

Wireless Bridge

WDS (wireless distributed system) is a wireless access point mode that enables wireless link and communication with other access points. It's easy to install, simply define the peer's MAC address of the connected AP. WDS takes advantage of cost saving and flexibility with no extra wireless client device required to bridge between two access points and extending an existing wired or wireless infrastructure network to create a larger network.

Here you can select what role the AP server has, AP or wireless bridge (WDS).

Configuration

Wireless Bridge

Parameters
You can select Wireless Bridge (also known as Wireless Distribution System) to disable access point functionality. Selecting Access Point enables access point functionality. Wireless bridge functionality will still be available and wireless stations will be able to associate to the AP. Select Disabled in Bridge Restrict which disables wireless bridge restriction. Any wireless bridge will be granted access. Selecting Enabled or Enabled(Scan) enables wireless bridge restriction. Only those bridges selected in Remote Bridges will be granted access.

AP Mode: Access Point

Bridge Restrict: Enable

Remote Bridges MAC Address

Apply Refresh

AP Mode: determines whether the gateway will act as an Access point or as a Bridge.

- ① **Access Point:** the gateway communicates with both clients and bridges.
- ① **Wireless Bridge:** the gateway communicates with other WDS devices only. In this mode, the gateway doesn't communicate with client devices.

If your wireless network includes repeaters that use WDS, the gateway in wireless bridge mode will also communicate with your repeaters. The gateway in wireless bridge mode will not communicate with a repeater that uses a proprietary (non-WDS) mode.

Bridge Restrict: When **AP Mode** is set to **Wireless Bridge**, this determines whether the gateway will communicate with all other bridges or only specific ones:

- ① **Enable:** to enable wireless bridge restriction. Only those specified in the Remote MAC Address the gateway can communicate with.

Bridge Restrict: Enable

Remote Bridges MAC Address

Apply Refresh

Remote Bridge MAC Address: enter the remote bridge MAC addresses. Here up to 4 bridge MAC addresses are supported.

- ① **Enabled (Scan):** to enable wireless bridge restriction. Only those scanned by the gateway can communicate.

Bridge Restrict: Enabled(Scan)

Remote Bridges MAC Address	SSID	BSSID
<input type="checkbox"/>	wlan-ap	00:04:ED:14:27:13

Apply Refresh

Remote Bridge MAC Address: select the remote bridge MAC addresses.

- ① **Disable:** Does not restrict the gateway communicating with bridges that have their MAC address listed, but it is still open to communicate with all bridges that are in the same network.

Bridge Restrict	Disable
<input type="button" value="Apply"/>	<input type="button" value="Refresh"/>

Click **Apply** to apply your settings.

Advanced

– 5GHz Wireless

Advanced	
Parameters	
Band	5GHz <input type="button" value="v"/>
Channel	161/80 <input type="button" value="v"/> Current: 161 <input type="button" value="Scan Used Channel"/>
Auto Channel Timer	15 minutes
802.11n/EWC	Auto <input type="button" value="v"/>
Bandwidth	80MHz in 5G <input type="button" value="v"/> Current: 80MHz
Control Sideband	Lower <input type="button" value="v"/> Current: N/A
802.11n Rate	Auto <input type="button" value="v"/>
802.11n Protection	Auto <input type="button" value="v"/>
Support 802.11n Client Only	Off <input type="button" value="v"/>
RIFS Advertisement	Auto <input type="button" value="v"/>
OBSS Coexistence	Enable <input type="button" value="v"/>
RX Chain Power Save	Enable <input type="button" value="v"/> Power Save status: Low Power
RX Chain Power Save Quiet Time	10
RX Chain Power Save PPS	10
54g™ Rate	6 Mbps <input type="button" value="v"/>
Multicast Rate	Auto <input type="button" value="v"/>
Basic Rate	Default <input type="button" value="v"/>
Fragmentation Threshold	2346 [256-2346]
RTS Threshold	2347 [0-2347]
DTIM Interval	1 [1-255]
Beacon Interval	100 [1-65535]
Global Max Clients	16 [1-128]
XPress™ Technology	Disable <input type="button" value="v"/>
Regulatory Mode	Disable <input type="button" value="v"/>
Pre-Network Radar Check	-1 [0 - 99]
In-Network Radar Check	-1 [10 - 99]
TPC Mitigation(db)	0(Off) <input type="button" value="v"/>
Transmit Power	100% <input type="button" value="v"/>
WMM(Wi-Fi Multimedia)	Enable <input type="button" value="v"/>
WMM No Acknowledgement	Disable <input type="button" value="v"/>
WMM APSD	Enable <input type="button" value="v"/>
Beamforming Transmission (BFR)	Disable <input type="button" value="v"/>
Beamforming Reception (BFE)	Disable <input type="button" value="v"/>

Band: In the 5GHz radio frequency.

Channel: Choose a channel to use. Here is a list of available channels or select Auto mode instead.

Scan Used Channel: Press the button to scan and list all channels being used.

Auto Channel Timer (min): Available when Auto Channel is selected. The auto channel times length it takes to scan in minutes.

802.11n/EWC: select to auto enable or disable 802.11n.

Bandwidth: The higher the bandwidth the better the performance will be but greater interference with other wireless devices. Select **20MHz** for lessen radio interference.

Control Sideband: only available for 40MHz. It allows you to select upper sideband or lower sideband. Sideband refers to the frequency band either above (**upper sideband**) or below (**lower sideband**) the carrier frequency, within which fall the spectral components produced by modulation

of a carrier wave.

802.11n Rate: This allows you to select the fixed transmission rate or auto.

802.11n Protection: turn off for maximize throughput.

Support 802.11n Client Only: turn on the option to only provide wireless access to the clients operating at 802.11n speeds.

RIFS Advertisement: Reduced Inter-frame Spacing (RIFS) is an 802.11n feature that also improves performance by reducing the amount of dead time required between OFDM transmissions. Select Off to disable this function or auto to enable this function.

OBSS Co-Existence: coexistence (or not) between 20 MHz and 40 MHz overlapping basic service sets (OBSS) in wireless local area networks.

RX Chain Power Save: Enabling this feature turns off one of the Receive chains, going from 2x2 to 2x1 to save power.

RX Chain Power Save Quiet Time: The number of seconds the traffic must be below the PPS value before the Rx Chain Power Save feature activates itself.

RX Chain Power Save PPS: The maximum number of packets per seconds that can be processed by the WLAN interface for duration of Quiet Time, described above, before the Rx Chain Power Save feature activates itself.

54g™ Rate: Available after changing **802.11n Rate** to “Use 54g Rate” in **802.11n Rate**. It is used to limit 11n speed to a specific rate, e.g. 6M, 12M, 24M, 48, etc.

Multicast Rate: Setting for multicast packets transmission rate.

Basic Rate: Setting for basic transmission rate. It is not a specific kind of rate but a series of rates supported. When set to Default, the router can transmit with all kinds of standardized rates.

Fragmentation Threshold: A threshold (in bytes) whether the packets will be fragmented and at what size. Packets succeeding the fragmentation threshold of 802.11n WLAN will be split into smaller units suitable for circuit size. While the packets smaller than fragmentation threshold will not be fragmented. Default is 2346, setting the fragmentation too low may result in poor performance.

RTS Threshold: Request to Send (RTS) threshold specifies the packet size, when exceeds the size, the RTS/CTS will be triggered. The default setting of 2347(max length) will disable the RTS.

DTIM Interval: Delivery Traffic Indication Message (DTIM). The entry range is a value between 1 and 255. A DTIM is countdown variable that informs clients of the next window for listening to broadcast and multicast messages. When the AP has buffered broadcast or multicast messages for associated clients, it sends the next DTIM with a DTIM interval value. AP clients hear the beacons and awaken to receive the broadcast and multicast messages. The default is 1.

Beacon Interval: The amount of time between beacon transmissions in is milliseconds. The default is 100ms and the acceptable is 1- 65535. The beacon transmissions identify the presence of an access point.

Global Max Clients: Here you have the option of setting the limit of the number of clients who can connect to your wireless network.

XPress™ Technology: It has been designed to improve the wireless network efficiency. Default is disabled.

Regulatory Mode: Select to deny any regulatory mode, which is only for **5GHz** band wireless. There are two regulatory modes: **Configuring Your Router Wireless 5G(wl0) & 2.4G(wl1) – Advanced for 5G Wireless**

802.11h: The standard solves interference problems with e.g. satellites and radar using the same 5 GHz band as 802.11a or 802.11n dual-band access points.

802.11d: This standard automatically adjusts its allowed frequencies, power levels and bandwidth accordingly to the country it's located in.

Pre-Network Radar Check (Used for 802.11h only): Specifies a period of time in seconds [0-99] to check for radar on a channel before the Access Point establishes a wireless network with the channel.

In-Network Radar Check (Used for 802.11h only): After the wireless network got established, specifies a period of time in seconds [10-99] to check for radar when switching to another non-radar channel.

TPC Mitigation (db): Known as Transmitter Power Control mitigation to reduce unnecessary transmitting power radio and possible radio interference to other users.

Transmit Power: select the transmitting power of your wireless signal.

WMM (Wi-Fi Multimedia): you can choose to enable or disable this function which allows for priority of certain data over wireless network.

WMM No Acknowledgement: Refers to the acknowledge policy at the MAC level. Enabling WMM No Acknowledgement can result in more efficient throughput but higher error rates in noisy Radio Frequency (RF) environment.

WMM APSD: Automatic Power Save Delivery. Enable this to save power.

Beamforming Transmission (BFR) / Beamforming Reception (BFE): Enable to increase wireless speed by focusing and concentrating transmitted (send) and/or receive signals with a wireless client instead of broadcast signals in all directions. **Note: Both router and client wireless must support beamforming technology.**

– 2.4GHz Wireless

▼ Advanced

Parameters

Band	5GHz	
Channel	161/80	Current: 161 <input type="button" value="Scan Used Channel"/>
Auto Channel Timer	15	minutes
802.11n/EWC	Auto	
Bandwidth	80MHz in 5G	Current: 80MHz
Control Sideband	Lower	Current: N/A
802.11n Rate	Auto	
802.11n Protection	Auto	
Support 802.11n Client Only	Off	
RIFS Advertisement	Auto	
OBSS Coexistence	Enable	
RX Chain Power Save	Enable	Power Save status: Low Power
RX Chain Power Save Quiet Time	10	
RX Chain Power Save PPS	10	
54g™ Rate	6 Mbps	
Multicast Rate	Auto	
Basic Rate	Default	
Fragmentation Threshold	2346	[256-2346]
RTS Threshold	2347	[0-2347]
DTIM Interval	1	[1-255]
Beacon Interval	100	[1-65535]
Global Max Clients	16	[1-128]
XPress™ Technology	Disable	
Regulatory Mode	Disable	
Pre-Network Radar Check	-1	[0 - 99]
In-Network Radar Check	-1	[10 - 99]
TPC Mitigation(db)	0(Off)	
Transmit Power	100%	
WMM(Wi-Fi Multimedia)	Enable	
WMM No Acknowledgement	Disable	
WMM APSD	Enable	
Beamforming Transmission (BFR)	Disable	
Beamforming Reception (BFE)	Disable	

Band: In the 2.4 GHz radio frequency.

Channel: Choose a channel to use. Here is a list of available channels or select Auto mode instead.

Scan Used Channel: Press the button to scan and list all channels being used.

Auto Channel Timer (min): Available when Auto Channel is selected. The auto channel times length it takes to scan in minutes.

802.11n/EWC: select to auto enable or disable 802.11n.

Bandwidth: The higher the bandwidth the better the performance will be but greater interference with other wireless devices. Select **20MHz** for lessen radio interference.

Control Sideband: only available for 40MHz. It allows you to select upper sideband or lower sideband. Sideband refers to the frequency band either above (**upper sideband**) or below (**lower sideband**) the carrier frequency, within which fall the spectral components produced by modulation of a carrier wave.

802.11n Rate: This allows you to select the fixed transmission rate or auto.

802.11n Protection: turn off for maximize throughput.

Support 802.11n Client Only: turn on the option to only provide wireless access to the clients operating at 802.11n speeds.

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Multicast Rate: Setting for multicast packets transmission rate.

Basic Rate: Setting for basic transmission rate. It is not a specific kind of rate, it is a series of rates supported. When set to Default, the router can transmit with all kinds of standardized rates.

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Station Info

Here you can view information about the wireless clients.



MAC Address: The MAC address of the wireless clients.

Associated: List all the stations that are associated with the Access Point. If a station is idle for too long, it is removed from this list

Authorized: List those devices with authorized access.

SSID: Show the current SSID of the client.

Interface: To show which interface the wireless client is connected to.

Refresh: To get the latest information.

Schedule Control

Schedule control is aimed to offer methods to flexibly control when the wireless network (SSID) is allowed for access.

The Wireless schedule only functions whilst Wireless is enabled.

The Guest/Virtual AP schedule control only operates whilst the associated AP is enabled.

For detail setting the timeslot, user can turn to [Time Schedule](#) .

Time Schedule: Set when the SSID works. If user wants the SSID works all the time, please select “Always On”; if not, please set or select the exact time your want the SSID works. Here user can set two separate intervals.

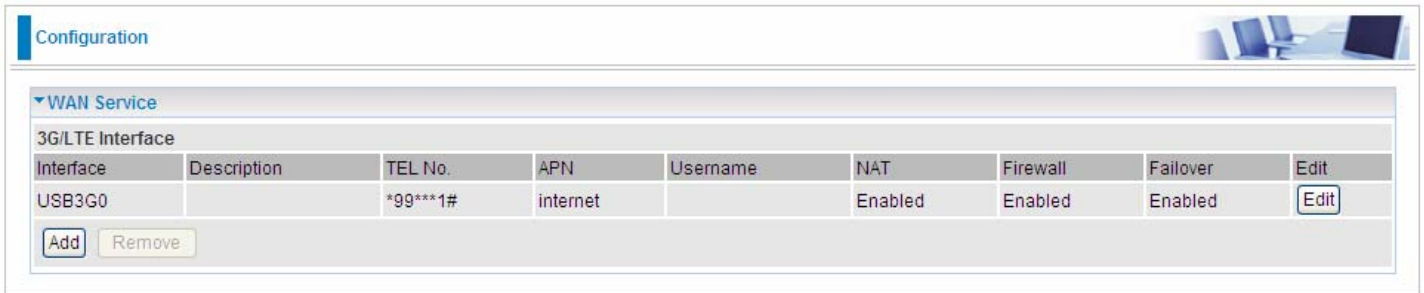
For example: user wants the SSID “*wlan-ap-5g*” to work on weekdays except for Wednesday, under this circumstance, user can set as shown below. (8920AX(L) offers a optimal way to set two separate timeslots when user needs to activate the SSID during separate intervals.)

WAN-Wide Area Network

A WAN (Wide Area Network) is a computer network that covers a broad geographical area (eg. Internet) that is used to connect LAN and other types of network systems.

WAN Service

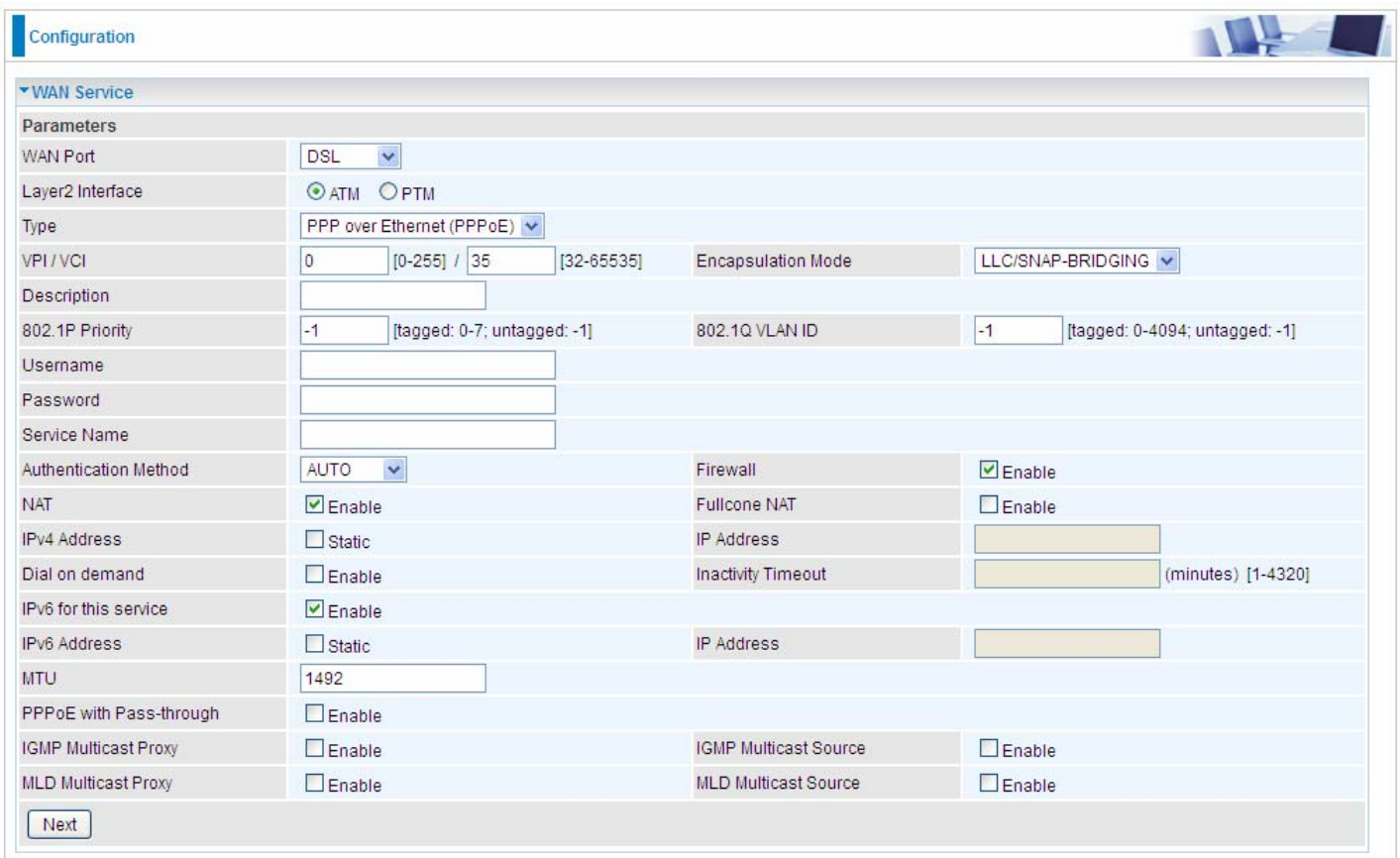
Three WAN interfaces are provided for WAN connection: DSL (VDSL/ADSL), and Ethernet.



Click **Add** to add new WAN connections.

DSL

In DSL mode, there are two transfer modes for you to configure for WAN connection, namely **ATM (ADSL)** and **PTM (VDSL)** configuration of PTM mode is similar as ATM mode, here take ATM mode WAN configuration for example.



Layer2 Interface: 2 transfer mode, **ATM (ADSL)** or **PTM (VDSL)**.

PPPoE (PPP over Ethernet) provides access control in a manner which is similar to dial-up services using PPP.

VPI/VCI: Enter the VPI/VCI combination from you ISP.

Encapsulation Mode: Select the encapsulation mode, LLC/SNAP-BRIDGING, or VC/MUX.

Description: User-defined description for the connection, commonly for friendly use.

802.1P Priority: The parameter indicates the frame priority level from 0 (lowest) to 7 (highest), which can be used to prioritize different classes of traffic (voice, video, data, etc). Enter the priority identification, tagged: 0-7, untagged: -1.

802.1Q VLAN ID: It is a parameter to specify the VLAN which the frame belongs. Enter the VLAN ID identification, tagged: 0-4094, untagged : -1.

Username: Enter the account obtained from the ISP.

Password: Enter the password obtained from the ISP.

Service Name: The item is for identification purposes, user can define this.

Authentication Method: Default is **Auto**. Or else your ISP will advise you the appropriate mode.

Firewall: Enable to drop all traffic from WAN side. If enabled, all incoming packets by default would be dropped, and please turn to [IP Filtering Incoming](#) to add allowing rules.

NAT: The NAT (Network Address Translation) feature allows multiple users to access the Internet through a single IP account by sharing the single IP address. If users on your LAN have their own public IP addresses to access the Internet, NAT function can be disabled. When enabled, a Fullcone NAT parameter will appear, you can determine whether to enable Fullcone NAT. While only NAT enabled, the default NAT type Port-Restricted cone NAT will be used.

Fullcone NAT: Enable or disable fullcone NAT. Fullcone is a kind of NAT, in this mode, all requests from the same internal IP address and port are mapped to the same external IP address and port. Furthermore, any external host can send a packet to the internal host, by sending a packet to the mapped external address.

Note: In PPPoE connection, NAT is enabled by default, you can determine whether to enable Fullcone NAT or disable Fullcone NAT and only use NAT, the default NAT type is Port Restricted cone NAT. Of Port-Restricted cone NAT, the restriction includes port numbers. Specifically, an external host can send a packet, with source IP address X and source port P, to the internal host only if the internal host had previously sent a packet to IP address X and port P

IPv4 Address: Select whether to set static IPv4 address or obtain automatically.

IP Address: If **Static** is enabled in the above field, enter the static IPv4 address get from the ISP.

Dial on demand: It is a parameter to let users to dial for connection to internet themselves. It is useful when saving internet fees.

Inactivity Timeout: The set Inactivity timeout period, unit: minutes. It is combined use with Dial on Demand, users should specify the concrete time interval for dial on demand.

IPv6 for this service: Enable to use IPv6 service.

IPv6 Address: Select whether to set static IPv6 address or obtain automatically.

IP Address: If **Static** is enabled in the above field, enter the static IPv4 address.

MTU: Maximum Transmission Unit, the size of the largest datagram (excluding media-specific headers) that IP will attempt to send through the interface.

PPPoE with Pass-through: Enable or disable PPPoE pass-through. If it is enabled, PCs behind the router can dial itself.

IGMP Multicast Proxy: Check whether to enable this feature. IGMP (**I**nternet **G**roup **M**anagement **P**rotocol) Proxy intercepts the IGMP request from Clients and set up the multicast-forwarding table, it takes over some of the router's job, simplifying the router's job and multicast communication.

IGMP Multicast Source: Enable to support the "source filtering" which is the ability for a system to report interest in receiving packets "only " from specific source address(es), or "all but" specific source address(es), sent to a particular multicast address. **Note:** It works only on IGMP version 3.

MLD Multicast Proxy: check whether to enable this function. MLD (**M**ulticast **L**istener **D**iscovery **P**rotocol) Proxy intercepts the MLD request from Clients a set up the multicast-forwarding table. it takes over some of the router's job, simplifying the router's job and multicast communication. Support MLDv1 and MLDv2.

MLD Multicast Source: Used in a similar way by IPv6 system as IGMP Multicast source in IPv4 system. Enable it to support the source filtering functionality for IPv6 system. **Note:** It works only on MLD version 2.

Click **Next** to continue to set the default gateway and DNS for IPv4 and IPv6.

The screenshot shows a configuration interface with two main sections: 'Default Gateway' and 'DNS'.
Default Gateway / DNS:
- **Default Gateway:** A table with 'Selected Default Gateway Interfaces' (containing 'ppp0.1') and 'Available Routed WAN Interfaces' (containing '3G0/USB3G0'). Arrows allow moving items between these lists.
- **Selected WAN Interface As The System Default IPv6 Gateway:** A dropdown menu set to 'pppoe_0_8_35/ppp0.1'.
DNS:
- **DNS Server Interface:** Radio buttons for 'Available WAN Interfaces' (selected), 'Static DNS Address', and 'Parent Controls'.
- **Selected DNS Server Interfaces:** A table with 'Selected DNS Server Interfaces' (containing 'ppp0.1') and 'Available WAN Interfaces' (containing '3G0/USB3G0').
- **Primary DNS server:** An empty text input field.
- **Secondary DNS server:** An empty text input field.
- **Note:** 'Note that selecting a WAN interface for IPv6 DNS server will enable DHCPv6 Client on that interface.'
- **DNS Server Interface:** Radio buttons for 'Available WAN Interfaces' (selected) and 'Static DNS IPv6 Address'.
- **WAN Interface selected:** A dropdown menu set to 'pppoe_0_8_35/ppp0.1'.
- **Primary IPv6 DNS server:** An empty text input field.
- **Secondary IPv6 DNS server:** An empty text input field.
- **Next:** A button at the bottom left.

Default Gateway

Select default gateway for you connection (IPv4 and IPv6).

DNS

➤ IPv4

Three ways to set an IPv4 DNS server

- ① **Available WAN interfaces:** Select a desirable WAN interface as the IPv4 DNS server.
- ① **Static DNS Address:** To specify DNS server manually by entering your primary and secondary DNS server addresses.
- ① **Parental Controls:** If user registers and gets a DNS account in the parental control provider website, expecting to enjoy a more reliable and safer internet surfing environment, please select this option (need to configure at [Parental Control Provider](#)).

➤ IPv6

Obtain IPv6 DNS info from a WAN interface

WAN Interface selected: Select one configured IPv6 WAN connection from the menu to be as an IPv6 DNS.

Static DNS IPv6 Address

Primary IPv6 DNS Server / Secondary IPv6 DNS Server: Type the specific primary and secondary IPv6 DNS Server address.

If you don't need a service, select the item you want to remove, check the checkbox, then press **Remove**.

Press **Edit** button to re-edit this service settings.

Configuration

▼ WAN Service

ATM Interface

Interface	Description	Type	VPI / VCI	Vlan8021p	VlanMuxId	Icmp	NAT	Firewall	IPv6	Mld	Remove	Edit
ppp0.1	pppoe_0_8_35	PPPoE	8 / 35	N/A	N/A	Disabled	Enabled	Enabled	Enabled	Disabled	<input type="checkbox"/>	Edit

3G/LTE Interface

Interface	Description	TEL No.	APN	Username	NAT	Firewall	Failover	Edit
USB3G0		*99***1#	internet		Enabled	Enabled	Enabled	Edit

Add Remove

Here you can configure WAN Service, if it is OK, you can access the internet. You can go to **Status >WAN** or **Summary** to view the WAN connection information (if your ISP provides IPv6 service, then you will obtain an IPv6 address).

(IPv4 or IPv6)

Status

▼ WAN

Wan Info

Interface	Description	Type	Status	Connection Time	IPv4 Address	IPv6 Address	DNS
ppp0.1	pppoe_0_8_35	PPPoE	Disconnect	00:04:03	10.40.90.211	2000:db98:1000:1000:29ac:afc6:59a4:5816/64	218.2.135.1
USB3G0			3G/LTE Card not found				

VPI/VCI: Enter the VPI/VCI combination from you ISP.

Encapsulation Mode: Select the encapsulation mode, LLC/SNAP-BRIDGING, or VC/MUX.

Description: User-defined description for the connection.

Username: Enter the account obtained from the ISP.

Password: Enter the password obtained from the ISP.

Authentication Method: Default is **Auto**. Or else your ISP will advise you the appropriate mode.

Firewall: Enable to drop all traffic from WAN side. If enabled, all incoming packets by default would be dropped, and please turn to [IP Filtering Incoming](#) to add allowing rules.

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Note: In this connection, NAT is enabled by default, you can determine whether to enable Fullcone NAT or disable Fullcone NAT and only use NAT, the default NAT type is Port Restricted cone NAT. With Port-Restricted cone NAT, the restriction includes port numbers. Specifically, an external host can send a packet, with source IP address X and source port P, to the internal host only if the internal host had previously sent a packet to IP address X and port P

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useful when saving internet fees.

Inactivity Timeout: The set Inactivity timeout period, unit: minutes. It is combined use with Dial on Demand, users should specify the concrete time interval for dial on demand.

IPv6 for this service: Enable to use IPv6 service.

IPv6 Address: Select whether to set static IPv6 address or obtain automatically.

IP Address: If **Static** is enabled in the above field, enter the static IPv4 address.

MTU: Maximum Transmission Unit, the size of the largest datagram (excluding media-specific headers) that IP will attempt to send through the interface.

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Description: User-defined description for the connection, commonly for friendly use.

Authentication Method: Default is **Auto**. Or else your ISP will advise you the appropriate mode.

802.1P Priority: The parameter indicates the frame priority level from 0 (lowest) to 7 (highest), which can be used to prioritize different classes of traffic (voice, video, data, etc). Enter the priority identification, tagged: 0-1, untagged: -1.

802.1Q VLAN ID: It is a parameter to specify the VLAN which the frame belongs. Enter the VLAN ID identification, tagged: 0-4094, untagged : -1.

Here two modes are supported for users to deal with the IP and DNS. You can select obtain automatically or manually input the information according to your ISP.

Obtain an IP address automatically: Check whether to enable this function.

Option 60 Vendor ID: Enter the associated information by your ISP. This option is used by DHCP clients to optionally identify the vendor type and configuration of a DHCP client. The information is a string of n octets, interpreted by servers. Vendors may choose to define specific vendor class identifiers to convey particular configuration or other identification information about a client.

Option 61 ClientID: Enter the associated information provided by your ISP.

Option 125: Option 125 is a complementary standard of DHCP protocol, it is used to encapsulate

option 125 message into DHCP offer packet before forward it to clients. After the clients receive the packet, it check the option 125 field in the packet with the prestored message, if it is matched, then the client accepts this offer, otherwise it will be abandoned. Check Enable or Disable this function. Default setting is **Disable**.

WAN IP Address: Enter your IPv4 address to the device provided by your ISP.

WAN Subnet Mask: Enter your submask to the device provided by your ISP.

WAN gateway IP Address: Enter your gateway IP address to the device provided by your ISP.

IPv6 for this service: Enable to use IPv6 service.

Obtain an IPv6 address automatically: check whether to enable or disable this feature.

WAN IPv6 Address/Prefix Length: Enter the WAN IPv6 Address/Prefix Length from your ISP.

WAN Next-Hop IPv6 Address: Enter the WAN Next-Hop IPv6 Address from your ISP.

Note: If you don't know well about the DHCP Option, you can leave it empty or leave it as default.

NAT: The NAT (Network Address Translation) feature allows multiple users to access the Internet through a single IP account by sharing the single IP address. If users on your LAN have their own public IP addresses to access the Internet, NAT function can be disabled. When enabled, a Fullcone NAT parameter will appear, you can determine whether to enable Fullcone NAT. While only NAT enabled, the default NAT type Port-Restricted cone NAT will be used.

Fullcone NAT: Enable or disable fullcone NAT. Fullcone is a kind of NAT, in this mode, all requests from the same internal IP address and port are mapped to the same external IP address and port. Furthermore, any external host can send a packet to the internal host, by sending a packet to the mapped external address.

Firewall: Enable to drop all traffic from WAN side. If enabled, all incoming packets by default would be dropped, and please turn to [IP Filtering Incoming](#) to add allowing rules.

IGMP Multicast Proxy: Check whether to enable this feature. IGMP (**I**nternet **G**roup **M**anagement **P**rotocol) Proxy intercepts the IGMP request from Clients and set up the multicast-forwarding table, it takes over some of the router's job, simplifying the router's job and multicast communication.

IGMP Multicast Source: Enable to support the "source filtering" which is the ability for a system to report interest in receiving packets "only " from specific source address(es), or "all but" specific source address(es), sent to a particular multicast address. **Note:** It works only on IGMP version 3.

No Multicast VLAN Filter: Enable to deactivate the multicast VLAN filter which allows users to filter on all multicast packets or on specific multicast groups.

MLD Multicast Proxy: check whether to enable this function. MLD (**M**ulticast **L**istener **D**iscovery Protocol) Proxy intercepts the MLD request from Clients a set up the multicast-forwarding table. it takes over some of the router's job, simplifying the router's job and multicast communication. Support MLDv1 and MLDv2. **Note:** It works only on MLD version 2.

MLD Multicast Source: Used in a similar way by IPv6 system as IGMP Multicast source in IPv4 system. Enable it to support the source filtering functionality for IPv6 system.

MTU: Maximum Transmission Unit, the size of the largest datagram (excluding media-specific headers) that IP will attempt to send through the interface.

MAC Spoofing: This option is required by some service providers specifying some specific MAC allowed for joining network. You must fill in the MAC address specified by your service provider when this information is required.

Click **Next** to continue to set the default gateway and DNS for IPv4 and IPv6.

The screenshot shows a configuration window titled 'Configuration' with a sub-section 'WAN Service'. Under 'Parameters', the following settings are visible:

- WAN Port:** DSL
- Layer2 Interface:** ATM (selected), PTM
- Type:** IPoA
- VPI / VCI:** 0 [0-255] / 35 [32-65535]
- Encapsulation Mode:** LLC/SNAP-ROUTING
- Description:** (empty text field)
- WAN IP Address:** (empty text field)
- WAN Subnet Mask:** (empty text field)
- NAT:** Enable, Fullcone NAT Enable
- Firewall:** Enable

A 'Next' button is located at the bottom left of the configuration area.

VPI/VCI: Enter the VPI/VCI combination from you ISP.

Encapsulation Mode: Select the encapsulation mode, LLC/SNAP-BRIDGING, or VC/MUX.

Description: User-defined description for the connection, commonly for friendly use.

WAN IP: Enter the WAN IP from the ISP.

WAN Subnet Mask: Enter the WAN Subnet Mask from the ISP.

NAT: The NAT (Network Address Translation) feature allows multiple users to access the Internet through a single IP account by sharing the single IP address. If users on your LAN have their own public IP addresses to access the Internet, NAT function can be disabled. When enabled, a Fullcone NAT parameter will appear, you can determine whether to enable Fullcone NAT. While only NAT enabled, the default NAT type Port-Restricted cone NAT will be used.

Fullcone NAT: Enable or disable fullcone NAT. Fullcone is a kind of NAT, in this mode, all requests from the same internal IP address and port are mapped to the same external IP address and port. Furthermore, any external host can send a packet to the internal host, by sending a packet to the mapped external address.

Firewall: Enable to drop all traffic from WAN side. If enabled, all incoming packets by default would be dropped, and please turn to [IP Filtering Incoming](#) to add allowing rules.

The screenshot shows a configuration window titled 'Configuration' with a sub-section 'WAN Service'. Under 'Parameters', the following settings are visible:

- WAN Port: DSL
- Layer2 Interface: ATM (selected), PTM
- Type: Bridging
- VPI / VCI: 0 [0-255] / 35 [32-65535]
- Encapsulation Mode: LLC/SNAP-BRIDGING
- Description: (empty text box)
- 802.1P Priority: -1 [tagged: 0-7; untagged: -1]
- 802.1Q VLAN ID: -1 [tagged: 0-4094; untagged: -1]
- Allow as IGMP Multicast Source: Enable
- Allow as MLD Multicast Source: Enable

A 'Next' button is located at the bottom left of the configuration area.

VPI/VCI: Enter the VPI/VCI combination from you ISP.

Encapsulation Mode: Select the encapsulation mode, LLC/SNAP-BRIDGING, or VC/MUX.

Description: User-defined description for the connection, commonly for friendly use.

802.1P Priority: The parameter indicates the frame priority level from 0 (lowest) to 7 (highest), which can be used to prioritize different classes of traffic (voice, video, data, etc). Enter the priority identification, tagged: 0-7, untagged: -1.

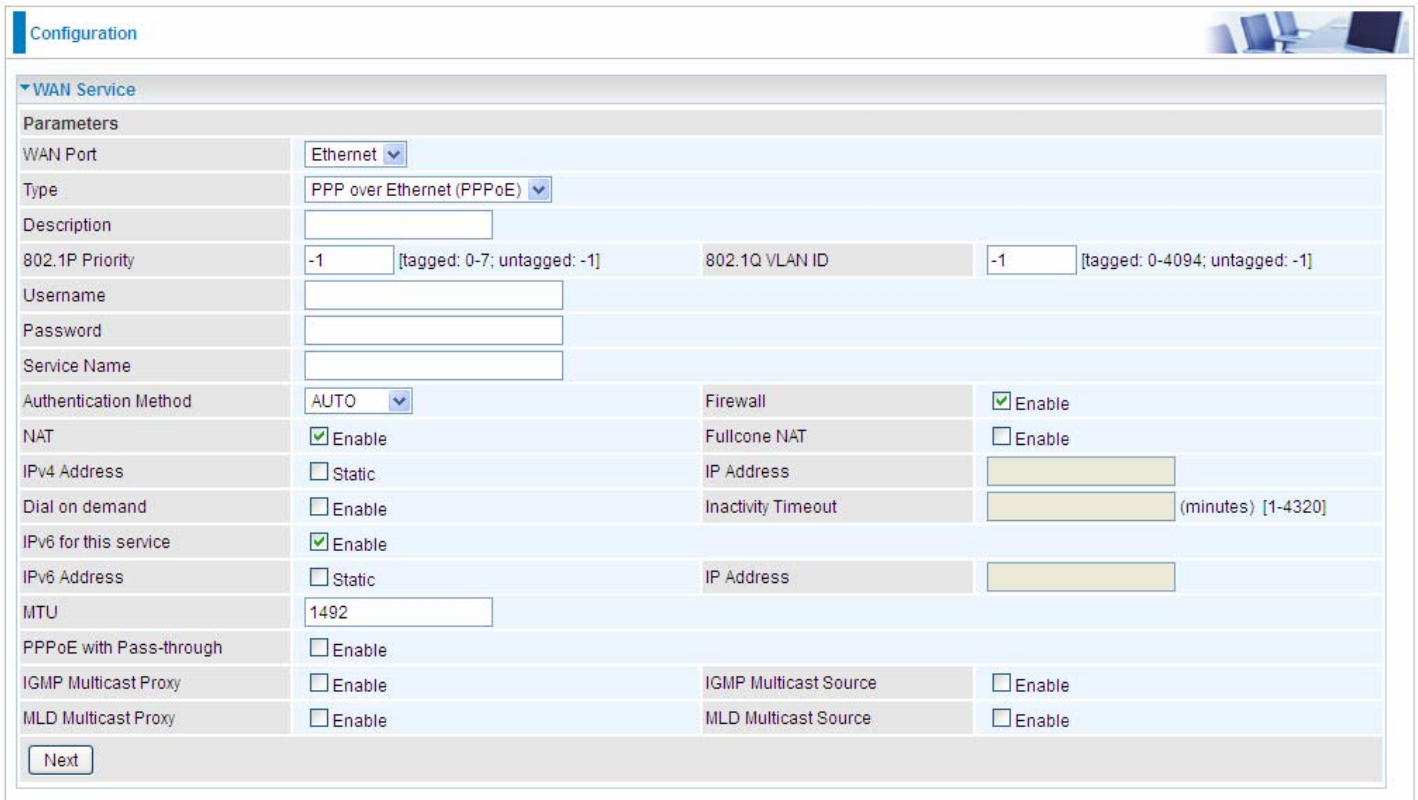
802.1Q VLAN ID: It is a parameter to specify the VLAN which the frame belongs. Enter the VLAN ID identification, tagged: 0-4094, untagged : -1.

Allow as IGMP Multicast Source: Enable to support the “source filtering” which is the ability for a system to report interest in receiving packets “only ” from specific source address(es), or “all but” specific source address(es), sent to a particular multicast address. **Note:** It works only on IGMP version 3.

Allow as MLD Multicast Source: Used in a similar way by IPv6 system as IGMP Multicast source in IPv4 system. Enable it to support the source filtering functionality for IPv6 system. **Note:** It works only on MLD version 2.

① Ethernet

Ethernet WAN connection is well known as directly broadband WAN connection.



Configuration

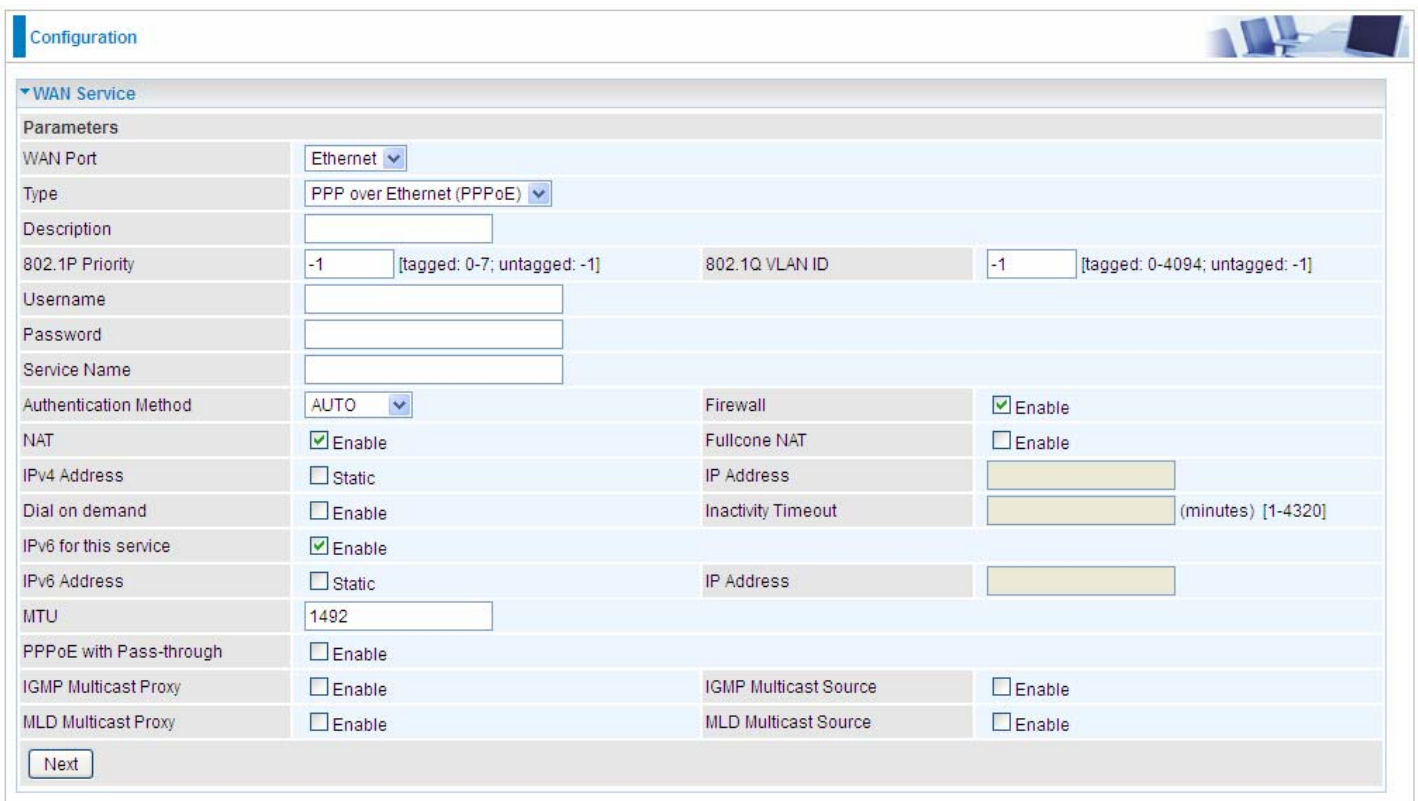
WAN Service

Parameters

WAN Port	Ethernet		
Type	PPP over Ethernet (PPPoE)		
Description			
802.1P Priority	-1 [tagged: 0-7; untagged: -1]	802.1Q VLAN ID	-1 [tagged: 0-4094; untagged: -1]
Username			
Password			
Service Name			
Authentication Method	AUTO	Firewall	<input checked="" type="checkbox"/> Enable
NAT	<input checked="" type="checkbox"/> Enable	Fullcone NAT	<input type="checkbox"/> Enable
IPv4 Address	<input type="checkbox"/> Static	IP Address	
Dial on demand	<input type="checkbox"/> Enable	Inactivity Timeout	(minutes) [1-4320]
IPv6 for this service	<input checked="" type="checkbox"/> Enable		
IPv6 Address	<input type="checkbox"/> Static	IP Address	
MTU	1492		
PPPoE with Pass-through	<input type="checkbox"/> Enable		
IGMP Multicast Proxy	<input type="checkbox"/> Enable	IGMP Multicast Source	<input type="checkbox"/> Enable
MLD Multicast Proxy	<input type="checkbox"/> Enable	MLD Multicast Source	<input type="checkbox"/> Enable

Next

● PPPoE



Configuration

WAN Service

Parameters

WAN Port	Ethernet		
Type	PPP over Ethernet (PPPoE)		
Description			
802.1P Priority	-1 [tagged: 0-7; untagged: -1]	802.1Q VLAN ID	-1 [tagged: 0-4094; untagged: -1]
Username			
Password			
Service Name			
Authentication Method	AUTO	Firewall	<input checked="" type="checkbox"/> Enable
NAT	<input checked="" type="checkbox"/> Enable	Fullcone NAT	<input type="checkbox"/> Enable
IPv4 Address	<input type="checkbox"/> Static	IP Address	
Dial on demand	<input type="checkbox"/> Enable	Inactivity Timeout	(minutes) [1-4320]
IPv6 for this service	<input checked="" type="checkbox"/> Enable		
IPv6 Address	<input type="checkbox"/> Static	IP Address	
MTU	1492		
PPPoE with Pass-through	<input type="checkbox"/> Enable		
IGMP Multicast Proxy	<input type="checkbox"/> Enable	IGMP Multicast Source	<input type="checkbox"/> Enable
MLD Multicast Proxy	<input type="checkbox"/> Enable	MLD Multicast Source	<input type="checkbox"/> Enable

Next

Description: User-defined description for the connection, commonly for friendly use.

802.1P Priority: The parameter indicates the frame priority level from 0 (lowest) to 7 (highest), which can be used to prioritize different classes of traffic (voice, video, data, etc). Enter the priority identification, tagged: 0-1, untagged: -1.

802.1Q VLAN ID: It is a parameter to specify the VLAN which the frame belongs. Enter the VLAN ID

identification, tagged: 0-4094, untagged : -1.

Username: Enter the account obtained from the ISP.

Password: Enter the password obtained from the ISP.

Service Name: The item is for identification purpose, user can define it yourselfe.

Authentication Method: Default is **Auto**. Or else your ISP will advise you the appropriate mode.

Firewall: Enable to drop all traffic from WAN side. If enabled, all incoming packets by default would be dropped, and please turn to [IP Filtering Incoming](#) to add allowing rules.

NAT: The NAT (Network Address Translation) feature allows multiple users to access the Internet through a single IP account by sharing the single IP address. If users on your LAN have their own public IP addresses to access the Internet, NAT function can be disabled. When enabled, a Fullcone NAT parameter will appear, you can determine whether to enable Fullcone NAT. While only NAT enabled, the default NAT type Port-Restricted cone NAT will be used.

Fullcone NAT: Enable or disable fullcone NAT. Fullcone is a kind of NAT, in this mode, all requests from the same internal IP address and port are mapped to the same external IP address and port. Furthermore, any external host can send a packet to the internal host, by sending a packet to the mapped external address.

Note: In PPPoE connection, NAT is enabled by default, you can determine whether to enable Fullcone NAT. and while you disable Fullcone NAT and only use NAT, the default NAT type is Port Restricted or Port-Restricted cone NAT, the restriction includes port numbers. Specifically, an external host can send a packet, with source IP address X and source port P, to the internal host only if the internal host had previously sent a packet to IP address X and port P.

IPv4 Address: Select whether to set static IPv4 address or obtain automatically.

IP Address: If **Static** is enabled in the above field, enter the static IPv4 address get from the ISP.

Dial on demand: It is a parameter to let users to dial for connection to internet themselves. It is useful when saving internet fees.

Inactivity Timeout: The set Inactivity timeout period, unit: minutes. It is combined use with Dial on Demand, users should specify the concrete time interval for dial on demand.

IPv6 for this service: Enable to use IPv6 service.

IPv6 Address: Select whether to set static IPv6 address or obtain automatically.

IP Address: If **Static** is enabled in the above field, enter the static IPv4 address.

MTU: Maximum Transmission Unit, the size of the largest datagram (excluding media-specific headers) that IP will attempt to send through the interface.

PPPoE with Pass-through: Enable or disable PPPoE pass-through. If it is enabled, PCs behind the router can dial itself.

IGMP Multicast Proxy: Check whether to enable this feature. IGMP (**I**nternet **G**roup **M**anagement **P**rotocol) Proxy intercepts the IGMP request from Clients and set up the multicast-forwarding table, it takes over some of the router's job, simplifying the router's job and multicast communication.

IGMP Multicast Source: Enable to support the "source filtering" which is the ability for a system to report interest in receiving packets "only " from specific source address(es), or "all but" specific source address(es), sent to a particular multicast address. **Note:** It works only on IGMP version 3.

MLD Multicast Proxy: check whether to enable this function. MLD (**M**ulticast **L**istener **D**iscovery **P**rotocol) Proxy intercepts the MLD request from Clients a set up the multicast-forwarding table. it takes over some of the router's job, simplifying the router's job and multicast communication. Support MLDv1 and MLDv2.

MLD Multicast Source: Used in a similar way by IPv6 system as IGMP Multicast source in IPv4 system. Enable it to support the source filtering functionality for IPv6 system. **Note:** It works only on MLD version 2.

Click **Next** to continue to set the default gateway and DNS for IPv4 and IPv6.

The screenshot shows a configuration interface with the following sections:

- Default Gateway / DNS**
 - Default Gateway**
 - Selected Default Gateway Interfaces: ppp0.1
 - Available Routed WAN Interfaces: 3G0/USB3G0
 - Selected WAN Interface As The System Default IPv6 Gateway: pppoe_eth0/ppp0.1
 - DNS**
 - DNS Server Interface: Available WAN Interfaces, Static DNS Address, Parent Controls
 - Selected DNS Server Interfaces: ppp0.1
 - Available WAN Interfaces: 3G0/USB3G0
 - Primary DNS server: [Empty text box]
 - Secondary DNS server: [Empty text box]
 - Note that selecting a WAN interface for IPv6 DNS server will enable DHCPv6 Client on that interface.
 - DNS Server Interface: Available WAN Interfaces, Static DNS IPv6 Address
 - WAN Interface selected: pppoe_eth0/ppp0.1
 - Primary IPv6 DNS server: [Empty text box]
 - Secondary IPv6 DNS server: [Empty text box]

At the bottom left, there is a **Next** button.

Default Gateway

Select default gateway for you connection (IPv4 and IPv6).

DNS

➤ IPv4

Three ways to set an IPv4 DNS server

- ① **Available WAN interfaces:** Select a desirable WAN interface as the IPv4 DNS server.
- ① **Static DNS Address:** To specify DNS server manually by entering your primary and secondary DNS server addresses.
- ① **Parental Controls:** If user registers and gets a DNS account in the parental control provider website, expecting to enjoy a more reliable and safer internet surfing environment, please select this option (need to configure at [Parental Control Provider](#)).

➤ IPv6

Obtain IPv6 DNS info from a WAN interface

WAN Interface selected: Select one configured IPv6 WAN connection from the menu to be as an IPv6 DNS.

Static DNS IPv6 Address

Primary IPv6 DNS Server / Secondary IPv6 DNS Server: Type the specific primary and secondary IPv6 DNS Server address.

If you don't need the service, select the item you want to remove, check the checkbox, then press **Remove**, it will be OK.

Press **Edit** button to re-edit this service settings.

Configuration

▼ WAN Service

ETH Interface

Interface	Description	Type	Vlan8021p	VlanMuxId	Igmp	NAT	Firewall	IPv6	Mld	Remove	Edit
ppp0.1	pppoe_eth4	PPPoE	N/A	N/A	Disabled	Enabled	Enabled	Enabled	Disabled	<input type="checkbox"/>	Edit

3G/LTE Interface

Interface	Description	TEL No.	APN	Username	NAT	Firewall	Failover	Edit
USB3G0		*99***1#	internet		Enabled	Enabled	Enabled	Edit

Add Remove

Here the corresponding WAN Service have been configured, if it is OK, you can access the internet. You can go to **Status>WAN** or **Summary** to view the WAN connection information (if your ISP provides IPv6 service, then you will obtain an IPv6 address).

(IPv4 or IPv6)

Status

▼ WAN

Wan Info

Interface	Description	Type	Status	Connection Time	IPv4 Address	IPv6 Address	DNS
ppp0.1	pppoe_eth4	PPPoE	Disconnect	00:04:03	10.40.90.211	2000:db98:1000:1000:29ac:afc6:59a4:5816/64	218.2.135.1
USB3G0			3G/LTE Card not found				

Description: User-defined description for the connection, commonly for friendly use.

802.1P Priority: The parameter indicates the frame priority level from 0 (lowest) to 7 (highest), which can be used to prioritize different classes of traffic (voice, video, data, etc). Enter the priority identification, tagged: 0-7, untagged: -1.

802.1Q VLAN ID: It is a parameter to specify the VLAN which the frame belongs. Enter the VLAN ID identification, tagged: 0-4094, untagged : -1.

Here two modes are supported for users to deal with the IP and DNS. You can select obtain automatically or manually input the information according to your ISP.

Obtain an IP address automatically: Check whether to enable this function.

Option 60 Vendor ID: Enter the associated information by your ISP. This option is used by DHCP clients to optionally identify the vendor type and configuration of a DHCP client. The information is a string of n octets, interpreted by servers. Vendors may choose to define specific vendor class identifiers to convey particular configuration or other identification information about a client.

Option 61 ClientID: Enter the associated information provided by your ISP.

Option 125: Option 125 is a complementary standard of DHCP protocol, it is used to encapsulate option 125 message into DHCP offer packet before forward it to clients. After the clients receive the packet, it check the option 125 field in the packet with the pre-stored message, if it is matched, then the client accepts this offer, otherwise it will be abandoned. Check Enable or Disable this function. Default setting is **Disable**.

WAN IP Address: Enter your IPv4 address to the device provided by your ISP.

WAN Subnet Mask: Enter your submask to the device provided by your ISP.

WAN gateway IP Address: Enter your gateway IP address to the device provided by your ISP.

IPv6 for this service: Enable to use IPv6 service.

Obtain an IPv6 address automatically: check whether to enable or disable this feature.

WAN IPv6 Address/Prefix Length: Enter the WAN IPv6 Address/Prefix Length from your ISP.

WAN Next-Hop IPv6 Address: Enter the WAN Next-Hop IPv6 Address from your ISP.

Note: If you don't know well about the DHCP Option, you can leave it empty or leave it as default.

NAT: The NAT (Network Address Translation) feature allows multiple users to access the Internet through a single IP account by sharing the single IP address. If users on your LAN have their own public IP addresses to access the Internet, NAT function can be disabled. When enabled, a Fullcone NAT parameter will appear, you can determine whether to enable Fullcone NAT. While only NAT enabled, the default NAT type Port-Restricted cone NAT will be used.

Fullcone NAT: Enable or disable fullcone NAT. Fullcone is a kind of NAT, in this mode, all requests from the same internal IP address and port are mapped to the same external IP address and port. Furthermore, any external host can send a packet to the internal host, by sending a packet to the mapped external address.

Firewall: Enable to drop all traffic from WAN side. If enabled, all incoming packets by default would be dropped, and please turn to [IP Filtering Incoming](#) to add allowing rules.

IGMP Multicast: IGMP (**I**nternet **G**roup **M**embership Protocol) is a protocol used by IP hosts to report their multicast group memberships to any immediately neighboring multicast routers. Check this item to enable IGMP multicast on that WAN interface for multicast forwarding.

IGMP Multicast Source: Enable to support the "source filtering" which is the ability for a system to report interest in receiving packets "only " from specific source address(es), or "all but" specific source address(es), sent to a particular multicast address. **Note:** It works only on IGMP version 3.

No Multicast VLAN Filter: Enable to deactivate the multicast VLAN filter which allows users to filter on all multicast packets or on specific multicast groups.

MLD Multicast Proxy: check whether to enable this function. MLD (**M**ulticast **L**istener **D**iscovery Protocol) Proxy intercepts the MLD request from Clients a set up the multicast-forwarding table. it takes over some of the router's job, simplifying the router's job and multicast communication. Support MLDv1 and MLDv2.

MLD Multicast Source: Used in a similar way by IPv6 system as IGMP Multicast source in IPv4 system. Enable it to support the source filtering functionality for IPv6 system. **Note:** It works only on MLD version 2.

MTU: Maximum Transmission Unit, the size of the largest datagram (excluding media-specific headers) that IP will attempt to send through the interface.

MAC Spoofing: This option is required by some service providers specifying some specific MAC allowed to join in network. You must fill in the MAC address specified by your service provider when this information is required.

Configuration 

▼ WAN Service

Parameters

WAN Port	Ethernet ▼		
Type	Bridging ▼		
Description	<input type="text"/>		
802.1P Priority	<input type="text" value="-1"/> [tagged: 0-7; untagged: -1]	802.1Q VLAN ID	<input type="text" value="-1"/> [tagged: 0-4094; untagged: -1]
Allow as IGMP Multicast Source	<input type="checkbox"/> Enable	Allow as MLD Multicast Source	<input type="checkbox"/> Enable

Description: User-defined description for the connection, commonly for friendly use.

802.1P Priority: The parameter indicates the frame priority level from 0 (lowest) to 7 (highest), which can be used to prioritize different classes of traffic (voice, video, data, etc). Enter the priority identification, tagged: 0-1, untagged: -1.

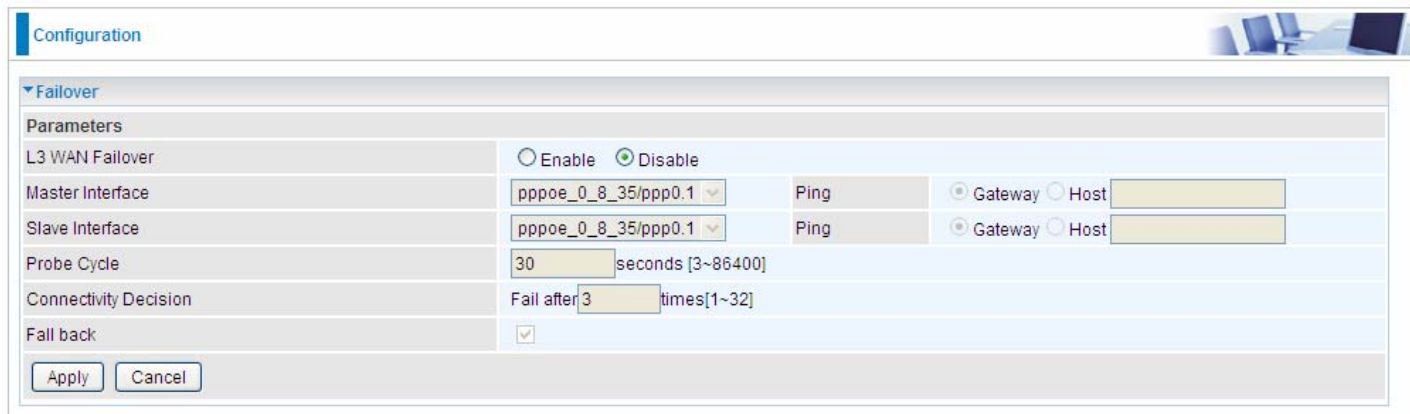
802.1Q VLAN ID: It is a parameter to specify the VLAN which the frame belongs. Enter the VLAN ID identification, tagged: 0-4094, untagged : -1.

Allow as IGMP Multicast Source: Enable to support the “source filtering” which is the ability for a system to report interest in receiving packets “only ” from specific source address(es), or “all but” specific source address(es), sent to a particular multicast address. **Note:** It works only on IGMP version 3.

Allow as MLD Multicast Source: Used in a similar way by IPv6 system as IGMP Multicast source in IPv4 system. Enable it to support the source filtering functionality for IPv6 system. **Note:** It works only on MLD version 2.

Failover

Auto failover/failback is to ensure an always-on internet connection. Users can set a Master WAN interface (main WAN) and a slave interface (backup WAN), and when Master WAN fails, it will switch to slave WAN, and when master WAN restores, it will switch to master WAN interface again.



The screenshot shows the 'Configuration' page for 'Failover'. Under 'Parameters', 'L3 WAN Failover' is set to 'Disable'. Both 'Master Interface' and 'Slave Interface' are set to 'pppoe_0_8_35/ppp0.1'. For both, the 'Ping' method is selected, with 'Gateway' as the target. The 'Probe Cycle' is set to '30 seconds [3~86400]'. The 'Connectivity Decision' is 'Fail after 3 times [1~32]'. The 'Fall back' checkbox is checked. 'Apply' and 'Cancel' buttons are at the bottom.

L3 WAN Failover: Check Enable to activate L3 WAN failover.

Master Interface: Select a master WAN interface.

Ping: To ping to check the master WAN interface's connectivity.

- ① **Gateway:** It will send ping packets to gateway of master interface and wait for response from it in every "Probe Cycle" to check the connectivity of the gateway of master interface.
- ① **Host:** It will send ping packets to specific host and wait for response in every "Probe Cycle".

Slave Interface: Select a slave WAN interface as backup port.

Ping: To ping to check the slave WAN interface's connectivity.

- ① **Gateway:** It will send ping packets to gateway of slave interface and wait for response from it in every "Probe Cycle" to check the connectivity of the gateway of slave interface.
- ① **Host:** It will send ping packets to specific host and wait for response in every "Probe Cycle".

Probe Cycle: Set the time duration for the **Probe Cycle** to determine when the router will switch to the backup connection once the main connection (main port) fails. For example, when set to 30 seconds, the probe will be conducted every 30 seconds.

Connectivity Decision: Set how many times of probing failure to switch to backup port.

Note:

1) The time set is for each probe cycle, but the decision to change to the backup port is determined by **Probe Cycle** multiplied by **connection Decision amount** (e.g. From the image above it will be 30 seconds multiplied by 3 consecutive fails, the router will determine failover to slave interface.

2).The failback setting follow the same decision policy as the failover. For example, according to settings above in the screenshot, the connection probe will be carried out every 30 seconds, and 3 consecutive times of probe success is found, the router will determine failback to master interface.

DSL

This screen allows you to set DSL parameters. DSL knowledge is required to configure these settings. Contact your ISP to make sure that these parameters are correct.

Configuration

DSL

Parameters

Modulation G.Dmt G.lite T1.413 ADSL2 AnnexL ADSL2+ AnnexM VDSL2

Profile 8a 8b 8c 8d 12a 12b 17a 30a

US0 Enable

Phone line pair Inner pair Outer pair

Capability Bitswap SRA

PhyR Upstream Downstream

*** If DSL line is not ready, related configuration cannot successfully set.

Apply

Modulation: There are 8 modes “G.Dmt”, “G.lite”, “T1.413”, “ADSL2”, “AnnexL”, “ADSL2+”, “AnnexM”, that user can select for this connection.

Profile: VDSL profiles up to 30a.

US0: Select to enable US0. In VDSL mode, profiles like 8a, 8b, 8c, 8d and 12a need users to enable US0 band.

Phone line pair: This is for reserved only. You can choose "Inner Pair" or "Outer Pair".

Capability: There are 2 options “Bitswap Enable” and “SRA Enable” that user can select for this connection.

① Bitswap Enable: Allows bitswapping function.

① SRA Enable: Allows seamless rate adaptation.

PhyR: A new technology to control impulse and noise to improve the BER and DSL data quality.

Click **Apply** to confirm the settings.

Click [Advanced Settings](#) to future configure DSL.

Configuration

DSL Advanced Settings

Parameters

Test Mode Normal Reverb Medley No Retrain L3

Apply Tone Selection

Select the Test Mode, or leave it as default.


Tone Selection: This should be left as default or be configured by an advanced user.

The frequency band of ADSL is split up into 256 separate tones, each spaced 4.3125 kHz apart.

With each tone carrying separate data, the technique operates as if 256 separate modems were running in parallel. The tone range is from 0 to 31 for upstream and from 32 to 255 for downstream.

Dual VDSL2 /ADSL2+

This feature allows you to double your VDSL2/ADSL2+ data rate. Contact your ISP to see if you can upgrade your Internet service in order to use this feature.



The screenshot shows a configuration page titled "Configuration" with a sub-section for "DSL Bonding". Under "Parameters", there are two rows: "xDSL Bonding Capability" with a checked checkbox and the text "Enable", and "Current WAN xDSL Mode" with the text "Bonded". At the bottom left of the configuration area is a button labeled "Apply/Reboot".

xDSL Bonding Capability: To enable or disable the Dual VDSL2/ADSL2+ feature.

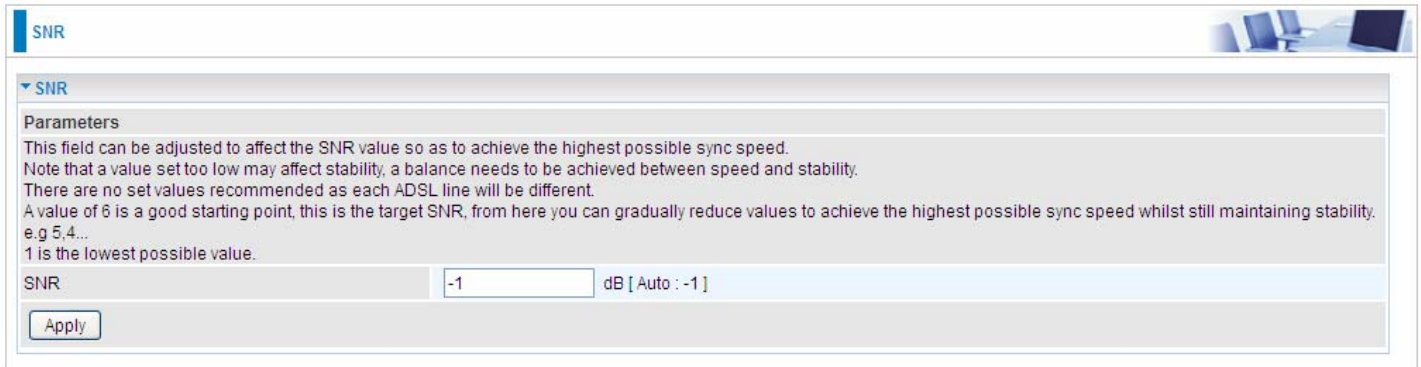
- ① **Enable:** The device will attempt to make connection in two-pair VDSL2/ADSL2+ mode.
- ① **Disable:** The device will only make a connection in single-pair VDSL2/ADSL2+ mode.

Current WAN xDSL Mode: This displays your current VDSL2/ADSL2+ connection mode on the DSLAM/ISP. two-pair VDSL2/ADSL2+ or single-pair VDSL2/ADSL2+ is available.

Click **Apply/Reboot** to save settings then reboot the system to activate the changes.

SNR

Signal-to-noise ratio (often abbreviated **SNR** or **S/N**) is a measure used in science and engineering that compares the level of a desired signal to the level of background noise. It is defined as the ratio of signal power to the noise power.



The screenshot shows a configuration window titled "SNR". At the top right, there is a small image of a computer workstation. Below the title bar, there is a section labeled "Parameters" with the following text: "This field can be adjusted to affect the SNR value so as to achieve the highest possible sync speed. Note that a value set too low may affect stability, a balance needs to be achieved between speed and stability. There are no set values recommended as each ADSL line will be different. A value of 6 is a good starting point, this is the target SNR, from here you can gradually reduce values to achieve the highest possible sync speed whilst still maintaining stability. e.g 5,4... 1 is the lowest possible value." Below this text, there is a label "SNR" followed by a text input field containing the value "-1" and the unit "dB [Auto : -1]". At the bottom left of the configuration area, there is an "Apply" button.

SNR: Change the value to adjust the DSL link rate, more suitable for an advanced user.

System

Internet Time

The router does not have a real time clock on board; instead, it uses the Network Time Protocol (NTP) to get the most current time from an NTP server.

NTP is a protocol for synchronization of computers. It can enable computers synchronize to the NTP server or clock source with a high accuracy.

Internet Time	
Parameters	
Synchronize with Internet time servers	<input checked="" type="checkbox"/> Enable
First NTP time server	Other <input type="text" value="192.43.244.18"/>
Second NTP time server	Other <input type="text" value="128.138.140.44"/>
Third NTP time server	Other <input type="text" value="129.6.15.29"/>
Fourth NTP time server	Other <input type="text" value="131.107.1.10"/>
Fifth NTP time server	None <input type="text"/>
Time zone offset	(GMT-00:00) Greenwich Mean Time: Dublin, Edinburgh, Lisbon, London

Apply Cancel

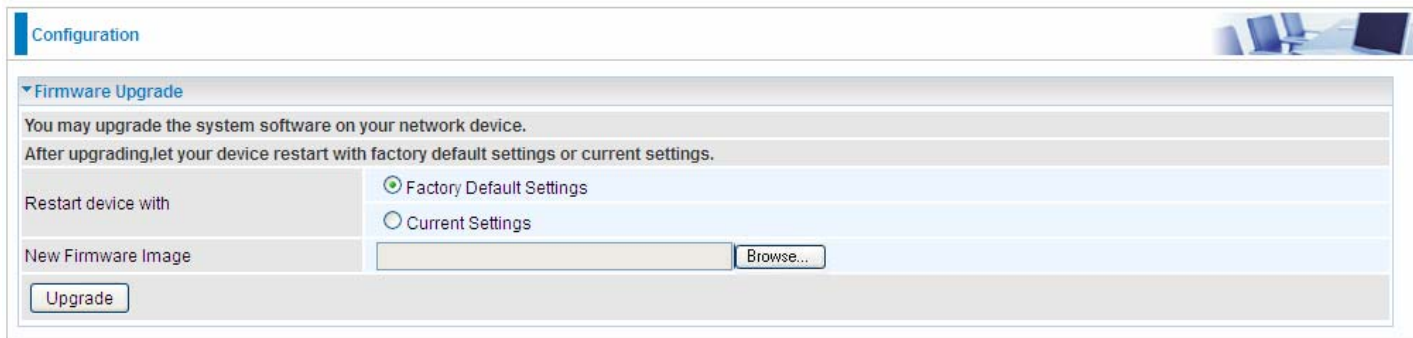
Choose the NTP time server from the drop-down menu, if you prefer to specify an NTP server other than those in the drop-down list, simply enter its IP address in their appropriate blanks provided as shown above. Your ISP may also provide an SNTP server for you to use.

Choose your local time zone from the drop-down menu. After a successful connection to the Internet, the router will retrieve the correct local time from the NTP server you have specified. If you prefer to specify an NTP server other than those in the drop-down list, simply enter its IP address in their appropriate blanks provided as shown above. Your ISP may also provide an NTP server for you to use.

Click **Apply** to apply your settings.

Firmware Upgrade

Software upgrading lets you experience new and integral functions of your router.



The screenshot shows the 'Configuration' page with a 'Firmware Upgrade' section. It includes instructions to upgrade the system software and restart the device with either factory default settings or current settings. There are radio buttons for 'Factory Default Settings' (selected) and 'Current Settings'. A 'New Firmware Image' field with a 'Browse...' button and an 'Upgrade' button are also visible.

Restart device with:

- ① **Factory Default Settings:** Restart the device with factory default settings automatically when finishing upgrading.
- ① **Current Settings:** Restart the device with the current settings automatically when finishing upgrading.

Your router's "firmware" is the software that allows it to operate and provides all its functionality.

Think of your router as a dedicated computer, and the firmware as the software it runs. Over time this software may be improved and revised, and your router allows you to upgrade the software it runs to take advantage of these changes.

Clicking on **Browse** will allow you to select the new firmware image file you have downloaded to your PC. Once the correct file is selected, click **Upgrade** to update the firmware in your router.

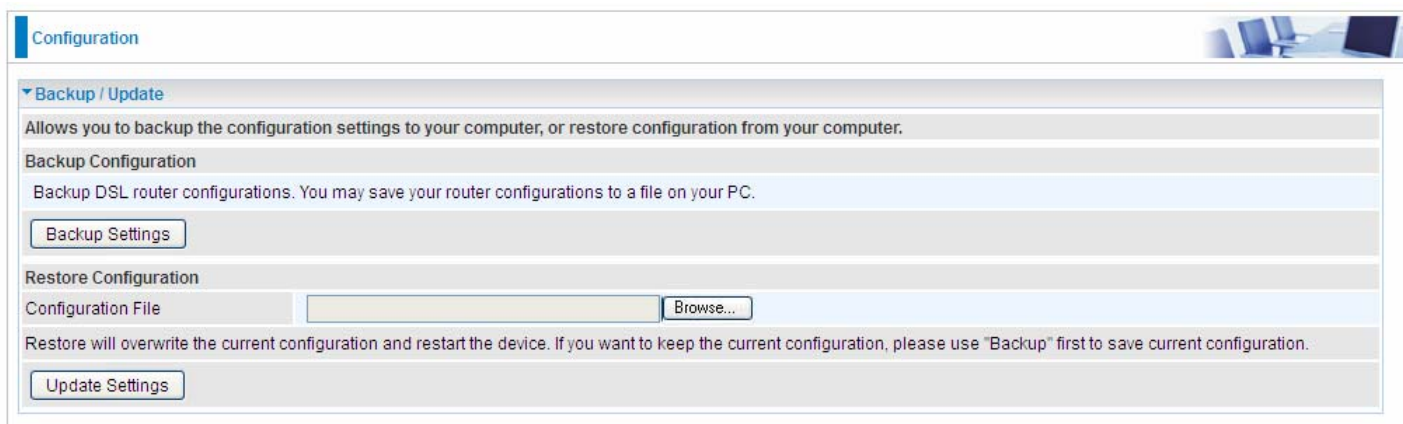


Warning

DO NOT power down the router or interrupt the firmware upgrading while it is still in process. Improper operation could damage the router.

Backup / Update

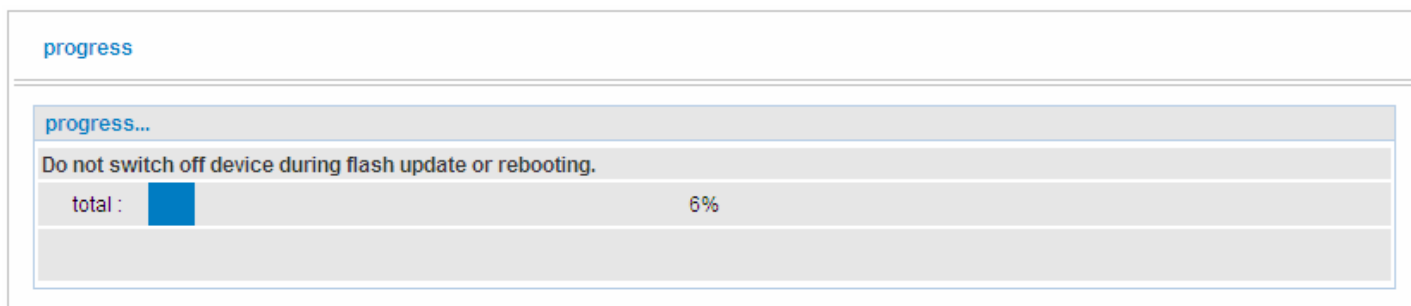
These functions allow you to save and backup your router's current settings to a file on your PC, or to restore from a previously saved backup. This is useful if you wish to experiment with different settings, knowing that you have a backup handy in the case of any mistakes. It is advisable to backup your router's settings before making any significant changes to your router's configuration.



The screenshot shows the 'Configuration' page with a sub-section titled 'Backup / Update'. It contains instructions for backing up and restoring configurations. There are two main sections: 'Backup Configuration' and 'Restore Configuration'. The 'Backup Configuration' section has a 'Backup Settings' button. The 'Restore Configuration' section has a 'Configuration File' input field, a 'Browse...' button, and an 'Update Settings' button. A warning message states: 'Restore will overwrite the current configuration and restart the device. If you want to keep the current configuration, please use "Backup" first to save current configuration.'

Click **Backup Settings**, a window appears, click save, then browse the location where you want to save the backup file.

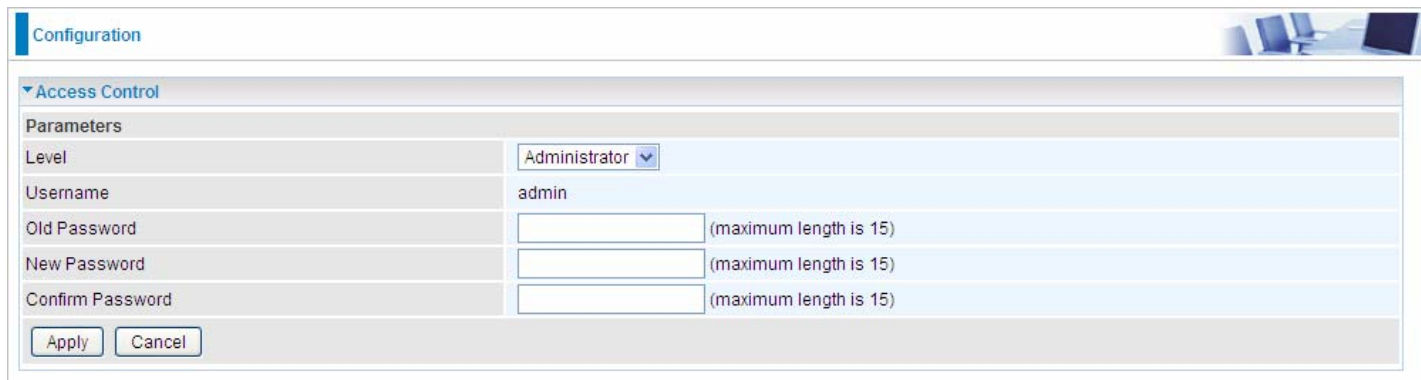
Click **Browse** and browse to the location where your backup file is saved, then click **Open**. Then in the above page, click **Update Settings**, the following process indicating screen will appear. Let it update to 100%, it will automatically turn to the Device Info page.



The screenshot shows a 'progress' screen with a warning: 'Do not switch off device during flash update or rebooting.' Below the warning is a progress bar labeled 'total :'. The progress bar is partially filled with blue, and the text '6%' is displayed to the right of the bar.

Access Control

Access Control is used to prevent unauthorized access to the router configuration page. Here you can change the login user password. Three user levels are provided here. Each user level there's a default provided user. You must access the router with the appropriate username and password. Here the corresponding passwords are allowed to change.



The screenshot shows the 'Configuration' page with the 'Access Control' section expanded. Under 'Parameters', the 'Level' is set to 'Administrator'. The 'Username' is 'admin'. There are three password fields: 'Old Password', 'New Password', and 'Confirm Password', each with a note '(maximum length is 15)'. At the bottom, there are 'Apply' and 'Cancel' buttons.

Level: select which level you want to change password to. There are three default levels.

- ① **Administrator:** the root user, corresponding default username and password are admin and admin respectively.
- ① **Remote:** username for the remote user to login, corresponding default username and password are support and support respectively.
- ① **Local:** username for the general user, when logon to the web page, only few items would be listed for common user, corresponding default username password are user and user respectively.

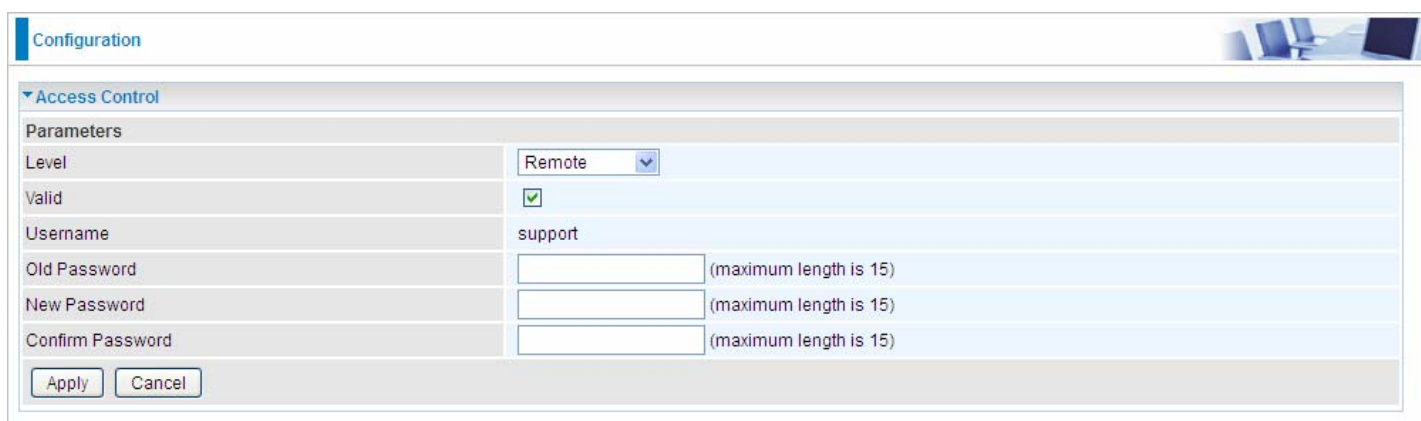
Username: The default username for each user level.

Old Password: Enter the old password.

New Password: Enter the new password.

Confirm Password: Enter again the new password to confirm.

Note: By default the accounts of **Remote** and **Local** are disabled, please click **Valid** check-box to activate the accounts.



The screenshot shows the 'Configuration' page with the 'Access Control' section expanded. Under 'Parameters', the 'Level' is set to 'Remote'. The 'Valid' checkbox is checked. The 'Username' is 'support'. There are three password fields: 'Old Password', 'New Password', and 'Confirm Password', each with a note '(maximum length is 15)'. At the bottom, there are 'Apply' and 'Cancel' buttons.

Click **Apply** to apply your new settings.

Mail Alert

Mail alert is designed to keep system administrator or other relevant personnel alerted of any unexpected events that might have occurred to the network computers or server for monitoring efficiency. With this alert system, appropriate solutions may be tackled to fix problems that may have arisen so that the server can be properly maintained.

Configuration

▼ Mail Alert

Server Information

WAN Port: DSL

Apply all the settings to: Ethernet

SMTP Server: [Text Field]

Username: [Text Field]

Password: [Text Field]

Sender's E-mail: [Text Field] (Must be xxx@yyy.zzz)

SSL / TLS: Enable

Port: 25

Account Test

WAN IP Change Alert

Recipient's E-mail: [Text Field] (Must be xxx@yyy.zzz)

3G/LTE Usage Allowance

Recipient's E-mail: [Text Field] (Must be xxx@yyy.zzz)

Apply Cancel

WAN Port: Mail Alert feature can be applicable to every WAN mode: Ethernet, and DSL. Select the port you want to use Mail Alert.

For example DSL, then when the WAN connection is in DSL mode and when there is any unexpected event, the alert message will be sent to your specified E-mail.

Apply all settings to: check whether you want to have a copy of the settings to apply to other WAN port, suppose the above Main port is DSL, then if you enable this function, then Ethernet port will have the same configuration.

SMTP Server: Enter the SMTP server that you would like to use for sending emails.

Username: Enter the username of your email account to be used by the SMTP server.

Password: Enter the password of your email account.

Sender's Email: Enter your email address.

SSL: Check to whether to enable SSL encryption feature.

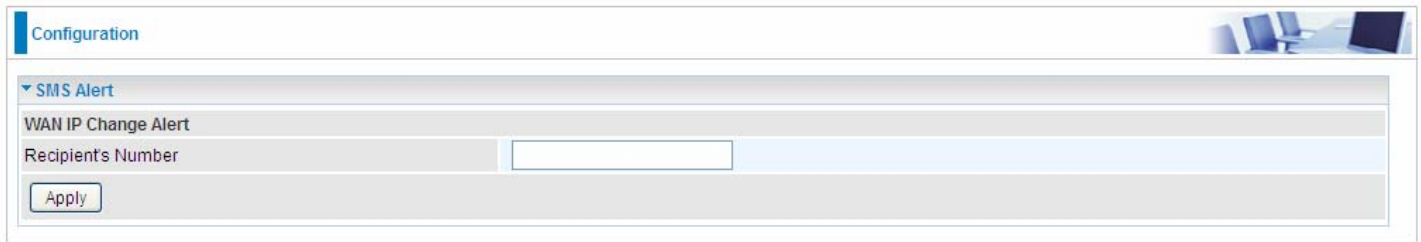
Port: the port, default is 25.

Account Test: Press this button to test the connectivity and feasibility to your sender's e-mail.

Recipient's Email (WAN IP Change Alert): Enter the email address that will receive the alert message once a WAN IP change has been detected.

SMS Alert

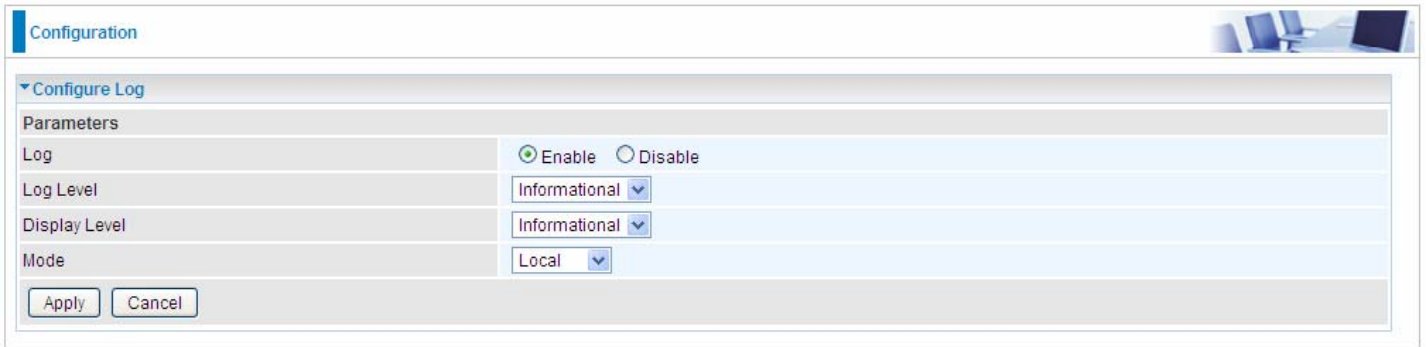
SMS, Short Message Service, is to inform clients the information clients subscribe. The BiPAC 8920AX(L) offers SMS alert sending clients alert messages when a WAN IP change is detected.



The screenshot shows a web-based configuration interface. At the top, there is a blue header bar with the word "Configuration" on the left and a small image of a laptop on the right. Below the header, there is a section titled "SMS Alert" with a downward-pointing arrow. Underneath, there is a sub-section titled "WAN IP Change Alert". Within this sub-section, there is a label "Recipient's Number" followed by a text input field. At the bottom left of the sub-section, there is an "Apply" button.

Recipient's Number (WAN IP Change Alert): Enter the Recipient's number that will receive the alert message once a WAN IP change has been detected.

Configure Log



Configuration

Configure Log

Parameters

Log Enable Disable

Log Level Informational

Display Level Informational

Mode Local

Apply Cancel

Log: Enable or disable this function.

Log level: Select your log level. The log level allows you to configure which types of events are logged. There are eight log levels from high to low are displayed below:

- ① **Emergency** = system is unusable
- ① **Alert** = action must be taken immediately
- ① **Critical** = critical conditions
- ① **Error** = error conditions
- ① **Warning** = warning conditions
- ① **Notice** = normal but significant conditions
- ① **Informational** = information events
- ① **Debugging** = debug-level messages

The gateway records all log events at the chosen level and above. For instance, if you set the log level to Critical, all critical, alert, and emergency events are logged, but none of the others are recorded

Display Level: Display the log according to the level you set when you view system log. Once you set the display level, the logs of the same or higher priority will be displayed.

Mode: Select the mode the system log adopted. Three modes: local, Remote and Both.

- ① **Local:** Select this mode to store the logs in the router's local memory.
- ① **Remote:** Select this mode to send the log information to a remote log server. Then you must assign the remote log server and port, 514 is often used.
- ① **Both:** Logs stored adopting above two ways.

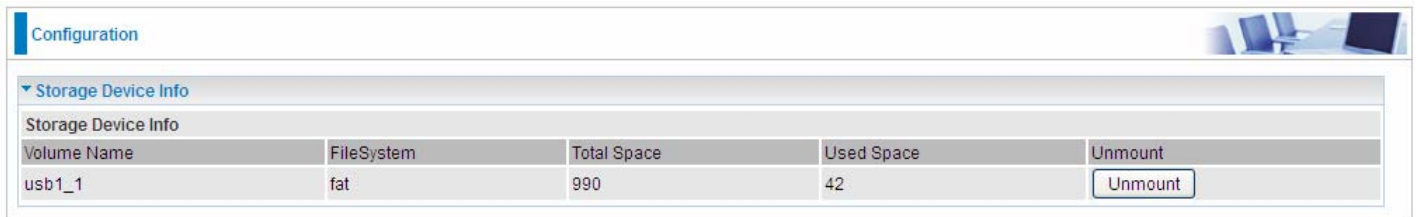
Click **Apply** to save your settings.

USB

Storage here refers to network sharing in the network environment, USB devices act as the storage carrier for DLNA, common file sharing.

Storage Device Info

This part provides users direct access to the storage information like the total volume, the used and the remaining capacity of the device.



The screenshot shows a configuration interface with a 'Configuration' header and a 'Storage Device Info' section. The section contains a table with the following data:

Volume Name	FileSystem	Total Space	Used Space	Unmount
usb1_1	fat	990	42	<input type="button" value="Unmount"/>

Volume Name: Display the storage volume name

FileSystem: Display the storage device's file system format, well-known is FAT.

Total Space: Display the total space of the storage, with unit MB.

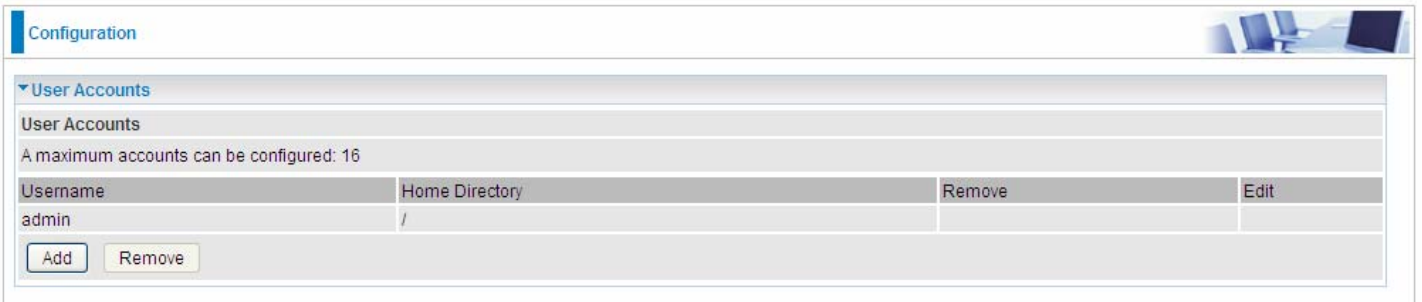
Used Space: Display the remaining space of each partition, unit MB.

Unmount: Click **Unmount** button if you want to uninstall the USB device. Please **Note** that first click **Unmount** before you uninstall your USB storage.

User Account

Users here can add user accounts for access to the storage, in this way users can access the network sharing storage with the specified account, and again protect their own data.

Default user admin.



Configuration

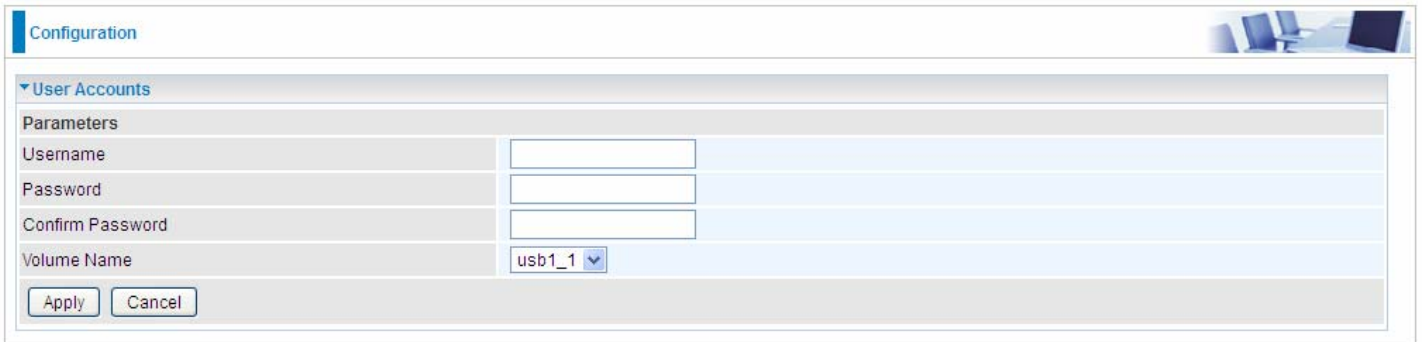
▼ User Accounts

User Accounts

A maximum accounts can be configured: 16

Username	Home Directory	Remove	Edit
admin	/		

Click **Add** button, enter the user account-adding page:



Configuration

▼ User Accounts

Parameters

Username

Password

Confirm Password

Volume Name

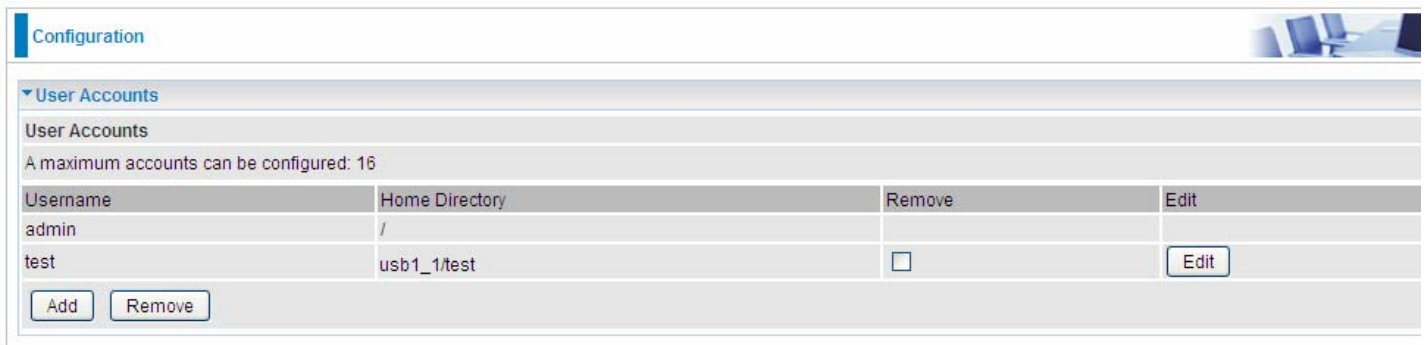
Username: user-defined name, but simpler and more convenient to remember would be favorable.

Password: Set the password.

Confirm Password: Reset the password for confirmation.

Volume Name: Select Volume name, as to create access to the volume of the specified partition of the storage.

For example, a user **test** is setup behind the **usb1_1**.



Configuration

▼ User Accounts

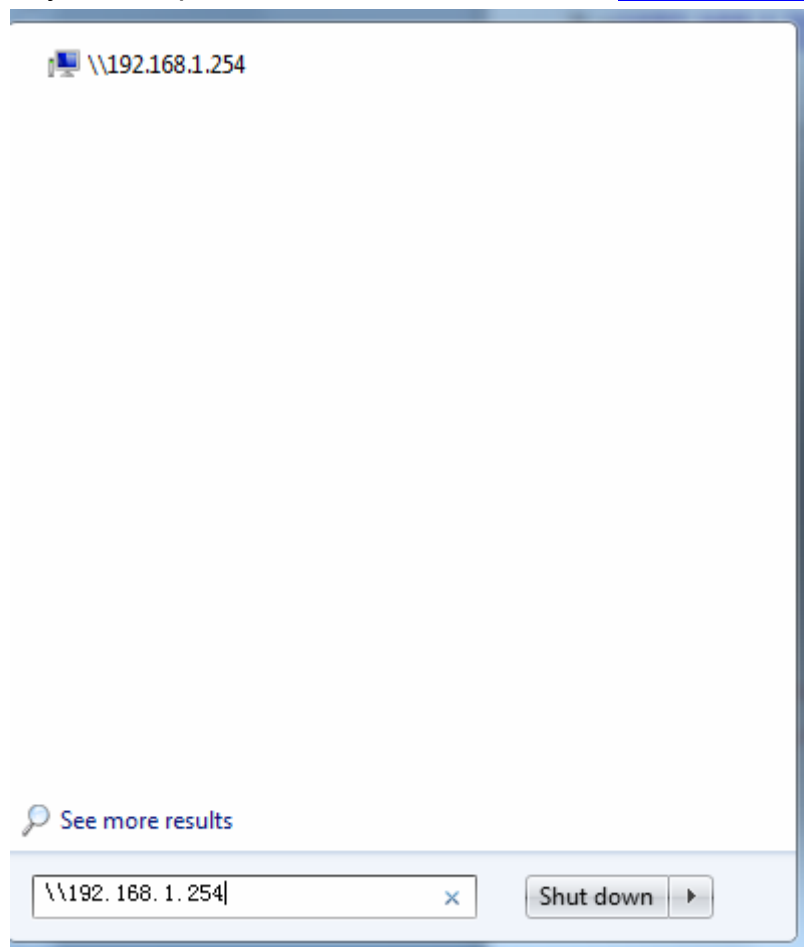
User Accounts

A maximum accounts can be configured: 16

Username	Home Directory	Remove	Edit
admin	/		
test	usb1_1/test	<input type="checkbox"/>	<input type="button" value="Edit"/>

Accessing mechanism of Storage:

In your computer, Click **Start > Run**, enter [\\192.168.1.254](#)

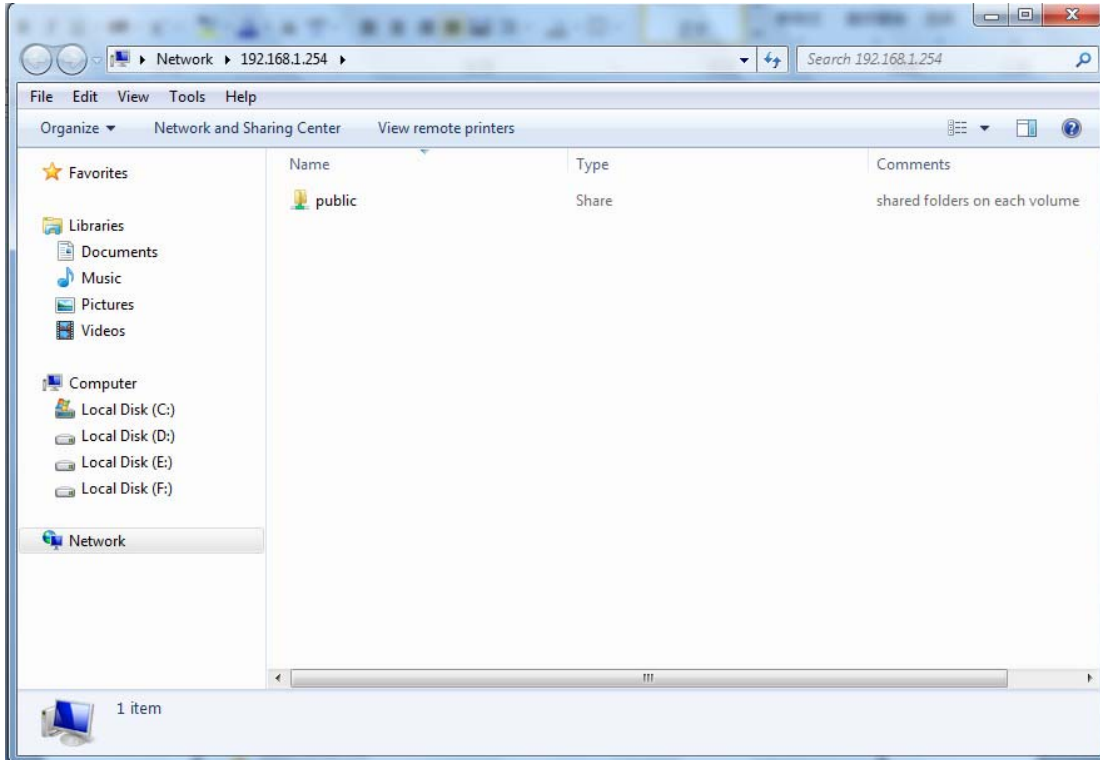


When accessing the network storage, you can see a folder named “**public**”, users should have the account to enter, and the account can be set at the User Accounts section.

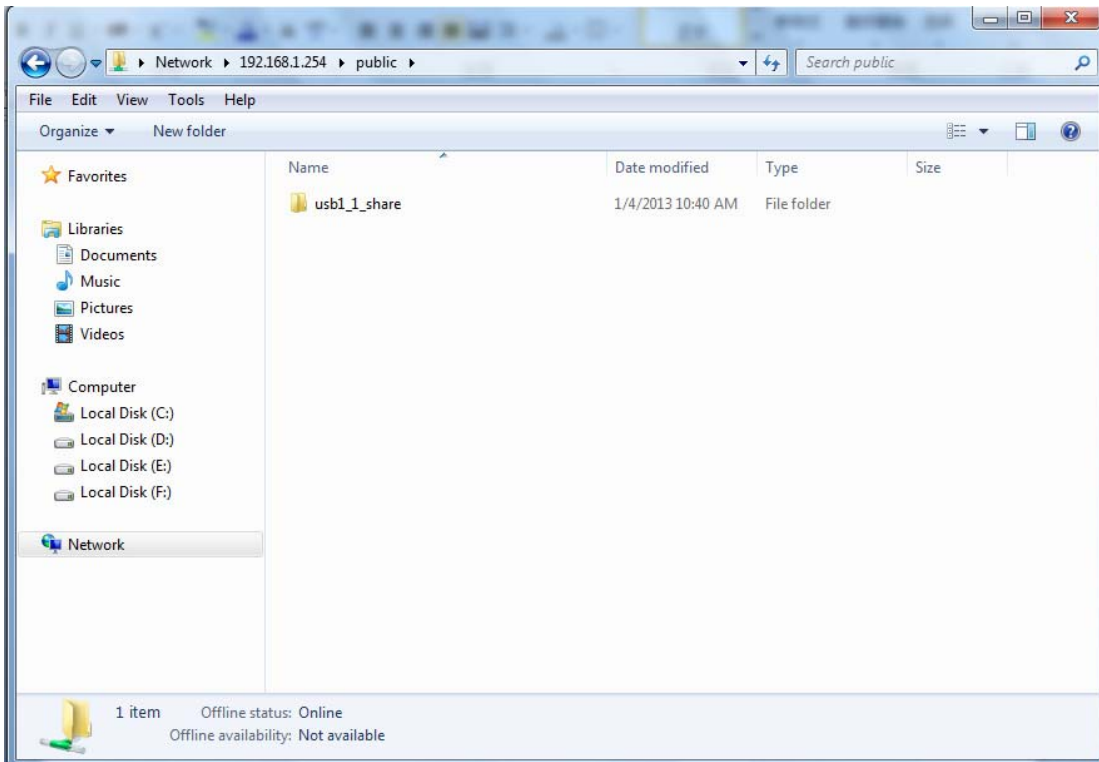
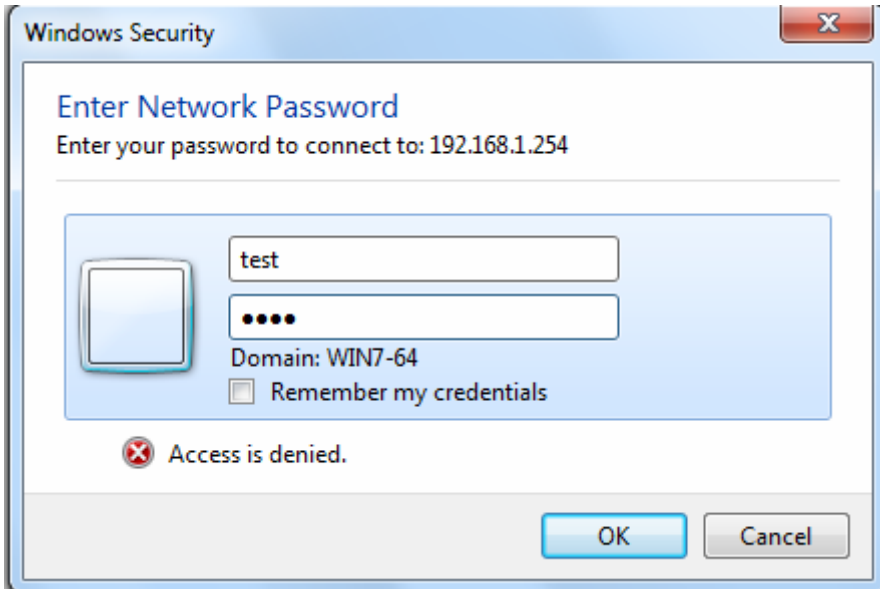
When first logged on to the network folder, you will see the “**public**” folder.

Public: The public sharing space for each user in the USB Storage.

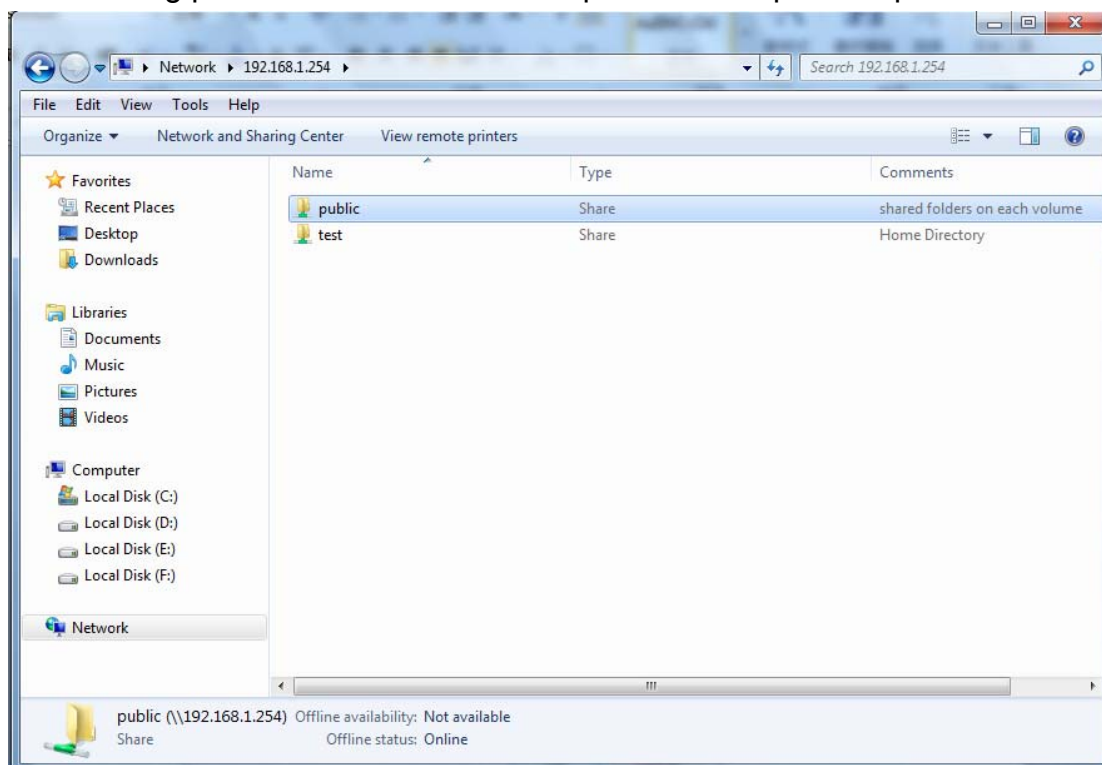
When user register a USB account and log successfully, a private folder (the same name as the user account registered) exclusive for each user is established. Go on to see the details.



Access the folder **public**.



When successfully accessed, the private folder of each user is established, and user can see from the following picture. The **test** fold in the picture is the private space for each user.



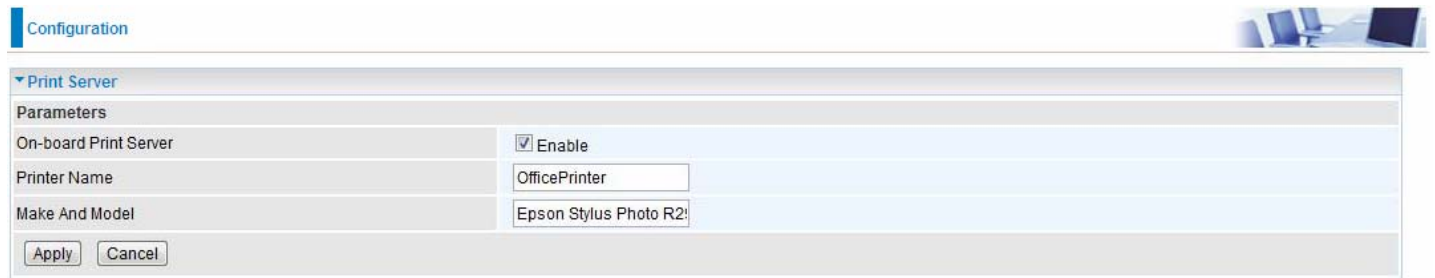
Print Server

The Print Server feature allows you to share a printer on your network by connecting a USB cable from your printer to the USB port on the 8920AX(L). This allows you to print from any location on your network.

Note: Only USB printers are supported

Setup of the printer is a 3 step process

1. Connect the printer to the 8920AX(L)'s USB port
2. Enable the print server on the 8920AX(L)
3. Install the printer drivers on the PC you want to print from



On-board Print Server: Check Enable to activate the print server

Printer Name: Enter the Printer name, for example, *OfficePrinter*

Make and Model: Enter in the Make and Model information for the printer, for example, *Epson Stylus Photo R290*

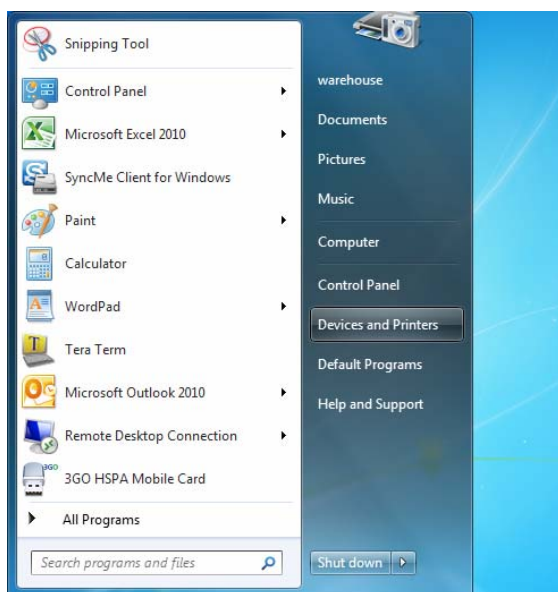
Note:

The **Printer name** can be any text string up to **40** characters. It cannot contain spaces.

The **Make and Model** can be any text string up to **128** characters.

Set up of Printer client (Windows 7)

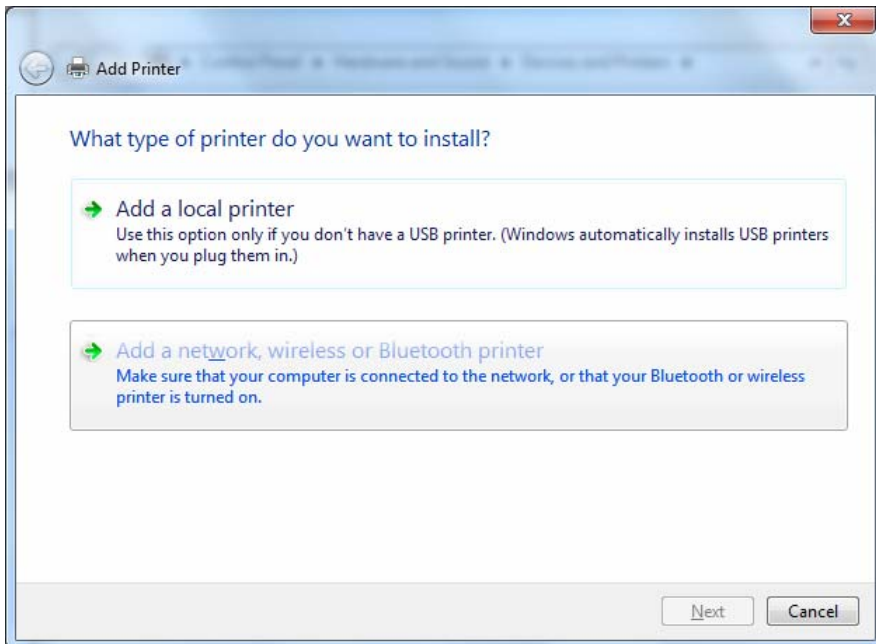
Step 1: Click **Start** and select "Devices and Printers"



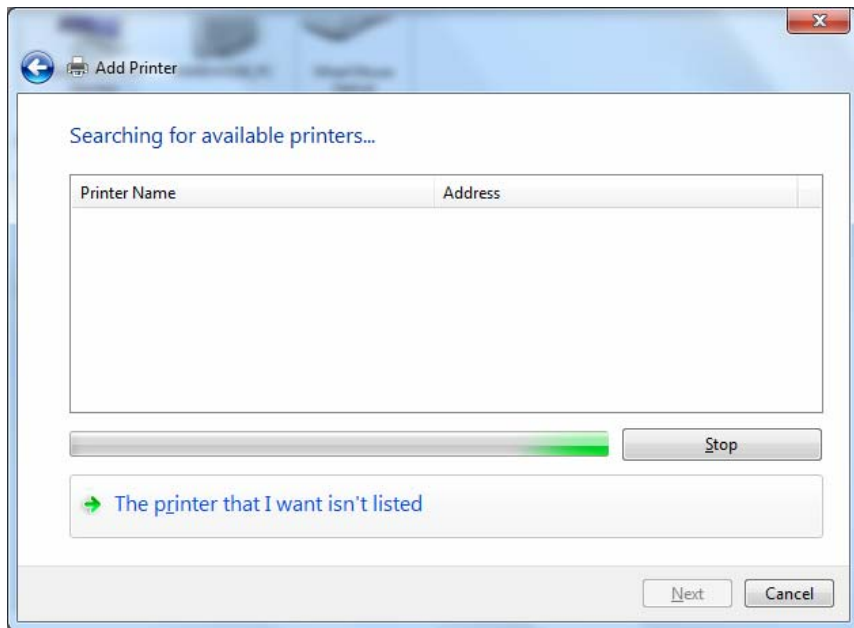
Step 2: Click "Add a Printer".



Step 3: Click "Add a network, wireless or Bluetooth printer".



Step 4: Click “The printer that I want isn’t listed”

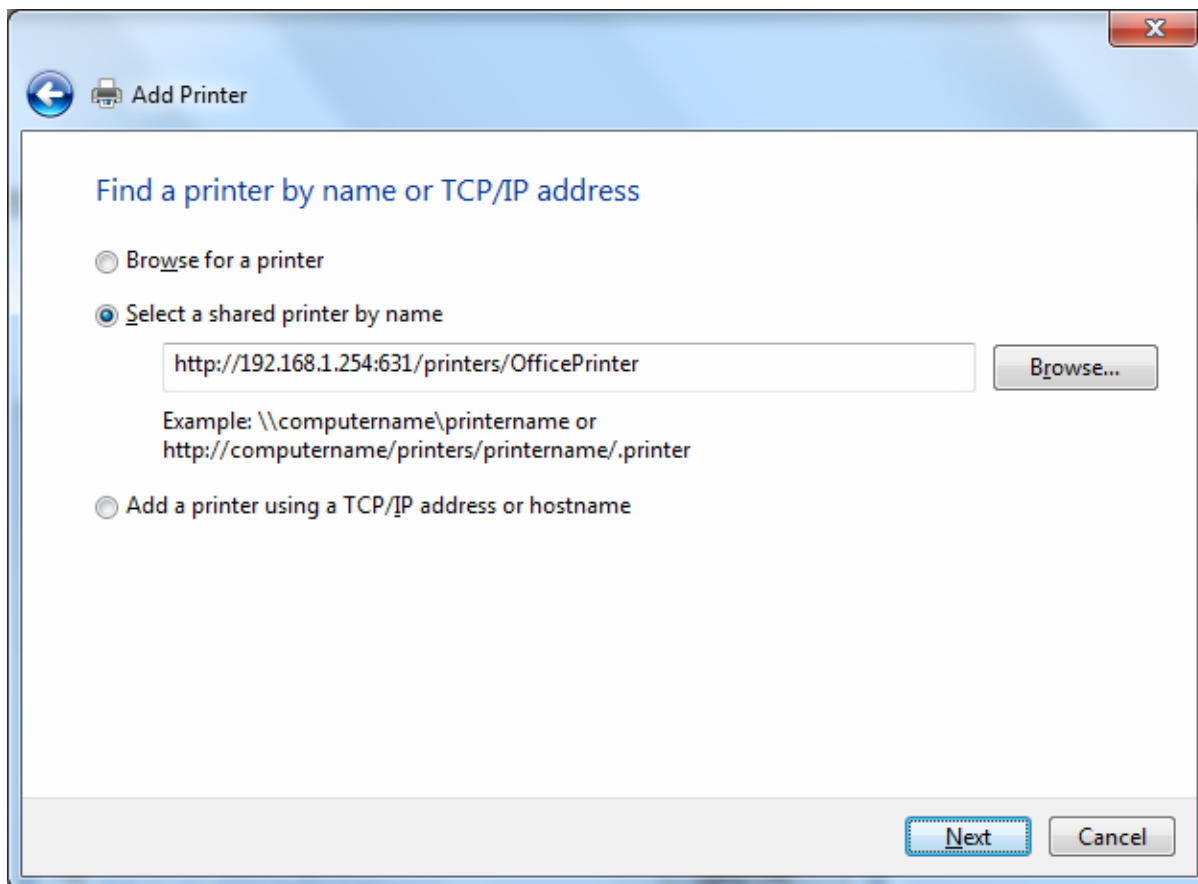


Step 5: Select “Select a shared printer by name”

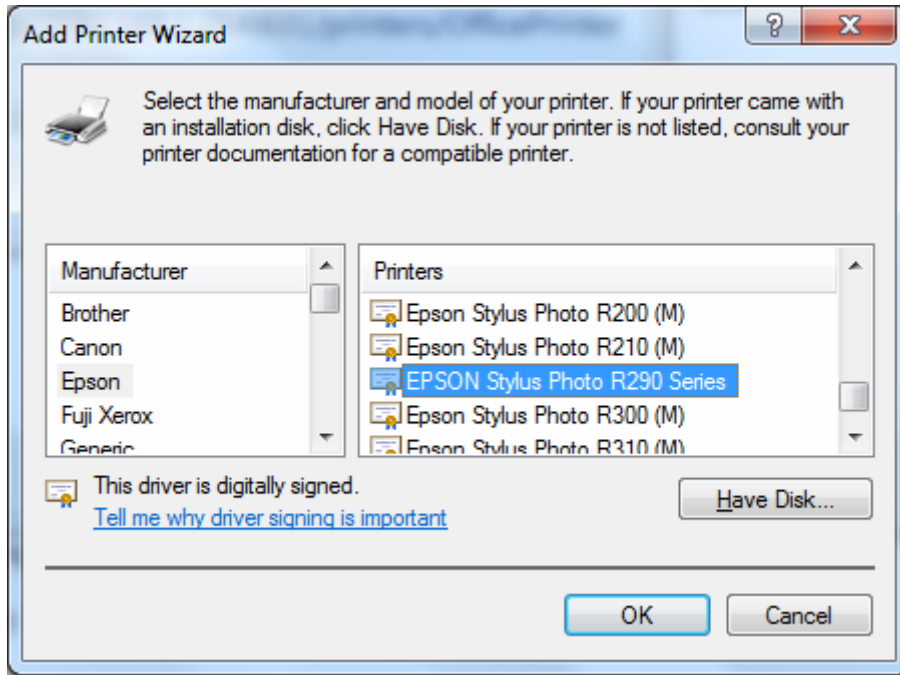
Enter `http://8920AX(L)- LAN-IP:631/printers/printer-name` or. Make sure printer’s name is the same as what you set in the 8920AX(L) earlier

For Example: `http://192.168.1.254:631/printers/OfficePrinter`

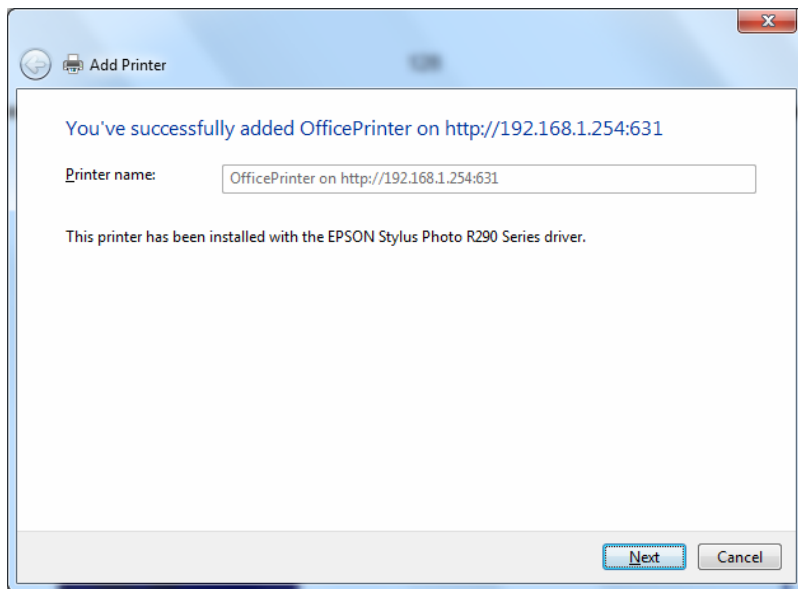
OfficePrinter is the Printer Name we setup earlier



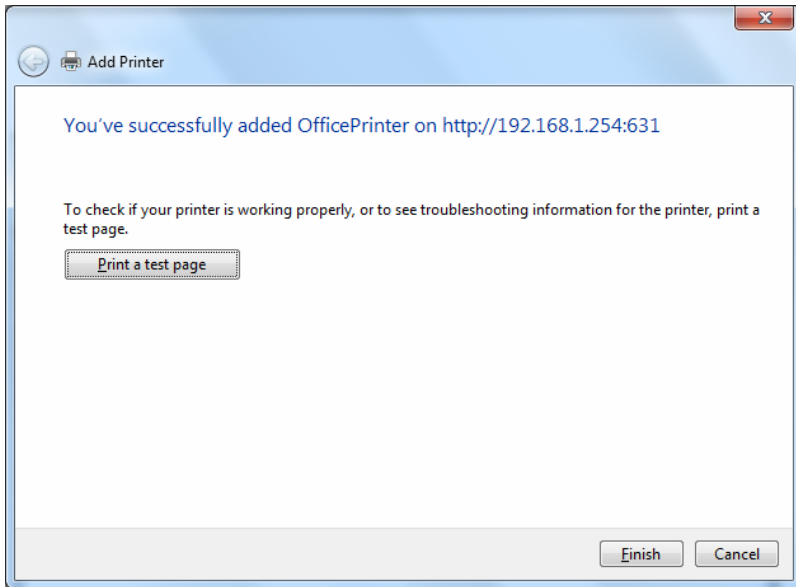
Step 6: Click “Next” to add the printer driver. If your printer is not listed and your printer came with an installation disk, click “Have Disk” find it and install the driver.



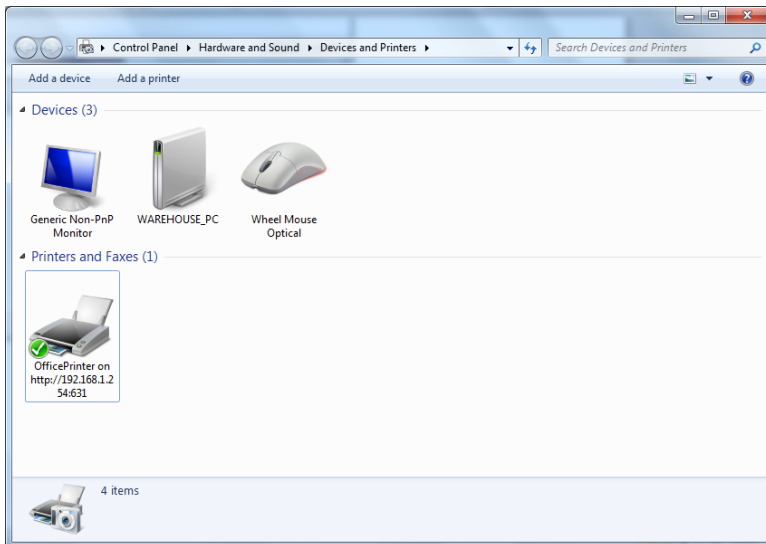
Step 7: Click “Next”



Step 8: Click “Next” and you are done



You will now be able to see your printer on the Devices and Printers Page



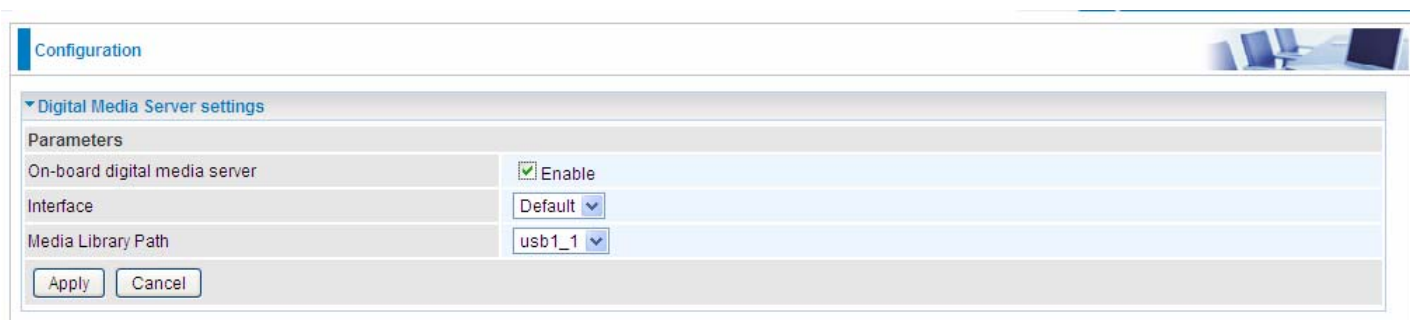
DLNA

The Digital Living Network Alliance (DLNA) is a non-profit collaborative trade organization established by Sony in June 2003, which is responsible for defining interoperability guidelines to enable sharing of digital media between consumer devices such as computers, printers, cameras, cell phones and other multiple devices.

DLNA uses Universal Plug and Play (UPnP) for media management, discovery and control. UPnP defines the types of devices ('server', 'renderer', 'controller') that DLNA supports and the mechanism for accessing media over a network.

Overall, DLNA allows more convenience, more choices and enjoyment of your digital content through DLNA certified devices. Any DLNA certified devices or software can access the DLNA server.

With USB storage, 8920AX(L) can serve as a DLNA server.



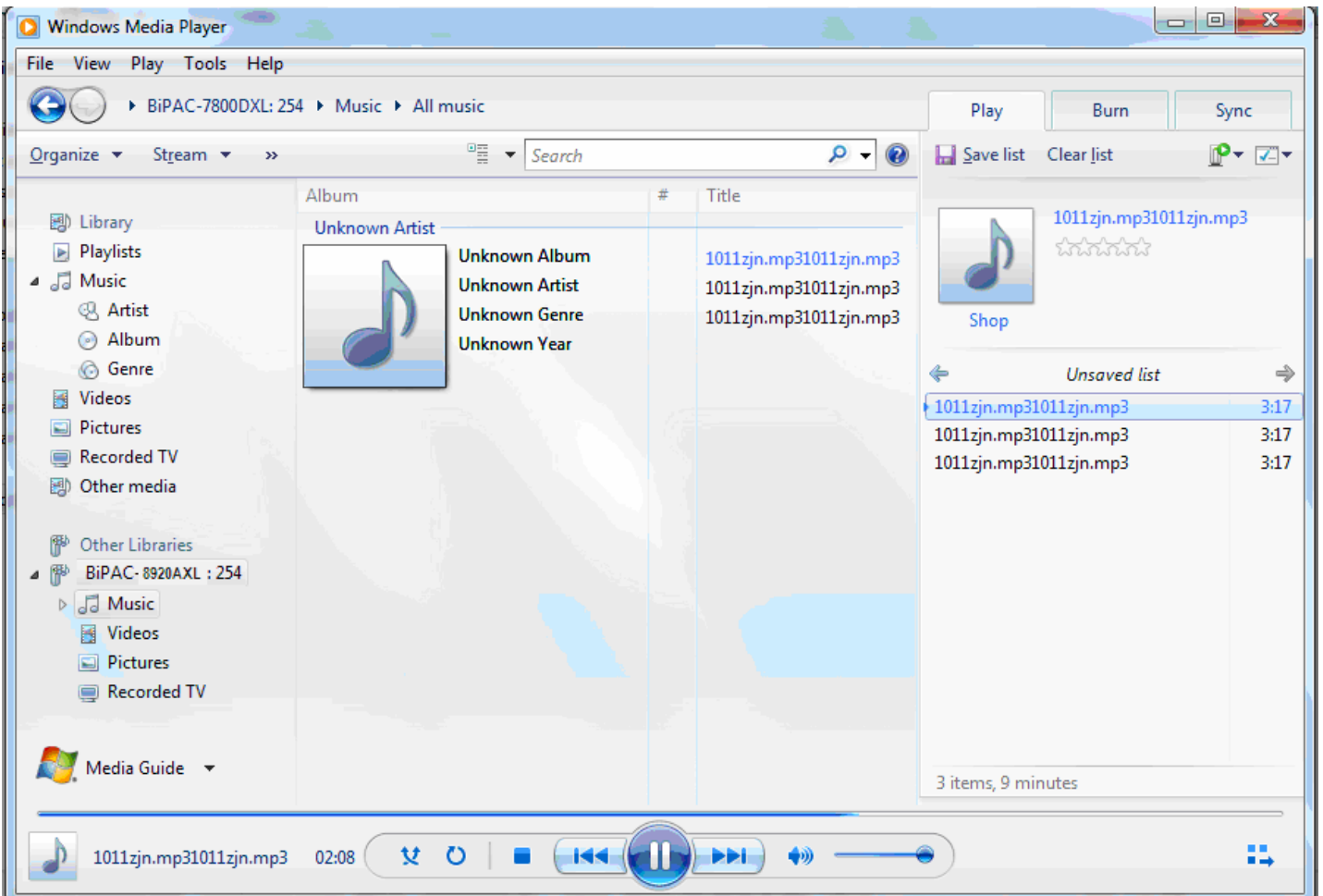
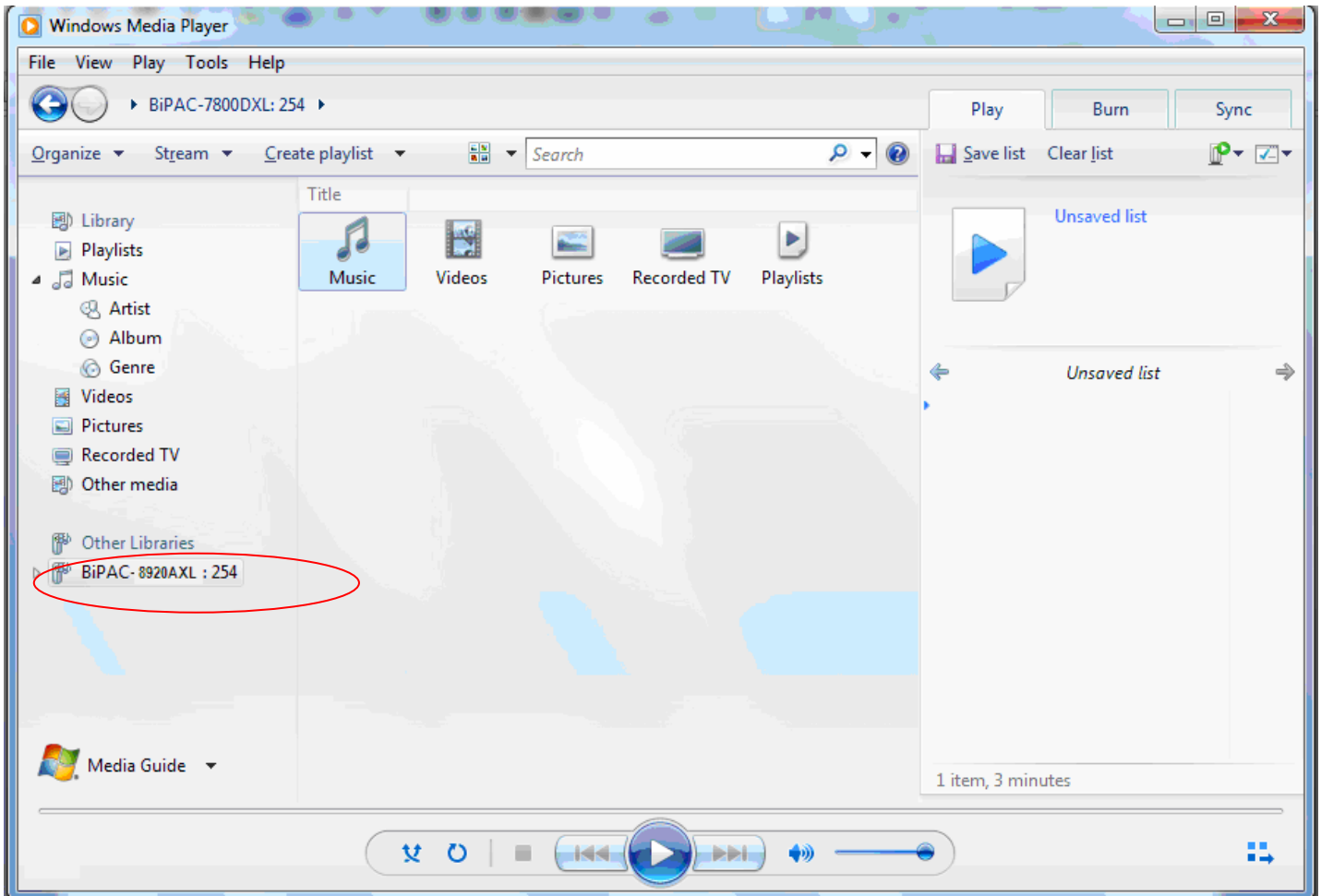
The screenshot shows a configuration window titled "Configuration" with a sub-section for "Digital Media Server settings". Under "Parameters", there are three settings: "On-board digital media server" is checked and set to "Enable"; "Interface" is set to "Default"; and "Media Library Path" is set to "usb1_1". At the bottom of the settings area are "Apply" and "Cancel" buttons.

On-board digital media server: Enable to share the device as a DLNA server.

Interface: The VLAN group, it is the bound interface for DLNA server accessing.

Media Library Path: Default is usb1_1, total USB space (pictures, videos, music, etc, all can be accessed with this path).

Take Windows media player in Windows 7 accessing the DLNA server for example for usage of DLNA .



IP Tunnel

An IP Tunnel is an Internet Protocol (IP) network communication channels between two networks of different protocols. It is used to transport another network protocol by encapsulation of its packets.

IP Tunnels are often used to connect two disjoint IP networks that do not have a native routing path to each other, via an underlying routable protocol across an intermediate transport network, like VPN.

Another prominent use of IP Tunnel is to connect islands of IPv6 installations across the IPv4 internet.

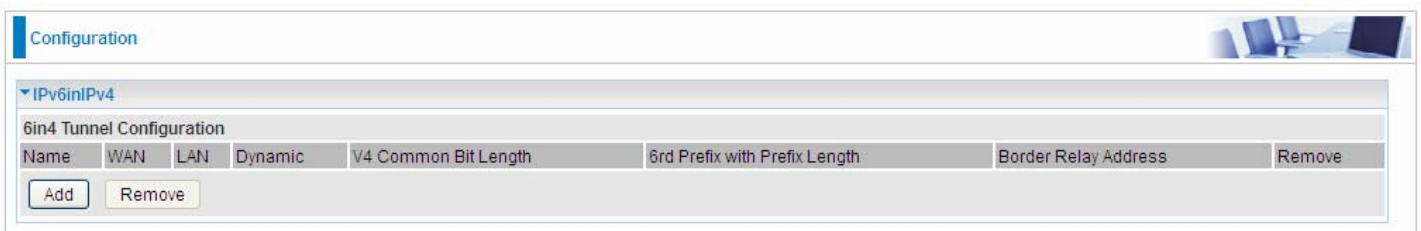
IPv6inIPv4

6in4 is an Internet transition mechanism for migrating from IPv4 to IPv6. 6in4 uses tunneling to encapsulate IPv6 traffic over explicitly configured IPv4 links. The 6in4 traffic is sent over the IPv4 Internet inside IPv4 packets whose IP headers have the IP Protocol number set to 41. This protocol number is specifically designated for IPv6 capsulation.

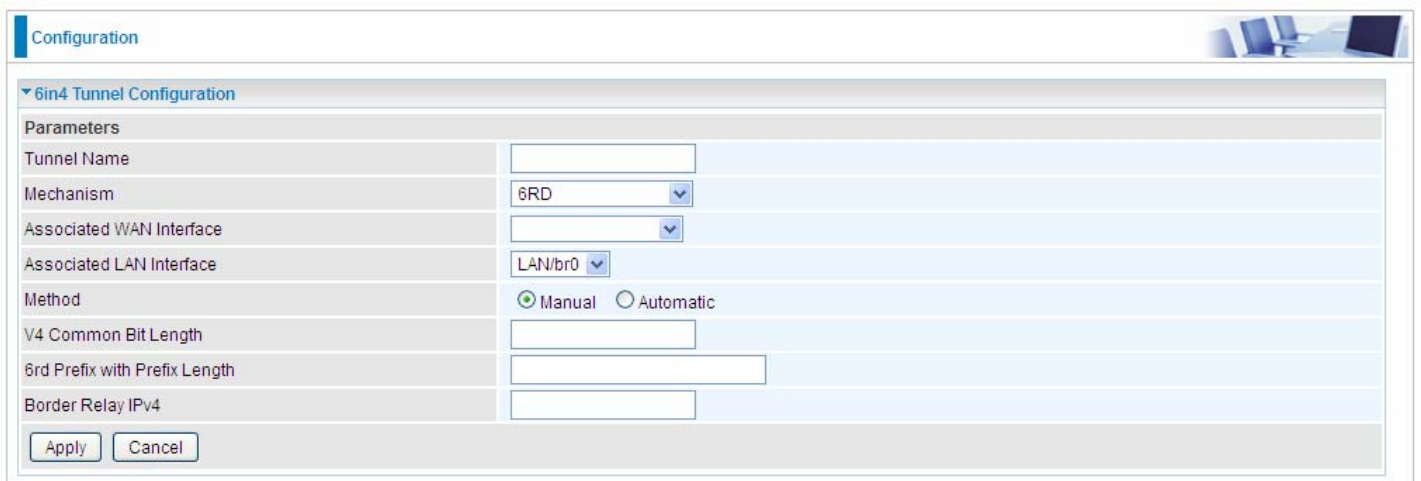
6RD:

6RD is a mechanism to facilitate IPv6 rapid deployment across IPv4 infrastructures of internet service providers (ISPs).

It is derived from 6to4, a preexisting mechanism to transporting IPv6 packets over IPv4 infrastructure network, with the significant change that it operates entirely within the enduser's ISP network, thus avoiding the major architectural problems inherent in the original design of 6to4.



Click **Add** button to manually add the 6in4 rules.



Tunnel Name: User-defined name.

Mechanism: Here only 6RD.

Associated WAN Interface: The applied WAN interface with the set tunnel, thus when there are packets from/to the WAN interface, the tunnel would be used to transport the packets.

Associated LAN Interface: Set the linked LAN interface with the tunnel.

Method: 6rd operation mechanism: manually configured or automatically configured. If manually, please fill out the following 6rd parameters.

V4 Common Bit Length: Specify the length of IPv4 address carried in IPv6 prefix, for example, 0 means to carry all the 32 bits of IPv4 address while 8 carries 24 bits of the IPv4 address.

6rd Prefix with Prefix Length: Enter the 6rd prefix and prefix length you uniquely designate to 6rd by the ISP(The 6rd prefix and prefix length are to replace the standard 6to4 prefix 2002::/16 by an IPv6 prefix that belongs to the ISP-assigned.)

Border Relay IPv4 Address: The IPv4 address of the border relay. The relay is used to unwrap capsulated IPv4 packets into IPv6 packets and send them to the IPv6 network.

IPv4inIPv6

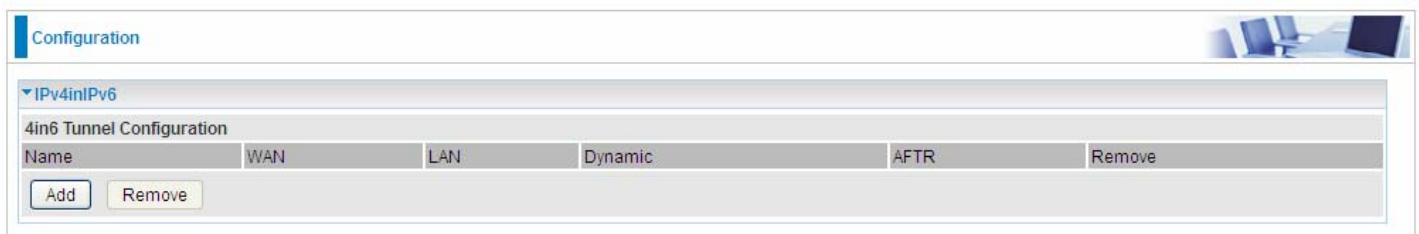
4in6 refers to tunneling of IPv4 in IPv6. It is an inherent internet interoperation mechanism allowing IPv4 to be used in an IPv6 only network.

4in6 uses tunneling to encapsulate IPv4 traffic over configured IPv6 tunnels. 4in6 tunnels are usually manually configured but they can be automated using protocols such as TSP to allow easy connection to a tunnel broker.

DS – Lite

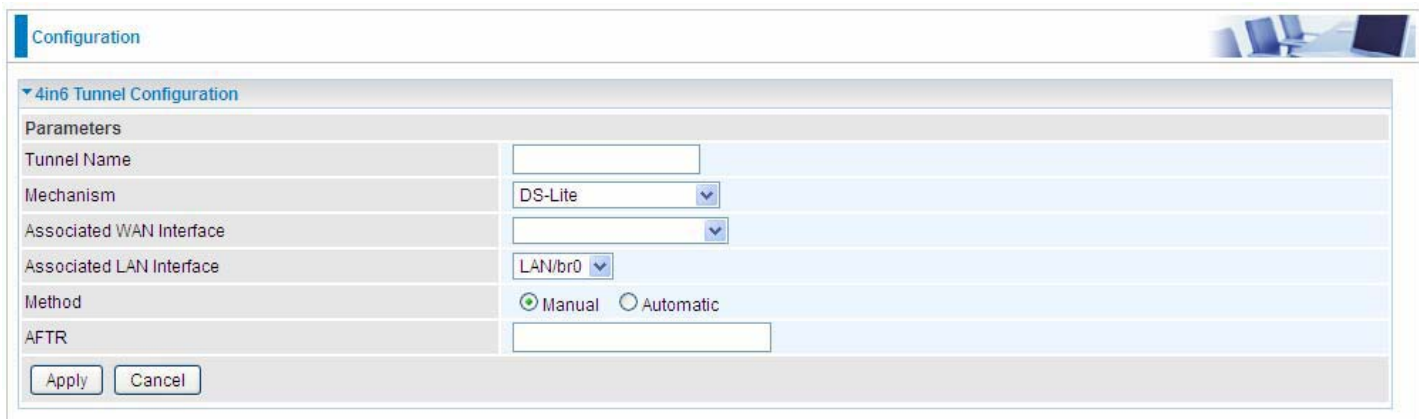
DS –Lite, or Dual-Stack Lite, is designed to let an ISP omit the deployment of any IPv4 address to the customer's CPE. Instead, only global IPv6 addresses are provided (Regular Dual-Stack Lite deploys global addresses for both IPv4 and IPv6).

The CPE distributes private IPv4 addresses for the LAN clients, the same as a NAT device. The subnet information is chosen by the customer, identically to the NAT model. However, instead of performing the NAT itself, the CPE encapsulates the IPv4 packet inside an IPv6 packet.



The screenshot shows a web interface for configuring IPv4inIPv6. At the top, there is a 'Configuration' header. Below it, a section titled 'IPv4inIPv6' contains a table for '4in6 Tunnel Configuration'. The table has columns for Name, WAN, LAN, Dynamic, AFTR, and Remove. A single entry is visible with 'Name' as 'WAN', 'LAN' as 'LAN', 'Dynamic' as 'Dynamic', and 'AFTR' as 'AFTR'. Below the table are 'Add' and 'Remove' buttons.

Click **Add** button to manually add the 4in6 rules.



The screenshot shows the '4in6 Tunnel Configuration' form. It includes fields for Tunnel Name, Mechanism (set to DS-Lite), Associated WAN Interface, Associated LAN Interface (set to LAN/br0), Method (with radio buttons for Manual and Automatic), and AFTR. At the bottom are 'Apply' and 'Cancel' buttons.

Tunnel Name: User-defined tunnel name.

Mechanism: It is the 4in6 tunnel operation technology. Please select DS-Lite.

Associated WAN Interface: The applied WAN interface with the set tunnel, and when there are packets from/to the WAN interface, the tunnel would be used to transport the packets.

Associated LAN Interface: Specify the linked LAN interface with the tunnel.

Method: Manually to specify the AFTP (Address Family Transition Router) address or Automatic.

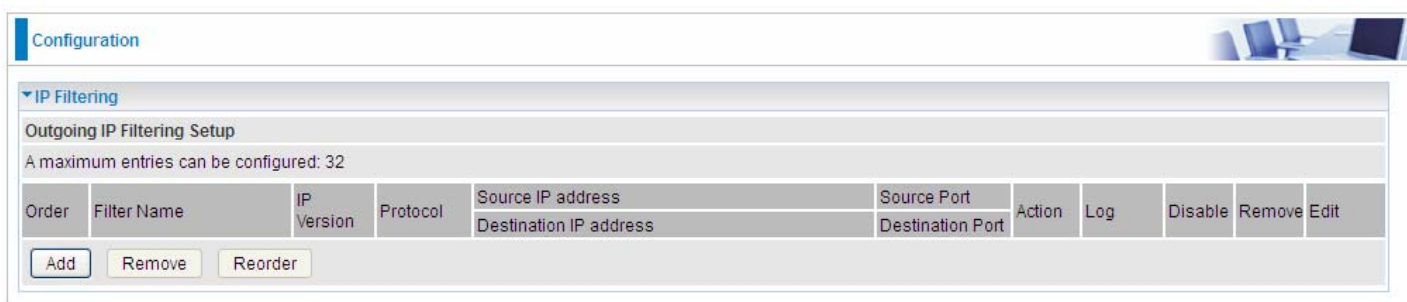
AFTR: Specify the address of AFTP (Address Family Transition Router) from your ISP.

Security

IP Filtering Outgoing

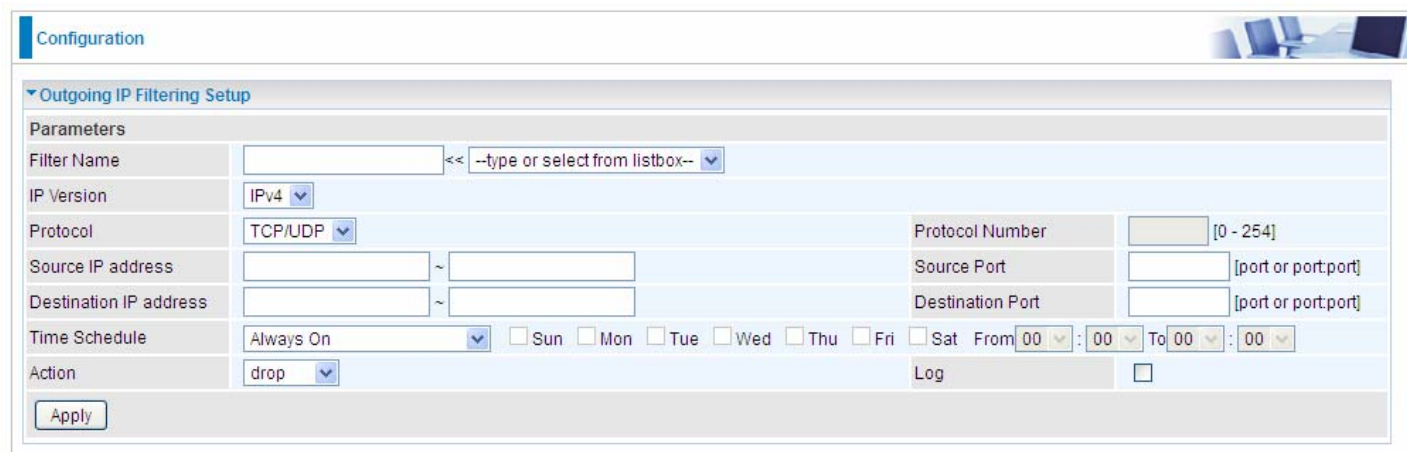
IP filtering enables you to configure your router to block specified internal/external users (**IP address**) from Internet access, or you can disable specific service requests (**Port number**) to /from Internet. The relationship among all filters is “**or**” operation, which means that the router checks these different filter rules one by one, starting from the first rule. As long as one of the rules is satisfied, the specified action will be taken.

Note: The maximum number of entries: 32.



The screenshot shows the 'Configuration' page with a sub-section for 'IP Filtering'. Under 'Outgoing IP Filtering Setup', it states 'A maximum entries can be configured: 32'. Below this is a table with columns: Order, Filter Name, IP Version, Protocol, Source IP address, Destination IP address, Source Port, Destination Port, Action, Log, Disable, Remove, and Edit. At the bottom of the table are buttons for 'Add', 'Remove', and 'Reorder'.

Click **Add** button to enter the exact rule setting page.



The screenshot shows the 'Outgoing IP Filtering Setup' configuration page. It includes fields for: Filter Name (with a dropdown), IP Version (IPv4), Protocol (TCP/UDP), Protocol Number (0-254), Source IP address, Destination IP address, Source Port, Destination Port, Time Schedule (Always On, with checkboxes for days and a time range), Action (drop), and Log (checkbox). An 'Apply' button is at the bottom.

Filter Name: A user-defined rule name. User can select simply from the list box for the application for quick setup.

IP Version: Select the IP Version, IPv4 or IPv6.

Protocol: Set the traffic type (TCP/UDP, TCP, UDP, ICMP, RAW, Any) rule applies to.


Source IP address: This is the Address-Filter used to allow or block traffic to/from particular IP address(es) featured in the IP range. If you leave empty, it means any IP address.

Source Port [port or port:port]: The port or port range defines traffic from the port (specific application) or port in the set port range blocked to go through the router. Default is set port from range 1 – 65535.

Destination IP address: Traffic from LAN with the particular traffic destination address specified in the IP range is to be blocked from going through the router, similarly set as the Source IP address above.

Destination Port [port or port: port]: Traffic with the particular set destination port or port in the set port range is to be blocked from going through the router. Default is set port from port range: 1 –

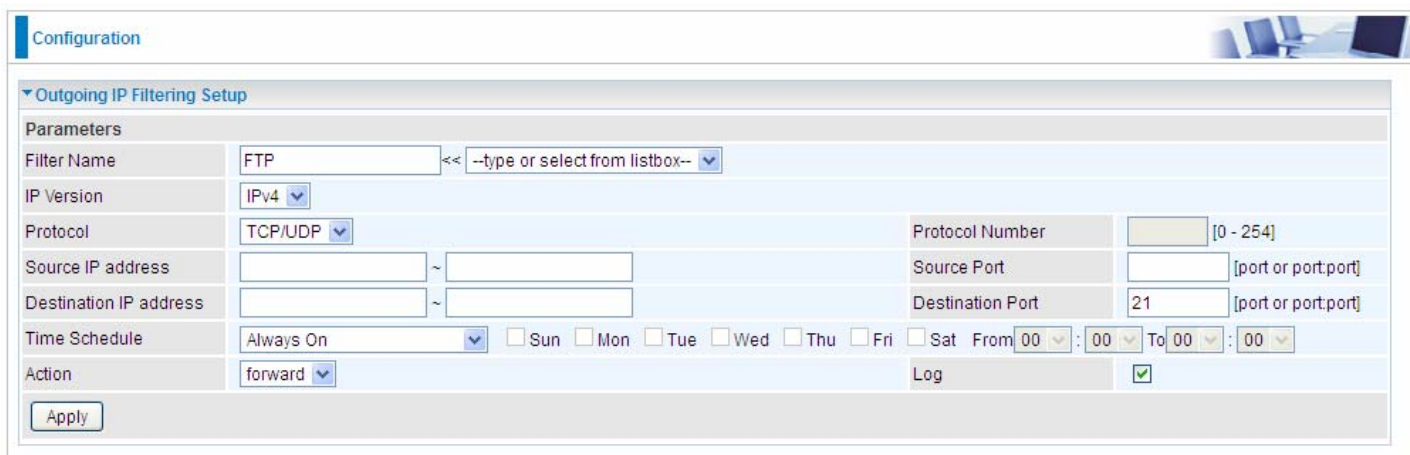
65535.

Time Schedule: Select or set exactly when the rule works. When set to “Always On”, the rule will work all time; and also you can set the precise time when the rule works, like 01:00 - 19:00 from Monday to Friday. Or you can select the already set timeslot in “**Time Schedule**” during which the rule works. And when set to “Disable”, the rule is disabled or inactive and there will be an icon”  ” in list table indicating the rule is inactive. See [Time Schedule](#).

Action: Select to **drop** or **forward** the packets fit the outgoing filtering rule.

Log: check the check-box to record the security log. To check the log, users can turn to [Security Log](#).

Example: For example, if there is an outgoing rule set as follows, then the 21 application between source IP and destination IP will be blocked. Or exactly in the rule below, all traffic trying to access FTP will be blocked.



Configuration

Outgoing IP Filtering Setup

Parameters

Filter Name: FTP << --type or select from listbox-- >>

IP Version: IPv4

Protocol: TCP/UDP Protocol Number: [0 - 254]

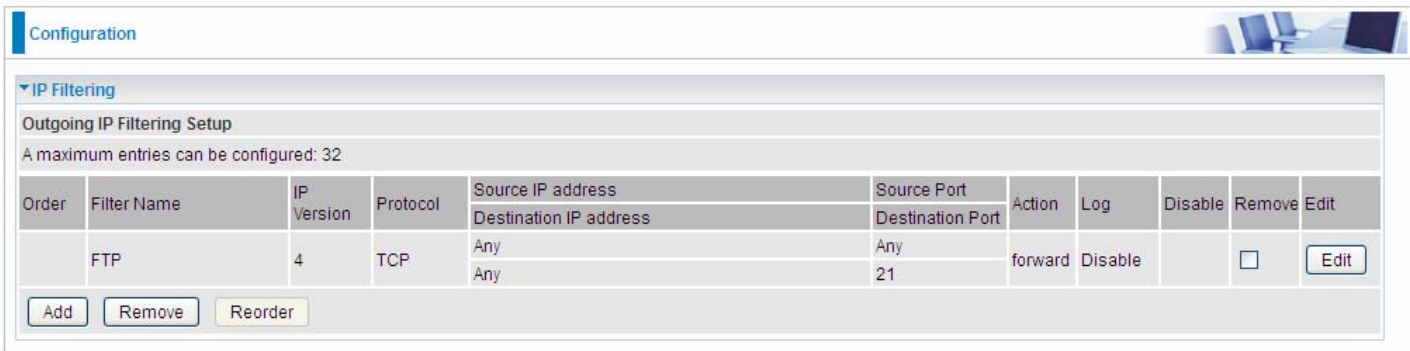
Source IP address: [] ~ [] Source Port: [] [port or port:port]

Destination IP address: [] ~ [] Destination Port: 21 [port or port:port]

Time Schedule: Always On Sun Mon Tue Wed Thu Fri Sat From 00 : 00 To 00 : 00

Action: forward Log:

Apply



Configuration

IP Filtering

Outgoing IP Filtering Setup

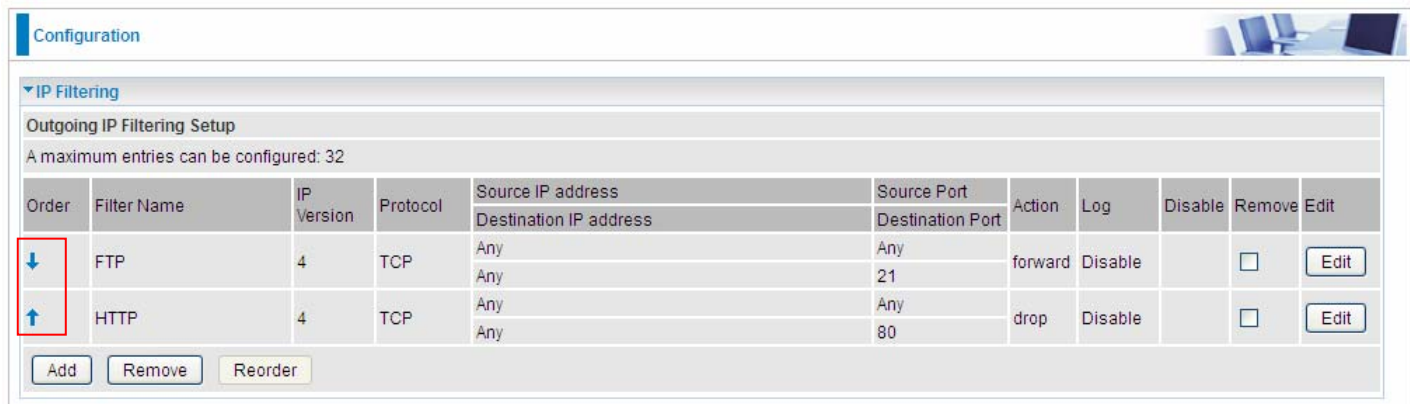
A maximum entries can be configured: 32

Order	Filter Name	IP Version	Protocol	Source IP address	Source Port	Action	Log	Disable	Remove	Edit
	FTP	4	TCP	Any	Any	forward	Disable	<input type="checkbox"/>	<input type="checkbox"/>	Edit

Add Remove Reorder

(The rule is active; disable field shows the status of the rule, active or inactive)

Add another Outgoing IP Filtering rule, users will find the “arrow” icon to change the IP outgoing filter rule working orders.



Configuration

IP Filtering

Outgoing IP Filtering Setup

A maximum entries can be configured: 32

Order	Filter Name	IP Version	Protocol	Source IP address	Source Port	Action	Log	Disable	Remove	Edit
↓	FTP	4	TCP	Any	Any	forward	Disable	<input type="checkbox"/>	<input type="checkbox"/>	Edit
↑	HTTP	4	TCP	Any	Any	drop	Disable	<input type="checkbox"/>	<input type="checkbox"/>	Edit

Add Remove Reorder

How to disable set rule.

Configuration

Outgoing IP Filtering Setup

Parameters

Filter Name	FTP	<< --type or select from listbox--
IP Version	IPv4	
Protocol	TCP	Protocol Number [0 - 254]
Source IP address		Source Port [port or port:port]
Destination IP address		Destination Port 21 [port or port:port]
Time Schedule	Disable	<input type="checkbox"/> Sun <input type="checkbox"/> Mon <input type="checkbox"/> Tue <input type="checkbox"/> Wed <input type="checkbox"/> Thu <input type="checkbox"/> Fri <input type="checkbox"/> Sat From 00 : 00 To 00 : 00
Action	forward	Log <input checked="" type="checkbox"/>

Apply

Configuration

IP Filtering

Outgoing IP Filtering Setup

A maximum entries can be configured: 32

Order	Filter Name	IP Version	Protocol	Source IP address	Source Port	Destination IP address	Destination Port	Action	Log	Disable	Remove	Edit
	FTP	4	TCP	Any	Any	Any	21	forward	Disable	<input checked="" type="checkbox"/>	<input type="checkbox"/>	Edit

Add Remove Reorder

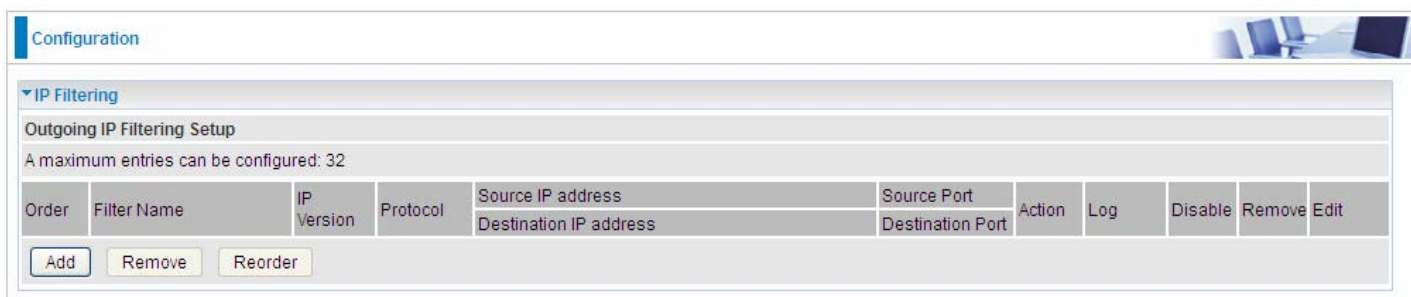
(Rule inactive)

IP Filtering Incoming

Incoming IP Filtering is set by default to **block** all incoming traffic, but user can set rules to **forward** the specific incoming traffic.

Note:

1. The maximum number of entries: 32.
2. When LAN side firewall or firewall in WAN interface(s) is enabled, user can move here to add allowing rules to pass through the firewall.



Configuration

IP Filtering

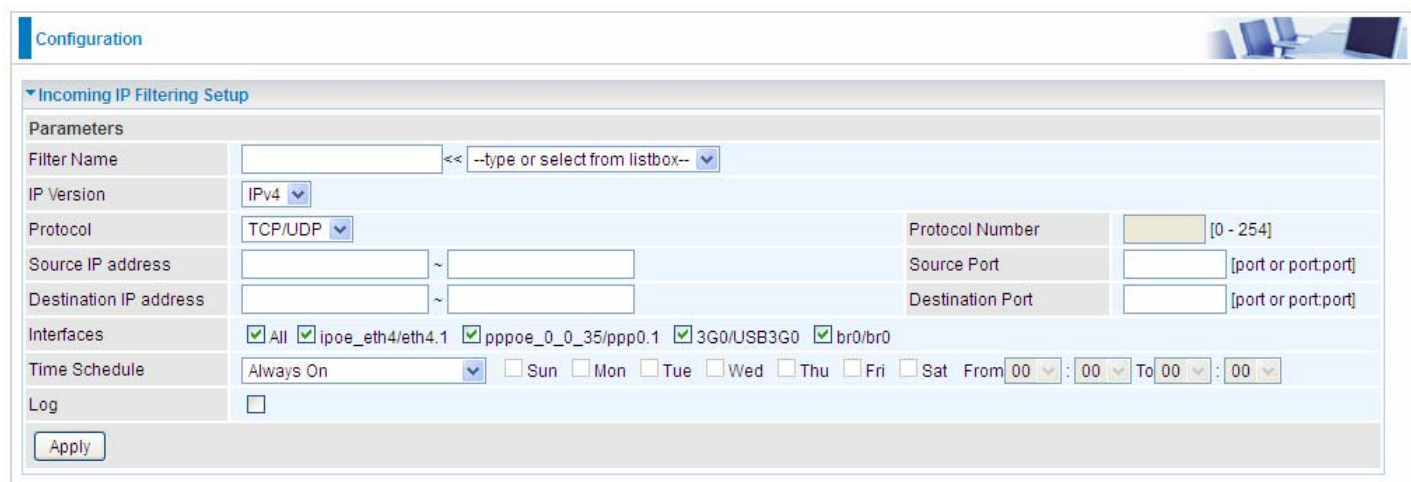
Outgoing IP Filtering Setup

A maximum entries can be configured: 32

Order	Filter Name	IP Version	Protocol	Source IP address	Destination IP address	Source Port	Destination Port	Action	Log	Disable	Remove	Edit
-------	-------------	------------	----------	-------------------	------------------------	-------------	------------------	--------	-----	---------	--------	------

Add Remove Reorder

Click **Add** button to enter the exact rule setting page.



Configuration

Incoming IP Filtering Setup

Parameters

Filter Name: [] << --type or select from listbox-- >>

IP Version: IPv4

Protocol: TCP/UDP Protocol Number: [] [0 - 254]

Source IP address: [] ~ [] Source Port: [] [port or port:port]

Destination IP address: [] ~ [] Destination Port: [] [port or port:port]

Interfaces: All ipoe_eth4/eth4.1 pppoe_0_0_35/ppp0.1 3G0/USB3G0 br0/br0

Time Schedule: Always On Sun Mon Tue Wed Thu Fri Sat From [00]:[00] To [00]:[00]

Log:

Apply

Filter Name: A user-defined rule name. User can select simply from the list box for the application for quick setup.

IP Version: Select the IP Version, IPv4 or IPv6.

Protocol: Set the traffic type (TCP/UDP, TCP, UDP, ICMP, RAW, Any) that the rule applies to.


Source IP address: This is the Address-Filter used to allow or block traffic to/from particular IP address(es) featured in the IP range.. If you leave empty, it means any IP address.

Source Port [port or port:port]: The port or port range defines traffic from the port (specific application) or port in the set port range blocked to go through the router. Default is set port from range 1 – 65535.

Destination IP address: Traffic from LAN with the particular traffic destination address specified in the IP range is to be blocked from going through the router, similarly set as the Source IP address above.

Destination Port [port or port : port]: Traffic with the particular set destination port or port in the set port range is to be blocked from going through the router. Default is set port from port range: 1 – 65535

Interfaces: Check if the filter rule applies to all interfaces. User can base on need select interfaces to make the rule take effect with those interfaces.

Time Schedule: Select or set exactly when the rule works. When set to “Always On”, the rule will work all time; and also you can set the precise time when the rule works, like 01:00 - 19:00 from Monday to Friday. Or you can select the already set timeslot in “**Time Schedule**” during which the rule works. And when set to “Disable”, the rule is disabled or inactive and there will be an icon”  ” in the list table indicating the rule is inactive. See [Time Schedule](#).

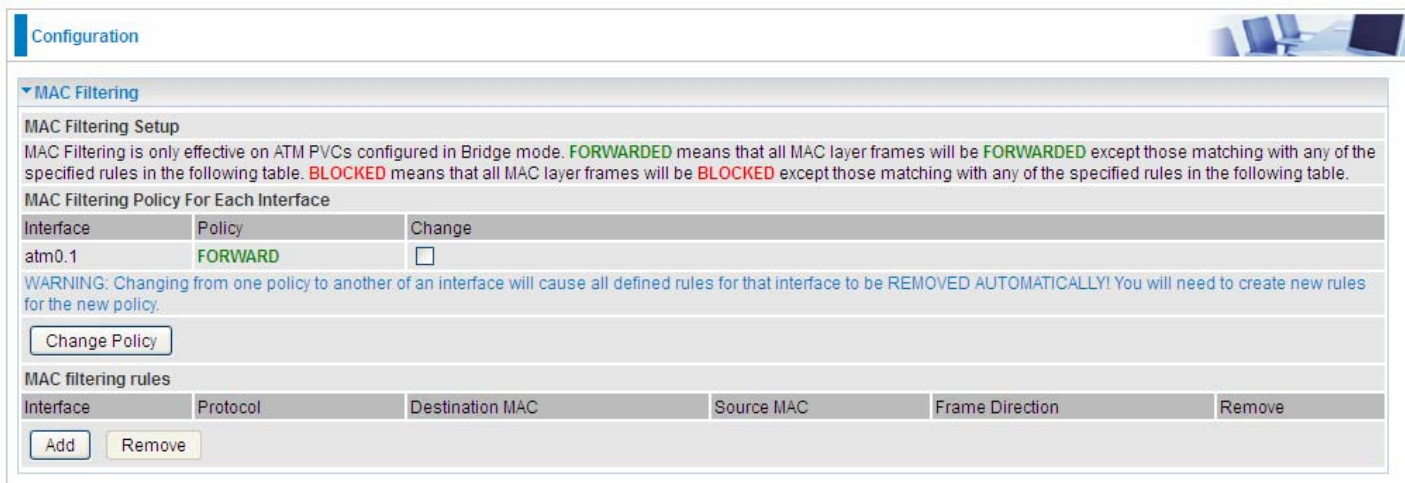
Log: check the check-box to record the security log. To check the log, users can turn to [Security Log](#).

MAC Filtering

MAC Filtering is only effective on ATM PVCs configured in Bridged mode.

FORWARDED means that all MAC layer frames will be **forwarded** except those matching with any of the specified rules in the following table.

BLOCKED means that all MAC layer frames will be **blocked** except those matching with any of the specified rules in the following table.

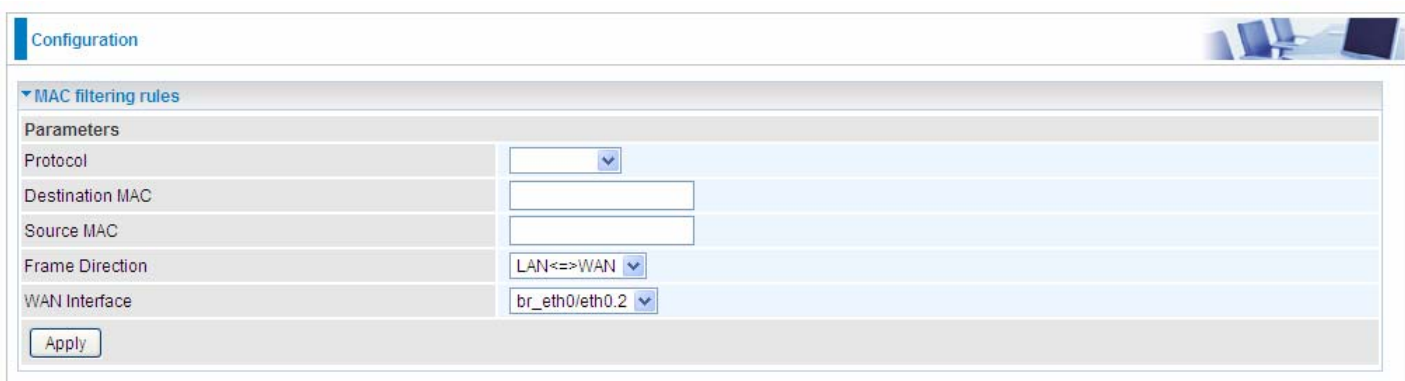


The screenshot shows the 'Configuration' page with the 'MAC Filtering' section expanded. It includes a 'MAC Filtering Setup' section with explanatory text and a 'MAC Filtering Policy For Each Interface' table. The table has columns for 'Interface', 'Policy', and 'Change'. The 'atm0.1' interface is currently set to 'FORWARD' with an unchecked 'Change' checkbox. A warning message states: 'WARNING: Changing from one policy to another of an interface will cause all defined rules for that interface to be REMOVED AUTOMATICALLY! You will need to create new rules for the new policy.' Below the table is a 'Change Policy' button. At the bottom, there is a section for 'MAC filtering rules' with columns for 'Interface', 'Protocol', 'Destination MAC', 'Source MAC', 'Frame Direction', and 'Remove', along with 'Add' and 'Remove' buttons.

By default, all MAC frames of the interface in Bridge Mode will be **forwarded**, you can check **Change** checkbox and then press **Change Policy** to change the settings to the interface.

For example, from above, the interface atm0.1 is of bridge mode, and all the MAC layer frames will be **forward**, but you can set some rules to let some item matched the rules to be **blocked**.

Click **Add** button to add the rules.



The screenshot shows the 'Configuration' page with the 'MAC filtering rules' section expanded. It displays a 'Parameters' section with the following fields: 'Protocol' (a dropdown menu), 'Destination MAC' (a text input field), 'Source MAC' (a text input field), 'Frame Direction' (a dropdown menu with 'LAN<=>WAN' selected), and 'WAN Interface' (a dropdown menu with 'br_eth0/eth0.2' selected). An 'Apply' button is located at the bottom of the configuration area.

Protocol type: Select from the drop-down menu the protocol that applies to this rule.

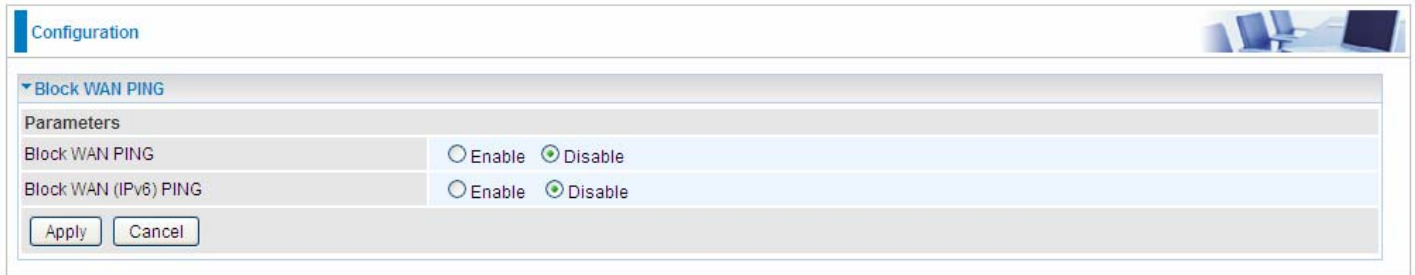
Destination /Source MAC Address: Enter the destination/source address.

Frame Direction: Select the frame direction this rule applies, both LAN and WAN: LAN <=>WAN, only LAN to WAN: LAN=>WAN, only WAN to LAN: WAN=>LAN.

WAN Interfaces: Select the interfaces configured in Bridge mode.

Blocking WAN PING

This feature is enabled to let your router not respond to any ping command when someone others “Ping” your WAN IP.



The screenshot shows a configuration interface for a router. At the top left, there is a blue header with the word "Configuration". Below this, a section titled "Block WAN PING" is expanded, showing a "Parameters" table. The table has two rows: "Block WAN PING" and "Block WAN (IPv6) PING". Each row has two radio button options: "Enable" and "Disable". In both rows, the "Disable" option is selected. At the bottom of the configuration area, there are two buttons: "Apply" and "Cancel".

Parameters	
Block WAN PING	<input type="radio"/> Enable <input checked="" type="radio"/> Disable
Block WAN (IPv6) PING	<input type="radio"/> Enable <input checked="" type="radio"/> Disable

Apply Cancel

Time Restriction

A MAC (Media Access Control) address is the unique network hardware identifier for each PC on your network's interface (i.e. its Network Interface Card or Ethernet card). Using your router's MAC Address Filter function, you can configure the network to block specific machines from accessing your LAN during the specified time.

This page adds time of day restriction to a special LAN device connected to the router. Please click Add button to add the device(s) to be subject to Time Restriction rules (forward or drop connection to internet). Devices Not added will not comply with the rules and access internet and router willingly.

To find out the MAC address of a window based PC, go to command window, and type "ipconfig/all".

Note: The maximum entries configured: 32.



Configuration

Time Restriction

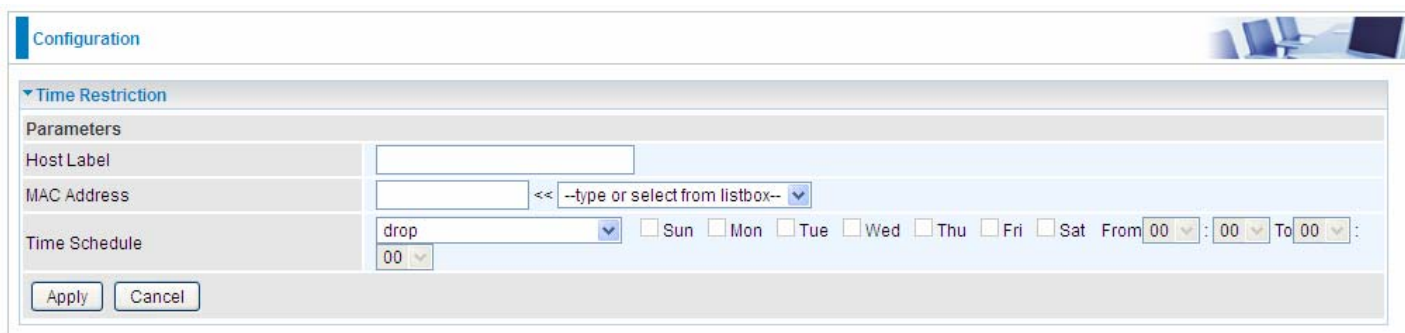
Access Time Restriction

A maximum entries can be configured: 32

Host Label	MAC Address	Mon	Tue	Wed	Thu	Fri	Sat	Sun	Start Time	End Time	Remove	Edit
------------	-------------	-----	-----	-----	-----	-----	-----	-----	------------	----------	--------	------

Add Remove

Click **Add** to add the rules.



Configuration

Time Restriction

Parameters

Host Label

MAC Address

Time Schedule

drop

Sun Mon Tue Wed Thu Fri Sat

From 00:00 To 00:00

Apply Cancel

Host Label: User-defined name.

MAC Address: Enter the MAC address(es) you want to allow or block to access the router and LAN. The format of MAC address could be: xx:xx:xx:xx:xx:xx or xx-xx-xx-xx-xx-xx. For convenience, user can select from the list box.

Time Schedule: Configure to control the PC from accessing router and internet.

- ① **Drop:** To drop the MAC entries always; in other words, the MACs are blocked access to router and internet always.
- ① **Forward:** To forward the MAC entries always; in other words, the MACs are granted access to the router and internet always.
- ① **Check or select from listbox:** To set the time duration during which the MACs are blocked from access the router and internet. "**select from listbox**" means that you can select the already set timeslot in "**Time Schedule**" section during which the MACs are blocked from access the router and internet.

Click **Apply** to confirm your settings. The following prompt window will appear to remind you of the attention.

An example:

The screenshot shows a configuration page titled "Configuration" with a sub-section "Time Restriction". Under "Access Time Restriction", it states "A maximum entries can be configured: 32". Below this is a table with columns for Host Label, MAC Address, and days of the week (Sun, Mon, Tue, Wed, Thu, Fri, Sat), along with Start Time, End Time, and actions (Remove, Edit). Two entries are listed: "test" with MAC 18:a9:05:38:04:03 and "forward" restriction, and "child-use" with MAC 18:a9:05:04:12:23 and a restriction from 00:00 to 23:59 Monday through Friday. Red circles highlight the "Remove" checkboxes for both entries and the "Remove" button at the bottom left.

Host Label	MAC Address	Sun	Mon	Tue	Wed	Thu	Fri	Sat	Start Time	End Time	Remove	Edit	
test	18:a9:05:38:04:03	forward										<input type="checkbox"/>	Edit
child-use	18:a9:05:04:12:23		x	x	x	x	x		00:00	23:59	<input type="checkbox"/>	Edit	

Buttons: Add, Remove

Here you can see that the user “child-use” with a MAC of 18:a9:05:04:12:23 is blocked to access the router from 00:00 to 23:59 Monday through Friday. The “test” can access the internet always.

If you needn't this rule, you can check the box, press Remove, it will be OK.

URL Filter

URL (Uniform Resource Locator – e.g. an address in the form of <http://www.abcde.com> or <http://www.example.com>) filter rules allow you to prevent users on your network from accessing particular websites by their URL. There are no pre-defined URL filter rules; you can add filter rules to meet your requirements.

Note:

- 1) URL Filter rules apply to both IPv4 and IPv6 sources.
- 2) But in **Exception IP Address** part, user can click [Detail ▶](#) to set the exception IP address(es) for IPv4 and IPv6 respectively.

Parameters	
Keywords Filtering	<input type="checkbox"/> Enable Detail ▶
Domains Filtering	<input type="checkbox"/> Enable Detail ▶
Restrict URL Features	BLOCK <input type="checkbox"/> Java Applet <input type="checkbox"/> ActiveX <input type="checkbox"/> Cookie <input type="checkbox"/> Proxy
Except IP Address	Detail ▶
Log	<input type="checkbox"/>
Time Schedule	Always On <input type="checkbox"/> Sun <input type="checkbox"/> Mon <input type="checkbox"/> Tue <input type="checkbox"/> Wed <input type="checkbox"/> Thu <input type="checkbox"/> Fri <input type="checkbox"/> Sat From <input type="text" value="00"/> : <input type="text" value="00"/> To <input type="text" value="00"/> : <input type="text" value="00"/>

Keywords Filtering: Allow blocking against specific keywords within a particular URL rather than having to specify a complete URL (e.g. to block any image called “advertisement.gif”). When enabled, your specified keywords list will be checked to see if any keywords are present in URLs accessed to determine if the connection attempt should be blocked. Please note that the URL filter blocks web browser (HTTP) connection attempts using port 80 only.

Domains Filtering: This function checks the whole URL address but not the IP address against your list of domains to block or allow. If it is matched, the URL request will either be sent (Trusted) or dropped (Forbidden).

Restrict URL Features: Click Block Java Applet to filter web access with Java Applet components. Click Block ActiveX to filter web access with ActiveX components. Click Block Cookie to filter web access with Cookie components. Click Block Proxy to filter web proxy access.

Exception IP Address: You can input a list of IP addresses as the exception list for URL filtering. These IPs will not be covered by the URL rules.

Time Schedule: Select or set exactly when the rule works. When set to “Always On”, the rule will work all time; and also you can set the precise time when the rule works, like 01:00 - 19:00 from Monday to Friday. Or you can select the already set timeslot in “**Time Schedule**” during which the rule works. And when set to “Disable”, the rule is disabled. See [Time Schedule](#).

Log: Select Enable for this option if you will like to capture the logs for this URL filter policy. To check the log, users can turn to [Security Log](#).

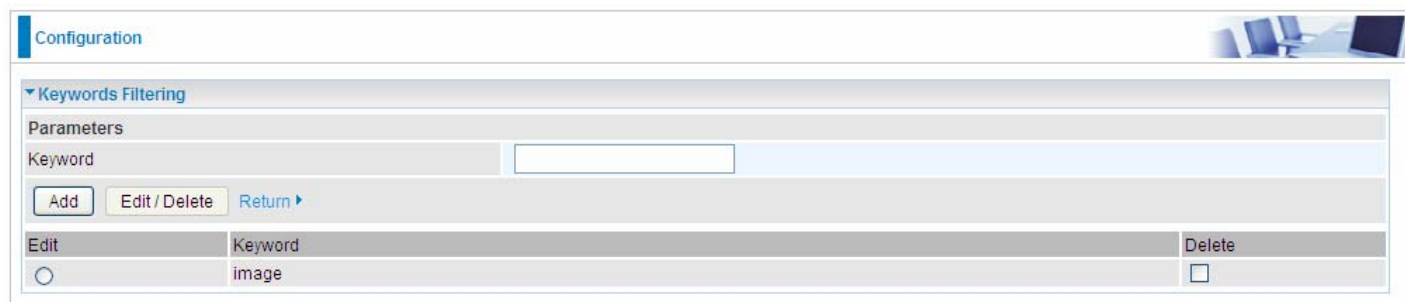
Keywords Filtering

Note: Maximum number of entries: 32.

Click [Detail ▶](#) to add the keywords.



Enter the Keyword, for example image, and then click **Add**.




Edit	Keyword	Delete
<input type="radio"/>	image	<input type="checkbox"/>

You can add other keywords like this. The keywords you add will be listed as above. If you want to reedit the keyword, press the Edit radio button left beside the item, and the word will listed in the Keyword field, edit, and then press **Edit/Delete** to confirm. If you want to delete certain keyword, check Delete checkbox right beside the item, and press **Edit/Delete**. Click **Return** to be back to the previous page.

Domain Filtering

Note: Maximum number of entries: 32.

Click [Detail ▶](#) to add Domains.



Domain Filtering: enter the domain you want this filter to apply.

Type: select the action this filter deals with the Domain.

- ① **Forbidden Domain:** The domain is forbidden access.
- ① **Trusted Domain:** The domain is trusted and allowed access.

Enter a domain and select whether this domain is trusted or forbidden with the pull-down menu. Next, click **Add**. Your new domain will be added to either the Trusted Domain or Forbidden Domain listing, depending on which you selected previously. For specific process, please refer to **Keywords**

Filtering.

Exception IP Address

In the section, users can set the exception IP respectively for IPv4 and IPv6.

Click [Detail ▶](#) to add the IP Addresses.



The screenshot shows a web interface for configuring exception IP addresses. At the top, there is a 'Configuration' header. Below it, a section titled 'Except IP Address' is expanded. Under the 'Parameters' heading, there are two main fields: 'IP Version' and 'Internal IP Address'. The 'IP Version' dropdown menu is currently set to 'IPv4'. The 'Internal IP Address' field consists of two text input boxes separated by a tilde (~) symbol, indicating a range of addresses. At the bottom of this section, there are three buttons: 'Add', 'Edit / Delete', and 'Return ▶'.

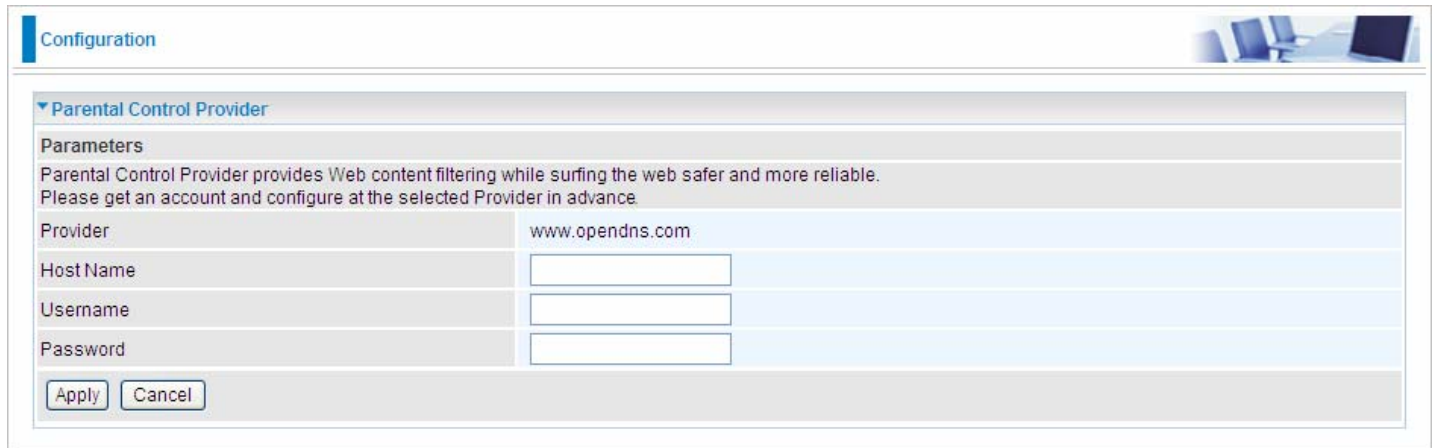
Enter the except IP address. Click **Add** to save your changes. The IP address will be entered into the **Exception List**, and excluded from the URL filtering rules in effect. For specific process, please refer to **Keywords Filtering**.

For example, users can set IPv4 client 192.168.1.103 in your network as a exception address that is not limited to the rules set in URL filter (or IPv4 clients (a range)). And also an IPv6 client (2000:1211:1002:6ba4:d160:5adb:9009:87ae) or IPv6 clients(a range) can be the exceptions from the URL rules.

At the URL Filter page, press **Apply** to confirm your settings.

Parental Control Provider

Parental Control Provider provides Web content filtering offering safer and more reliable web surfing for users. Please get an account and configure at the selected Provider “www.opendns.com” in advance. To use parental control (DNS), user needs to configure to use parental control (DNS provided by parental control provider) to access internet at WAN configuration or DNS page(See [DNS](#)).



The screenshot shows a configuration window titled "Configuration" with a sub-section for "Parental Control Provider". Under "Parameters", there is a descriptive text: "Parental Control Provider provides Web content filtering while surfing the web safer and more reliable. Please get an account and configure at the selected Provider in advance." Below this, there are four input fields: "Provider" (pre-filled with "www.opendns.com"), "Host Name", "Username", and "Password". At the bottom left, there are "Apply" and "Cancel" buttons.

Parental Control Provider	
Parameters	
Parental Control Provider provides Web content filtering while surfing the web safer and more reliable. Please get an account and configure at the selected Provider in advance.	
Provider	www.opendns.com
Host Name	<input type="text"/>
Username	<input type="text"/>
Password	<input type="password"/>
<input type="button" value="Apply"/> <input type="button" value="Cancel"/>	

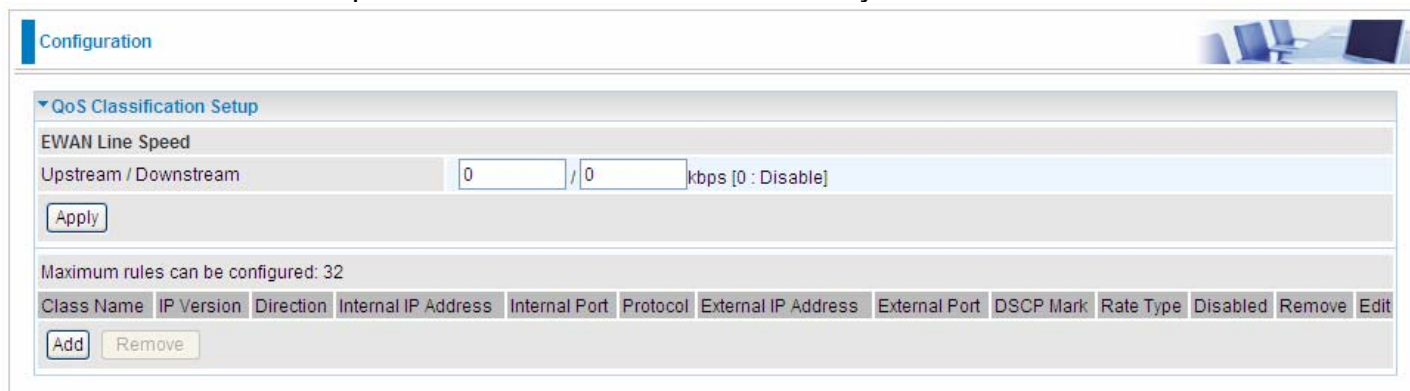
Host Name, Username and Password: Enter your registered domain name and your username and password at the provider website www.opendns.com.

QoS - Quality of Service

Quality of Service

QoS helps you to control the data upload traffic of each application from LAN (Ethernet) to WAN (Internet). This feature allows you to control the quality and speed of throughput for each application when the system is running with full upstream load.

Note: VDSL/ADSL line speed is based on the VDSL/ADSL sync rate.

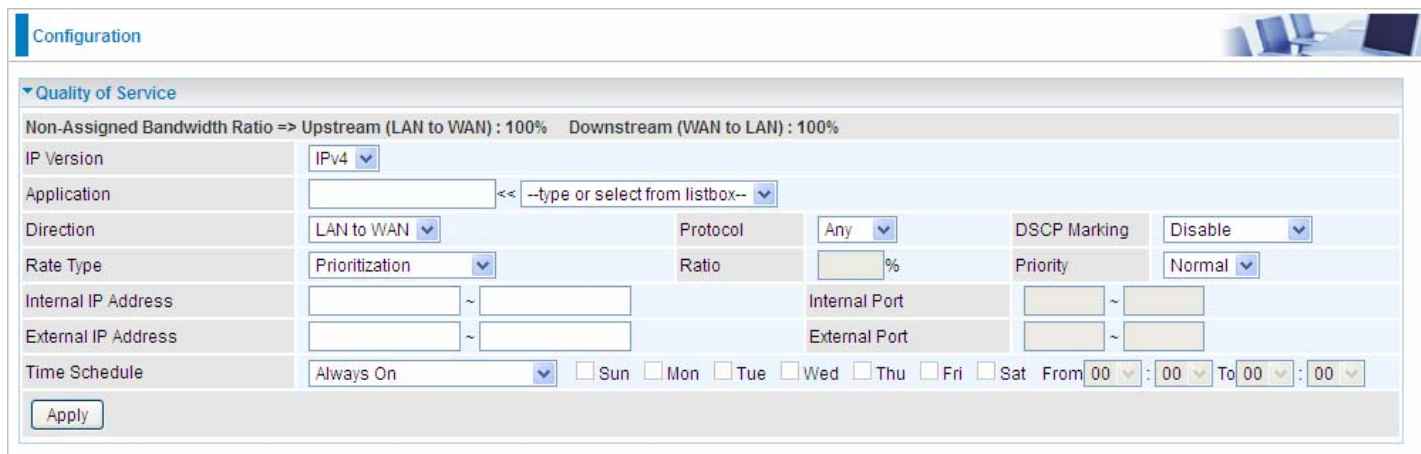


The screenshot shows the 'Configuration' page for 'QoS Classification Setup'. It features a section for 'EWAN Line Speed' with input fields for 'Upstream / Downstream' rates in kbps, currently set to 0/0. Below this is an 'Apply' button. A note states 'Maximum rules can be configured: 32'. At the bottom, there is a table with columns: Class Name, IP Version, Direction, Internal IP Address, Internal Port, Protocol, External IP Address, External Port, DSCP Mark, Rate Type, Disabled, Remove, and Edit. There are 'Add' and 'Remove' buttons below the table.

EWAN Line Speed

Upstream / Downstream: Specify the upstream and downstream rate of the EWAN interface. Click **Apply** to save the EWAN rate settings.

Click **Add** to enter QoS rules.



The screenshot shows the 'Configuration' page for 'Quality of Service'. It displays 'Non-Assigned Bandwidth Ratio => Upstream (LAN to WAN) : 100% Downstream (WAN to LAN) : 100%'. The configuration includes fields for IP Version (IPv4), Application (with a dropdown for '--type or select from listbox--'), Direction (LAN to WAN), Protocol (Any), DSCP Marking (Disable), Rate Type (Prioritization), Ratio (%), Priority (Normal), Internal IP Address, Internal Port, External IP Address, External Port, and Time Schedule (Always On, with checkboxes for days of the week and a time range). An 'Apply' button is at the bottom.

IP Version: Select either IPv4 or IPv6 base on need.

Application: Assign a name that identifies the new QoS application rule. Select from the list box for quick setup.

Direction: Shows the direction mode of the QoS application.

- ① **LAN to WAN:** You want to control the traffic from local network to the outside (Upstream). You can assign the priority for the application or you can limit the rate of the application.
Eg: you have a FTP server inside the local network, and you want to have a limited control by the QoS policy and so you need to add a policy with LAN to WAN direction setting.
- ① **WAN to LAN:** Control traffic from WAN to LAN (Downstream).

Protocol: Select the supported protocol from the drop down list.

DSCP Marking: Differentiated Services Code Point (DSCP), it is the first 6 bits in the ToS byte.

DSCP Marking allows users to classify the traffic of the application to be executed according to the DSCP value.

IP Precedence and DSCP Mapping Table

Mapping Table	
Default (000000)	Best Effort
EF(101110)	Expedited Forwarding
AF11 (001010)	Assured Forwarding Class1(L)
AF12 (001100)	Assured Forwarding Class1(M)
AF13 (001110)	Assured Forwarding Class1(H)
AF21 (010010)	Assured Forwarding Class1(L)
AF22 (010100)	Assured Forwarding Class1(M)
AF23 (010110)	Assured Forwarding Class1(H)
AF31 (011010)	Assured Forwarding Class1(L)
AF32 (011100)	Assured Forwarding Class1(M)
AF33 (011110)	Assured Forwarding Class1(H)
AF41 (100010)	Assured Forwarding Class1(L)
AF42 (100100)	Assured Forwarding Class1(M)
AF43 (100110)	Assured Forwarding Class1(H)
CS1(001000)	Class Selector(IP precedence)1
CS2(010000)	Class Selector(IP precedence) 2
CS3(011000)	Class Selector(IP precedence)3
CS4(100000)	Class Selector(IP precedence) 4
CS5(101000)	Class Selector(IP precedence) 5
CS6(110000)	Class Selector(IP precedence) 6
CS7(111000)	Class Selector(IP precedence) 7

DSCP offers three levels of service, Class Selector (CS), Assured Forwarding (AF) and Expedited Forwarding (EF). AF1, AF2, AF3 and AF4 are four levels of assured forwarding services. Each AF has three different packet loss priorities from high, medium, to low. Also, CS1-CS7 indicates the IP precedence.

Rate Type: You can choose *Limited* or *Prioritization*.

- ① **Limited (Maximum):** Specify a limited data rate for this policy. It also is the maximum rate for this policy. When you choose *Limited*, type the *Ratio* proportion. As above FTP server example, you may want to “throttle” the outgoing FTP speed to 20% of 256K and limit to it, you may use this type.
- ① **Prioritization:** Specify the rate type control for the rule to be used. If you choose *Prioritization* for the rule, you parameter *Priority* would be available, you can set the priority for this rule.
- ① **Set DSCP Marking:** When select *Set DSCP Marking*, the packets matching the rule will be forwarded according to the pre-set DSCP marking.

Ratio: The rate percent of each application/policy compared to total traffic on the interface with limited rate type. For example, we want to only allow 20% of the total data for the LAN-to-WAN direction to be used for FTP server. Then we can specify here with data ratio = 20. If you have ADSL LINE with 256K/bps.rate, the estimated data rate, in kbps, for this rule is $20\% * 256 * 0.9 = 46\text{kbps}$. (For 0.9 is an estimated factor for the effective data transfer rate for an ADSL LINE from LAN to WAN. For WAN-to-LAN, it is 0.85 to 0.8)

Priority: Set the priority given to each policy/application. Specify the priority for the use of bandwidth. You can specify which application can have higher priority to acquire the bandwidth. Its default setting is set to Normal. You may adjust this setting to fit your policy / application.


Internal IP Address: The IP address values for Local LAN devices you want to give control.

Internal Port: The Port number on the LAN side, it is used to identify an application.

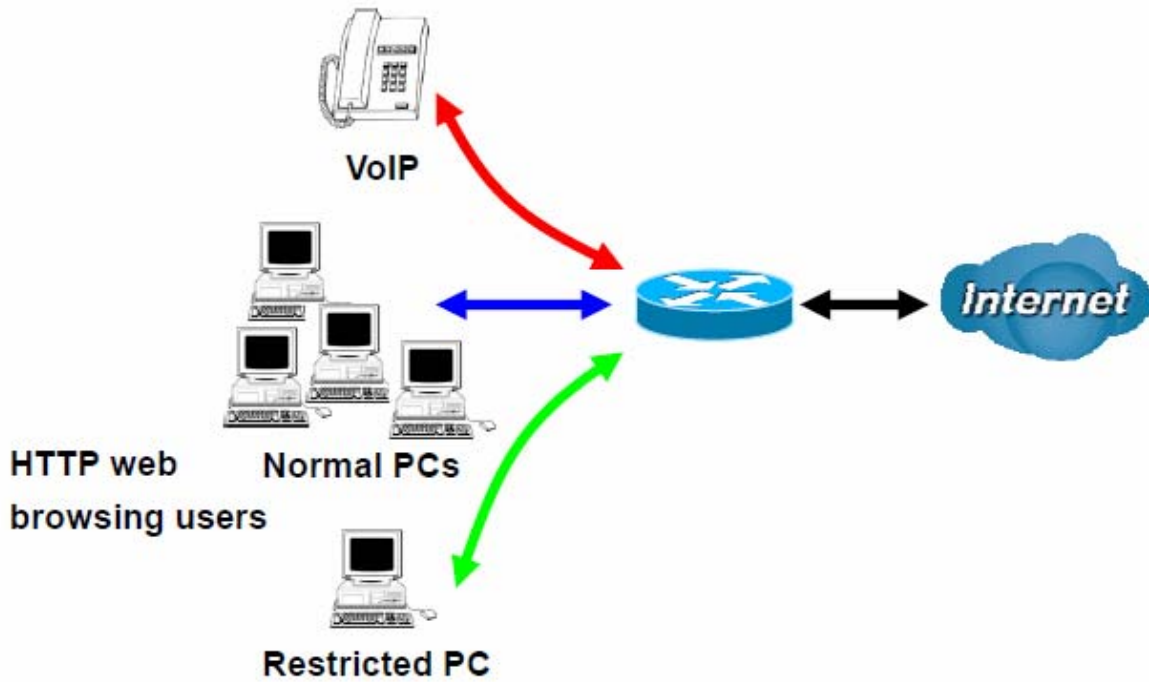
External IP Address: The IP address on remote / WAN side.

External Port: The Port number on the remote / WAN side.

Time Schedule: Select or set exactly when the rule works. When set to “Always On”, the rule will work all time; and also you can set the precise time when the rule works, like 01:00 - 19:00 from Monday to Friday. Or you can select the already set timeslot in “**Time Schedule**” during which the rule works. And when set to “Disable”, the rule is disabled or inactive and there will be an icon”

 ” indicating the rule is inactive. See [Time Schedule](#).

Examples: Common usage



1. Give outgoing VoIP traffic more priority.

The default queue priority is normal, so if you have VoIP users in your local network, you can set a higher priority to the outgoing VoIP traffic.

Configuration

Quality of Service

Non-Assigned Bandwidth Ratio => Upstream (LAN to WAN) : 100% Downstream (WAN to LAN) : 100%

IP Version	IPv4	Application	Voip	Direction	LAN to WAN	Protocol	Any	DSCP Marking	EF(101110)
Rate Type	Prioritization	Ratio	%	Priority	High	Internal IP Address	~	Internal Port	~
External IP Address	~	External Port	~	Time Schedule	timeslot1	<input type="checkbox"/> Sun <input checked="" type="checkbox"/> Mon <input checked="" type="checkbox"/> Tue <input checked="" type="checkbox"/> Wed <input checked="" type="checkbox"/> Thu <input checked="" type="checkbox"/> Fri <input type="checkbox"/> Sat	From 00 : 00 To 09 : 19		

Apply

2. Give regular web http access a limited rate

Configuration

Quality of Service

Non-Assigned Bandwidth Ratio => Upstream (LAN to WAN) : 100% Downstream (WAN to LAN) : 100%

IP Version	IPv4	Application	HTTP	Direction	LAN to WAN	Protocol	TCP	DSCP Marking	Disable
Rate Type	Limited (Maximum)	Ratio	20 %	Priority	Normal	Internal IP Address	~	Internal Port	~
External IP Address	~	External Port	80 ~ 80	Time Schedule	timeslot1	<input type="checkbox"/> Sun <input checked="" type="checkbox"/> Mon <input checked="" type="checkbox"/> Tue <input checked="" type="checkbox"/> Wed <input checked="" type="checkbox"/> Thu <input checked="" type="checkbox"/> Fri <input type="checkbox"/> Sat	From 00 : 00 To 09 : 19		

Apply

3. If you are actively engaged in P2P and are afraid of slowing down internet access for other users within your network, you can then use QoS to set a rule that has low priority. In this way, P2P application will not congest the data transmission with other applications.

Configuration

Quality of Service

Non-Assigned Bandwidth Ratio => Upstream (LAN to WAN) : 80% Downstream (WAN to LAN) : 100%

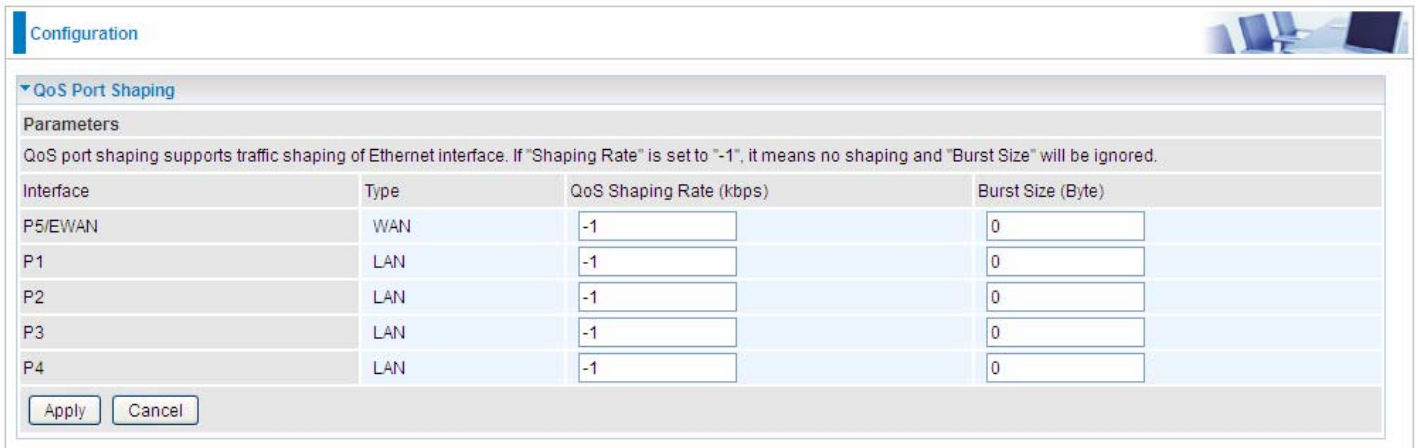
IP Version	IPv4								
Application	P2P	<< --type or select from listbox--							
Direction	LAN to WAN	Protocol	Any	DSCP Marking	Disable				
Rate Type	Prioritization	Ratio	%	Priority	Low				
Internal IP Address		Internal Port							
External IP Address		External Port							
Time Schedule	timeslot1	<input type="checkbox"/> Sun	<input checked="" type="checkbox"/> Mon	<input checked="" type="checkbox"/> Tue	<input checked="" type="checkbox"/> Wed	<input checked="" type="checkbox"/> Thu	<input checked="" type="checkbox"/> Fri	<input type="checkbox"/> Sat	From 00 : 00 To 09 : 19

Apply

Other applications, like FTP, Mail access, users can use QoS to control based on need.

QoS Port Shaping

QoS port shaping supports traffic shaping of Ethernet interfaces. It forcefully maximizes the throughput of the Ethernet interface. When “Shaping Rate” is set to “-1”, no shaping will be in place and the “Burst Size” is to be ignored.



Configuration

QoS Port Shaping

Parameters

QoS port shaping supports traffic shaping of Ethernet interface. If "Shaping Rate" is set to "-1", it means no shaping and "Burst Size" will be ignored.

Interface	Type	QoS Shaping Rate (kbps)	Burst Size (Byte)
P5/EWAN	WAN	-1	0
P1	LAN	-1	0
P2	LAN	-1	0
P3	LAN	-1	0
P4	LAN	-1	0

Apply Cancel

Interface: P1-P5. P5 used as EWAN also covered.

Type: All LAN when P4 is LAN port; P4 used as EWAN, type WAN and all others LAN.

QoS Shaping Rate (Kbps): Set the forcefully maximum rate.

Burst Size(Bytes): Set the forcefully Burst Size.

NAT

NAT (Network Address Translation) feature translates a private IP to a public IP, allowing multiple users to access the Internet through a single IP account, sharing the single IP address. It is a natural firewall for the private network.

Exceptional Rule Group

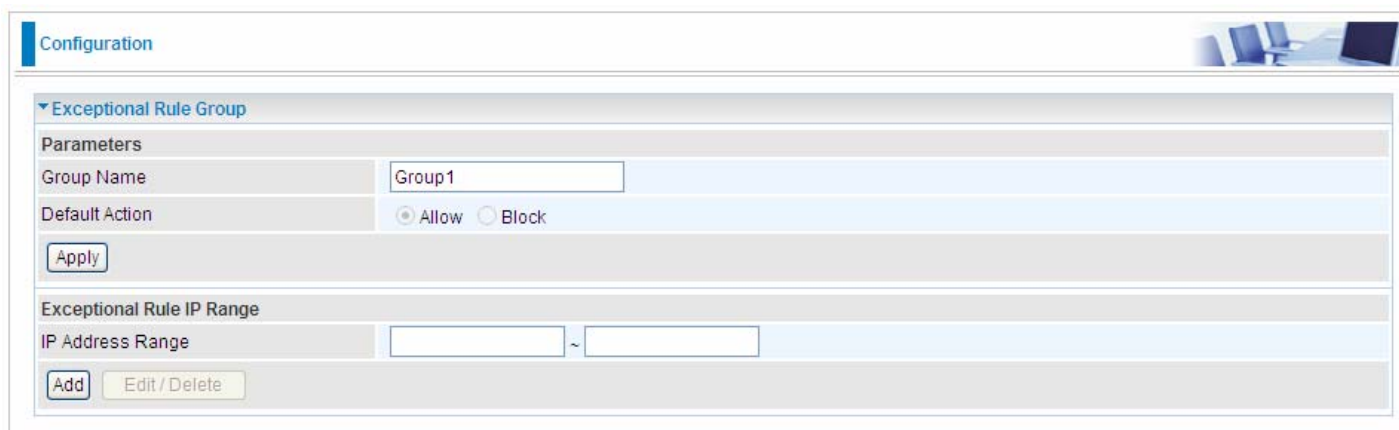
Exceptional Rule is dedicated to giving or blocking NAT/DMZ access to some specific IP or IPs(range). Users are allowed to set 8 different exceptional rule groups at most. In each group, user can add specific IP or IP range.



The screenshot shows a web interface for configuring Exceptional Rule Groups. At the top, there is a 'Configuration' tab and a small image of a computer desk. Below this is a section titled 'Exceptional Rule Group' with a dropdown arrow. Underneath is a table with the following columns: Group Index, Group Name, Default Action, Exceptional Rule IP Range, and Edit. There are 8 rows, each representing a group from Group1 to Group8, all with a Default Action of 'Allow'. Each row has an 'Edit' button in the 'Edit' column.

Group Index	Group Name	Default Action	Exceptional Rule IP Range	Edit
1	Group1	Allow		Edit
2	Group2	Allow		Edit
3	Group3	Allow		Edit
4	Group4	Allow		Edit
5	Group5	Allow		Edit
6	Group6	Allow		Edit
7	Group7	Allow		Edit
8	Group8	Allow		Edit

Press **Edit** to set the exceptional IP (IP Range).



The screenshot shows the configuration form for an Exceptional Rule Group. It has a 'Configuration' tab and a small image of a computer desk. The form is titled 'Exceptional Rule Group' and has a dropdown arrow. Underneath is a section titled 'Parameters' with the following fields: Group Name (text input with 'Group1'), Default Action (radio buttons for 'Allow' and 'Block', with 'Allow' selected), and an 'Apply' button. Below this is a section titled 'Exceptional Rule IP Range' with the following fields: IP Address Range (text input with a tilde separator), an 'Add' button, and an 'Edit / Delete' button.

Default Action: Please first set the range to make “**Default Action**” setting available. Select “Allow” to grant access to the listed IP or IPs to Virtual Server and DMZ Host.

While choose “Block” to ban the listed IP or IPs to access the Virtual Server and DMZ Host.

Apply: Press **Apply** button to apply the change.

Exceptional Rule Range

IP Address Range: Specify the IP address range; IPv4 address range can be supported.

Click **Add** to add the IP Range.

For instance, if user wants block IP range of 172.16.1.102-172.16.1.106 from accessing your set virtual server and DMZ host, you can add this IP range and valid it.

Configuration

▼ Exceptional Rule Group

Parameters

Group Name:

Default Action: Allow Block

Exceptional Rule IP Range

IP Address Range: ~

Edit	Action	IP Address Range	Delete
<input type="radio"/>	Block	172.16.1.102 ~ 172.16.1.106	<input type="checkbox"/>

Virtual Servers

In TCP/IP and UDP networks a port is a 16-bit number used to identify which application program (usually a server) incoming connections should be delivered to. Some ports have numbers that are pre-assigned to them by the IANA (the Internet Assigned Numbers Authority), and these are referred to as “well-known ports”. Servers follow the well-known port assignments so clients can locate them.

If you wish to run a server on your network that can be accessed from the WAN (i.e. from other machines on the Internet that are outside your local network), or any application that can accept incoming connections (e.g. Peer-to-peer/P2P software such as instant messaging applications and P2P file-sharing applications) and are using NAT (Network Address Translation), then you will usually need to configure your router to forward these incoming connection attempts using specific ports to the PC on your network running the application. You will also need to use port forwarding if you want to host an online game server.

The reason for this is that when using NAT, your publicly accessible IP address will be used by and point to your router, which then needs to deliver all traffic to the private IP addresses used by your PCs. Please see the **WAN** configuration section of this manual for more information on NAT.

The device can be configured as a virtual server so that remote users accessing services such as Web or FTP services via the public (WAN) IP address can be automatically redirected to local servers in the LAN network. Depending on the requested service (TCP/UDP port number), the device redirects the external service request to the appropriate server within the LAN network.

This part is only available when NAT is enabled.

Note: The maximum number of entries: 64.

Configuration

▼ Virtual Servers

Virtual Servers Setup

Server Name	External Port		Protocol	Internal Port		Server IP Address	WAN Interface	Disabled	Remove	Edit
	Start	End		Start	End					
<input type="button" value="Add"/> <input type="button" value="Remove"/>										

It is virtual server listing table as you see, Click **Add** to move on.

The following configuration page will appear to let you configure.

Interface: Select from the drop-down menu the interface you want the virtual server(s) to apply.

WAN IP: To specify the exact WAN IP address. It can be flexible while there are multiple WAN IPs on one interface. If the WAN IP field is empty, 8920AX(L) uses the current WAN IP of this interface.

Server Name: Select the server name from the drop-down menu.

Custom Service: It is a kind of service to let users customize the service they want. Enter the user-defined service name here. It is a parameter only available when users select **Custom Service** in the above parameter.

Server IP Address: Enter your server IP Address here. User can select from the list box for quick setup.


External Port

- ① **Start:** Enter a port number as the external starting number for the range you want to give access to internal network.
- ① **End:** Enter a port number as the external ending number for the range you want to give access to internal network.

Internal Port

- ① **Start:** Enter a port number as the internal starting number.
- ① **End:** Here it will generate automatically according to the End port number of External port and can't be modified.

Protocol: select the protocol this service used: TCP/UDP, TCP, UDP.

Time Schedule: Select or set exactly when the Virtual Server works. When set to "Always On", the Virtual Server will work all time; and also you can set the precise time when Virtual Server works, like 01:00 - 19:00 from Monday to Friday. Or you can select the already set timeslot in **Time Schedule** during which the Virtual Server works. And when set to "Disable", the rule is disabled and there will be an icon  in the list table indicating the rule is disabled. See [Time Schedule](#).

Exceptional Rule Group: Select the exceptional group listed. It is to grant or block Virtual Server access to a group of IPs. For example, as we set previously group 1 blocking access to

172.16.1.102-172.16.1.106. If here you want to block Virtual Server access to this IP range, you can select Group1.

● Set up

1. Select a Server Name from the drop-down menu, then the port will automatically appear, modify some as you like, or you can just leave it as default. Remember to enter your server IP Address.

Virtual Servers

Parameters

Interface: pppoe_0_8_35/ppp0.1 WAN IP:

Server Name: Custom Service

Custom Service:

Server IP Address: << --type or select from listbox--

Time Schedule: Always On Sun Mon Tue Wed Thu Fri Sat From : To

Exceptional Rule Group: None

External Port		Protocol	Protocol Number	Internal Port	
Start	End			Start	End
<input type="text"/>	<input type="text"/>	TCP	<input type="text"/>	<input type="text"/>	<input type="text"/>
<input type="text"/>	<input type="text"/>	TCP	<input type="text"/>	<input type="text"/>	<input type="text"/>
<input type="text"/>	<input type="text"/>	TCP	<input type="text"/>	<input type="text"/>	<input type="text"/>
<input type="text"/>	<input type="text"/>	TCP	<input type="text"/>	<input type="text"/>	<input type="text"/>
<input type="text"/>	<input type="text"/>	TCP	<input type="text"/>	<input type="text"/>	<input type="text"/>
<input type="text"/>	<input type="text"/>	TCP	<input type="text"/>	<input type="text"/>	<input type="text"/>
<input type="text"/>	<input type="text"/>	TCP	<input type="text"/>	<input type="text"/>	<input type="text"/>
<input type="text"/>	<input type="text"/>	TCP	<input type="text"/>	<input type="text"/>	<input type="text"/>
<input type="text"/>	<input type="text"/>	TCP	<input type="text"/>	<input type="text"/>	<input type="text"/>
<input type="text"/>	<input type="text"/>	TCP	<input type="text"/>	<input type="text"/>	<input type="text"/>
<input type="text"/>	<input type="text"/>	TCP	<input type="text"/>	<input type="text"/>	<input type="text"/>
<input type="text"/>	<input type="text"/>	TCP	<input type="text"/>	<input type="text"/>	<input type="text"/>

Apply Cancel

2. Press **Apply** to conform, and the items will be list in the **Virtual Servers Setup** table.

Configuration

Virtual Servers

Virtual Servers Setup

Server Name	External Port		Protocol	Internal Port		Server IP Address	WAN Interface	Disabled	Remove	Edit
	Start	End		Start	End					
Age of Empires	47624	47624	TCP	47624	47624	192.168.1.103	ppp0.1	<input type="checkbox"/>	<input type="checkbox"/>	Edit
Age of Empires	6073	6073	TCP	6073	6073	192.168.1.103	ppp0.1	<input type="checkbox"/>	<input type="checkbox"/>	Edit
Age of Empires	2300	2400	TCP	2300	2400	192.168.1.103	ppp0.1	<input type="checkbox"/>	<input type="checkbox"/>	Edit
Age of Empires	2300	2400	UDP	2300	2400	192.168.1.103	ppp0.1	<input type="checkbox"/>	<input type="checkbox"/>	Edit

Add Remove

Configuration

Virtual Servers

Virtual Servers Setup

Server Name	External Port		Protocol	Internal Port		Server IP Address	WAN Interface	Disabled	Remove	Edit
	Start	End		Start	End					
Age of Empires	47624	47624	TCP	47624	47624	192.168.1.103	ppp0.1	✓	<input type="checkbox"/>	Edit
Age of Empires	6073	6073	TCP	6073	6073	192.168.1.103	ppp0.1		<input type="checkbox"/>	Edit
Age of Empires	2300	2400	TCP	2300	2400	192.168.1.103	ppp0.1		<input type="checkbox"/>	Edit
Age of Empires	2300	2400	UDP	2300	2400	192.168.1.103	ppp0.1		<input type="checkbox"/>	Edit

Add Remove

(✓ Means the rule is inactive)

Remove

If you don't need a specified Server, you can remove it. Check the check box beside the item you want to remove, then press **Remove**, it will be OK.

Configuration

Virtual Servers

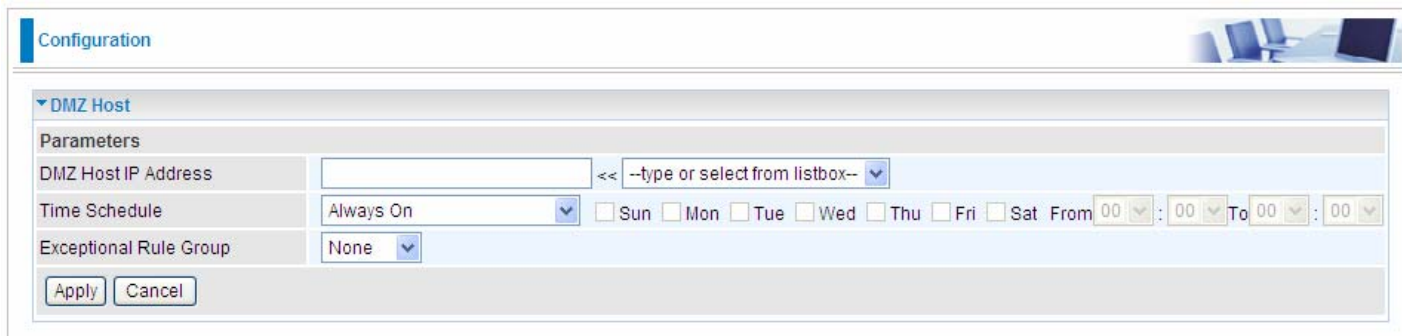
Virtual Servers Setup

Server Name	External Port		Protocol	Internal Port		Server IP Address	WAN Interface	Disabled	Remove	Edit
	Start	End		Start	End					
Age of Empires	47624	47624	TCP	47624	47624	192.168.1.103	ppp0.1	✓	<input type="checkbox"/>	Edit
Age of Empires	6073	6073	TCP	6073	6073	192.168.1.103	ppp0.1		<input type="checkbox"/>	Edit
Age of Empires	2300	2400	TCP	2300	2400	192.168.1.103	ppp0.1		<input type="checkbox"/>	Edit
Age of Empires	2300	2400	UDP	2300	2400	192.168.1.103	ppp0.1		<input checked="" type="checkbox"/>	Edit

Add Remove

DMZ Host

The DMZ Host is a local computer exposed to the Internet. When setting a particular internal IP address as the DMZ Host, all incoming packets will be checked by Firewall and NAT algorithms before being passed to the DMZ host, when a packet received does not use a port number used by any other Virtual Server entries.



DMZ Host IP Address: Enter the IP Address of a host you want it to be a DMZ host. Select from the list box to quick set the DMZ.

Time Schedule: Select or set exactly when the DMZ works. When set to “Always On”, the DMZ will work all time; and also you can set the precise time when DMZ works, like 01:00 - 19:00 from Monday to Friday. Or you can select the already set timeslot in **Time Schedule** during which the DMZ works. And when set to “Disable”, the rule is disabled. See [Time Schedule](#).

Exceptional Rule Group: Select the exceptional group listed. It is to grant or block DMZ access to a group of IPs. For example, as we set previously group 1 blocking access to 172.16.1.102-172.16.1.106. If here you want to block DMZ Access to this IP range, you can select Group1.



Using port mapping does have security implications, since outside users are able to connect to PCs on your network. For this reason you are advised to use specific Virtual Server entries just for the ports your application requires instead of simply using DMZ or creating a Virtual Server entry for “All” protocols, as doing so results in all connection attempts to your public IP address accessing the specified PC.

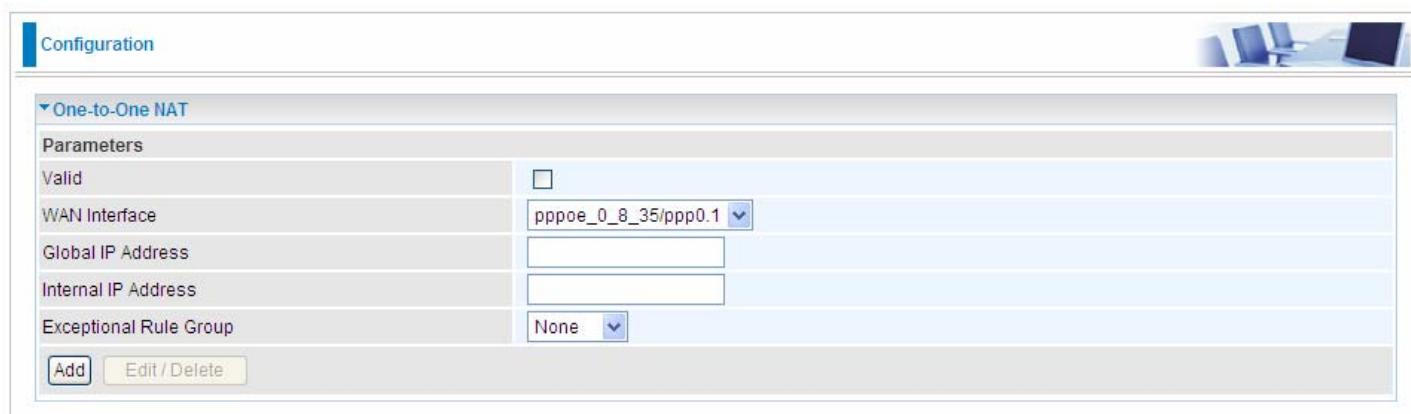


Attention

If you have disabled the NAT option in the WAN-ISP section, the Virtual Server function will hence be invalid.
If the DHCP server option is enabled, you have to be very careful in assigning the IP addresses of the virtual servers in order to avoid conflicts. The easiest way of configuring Virtual Servers is to manually assign static IP address to each virtual server PC, with an address that does not fall into the range of IP addresses that are to be issued by the DHCP server. You can configure the virtual server IP address manually, but it must still be in the same subnet as the router.

One-to-One NAT

One-to-One NAT maps a specific private/local address to a global/public IP address. If user has multiple global/public IP addresses from your ISP, you are free to use one-to-one NAT to assign some specific public IP for an internal IP like a public web server mapped with a global/public IP for outside access.



The screenshot shows a configuration window titled "Configuration" with a sub-section for "One-to-One NAT". Under the "Parameters" section, there are five fields: "Valid" (checkbox), "WAN Interface" (dropdown menu showing "pppoe_0_8_35/ppp0.1"), "Global IP Address" (text input), "Internal IP Address" (text input), and "Exceptional Rule Group" (dropdown menu showing "None"). At the bottom of the configuration area, there are two buttons: "Add" and "Edit / Delete".

Valid: Check whether to valid the one-to-one NAT mapping rule.

WAN Interface: Select one based WAN interface to configure the one-to-one NAT.

Global IP address: The Global IP mapped to an internal device. It can be left empty, and under this circumstance, it can be reached through the WAN IP of interface set in the field above.

Internal Address: The IP address of an internal device in the LAN.

Exceptional Rule Group: Select the exceptional group listed. It is to give or block access to a group of IPs to the server after One-to-One NAT. For example, a server with 192.168.1.3 is mapped to 123.1.1.2 by One-to-One NAT, then the exceptional group can be designated to have or have not access to 123.1.1.2.

For example, you have an ADSL connection of pppoe_0_8_35/ppp0.1 interface with three fixed global IP, and you then can assign the other two global IPs to two internal devices respectively.

If you have a WEB server (IP address: 192.168.1.3) and a FTP server (IP address: 192.168.1.4) in local network, owning a public IP address range of 123.1.1.2 to 123.1.1.4 assigned by ISP. 123.1.1.2 is used as WAN IP address of the router, 123.1.1.3 is used for WEB server and 123.1.1.4 is used for FTP server. With One-to-One NAT, the servers with private IP addresses can be accessed at the corresponding valid public IP addresses

Port Triggering

Port triggering is a way to automate port forwarding with outbound traffic on predetermined ports ('triggering ports'), incoming ports are dynamically forwarded to the initiating host, while the outbound ports are in use. Port triggering triggers can open an incoming port when a client on the local network makes an outgoing connection on a predetermined port or a range of ports.

Configuration

▼ Port Triggering

Port Triggering Setup

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

Add Remove

Click **Add** to add a port triggering rule.

Configuration

▼ Port Triggering

Parameters

Interface: pppoe_0_0_35/ppp0.1

Application: Custom Application

Custom Application: [Text Field]

Trigger Port		Trigger Protocol	Open Port		Open Protocol
Start	End		Start	End	
[Text]	[Text]	TCP	[Text]	[Text]	TCP
[Text]	[Text]	TCP	[Text]	[Text]	TCP
[Text]	[Text]	TCP	[Text]	[Text]	TCP
[Text]	[Text]	TCP	[Text]	[Text]	TCP
[Text]	[Text]	TCP	[Text]	[Text]	TCP
[Text]	[Text]	TCP	[Text]	[Text]	TCP
[Text]	[Text]	TCP	[Text]	[Text]	TCP
[Text]	[Text]	TCP	[Text]	[Text]	TCP

Apply

Interface: Select from the drop-down menu the interface you want the port triggering rules apply to.

Application: Preinstalled applications or Custom Application user can customize the utility yourself.

Custom Application: It is a kind of service to let users themselves customizes the service they want. Enter the user-defined service name here.

Trigger Port

① **Start:** Enter a port number as the triggering port starting number.

① **End:** Enter a port number as the triggering port ending number.

Any port in the range delimited by the 'Start' and 'End' would be the trigger port.

Open port

- ① **Start:** Enter a port number as the open port starting number.
- ① **End:** Enter a port number as the open port ending number.

Any port in the range delimited by the 'Start' and 'End' would be the preset forwarding port or open port.

Protocol: select the protocol this service used: TCP/UDP, TCP, UDP.

Set up

An example of how port triggering works, when a client behind a NAT router connecting to Aim Talk, it is a TCP connection with the default port 4099.

When connecting to Aim Talk, the client typically makes an outgoing connection on port 4099 to the Aim Talk server, but when the computer is behind the NAT, the NAT silently drops this connection because it does not know which computer behind the NAT to send the request to connect.

So, in this case, port triggering in the router is working, when an outbound connection is attempted on port 4099 (or any port in the range set), it should allow inbound connections to that particular computer.

1. Select a Server Name from the drop-down menu, then the port will automatically appear, modify some as you like, or you can just leave it as default. Remember to enter your server IP Address.

Configuration

Port Triggering

Parameters

Interface: pppoe_0_0_35/ppp0.1

Application: Aim Talk

Custom Application:

Trigger Port		Trigger Protocol	Open Port		Open Protocol
Start	End		Start	End	
4099	4099	TCP	5191	5191	TCP
		TCP			TCP
		TCP			TCP
		TCP			TCP
		TCP			TCP
		TCP			TCP
		TCP			TCP
		TCP			TCP
		TCP			TCP

Apply

2. Press **Apply** to conform, and the items will be list in the **Virtual Servers Setup** table.

Configuration

Port Triggering

Port Triggering Setup

Application	Trigger			Open			WAN Interface	Remove
	Protocol	Port Range		Protocol	Port Range			
		Start	End		Start	End		
Aim Talk	TCP	4099	4099	TCP	5191	5191	ppp0.1	<input type="checkbox"/>

Add Remove

Remove

If you don't need a specified Server, you can remove it. Check the check box beside the item you want to remove, and then press **Remove**.

Advanced Setup

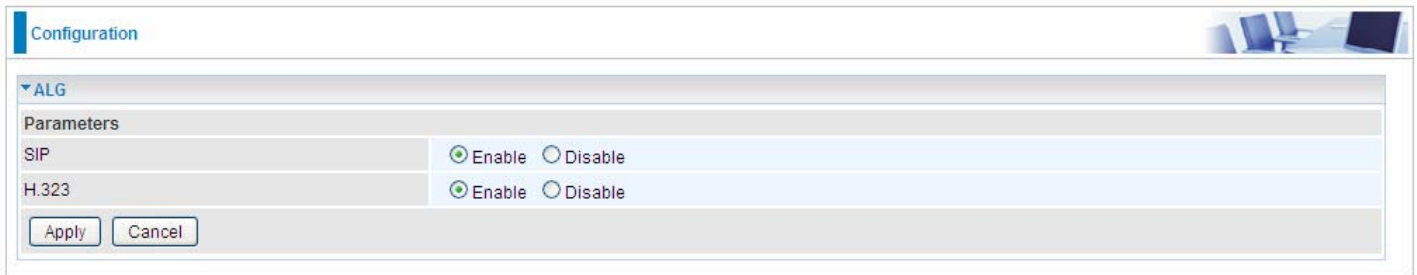
Port Triggering

Port Triggering Setup

Application	Trigger		Open			WAN Interface	Remove
	Protocol	Port Range	Protocol	Port Range			
		Start	End		Start	End	
Aim Talk	TCP	4099	4099	TCP	5191	5191	ppp0.1 <input type="checkbox"/>

ALG

The ALG Controls enable or disable protocols over application layer.



The screenshot shows a configuration window titled "Configuration" with a sub-section for "ALG". Under "Parameters", there are two rows: "SIP" and "H.323". Each row has radio buttons for "Enable" and "Disable". Both "Enable" options are selected. At the bottom of the configuration area, there are "Apply" and "Cancel" buttons.

Parameters	
SIP	<input checked="" type="radio"/> Enable <input type="radio"/> Disable
H.323	<input checked="" type="radio"/> Enable <input type="radio"/> Disable

SIP: Enable the SIP ALG when SIP phone needs ALG to pass through the NAT. Disable the SIP when SIP phone includes NAT-Traversal algorithm.

H.323: Enable to secure the voice communication using H.323 protocol when one or both terminals are behind a NAT.

Wake On LAN

Wake on LAN (WOL, sometimes WoL) is an Ethernet computer networking standard that allows a computer to be turned on or woken up remotely by a network message.

Configuration

Wake On LAN

Parameters

Host Label

MAC Address << --select-- (type or select from listbox)

Wake by Schedule Enable [Schedule](#)

Host Label: Enter identification for the host.

Select: Select MAC address of the computer that you want to wake up or turn on remotely.

Wake by Schedule: Enable to wake up your set device at some specific time. For instance, user can set to get some device woken up at 8:00 every weekday. Click [Schedule](#) to enter time schedule configuring page to set the exact timeline.

Configuration

Wake up Time Schedule

Parameters

Name

Day in a week Sun Mon Tue Wed Thu Fri Sat

Time 00 : 00

Edit	Name	Day in a week	Time	Delete
<input type="radio"/>	11	SMTWTFs	08:00	<input type="checkbox"/>

Add: After selecting, click Add then you can submit the Wake-up action.

Edit/Delete: Click to edit or delete the selected MAC address.

Ready:

“**Yes**” indicating the remote computer is ready for your waking up.

“**No**” indicating the machine is not ready for your waking up.

Delete: Delete the selected MAC address.

Configuration

Wake On LAN

Parameters

Host Label

MAC Address << --select-- (type or select from listbox)

Wake by Schedule Enable [Schedule](#)

Edit	Action	Host Label	MAC Address	Ready	Delete
<input type="radio"/>	Schedule	billion-17bc6f1	18:A9:05:38:04:03	Yes	<input type="checkbox"/>