

# Quality of Service

**User Manual (74xx/75xx/85xx series)**

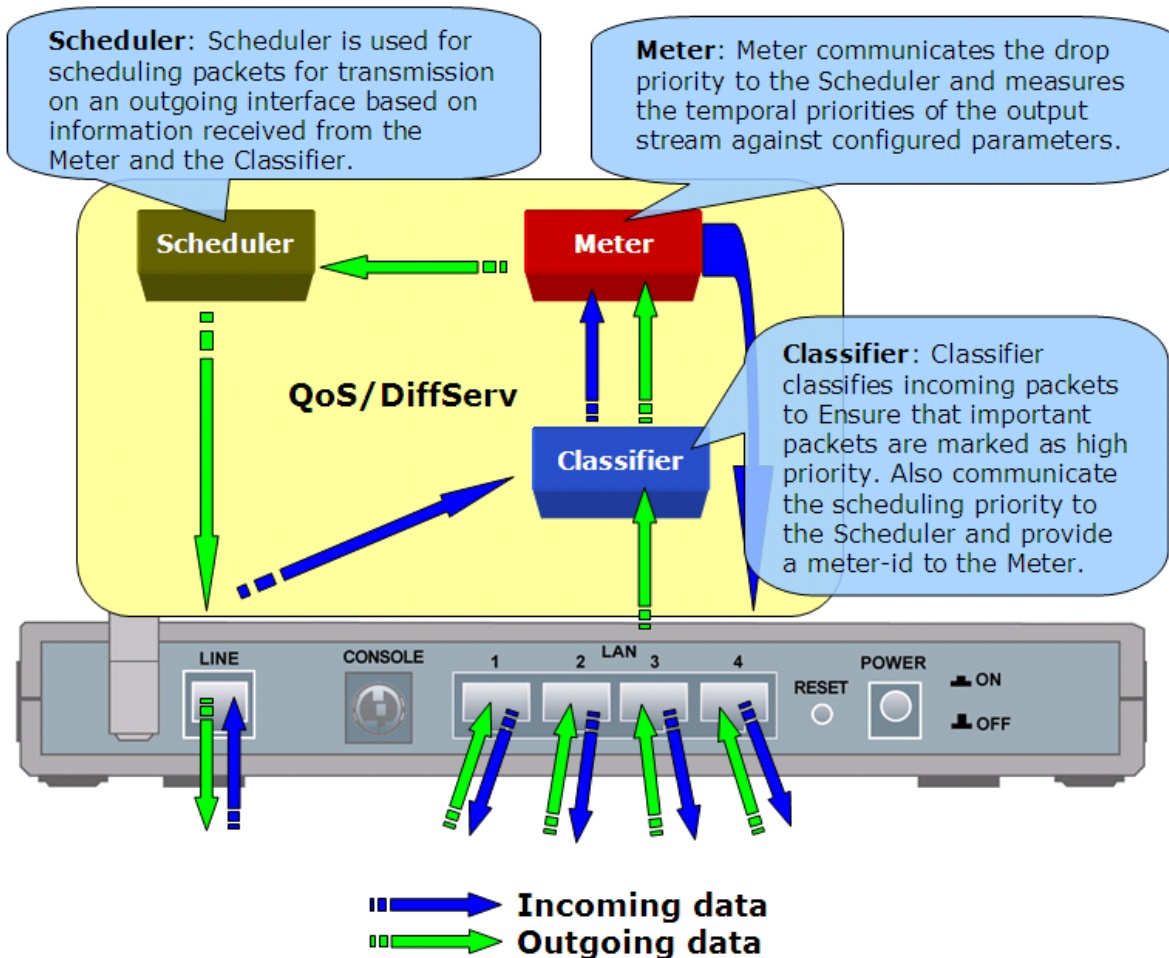
**Keep Your Net Connection Smooth and Responsive**

## Quality of Service Introduction

If you've ever found your 'net' speed has slowed to a crawl because another family member is using a P2P file sharing program, you'll understand why the Quality of Service (QoS) features in Billion's routers is such a breakthrough for home users and office users.

### QoS: Keep Your Net Connection Smooth and Responsive

Configurable by source IP address, destination IP address, protocol, and port, the Quality of Service (QoS) gives you full control over which types of outgoing data traffic should be given priority by the router, ensuring bandwidth-consuming data like gaming packets, latency-sensitive application like voice, or even mission critical files, move through the router at lightning speed, even under heavy load. You can throttle the speed at which different types of outgoing data pass through the router. In addition, you can simply change the priority of different types of upload data and let the router sort out the actual speeds.

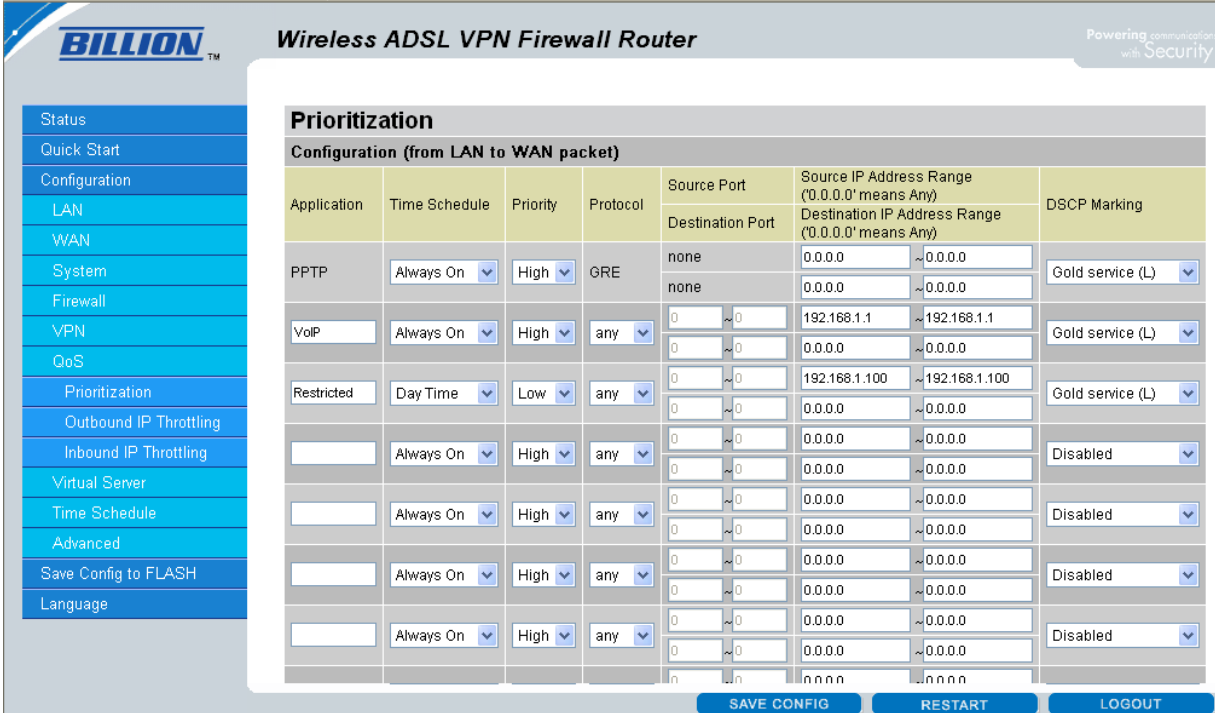


## ■ Prioritization

There are three priority settings to be provided in the Router:

- **High**
- **Normal** (The default is normal priority for all of traffic without setting).
- **Low**

And the balances of utilization for each priority are High (60%), Normal (30%) and Low (10%).



**Wireless ADSL VPN Firewall Router**

**Prioritization**

Configuration (from LAN to WAN packet)

Application	Time Schedule	Priority	Protocol	Source Port	Source IP Address Range ('0.0.0.0' means Any)		DSCP Marking
				Destination Port	Destination IP Address Range ('0.0.0.0' means Any)		
PPTP	Always On	High	GRE	none	0.0.0.0	~0.0.0.0	Gold service (L)
				none	0.0.0.0	~0.0.0.0	
VoIP	Always On	High	any	0 ~ 0	192.168.1.1	~192.168.1.1	Gold service (L)
				0 ~ 0	0.0.0.0	~0.0.0.0	
Restricted	Day Time	Low	any	0 ~ 0	192.168.1.100	~192.168.1.100	Gold service (L)
				0 ~ 0	0.0.0.0	~0.0.0.0	
	Always On	High	any	0 ~ 0	0.0.0.0	~0.0.0.0	Disabled
	Always On	High	any	0 ~ 0	0.0.0.0	~0.0.0.0	Disabled
	Always On	High	any	0 ~ 0	0.0.0.0	~0.0.0.0	Disabled
	Always On	High	any	0 ~ 0	0.0.0.0	~0.0.0.0	Disabled

SAVE CONFIG    RESTART    LOGOUT

**Application:** A name that identifies an existing policy.

**Time Schedule:** Scheduling your prioritization policy.

**Priority:** The priority for each policy. All of traffic will be set to normal priority until you change it.

**Protocol:** The name of supported protocol.

**Source Port:** The source port of packets to be monitored.

**Destination Port:** The destination port of packets to be monitored.

**Source IP Address Range:** The source IP address or range of packets to be monitored.

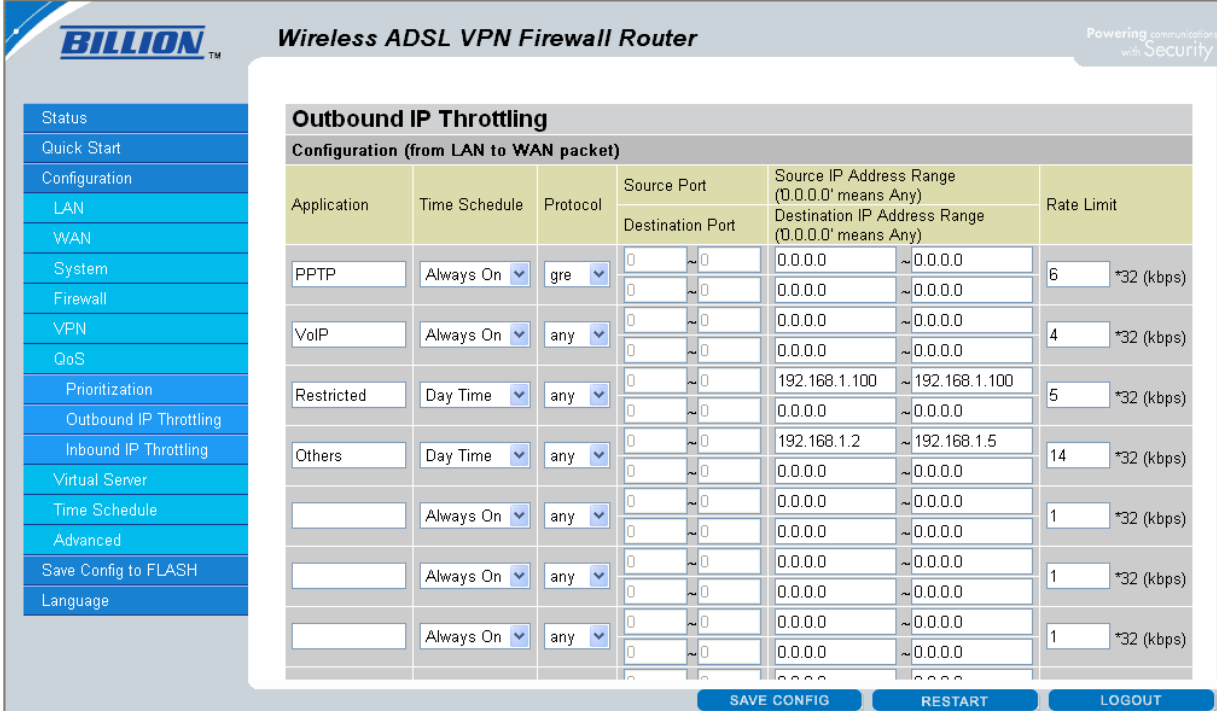
**Destination IP address Range:** The destination IP address or range of packets to be monitored.

**DSCP Marking:** Differentiated Services Code Point (DSCP), it is the first 6 bits in the ToS byte. DSCP Marking allows users to classify traffic based on DSCP value and send packets to next Router.

DSCP Mapping Table	
Billion	Standard DSCP
Disabled	None
Best Effort	Best Effort (000000)
Premium	Express Forwarding (101110)
Gold service (L)	Class 1, Gold (001010)
Gold service (M)	Class 1, Silver (001100)
Gold service (H)	Class 1, Bronze (001110)
Silver service (L)	Class 2, Gold (010010)
Silver service (M)	Class 2, Silver (010100)
Silver service (H)	Class 2, Bronze (010110)
Bronze service (L)	Class 3, Gold (011010)
Bronze service (M)	Class 3, Silver (011100)
Bronze service (H)	Class 3, Bronze (011110)

## ■ Outbound IP Throttling

IP Throttling allows you to limit the speed of network traffic. The value entered will limit the speed of the application with the specified value's multiple of 32kbps.



Application	Time Schedule	Protocol	Source Port	Destination Port	Source IP Address Range (0.0.0.0' means Any)	Destination IP Address Range (0.0.0.0' means Any)	Rate Limit
PPTP	Always On	gre	0 ~ 0	0 ~ 0	0.0.0.0 ~ 0.0.0.0	0.0.0.0 ~ 0.0.0.0	6 *32 (kbps)
VoIP	Always On	any	0 ~ 0	0 ~ 0	0.0.0.0 ~ 0.0.0.0	0.0.0.0 ~ 0.0.0.0	4 *32 (kbps)
Restricted	Day Time	any	0 ~ 0	0 ~ 0	192.168.1.100 ~ 192.168.1.100	0.0.0.0 ~ 0.0.0.0	5 *32 (kbps)
Others	Day Time	any	0 ~ 0	0 ~ 0	192.168.1.2 ~ 192.168.1.5	0.0.0.0 ~ 0.0.0.0	14 *32 (kbps)
	Always On	any	0 ~ 0	0 ~ 0	0.0.0.0 ~ 0.0.0.0	0.0.0.0 ~ 0.0.0.0	1 *32 (kbps)
	Always On	any	0 ~ 0	0 ~ 0	0.0.0.0 ~ 0.0.0.0	0.0.0.0 ~ 0.0.0.0	1 *32 (kbps)
	Always On	any	0 ~ 0	0 ~ 0	0.0.0.0 ~ 0.0.0.0	0.0.0.0 ~ 0.0.0.0	1 *32 (kbps)

**Application:** A name that identifies an existing policy.

**Time Schedule:** Scheduling your prioritization policy.

**Protocol:** The name of supported protocol.

**Source Port:** The source port of packets to be monitored.

**Destination Port:** The destination port of packets to be monitored.

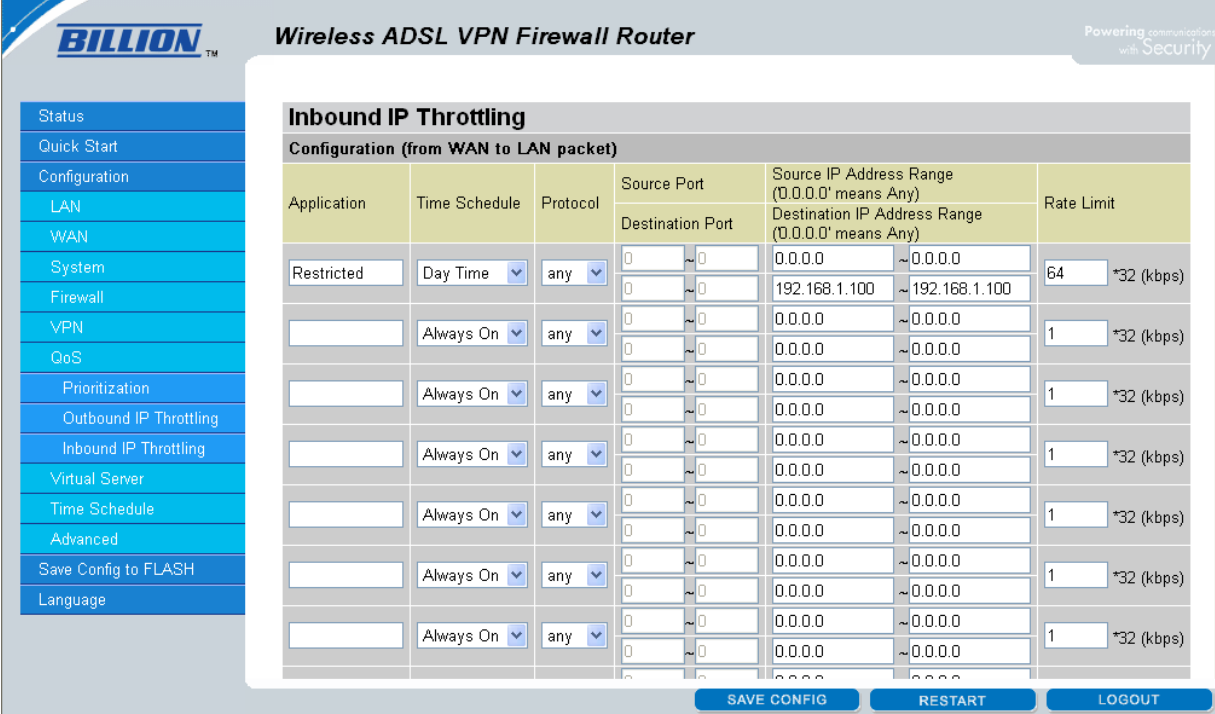
**Source IP Address Range:** The source IP address or range of packets to be monitored.

**Destination IP address Range:** The destination IP address or range of packets to be monitored.

**Outbound Rate Limit:** To limit the speed of outbound traffic.

## ■ Inbound IP Throttling

IP Throttling allows you to limit the speed of network traffic. The value entered will limit the speed of the application with the specified value's multiple of 32kbps.



Inbound IP Throttling							
Configuration (from WAN to LAN packet)							
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			Destination Port	Destination IP Address Range (0.0.0.0' means Any)			
Restricted	Day Time	any	0 ~ 0	0 ~ 0	0.0.0.0 ~ 0.0.0.0	192.168.1.100 ~ 192.168.1.100	64 *32 (kbps)
	Always On	any	0 ~ 0	0 ~ 0	0.0.0.0 ~ 0.0.0.0	0.0.0.0 ~ 0.0.0.0	1 *32 (kbps)
	Always On	any	0 ~ 0	0 ~ 0	0.0.0.0 ~ 0.0.0.0	0.0.0.0 ~ 0.0.0.0	1 *32 (kbps)
	Always On	any	0 ~ 0	0 ~ 0	0.0.0.0 ~ 0.0.0.0	0.0.0.0 ~ 0.0.0.0	1 *32 (kbps)
	Always On	any	0 ~ 0	0 ~ 0	0.0.0.0 ~ 0.0.0.0	0.0.0.0 ~ 0.0.0.0	1 *32 (kbps)
	Always On	any	0 ~ 0	0 ~ 0	0.0.0.0 ~ 0.0.0.0	0.0.0.0 ~ 0.0.0.0	1 *32 (kbps)
	Always On	any	0 ~ 0	0 ~ 0	0.0.0.0 ~ 0.0.0.0	0.0.0.0 ~ 0.0.0.0	1 *32 (kbps)
	Always On	any	0 ~ 0	0 ~ 0	0.0.0.0 ~ 0.0.0.0	0.0.0.0 ~ 0.0.0.0	1 *32 (kbps)

**Application:** A name that identifies an existing policy.

**Time Schedule:** Scheduling your prioritization policy.

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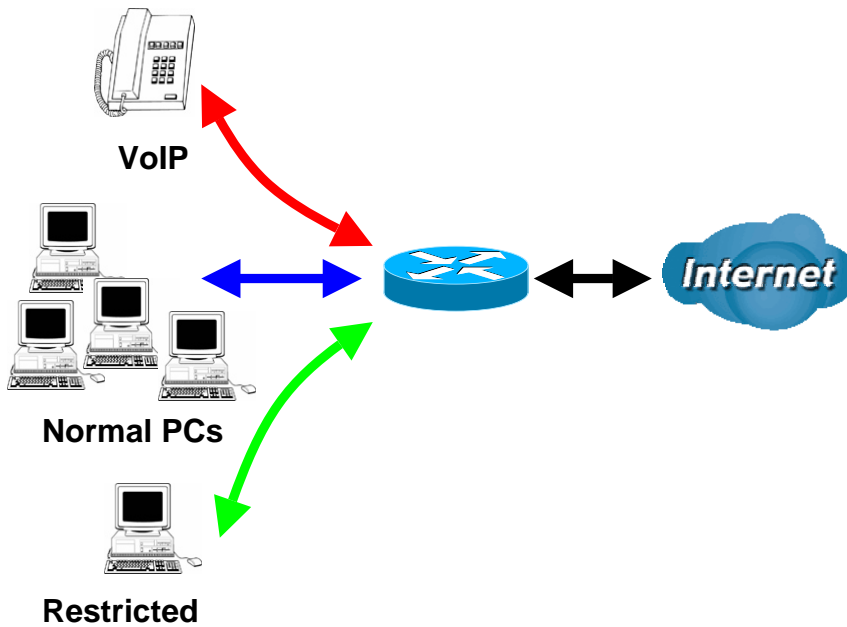
**Source IP Address Range:** The source IP address or range of packets to be monitored.

**Destination IP address Range:** The destination IP address or range of packets to be monitored.

**Inbound Rate Limit:** To limit the speed of for inbound traffic.

## ■ QoS example for your Network

### Connection Diagram



### Settings

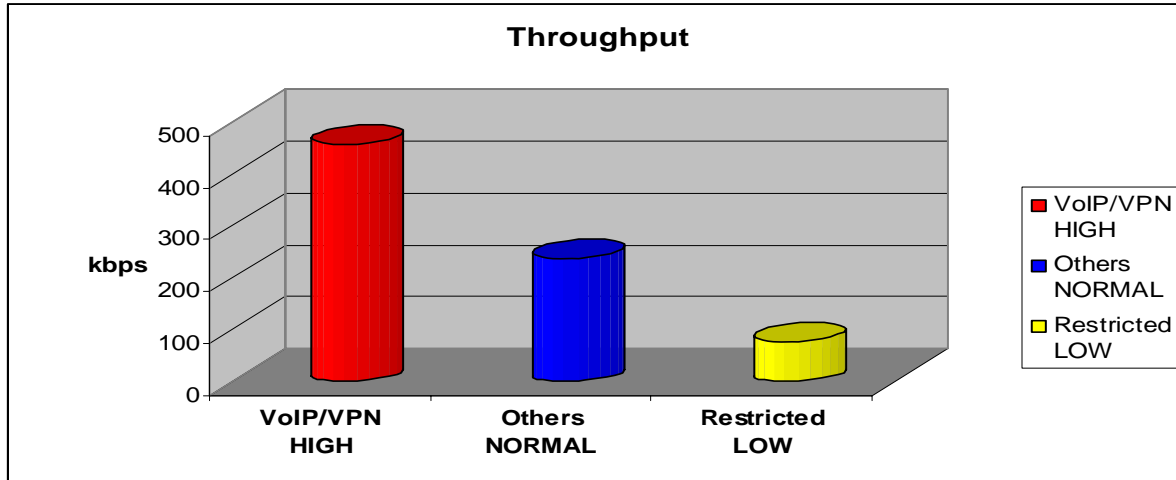
Upstream: 928 kbps  
Downstream: 8 Mbps

VoIP User : 192.168.1.1  
Normal Users : 192.168.1.2~192.168.1.5  
Restricted User: 192.168.1.100

### Prioritization

#### Configuration (from LAN to WAN packet)

Application	Time Schedule	Priority	Protocol	Source Port	Source IP Address Range ('0.0.0.0' means Any)		DSCP Marking
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				0 ~ 0	0.0.0.0	~0.0.0.0	
Restricted	Day Time	Low	any	0 ~ 0	192.168.1.100	~192.168.1.100	Gold service (L)
				0 ~ 0	0.0.0.0	~0.0.0.0	



### Mission-critical application

Mostly the VPN connection is mission-critical application for doing data exchange between head and branch office.

PPTP	Always On	High	GRE	none	0.0.0.0	~0.0.0.0	Gold service (L)
				none	0.0.0.0	~0.0.0.0	

The mission-critical application must be sent out smoothly without any dropping. Set priority as high level for preventing any other applications to saturate the bandwidth.

### Voice application

Voice is latency-sensitive application. Most VoIP devices are use SIP protocol and the port number will be assigned by SIP module automatically. Better to use fixed IP address for catching VoIP packets as high priority.

VoIP	Always On	High	any	0	~0	192.168.1.1	~192.168.1.1	Gold service (L)
				0	~0	0.0.0.0	~0.0.0.0	

Above settings will help to improve quality of your VoIP service when traffic is full loading.

### Restricted Application

Some of companies will setup FTP server for customer downloading or home user sharing their files by using FTP.

Restricted	Day Time	Low	any	0	~0	192.168.1.100	~192.168.1.100	Gold service (L)
				0	~0	0.0.0.0	~0.0.0.0	

With above settings that help to limit utilization of upstream of FTP. Time schedule also help you to only limit utilization at daytime.

### Advanced setting by using IP throttling

With IP throttling you can specify more detail for allocating bandwidth; even the applications are located in the same level.

- Upstream: 928kbps (29\*32kbps)
- Mission-critical Application: 192kbps (6\*32kbps)
- Voice Application: 128kbps (4\*32kbps)
- Restricted Application: 160kbps (5\*32kbps)
- Other Applications: 448kbps (14\*32kbps)

$6+4+14+5=29, 29*32\text{kbps}=928\text{kbps}$

#### Outbound IP Throttling

Configuration (from LAN to WAN packet)

Application	Time Schedule	Protocol	Source Port	Source IP Address Range (0.0.0.0' means Any)	Rate Limit
			Destination Port	Destination IP Address Range (0.0.0.0' means Any)	
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VoIP	Always On	any	0 ~ 0	0.0.0.0 ~ 0.0.0.0	4 *32 (kbps)
			0 ~ 0	0.0.0.0 ~ 0.0.0.0	
Restricted	Day Time	any	0 ~ 0	192.168.1.100 ~ 192.168.1.100	5 *32 (kbps)
			0 ~ 0	0.0.0.0 ~ 0.0.0.0	
Others	Day Time	any	0 ~ 0	192.168.1.2 ~ 192.168.1.5	14 *32 (kbps)
			0 ~ 0	0.0.0.0 ~ 0.0.0.0	

Sometime your customers or friends may upload their files to your FTP server and that will saturate your downstream bandwidth. The settings below help you to limit bandwidth for the restricted application.

#### Inbound IP Throttling

Configuration (from WAN to LAN packet)

Application	Time Schedule	Protocol	Source Port	Source IP Address Range (0.0.0.0' means Any)	Rate Limit
			Destination Port	Destination IP Address Range (0.0.0.0' means Any)	
Restricted	Day Time	any	0 ~ 0	0.0.0.0 ~ 0.0.0.0	64 *32 (kbps)
			0 ~ 0	192.168.1.100 ~ 192.168.1.100	