

Figure 43 Edit Address Mapping Rule

NAT - Edit Address Mapping Rule 1

Type: One-to-One

Local Start IP: 0.0.0.0

Local End IP: N/A

Global Start IP: 0.0.0.0

Global End IP: N/A

Server Mapping Set: N/A [Edit Details](#)

Apply Cancel Delete

The following table describes the fields in this screen.

Table 30 Edit Address Mapping Rule

LABEL	DESCRIPTION
Type	Choose the port mapping type from one of the following. • One-to-One: One-to-One mode maps one local IP address to one global IP address. Note that port numbers do not change for One-to-one NAT mapping type. • Many-to-One: Many-to-One mode maps multiple local IP addresses to one global IP address. This is equivalent to SUA (i.e., PAT, port address translation), ZyXEL's Single User Account feature that previous ZyXEL routers supported only. • Many-to-Many Overload: Many-to-Many Overload mode maps multiple local IP addresses to shared global IP addresses. • Many-to-Many No Overload: Many-to-Many No Overload mode maps each local IP address to unique global IP addresses. • Server: This type allows you to specify inside servers of different services behind the NAT to be accessible to the outside world.
Local Start IP	This is the starting local IP address (ILA). Local IP addresses are N/A for Server port mapping.
Local End IP	This is the end local IP address (ILA). If your rule is for all local IP addresses, then enter 0.0.0.0 as the Local Start IP address and 255.255.255.255 as the Local End IP address. This field is N/A for One-to-One and Server mapping types.
Global Start IP	This is the starting global IP address (IGA). Enter 0.0.0.0 here if you have a dynamic IP address from your ISP.
Global End IP	This is the ending global IP address (IGA). This field is N/A for One-to-One , Many-to-One and Server mapping types.
Server Mapping Set	Only available when Type is set to Server . Select a number from the drop-down menu to choose a server set from the NAT - Address Mapping Rules screen.
Edit Details	Click this link to go to the NAT - Edit SUA/NAT Server Set screen to edit a server set that you have selected in the Server Mapping Set field.
Apply	Click Apply to save your changes back to the Prestige.

Table 30 Edit Address Mapping Rule (continued)

LABEL	DESCRIPTION
Cancel	Click Cancel to return to the previously saved settings.
Delete	Click Delete to exit this screen without saving.

CHAPTER 8

Dynamic DNS Setup

This chapter discusses how to configure your Prestige to use Dynamic DNS.

8.1 Dynamic DNS Overview

Dynamic DNS allows you to update your current dynamic IP address with one or many dynamic DNS services so that anyone can contact you (in NetMeeting, CU-SeeMe, etc.). You can also access your FTP server or Web site on your own computer using a domain name (for instance myhost.dhs.org, where myhost is a name of your choice) that will never change instead of using an IP address that changes each time you reconnect. Your friends or relatives will always be able to call you even if they don't know your IP address.

First of all, you need to have registered a dynamic DNS account with www.dyndns.org. This is for people with a dynamic IP from their ISP or DHCP server that would still like to have a domain name. The Dynamic DNS service provider will give you a password or key.

8.1.1 DYNDNS Wildcard

Enabling the wildcard feature for your host causes *.yourhost.dyndns.org to be aliased to the same IP address as yourhost.dyndns.org. This feature is useful if you want to be able to use, for example, www.yourhost.dyndns.org and still reach your hostname.

If you have a private WAN IP address, then you cannot use Dynamic DNS.

See [Section 8.2 on page 114](#) for configuration instruction.

8.2 Configuring Dynamic DNS

To change your Prestige's DDNS, click **Dynamic DNS**. The screen appears as shown.

See [Section 8.1 on page 114](#) for more information.

Figure 44 Dynamic DNS

Dynamic DNS

☐ Active

Service Provider: WWW.DynDNS.ORG

Host Name:

E-mail Address:

User:

Password:

☐ Enable Wildcard

Apply Cancel

The following table describes the fields in this screen.

Table 31 Dynamic DNS

LABEL	DESCRIPTION
Active	Select this check box to use dynamic DNS.
Service Provider	This is the name of your Dynamic DNS service provider.
Host Names	Type the domain name assigned to your Prestige by your Dynamic DNS provider.
E-mail Address	Type your e-mail address.
User	Type your user name.
Password	Type the password assigned to you.
Enable Wildcard	Select the check box to enable DYNDNS Wildcard.
Apply	Click Apply to save your changes back to the Prestige.
Cancel	Click Cancel to begin configuring this screen afresh.

CHAPTER 9

Time and Date

This screen is not available on all models. Use this screen to configure the Prestige's time and date settings.

9.1 Configuring Time and Date

To change your Prestige's time and date, click **Time And Date**. The screen appears as shown. Use this screen to configure the Prestige's time based on your local time zone.

Figure 45 Time and Date

Time and Date

Time Server

Use Protocol when Bootup: None

IP Address or URL: N/A

Time and Date: (GMT) Greenwich Mean Time : Dublin, Edinburgh, Lisbon, London

☐ Daylight Savings

Start Date: 1 month 1 day

End Date: 1 month 1 day

☐ Synchronize system clock with Time Server now.
(This may take up to 60 seconds.)

Date

Current Date: 2000-01-01

New Date (yyyy-mm-dd): 2000-01-01

Time

Current Time: 01:10:51

New Time: 01:10:51

Apply Cancel

The following table describes the fields in this screen.

Table 32 Time and Date

LABEL	DESCRIPTION
Time Server	
Use Protocol when Bootup	Select the time service protocol that your time server sends when you turn on the Prestige. Not all time servers support all protocols, so you may have to check with your ISP/network administrator or use trial and error to find a protocol that works. The main difference between them is the format. Daytime (RFC 867) format is day/month/year/time zone of the server. Time (RFC 868) format displays a 4-byte integer giving the total number of seconds since 1970/1/1 at 0:0:0. NTP (RFC 1305) is similar to Time (RFC 868). Select None to enter the time and date manually.
IP Address or URL	Enter the IP address or URL of your time server. Check with your ISP/network administrator if you are unsure of this information.
Time and Date	Choose the time zone of your location. This will set the time difference between your time zone and Greenwich Mean Time (GMT).
Daylight Savings	Select this option if you use daylight savings time. Daylight saving is a period from late spring to early fall when many countries set their clocks ahead of normal local time by one hour to give more daytime light in the evening.
Start Date	Enter the month and day that your daylight-savings time starts on if you selected Daylight Savings .
End Date	Enter the month and day that your daylight-savings time ends on if you selected Daylight Savings .
Synchronize system clock with Time Server now.	Select this option to have your Prestige use the time server (that you configured above) to set its internal system clock. Please wait for up to 60 seconds while the Prestige locates the time server. If the Prestige cannot find the time server, please check the time server protocol and its IP address. If the IP address was entered correctly, try pinging it for example to test the connection.
Date	
Current Date	This field displays the date of your Prestige. Each time you reload this page, the Prestige synchronizes the time with the time server.
New Date (yyyy-mm-dd)	This field displays the last updated date from the time server. When you select None in the Use Protocol when Bootup field, enter the new date in this field and then click Apply.
Time	
Current Time	This field displays the time of your Prestige. Each time you reload this page, the Prestige synchronizes the time with the time server.
New Time	This field displays the last updated time from the time server. When you select None in the Use Protocol when Bootup field, enter the new time in this field and then click Apply.
Apply	Click Apply to save your changes back to the Prestige.
Cancel	Click Cancel to begin configuring this screen afresh.

CHAPTER 10

Firewalls

This chapter gives some background information on firewalls and introduces the Prestige firewall.

10.1 Firewall Overview

Originally, the term *firewall* referred to a construction technique designed to prevent the spread of fire from one room to another. The networking term “firewall” is a system or group of systems that enforces an access-control policy between two networks. It may also be defined as a mechanism used to protect a trusted network from an untrusted network. Of course, firewalls cannot solve every security problem. A firewall is *one* of the mechanisms used to establish a network security perimeter in support of a network security policy. It should never be the *only* mechanism or method employed. For a firewall to guard effectively, you must design and deploy it appropriately. This requires integrating the firewall into a broad information-security policy. In addition, specific policies must be implemented within the firewall itself.

Refer to [Section 11.5 on page 135](#) to configure default firewall settings.

Refer to [Section 11.6 on page 136](#) to view firewall rules.

Refer to [Section 11.6.1 on page 138](#) to configure firewall rules.

Refer to [Section 11.7 on page 141](#) to configure a custom service.

Refer to [Section 11.12.3 on page 151](#) to configure firewall thresholds.

10.2 Types of Firewalls

There are three main types of firewalls:

- Packet Filtering Firewalls
- Application-level Firewalls
- Stateful Inspection Firewalls

10.2.1 Packet Filtering Firewalls

Packet filtering firewalls restrict access based on the source/destination computer network address of a packet and the type of application.

10.2.2 Application-level Firewalls

Application-level firewalls restrict access by serving as proxies for external servers. Since they use programs written for specific Internet services, such as HTTP, FTP and telnet, they can evaluate network packets for valid application-specific data. Application-level gateways have a number of general advantages over the default mode of permitting application traffic directly to internal hosts:

Information hiding prevents the names of internal systems from being made known via DNS to outside systems, since the application gateway is the only host whose name must be made known to outside systems.

Robust authentication and logging pre-authenticates application traffic before it reaches internal hosts and causes it to be logged more effectively than if it were logged with standard host logging. Filtering rules at the packet filtering router can be less complex than they would be if the router needed to filter application traffic and direct it to a number of specific systems. The router need only allow application traffic destined for the application gateway and reject the rest.

10.2.3 Stateful Inspection Firewalls

Stateful inspection firewalls restrict access by screening data packets against defined access rules. They make access control decisions based on IP address and protocol. They also "inspect" the session data to assure the integrity of the connection and to adapt to dynamic protocols. These firewalls generally provide the best speed and transparency, however, they may lack the granular application level access control or caching that some proxies support. See [Section 10.5 on page 124](#) for more information on stateful inspection.

Firewalls, of one type or another, have become an integral part of standard security solutions for enterprises.

10.3 Introduction to ZyXEL's Firewall

The Prestige firewall is a stateful inspection firewall and is designed to protect against Denial of Service attacks when activated (in SMT menu 21.2 or in the web configurator). The Prestige's purpose is to allow a private Local Area Network (LAN) to be securely connected to the Internet. The Prestige can be used to prevent theft, destruction and modification of data, as well as log events, which may be important to the security of your network. The Prestige also has packet filtering capabilities.

The Prestige is installed between the LAN and the Internet. This allows it to act as a secure gateway for all data passing between the Internet and the LAN.

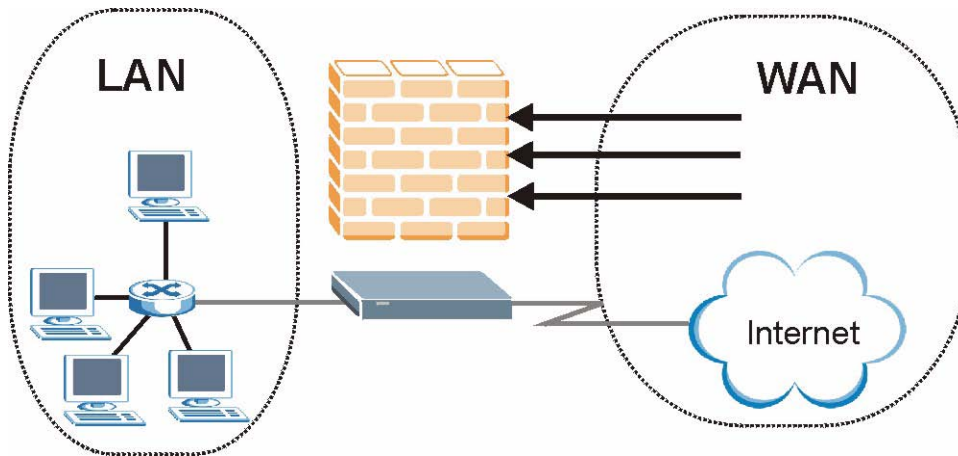
The Prestige has one DSL/ISDN port and one Ethernet LAN port, which physically separate the network into two areas.

- The DSL/ISDN port connects to the Internet.

- The LAN (Local Area Network) port attaches to a network of computers, which needs security from the outside world. These computers will have access to Internet services such as e-mail, FTP, and the World Wide Web. However, “inbound access” will not be allowed unless you configure remote management or create a firewall rule to allow a remote host to use a specific service.

10.3.1 Denial of Service Attacks

Figure 46 Prestige Firewall Application



10.4 Denial of Service

Denials of Service (DoS) attacks are aimed at devices and networks with a connection to the Internet. Their goal is not to steal information, but to disable a device or network so users no longer have access to network resources. The Prestige is pre-configured to automatically detect and thwart all known DoS attacks.

10.4.1 Basics

Computers share information over the Internet using a common language called TCP/IP. TCP/IP, in turn, is a set of application protocols that perform specific functions. An “extension number”, called the “TCP port” or “UDP port” identifies these protocols, such as HTTP (Web), FTP (File Transfer Protocol), POP3 (E-mail), etc. For example, Web traffic by default uses TCP port 80.

When computers communicate on the Internet, they are using the client/server model, where the server “listens” on a specific TCP/UDP port for information requests from remote client computers on the network. For example, a Web server typically listens on port 80. Please note that while a computer may be intended for use over a single port, such as Web on port 80, other ports are also active. If the person configuring or managing the computer is not careful, a hacker could attack it over an unprotected port.

Some of the most common IP ports are:

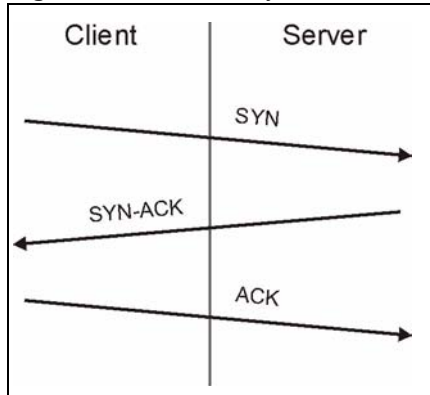
Table 33 Common IP Ports

21	FTP	53	DNS
23	Telnet	80	HTTP
25	SMTP	110	POP3

10.4.2 Types of DoS Attacks

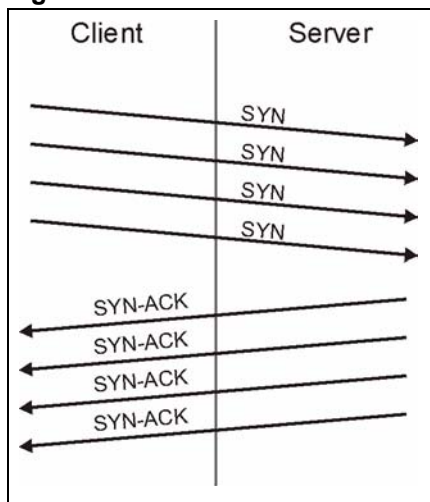
There are four types of DoS attacks:

- 1 Those that exploit bugs in a TCP/IP implementation.
- 2 Those that exploit weaknesses in the TCP/IP specification.
- 3 Brute-force attacks that flood a network with useless data.
- 4 IP Spoofing.
- 5 **"Ping of Death"** and **"Teardrop"** attacks exploit bugs in the TCP/IP implementations of various computer and host systems.
 - Ping of Death uses a "ping" utility to create an IP packet that exceeds the maximum 65,536 bytes of data allowed by the IP specification. The oversize packet is then sent to an unsuspecting system. Systems may crash, hang or reboot.
 - Teardrop attack exploits weaknesses in the re-assembly of IP packet fragments. As data is transmitted through a network, IP packets are often broken up into smaller chunks. Each fragment looks like the original IP packet except that it contains an offset field that says, for instance, "This fragment is carrying bytes 200 through 400 of the original (non fragmented) IP packet." The Teardrop program creates a series of IP fragments with overlapping offset fields. When these fragments are reassembled at the destination, some systems will crash, hang, or reboot.
- 6 Weaknesses in the TCP/IP specification leave it open to **"SYN Flood"** and **"LAND"** attacks. These attacks are executed during the handshake that initiates a communication session between two applications.

Figure 47 Three-Way Handshake

Under normal circumstances, the application that initiates a session sends a SYN (synchronize) packet to the receiving server. The receiver sends back an ACK (acknowledgment) packet and its own SYN, and then the initiator responds with an ACK (acknowledgment). After this handshake, a connection is established.

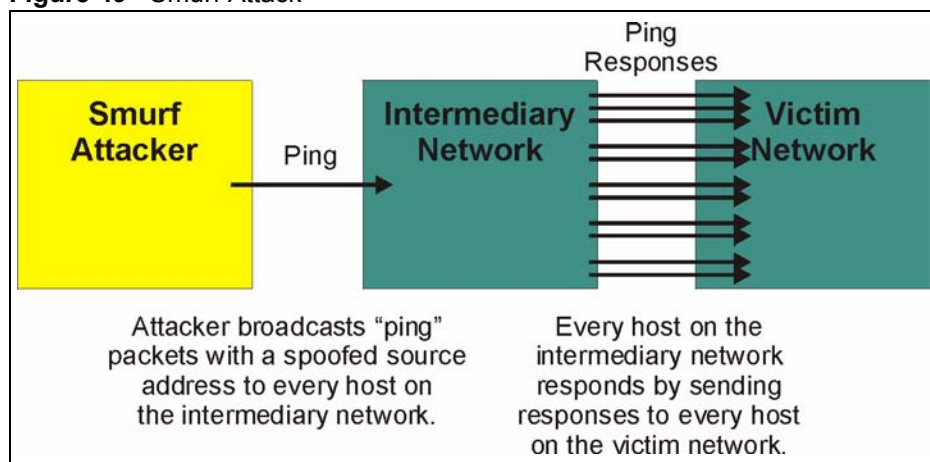
- **SYN Attack** floods a targeted system with a series of SYN packets. Each packet causes the targeted system to issue a SYN-ACK response. While the targeted system waits for the ACK that follows the SYN-ACK, it queues up all outstanding SYN-ACK responses on what is known as a backlog queue. SYN-ACKs are moved off the queue only when an ACK comes back or when an internal timer (which is set at relatively long intervals) terminates the three-way handshake. Once the queue is full, the system will ignore all incoming SYN requests, making the system unavailable for legitimate users.

Figure 48 SYN Flood

- In a **LAND Attack**, hackers flood SYN packets into the network with a spoofed source IP address of the targeted system. This makes it appear as if the host computer sent the packets to itself, making the system unavailable while the target system tries to respond to itself.
- 7** A **brute-force** attack, such as a "Smurf" attack, targets a feature in the IP specification known as directed or subnet broadcasting, to quickly flood the target network with useless data. A Smurf hacker floods a router with Internet Control Message Protocol

(ICMP) echo request packets (pings). Since the destination IP address of each packet is the broadcast address of the network, the router will broadcast the ICMP echo request packet to all hosts on the network. If there are numerous hosts, this will create a large amount of ICMP echo request and response traffic. If a hacker chooses to spoof the source IP address of the ICMP echo request packet, the resulting ICMP traffic will not only clog up the "intermediary" network, but will also congest the network of the spoofed source IP address, known as the "victim" network. This flood of broadcast traffic consumes all available bandwidth, making communications impossible.

Figure 49 Smurf Attack



10.4.2.1 ICMP Vulnerability

ICMP is an error-reporting protocol that works in concert with IP. The following ICMP types trigger an alert:

Table 34 ICMP Commands That Trigger Alerts

5	REDIRECT
13	TIMESTAMP_REQUEST
14	TIMESTAMP_REPLY
17	ADDRESS_MASK_REQUEST
18	ADDRESS_MASK_REPLY

10.4.2.2 Illegal Commands (NetBIOS and SMTP)

The only legal NetBIOS commands are the following - all others are illegal.

Table 35 Legal NetBIOS Commands

MESSAGE:
REQUEST:
POSITIVE:
VE:

Table 35 Legal NetBIOS Commands

RETARGET:
KEEPALIVE:

All SMTP commands are illegal except for those displayed in the following tables.

Table 36 Legal SMTP Commands

AUTH	DATA	EHLO	ETRN	EXPN	HELO	HELP	MAIL	NOOP
QUIT	RCPT	RSET	SAML	SEND	SOML	TURN	VERFY	

10.4.2.3 Traceroute

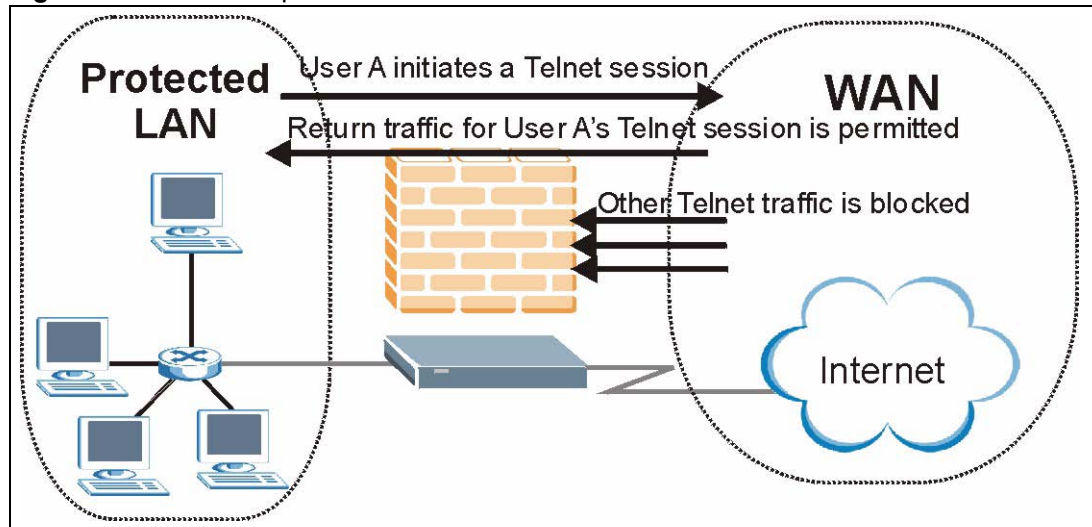
Traceroute is a utility used to determine the path a packet takes between two endpoints. Sometimes when a packet filter firewall is configured incorrectly an attacker can traceroute the firewall gaining knowledge of the network topology inside the firewall.

Often, many DoS attacks also employ a technique known as "**IP Spoofing**" as part of their attack. IP Spoofing may be used to break into systems, to hide the hacker's identity, or to magnify the effect of the DoS attack. IP Spoofing is a technique used to gain unauthorized access to computers by tricking a router or firewall into thinking that the communications are coming from within the trusted network. To engage in IP spoofing, a hacker must modify the packet headers so that it appears that the packets originate from a trusted host and should be allowed through the router or firewall. The Prestige blocks all IP Spoofing attempts.

10.5 Stateful Inspection

With stateful inspection, fields of the packets are compared to packets that are already known to be trusted. For example, if you access some outside service, the proxy server remembers things about your original request, like the port number and source and destination addresses. This "remembering" is called *saving the state*. When the outside system responds to your request, the firewall compares the received packets with the saved state to determine if they are allowed in. The Prestige uses stateful packet inspection to protect the private LAN from hackers and vandals on the Internet. By default, the Prestige's stateful inspection allows all communications to the Internet that originate from the LAN, and blocks all traffic to the LAN that originates from the Internet. In summary, stateful inspection:

- Allows all sessions originating from the LAN (local network) to the WAN (Internet).
- Denies all sessions originating from the WAN to the LAN.

Figure 50 Stateful Inspection

The previous figure shows the Prestige's default firewall rules in action as well as demonstrates how stateful inspection works. User A can initiate a Telnet session from within the LAN and responses to this request are allowed. However other Telnet traffic initiated from the WAN is blocked.

10.5.1 Stateful Inspection Process

In this example, the following sequence of events occurs when a TCP packet leaves the LAN network through the firewall's WAN interface. The TCP packet is the first in a session, and the packet's application layer protocol is configured for a firewall rule inspection:

- 1 The packet travels from the firewall's LAN to the WAN.
- 2 The packet is evaluated against the interface's existing outbound access list, and the packet is permitted (a denied packet would simply be dropped at this point).
- 3 The packet is inspected by a firewall rule to determine and record information about the state of the packet's connection. This information is recorded in a new state table entry created for the new connection. If there is not a firewall rule for this packet and it is not an attack, then the settings in the **Default Policy** screen determine the action for this packet.
- 4 Based on the obtained state information, a firewall rule creates a temporary access list entry that is inserted at the beginning of the WAN interface's inbound extended access list. This temporary access list entry is designed to permit inbound packets of the same connection as the outbound packet just inspected.
- 5 The outbound packet is forwarded out through the interface.
- 6 Later, an inbound packet reaches the interface. This packet is part of the connection previously established with the outbound packet. The inbound packet is evaluated against the inbound access list, and is permitted because of the temporary access list entry previously created.
- 7 The packet is inspected by a firewall rule, and the connection's state table entry is updated as necessary. Based on the updated state information, the inbound extended access list

temporary entries might be modified, in order to permit only packets that are valid for the current state of the connection.

- 8 Any additional inbound or outbound packets that belong to the connection are inspected to update the state table entry and to modify the temporary inbound access list entries as required, and are forwarded through the interface.
- 9 When the connection terminates or times out, the connection's state table entry is deleted and the connection's temporary inbound access list entries are deleted.

10.5.2 Stateful Inspection and the Prestige

Additional rules may be defined to extend or override the default rules. For example, a rule may be created which will:

- Block all traffic of a certain type, such as IRC (Internet Relay Chat), from the LAN to the Internet.
- Allow certain types of traffic from the Internet to specific hosts on the LAN.
- Allow access to a Web server to everyone but competitors.
- Restrict use of certain protocols, such as Telnet, to authorized users on the LAN.

These custom rules work by evaluating the network traffic's Source IP address, Destination IP address, IP protocol type, and comparing these to rules set by the administrator.

Note: The ability to define firewall rules is a very powerful tool. Using custom rules, it is possible to disable all firewall protection or block all access to the Internet. Use extreme caution when creating or deleting firewall rules. Test changes after creating them to make sure they work correctly.

Below is a brief technical description of how these connections are tracked. Connections may either be defined by the upper protocols (for instance, TCP), or by the Prestige itself (as with the "virtual connections" created for UDP and ICMP).

10.5.3 TCP Security

The Prestige uses state information embedded in TCP packets. The first packet of any new connection has its SYN flag set and its ACK flag cleared; these are "initiation" packets. All packets that do not have this flag structure are called "subsequent" packets, since they represent data that occurs later in the TCP stream.

If an initiation packet originates on the WAN, this means that someone is trying to make a connection from the Internet into the LAN. Except in a few special cases (see "Upper Layer Protocols" shown next), these packets are dropped and logged.

If an initiation packet originates on the LAN, this means that someone is trying to make a connection from the LAN to the Internet. Assuming that this is an acceptable part of the security policy (as is the case with the default policy), the connection will be allowed. A cache entry is added which includes connection information such as IP addresses, TCP ports, sequence numbers, etc.

When the Prestige receives any subsequent packet (from the Internet or from the LAN), its connection information is extracted and checked against the cache. A packet is only allowed to pass through if it corresponds to a valid connection (that is, if it is a response to a connection which originated on the LAN).

10.5.4 UDP/ICMP Security

UDP and ICMP do not themselves contain any connection information (such as sequence numbers). However, at the very minimum, they contain an IP address pair (source and destination). UDP also contains port pairs, and ICMP has type and code information. All of this data can be analyzed in order to build "virtual connections" in the cache.

For instance, any UDP packet that originates on the LAN will create a cache entry. Its IP address and port pairs will be stored. For a short period of time, UDP packets from the WAN that have matching IP and UDP information will be allowed back in through the firewall.

A similar situation exists for ICMP, except that the Prestige is even more restrictive. Specifically, only outgoing echoes will allow incoming echo replies, outgoing address mask requests will allow incoming address mask replies, and outgoing timestamp requests will allow incoming timestamp replies. No other ICMP packets are allowed in through the firewall, simply because they are too dangerous and contain too little tracking information. For instance, ICMP redirect packets are never allowed in, since they could be used to reroute traffic through attacking machines.

10.5.5 Upper Layer Protocols

Some higher layer protocols (such as FTP and RealAudio) utilize multiple network connections simultaneously. In general terms, they usually have a "control connection" which is used for sending commands between endpoints, and then "data connections" which are used for transmitting bulk information.

Consider the FTP protocol. A user on the LAN opens a control connection to a server on the Internet and requests a file. At this point, the remote server will open a data connection from the Internet. For FTP to work properly, this connection must be allowed to pass through even though a connection from the Internet would normally be rejected.

In order to achieve this, the Prestige inspects the application-level FTP data. Specifically, it searches for outgoing "PORT" commands, and when it sees these, it adds a cache entry for the anticipated data connection. This can be done safely, since the PORT command contains address and port information, which can be used to uniquely identify the connection.

Any protocol that operates in this way must be supported on a case-by-case basis. You can use the web configurator's Custom Ports feature to do this.

10.6 Guidelines for Enhancing Security with Your Firewall

- Change the default password via SMT or web configurator.

- Limit who can telnet into your router.
- Don't enable any local service (such as SNMP or NTP) that you don't use. Any enabled service could present a potential security risk. A determined hacker might be able to find creative ways to misuse the enabled services to access the firewall or the network.
- For local services that are enabled, protect against misuse. Protect by configuring the services to communicate only with specific peers, and protect by configuring rules to block packets for the services at specific interfaces.
- Protect against IP spoofing by making sure the firewall is active.
- Keep the firewall in a secured (locked) room.

10.6.1 Security In General

You can never be too careful! Factors outside your firewall, filtering or NAT can cause security breaches. Below are some generalizations about what you can do to minimize them.

- Encourage your company or organization to develop a comprehensive security plan. Good network administration takes into account what hackers can do and prepares against attacks. The best defense against hackers and crackers is information. Educate all employees about the importance of security and how to minimize risk. Produce lists like this one!
- DSL or cable modem connections are “always-on” connections and are particularly vulnerable because they provide more opportunities for hackers to crack your system. Turn your computer off when not in use.
- Never give out a password or any sensitive information to an unsolicited telephone call or e-mail.
- Never e-mail sensitive information such as passwords, credit card information, etc., without encrypting the information first.
- Never submit sensitive information via a web page unless the web site uses secure connections. You can identify a secure connection by looking for a small “key” icon on the bottom of your browser (Internet Explorer 3.02 or better or Netscape 3.0 or better). If a web site uses a secure connection, it is safe to submit information. Secure web transactions are quite difficult to crack.
- Never reveal your IP address or other system networking information to people outside your company. Be careful of files e-mailed to you from strangers. One common way of getting BackOrifice on a system is to include it as a Trojan horse with other files.
- Change your passwords regularly. Also, use passwords that are not easy to figure out. The most difficult passwords to crack are those with upper and lower case letters, numbers and a symbol such as % or #.
- Upgrade your software regularly. Many older versions of software, especially web browsers, have well known security deficiencies. When you upgrade to the latest versions, you get the latest patches and fixes.
- If you use “chat rooms” or IRC sessions, be careful with any information you reveal to strangers.
- If your system starts exhibiting odd behavior, contact your ISP. Some hackers will set off hacks that cause your system to slowly become unstable or unusable.

- Always shred confidential information, particularly about your computer, before throwing it away. Some hackers dig through the trash of companies or individuals for information that might help them in an attack.

10.7 Packet Filtering Vs Firewall

Below are some comparisons between the Prestige's filtering and firewall functions.

10.7.1 Packet Filtering:

- The router filters packets as they pass through the router's interface according to the filter rules you designed.
- Packet filtering is a powerful tool, yet can be complex to configure and maintain, especially if you need a chain of rules to filter a service.
- Packet filtering only checks the header portion of an IP packet.

10.7.1.1 When To Use Filtering

- To block/allow LAN packets by their MAC addresses.
- To block/allow special IP packets which are neither TCP nor UDP, nor ICMP packets.
- To block/allow both inbound (WAN to LAN) and outbound (LAN to WAN) traffic between the specific inside host/network "A" and outside host/network "B". If the filter blocks the traffic from A to B, it also blocks the traffic from B to A. Filters can not distinguish traffic originating from an inside host or an outside host by IP address.
- To block/allow IP trace route.

10.7.2 Firewall

- The firewall inspects packet contents as well as their source and destination addresses. Firewalls of this type employ an inspection module, applicable to all protocols, that understands data in the packet is intended for other layers, from the network layer (IP headers) up to the application layer.
- The firewall performs stateful inspection. It takes into account the state of connections it handles so that, for example, a legitimate incoming packet can be matched with the outbound request for that packet and allowed in. Conversely, an incoming packet masquerading as a response to a nonexistent outbound request can be blocked.
- The firewall uses session filtering, i.e., smart rules, that enhance the filtering process and control the network session rather than control individual packets in a session.
- The firewall provides e-mail service to notify you of routine reports and when alerts occur.

10.7.2.1 When To Use The Firewall

- To prevent DoS attacks and prevent hackers cracking your network.

- A range of source and destination IP addresses as well as port numbers can be specified within one firewall rule making the firewall a better choice when complex rules are required.
- To selectively block/allow inbound or outbound traffic between inside host/networks and outside host/networks. Remember that filters can not distinguish traffic originating from an inside host or an outside host by IP address.
- The firewall performs better than filtering if you need to check many rules.
- Use the firewall if you need routine e-mail reports about your system or need to be alerted when attacks occur.
- The firewall can block specific URL traffic that might occur in the future. The URL can be saved in an Access Control List (ACL) database.

CHAPTER 11

Firewall Configuration

This chapter shows you how to enable and configure the Prestige firewall.

11.1 Access Methods

The web configurator is, by far, the most comprehensive firewall configuration tool your Prestige has to offer. For this reason, it is recommended that you configure your firewall using the web configurator. SMT screens allow you to activate the firewall. CLI commands provide limited configuration options and are only recommended for advanced users.

11.2 Firewall Policies Overview

Firewall rules are grouped based on the direction of travel of packets to which they apply:

- LAN to LAN/ Router
- LAN to WAN
- WAN to LAN
- WAN to WAN/ Router

Note: The LAN includes both the LAN port and the WLAN.

By default, the Prestige's stateful packet inspection allows packets traveling in the following directions:

- LAN to LAN/ Router

This allows computers on the LAN to manage the Prestige and communicate between networks or subnets connected to the LAN interface.

- LAN to WAN

By default, the Prestige's stateful packet inspection blocks packets traveling in the following directions:

- WAN to LAN
- WAN to WAN/ Router

This prevents computers on the WAN from using the Prestige as a gateway to communicate with other computers on the WAN and/or managing the Prestige.

You may define additional rules and sets or modify existing ones but please exercise extreme caution in doing so.

Note: If you configure firewall rules without a good understanding of how they work, you might inadvertently introduce security risks to the firewall and to the protected network. Make sure you test your rules after you configure them.

For example, you may create rules to:

- Block certain types of traffic, such as IRC (Internet Relay Chat), from the LAN to the Internet.
- Allow certain types of traffic, such as Lotus Notes database synchronization, from specific hosts on the Internet to specific hosts on the LAN.
- Allow everyone except your competitors to access a Web server.
- Restrict use of certain protocols, such as Telnet, to authorized users on the LAN.

These custom rules work by comparing the Source IP address, Destination IP address and IP protocol type of network traffic to rules set by the administrator. Your customized rules take precedence and override the Prestige's default rules.

11.3 Rule Logic Overview

Note: Study these points carefully before configuring rules.

11.3.1 Rule Checklist

State the intent of the rule. For example, "This restricts all IRC access from the LAN to the Internet." Or, "This allows a remote Lotus Notes server to synchronize over the Internet to an inside Notes server."

- 1 Is the intent of the rule to forward or block traffic?
- 2 What direction of traffic does the rule apply to?
- 3 What IP services will be affected?
- 4 What computers on the LAN are to be affected (if any)?
- 5 What computers on the Internet will be affected? The more specific, the better. For example, if traffic is being allowed from the Internet to the LAN, it is better to allow only certain machines on the Internet to access the LAN.

11.3.2 Security Ramifications

- 1 Once the logic of the rule has been defined, it is critical to consider the security ramifications created by the rule:
- 2 Does this rule stop LAN users from accessing critical resources on the Internet? For example, if IRC is blocked, are there users that require this service?
- 3 Is it possible to modify the rule to be more specific? For example, if IRC is blocked for all users, will a rule that blocks just certain users be more effective?

- 4 Does a rule that allows Internet users access to resources on the LAN create a security vulnerability? For example, if FTP ports (TCP 20, 21) are allowed from the Internet to the LAN, Internet users may be able to connect to computers with running FTP servers.
- 5 Does this rule conflict with any existing rules?
- 6 Once these questions have been answered, adding rules is simply a matter of plugging the information into the correct fields in the web configurator screens.

11.3.3 Key Fields For Configuring Rules

11.3.3.1 Action

Should the action be to **Block** or **Forward**? “Block” means the firewall silently discards the packet.

11.3.3.2 Service

Select the service from the **Service** scrolling list box. If the service is not listed, it is necessary to first define it. See [Section 11.10 on page 146](#) for more information on predefined services.

11.3.3.3 Source Address

What is the connection’s source address; is it on the LAN, WAN? Is it a single IP, a range of IPs or a subnet?

11.3.3.4 Destination Address

What is the connection’s destination address; is it on the LAN, WAN? Is it a single IP, a range of IPs or a subnet?

11.4 Connection Direction

This section describes examples for firewall rules for connections going from LAN to WAN and from WAN to LAN.

LAN to LAN/ Router, WAN to WAN/ Router rules apply to packets coming in on the associated interface (LAN, WAN respectively). LAN to LAN/ Router means policies for LAN-to-Prestige (the policies for managing the Prestige through the LAN interface) and policies for LAN-to-LAN (the policies that control routing between two subnets on the LAN). Similarly, WAN to WAN/ Router policies apply in the same way to the WAN ports.

11.4.1 LAN to WAN Rules

The default rule for LAN to WAN traffic is that all users on the LAN are allowed non-restricted access to the WAN. When you configure a LAN to WAN rule, you in essence want to limit some or all users from accessing certain services on the WAN. WAN to LAN Rules

The default rule for WAN to LAN traffic blocks all incoming connections (WAN to LAN). If you wish to allow certain WAN users to have access to your LAN, you will need to create custom rules to allow it.

11.4.2 Alerts

Alerts are reports on events, such as attacks, that you may want to know about right away. You can choose to generate an alert when an attack is detected in the **Edit Rule** screen (select the **Send Alert Message to Administrator When Matched** check box) or when a rule is matched in the **Edit Rule** screen. When an event generates an alert, a message can be immediately sent to an e-mail account that you specify in the **Log Settings** screen (see the chapter on logs).

11.5 Configuring Default Firewall Policy

Click **Firewall** and then **Default Policy** to display the following screen. Activate the firewall by selecting the **Firewall Enabled** check box as seen in the following screen.

Refer to [Section 10.1 on page 118](#) for more information.

Figure 51 Firewall: Default Policy

Packet Direction	Default Action	Log
LAN to LAN / Router	☐ Block ☒ Forward	☐
LAN to WAN	☐ Block ☒ Forward	☒
WAN to LAN	☒ Block ☐ Forward	☒
WAN to WAN / Router	☒ Block ☐ Forward	☒

The following table describes the labels in this screen.

Table 37 Firewall: Default Policy

LABEL	DESCRIPTION
Firewall Enabled	Select this check box to activate the firewall. The Prestige performs access control and protects against Denial of Service (DoS) attacks when the firewall is activated.
Allow Asymmetrical Route	Select this check box to have the Prestige firewall permit the use of triangle route topology on the network. See the appendix for more on triangle route topology.

Table 37 Firewall: Default Policy (continued)

LABEL	DESCRIPTION
Packet Direction	This is the direction of travel of packets (LAN to LAN/Router , LAN to WAN , WAN to WAN/Router , WAN to LAN). Firewall rules are grouped based on the direction of travel of packets to which they apply. For example, LAN to LAN/Router means packets traveling from a computer/subnet on the LAN to either another computer/subnet on the LAN interface of the Prestige or the Prestige itself.
Default Action	Use the radio buttons to select whether to Block (silently discard) or Forward (allow the passage of) packets that are traveling in the selected direction.
Log	Select the check box to create a log (when the above action is taken) for packets that are traveling in the selected direction and do not match any of the rules below.
Back	Click Back to return to the previous screen.
Apply	Click Apply to save your changes back to the Prestige.
Cancel	Click Cancel to begin configuring this screen afresh.

11.6 Rule Summary

Note: The ordering of your rules is very important as rules are applied in turn.

Refer to [Section 10.1 on page 118](#) for more information.

Click on **Firewall**, then **Rule Summary** to bring up the following screen. This screen is a summary of the existing rules. Note the order in which the rules are listed.

Figure 52 Firewall: Rule Summary

Firewall - Rule Summary

Firewall Rules Storage Space in Use (1%)

0%  100%

Packet Direction: LAN to LAN / Router

Default Policy: Forward, None Log

Rule	Active	Source IP	Destination IP	Service	Action	Schedule	Log	Alert
1	Y	Any	Any	HTTP(TCP:80)	Block	Yes	Enable	Yes

Create Rule: Insert new rule before rule number 1

Rules Reorder: Move rule number 0 to rule number 0

The following table describes the labels in this screen.

Table 38 Rule Summary

LABEL	DESCRIPTION
Firewall Rules Storage Space in Use	This read-only bar shows how much of the Prestige's memory for recording firewall rules it is currently using. When you are using 80% or less of the storage space, the bar is green. When the amount of space used is over 80%, the bar is red.
Packet Direction	Use the drop-down list box to select a direction of travel of packets for which you want to configure firewall rules.
Default Policy	This field displays the default action and log policy you selected in the Default Rule screen for the packet direction shown in the field above.
	The following read-only fields summarize the rules you have created that apply to traffic traveling in the selected packet direction. The firewall rules that you configure (summarized below) take priority over the general firewall action settings above.
Rule	This is your firewall rule number. The ordering of your rules is important as rules are applied in turn. Click a rule's number to go to the Firewall Edit Rule screen to configure or edit a firewall rule.
Active	This field displays whether a firewall is turned on (Y) or not (N).
Source IP	This drop-down list box displays the source addresses or ranges of addresses to which this firewall rule applies. Please note that a blank source or destination address is equivalent to Any .
Destination IP	This drop-down list box displays the destination addresses or ranges of addresses to which this firewall rule applies. Please note that a blank source or destination address is equivalent to Any .
Service	This drop-down list box displays the services to which this firewall rule applies. Please note that a blank service type is equivalent to Any . See Section 11.10 on page 146 for more information.

Table 38 Rule Summary (continued)

LABEL	DESCRIPTION
Action	This is the specified action for that rule, either Block or Forward . Note that Block means the firewall silently discards the packet.
Schedule	This field tells you whether a schedule is specified (Yes) or not (No).
Log	This field shows you whether a log is created when packets match this rule (Enabled) or not (Disable).
Alert	This field tells you whether this rule generates an alert (Yes) or not (No) when the rule is matched.
Insert/Append	Type the index number for where you want to put a rule. For example, if you type "6", your new rule becomes number 6 and the previous rule 6 (if there is one) becomes rule 7. Click Insert to add a new firewall rule before the specified index number. Click Append to add a new firewall rule after the specified index number.
Move	Type a rule's index number and the number for where you want to put that rule. Click Move to move the rule to the number that you typed. The ordering of your rules is important as they are applied in order of their numbering.
Back	Click Back to return to the previous screen.
Apply	Click Apply to save your changes back to the Prestige.
Cancel	Click Cancel to begin configuring this screen afresh.

11.6.1 Configuring Firewall Rules

Refer to [Section 10.1 on page 118](#) for more information.

Follow these directions to create a new rule.

- 1** In the **Rule Summary** screen, type the index number for where you want to put the rule. For example, if you type "6", your new rule becomes number 6 and the previous rule 6 (if there is one) becomes rule 7.
- 2** Click **Insert** to display this screen and refer to the following table for information on the labels.

Figure 53 Firewall: Edit Rule

Firewall - Edit Rule 1

☒ Active

Action for Matched Packets: ☐ Block ☒ Forward

Source Address:

Address Type: Source Address List:

Start IP Address: Add >>

End IP Address: Edit <<

Subnet Mask: Delete

Destination Address:

Address Type: Destination Address List:

Start IP Address: Add >>

End IP Address: Edit <<

Subnet Mask: Delete

Service:

Available Services: Selected Services:

AUTH(TCP:113)

BGP(TCP:179)

BOOTP_CLIENT(UDP:68)

BOOTP_SERVER(UDP:67)

Add >> Remove

[Edit Customized Services](#)

Schedule:

Day to Apply:

☒ Everyday

☒ Sun ☒ Mon ☒ Tue ☒ Wed ☒ Thu ☒ Fri ☒ Sat

Time of Day to Apply : (24-Hour Format)

☒ All day

Start hour minute End hour minute

Log:

☐ Log Packet Detail Information.

Alert:

☐ Send Alert Message to Administrator When Matched.

Back Apply Cancel Delete

The following table describes the labels in this screen.

Table 39 Firewall: Edit Rule

LABEL	DESCRIPTION
Active	Select this option to enable this firewall rule.
Action for Matched Packet	Use the radio button to select whether to discard (Block) or allow the passage of (Forward) packets that match this rule.
Source/Destination Address	
Address Type	Do you want your rule to apply to packets with a particular (single) IP, a range of IP addresses (e.g., 192.168.1.10 to 192.169.1.50), a subnet or any IP address? Select an option from the drop-down list box that includes: Single Address , Range Address , Subnet Address and Any Address .
Start IP Address	Enter the single IP address or the starting IP address in a range here.
End IP Address	Enter the ending IP address in a range here.
Subnet Mask	Enter the subnet mask here, if applicable.
Add	Click Add to add a new address to the Source or Destination Address box. You can add multiple addresses, ranges of addresses, and/or subnets.
Edit	To edit an existing source or destination address, select it from the box and click Edit .
Delete	Highlight an existing source or destination address from the Source or Destination Address box above and click Delete to remove it.
Services	
Available/ Selected Services	Please see Section 11.10 on page 146 for more information on services available. Highlight a service from the Available Services box on the left, then click Add>> to add it to the Selected Services box on the right. To remove a service, highlight it in the Selected Services box on the right, then click Remove .
Edit Customized Service	Click the Edit Customized Services link to bring up the screen that you use to configure a new custom service that is not in the predefined list of services.
Schedule	
Day to Apply	Select everyday or the day(s) of the week to apply the rule.
Time of Day to Apply (24-Hour Format)	Select All Day or enter the start and end times in the hour-minute format to apply the rule.
Log	
Log Packet Detail Information	This field determines if a log for packets that match the rule is created (Enable) or not (Disable). Go to the Log Settings page and select the Access Control logs category to have the Prestige record these logs.
Alert	
Send Alert Message to Administrator When Matched	Select the check box to have the Prestige generate an alert when the rule is matched.
Back	Click Back to return to the previous screen.
Apply	Click Apply to save your customized settings and exit this screen.
Cancel	Click Cancel to exit this screen without saving.
Delete	Click Delete to remove this firewall rule and return to the Firewall Rule Summary screen.

11.7 Customized Services

Configure customized services and port numbers not predefined by the Prestige. For a comprehensive list of port numbers and services, visit the IANA (Internet Assigned Number Authority) website. For further information on these services, please read [Section 11.10 on page 146](#). Click the **Customized Services** link while editing a firewall rule to configure a custom service port. This displays the following screen.

Refer to [Section 10.1 on page 118](#) for more information.

Figure 54 Firewall: Customized Services

No.	Name:	Protocol	Port
1			
2			
3			
4			
5			
6			
7			
8			
9			
10			

Back

The following table describes the labels in this screen.

Table 40 Customized Services

LABEL	DESCRIPTION
No.	This is the number of your customized port. Click a rule's number of a service to go to the Firewall Customized Services Config screen to configure or edit a customized service.
Name	This is the name of your customized service.
Protocol	This shows the IP protocol (TCP , UDP or TCP/UDP) that defines your customized service.
Port	This is the port number or range that defines your customized service.
Back	Click Back to return the Firewall Edit Rule screen.

11.8 Configuring A Customized Service

Click a rule number in the **Firewall Customized Services** screen to create a new custom port or edit an existing one. This action displays the following screen.

Refer to [Section 10.1 on page 118](#) for more information.

Figure 55 Firewall: Configure Customized Services

The following table describes the labels in this screen.

Table 41 Firewall: Configure Customized Services

LABEL	DESCRIPTION
Service Name	Type a unique name for your custom port.
Service Type	Choose the IP port (TCP , UDP or TCP/UDP) that defines your customized port from the drop down list box.
Port Configuration	
Type	Click Single to specify one port only or Range to specify a span of ports that define your customized service.
Port Number	Type a single port number or the range of port numbers that define your customized service.
Back	Click Back to return to the Firewall Customized Services screen.
Apply	Click Apply to save your customized settings and exit this screen.
Cancel	Click Cancel to return to the previously saved settings.
Delete	Click Delete to delete the current rule.

11.9 Example Firewall Rule

The following Internet firewall rule example allows a hypothetical “My Service” connection from the Internet.

- 1 Click **Firewall** in the navigation panel and click **Rule Summary**.
- 2 Select **WAN to LAN** in the **Packet Direction** field.

Figure 56 Firewall Example: Rule Summary

The screenshot shows the 'Firewall - Rule Summary' window. At the top, it displays 'Firewall Rules Storage Space in Use (1%)' with a progress bar from 0% to 100%. Below this, the 'Packet Direction' is set to 'WAN to LAN' in a dropdown menu, and the 'Default Policy' is 'Block, Log'. There are two main action sections: 'Create Rule: Insert new rule before rule number' with a dropdown and 'Insert'/'Append' buttons, and 'Rules Reorder: Move rule number' with two input fields (both containing '0') and a 'Move' button. At the bottom are 'Back', 'Apply', and 'Cancel' buttons.

- 3** In the **Rule Summary** screen, type the index number for where you want to put the rule.
For example, if you type “6”, your new rule becomes number 6 and the previous rule 6 (if there is one) becomes rule 7.
- 4** Click **Insert** to display the firewall rule configuration screen.
- 5** Select **Any** in the **Destination Address** box and then click **Delete**.
- 6** Configure the destination address screen as follows and click **Add**.

Figure 57 Firewall Example: Edit Rule: Destination Address

Firewall - Edit Rule 1

☒ Active
 Action for Matched Packets: ☐ Block ☒ Forward

Source Address:

Address Type: Any Address
 Start IP Address: 0.0.0.0
 End IP Address: 0.0.0.0
 Subnet Mask: 0.0.0.0

Source Address List: Any

Destination Address:

Address Type: Range Address
 Start IP Address: 10.0.0.10
 End IP Address: 10.0.0.15
 Subnet Mask: 0.0.0.0

Destination Address List:

Service:

Available Services: AIM/NEW-ICQ(TCP:5190)
 AUTH(TCP:113)

Selected Services: Any(UDP)
 Any(TCP)

- 7 In the **Edit Rule** screen, click the **Customized Services** link to open the **Customized Service** screen.
- 8 Click an index number to display the **Customized Services -Config** screen and configure the screen as follows and click **Apply**.

Figure 58 Edit Custom Port Example

Firewall - Customized Services - Config

Service Name: MyService
 Service Type: TCP/UDP

Port Configuration

Type: ☒ Single ☐ Range
 Port Number: 123 - 0

Back Apply Cancel Delete

- 9 In the **Edit Rule** screen, use the **Add>>** and **Remove** buttons between **Available Services** and **Selected Services** list boxes to configure it as follows. Click **Apply** when you are done.

Figure 59 Firewall Example: Edit Rule: Select Customized Services

Firewall - Edit Rule 1

☒ Active
 Action for Matched Packets: ☐ Block ☒ Forward

Source Address:

Address Type: Any Address
 Start IP Address: 0.0.0.0 Add >>
 End IP Address: 0.0.0.0 Edit <<
 Subnet Mask: 0.0.0.0 Delete

Source Address List: Any

Destination Address:

Address Type: Range Address
 Start IP Address: 10.0.0.10 Add >>
 End IP Address: 10.0.0.15 Edit <<
 Subnet Mask: 0.0.0.0 Delete

Destination Address List: 10.0.0.10 - 10.0.0.15

Service:

Available Services:
 AIM/NEW-ICQ(TCP:5190)
 AUTH(TCP:113)
 BGP(TCP:179)
 BOOTP_CLIENT(UDP:68)
 BOOTP_SERVER(UDP:67)

Add >> Remove

Selected Services: *MyService(TCP/UDP:123)

[Edit Customized Services](#)

Schedule:

Day to Apply:
☒ Everyday
☒ Sun ☒ Mon ☒ Tue ☒ Wed ☒ Thu ☒ Fri ☒ Sat

Time of Day to Apply : (24-Hour Format)
☒ All day
 Start 0 hour 0 minute End 0 hour 0 minute

Log:
☐ Log Packet Detail Information.

Alert:
☐ Send Alert Message to Administrator When Matched.

Back Apply Cancel Delete

Note: Custom ports show up with an “*” before their names in the Services list box and the **Rule Summary** list box. Click **Apply** after you’ve created your custom port.

On completing the configuration procedure for this Internet firewall rule, the **Rule Summary** screen should look like the following.

Rule 2 allows a “My Service” connection from the WAN to IP addresses 10.0.0.10 through 10.0.0.15 on the LAN.

Figure 60 Firewall Example: Rule Summary: My Service

Firewall - Rule Summary

Firewall Rules Storage Space in Use (2%)

0%  100%

Packet Direction: WAN to LAN

Default Policy: Block, Log

Rule	Active	Source IP	Destination IP	Service	Action	Schedule	Log	Alert
1	Y	Any	Any	Any(UDP)	Forward	No	Disable	No
2	Y	Any	10.0.0.10 - 10.0.0.15	*MyService(TCP/UDP:123)	Forward	No	Disable	No

Create Rule: Insert new rule before rule number 1 Insert Append

Rules Reorder: Move rule number 0 to rule number 0 Move

Back Apply Cancel

11.10 Predefined Services

The **Available Services** list box in the **Edit Rule** screen (see [Section 11.6.1 on page 138](#)) displays all predefined services that the Prestige already supports. Next to the name of the service, two fields appear in brackets. The first field indicates the IP protocol type (TCP, UDP, or ICMP). The second field indicates the IP port number that defines the service. (Note that there may be more than one IP protocol type. For example, look at the default configuration labeled “(DNS)”. **(UDP/TCP:53)** means UDP port 53 and TCP port 53. Up to 128 entries are supported. Custom service ports may also be configured using the **Edit Customized Services** function discussed previously.

Table 42 Predefined Services

SERVICE	DESCRIPTION
AIM/NEW_ICQ(TCP:5190)	AOL's Internet Messenger service, used as a listening port by ICQ.
AUTH(TCP:113)	Authentication protocol used by some servers.
BGP(TCP:179)	Border Gateway Protocol.
BOOTP_CLIENT(UDP:68)	DHCP Client.
BOOTP_SERVER(UDP:67)	DHCP Server.

Table 42 Predefined Services (continued)

SERVICE	DESCRIPTION
CU-SEEME(TCP/UDP:7648, 24032)	A popular videoconferencing solution from White Pines Software.
DNS(UDP/TCP:53)	Domain Name Server, a service that matches web names (e.g. www.zyxel.com) to IP numbers.
FINGER(TCP:79)	Finger is a UNIX or Internet related command that can be used to find out if a user is logged on.
FTP(TCP:20,21)	File Transfer Program, a program to enable fast transfer of files, including large files that may not be possible by e-mail.
H.323(TCP:1720)	Net Meeting uses this protocol.
HTTP(TCP:80)	Hyper Text Transfer Protocol - a client/server protocol for the world wide web.
HTTPS	HTTPS is a secured http session often used in e-commerce.
ICQ(UDP:4000)	This is a popular Internet chat program.
IPSEC_TRANSPORT/ TUNNEL(AH:0)	The IPSEC AH (Authentication Header) tunneling protocol uses this service.
IPSEC_TUNNEL(ESP:0)	The IPSEC ESP (Encapsulation Security Protocol) tunneling protocol uses this service.
IRC(TCP/UDP:6667)	This is another popular Internet chat program.
MSN Messenger(TCP:1863)	Microsoft Networks' messenger service uses this protocol.
MULTICAST(IGMP:0)	Internet Group Multicast Protocol is used when sending packets to a specific group of hosts.
NEWS(TCP:144)	A protocol for news groups.
NFS(UDP:2049)	Network File System - NFS is a client/server distributed file service that provides transparent file-sharing for network environments.
NNTP(TCP:119)	Network News Transport Protocol is the delivery mechanism for the USENET newsgroup service.
PING(ICMP:0)	Packet Internet Groper is a protocol that sends out ICMP echo requests to test whether or not a remote host is reachable.
POP3(TCP:110)	Post Office Protocol version 3 lets a client computer get e-mail from a POP3 server through a temporary connection (TCP/IP or other).
PPTP(TCP:1723)	Point-to-Point Tunneling Protocol enables secure transfer of data over public networks. This is the control channel.
PPTP_TUNNEL(GRE:0)	Point-to-Point Tunneling Protocol enables secure transfer of data over public networks. This is the data channel.
RCMD(TCP:512)	Remote Command Service.
REAL_AUDIO(TCP:7070)	A streaming audio service that enables real time sound over the web.
REXEC(TCP:514)	Remote Execution Daemon.
RLOGIN(TCP:513)	Remote Login.
RTELNET(TCP:107)	Remote Telnet.
RTSP(TCP/UDP:554)	The Real Time Streaming (media control) Protocol (RTSP) is a remote control for multimedia on the Internet.
SFTP(TCP:115)	Simple File Transfer Protocol.

Table 42 Predefined Services (continued)

SERVICE	DESCRIPTION
SMTP(TCP:25)	Simple Mail Transfer Protocol is the message-exchange standard for the Internet. SMTP enables you to move messages from one e-mail server to another.
SNMP(TCP/UDP:161)	Simple Network Management Program.
SNMP-TRAPS (TCP/UDP:162)	Traps for use with the SNMP (RFC:1215).
SQL-NET(TCP:1521)	Structured Query Language is an interface to access data on many different types of database systems, including mainframes, midrange systems, UNIX systems and network servers.
SSDP(UDP:1900)	Simole Service Discovery Protocol (SSDP) is a discovery service searching for Universal Plug and Play devices on your home network or upstream Internet gateways using DUDP port 1900.
SSH(TCP/UDP:22)	Secure Shell Remote Login Program.
STRMWORKS(UDP:1558)	Stream Works Protocol.
SYSLOG(UDP:514)	Syslog allows you to send system logs to a UNIX server.
TACACS(UDP:49)	Login Host Protocol used for (Terminal Access Controller Access Control System).
TELNET(TCP:23)	Telnet is the login and terminal emulation protocol common on the Internet and in UNIX environments. It operates over TCP/IP networks. Its primary function is to allow users to log into remote host systems.
TFTP(UDP:69)	Trivial File Transfer Protocol is an Internet file transfer protocol similar to FTP, but uses the UDP (User Datagram Protocol) rather than TCP (Transmission Control Protocol).
VDOLIVE(TCP:7000)	Another videoconferencing solution.

11.11 Anti-Probing

If an outside user attempts to probe an unsupported port on your Prestige, an ICMP response packet is automatically returned. This allows the outside user to know the Prestige exists. The Prestige supports anti-probing, which prevents the ICMP response packet from being sent. This keeps outsiders from discovering your Prestige when unsupported ports are probed.

Internet Control Message Protocol (ICMP) is a message control and error-reporting protocol between a host server and a gateway to the Internet. ICMP uses Internet Protocol (IP) datagrams, but the messages are processed by the TCP/IP software and directly apparent to the application user.

Refer to [Section 10.1 on page 118](#) for more information.

Click **Firewall** in the navigation panel and click **Anti Probing** to display the screen as shown.

Figure 61 Firewall: Anti Probing

The following table describes the labels in this screen.

Table 43 Firewall: Anti Probing

LABEL	DESCRIPTION
Respond to PING on	The Prestige does not respond to any incoming Ping requests when Disable is selected. Select LAN to reply to incoming LAN Ping requests. Select WAN to reply to incoming WAN Ping requests. Otherwise select LAN & WAN to reply to both incoming LAN and WAN Ping requests.
Do not respond to requests for unauthorized services.	Select this option to prevent hackers from finding the Prestige by probing for unused ports. If you select this option, the Prestige will not respond to port request(s) for unused ports, thus leaving the unused ports and the Prestige unseen. By default this option is not selected and the Prestige will reply with an ICMP Port Unreachable packet for a port probe on its unused UDP ports, and a TCP Reset packet for a port probe on its unused TCP ports. Note that the probing packets must first traverse the Prestige's firewall mechanism before reaching this anti-probing mechanism. Therefore if the firewall mechanism blocks a probing packet, the Prestige reacts based on the firewall policy, which by default, is to send a TCP reset packet for a blocked TCP packet. You can use the command "sys firewall tcprst rst [on off]" to change this policy. When the firewall mechanism blocks a UDP packet, it drops the packet without sending a response packet.
Back	Click Back to return to the previous screen.
Apply	Click Apply to save your changes back to the Prestige.
Reset	Click Reset to begin configuring this screen afresh.

11.12 DoS Thresholds

For DoS attacks, the Prestige uses thresholds to determine when to drop sessions that do not become fully established. These thresholds apply globally to all sessions.

You can use the default threshold values, or you can change them to values more suitable to your security requirements.

Refer to [Section 11.12.3 on page 151](#) to configure thresholds.

11.12.1 Threshold Values

Tune these parameters when something is not working and after you have checked the firewall counters. These default values should work fine for most small offices. Factors influencing choices for threshold values are:

- The maximum number of opened sessions.
- The minimum capacity of server backlog in your LAN network.
- The CPU power of servers in your LAN network.
- Network bandwidth.
- Type of traffic for certain servers.

If your network is slower than average for any of these factors (especially if you have servers that are slow or handle many tasks and are often busy), then the default values should be reduced.

You should make any changes to the threshold values before you continue configuring firewall rules.

11.12.2 Half-Open Sessions

An unusually high number of half-open sessions (either an absolute number or measured as the arrival rate) could indicate that a Denial of Service attack is occurring. For TCP, "half-open" means that the session has not reached the established state-the TCP three-way handshake has not yet been completed (see [Figure 47 on page 122](#)). For UDP, "half-open" means that the firewall has detected no return traffic.

The Prestige measures both the total number of existing half-open sessions and the rate of session establishment attempts. Both TCP and UDP half-open sessions are counted in the total number and rate measurements. Measurements are made once a minute.

When the number of existing half-open sessions rises above a threshold (**max-incomplete high**), the Prestige starts deleting half-open sessions as required to accommodate new connection requests. The Prestige continues to delete half-open requests as necessary, until the number of existing half-open sessions drops below another threshold (**max-incomplete low**).

When the rate of new connection attempts rises above a threshold (**one-minute high**), the Prestige starts deleting half-open sessions as required to accommodate new connection requests. The Prestige continues to delete half-open sessions as necessary, until the rate of new connection attempts drops below another threshold (**one-minute low**). The rate is the number of new attempts detected in the last one-minute sample period.

11.12.2.1 TCP Maximum Incomplete and Blocking Time

An unusually high number of half-open sessions with the same destination host address could indicate that a Denial of Service attack is being launched against the host.

Whenever the number of half-open sessions with the same destination host address rises above a threshold (**TCP Maximum Incomplete**), the Prestige starts deleting half-open sessions according to one of the following methods:

- If the **Blocking Time** timeout is 0 (the default), then the Prestige deletes the oldest existing half-open session for the host for every new connection request to the host. This ensures that the number of half-open sessions to a given host will never exceed the threshold.
- If the **Blocking Time** timeout is greater than 0, then the Prestige blocks all new connection requests to the host giving the server time to handle the present connections. The Prestige continues to block all new connection requests until the **Blocking Time** expires.

11.12.3 Configuring Firewall Thresholds

The Prestige also sends alerts whenever **TCP Maximum Incomplete** is exceeded. The global values specified for the threshold and timeout apply to all TCP connections.

Click **Firewall**, and **Threshold** to bring up the next screen.

Figure 62 Firewall: Threshold

Firewall - Threshold

Denial of Service Thresholds

One Minute Low	80	(Sessions per Minute)
One Minute High	100	(Sessions per Minute)
Maximum Incomplete Low	80	(Sessions)
Maximum Incomplete High	100	(Sessions)
TCP Maximum Incomplete	10	(Sessions)

Action taken when TCP Maximum Incomplete reached threshold

☒ Delete the Oldest Half Open Session when New Connection Request Comes.

☐ Deny New Connection Request for Minutes(1~255)

The following table describes the labels in this screen.

Table 44 Firewall: Threshold

LABEL	DESCRIPTION	DEFAULT VALUES
Denial of Service Thresholds		
One Minute Low	This is the rate of new half-open sessions that causes the firewall to stop deleting half-open sessions. The Prestige continues to delete half-open sessions as necessary, until the rate of new connection attempts drops below this number.	80 existing half-open sessions.
One Minute High	This is the rate of new half-open sessions that causes the firewall to start deleting half-open sessions. When the rate of new connection attempts rises above this number, the Prestige deletes half-open sessions as required to accommodate new connection attempts.	100 half-open sessions per minute. The above numbers cause the Prestige to start deleting half-open sessions when more than 100 session establishment attempts have been detected in the last minute, and to stop deleting half-open sessions when fewer than 80 session establishment attempts have been detected in the last minute.
Maximum Incomplete Low	This is the number of existing half-open sessions that causes the firewall to stop deleting half-open sessions. The Prestige continues to delete half-open requests as necessary, until the number of existing half-open sessions drops below this number.	80 existing half-open sessions.
Maximum Incomplete High	This is the number of existing half-open sessions that causes the firewall to start deleting half-open sessions. When the number of existing half-open sessions rises above this number, the Prestige deletes half-open sessions as required to accommodate new connection requests. Do not set Maximum Incomplete High to lower than the current Maximum Incomplete Low number.	100 existing half-open sessions. The above values causes the Prestige to start deleting half-open sessions when the number of existing half-open sessions rises above 100, and to stop deleting half-open sessions with the number of existing half-open sessions drops below 80.
TCP Maximum Incomplete	This is the number of existing half-open TCP sessions with the same destination host IP address that causes the firewall to start dropping half-open sessions to that same destination host IP address. Enter a number between 1 and 256. As a general rule, you should choose a smaller number for a smaller network, a slower system or limited bandwidth.	30 existing half-open TCP sessions.
Action taken when the TCP Maximum Incomplete threshold is reached.		
Delete the oldest half open session when new connection request comes	Select this radio button to clear the oldest half open session when a new connection request comes.	

Table 44 Firewall: Threshold (continued)

LABEL	DESCRIPTION	DEFAULT VALUES
Deny new connection request for	Select this radio button and specify for how long the Prestige should block new connection requests when TCP Maximum Incomplete is reached. Enter the length of blocking time in minutes (between 1 and 256).	
Back	Click Back to return to the previous screen.	
Apply	Click Apply to save your changes back to the Prestige.	
Cancel	Click Cancel to begin configuring this screen afresh.	

CHAPTER 12

Content Filtering

This chapter covers how to configure content filtering.

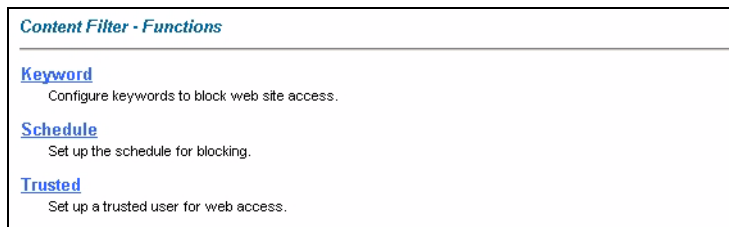
12.1 Content Filtering Overview

Internet content filtering allows you to create and enforce Internet access policies tailored to your needs. Content filtering gives you the ability to block web sites that contain key words (that you specify) in the URL. You can set a schedule for when the Prestige performs content filtering. You can also specify trusted IP addresses on the LAN for which the Prestige will not perform content filtering.

12.2 The Main Content Filter Screen

Click **Content Filter** to display the main Content Filtering screen.

Figure 63 Content Filtering



The following table describes the links in this screen.

Table 45

LINK	DESCRIPTION
Keyword	Click this link to display a screen where you can configure your Prestige to block Web sites containing keywords in their URLs,
Schedule	Click this link to display a screen where you can set the days and times for the Prestige to perform content filtering,
Trusted	Click this link to display a screen where you can exclude a range of users on the LAN from content filtering on your Prestige

12.3 Configuring Keyword Blocking

Use this screen to block sites containing certain keywords in the URL. For example, if you enable the keyword "bad", the Prestige blocks all sites containing this keyword including the URL <http://www.website.com/bad.html>, even if it is not included in the Filter List.

To have your Prestige block Web sites containing keywords in their URLs, click **Content Filter** and **Keyword**. The screen appears as shown.

Figure 64 Content Filter: Keyword

The following table describes the labels in this screen.

Table 46 Content Filter: Keyword

LABEL	DESCRIPTION
Enable Keyword Blocking	Select this check box to enable this feature.
Block Websites that contain these keywords in the URL:	This box contains the list of all the keywords that you have configured the Prestige to block.
Delete	Highlight a keyword in the box and click Delete to remove it.
Clear All	Click Clear All to remove all of the keywords from the list.
Keyword	Type a keyword in this field. You may use any character (up to 127 characters). Wildcards are not allowed.
Add Keyword	Click Add Keyword after you have typed a keyword. Repeat this procedure to add other keywords. Up to 64 keywords are allowed. When you try to access a web page containing a keyword, you will get a message telling you that the content filter is blocking this request.
Back	Click Back to return to the previous screen.
Apply	Click Apply to save your changes back to the Prestige.
Cancel	Click Cancel to return to the previously saved settings.

12.4 Configuring the Schedule

To set the days and times for the Prestige to perform content filtering, click **Content Filter** and **Schedule**. The screen appears as shown.

Figure 65 Content Filter: Schedule

The following table describes the labels in this screen.

Table 47 Content Filter: Schedule

LABEL	DESCRIPTION
Days to Block:	Select a check box to configure which days of the week (or everyday) you want the content filtering to be active.
Time of Day to Block:	Use the 24 hour format to configure which time of the day (or select the All day check box) you want the content filtering to be active.
Back	Click Back to return to the previous screen.
Apply	Click Apply to save your changes.
Cancel	Click Cancel to return to the previously saved settings.

12.5 Configuring Trusted Computers

To exclude a range of users on the LAN from content filtering on your Prestige, click **Content Filter** and **Trusted**. The screen appears as shown.

Figure 66 Content Filter: Trusted

Content Filter - Trusted

Trusted User IP Range

From : (IP address)

To : (IP address)

The following table describes the labels in this screen.

Table 48 Content Filter: Trusted

LABEL	DESCRIPTION
Trusted User IP Range	
From	Type the IP address of a computer (or the beginning IP address of a specific range of computers) on the LAN that you want to exclude from content filtering.
To	Type the ending IP address of a specific range of users on your LAN that you want to exclude from content filtering. Leave this field blank if you want to exclude an individual computer.
Back	Click Back to return to the previous screen.
Apply	Click Apply to save your changes back to the Prestige.
Cancel	Click Cancel to return to the previously saved settings.

CHAPTER 13

Remote Management Configuration

This chapter provides information on configuring remote management.

13.1 Remote Management Overview

Remote management allows you to determine which services/protocols can access which Prestige interface (if any) from which computers.

When you configure remote management to allow management from the WAN, you still need to configure a firewall rule to allow access.

You may manage your Prestige from a remote location via:

- Internet (WAN only)
- ALL (LAN and WAN)
- LAN only,
- Neither (Disable).

When you Choose **WAN only** or **ALL** (LAN & WAN), you still need to configure a firewall rule to allow access.

To disable remote management of a service, select **Disable** in the corresponding **Server Access** field.

You may only have one remote management session running at a time. The Prestige automatically disconnects a remote management session of lower priority when another remote management session of higher priority starts. The priorities for the different types of remote management sessions are as follows.

- 1 Telnet
- 2 HTTP

13.1.1 Remote Management Limitations

Remote management over LAN or WAN will not work when:

- A filter in SMT menu 3.1 (LAN) or in menu 11.5 (WAN) is applied to block a Telnet, FTP or Web service.
- You have disabled that service in one of the remote management screens.
- The IP address in the **Secured Client IP** field does not match the client IP address. If it does not match, the Prestige will disconnect the session immediately.
- There is already another remote management session with an equal or higher priority running. You may only have one remote management session running at one time.
- There is a firewall rule that blocks it.

13.1.2 Remote Management and NAT

When NAT is enabled:

- Use the Prestige's WAN IP address when configuring from the WAN.
- Use the Prestige's LAN IP address when configuring from the LAN.

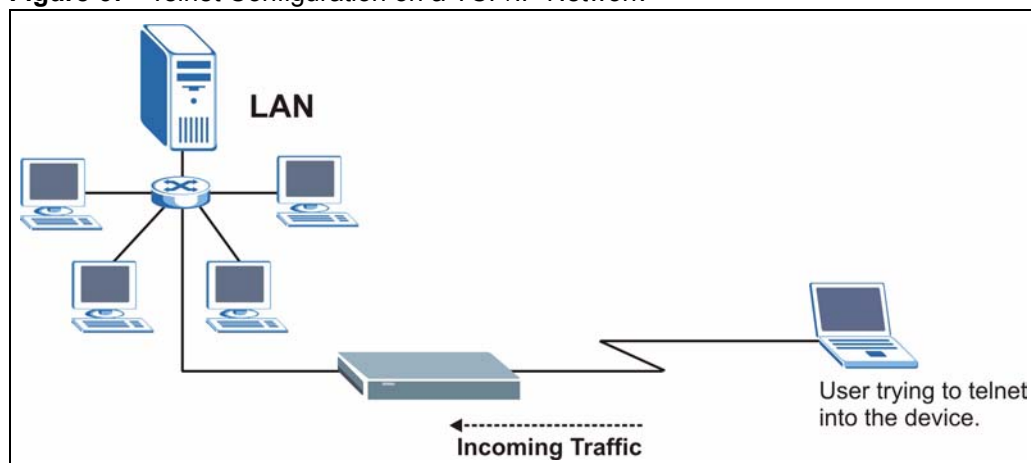
13.1.3 System Timeout

There is a default system management idle timeout of five minutes (three hundred seconds). The Prestige automatically logs you out if the management session remains idle for longer than this timeout period. The management session does not time out when a statistics screen is polling.

13.2 Telnet

You can configure your Prestige for remote Telnet access as shown next.

Figure 67 Telnet Configuration on a TCP/IP Network



13.3 FTP

You can upload and download Prestige firmware and configuration files using FTP. To use this feature, your computer must have an FTP client.

13.4 Web

You can use the Prestige's embedded web configurator for configuration and file management. See the online help for details.

13.5 Configuring Remote Management

Click **Remote Management** to open the following screen. See [Section 13.1 on page 158](#) for more information.

Figure 68 Remote Management

Server Type	Access Status	Port	Secured Client IP
Telnet	All	23	0.0.0.0
FTP	All	21	0.0.0.0
Web	All	80	0.0.0.0

Apply Cancel

The following table describes the fields in this screen.

Table 49 Remote Management

LABEL	DESCRIPTION
Server Type	Each of these labels denotes a service that you may use to remotely manage the Prestige.
Access Status	Select the access interface. Choices are All , LAN Only , WAN Only and Disable .
Port	This field shows the port number for the remote management service. You may change the port number for a service in this field, but you must use the same port number to use that service for remote management.
Secured Client IP	The default 0.0.0.0 allows any client to use this service to remotely manage the Prestige. Type an IP address to restrict access to a client with a matching IP address.
Apply	Click Apply to save your settings back to the Prestige.
Cancel	Click Cancel to begin configuring this screen afresh.

CHAPTER 14

Universal Plug-and-Play (UPnP)

This chapter introduces the UPnP feature in the web configurator.

14.1 Introducing Universal Plug and Play

Universal Plug and Play (UPnP) is a distributed, open networking standard that uses TCP/IP for simple peer-to-peer network connectivity between devices. A UPnP device can dynamically join a network, obtain an IP address, convey its capabilities and learn about other devices on the network. In turn, a device can leave a network smoothly and automatically when it is no longer in use.

See [Section 14.2.1 on page 163](#) for configuration instructions.

14.1.1 How do I know if I'm using UPnP?

UPnP hardware is identified as an icon in the Network Connections folder (Windows XP). Each UPnP compatible device installed on your network will appear as a separate icon. Selecting the icon of a UPnP device will allow you to access the information and properties of that device.

14.1.2 NAT Traversal

UPnP NAT traversal automates the process of allowing an application to operate through NAT. UPnP network devices can automatically configure network addressing, announce their presence in the network to other UPnP devices and enable exchange of simple product and service descriptions. NAT traversal allows the following:

- Dynamic port mapping
- Learning public IP addresses
- Assigning lease times to mappings

Windows Messenger is an example of an application that supports NAT traversal and UPnP.

See the NAT chapter for more information on NAT.

14.1.3 Cautions with UPnP

The automated nature of NAT traversal applications in establishing their own services and opening firewall ports may present network security issues. Network information and configuration may also be obtained and modified by users in some network environments.

All UPnP-enabled devices may communicate freely with each other without additional configuration. Disable UPnP if this is not your intention.

14.2 UPnP and ZyXEL

ZyXEL has achieved UPnP certification from the Universal Plug and Play Forum Creates UPnP™ Implementers Corp. (UIC). ZyXEL's UPnP implementation supports IGD 1.0 (Internet Gateway Device). At the time of writing ZyXEL's UPnP implementation supports Windows Messenger 4.6 and 4.7 while Windows Messenger 5.0 and Xbox are still being tested.

UPnP broadcasts are only allowed on the LAN.

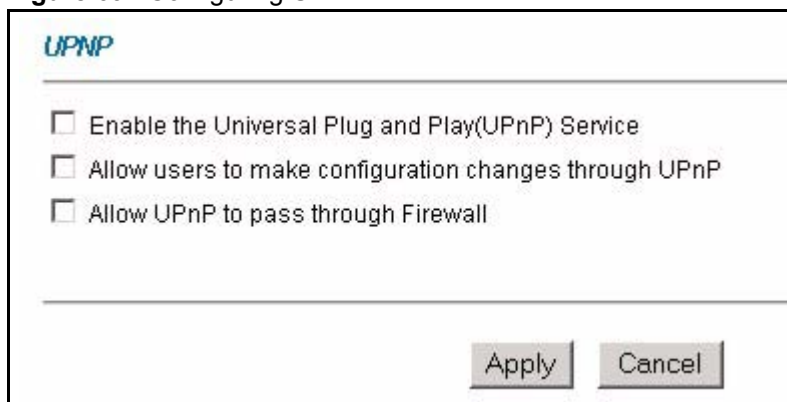
See later sections for examples of installing UPnP in Windows XP and Windows Me as well as an example of using UPnP in Windows.

14.2.1 Configuring UPnP

From the **Site Map** in the main menu, click **UPnP** under **Advanced Setup** to display the screen shown next.

See [Section 14.1 on page 162](#) for more information.

Figure 69 Configuring UPnP



The following table describes the fields in this screen.

Table 50 Configuring UPnP

LABEL	DESCRIPTION
Enable the Universal Plug and Play (UPnP) Service	Select this check box to activate UPnP. Be aware that anyone could use a UPnP application to open the web configurator's login screen without entering the Prestige's IP address (although you must still enter the password to access the web configurator).
Allow users to make configuration changes through UPnP	Select this check box to allow UPnP-enabled applications to automatically configure the Prestige so that they can communicate through the Prestige, for example by using NAT traversal, UPnP applications automatically reserve a NAT forwarding port in order to communicate with another UPnP enabled device; this eliminates the need to manually configure port forwarding for the UPnP enabled application.
Allow UPnP to pass through Firewall	Select this check box to allow traffic from UPnP-enabled applications to bypass the firewall. Clear this check box to have the firewall block all UPnP application packets (for example, MSN packets).
Apply	Click Apply to save the setting to the Prestige.
Cancel	Click Cancel to return to the previously saved settings.

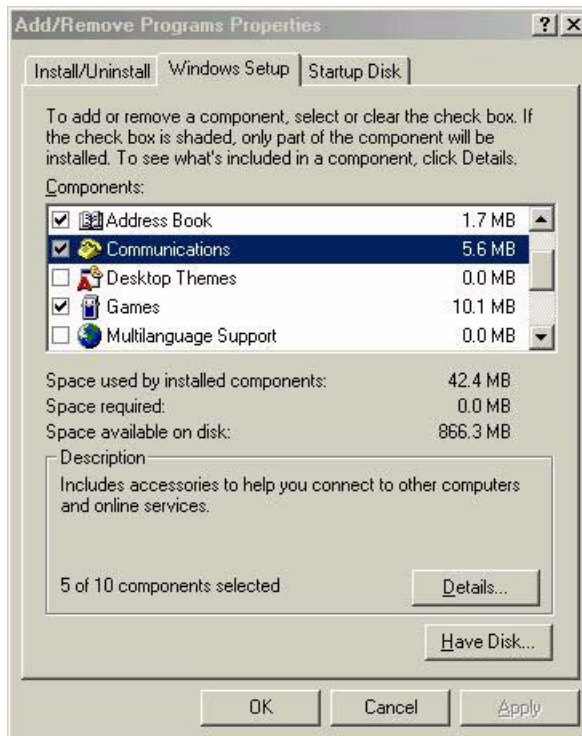
14.3 Installing UPnP in Windows Example

This section shows how to install UPnP in Windows Me and Windows XP.

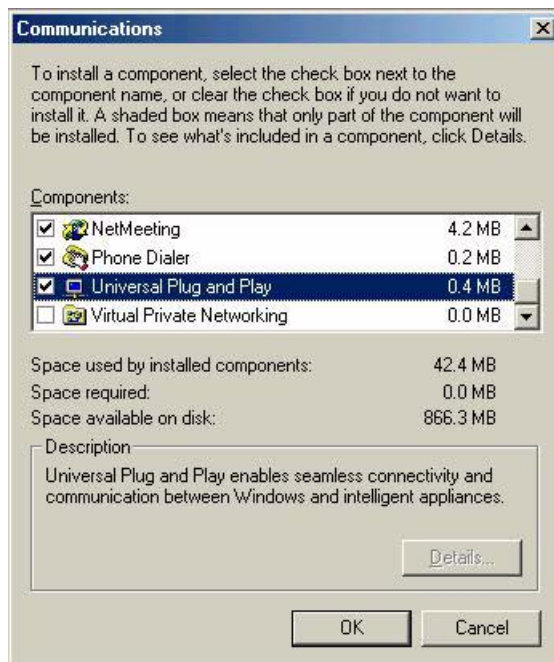
Installing UPnP in Windows Me

Follow the steps below to install the UPnP in Windows Me.

- 1** Click **Start** and **Control Panel**. Double-click **Add/Remove Programs**.
- 2** Click on the **Windows Setup** tab and select **Communication** in the **Components** selection box. Click **Details**.

Figure 70 Add/Remove Programs: Windows Setup: Communication

- 3** In the **Communications** window, select the **Universal Plug and Play** check box in the **Components** selection box.

Figure 71 Add/Remove Programs: Windows Setup: Communication: Components

- 4** Click **OK** to go back to the **Add/Remove Programs Properties** window and click **Next**.
- 5** Restart the computer when prompted.

Installing UPnP in Windows XP

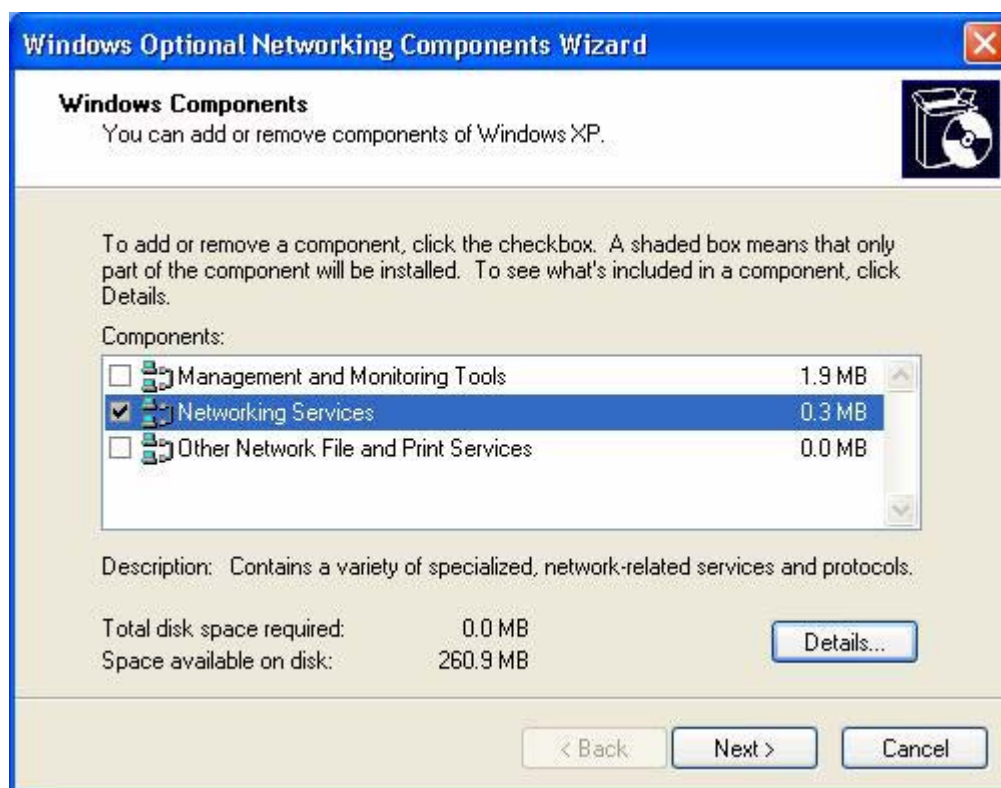
Follow the steps below to install the UPnP in Windows XP.

- 1** Click **Start** and **Control Panel**.
- 2** Double-click **Network Connections**.
- 3** In the **Network Connections** window, click **Advanced** in the main menu and select **Optional Networking Components**

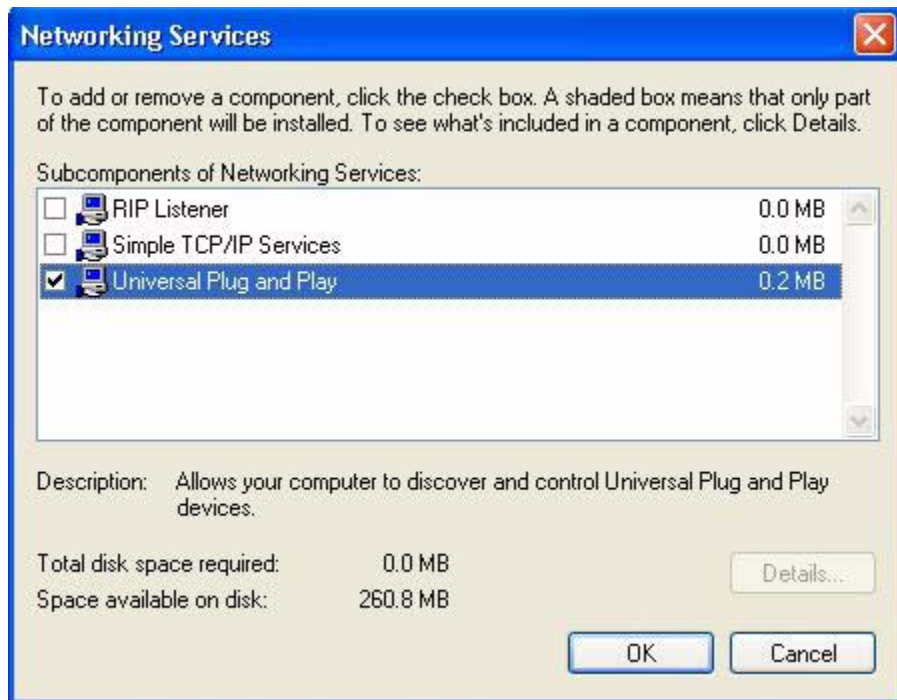
Figure 72 Network Connections



- 4** The **Windows Optional Networking Components Wizard** window displays. Select **Networking Service** in the **Components** selection box and click **Details**.

Figure 73 Windows Optional Networking Components Wizard

5 In the **Networking Services** window, select the **Universal Plug and Play** check box.

Figure 74 Networking Services

- 6** Click **OK** to go back to the **Windows Optional Networking Component Wizard** window and click **Next**.

14.4 Using UPnP in Windows XP Example

This section shows you how to use the UPnP feature in Windows XP. You must already have UPnP installed in Windows XP and UPnP activated on the Prestige.

Make sure the computer is connected to a LAN port of the Prestige. Turn on your computer and the Prestige.

Auto-discover Your UPnP-enabled Network Device

- 1** Click **Start** and **Control Panel**. Double-click **Network Connections**. An icon displays under Internet Gateway.
- 2** Right-click the icon and select **Properties**.

Figure 75 Network Connections

- 3** In the **Internet Connection Properties** window, click **Settings** to see the port mappings there were automatically created.

Figure 76 Internet Connection Properties

- 4** You may edit or delete the port mappings or click **Add** to manually add port mappings.