It is better to create higher priority ACL rules to override the default rule.

9.2 NAT Overview

Network Address Translation allows use of a single device, such as the Internet Security Router, to act as an agent between the Internet (public network) and a local (private) network. This means that a NAT IP address can represent an entire group of computers to any entity outside a network. Network Address Translation (NAT) is a mechanism for conserving registered IP addresses in large networks and simplifying IP addressing management tasks. Because of the translation of IP addresses, NAT also conceals true network address from privy eyes and provide a certain degree security to the local network.

The NAT modes supported are static NAT, dynamic NAT, NAPT, reverse static NAT and reverse NAPT.

9.2.1 Static (One to One) NAT

Static NAT maps an internal host address to a globally valid Internet address (one-to-one). The IP address in each packet is directly translated with a globally valid IP contained in the mapping. Figure 9.1 illustrates the IP address mapping relationship between the four private IP addresses and the four globally valid IP addresses. Note that this mapping is static, i.e. the mapping will not change over time until this mapping is manually changed by the administrator. This means that a host will always use the same global valid IP address for all its outgoing traffic.

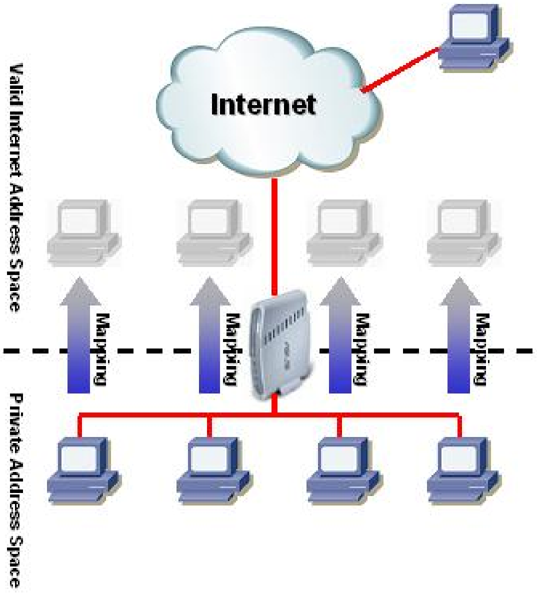
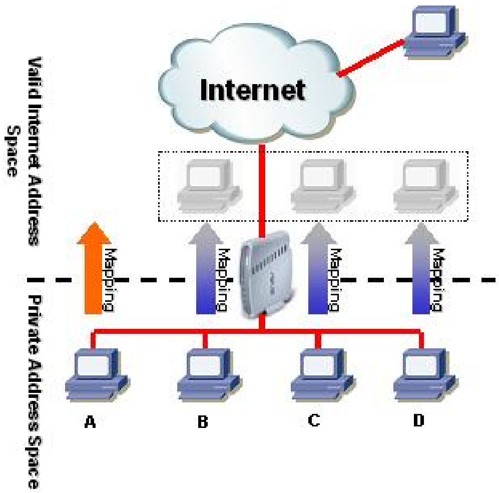


Figure 9.1 Static NAT – Mapping Four Private IP Addresses to Four Globally Valid IP Addresses

9.2.2 Dynamic NAT

Dynamic NAT maps an internal host dynamically to a globally valid Internet address (m-to-n). The mapping usually contains a pool of internal IP addresses (m) and a pool of globally valid Internet IP addresses (n) with m usually greater than n. Each internal IP address is mapped to one external IP address on a first come first serve basis. Figure 9.2 shows that PC B, C and D are mapped to a globally valid IP address respectively, while PC A does not map to any globally valid IP address. If PC A wants to go to the Internet, PC A must wait until a global valid IP address is available. For example, in Figure 9.3, PC B must disconnect from the Internet first to allow PC A to access Internet.



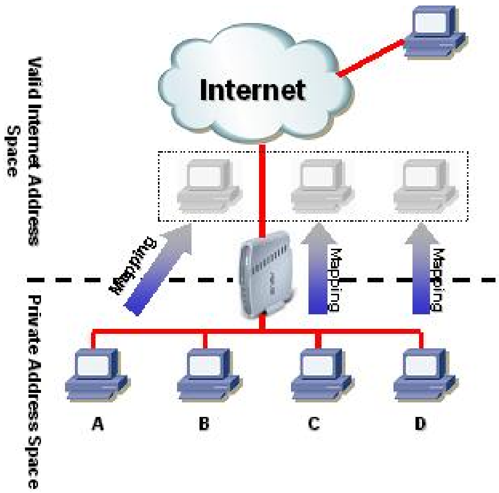


Figure 9.2 Dynamic NAT – Four Private IP addresses Mapped to Three Valid IP Addresses

Figure 9.3 Dynamic NAT – PC-A can get an NAT association after PC-B is disconnected

9.2.3 NAPT (Network Address and Port Translation) or PAT (Port Address Translation)

Also called IP Masquerading, this feature maps many internal hosts to one globally valid Internet address. The mapping contains a pool of network ports to be used for translation. Every packet is translated with the globally valid Internet address and the port number is translated with an un-used port from the pool of network ports. Figure 9.4 shows that all the hosts on the local network gain access to the Internet by mapping to only one globally valid IP address and different port numbers from a free pool of network ports.

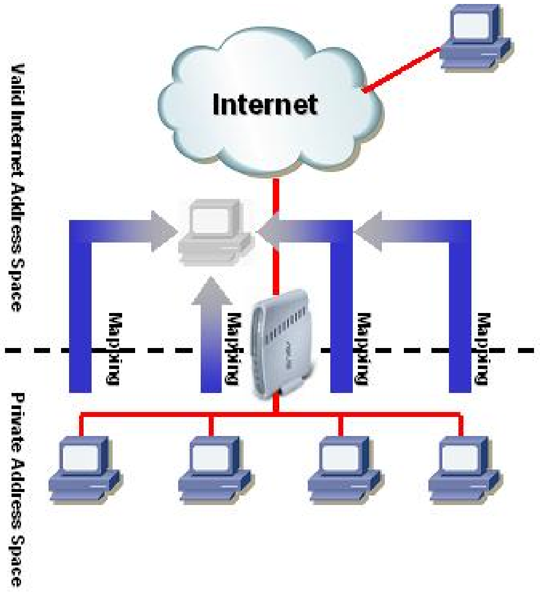


Figure 9.4 NAPT – Map Any Internal PCs to a Single Global IP Address

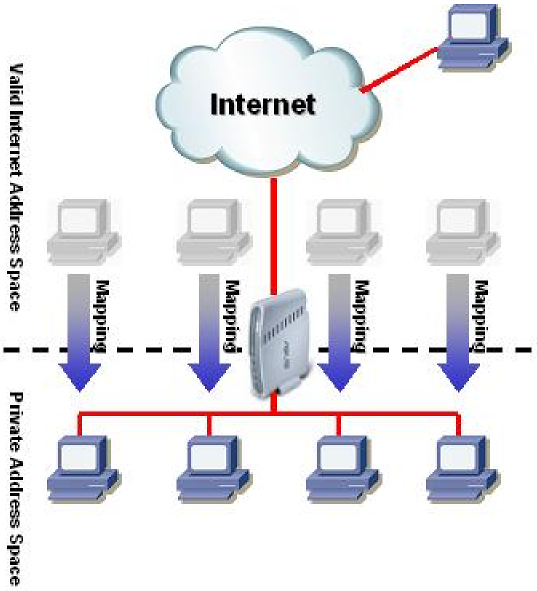


Figure 9.5 Reverse Static NAT – Map a Global IP Address to An Internal PC

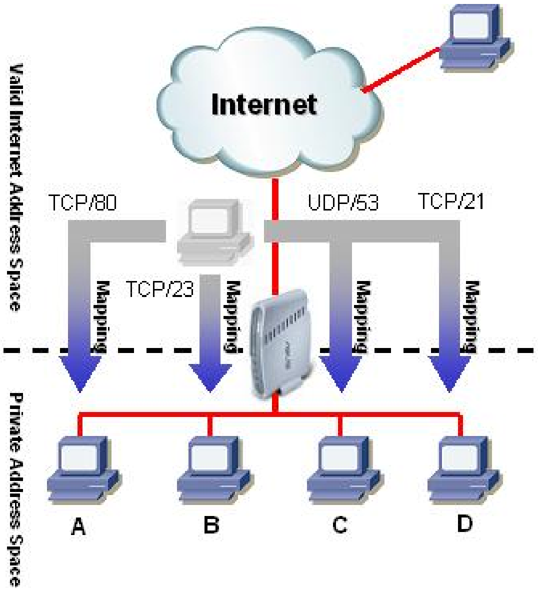


Figure 9.6 Reverse NAPT – Relayed Incoming Packets to the Internal Host Base on the Protocol, Port Number or IP Address

9.2.4 Reverse Static NAT

Reverse static NAT maps a globally valid IP address to an internal host address for the inbound traffic. All packets coming to that globally valid IP address are relayed to the Internal address. This is useful when hosting services in an internal machine. Figure 9.5 shows that four globally valid IP addresses are mapped to four hosts on the internal network and each can be used to host some services for inbound traffic, e.g. FTP server.

9.2.5 Reverse NAPT / Virtual Server

Reverse NAPT is also called inbound mapping, port mapping, or virtual server. Any packet coming to the Internet Security Router can be relayed to the internal host based on the protocol, port number and/or IP address specified in the ACL rule. This is useful when multiple services are hosted on different internal machines. Figure 9.6 shows that web server (TCP/80) is hosted on PC A, telnet server (TCP/23) on PC B, DNS server (UDP/53) on PC C and FTP server (TCP/21) on PC D. This means that the inbound traffic of these four services will be directed to respective host hosting these services.

9.3 Configuring Inbound ACL Rules

By creating ACL rules in Inbound ACL configuration page as shown in Figure 9.7, you can control (allow or deny) incoming access to computers on your LAN.

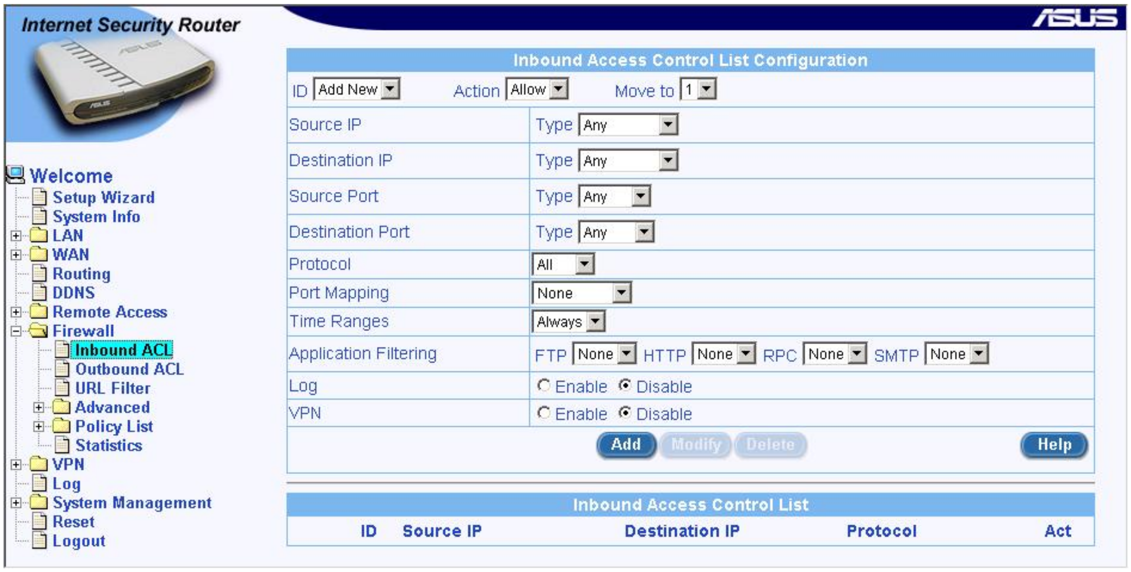
Options in this configuration page allow you to:

„ Add a rule, and set parameters for it

„ Modify an existing rule

„ Delete an existing rule

„ View configured ACL rules



Inbound Access Control List Configuration

ID Add New	Action Allow Move to 1
Source IP	Type Any
Destination IP	Type Any
Source Port	Type Any
Destination Port	Type Any
Protocol	All
Port Mapping	None
Time Ranges	Always
Application Filtering	FTP None HTTP None RPC None SMTP None
Log	○ Enable ● Disable
VPN	○ Enable ● Disable

Inbound Access Control List

ID	Source IP	Destination IP	Protocol	Act

Figure 9.7. Inbound ACL Configuration Page

9.3.1 Inbound ACL Rule Configuration Parameters

Table 9.1 describes the configuration parameters available for firewall inbound ACL rule.

Table 9.1. Inbound ACL Rule Configuration Parameters

Field	Description

Field	Description
ID	
Add New	Click on this option to add a new 'basic' Firewall rule.
Rule Number	Select a rule from the drop-down list, to modify its attributes.
Action	
Allow	Select this button to configure the rule as an **allow** rule. This rule when bound to the Firewall will allow matching packets to pass through.
Deny	Select this button to configure the rule as a **deny** rule. This rule when bound to the Firewall will **not allow** matching packets to pass through.
Mave to This option allows you to set a priority for this rule. The Internet Security Router Firewall acts on packets based on the priority of the rules. Set a priority by specifying a number for its position in the list of rules:	
1 (First)	This number marks the highest priority.
Other numbers	Select other numbers to indicate the priority you wish to assign to the rule.
Source IP This option allows you to set the **source network** to which this rule should apply. Use the drop-down list to select one of the following options:	
Any	This option allows you to apply this rule to all the computers in the source network, such as those on the Internet.
IP Address	This option allows you to specify an IP address on which this rule will be applied.
IP Address	Specify the appropriate network address
Subnet	This option allows you to include all the computers that are connected in an IP subnet. When this option is selected, the following fields become available for entry:
Address	Enter the appropriate IP address.
Mask	Enter the corresponding subnet mask.
Range	This option allows you to include a range of IP addresses for applying this rule. The following fields become available for entry when this option is selected:
Begin	Enter the starting IP address of the range
End	Enter the ending IP address of the range
IP Pool	This option allows you to associate a pre-configured IP pool with this rule. The available IP pool can be selected from the IP pool drop-down list.
Destination IP This option allows you to set the **destination network** to which this rule should apply. Use the drop-down list to select one of the following options:	
Any	This option allows you to apply this rule to all the computers in the local network.

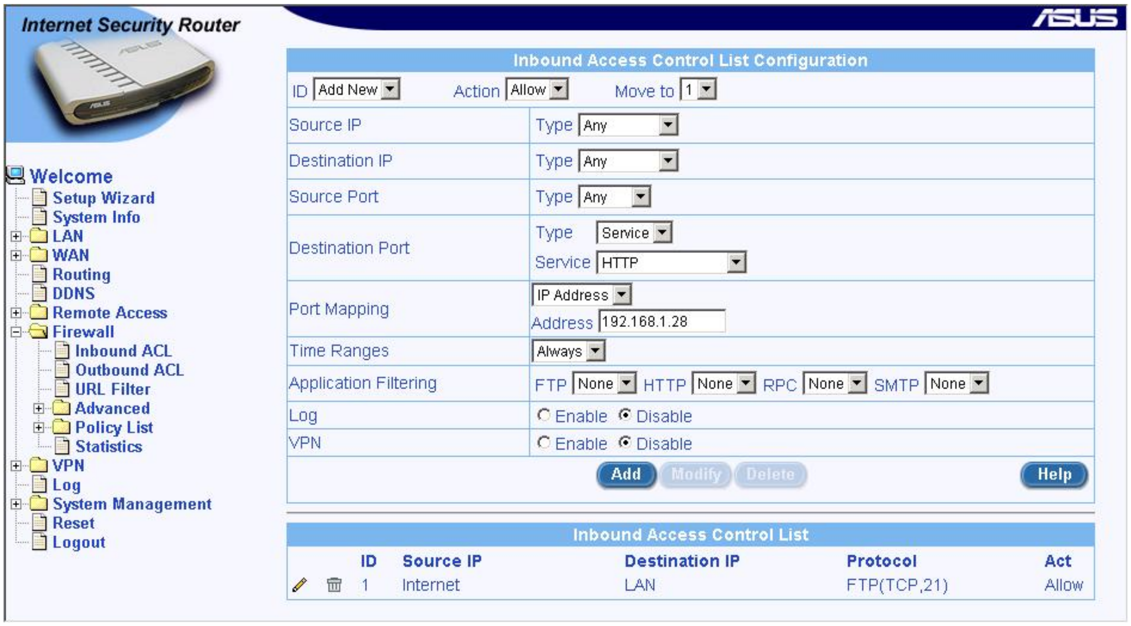
Field	Description
IP Address, Subnet, Range and IP Pool	Select any of these options and enter details as described in the **Source IP** section above.
Source Port This option allows you to set the source port to which this rule should apply. Use the drop-down list to select one of the following options:	
Any	Select this option if you want this rule to apply to all applications with an arbitrary source port number.
Single	This option allows you to apply this rule to an application with a specific source port number.
Port Number	Enter the source port number
Range	Select this option if you want this rule to apply to applications with this port range. The following fields become available for entry when this option is selected.
Begin	Enter the starting port number of the range
End	Enter the ending port number of the range
Destination Port This option allows you to set the destination port to which this rule should apply. Use the drop-down list to select one of the following options:	
Any	Select this option if you want this rule to apply to all applications with an arbitrary destination port number.
Single, Range	Select any of these and enter details as described in the **Source Port** section above.
Service	This option allows you to select any of the pre-configured services (selectable from the drop-down list) instead of the destination port. The following are examples of services: BATTLE-NET, PC-ANYWHERE, FINGER, DIABLO-II, L2TP, H323GK, CUSEEME, MSN-ZONE, ILS, ICQ_2002, ICQ_2000, MSN, AOL, RPC, RTSP7070, RTSP554, QUAKE, N2P, PPTP, MSG2, MSG1, IRC, IKE, H323, IMAP4, HTTPS, DNS, SNMP, NNTP, POP3, SMTP, HTTP, FTP, TELNET. **Note:** service is a combination of protocol and port number. They appear here after you add them in the “Firewall Service” configuration page.
Protocol This option allows you to select protocol type from a drop-down list. Available settings are All, TCP, UDP, ICMP, AH and ESP. Note that if you select “service” for the destination port, this option will not be available.	
NAT This option allows you to select the type of NAT for the inbound traffic.	
None	Select this option if you don't intend to use NAT in this inbound ACL rule.
IP Address	Select this option to specify the IP address of the computer (usually a server in your LAN) that you want the incoming traffic to be directed. Note this option is called reverse NAPT or virtual server.
NAT Pool	Select this option to associate a pre-configured NAT pool to the rule. Note that only reverse static NAT and reverse NAPT pool can be used to

Field	Description
	associate with an inbound ACL rule.
Time Ranges	Select a pre-configured time range during which the rule is active. Select "Always" to make the rule active at all times.
Application Filtering	This option allows you to select pre-configured FTP, HTTP, RPC and/or SMTP application filters from the drop-down list.
Log	Click on the "Enable" or "Disable" radio button to enable or disable logging for this ACL rule.
VPN	Click on the "Enable" radio button if you want the traffic to go through VPN; otherwise, click on the "Disable" radio button.

9.3.2 Access Inbound ACL Rule Configuration Page – (Firewall è Inbound ACL)

Log into Configuration Manager as admin, click the **Firewall** menu, and then click the **Inbound ACL** submenu. The Firewall Inbound ACL Configuration page displays, as shown in Figure 9.7.

Note that when you open the Inbound ACL Configuration page, a list of existing ACL rules is also displayed at the bottom half of the configuration page such as those shown in Figure 9.8.



Inbound Access Control List Configuration

ID Add New   Action Allow   Move to 1

Source IP	Type Any
Destination IP	Type Any
Source Port	Type Any
Destination Port	Type Service Service HTTP
Port Mapping	IP Address Address 192.168.1.28
Time Ranges	Always
Application Filtering	FTP None HTTP None RPC None SMTP None
Log	○ Enable ● Disable
VPN	○ Enable ● Disable

Inbound Access Control List

ID	Source IP	Destination IP	Protocol	Act
1	Internet	LAN	FTP(TCP,21)	Allow

Figure 9.8. Inbound ACL configuration example

9.3.3 Add Inbound ACL Rules

To add an inbound ACL rule, follow the instructions below:

1. Open the Outbound ACL Rule Configuration Page (see section *9.3.2 Access Inbound ACL Rule Configuration Page*).
2. Select "**Add New**" from the "**ID**" drop-down list.
3. Set desired action (Allow or Deny) from the "**Action**" drop-down list.

4. Make changes to any or all of the following fields: source/destination IP, source/destination port, protocol, port mapping, time ranges, application filtering, log, and VPN. Please see Table 9.1 for explanation of these fields.
5. Assign a priority for this rule by selecting a number from the "**Move to**" drop-down list. Note that the number indicates the priority of the rule with 1 being the highest. Higher priority rules will be examined prior to the lower priority rules by the firewall.
6. Click on the Add button to create the new ACL rule. The new ACL rule will then be displayed in the inbound access control list table at the bottom half of the Inbound ACL Configuration page.

Figure 9.8 illustrates how to create a rule to allow inbound HTTP (i.e. web server) service. This rule allows inbound HTTP traffic to be directed to the host w/ IP address 192.168.1.28.

9.3.4 Modify Inbound ACL Rules

To modify an inbound ACL rule, follow the instructions below:

1. Open the Outbound ACL Rule Configuration Page (see section *9.3.2 Access Inbound ACL Rule Configuration Page*).
2. Click on the ✎ icon of the rule to be modified in the inbound ACL table or select the rule number from the "**ID**" drop-down list.
3. Make desired changes to any or all of the following fields: action, source/destination IP, source/destination port, protocol, port mapping, time ranges, application filtering, log, and VPN. Please see Table 9.1 for explanation of these fields.
4. Click on the Add button to modify this ACL rule. The new settings for this ACL rule will then be displayed in the inbound access control list table at the bottom half of the Inbound ACL Configuration page.

9.3.5 Delete Inbound ACL Rules

To delete an inbound ACL rule, click on the 🗑 in front of the rule to be deleted follow the instructions below:

1. Open the Outbound ACL Rule Configuration Page (see section *9.3.2 Access Inbound ACL Rule Configuration Page*).
2. Click on the ✎ icon of the rule to be deleted in the inbound ACL table or select the rule number from the "**ID**" drop-down list.
3. Click on the Delete button to delete this ACL rule. Note that the ACL rule deleted will be removed from the ACL rule table located at the bottom half of the same configuration page.

9.3.6 Display Inbound ACL Rules

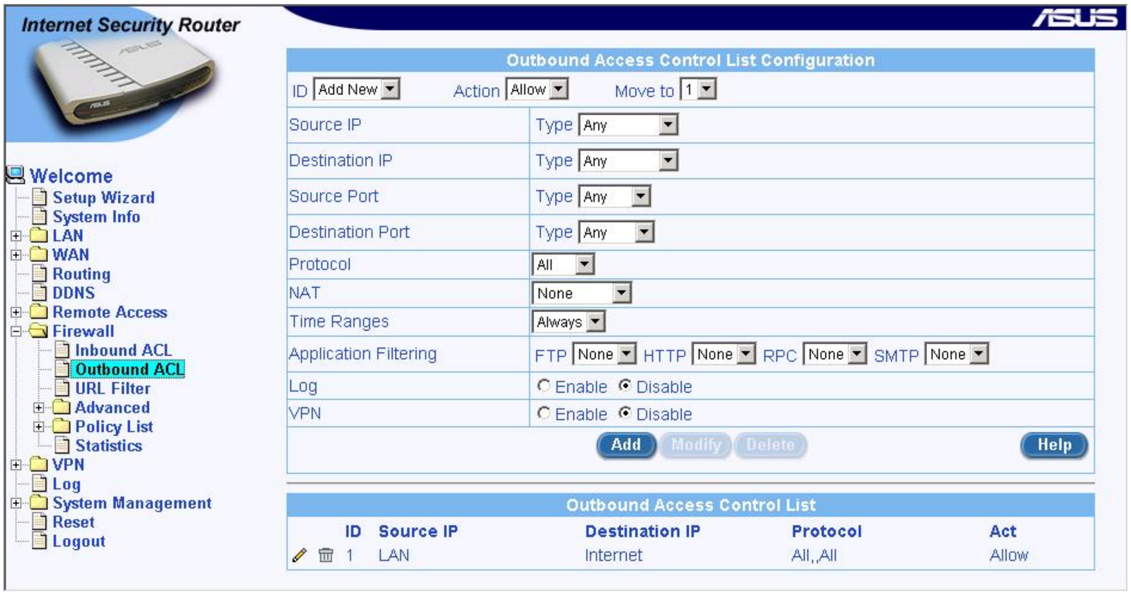
To see existing inbound ACL rules, just open the Inbound ACL Rule Configuration page as described in section *9.3.2 Access Inbound ACL Rule Configuration Page*.

9.4 Configuring Outbound ACL Rules

By creating ACL rules in outbound ACL configuration page as shown in Figure 9.9, you can control (allow or deny) Internet or external network access for computers on your LAN.

Options in this configuration page allow you to:

- Add a rule, and set parameters for it
- Modify an existing rule
- Delete an existing rule
- View configured ACL rules



Outbound Access Control List Configuration

ID: Add New	Action: Allow Move to: 1
Source IP	Type: Any
Destination IP	Type: Any
Source Port	Type: Any
Destination Port	Type: Any
Protocol	All
NAT	None
Time Ranges	Always
Application Filtering	FTP: None HTTP: None RPC: None SMTP: None
Log	○ Enable ● Disable
VPN	○ Enable ● Disable

Outbound Access Control List

ID	Source IP	Destination IP	Protocol	Act
1	LAN	Internet	All,,All	Allow

Figure 9.9. Outbound ACL Configuration Page

9.4.1 Outbound ACL Rule Configuration Parameters

Table 9.2 describes the configuration parameters available for firewall outbound ACL rule.

Table 9.2. Outbound ACL Rule Configuration Parameters

Field	Description
ID	
Add New	Click on this option to add a new 'basic' Firewall rule.
Rule Number	Select a rule from the drop-down list, to modify its attributes.
Action	
Allow	Select this button to configure the rule as an **allow** rule. This rule when bound to the Firewall will allow matching packets to pass through.
Deny	Select this button to configure the rule as a **deny** rule. This rule when bound to the Firewall will **not allow** matching packets to pass through.
Mave to This option allows you to set a priority for this rule. The Internet Security Router Firewall acts on packets based on the priority of the rules. Set a priority by specifying a number for its position in the list of rules:	
1 (First)	This number marks the highest priority.
Other numbers	Select other numbers to indicate the priority you wish to assign to the rule.
Source IP This option allows you to set the **source network** to which this rule should apply. Use the drop-down list to select one of the following options:	
Any	This option allows you to apply this rule to all the computers in the local

Field	Description
	network.
IP Address	This option allows you to specify an IP address on which this rule will be applied.
IP Address	Specify the appropriate network address
Subnet	This option allows you to include all the computers that are connected in an IP subnet. When this option is selected, the following fields become available for entry:
Address	Enter the appropriate IP address.
Mask	Enter the corresponding subnet mask.
Range	This option allows you to include a range of IP addresses for applying this rule. The following fields become available for entry when this option is selected:
Begin	Enter the starting IP address of the range
End	Enter the ending IP address of the range
IP Pool	This option allows you to associate a pre-configured IP pool with this rule. The available IP pool can be selected from the IP pool drop-down list.
Destination IP This option allows you to set the **destination network** to which this rule should apply. Use the drop-down list to select one of the following options:	
Any	This option allows you to apply this rule to all the computers in the destination network, such as those on the Internet.
IP Address, Subnet, Range and IP Pool	Select any of these and enter details as described in the **Source IP** section above.
Source Port This option allows you to set the source port to which this rule should apply. Use the drop-down list to select one of the following options:	
Any	Select this option if you want this rule to apply to all applications with an arbitrary source port number.
Single	This option allows you to apply this rule to an application with a specific source port number.
Port Number	Enter the source port number
Range	Select this option if you want this rule to apply to applications with this port range. The following fields become available for entry when this option is selected.
Begin	Enter the starting port number of the range
End	Enter the ending port number of the range
Destination Port This option allows you to set the destination port to which this rule should apply. Use the drop-down list to select one of the following options:	
Any	Select this option if you want this rule to apply to all applications with an arbitrary destination port number.

Field	Description
Single, Range	Select any of these and enter details as described in the **Source Port** section above.
Service	This option allows you to select any of the pre-configured services (selectable from the drop-down list) instead of the destination port. The following are examples of services: BATTLE-NET, PC-ANYWHERE, FINGER, DIABLO-II, L2TP, H323GK, CUSEEME, MSN-ZONE, ILS, ICQ_2002, ICQ_2000, MSN, AOL, RPC, RTSP7070, RTSP554, QUAKE, N2P, PPTP, MSG2, MSG1, IRC, IKE, H323, IMAP4, HTTPS, DNS, SNMP, NNTP, POP3, SMTP, HTTP, FTP, TELNET. **Note:** service is a combination of protocol and port number. They appear here after you add them in the “Firewall Service” configuration page.
Protocol This option allows you to select protocol type from a drop-down list. Available settings are All, TCP, UDP, ICMP, AH and ESP. Note that if you select “service” for the destination port, this option will not be available.	
NAT This option allows you to select the type of NAT for the outbound traffic.	
None	Select this option if you don’t intend to use NAT in this outbound ACL rule.
IP Address	Select this option to specify the IP address that you want the outbound traffic to use. Note this option is called NAPT or overload.
NAT Pool	Select this option to associate a pre-configured NAT pool to the rule. Note that only static, dynamic and overload NAT pool can be used to associate with an outbound ACL rule.
Interface	Select this option to use the WAN interface IP address for the outbound traffic. Note that WAN IP must be configured prior to selecting this option.
Time Ranges Select a pre-configured time range during which the rule is active. Select “Always” to make the rule active at all times.	
Application Filtering This option allows you to select pre-configured FTP, HTTP, RPC and/or SMTP application filters from the drop-down list.	
Log Click on the “Enable” or “Disable” radio button to enable or disable logging for this ACL rule.	
VPN Click on the “Enable” radio button if you want the traffic to go through VPN; otherwise, click on the “Disable” radio button.	

9.4.2 Access Outbound ACL Rule Configuration Page – (Firewall è Outbound ACL)

Log into Configuration Manager as admin, click the **Firewall** menu, and then click the **Outbound ACL** submenu. The Firewall Outbound ACL Configuration page displays, as shown in Figure 9.9.

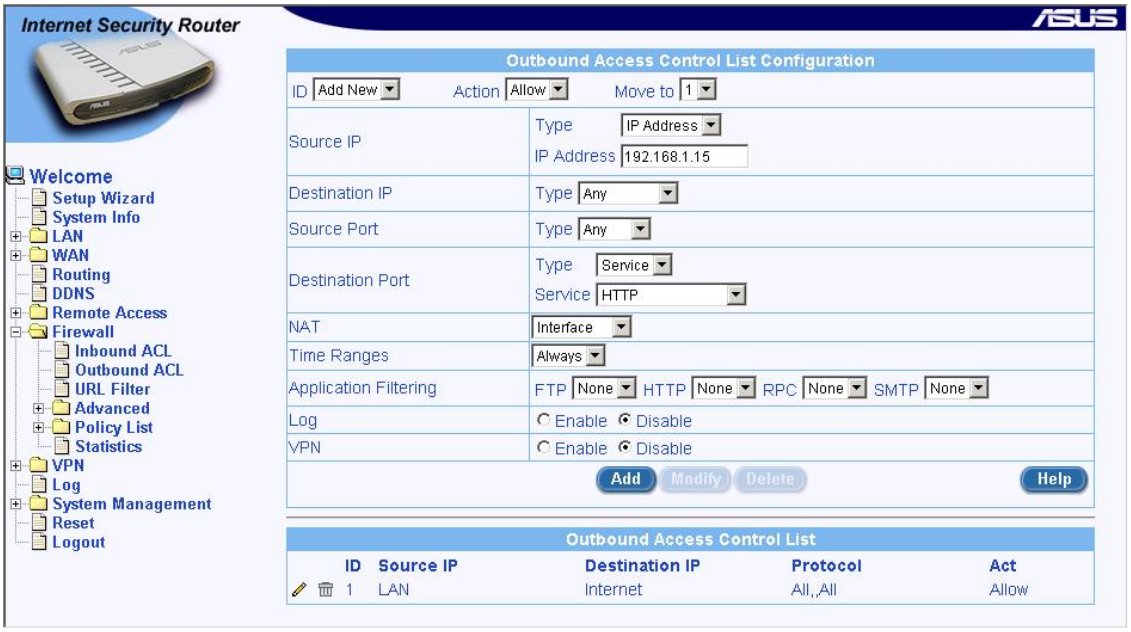
Note that when you open the Outbound ACL Configuration page, a list of existing ACL rules is also displayed at the bottom half of the configuration page such as those shown in Figure 9.9.

9.4.3 Add an Outbound ACL Rule

To add an outbound ACL rule, follow the instructions below:

1. Open the Outbound ACL Rule Configuration Page (see section 9.4.2 Access Outbound ACL Rule Configuration Page).
2. Select "**Add New**" from the "**ID**" drop-down list.
3. Set desired action (Allow or Deny) from the "**Action**" drop-down list.
4. Make changes to any or all of the following fields: source/destination IP, source/destination port, protocol, NAT, time ranges, application filtering, log, and VPN. Please see Table 9.2 for explanation of these fields.
5. Assign a priority for this rule by selecting a number from the "**Move to**" drop-down list. Note that the number indicates the priority of the rule with 1 being the highest. Higher priority rules will be examined prior to the lower priority rules by the firewall.
6. Click on the Add button to create the new ACL rule. The new ACL rule will then be displayed in the outbound access control list table at the bottom half of the Outbound ACL Configuration page.

Figure 9.10 illustrates how to create a rule to allow outbound HTTP traffic. This rule allows outbound HTTP traffic to be directed to any host on the external network for a host in your LAN w/ IP address 192.168.1.15.



Outbound Access Control List Configuration

ID Add New Action Allow Move to 1

Source IP	Type IP Address IP Address 192.168.1.15
Destination IP	Type Any
Source Port	Type Any
Destination Port	Type Service Service HTTP
NAT	Interface
Time Ranges	Always
Application Filtering	FTP None HTTP None RPC None SMTP None
Log	○ Enable ● Disable
VPN	○ Enable ● Disable

Outbound Access Control List

	ID	Source IP	Destination IP	Protocol	Act
✎ 🗑	1	LAN	Internet	All,,All	Allow

Figure 9.10. Outbound ACL Configuration Example

9.4.4 Modify Outbound ACL Rules

To modify an outbound ACL rule, follow the instructions below:

1. Open the Outbound ACL Rule Configuration Page (see section 9.4.2 Access Outbound ACL Rule Configuration Page).
2. Click on the ✎ icon of the rule to be modified in the outbound ACL table or select the rule number from the "**ID**" drop-down list.
3. Make desired changes to any or all of the following fields: action, source/destination IP, source/destination port, protocol, NAT, time ranges, application filtering, log, and VPN. Please see Table 9.2 for explanation of these fields.

4. Click on the Modify button to modify this ACL rule. The new settings for this ACL rule will then be displayed in the outbound access control list table at the bottom half of the Outbound ACL Configuration page.

9.4.5 Delete Outbound ACL Rules

To delete an outbound ACL rule, just click on the 🗑 in front of the rule to be deleted or follow the instructions below:

1. Open the Outbound ACL Rule Configuration Page (see section 9.4.2 Access Outbound ACL Rule Configuration Page).
2. Click on the ✏ icon of the rule to be deleted in the outbound ACL table or select the rule number from the "**ID**" drop-down list.
3. Click on the Delete button to delete this ACL rule. Note that the ACL rule deleted will be removed from the ACL rule table located at the bottom half of the same configuration page.

9.4.6 Display Outbound ACL Rules

To see existing outbound ACL rules, just open the Outbound ACL Rule Configuration page as described in section *9.4.2 Access Outbound ACL Rule Configuration Page*.

9.5 Configuring URL Filters

Keyword based URL (Uniform Resource Locator, e.g. www.yahoo.com) filtering allows you to define one or more keywords that should not appear in URL's. Any URL containing one or more of these keywords will be blocked. This is a policy independent feature i.e. it cannot be associated to ACL rules. This feature can be independently enabled/disabled, but works only if firewall is enabled.

9.5.1 URL Filter Configuration Parameters

Table 9.3 describes the configuration parameters available for an URL filter rule.

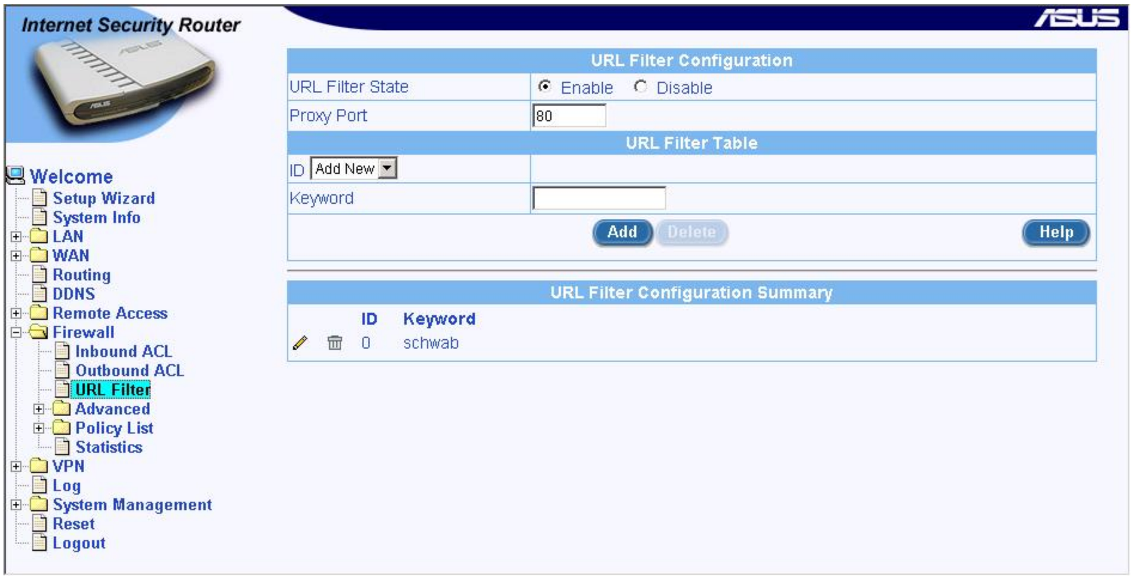
Table 9.3. URL Filter Configuration Parameters

Field	Description
URL Filter State	Click on "Enable" or "Disable" radio button to enable or disable URL filtering.
Proxy Server Port	Enter the proxy server (web server) port number configured for your web browser. Note that the proxy server port change requires you to disable and enable the firewall to take effect.
ID	
Add New	Click on this option to add a new URL filter rule.
Rule Number	Select a rule from the drop-down list to modify its attributes.
Keyword	Define a keyword that should not appear in the URL.

9.5.2 Access URL Filter Configuration Page – (Firewall è URL Filter)

Log into Configuration Manager as admin, click the **Firewall** menu, and then click the **URL Filter** submenu. The Firewall URL Filter Configuration page displays, as shown in Figure 9.11.

Note that when you open the URL Filter Configuration page, a list of existing URL filter rules is also displayed at the bottom half of the configuration page such as those shown in Figure 9.11.



URL Filter Configuration	
URL Filter State	● Enable ○ Disable
Proxy Port	80

URL Filter Table	
ID	Add New
Keyword	

URL Filter Configuration Summary

		ID	Keyword
✎	🗑	0	schwab

Figure 9.11. URL Filter Configuration Page

9.5.3 Add an URL Filter Rule

To add an URL Filter, follow the instructions below:

1. Open the URL Configuration page (see section 9.5.2 Access URL Filter Configuration Page).
2. Select "**Add New**" from the "**ID**" drop-down list.
3. Enter a keyword to the Keyword field.
4. Click on the Add button to create the URL Filter rule. The new rule will then be displayed in the URL Filter Configuration Summary table.

9.5.4 Modify an URL Filter Rule

To modify an URL Filter rule, you must first delete the existing URL filter rule (see Section 9.5.5) and then add a new one (see Section 9.5.3 Add an URL Filter Rule).

9.5.5 Delete an URL Filter Rule

To delete an URL Filter rule, just click on the 🗑 in front of the rule to be deleted or follow the instructions below:

1. Open the URL Configuration page (see section 9.5.2 Access URL Filter Configuration Page).
2. Click on the ✎ icon of the rule to be deleted in the URL Filter Configuration Summary table or select the rule number from the "**ID**" drop-down list.
3. Click on the Delete button to delete this rule.

9.5.6 View Configured URL Filter Rules

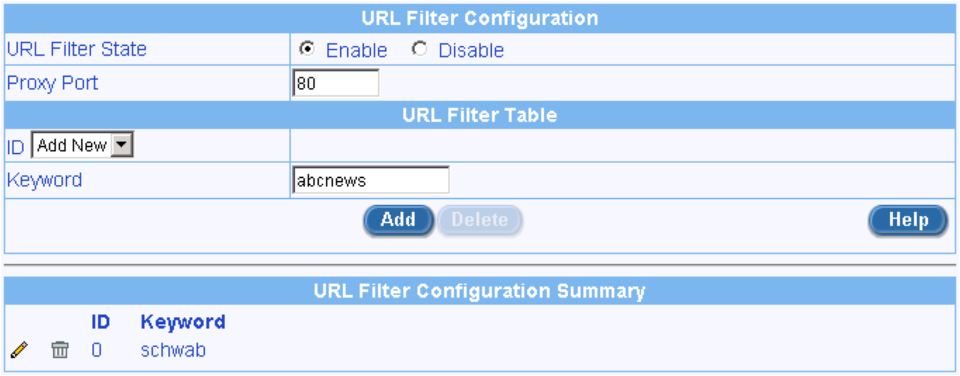
To see existing URL filter rules, just open the URL Filter Configuration page as described in section 9.5.2 Access URL Filter Configuration Page.

9.5.7 URL Filter Rule Example

Figure 9.12 shows an URL filter rule example. It demonstrates

„ How to add the keyword "abcnews". Any URL containing this keyword will be blocked.

„ Set the proxy web server port number to 80 (you may use a different port number for your proxy server). This means that this URL filter rule will be applied over the proxy server port 80 in case a proxy web server is used. If you don't use a proxy server for your browser, this setting will be ignored. Note that you must disable and then enable the firewall for this change to take effect. Please refer to section 12.1 Configure System Services on details of enabling and disabling firewall services.



URL Filter Configuration

URL Filter State	● Enable ○ Disable
Proxy Port	80

URL Filter Table

ID	Add New
Keyword	abcnews

URL Filter Configuration Summary

ID	Keyword
0	schwab

Figure 9.12. URL Filter Rule Example

9.6 Configuring Advanced Firewall Features – (Firewall è Advanced)

This option sequence brings up the screen with the following sub-options for setting advanced firewall features:

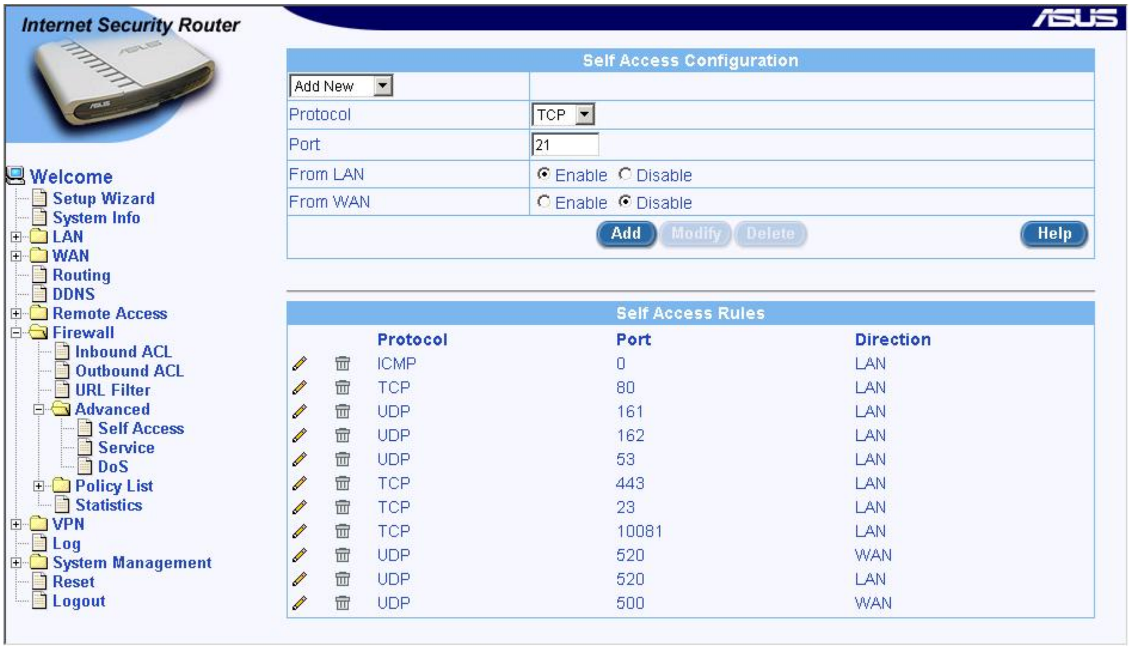
- Self Access – This option allows you to configure rules for controlling packets targeting the Internet Security Router itself.
- Services – Use this option to configure services (applications using specified port numbers). Each service record contains the name of service record, the IP protocol value and its corresponding port number.
- DoS – Use this option to configure DoS – Denial of Service – parameters. This option lists the default set of DoS attacks against which the Internet Security Router firewall provides protection.

The following sections describe usage of these options

9.6.1 Configuring Self Access Rules

Self Access rules control access to the Internet Security Router itself. You may use Self Access Rule Configuration page, as illustrated in Figure 9.13, to:

- Add a Self Access rule, and set basic parameters for it
- Modify an existing Self Access rule
- Delete an existing Self Access rule
- View existing Self Access rules



Self Access Configuration

Add New	
Protocol	TCP
Port	21
From LAN	● Enable ○ Disable
From WAN	○ Enable ● Disable

Self Access Rules

		Protocol	Port	Direction
✎	🗑	ICMP	0	LAN
✎	🗑	TCP	80	LAN
✎	🗑	UDP	161	LAN
✎	🗑	UDP	162	LAN
✎	🗑	UDP	53	LAN
✎	🗑	TCP	443	LAN
✎	🗑	TCP	23	LAN
✎	🗑	TCP	10081	LAN
✎	🗑	UDP	520	WAN
✎	🗑	UDP	520	LAN
✎	🗑	UDP	500	WAN

Figure 9.13. Self Access Rule Configuration Page

9.6.1.1 Self Access Configuration Parameters

Table 9.4 describes the configuration parameters available in the Self Access configuration page.

Table 9.4. Self Access Configuration Parameters

Field	Description
Protocol	Select protocol from drop down list - TCP/ UDP/ICMP
Port	Enter the Port Number.
Direction Select the direction from which the traffic will be allowed.	
From LAN	Select Enable or Disable to allow or deny traffic from the LAN (internal network) to the Internet Security Router.
From WAN	Select Enable or Disable to allow or deny traffic from WAN (external network) to the Internet Security Router.

9.6.1.2 Access Self Access Rule Configuration Page – (Firewall è Advanced è Self Access)

Log into Configuration Manager as admin, click the **Firewall** menu, click the **Advanced** submenu and then click the **Self Access** submenu. The Firewall Self Access Rule Configuration page displays, as shown in Figure 9.13.

Note that when you open the Self Access Configuration page, a list of existing Self Access rules is also displayed at the bottom half of the configuration page such as those shown in Figure 9.13.

9.6.1.3 Add a Self Access Rule

To add a Self Access rule, follow the instructions below:

1. Open the Self Access Rule Configuration page (see section 9.6.1.2 Access Self Access Rule Configuration Page).

2. Select "**Add New**" from the Self Access rule drop-down list.
3. Select a protocol from the Protocol drop-down list. If you select TCP or UDP protocol, you will need to enter port number as well.
4. Click on the Add button to create the new Self Access rule. The new rule will then be displayed in the Self Access Rule list table at the bottom half of the Self Access Rule Configuration page.

Example

Figure 9.13 displays the screen with entries to:

„ Add a new Self Access rule to:

- Allow TCP port 80 traffic (i.e. HTTP traffic) from the LAN and deny the HTTP traffic from the WAN port (i.e. from the external network) to the Internet Security Router.

9.6.1.4 Modify a Self Access Rule

To modify a Self Access rule, follow the instructions below:

1. Open the Self Access Rule Configuration page (see section 9.6.1.2 Access Self Access Rule Configuration Page).
2. Click on the ✎ icon of the Self Access rule to be modified in the Self Access rule table or select the Self Access rule from the Self Access rule drop-down list.
3. You may then disable or enable the traffic from LAN or WAN or both. Note that port number cannot be changed if TCP or UCP protocol is selected. To modify the port number, you must first delete the existing Self Access rule and add a new rule instead.
4. Click on the Modify button to save the changes. The new settings for this Self Access rule will then be displayed in the Self Access rule table located at the bottom half of the Self Access Rule Configuration page.

9.6.1.5 Delete a Self Access Rule

To delete a Self Access rule, click on the 🗑 icon of the rule to be deleted or follow the instruction below:

1. Open the Self Access Rule Configuration page (see section 9.6.1.2 Access Self Access Rule Configuration Page).
2. Click on the ✎ icon of the Self Access rule to be deleted in the Self Access rule table or select the Self Access rule from the Self Access rule drop-down list.
3. Click on the Delete button to delete the rule. Note that the rule deleted will be removed from the Self Access rule table located at the bottom half of the same configuration page.

9.6.1.6 View Configured Self Access Rules

To see existing Self Access Rules, just open the Self Access Rule Configuration page as described in section 9.6.1.2 Access Self Access Rule Configuration Page.

9.6.2 Configuring Service List

Services are a combination of Protocol and Port number. It is used in inbound and outbound ACL rule configuration. You may use Service Configuration Page to:

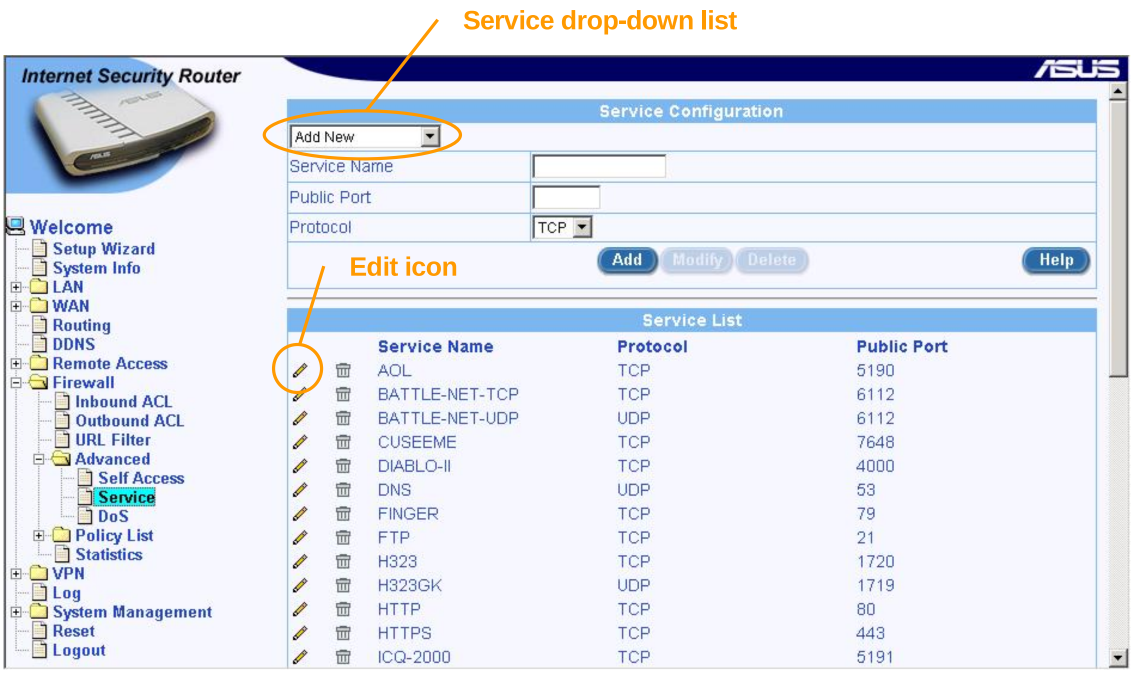
„ Add a service, and set parameters for it

„ Modify an existing service

„ Delete an existing service

„ View configured services

Figure 9.14 shows the Firewall Service List Configuration page. The configured services are listed at the bottom half of the same page.



Service drop-down list

Edit icon

Service Configuration

Add New

Service Name

Public Port

Protocol TCP

Service List

Service Name	Protocol	Public Port
AOL	TCP	5190
BATTLE-NET-TCP	TCP	6112
BATTLE-NET-UDP	UDP	6112
CUSEEME	TCP	7648
DIABLO-II	TCP	4000
DNS	UDP	53
FINGER	TCP	79
FTP	TCP	21
H323	TCP	1720
H323GK	UDP	1719
HTTP	TCP	80
HTTPS	TCP	443
ICQ-2000	TCP	5191

Figure 9.14. Service List Configuration Page

9.6.2.1 Service List Configuration Parameters

Table 9.5 describes the available configuration parameters for firewall service list.

Table 9.5. Service List configuration parameters

Field	Description
Service Name	Enter the name of the Service to be added. Note that only alphanumeric characters are allowed in a name.
Protocol	Enter the type of protocol the service uses.
Port	Enter the port number that is set for this service.

9.6.2.2 Access Service List Configuration Page – (Firewall è Advanced è Service)

Log into Configuration Manager as admin, click the **Firewall** menu, click the **Advanced** submenu and then click the **Service** submenu. The Service List Configuration page displays, as shown in Figure 9.14.

Note that when you open the Service List Configuration page, a list of existing configured services is also displayed at the bottom half of the configuration page such as those shown in Figure 9.14.

9.6.2.3 Add a Service

To add a service, follow the instructions below:

1. Open the Service List Configuration Page (see section 9.6.2.2 Access Service List Configuration Page).
2. Select "**Add New**" from the service drop-down list.
3. Enter a desired name, preferably a meaningful name that signifies the nature of the service, in the "**Service Name**" field. Note that only alphanumeric characters are allowed in a name.
4. Make changes to any or all of the following fields: public port and protocol. Please see Table 9.5 for explanation of these fields.

5. Click on the **Add** button to create the new service. The new service will then be displayed in the service list table at the bottom half of the Service Configuration page.

9.6.2.4 Modify a Service

To modify a service, follow the instructions below:

1. Open the Service List Configuration Page (see section 9.6.2.2 Access Service List Configuration Page).
2. Select the service from the service drop-down list or click on the ✎ icon of the service to be modified in the service list table.
3. Make desired changes to any or all of the following fields: service name, public port and protocol. Please see Table 9.5 for explanation of these fields.
4. Click on the **Modify** button to modify this service. The new settings for this service will then be displayed in the service list table at the bottom half of the Service Configuration page.

9.6.2.5 Delete a Service

To delete a service, follow the instructions below:

1. Open the Service List Configuration Page (see section 9.6.2.2 Access Service List Configuration Page).
2. Select the service from the service drop-down list or click on the ✎ icon of the service to be modified in the service list table.
3. Click on the **Delete** button to delete this service. Note that the service deleted will be removed from the service list table located at the bottom half of the same configuration page.

9.6.2.6 View Configured Services

To see a list of existing services, follow the instructions below:

1. Open the Service List Configuration Page (see section 9.6.2.2 Access Service List Configuration Page).
2. The service list table located at the bottom half of the Service Configuration page shows all the configured services.

9.6.3 Configuring DoS Settings

The Internet Security Router has a proprietary Attack Defense Engine that protects internal networks from Denial of Service (DoS) attacks such as SYN flooding, IP smurfing, LAND, Ping of Death and all re-assembly attacks. It can drop ICMP redirects and IP loose/strict source routing packets. For example, a security device with the Internet Security Router Firewall provides protection from "WinNuke", a widely used program to remotely crash unprotected Windows systems in the Internet. The Internet Security Router Firewall also provides protection from a variety of common Internet attacks such as IP Spoofing, Ping of Death, Land Attack, Reassembly and SYN flooding. For a complete list of DoS protection provided by the Internet Security Router, please see Table 2.3.

9.6.3.1 DoS Protection Configuration Parameters

Table 9.6 describes the configuration parameters available for DoS Protection.

Table 9.6. DoS Protection Configuration Parameters

Field	Description
SYN Flooding	Check or un-check this option to enable or disable protection against SYN Flood attacks. This attack involves sending connection requests to a server, but never fully completing the connections. This will cause some computers

Field	Description
	to get into a "stuck state" where they cannot accept connections from legitimate users. ("SYN" is short for "SYNchronize"; this is the first step in opening an Internet connection). You can select this box if you wish to protect the network from TCP SYN flooding. By default, SYN Flood protection is enabled.
Winnuke	Check or un-check this option to enable or disable protection against Winnuke attacks. Some older versions of the Microsoft Windows OS are vulnerable to this attack. If the computers in the LAN are not updated with recent versions/patches, you are advised to enable this protection by checking this check box.
MIME Flood	Check or un-check this option to enable or disable protection against MIME attacks. You can select this box to protect the mail server in your network against MIME flooding.
FTP Bounce	Check or un-check this option to enable or disable protection against FTP bounce attack. In its simplest terms, the attack is based on the misuse of the PORT command in the FTP protocol. An attacker can establish a connection between the FTP server machine and an arbitrary port on another system. This connection may be used to bypass access controls that would otherwise apply.
IP Unaligned Time Stamp	Check or un-check this option to enable or disable protection against unaligned IP time stamp attack. Certain operating systems will crash if they receive a frame with the IP timestamp option that isn't aligned on a 32-bit boundary.
Sequence Number Prediction Check	Check or un-check this option to enable or disable protection against TCP sequence number prediction attacks. For TCP packets, sequence number is used to guard against accidental receipt of unintended data and malicious use by the attackers if the ISN (Initial Sequence Number) is generated randomly. Forged packets w/ valid sequence numbers can be used to gain trust from the receiving host. Attackers can then gain access to the compromised system. Note that this attack affects only the TCP packets originated or terminated at the Internet Security Router.
Sequence Number Out of Range Check	Check or un-check this option to enable or disable protection against TCP out of range sequence number attacks. An attacker can send a TCP packet to cause an intrusion detection system (IDS) to become unsynchronized with the data in a connection. Subsequent frames sent in that connection may then be ignored by the IDS. This may indicate an unsuccessful attempt to hijack a TCP session.
ICMP Verbose	Check or un-check this option to enable or disable protection against ICMP error message attacks. ICMP messages can be used to flood your network w/ undesired traffic. By default, this option is enabled.
Maximum IP Fragment Count	Enter the maximum number of fragments the Firewall should allow for every IP packet. This option is required if your connection to the ISP is through PPPoE. This data is used during transmission or reception of IP fragments. When large sized packets are sent via the Internet Security Router, the packets are chopped into fragments as large as MTU (Maximum Transmission Unit). By default, this number is set to 45. If MTU of the interface is 1500 (default for Ethernet), then there can be a maximum of 45 fragments per IP packet. If the MTU is less, then there can be more number of fragments and this number should be increased.

Field	Description
Minimum IP Fragment Size	Enter the Minimum size of IP fragments to be allowed through Firewall. This limit will not be enforced on the last fragment of the packet. If the Internet traffic is such that it generates many small sized fragments, this value can be decreased. This can be found if there are lots of packet loss, degradation in speed and if the following log message is generated very often:"fragment of size less than configured minimum fragment size detected".

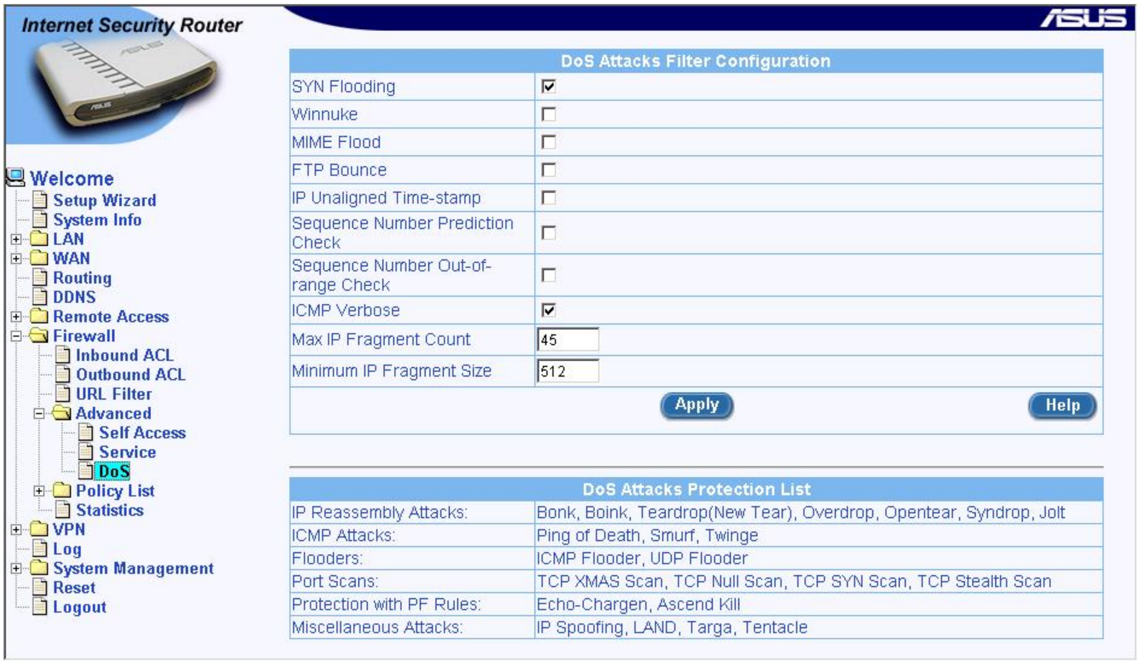
9.6.3.2 Access DoS Configuration Page – (Firewall è Advanced è DoS)

Log into Configuration Manager as admin, click the **Firewall** menu, click the **Advanced** submenu and then click the **DoS** submenu. The DoS Configuration page displays, as shown in Figure 9.15.

Note that when you open the DoS Configuration page, a list of supported DoS protection is also displayed at the bottom half of the configuration page such as those shown in Figure 9.15. Note that most of these protections are enabled by default when firewall is enabled.

9.6.3.3 Configuring DoS Settings

By default, most DoS protection against all supported attack types are enabled. Figure 9.15 shows the default configuration for DoS settings. You may check or un-check individual type of attack defense to disable or enable protection against that specific type of attack.



DoS Attacks Filter Configuration

SYN Flooding	☑
Winnuke	□
MIME Flood	□
FTP Bounce	□
IP Unaligned Time-stamp	□
Sequence Number Prediction Check	□
Sequence Number Out-of-range Check	□
ICMP Verbose	☑
Max IP Fragment Count	45
Minimum IP Fragment Size	512

DoS Attacks Protection List

IP Reassembly Attacks:	Bonk, Boink, Teardrop(New Tear), Overdrop, Opentear, Syndrop, Jolt
ICMP Attacks:	Ping of Death, Smurf, Twinge
Flooders:	ICMP Flooder, UDP Flooder
Port Scans:	TCP XMAS Scan, TCP Null Scan, TCP SYN Scan, TCP Stealth Scan
Protection with PF Rules:	Echo-Chargen, Ascend Kill
Miscellaneous Attacks:	IP Spoofing, LAND, Targa, Tentacle

Figure 9.15. DoS Configuration Page

9.7 Firewall Policy List – (Firewall è Policy List)

Firewall policy list provides a convenient way to manage firewall ACL rules (inbound/outbound ACL rules, and group ACL rules).

„ Application Filters – This option allows you to configure Command Filters for FTP, HTTP, RPC and SMTP applications. Configure filters here before attaching them to policies.

„ IP Pools – This option allows you to configure logical names for IP Pools and set appropriate IP addresses. Each record contains the name of the IP record and the types of IP address (single IP address or a range of IP address or a subnet address).

- NAT Pools – This option allows you to configure NAT Pools that will ensure mapping of the internal IP address to public IP address. Configure NAT Pools here before attaching them to policies.
- Time Ranges – This option allows you to configure time-windows for user-access to the networks across the Internet Security Router.

9.7.1 Configuring Application Filter

Application filter allows network administrator to block, monitor, and report on network users' access to non-business and objectionable content. This high-performance content access control results in increased productivity, lower bandwidth usage and reduced legal liability.

The Internet Security Router has the ability to handle active content filtering on certain application protocols such as HTTP, FTP, SMTP and RPC.

- HTTP – You can define HTTP extension based filtering schemes for blocking

  ActiveX – *.ocx

  Java Archive – *.jar

  Java Applets – *.class

  Microsoft Archives – *.msar

  Other URLs based on file extensions.
- FTP – allows you to define and enforce the file transfer policy for the site or group of users
- SMTP – allows you to filter operations such as VRFY, EXPN, etc. which reveal excess information about the recipient.
- RPC – allows you to filter programs based on the assigned RPC program numbers.

9.7.1.1 Application Filter Configuration Parameters

Table 9.7 describes the configuration parameters available for application filter.

Table 9.7. Application Filter Configuration Parameters

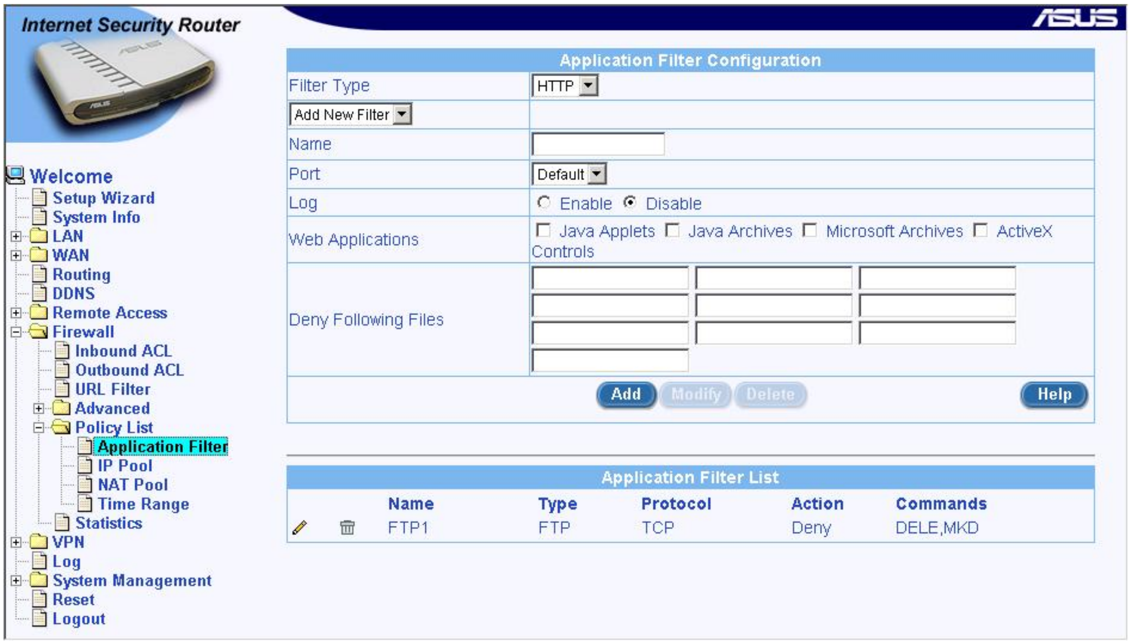
Field	Description
Filter Type	Select the type of filter: FTP, HTTP, RPC and SMTP.
Filter Name	Enter a name for the filter.
Protocol	Select the protocol that Application Filter uses (TCP/UDP).
Port	Enter the port number that the Application Filter uses.
Log This option includes buttons to enable and disable logging for this Application Filter.	
Enable	Select this option to enable logging for this application filter.
Disable	Select this option to disable logging for this application filter.
Action	
Allow	Select this option to configure the rule as an "allow" rule. This rule when bound to the Firewall will allow matching packets to pass through.
Deny	Select this option to configure the rule as a "deny" rule. This rule when bound to the Firewall will not allow matching packets to pass through.
Filter Commands This section allows you to enter a command for the respective application. The list of supported commands per application is as follows:	
FTP Commands	Add the following command to an FTP filter to:

Field	Description
CWD	Allow or deny of change directory.
LIST	Allow or deny of Listing of files/directory.
MKD	Allow or deny of Creating a directory.
NLST	Allow Short listing of directory contents.
PASV	Allow initiation of a passive data connection.
PORT	Allow or deny Port Number to participate in an active data connection.
RETR	Allow or deny getting a file from the FTP server.
RMD	Allow Removing a directory.
RNFR	Allow Rename from.
RNTO	Allow Rename to.
DELE	Allow Deletion of a file.
SITE	Allow Site parameters (Specific services provided by the FTP server).
STOR	Allow or deny of putting a file to the FTP server.
SMTP Commands	Add the following command to an SMTP filter to:
MAIL	Allow or deny initiating a mail transaction.
RCPT	Allow or deny identifying an individual recipient of the mail data.
DATA	Allow or deny mail data.
VRFY	Allow or deny verifying the existence of the user.
EXPN	Allow or deny identification for a mailing list.
TURN	Allow or deny the switching roles of the client and server, to send mail in the reverse direction.
SEND	Allow or deny initiating a mail transaction.
HTTP (Deny Following Files)	Add the following command to an HTTP filter to:
Java Applet	Deny all *.class files.
Java-archive	Deny all *.jar files.
MS Archive	Deny all *.msar files.
ActiveX	Deny all *.ocx files.
RPC Numbers	
RPC numbers	Add this command to an RPC filter to allow or deny RPC program numbers.

9.7.1.2 Access Application Filter Configuration Page – (Firewall è Policy List è Application Filter)

Log into Configuration Manager as admin, click the **Firewall** menu, click the **Policy List** submenu and then click the **Application Filter** submenu. The Application Filter Configuration page displays, as shown in Figure 9.16.

Note that when you open the Application Filter Configuration page, a list of existing application filter rules is also displayed at the bottom half of the configuration page such as those shown in Figure 9.16.



Application Filter Configuration	
Filter Type	HTTP
Add New Filter	
Name	
Port	Default
Log	○ Enable ● Disable
Web Applications	□ Java Applets □ Java Archives □ Microsoft Archives □ ActiveX Controls
Deny Following Files	

Application Filter List

		Name	Type	Protocol	Action	Commands
✎	🗑	FTP1	FTP	TCP	Deny	DELE,MKD

Figure 9.16. Application Filter Configuration Page

9.7.1.3 Add an Application Filter

The application filter configuration is best explained with a few examples. Note that the configuration for RPC and SMTP is similar to that for FTP and will not be presented here.

9.7.1.3.1 FTP Example: Add a FTP Filter Rule to Block FTP DELETE Command

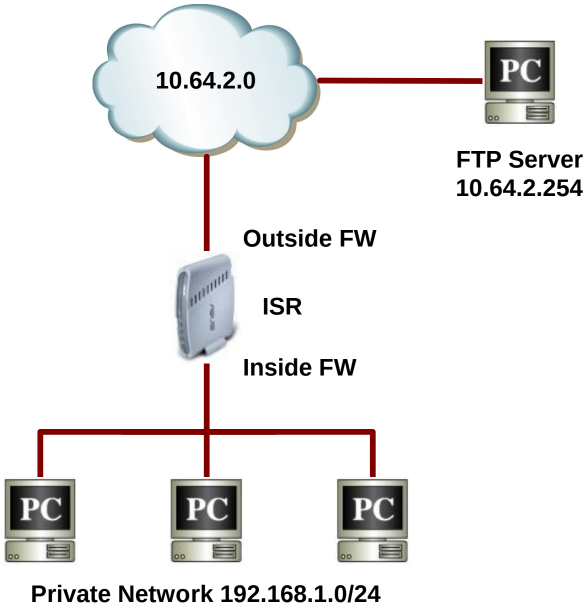
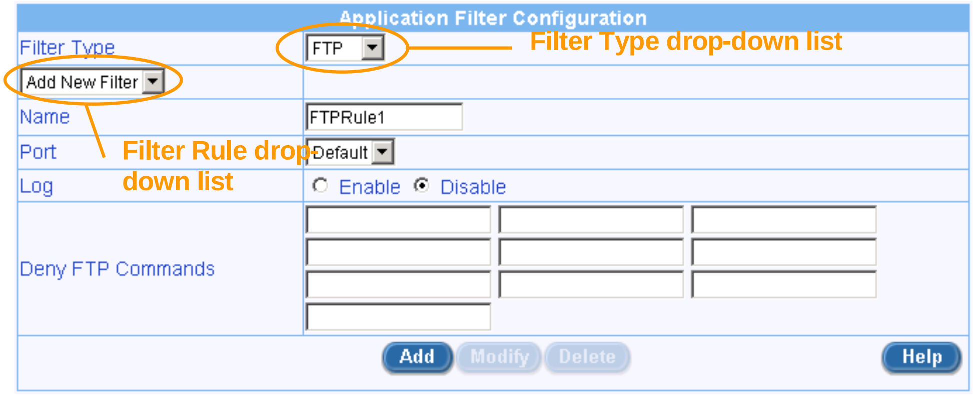


Figure 9.17 Network Diagram for FTP Filter Example – Blocking FTP Delete Command

1. Open the Application Filer Rule Configuration page (Firewall è Policy List è Application Filter)



Filter Type: FTP

Add New Filter

Name: FTPRule1

Port: Default

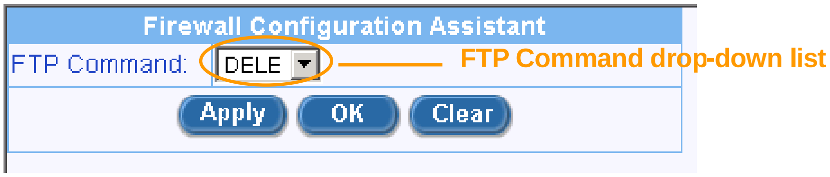
Log: ○ Enable ● Disable

Filter Type drop-down list

Filter Rule drop-down list

Figure 9.18. FTP Filter Example – Configuring FTP Filter Rule

2. Select FTP from the Filter Type drop-down list.
3. Select "Add New Filter" from the Filter Rule drop-down list.
4. Enter a name for this rule – in this example, FTPRule1.
5. Change the port number if necessary. However, it is recommended that you keep the "Default" setting.
6. Choose to enable to disable the logging option. The default setting is to keep the logging for this rule disabled.
7. Click on the first FTP commands field, a Firewall Configuration Assistant page is displayed.

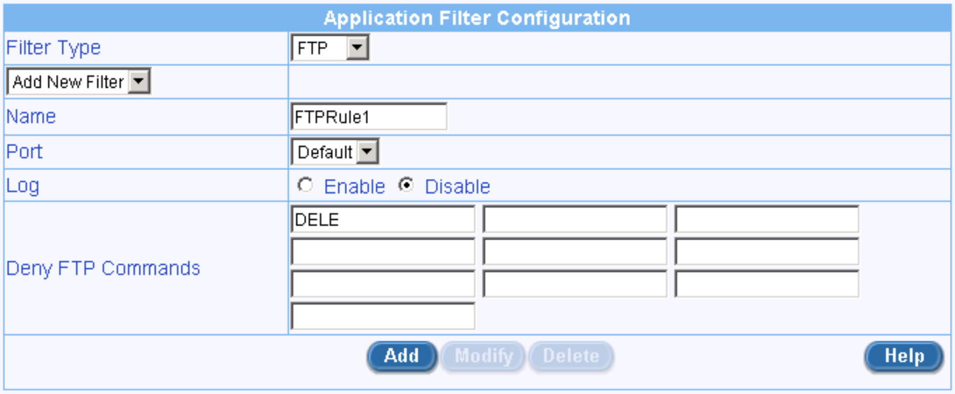


FTP Command: DELE

FTP Command drop-down list

Figure 9.19 FTP Filter Example – Firewall Configuration Assistant

8. Select the desired FTP command from the FTP Command drop-down list and then click on the OK button. The selected FTP command will be added into the selected Deny FTP Commands field.



Filter Type: FTP

Add New Filter

Name: FTPRule1

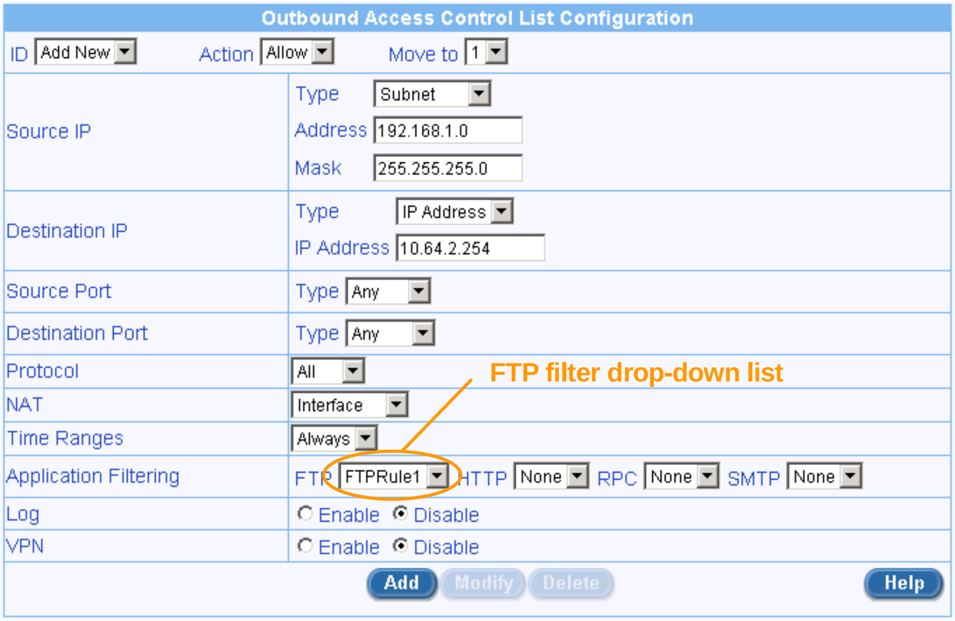
Port: Default

Log: ○ Enable ● Disable

Deny FTP Commands: DELE

Figure 9.20 FTP Filter Example – Add an FTP Filter to Deny FTP Delete Command

9. Repeat step 8 if more commands are to be added; otherwise, proceed to the next step.
10. Click on Add button to create this FTP application filter rule.



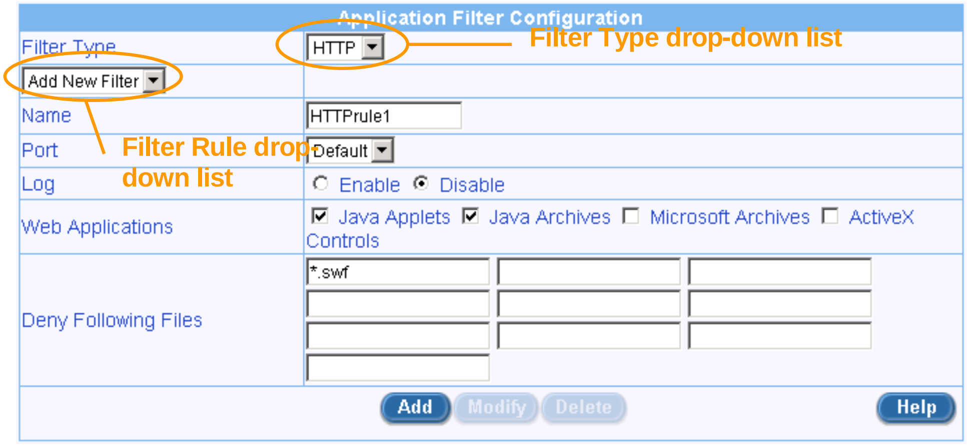
Outbound Access Control List Configuration	
ID Add New ▾ Action Allow ▾ Move to 1 ▾	
Source IP	Type Subnet ▾ Address 192.168.1.0 Mask 255.255.255.0
Destination IP	Type IP Address ▾ IP Address 10.64.2.254
Source Port	Type Any ▾
Destination Port	Type Any ▾
Protocol	All ▾
NAT	Interface ▾
Time Ranges	Always ▾
Application Filtering	FTP FTPRule1 ▾ HTTP None ▾ RPC None ▾ SMTP None ▾
Log	○ Enable ● Disable
VPN	○ Enable ● Disable

Figure 9.21. FTP Filter Example – Associate FTP Filter Rule to an ACL Rule

11. Associate the newly added FTP application filter rule to a firewall ACL rule (inbound, outbound or group ACL) by selecting a FTP filter from the FTP filter drop-down list (see Figure 9.21) and then click on Add or Modify button to save the settings.

9.7.1.3.2 HTTP Example: Add a HTTP Filter Rule to Block JAVA Applets and Java Archives

1. Open the Application Filer Rule Configuration page (Firewall è Policy List è Application Filter)



Application Filter Configuration	
Filter Type	HTTP ▾
Add New Filter ▾	
Name	HTTPrule1
Port	Default ▾
Log	○ Enable ● Disable
Web Applications	☑ Java Applets ☑ Java Archives □ Microsoft Archives □ ActiveX Controls
Deny Following Files	*.swf

Figure 9.22. HTTP Filter Example – Configuring HTTP Filter Rule

2. Select HTTP from the Filter Type drop-down list.

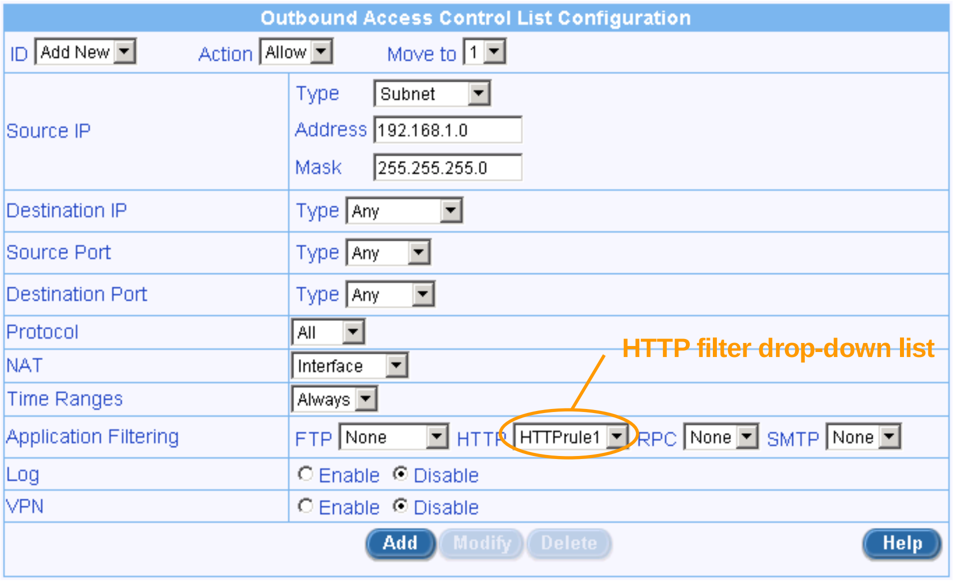
3. Select "Add New Filter" from the Filter Rule drop-down list.

4. Enter a name for this rule – in this example, HTTPrule1.

5. Change the port number if necessary. However, it is recommended that you keep the "Default" setting.

6. Choose to enable to disable the logging option. The default setting is to keep the logging for this rule disabled.

7. Check the web application files to block – in this example, Java Applets and Java Archives
8. Enter additional web application files to block. Enter the file extension in the "Deny Following Files" fields if desired. Figure 9.22 shows that flash files (file extension is *.swf) are to be blocked in addition to Java applet and archive files.
9. Click on Add button to create this HTTP application filter rule.
10. Associate the newly created HTTP application filter rule to a firewall ACL rule (inbound, outbound or group ACL) by selecting a HTTP filter from the HTTP filter drop-down list (see Figure 9.23) and then click on Add or Modify button to save the settings.



Outbound Access Control List Configuration

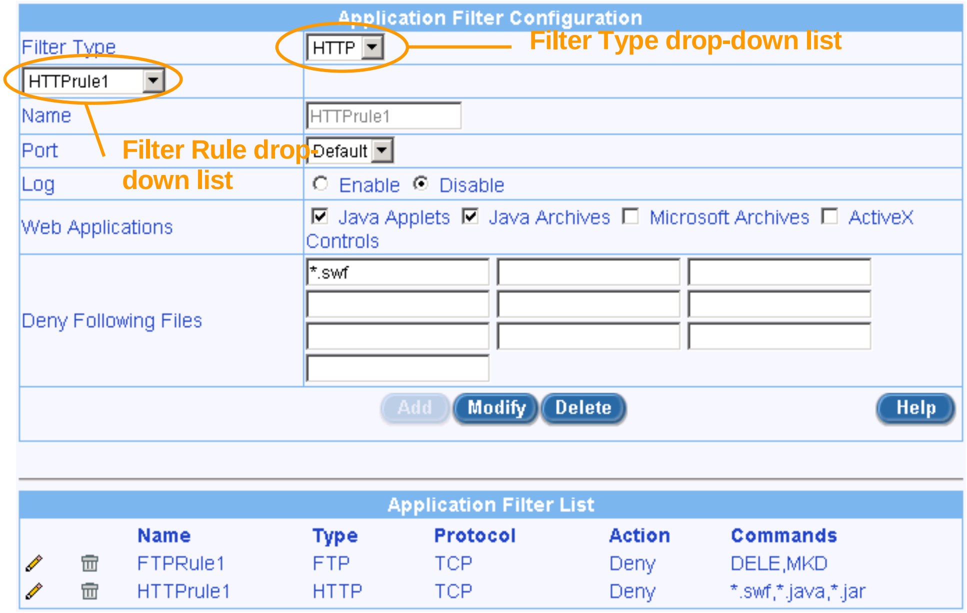
ID: Add New	Action: Allow · Move to: 1
Source IP	Type: Subnet Address: 192.168.1.0 Mask: 255.255.255.0
Destination IP	Type: Any
Source Port	Type: Any
Destination Port	Type: Any
Protocol	All
NAT	Interface
Time Ranges	Always
Application Filtering	FTP: None · HTTP: HTTPrule1 · RPC: None · SMTP: None
Log	○ Enable ● Disable
VPN	○ Enable ● Disable

Figure 9.23. HTTP Filter Example – Associate HTTP Filter Rule to an ACL Rule

9.7.1.4 Modify an Application Filter

To modify an IP Pool, follow the instructions below:

1. Open the Application Filter Configuration page (see section 9.7.1.2Access Application Filter Configuration Page – (Firewall è Policy List è Application Filter)).
2. Select the application filter to modify. Click on the ✏ icon of the application filter to be modified in the Application Filter List table or select the filter type from the Filter Type drop-down list and then select the filter rule from the Filter Rule drop-down.
3. Make desired changes to any or all of the following fields: Port number, logging option, etc.
4. Click on the Modify button to save the new settings. The new settings for this application filter will then be displayed in the Application Filter List table.



Application Filter Configuration

Filter Type	HTTP
HTTPrule1	
Name	HTTPrule1
Port	Default
Log	○ Enable ● Disable
Web Applications	☑ Java Applets ☑ Java Archives □ Microsoft Archives □ ActiveX Controls
Deny Following Files	*.swf

Filter Type drop-down list

Filter Rule drop-down list

Application Filter List

		Name	Type	Protocol	Action	Commands
✎	🗑	FTPRule1	FTP	TCP	Deny	DELE,MKD
✎	🗑	HTTPrule1	HTTP	TCP	Deny	*.swf,*.java,*.jar

Figure 9.24. Modify an Application Filter

9.7.1.5 Delete an Application Filter

To delete an Application Filter, click on the 🗑 icon of the filter to be deleted or follow the instruction below:

1. Open the Application Filter Configuration page (see section 9.7.1.2Access Application Filter Configuration Page – (Firewall è Policy List è Application Filter)).
2. Select the application filter to delete. Click on the ✎ icon of the application filter to be deleted in the Application Filter List table or select the filter type from the Filter Type drop-down list and then select the filter rule from the Filter Rule drop-down.
3. Click on the Delete button to delete this filter.

9.7.2 Configuring IP Pool

9.7.2.1 IP Pool Configuration Parameters

Table 9.8 describes the configuration parameters available for an IP pool.

Table 9.8. IP Pool Configuration Parameters

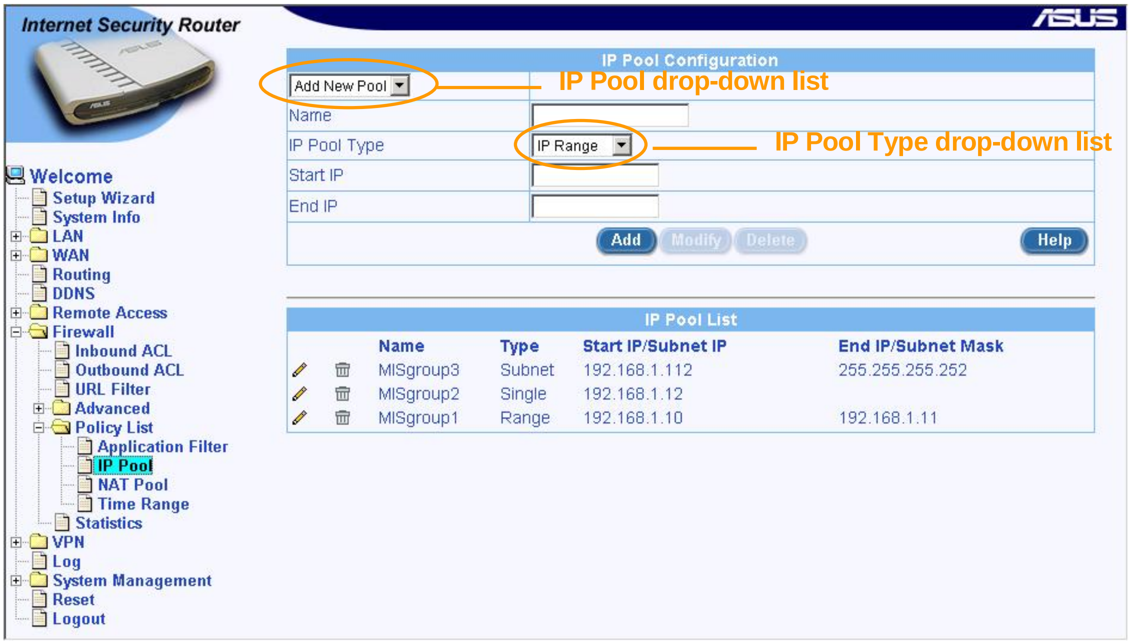
Field	Description
IP Pool Name	Enter the name of the local IP
IP Pool Type	Select the type of IP Pool.
IP Range	This option allows you to configure the range of IP addresses.
Start IP	Enter the starting IP address of the range.
End IP	Enter the ending IP address of the range.
Subnet	This option allows you to include all the computers that are connected in an IP subnet.
Subnet Address	Enter the appropriate IP address.
Subnet Mask	Enter the corresponding mask.
IP Address	This option allows you to configure single IP address.

Field	Description
IP Address	Enter the IP Address.

9.7.2.2 Access IP Pool Configuration Page – (Firewall è Policy List è IP Pool)

Log into Configuration Manager as admin, click the **Firewall** menu, click the **Policy List** submenu and then click the **IP Pool** submenu. The IP Pool Configuration page displays, as shown in Figure 9.25.

Note that when you open the IP Pool Configuration page, a list of existing IP pools is also displayed at the bottom half of the configuration page such as those shown in Figure 9.25.



IP Pool Configuration

Add New Pool	
Name	
IP Pool Type	IP Range
Start IP	
End IP	

IP Pool List

Name	Type	Start IP/Subnet IP	End IP/Subnet Mask
MISgroup3	Subnet	192.168.1.112	255.255.255.252
MISgroup2	Single	192.168.1.12	
MISgroup1	Range	192.168.1.10	192.168.1.11

Figure 9.25 IP Pool Configuration Page

9.7.2.3 Add an IP Pool

To add an IP Pool, follow the instructions below:

1. Open the IP Pool Configuration page (see section 9.7.2.2 Access IP Pool Configuration Page – (Firewall è Policy List è IP Pool)).
2. Select "**Add New Pool**" from the IP Pool drop-down list.
3. Enter a pool name into the Name field.
4. Select a pool type from the IP Pool Type drop-down list.
5. If "IP Range" pool type is selected, enter start IP address and end IP address. If "Subnet" pool type is selected, enter subnet address and subnet mask. If "IP Address" pool type is selected, enter an IP adderss.
6. Click on the Add button to create the new IP Pool. The new IP Pool will then be displayed in the IP Pool list table.

9.7.2.4 Modify an IP Pool

To modify an IP Pool, follow the instructions below:

1. Open the IP Pool Configuration page (see section 9.7.2.2 Access IP Pool Configuration Page – (Firewall è Policy List è IP Pool)).

2. Click on the ✎ icon of the IP pool to be modified in the IP Pool List table or select the IP pool from the IP Pool drop-down list.
3. Make desired changes to any or all of the following fields: Pool name, Pool type and IP address.
4. Click on the Modify button to save the new settings. The new settings for this pool will then be displayed in the IP Pool list table.

9.7.2.5 Delete an IP Pool

To delete an IP Pool, click on the 🗑 icon of the IP pool to be deleted or follow the instruction below:

1. Open the IP Pool Configuration page (see section 9.7.2.2 Access IP Pool Configuration Page – (Firewall è Policy List è IP Pool)).
2. Click on the ✎ icon of the IP pool to be deleted in the IP Pool List table or select the IP pool from the IP Pool drop-down list.
3. Click on the Delete button to delete this IP pool.

9.7.2.6 IP Pool Example

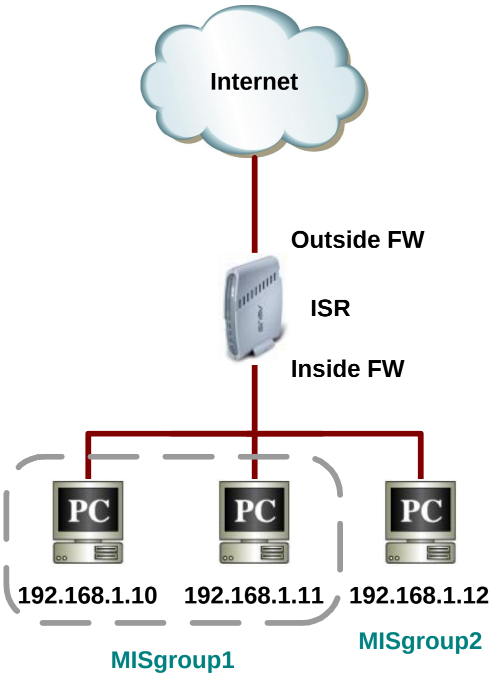
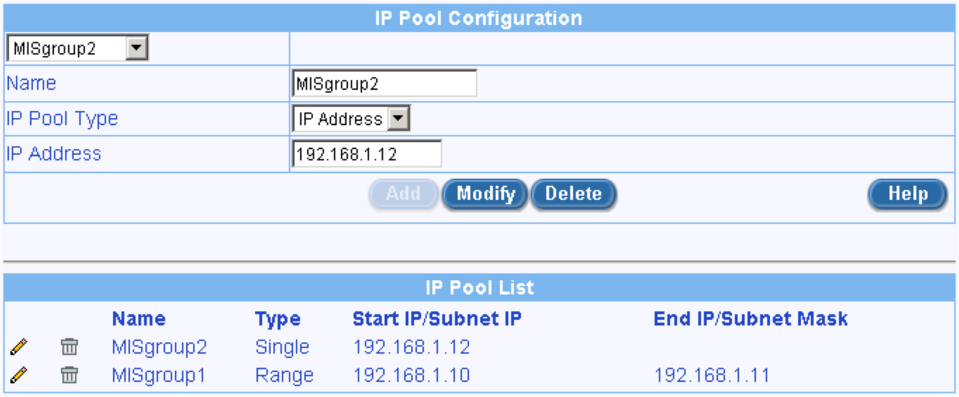


Figure 9.26. Network Diagram for IP Pool Configuration

1. Open the IP Pool Configuration page to create two IP groups – see Figure 9.27.



IP Pool Configuration

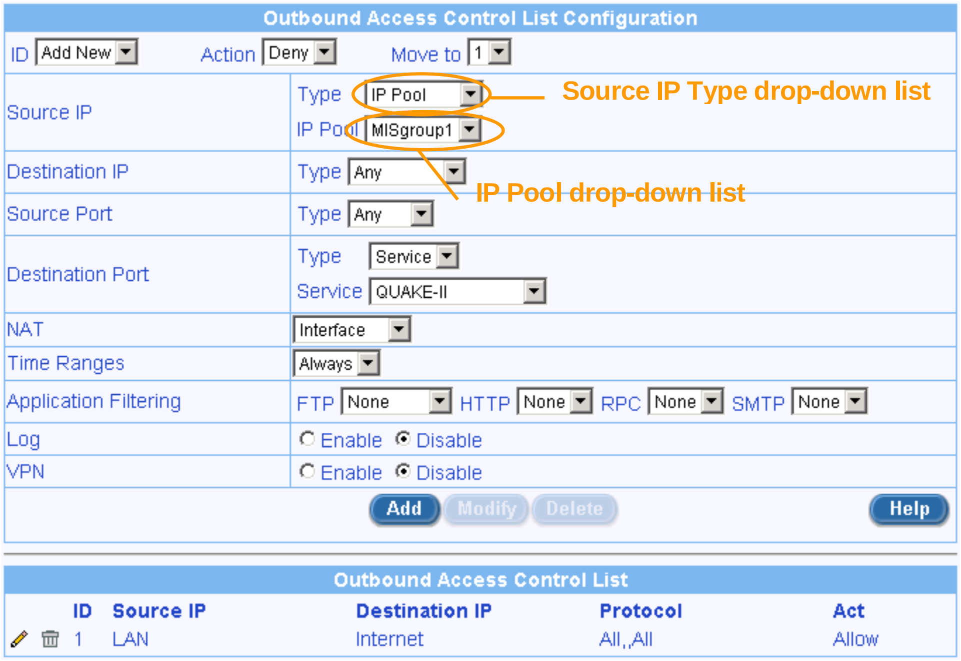
MISgroup2	
Name	MISgroup2
IP Pool Type	IP Address
IP Address	192.168.1.12

IP Pool List

		Name	Type	Start IP/Subnet IP	End IP/Subnet Mask
✎	🗑	MISgroup2	Single	192.168.1.12	
✎	🗑	MISgroup1	Range	192.168.1.10	192.168.1.11

Figure 9.27. IP Pool Example – Add Two IP Pools – MISgroup1 and MISgroup2

2. Associate an IP pool to firewall ACL rules – inbound, outbound or group ACL by selecting "IP Pool" from the Source IP Type drop-down list and then choose an IP pool from the IP pool drop-down list. In this example, IP pool is used to associate to source IP; however, it can be used to associate to destination IP as well. As shown in Figure 9.28, MISgroup1 is not allow to play networked game, Quake-II at all times.



Outbound Access Control List Configuration

ID: Add New   Action: Deny   Move to: 1

Source IP	Type: IP Pool IP Pool: MISgroup1
Destination IP	Type: Any
Source Port	Type: Any
Destination Port	Type: Service Service: QUAKE-II
NAT	Interface
Time Ranges	Always
Application Filtering	FTP: None HTTP: None RPC: None SMTP: None
Log	○ Enable ● Disable
VPN	○ Enable ● Disable

Source IP Type drop-down list

IP Pool drop-down list

Outbound Access Control List

		ID	Source IP	Destination IP	Protocol	Act
✎	🗑	1	LAN	Internet	All,,All	Allow

Figure 9.28. IP Pool Example – Deny QUAKE-II Connection for MISgroup1

9.7.3 Configuring NAT Pool

9.7.3.1 NAT Pool Configuration Parameters

Table 9.9 describes the configuration parameters available for a NAT pool.

Table 9.9. NAT Pool Configuration Parameters

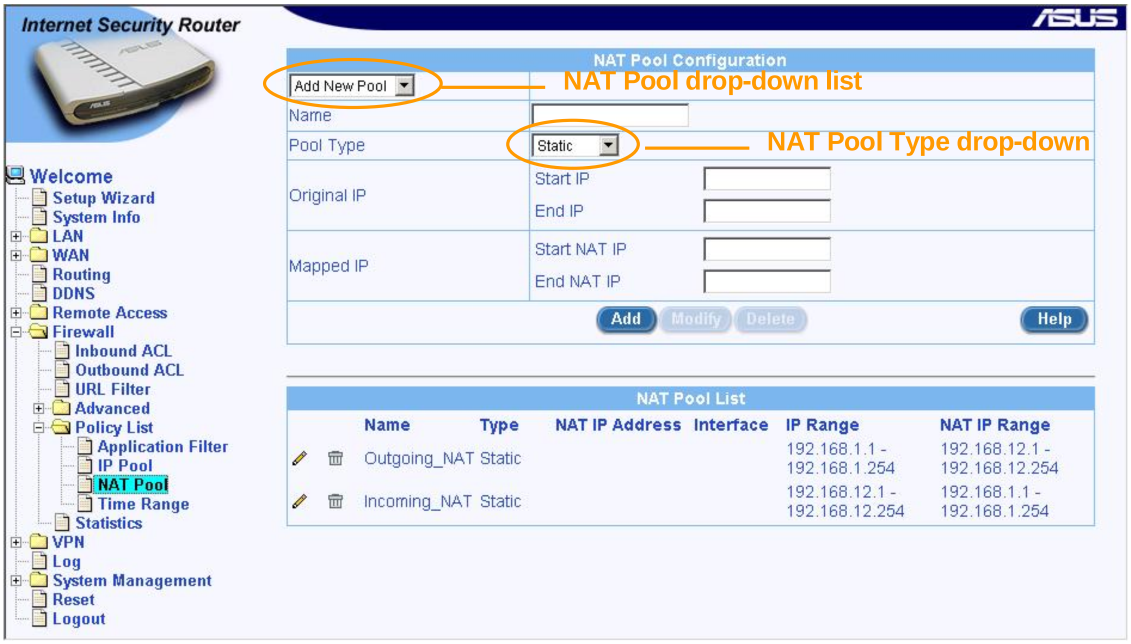
Field	Description
NAT Pool Name	Enter a name for the NAT Pool.
NAT Pool Type	Select the type of NAT Pool and make appropriate IP Address entries.

Field	Description
Static Select this type of NAT to set a one-to-one Mapping between the Internal Address and the External Address.	
LAN IP range	For the Internal Address
Start IP	Enter the starting IP address.
End IP	Enter the ending IP address.
Internet IP Range	For the External Address
Start IP	Enter the starting IP address.
End IP	Enter the ending IP address.
Dynamic Select this type of NAT to map a set of internal (corporate) machines to a set of public IP addresses. Make entries for the LAN IP Range and the Internet IP Range as described above.	
Overload Select this type of NAT to use a single public IP address to connect multiple internal (corporate LAN) machines to external (Internet) network.	
NAT IP Address	Enter NAT IP address, for the overload.
Interface Select this type of NAT to specify the Dynamic Interface whose IP address should be used for subjecting traffic to NAT.	

9.7.3.2 Access NAT Pool Configuration Page – (Firewall è Policy List è NAT Pool)

Log into Configuration Manager as admin, click the **Firewall** menu, click the **Policy List** submenu and then click the **NAT Pool** submenu. The NAT Pool Configuration page displays, as shown in Figure 9.29.

Note that when you open the NAT Pool Configuration page, a list of existing NAT pools is also displayed at the bottom half of the configuration page such as those shown in Figure 9.29.



NAT Pool Configuration

Add New Pool	
Name	
Pool Type	Static
Original IP	Start IP End IP
Mapped IP	Start NAT IP End NAT IP

NAT Pool drop-down list

NAT Pool Type drop-down

NAT Pool List

Name	Type	NAT IP Address	Interface	IP Range	NAT IP Range
Outgoing_NAT	Static			192.168.1.1 - 192.168.1.254	192.168.12.1 - 192.168.12.254
Incoming_NAT	Static			192.168.12.1 - 192.168.12.254	192.168.1.1 - 192.168.1.254

Figure 9.29. NAT Pool configuration page

9.7.3.3 Add a NAT Pool

To add a NAT Pool, follow the instructions below:

1. Open the NAT Pool Configuration page (see section 9.7.3.2 Access NAT Pool Configuration Page – (Firewall **è** Policy List **è** NAT Pool)).
2. Select "**Add New Pool**" from the NAT Pool drop-down list.
3. Enter a pool name into the Name field.
4. Select a pool type from the Type drop-down list.
5. If "Static" or "Dynamic" pool type is selected, enter the original IP addresses (start IP Address, and end IP Address), and mapped IP addresses (start NAT IP Address and end NAT IP Address). If "Overload" pool type is selected, enter the NAT IP address. If you want to use the IP address assigned for the WAN port as the NAT IP address, select the Interface pool type.
6. Click on the Add button to create the new NAT pool. The new NAT pool will then be displayed in the NAT Pool List table.

9.7.3.4 Modify a NAT Pool

To modify a NAT Pool, follow the instructions below:

1. Open the NAT Pool Configuration page (see section 9.7.3.2 Access NAT Pool Configuration Page – (Firewall **è** Policy List **è** NAT Pool)).
2. Click on the ✎ icon of the NAT pool to be modified in the NAT Pool List table or select the NAT pool from the NAT Pool drop-down list.
3. Make desired changes to any or all of the following fields: Pool name, Pool type and IP address.
4. Click on the Modify button to save the new settings. The new settings for this pool will then be displayed in the NAT Pool List table.

9.7.3.5 Delete a NAT Pool

To delete a NAT Pool, click on the 🗑 icon of the NAT pool to be deleted or follow the instruction below:

1. Open the NAT Pool Configuration page (see section 9.7.3.2 Access NAT Pool Configuration Page – (Firewall **è** Policy List **è** NAT Pool)).
2. Click on the ✎ icon of the NAT pool to be deleted in the NAT Pool List table or select the NAT pool from the NAT Pool drop-down list.
3. Click on the Delete button to delete this NAT pool.

9.7.3.6 NAT Pool Example

Figure 9.30 shows the network diagram for this NAT pool example.

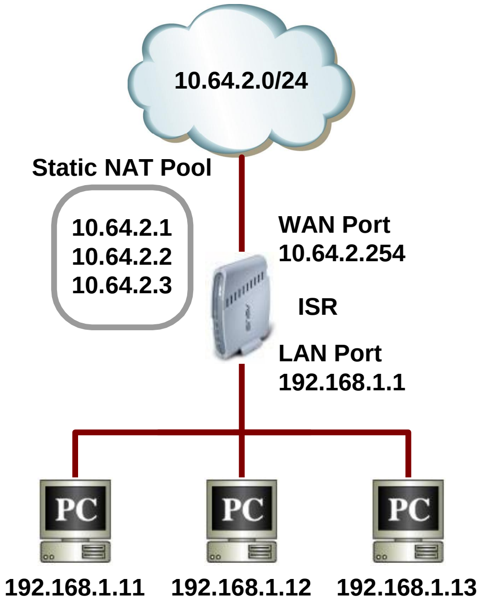
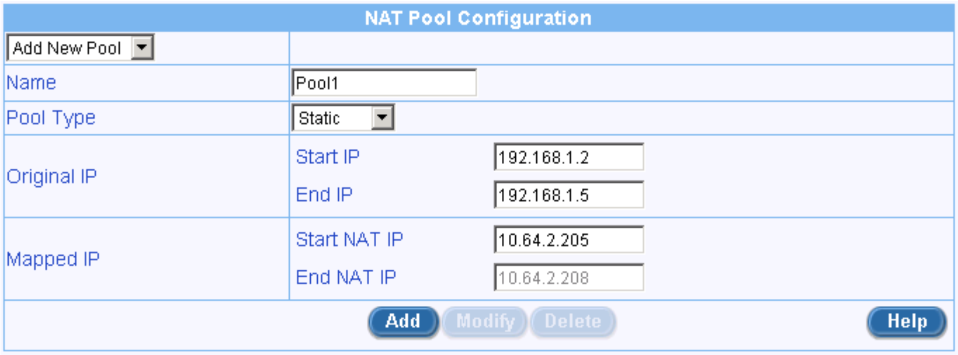


Figure 9.30. Network Diagram for NAT Pool Example

1. Create a NAT pool for static NAT – see Figure 9.31.

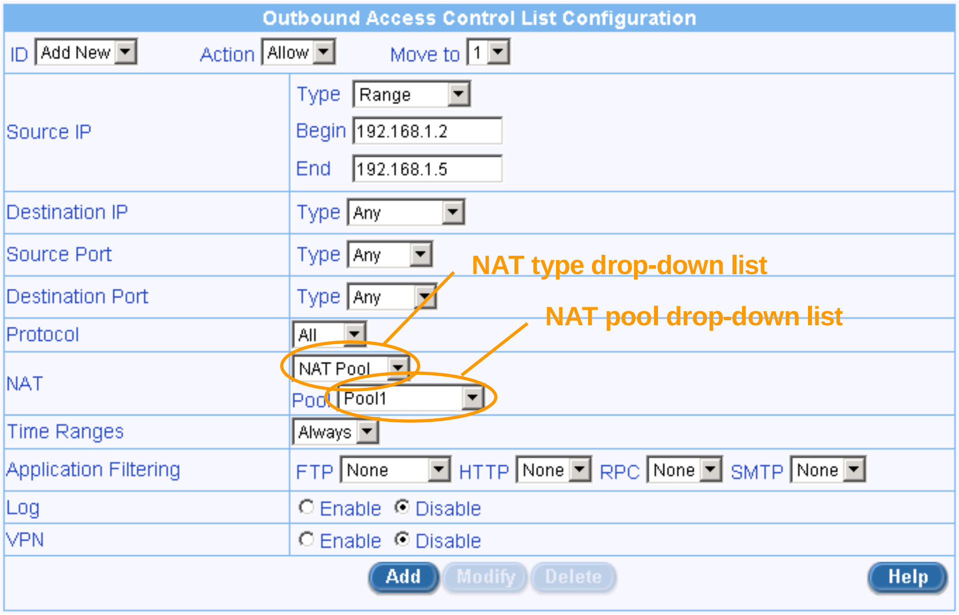


NAT Pool Configuration

Add New Pool		
Name	Pool1	
Pool Type	Static	
Original IP	Start IP	192.168.1.2
	End IP	192.168.1.5
Mapped IP	Start NAT IP	10.64.2.205
	End NAT IP	10.64.2.208

Figure 9.31. NAT Pool Example – Create a Static NAT Pool

2. Associate the NAT pool to an outbound ACL rule by selecting "NAT Pool" from the NAT type drop-down list and then choose an existing NAT pool from the NAT pool drop-down list.



Outbound Access Control List Configuration

ID Add New	Action Allow Move to 1
Source IP	Type Range Begin 192.168.1.2 End 192.168.1.5
Destination IP	Type Any
Source Port	Type Any
Destination Port	Type Any
Protocol	All
NAT	NAT Pool Pool Pool1
Time Ranges	Always
Application Filtering	FTP None HTTP None RPC None SMTP None
Log	○ Enable ● Disable
VPN	○ Enable ● Disable

NAT type drop-down list

NAT pool drop-down list

Figure 9.32. NAT Pool Example – Associate a NAT Pool to an ACL Rule

9.7.4 Configuring Time Range

With this option you can configure access time range records for eventual association with ACL rules. ACL rules associated with a time range record will be active only during the scheduled period. If the ACL rule denies HTTP access during 10:00hrs to 18:00hrs, then before 10:00hrs and after 18:00hrs the HTTP traffic will be permitted to pass through. One time range record can contain up to three time periods. For example:

Office hours on weekdays (Mon-Fri) can have the following periods:

„ Pre-lunch period between 9:00 and 13:00 Hrs

„ Post-lunch period between 14:00 and 18:30 Hrs

Office hours on weekends (Saturday-Sunday) can have the following periods:

„ 9:00 to 12:00 Hrs

Such varying time periods can be configured into a single time range record. Access rules can be activated based on these time periods.

9.7.4.1 Time Range Configuration Parameters

Table 9.10 describes the configuration parameters available for a time range.

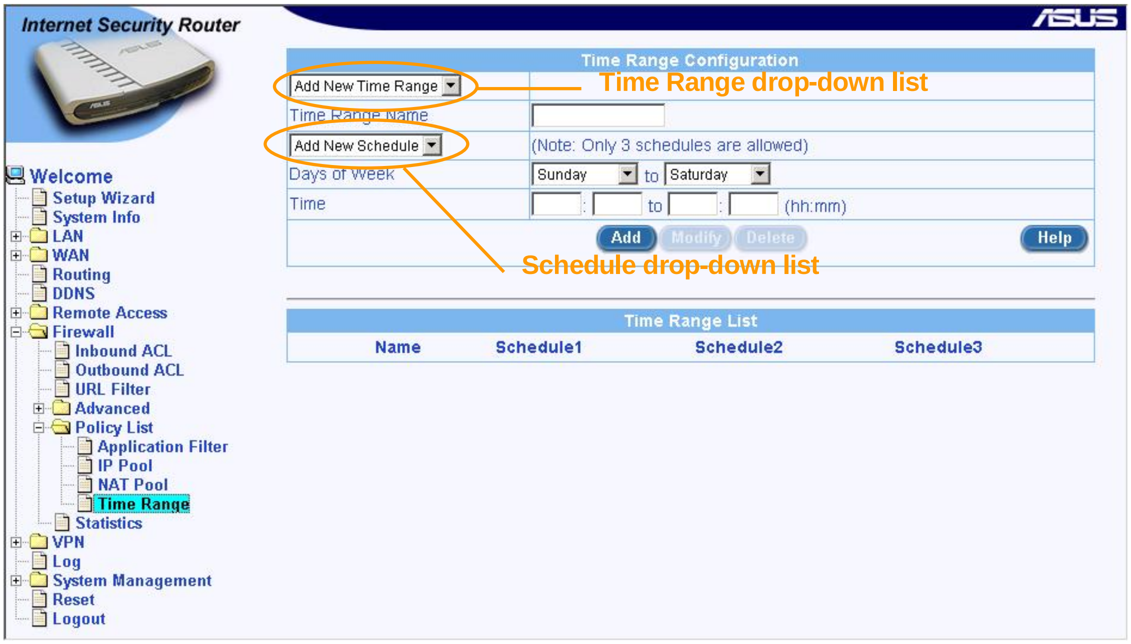
Table 9.10. Time Range Configuration Parameters

Field	Description
Time Range drop-down list	Select "Add New Time Range" to add a new time range or select an existing time range from the drop-down list.
Time Range Name	Enter a name for the Time Range.
Schedule drop-down list	Select "Add New Schedule" to add a new schedule or select an existing schedule from the drop-down list.
Days of Week	Set the days for the schedule.
Time (hh:mm)	Set the time windows for the schedule in hh:mm format.

9.7.4.2 Access Time Range Configuration Page – (Firewall è Policy List è Time Range)

Log into Configuration Manager as admin, click the **Firewall** menu, click the **Policy List** submenu and then click the **Time Range** submenu. The Time Range Configuration page displays, as shown in Figure 9.33.

Note that when you open the Time Range Configuration page, a list of existing time ranges is also displayed at the bottom half of the configuration page such as those shown in Figure 9.33.



Time Range Configuration

Add New Time Range	
Time Range Name	
Add New Schedule	(Note: Only 3 schedules are allowed)
Days of Week	Sunday to Saturday
Time	: to : (hh:mm)

Time Range List

Name	Schedule1	Schedule2	Schedule3

Figure 9.33. Time Range Configuration Page

9.7.4.3 Add a Time Range

To add a Time Range, follow the instructions below:

1. Open the Time Range Configuration page (see section 9.7.4.2 Access Time Range Configuration Page – (Firewall è Policy List è Time Range)).
2. Select "**Add New Time Range**" from the Time Range drop-down list.
3. Enter a name into the Time Range Name field.
4. Select "**Add New Schedule**" from the Schedule drop-down list.
5. Select Days of Week. For example, from Sunday to Saturday.
6. Enter day hours, For example, from 08:00 to 18:00.
7. Click on the Add button to create the new schedule.

9.7.4.4 Modify a Time Range

To modify a Time Range, follow the instructions below:

1. Open the Time Range Configuration page (see section 9.7.4.2 Access Time Range Configuration Page – (Firewall è Policy List è Time Range)).
2. Click on the ✎ icon of the Time Range to be modified in the Time Range list table or select the Time Range from the Time Range drop-down list.
3. Select the Schedule from the schedule drop-down list.
4. Make desired changes to any or all of the following fields: Days of week and hours.

5. Click on the **Modify** button to save the new settings.

9.7.4.5 Delete a Time Range

To delete a Time Range, click on the 🗑 icon of the Time Range to be deleted.

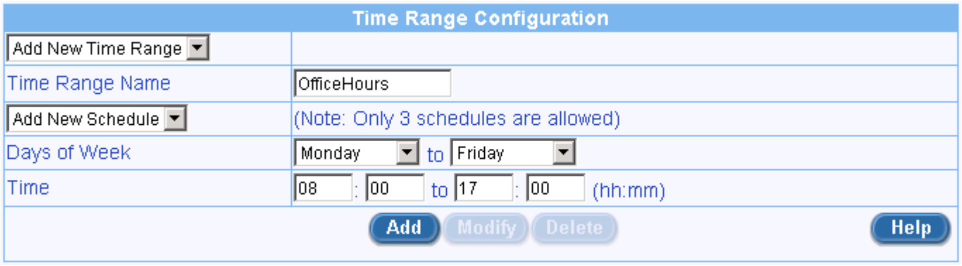
9.7.4.6 Delete a Schedule in a Time Range

To delete a schedule in a Time Range, follow the instructions below:

1. Open the Time Range Configuration page (see section 9.7.4.2 Access Time Range Configuration Page – (Firewall è Policy List è Time Range)).
2. Click on the ✎ icon of the Time Range to be deleted in the Time Range list table or select the Time Range from the Time Range drop-down list.
3. Select the Schedule from the drop-down list.
4. Click on the **Delete** button to delete this schedule.

9.7.4.7 Time Range Example

1. Create a time range – see Figure 9.31.

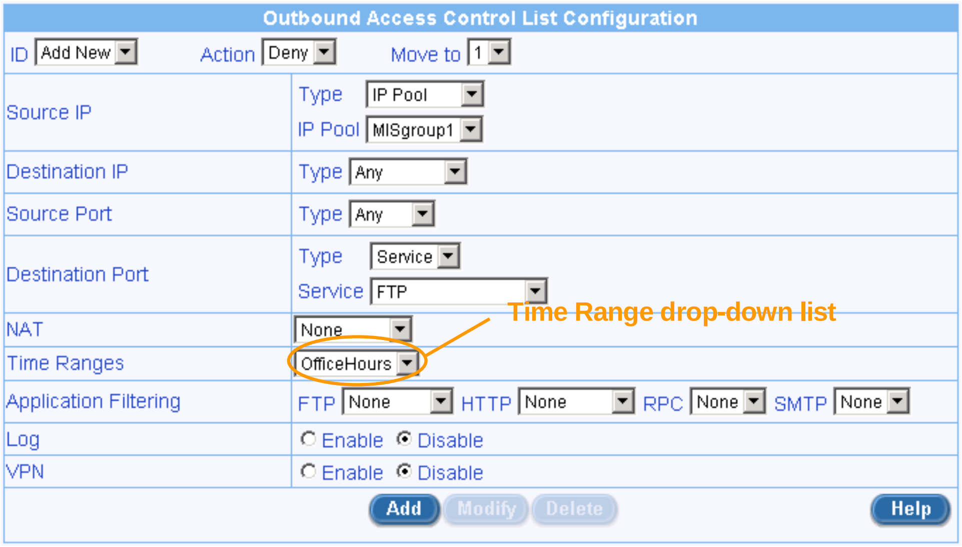


Time Range Configuration

Add New Time Range	
Time Range Name	OfficeHours
Add New Schedule	(Note: Only 3 schedules are allowed)
Days of Week	Monday to Friday
Time	08 : 00 to 17 : 00 (hh:mm)

Figure 9.34. Time Range Example – Create a Time Range

2. Associate the time range to an outbound ACL rule by selecting an existing time range from the Time Range drop-down list. Figure 9.35 shows that MISgroup1 is denied FTP access during office hours.



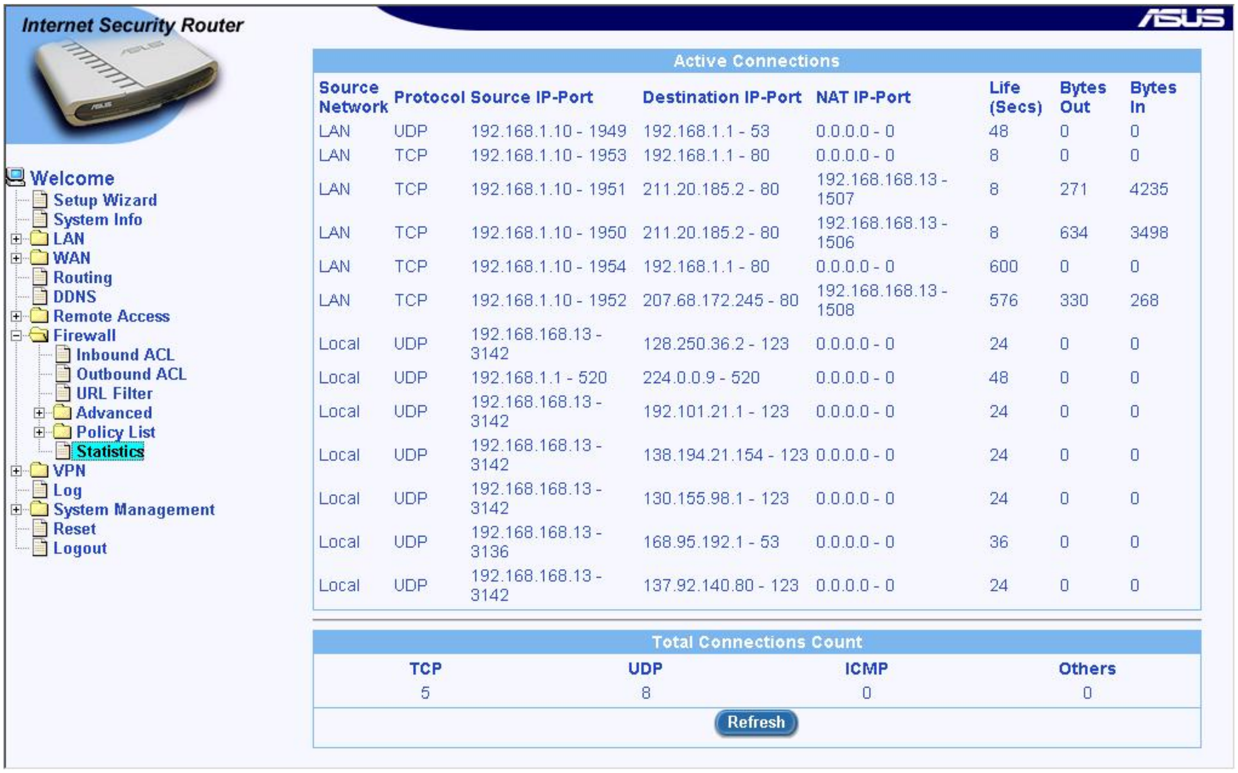
Outbound Access Control List Configuration

ID Add New	Action Deny Move to 1
Source IP	Type IP Pool IP Pool MISgroup1
Destination IP	Type Any
Source Port	Type Any
Destination Port	Type Service Service FTP
NAT	None
Time Ranges	OfficeHours
Application Filtering	FTP None HTTP None RPC None SMTP None
Log	○ Enable ● Disable
VPN	○ Enable ● Disable

Figure 9.35. Time Range Example – Deny FTP Access for MISgroup1 During OfficeHours

9.8 Firewall Statistics – Firewall è Statistics

The Firewall Statistics page displays details regarding the active connections. Figure 9.36 shows a sample firewall statistics for active connections. To see an updated statistics, click on Refresh button.



Active Connections

Source Network	Protocol	Source IP-Port	Destination IP-Port	NAT IP-Port	Life (Secs)	Bytes Out	Bytes In
LAN	UDP	192.168.1.10 - 1949	192.168.1.1 - 53	0.0.0.0 - 0	48	0	0
LAN	TCP	192.168.1.10 - 1953	192.168.1.1 - 80	0.0.0.0 - 0	8	0	0
LAN	TCP	192.168.1.10 - 1951	211.20.185.2 - 80	192.168.168.13 - 1507	8	271	4235
LAN	TCP	192.168.1.10 - 1950	211.20.185.2 - 80	192.168.168.13 - 1506	8	634	3498
LAN	TCP	192.168.1.10 - 1954	192.168.1.1 - 80	0.0.0.0 - 0	600	0	0
LAN	TCP	192.168.1.10 - 1952	207.68.172.245 - 80	192.168.168.13 - 1508	576	330	268
Local	UDP	192.168.168.13 - 3142	128.250.36.2 - 123	0.0.0.0 - 0	24	0	0
Local	UDP	192.168.1.1 - 520	224.0.0.9 - 520	0.0.0.0 - 0	48	0	0
Local	UDP	192.168.168.13 - 3142	192.101.21.1 - 123	0.0.0.0 - 0	24	0	0
Local	UDP	192.168.168.13 - 3142	138.194.21.154 - 123	0.0.0.0 - 0	24	0	0
Local	UDP	192.168.168.13 - 3142	130.155.98.1 - 123	0.0.0.0 - 0	24	0	0
Local	UDP	192.168.168.13 - 3136	168.95.192.1 - 53	0.0.0.0 - 0	36	0	0
Local	UDP	192.168.168.13 - 3142	137.92.140.80 - 123	0.0.0.0 - 0	24	0	0

Total Connections Count

TCP	UDP	ICMP	Others
5	8	0	0

Figure 9.36. Firewall active connections statistics

10 Configuring VPN

The chapter contains instructions for configuring VPN connections using automatic keying and manual keys.

10.1 Default Parameters

The Internet Security Router is pre-configured with a default set of proposals/connections. They cover the most commonly used sets of parameters, required for typical deployment scenarios. It is recommended that you use these pre-configured proposals/connections to simplify VPN connection setup. The default parameters provided in the Internet Security Router are as follows:

Default Connections

Each connection represents a rule that can be applied on traffic originating from / terminating at the security gateway. It contains the parameters: local/remote IP-Addresses and ports.

Table 10.1 lists the default connections that are provisioned on the gateway:

Table 10.1. Default Connections in the Internet Security Router

Name	Type	Port	Protocol	State	Purpose
allow-ike-io	passby	500	UDP	Enabled	To allow the IKE traffic to the Internet Security Router
allow-all	passby			Enabled	To allow the plain traffic

WARNING

Do not delete or modify default VPN policies.

Proposals

Each proposal represents a set of authentication/encryption parameters. Once configured, a proposal can be tied to a connection. Upon session establishment, one of the proposals specified is selected and used for the tunnel.

Note that multiple proposals can be specified for a connection. If you do not specify the proposal to be used for a connection, all the pre-configured proposals will be included for that connection.

Pre-configured IKE proposals

IKE proposals decide the type of encryption, hash algorithms and authentication method that will be used for the establishment of the session keys between the endpoints of a tunnel. Table 10.2 lists the pre-configured IKE proposals.

Table 10.2. Pre-configured IKE proposals in the Internet Security Router

Name	Encryption Algorithm	Authentication Algorithm	Diffie-Hellman Group	Key Management	Life time (secs)
ike-preshared-3des-sha1-dh2	3DES	SHA-1	2	Pre-shared Keys	3600
ike-preshared-3des-md5-dh2	3DES	MD5	2	Pre-shared Keys	3600

Name	Encryption Algorithm	Authentication Algorithm	Diffie-Hellman Group	Key Management	Life time (secs)
ike-preshared-des-sha1-dh2	DES	SHA-1	2	Pre-shared Keys	3600
ike-preshared-des-md5-dh2	DES	MD5	2	Pre-shared Keys	3600
ike-preshared-3des-sha1-dh1	3DES	SHA-1	1	Pre-shared Keys	3600
ike-preshared-3des-md5-dh1	3DES	MD5	1	Pre-shared Keys	3600
ike-preshared-des-sha1-dh1	DES	SHA-1	1	Pre-shared Keys	3600
ike-preshared-des-md5-dh1	DES	MD5	1	Pre-shared Keys	3600
ike-preshared-3des-sha1-dh5	3DES	SHA-1	5	Pre-shared Keys	3600
ike-preshared-3des-md5-dh5	3DES	MD5	5	Pre-shared Keys	3600
ike-preshared-des-sha1-dh5	DES	SHA-1	5	Pre-shared Keys	3600
ike-preshared-des-md5-dh5	DES	MD5	5	Pre-shared Keys	3600

Pre-configured IPSec proposals

IPSec proposals decide the type of encryption and authentication for the traffic that flows between the endpoints of the tunnel.

Table 10.3 lists the default IPSec proposals available on the Internet Security Router

Table 10.3. Pre-configured IPSec proposals in the Internet Security Router

Name	Encryption Algorithm	Authentication Algorithm	Encapsulation	Life time (Mbytes/secs)
ipsec-esp-3des-sha1	3DES	SHA-1	ESP	75/3600
ipsec-esp-3des-md5	3DES	MD5	ESP	75/3600
ipsec-esp-des-sha1	DES	SHA-1	ESP	75/3600
ipsec-esp-des-md5	DES	MD5	ESP	75/3600
ipsec-ah-sha1	-	SHA-1	AH	75/3600
ipsec-ah-md5	-	MD5	AH	75/3600
ipsec-esp-3des	3DES	-	ESP	75/3600
ipsec-esp-des	DES	-	ESP	75/3600
ipsec-esp-sha1	-	SHA-1	ESP	75/3600
ipsec-esp-md5	-	MD5	ESP	75/3600

Default lifetime

Default lifetime for the pre-configured IKE proposals and IPSec proposals is 3600 seconds. (One hour). It is recommended to set lifetime value greater than 600 seconds, for a new IKE proposal or IPSec proposal. This will reduce quick re-keying which will unnecessarily burden the system.

Limits for key length

The maximum key length for pre shared key, cipher key and Authentication Key is 50characters. If the cipher key length is greater than the length specified by the encryption algorithm, the key is truncated to the appropriate length.

Priority of the connections

The *allow-ike-io* default rule has the highest priority (1). The *allow-all* default rule has the lowest priority. At any point of time it is recommended to maintain this priority. If you add connections below the *allow-all rule (lower priority)*, it will not have any effect as the corresponding packets will match the *allow-all rule* and go without encryption.

Important:

Note that these pre-configured Proposals/Connections are read-only and cannot be modified. If you have to specify a proposal (other than the default), you should add a new one via the VPN configuration page. This way you can control the proposals that become part of a connection.

***Note**: For the negotiation to succeed, the peer gateway should also be configured with matching parameters. However, any specific proposal can be chosen if needed.*

This chapter includes the procedure to configure the Access List through GUI:

„ Basic Access List Configuration

- Access List using IKE
- Access List using Manual Keys

„ Advanced Access List Configuration

- Access List using IKE
- Access List using Manual Keys

10.2 VPN Tunnel Configuration Parameters

Table 10.4 describes all the VPN tunnel configuration parameters available for various VPN configurations.

Table 10.4. VPNTtunnel Configuration Parameter

Options	Description
VPN Connection Settings	
ID	
Add New	Click on this option to add a new VPN rule.
Rule number	Select a rule from the drop-down list, to modify its attributes.
Name	Enter a unique name, preferably a meaningful name that signifies the tunnel connection. Note that only alphanumeric characters are allowed in this field.
Enable	Select this radio button to enable this rule (default).
Disable	Select this radio button to disable this rule.
Move to This option allows you to set a priority for this rule. The VPN service in the Internet Security Router acts on packets based on the priority of the rule, with 1 being the highest priority. Set a priority by selecting from the drop-down list for its position in the list of rules:	

Options	Description
VPN Connection Type	
Site to site	Click this radio button to add a policy for site-to-site users.
Remote access	Click this radio button to add a policy for remote access users.
User Group (only available for Remote Access mode) Select a user group from the User Group drop-down list to which this rule should apply.	
Local Secure Group This option allows you to set the **local secure network** to which this rule should apply. This option allows you to apply this rule inclusively on all computers in the internal network. Use the "**Type**" drop-down list to select one of the following:	
IP Address	Enter the appropriate IP address for the local secure group.
Subnet	This option allows you to include all the computers that are connected in an IP subnet. The following fields become available when this option is selected:
Subnet Address	Specify the appropriate network address.
Subnet Mask	Enter the subnet mask.
IP Range	This option allows you to include a range of IP addresses for applying this rule. The following fields become available for entry when this option is selected:
Start IP	Enter the starting IP address of the range.
End IP	Enter the ending IP address of the range.
Remote Secure Group (only available for site to site VPN mode) This option allows you to set the **remote (destination) secure network** to which this rule should apply. This option allows you to apply this rule inclusively on all computers in the external network. Use the "**Type**" drop-down list to select one of the following:	
IP Address Subnet IP Range	Select any of these and enter details as described in the **Local Secure Group** above.
Remote Gateway You have a choice of entering either the IP address or the FQDN (fully qualified domain name) for the remote secure gateway.	
Any	Select this option to accept connection request from any computer.
IP Address	Select this option to specify an IP address for the remote secure gateway.
FQDN	Select this option to enter the fully qualified domain name for the remote secure gateway.
Key Management (only available for site to site VPN mode) Two modes are supported: pre-shared key and manual key. Select from the Key Management drop-down list for the desired key management mode. If "manual key" mode is selected, configuration for IKE proposal is skipped.	
IKE Proposal Settings (only available for pre-shared key) Note that all options for the IKE proposal settings are available only when pre-shared key is selected.	
IKE Mode	Main mode and aggressive mode are supported. Click the proper radio button for the desired IKE mode.

Options	Description
Xauth (aggressive mode only)	Xauth is a user ID and password based authentication. This option is available only when aggressive mode is selected.
Preshared Key	Enter the shared secret (this should match the secret key at the other end).
IKE Encryption / Authentication	Select the IKE authentication and encryption from the drop-down list. All 3DES & SHA1-DH2 3DES & MD5-DH2 DES & SHA1-DH2 DES & MD5-DH2 3DES & SHA1-DH1 DES & MD5-DH1 DES & SHA1-DH1 DES & MD5-DH1 3DES & SHA1-DH5 3DES & MD5-DH5 DES & SHA1-DH5 DES & MD5-DH5 ***Note:*** *It is recommended that you choose All to have all the IKE proposals associated with the current tunnel and allow IKE to automatically select one (among the set of IKE proposals) to communicate with its peer. However, if a specific proposal is required, then it can be chosen from the list.*
Life Time	Enter the IKE security association life time in seconds, minutes, hours or days.
IPSec Proposal Settings	
IPSec Encryption / Authentication	Select one of the following pre-configured IKE proposals from the drop-down list. If "All" is selected, all the pre-configured proposals will be associated with existing tunnel and one (among the set of IPSec proposals) will be selected automatically and used by IPSec to communicate with its peer. All Strong Encryption & Authentication (ESP 3DES HMAC SHA1) Strong Encryption & Authentication (ESP 3DES HMAC MD5) Encryption & Authentication (ESP DES HMAC SHA1) Encryption & Authentication (ESP DES HMAC MD5) Authentication (AH SHA1) Authentication (AH MD5) Strong Encryption (ESP 3DES) Encryption (ESP DES) Authentication (ESP SHA1) Authentication (ESP MD5)
Chained Encryption / Authentication	You can add additional security to the VPN tunnel by using both ESP and AH protocols together (also called chained encryption/authentication). The only combination supported is ESP encapsulated by AH. To turn on this functionality, first select ESP IPSec proposal from the IPSec Encryption/Authentication drop-down list and then click on either the AH SHA-1 or AH MD-5 radio button in the Chained Encryption / Authentication field.
Operation Mode Click the radio button to select Tunnel or Transport mode.	

Options	Description
Pre-shared Key Specific Options	
PFS Group	PFS stands for perfect forward secrecy.You may choose to use the same keys (generated when the IKE tunnel is created) for all re-negotiations or you can choose to generate new keys for every re-negotiation. Select "None" to use the same keys for all the re-negotiations. Select a specific DH (Diffie-Hellman) group to generate new keys for every re-negotiation. The supported DH groups are DH-1, DH-2 and DH-5. The greater the group number, the more secure the connection is. However, the greater the group number, the more time it takes to negotiate a tunnel. **Note**: With PFS selected, keys are changed during the course of a connection and the tunnel is more secure. However, enabling this option slows down the tunnel negotiation.
Life Times	Enter the life time of IPSec security association in seconds, minutes, hours or days and kilo bytes. Default value is 3600 seconds and 75000 kilo bytes.
Manual Key Specific Options	
Encryption Key	Enter the encryption key. To enter the encryption key in hex, start with 0x.
Authentication Key	Enter the authentication. To enter the authentication key in hex, start with 0x.
Inbound SPI / Inbound AH SPI / Inbound ESP SPI	Enter the inbound security parameter index. If chained encryption / authentication is selected for the VPN tunnel, please enter both the inbound ESP and AH SPIs.
Outbound SPI / Outbound AH SPI / Outbound ESP SPI	Enter the outbound security parameter index. If chained encryption / authentication is selected for the VPN tunnel, please enter both the outbound ESP and AH SPIs.

10.3 Establish VPN Connection Using Automatic Keying

This section describes the steps to establish the VPN tunnel using the Configuration Manager. Internet Key Exchange (IKE) is the automatic keying protocol used to exchange the key that is used to encrypt/authenticate the data packets according to the user-configured rule. The parameters that should be configured are:

- the network addresses of internal and remote networks.
- the remote gateway address and the local gateway address.
- pre-shared secret for remote gateway authentication.
- appropriate priority for the connection.

This option sequence brings up the screen as illustrated in Figure 4.2. Fields and buttons represent the basic VPN parameters. Use them to configure basic Access Rule that will be used to establish a tunnel from local secure group to remote secure group with basic parameters.

Options in this screen allow you to:

- Add an Access List, and set basic parameters for it
- Modify an Access List
- Delete an existing Access List

10.3.1 Add a Rule for VPN Connection Using Pre-shared Key

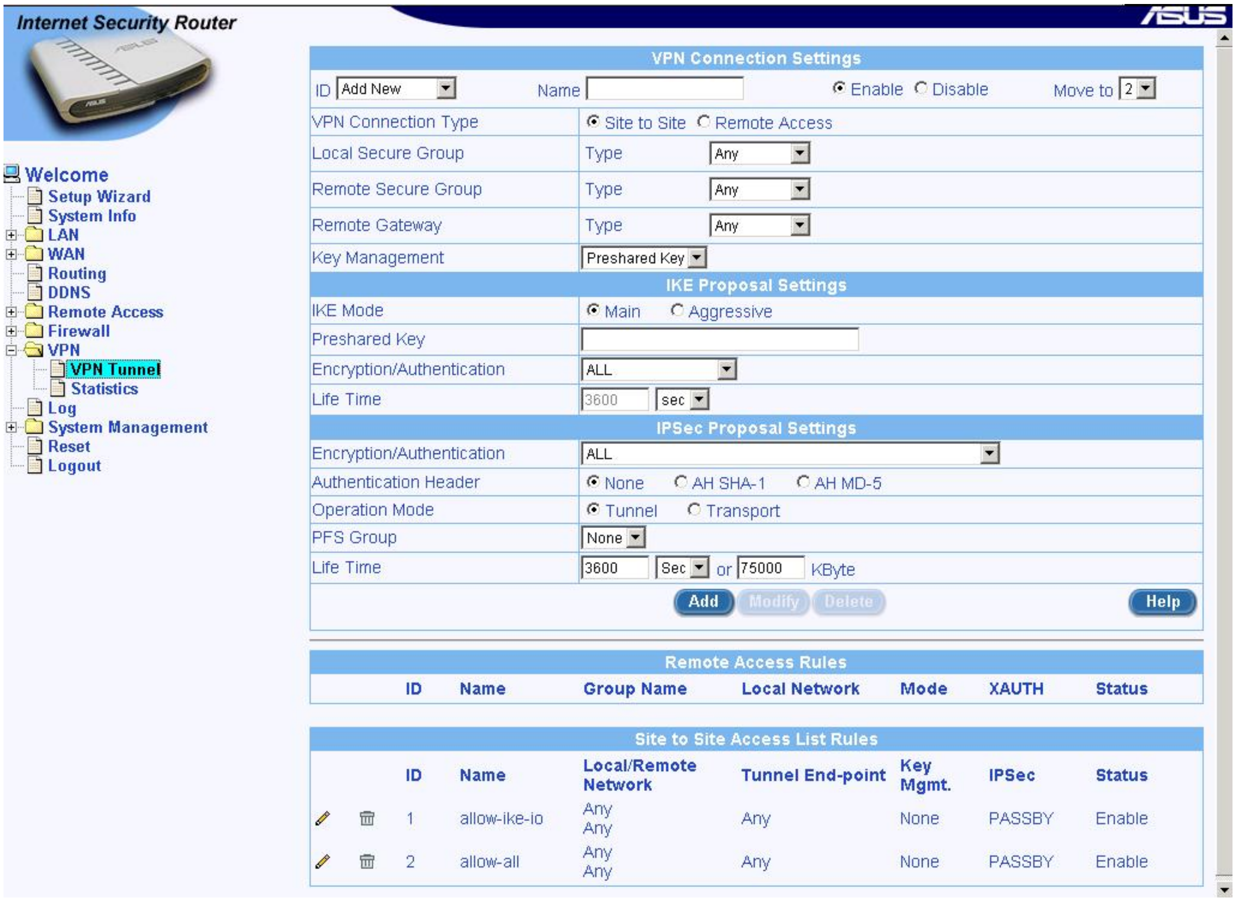
VPN Tunnel Configuration Page, as illustrated in the Figure 10.1, is used to configure a rule for VPN connection using pre-shared key

To add a rule for a VPN connection, follow the instructions below:

1. Log into Configuration Manager as admin, click the **VPN** menu, and then click the **VPN Tunnel** submenu. The VPN Tunnel Configuration page displays, as shown in Figure 10.1.

   Note that when you open the VPN Tunnel Configuration page, a list of existing rules for VPN connections are also displayed at the bottom half of the configuration page such as those shown in Figure 10.1.

2. Prior to adding a VPN rule, make sure that the VPN service is enabled in System Service Configuration page.
3. Select "**Add New**" from the "**ID**" drop-down list.
4. Enter a desired name, preferably a meaningful name that signifies the nature of the VPN connection, in the "**Name**" field. Note that only alphanumeric characters are allowed in a name.
5. Click on "**Enable**" or "**Disable**" radio button to enable or disable this rule.



VPN Connection Settings

ID: Add New | Name: | ● Enable ○ Disable | Move to: 2

VPN Connection Type	● Site to Site ○ Remote Access	
Local Secure Group	Type	Any
Remote Secure Group	Type	Any
Remote Gateway	Type	Any
Key Management	Preshared Key	

IKE Proposal Settings

IKE Mode	● Main ○ Aggressive
Preshared Key	
Encryption/Authentication	ALL
Life Time	3600 sec

IPSec Proposal Settings

Encryption/Authentication	ALL
Authentication Header	● None ○ AH SHA-1 ○ AH MD-5
Operation Mode	● Tunnel ○ Transport
PFS Group	None
Life Time	3600 Sec or 75000 KByte

Remote Access Rules

ID	Name	Group Name	Local Network	Mode	XAUTH	Status

Site to Site Access List Rules

		ID	Name	Local/Remote Network	Tunnel End-point	Key Mgmt.	IPSec	Status
✎	🗑	1	allow-ike-io	Any Any	Any	None	PASSBY	Enable
✎	🗑	2	allow-all	Any Any	Any	None	PASSBY	Enable

Figure 10.1. VPN Tunnel Configuration Page – Pre-shared Key Mode

6. Make changes to any or all of the following fields: local/remote secure group, remote gateway, key management type (select **Preshared Key**), pre-shared key for IKE, encryption/authentication algorithm for IKE, lifetime for IKE, encryption/authentication algorithm for IPSec, operation mode for IPSec, PFS group for IPSec and lifetime for IPSec. Please see Table 10.4 for explanation of these fields.

7. Assign a priority for this rule by selecting a number from the "**Move to**" drop-down list. Note that the number indicates the priority of the rule with two being the highest as one is used by the rule, allow-ike-io, which is needed by IKE. Higher priority rules will be examined prior to the lower priority rules by the VPN.
8. Click on the Add button to create the new VPN rule. The new VPN rule will then be displayed in the VPN Connection Status table at the bottom half of the VPN Configuration page.

10.3.2 Modify VPN Rules

To modify a VPN rule, follow the instructions below:

1. Log into Configuration Manager as admin, click the **VPN** menu, and then click the **VPN Tunnel** submenu.
2. Prior to modifying a VPN rule, make sure that the VPN service is enabled in System Service Configuration page.
3. Select the rule number from the "**ID**" drop-down list or click on the ✎ icon of the rule to be modified in the VPN Connection Status table.
4. Click on "**Enable**" or "**Disable**" radio button to enable or disable this rule.
5. Make changes to any or all of the following fields: local/remote secure group, remote gateway, key management type (select **Preshared Key**), pre-shared key for IKE, encryption/authentication algorithm for IKE, lifetime for IKE, encryption/authentication algorithm for IPSec, operation mode for IPSec, PFS group for IPSec and lifetime for IPSec. Please see Table 10.4 for explanation of these fields.
6. Click on the Modify button to modify this VPN rule. The new settings for this VPN rule will then be displayed in the VPN Connection Status table at the bottom half of the VPN Configuration page.

10.3.3 Delete VPN Rules

To delete an outbound ACL rule, follow the instructions below:

1. Log into Configuration Manager as admin, click the **VPN** menu, and then click the **VPN Tunnel** submenu.
2. Prior to deleting a VPN rule, make sure that the VPN service is enabled in System Service Configuration page.
3. Select the rule number from the "**ID**" drop-down list or click on the ✎ icon of the rule to be modified in the VPN Connection Status table.
4. Click on the Delete button to delete this VPN rule. Note that the VPN rule deleted will be removed from the VPN Connection Status table located at the bottom half of the same configuration page.

10.3.4 Display VPN Rules

To see existing VPN rules, follow the instructions below:

1. Log into Configuration Manager as admin, click the **VPN** menu, and then click the **VPN Tunnel** submenu.
2. The VPN rule table located at the bottom half of the VPN Configuration page shows all the configured VPN rules.

10.4 Establish VPN Connection Using Manual Keys

This section describes the steps to establish the VPN tunnel-using manual keying. Manual keying is a method to achieve security when ease of configuration and maintenance is more important or automatic keying is not feasible due to interoperability issues between IKE implementations on the gateways. However, this is a weak security option as all packets use the same keys unless you – as the network administrator, use different key for authentication.

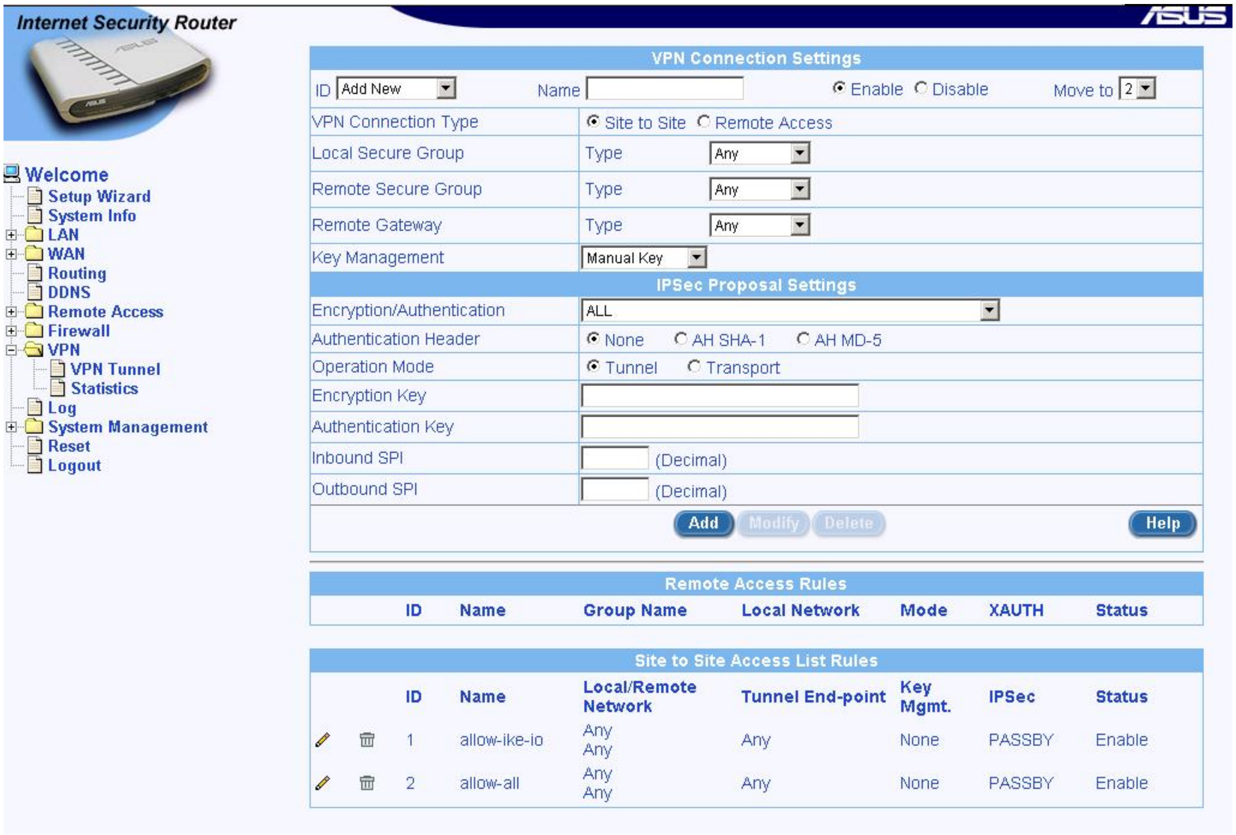
10.4.1 Add a Rule for VPN Connection Using Manual Key

VPN Tunnel Configuration Page, as illustrated in the Figure 10.2, is used to configure a rule for VPN connection using manual key.

To add a rule for a VPN connection, follow the instructions below:

1. Log into Configuration Manager as admin, click the **VPN** menu, and then click the **VPN Tunnel** submenu. The VPN Tunnel Configuration page displays, as shown in Figure 10.2.

   Note that when you open the VPN Tunnel Configuration page, a list of existing rules for VPN connections are also displayed at the bottom half of the configuration page such as those shown in Figure 10.2.



VPN Connection Settings

ID: Add New Name: ● Enable ○ Disable Move to 2

VPN Connection Type	● Site to Site ○ Remote Access
Local Secure Group	Type Any
Remote Secure Group	Type Any
Remote Gateway	Type Any
Key Management	Manual Key

IPSec Proposal Settings

Encryption/Authentication	ALL
Authentication Header	● None ○ AH SHA-1 ○ AH MD-5
Operation Mode	● Tunnel ○ Transport
Encryption Key	
Authentication Key	
Inbound SPI	(Decimal)
Outbound SPI	(Decimal)

Remote Access Rules

ID	Name	Group Name	Local Network	Mode	XAUTH	Status

Site to Site Access List Rules

ID	Name	Local/Remote Network	Tunnel End-point	Key Mgmt.	IPSec	Status
1	allow-ike-io	Any Any	Any	None	PASSBY	Enable
2	allow-all	Any Any	Any	None	PASSBY	Enable

Figure 10.2. VPN Tunnel Configuration Page – Manual Key Mode

2. Prior to adding a VPN rule, make sure that the VPN service is enabled in System Service Configuration page (see section 12.1 Configure System Services).

3. Select "**Add New**" from the "**ID**" drop-down list.

4. Enter a desired name, preferably a meaningful name that signifies the nature of the VPN connection, in the "**Name**" field. Note that only alphanumeric characters are allowed in a name.

5. Click on "**Enable**" or "**Disable**" radio button to enable or disable this rule.
6. Make changes to any or all of the following fields: local/remote secure group, remote gateway, key management type (select **Manual Key**), pre-shared key for IKE, encryption/authentication algorithm for IKE, lifetime for IKE, encryption/authentication algorithm for IPSec, operation mode for IPSec, PFS group for IPSec and lifetime for IPSec. Please see Table 10.4 for explanation of these fields.
7. Assign a priority for this rule by selecting a number from the "**Move to**" drop-down list. Note that the number indicates the priority of the rule with two being the highest as one is used by the rule, allow-ike-io, which is needed by IKE. Higher priority rules will be examined prior to the lower priority rules by the VPN.
8. Click on the Add button to create the new VPN rule. The new VPN rule will then be displayed in the VPN Connection Status table at the bottom half of the VPN Configuration page.

10.4.2 Modify VPN Rules

To modify a VPN rule, follow the instructions below:

1. Log into Configuration Manager as admin, click the **VPN** menu, and then click the **VPN Tunnel** submenu.
2. Prior to modifying a VPN rule, make sure that the VPN service is enabled in System Service Configuration page.
3. Select the rule number from the "**ID**" drop-down list or click on the ✎ icon of the rule to be modified in the VPN Connection Status table.
4. Click on "**Enable**" or "**Disable**" radio button to enable or disable this rule.
5. Make changes to any or all of the following fields: local/remote secure group, remote gateway, key management type (select **Preshared Key**), pre-shared key for IKE, encryption/authentication algorithm for IKE, lifetime for IKE, encryption/authentication algorithm for IPSec, operation mode for IPSec, PFS group for IPSec and lifetime for IPSec. Please see Table 10.4 for explanation of these fields.
6. Click on the Modify button to modify this VPN rule. The new settings for this VPN rule will then be displayed in the VPN Connection Status table at the bottom half of the VPN Tunnel Configuration page.

10.4.3 Delete VPN Rules

To delete an outbound ACL rule, follow the instructions below:

1. Log into Configuration Manager as admin, click the **VPN** menu, and then click the **VPN Tunnel** submenu.
2. Prior to deleting a VPN rule, make sure that the VPN service is enabled in System Service Configuration page.
3. Select the rule number from the "**ID**" drop-down list or click on the ✎ icon of the rule to be modified in the VPN Connection Status table.
4. Click on the Delete button to delete this VPN rule. Note that the VPN rule deleted will be removed from the VPN Connection Status table located at the bottom half of the same configuration page.

10.4.4 Display VPN Rules

To see existing VPN rules, follow the instructions below:

1. Log into Configuration Manager as admin, click the **VPN** menu, and then click the **VPN Tunnel** submenu.
2. The VPN rule table located at the bottom half of the VPN Configuration page shows all the configured VPN rules.

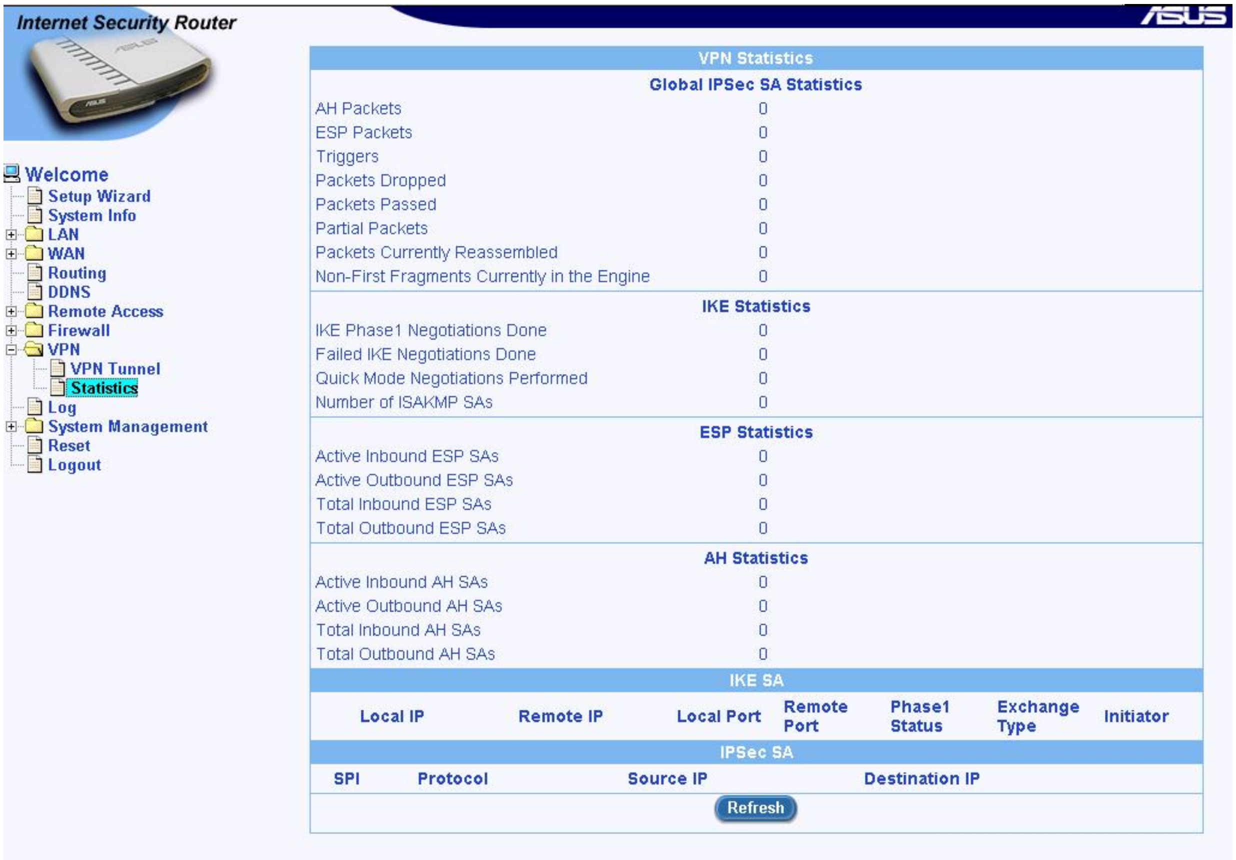
10.5 VPN Statistics

Statistics option allows you to view the information about the VPN statistics – Global, IKE SAs and IPSec SAs. Table 10.5 gives description for the VPN statistics parameters.

Table 10.5. VPN Statistics

Entry	**Descriptions**
VPN Statistics	
Global IPSEC SA Statistics	**Overall packet statistics**
AH Packets	Number of AH packets
ESP Packets	Number of ESP packets
Triggers	Number of triggers
Packets Dropped	Number of packets dropped
Packets Passed	Total number of packets passed by VPN
Partial Packets	Total count of partial packets
Packets Currently Reassembled	Number of partial packets currently being reassembled
Non-First Fragments Currently in the Engine	Number of non-first fragments currently in the engine
IKE Statistics	**IKE negotiation statistics**
IKE Phase1 Negotiation Done	Number of IKE phase-1 negotiations performed
Failed IKE Negotiations Done	Number of failed IKE phase -1negotiations
Quick Mode Negotiation Performed	Number of IKE quick mode negotiations performed
Number of ISAKMP SAs	Number of phase 1 SA's
ESP Statistics	**Number of ESP statistics**
Active Inbound ESP SAs	Number of active inbound ESP SA's
Active Outbound ESP SAs	Number of active outbound ESP SA's
Total Inbound ESP SAs	Number of inbound ESP SA's since the system has started
Total Outbound ESP SAs	Number of active outbound ESP SA's since the system has started
AH Statistics	**SA statistics for all AH SAs**
Active Inbound AH SAs	Number of active inbound AH SA's
Active Outbound AH SAs	Number of active outbound AH SA's
Total Inbound AH SAs	Number of inbound AH SA's since the system has started
Total Outbound AH SAs	Number of outbound AH SA's since the system has started
IKE SA	
IPSec SA	

Figure 10.3 shows all the parameters available for VPN connections. To see an updated statistics, click on the Refresh button.



VPN Statistics

Global IPSec SA Statistics	
AH Packets	0
ESP Packets	0
Triggers	0
Packets Dropped	0
Packets Passed	0
Partial Packets	0
Packets Currently Reassembled	0
Non-First Fragments Currently in the Engine	0
IKE Statistics	
IKE Phase1 Negotiations Done	0
Failed IKE Negotiations Done	0
Quick Mode Negotiations Performed	0
Number of ISAKMP SAs	0
ESP Statistics	
Active Inbound ESP SAs	0
Active Outbound ESP SAs	0
Total Inbound ESP SAs	0
Total Outbound ESP SAs	0
AH Statistics	
Active Inbound AH SAs	0
Active Outbound AH SAs	0
Total Inbound AH SAs	0
Total Outbound AH SAs	0

IKE SA

Local IP	Remote IP	Local Port	Remote Port	Phase1 Status	Exchange Type	Initiator

IPSec SA

SPI	Protocol	Source IP	Destination IP

Figure 10.3. VPN Statistics Page

10.6 VPN Connection Examples

Gateways with integrated VPN and Firewall are useful in scenarios where:

- The traffic between branch offices is protected by VPN and
- Traffic destined for public Internet goes through Firewall/NAT.

To avoid NAT/IPSec interoperability issues, outgoing traffic is first processed by Firewall/NAT and then by IPSec. Hence, you must ensure that appropriate Firewall rules are configured to let the VPN traffic goes through. This section describes these scenarios and presents step-by-step instructions for configuring these scenarios.

10.6.1 Intranet Scenario – firewall + VPN and no NAT for VPN traffic

This is a common scenario where traffic to the public Internet goes through the Firewall/NAT only and traffic between private networks is allowed without NAT before IPSec processing. The same authority administers the networks that are protected by VPN to avoid any possible address clash. Configure each of the Internet Security Router for the Intranet scenario using the following steps:

- Configure VPN connection rules.
- Configure Firewall access rules to allow inbound and outbound VPN traffic.
- Configure a Firewall self rule to allow IKE packets into the Internet Security Router.

10.6.1.1 Configure Rules on Internet Security Router 1 (ISR1)

This section describes the steps to establish the VPN/Firewall for the Internet scenario. Figure 10.4 depicts the typical Intranet connections. Note that ADSL or cable modem is not required if the two networks are connected via Ethernet connections.The setting of each configuration step is illustrated in a figure. For instructions on configuration of each step, please refer to the corresponding section for details.

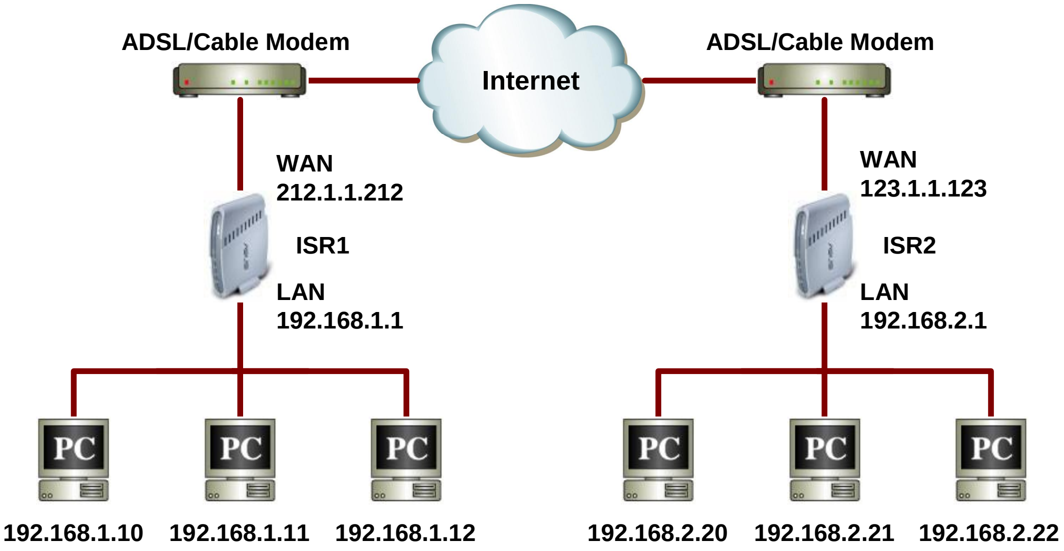
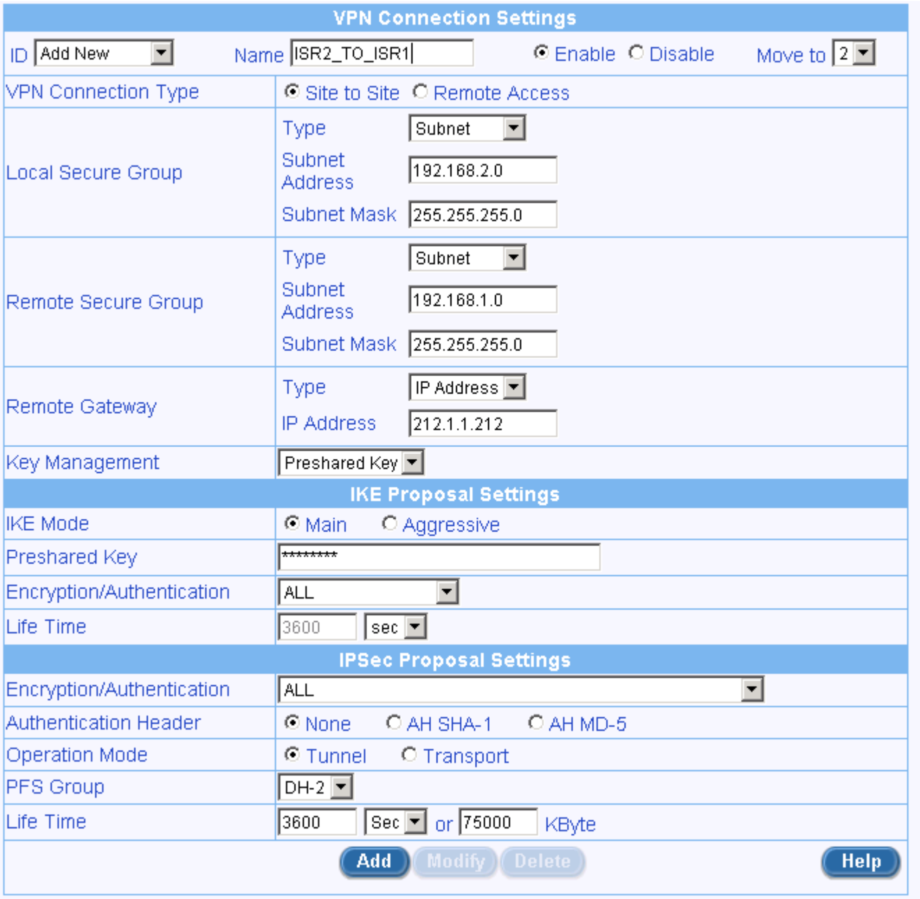


Figure 10.4. Typical Intranet Network Diagram



VPN Connection Settings	
ID Add New ▾	Name ISR2_TO_ISR1 ● Enable ○ Disable Move to 2 ▾
VPN Connection Type	● Site to Site ○ Remote Access
Local Secure Group	Type: Subnet ▾ Subnet Address: 192.168.2.0 Subnet Mask: 255.255.255.0
Remote Secure Group	Type: Subnet ▾ Subnet Address: 192.168.1.0 Subnet Mask: 255.255.255.0
Remote Gateway	Type: IP Address ▾ IP Address: 212.1.1.212
Key Management	Preshared Key ▾
IKE Proposal Settings	
IKE Mode	● Main ○ Aggressive
Preshared Key	********
Encryption/Authentication	ALL ▾
Life Time	3600 sec ▾
IPSec Proposal Settings	
Encryption/Authentication	ALL ▾
Authentication Header	● None ○ AH SHA-1 ○ AH MD-5
Operation Mode	● Tunnel ○ Transport
PFS Group	DH-2 ▾
Life Time	3600 Sec ▾ or 75000 KByte

Figure 10.5. Intranet VPN Policy Configuration on ISR1

Step 1: Configure VPN connection rules

Refer to the section 10.3 Establish VPN Connection Using Automatic Keying to configure VPN policies on ISR1 using automatic keying.

Step 2: Configure Firewall rules

1. Configure outbound Firewall rule to allow packets from 192.168.1.0/255.255.255.0 to 192.168.2.0/255.255.255.0 without any NAT
2. Configure inbound Firewall rule to allow packets from 192.168.2.0/255.255.255.0 to 192.168.1.0/255.255.255.0 without any NAT.

Table 10.6 and Table 10.7 provide the parameters to be configured for the outbound and inbound Firewall rule fields. For a general description on configuring any inbound/outbound Firewall rule, please refer to sections 9.3 and 9.4.

Table 10.6. Outbound Un-translated Firewall Rule for VPN Packets on ISR1

Field		Value
Source IP	Type	Subnet
	Address	192.168.1.0
	Mask	255.255.255.0
Destination IP	Type	Subnet
	Address	192.168.2.0
	Mask	255.255.255.0
NAT		None
Action		Allow
VPN		Enable

Note: *The outbound Un-translated Firewall rule has to be added the existing rule ID 1001.*

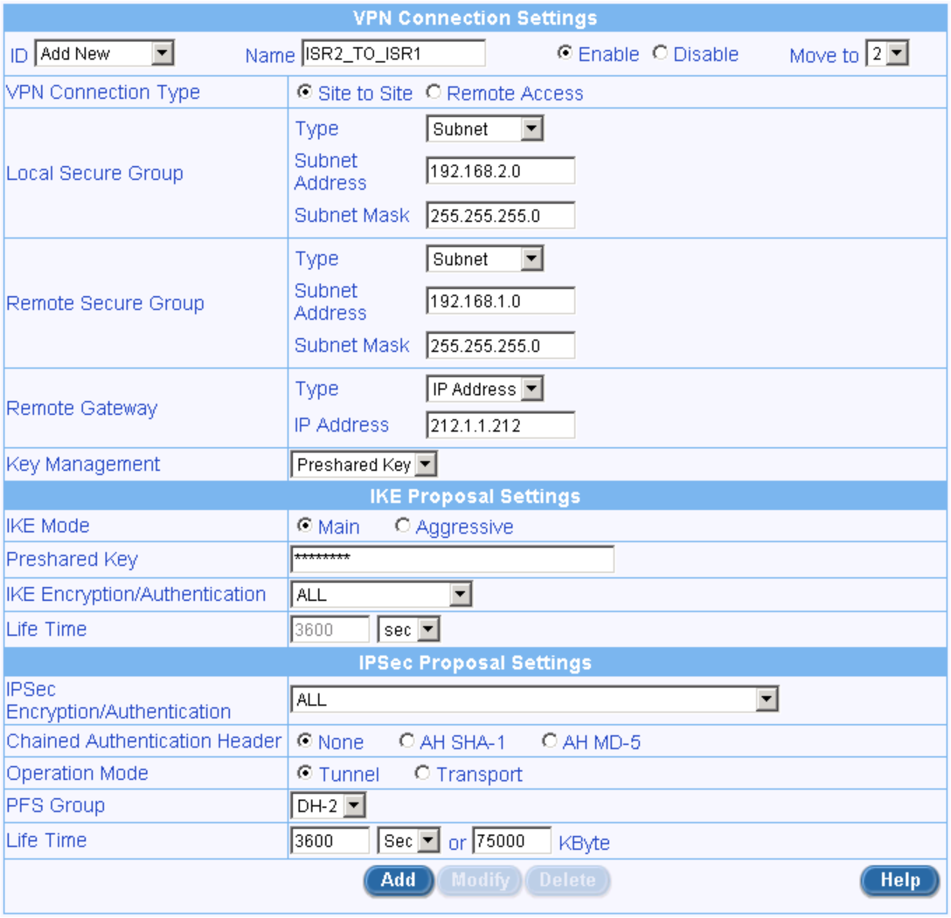
Table 10.7. Inbound Un-translated Firewall Rule for VPN Packets on ISR1

Field		Value
Source IP	Type	Subnet
	Address	192.168.2.0
	Mask	255.255.255.0
Destination IP	Type	Subnet
	Address	192.168.1.0
	Mask	255.255.255.0
NAT		None
Action		Allow
VPN		Enable

10.6.1.2 Configure Rules on Internet Security Router 2 (ISR2)

Step 1: Configure VPN connection rules

Refer to the section 10.3 Establish VPN Connection Using Automatic Keying to configure VPN policies on ISR2 using automatic keying.



VPN Connection Settings

ID: Add New | Name: ISR2_TO_ISR1 | ● Enable ○ Disable | Move to: 2

VPN Connection Type	● Site to Site ○ Remote Access	
Local Secure Group	Type	Subnet
	Subnet Address	192.168.2.0
	Subnet Mask	255.255.255.0
Remote Secure Group	Type	Subnet
	Subnet Address	192.168.1.0
	Subnet Mask	255.255.255.0
Remote Gateway	Type	IP Address
	IP Address	212.1.1.212
Key Management	Preshared Key	

IKE Proposal Settings

IKE Mode	● Main ○ Aggressive
Preshared Key	********
IKE Encryption/Authentication	ALL
Life Time	3600 sec

IPSec Proposal Settings

IPSec Encryption/Authentication	ALL
Chained Authentication Header	● None ○ AH SHA-1 ○ AH MD-5
Operation Mode	● Tunnel ○ Transport
PFS Group	DH-2
Life Time	3600 Sec or 75000 KByte

Figure 10.6. Intranet VPN Policy Configuration on ISR2

Step 2: Configure Firewall rules

1. Configure outbound Firewall rule to allow packets from 192.168.2.0/255.255.255.0 to 192.168.1.0/255.255.255.0 without any NAT.
2. Configure inbound Firewall rule to allow packets from 192.168.1.0/255.255.255.0 to 192.168.2.0/255.255.255.0 without any NAT.

Table 10.8 and Table 10.9 provide the parameters to be configured for the outbound and inbound Firewall rule fields. For a general description on configuring any inbound/outbound Firewall rule, please refer to sections 9.3 and 9.4.

Table 10.8. Outbound Un-translated Firewall Rule for VPN Packets on ISR1

Field		**Value**
Source IP	Type	Subnet
	Address	192.168.2.0
	Mask	255.255.255.0
Destination IP	Type	Subnet
	Address	192.168.1.0

Field		Value
	Mask	255.255.255.0
NAT		None
Action		Allow
VPN		Enable

Note: *The outbound Un-translated Firewall rule has to be added the existing rule ID 1001.*

Table 10.9. Inbound Un-translated Firewall Rule for VPN Packets on ISR1

Field		Value
Source IP	Type	Subnet
	Address	192.168.1.0
	Mask	255.255.255.0
Destination IP	Type	Subnet
	Address	192.168.2.0
	Mask	255.255.255.0
NAT		None
Action		Allow
VPN		Enable

10.6.1.3 Establish Tunnel and Verify

- Ping continuously from a host in the LAN behind ISR1 to a host in the LAN behind ISR2. The first few pings might fail. After a few seconds, the host in the LAN behind ISR1 should start getting ping response.

10.6.2 Extranet Scenario – firewall + static NAT + VPN for VPN traffic

In case of the extranet scenario, the networks protected by the Internet Security Routers could be under different administrative authorities. Hence, there is a possibility that the IP addresses of both networks are in the same subnet. The typical extranet set up is shown in Figure 10.7.

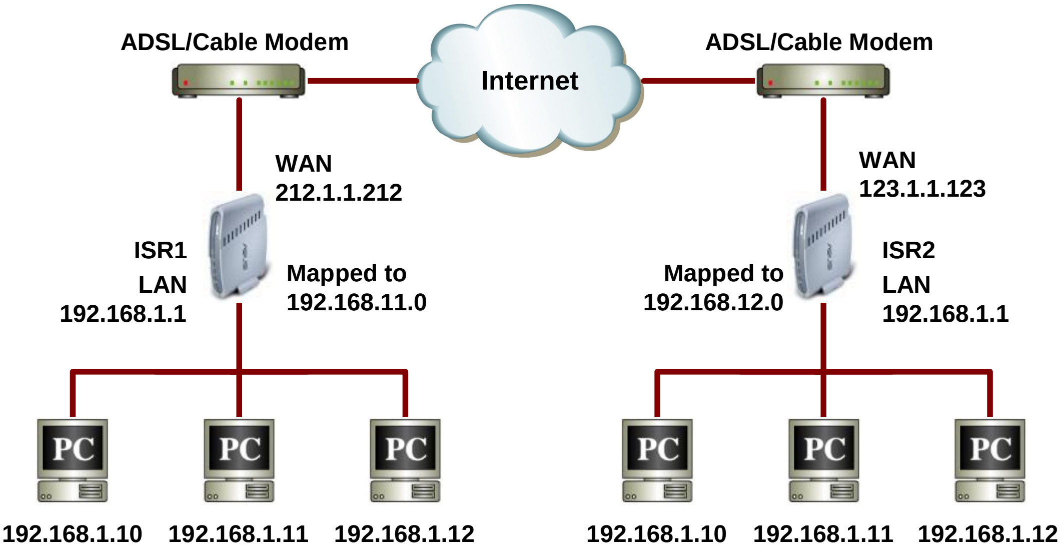


Figure 10.7. Typical Extranet Network Diagram

Both networks behind the ISR1 and ISR2 are 192.168.1.0/255.255.255.0.

To avoid routing problems in such scenario, network IP addresses must be mapped to different ones:

- Network 192.168.1.0/255.255.255.0 behind ISR1 is translated to 192.168.11.0/255.255.255.0 before VPN processing.
- Network 192.168.1.0/255.255.255.0 behind ISR2 is translated to 192.168.12.0/255.255.255.0 before VPN processing.

The results are:

- The LAN behind ISR1 would be viewed as 192.168.11. 0/24 by the LAN behind ISR2.
- The LAN behind ISR2 would be viewed as 192.168.12. 0/24 by the LAN behind ISR1.

The configuration of each of the Internet Security Routers for extranet scenario consists of the following steps:

- Configure VPN Connection rules.
- Configure Firewall rules to allow inbound and outbound VPN traffic by performing one-to-one NAT.
- Configure a Firewall Self Access rule to allow IKE packets into the Internet Security Router.

10.6.2.1 Setup the Internet Security Routers

On ISR1

1. Configure LAN interface of ISR1 with IP address 192.168.1.1.
2. Configure DHCP pool with IP addresses from 192.168.1.10 to 192.168.1.110 on ISR1.
3. Configure WAN interface of ISR1 with IP address 212.1.1.212.
4. Add a route on ISR1 with gateway as 123.1.1.123.
5. Save the configuration.

On ISR2

1. Configure LAN interface of ISR2 with IP address 192.168.1.1.
2. Configure DHCP pool with IP addresses from 192.168.1.10 to 192.168.1.110 on ISR2.
3. Configure WAN interface of ISR2 for IP address 123.1.1.123.
4. Add a default route on ISR2 with gateway as 212.1.1.212.

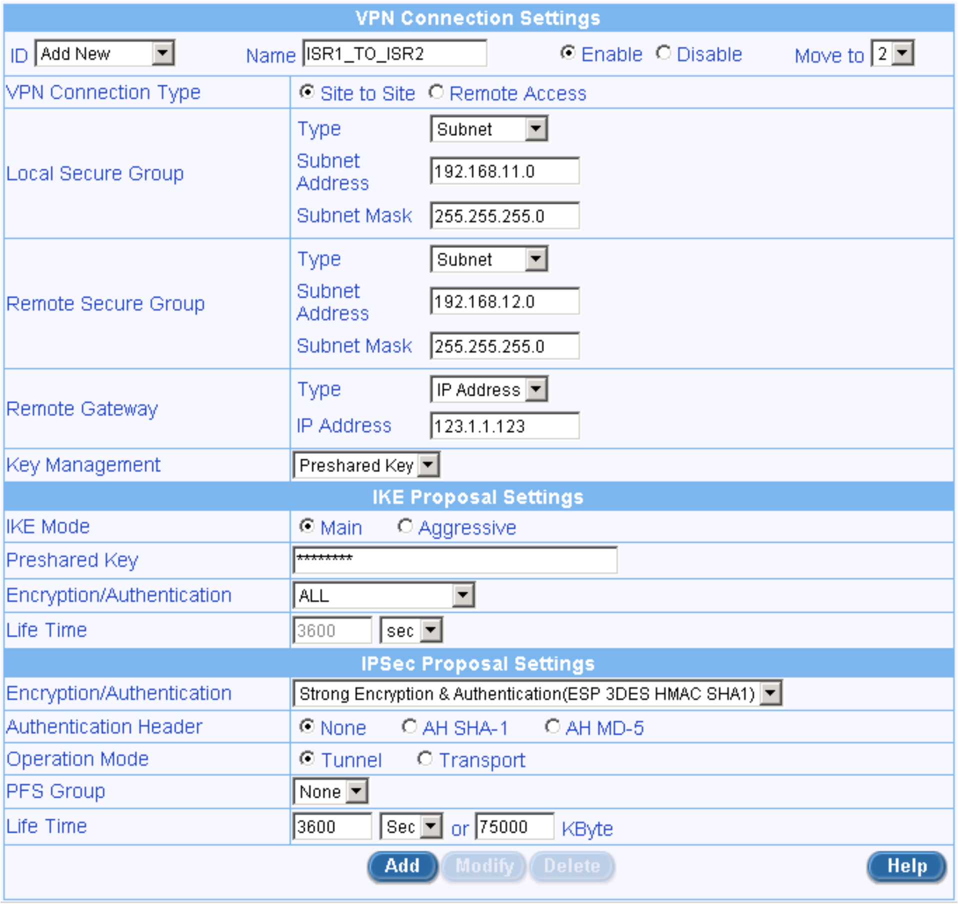
5. Save the configuration.

10.6.2.2 Configure VPN Rules on ISR1

Step 1: Configure VPN Rule

Refer to the section 10.3 Establish VPN Connection Using Automatic Keying to configure VPN policies on ISR1 using automatic keying with the following addresses:

1. Use 192.168.11.0/255.255.255.0 for the Local Secure Group
2. Use 192.168.12.0/255.255.255.0 for the Remote Secure Group



VPN Connection Settings

ID: Add New | Name: ISR1_TO_ISR2 | ● Enable ○ Disable | Move to: 2

VPN Connection Type	● Site to Site ○ Remote Access	
Local Secure Group	Type	Subnet
	Subnet Address	192.168.11.0
	Subnet Mask	255.255.255.0
Remote Secure Group	Type	Subnet
	Subnet Address	192.168.12.0
	Subnet Mask	255.255.255.0
Remote Gateway	Type	IP Address
	IP Address	123.1.1.123
Key Management	Preshared Key	

IKE Proposal Settings

IKE Mode	● Main ○ Aggressive
Preshared Key	********
Encryption/Authentication	ALL
Life Time	3600 sec

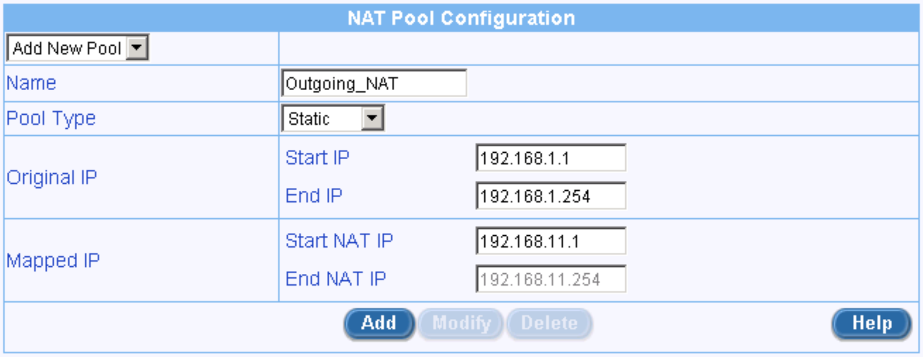
IPSec Proposal Settings

Encryption/Authentication	Strong Encryption & Authentication(ESP 3DES HMAC SHA1)
Authentication Header	● None ○ AH SHA-1 ○ AH MD-5
Operation Mode	● Tunnel ○ Transport
PFS Group	None
Life Time	3600 Sec or 75000 KByte

Figure 10.8. Extranet Example –VPN Policy Configuration on ISR1

Step 2: Configure Static NAT Pools

1. Configure outgoing static NAT pool (static-NAT) for translating addresses in range 192.168.1.1-192.168.1.254 to 192.168.11. 1-192.168.11.254

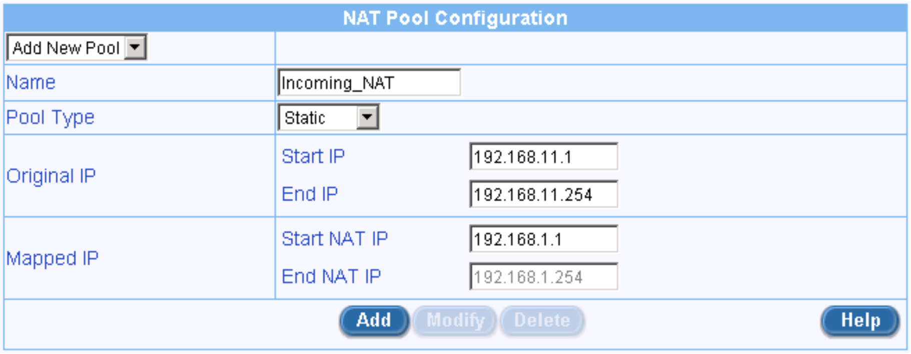


NAT Pool Configuration

Add New Pool		
Name	Outgoing_NAT	
Pool Type	Static	
Original IP	Start IP	192.168.1.1
	End IP	192.168.1.254
Mapped IP	Start NAT IP	192.168.11.1
	End NAT IP	192.168.11.254

Figure 10.9. Extranet Example – Outgoing NAT Pool Configuration on ISR1

2. Configure incoming static NAT pool (reverse-static-NAT) for translating addresses in range 192.168.11.1-192.168.11.254 to 192.168.1.1-192.168.1.254



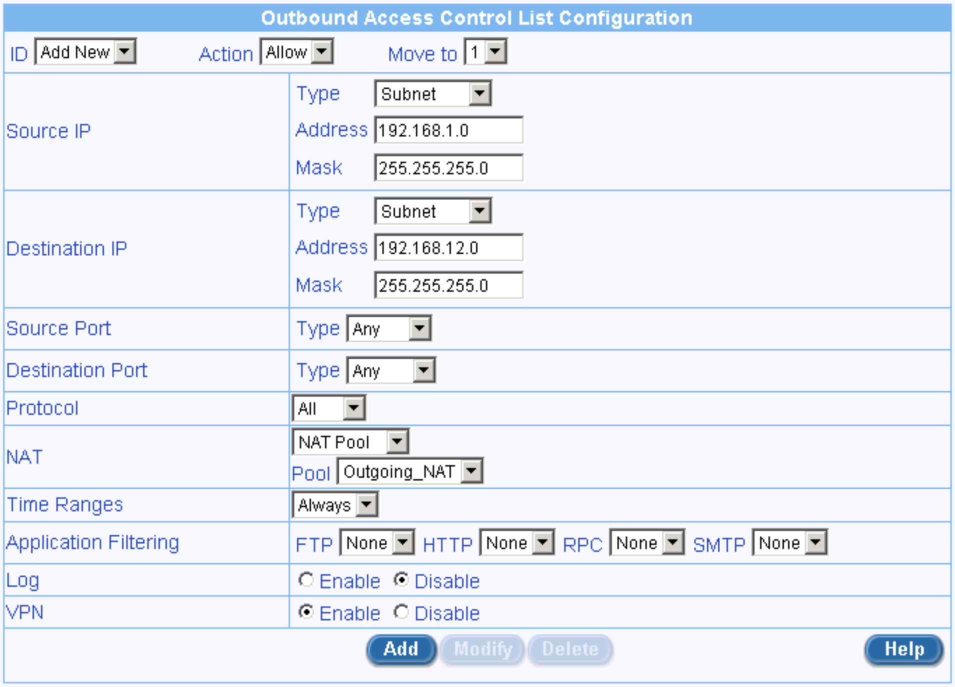
NAT Pool Configuration

Add New Pool		
Name	Incoming_NAT	
Pool Type	Static	
Original IP	Start IP	192.168.11.1
	End IP	192.168.11.254
Mapped IP	Start NAT IP	192.168.1.1
	End NAT IP	192.168.1.254

Figure 10.10. Extranet Example – Incoming NAT Pool Configuration on ISR1

Step 3: Configure Extranet access rules

1. Configure outbound Firewall rules to map the source IP address of outbound packets from 192.168.1.x range to 192.168.11.x (defined by Outgoing_NAT pool) range before sending the packet to VPN.



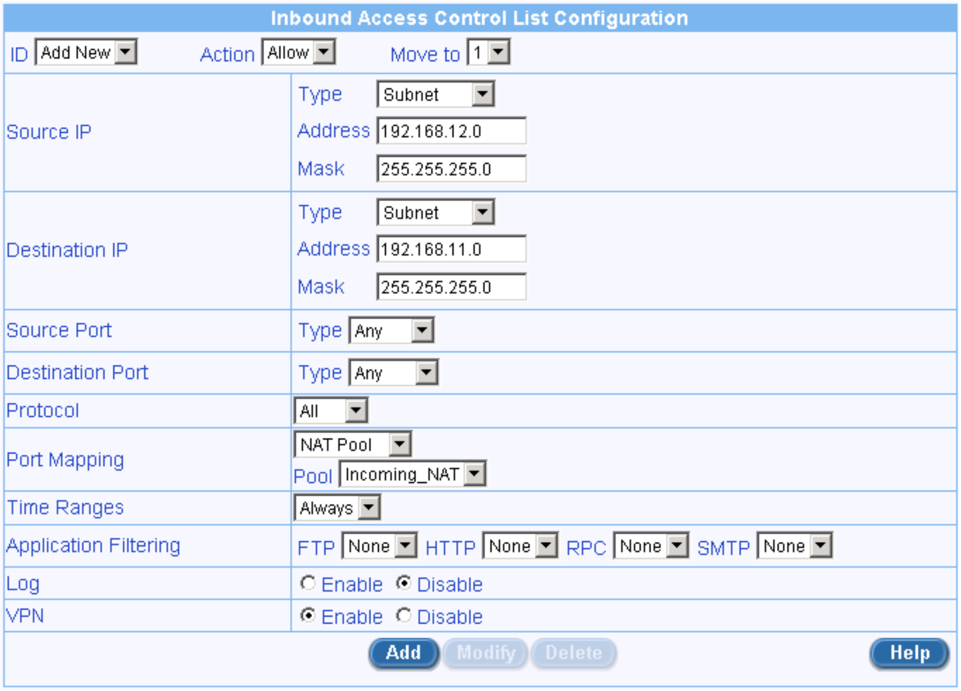
Outbound Access Control List Configuration

ID Add New ▾ Action Allow ▾ Move to 1 ▾

Source IP	Type Subnet ▾ Address 192.168.1.0 Mask 255.255.255.0
Destination IP	Type Subnet ▾ Address 192.168.12.0 Mask 255.255.255.0
Source Port	Type Any ▾
Destination Port	Type Any ▾
Protocol	All ▾
NAT	NAT Pool ▾ Pool Outgoing_NAT ▾
Time Ranges	Always ▾
Application Filtering	FTP None ▾ HTTP None ▾ RPC None ▾ SMTP None ▾
Log	○ Enable ● Disable
VPN	● Enable ○ Disable

Figure 10.11. Extranet Example – Outbound ACL Rule on ISR1

2. Configure inbound Firewall rules to map the destination IP address of inbound packets from 192.168.11.x range to 192.168.1.x (defined by Incoming_NAT pool) range after the packet is processed by VPN.



Inbound Access Control List Configuration

ID Add New ▾ Action Allow ▾ Move to 1 ▾

Source IP	Type Subnet ▾ Address 192.168.12.0 Mask 255.255.255.0
Destination IP	Type Subnet ▾ Address 192.168.11.0 Mask 255.255.255.0
Source Port	Type Any ▾
Destination Port	Type Any ▾
Protocol	All ▾
Port Mapping	NAT Pool ▾ Pool Incoming_NAT ▾
Time Ranges	Always ▾
Application Filtering	FTP None ▾ HTTP None ▾ RPC None ▾ SMTP None ▾
Log	○ Enable ● Disable
VPN	● Enable ○ Disable

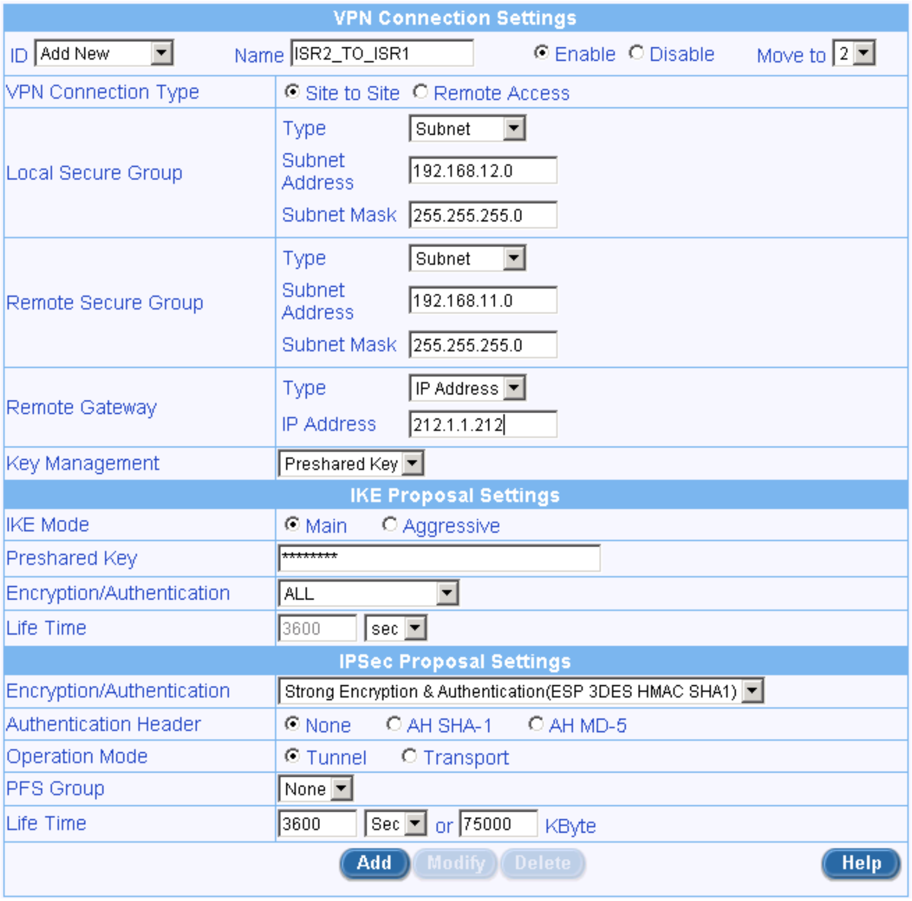
Figure 10.12. Extranet Example – Inbound ACL Rule on ISR1

10.6.2.3 Configure VPN Rules on ISR2

Step 1: Configure VPN rules

Refer to the section 10.3 Establish VPN Connection Using Automatic Keying to configure VPN policies on ISR2 using automatic keying with the following addresses:

1. Use 192.168.12.0/255.255.255.0 as Local Secure Group
2. Use 192.168.11.0/255.255.255.0 as Remote Secure Group



VPN Connection Settings

ID: Add New	Name: ISR2_TO_ISR1	● Enable ○ Disable Move to 2
VPN Connection Type	● Site to Site ○ Remote Access	
Local Secure Group	Type	Subnet
	Subnet Address	192.168.12.0
	Subnet Mask	255.255.255.0
Remote Secure Group	Type	Subnet
	Subnet Address	192.168.11.0
	Subnet Mask	255.255.255.0
Remote Gateway	Type	IP Address
	IP Address	212.1.1.212
Key Management	Preshared Key	

IKE Proposal Settings

IKE Mode	● Main ○ Aggressive
Preshared Key	********
Encryption/Authentication	ALL
Life Time	3600 sec

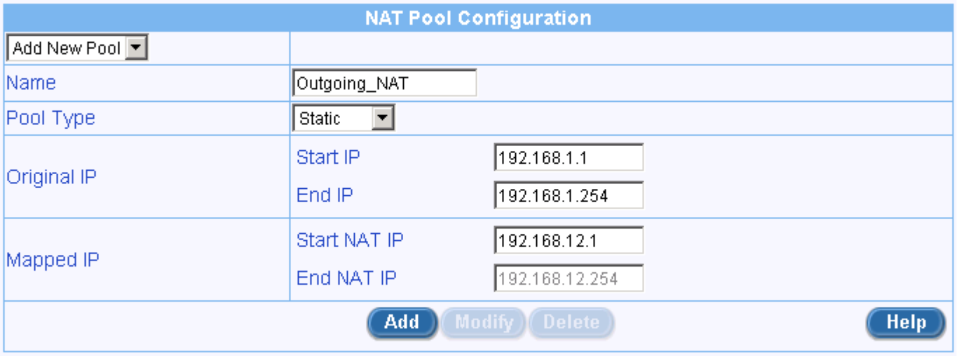
IPSec Proposal Settings

Encryption/Authentication	Strong Encryption & Authentication(ESP 3DES HMAC SHA1)
Authentication Header	● None ○ AH SHA-1 ○ AH MD-5
Operation Mode	● Tunnel ○ Transport
PFS Group	None
Life Time	3600 Sec or 75000 KByte

Figure 10.13. Extranet Example –VPN Policy Configuration on ISR2

Step 2: Configure Static NAT Pools

1. Configure outgoing static NAT pool (static-NAT) for translating addresses in range 192.168.1.1-192.168.1.254 to 192.168.12.1-192.168.12.254

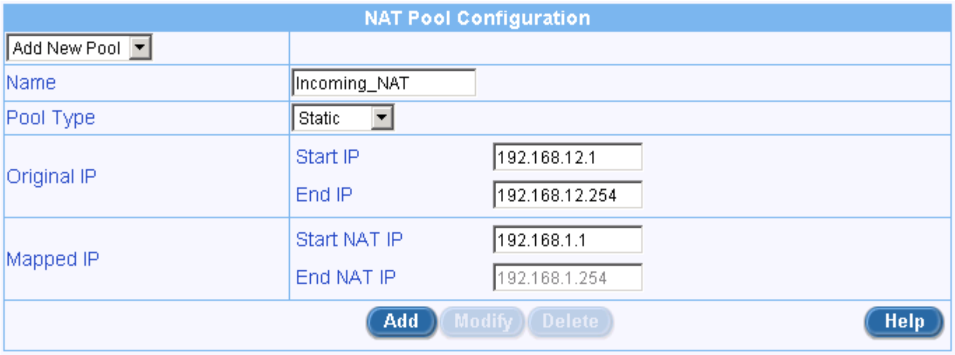


NAT Pool Configuration

Add New Pool		
Name	Outgoing_NAT	
Pool Type	Static	
Original IP	Start IP	192.168.1.1
	End IP	192.168.1.254
Mapped IP	Start NAT IP	192.168.12.1
	End NAT IP	192.168.12.254

Figure 10.14. Extranet Example – Outgoing NAT Pool Configuration on ISR2

2. Configure incoming static NAT pool (reverse-static-NAT) for translating addresses in range 192.168.12.1-192.168.12.254 to 192.168.1.1-192.168.1.254

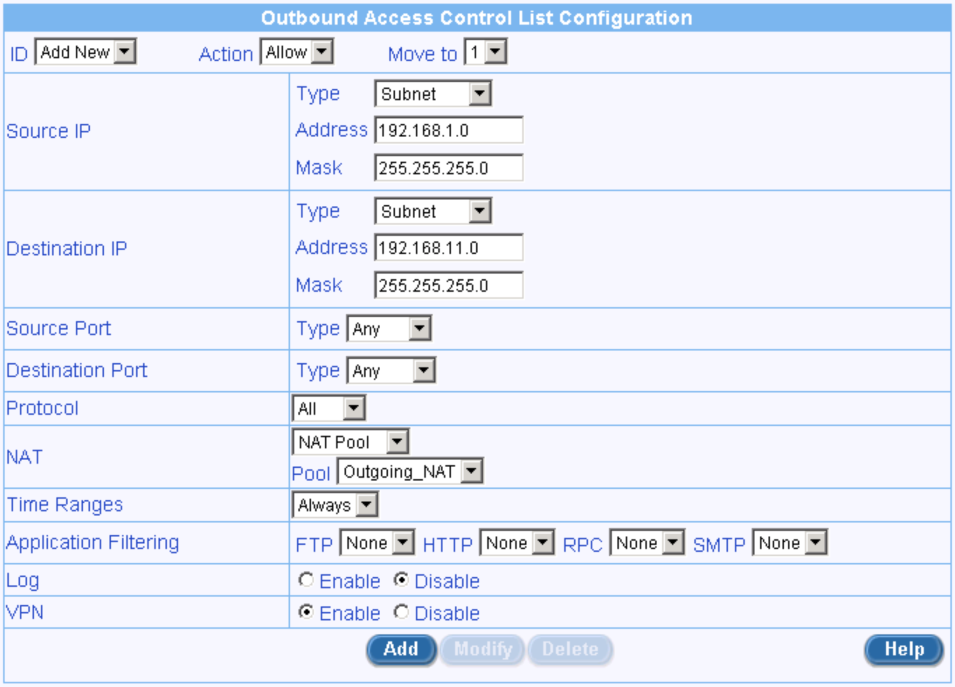


NAT Pool Configuration		
Add New Pool ▼		
Name	Incoming_NAT	
Pool Type	Static ▼	
Original IP	Start IP	192.168.12.1
	End IP	192.168.12.254
Mapped IP	Start NAT IP	192.168.1.1
	End NAT IP	192.168.1.254

Figure 10.15. Extranet Example – Incoming NAT Pool Configuration on ISR2

Step 3: Configure Extranet rules

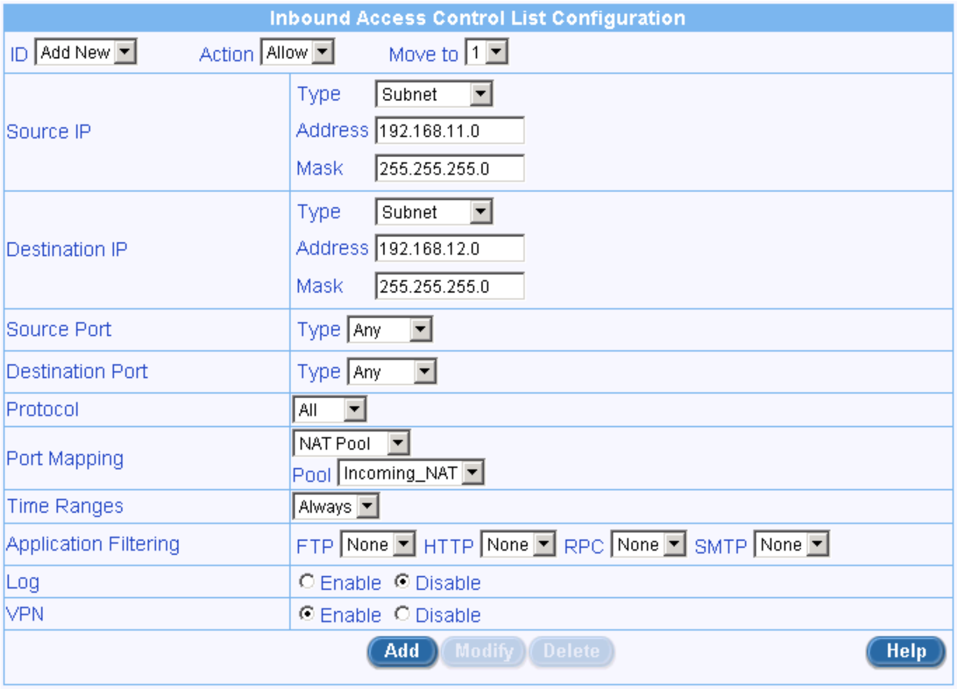
1. Configure outbound Firewall rules to map the source IP address of outbound packets from 192.168.1.x range to 192.168.12.x (defined by Outgoing_NAT pool) range before sending the packet to VPN.



Outbound Access Control List Configuration		
ID Add New ▼	Action Allow ▼	Move to 1 ▼
Source IP	Type	Subnet ▼
	Address	192.168.1.0
	Mask	255.255.255.0
Destination IP	Type	Subnet ▼
	Address	192.168.11.0
	Mask	255.255.255.0
Source Port	Type	Any ▼
Destination Port	Type	Any ▼
Protocol	All ▼	
NAT	NAT Pool ▼	
	Pool	Outgoing_NAT ▼
Time Ranges	Always ▼	
Application Filtering	FTP None ▼ HTTP None ▼ RPC None ▼ SMTP None ▼	
Log	○ Enable ● Disable	
VPN	● Enable ○ Disable	

Figure 10.16. Extranet Example – Outbound ACL Rule on ISR2

2. Configure inbound Firewall rules to map the destination IP address of inbound packets from 192.168.12.x range to 192.168.1.x range after the packet is processed by VPN.



Inbound Access Control List Configuration

ID Add New ▾ Action Allow ▾ Move to 1 ▾	
Source IP	Type Subnet ▾ Address 192.168.11.0 Mask 255.255.255.0
Destination IP	Type Subnet ▾ Address 192.168.12.0 Mask 255.255.255.0
Source Port	Type Any ▾
Destination Port	Type Any ▾
Protocol	All ▾
Port Mapping	NAT Pool ▾ Pool Incoming_NAT ▾
Time Ranges	Always ▾
Application Filtering	FTP None ▾ HTTP None ▾ RPC None ▾ SMTP None ▾
Log	○ Enable ● Disable
VPN	● Enable ○ Disable

Figure 10.17. Extranet Example – Inbound ACL Rule on ISR2

10.6.2.4 Establish Tunnel and Verify

- Start continuous ping from a host on the LAN behind ISR1 to a host on the LAN behind ISR2. The first few pings would fail. After a few seconds, The host on the LAN behind ISR1 should start getting ping response.
- Ping from a host on the LAN behind ISR2 to a host on the LAN behind ISR1. Ping should be successful.
- The ping might fail due to any of the following:
  - The IP address of the host on the LAN behind ISR2 used in the ping command may not be correct. Check and give the correct IP address.
  - Default route is not configured for ISR1 or ISR2. Configure the default routes as necessary.
  - Firewall rules corresponding to VPN connection may not be configured properly. If any of the network addresses is not correctly configured, correct the parameters and apply the configuration.
  - Local and remote network addresses may not be configured correctly. The network addresses used in VPN connection rule are 192.168.11.0/255.255.255.0 and 192.168.12.0/255.255.255.0.

11 Configuring Remote Access

11.1 Remote Access

The Internet Security Router firewall allows telecommuters to securely access their corporate network using the Remote Access mechanism based on the notions of groups, users and access policies. Each group is associated with a set of access policies that are activated when a user belonging to that group logs in. The Internet Security Router maintains details about the access policies defined for the remote access groups. These access lists define the resources the remote users are allowed to access and the inactivity time-out applicable to all the users in the group.

When a user belonging to a group logs in via the Internet or through the local network, the Internet Security Router Firewall activates the policies associated with the group and creates dynamic policies associated with the user. These dynamic policies are referred to for every connection from the user. They are deleted once the user logs out of the Internet Security Router or in case of inactivity time-out.

A typical configuration for remote access involves the following actions:

- Add/modify/delete a new user group and user information (including user name, password and etc) to the group.
- For VPN remote access, virtual IP address assignment is required for each remote access user.
- Add/modify/delete group access policies.

11.2 Manage User Groups and Users

The Remote Access option allows you to configure users and groups.

11.2.1 User Group Configuration Parameters

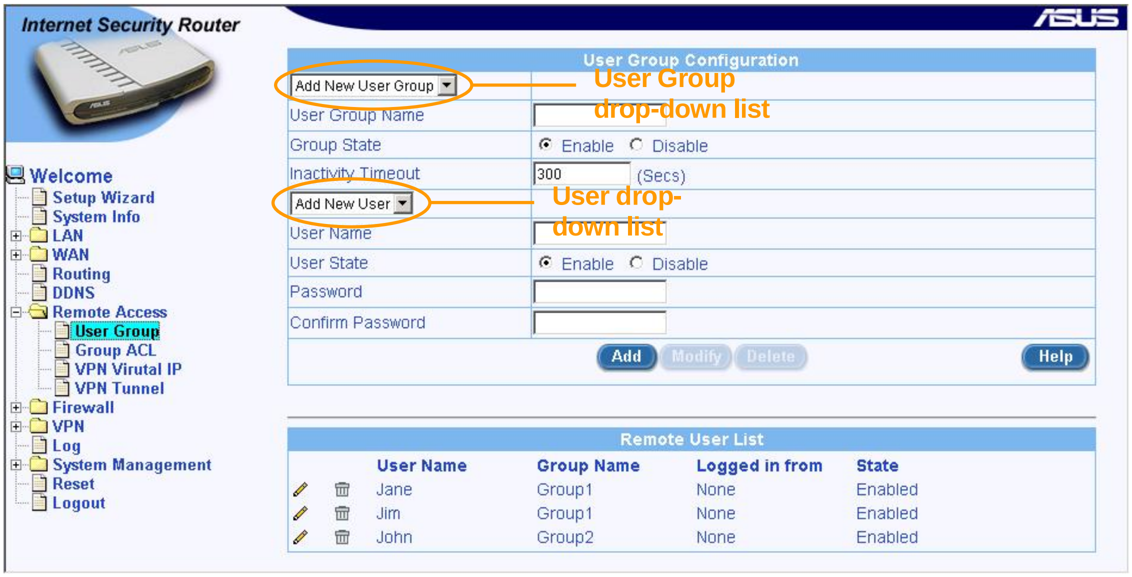
Table 11.1 describes the configuration parameters available for remote access user group and users.

Table 11.1. User Group Configuration Parameters

Field	Description
User Group	
User Group Drop-down list	Select "Add New User Group" to add a new group or select an existing group from the drop-down list.
User Group Name	Enter a unique User group name for the group that you would like to add.
Group State	Click on the Enable or Disable radio button to enable or disable the group. Disabling the group will force all the users to be disconnected in that group who have already logged in. Further login of all the users in that group will be disabled. Enabling the group will allow all the enabled-users in the group to log in.
Inactivity Timeout	Enter the timeout period, which is used to delete the User related sessions when there is no traffic across this connection.
User	
User Drop-down list	Select "Add New User" to add a new user or select an existing user from the drop-down list.

Field	Description
User Name	Enter a unique User name for the user that you would like to add.
User State	Click on the Enable or Disable radio button to enable or disable the user. Disabling the user will force the user to be disconnected. Further login from that specific user will be disabled. Enabling the user will allow the specific user to log in.
Password	Enter the User’s password.
Confirm Password	Enter the User’s password again for confirmation. Make sure that you enter the same password as what you entered in the “Password” field.

11.2.2 Access User Group Configuration Page – (Remote Access è User Group)



User Group Configuration

Add New User Group	
User Group Name	
Group State	● Enable ○ Disable
Inactivity Timeout	300 (Secs)
Add New User	
User Name	
User State	● Enable ○ Disable
Password	
Confirm Password	

Remote User List

User Name	Group Name	Logged in from	State
Jane	Group1	None	Enabled
Jim	Group1	None	Enabled
John	Group2	None	Enabled

Figure 11.1. User Group Configuration Page

Log into Configuration Manager as admin, click the **Remote Access** menu, and then click the **User Group** submenu. The User Group Configuration page displays, as shown in Figure 11.2.

Note that when you open the User Group Configuration page, a list of users is displayed at the bottom half of the configuration page such as those shown in Figure 11.2.

11.2.3 Add a User Group and/or a User

To add a user group and a new user, follow the instructions below:

1. Open the User Group Configuration page (see section 11.2.2 Access User Group Configuration Page – (Remote Access è User Group)).
2. Select “Add New User Group” from the user group drop-down list.
3. Enter a name into the User Group Name field. Make sure that this name is unique among the existing groups. Note that the group name is case sensitive. For example, Group1 and group1 are treated as separate groups.
4. Click on the “Enable” or “Disable” radio button in the Group State field to enable or disable this group.
5. Enter inactivity timeout period. Default is 300 seconds.

6. If you want to add a user to this newly created group, continue with the following steps; otherwise, jump to step 12 to complete the configuration.
7. Select "Add New User" from the user drop-down list.
8. Enter a unique user name in the User Name field.
9. Click on the "Enable" or "Disable" radio in the User State field to enable or disable this user.
10. Enter the password in the Password field for this user.
11. Confirm the password by entering again the password in the Confirm Password field.
12. Click on the Add button to create the new group and/or the new user.

To add a new user, follow the instructions below:

1. Open the User Group Configuration page (see section 11.2.2 Access User Group Configuration Page – (Remote Access è User Group)).
2. Select an existing group from the user group drop-down list.
3. Select "Add New User" from the user drop-down list.
4. Enter a unique user name in the User Name field.
5. Click on the "Enable" or "Disable" radio button in the User State field to enable or disable this user.
6. Enter the password in the Password field for this user.
7. Confirm the password by entering again the password in the Confirm Password field.
8. Click on the Add button to add the new user.

11.2.4 Modify a User Group or a User

To modify a user group and/or a user, follow the instructions below:

1. Open the User Group Configuration page (see section 11.2.2 Access User Group Configuration Page – (Remote Access è User Group)).
2. Select an existing user group from the user group drop-down list. If you just want to modify the attributes of an existing user, please skip to step 4.
3. Make desired changes in the Group State and/or Inactivity Timeout fields. If you don't intend to modify attributes of existing users in the group, please skip to step 6. Note that the group name cannot be changed. To change the group name, you must first delete the existing group and then create a new group with the desired name.
4. Select an existing user from the user drop-down list.
5. Make desired changes in the User State, Password and Confirm Password fields. Note that the user name cannot be changed. To change the user name, you must delete the existing user and then create a new user with the desired name.
6. Click on the Modify button to save the new settings.

11.2.5 Delete a User Group or a User

To delete a user group, follow the instructions below:

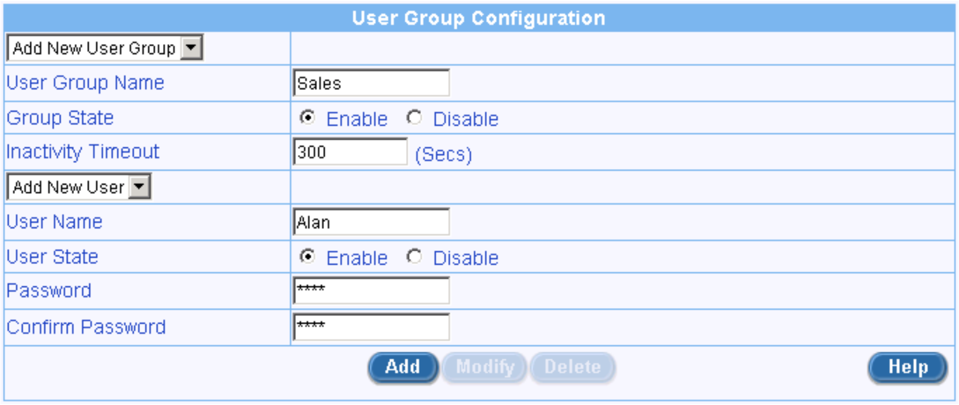
1. Open the User Group Configuration page (see section 11.2.2 Access User Group Configuration Page – (Remote Access è User Group)).
2. Select an existing user group from the user group drop-down list.

3. Click on the Delete button to delete this user group. Note that a user group cannot be deleted unless all the users belong to the group are deleted first.

To delete a user, simply click on the 🗑 icon of the user in the Remote User List table in the User Group Configuration page or follow the instruction below:

1. Open the User Group Configuration page (see section 11.2.2 Access User Group Configuration Page – (Remote Access è User Group)).
2. Click on the ✎ icon of the user to be deleted in the Remote User List table or select the user from the User drop-down list.
3. Click on the Delete button to delete this user.

11.2.6 User Group and Users Configuration Example



User Group Configuration

Add New User Group ▾	
User Group Name	Sales
Group State	● Enable ○ Disable
Inactivity Timeout	300 (Secs)
Add New User ▾	
User Name	Alan
User State	● Enable ○ Disable
Password	****
Confirm Password	****

Figure 11.2. User Group and Users Configuration Example

Example

Figure 11.2 displays the screen with entries to:

„ Add a new user group and a new user
- Group "Sales"
- User "Alan"

11.3 Configure Group ACL Rules

Group ACL is used to control access privileges for remote or local user groups. Its configuration is similar to that for firewall inbound/outbound ACL rules, except two additional fields – rule type and group name (see Figure 11.3). For procedures to configure group ACL rules, please refer to section 9.3 or 9.4 for details.

11.3.1 Group ACL Specific Configuration Parameters

Table 11.2 describes the group ACL specific configuration parameters. The rest of the configuration parameters are the same as those for firewall inbound/outbound ACL rules. Please refer to Table 9.1 and Table 9.2 for details on common configuration parameters.

Table 11.2. Group ACL Specific Configuration Parameters

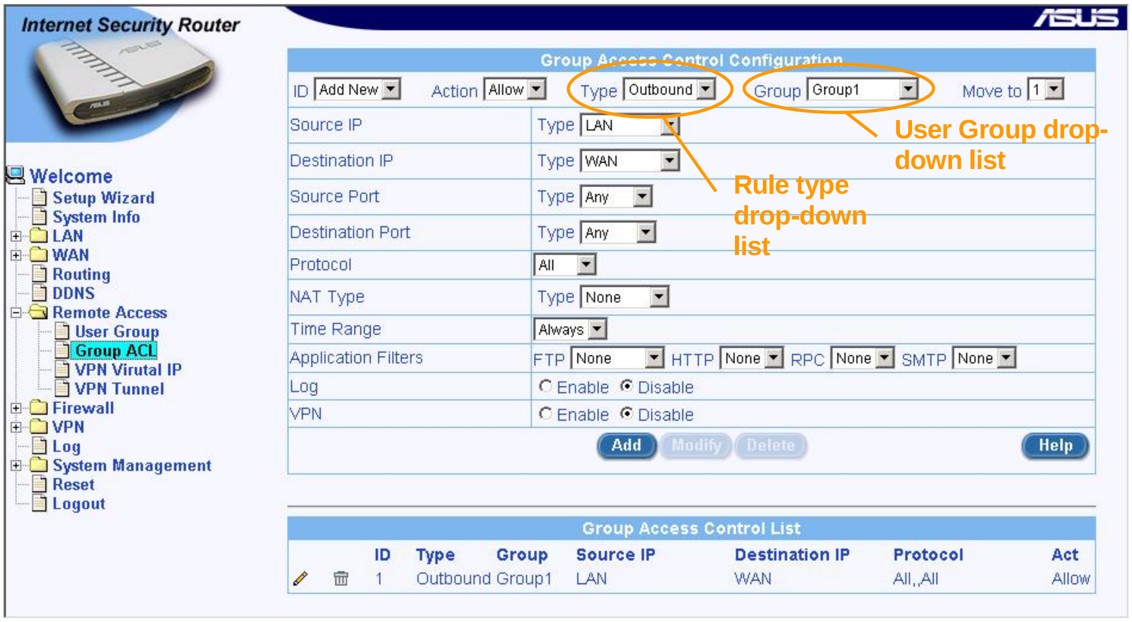
Field	Description
Type Select the type of traffic to which this rule should apply.	
Inbound	Select this if this rule is for inbound traffic.

Field	Description
Outbound	Select this if this rule is for outbound traffic.
Group Select from the group drop-down list to which this rule should apply. Note that to configure a group ACL rule, a user group must be configured first. Please refer to 11.2 for the configuration of user groups.	

11.3.2 Access Group ACL Configuration Page – (Remote Access è Group ACL)

Log into Configuration Manager as admin, click the **Remote Access** menu, and then click the **Group ACL** submenu. The Group ACL Configuration page displays, as shown in Figure 11.3.

Note that when you open the Group ACL Configuration page, a list of existing group ACL rules is also displayed at the bottom half of the configuration page such as those shown in Figure 11.3.



Group Access Control Configuration

ID Add New Action Allow Type Outbound Group Group1 Move to 1

Source IP Type LAN

Destination IP Type WAN

Source Port Type Any

Destination Port Type Any

Protocol All

NAT Type Type None

Time Range Always

Application Filters FTP None HTTP None RPC None SMTP None

Log ○ Enable ● Disable

VPN ○ Enable ● Disable

User Group drop-down list

Rule type drop-down list

Group Access Control List

ID	Type	Group	Source IP	Destination IP	Protocol	Act
1	Outbound	Group1	LAN	WAN	All,,All	Allow

Figure 11.3. Goup ACL Configuration Page

11.3.3 Add/Modify/Delete Group ACL Rules

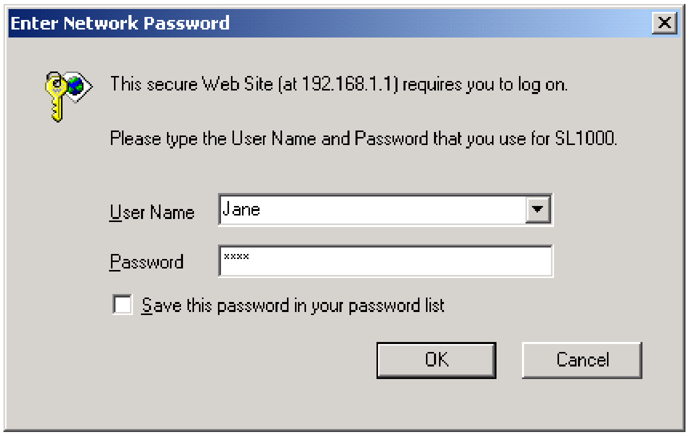
The configuration parameters for group ACL rules are similar to those of firewall inbound/outbound ACL rules except rule type and group name as indicated in Figure 11.3. You have to configure these two parameters in addition to the common parameters shared by firewall inbound, outbound and group ACL rules. Please refer to sections 9.3.3, 9.3.4, and 9.3.5 for instructions on configuring inbound group ACL rules and sections 9.4.3, 9.4.4, and 9.4.5 for configuring outbound group ACL rules.

11.4 Remote User Login Process

For a user belonging to a user group to connect to the Internet Access Router, he or she must do a special login first to activate user group based policies; otherwise, the Internet Security Router will drop all the connection requests from the user. Users in a user group can enter the following URL in the browser in order to login to the Internet Security Router and activate associated access policies.

http://<IP Address>/login

The Login Console appears as illustrated in Figure 11.4



Enter Network Password

This secure Web Site (at 192.168.1.1) requires you to log on.

Please type the User Name and Password that you use for SL1000.

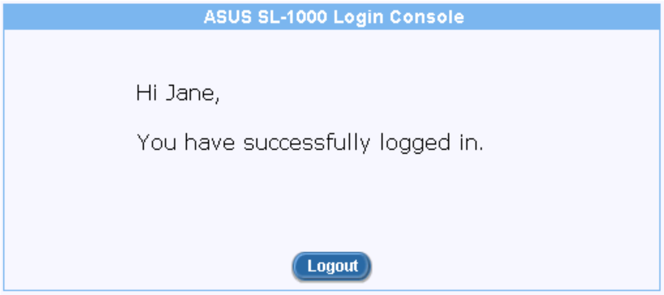
User Name: Jane

Password: ****

□ Save this password in your password list

Figure 11.4. Login Console

After a successful login, the screen appears as in Figure 11.5.



ASUS SL-1000 Login Console

Hi Jane,

You have successfully logged in.

Figure 11.5. Login Status Screen

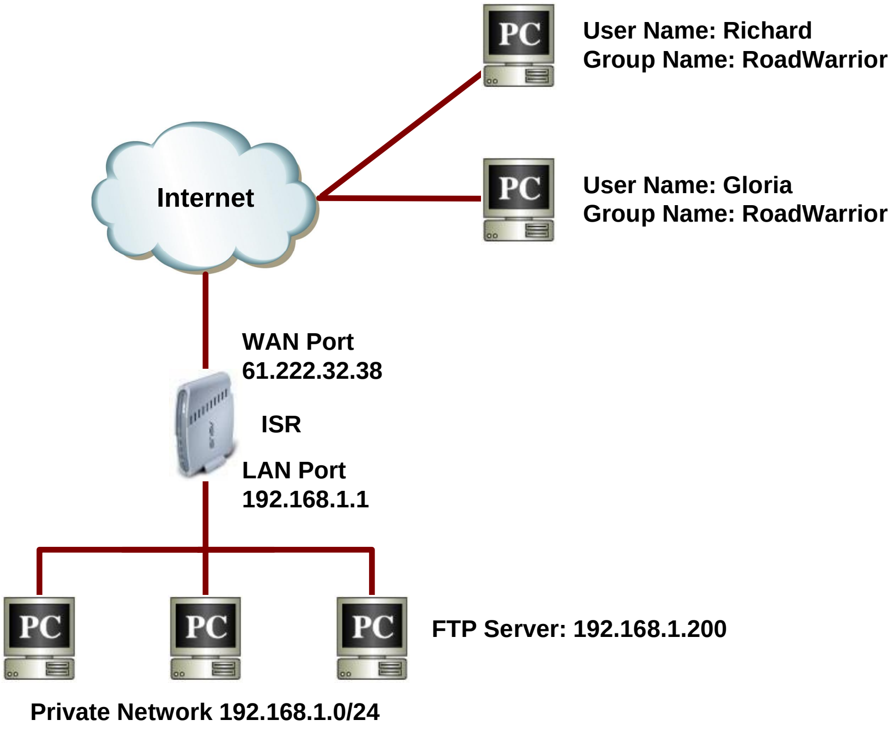
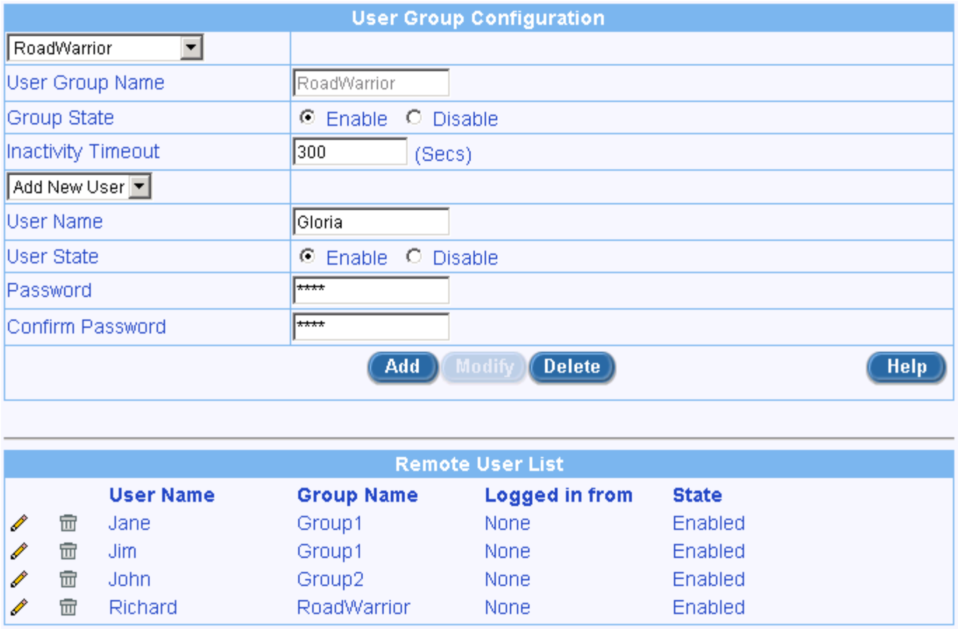


Figure 11.6. Network Diagram for Inbound Remote Access

11.5 Configure Firewall for Remote Access

Remote Access is usually used to support mobile users of a company to access their corporate network without compromising on security. The steps required for configuring the Internet Security Router for remote access is best explained with an example. The following shows the steps required to configure the Internet Security Router for the remote users, Richard and Gloria, to access the FTP server located in the protected network, i.e. corporate LAN. Figure 11.6 shows the network diagram for this example.

1. Create remote access users and groups if necessary. Figure 11.7 illustrates the creation of a new user, Gloria. For details on how to add new users and/or new user group for remote access, please refer to section 11.2 Manage User Groups and Users.



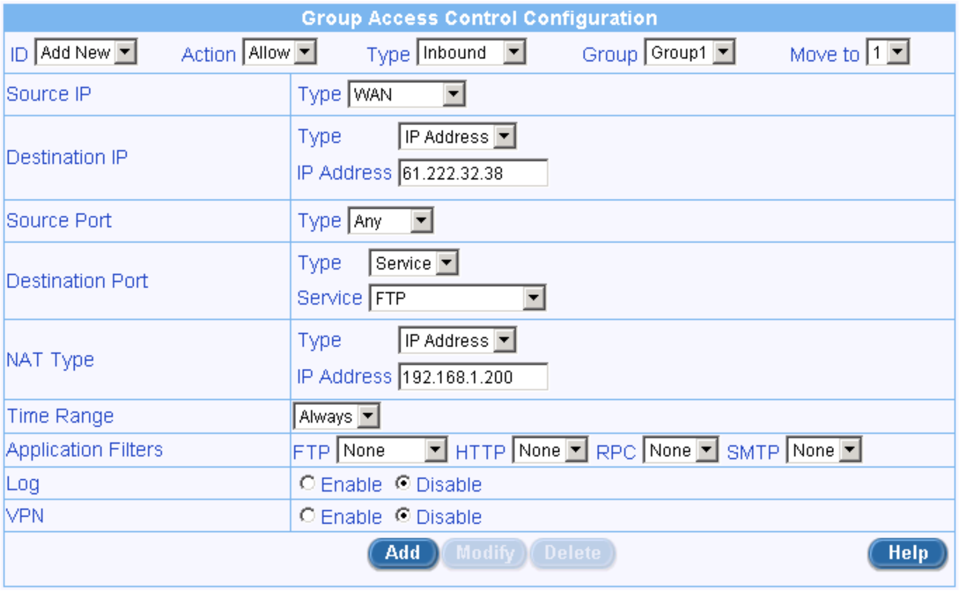
User Group Configuration

RoadWarrior	
User Group Name	RoadWarrior
Group State	● Enable ○ Disable
Inactivity Timeout	300 (Secs)
Add New User	
User Name	Gloria
User State	● Enable ○ Disable
Password	****
Confirm Password	****

Remote User List

		User Name	Group Name	Logged in from	State
✎	🗑	Jane	Group1	None	Enabled
✎	🗑	Jim	Group1	None	Enabled
✎	🗑	John	Group2	None	Enabled
✎	🗑	Richard	RoadWarrior	None	Enabled

Figure 11.7. User and User Group Configuration Example



Group Access Control Configuration

ID Add New Action Allow Type Inbound Group Group1 Move to 1

Source IP	Type WAN
Destination IP	Type IP Address IP Address 61.222.32.38
Source Port	Type Any
Destination Port	Type Service Service FTP
NAT Type	Type IP Address IP Address 192.168.1.200
Time Range	Always
Application Filters	FTP None HTTP None RPC None SMTP None
Log	○ Enable ● Disable
VPN	○ Enable ● Disable

Figure 11.8. Group ACL Configuration Example

2. Create an inbound group ACL rule (see Figure 11.8) to allow remote access users, Richard and Gloria, to access FTP server in the corporate network.

3. Remote users, Richard and Gloria, can then login into the Internet Security Router to access the FTP server by entering the following URL in the browser:

http://61.222.32.38/login

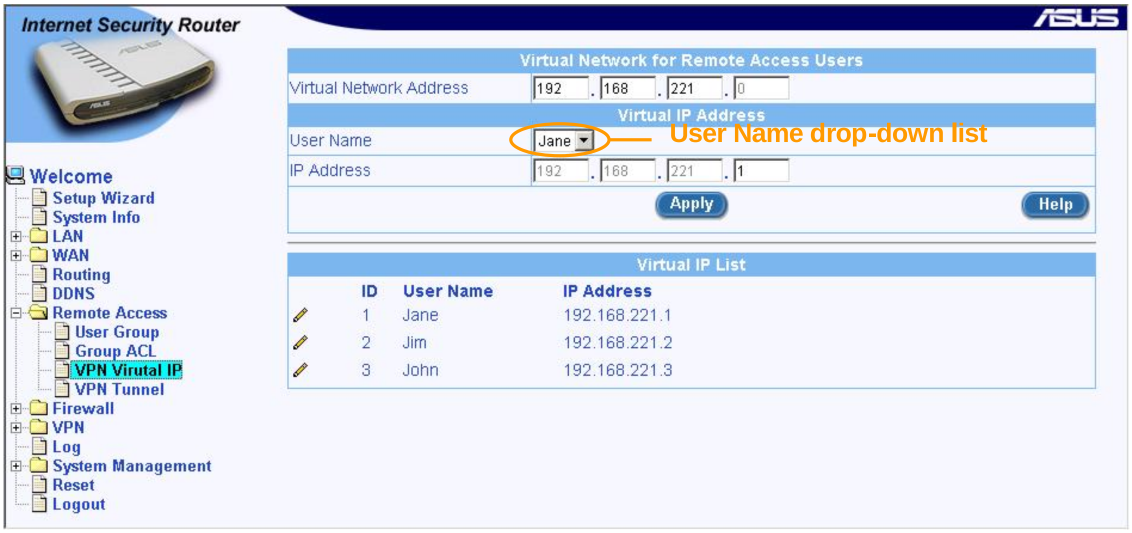
11.6 Virtual IP Address Configuration for Remote Access VPN

To create an illusion of seamless integration (for the VPN remote access users) with your private network, the Internet Security Router allows you to assign a virtual IP address for each remote VPN user. Those remote VPN users can use VPN client software such as SafeNet SoftRemote or SSH Sentinel VPN Client software to establish VPN connection between the Internet Security Router and the VPN client software.

11.6.1 Access VPN Virtual IP Configuration Page – (Remote Access è VPN Virtual IP)

Log into Configuration Manager as admin, click the **Remote Access** menu, and then click the **VPN Virtual IP** submenu. The VPN Virtual IP Configuration page displays, as shown in Figure 11.9.

Note that when you open the VPN Virtual IP Configuration page, a list of existing VPN virtual IP assignments is also displayed at the bottom half of the configuration page such as those shown in Figure 11.9.



Virtual Network for Remote Access Users

Virtual Network Address: 192 . 168 . 221 . 0

Virtual IP Address

User Name: Jane

IP Address: 192 . 168 . 221 . 1

Virtual IP List

ID	User Name	IP Address
1	Jane	192.168.221.1
2	Jim	192.168.221.2
3	John	192.168.221.3

Figure 11.9. VPN Virtual IP Configuration Page

11.6.2 Assign VPN Virtual IP Address for Remote Access Users

Follow these instructions to configure the VPN virtual IP address for remote access users:

1. Create remote access users and/or groups if you have not done so already. Please see section 11.2 Manage User Groups and Users for details.

2. Open the VPN Virtual IP Configuration page by clicking on the **Remote Access** menu, and then click the **VPN Virtual IP** submenu. The VPN Virtual IP Configuration page displays, as shown in Figure 11.9. Note that you must login as administrator to configure any settings for the Internet Security Router.

3. Enter the virtual network address in the Virtual Network Address field. Note that a routing entry must exist between the virtual network and the LAN.

4. Select a user from the User Name drop-down list.

5. An IP address (in the IP Address field) is automatically assigned for the selected user. However, you may change it to any desired value.

6. Click Apply to save the virtual IP settings. Note that a list of existing virtual IP assignments is displayed at the bottom half of the VPN Virtual IP Configuration page.

11.6.3 Change Virtual IP Assignments for Remote Access Users

Follow these instructions to change the VPN virtual IP address for remote access users:

1. Open the VPN Virtual IP Configuration page by clicking on the **Remote Access** menu, and then click the **VPN Virtual IP** submenu. The VPN Virtual IP Configuration page displays, as shown in Figure 11.9. Note that you must login as administrator to configure any settings for the Internet Security Router.
2. Change the virtual network address in the Virtual Network Address field if necessary. Note that a routing entry must exist between the virtual network and the LAN.
3. Click on the ✎ icon in the Virtual IP List table to select an existing virtual IP assignment or select a user from the User Name drop-down list.
4. Change the virtual IP address in the IP Address field.
5. Click Apply to save the virtual IP settings. Note that a list of existing virtual IP assignments is displayed at the bottom half of the VPN Virtual IP Configuration page.
6. Repeat steps 3, 4 and 5 until all the desired changes are made.

11.6.4 Delete Virtual IP Address for Remote Access Users

You need to delete the remote user in the User Group configuration page in order to delete the virtual IP assignment for the prospective user. Please refer to section 11.2.5 Delete a User Group or a User for details.

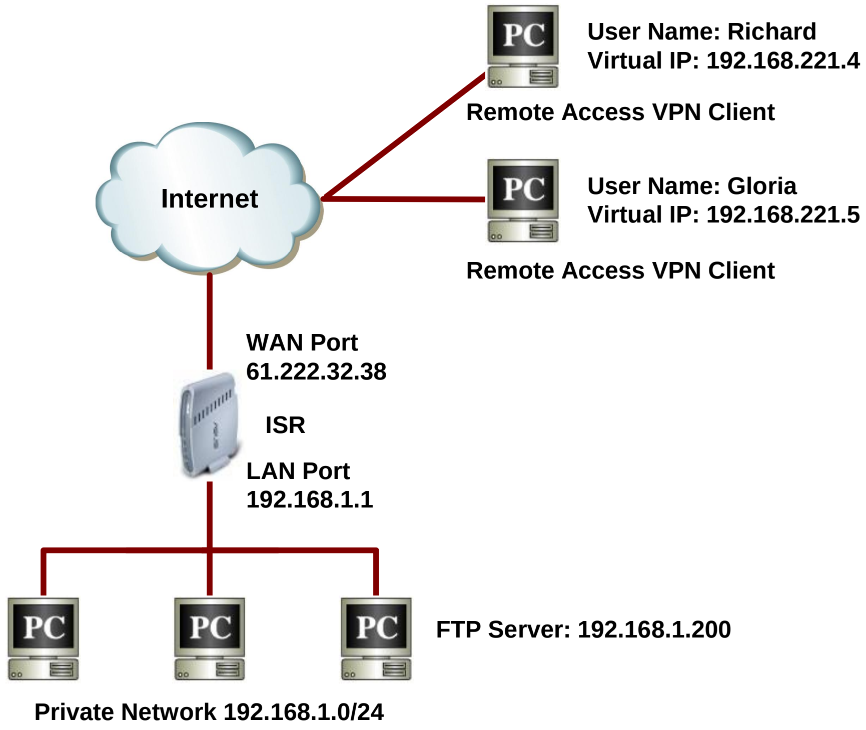


Figure 11.10. Network Diagram for VPN Remote Access

11.7 Configure VPN for Remote Access

Remote Access VPN is used primarily by telecommuters/road-warriors to securely access resources behind the Internet Security Router located at a head-office or a central site. The steps required for configuring the Internet Security Router and the VPN client on a remote user's machine to provide remote access are explained in the following sections. A typical deployment in a small office (see Figure 11.10) is taken as an example to demonstrate the Remote Access VPN features of the Internet Security Router. In this example, remote users Richard and Gloria are allowed to have secure access to the LAN (192.168.1.0/24) protected by the Internet Security Router. However, you may change this configuration to have a finer control over the secure access for Richard and Gloria. For example, you can limit Richard to gain secure access to a group of computers in the LAN while Gloria to have secure access to a different group of computers in the LAN.

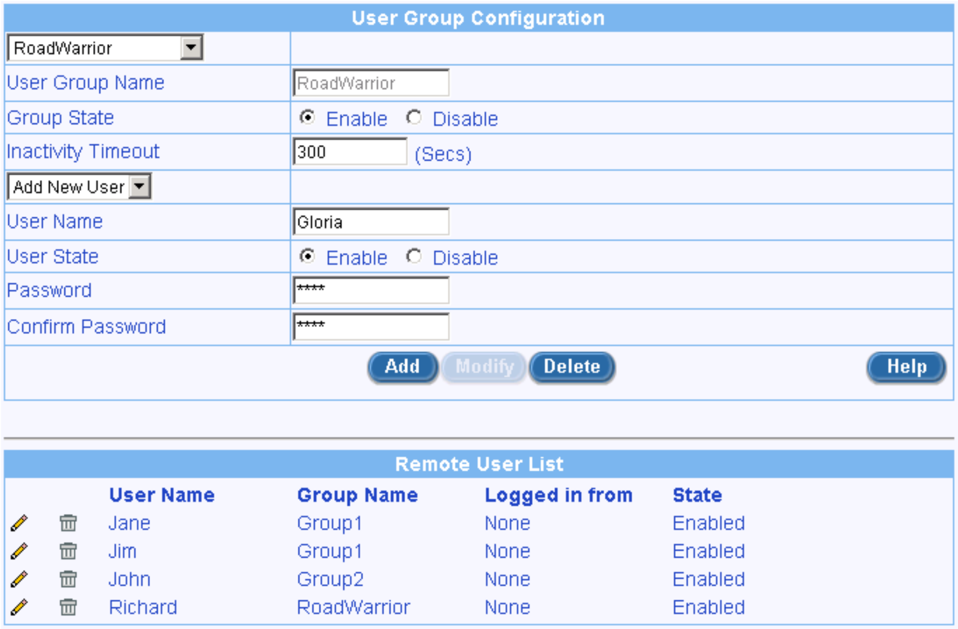
Note that third party VPN client software, such as SafeNet SoftRemote 9.0, is required to use the VPN remote access feature in the Internet Security Router.

Two modes, main mode and aggressive mode, are supported for VPN remote access.

11.7.1 Main Mode Remote Access

Main Mode remote access is a mechanism where identity protection is provided for the communicating entities. Normal HTTP login by the remote user is used to instantiate appropriate policies in the Internet Security Router. Once these policies are instantiated, then the remote user is allowed secure access by the Internet Security Router. Follow the instructions below to configure for main mode remote access.

1. Create remote access user group and users for Richard and Gloria. For details on how to do this, please refer to section 11.2 Manage User Groups and Users. Figure 11.11 shows the settings for adding Gloria into RoadWarrior user group.



User Group Configuration

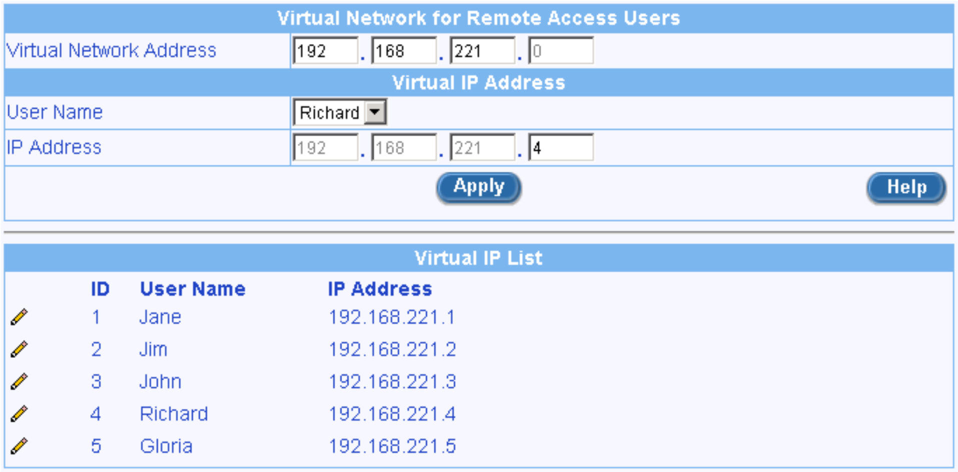
RoadWarrior ▾	
User Group Name	RoadWarrior
Group State	● Enable ○ Disable
Inactivity Timeout	300 (Secs)
Add New User ▾	
User Name	Gloria
User State	● Enable ○ Disable
Password	****
Confirm Password	****

Remote User List

		User Name	Group Name	Logged in from	State
✎	🗑	Jane	Group1	None	Enabled
✎	🗑	Jim	Group1	None	Enabled
✎	🗑	John	Group2	None	Enabled
✎	🗑	Richard	RoadWarrior	None	Enabled

Figure 11.11. Main Mode Remote Access Example – Create a User Group and Add Two Users into the Group

2. Set the Virtual Network Address to 192.168.221.0 and assign virtual IP address for Richard and Gloria.



Virtual Network for Remote Access Users

Virtual Network Address	192 . 168 . 221 . 0

Virtual IP Address

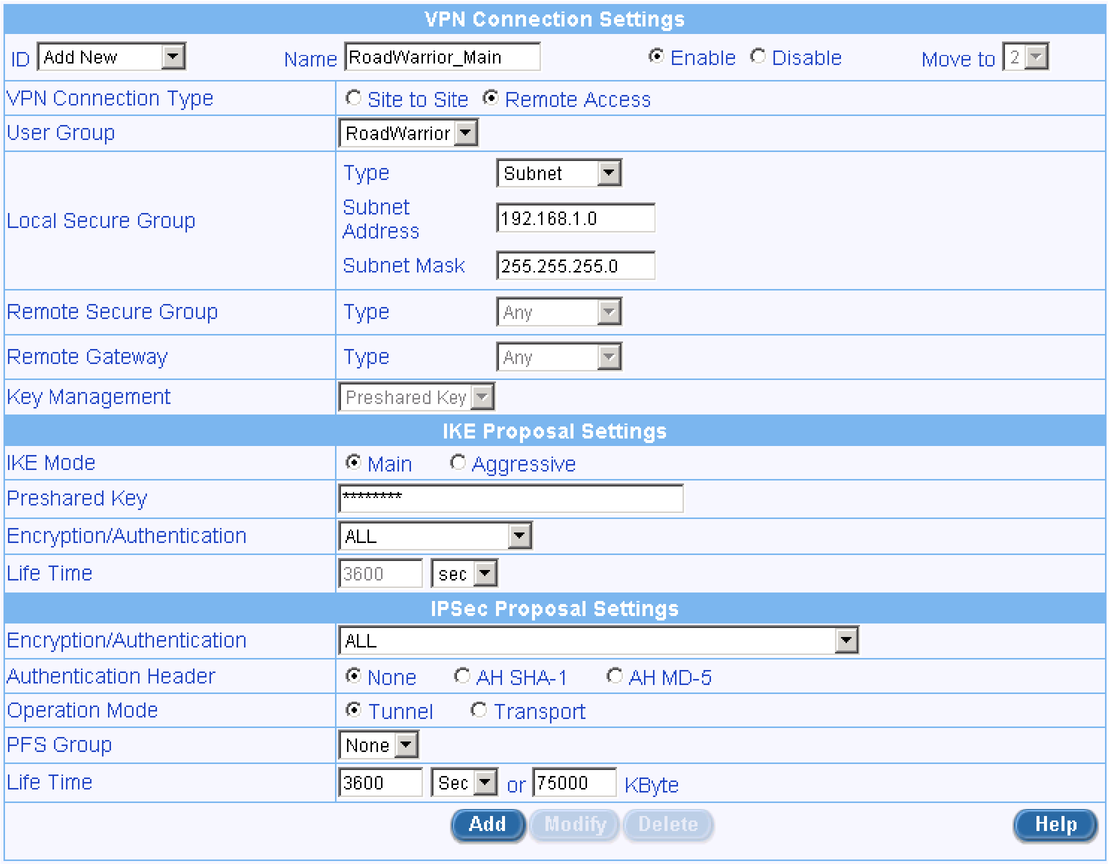
User Name	Richard
IP Address	192 . 168 . 221 . 4

Virtual IP List

ID	User Name	IP Address
1	Jane	192.168.221.1
2	Jim	192.168.221.2
3	John	192.168.221.3
4	Richard	192.168.221.4
5	Gloria	192.168.221.5

Figure 11.12. Main Mode Remote Access Example – Configure the Virtual IP address

3. Create a VPN policy for Richard and Gloria. The settings for this policy are illustrated in Figure 11.13. Note that only one policy is needed for both Richard and Gloria because they belong to the same group, RoadWarrior. If Richard and Gloria belong to different groups, one VPN policy is required for each user.



VPN Connection Settings

ID Add New   Name RoadWarrior_Main   ● Enable ○ Disable   Move to 2

VPN Connection Type	○ Site to Site ● Remote Access
User Group	RoadWarrior
Local Secure Group	Type Subnet Subnet Address 192.168.1.0 Subnet Mask 255.255.255.0
Remote Secure Group	Type Any
Remote Gateway	Type Any
Key Management	Preshared Key

IKE Proposal Settings

IKE Mode	● Main ○ Aggressive
Preshared Key	*********
Encryption/Authentication	ALL
Life Time	3600 sec

IPSec Proposal Settings

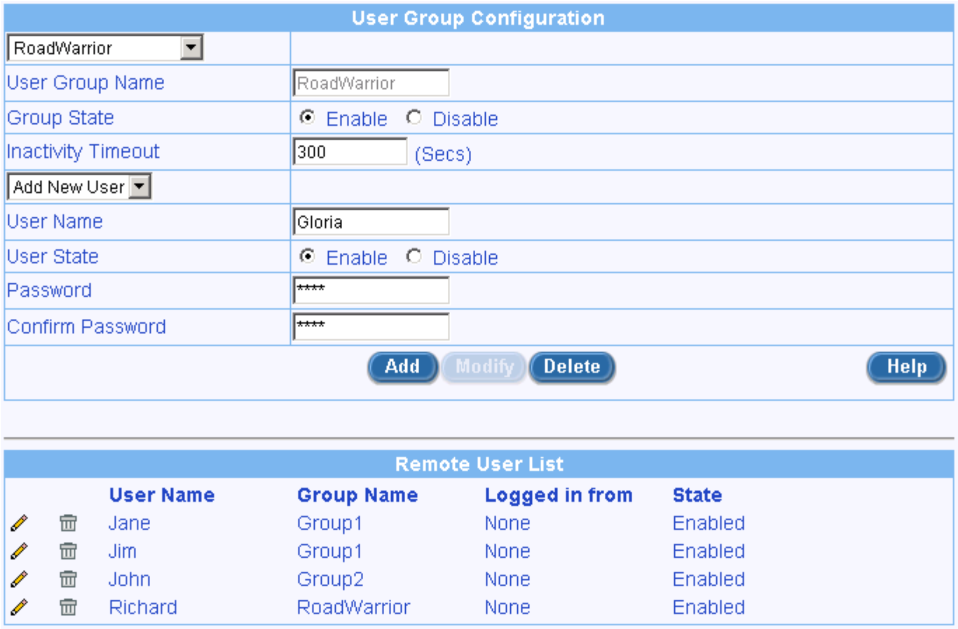
Encryption/Authentication	ALL
Authentication Header	● None ○ AH SHA-1 ○ AH MD-5
Operation Mode	● Tunnel ○ Transport
PFS Group	None
Life Time	3600 Sec or 75000 KByte

Figure 11.13. Main Mode Remote Access Example – Remote VPN Connection Setup for "RoadWarrior" Group

11.7.2 Aggressive Mode Remote Access

Aggressive Mode remote access with Xauth is a mechanism where the remote access client is prompted for an additional login (the Xauth login). This form of remote access is more secure since an intruder cannot access the corporate resources through a connected Laptop, which belongs to a valid employee. In addition, normal HTTP login by the remote user is used to instantiate appropriate Firewall policies on the Internet Security Router. Once these policies are instantiated, the remote user is allowed secure access through the Internet Security Router. Again, the example, see Figure 11.10, used to illustrate the main mode remote access is used here. Follow the instructions below to configure for aggressive mode remote access.

1. Create remote access user for Richard and Gloria. For details on how to do this, please refer to section 11.2 Manage User Groups and Users. Figure 11.11 shows the settings for adding Gloria into RoadWarrior user group.



User Group Configuration

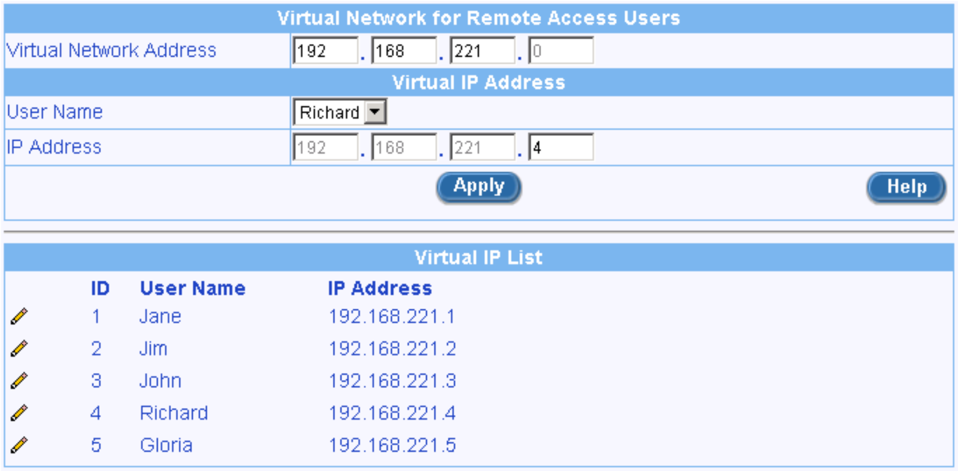
RoadWarrior ▾	
User Group Name	RoadWarrior
Group State	● Enable ○ Disable
Inactivity Timeout	300 (Secs)
Add New User ▾	
User Name	Gloria
User State	● Enable ○ Disable
Password	****
Confirm Password	****

Remote User List

		User Name	Group Name	Logged in from	State
✎	🗑	Jane	Group1	None	Enabled
✎	🗑	Jim	Group1	None	Enabled
✎	🗑	John	Group2	None	Enabled
✎	🗑	Richard	RoadWarrior	None	Enabled

Figure 11.14. Aggressive Mode Remote Access Example – Create a User Group and Add Two Users into the Group

2. Set the Virtual Network Address to 192.168.221.0 as shown in Figure 11.15.



Virtual Network for Remote Access Users

Virtual Network Address	192 . 168 . 221 . 0

Virtual IP Address

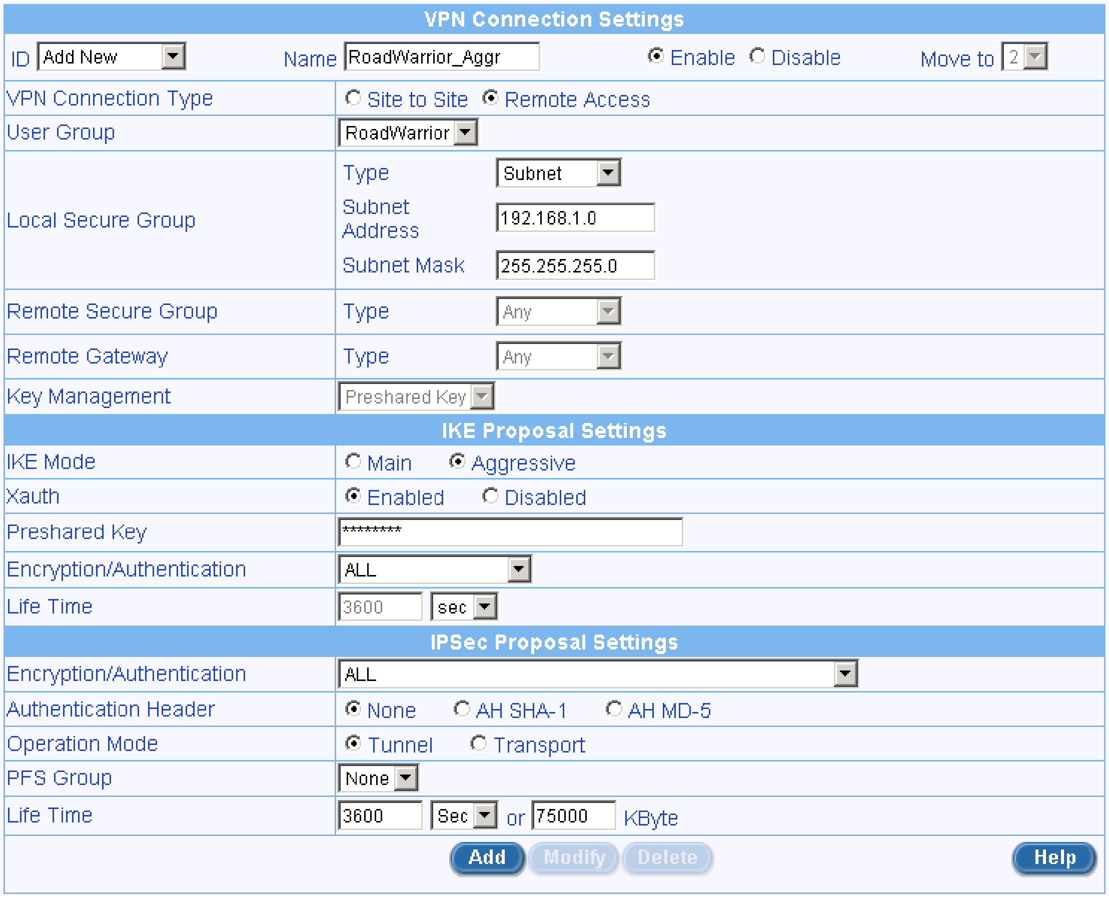
User Name	Richard ▾
IP Address	192 . 168 . 221 . 4

Virtual IP List

	ID	User Name	IP Address
✎	1	Jane	192.168.221.1
✎	2	Jim	192.168.221.2
✎	3	John	192.168.221.3
✎	4	Richard	192.168.221.4
✎	5	Gloria	192.168.221.5

Figure 11.15. Aggressive Mode Remote Access Example – Configure the Virtual IP address

3. Create a VPN policy for Richard and Gloria. The settings for this policy are illustrated in Figure 11.16. Note that only one policy is needed for both Richard and Gloria because they belong to the same group, RoadWarrior. If Richard and Gloria belong to different groups, one VPN policy is required for each user.



VPN Connection Settings

ID Add New ▾ Name RoadWarrior_Aggr ● Enable ○ Disable Move to 2 ▾

VPN Connection Type	○ Site to Site ● Remote Access	
User Group	RoadWarrior ▾	
Local Secure Group	Type	Subnet ▾
	Subnet Address	192.168.1.0
	Subnet Mask	255.255.255.0
Remote Secure Group	Type	Any ▾
Remote Gateway	Type	Any ▾
Key Management	Preshared Key ▾	

IKE Proposal Settings

IKE Mode	○ Main ● Aggressive
Xauth	● Enabled ○ Disabled
Preshared Key	********
Encryption/Authentication	ALL ▾
Life Time	3600 sec ▾

IPSec Proposal Settings

Encryption/Authentication	ALL ▾
Authentication Header	● None ○ AH SHA-1 ○ AH MD-5
Operation Mode	● Tunnel ○ Transport
PFS Group	None ▾
Life Time	3600 Sec ▾ or 75000 KByte

Figure 11.16. Aggressive Mode Remote Access Example – Remote VPN Connection Setup for "RoadWarrior" Group

12 System Management

This chapter describes the following administrative tasks that you can perform using Configuration Manager:

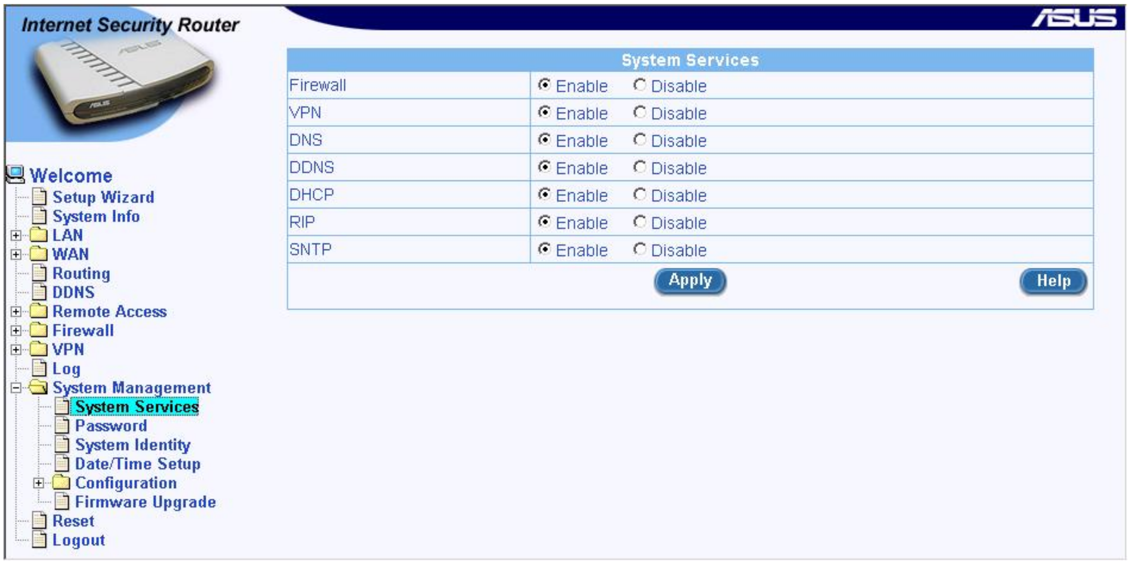
- Configure system services
- Modify password
- Modify system Information
- Modify system date and time
- Reset, backup and restore system configuration
- Update firmware
- Logout of Configuration Manager

You can access these tasks from the System Management menu.

12.1 Configure System Services

As shown in Figure 12.1, you can use the System Services Configuration page to enable or disable services supported by the Internet Security Router. All services, firewall, VPN, DNS, DHCP and RIP, are all enabled at the factory. To disable or enable individual service, follow the steps below:

1. Log into Configuration Manager as admin, click the **System Management** menu, and then click the **System Services** submenu. The System Services Configuration page displays, as shown in Figure 12.1.
2. Click on the corresponding "Enable" or "Disable" radio button to enable or disable the desired services.
3. Click on Apply button to save the changes.



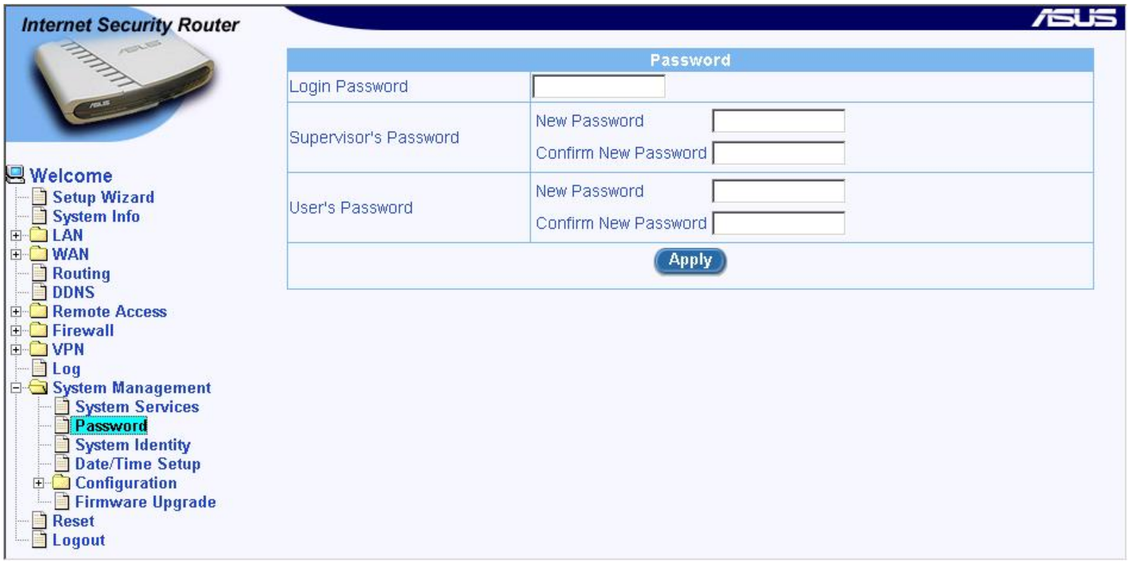
System Services	
Firewall	● Enable ○ Disable
VPN	● Enable ○ Disable
DNS	● Enable ○ Disable
DDNS	● Enable ○ Disable
DHCP	● Enable ○ Disable
RIP	● Enable ○ Disable
SNTP	● Enable ○ Disable

Figure 12.1. System Services Configuration Page

12.2 Change the Login Password

The first time you log into the Configuration Manager, you use the default username and password (*admin* and *admin*). The system allows two types of users – administrator (username: admin) and guest (username: guest). Administrator has the privilege to modify the system settings while guest can only view the system settings. Passwords of both the admin and guest accounts can be changed by the administrator.

> **Note**
>
> *This username and password is only used for logging into the Configuration Manager; it is not the same as the login password you may use to connect to your ISP.*



Password		
Login Password		
Supervisor's Password	New Password	
	Confirm New Password	
User's Password	New Password	
	Confirm New Password	

Figure 12.2. Password Configuration Page

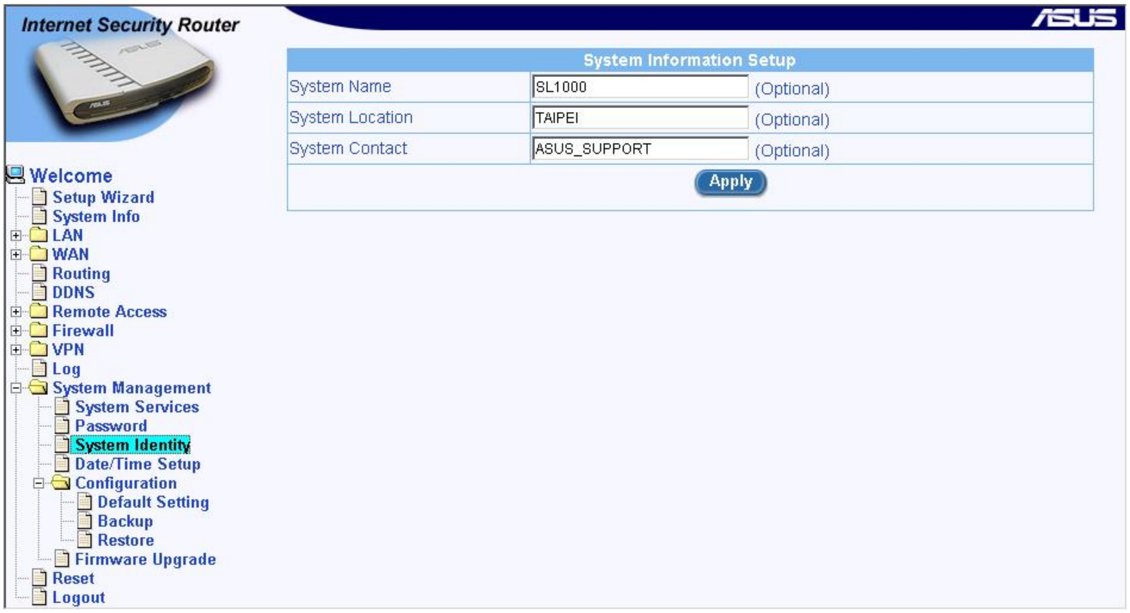
Password configuration page, see Figure 12.2, allows you to change supervisor or user's password. Follow the steps below to change password:

1. Log into Configuration Manager as admin, click the **System Management** menu, and then click the **User Account** submenu. The User Account Configuration page displays, as shown in Figure 12.2.
2. Enter existing password in the Login Password field.
3. Type the new password in the New Password text field and again in the Confirm New Password text field.

   The password can be up to 16 characters long. When logging in, you must type the new password in the same upper and lower case characters that you use here.
4. Click on Apply button to save the new password.

12.3 Modify System Information

As illustrated in Figure 12.3, you can use System Information Setup page to enter system specific information such as system name (unique name for this device), system location (where this device is located), and contact person information for this device. Note that all fields allow only alphanumeric characters. When you are done entering system specific information, click on Apply button to save the changes.



System Information Setup

System Name	SL1000	(Optional)
System Location	TAIPEI	(Optional)
System Contact	ASUS_SUPPORT	(Optional)

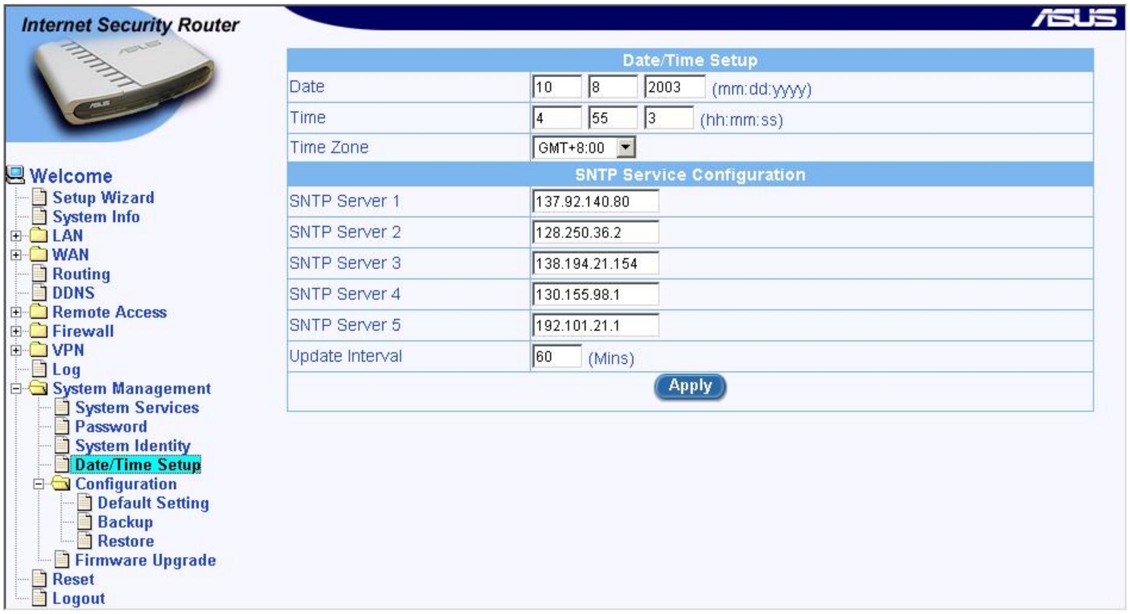
Figure 12.3. System Information Configuration Page

12.4 Setup Date and Time

The Internet Security Router keeps a record of the current date and time, which it uses to calculate and report various performance data.

Note

Changing the Internet Security Router date and time does not affect the date and time on your PCs.



Date/Time Setup

Date	10 / 8 / 2003 (mm:dd:yyyy)
Time	4 / 55 / 3 (hh:mm:ss)
Time Zone	GMT+8:00

SNTP Service Configuration

SNTP Server 1	137.92.140.80
SNTP Server 2	128.250.36.2
SNTP Server 3	138.194.21.154
SNTP Server 4	130.155.98.1
SNTP Server 5	192.101.21.1
Update Interval	60 (Mins)

Figure 12.4. Date and Time Configuration Page

There is no real time clock inside the Internet Security Router. The system date and time are maintained by external network time server. The only fields configurable in this configuration page are the "**Time Zone**", IP address of time servers and the desired update interval. Select your time zone from the "Time Zone" drop-down list, change the IP address of the time servers and the update interval if desired and then click on Apply button to save the changes.

12.4.1 View the System Date and Time

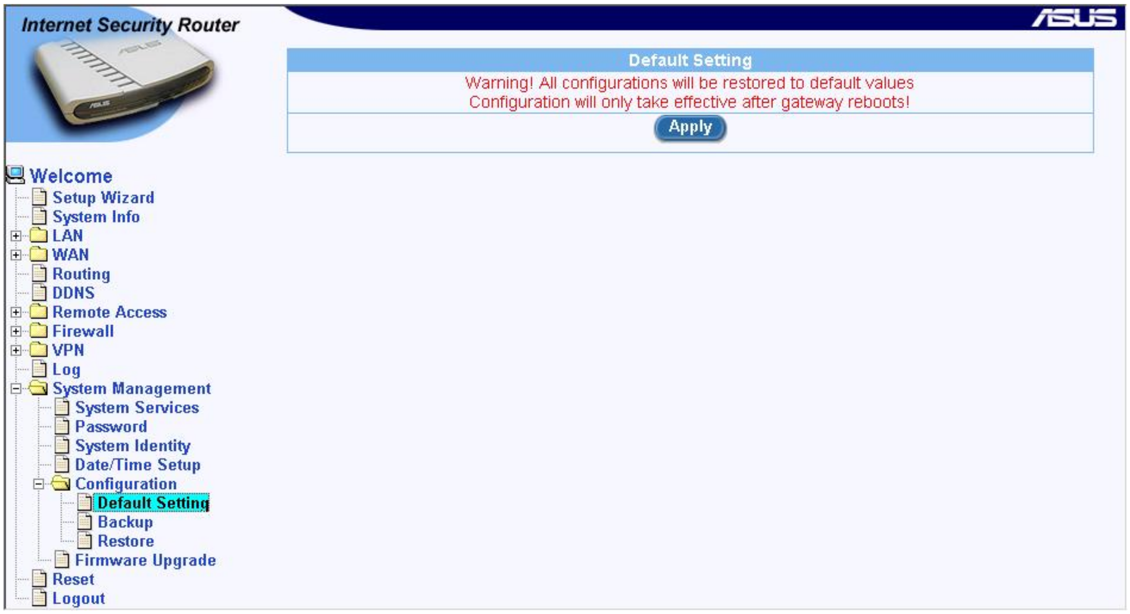
To view the updated system date and time, log into Configuration Manager as admin, click the **System Management** menu, and then click the **Date/Time Setup** submenu.

12.5 System Configuration Management

12.5.1 Reset System Configuration

At times, you may want to revert to factory default settings to eliminate problems resulted from incorrect system configuration. Follow the steps below to reset system configuration:

1. Log into Configuration Manager as admin, click the **System Management** menu, click the **Configuration** submenu and then click the **Default Settings** submenu. The Default Settings Configuration page displays, as shown in Figure 12.5.
2. Click on Apply button to set the system configuration back to factory default. Note that the Internet Security Router will reboot to make the factory default configuration in effect.



Default Setting

Warning! All configurations will be restored to default values
Configuration will only take effective after gateway reboots!

Apply

Figure 12.5. Default Setting Configuration Page

Sometimes, you may find that you have no way to access the Internet Security Router, e.g. you forget your password. The only way out in this scenario is to reset the system configuration to the factory default by following the procedures below using the reset switch:

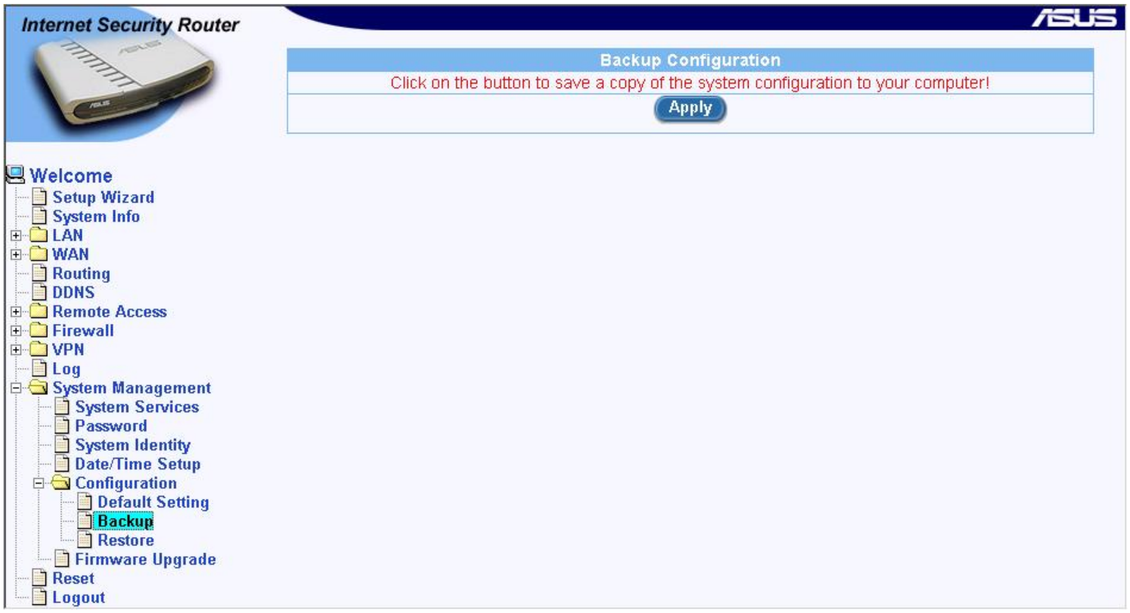
1. Power down the Internet Security Router and wait for at least 5 seconds.
2. Power on the Internet Security Router and wait for at least 5 seconds before pressing the reset switch the first time. You will see the Alarm LED flash once in about 5 seconds.
3. When you see the Alarm LED flash once, press the reset switch again. You will then see the Alarm LED flash twice in about 5 seconds. This indicates that the Internet Security Router is about to revert to the factory default settings. If you change your mind, you may press the reset switch again or turn the power off to cancel this action.

12.5.2 Backup System Configuration

Follow the steps below to backup system configuration:

1. Log into Configuration Manager as admin, click the **System Management** menu, click the **Configuration** submenu and then click the **Backup** submenu. The Backup Configuration page displays, as shown in Figure 12.6.

2. Click on Apply button to backup the system configuration.



Backup Configuration

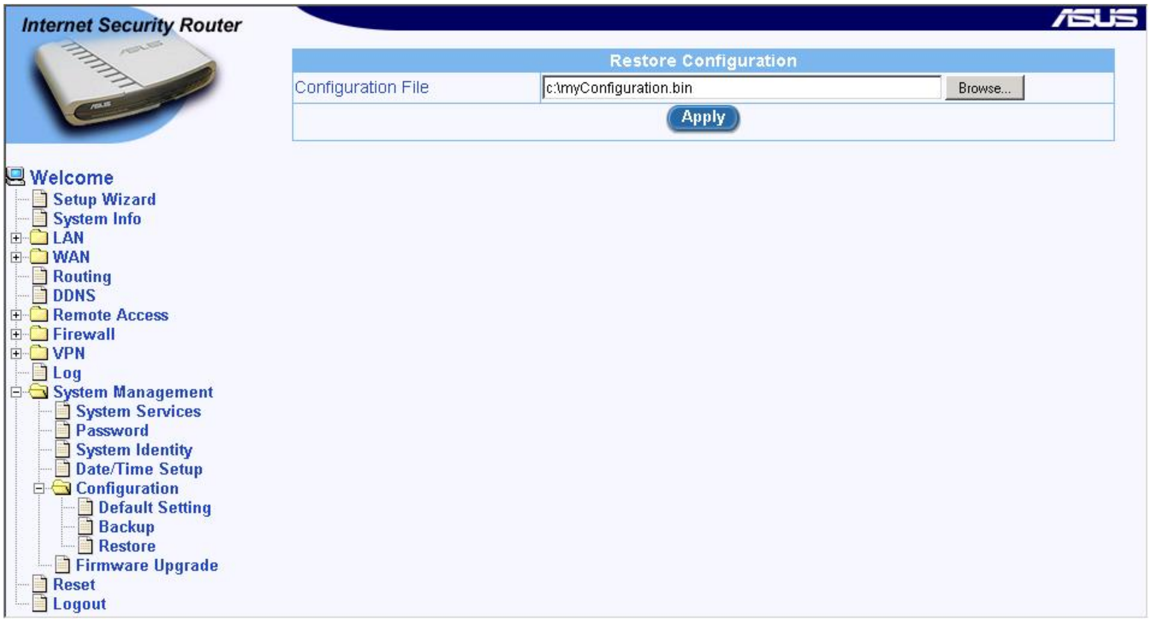
Click on the button to save a copy of the system configuration to your computer!

Figure 12.6. Backup System Configuration Page

12.5.3 Restore System Configuration

Follow the steps below to backup system configuration:

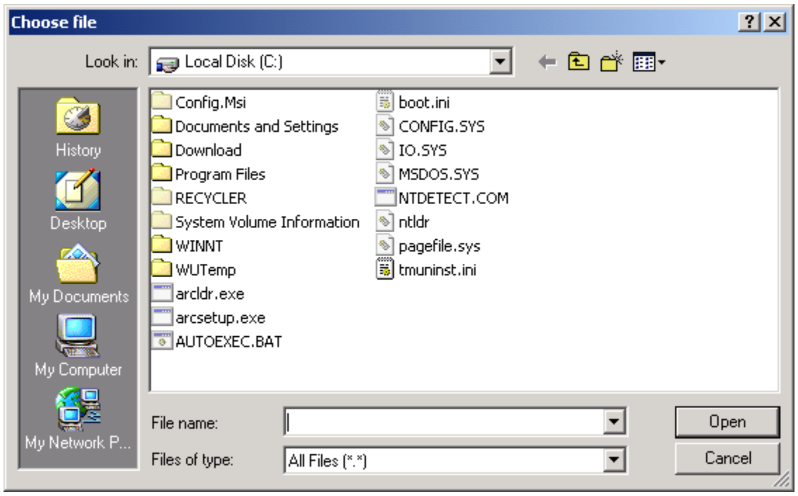
1. Log into the Configuration Manager as admin, click the **System Management** menu, click the **Configuration** submenu and then click the **Restore** submenu. The Restore Configuration page displays, as shown in Figure 12.7.


Restore Configuration

Configuration File: c:\myConfiguration.bin

Figure 12.7. Restore System Configuration Page

2. Enter the path and name of the system configuration file that you want to restore in the "Configuration File" text box. Alternatively, you may click on the Browse... button to search for the system configuration file on your hard drive. A window similar to the one shown in Figure 12.8 will pop up for you to select the configuration file to restore.


Choose file

Look in: Local Disk (C:)

File name:

Files of type: All Files (*.*)

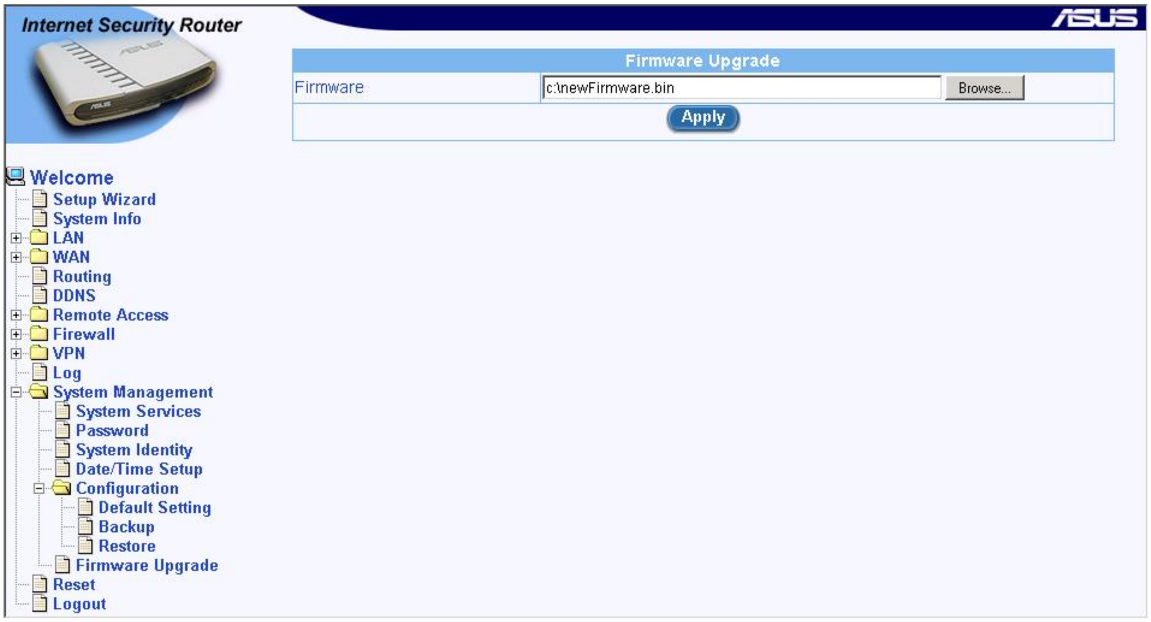
Figure 12.8. Windows File Browser

3. Click on Apply button to restore the system configuration. Note that the Internet Security Router will reboot to make the new system configuration in effect.

12.6 Upgrade Firmware

ASUSTeK may from time to time provide you with an update to the firmware running on the Internet Security Router. All system software is contained in a single file, called an *image*. Configuration Manager provides an easy way to upload the new firmware image. To upgrade the image, follow this procedure:

1. Log into Configuration Manager, click the **System Management** menu and then click the **Firmware Upgrade** submenu. The Firmware Upgrade page displays, as shown in Figure 12.9.



Firmware Upgrade

Firmware: c:\newFirmware.bin

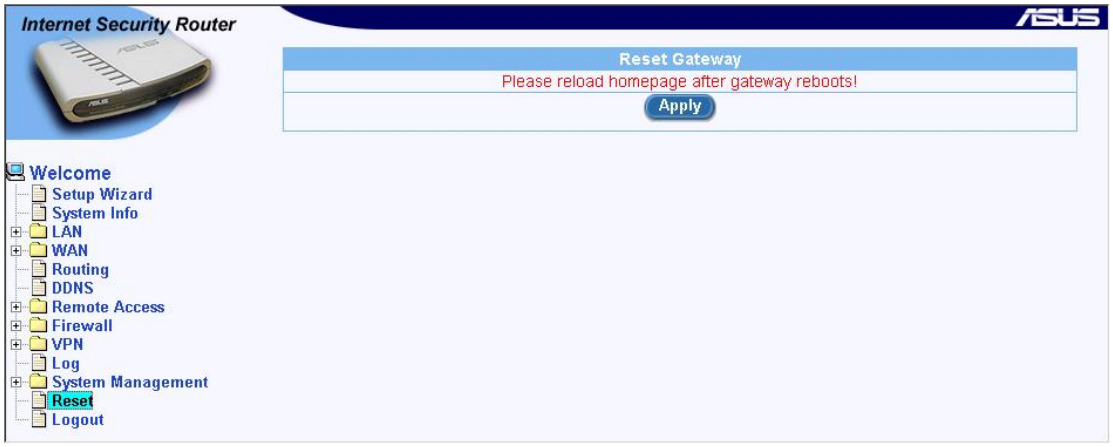
Figure 12.9. Firmware Upgrade Page

2. In the Firmware text box, enter the path and name of the firmware image file. Alternatively, you may click on Browse... button to search for it on your hard drive.

3. Click on Apply button to update the firmware. Note: it may take up to 5 minutes for the firmware upgrade. Note that after the transfer of firmware is completed, the Internet Security Router will reboot to make the new firmware in effect.

12.7 Reset the Internet Security Router

To reset the Internet Security Router, click on the Apply button in the Configuration Manager Reset page.



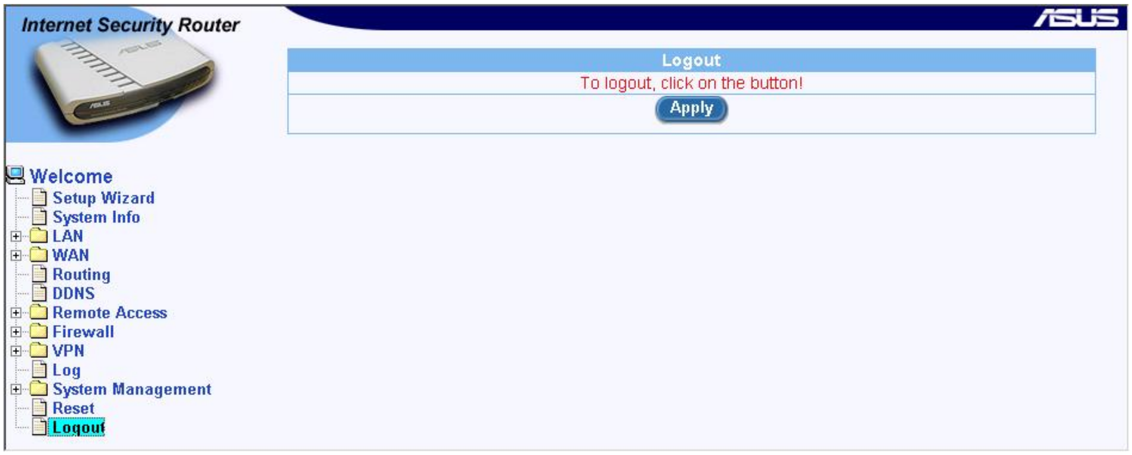
Reset Gateway

Please reload homepage after gateway reboots!

Figure 12.10. Configuration Manager Reset Page

12.8 Logout Configuration Manager

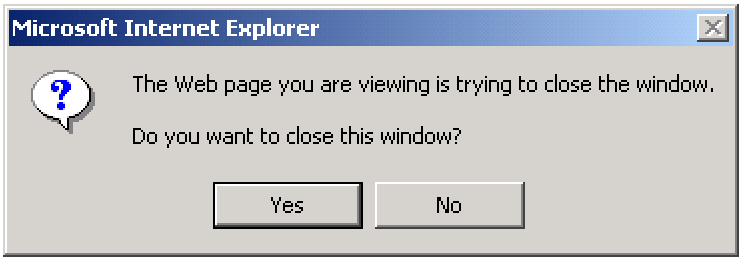
To logout of Configuration Manager, click on the Apply button in the Configuration Manager Logout page. If you are using IE as your browser, a window similar to the one shown in Figure 12.12 will prompt for confirmation before closing your browser.



Logout

To logout, click on the button!

Figure 12.11. Configuration Manager Logout Page



Microsoft Internet Explorer

The Web page you are viewing is trying to close the window.

Do you want to close this window?

Figure 12.12. Confirmation for Closing Browser (IE)

.

13 ALG Configuration

Table 13.1 lists all the supported ALGs (Application Layer Gateway).

Table 13.1. Supported ALG

ALG/Application Name	Protocol and Port	Predefined Service Name	Tested Software Version
PCAnywhere	UDP/22	PC-ANYWHERE	pcAnywhere 9.0.0
RTSP-554	TCP/554	RTSP554	RealPlayer 8 Plus QuickTime Version 6
	UDP/53	DNS	
	TCP/80	HTTP	
RTSP-7070	TCP/7070	RTSP7070	RealPlayer 8 Plus
	UDP/53	DNS	QuickTime Version 6
	TCP/80	HTTP	
Net2Phone	UDP/6801	N2P	Net2Phone CommCenter Release 1.5.0
	TCP/80	HTTP	
	TCP/443	HTTPS	
	UDP/53	DNS	
CUSeeMe	TCP/7648	CUSEEME	CUSeeMe Version 5.0.0.043
	TCP/80	HTTP	
	UDP/53	DNS	
Netmeeting	TCP/1720	H323	
	UDP/53	DNS	
Netmeeting with ILS	TCP/1720	H323	Windows Netmeeting Version 3.01 Opengk Version 1.2.0
	TCP/389	ILS	
	UDP/53	DNS	
Netmeeting with GK	TCP/1720	H323	
	UDP/1719	H323GK	
	UDP/53	DNS	
SIP	UDP/5060	SIP	SIP User Agent 2.0
Intel Video Phone	TCP/1720	H323	Intel Video Phone Version 5.0
	UDP/53	DNS	
FTP	TCP/21	FTP	WFTPD version 2.03 Redhat Linux 7.3
	UDP/53	DNS	
Security ALGs			

ALG/Application Name	Protocol and Port	Predefined Service Name	Tested Software Version
L2TP	UDP/1701	L2TP	Windows 2000 Server built-in
	UDP/53	DNS	
PPTP	TCP/1723	PPTP	Windows 2000 Server built-in
	UDP/53	DNS	
IPSec (Only Tunnel Mode with ESP)	UDP/500	IKE	Windows 2000 Server built-in
	ESP		
	UDP/53	DNS	
Chats			
AOL Chat	TCP/ 5190	AOL	AOL Instant Messenger Version 5.0.2938
	TCP/80	HTTP	
	UDP/53	DNS	
ICQ Chat NB: Application should be configured to use TCP/5191	TCP /5191	ICQ_2000	ICQ 2000b
	TCP/80	HTTP	
	UDP/53	DNS	
IRC	TCP/ 6667	IRC	MIRC v6.02
	TCP/80	HTTP	
	UDP/53	DNS	
MSIM	TCP/1863	MSN	MSN Messenger Service Version 3.6.0039
	TCP/80	HTTP	
	UDP/53	DNS	
Games			
Flight Simulator 2002 (Gaming Zone)	TCP/47624	MSG1	Flight Simulator 2002, Professional Edition
	TCP/28801	MSN-ZONE	
	TCP/443	HTTPS	
	TCP/80	HTTP	
	UDP/53	DNS	
Quake II (Gaming Zone)	UDP/ 27910	QUAKE	Quake II
	TCP/28801	MSN-ZONE	
	TCP/443	HTTPS	
	TCP/80	HTTP	
	UDP/53	DNS	
Age Of Empires (Gaming Zone)	TCP/47624	MSG1	Age of Empires, Gold Edition
	TCP/28801	MSN-ZONE	

ALG/Application Name	Protocol and Port	Predefined Service Name	Tested Software Version
	TCP/443	HTTPS	
	TCP/80	HTTP	
	UDP/53	DNS	
Diablo II (BATTLE-NET-TCP, BATTLE-NET-UDP)	TCP/4000	DIABLO-II	Diablo II
	TCP/ 6112	BATTLE-NET-TCP, BATTLE-NET-UDP	
	UDP/53	DNS	
	UDP/6112	Diablo II	
Other common Applications			
POP3	TCP/110	POP3	Outlook Express 5
	UDP/53	DNS	
IMAP	TCP/143	IMAP4	Outlook Express 5
	UDP/53	DNS	
SMTP	TCP/25	SMTP	Outlook Express 5
	UDP/53	DNS	
HTTPS / TLS / SSL	TCP/443	HTTPS	Internet Explorer 5
	TCP/80	HTTP	
	UDP/53	DNS	
LDAP	TCP/389	ILS	Openldap 2.0.25
	UDP/53	DNS	
NNTP	TCP/119	NNTP	Outlook Express 5
	UDP/53	DNS	
Finger	TCP/79	FINGER	Redhat Linux 7.3
	UDP/53	DNS	

14 IP Addresses, Network Masks, and Subnets

14.1 IP Addresses

Note

> *This section pertains only to IP addresses for IPv4 (version 4 of the Internet Protocol). IPv6 addresses are not covered.*
>
> *This section assumes basic knowledge of binary numbers, bits, and bytes. For details on this subject, see Appendix 13.*

IP addresses, the Internet's version of telephone numbers, are used to identify individual nodes (computers or devices) on the Internet. Every IP address contains four numbers, each from 0 to 255 and separated by dots (periods), e.g. 20.56.0.211. These numbers are called, from left to right, field1, field2, field3, and field4.

This style of writing IP addresses as decimal numbers separated by dots is called *dotted decimal notation*. The IP address 20.56.0.211 is read "twenty dot fifty-six dot zero dot two-eleven."

14.1.1 Structure of an IP address

IP addresses have a hierarchical design similar to that of telephone numbers. For example, a 7-digit telephone number starts with a 3-digit prefix that identifies a group of thousands of telephone lines, and ends with four digits that identify one specific line in that group.

Similarly, IP addresses contain two kinds of information.

- *Network ID*
  Identifies a particular network within the Internet or Intranet
- *Host ID*
  Identifies a particular computer or device on the network

The first part of every IP address contains the network ID, and the rest of the address contains the host ID. The length of the network ID depends on the network's *class* (see following section). Table 14.1 shows the structure of an IP address.

Table 14.1. IP Address structure

	Field1	**Field2**	**Field3**	**Field4**
Class A	Network ID	Host ID		
Class B	Network ID		Host ID	
Class C	Network ID			Host ID

Here are some examples of valid IP addresses:

Class A: 10.30.6.125 (network = 10, host = 30.6.125)
Class B: 129.88.16.49 (network = 129.88, host = 16.49)
Class C: 192.60.201.11 (network = 192.60.201, host = 11)

14.2 Network classes

The three commonly used network classes are A, B, and C. (There is also a class D but it has a special use beyond the scope of this discussion.) These classes have different uses and characteristics.

Class A networks are the Internet's largest networks, each with room for over 16 million hosts. Up to 126 of these huge networks can exist, for a total of over 2 billion hosts. Because of their huge size, these networks are used for WANs and by organizations at the infrastructure level of the Internet, such as your ISP.

Class B networks are smaller but still quite large, each able to hold over 65,000 hosts. There can be up to 16,384 class B networks in existence. A class B network might be appropriate for a large organization such as a business or government agency.

Class C networks are the smallest, only able to hold 254 hosts at most, but the total possible number of class C networks exceeds 2 million (2,097,152 to be exact). LANs connected to the Internet are usually class C networks.

Some important notes regarding IP addresses:

- The class can be determined easily from field1:

field1 = 1-126:	Class A
field1 = 128-191:	Class B
field1 = 192-223:	Class C

(field1 values not shown are reserved for special uses)

- A host ID can have any value except all fields set to 0 or all fields set to 255, as those values are reserved for special uses.

14.3 Subnet masks

Definition
mask

A mask *looks like a regular IP address, but contains a pattern of bits that tells what parts of an IP address are the network ID and what parts are the host ID: bits set to 1 mean "this bit is part of the network ID" and bits set to 0 mean "this bit is part of the host ID."*

Subnet masks are used to define *subnets* (what you get after dividing a network into smaller pieces). A subnet's network ID is created by "borrowing" one or more bits from the host ID portion of the address. The subnet mask identifies these host ID bits.

For example, consider a class C network 192.168.1. To split this into two subnets, you would use the subnet mask:

255.255.255.128

It's easier to see what's happening if we write this in binary:

11111111. 11111111. 11111111.10000000

As with any class C address, all of the bits in field1 through field 3 are part of the network ID, but note how the mask specifies that the first bit in field 4 is also included. Since this extra bit has only two values (0 and 1), this means there are two subnets. Each subnet uses the remaining 7 bits in field4 for its host IDs, which range from 0 to 127 (instead of the usual 0 to 255 for a class C address).

Similarly, to split a class C network into four subnets, the mask is:

255.255.255.192 or 11111111. 11111111. 11111111.11000000

The two extra bits in field4 can have four values (00, 01, 10, 11), so there are four subnets. Each subnet uses the remaining six bits in field4 for its host IDs, ranging from 0 to 63.

Note

Sometimes a subnet mask does not specify any additional network ID bits, and thus no subnets. Such a mask is called a default subnet mask. *These masks are:*

Class A:	*255.0.0.0*
Class B:	*255.255.0.0*

Class C: 255.255.255.0

These are called default *because they are used when a network is initially configured, at which time it has no subnets.*

15 Troubleshooting

This appendix suggests solutions for problems you may encounter in installing or using the Internet Security Router, and provides instructions for using several IP utilities to diagnose problems.

Contact Customer Support if these suggestions do not resolve the problem.

Problem	Troubleshooting Suggestion
LEDs	
Power LED does not illuminate after product is turned on.	Verify that you are using the power adapter provided with the device and that it is securely connected to the Internet Security Router and a wall socket/power strip.
LINK WAN LED does not illuminate after Ethernet cable is attached.	Verify that an Ethernet cable like the one provided is securely connected to the Ethernet port of your ADSL or cable modem and the WAN port of the Internet Security Router. Make sure that your ADSL or cable modem is powered on. Wait 30 seconds to allow the Internet Security Router to negotiate a connection with your broadband modem.
LINK LAN LED does not illuminate after Ethernet cable is attached.	Verify that the Ethernet cable is securely connected to your LAN hub or PC and to the Internet Security Router. Make sure the PC and/or hub is turned on. Verify that your cable is sufficient for your network requirements. A 100 Mbit/sec network (100BaseTx) should use cables labeled Cat 5. 10Mbit/sec cables may tolerate lower quality cables.
Internet Access	
PC cannot access Internet	Use the ping utility, discussed in the following section, to check whether your PC can communicate with the Internet Security Router's LAN IP address (by default 192.168.1.1). If it cannot, check the Ethernet cabling. If you statically assigned a private IP address to the computer, (not a registered public address), verify the following: • Check that the gateway IP address on the computer is your public IP address (see the Quick Start Guide chapter, Part 2 for instructions on viewing the IP information.) If it is not, correct the address or configure the PC to receive IP information automatically. • Verify with your ISP that the DNS server specified for the PC is valid. Correct the address or configure the PC to receive this information automatically. • Verify that a Network Address Translation rule has been defined on the Internet Security Router to translate the private address to your public IP address. The assigned IP address must be within the range specified in the NAT rules. Or, configure the PC to accept an address assigned by another device (see section 3.2 "Part 2 — Configuring Your Computers"). The default configuration includes a NAT rule for all dynamically assigned

Problem	Troubleshooting Suggestion
	addresses within a predefined pool
PCs cannot display web pages on the Internet.	Verify that the DNS server specified on the PCs is correct for your ISP, as discussed in the item above. You can use the ping utility, discussed in the following section, to test connectivity with your ISP's DNS server.
Configuration Manager Program	
You forgot/lost your Configuration Manager user ID or password.	If you have not changed the password from the default, try using "admin" as both the user ID and password. Otherwise, you can reset the device to the default configuration by following the instructions provided in section 12.5.1 "Reset System Configuration". **WARNING:** Resetting the device removes any custom settings and returns all settings to their default values.
Cannot access the Configuration Manager program from your browser.	Use the ping utility, discussed in the following section, to check whether your PC can communicate with the Internet Security Router's LAN IP address (by default 192.168.1.1). If it cannot, check the Ethernet cabling. Verify that you are using Internet Explorer v5.5, Netscape 7.0.2 or later. Support for Javascript® must be enabled in your browser. Support for Java® may also be required. Verify that the PC's IP address is defined as being on the same subnet as the IP address assigned to the LAN port on the Internet Security Router.
Changes to Configuration *Manager are not being retained.*	Be sure to click on Apply button to save any changes.

15.1 Diagnosing Problem using IP Utilities

15.1.1 ping

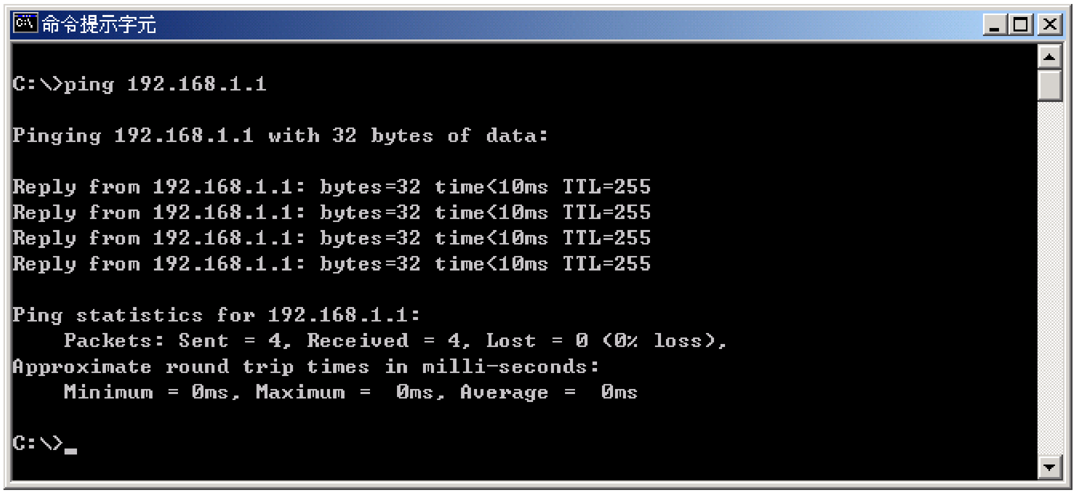
Ping is a command you can use to check whether your PC can recognize other computers on your network and the Internet. A ping command sends a message to the computer you specify. If the computer receives the message, it sends messages in reply. To use it, you must know the IP address of the computer with which you are trying to communicate.

On Windows-based computers, you can execute a ping command from the Start menu. Click the Start button, and then click Run. In the Open text box, type a statement such as the following:

ping 192.168.1.1

Click OK. You can substitute any private IP address on your LAN or a public IP address for an Internet site, if known.

If the target computer receives the message, a Command Prompt window displays like that shown in Figure 15.1.



```
C:\>ping 192.168.1.1

Pinging 192.168.1.1 with 32 bytes of data:

Reply from 192.168.1.1: bytes=32 time<10ms TTL=255
Reply from 192.168.1.1: bytes=32 time<10ms TTL=255
Reply from 192.168.1.1: bytes=32 time<10ms TTL=255
Reply from 192.168.1.1: bytes=32 time<10ms TTL=255

Ping statistics for 192.168.1.1:
    Packets: Sent = 4, Received = 4, Lost = 0 (0% loss),
Approximate round trip times in milli-seconds:
    Minimum = 0ms, Maximum =  0ms, Average =  0ms

C:\>_
```

Figure 15.1. Using the ping Utility

If the target computer cannot be located, you will receive the message "Request timed out."

Using the ping command, you can test whether the path to the Internet Security Router is working (using the preconfigured default LAN IP address 192.168.1.1) or another address you assigned.

You can also test whether access to the Internet is working by typing an external address, such as that for www.yahoo.com (216.115.108.243). If you do not know the IP address of a particular Internet location, you can use the nslookup command, as explained in the following section.

From most other IP-enabled operating systems, you can execute the same command at a command prompt or through a system administration utility.

15.1.2 nslookup

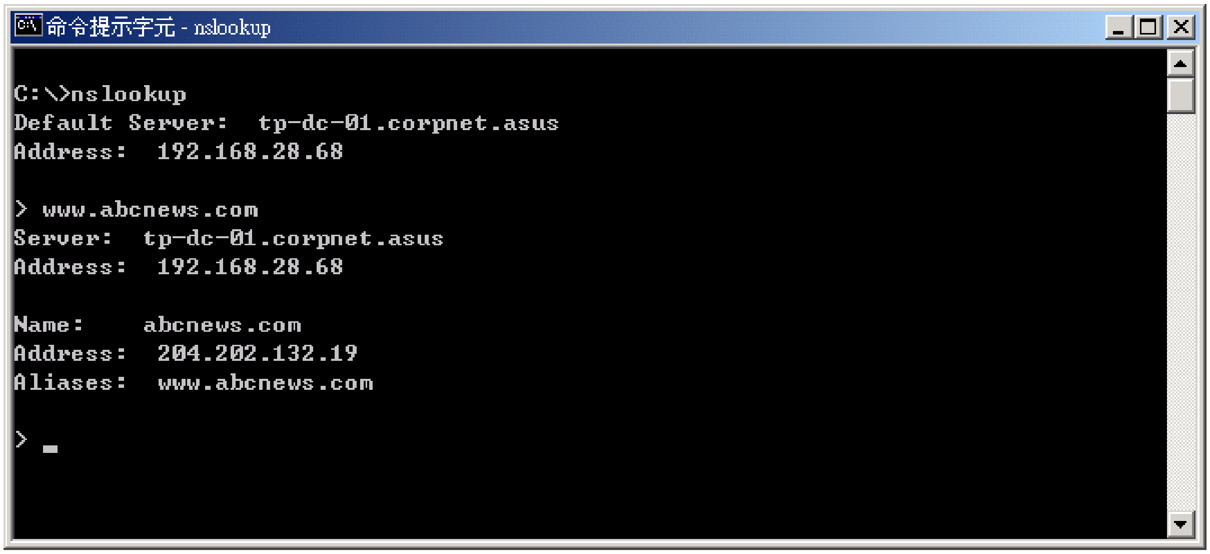
You can use the nslookup command to determine the IP address associated with an Internet site name. You specify the common name, and the nslookup command looks up the name on your DNS server (usually located with your ISP). If that name is not an entry in your ISP's DNS table, the request is then referred to another higher-level server, and so on, until the entry is found. The server then returns the associated IP address.

On Windows-based computers, you can execute the nslookup command from the Start menu. Click the Start button, and then click Run. In the Open text box, type the following:

nslookup

Click OK. A Command Prompt window displays with a bracket prompt (>). At the prompt, type the name of the Internet address you are interested in, such as www.absnews.com.

The window will display the associate IP address, if known, as shown in Figure 15.2.



```
C:\>nslookup
Default Server:  tp-dc-01.corpnet.asus
Address:  192.168.28.68

> www.abcnews.com
Server:  tp-dc-01.corpnet.asus
Address:  192.168.28.68

Name:    abcnews.com
Address:  204.202.132.19
Aliases:  www.abcnews.com

> _
```

Figure 15.2. Using the nslookup Utility

There may be several addresses associated with an Internet name. This is common for web sites that receive heavy traffic; they use multiple, redundant servers to carry the same information.

To exit from the nslookup utility, type **exit** and press **<Enter>** at the command prompt.

16 Glossary

10BASE-T A designation for the type of wiring used by Ethernet networks with a data rate of 10 Mbps. Also known as Category 3 (CAT 3) wiring. *See also data rate, Ethernet*.

100BASE-T A designation for the type of wiring used by Ethernet networks with a data rate of 100 Mbps. Also known as Category 5 (CAT 5) wiring. *See also data rate, Ethernet*.

ADSL Asymmetric Digital Subscriber Line
The most commonly deployed "flavor" of DSL for home users. The term asymmetrical refers to its unequal data rates for downloading and uploading (the download rate is higher than the upload rate). The asymmetrical rates benefit home users because they typically download much more data from the Internet than they upload.

authenticate To verify user’s identity, such as by prompting for a password.

binary The "base two" system of numbers, that uses only two digits, 0 and 1, to represent all numbers. In binary, the number 1 is written as 1, 2 as 10, 3 as 11, 4 as 100, etc. Although expressed as decimal numbers for convenience, IP addresses in actual use are binary numbers; e.g., the IP address 209.191.4.240 is 11010001.10111111.00000100.11110000 in binary. *See also bit, IP address, network mask*.

bit Short for "binary digit," a bit is a number that can have two values, 0 or 1. *See also binary*.

bps bits per second

broadband A telecommunications technology that can send different types of data over the same medium. DSL is a broadband technology.

broadcast To send data to all computers on a network.

DHCP Dynamic Host Configuration Protocol
DHCP automates address assignment and management. When a computer connects to the LAN, DHCP assigns it an IP address from a shared pool of IP addresses; after a specified time limit, DHCP returns the address to the pool.

DHCP relay Dynamic Host Configuration Protocol relay
A DHCP relay is a computer that forwards DHCP data between computers that request IP addresses and the DHCP server that assigns the addresses. Each of the Internet Security Router's interfaces can be configured as a DHCP relay. *See DHCP*.

DHCP server Dynamic Host Configuration Protocol server
A DHCP server is a computer that is responsible for assigning IP addresses to the computers on a LAN. *See DHCP*.

DNS Domain Name System
The DNS maps domain names into IP addresses. DNS information is distributed hierarchically throughout the Internet among computers called DNS servers. When you start to access a web site, a DNS server looks up the requested domain name to find its corresponding IP address. If the DNS server cannot find the IP address, it communicates with higher-level DNS servers to determine the IP address. *See also domain name.*

domain name A domain name is a user-friendly name used in place of its associated IP address. For example, www.hinet.net is the domain name associated with IP address 168.95.1.88. Domain names must be unique; their assignment is controlled by the Internet Corporation for Assigned Names and Numbers (ICANN). Domain names are a key element of URLs, which identify a specific file at a web site, e.g., http://www.asus.com. *See also DNS.*

download To transfer data in the downstream direction, i.e., from the Internet to the user.

DSL Digital Subscriber Line
A technology that allows both digital data and analog voice signals to travel over existing copper telephone lines.

Ethernet The most commonly installed computer network technology, usually using twisted pair wiring. Ethernet data rates are 10 Mbps and 100 Mbps. *See also 10BASE-T, 100BASE-T, twisted pair*.

filtering To screen out selected types of data, based on filtering rules. Filtering can be applied in one direction (upstream or downstream), or in both directions.

filtering rule A rule that specifies what kinds of data the a routing device will accept and/or reject. Filtering rules are defined to operate on an interface (or multiple interfaces) and in a particular direction (upstream, downstream, or both).

firewall Any method of protecting a computer or LAN connected to the Internet from intrusion or attack from the outside. Some firewall protection can be provided by packet filtering and Network Address Translation services.

FTP File Transfer Protocol
A program used to transfer files between computers connected to the Internet. Common uses include uploading new or updated files to a web server, and downloading files from a web server.

hop When you send data through the Internet, it is sent first from your computer to a router, and then from one router to another until it finally reaches a router that is directly connected to the recipient. Each individual “leg” of the data’s journey is called a hop.

hop count The number of hops that data has taken on its route to its destination. Alternatively, the maximum number of hops that a packet is allowed to take before being discarded (*see also TTL*).

host A device (usually a computer) connected to a network.

HTTP Hyper-Text Transfer Protocol
HTTP is the main protocol used to transfer data from web sites so that it can be displayed by web browsers. *See also web browser, web site*.

ICMP Internet Control Message Protocol
An Internet protocol used to report errors and other network-related information. The ping command makes use of ICMP.

IGMP Internet Group Management Protocol
An Internet protocol that enables a computer to share information about its membership in multicast groups with adjacent routers. A multicast group of computers is one whose members have designated as interested in receiving specific content from the others. Multicasting to an IGMP group can be used to simultaneously update the address books of a group of mobile computer users or to send company newsletters to a distribution list.

Internet The global collection of interconnected networks used for both private and business communications.

intranet A private, company-internal network that looks like part of the Internet (users access information using web browsers), but is accessible only by employees.

IP *See TCP/IP*.

IP address Internet Protocol address
The address of a host (computer) on the Internet, consisting of four numbers, each

from 0 to 255, separated by periods, e.g., 209.191.4.240. An IP address consists of a *network ID* that identifies the particular network the host belongs to, and a *host ID* uniquely identifying the host itself on that network. A network mask is used to define the network ID and the host ID. Because IP addresses are difficult to remember, they usually have an associated domain name that can be specified instead. *See also domain name, network mask*.

ISP Internet **S**ervice **P**rovider
A company that provides Internet access to its customers, usually for a fee.

LAN **L**ocal **A**rea **N**etwork
A network limited to a small geographic area, such as a home, office, or small building.

LED Light Emitting Diode
An electronic light-emitting device. The indicator lights on the front of the Internet Security Router are LEDs.

MAC address Media Access Control address
The permanent hardware address of a device, assigned by its manufacturer. MAC addresses are expressed as six pairs of characters.

mask *See network mask*.

Mbps Abbreviation for Megabits per second, or one million bits per second. Network data rates are often expressed in Mbps.

NAT Network Address Translation
A service performed by many routers that translates your network's publicly known IP address into a *private* IP address for each computer on your LAN. Only your router and your LAN know these addresses; the outside world sees only the public IP address when talking to a computer on your LAN.

NAT rule A defined method for translating between public and private IP addresses on your LAN.

network A group of computers that are connected together, allowing them to communicate with each other and share resources, such as software, files, etc. A network can be small, such as a *LAN*, or very large, such as the *Internet*.

network mask A network mask is a sequence of bits applied to an IP address to select the network ID while ignoring the host ID. Bits set to 1 mean "select this bit" while bits set to 0 mean "ignore this bit." For example, if the network mask 255.255.255.0 is applied to the IP address 100.10.50.1, the network ID is 100.10.50, and the host ID is 1. *See also binary, IP address, subnet, "IP Addresses Explained" section*.

NIC Network Interface Card
An adapter card that plugs into your computer and provides the physical interface to your network cabling, which for Ethernet NICs is typically an RJ-45 connector. *See Ethernet, RJ-45*.

packet Data transmitted on a network consists of units called packets. Each packet contains a payload (the data), plus overhead information such as where it came from (source address) and where it should go (destination address).

ping Packet Internet (or Inter-Network) Groper
A program used to verify whether the host associated with an IP address is online. It can also be used to reveal the IP address for a given domain name.

port A physical access point to a device such as a computer or router, through which data flows into and out of the device.

PPP Point-to-Point Protocol
A protocol for serial data transmission that is used to carry IP (and other protocol) data

between your ISP and your computer. The WAN interface on the Internet Security Router uses two forms of PPP called PPPoA and PPPoE. *See also PPPoA, PPPoE*.

PPPoE Point-to-Point Protocol over Ethernet
One of the two types of PPP interfaces you can define for a Virtual Circuit (VC), the other type being PPPoA. You can define one or more PPPoE interfaces per VC.

protocol A set of rules governing the transmission of data. In order for a data transmission to work, both ends of the connection have to follow the rules of the protocol.

remote In a physically separate location. For example, an employee away on travel who logs in to the company's intranet is a remote user.

RIP Routing Information Protocol
The original TCP/IP routing protocol. There are two versions of RIP: version I and version II.

RJ-45 Registered Jack Standard-45
The 8-pin plug used in transmitting data over phone lines. Ethernet cabling usually uses this type of connector.

routing Forwarding data between your network and the Internet on the most efficient route, based on the data's destination IP address and current network conditions. A device that performs routing is called a router.

rule *See filtering rule, NAT rule*.

SDNS Secondary Domain Name System (server)
A DNS server that can be used if the primary DSN server is not available. *See DNS*.

SNMP Simple Network Management Protocol
The TCP/IP protocol used for network management.

subnet A subnet is a portion of a network. The subnet is distinguished from the larger network by a *subnet mask* which selects some of the computers of the network and excludes all others. The subnet's computers remain physically connected to the rest of the parent network, but they are treated as though they were on a separate network. *See also network mask*.

subnet mask A mask that defines a subnet. *See also network mask*.

TCP *See TCP/IP*.

TCP/IP Transmission Control Protocol/Internet Protocol
The basic protocols used on the Internet. TCP is responsible for dividing data up into packets for delivery and reassembling them at the destination, while IP is responsible for delivering the packets from source to destination. When TCP and IP are bundled with higher-level applications such as HTTP, FTP, Telnet, etc., TCP/IP refers to this whole suite of protocols.

Telnet An interactive, character-based program used to access a remote computer. While HTTP (the web protocol) and FTP only allow you to download files from a remote computer, Telnet allows you to log into and use a computer from a remote location.

TFTP Trivial File Transfer Protocol
A protocol for file transfers, TFTP is easier to use than File Transfer Protocol (FTP) but not as capable or secure.

TTL Time To Live
A field in an IP packet that limits the life span of that packet. Originally meant as a time duration, the TTL is usually represented instead as a maximum hop count; each router that receives a packet decrements this field by one. When the TTL reaches zero, the packet is discarded.

twisted pair The ordinary copper telephone wiring long used by telephone companies. It contains one or more wire pairs twisted together to reduce inductance and noise. Each telephone line uses one pair. In homes, it is most often installed with two pairs. For Ethernet LANs, a higher grade called Category 3 (CAT 3) is used for 10BASE-T networks, and an even higher grade called Category 5 (CAT 5) is used for 100BASE-T networks. *See also 10BASE-T, 100BASE-T, Ethernet*.

upstream The direction of data transmission from the user to the Internet.

WAN Wide Area Network
Any network spread over a large geographical area, such as a country or continent. With respect to the Internet Security Router, WAN refers to the Internet.

Web browser A software program that uses Hyper-Text Transfer Protocol (HTTP) to download information from (and upload to) web sites, and displays the information, which may consist of text, graphic images, audio, or video, to the user. Web browsers use Hyper-Text Transfer Protocol (HTTP). Popular web browsers include Netscape Navigator and Microsoft Internet Explorer. *See also HTTP, web site, WWW*.

Web page A web site file typically containing text, graphics and hyperlinks (cross-references) to the other pages on that web site, as well as to pages on other web sites. When a user accesses a web site, the first page that is displayed is called the *home page*. *See also hyperlink, web site*.

Web site A computer on the Internet that distributes information to (and gets information from) remote users through web browsers. A web site typically consists of web pages that contain text, graphics, and hyperlinks. *See also hyperlink, web page*.

WWW World Wide Web
Also called *(the) Web.* Collective term for all web sites anywhere in the world that can be accessed via the Internet

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17 Index