DRAFT

User's Guide

GPT-2541GNAC

Indoor GPON HGU

Default Login Details

http://192.168.1.1

User Name: admin

Password: 1234

Firmware Version 1.00

Edition 1, 9/2015

IMPORTANT!

READ CAREFULLY BEFORE USE.

KEEP THIS GUIDE FOR FUTURE REFERENCE.

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

Contents

Introduction

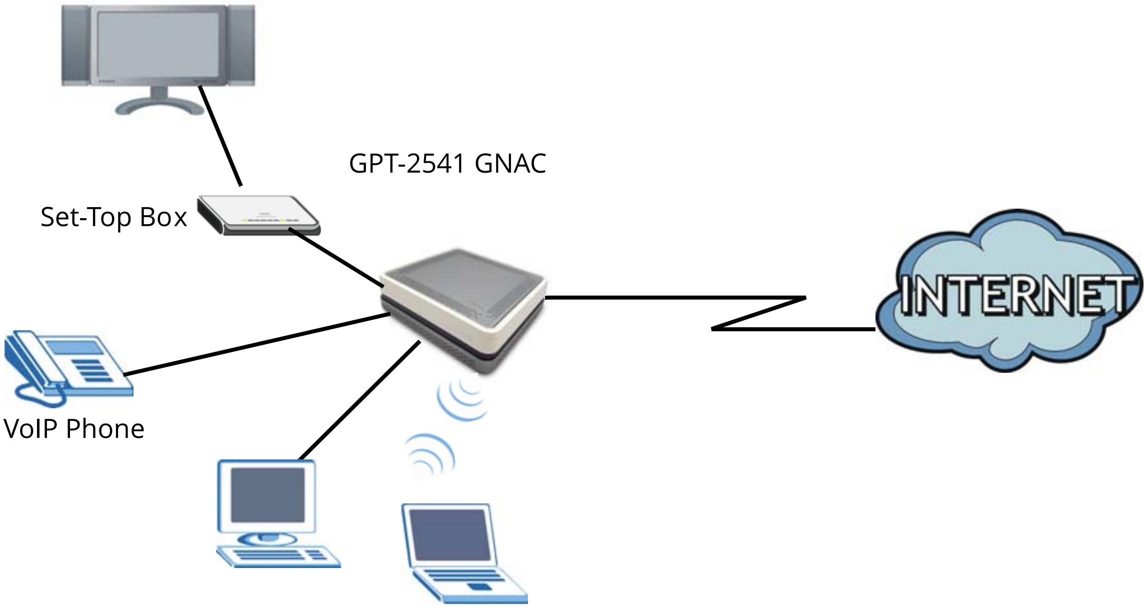
1 Chapter

1.1 Overview

The GPT-2541GNAC GPON ONT combines high-speed Fiber Internet access with a built-in switch, a firewall and high-speed wireless networking capability. It has a phone port for making calls over the Internet (Voice over IP or VoIP). It also supports IPTV service when available from your service provider.

The following figure shows an application example of the Router. The Router is connected to a provides IPTV, VoIP services as well as wired and wireless Internet access to home devices on the LAN.

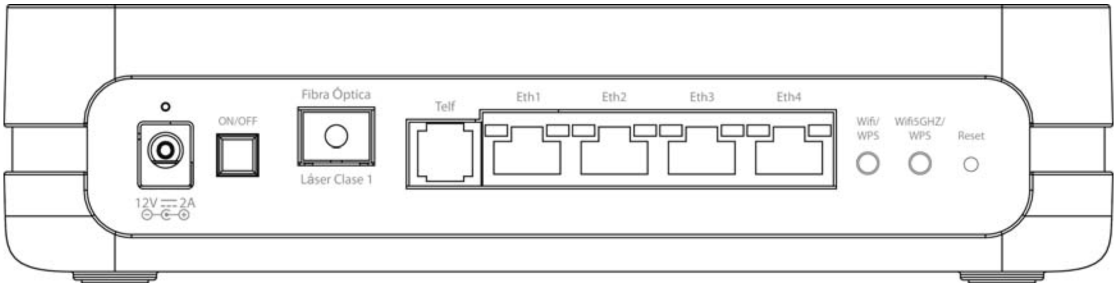
Figure 1 Application Example



1.2 Hardware Connection

Make sure to use the proper cables and power adapter to connect the Router.

Figure 2 Rear Panel



The following table explains the connectors and buttons on the rear panel.

Table 1 Rear Panel

CONECTOR	DESCRIPTION
12V-2A	Connect the provided power adapter to the 12V-1A power connector. Attach the power adapter to a proper power source.
ON/OFF	Use this button to turn the Router on or off.
Fibra Óptica	Connect the service provider's fiber optic cable to this port.
Telf	Use a telephone cable to connect the Router to a VoIP phone for VoIP service.
Eth 1-4	Use an Ethernet cable to connect a computer to one of these ports for initial configuration and/or Internet access.
Wifi/WPS	Use this button to enable or disable the 2.4 GHz WiFi and WPS features on the Router. By default, WiFi is enabled on the Router. Press this button for 1 second to turn it off. To enable the WPS feature, press the button for more than 3 seconds The WPS LED on the front panel will flash green while the Router sets up a WPS Connection with the wireless device. Note: To activate WPS, you must enable WPS in the Router and in another wireless device within two minutes of each other.

Table 1 Rear Panel (continued)

CONECTOR	DESCRIPTION
Wifi5GHz/WPS	Use this button to enable or disable the 5 GHz WiFi and WPS features on the Router. By default, WiFi is enabled on the Router. Press this button for 1 second to turn it off. To enable the WPS feature, press the button for more than 3 seconds The WPS LED on the front panel will flash green while the Router sets up a WPS Connection with the wireless device. Note: To activate WPS, you must enable WPS in the Router and in another wireless device within two minutes of each other.
Reset	Use this button to restore the default settings of the Router. Press this button for 10 seconds to restore default values. Press 1 second or longer to restart it. Note: If you reset the Router, you will lose all configurations that you had previously and the password will be reset to the defaults.

1.3 LEDs (Lights)

The following graphic displays the labels of the LEDs.

Figure 3 Front Panel LEDs

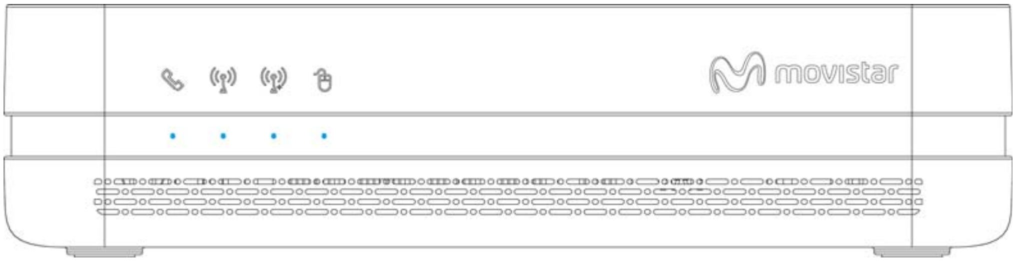


Figure 4 Rear Panel LEDs

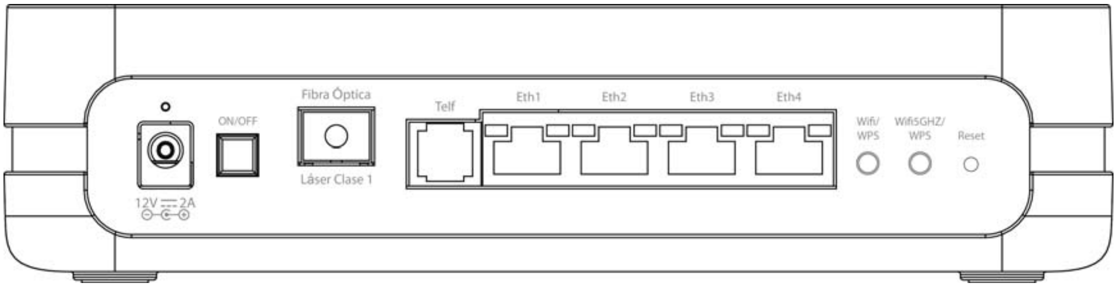


Table 2 LED Descriptions

LED	COLOR	STATUS	DESCRIPTION
Power	Blue	On	The Router is receiving power and ready for use.
	Red	On	The Router has hardware failure.
		Blinking	The Router detected an error while self-testing.
		Off	The Router is not receiving power.
Eth 1-4	Blue	On	The Router has a successful Ethernet connection with a device on the LAN.
		Blinking	The Router is sending or receiving data to/from the LAN.
		Off	The Router does not have an Ethernet connection with the LAN.

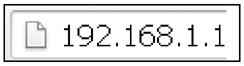
Table 2 LED Descriptions (continued)

LED	COLOR	STATUS	DESCRIPTION
Telf	Blue	On	The SIP registration is successful.
		Blinking	The Router is negotiating the SIP registration.
	Green	On	There is incoming or outgoing voice traffic.
	Red	Blinking	The Router has failed to register the VoIP service.
		Off	There is no VoIP service.
Wifi/WPS	Blue	On	The 2.4 GHz wireless is on.
		Blinking	The 2.4 GHz WPS is activated. It also blinks when the Router is setting up a WPS connection.
		Off	The 2.4 GHz wireless is not activated.
Wifi5GHz/ WPS	Blue	On	The 5 GHz wireless is on.
		Blinking	The 5 GHz WPS is activated. It also blinks when the Router is setting up a WPS connection.
		Off	The 5 GHz wireless is not activated.
Internet	Blue	On	The Router has a PPP connection but no traffic. It has a WAN IP address (either static or assigned by a DHCP server), PPP negotiation was successfully completed (if used).
		Blinking	Startup process. The Router is running an automatic startup diagnostic process on the GPON port.
		Fast Blinking	The Router is sending or receiving IP traffic. The Router is synchronizing with the PON. Activation phase. The Router is negotiating a PPP connection.
	Red	On	The Router attempted to make an IP connection but failed. Possible causes are no response from a DHCP server, no PPPoE response, PPPoE authentication failed. The GPON port failed during the POST (Power On Self Test) or there is an error due to hardware or firmware failure.
		Blinking	The GPON port's optical power level is below the threshold.
		Off	There is no Internet connection.

1.4 Advanced Configuration

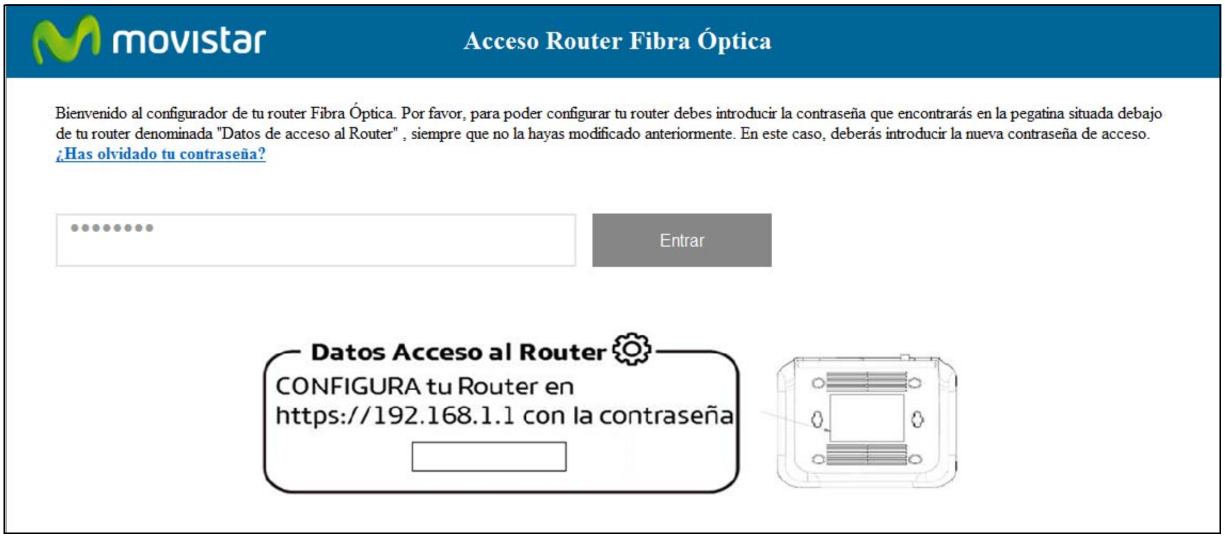
Do the following to access the advanced configuration screens.

1 Access the **Client Wizard** screens. Enter the IP address: http://192.168.1.1.



192.168.1.1

2 The login screen appears. The default password is random. Please refer to the label sticker at the bottom of the device. Enter the password. Click **Entrar** to enter the **Client Wizard**.



Acceso Router Fibra Óptica

Bienvenido al configurador de tu router Fibra Óptica. Por favor, para poder configurar tu router debes introducir la contraseña que encontrarás en la pegatina situada debajo de tu router denominada "Datos de acceso al Router" , siempre que no la hayas modificado anteriormente. En este caso, deberás introducir la nueva contraseña de acceso.

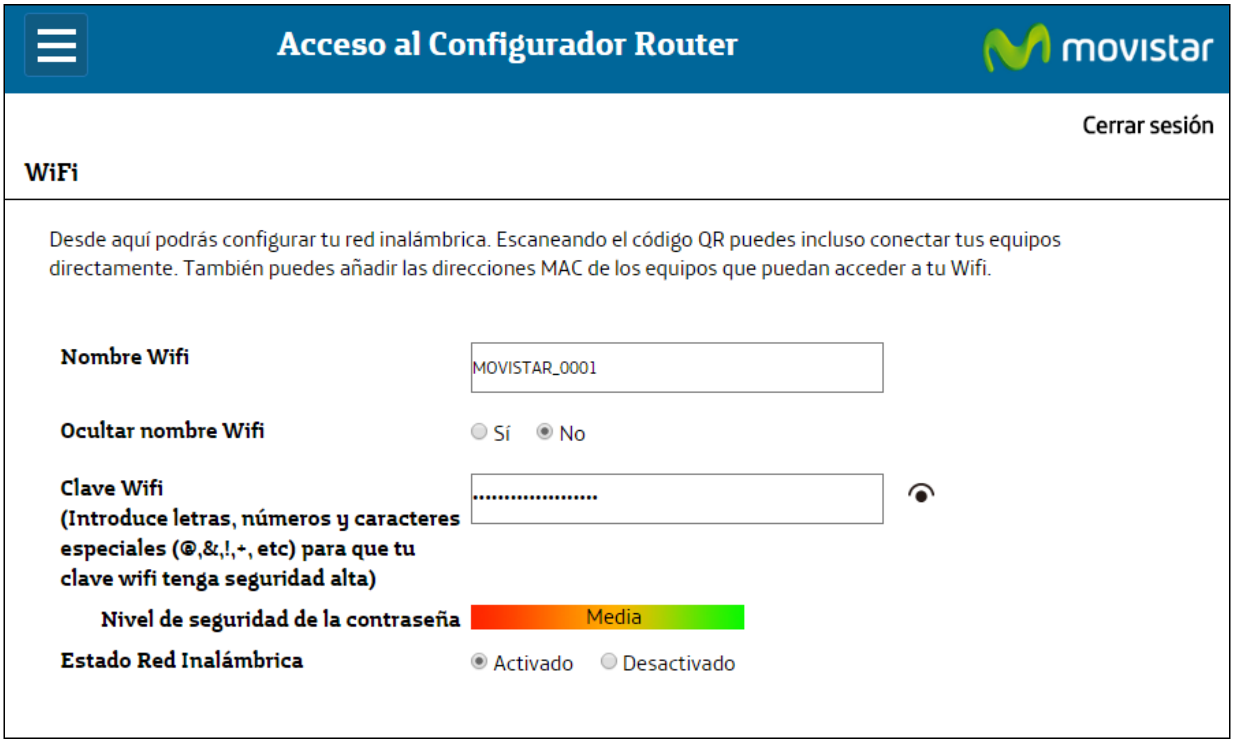
¿Has olvidado tu contraseña?

••••••••• Entrar

Datos Acceso al Router

CONFIGURA tu Router en https://192.168.1.1 con la contraseña

3 The **main s**creen appears.



Acceso al Configurador Router

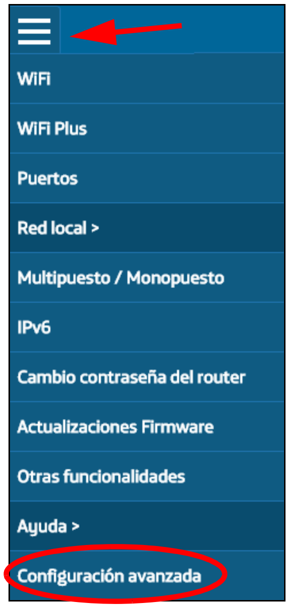
Cerrar sesión

WiFi

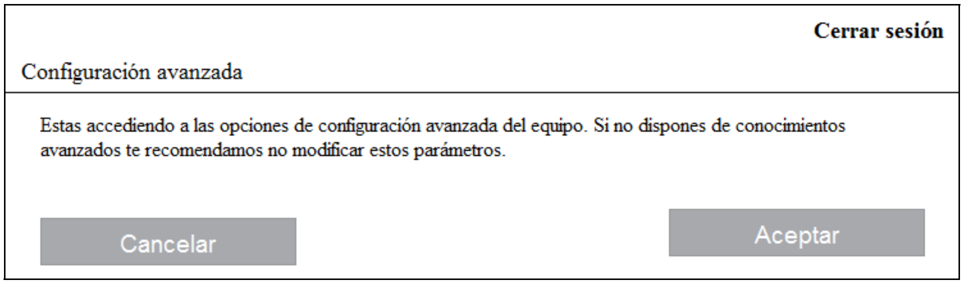
Desde aquí podrás configurar tu red inalámbrica. Escaneando el código QR puedes incluso conectar tus equipos directamente. También puedes añadir las direcciones MAC de los equipos que puedan acceder a tu Wifi.

Nombre Wifi	MOVISTAR_0001
Ocultar nombre Wifi	○ Sí ● No
Clave Wifi **(Introduce letras, números y caracteres especiales (@,&,!,+, etc) para que tu clave wifi tenga seguridad alta)**	....
Nivel de seguridad de la contraseña	Media
Estado Red Inalámbrica	● Activado ○ Desactivado

4 Click the **Menu** button and then **Configuración avanzada**.



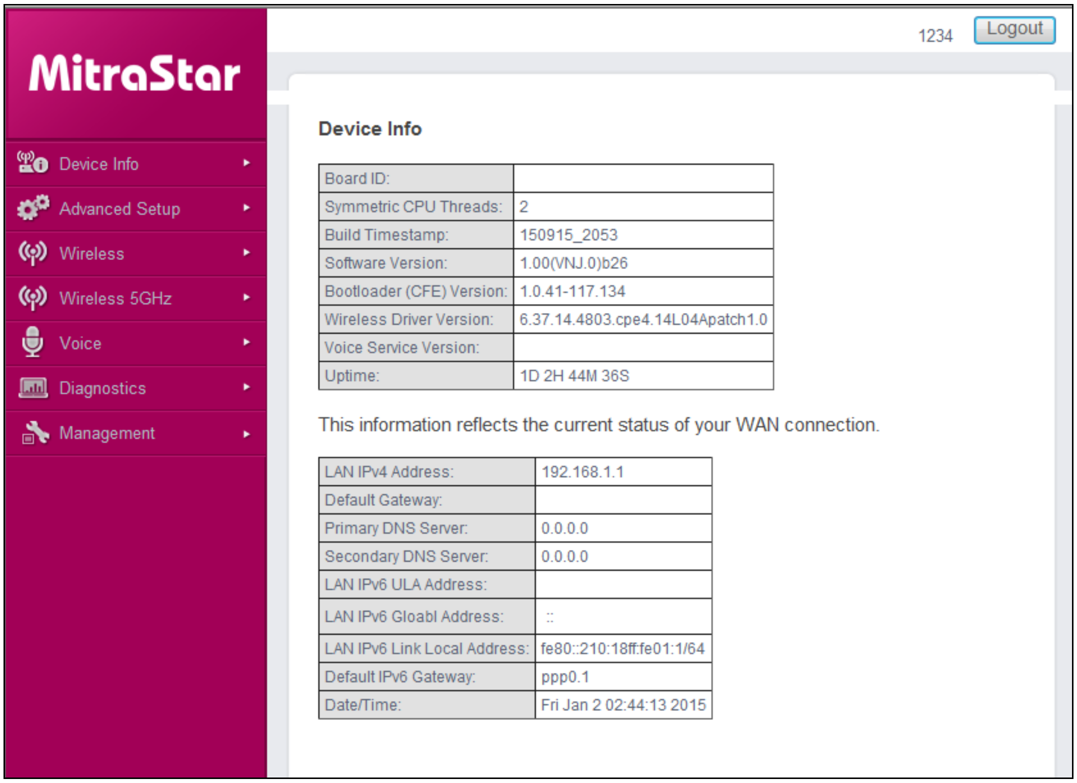
5 Click **Aceptar**.


Cerrar sesión

Configuración avanzada

Estas accediendo a las opciones de configuración avanzada del equipo. Si no dispones de conocimientos avanzados te recomendamos no modificar estos parámetros.

6 The advanced configuration screens display. Use the menu on the left to navigate the screens. Refer to the rest of this guide for details about the screens. Click **Logout** to exit the configuration screens.



Device Info

Board ID:	
Symmetric CPU Threads:	2
Build Timestamp:	150915_2053
Software Version:	1.00(VNJ.0)b26
Bootloader (CFE) Version:	1.0.41-117.134
Wireless Driver Version:	6.37.14.4803.cpe4.14L04Apatch1.0
Voice Service Version:	
Uptime:	1D 2H 44M 36S

This information reflects the current status of your WAN connection.

LAN IPv4 Address:	192.168.1.1
Default Gateway:	
Primary DNS Server:	0.0.0.0
Secondary DNS Server:	0.0.0.0
LAN IPv6 ULA Address:	
LAN IPv6 Gloabl Address:	::
LAN IPv6 Link Local Address:	fe80::210:18ff:fe01:1/64
Default IPv6 Gateway:	ppp0.1
Date/Time:	Fri Jan 2 02:44:13 2015

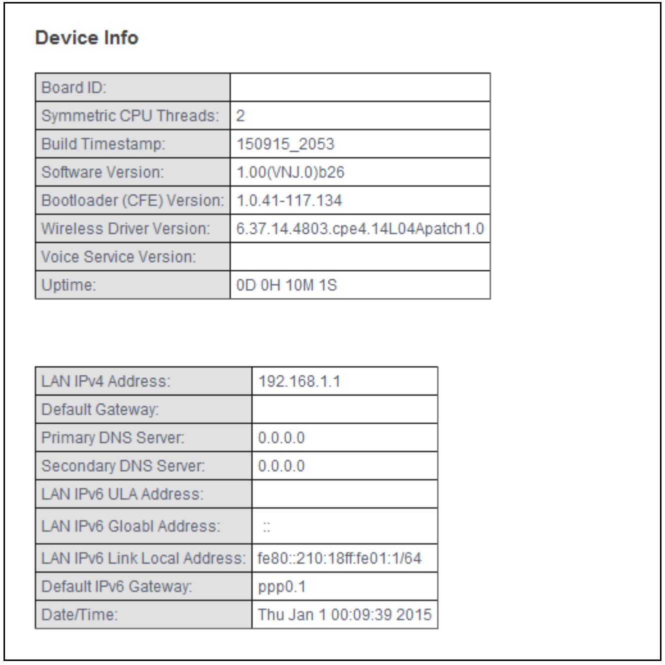
Device Info

2 Chapter

2.1 Device Info Summary

Click **Device Info > Summary** to open this screen with general device and WAN connection status information.

Figure 5 Device Info Summary



Device Info

Board ID:	
Symmetric CPU Threads:	2
Build Timestamp:	150915_2053
Software Version:	1.00(VNJ.0)b26
Bootloader (CFE) Version:	1.0.41-117.134
Wireless Driver Version:	6.37.14.4803.cpe4.14L04Apatch1.0
Voice Service Version:	
Uptime:	0D 0H 10M 1S

LAN IPv4 Address:	192.168.1.1
Default Gateway:	
Primary DNS Server:	0.0.0.0
Secondary DNS Server:	0.0.0.0
LAN IPv6 ULA Address:	
LAN IPv6 Gloabl Address:	::
LAN IPv6 Link Local Address:	fe80::210:18ff:fe01:1/64
Default IPv6 Gateway:	ppp0.1
Date/Time:	Thu Jan 1 00:09:39 2015

Table 3 Device Info Summary

LABEL	DESCRIPTION
Board ID	This field displays the ID number of the circuit board in the Router.
Symmetric CPU Threads	This field displays the number of threads in the Router's CPU.
Build Timestamp	This field displays the date (YYMMDD) and time (HHMM) of the firmware in the Router.
Software Version	This field displays the current version of the firmware inside the Router.

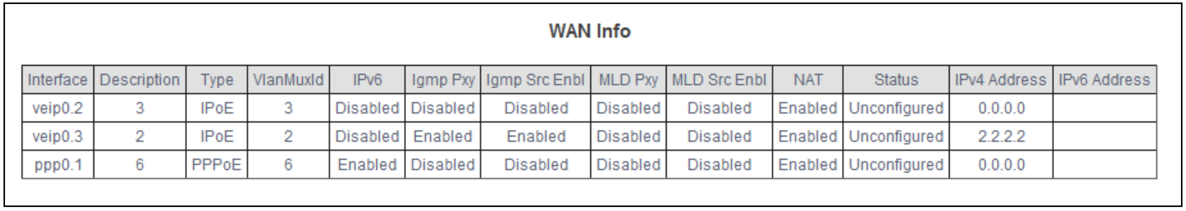
Table 3 Device Info Summary (continued)

LABEL	DESCRIPTION
Bootloader (CFE) Version	This field displays the version of bootloader the Router is using.
Wireless Driver Version	This field displays the version of the driver for the Router's wireless chipset.
Voice Service Version	This field displays the version of the VoIP software the Router is using.
Uptime	This field displays how long the Router has been running since it last started up.
LAN IPv4 Address	This field displays the current IP address of the Router in the LAN.
Default Gateway	This field displays the IP address of the gateway through which the Router sends traffic unless it matches a static route.
Primary DNS Server	The Router tries this DNS server first when it needs to resolve a domain name into a numeric IP address.
Secondary DNS Server	The Router uses this DNS server first when it needs to resolve a domain name into a numeric IP address if the primary DNS server does not respond.
LAN IPv6 ULA Address	This field displays the current unique local address (ULA). This is a unique IPv6 address for use in private networks but not routable in the global IPv6 Internet.
LAN IPv6 Address (Global)	This field displays the current global IPv6 address of the Router.
LAN IPv6 Link Local Address	This field displays the current IPv6 address of the Router in the LAN.
Default IPv6 Gateway	This field displays the IPv6 address of the gateway through which the Router sends IPv6 traffic unless it matches a static route.
Date/Time	This field displays the Router's current day of the week, month, hour, minute, second, and year.

2.2 WAN Info

Click **Device Info > WAN** to open this screen which lists the Router's WAN connections and their status.

Figure 6 WAN Info



WAN Info

Interface	Description	Type	VlanMuxId	IPv6	Igmp Pxy	Igmp Src Enbl	MLD Pxy	MLD Src Enbl	NAT	Status	IPv4 Address	IPv6 Address
veip0.2	3	IPoE	3	Disabled	Disabled	Disabled	Disabled	Disabled	Enabled	Unconfigured	0.0.0.0	
veip0.3	2	IPoE	2	Disabled	Enabled	Enabled	Disabled	Disabled	Enabled	Unconfigured	2.2.2.2	
ppp0.1	6	PPPoE	6	Enabled	Disabled	Disabled	Disabled	Disabled	Enabled	Unconfigured	0.0.0.0	

Table 4 WAN Info

LABEL	DESCRIPTION
Interface	This shows the name of the WAN interface. **veip0** stands for a virtual Ethernet card and is the foundation for veip0/* which are virtual WAN interfaces of the physical GPON line. The **ppp0.*** indicates a PPP connection. The number after the dot (**.**) represents the VLAN ID number assigned to traffic sent through this connection. The number after the underscore (_) represents the index number of connections through the same interface. **(null)** means the entry is not valid.
Description	This is the service name of this connection.
Type	This shows the method of encapsulation used by this connection (IP over Ethernet, PPP over Ethernet, or bridging).
VlanMuxID	This indicates the VLAN ID number assigned to traffic sent through this connection. This displays **N/A** when there is no VLAN ID number assigned.
IPv6	This displays whether or not IPv6 is enabled on the interface.
Igmp Pxy	This shows whether IGMP (Internet Group Multicast Protocol) proxy is activated or not for this connection. IGMP is not available when the connection uses the bridging service.
Igmp Src Enbl	This shows whether IGMP source enable is activated or not for this connection. IGMP source enable has the Router add routing table entries based on the IGMP traffic.
MLD Pxy	This shows whether Multicast Listener Discovery (MLD) proxy is activated or not for this connection. MLD is not available when the connection uses the bridging service.
MLD Src Enbl	This shows whether MLD source enable is activated or not for this connection. MLD source enable has the Router add routing table entries based on the MLD traffic.
NAT	This shows whether NAT is activated or not for this interface. NAT is not available when the connection uses the bridging service.
Status	This displays the connection state or **Unconfigured** if the interface has not yet been configured.

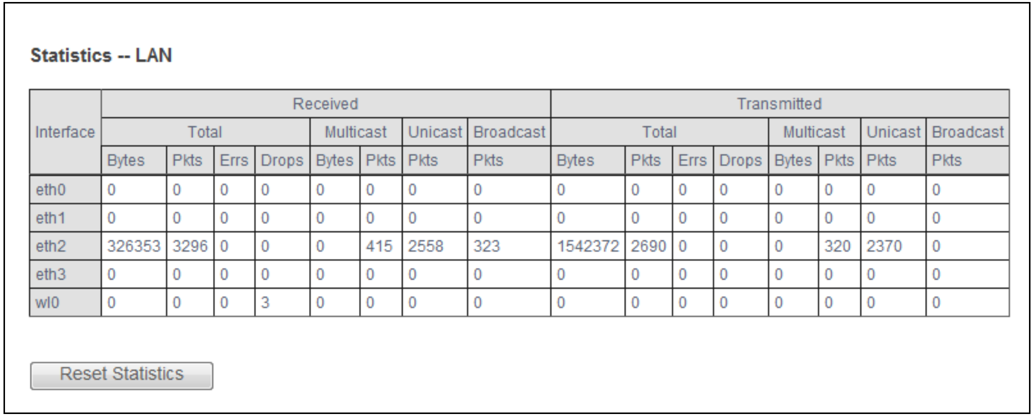
Table 4 WAN Info (continued)

LABEL	DESCRIPTION
IPv4 Address	This displays the interface’s current IPv4 address if it has one.
IPv6 Address	This displays the interface’s current IPv6 address if it has one.

2.3 LAN Statistics

Click **Device Info > Statistics > LAN** to open this screen of traffic statistics counters for the Router’s wired and wireless LAN interfaces. Use the button to clear the counters.

Figure 7 LAN Statistics



Statistics -- LAN

Interface	Received								Transmitted							
	Total				Multicast		Unicast	Broadcast	Total				Multicast		Unicast	Broadcast
	Bytes	Pkts	Errs	Drops	Bytes	Pkts	Pkts	Pkts	Bytes	Pkts	Errs	Drops	Bytes	Pkts	Pkts	Pkts
eth0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
eth1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
eth2	326353	3296	0	0	0	415	2558	323	1542372	2690	0	0	0	320	2370	0
eth3	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
wl0	0	0	0	3	0	0	0	0	0	0	0	0	0	0	0	0

Table 5 LAN Statistics

LABEL	DESCRIPTION
Interface	These fields identify the LAN interfaces. **eth0** ~ **eth3** represent the ethernet LAN ports 1 ~ 4. **wlo** represents the wireless LAN interface.
Received / Transmitted	These fields display the number of bytes, packets, error packets, and dropped packets for each interface.
Received	
Bytes	This indicates the number of bytes received on this interface.
Pkts	This indicates the number of packets received on this interface.
Errs	This indicates the number of frames with errors received on this interface.
Drops	This indicates the number of received packets dropped on this interface.
Transmitted	
Bytes	This indicates the number of bytes transmitted on this interface.

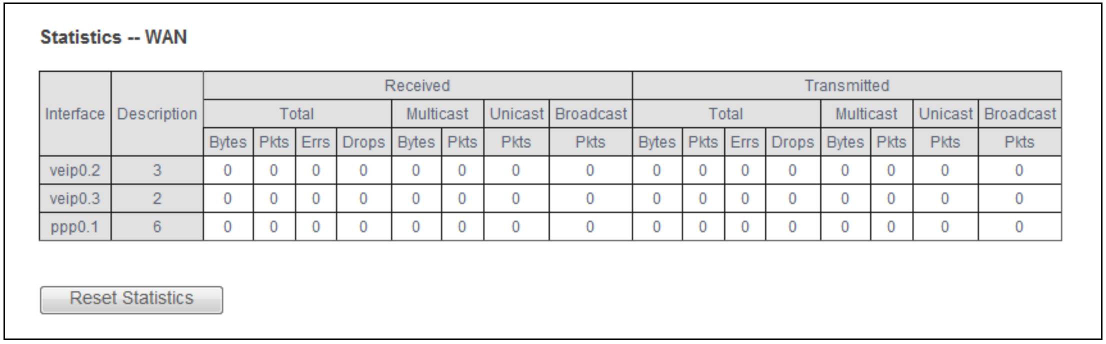
Table 5 LAN Statistics (continued)

LABEL	DESCRIPTION
Pkts	This indicates the number of transmitted packets on this interface.
Errs	This indicates the number of frames with errors transmitted on this interface.
Drops	This indicates the number of outgoing packets dropped on this interface.
Reset Statistics	Click this to clear the screen’s statistics counters.

2.4 WAN Statistics

Click **Device Info > Statistics > WAN Service** to display the total, multicast, unicast, and broadcast traffic statistics counters for the Router’s WAN interfaces. Use the button to clear the counters.

Figure 8 WAN Statistics



Statistics -- WAN

Interface	Description	Received								Transmitted							
		Total				Multicast		Unicast	Broadcast	Total				Multicast		Unicast	Broadcast
		Bytes	Pkts	Errs	Drops	Bytes	Pkts	Pkts	Pkts	Bytes	Pkts	Errs	Drops	Bytes	Pkts	Pkts	Pkts
veip0.2	3	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
veip0.3	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
ppp0.1	6	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

Table 6 WAN Statistics

LABEL	DESCRIPTION
Interface	This shows the name of the WAN interface used by this connection. **veip0** stands for a virtual Ethernet card and is the foundation for veip0/* which are virtual WAN interfaces of the physical GPON line. The **ppp0.*** indicates a PPP connection. **eth0** ~ **eth3** represent the Ethernet LAN ports 1 ~ 4 and are the foundation for eth0/* which are virtual WAN interfaces of the physical Gigabit Ethernet line. The number after the dot (**.**) represents the VLAN ID number assigned to traffic sent through this connection. The number after the underscore (_) represents the index number of connections through the same interface. **(null)** means the entry is not valid.
Description	This is the service name of this connection.
Received	
Bytes	This indicates the number of bytes received on this interface.
Pkts	This indicates the number of packets received on this interface.
Errs	This indicates the number of frames with errors received on this interface.
Drops	This indicates the number of received packets dropped on this interface.
Transmitted	
Bytes	This indicates the number of bytes transmitted on this interface.
Pkts	This indicates the number of transmitted packets on this interface.
Errs	This indicates the number of frames with errors transmitted on this interface.

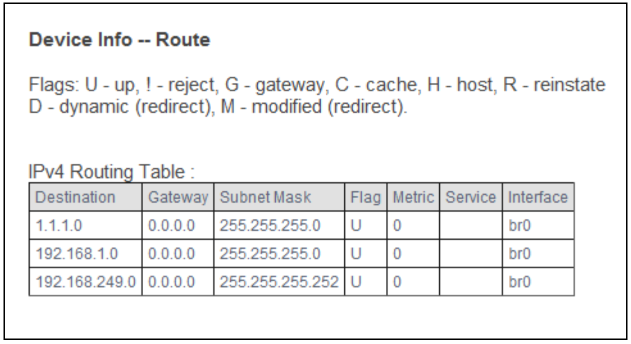
Table 6 WAN Statistics (continued)

LABEL	DESCRIPTION
Drops	This indicates the number of outgoing packets dropped on this interface.
Reset	Click this to clear the screen’s statistics counters.

2.5 Route Info

Click **Device Info > Route** to display the Router’s IPv4 and IPv6 routing tables.

Figure 9 Route Info



Device Info -- Route

Flags: U - up, ! - reject, G - gateway, C - cache, H - host, R - reinstate
D - dynamic (redirect), M - modified (redirect).

IPv4 Routing Table :

Destination	Gateway	Subnet Mask	Flag	Metric	Service	Interface
1.1.1.0	0.0.0.0	255.255.255.0	U	0		br0
192.168.1.0	0.0.0.0	255.255.255.0	U	0		br0
192.168.249.0	0.0.0.0	255.255.255.252	U	0		br0

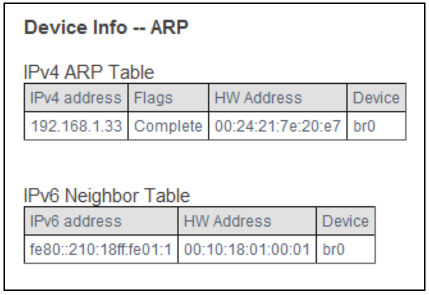
Table 7 Route Info

LABEL	DESCRIPTION
Destination	This displays the IP address to which this entry applies.
Gateway	This displays the gateway the Router uses to send traffic to the entry’s destination address.
Subnet Mask	This displays the subnet mask of the destination net.
Flag	This displays whether the route is up (**U**), the Router drops packets for this destination (**!**), the route uses a gateway (**G**), the target is in the neighbor cache (**C**), the target is a host (**H**), reinstate route for dynamic routing (**R**), the route was dynamically installed by redirect (**D**), or modified from redirect (**M**).
Metric	The metric represents the “cost” of transmission for routing purposes. IP routing uses hop count as the measurement of cost, with a minimum of 1 for directly-connected networks.
Service	The name of a specific service to which the route applies if one is specified.
Interface	The interface through which this route sends traffic.

2.6 ARP Info

Click **Device Info > ARP** to display the Router's IPv4 Address Resolution Protocol and IPv6 neighbor tables. This screen lists the IP addresses the Router has mapped to MAC addresses.

Figure 10 ARP Info



Device Info -- ARP

IPv4 ARP Table

IPv4 address	Flags	HW Address	Device
192.168.1.33	Complete	00:24:21:7e:20:e7	br0

IPv6 Neighbor Table

IPv6 address	HW Address	Device
fe80::210:18ff:fe01:1	00:10:18:01:00:01	br0

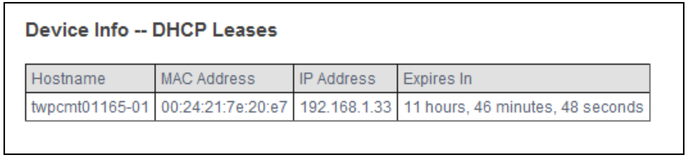
Table 8 ARP Info

LABEL	DESCRIPTION
IPv4 / IPv6 address	The learned IP address of a device connected to one of the system's ports.
Flags	**Static** - static entry, **Dynamic** - dynamic entry that is not yet complete, **Complete** - dynamic entry that is complete.
HW Address	The MAC address of the device with the listed IP address.
Device	The interface through which the Router sends traffic to the device listed in the entry.

2.7 DHCP Leases

Click **Device Info > DHCP** to display the Router's list of IP address currently leased to DHCP clients.

Figure 11 DHCP Leases



Device Info -- DHCP Leases

Hostname	MAC Address	IP Address	Expires In
twpcmt01165-01	00:24:21:7e:20:e7	192.168.1.33	11 hours, 46 minutes, 48 seconds

Table 9 DHCP Leases

LABEL	DESCRIPTION
Hostname	This field displays the name used to identify this device on the network (the computer name). The Router learns these from the DHCP client requests. "None" shows here for a static DHCP entry.
MAC Address	This field displays the MAC address to which the IP address is currently assigned or for which the IP address is reserved. Click the column's heading cell to sort the table entries by MAC address. Click the heading cell again to reverse the sort order.
IP Address	This field displays the IP address currently assigned to a DHCP client or reserved for a specific MAC address. Click the column's heading cell to sort the table entries by IP address. Click the heading cell again to reverse the sort order.
Expires In	This field displays how much longer the IP address is leased to the DHCP client.

WAN

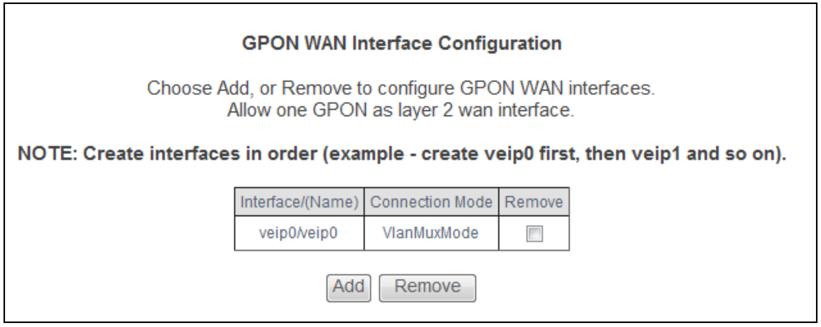
3 Chapter

3.1 GPON Layer2 Interface

The Router must have a layer-2 interface to allow users to use the GPON port to access the Internet. Log into the Router’s Web Configurator and click **Advanced Setup > Layer2 Interface > GPON Interface** to manage the GPON layer-2 interface.

ⓘ The GPON and ETH layer-2 interfaces cannot work at the same time.

Figure 12 GPON Interface



GPON WAN Interface Configuration

Choose Add, or Remove to configure GPON WAN interfaces.
Allow one GPON as layer 2 wan interface.

NOTE: Create interfaces in order (example - create veip0 first, then veip1 and so on).

Interface/(Name)	Connection Mode	Remove
veip0/veip0	VlanMuxMode	□

The following table describes the fields in this screen.

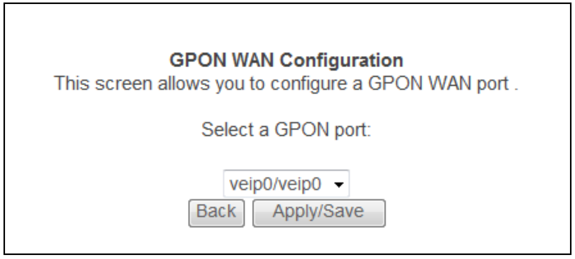
Table 10 GPON Interface

LABEL	DESCRIPTION
Interface/(Name)	The name of a configured layer-2 interface. **veip0** stands for a virtual Ethernet card and is the foundation for veip0/* which are virtual WAN interfaces of the physical GPON line. The number after the dot (**.**) represents the VLAN ID number assigned to traffic sent through this connection. The number after the underscore (_) represents the index number of connections through the same interface.
Connection Mode	This shows the connection mode of the layer-2 interface.
Remove	Select an interface and click the **Remove** button to delete it. You cannot remove a layer-2 interface when a WAN service is associated with it.
Add	Click this button to create a new layer-2 interface. You can only have one GPON layer 2 interface at a time.

3.1.1 Layer-2 GPON Interface Configuration

Click the **Add** button in the **Layer2 Interface: GPON Interface** screen to open the following screen. Use this screen to create a new layer-2 interface.

Figure 13 GPON Interface Configuration



GPON WAN Configuration

This screen allows you to configure a GPON WAN port .

Select a GPON port:

Select the GPON port and click **Apply/Save**.

The following table describes the fields in this screen.

Table 11 GPON Interface Configuration

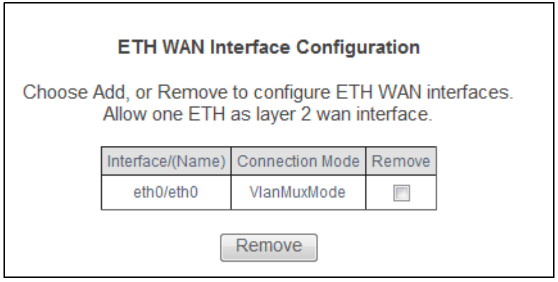
LABEL	DESCRIPTION
Select a GPON port	Select a GPON port. **veip0** stands for a virtual Ethernet card and is the foundation for veip0/* which are virtual WAN interfaces of the physical GPON line.
Back	Click this button to return to the previous screen without saving any changes.
Apply/Save	Click this button to save your changes and go back to the previous screen.

3.2 Ethernet Layer2 Interface

The Router must have a layer-2 interface to allow users to use the Gigabit Ethernet port to access the Internet. Log into the Router’s Web Configurator and click **Advanced Setup > Layer2 Interface > ETH Interface** to manage the Ethernet layer-2 interface.

The GPON and ETH layer-2 interfaces cannot work at the same time.

Figure 14 ETH Interface



ETH WAN Interface Configuration

Choose Add, or Remove to configure ETH WAN interfaces.
Allow one ETH as layer 2 wan interface.

Interface/(Name)	Connection Mode	Remove
eth0/eth0	VlanMuxMode	□

The following table describes the fields in this screen.

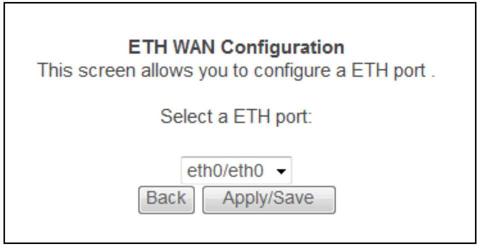
Table 12 ETH Interface

LABEL	DESCRIPTION
Interface/(Name)	The name of a configured layer-2 interface. **eth0** ~ **eth3** represent the ethernet LAN ports 1 ~ 4.
Connection Mode	This shows the connection mode of the layer-2 interface.
Remove	Select an interface and click the **Remove** button to delete it. You cannot remove a layer-2 interface when a WAN service is associated with it.
Add	Click this button to create a new layer-2 interface. You can only have one ETH layer 2 interface at a time.

3.2.1 Ethernet Layer-2 Interface Configuration

Click the **Add** button in the **Layer2 Interface: ETH Interface** screen to open the following screen. Use this screen to create a new layer-2 interface.

Figure 15 ETH Interface Configuration



ETH WAN Configuration
This screen allows you to configure a ETH port .

Select a ETH port:

eth0/eth0

The following table describes the fields in this screen.

Table 13 ETH Interface Configuration

LABEL	DESCRIPTION
Select a ETH port	Select an Ethernet port. **eth0** ~ **eth3** represent the ethernet LAN ports 1 ~ 4.
Back	Click this button to return to the previous screen without saving any changes.
Apply/Save	Click this button to save your changes and go back to the previous screen.

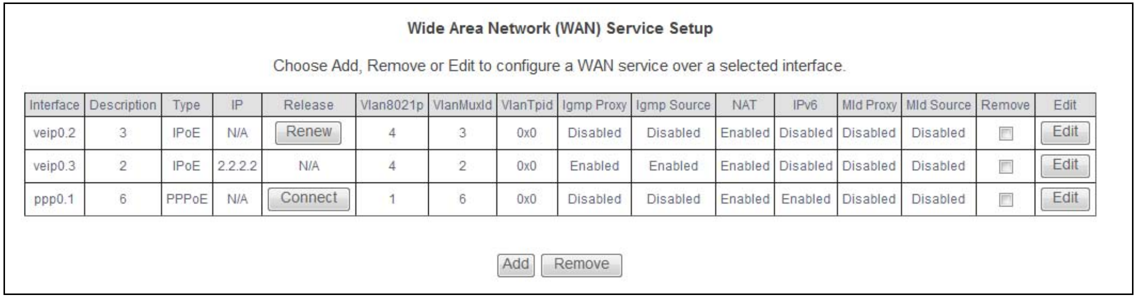
3.3 WAN Service

Use this screen to change your Router’s WAN settings. Click **Advanced Setup > WAN Service**. The summary table shows you the configured WAN services (connections) on the Router.

To use NAT, firewall or IGMP proxy in the Router, you need to configure a WAN connection with PPPoE or IPoE.

When a layer-2 interface is in **VLAN MUX Mode**, you can configure up to five WAN services on the Router.

Figure 16 WAN Service



Wide Area Network (WAN) Service Setup

Choose Add, Remove or Edit to configure a WAN service over a selected interface.

Interface	Description	Type	IP	Release	Vlan8021p	VlanMuxId	VlanTpid	Igmp Proxy	Igmp Source	NAT	IPv6	Mld Proxy	Mld Source	Remove	Edit
veip0.2	3	IPoE	N/A	Renew	4	3	0x0	Disabled	Disabled	Enabled	Disabled	Disabled	Disabled	□	Edit
veip0.3	2	IPoE	2.2.2.2	N/A	4	2	0x0	Enabled	Enabled	Enabled	Disabled	Disabled	Disabled	□	Edit
ppp0.1	6	PPPoE	N/A	Connect	1	6	0x0	Disabled	Disabled	Enabled	Enabled	Disabled	Disabled	□	Edit

Table 14   WAN Service

LABEL	DESCRIPTION
Interface	This shows the name of the interface used by this connection. **veip0** stands for a virtual Ethernet card and is the foundation for veip0/* which are virtual WAN interfaces of the physical GPON line. The **ppp0.*** indicates a PPP connection. The number after the dot (**.**) represents the VLAN ID number assigned to traffic sent through this connection. The number after the underscore (_) represents the index number of connections through the same interface. **(null)** means the entry is not valid.
Description	This is the service name of this connection.
Type	This shows the method of encapsulation used by this connection (IP over Ethernet, PPP over Ethernet, or bridging).
IP	This displays the IP address the connection uses. This displays **N/A** when the connection does not have an IP address.
Release	Use the buttons in this column to renew, release, or connect a WAN connection. This displays **N/A** for a connection with a static IP address.
Vlan8021p	This indicates the 802.1P priority level assigned to traffic sent through this connection. This displays **N/A** when there is no priority level assigned.
VlanMuxId	This indicates the VLAN ID number assigned to traffic sent through this connection. This displays **N/A** when there is no VLAN ID number assigned.
VlanTpid	This field displays the VLAN Tag Protocol Identifier (TPID), a four-digit hexadecimal number from 0000 to FFFF that the OLT adds to the matched packets.
Igmp Proxy	This shows whether IGMP (Internet Group Multicast Protocol) proxy is activated or not for this connection. IGMP is not available when the connection uses the bridging service.

Table 14 WAN Service (continued)

LABEL	DESCRIPTION
NAT	This shows whether NAT is activated or not for this interface. NAT is not available when the connection uses the bridging service.
IPv6	This shows whether IPv6 is activated or not for this connection. IPv6 is not available when the connection uses the bridging service.
Mld Proxy	This shows whether Multicast Listener Discovery (MLD) proxy is activated or not for this connection. MLD is not available when the connection uses the bridging service.
MLD Source	This shows whether MLD source is activated or not for this connection.
Remove	Select an interface and click the **Remove** button to delete it. You cannot remove a layer-2 interface when a WAN service is associated with it.
Edit	Click the **Edit** button to configure the WAN connection. Click the **Remove** icon to delete the WAN connection.
Add	Click **Add** to create a new connection.

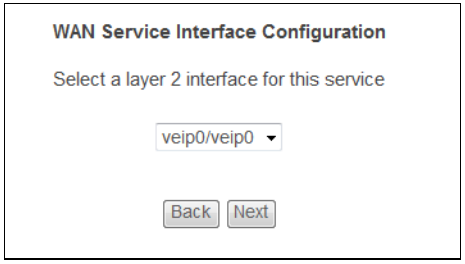
3.3.1 WAN Connection Configuration

Click the **Edit** or **Add** button in the **WAN Service** screen to configure a WAN connection.

3.3.1.1 WAN Interface

This screen displays when you add a new WAN connection.

Figure 17 WAN Configuration: WAN Interface



WAN Service Interface Configuration

Select a layer 2 interface for this service

veip0/veip0

Table 15 WAN Configuration: WAN Interface

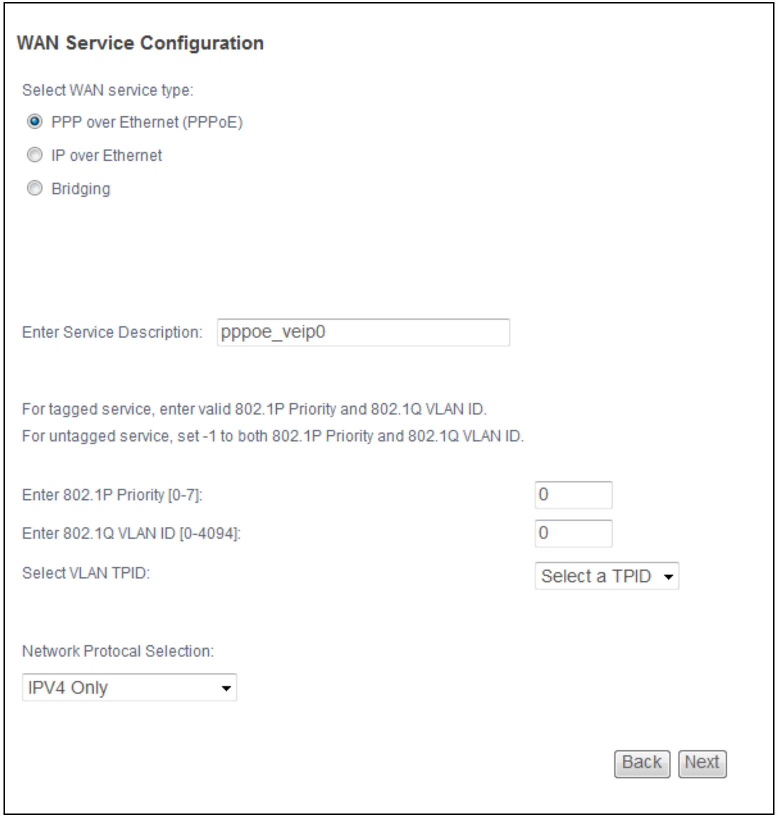
LABEL	DESCRIPTION
Select a layer 2 interface for this service	Select the port this WAN service uses for data transmission. **veip0/veip0** is the GPON port. **eth0** ~ **eth3** represent the ethernet LAN ports 1 ~ 4.

Table 15 WAN Configuration: WAN Interface (continued)

LABEL	DESCRIPTION
Back	Click this button to return to the previous screen.
Next	Click this button to continue.

3.3.1.2 WAN Service Configuration

This screen displays after you select the WAN interface for a new WAN connection.



WAN Service Configuration

Select WAN service type:

● PPP over Ethernet (PPPoE)

○ IP over Ethernet

○ Bridging

Enter Service Description: pppoe_veip0

For tagged service, enter valid 802.1P Priority and 802.1Q VLAN ID.
For untagged service, set -1 to both 802.1P Priority and 802.1Q VLAN ID.

Enter 802.1P Priority [0-7]: 0

Enter 802.1Q VLAN ID [0-4094]: 0

Select VLAN TPID: Select a TPID

Network Protocal Selection: IPV4 Only

Figure 18 WAN Configuration: WAN Service Configuration

Table 16 WAN Configuration: WAN Service Configuration

LABEL	DESCRIPTION
Select WAN service type	Select the method of encapsulation used by your ISP. Choices are **PPP over Ethernet (PPPoE)**, **IP over Ethernet** and **Bridging**.
Allow as IGMP Multicast Source	This displays when you select the **Bridging** service type. Select this to have the Router add routing table entries based on the IGMP traffic.

Table 16 WAN Configuration: WAN Service Configuration

LABEL	DESCRIPTION
Allow as MLD Multicast Source	This displays when you select the **Bridging** service type. Select this to have the Router add routing table entries based on the MLD traffic.
Enter Service Description	Specify a name to identify the service. **veip0** stands for a virtual Ethernet card and is the foundation for veip0/* which are virtual WAN interfaces of the physical GPON line. **eth0** ~ **eth3** represent the ethernet LAN ports 1 ~ 4.
Enter 802.1P Priority [0-7]	IEEE 802.1p defines up to 8 separate traffic types by inserting a tag into a MAC-layer frame that contains bits to define class of service. Type the IEEE 802.1p priority level (from 0 to 7) to add to traffic through this connection. The greater the number, the higher the priority level.
Enter 802.1Q VLAN ID [0-4094]	Type the VLAN ID number (from 1 to 4094) for traffic through this connection.
Select VLAN TPID	Select a Tag Protocol Identifier (TPID) the Router to add it to the service's packets.
Network Protocol Selection	Select **IPv4 Only** to have the Router use only IPv4. Select **IPv4&IPv6(Dual Stack)** to let the Router connect to IPv4 and IPv6 networks an choose the protocol for applications according to the address type. This lets the Router use an IPv6 address when sending traffic through this connection. You can only select this for a WAN service that uses the PPPoE or IPoE encapsulation method over the layer 2 interface. Select **IPv6 Only** to have the Router use only IPv6.
Back	Click this button to return to the previous screen.
Next	Click this button to continue.

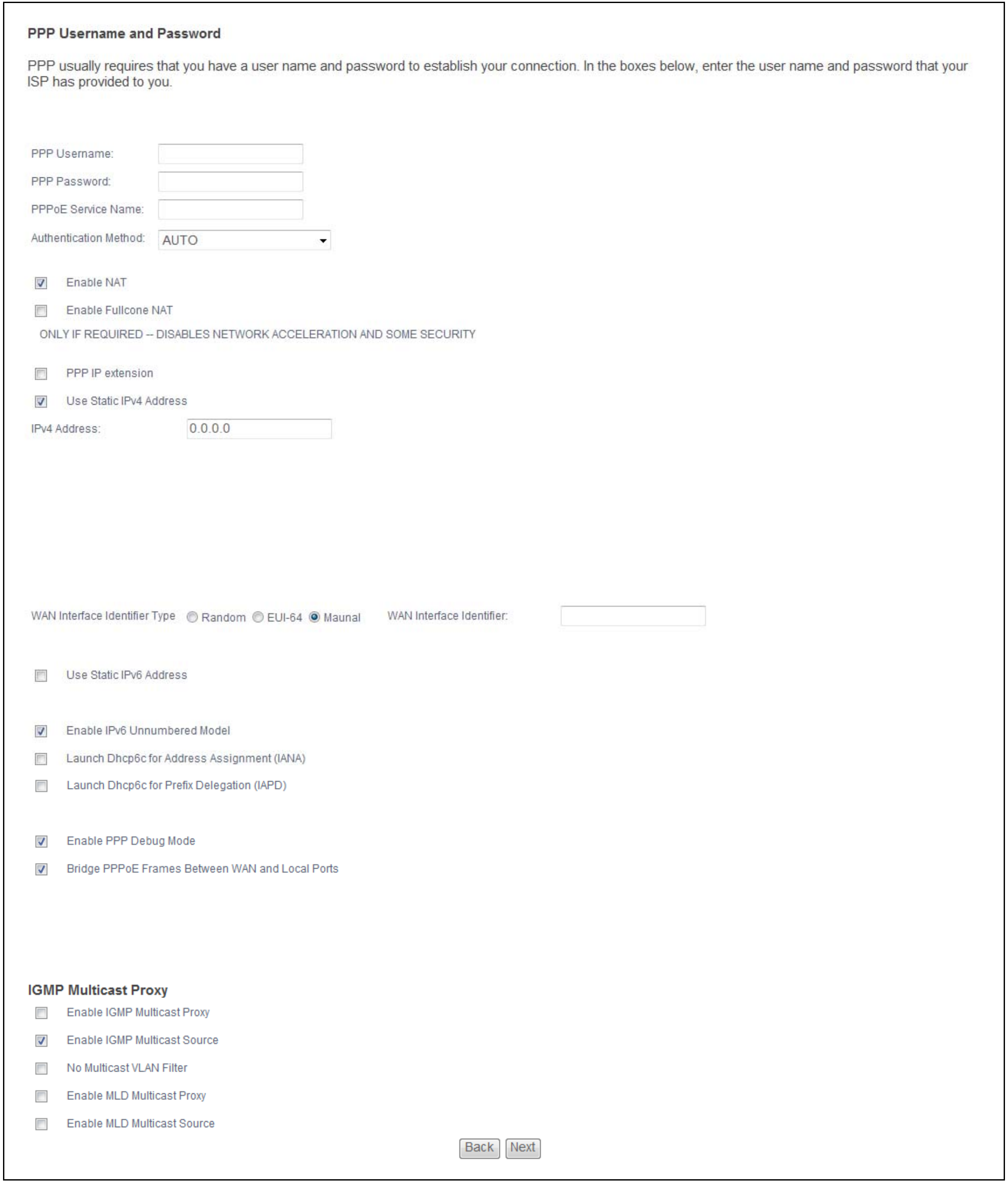
3.3.1.3 WAN IP Address and DNS Server

The screen differs by the encapsulation you selected in the previous screen.

PPPoE

This screen displays when you select **PPP over Ethernet (PPPoE)** in the **WAN Service Configuration** screen.

Figure 19 WAN Configuration: PPPoE



PPP Username and Password

PPP usually requires that you have a user name and password to establish your connection. In the boxes below, enter the user name and password that your ISP has provided to you.

PPP Username:	
PPP Password:	
PPPoE Service Name:	
Authentication Method:	AUTO

☑ Enable NAT

☐ Enable Fullcone NAT

ONLY IF REQUIRED -- DISABLES NETWORK ACCELERATION AND SOME SECURITY

☐ PPP IP extension

☑ Use Static IPv4 Address

IPv4 Address: 0.0.0.0

WAN Interface Identifier Type ○ Random ○ EUI-64 ● Maunal WAN Interface Identifier:

☐ Use Static IPv6 Address

☑ Enable IPv6 Unnumbered Model

☐ Launch Dhcp6c for Address Assignment (IANA)

☐ Launch Dhcp6c for Prefix Delegation (IAPD)

☑ Enable PPP Debug Mode

☑ Bridge PPPoE Frames Between WAN and Local Ports

IGMP Multicast Proxy

☐ Enable IGMP Multicast Proxy

☑ Enable IGMP Multicast Source

☐ No Multicast VLAN Filter

☐ Enable MLD Multicast Proxy

☐ Enable MLD Multicast Source

Table 17 WAN Configuration: PPPoE

LABEL	DESCRIPTION
PPP Username	Enter the user name exactly as your ISP assigned. If assigned a name in the form user@domain where domain identifies a service name, then enter both components exactly as given.
PPP Password	Enter the password associated with the user name above.
PPPoE Service Name	Type the name of your PPPoE service here. This field is not available for a PPPoA connection.
Authentication Method	The Router supports PAP (Password Authentication Protocol) and CHAP (Challenge Handshake Authentication Protocol). CHAP is more secure than PAP; however, PAP is readily available on more platforms. Use the drop-down list box to select an authentication protocol for outgoing calls. Options are: **AUTO** - Your Router accepts either CHAP or PAP when requested by this remote node. **PAP** - Your Router accepts PAP only. **CHAP** - Your Router accepts CHAP only. **MSCHAP** - Your Router accepts MSCHAP only. MS-CHAP is the Microsoft version of the CHAP.
Enable NAT	Select this check box to activate NAT on this connection.
Enable Fullcone NAT	This field is available only when you select **Enable NAT**. Select this check box to activate full cone NAT on this connection.
PPP IP extension	Select this only if your service provider requires it. PPP IP extension extends the service provider's IP subnet to a single LAN computer. • It lets only one computer on the LAN connect to the WAN. • The public IP address from the ISP is forwarded through DHCP to the LAN computer instead of being used on the WAN PPP interface. • It disables NAT and the firewall. • DHCP tells the LAN computer to use the gateway as the default gateway and DNS server. • The Router bridges IP packets between the WAN and LAN ports except packets destined for the Router's LAN IP address.
Use Static IPv4 Address	Select this option if you have a fixed IPv4 address assigned by your ISP.
IPv4 Address	Enter the IPv4 address assigned by your ISP.
WAN Interface Identifier Type	Select **Random** to have the Device randomly configure a WAN Identifier, which is shown in the WAN Interface Identifier field. Select **EUI-64** to use the EUI-64 format to generate an interface ID from the MAC address of the WAN interface. Select **Manual** to manually enter a WAN Identifier as the interface ID to identify the WAN interface. The WAN Identifier is appended to the IPv6 address prefix to create the routable global IPv6 address.

Table 17 WAN Configuration: PPPoE (continued)

LABEL	DESCRIPTION
WAN Interface Identifier	If you selected **Random**, this field is automatically configured. If you selected **Manual**, enter the WAN Identifier in this field. The WAN identifier should be unique and 64 bits in hexadecimal form. Every 16 bit block should be separated by a colon as in XXXX:XXXX:XXXX:XXXX where X is a hexadecimal character. Blocks of zeros can be represented with double colons as in XXXX:XXXX::XXXX.
Use Static IPv6 Address	Select this option if you have a fixed IPv6 address assigned by your ISP.
IPv6 Address	Enter the IPv6 address assigned by your ISP.
Enable IPv6 Unnumbered Model	Select this to enable IPv6 processing on the interface without assigning an explicit IPv6 address to the interface.
Launch Dhcp6c for Address Assignment (IANA)	Select this check box to obtain an IPv6 address from a DHCPv6 server. The IP address assigned by a DHCPv6 server has priority over the IP address automatically generated by the Router using the IPv6 prefix from an RA.
Launch Dhcp6c for Prefix Delegation (IAPD)	Select this to use DHCP PD (Prefix Delegation) that enables the Device to pass the IPv6 prefix information to its LAN hosts. The hosts can then use the prefix to generate their IPv6 addresses.
Enable PPP Debug Mode	Select this option to display PPP debugging messages on the console.
Bridge PPPoE Frames Between WAN and Local Ports	Select this option to forward PPPoE packets from the WAN port to the LAN ports and from the LAN ports to the WAN port. In addition to the Router's built-in PPPoE client, you can select this to allow up to ten hosts on the LAN to use PPPoE client software on their computers to connect to the ISP via the Router. Each host can have a separate account and a public WAN IP address. This is an alternative to NAT for application where NAT is not appropriate. Clear this if you do not need to allow hosts on the LAN to use PPPoE client software on their computers to connect to the ISP.
Enable IGMP Multicast Proxy	Select this check box to have the Router act as an IGMP proxy on this connection. This allows the Router to get subscribing information and maintain a joined member list for each multicast group. It can reduce multicast traffic significantly.
Enable IGMP Multicast Source	Select this check box to have the Router add routing table entries based on the IGMP traffic.
No Multicast VLAN Filter	Select this check box to have the Router not filter multicast traffic based on its VLAN.
Enable MLD Multicast Proxy	Select this check box to have the Router act as an MLD proxy on this connection. This allows the Router to get subscription information and maintain a joined member list for each multicast group. It can reduce multicast traffic significantly.

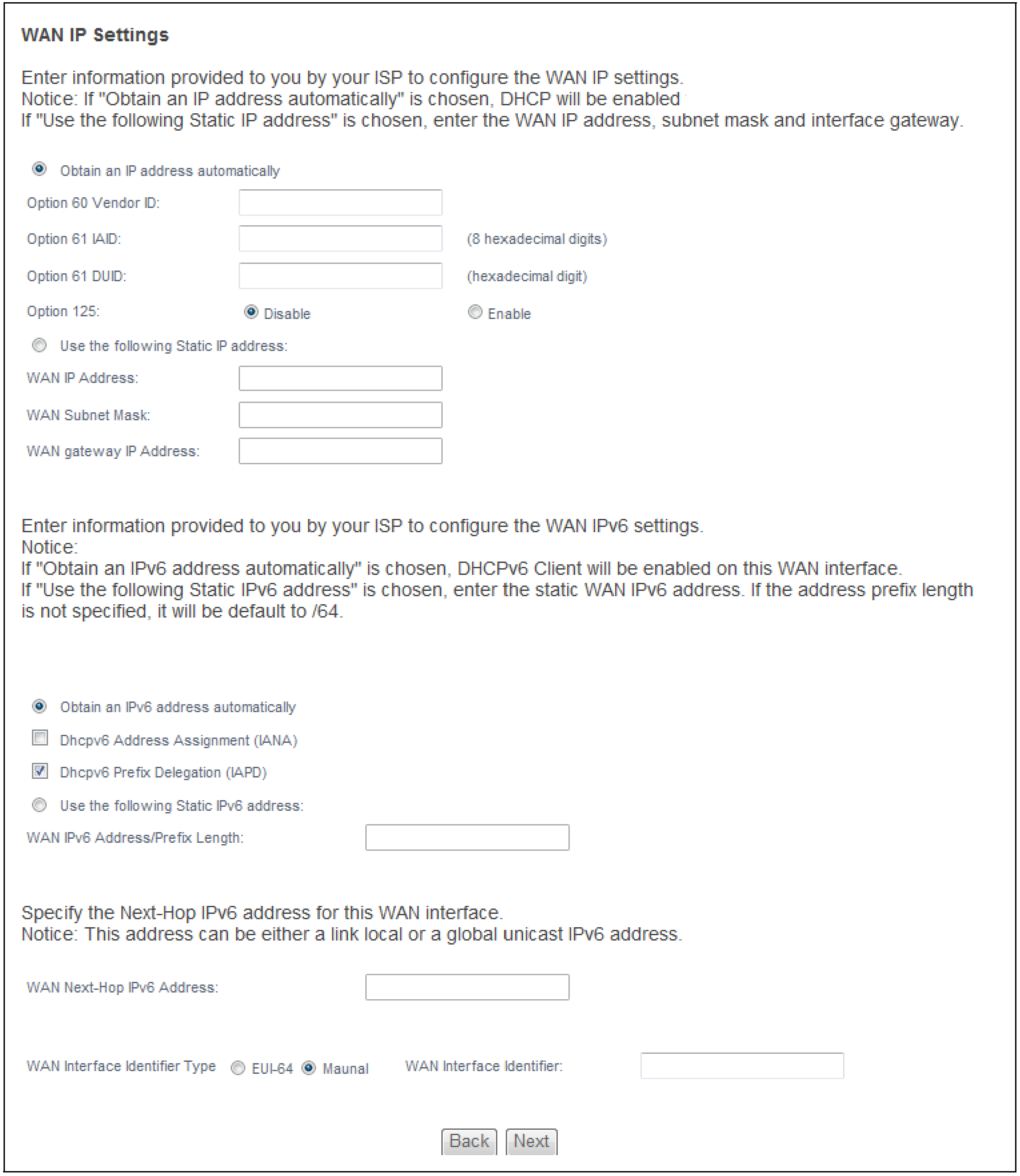
Table 17 WAN Configuration: PPPoE (continued)

LABEL	DESCRIPTION
Enable MLD Multicast Source	Select this check box to have the Router add routing table entries based on the MLD traffic.
Back	Click this button to return to the previous screen.
Next	Click this button to continue.

IPoE

This screen displays when you select **IP over Ethernet** in the **WAN Service Configuration** screen.

Figure 20 WAN Configuration: IPoE



WAN IP Settings

Enter information provided to you by your ISP to configure the WAN IP settings.
Notice: If "Obtain an IP address automatically" is chosen, DHCP will be enabled
If "Use the following Static IP address" is chosen, enter the WAN IP address, subnet mask and interface gateway.

● Obtain an IP address automatically

Option 60 Vendor ID:

Option 61 IAID: (8 hexadecimal digits)

Option 61 DUID: (hexadecimal digit)

Option 125: ● Disable ○ Enable

○ Use the following Static IP address:

WAN IP Address:

WAN Subnet Mask:

WAN gateway IP Address:

Enter information provided to you by your ISP to configure the WAN IPv6 settings.
Notice:
If "Obtain an IPv6 address automatically" is chosen, DHCPv6 Client will be enabled on this WAN interface.
If "Use the following Static IPv6 address" is chosen, enter the static WAN IPv6 address. If the address prefix length is not specified, it will be default to /64.

● Obtain an IPv6 address automatically

□ Dhcpv6 Address Assignment (IANA)

☑ Dhcpv6 Prefix Delegation (IAPD)

○ Use the following Static IPv6 address:

WAN IPv6 Address/Prefix Length:

Specify the Next-Hop IPv6 address for this WAN interface.
Notice: This address can be either a link local or a global unicast IPv6 address.

WAN Next-Hop IPv6 Address:

WAN Interface Identifier Type ○ EUI-64 ● Maunal WAN Interface Identifier:

Table 18 WAN Configuration: IPoE

LABEL	DESCRIPTION
Obtain an IP address automatically	A static IP address is a fixed IP that your ISP gives you. A dynamic IP address is not fixed; the ISP assigns you a different one each time you connect to the Internet. Select this if you have a dynamic IP address.
Option 60 Vendor ID	DHCP Option 60 identifies the vendor and functionality of the Router in DHCP requests that the Router sends to a DHCP server when getting a WAN IP address. Enter the Vendor Class Identifier (Option 60), such as the type of the hardware or firmware.
Option 61 IAID	DHCP Option 61 identifies the Router in DHCP requests the Router sends to a DHCP server when getting a WAN IP address. Enter the Identity Association Identifier (IAID) of the Router. For example, the WAN connection index number.
Option 61 DUID	Enter the DHCP Unique Identifier (DUID) of the Router.
Option 125	Enable this to add vendor specific information to DHCP requests that the Router sends to a DHCP server when getting a WAN IP address.
Use the following Static IP address	Select this if you have a static IP address.
WAN IP Address	Enter the static IP address provided by your ISP.
WAN Subnet Mask	Enter the subnet mask provided by your ISP.
WAN gateway IP Address	Enter the gateway IP address provided by your ISP.
Obtain an IPv6 address automatically	Select this option to have the Router use the IPv6 prefix from the connected router's Router Advertisement (RA) to generate an IPv6 address.
Dhcpv6 Address Assignment	Select this check box to obtain an IPv6 address from a DHCPv6 server. The IP address assigned by a DHCPv6 server has priority over the IP address automatically generated by the Router using the IPv6 prefix from an RA.
Dhcp6c Prefix Delegation (IAPD)	Select this to use DHCP PD (Prefix Delegation) that enables the Device to pass the IPv6 prefix information to its LAN hosts. The hosts can then use the prefix to generate their IPv6 addresses.
Use the following Static IPv6 address	Select this option if you have a fixed IPv6 address assigned by your ISP.
WAN IPv6 Address/Prefix Length	Enter the static IPv6 address and bit number of the IPv6 subnet mask provided by your ISP.
WAN Next-Hop IPv6 Address	Enter the gateway IPv6 address provided by your ISP.

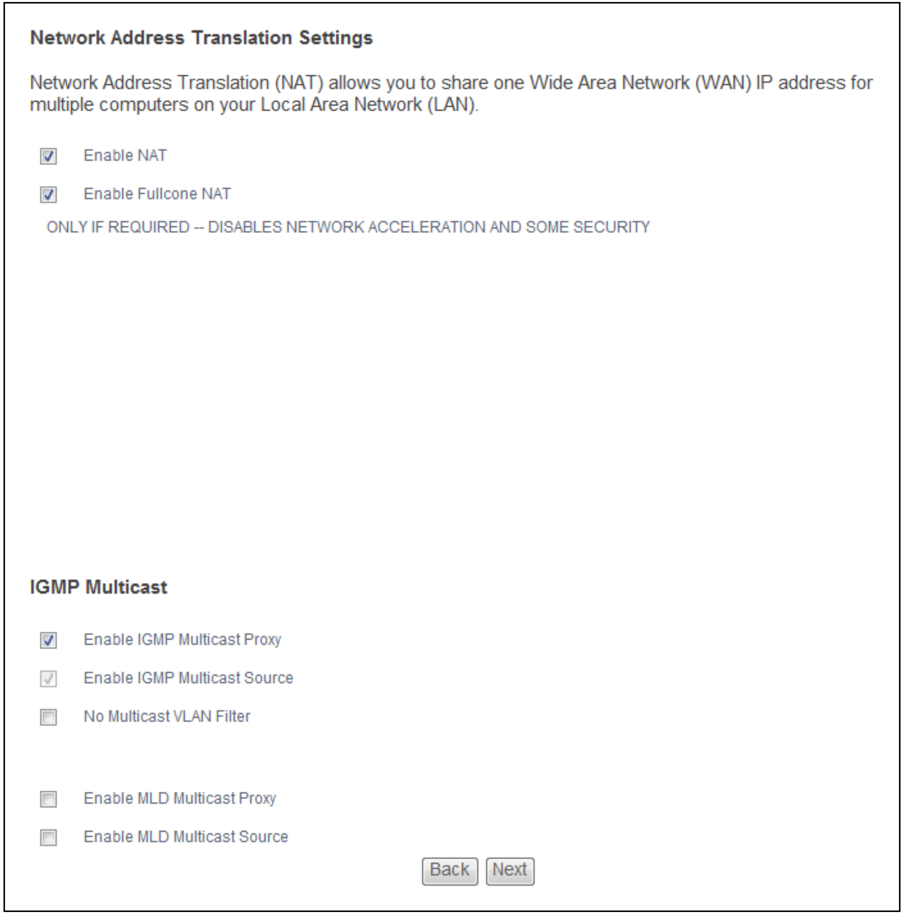
Table 18   WAN Configuration: IPoE (continued)

LABEL	DESCRIPTION
WAN Interface Identifier Type	Select **Random** to have the Device randomly configure a WAN Identifier, which is shown in the WAN Interface Identifier field. Select **EUI-64** to use the EUI-64 format to generate an interface ID from the MAC address of the WAN interface. Select **Manual** to manually enter a WAN Identifier as the interface ID to identify the WAN interface. The WAN Identifier is appended to the IPv6 address prefix to create the routable global IPv6 address.
WAN Interface Identifier	If you selected **Random**, this field is automatically configured. If you selected **Manual**, enter the WAN Identifier in this field. The WAN identifier should be unique and 64 bits in hexadecimal form. Every 16 bit block should be separated by a colon as in XXXX:XXXX:XXXX:XXXX where X is a hexadecimal character. Blocks of zeros can be represented with double colons as in XXXX:XXXX::XXXX.
Back	Click this button to return to the previous screen.
Next	Click this button to continue.

3.3.1.4 NAT and IGMP Multicast

This screen is available only when you select **IP over Ethernet** in the **WAN Service Configuration** screen.

Figure 21 WAN Configuration: NAT and IGMP Multicast: IPoE



Network Address Translation Settings

Network Address Translation (NAT) allows you to share one Wide Area Network (WAN) IP address for multiple computers on your Local Area Network (LAN).

☑ Enable NAT

☑ Enable Fullcone NAT

ONLY IF REQUIRED -- DISABLES NETWORK ACCELERATION AND SOME SECURITY

IGMP Multicast

☑ Enable IGMP Multicast Proxy

☑ Enable IGMP Multicast Source

□ No Multicast VLAN Filter

□ Enable MLD Multicast Proxy

□ Enable MLD Multicast Source

Table 19 WAN Configuration: NAT and IGMP Multicast: IPoE

LABEL	DESCRIPTION
Enable NAT	Select this check box to activate NAT on this connection.
Enable Fullcone NAT	Select this check box to activate full cone NAT on this connection. This field is available only when you select **Enable NAT**.
Enable IGMP Multicast Proxy	Select this check box to have the Router act as an IGMP proxy on this connection. This allows the Router to get subscribing information and maintain a joined member list for each multicast group. It can reduce multicast traffic significantly.
Enable IGMP Multicast Source	Select this check box to have the Router add routing table entries based on the IGMP traffic.

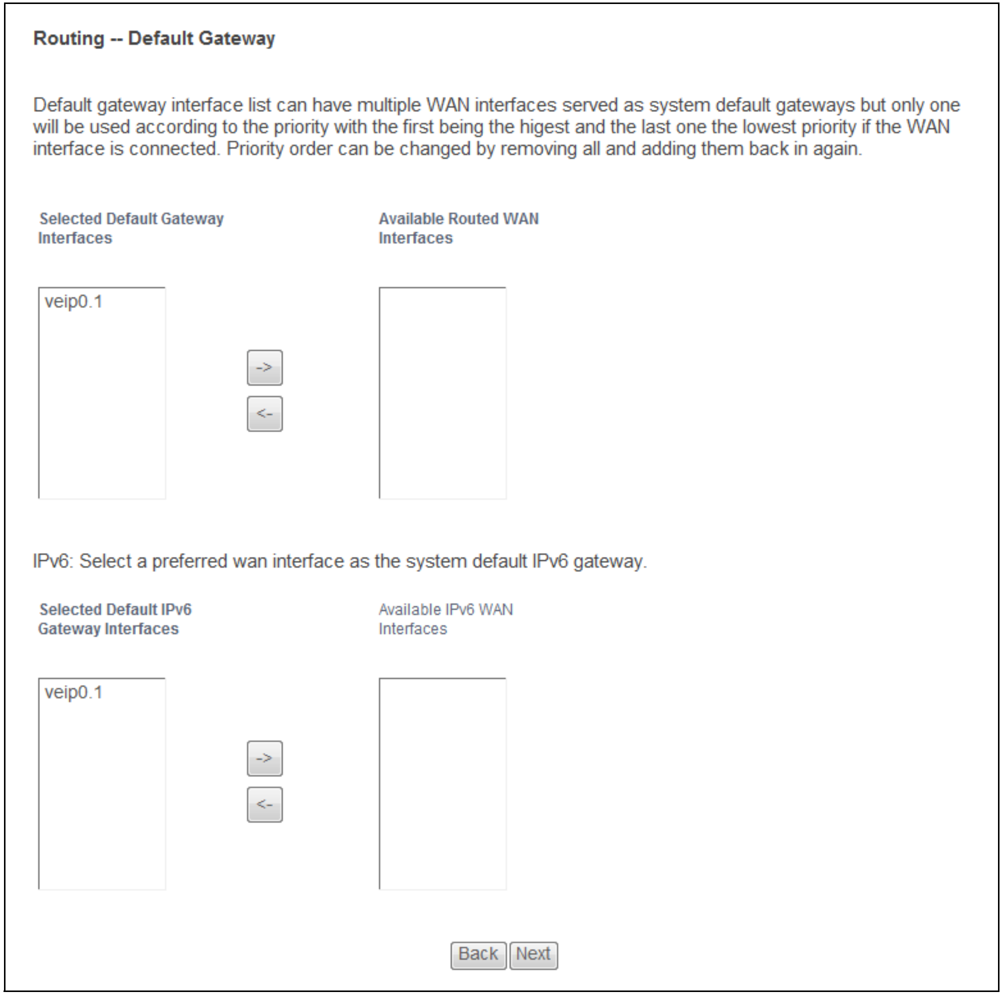
Table 19 WAN Configuration: NAT and IGMP Multicast: IPoE (continued)

LABEL	DESCRIPTION
No Multicast VLAN Filter	Select this check box to have the Router not filter multicast traffic based on its VLAN.
Enable MLD Multicast Proxy	Select this check box to have the Router act as an MLD proxy on this connection. This allows the Router to get subscription information and maintain a joined member list for each multicast group. It can reduce multicast traffic significantly.
Enable MLD Multicast Source	Select this check box to have the Router add routing table entries based on the MLD traffic.
Back	Click this button to return to the previous screen.
Next	Click this button to continue.

3.3.1.5 Default Gateway (PPPoE or IPoE)

The screen is not available when you select **Bridging** in the **WAN Service Configuration** screen.

Figure 22 WAN Configuration: Default Gateway



Routing -- Default Gateway

Default gateway interface list can have multiple WAN interfaces served as system default gateways but only one will be used according to the priority with the first being the higest and the last one the lowest priority if the WAN interface is connected. Priority order can be changed by removing all and adding them back in again.

Selected Default Gateway Interfaces: veip0.1

Available Routed WAN Interfaces:

IPv6: Select a preferred wan interface as the system default IPv6 gateway.

Selected Default IPv6 Gateway Interfaces: veip0.1

Available IPv6 WAN Interfaces:

Table 20 WAN Configuration: Default Gateway

LABEL	DESCRIPTION
Selected Default Gateway Interfaces	Select a WAN interface through which to forward the service's traffic. You can select multiple WAN interfaces for the device to try. The Router tries the WAN interfaces in the order listed and uses only the default gateway of the first WAN interface that connects; there is no backup WAN function. To change the priority order remove them all and add them back in again.
Available Routed WAN Interfaces	Select from these WAN interfaces.

Table 20 WAN Configuration: Default Gateway (continued)

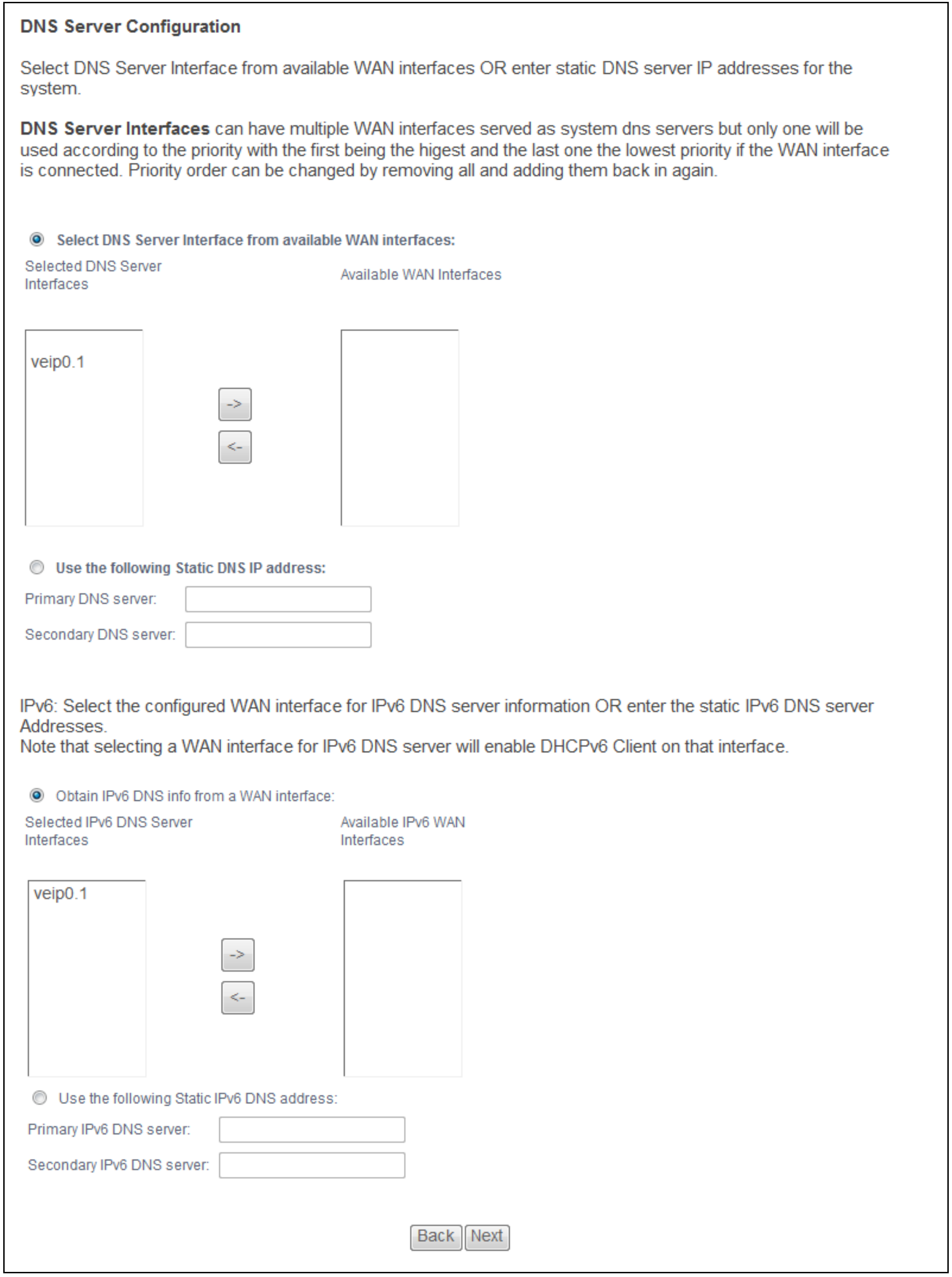
LABEL	DESCRIPTION
Selected WAN Interface	Select a WAN interface through which to forward IPv6 traffic.
Selected Default IPv6 Gateway Interfaces	Select an IPv6 WAN interface through which to forward the service’s IPv6 traffic. You can select multiple WAN interfaces for the device to try. The Router tries the WAN interfaces in the order listed and uses only the default gateway of the first WAN interface that connects; there is no backup WAN function. To change the priority order remove them all and add them back in again.
Available IPv6 WAN Interfaces	Select from these IPv6 WAN interfaces.
Back	Click this button to return to the previous screen.
Next	Click this button to continue.

3.3.1.6 DNS Server

The screen is not available when you select **Bridging** in the **WAN Service Configuration** screen.

ⓘ If you configure only one IPoE connection, you must enter the static DNS server address.

Figure 23 WAN Configuration: DNS Server: PPPoE or IPoE



DNS Server Configuration

Select DNS Server Interface from available WAN interfaces OR enter static DNS server IP addresses for the system.

DNS Server Interfaces can have multiple WAN interfaces served as system dns servers but only one will be used according to the priority with the first being the higest and the last one the lowest priority if the WAN interface is connected. Priority order can be changed by removing all and adding them back in again.

● **Select DNS Server Interface from available WAN interfaces:**

Selected DNS Server Interfaces: veip0.1

Available WAN Interfaces:

○ **Use the following Static DNS IP address:**

Primary DNS server:

Secondary DNS server:

IPv6: Select the configured WAN interface for IPv6 DNS server information OR enter the static IPv6 DNS server Addresses.
Note that selecting a WAN interface for IPv6 DNS server will enable DHCPv6 Client on that interface.

● Obtain IPv6 DNS info from a WAN interface:

Selected IPv6 DNS Server Interfaces: veip0.1

Available IPv6 WAN Interfaces:

○ Use the following Static IPv6 DNS address:

Primary IPv6 DNS server:

Secondary IPv6 DNS server:

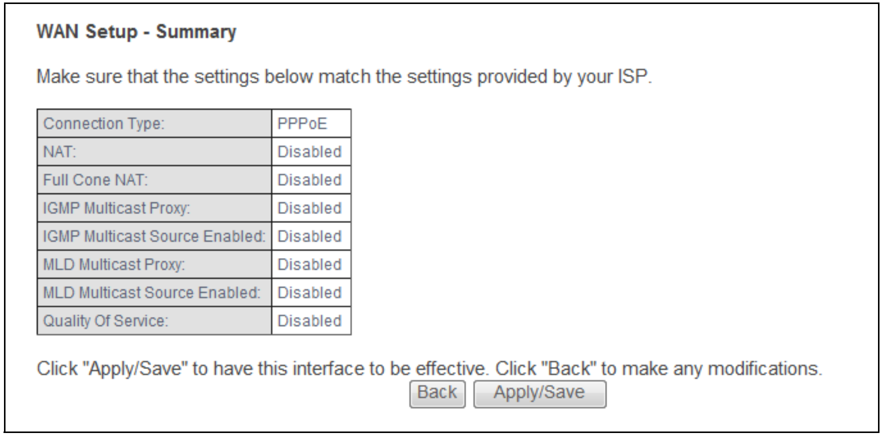
Table 21 WAN Configuration: DNS Server: PPPoE or IPoE

LABEL	DESCRIPTION
Select DNS Server Interface from available WAN interfaces	Select this to have the Router get the DNS server addresses from one of the Router’s WAN interfaces.
Selected DNS Server Interfaces	Select a WAN interface through which to get DNS server addresses. You can select multiple WAN interfaces for the device to try. The Router tries the WAN interfaces in the order listed and uses only the DNS server information of the first WAN interface that connects; there is no backup WAN function. To change the priority order remove them all and add them back in again.
Available WAN Interfaces	These are the WAN interfaces you can select from.
Use the following Static DNS IP address	Select this to have the Router use the DNS server addresses you configure manually.
Primary DNS server	Enter the first DNS server address assigned by the ISP.
Secondary DNS server	Enter the second DNS server address assigned by the ISP.
Obtain IPv6 DNS info from a WAN interface	Select this to have the Router get the IPv6 DNS server addresses from the ISP automatically.
WAN Interface selected	Select a WAN interface through which you want to obtain the IPv6 DNS related information.
Use the following Static IPv6 DNS address	Select this to have the Router use the IPv6 DNS server addresses you configure manually.
Primary IPv6 DNS server	Enter the first IPv6 DNS server address assigned by the ISP.
Secondary IPv6 DNS server	Enter the second IPv6 DNS server address assigned by the ISP.
Back	Click this button to return to the previous screen.
Next	Click this button to continue.

3.3.1.7 Configuration Summary

This read-only screen shows the current WAN connection settings.

Figure 24 WAN Configuration: Configuration Summary



WAN Setup - Summary

Make sure that the settings below match the settings provided by your ISP.

Connection Type:	PPPoE
NAT:	Disabled
Full Cone NAT:	Disabled
IGMP Multicast Proxy:	Disabled
IGMP Multicast Source Enabled:	Disabled
MLD Multicast Proxy:	Disabled
MLD Multicast Source Enabled:	Disabled
Quality Of Service:	Disabled

Click "Apply/Save" to have this interface to be effective. Click "Back" to make any modifications.

Table 22 WAN Configuration: Configuration Summary

LABEL	DESCRIPTION
Connection Type	This is the encapsulation method used by this connection.
NAT	This shows whether NAT is active or not for this connection.
Full Cone NAT	This shows whether full cone NAT is active or not for this connection.
IGMP Multicast Proxy	This shows whether IGMP proxy is activated or not for this connection. IGMP is not available when the connection uses the bridging service.
IGMP Multicast Source Enabled	This shows whether IGMP source enable is activated or not for this connection. IGMP source enable has the Router add routing table entries based on the IGMP traffic.
MLD Multicast Proxy	This shows whether MLD proxy is activated or not for this connection. MLD is not available when the connection uses the bridging service.
MLD Multicast Source Enabled	This shows whether MLD source enable is activated or not for this connection. MLD source enable has the Router add routing table entries based on the MLD traffic.
Quality Of Service	This shows whether QoS is active or not for this connection.
Back	Click this button to return to the previous screen.
Apply/Save	Click this button to save your changes.

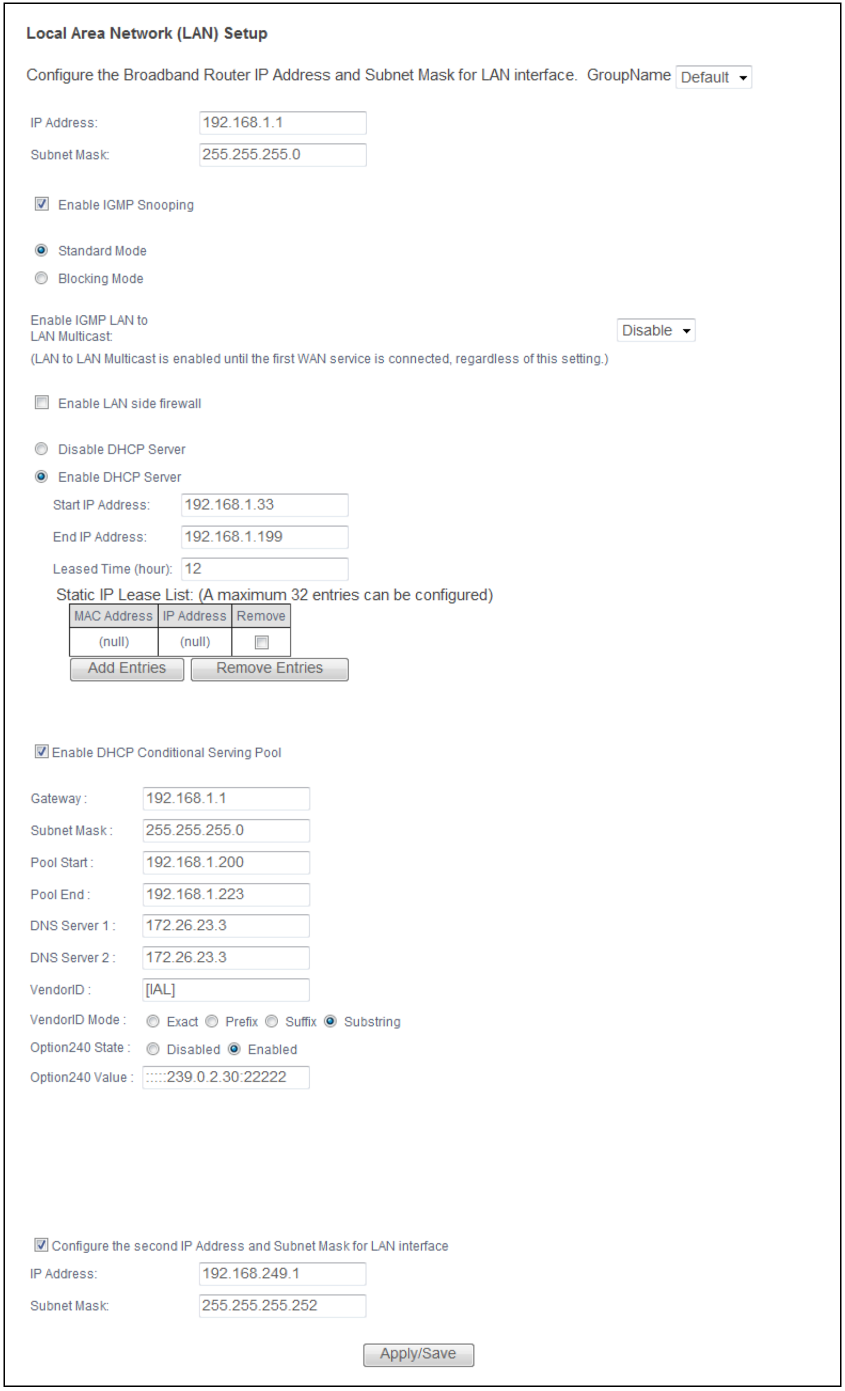
LAN

4 Chapter

4.1 LAN Setup

Click **Advanced Setup > LAN** to open the **LAN Setup** screen. Use this screen to set the Local Area Network IP address and subnet mask of your Router and configure the DNS server information that the Router sends to the DHCP client devices on the LAN.

Figure 25 LAN Setup



Local Area Network (LAN) Setup

Configure the Broadband Router IP Address and Subnet Mask for LAN interface. GroupName Default ▾

IP Address:	192.168.1.1
Subnet Mask:	255.255.255.0

☑ Enable IGMP Snooping

● Standard Mode
○ Blocking Mode

Enable IGMP LAN to LAN Multicast: Disable ▾
(LAN to LAN Multicast is enabled until the first WAN service is connected, regardless of this setting.)

☐ Enable LAN side firewall

○ Disable DHCP Server
● Enable DHCP Server

Start IP Address:	192.168.1.33
End IP Address:	192.168.1.199
Leased Time (hour):	12

Static IP Lease List: (A maximum 32 entries can be configured)

MAC Address	IP Address	Remove
(null)	(null)	☐

☑ Enable DHCP Conditional Serving Pool

Gateway :	192.168.1.1
Subnet Mask :	255.255.255.0
Pool Start :	192.168.1.200
Pool End :	192.168.1.223
DNS Server 1 :	172.26.23.3
DNS Server 2 :	172.26.23.3
VendorID :	[IAL]
VendorID Mode :	○ Exact ○ Prefix ○ Suffix ● Substring
Option240 State :	○ Disabled ● Enabled
Option240 Value :	:::::239.0.2.30:22222

☑ Configure the second IP Address and Subnet Mask for LAN interface

IP Address:	192.168.249.1
Subnet Mask:	255.255.255.252

Table 23 LAN Setup

LABEL	DESCRIPTION
Group Name	Select the LAN interface for which to configure the IP address and subnet mask.
IP Address	Enter the LAN IP address you want to assign to your Router. The factory default is 192.168.1.1.
Subnet Mask	Type the subnet mask of your network. The factory default is 255.255.255.0. Your Router automatically computes the subnet mask based on the IP address you enter, so do not change this field unless you are instructed to do so.
Enable IGMP Snooping	IGMP (Internet Group Multicast Protocol) is a network-layer protocol used to establish membership in a multicast group. Select this to activate IGMP Snooping. This allows the Router to passively learn memberships in multicast groups. Otherwise, clear the option to deactivate it. Select **Standard Mode** to have the Router forward multicast packets to a port that joins the multicast group and broadcast unknown multicast packets from the WAN to all LAN ports. Select **Blocking Mode** to have the Router block all unknown multicast packets from the WAN.
Enable IGMP LAN to LAN Multicast	Select this to allow IGMP multicast traffic to travel between the LAN ports.
Disable DHCP Server	Select this to have the Router not provide DHCP services. Users must configure LAN devices with manual network settings if you do not have another DHCP server on the network.
Enable DHCP Server	Select this to have the Router serve as the DHCP server for the network to assign IP addresses and provide subnet mask, gateway, and DNS server information to LAN devices.
Start IP Address	This field specifies the first of the contiguous addresses in the IP address pool.
End IP Address	This field specifies the last of the contiguous addresses in the IP address pool.
Leased Time (hour)	Specify for how many hours to assign an IP address to a LAN device before making it available for reassignment to other systems.
Static IP Lease List	Use this table to assign IP addresses on the LAN to specific computers based on their MAC Addresses.
MAC Address	The MAC (Media Access Control) of a LAN device to which the entry’s IP address is assigned.
IP Address	This field displays the IP address reserved for the LAN device with the entry’s MAC.
Remove	Select entries and click the **Remove Entries** button to delete them.
Add Entries	Click this button to create a new static IP lease entry.
Enable DHCP Conditional Serving Pool	Select this to enable the DHCP conditional serving pool for IPTV set-top boxes. DHCP server will offer IP address from the conditional pool if the DHCP request sent from a set-top box contains the specific Vendor ID.

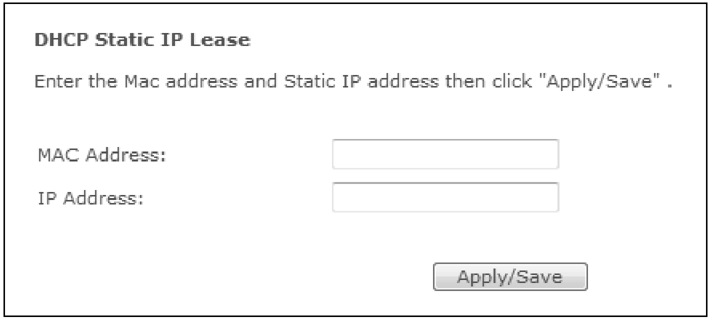
Table 23 LAN Setup (continued)

LABEL	DESCRIPTION
Gateway	Enter the IPTV server’s IP address.
Subnet Mask	Enter the IPTV server’s subnet mask.
Pool Start/End	Specify the first and last of the contiguous addresses in the IPTV server’s IP address pool.
DNS Server 1/2	Enter the IPTV server’s first/second DNS server IP address.
VendorID	Specify the IPTV’s vendor ID.
VendorID Mode	Specify the IPTV’s vendor ID mode type.
VendorID Exclude	Specify if you want to enable vendor ID exclude.
Option240 State	Select **Enabled** to have the Router assign DHCP option 240 to the LAN set top box.
Option240 Value	Enter the option 240 value.
Configure the second IP Address and Subnet Mask for LAN interface	Select the check box to use IP alias to configure another LAN network for the Router. IP alias partitions a physical network into different logical networks over the same Ethernet interface. The Router supports multiple logical LAN interfaces via its physical Ethernet interface with the Router itself as the gateway for the LAN network. You can also configure firewall rules to control access to the LAN's logical network (subnet).
IP Address	Enter the second LAN IP address of your Router in dotted decimal notation.
Subnet Mask	Type the subnet mask of your network in dotted decimal notation, for example 255.255.255.0 (factory default).

4.1.1 Add DHCP Static IP Lease

Click **Add Entries** in the **LAN Setup** screen to display the following screen.

Figure 26 Add DHCP Static IP Lease



DHCP Static IP Lease

Enter the Mac address and Static IP address then click "Apply/Save" .

MAC Address:

IP Address:

Table 24 Add DHCP Static IP Lease

LABEL	DESCRIPTION
MAC Address	Enter the MAC address of a computer on your LAN. Every Ethernet device has a unique MAC (Media Access Control) address. The MAC address is assigned at the factory and consists of six pairs of hexadecimal characters, for example, 00:A0:C5:00:00:02.
IP Address	Enter the IP address that you want to assign to the computer on your LAN with the MAC address that you will also specify.
Apply/Save	Click this button to save your changes and go back to the previous screen.

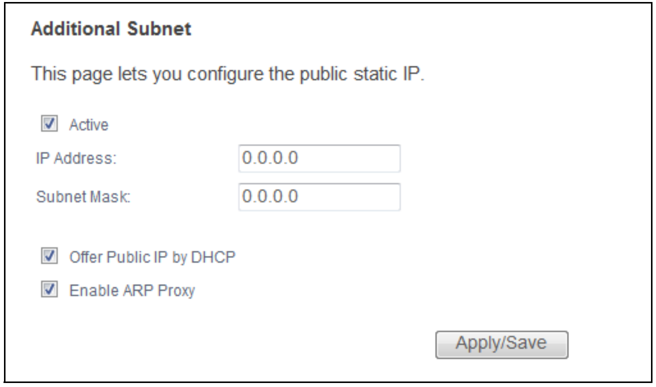
4.2 LAN Additional Subnet

Click **Advanced Setup > LAN > Additional Subnet** to open the **Additional Subnet** screen. Use this screen to configure IP alias and public static IP.

IP alias allows you to partition a physical network into different logical networks over the same Ethernet interface. The Router supports multiple logical LAN interfaces via its physical Ethernet interface with the Router itself as the gateway for the LAN network. When you use IP alias, you can also configure firewall rules to control access to the LAN's logical network (subnet).

If your ISP provides the Public LAN service, the Router may use an LAN IP address that can be accessed from the WAN.

Figure 27 LAN Additional Subnet



Additional Subnet

This page lets you configure the public static IP.

☑ Active

IP Address: 0.0.0.0

Subnet Mask: 0.0.0.0

☑ Offer Public IP by DHCP

☑ Enable ARP Proxy

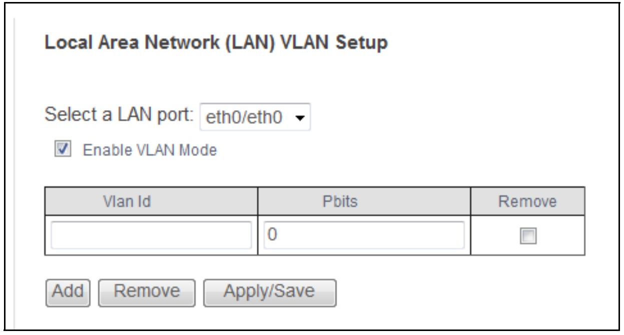
Table 25 LAN Additional Subnet

LABEL	DESCRIPTION
Active	Select the check box to configure a LAN network for the Router.
IP Address	Enter the IP address of your Router in dotted decimal notation.
IP Subnet Mask	Your Router will automatically calculate the subnet mask based on the IP address that you assign. Unless you are implementing subnetting, use the subnet mask computed by the Router.
Offer Public IP by DHCP	Select the check box to enable the Router to provide public IP addresses by DHCP server.
Enable ARP Proxy	Select the check box to enable the ARP (Address Resolution Protocol) proxy.
Apply/Save	Click this button to save your changes and go back to the previous screen.

4.3 LAN VLAN

Click **Advanced Setup > LAN > LAN VLAN** to open this screen. Use this screen to control the VLAN ID and IEEE 802.1p priority tags of traffic sent out through individual LAN ports.

Figure 28 LAN VLAN



Local Area Network (LAN) VLAN Setup

Select a LAN port: eth0/eth0

☑ Enable VLAN Mode

Vlan Id	Pbits	Remove
	0	□

Table 26 LAN VLAN

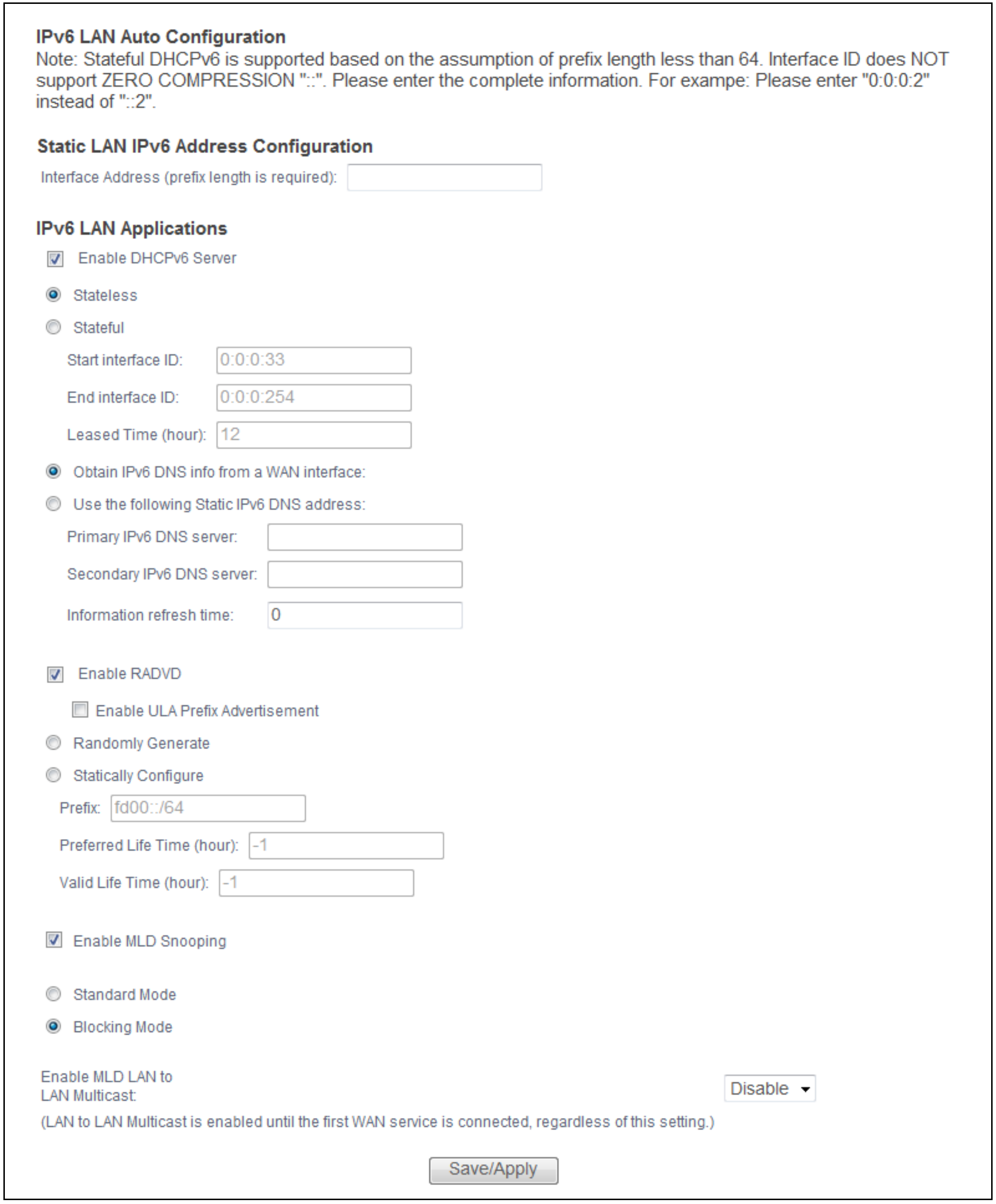
LABEL	DESCRIPTION
Select a LAN port	**eth0** ~ **eth3** represent the Ethernet LAN ports 1 ~ 4. Select a port.
Enable VLAN Mode	Select this to use VLAN on the LAN port you selected.
VLAN ID	Specify the VLAN ID (from 0 to 4094) to use for this LAN port’s downstream traffic.

Table 26 LAN VLAN (continued)

LABEL	DESCRIPTION
Pbits	Set the IEEE 802.1p priority tag value (o to 7) to use for the LAN port's downstream traffic. The larger the number, the higher the priority.
Remove	Select an entry and click the **Remove** button to delete it.
Add	Click this button to create a new LAN VLAN setting entry.
Apply/Save	Click this button to save your changes and go back to the previous screen.

4.4 IPv6 LAN Auto Configuration

Click **Advanced Setup > LAN > IPv6 Autoconfig** to open the **IPv6 LAN Auto Configuration** screen. Use this screen to set the Local Area Network interface IPv6 settings.



IPv6 LAN Auto Configuration

Note: Stateful DHCPv6 is supported based on the assumption of prefix length less than 64. Interface ID does NOT support ZERO COMPRESSION "::". Please enter the complete information. For exampe: Please enter "0:0:0:2" instead of "::2".

Static LAN IPv6 Address Configuration

Interface Address (prefix length is required):

IPv6 LAN Applications

☑ Enable DHCPv6 Server

● Stateless

○ Stateful

Start interface ID: 0:0:0:33

End interface ID: 0:0:0:254

Leased Time (hour): 12

● Obtain IPv6 DNS info from a WAN interface:

○ Use the following Static IPv6 DNS address:

Primary IPv6 DNS server:

Secondary IPv6 DNS server:

Information refresh time: 0

☑ Enable RADVD

□ Enable ULA Prefix Advertisement

○ Randomly Generate

○ Statically Configure

Prefix: fd00::/64

Preferred Life Time (hour): -1

Valid Life Time (hour): -1

☑ Enable MLD Snooping

○ Standard Mode

● Blocking Mode

Enable MLD LAN to LAN Multicast: Disable

(LAN to LAN Multicast is enabled until the first WAN service is connected, regardless of this setting.)

Figure 29 IPv6 LAN Auto Configuration

The following table describes the fields in this screen.

Table 27 IPv6 LAN Auto Configuration

LABEL	DESCRIPTION
Interface Address	To use a static IPv6 address, enter the IPv6 address prefix and prefix length that the Router uses for the LAN IPv6 address. The IPv6 prefix length specifies how many most significant bits (starting from the left) in the address compose the network address. This field displays the bit number of the IPv6 subnet mask.
Enable DHCPv6 Server	Select this to have the Router act as a DHCPv6 server and pass IPv6 addresses, DNS server and domain name information to DHCPv6 clients.
Stateless	Select this to have the Router use IPv6 stateless autoconfiguration.
Stateful	Select this to have the Router use IPv6 stateful autoconfiguration. **Start interface ID**: specify the first IPv6 address in the pool of addresses that can be assigned to DHCPv6 clients. **End interface ID**: specify the last IPv6 address in the pool of addresses that can be assigned to DHCPv6 clients. **Leased Time (hour)**: Specify for how many hours to assign an IPv6 address to a DHCPv6 client before making it available for reassignment to other systems.
Obtain IPv6 DNS info from a WAN interface	Select this to have the Router get the IPv6 DNS server addresses from the ISP automatically.
Use the following Static IPv6 DNS address	Select this to have the Router use the IPv6 DNS server addresses you configure manually.
Primary IPv6 DNS server	Enter the first IPv6 DNS server address assigned by the ISP.
Secondary IPv6 DNS server	Enter the second IPv6 DNS server address assigned by the ISP.
Enable RADVD	Select this to have the Router send router advertisement messages to the LAN hosts. Router advertisement is a response to a router solicitation or a periodical multicast advertisement from a router to advertise its presence and other parameters, such as IPv6 prefix and DNS information. Router solicitation is a request from a host to locate a router that can act as the default router and forward packets. Note: The LAN hosts neither generate global IPv6 addresses nor communicate with other networks if you disable this feature.
Enable ULA Prefix Advertisement	Select this to send Unique Local IPv6 Unicast Addresses (ULA) advertisement messages to the LAN hosts.
Randomly Generate	Select this to automatically create a LAN IPv6 address prefix.

Table 27 IPv6 LAN Auto Configuration (continued)

LABEL	DESCRIPTION
Statically Configure	Select this to send a fixed LAN IPv6 address prefix. **Prefix**: enter the IPv6 prefix and length the Router uses to generate the LAN IPv6 address. The prefix length specifies how many most significant bits (starting from the left) in the address compose the network address. This field displays the bit number of the IPv6 subnet mask. **Preferred Life Time (hour)**: enter the preferred lifetime for the prefix. -1 means no time limit. **Valid Life Time (hour)**: enter the valid lifetime for the prefix. Set this greater than or equal to the preferred life time. -1 means no time limit.
Enable MLD Snooping	Select this to have the Router check Multicast Listener Discovery (MLD) packets to learn the multicast group membership. This helps reduce multicast traffic.
Standard Mode	Select this to have the Router forward multicast packets to a port that joins the multicast group and broadcast unknown multicast packets from the WAN to all LAN ports.
Blocking Mode	Select this to have the Router block all unknown multicast packets from the WAN.
Enable MLD LAN to LAN Multicast	Select this to allow MLD multicast traffic to travel between the LAN ports.
Save/Apply	Click this button to save your changes.

VPN

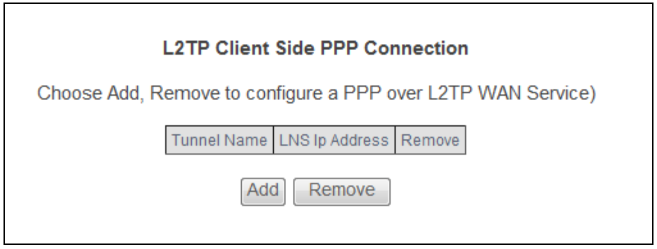
5 Chapter

5.1 L2TP VPN Client

Use this screen to manage WAN service Layer 2 Tunneling Protocol (L2TP) client settings for connecting to L2TP servers.

Click **Advanced Setup > VPN > L2TP Client** to open this screen as shown next.

Figure 30 L2TP Client



L2TP Client Side PPP Connection

Choose Add, Remove to configure a PPP over L2TP WAN Service)

Tunnel Name	LNS Ip Address	Remove

This screen contains the following fields:

Table 28 L2TP Client

LABEL	DESCRIPTION
Tunnel Name	This is the name of this client connection.
LNS Ip Address	This is the IP address of the L2TP VPN server.
Remove	Select entries and click the **Remove** button to delete them.
Status	This is the connection status.
Add	Click this to add a VPN client profile.

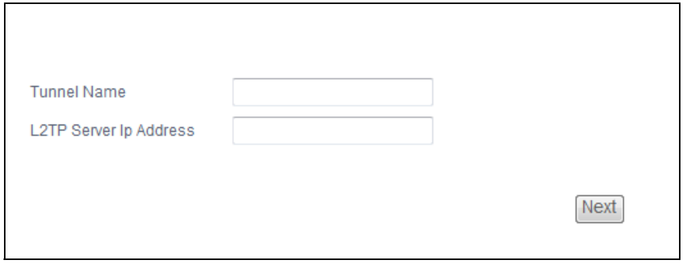
5.1.1 L2TP VPN Client: Add

Click **Advanced Setup > VPN > L2TP Client > Add** to configure L2TP WAN service settings for connecting to L2TP servers.

5.1.1.1 Name and Server IP Address

This screen displays when you add a new L2TP client WAN service.

Figure 31 L2TP Client: Add



Tunnel Name

L2TP Server Ip Address

This screen contains the following fields:

Table 29 L2TP Client: Add

LABEL	DESCRIPTION
Tunnel Name	Enter the name for this client connection.
L2TP Server Ip Address	Enter the IP address of the L2TP server.
L2TP Protocol Version	Select the L2TP Protocol Version **2** or **3**. L2TPv2 is a standard method for tunneling Point-to-Point Protocol (PPP) while L2TPv3 provides improved support for other types of networks including frame relay and ATM.
NAT Mode?	Select **Yes** if the client will be located behind a NAT enabled router. This will allow multiple clients using NAT to connect with L2TP at the same time.
Auth Protocol	Select the Authentication Protocol allowed for the connection. Options are: **PAP** - Password Authentication Protocol (PAP) authentication occurs in clear text and does not use encryption. It's probably not a good idea to rely on this for security. **CHAP** - Challenge Handshake Authentication Protocol (CHAP) provides authentication through a shared secret key and uses a three way handshake. **MSCHAPv1** - Microsoft CHAP v1 (MSCHAPv1) provides authentication through a shared secret key and uses a three way handshake. It provides improved usability with Microsoft products. **MSCHAPv2** - Microsoft CHAP v2 (MSCHAPv2) provides encryption through a shared secret key and uses a three way handshake. It provides additional security over **MSCHAPv1**, including two-way authentication.
MPPE Encryption	If **MSCHAPv1** or **MSCHAPv2** is selected as an **Auth Protocol**, use the drop-down list box to select the type of Microsoft Point-to-Point Encryption (MPPE). Options are: **MPPE 40 -** MPPE with 40 bit session key length **MPPE 128 -** MPPE with 128 bit session key length **Auto -** Automatically select either **MPPE 40** or **MPPE 128**

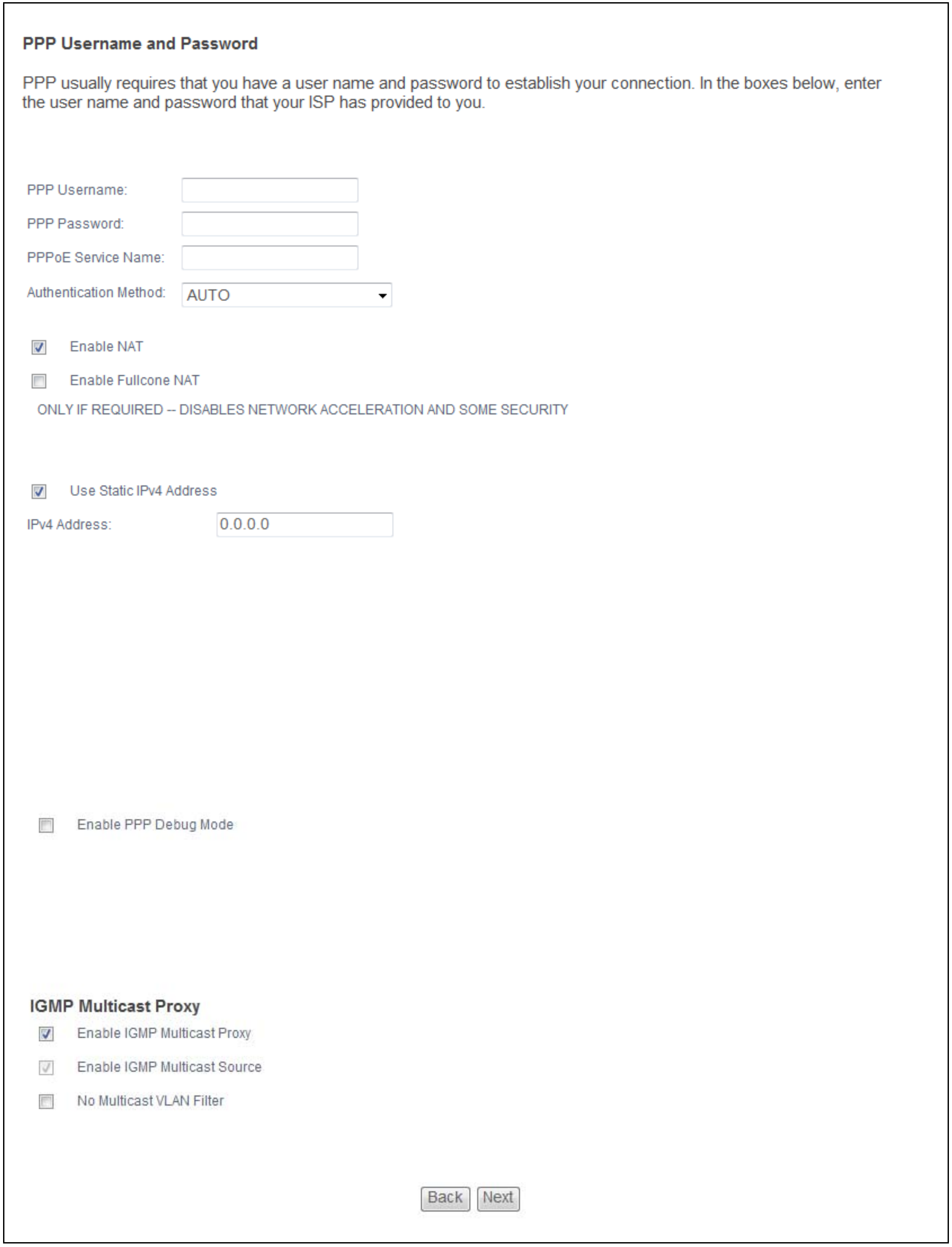
Table 29 L2TP Client: Add (continued)

LABEL	DESCRIPTION
MPPE Stateful?	Select **Yes** to enable stateful MPPE encryption. This can increase performance over stateless MPPE, but should not be used in lossy network environments like layer two tunnels over the Internet.
User Name	Enter the user name for connecting to the L2TP server.
Password	Enter the password for connecting to the L2TP server.
Retype	Retype the password for connecting to the L2TP server.
Get IP automatically	Select **Yes** to have the L2TP server assign a local IP address to the client.
Assign IP Address	Enter the IP address for the client. Ensure that the IP address is configured to be allowed on the L2TP server.
Idle Timeout	Enter the time in minutes to timeout L2TP connections.

5.1.1.2 PPP

This screen displays second when you add a new L2TP client WAN service.

Figure 32 L2TP Client Add: PPP



PPP Username and Password

PPP usually requires that you have a user name and password to establish your connection. In the boxes below, enter the user name and password that your ISP has provided to you.

PPP Username:	
PPP Password:	
PPPoE Service Name:	
Authentication Method:	AUTO

☑ Enable NAT

□ Enable Fullcone NAT

ONLY IF REQUIRED -- DISABLES NETWORK ACCELERATION AND SOME SECURITY

☑ Use Static IPv4 Address

IPv4 Address: 0.0.0.0

□ Enable PPP Debug Mode

IGMP Multicast Proxy

☑ Enable IGMP Multicast Proxy

☑ Enable IGMP Multicast Source

□ No Multicast VLAN Filter

This screen contains the following fields:

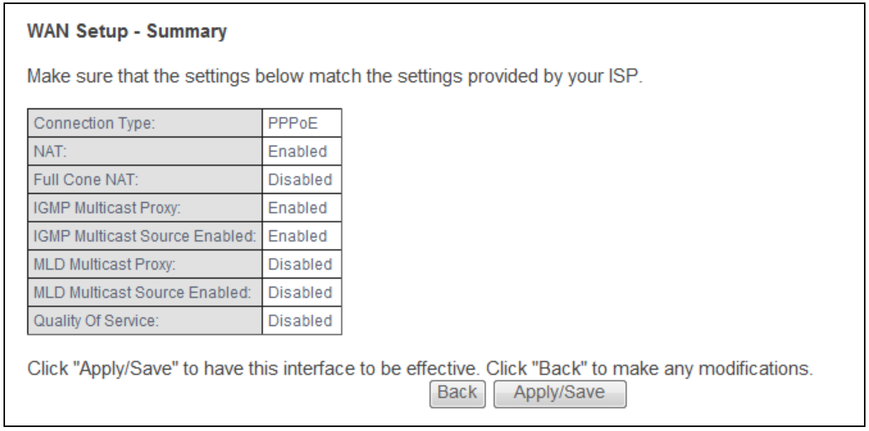
Table 30 L2TP Client Add: PPP

LABEL	DESCRIPTION
PPP Username	Enter the user name exactly as your ISP assigned. If assigned a name in the form user@domain where domain identifies a service name, then enter both components exactly as given.
PPP Password	Enter the password associated with the user name above.
PPPoE Service Name	Type the name of your PPPoE service here. This field is not available for a PPPoA connection.
Authentication Method	The Router supports PAP (Password Authentication Protocol) and CHAP (Challenge Handshake Authentication Protocol). CHAP is more secure than PAP; however, PAP is readily available on more platforms. Use the drop-down list box to select an authentication protocol for outgoing calls. Options are: **AUTO** - Your Router accepts either CHAP or PAP when requested by this remote node. **PAP** - Your Router accepts PAP only. **CHAP** - Your Router accepts CHAP only. **MSCHAP** - Your Router accepts MSCHAP only. MS-CHAP is the Microsoft version of the CHAP.
Enable NAT	Select this check box to activate NAT on this connection.
Enable Fullcone NAT	This field is available only when you select **Enable NAT**. Select this check box to activate full cone NAT on this connection.
Tunnel Name	Enter the name for this client connection.
Use Static IPv4 Address	Select this option if you have a fixed IPv4 address assigned by your ISP.
IPv4 Address	Enter the IPv4 address assigned by your ISP.
Enable PPP Debug Mode	Select this option to display PPP debugging messages on the console.
Enable IGMP Multicast Proxy	Select this check box to have the Router act as an IGMP proxy on this connection. This allows the Router to get subscribing information and maintain a joined member list for each multicast group. It can reduce multicast traffic significantly.
Enable IGMP Multicast Source	Select this check box to have the Router add routing table entries based on the IGMP traffic.
No Multicast VLAN Filter	Select this check box to have the Router not filter multicast traffic based on its VLAN.
Back	Click this button to return to the previous screen.
Next	Click this button to continue.

5.1.1.3 L2TP Client Add: Configuration Summary

This read-only screen shows the current L2TP WAN connection settings.

Figure 33 L2TP Client Add: Configuration Summary



WAN Setup - Summary

Make sure that the settings below match the settings provided by your ISP.

Connection Type:	PPPoE
NAT:	Enabled
Full Cone NAT:	Disabled
IGMP Multicast Proxy:	Enabled
IGMP Multicast Source Enabled:	Enabled
MLD Multicast Proxy:	Disabled
MLD Multicast Source Enabled:	Disabled
Quality Of Service:	Disabled

Click "Apply/Save" to have this interface to be effective. Click "Back" to make any modifications.

Table 31 L2TP Client Add: Configuration Summary

LABEL	DESCRIPTION
Connection Type	This is the encapsulation method used by this connection.
NAT	This shows whether NAT is active or not for this connection.
Full Cone NAT	This shows whether full cone NAT is active or not for this connection.
IGMP Multicast Proxy	This shows whether IGMP proxy is activated or not for this connection. IGMP is not available when the connection uses the bridging service.
IGMP Multicast Source Enabled	This shows whether IGMP source enable is activated or not for this connection. IGMP source enable has the Router add routing table entries based on the IGMP traffic.
MLD Multicast Proxy	This shows whether MLD proxy is activated or not for this connection.
MLD Multicast Source Enabled	This shows whether MLD source enable is activated or not for this connection. MLD source enable has the Router add routing table entries based on the MLD traffic.
Quality Of Service	This shows whether QoS is active or not for this connection.
Back	Click this button to return to the previous screen.
Apply/Save	Click this button to save your changes.

Network Address Translation (NAT)

6 Chapter

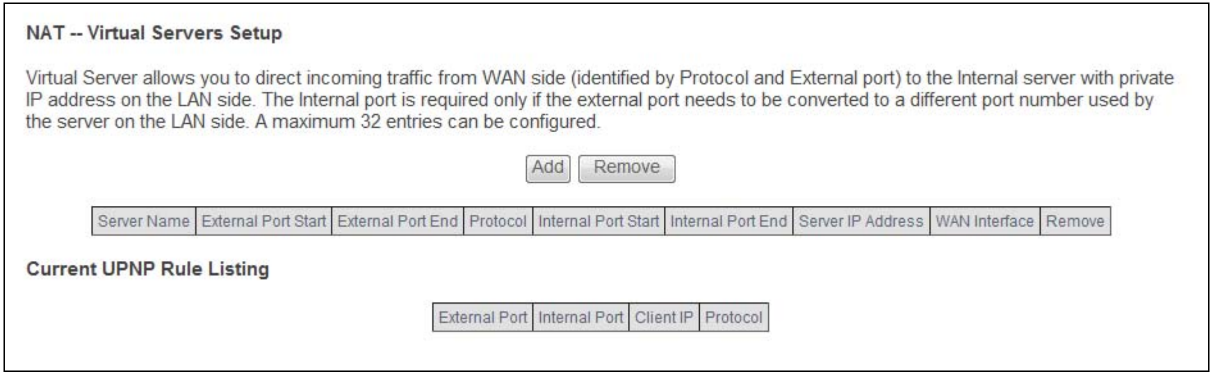
6.1 Virtual Servers

Click **Advanced Setup > NAT > Virtual Servers** to open the screen where you manage the list of virtual server rules.

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

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

Figure 34 Virtual Servers



NAT -- Virtual Servers Setup

Virtual Server allows you to direct incoming traffic from WAN side (identified by Protocol and External port) to the Internal server with private IP address on the LAN side. The Internal port is required only if the external port needs to be converted to a different port number used by the server on the LAN side. A maximum 32 entries can be configured.

Server Name	External Port Start	External Port End	Protocol	Internal Port Start	Internal Port End	Server IP Address	WAN Interface	Remove

Current UPNP Rule Listing

External Port	Internal Port	Client IP	Protocol

Table 32 Virtual Servers

LABEL	DESCRIPTION
Add	Click this button to create a new entry.
Remove	Select entries and click the **Remove** button to delete them.

Table 32 Virtual Servers (continued)

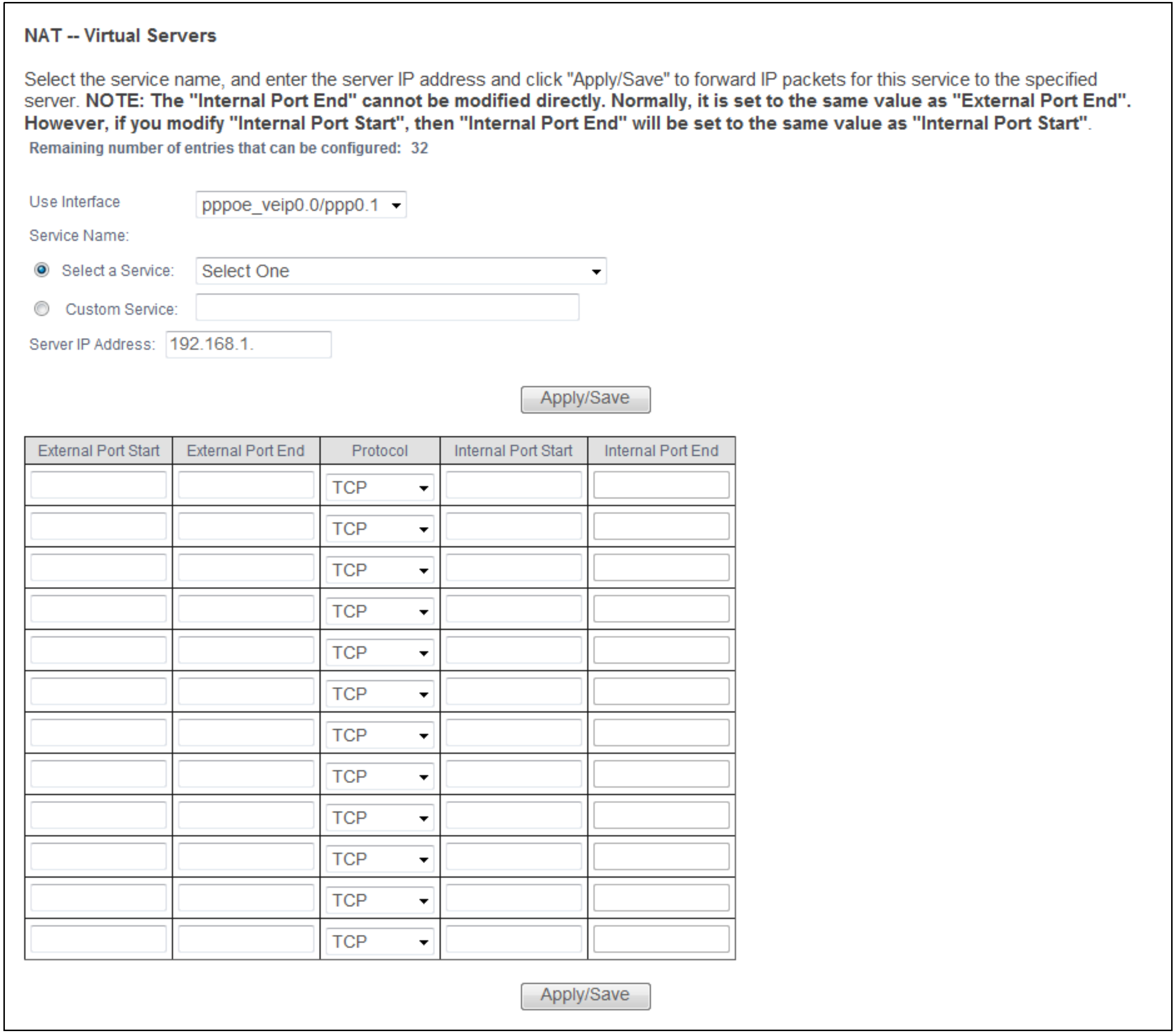
LABEL	DESCRIPTION
Server Name	This field displays the name of the service used by the packets for this virtual server.
External Port Start	This is the first external port number that identifies a service.
External Port End	This is the last external port number that identifies a service.
Protocol	This show whether the virtual server applies to TCP traffic, UDP traffic, or both.
Internal Port Start	This is the first internal port number that identifies a service.
Internal Port End	This is the last internal port number that identifies a service.
Server IP Address	This field displays the inside IP address of the server.
WAN Interface	This field displays the WAN interface through which the service is forwarded.
Current UPNP Rule Listing	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. These are the rules the Router has created using UPnP.
External Port	This is the external port number that identifies a service.
Internal	This is the internal port number that identifies a service.
Client IP	This is the IP address of the device for which the Router created the UPnP rule.
Protocol	This is the protocol of the traffic for which the Router created the UPnP rule.

6.1.1 Virtual Servers Add

This screen lets you create or edit a virtual server rule. Click **Add** in the **Virtual Servers** screen to open the following screen.

You may enter a single port number or a range of port numbers to be forwarded, and the local IP address of the desired server. The port number identifies a service; for example, web service is on port 80 and FTP on port 21. In some cases, such as for unknown services or where one server can support more than one service (for example both FTP and web service), it might be better to specify a range of port numbers. You can allocate a server IP address that corresponds to a port or a range of ports.

Figure 35 Virtual Servers Add



NAT -- Virtual Servers

Select the service name, and enter the server IP address and click "Apply/Save" to forward IP packets for this service to the specified server. **NOTE: The "Internal Port End" cannot be modified directly. Normally, it is set to the same value as "External Port End". However, if you modify "Internal Port Start", then "Internal Port End" will be set to the same value as "Internal Port Start".**

Remaining number of entries that can be configured: 32

Use Interface: pppoe_veip0.0/ppp0.1

Service Name:

● Select a Service: Select One

○ Custom Service:

Server IP Address: 192.168.1.

External Port Start	External Port End	Protocol	Internal Port Start	Internal Port End
		TCP		
		TCP		
		TCP		
		TCP		
		TCP		
		TCP		
		TCP		
		TCP		
		TCP		
		TCP		
		TCP		
		TCP		

Table 33 Virtual Servers Add

LABEL	DESCRIPTION
Use Interface	Select a WAN interface for which you want to configure a virtual server rules.
Service Name	**Select a Service**: use the drop-down list to select a service. **Custom Service**: type a name to specify a different service.
Server IP Address	Enter the inside IP address of the LAN device to which the virtual server forwards traffic.
Apply/Save	Click this button to save your changes.
External Port Start	Enter the original destination port for the packets. To forward only one port, enter the port number again in the **External End Port** field. To forward a series of ports, enter the start port number here and the end port number in the **External End Port** field.
External Port End	Enter the last port of the original destination port range. To forward only one port, enter the port number in the **External Start Port** field above and then enter it again in this field. To forward a series of ports, enter the last port number in a series that begins with the port number in the **External Start Port** field above.
Protocol	Select the protocol supported by this virtual server. Choices are **TCP**, **UDP**, or **TCP/UDP**.
Internal Port Start	Enter the port number here to which you want the Router to translate the incoming port. For a range of ports, enter the first number of the range to which you want the incoming ports translated.
Internal Port End	Enter the last port of the translated port range.
Apply/Save	Click this button to save your changes.

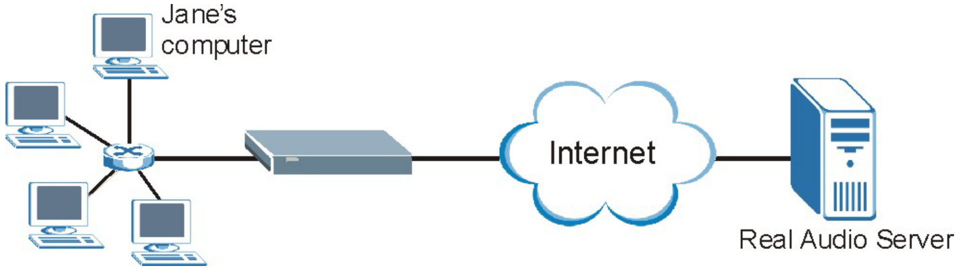
6.2 Port Triggering

Some services use a dedicated range of ports on the client side and a dedicated range of ports on the server side. With regular port forwarding you set a forwarding port in NAT to forward a service (coming in from the server on the WAN) to the IP address of a computer on the client side (LAN). The problem is that port forwarding only forwards a service to a single LAN IP address. In order to use the same service on a different LAN computer, you have to manually replace the LAN computer's IP address in the forwarding port with another LAN computer's IP address.

Trigger port forwarding solves this problem by allowing computers on the LAN to dynamically take turns using the service. The Router records the IP address of a LAN computer that sends traffic to the WAN to request a service with a specific port number and protocol (a "trigger" port). When the Router's WAN port receives a response with a specific port number and protocol ("open" port), the Router forwards the traffic to the LAN IP address of the computer that sent the request. After that computer’s connection for that service closes, another computer on the LAN can use the service in the same manner. This way you do not need to configure a new IP address each time you want a different LAN computer to use the application.

For example:

Figure 36 Trigger Port Forwarding Process: Example



1 Jane requests a file from the Real Audio server (port 7070).

2 Port 7070 is a “trigger” port and causes the Router to record Jane’s computer IP address. The Router associates Jane's computer IP address with the "open" port range of 6970-7170.

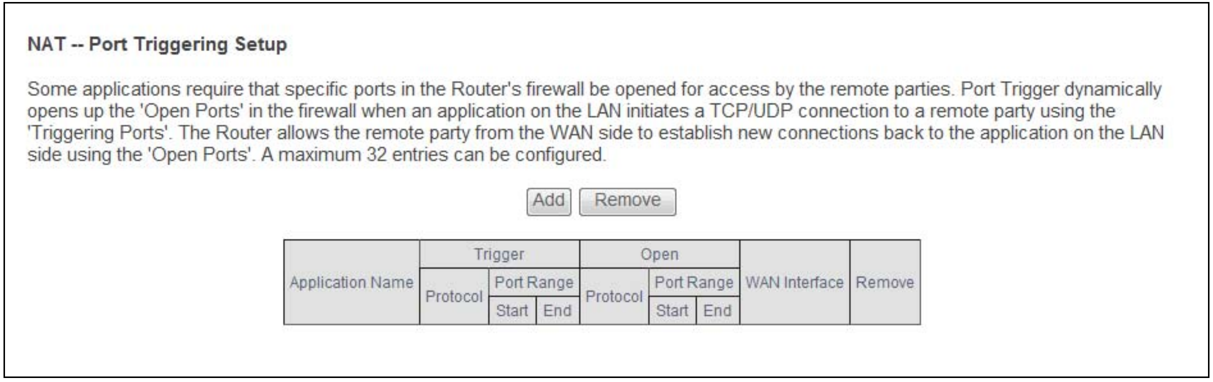
3 The Real Audio server responds using a port number ranging between 6970-7170.

4 The Router forwards the traffic to Jane’s computer IP address.

5 Only Jane can connect to the Real Audio server until the connection is closed or times out. The Router times out in three minutes with UDP (User Datagram Protocol) or two hours with TCP/IP (Transfer Control Protocol/Internet Protocol).

Click **Advanced Setup > NAT > Port Triggering** to manage your Router’s trigger port settings.

Figure 37 Port Triggering



NAT -- Port Triggering Setup

Some applications require that specific ports in the Router's firewall be opened for access by the remote parties. Port Trigger dynamically opens up the 'Open Ports' in the firewall when an application on the LAN initiates a TCP/UDP connection to a remote party using the 'Triggering Ports'. The Router allows the remote party from the WAN side to establish new connections back to the application on the LAN side using the 'Open Ports'. A maximum 32 entries can be configured.

Application Name	Trigger			Open			WAN Interface	Remove
	Protocol	Port Range		Protocol	Port Range			
		Start	End		Start	End		

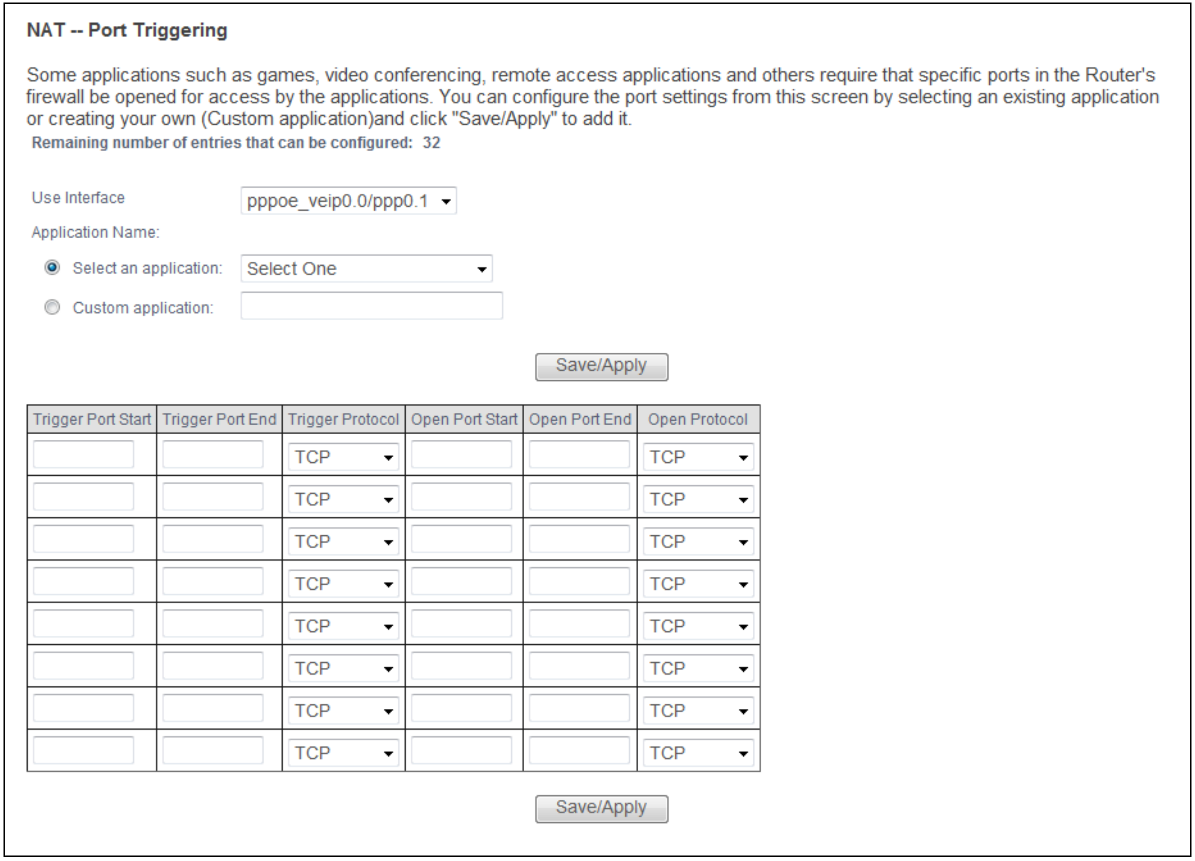
Table 34 Port Triggering

LABEL	DESCRIPTION
Add	Click this to create a new rule.
Remove	Select entries and click the **Remove** button to delete them.
#	This is the index number of the entry.
Status	This field displays whether the port triggering rule is active or not. A yellow bulb signifies that this rule is active. A gray bulb signifies that this rule is not active.
Application Name	This field displays the name of the service used by this rule.
Trigger Protocol	This is the trigger transport layer protocol.
Trigger Port Range Start	The trigger port is a port (or a range of ports) that causes (or triggers) the Router to record the IP address of the LAN computer that sent the traffic to a server on the WAN. This is the first port number that identifies a service.
Trigger Port Range End	This is the last port number that identifies a service.
Open Protocol	This is the open transport layer protocol.
Open Port Range Start	The open port is a port (or a range of ports) that a server on the WAN uses when it sends out a particular service. The Router forwards the traffic with this port (or range of ports) to the client computer on the LAN that requested the service. This is the first port number that identifies a service.
Open Port Range End	This is the last port number that identifies a service.
WAN Interface	This field shows the WAN interface through which the service is forwarded.

6.2.1 Add Port Triggering Rule

This screen lets you create new port triggering rules. Click **Add** in the **Port Triggering** screen to open the following screen.

Figure 38 Port Triggering: Add



NAT -- Port Triggering

Some applications such as games, video conferencing, remote access applications and others require that specific ports in the Router's firewall be opened for access by the applications. You can configure the port settings from this screen by selecting an existing application or creating your own (Custom application)and click "Save/Apply" to add it.

Remaining number of entries that can be configured: 32

Use Interface: pppoe_veip0.0/ppp0.1

Application Name:

● Select an application: Select One

○ Custom application:

Trigger Port Start	Trigger Port End	Trigger Protocol	Open Port Start	Open Port End	Open Protocol
		TCP			TCP
		TCP			TCP
		TCP			TCP
		TCP			TCP
		TCP			TCP
		TCP			TCP
		TCP			TCP
		TCP			TCP

Table 35 Port Triggering: Add

LABEL	DESCRIPTION
User Interface	Select a WAN interface for which you want to configure port triggering rules.
Application Name	Choose an application from the drop-down list or select **Custom application** and enter a name to identify this rule using keyboard characters (A-Z, a-z, 1-2 and so on).
Save/Apply	Click this button to save your changes.
Trigger Port Start	The trigger port is a port (or a range of ports) that causes (or triggers) the Router to record the IP address of the LAN computer that sent the traffic to a server on the WAN. Type a port number or the starting port number in a range of port numbers.

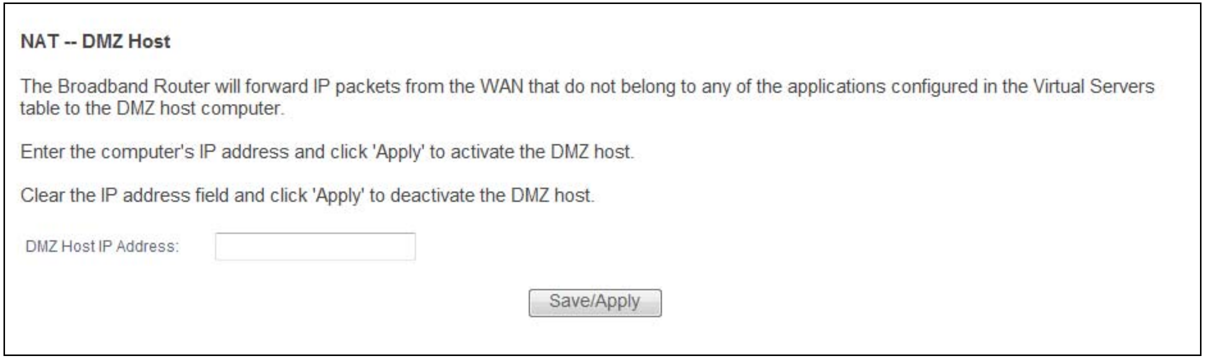
Table 35 Port Triggering: Add (continued)

LABEL	DESCRIPTION
Trigger Port End	Type a port number or the ending port number in a range of port numbers.
Trigger Protocol	Select the transport layer protocol from **TCP**, **UDP**, or **TCP/UDP**.
Open Port Start	The open port is a port (or a range of ports) that a server on the WAN uses when it sends out a particular service. The Router forwards the traffic with this port (or range of ports) to the client computer on the LAN that requested the service. Type a port number or the starting port number in a range of port numbers.
Open Port End	Type a port number or the ending port number in a range of port numbers.
Open Protocol	Select the transport layer protocol from **TCP**, **UDP**, or **TCP/UDP**.
Save/Apply	Click this button to save your changes.

6.3 DMZ Host

Click **Advanced Setup > NAT > DMZ Host** to specify the IP address of a default server to receive packets from ports not specified in the **Port Forwarding** screen.

Figure 39 DMZ Host



NAT -- DMZ Host

The Broadband Router will forward IP packets from the WAN that do not belong to any of the applications configured in the Virtual Servers table to the DMZ host computer.

Enter the computer's IP address and click 'Apply' to activate the DMZ host.

Clear the IP address field and click 'Apply' to deactivate the DMZ host.

DMZ Host IP Address:

Table 36 DMZ Host

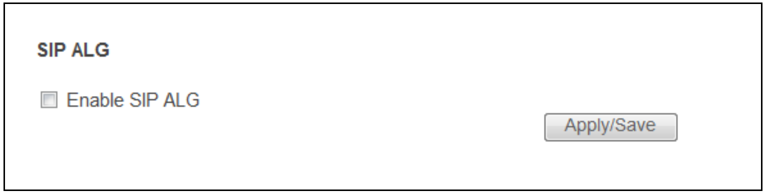
LABEL	DESCRIPTION
DMZ Host IP Address	Enter the IP address which receives packets from ports that are not specified in the **Port Forwarding** screen. Note: If you do not assign a default server, the Router discards all packets received for ports not specified in the virtual server configuration.
Save/Apply	Click this button to save your changes.

6.4 SIP ALG

Click **Advanced Setup > NAT > SIP ALG** to enable and disable the NAT Application Layer Gateway (ALG) in the Router.

The SIP ALG allows SIP calls to pass through NAT by examining and translating IP addresses embedded in the data stream. When the Router registers with the SIP register server, the SIP ALG translates the Router's private IP address inside the SIP data stream to a public IP address. You do not need to use STUN or an outbound proxy if you enable the SIP ALG.

Figure 40 SIP ALG



SIP ALG

□ Enable SIP ALG

Table 37 SIP ALG

LABEL	DESCRIPTION
Enable SIP ALG	Enable this to make sure SIP (VoIP) works correctly with port-forwarding.
Apply/Save	Click this button to save your changes.

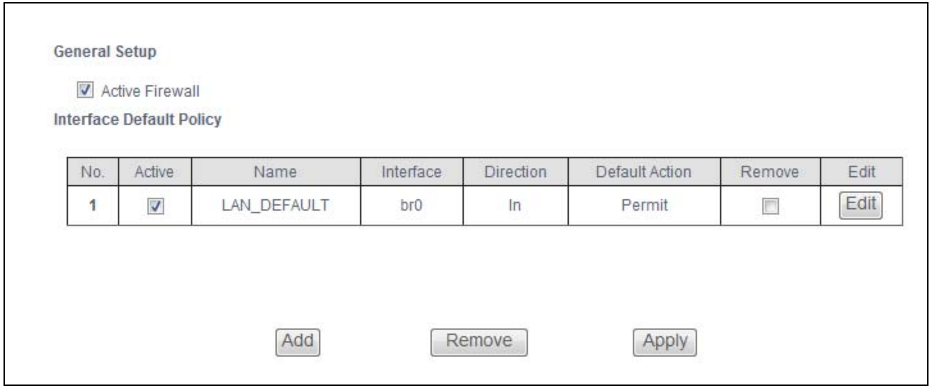
Firewall

Chapter 7

7.1 Firewall General

Use this screen to enable or disable the firewall and manage the default policies (filters). Click **Advanced Setup > Firewall** to open the **General** screen.

Figure 41 Firewall General



General Setup

☑ Active Firewall

Interface Default Policy

No.	Active	Name	Interface	Direction	Default Action	Remove	Edit
1	☑	LAN_DEFAULT	br0	In	Permit	□	Edit

Table 38 Firewall General

LABEL	DESCRIPTION
Active Firewall	Select this check box to activate the firewall. The Router performs access control and protects against Denial of Service (DoS) attacks when the firewall is activated. By default the firewall allows traffic from all interfaces to go to all interfaces. Configure firewall interface default policies to block specific traffic directions or firewall rules to block specific traffic.
No.	This displays the index number of the default firewall policy.
Active	This field displays whether a policy is turned on or not. Select the check box to enable the policy. Clear the check box to disable the policy.
Name	This displays the name of the policy.
Interface	This displays the LAN or WAN interface(s) to which this policy is applied.
Direction	This displays the direction of travel of packets (**In** and **Out**). Firewall rules are grouped based on the direction of travel of packets to which they apply.

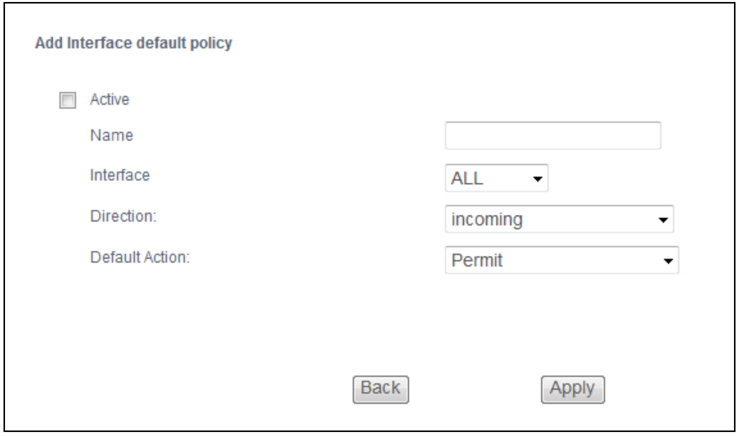
Table 38 Firewall General (continued)

LABEL	DESCRIPTION
Default Action	This displays the default action that the firewall is to take on packets that are traveling in the selected direction and do not match any of the firewall rules. **Drop**: the Router silently discards the packets without sending a TCP reset packet or an ICMP destination-unreachable message to the sender. **Permit**: the Router allows the passage of the packets.
Remove	Select entries and click the **Remove** button to delete them.
Edit	Click the **Edit** button to go to the screen where you can edit the rule.
Add	Click **Add** to create a new policy.
Apply	Click **Apply** to save your changes back to the Router.

7.1.1 Default Policy Configuration

In the **Firewall General** screen, click **Add** or click an entry's **Edit** icon to configure a firewall policy.

Figure 42 Default Policy



Add Interface default policy

☐ Active

Name

Interface: ALL

Direction: incoming

Default Action: Permit

Table 39 Default Policy

LABEL	DESCRIPTION
Active	Select this check box to enable the rule.
Name	Enter a descriptive name using printable English keyboard characters.
Interface	Select **All** to apply the policy to all interfaces on the Router or select the specific LAN or WAN interface to which this policy applies.
Direction	Specify the direction of travel of packets (**incoming** or **outgoing**) in this policy.

Table 39 Default Policy (continued)

LABEL	DESCRIPTION
Default Action	Specify whether the firewall silently discards packets (**Drop**) or allows the passage of packets (**Permit**).
Back	Click **Back** to return to the previous screen.
Apply	Click **Apply** to save your customized settings and exit this screen.

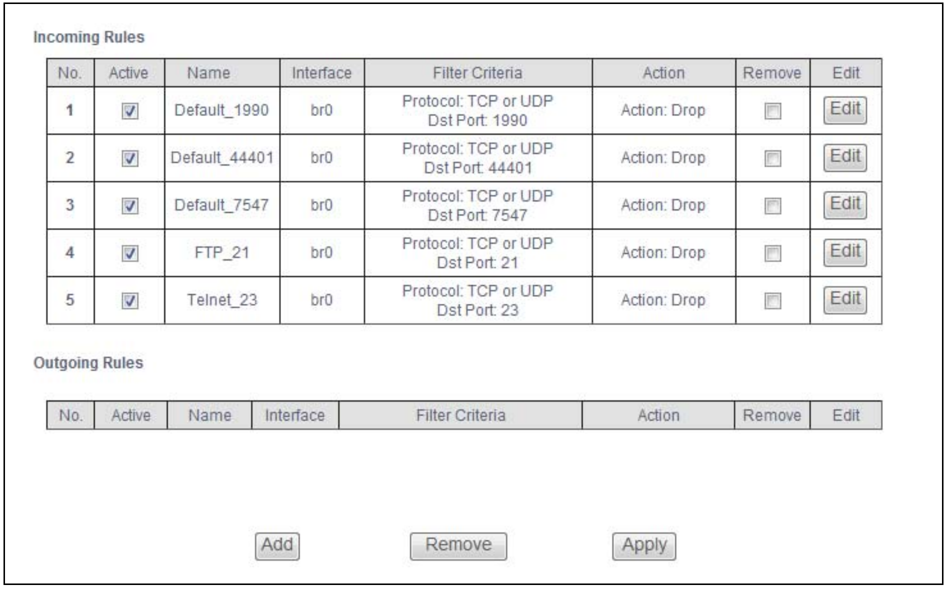
7.2 Firewall Rules

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

Click **Advanced Setup > Firewall > Rules** to display the following screen. This screen lists the configured incoming or outgoing firewall rules. Note the order in which the rules are listed.

The firewall rules that you configure here take priority over the general firewall action settings in the **General** screen.

Figure 43 Firewall Rules



Incoming Rules

No.	Active	Name	Interface	Filter Criteria	Action	Remove	Edit
1	☑	Default_1990	br0	Protocol: TCP or UDP Dst Port: 1990	Action: Drop	□	Edit
2	☑	Default_44401	br0	Protocol: TCP or UDP Dst Port: 44401	Action: Drop	□	Edit
3	☑	Default_7547	br0	Protocol: TCP or UDP Dst Port: 7547	Action: Drop	□	Edit
4	☑	FTP_21	br0	Protocol: TCP or UDP Dst Port: 21	Action: Drop	□	Edit
5	☑	Telnet_23	br0	Protocol: TCP or UDP Dst Port: 23	Action: Drop	□	Edit

Outgoing Rules

No.	Active	Name	Interface	Filter Criteria	Action	Remove	Edit

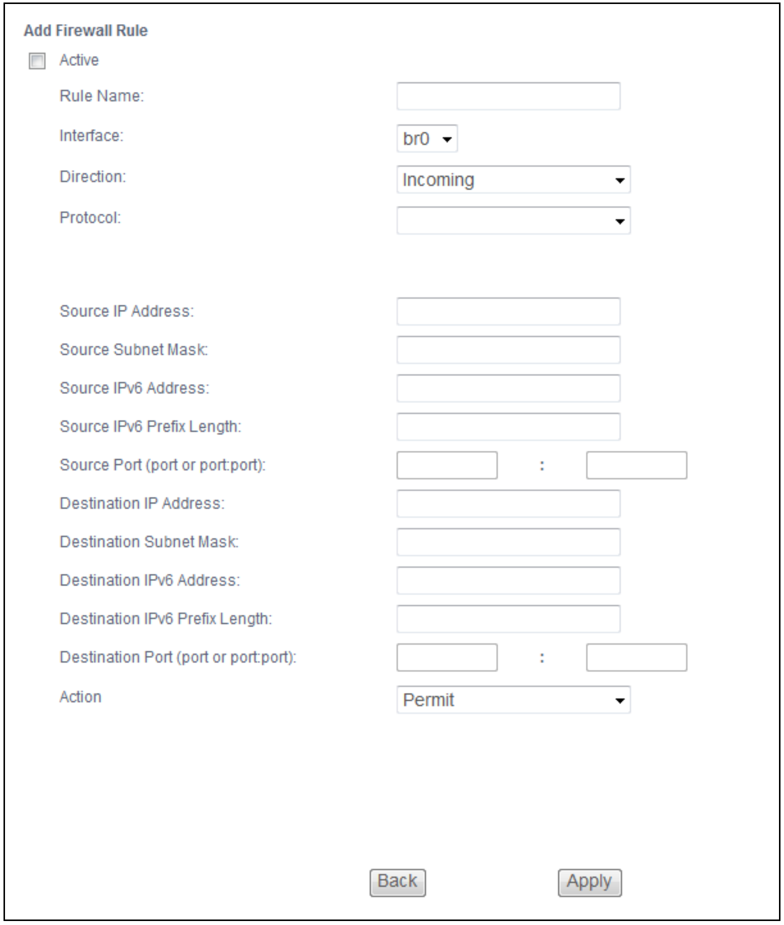
Table 40 Firewall Rules

LABEL	DESCRIPTION
Incoming/ Outgoing Rules	The following fields summarize the rules you have created that apply to traffic traveling in the selected packet direction.
No.	This is your firewall rule number. The ordering of your rules is important as rules are applied in turn.
Active	This field displays whether a firewall rule is turned on or not. Select the check box to enable the rule. Clear the check box to disable the rule.
Name	This displays the name of the rule.
Interface	This displays the LAN or WAN interface(s) to which this rule is applied.
Filter Criteria	This displays the filtering criteria, such as the source or destination IP addresses and subnet mask to which this rule applies.
Action	This displays whether the firewall silently discards packets (**Drop**), discards packets and sends an ICMP message to the sender (**Reject**) or allows the passage of packets (**Permit**).
Remove	Select entries and click the **Remove** button to delete them.
Edit	Click the **Edit** button to go to the screen where you can edit the rule.
Add	Click **Add** to create a new rule.
Apply	Click **Apply** to save your changes back to the Router.

7.2.1 Firewall Rules Configuration

In the **Firewall Rules** screen, click **Add** or click a rule's **Edit** button to display this screen and refer to the following table for information on the labels.

Figure 44 Firewall Rules: Add



Add Firewall Rule

☐ Active

Rule Name:	
Interface:	br0
Direction:	Incoming
Protocol:	
Source IP Address:	
Source Subnet Mask:	
Source IPv6 Address:	
Source IPv6 Prefix Length:	
Source Port (port or port:port):	:
Destination IP Address:	
Destination Subnet Mask:	
Destination IPv6 Address:	
Destination IPv6 Prefix Length:	
Destination Port (port or port:port):	:
Action	Permit

Table 41 Firewall Rules: Add

LABEL	DESCRIPTION
Active	Select this check box to enable the rule.
Rule Name	Enter a descriptive name of up to 16 printable English keyboard characters, including spaces. To add a firewall rule, you need to configure at least one of the following fields (except the **Interface** field).
Interface	Select an interface on the Router to which this rule applies.

Table 41 Firewall Rules: Add (continued)

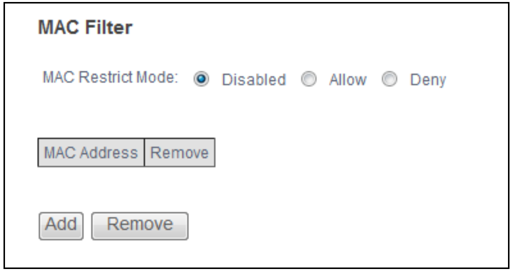
LABEL	DESCRIPTION
Direction	Select a direction of travel of packets for which you want to configure the firewall rule.
Protocol	Select the IP protocol (**TCP**, **UDP** or **ICMP**) and enter the protocol (service type) number in the port field.
Source IP Address	Enter the source IP address in dotted decimal notation.
Source Subnet Mask	Enter the source subnet mask.
Source IPv6 Address	Enter the source IPv6 address in dotted decimal notation.
Source IPv6 Prefix Length	Enter the IPv6 prefix length for the source IPv6 address. The IPv6 prefix length specifies how many most significant bits (starting from the left) in the address compose the network address. This field displays the bit number of the IPv6 subnet mask.
Source Port	Enter the single port number or the range of port numbers of the source.
Destination IP Address	Enter the destination IP address in dotted decimal notation.
Destination Subnet Mask	Enter the destination subnet mask.
Destination IPv6 Address	Enter the destination IPv6 address in dotted decimal notation.
Destination IPv6 Prefix Length	Enter the IPv6 prefix length for the destination IPv6 address. The IPv6 prefix length specifies how many most significant bits (starting from the left) in the address compose the network address. This field displays the bit number of the IPv6 subnet mask.
Destination Port	Enter the single port number or the range of port numbers of the destination.
Action	Use the drop-down list box to select whether to discard (**Drop**), deny and send an ICMP message to the sender of (**Reject**) or allow the passage of (**Permit**) packets that match this rule.
Reject Type	If you select **Reject**, specify the type of ICMP message to send to the sender.
Back	Click **Back** to return to the previous screen.
Apply	Click **Apply** to save your customized settings and exit this screen.

7.3 MAC Filtering

Click **Advanced Setup > Firewall > MAC Filtering** to allow or block wireless and LAN clients access to the Router.

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

Figure 45 MAC Filtering



MAC Filter

MAC Restrict Mode: ● Disabled ○ Allow ○ Deny

The following table describes the labels in this menu.

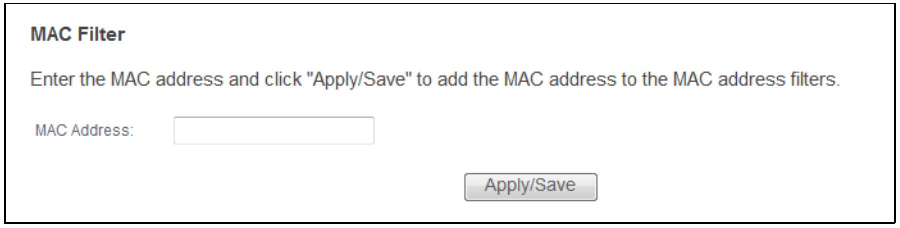
Table 42 MAC Filtering

LABEL	DESCRIPTION
MAC Restrict Mode	Select **Disabled** to turn off MAC address filtering. Select **Allow** to have the Router permit access from the listed wireless and LAN client MAC addresses and block access from MAC addresses not in the list. Select **Deny** to have the Router block access from the listed wireless and LAN client MAC addresses and allow access from MAC addresses not in the list.
MAC Address	These are the MAC addresses of LAN devices. Enter the MAC addresses in a valid MAC address format, that is, six hexadecimal character pairs, for example, 12:34:56:78:9a:bc.
Apply	Click **Apply** to save your changes.
Cancel	Click **Cancel** to restore your previously saved settings.

7.3.1 MAC Filtering Add

Click **Advanced Setup > Firewall > MAC Filtering > Add** to add a MAC address to the **MAC Filtering** screen's list of wireless and LAN clients access to the Router.

Figure 46 MAC Filtering Add



MAC Filter

Enter the MAC address and click "Apply/Save" to add the MAC address to the MAC address filters.

MAC Address:

The following table describes the labels in this menu.

Table 43 MAC Filtering Add

LABEL	DESCRIPTION
MAC Address	Enter the MAC address in a valid MAC address format, that is, six hexadecimal character pairs, for example, 12:34:56:78:9a:bc.
Apply/Save	Click this button to save your changes.

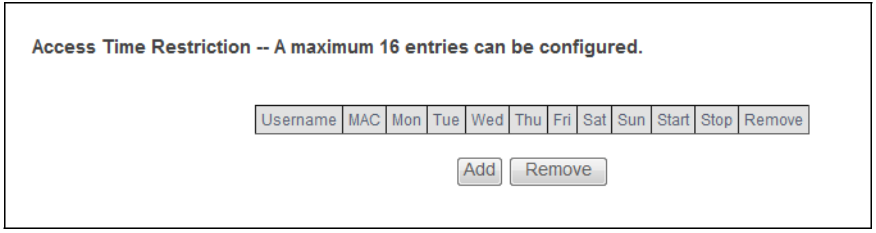
Parental Control

Chapter 8

8.1 Time Restriction

Click **Advanced Setup > Parental Control > Time Restriction** to configure access time schedules for specific users.

Figure 47 Time Restriction



Access Time Restriction -- A maximum 16 entries can be configured.

Username	MAC	Mon	Tue	Wed	Thu	Fri	Sat	Sun	Start	Stop	Remove

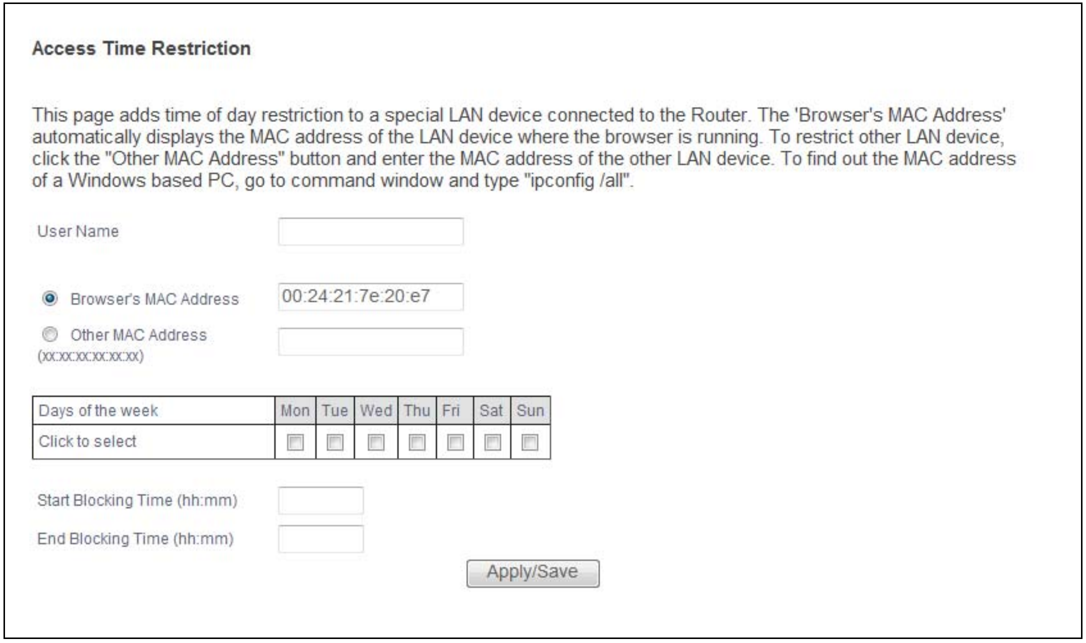
Table 44 Time Restriction

LABEL	DESCRIPTION
Username	This is the name of the user whose access the rule controls.
MAC	This is the MAC address of the LAN or wireless device whose access the rule controls.
Mon ~ Sun	This shows an “x” for every day of the week the schedule applies to.
Start	This shows the beginning of the access blocking time.
Stop	This shows the end of the access blocking time.
Remove	Select entries and click the **Remove** button to delete them.
Add	Click this to add a new entry.

8.1.1 Add a Time Restriction Rule

Click **Add** in the **Time Restriction** screen to add a new rule. Use this screen to configure a restricted access schedule.

Figure 48 Time Restriction: Add



Access Time Restriction

This page adds time of day restriction to a special LAN device connected to the Router. The 'Browser's MAC Address' automatically displays the MAC address of the LAN device where the browser is running. To restrict other LAN device, click the "Other MAC Address" button and enter the MAC address of the other LAN device. To find out the MAC address of a Windows based PC, go to command window and type "ipconfig /all".

User Name

● Browser's MAC Address: 00:24:21:7e:20:e7

○ Other MAC Address (xx:xx:xx:xx:xx:xx)

Days of the week	Mon	Tue	Wed	Thu	Fri	Sat	Sun
Click to select	□	□	□	□	□	□	□

Start Blocking Time (hh:mm)

End Blocking Time (hh:mm)

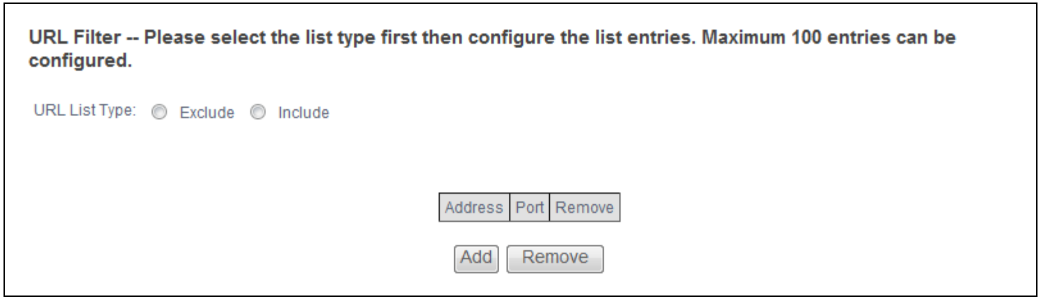
Table 45 Time Restriction: Add

LABEL	DESCRIPTION
Username	Specify the name of the user whose access the rule controls.
Browser's MAC Address	Select this to create the rule for the MAC address of the device with the browser you are using to configure the Router. 'Browser's MAC Address' automatically displays the MAC address of the LAN device where the browser is running. This is the MAC address of the LAN or wireless device whose access the rule controls.
Other MAC Address	Select this and enter the MAC address of another LAN device. To find out the MAC address of a Windows based PC, go to the command window and type "ipconfig / all".
Days of the week	Select check boxes for the days that you want the Router to perform parental control.
Start Blocking Time	Enter the time in 24-hour format to begin blocking access.
End Blocking Time	Enter the time in 24-hour format to stop blocking access.
Apply/Save	Click this button to save your changes.

8.2 URL Filter

Click **Advanced Setup > Parental Control > Url Filter** to use the **Url Filter** screen to block or allow access to specific web sites.

Figure 49 URL Filter



URL Filter -- Please select the list type first then configure the list entries. Maximum 100 entries can be configured.

URL List Type: ○ Exclude ○ Include

Address	Port	Remove

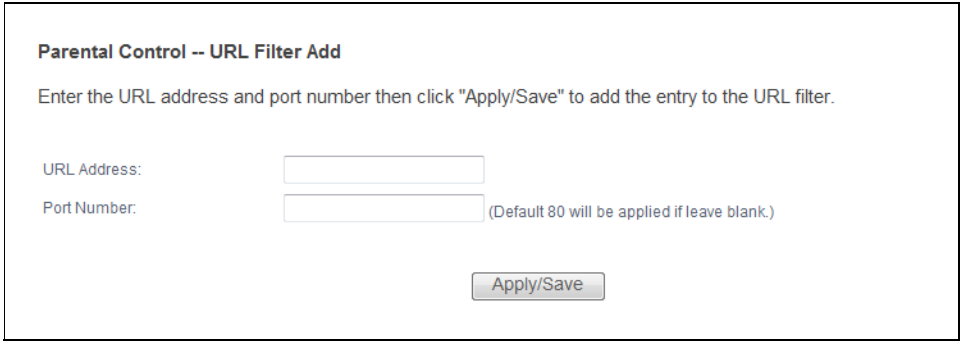
Table 46 URL Filter

LABEL	DESCRIPTION
URL List Type	Select **Exclude** to block access to the URLs in the list and allow access to other URLs. Select **Include** to allow access to the URLs in the list and block access to other URLs.
Address	This shows the website address (URL) to which the entry applies.
Port	This shows the port number for the URL list entry.
Remove	Select entries and click the **Remove** button to delete them.
Add	Click this to add a new entry.

8.2.1 Add a URL Filter Rule

Click **Add** in the **URL Filter** screen to add a new entry. Use this screen to configure a URL filtering setting to control access to certain web sites.

Figure 50 URL Filter: Add



Parental Control -- URL Filter Add

Enter the URL address and port number then click "Apply/Save" to add the entry to the URL filter.

URL Address:

Port Number: (Default 80 will be applied if leave blank.)

Table 47 URL Filter: Add

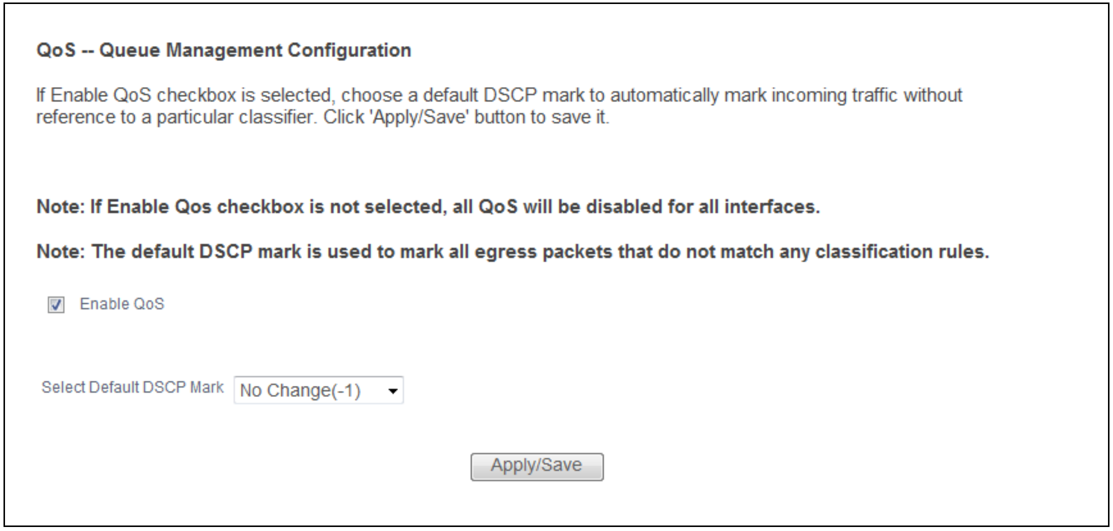
LABEL	DESCRIPTION
URL Address	Specify a web site or URL to which to filter access.
Port Number	Specify the port number if you need to control access to one other than 80.
Apply/Save	Click this button to save your changes.

Quality of Service (QoS)

Chapter 9

9.1 QoS General

Click **Advanced Setup > Quality of Service** to enable or disable QoS, set the bandwidth, and select to have the Router automatically assign priority to upstream traffic according to the IP precedence or packet length.



QoS -- Queue Management Configuration

If Enable QoS checkbox is selected, choose a default DSCP mark to automatically mark incoming traffic without reference to a particular classifier. Click 'Apply/Save' button to save it.

Note: If Enable Qos checkbox is not selected, all QoS will be disabled for all interfaces.

Note: The default DSCP mark is used to mark all egress packets that do not match any classification rules.

☑ Enable QoS

Select Default DSCP Mark: No Change(-1)

Figure 51 QoS General

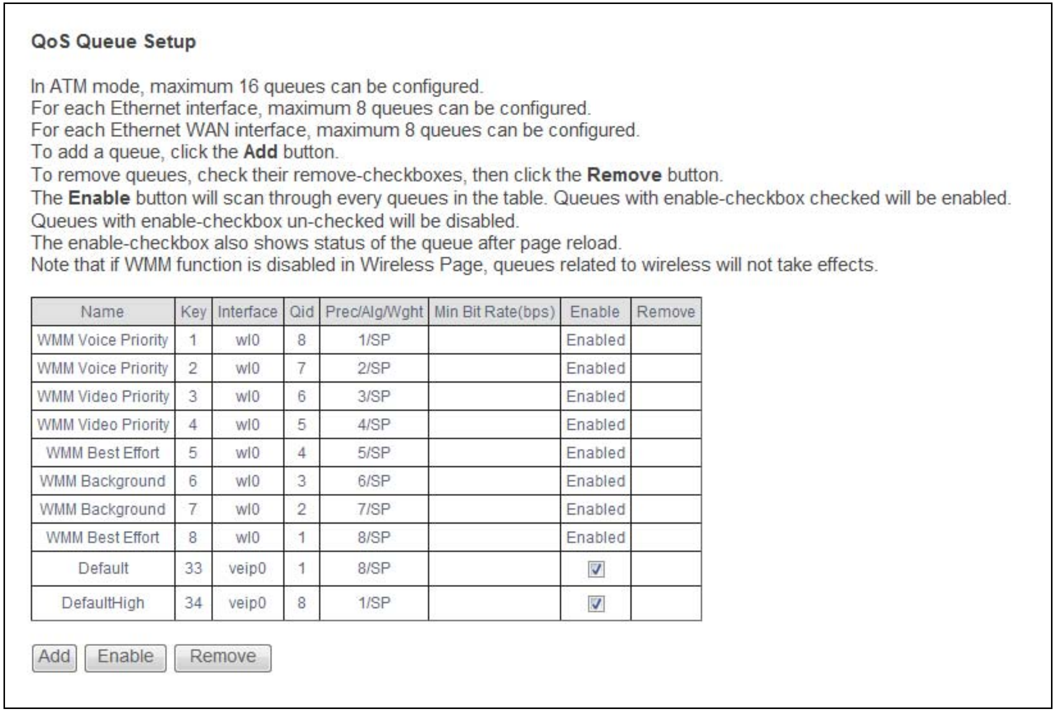
Table 48 QoS General

LABEL	DESCRIPTION
Enable QoS	Select the check box to turn on QoS to improve your network performance. You can give priority to traffic that the Router forwards out through the WAN interface. Give high priority to voice and video to make them run more smoothly. Similarly, give low priority to many large file downloads so that they do not reduce the quality of other applications.
Select Default DSCP Mark	Set the default DSCP (DiffServ Code Point) value for outgoing packets that do not match any classification rules.
Apply/Save	Click this button to save your changes.

9.2 Queue Setup

Click **Advanced Setup > Quality of Service > Queue Setup** to use the **Queue Setup** screen to configure QoS queue assignment.

Figure 52 Queue Setup



QoS Queue Setup

In ATM mode, maximum 16 queues can be configured.
For each Ethernet interface, maximum 8 queues can be configured.
For each Ethernet WAN interface, maximum 8 queues can be configured.
To add a queue, click the **Add** button.
To remove queues, check their remove-checkboxes, then click the **Remove** button.
The **Enable** button will scan through every queues in the table. Queues with enable-checkbox checked will be enabled.
Queues with enable-checkbox un-checked will be disabled.
The enable-checkbox also shows status of the queue after page reload.
Note that if WMM function is disabled in Wireless Page, queues related to wireless will not take effects.

Name	Key	Interface	Qid	Prec/Alg/Wght	Min Bit Rate(bps)	Enable	Remove
WMM Voice Priority	1	wl0	8	1/SP		Enabled	
WMM Voice Priority	2	wl0	7	2/SP		Enabled	
WMM Video Priority	3	wl0	6	3/SP		Enabled	
WMM Video Priority	4	wl0	5	4/SP		Enabled	
WMM Best Effort	5	wl0	4	5/SP		Enabled	
WMM Background	6	wl0	3	6/SP		Enabled	
WMM Background	7	wl0	2	7/SP		Enabled	
WMM Best Effort	8	wl0	1	8/SP		Enabled	
Default	33	veip0	1	8/SP		☑	
DefaultHigh	34	veip0	8	1/SP		☑	

Table 49 Queue Setup

LABEL	DESCRIPTION
Name	This shows the descriptive name of this queue.
Key	This is the queue’s index number.
Interface	This shows the name of the Router’s interface through which traffic in this queue passes.
Qid	This shows the priority of this queue for the interface.
Prec/Alg/Wght	This displays the queue’s default precedence, queue management algorithm, and weighted round robin weight. **SP** is strict priority.
Min Bit Rate (bps)	This shows the minimum transmission rate for traffic in this queue.
Enable	This shows whether the queue is active or not. For queues with a check box, select it and click the **Enable** button to turn them on. Clear the check box to turn a queue off.
Remove	Select entries and click the **Remove** button to delete them.

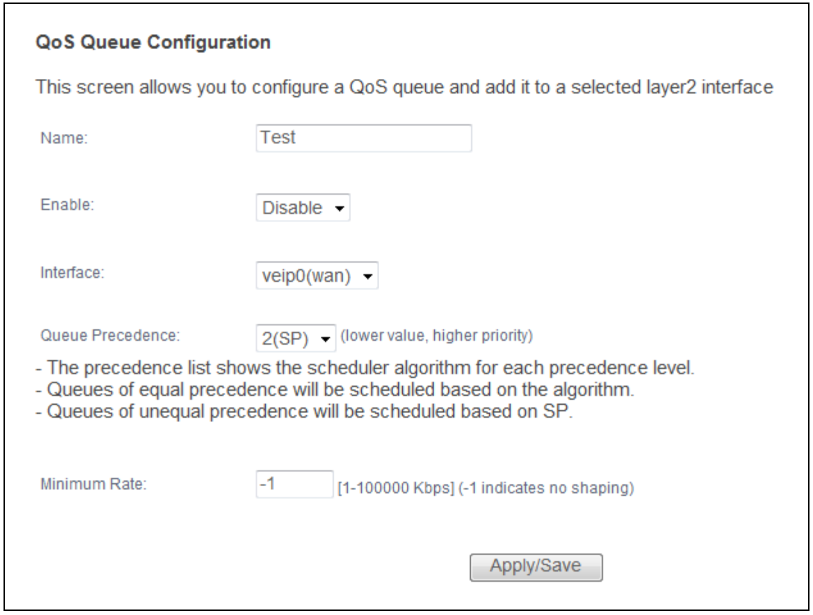
Table 49 Queue Setup (continued)

LABEL	DESCRIPTION
Add	Click **Add** to create a new queue.
Enable	Select disabled entries and click the **Enable** button to activate them.

9.2.1 Add a QoS Queue

Click the Add button in the QoS Queue screen to configure a new queue.

Figure 53 Queue Setup: Add



QoS Queue Configuration

This screen allows you to configure a QoS queue and add it to a selected layer2 interface

Name: Test

Enable: Disable

Interface: veip0(wan)

Queue Precedence: 2(SP) (lower value, higher priority)

- The precedence list shows the scheduler algorithm for each precedence level.
- Queues of equal precedence will be scheduled based on the algorithm.
- Queues of unequal precedence will be scheduled based on SP.

Minimum Rate: -1 [1-100000 Kbps] (-1 indicates no shaping)

Table 50 Queue Setup: Add

LABEL	DESCRIPTION
Name	Enter the descriptive name of this queue.
Enable	Select to enable or disable this queue.
Interface	Select the interface of this queue.

Table 50 Queue Setup: Add (continued)

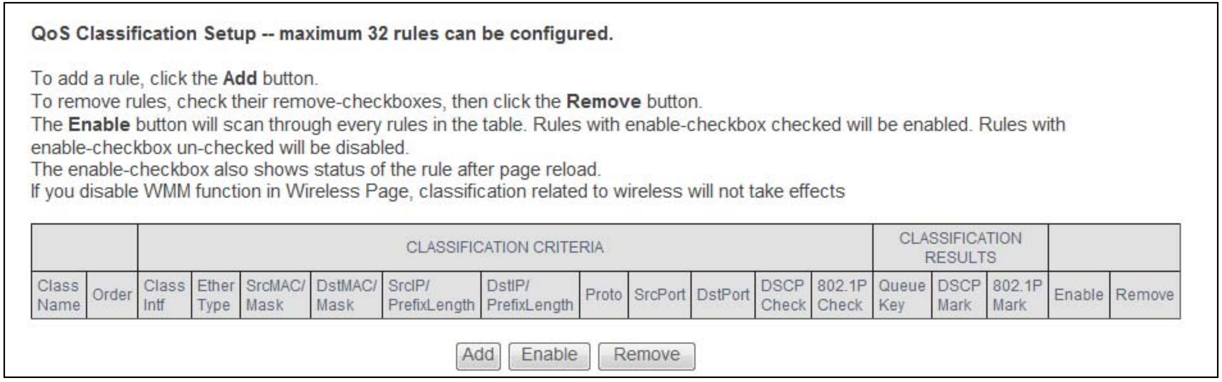
LABEL	DESCRIPTION
Queue Precedence	Select a queue precedence level (from 1 to 8) to configure for the selected interface. The smaller the number, the higher the priority level. Traffic assigned to higher priority queues gets through faster while traffic in lower priority queues is dropped if the network is congested. If the queue precedence level already has a queue scheduler configured, it displays after the precedence level. The Router uses strict priority to service queues with different precedences.
Minimum Rate	This displays for GPON interface queues. Specify the minimum transmission rate (in **Kbps**) allowed for traffic on this queue.

9.3 Class Setup

Click **Advanced Setup > Quality of Service > Class Setup** to configure QoS classifiers. A classifier groups traffic into data flows according to specific criteria such as the source address, destination address, source port number, destination port number or incoming interface.

You can give different priorities to traffic that the Router forwards out through the WAN interface. Give high priority to voice and video to make them run more smoothly. Similarly, give low priority to many large file downloads so that they do not reduce the quality of other applications.

Figure 54 QoS Classification Setup



QoS Classification Setup -- maximum 32 rules can be configured.

To add a rule, click the **Add** button.
To remove rules, check their remove-checkboxes, then click the **Remove** button.
The **Enable** button will scan through every rules in the table. Rules with enable-checkbox checked will be enabled. Rules with enable-checkbox un-checked will be disabled.
The enable-checkbox also shows status of the rule after page reload.
If you disable WMM function in Wireless Page, classification related to wireless will not take effects

		CLASSIFICATION CRITERIA											CLASSIFICATION RESULTS				
Class Name	Order	Class Intf	Ether Type	SrcMAC/ Mask	DstMAC/ Mask	SrcIP/ PrefixLength	DstIP/ PrefixLength	Proto	SrcPort	DstPort	DSCP Check	802.1P Check	Queue Key	DSCP Mark	802.1P Mark	Enable	Remove

Table 51 QoS Classification Setup

LABEL	DESCRIPTION
Class Name	This displays the name of the classifier rule.
Order	This displays the rule’s place in the list of classifier rules. The Router checks traffic against classifiers in order until it matches one.

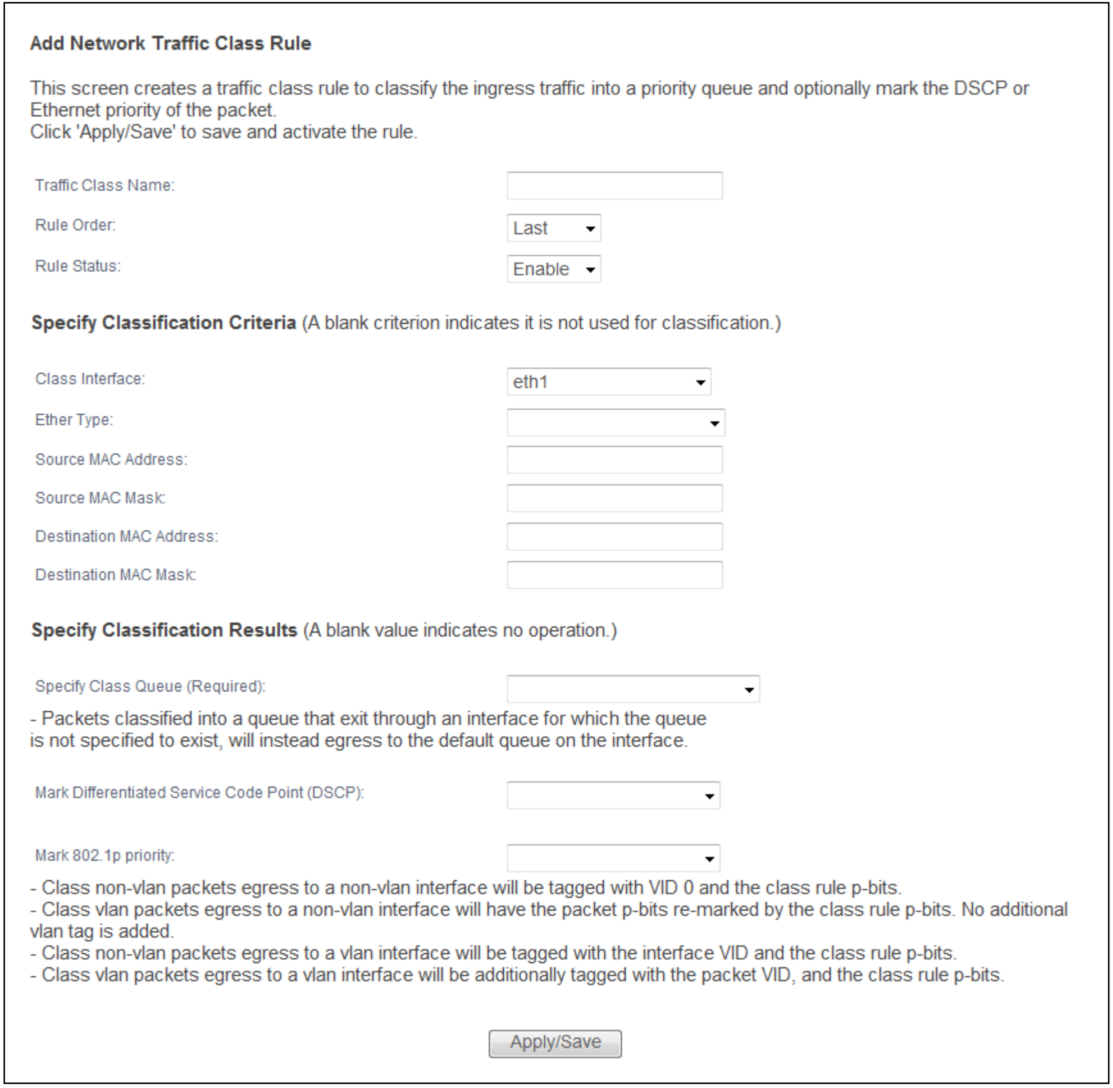
Table 51 QoS Classification Setup (continued)

LABEL	DESCRIPTION
CLASSIFICATION CRITERIA	These fields show the criteria specified in the classifier rule. For example the interface from which traffic of this class comes and the source MAC address of traffic that matches this classifier.
Class Intf	This displays the ingress interface to which the classifier applies.
Ether Type	This displays the type of Ethernet frames to which the classifier applies.
SrcMAC/ Mask	This displays the source MAC and network mask of traffic to which the classifier applies.
DstMAC/ Mask	This displays the destination MAC and network mask of traffic to which the classifier applies.
SrcIP/ PrefixLength	This displays the source IP address and prefix length of traffic to which the classifier applies.
DstIP/ PrefixLength	This displays the destination IP address and prefix length of traffic to which the classifier applies.
Proto	This displays the protocol of traffic to which the classifier applies.
SrcPort	This displays the source port of traffic to which the classifier applies.
DstPort	This displays the destination port of traffic to which the classifier applies.
DSCP Check	This displays the DSCP mark of traffic to which the classifier applies.
802.1P Check	This displays the IEEE 802.1p priority level of traffic to which the classifier applies.
CLASSIFICATION RESULTS	These fields show the changes the classifier rule applies to matching traffic.
Queue Key	This displays the number of the queue to which the Router adds traffic that matches this classifier.
DSCP Mark	This displays the DSCP mark the Router adds to traffic that matches this classifier.
802.1P Mark	This displays the IEEE 802.1p priority level the Router assigns to traffic that matches this classifier.
Enable	Select an entry’s **Enable** option and click the **Enable** button to turn it on.
Remove	Select an entry’s **Remove** option and click the **Remove** button to delete it.
Add	Click this button to create a new classifier rule.

9.3.1 Add QoS Class

Click **Add** in the **Class Setup** screen to configure a new classifier.

Figure 55 Add QoS Class



Add Network Traffic Class Rule

This screen creates a traffic class rule to classify the ingress traffic into a priority queue and optionally mark the DSCP or Ethernet priority of the packet.
Click 'Apply/Save' to save and activate the rule.

Traffic Class Name:	
Rule Order:	Last
Rule Status:	Enable

Specify Classification Criteria (A blank criterion indicates it is not used for classification.)

Class Interface:	eth1
Ether Type:	
Source MAC Address:	
Source MAC Mask:	
Destination MAC Address:	
Destination MAC Mask:	

Specify Classification Results (A blank value indicates no operation.)

Specify Class Queue (Required):

- Packets classified into a queue that exit through an interface for which the queue is not specified to exist, will instead egress to the default queue on the interface.

Mark Differentiated Service Code Point (DSCP):

Mark 802.1p priority:

- Class non-vlan packets egress to a non-vlan interface will be tagged with VID 0 and the class rule p-bits.
- Class vlan packets egress to a non-vlan interface will have the packet p-bits re-marked by the class rule p-bits. No additional vlan tag is added.
- Class non-vlan packets egress to a vlan interface will be tagged with the interface VID and the class rule p-bits.
- Class vlan packets egress to a vlan interface will be additionally tagged with the packet VID, and the class rule p-bits.

Table 52 Add QoS Class

LABEL	DESCRIPTION
Traffic Class Name	Enter a descriptive name of up to 15 printable English keyboard characters, not including spaces.
Rule Order	Select this classifier’s place in the list of classifiers. Select **Last** to put this rule in the back of the classifier list.
Rule Status	Turn this classifier on or off.

Table 52 Add QoS Class (continued)

LABEL	DESCRIPTION
Specify Classification Criteria	Configure these fields to identify the traffic to which the class applies. The fields available vary depending on the selected interface and Ether type. Leave a field blank to not apply that criterion.
Class Interface	Select the ingress interface to which the classifier applies.
Ether Type	Select the predefined application (IP, ARP, IPv6, PPPoE discovery, PPPoE session, 8865, 8866, or IEEE 802.1q) to which the classifier applies. The list of types available to choose from varies depending on the selected interface.
Source MAC Address	Enter a MAC address to apply the classifier to packets from that MAC address.
Source MAC Mask	Type the mask for the specified MAC address to determine which bits a packet's MAC address should match. Enter "f" for each bit of the specified source MAC address that the traffic's MAC address should match. Enter "0" for the bit(s) of the matched traffic's MAC address, which can be of any hexadecimal character(s). For example, if you set the MAC address to 00:13:49:00:00:00 and the mask to ff:ff:ff:00:00:00, a packet with a MAC address of 00:13:49:12:34:56 matches this criteria.
Destination MAC Address	Enter a MAC address to apply the classifier to packets destined for that MAC address.
Destination MAC Mask	Type the mask for the specified MAC address to determine which bits a packet's MAC address should match. Enter "f" for each bit of the specified source MAC address that the traffic's MAC address should match. Enter "0" for the bit(s) of the matched traffic's MAC address, which can be of any hexadecimal character(s). For example, if you set the MAC address to 00:13:49:00:00:00 and the mask to ff:ff:ff:00:00:00, a packet with a MAC address of 00:13:49:12:34:56 matches this criteria.
Source IP Address[/Mask]	Select this and enter an IP address to apply the classifier to packets from that IP address. You can also include a source subnet mask.
Vendor Class ID (DHCP Option 60)	Select this and enter the Vendor Class Identifier (Option 60) of the matched traffic, such as the type of the hardware or firmware.
User Class ID DHCP option 77	Select this and enter a string that identifies the user's category or application type in the matched DHCP packets.
Destination IP Address[/Mask]	Enter an IP address to apply the classifier to packets destined for that IP address. You can also include a destination subnet mask.
Differentiated Service Code Point (DSCP) Check	Select a DSCP mark of traffic to which to apply the classifier.
802.1p Priority Check	This field displays when you set the **Ether Type** field to **8021Q**. Select the IEEE 802.1p priority level (between 0 and 7) of traffic to which to apply the classifier. "0" is the lowest priority level and "7" is the highest.

Table 52 Add QoS Class (continued)

LABEL	DESCRIPTION
Specify Classification Results	Configure these fields to change traffic that matches the classifier. The fields available vary depending on the selected interface, Ether type, and sometimes on the selected class queue. Leave a field blank to not apply that type of change.
Specify Class Queue	Select the queue to which to add traffic that matches this classifier.
Mark Differentiated Service Code Point (DSCP):	Select the DSCP mark to add to traffic that matches this classifier. Use **Auto** marking to automatically apply a DSCP mark according to the type of traffic. Use **default** to leave the DSCP mark unchanged.
Mark 802.1p priority	Select the IEEE 802.1p priority level to assign to traffic that matches this classifier.
Set Rate Limit	Set the rate limit to apply to traffic that matches this classifier.
Apply/Save	Click this button to save your changes.

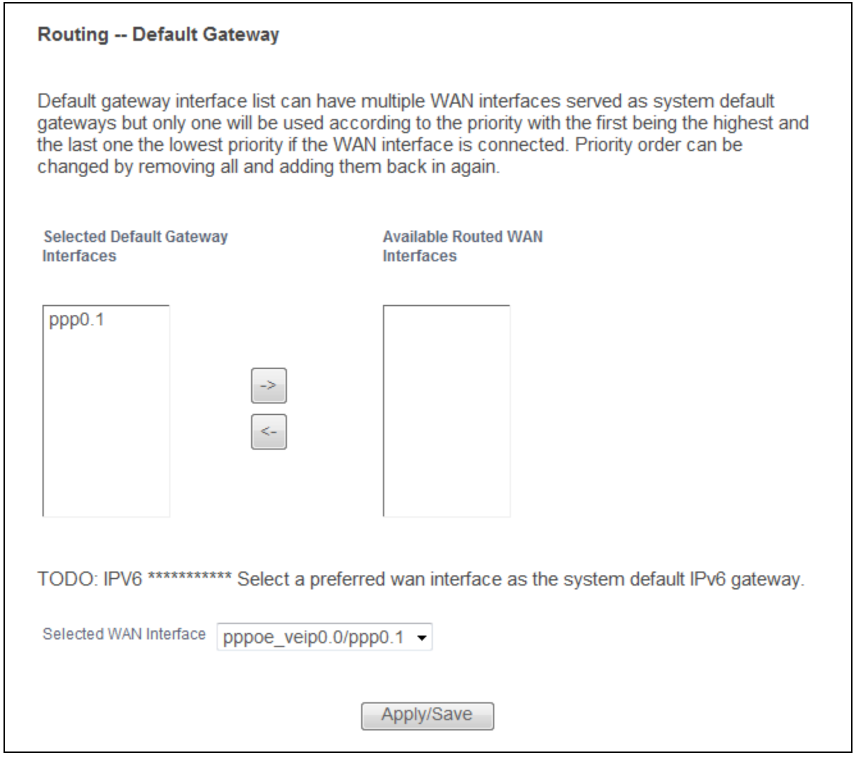
Routing

Chapter 10

10.1 Default Gateway

Click **Advanced Setup > Routing > Default Gateway** to open the **Default Gateway** screen. Use this screen to select WAN interfaces to serve as system default gateways.

Figure 56 Default Gateway



Routing -- Default Gateway

Default gateway interface list can have multiple WAN interfaces served as system default gateways but only one will be used according to the priority with the first being the highest and the last one the lowest priority if the WAN interface is connected. Priority order can be changed by removing all and adding them back in again.

Selected Default Gateway Interfaces: ppp0.1

Available Routed WAN Interfaces:

TODO: IPV6 *********** Select a preferred wan interface as the system default IPv6 gateway.

Selected WAN Interface: pppoe_veip0.0/ppp0.1

Move the WAN interfaces to serve as system default gateways from **Available Routed WAN Interfaces** to **Selected Default Gateway Interfaces**.

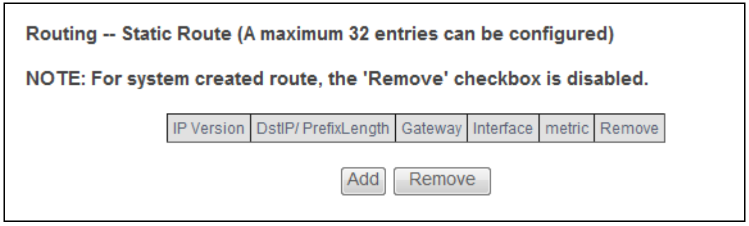
Use the **Selected WAN Interface** field to select the preferred WAN interface to server as the Router’s default IPv6 gateway.

Click **Apply/Save** to save your changes.

10.2 Static Route

Click **Advanced Setup > Routing > Static Route** to view and configure the static route rules on the Router.

Figure 57 Static Route



Routing -- Static Route (A maximum 32 entries can be configured)

NOTE: For system created route, the 'Remove' checkbox is disabled.

IP Version	DstIP/ PrefixLength	Gateway	Interface	metric	Remove

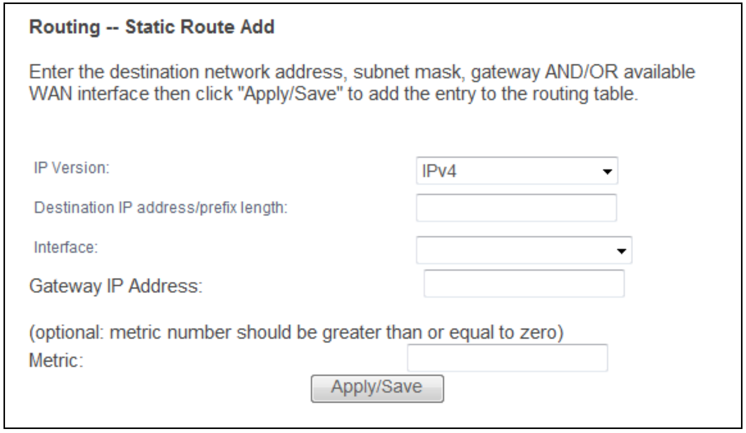
Table 53 Static Route

LABEL	DESCRIPTION
IP Version	This displays whether the entry uses IPv4 or IPv6.
DstIP/ PrefixLength	This specifies the IP network address and prefix length of the final destination. Routing is always based on network number.
Gateway	This is the IP address of the gateway. The gateway is a router or switch on the same network segment as the device's LAN or WAN port. The gateway helps forward packets to their destinations.
Interface	This is the interface this static route uses to forward traffic for the listed destination address.
metric	The metric represents the "cost of transmission". A router determines the best route for transmission by choosing a path with the lowest "cost". The smaller the number, the lower the "cost".
Remove	Select entries and click the **Remove** button to delete them.
Add	Click this to configure a new static route.

10.2.1 Add Static Route

Use this screen to add a static route. Click **Add** in the **Static Route** screen to display the following screen.

Figure 58 Static Route: Add



Routing -- Static Route Add

Enter the destination network address, subnet mask, gateway AND/OR available WAN interface then click "Apply/Save" to add the entry to the routing table.

IP Version: IPv4

Destination IP address/prefix length:

Interface:

Gateway IP Address:

(optional: metric number should be greater than or equal to zero)
Metric:

Table 54 Static Route: Add

LABEL	DESCRIPTION
IP Version	Select whether your IP type is **IPv4** or **IPv6**.
Destination IP address/ prefix length	Enter the IPv4 or IPv6 address and network length of the final destination.
Interface	Select the interface through which this static route sends traffic.
Gateway IP Address	Enter the IP address of the gateway when you configure a static route that uses an IP-based interface (such as IPoE, IPoA, or LAN). The gateway is a router or switch on the same network segment as the device's LAN or WAN port. The gateway helps forward packets to their destinations.
Apply/Save	Click this button to save your changes.

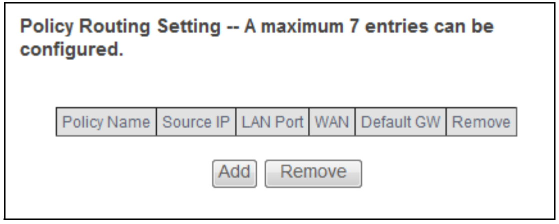
10.3 Policy Routing

Traditionally, routing is based on the destination address only and the Router takes the shortest path to forward a packet. Policy routing allows the Router to override the default routing behavior and alter the packet routing based on the policy defined by the network administrator. Policy-based routing is applied to outgoing packets, prior to the normal routing.

You can use source-based policy routing to direct traffic from different users through different connections or distribute traffic among multiple paths for load sharing.

Use the **Policy Routing** screen to view and configure routing policies on the Router. Click **Advanced Setup > Routing > Policy Routing** to open the following screen.

Figure 59 Policy Routing



Policy Routing Setting -- A maximum 7 entries can be configured.

Policy Name	Source IP	LAN Port	WAN	Default GW	Remove

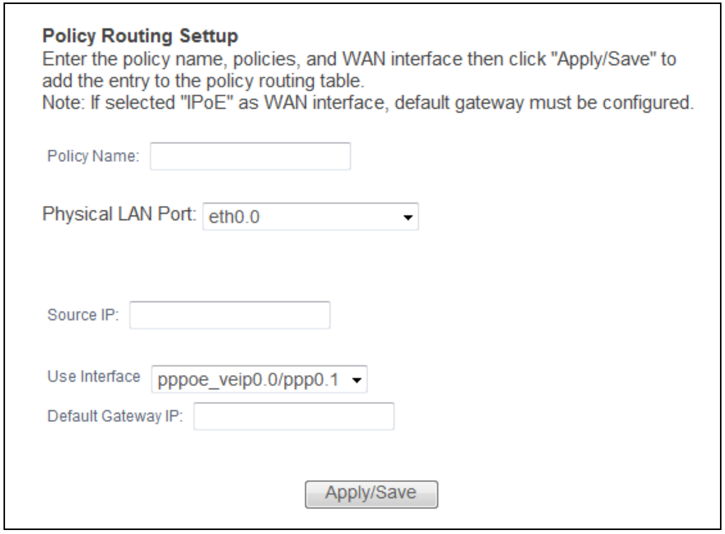
Table 55 Policy Routing

LABEL	DESCRIPTION
Policy Name	This displays the name of the rule.
Source IP	This displays the source IP address.
LAN Port	This displays the source LAN port number.
WAN	This displays the WAN interface through which the traffic is routed.
Default GW	This displays the default gateway IP address the route uses.
Remove	Select entries and click the **Remove** button to delete them.
Add	Click this to create a new policy routing rule.

10.3.1 Add Policy Routing

Click **Add** in the **Policy Routing** screen to open the following screen. Use this screen to configure the required information for a policy route.

Figure 60 Policy Routing: Add



Policy Routing Setup

Enter the policy name, policies, and WAN interface then click "Apply/Save" to add the entry to the policy routing table.

Note: If selected "IPoE" as WAN interface, default gateway must be configured.

Policy Name:

Physical LAN Port: eth0.0

Source IP:

Use Interface pppoe_veip0.0/ppp0.1

Default Gateway IP:

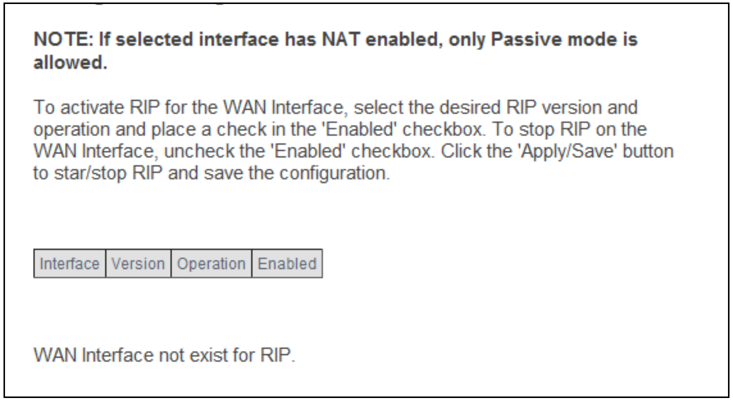
Table 56 Policy Routing: Add

LABEL	DESCRIPTION
Policy Name	Enter a descriptive name of printable English keyboard characters, not including spaces.
Physical LAN Port	Select the source LAN Ethernet port number.
Source IP	Enter the source IP address.
Use Interface	Select a WAN interface through which the traffic is sent. You must have the WAN interface(s) already configured in the **Broadband** screens.
Default Gateway IP	Enter the default gateway IP address the route uses.
Apply/Save	Click this button to save your changes.

10.4 RIP

Click **Advanced Setup > Routing > RIP** to open the **RIP** screen. Use this screen to configure RIP settings. Routing Information Protocol (RIP, RFC 1058 and RFC 1389) allows a device to exchange routing information with other routers.

Figure 61 RIP



NOTE: If selected interface has NAT enabled, only Passive mode is allowed.

To activate RIP for the WAN Interface, select the desired RIP version and operation and place a check in the 'Enabled' checkbox. To stop RIP on the WAN Interface, uncheck the 'Enabled' checkbox. Click the 'Apply/Save' button to star/stop RIP and save the configuration.

Interface	Version	Operation	Enabled

WAN Interface not exist for RIP.

Table 57 RIP

LABEL	DESCRIPTION
Interface	This is the name of the interface in which the RIP setting is used.
Version	The RIP version controls the format and the broadcasting method of the RIP packets that the Router sends (it recognizes both formats when receiving). RIP version **1** is universally supported but RIP version **2** carries more information. RIP version **1** is probably adequate for most networks, unless you have an unusual network topology.
Operation	Select **Passive** to have the Router update the routing table based on the RIP packets received from neighbors but not advertise its route information to other routers in this interface. Select **Active** to have the Router advertise its route information and also listen for routing updates from neighboring routers.
Enabled	Select the check box to activate the settings.
Apply/Save	Click this button to save your changes.

DNS

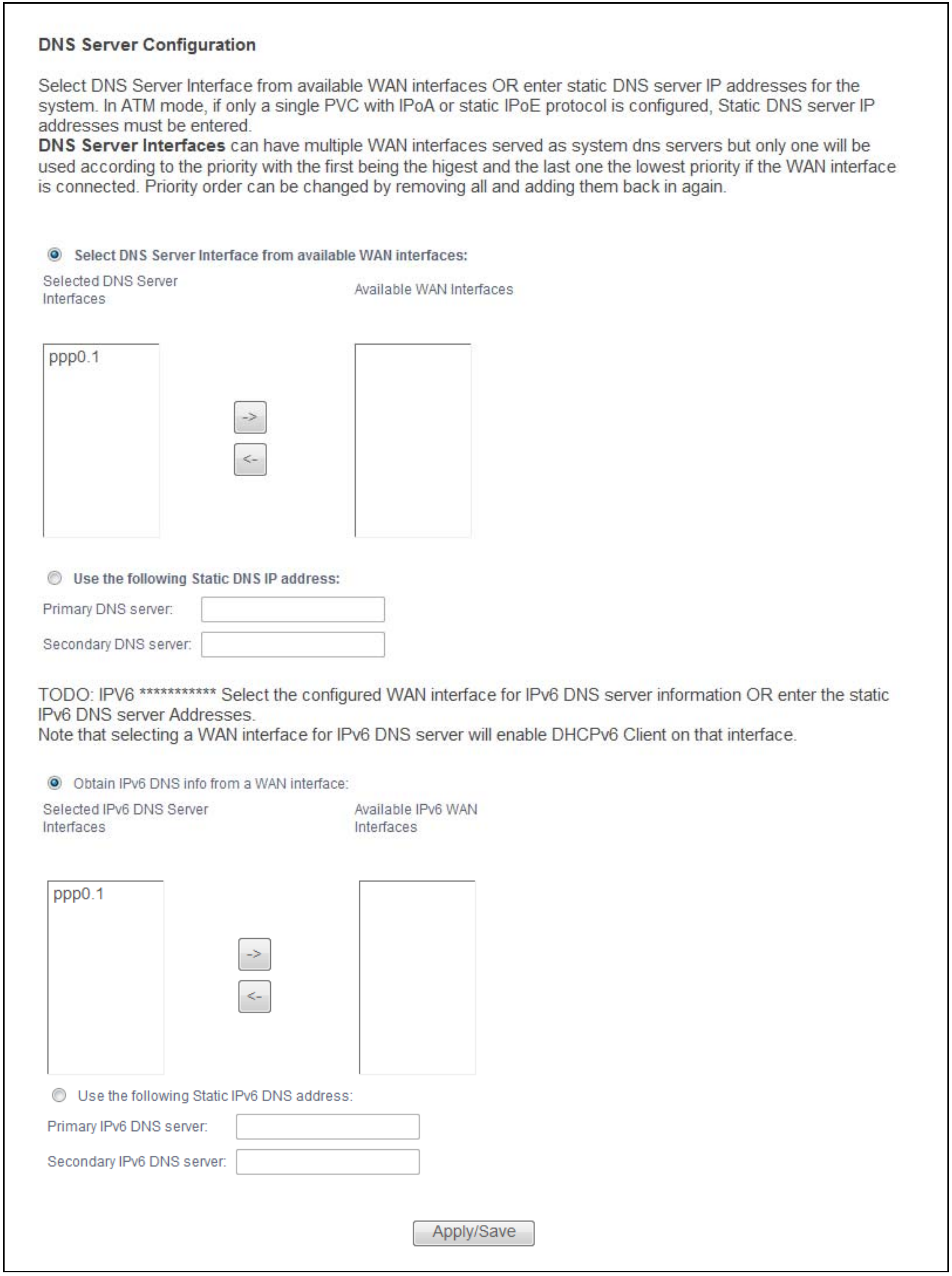
Chapter 11

11.1 DNS Server

DNS (Domain Name System) maps a domain name to its corresponding IP address and vice versa. The DNS server is extremely important because without it, you must know the IP address of a machine before you can access it.

Use this screen to view and configure DNS routes on the Router. Click **Advanced Setup > DNS > DNS Server** to open this screen.

Figure 62 DNS Server



DNS Server Configuration

Select DNS Server Interface from available WAN interfaces OR enter static DNS server IP addresses for the system. In ATM mode, if only a single PVC with IPoA or static IPoE protocol is configured, Static DNS server IP addresses must be entered.
DNS Server Interfaces can have multiple WAN interfaces served as system dns servers but only one will be used according to the priority with the first being the higest and the last one the lowest priority if the WAN interface is connected. Priority order can be changed by removing all and adding them back in again.

● **Select DNS Server Interface from available WAN interfaces:**

Selected DNS Server Interfaces: ppp0.1

Available WAN Interfaces:

○ **Use the following Static DNS IP address:**

Primary DNS server:

Secondary DNS server:

TODO: IPV6 *********** Select the configured WAN interface for IPv6 DNS server information OR enter the static IPv6 DNS server Addresses.
Note that selecting a WAN interface for IPv6 DNS server will enable DHCPv6 Client on that interface.

● Obtain IPv6 DNS info from a WAN interface:

Selected IPv6 DNS Server Interfaces: ppp0.1

Available IPv6 WAN Interfaces:

○ Use the following Static IPv6 DNS address:

Primary IPv6 DNS server:

Secondary IPv6 DNS server:

The following table describes the fields in this screen.

Table 58 DNS Server

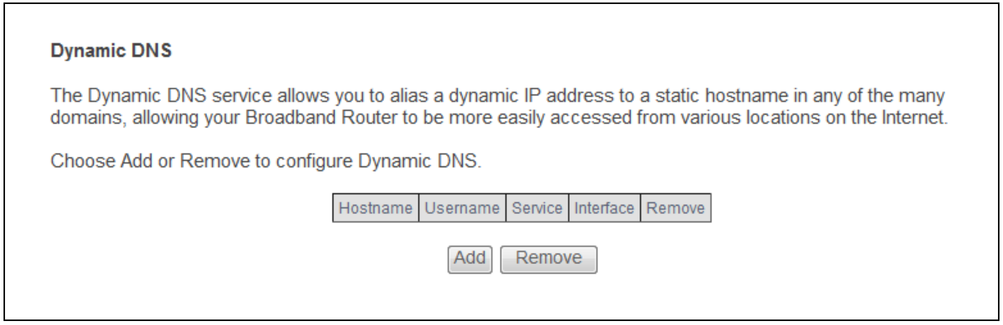
LABEL	DESCRIPTION
Select DNS Server Interface from available WAN interfaces	Select this to have the Router get the DNS server addresses from one of the Router’s WAN interfaces.
Selected DNS Server Interfaces	Select a WAN interface through which to get DNS server addresses. You can select multiple WAN interfaces for the device to try. The Router tries the WAN interfaces in the order listed and uses only the DNS server information of the first WAN interface that connects; there is no backup WAN function. To change the priority order remove them all and add them back in again.
Available WAN Interfaces	These are the WAN interfaces you can select from.
Use the following Static DNS IP address	Select this to have the Router use the DNS server addresses you configure manually.
Primary DNS server	Enter the first DNS server address assigned by the ISP.
Secondary DNS server	Enter the second DNS server address assigned by the ISP.
Obtain IPv6 DNS info from a WAN interface	Select this to have the Router get the IPv6 DNS server addresses from the ISP automatically.
Selected IPv6 DNS Server Interfaces	Select an IPv6 WAN interface through which you want to obtain the IPv6 DNS related information.
Available IPv6 WAN Interfaces	These are the IPv6 WAN interfaces you can select from.
Use the following Static IPv6 DNS address	Select this to have the Router use the IPv6 DNS server addresses you configure manually.
Primary IPv6 DNS server	Enter the first IPv6 DNS server address assigned by the ISP.
Secondary IPv6 DNS server	Enter the second IPv6 DNS server address assigned by the ISP.
Apply/Save	Click this button to save your changes.

11.2 Dynamic DNS

Dynamic DNS allows you to update your current dynamic IP address with one or many dynamic DNS services. 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.

Click **Advanced Setup > DNS > Dynamic DNS** to configure DDNS entries.

Figure 63 Dynamic DNS



Dynamic DNS

The Dynamic DNS service allows you to alias a dynamic IP address to a static hostname in any of the many domains, allowing your Broadband Router to be more easily accessed from various locations on the Internet.

Choose Add or Remove to configure Dynamic DNS.

Hostname	Username	Service	Interface	Remove

The following table describes the fields in this screen.

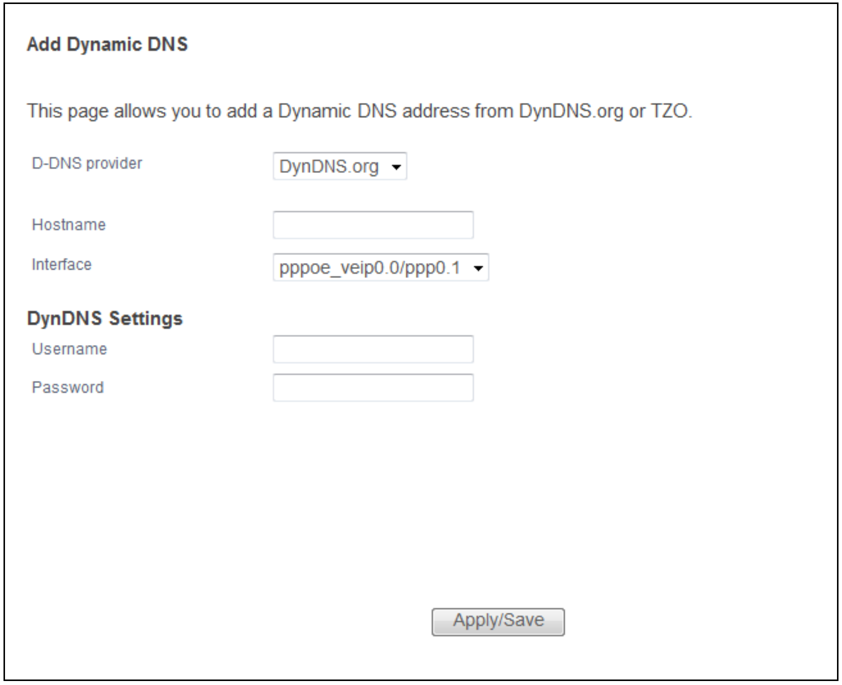
Table 59 Dynamic DNS

LABEL	DESCRIPTION
Hostname	This displays the entry’s domain name.
Username	This displays the entry’s user name.
Service	This displays the entry’s Dynamic DNS service provider.
Interface	This displays the interface the DDNS entry uses.
Remove	Select entries and click the **Remove** button to delete them.
Add	Click this to create a new DDNS entry.

11.2.1 Dynamic DNS Add

Use this screen to create a DDNS entry. Click the **Dynamic DNS** screen's **Add** button to display the following screen.

Figure 64 Dynamic DNS Add



Add Dynamic DNS

This page allows you to add a Dynamic DNS address from DynDNS.org or TZO.

D-DNS provider: DynDNS.org

Hostname:

Interface: pppoe_veip0.0/ppp0.1

DynDNS Settings

Username:

Password:

The following table describes the fields in this screen.

Table 60 Dynamic DNS Add

LABEL	DESCRIPTION
D-DNS provider	Select your Dynamic DNS service provider from the drop-down list box.
Hostname	Type the domain name assigned to your Router by your Dynamic DNS provider. You can specify up to two host names in the field separated by a comma (",").
Interface	Select the interface the DDNS entry uses.
Username	Type your user name.
Password	Type the password assigned to you.
Apply/Save	Click this button to save your changes.

UPnP

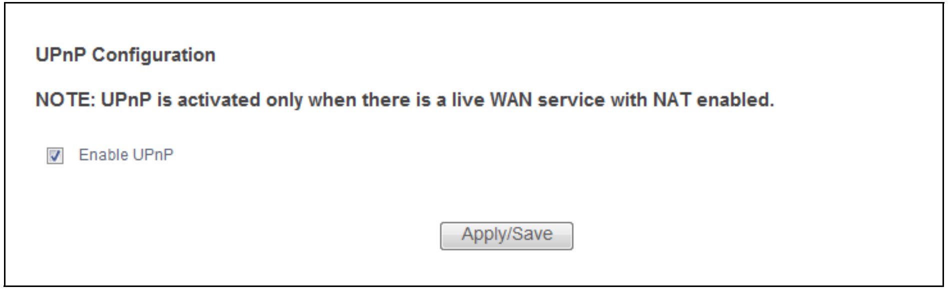
12 Chapter

12.1 UPnP

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.

Use the **UPnP** screen to enable the UPnP feature on your Router. Click **Advanced Setup > UPnP**.

Figure 65 UPnP



UPnP Configuration

NOTE: UPnP is activated only when there is a live WAN service with NAT enabled.

☑ Enable UPnP

Table 61 UPnP

LABEL	DESCRIPTION
UPnP	Select **Enable** to activate UPnP. Be aware that anyone could use a UPnP application to open the web configurator's login screen without entering the Router's IP address (although you must still enter the password to access the web configurator).
Apply/Save	Click this button to save your changes.

DNS Proxy

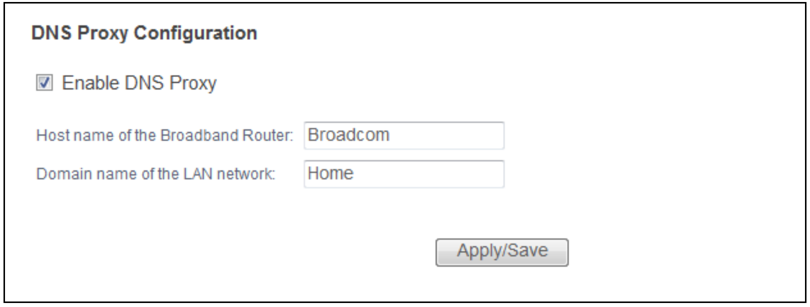
13 Chapter

13.1 DNS Proxy

Use DNS Proxy to have the Router send its own address to the LAN clients for them to use as the DNS server.

Click **Advanced Setup > DNS Proxy** to open the **DNS Proxy** screen.

Figure 66 DNS Proxy



DNS Proxy Configuration

☑ Enable DNS Proxy

Host name of the Broadband Router: Broadcom

Domain name of the LAN network: Home

Table 62 DNS Proxy

LABEL	DESCRIPTION
Enable DNS Proxy	Select this to have the Router send its own address to the LAN clients for them to use as the DNS server.
Host name of the Broadband Router	Enter a descriptive name for this Router.
Domain name of the LAN network	Enter the domain name of the LAN network.
Apply/Save	Click this button to save your changes.

Interface Grouping

14 Chapter

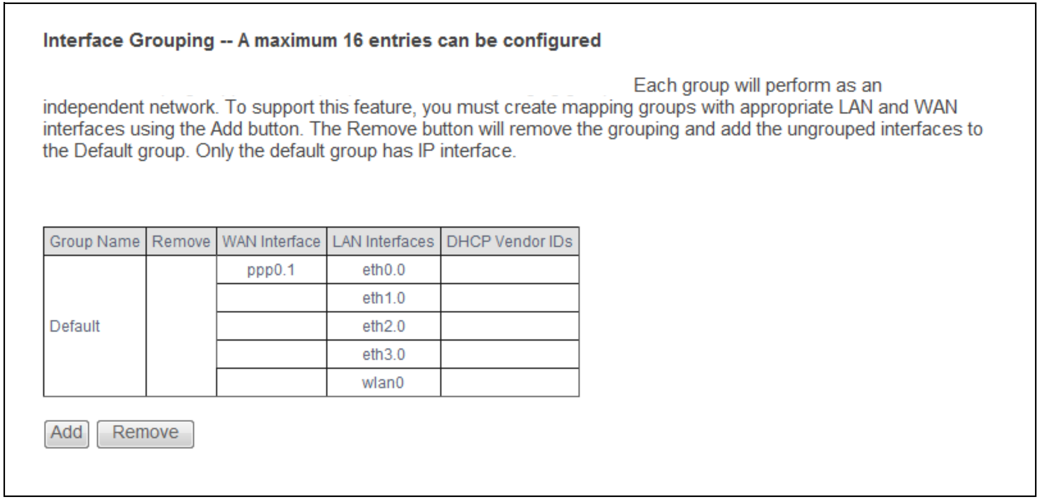
14.1 Interface Grouping

By default, all LAN and WAN interfaces on the Router are in the same group and can communicate with each other. Create interface groups to have the Router assign the IP addresses in different domains to different groups. Each group acts as an independent network on the Router. This lets devices connected to an interface group's LAN interfaces communicate through the interface group's WAN or LAN interfaces but not other WAN or LAN interfaces.

You can manually add a LAN interface to a new group. Alternatively, you can have the Router automatically add the incoming traffic and the LAN interface on which traffic is received to an interface group when its DHCP Vendor ID option information matches one listed for the interface group.

Use the **LAN** screen to configure the private IP addresses the DHCP server on the Router assigns to the clients in the default and/or user-defined groups. If you set the Router to assign IP addresses based on the client's DHCP Vendor ID option information, you must enable DHCP server and configure LAN TCP/IP settings for both the default and user-defined groups. Click **Advanced Setup > Interface Grouping** to open the following screen.

Figure 67 Interface Grouping



Interface Grouping -- A maximum 16 entries can be configured

Each group will perform as an independent network. To support this feature, you must create mapping groups with appropriate LAN and WAN interfaces using the Add button. The Remove button will remove the grouping and add the ungrouped interfaces to the Default group. Only the default group has IP interface.

Group Name	Remove	WAN Interface	LAN Interfaces	DHCP Vendor IDs
Default		ppp0.1	eth0.0	
			eth1.0	
			eth2.0	
			eth3.0	
			wlan0	

The following table describes the fields in this screen.

Table 63 Interface Grouping

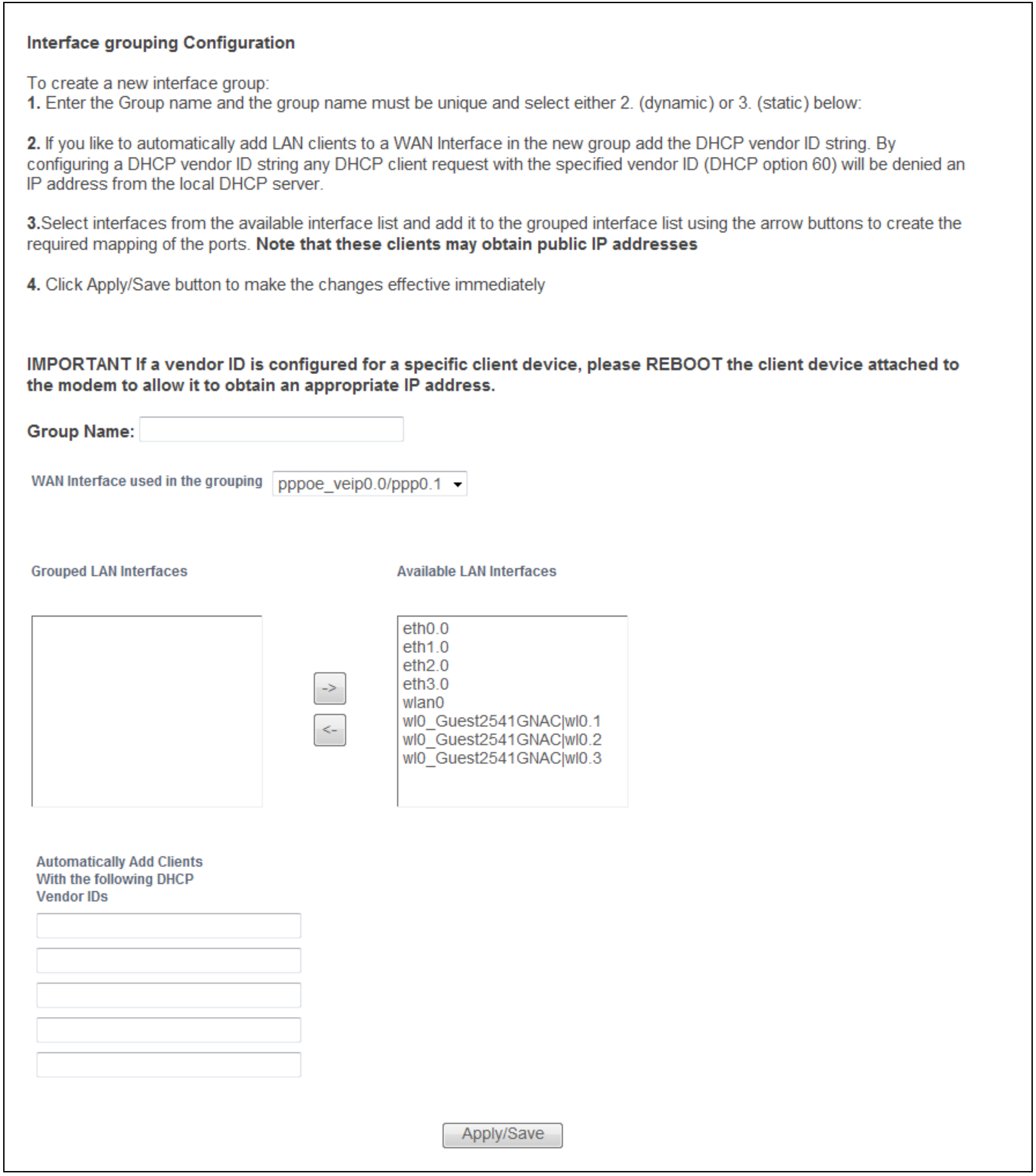
LABEL	DESCRIPTION
Group Name	This shows the descriptive name of the group.
Remove	Select this check box and click the **Remove** button to delete the group from the Router.
WAN Interface	This shows the WAN interfaces in the group.
LAN Interfaces	This shows the LAN interfaces in the group.
DHCP Vendor IDs	This shows the DHCP Vendor’s ID for the group.
Add	Click this button to create a new group.

14.1.1 Interface Group Configuration

Click the **Add** button in the **Interface Grouping** screen to open the following screen. Use this screen to create a new interface group.

ⓘ An interface can belong to only one group at a time.

Figure 68 Interface Grouping: Add



Interface grouping Configuration

To create a new interface group:
1. Enter the Group name and the group name must be unique and select either 2. (dynamic) or 3. (static) below:

2. If you like to automatically add LAN clients to a WAN Interface in the new group add the DHCP vendor ID string. By configuring a DHCP vendor ID string any DHCP client request with the specified vendor ID (DHCP option 60) will be denied an IP address from the local DHCP server.

3.Select interfaces from the available interface list and add it to the grouped interface list using the arrow buttons to create the required mapping of the ports. **Note that these clients may obtain public IP addresses**

4. Click Apply/Save button to make the changes effective immediately

IMPORTANT If a vendor ID is configured for a specific client device, please REBOOT the client device attached to the modem to allow it to obtain an appropriate IP address.

Group Name:

WAN Interface used in the grouping: pppoe_veip0.0/ppp0.1

The following table describes the fields in this screen.

Table 64 Interface Grouping: Add

LABEL	DESCRIPTION
Group Name	Enter a name to identify this group. You can enter up to 30 characters. You can use letters, numbers, hyphens (-) and underscores (_). Spaces are not allowed.
WAN Interface used in the grouping	Select the WAN interface this group uses. Select **None** to not add a WAN interface to this group.
Grouped LAN Interfaces Available LAN Interfaces	Select one or more LAN interfaces (Ethernet LAN, HPNA or wireless LAN) in the **Available LAN Interfaces** list and use the left arrow to move them to the **Grouped LAN Interfaces** list to add the interfaces to this group. To remove a LAN or wireless LAN interface from the **Grouped LAN Interfaces**, use the right-facing arrow.
Automatically Add Clients With the following DHCP Vendor IDs	If you want LAN clients to get public IP addresses, you can list their DHCP vendor IDs here.
Apply/Save	Click **Apply/Save** to save your changes back to the Router.

IP Tunnel

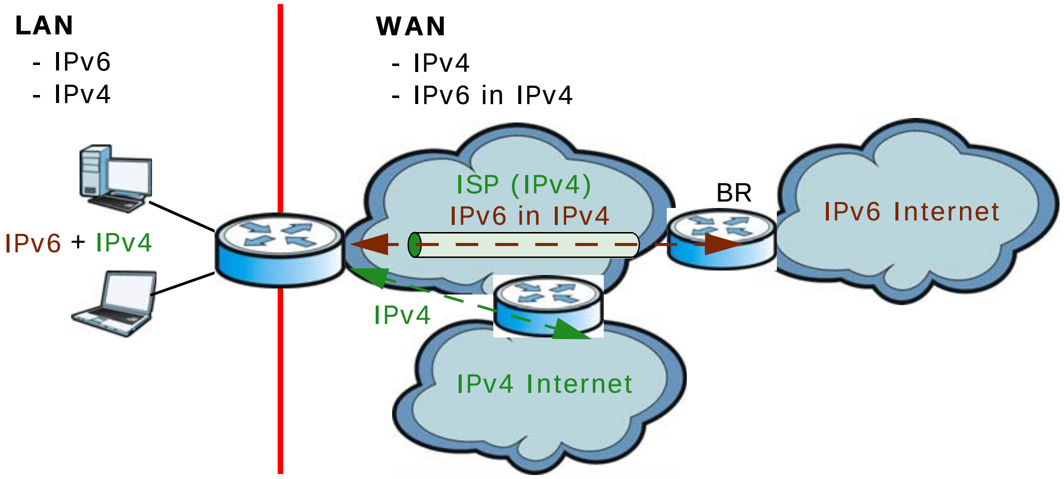
Chapter 15

15.1 IPv6inIPv4 (6RD)

Use IPv6 Rapid Deployment (6RD) when the local network uses IPv6 and the ISP has an IPv4 network. When the Router has an IPv4 WAN address and is configured to **IPv4 only**, you can enable 6RD to encapsulate IPv6 packets in IPv4 packets to cross the ISP's IPv4 network.

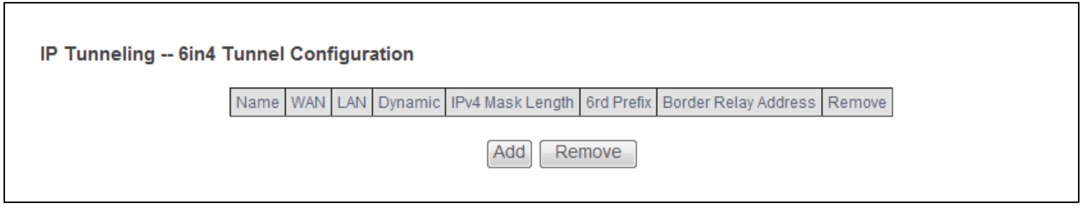
The Router generates a global IPv6 prefix from its IPv4 WAN address and tunnels IPv6 traffic to the ISP's Border Relay router (BR in the figure) to connect to the native IPv6 Internet. The local network can also use IPv4 services. The Router uses it's configured IPv4 WAN IP to route IPv4 traffic to the IPv4 Internet.

Figure 69 IPv6 Rapid Deployment



Click **Advanced Setup > IP Tunnel > IPv6inIPv4** to view and configure IPv6 through IPv4 tunneling. This will encapsulate IPv6 packets in IPv4 packets so they can travel through IPv4 networks.

Figure 70 IPv6inIPv4



IP Tunneling -- 6in4 Tunnel Configuration

Name	WAN	LAN	Dynamic	IPv4 Mask Length	6rd Prefix	Border Relay Address	Remove

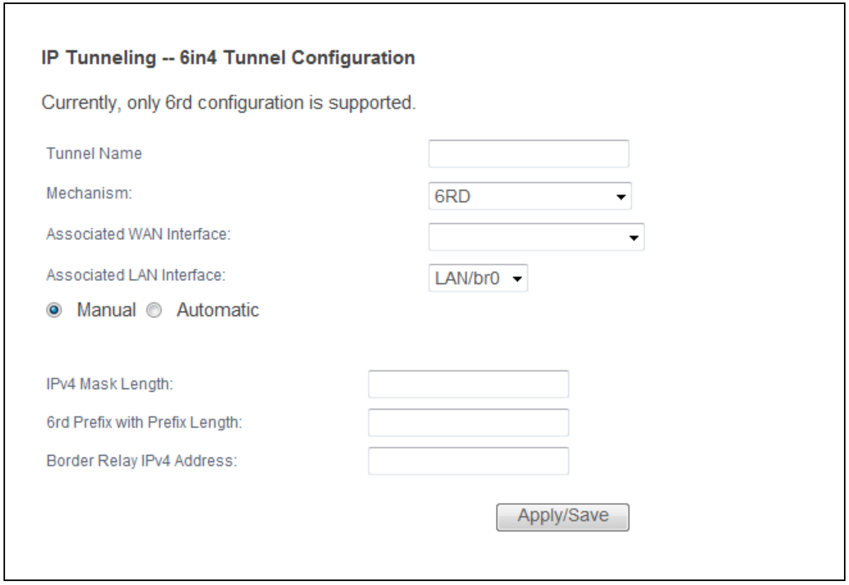
Table 65 IPv6inIPv4

LABEL	DESCRIPTION
Name	This displays the IPv6 to IPv4 tunnel's name.
WAN	This displays the associated WAN interface.
LAN	This displays the associated LAN interface.
Dynamic	This displays the type of 6RD.
IPv4 Mask Length	This displays the subnet mask number for the IPv4 network.
6rd Prefix	This displays the IPv6 prefix for tunneling IPv6 traffic to the ISP's border relay router and connecting to the native IPv6 Internet.
Boarder Relay Address	This displays the relay server's IPv4 address.
Remove	Select an entry and click the **Remove** button to delete it.
Add	Click this to add a new IPv6 through IPv4 tunnel.

15.1.1 IPv6inIPv4 Configuration

Click the **Add** button in the **IPv6inIPv4 screen to add a new IPv6 through IPv4 tunnel entry.**

Figure 71 IPv6inIPv4: Add



IP Tunneling -- 6in4 Tunnel Configuration

Currently, only 6rd configuration is supported.

Tunnel Name	
Mechanism:	6RD
Associated WAN Interface:	
Associated LAN Interface:	LAN/br0

● Manual ○ Automatic

IPv4 Mask Length:	
6rd Prefix with Prefix Length:	
Border Relay IPv4 Address:	

Table 66 IPv6inIPv4: Add

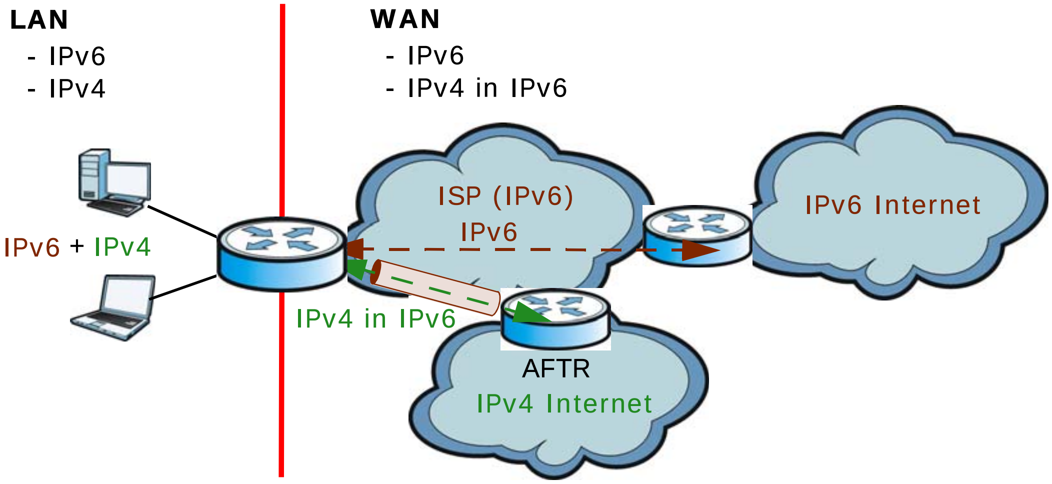
LABEL	DESCRIPTION
Tunnel Name	Enter a descriptive name for the IPv6 through IPv4 tunnel.
Mechanism	The current mechanism is set to **6RD** to tunnel IPv6 traffic from the local network through the ISP's IPv4 network.
Associated WAN Interface	Select a WAN interface to associate with the IPv6 to IPv4 tunnel.
Associated LAN Interface	Select a LAN interface to associate with the IPv6 to IPv4 tunnel.
Manual/ Automatic	Select the 6RD type. Select **Manual** to set the 6RD type to static. Select **Automatic** to have the Router detect it automatically through DHCP.
IPv4 Mask Length	Enter the subnet mask number (1~32) for the IPv4 network.
6rd Prefix with Prefix Length	Enter an IPv6 prefix for tunneling IPv6 traffic to the ISP's border relay router and connecting to the native IPv6 Internet.
Border Relay IPv4 Address	Specify the relay server's IPv4 address in this field.
Apply/Save	Click this button to save your changes.

15.2 IPv4inIPv6 (Dual Stack Lite)

Use DS-Lite (Dual Stack Lite) when local network computers use IPv4 and the ISP has an IPv6 network. When the Router has an IPv6 WAN address and is set to **IPv6 only**, you can enable Dual Stack Lite to use IPv4 computers and services.

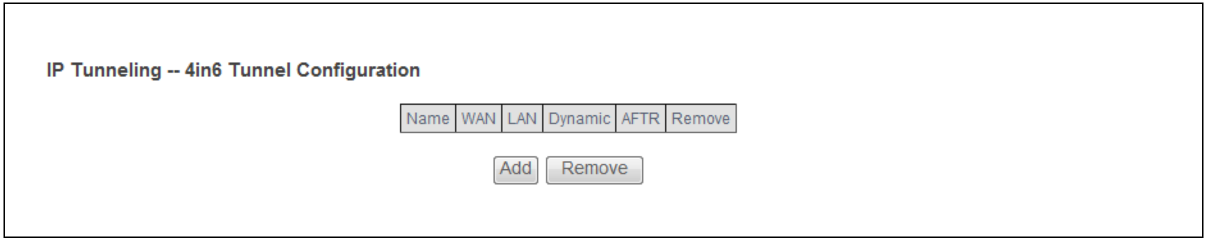
The Router tunnels IPv4 packets inside IPv6 encapsulation packets to the ISP's Address Family Transition Router (AFTR in the graphic) to connect to the IPv4 Internet. The local network can also use IPv6 services. The Router uses it's configured IPv6 WAN IP to route IPv6 traffic to the IPv6 Internet.

Figure 72 Dual Stack Lite



Click **Advanced Setup > IP Tunnel > IPv4inIPv6** to view and configure Dual Stack Lite to let local computers use IPv4 through an ISP's IPv6 network.

Figure 73 IPv4inIPv6


IP Tunneling -- 4in6 Tunnel Configuration

Name	WAN	LAN	Dynamic	AFTR	Remove

Table 67 IPv4inIPv6

LABEL	DESCRIPTION
Name	This displays the IPv4 through IPv6 tunnel's name.
WAN	This displays the associated WAN interface.
LAN	This displays the associated LAN interface.
Dynamic	This displays the type of 6RD.
AFTR	This displays the transition router's IPv6 address.

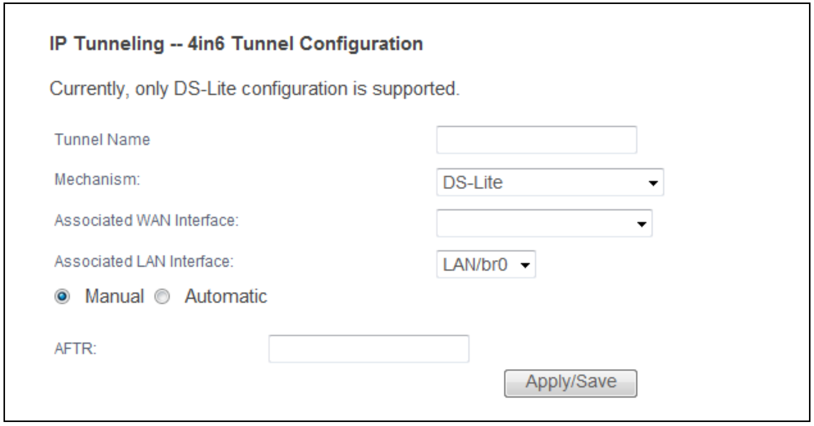
Table 67 IPv4inIPv6 (continued)

LABEL	DESCRIPTION
Remove	Select an entry and click the **Remove** button to delete it.
Add	Click this to add a new IPv4 through IPv6 tunnel.

15.2.1 IPv4inIPv6 Configuration

Click the **Add** button in the **IPv4inIPv6** screen to add a new IPv6 through IPv4 tunnel entry.

Figure 74 IPv4inIPv6: Add



IP Tunneling -- 4in6 Tunnel Configuration

Currently, only DS-Lite configuration is supported.

Tunnel Name	
Mechanism:	DS-Lite
Associated WAN Interface:	
Associated LAN Interface:	LAN/br0

● Manual ○ Automatic

AFTR:

Table 68 IPv4inIPv6: Add

LABEL	DESCRIPTION
Tunnel Name	Enter a descriptive name for the IPv4 to IPv6 tunnel.
Mechanism	The mechanism is set to **DS-Lite** to let local computers use IPv4 through an ISP's IPv6 network.
Associated WAN Interface	Select a WAN interface to associate with the IPv4 to IPv6 tunnel.
Associated LAN Interface	Select a LAN interface to associate with the IPv4 to IPv6 tunnel.
Manual/Automatic	Select the 6RD type. Select **Manual** to set the 6RD type to static. Select **Automatic** to have the Router detect it automatically through DHCP.
AFTR	Specify the ISP's Address Family Transition Router's IPv6 address.
Apply/Save	Click this button to save your changes.