Balance and MediaFast

User Manual

Peplink Products:
One / One Core / Two / 20 / 20X / 30 LTE / 30 Pro / 210 / 310 / 310X / 310 5G / 310 Fiber 5G / 305 / 380 / 380X / 580 / 580X / 710 / 1350 / 2500 / 2500 EC/ EPX / SDX / SDX Pro / MediaFast 200 / 500 / 750

Peplink Balance Firmware 8.3.0
September 2023

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Introduction and Scope

Peplink Balance routers provide link aggregation and load balancing across multiple WAN connections. We develop products and technologies that can help you build SD-WAN networks with unbreakable connection resilience, unmatched deployment flexibility, and intuitive ease of use.

Our product and technology focus has always been on WAN virtualization and the intelligent use of multiple WAN links at the same time to increase reliability and bandwidth whilst reducing costs.
We have two key WAN virtualization technologies, Intelligent load balancing for Internet access and SpeedFusion VPN Bonding for secure branch to branch connectivity.

The Peplink MediaFast series are a range of routers capable of content caching.
Designed with education and entertainment in mind, MediaFast downloads and accelerates video, iTunes iOS updates, app downloads, and other content for uninterrupted learning and fun anytime.
The MediaFast can prefetch content during off-peak hours, saving connectivity costs and reducing network burden during busy times.

This manual applies to the following Peplink Balance products:

- Peplink Balance One
- Peplink Balance Two
- Peplink Balance 20
- Peplink Balance 20X
- Peplink Balance 30 LTE/Pro
- Peplink Balance 210
- Peplink Balance 310
- Peplink Balance 310X
- Peplink Balance 310 5G
- Peplink Balance 310 Fiber 5G
- Peplink Balance 380
- Peplink Balance 380X
- Peplink Balance 580
- Peplink Balance 580X
- Peplink Balance 710
- Peplink Balance 1350
- Peplink Balance 2500
- Peplink Balance 2500 EC
- Peplink MediaFast 200/500/750
- Peplink EPX
- Peplink SDX
- Peplink SDX Pro

The manual covers setting up your Peplink Balance or MediaFast and provides a collection of case studies detailing the advanced features of the Peplink Balance.

1 Glossary

The following terms, acronyms, and abbreviations are frequently used in this manual:

Term	Definition
3G	3rd generation standards for wireless communications (e.g., HSDPA)
4G	4th generation standards for wireless communications (e.g., LTE)
DHCP	Dynamic Host Configuration Protocol
DNS	Domain Name System
EVDO	Evolution-Data Optimized
FQDN	Fully Qualified Domain Name
HSDPA	High-Speed Downlink Packet Access
HTTP	Hyper-Text Transfer Protocol
ICMP	Internet Control Message Protocol
IP	Internet Protocol
LAN	Local Area Network
MAC Address	Media Access Control Address
MTU	Maximum Transmission Unit
MSS	Maximum Segment Size
NAT	Network Address Translation
PPPoE	Point to Point Protocol over Ethernet
QoS	Quality of Service
SNMP	Simple Network Management Protocol
TCP	Transmission Control Protocol
UDP	User Datagram Protocol
VPN	Virtual Private Network
VRF	Virtual Routing and Forwarding
VRRP	Virtual Router Redundancy Protocol
WAN	Wide Area Network
WINS	Windows Internet Name Service
WLAN	Wireless Local Area Network
210+	Refers to Peplink Balance 210/310/380/580/710/1350/2500/2500 EC

380+	Refers to Peplink Balance 380/580/710/1350/2500/2500 EC

2 Product Comparison Charts

2.1 Balance Routers (for Small Office / Branch)

	20	20X	30 LTE	30 PRO	ONE	TWO	210	310X
Product Code	**BPL-021**	**BPL-021X-LTE**	**BPL-031-LTE**	**BPL-031-LTEA**	**BPL-ONE**	**BPL-TWO**	**BPL-210**	**BPL-310X**
Capacity								
Ethernet WAN Ports	2 (GE) +	1 (GE)	2 (GE)	2 (GE)	2/5 (GE) #	2 (GE)	2 (GE) +	2 (GE)
LAN Ports	4 (GE)	4 (GE)	4 (GE)	4 (GE)	8/5 (GE) #	4 (GE)	7 (GE)	9 (GE)
Simultaneous Dual-Band 802.11ac/a/b/g/n Wi-Fi AP	No	Yes	No	Yes	Yes	No	No	No
Embedded 4G LTE	No	Yes	Yes	Yes	No	No	No	Yes
SIM Card Size	No	Mini-SIM (2FF)	Mini-SIM (2FF)	Mini-SIM (2FF)	No	No	No	Mini-SIM (2FF)
USB WAN Modem Port	1	1	1	1	1	1	1	2
Recommended Users	1-60	1-60	1-60	1-60	1-60	25-150	25-150	50-500
Stateful Firewall Throughput	150Mbps	900Mbps	200Mbps	400Mbps	600Mbps/ 400Mbps #	1Gbps	350Mbps	2.5Gbps

A full product comparison for Balance routers is available at:
http://www.peplink.com/products/balance/model-comparison/

2.2 Balance Routers (for for Enterprise / Headquarters)

	305	310X	380	380X	580	580X	710	1350	2500	2500 EC
Product Code	**BPL-305**	**BPL-310X**	**BPL-380**	**BPL-380X**	**BPL-580**	**BPL-580X**	**BPL-710**	**BPL-135**	**BPL-2500 ***	**BPL-2500-EC**
Capacity										
Ethernet WAN Ports	3 (GE)	2 (GE)	3 (GE)	3 (GE)	5 (GE)	5 (GE)	7 (GE)	13 (GE)	12 (GE)/4 (GE) & 2 (10G SFP+) *	Up to 16 (GE)* Up to 4x 10G SFP+*
LAN Ports	3 (GE)	9 (GE)	3 (GE)	3 (GE)	3 (GE)	3 (GE)	3 (GE)	3 (GE)	8 (GE)/ 2 (10G SFP+) *	Up to 16 (GE)* Up to 4x 10G SFP+*
Simultaneous Dual-Band 802.11ac/a/b/g/n Wi-Fi AP	No	No	No	No	No	No	No	No	No	No
Embedded 4G LTE	No	Yes	No	No	No	No	No	No	No	No
SIM Card Size	No	Yes	No	No	No	No	No	No	No	No
USB WAN Modem Port	1	2	1	1	1	1	1	1	1	1
Recommended Users	50-500	50-500	50-500	50-500	300-1000	300-1000	500-2000	1000-5000	5000-20000+	10000-20000+
Stateful Firewall Throughput	1Gbps	2.5Gbps	1Gbps	3Gbps	1.5Gbps	4Gbps1	2.5Gbps	5Gbps	8Gbps	30Gbps

A full product comparison for Balance routers is available at:
http://www.peplink.com/products/balance/model-comparison/

2.3 MediaFast Routers

	MediaFast 200	MediaFast 500	MediaFast 750
Product Code	MFA-200-W	MFA-500-B	MFA-750-B
WAN Interface	2x GE (Only WAN 1 is activated.)	5x GE	7x GE
Wi-Fi Interface	Simultaneous Dual-Band 802.11a/b/g/n Access Point	-	-
Embedded 3G/4G LTE	-	-	-
USB WAN Modem	1	1	1
LAN Interface	8x GE; 802.3at PoE Output	3x GE	3x GE
Recommended Users	25-150	300-1000	500-2000
Router Throughput	200Mbps	800Mbps	1.5Gbps
Disk Drive	120GB SSD	500GB SSD	1TB SSD
Load Balancing & Failover	Yes	Yes	Yes
PepVPN	Yes	Yes	Yes
SpeedFusion Hot Failover	Optional Feature	Yes	Yes
SpeedFusion WAN Smoothing	Optional Feature	Yes	Yes
SpeedFusion Bandwidth Bonding	Optional Feature	Yes	Yes
Number of PepVPN/SpeedFusion Peers	2	50	300
PepVPN/ SpeedFusion Throughput	50Mbps	200Mbps	400Mbps
Built-in AP Controller	Yes	Yes	Yes
Maximum Number of AP Support	50	100	250
PoE Input	-	-	-
PoE Output	8x 802.3at (optional feature)	-	-
Dimensions	292 x 177 x 44 mm	431 x 305 x 44 mm	426 x 365 x 44 mm
Gross Weight	2.8 kg	6.6 kg	5.5 kgs

A full product comparison for MediaFast routers is available at:
https://www.peplink.com/products/mediafast-specifications/

3 Product Features

Peplink Balance Series products enable all LAN users to share broadband Internet connections and provide advanced features to enhance Internet access. The following is a list of supported features:

3.1 WAN

- Multiple public IP support (DHCP, PPPoE, static IP address)
- Static IP support for PPPoE
- 10/100/1000Mbps Ethernet connection in full/half duplex
- Built-in HSPA and EVDO cellular modems
- USB mobile connection **(only one USB modem can be connected at a time)**
- Drop-in mode on selectable WAN port with MAC address passthrough **n**etwork address translation (NAT) / port address translation (PAT)
- Inbound and outbound NAT mapping
- Multiple static IP addresses per WAN connection
- MAC address clone
- Customizable MTU and MSS values
- WAN connection health check
- Dynamic DNS (supported service providers: changeip.com, dyndns.org, no-ip.org,tzo.com, and DNS-O-Matic)
- Ping, DNS lookup, and HTTP-based health check
- WAN throughput and consistency diagnosis
- WAN to WAN speed test
- USB Ethernet Adapter support

3.2 LAN

- DHCP server on LAN
- Extended DHCP option support
- Static routing rules
- Local DNS proxy server
- 802.1q VLANs
- Port-based VLANs
- Virtual Network Mapping

3.3 VPN

- Secure SpeedFusion™
- SpeedFusion performance analyzer
- X.509 certificate support
- Bandwidth bonding and failover among selected WAN connections
- Ability to route traffic to a remote VPN peer
- Optional pre-shared key setting
- Layer 2 bridging
- Layer 2 Peer Isolation
- SpeedFusion™ throughput, ping, and traceroute tests
- Built-in L2TP / PPTP / OpenVPN VPN server
- Authenticate L2TP / PPTP clients using RADIUS and LDAP servers
- Multi-Site PepVPN Profile
- IPsec VPN for network-to-network connections
- L2TP / PPTP and IPsec passthrough
- Simultaneous L2 & L3 VPN tunnel between the same pair of devices

3.4 Inbound Traffic Management

- TCP/UDP traffic redirection to dedicated LAN server(s)
- Inbound link load balancing by means of DNS

3.5 Outbound Policy

- Link load distribution per TCP/UDP service
- Persistent routing for specified source and/or destination IP addresses per TCP/UDP service
- Prioritize and route traffic to VPN tunnels with Priority and Enforced algorithms
- Time-based scheduling

3.6 AP Controller

- Configure and manage Pepwave AP devices
- Review the status of connected AP

3.7 QoS

- Quality of service for different applications and custom protocols

- User group classification for different service levels
- Bandwidth usage control and monitoring on group- and user-level
- Application prioritization for custom protocols and DSL optimization

3.8 Firewall

- Outbound (LAN to WAN) firewall rules
- Inbound (WAN to LAN) firewall rules per WAN connection
- Intrusion detection and prevention
- Specification of NAT mappings
- Web blocking
- Application blocking
- Time-based scheduling
- Outbound firewall rules can be defined by destination domain name

3.9 Captive Portal

- Social Wi-Fi Hotspot Support
- Splash screen of open networks, login page for secure networks
- Customizable built-in captive portal
- Supports linking to outside page for captive portal

3.10 Other Supported Features

- Easy-to-use web administration interface
- HTTP and HTTPS support for web administration interface
- Configurable web administration port and administrator password
- Read-only user for web admin
- Shared-IP drop-in mode
- Authentication and accounting by RADIUS server for web admin
- Firmware upgrades, configuration backups, ping, and traceroute via web administration interface
- Remote web-based configuration (via WAN and LAN interfaces)
- Remote reporting to Peplink Balance reporting server
- Hardware high availability via VRRP, with automatic configuration synchronization
- Real-time, hourly, daily and monthly bandwidth usage reports and charts
- Hardware backup via LAN bypass
- Built-in WINS server
- Time server synchronization
- SNMP

- Email notification
- Syslog
- SIP passthrough
- PPTP packet passthrough
- Active sessions
- Active client list
- WINS client list
- UPnP / NAT-PMP
- Event log is persistent across reboots
- IPv6 support
- Support for USB tethering on Android phones

4 Advanced Feature Summary

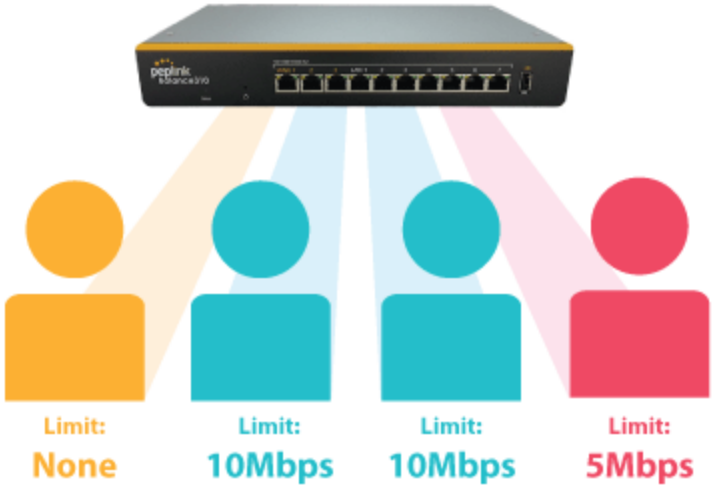
4.1 Drop-in Mode and LAN Bypass: Transparent Deployment

As your organization grows, it may require more bandwidth, but modifying your network can be tedious. In **Drop-in Mode**, you can conveniently install your Peplink router without making any changes to your network. For any reason your Peplink router looses power, the **LAN Bypass** will safely and automatically bypass the Peplink router to resume your original network connection.

4.2 QoS: Clearer VoIP

VoIP and videoconferencing are highly sensitive to latency. With QoS, Peplink routers can detect VoIP traffic and assign it the highest priority, giving you crystal-clear calls.

4.3 Per-User Bandwidth Control



With per-user bandwidth control, you can define bandwidth control policies for up to 3 groups of users to prevent network congestion. Define groups by IP address and subnet, and set bandwidth limits for every user in the group.

4.4 High Availability via VRRP

When your organization has a corporate requirement demanding the highest availability with no single point of failure, you can deploy two Peplink routers in High Availability mode. With High Availability mode, the second device will take over when needed.

4.5 USB Modem and Android Tethering

For increased WAN diversity, plug in a USB LTE modem as backup. Peplink routers are compatible with over 200 modem types. You can also tether to smartphones running Android 4.1.X and above.

By default, the USB port is “USB Modem” mode. If you need to use it to connect to USB Ethernet Adapter, you need to change it to “USB Ethernet” mode,
https://forum.peplink.com/t/can-i-use-ethernet-adapters-on-the-usb-wan/8327

4.6 Built-In Remote User VPN Support

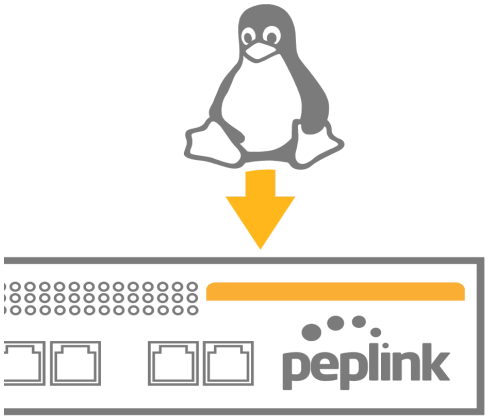
Use OpenVPN or L2TP with IPsec to safely and conveniently connect remote clients to your private network. L2TP with IPsec is supported by most devices, but legacy devices can also connect using PPTP.

Click here for the full instructions on setting up L2TP with IPsec.
Click here for the full instructions on setting up OpenVPN connections

4.7 LACP NIC Bonding

Use 802.3ad to combine multiple LAN connections into a virtual LAN connection. This virtual connection has higher throughput and redundancy in case any single link fails.

4.8 KVM Virtualization



KVM is a virtualisation module that allows administrators using our routers to host a large range of virtual machines. KVM is now supported by some of the MediaFast / ContentHub routers.

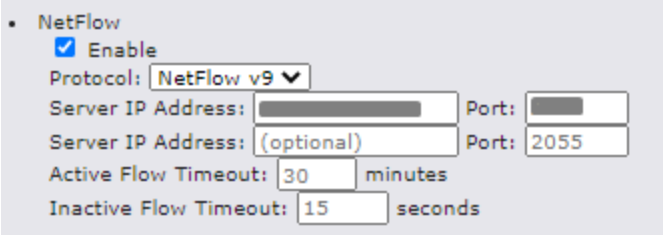
Click here for the full instructions on how to set up KVM
Click here for the full instructions on how to set up KVM with USB Storage

4.9 DPI Engine

The DPI report written in the updated KB article will show further information on InControl2 through breaking down application categories into subcategories.
https://forum.peplink.com/t/ic2-deep-packet-inspection-dpi-reports-and-everything-you-need-to-know-about-it/10151/

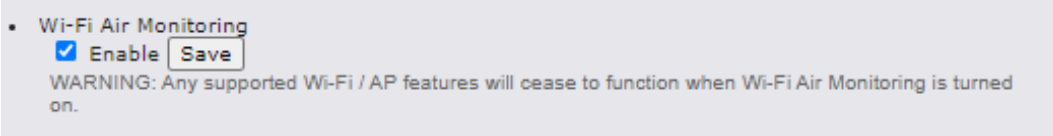
4.10 NetFlow

NetFlow protocol is used to track network traffic. Tracking information from NetFlow can be sent to the NetFlow collector, which analyzes data and generates reports for review.
Note: To enable this feature, go to https://<Device's IP>/cgi-bin/MANGA/support.cgi



4.11 Wi-Fi Air Monitoring

Peplink routers support Wi-Fi “Air Monitoring Mode” which is used to troubleshoot remotely and proactively monitor Wi-Fi and WAN performance. After enabling Wi-Fi Air Monitoring, reports can be viewed under **InControl 2** > **Reports** > **AirProbe Reports**.
Note: To enable this feature, go to https://<Device's IP>/cgi-bin/MANGA/support.cgi



4.12 SP Default Configuration

The SP Default Configuration feature written in the updated KB article allows for the provisioning of custom made settings (a.k.a. InControl2 configuration) via the Ethernet LAN port and is ideal for those wanting to do a bulk deployment of many Peplink devices.
Note: If you would like to use this feature, please contact your purchase point (Eg.VAD).

4.13 Peplink Relay

Cloud Service Providers often restrict access to certain applications. With SFC Relay, you can route traffic before going out to the Internet, allowing access to previously restricted applications experienced with the public SpeedFusion Cloud nodes. Available as an add-on for your home router or as an upgradable license to your Peplink router, SFC Relay is sure to impress you and any peers you give access to.
https://forum.peplink.com/t/configure-speedfusion-cloud-relay-server-and-client/6215ca9b017e48e0f3ff2479/

4.14 DNS over HTTPS (DoH)

DoH provides the benefits of communicating DNS information over a secure HTTPS connection in an encrypted manner. The protocol offers increased privacy and confidentiality by preventing data interception and man-in-the-middle attacks.

4.15 Peplink InTouch

InTouch is Peplink's zero-touch remote network management solution, leveraging InControl 2 and a SpeedFusion Connect (formerly known as SpeedFusion Cloud) data plan. This service extends a network administrator's ability to reach any device UI backed by a Peplink/Pepwave router. To configure InTouch, all you need is a valid InControl 2 subscription, a SpeedFusion Connect data plan, and a Peplink/Pepwave router (which requires the latest 8.2.0 firmware).

To watch a demonstration and read the FAQ, visit
https://www.peplink.com/enterprise-solutions/intouch/

Or learn to configure InTouch at https://youtu.be/zg0iavHGkJw

4.16 Synergy Mode

Synergy mode is a cascade multiple devices and combine the number of WANs to a single device virtually. All the WANs on the Synergized Device will appear as native WAN interfaces at the Synergy Controller and it can be managed like the built-in WAN interfaces.
https://forum.peplink.com/t/synergy-mode-(firmware-8.3.0)/639be7d8af8c71a6f3050323/

4.17 Virtual WAN on VLAN

The Virtual WAN Activation License allows you to create 1 x virtual WAN on a particular VLAN, on either WAN or LAN interface. This means that you can create a virtual WAN on VLAN for a WAN port, or a virtual WAN on VLAN for a LAN port.
https://forum.peplink.com/t/b20x-virtual-wan-activation-license-faq/6204bac7d90b9e6355e96e8d/1

5 Package Contents

The contents of Peplink Balance product packages are as follows:

5.1 Peplink Balance One/Two

- Peplink Balance One/Two
- Power adapter
- Information slip

5.2 Peplink Balance 20/30/30 LTE/30 Pro/50

- Peplink Balance 20/30/30 LTE/30 Pro/50
- Power adapter
- Information slip

5.3 Peplink Balance 20X

- Peplink Balance 20X
- 2x LTE Antenna, 1x GPS Antenna, 2x Wi-Fi Antenna
- Power adapter
- Information slip

5.4 Peplink Balance 210/310

- Peplink Balance 210/310
- Power adapter
- Information slip
- Rackmount kit

5.5 Peplink Balance 310X

- Peplink Balance 310X
- 2x LTE Antenna, 1x GPS Antenna
- Power adapter
- Ear L-Mounts kit
- Power cord

5.6 Peplink Balance 310 5G

- Balance 310 5G
- Power adapter
- Power cord
- 4x Rubber foot
- 6x Cellular Antenna

5.7 Peplink Balance 310 Fiber 5G

- Balance 310 Fiber 5G
- Power adapter
- Power cord
- 4x Rubber foot
- 4x Cellular Antenna
- 4x Wi-Fi Antenna

5.8 Peplink Balance 305/380/580/710/1350/2500/2500 EC

- Peplink Balance 305/380/580/710/1350/2500/ 2500 EC
- Power cord
- Information slip
- Rackmount kit

5.9 Peplink Balance 380X/580X

- Peplink 380X/580X
- Power cord
- 1 Pair of Mounting Brackets

5.10 Peplink MediaFast 200

- Peplink MediaFast 200
- Power adapter
- Information slip

5.11 Peplink MediaFast 500

- Peplink MediaFast 500
- Power cord
- Information slip
- Rackmount kit

5.12 Peplink EPX

- Wireless SD-WAN Powerhouse
- EPX Chassis with OLD
- Optional x LTE-A modules
- Optional x Copper ETH module
- Optional x Fiber ETH module
- Rack mounting kit with brackets and slide

5.13 Peplink SDX

- SDX Base Chassis
- 1U 19″ Rackmount Chassis

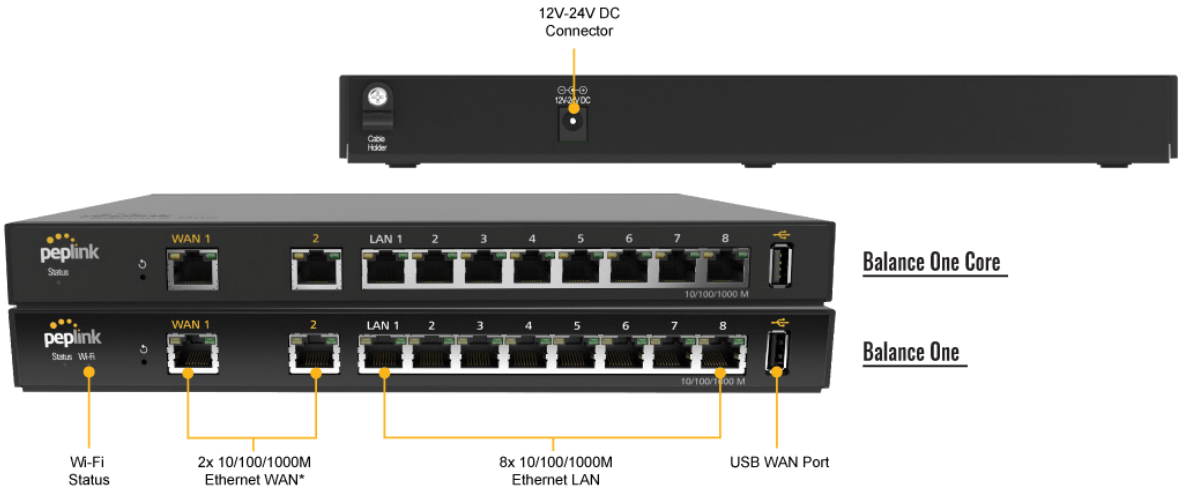
5.14 Peplink SDX Pro

- SDX Pro Base Chassis
- 1U 19″ Rack-mount Chassis
- 1x Rubber Foot Pack
- 2x Power Cords
- 1x L-mount Set

6 Peplink Balance Overview

6.1 Peplink Balance One

6.1.1 Panel Appearance



*If the WAN Activation License (BPL-ONE-LC-5WAN) is activated, router throughput will be changed to 400Mbps, both number of WAN and LAN will become 5.

6.1.2 LED Indicators

The statuses indicated by the front panel LEDs are as follows:

Power and Status Indicators	
Status	OFF – Upgrading firmware
	Red – Booting up or busy
	Blinking red – Boot up error
	Green – Ready

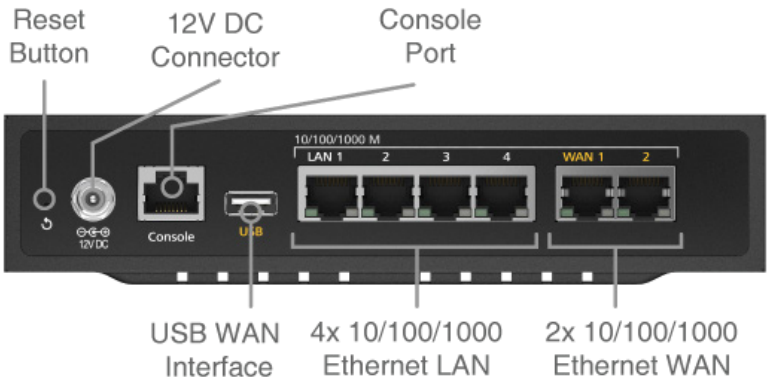
LAN and WAN Ports	
Green LED	ON – 1000 Mbps OFF – 10 / 100 Mbps or port is not connected
Orange LED	Blinking – Data is transferring
	OFF – No data is being transferred or port is not connected
Port Type	Auto MDI/MDI-X ports

Wi-Fi Indicators		
Wi-Fi	OFF	Disabled
	Green	Ready

USB Port	
USB Ports	For future functionality

6.2 Peplink Balance Two

6.2.1 Panel Appearance



6.2.2 LED Indicators

The statuses indicated by the front panel LEDs are as follows:

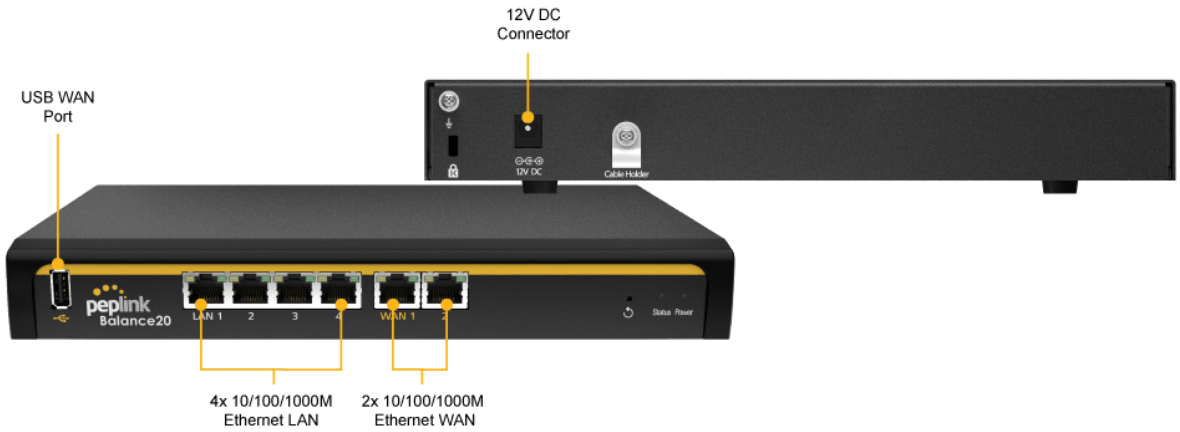
Power and Status Indicators	
Power	OFF – Power off
	Green – Power on
Status	OFF – Upgrading firmware
	Red – Booting up or busy
	Blinking red – Boot up error
	Green – Ready

LAN and WAN Ports	
Green LED	ON – 1000 Mbps OFF –10 / 100 Mbps or port is not connected
Orange LED	Blinking – Data is transferring
	OFF – No data is being transferred or port is not connected
Port Type	Auto MDI/MDI-X ports

USB Port	
USB Ports	For connecting a 4G/3G USB modem

6.3 Peplink Balance 20

6.3.1 Panel Appearance



6.3.2 LED Indicators

The statuses indicated by the front panel LEDs are as follows:

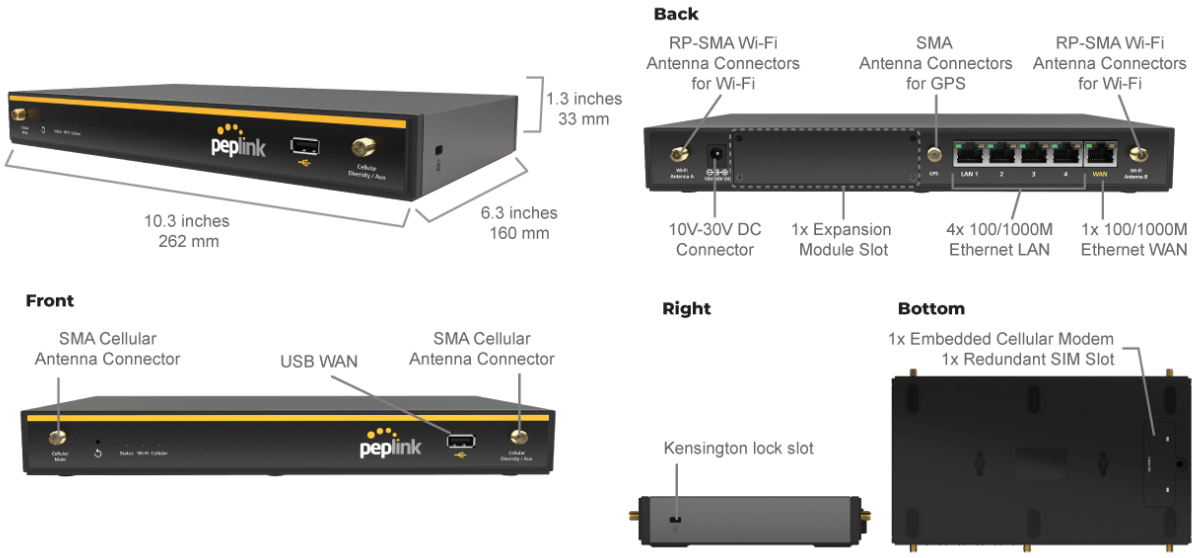
Power and Status Indicators	
Power	OFF – Power off
	Green – Power on
Status	OFF – Upgrading firmware
	Red – Booting up or busy
	Blinking red – Boot up error
	Green – Ready

LAN and WAN Ports	
Green LED	ON – 10 / 100 / 1000 Mbps
Orange LED	Blinking – Data is transferring
	OFF – No data is being transferred or port is not connected
Port Type	Auto MDI/MDI-X ports

USB Port	
USB Ports	For connecting a 4G/3G USB modem

6.4 Peplink Balance 20X

6.4.1 Panel Appearance



6.4.2 LED Indicators

The statuses indicated by the front panel LEDs are as follows:

Power and Status Indicators	
Status	OFF – Upgrading firmware
	Red – Booting up or busy
	Blinking red – Boot up error
	Green – Ready

LAN and WAN Ports	
Green LED	ON – 1000 Mbps OFF – 10 / 100 Mbps or port is not connected
Orange LED	Blinking – Data is transferring
	OFF – No data is being transferred or port is not connected
Port Type	Auto MDI/MDI-X ports

Wi-Fi AP Indicators		
Wi-Fi AP	OFF	Disabled
	ON	Enabled

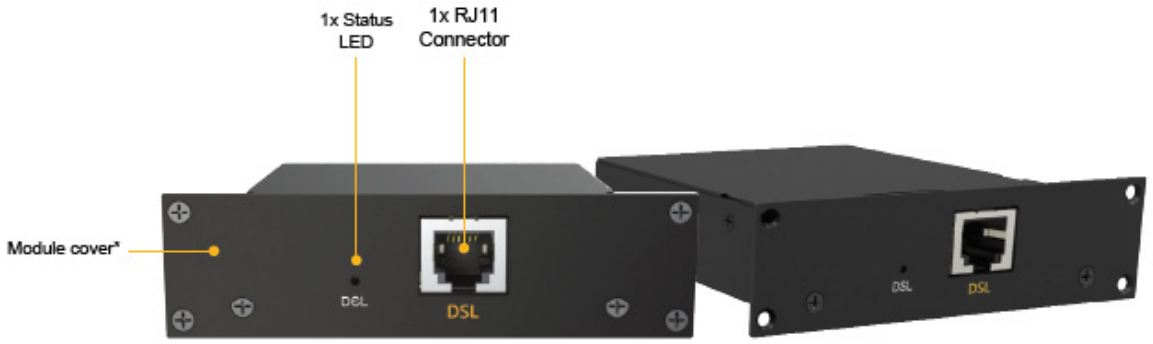
USB Port	
USB Ports	For connecting a 4G/3G USB modem

6.4.3 Flex Module Mini

1x LTE-A Module	
Interface	1x Embedded LTE-A Cellular Modems with Redundant SIM Slots
Antenna Connectors	2x SMA Cellular Antenna Connectors
Downlink / Uplink Datarate	300Mbps/50Mbps (CAT-6) 600Mbps/150Mbps (CAT-12)
Power Consumption	10W
Weight	0.83 pounds | 375 grams

1xLTE-A Module	
Interface	1x Embedded LTE-A Cellular Modems with Redundant SIM Slots
Antenna Connectors	4x SMA Cellular Antenna Connectors

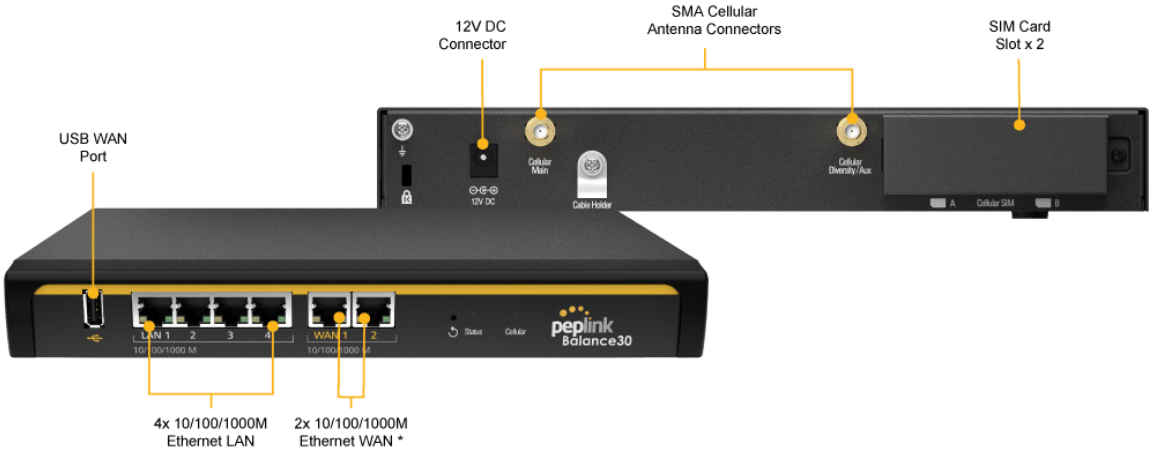
Downlink / Uplink Datarate	1.2 Gbps/150 Mbps (CAT-18)
Power Consumption	10W
Weight	0.83 pounds | 375 grams



1x VDSL Module	
Interface	1x RJ11 Connector, 1x Status LED
Power Consumption	9W
Weight	0.44 pounds | 200 grams

6.5 Peplink Balance 30 LTE

6.5.1 Panel Appearance



* WAN ports can act as a LAN port if needed.

6.5.2 LED Indicators

The statuses indicated by the front panel LEDs are as follows:

Power and Status Indicators	
Power	OFF – Power off
	Green – Power on
Status	OFF – Upgrading firmware
	Red – Booting up or busy
	Blinking red – Boot up error
	Green – Ready

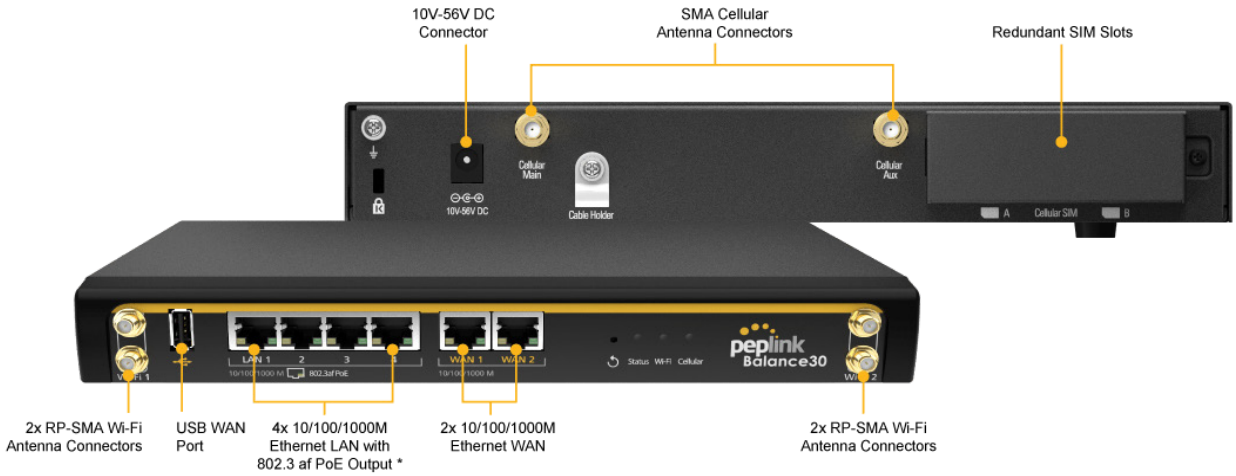
LAN and WAN Ports	
Green LED	ON – 10 / 100 /1000 Mbps
Orange LED	Blinking – Data is transferring
	OFF – No data is being transferred or port is not connected
Port Type	Auto MDI/MDI-X ports

Cellular WAN Indicators		
Cellular	OFF	Disabled
	Blinking slowly	Connecting to wireless network
	ON	Connected to wireless network

USB Port	
USB Ports	For connecting a 4G/3G USB modem

6.6 Peplink Balance 30 Pro

6.6.1 Panel Appearance



* PoE Activation Kit is available separately, needs at least 48V of input for PoE output

6.6.2 LED Indicators

The statuses indicated by the front panel LEDs are as follows:

Power and Status Indicators	
Power	OFF – Power off
	Green – Power on
Status	OFF – Upgrading firmware
	Red – Booting up or busy
	Blinking red – Boot up error

Green – Ready

WAN Ports	
Green LED	ON – 1000 Mbps OFF -10 / 100 Mbps or port is not connected
Orange LED	Blinking – Data is transferring
	OFF – No data is being transferred or port is not connected
Port Type	Auto MDI/MDI-X ports

LAN Ports	
Green LED	ON – POE Enabled OFF - POE Disabled
Orange LED	Blinking – 10 / 100 / 1000 Mbps with activity
	OFF – No data is being transferred or port is not connected
Port Type	Auto MDI/MDI-X ports

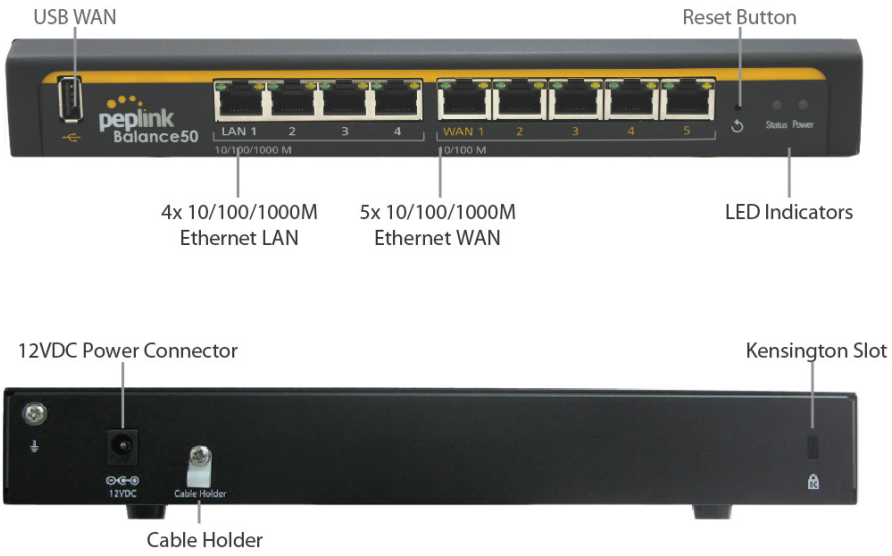
Wi-Fi AP Indicators		
Wi-Fi AP	OFF	Disabled
	ON	Enabled

Cellular WAN Indicators		
Cellular	OFF	Disabled
	Blinking slowly	Connecting to wireless network
	ON	Connected to wireless network

USB Port	
USB Ports	For connecting a 4G/3G USB modem

6.7 Peplink Balance 50

6.7.1 Front Panel Appearance



6.7.2 LED Indicators

The statuses indicated by the front panel LEDs are as follows:

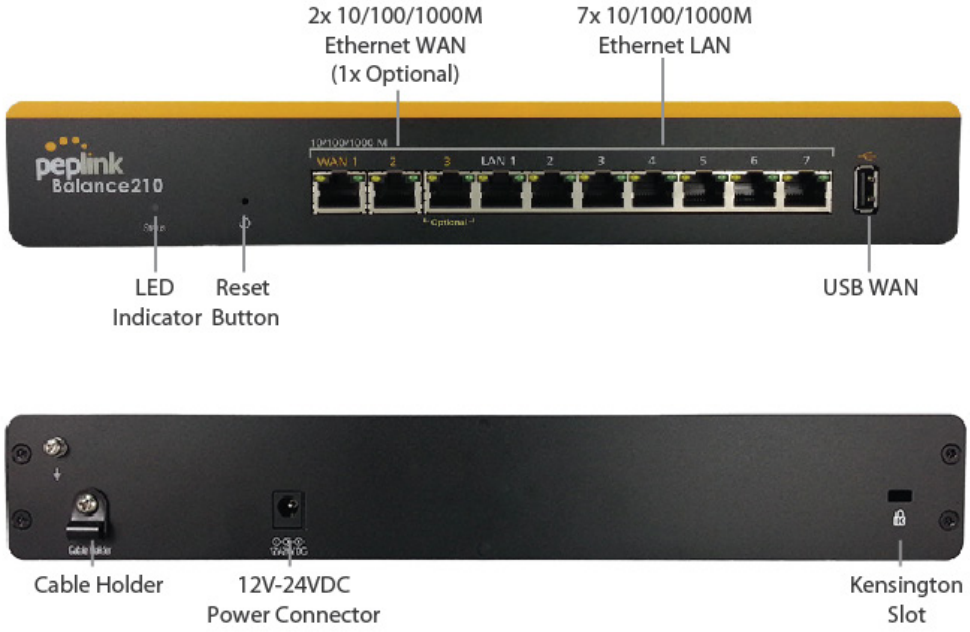
Power and Status Indicators	
Power	OFF – Power off
	Green – Power on
Status	OFF – Upgrading firmware
	Red – Booting up or busy
	Blinking red – Boot up error
	Green – Ready

LAN and WAN Ports	
Green LED	ON – 10 / 100 /1000 Mbps
Orange LED	Blinking – Data is transferring
	OFF – No data is being transferred or port is not connected
Port Type	Auto MDI/MDI-X ports

USB Port	
USB Ports	For connecting a 4G/3G USB modem

6.8 Peplink Balance 210

6.8.1 Front Panel Appearance



6.8.2 LED Indicators

The statuses indicated by the front panel LEDs are as follows:

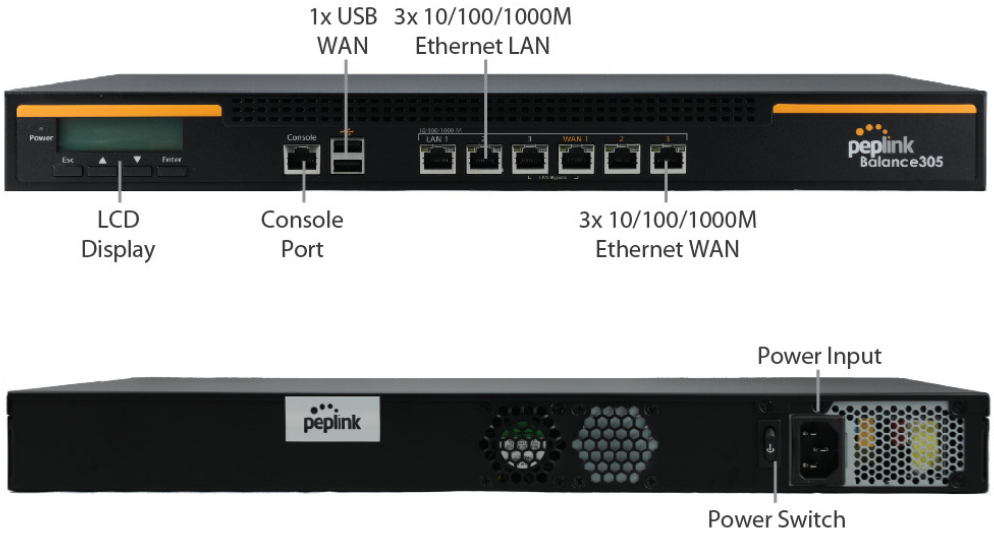
Power and Status Indicators	
Status	OFF – Upgrading firmware
	Red – Booting up or busy
	Blinking red – Boot up error
	Green – Ready

LAN and WAN Ports	
Green LED	ON – 10 / 100 / 1000 Mbps
Orange LED	Blinking – Data is transferring
	OFF – No data is being transferred or port is not connected
Port Type	Auto MDI/MDI-X ports

USB Port	
USB Ports	For connecting a 4G/3G USB modem

6.9 Peplink Balance 305

6.9.1 Front Panel Appearance



6.9.2 LED Indicators

The statuses indicated by the front panel LEDs are as follows:

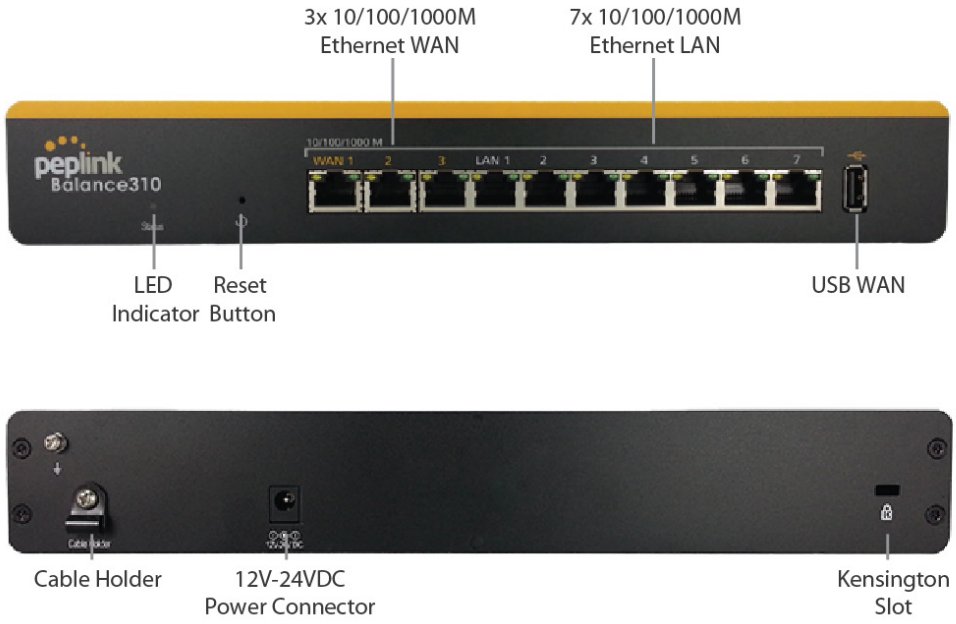
Power and Status Indicators	
Power LED	OFF – Power off
	GREEN – Power on

LAN Port, WAN 1 – 3 Ports	
Right LED	ORANGE – 1000 Mbps
	GREEN – 100 Mbps
	OFF – 10 Mbps
Left LED	Solid – Port is connected without traffic
	Blinking – Data is transferring
	OFF – Port is not connected
Port Type	Auto MDI/MDI-X ports

Console and USB Ports	
Console Port	Reserved for engineering use
USB Ports	For connecting a 4G/3G USB modem

6.10 Peplink Balance 310

6.10.1 Front Panel Appearance



6.10.2 LED Indicators

The statuses indicated by the front panel LEDs are as follows:

Power and Status Indicators	
Status	OFF – Upgrading firmware
	Red – Booting up or busy
	Blinking red – Boot up error
	Green – Ready

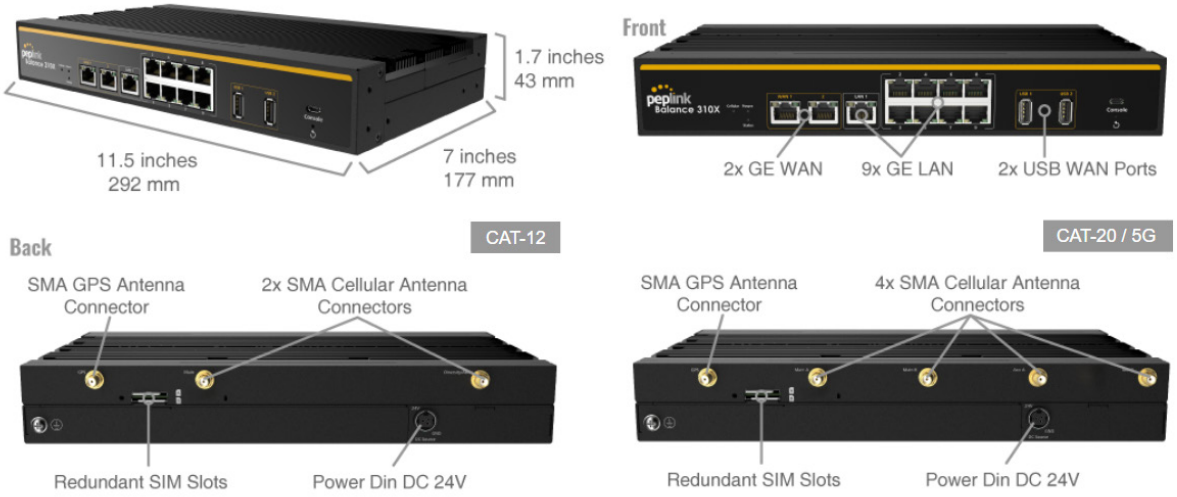
LAN and WAN Ports	
Green LED	ON – 10 / 100 / 1000 Mbps
Orange LED	Blinking – Data is transferring

	OFF – No data is being transferred or port is not connected
Port Type	Auto MDI/MDI-X ports

USB Port	
USB Ports	For connecting a 4G/3G USB modem

6.11 Peplink Balance 310X

6.11.1 Front Panel Appearance



6.11.2 LED Indicators

The statuses indicated by the front panel LEDs are as follows:

Power and Status Indicators	
Power	OFF – Power off
	Green – Power on
Status	OFF – Upgrading firmware
	Red – Booting up or busy
	Blinking red – Boot up error
	Green – Ready

WAN Ports	
Green LED	ON - 1000 Mbps OFF – 10 / 100 Mbps or port is not connected
Orange LED	Blinking – Data is transferring
	OFF – No data is being transferred or port is not connected
Port Type	Auto MDI/MDI-X ports

LAN Ports	
Green LED	ON – 1000 Mbps OFF – 10 / 100 Mbps or port is not connected
Orange LED	Blinking – 10 / 100 / 1000 Mbps with activity
	OFF – No data is being transferred or port is not connected
Port Type	Auto MDI/MDI-X ports

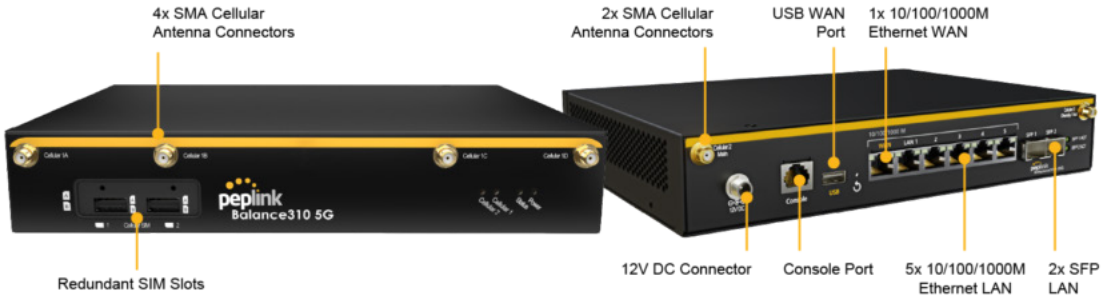
Cellular WAN Indicators		
Cellular	OFF	Disabled
	Blinking slowly	Connecting to wireless network
	ON	Connected to wireless network

Wi-Fi AP Indicators		
Wi-Fi AP	OFF	Disabled
	ON	Enabled

USB Port	
USB Ports	For connecting a 4G/3G USB modem

6.12 Peplink Balance 310 5G

6.12.1 Front Panel Appearance



6.12.2 LED Indicators

The statuses indicated by the front panel LEDs are as follows:

Power and Status Indicators	
Power	OFF – Power off
	Green – Power on
Status	OFF – Upgrading firmware
	Red – Booting up or busy
	Blinking red – Boot up error
	Green – Ready

WAN Port	
Right LED	GREEN - 1000 Mbps ORANGE - 100 Mbps OFF – 10 Mbps or port is not connected
Left LED	Blinking – Data is transferring
	OFF – Port is not connected
Port Type	Auto MDI/MDI-X ports

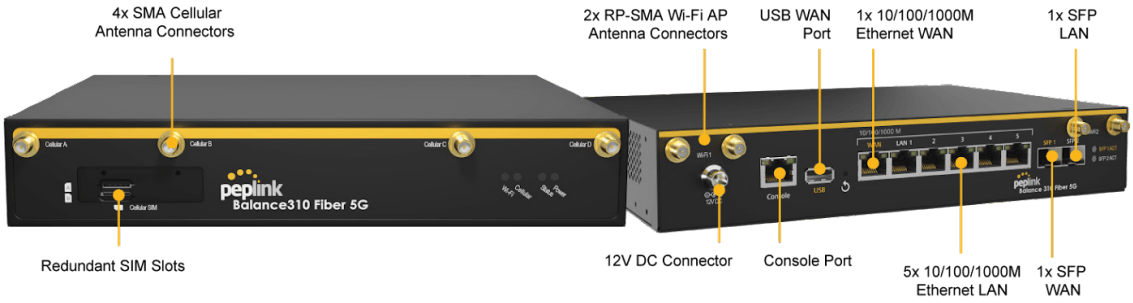
LAN Ports	
Right LED	GREEN – 1000 Mbps ORANGE - 100 Mbps OFF – 10 Mbps or port is not connected
Left LED	Blinking – Data is transferring
	OFF – Port is not connected
Port Type	Auto MDI/MDI-X ports

Cellular WAN Indicators		
Cellular	OFF	Disabled
	Blinking slowly	Connecting to wireless network
	ON	Connected to wireless network

USB Port	
USB Ports	For connecting a 4G/3G USB modem

6.13 Peplink Balance 310 Fiber 5G

6.13.1 Front Panel Appearance



6.13.2 LED Indicators

The statuses indicated by the front panel LEDs are as follows:

Power and Status Indicators	
Power	OFF – Power off
	Green – Power on
Status	OFF – Upgrading firmware
	Red – Booting up or busy
	Blinking red – Boot up error

	Green – Ready

WAN Port	
Right LED	Green - 1000 Mbps Orange - 100 Mbps OFF – 10 Mbps or port is not connected
Left LED	Blinking – Data is transferring
	OFF – Port is not connected
Port Type	Auto MDI/MDI-X ports

LAN Ports	
Right LED	Green – 1000 Mbps Orange - 100 Mbps OFF – 10 Mbps or port is not connected
Left LED	Blinking – Data is transferring
	OFF – Port is not connected
Port Type	Auto MDI/MDI-X ports

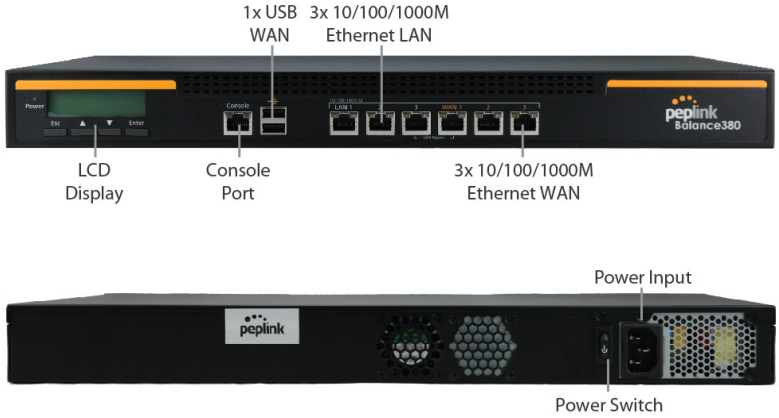
Cellular WAN Indicators		
Cellular	OFF	Disabled
	Blinking slowly	Connecting to wireless network
	ON	Connected to wireless network

Wi-Fi AP Indicators		
Wi-Fi AP	OFF	Disabled
	ON	Enabled

USB Port	
USB Ports	For connecting a 4G/3G USB modem

6.14 Peplink Balance 380

6.14.1 Panel Appearance



6.14.2 LED Indicators

The statuses indicated by the front panel LEDs are as follows:

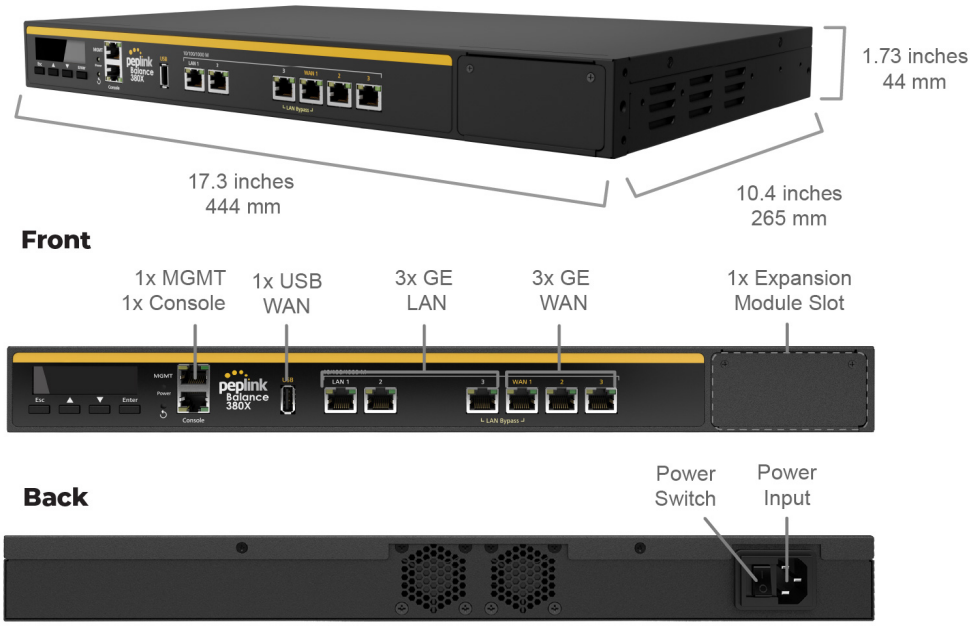
Power and Status Indicators	
Power LED	OFF – Power off
	Green – Power on

LAN Port, WAN 1 – 3 Ports	
Right LED	Orange – 1000 Mbps
	Green – 100 Mbps
	OFF – 10 Mbps
Left LED	Solid – Port is connected without traffic
	Blinking – Data is transferring
	OFF – Port is not connected
Port Type	Auto MDI/MDI-X ports

Console and USB Ports	
Console Port	Reserved for engineering use
USB Ports	For connecting a 4G/3G USB modem

6.15 Peplink Balance 380X

6.15.1 Panel Appearance



6.15.2 LED Indicators

The statuses indicated by the front panel LEDs are as follows:

Power and Status Indicators	
Power LED	OFF – Power off
	Green – Power on

LAN Port, WAN 1 – 3 Ports	
Right LED	Green – 1000 Mbps
	OFF – 10 / 100 Mbps
Left LED	Solid – Port is connected without traffic
	Blinking – Data is transferring
	OFF – Port is not connected
Port Type	Auto MDI/MDI-X ports

Console and USB Ports	
Console Port	Reserved for engineering use

USB Ports	For connecting a 4G/3G USB modem

6.15.3 Flex Module Mini

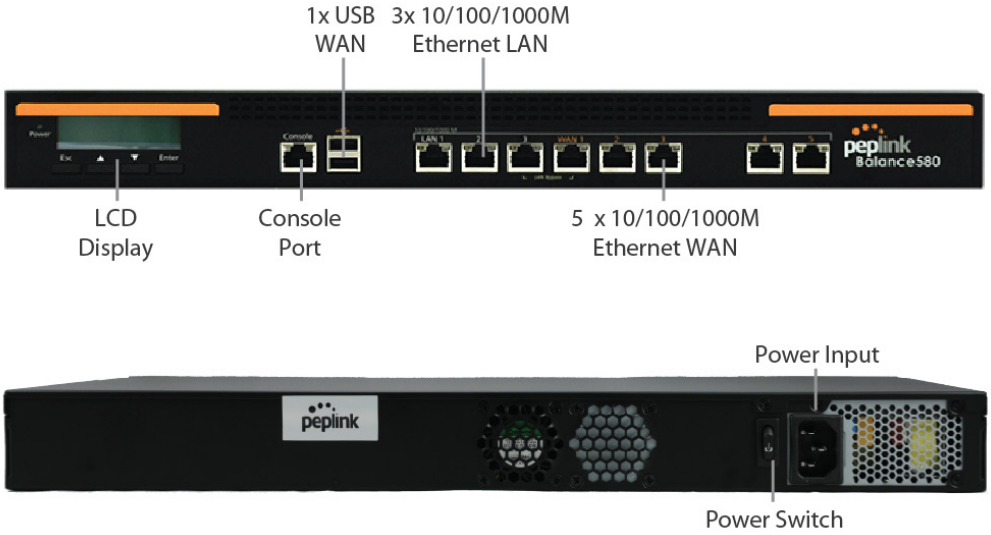
1x LTE-A Module	
Interface	1x Embedded LTE-A Cellular Modems with Redundant SIM Slots
Antenna Connectors	2x SMA Cellular Antenna Connectors
Downlink / Uplink Datarate	300Mbps/50Mbps (CAT-6) 600Mbps/150Mbps (CAT-12)
Power Consumption	10W
Weight	0.83 pounds | 375 grams

1xLTE-A Module	
Interface	1x Embedded LTE-A Cellular Modems with Redundant SIM Slots
Antenna Connectors	4x SMA Cellular Antenna Connectors
Downlink / Uplink Datarate	1.2 Gbps/150 Mbps (CAT-18)
Power Consumption	10W

Weight	0.83 pounds | 375 grams

6.16 Peplink Balance 580

6.16.1 Panel Appearance



6.16.2 LED Indicators

The statuses indicated by the front panel LEDs are as follows:

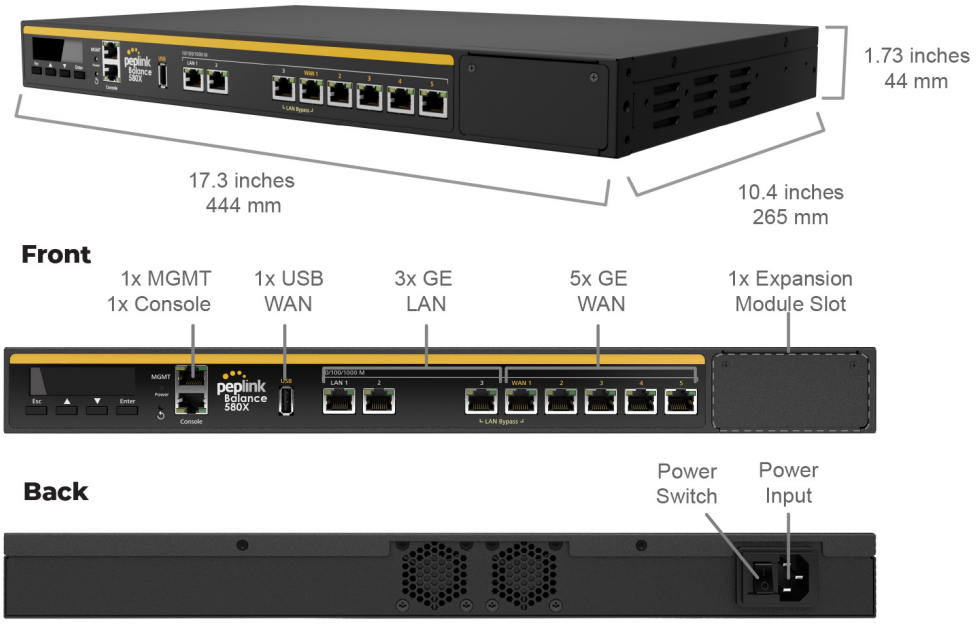
Power and Status Indicators	
Power LED	OFF – Power off
	Green – Power on

LAN Port, WAN 1 – 5 Ports	
Right LED	Orange – 1000 Mbps
	Green – 100 Mbps
	OFF – 10 Mbps
Left LED	Solid – Port is connected without traffic
	Blinking – Data is transferring
	OFF – Port is not connected
Port Type	Auto MDI/MDI-X ports

Console and USB Ports	
Console Port	Reserved for engineering use
USB Ports	For connecting a 4G/3G USB modem

6.17 Peplink Balance 580X

6.17.1 Panel Appearance



6.17.2 LED Indicators

The statuses indicated by the front panel LEDs are as follows:

Power and Status Indicators	
Power LED	OFF – Power off
	Green – Power on

LAN Port, WAN 1 – 5 Ports	
Right LED	Green – 1000 Mbps
	OFF – 10 / 100 Mbps

Left LED	Solid – Port is connected without traffic
	Blinking – Data is transferring
	OFF – Port is not connected
Port Type	Auto MDI/MDI-X ports

Console and USB Ports	
Console Port	Reserved for engineering use
USB Ports	For connecting a 4G/3G USB modem

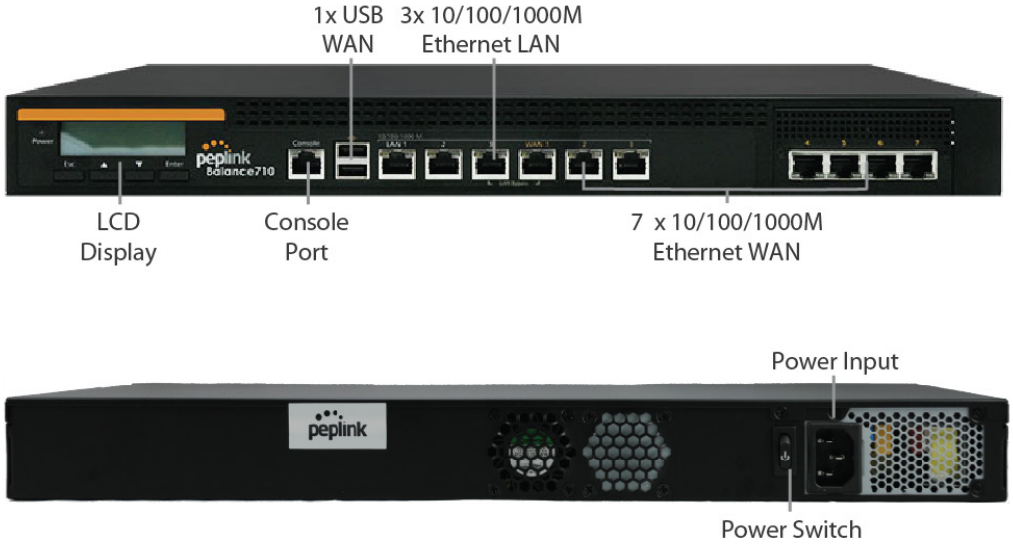
6.17.3 Flex Module Mini

1x LTEA Module	
Interface	1x Embedded LTE-A Cellular Modems with Redundant SIM Slots
Antenna Connectors	2x SMA Cellular Antenna Connectors
Downlink / Uplink Datarate	300Mbps/50Mbps (CAT-6) 600Mbps/150Mbps (CAT-12)
Power Consumption	10W
Weight	0.83 pounds | 375 grams

1xLTEA Module	
Interface	1x Embedded LTE-A Cellular Modems with Redundant SIM Slots
Antenna Connectors	4x SMA Cellular Antenna Connectors
Downlink / Uplink Datarate	1.2 Gbps/150 Mbps (CAT-18)
Power Consumption	10W
Weight	0.83 pounds | 375 grams

6.18 Peplink Balance 710

6.18.1 Front Panel Appearance



6.18.2 LED Indicators

Status indicated in the front panel is as follows:

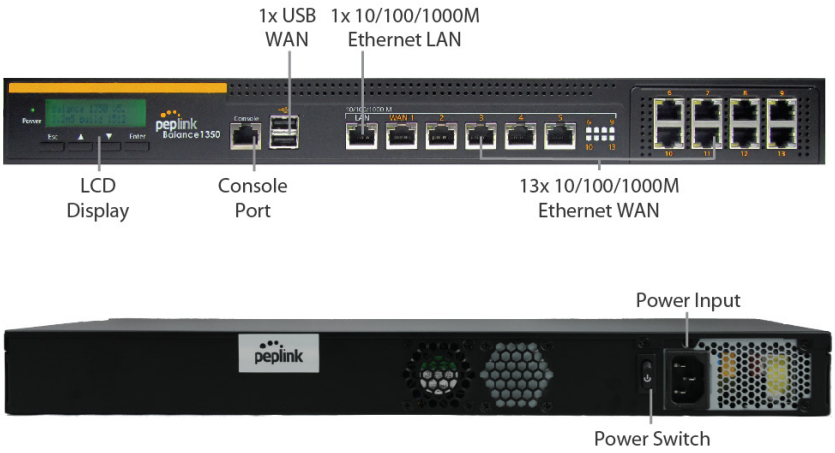
LED Indicator	
Power LED	OFF – Power off
	Green – Power on

LAN Port, WAN 1 – 7 Ports	
Green LED	Orange – 1000 Mbps
	Green – 100 Mbps
	OFF – 10 Mbps
Orange LED	Solid – Port is connected without traffic
	Blinking – Data is transferring
	OFF – Port is not connected
Port Type	Auto MDI/MDI-X ports

Console & USB Ports	
Console Port	Reserved for engineering use
USB Ports	For connecting a 4G/3G USB modem

6.19 Peplink Balance 1350

6.19.1 Panel Appearance



6.19.2 LED Indicators

Status indicated in the front panel is as follows:

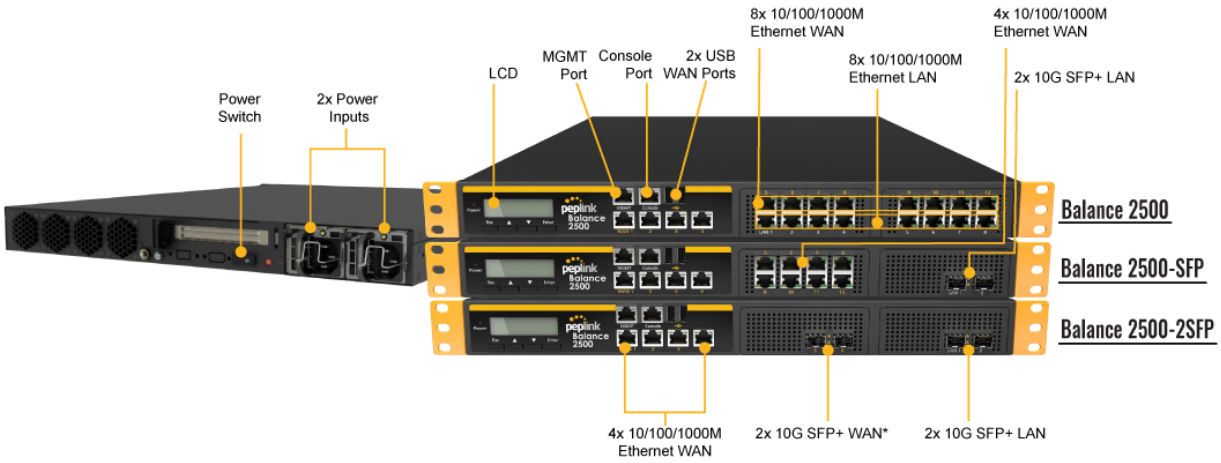
LED Indicator	
Power LED	OFF – Power off
	Green – Power on

LAN Port, WAN 1 – 13 Ports	
Right LED	Orange – 1000 Mbps
	Green – 100 Mbps
	OFF – 10 Mbps
Left LED	Solid – Port is connected without traffic
	Blinking – Data is transferring
	OFF – Port is not connected
Port Type	Auto MDI/MDI-X ports

Console & USB Ports	
Console Port	Reserved for engineering use
USB Ports	For connecting a 4G/3G USB modem

6.20 Peplink Balance 2500

6.20.1 Panel Appearance



*Balance 2500 is available in two configurations with different LAN interfaces.

6.20.2 LED Indicators

Status indicated in the front panel is as follows:

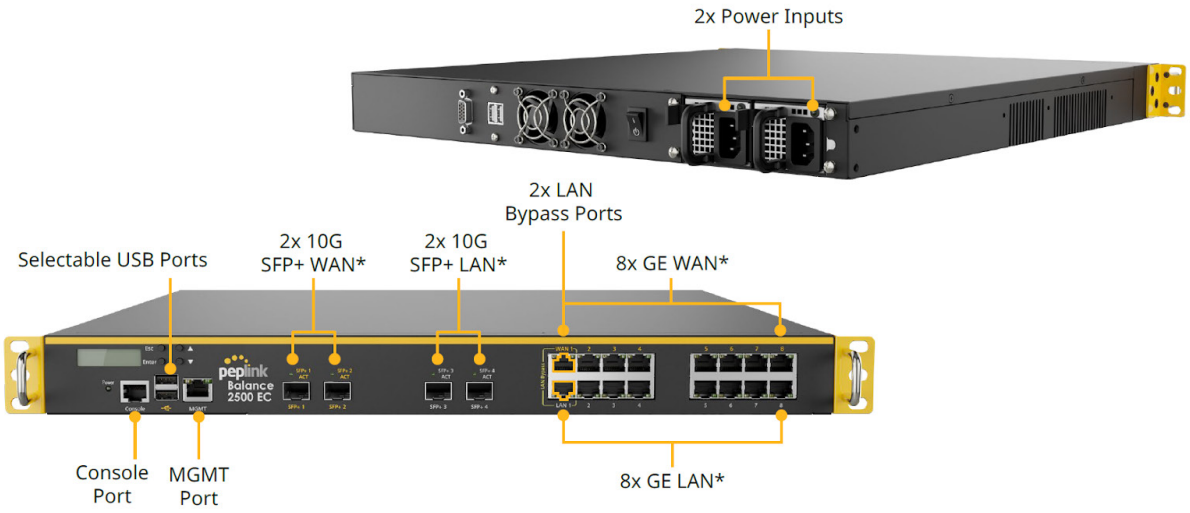
LED Indicator	
Power LED	OFF – Power off
	Green – Power on

LAN and WAN Ports	
Right LED	Orange – 1000 Mbps
	Green – 100 Mbps
	OFF – 10 Mbps
Left LED	Solid – Port is connected without traffic
	Blinking – Data is transferring
	OFF – Port is not connected
Port Type	Auto MDI/MDI-X ports

Console & USB Ports	
Console Port	Reserved for engineering use
USB Ports	For connecting a 4G/3G USB modem

6.21 Peplink Balance 2500 EC

6.21.1 Panel Appearance



6.21.2 LED Indicators

Status indicated in the front panel is as follows:

LED Indicator	
Power LED	OFF – Power off
	Green – Power on

LAN and WAN Ports	
Right LED	Orange – 1000 Mbps
	Green – 100 Mbps
	OFF – 10 Mbps
Left LED	Solid – Port is connected without traffic
	Blinking – Data is transferring
	OFF – Port is not connected

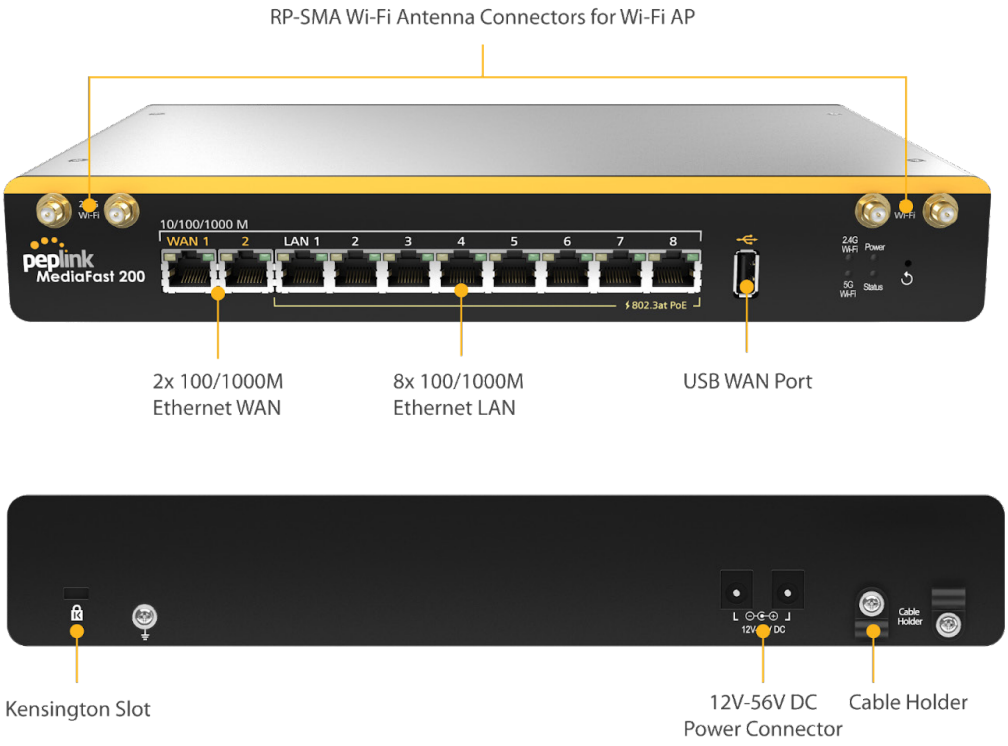
Port Type	Auto MDI/MDI-X ports

Console & USB Ports	
USB Ports	For connecting a 4G/3G USB modem

7 Peplink MediaFast Overview

7.1 Peplink MediaFast 200

7.1.1 Panel Appearance



7.1.2 LED Indicators

Status indicated in the front panel is as follows:

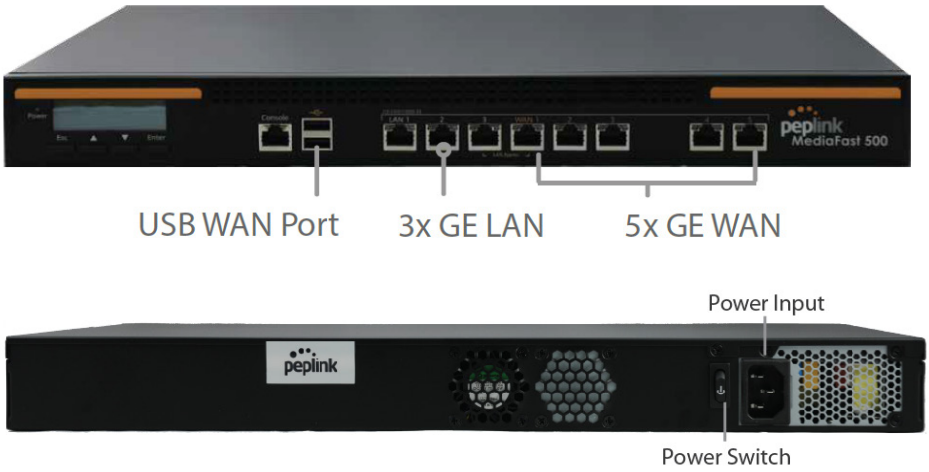
LED Indicator	
Power LED	OFF – Power off
	Green – Power on

LAN 1-3 Ports, WAN 1-5 Ports	
Right LED	Orange – 1000 Mbps
	Green – 100 Mbps
	OFF – 10 Mbps
Left LED	Solid – Port is connected without traffic
	Blinking – Data is transferring
	OFF – Port is not connected
Port Type	Auto MDI/MDI-X ports

Console & USB Ports	
Console Port	Reserved for engineering use
USB Ports	For connecting 4G/3G USB modems

7.2 Peplink MediaFast 500

7.2.1 Panel Appearance



7.2.2 LED Indicators

Status indicated in the front panel is as follows:

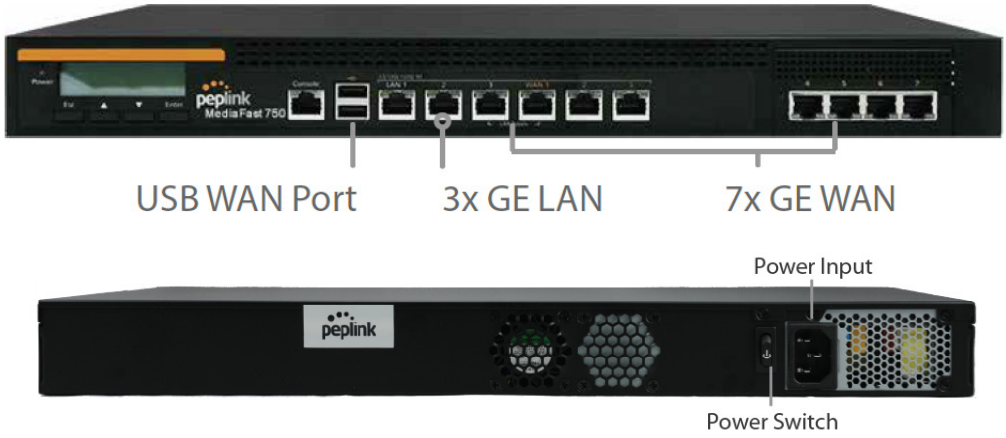
LED Indicator	
Power LED	OFF – Power off
	Green – Power on

LAN 1-3 Ports, WAN 1-5 Ports	
Right LED	Orange – 1000 Mbps
	Green – 100 Mbps
	OFF – 10 Mbps
Left LED	Solid – Port is connected without traffic
	Blinking – Data is transferring
	OFF – Port is not connected
Port Type	Auto MDI/MDI-X ports

Console & USB Ports	
Console Port	Reserved for engineering use
USB Ports	For connecting 4G/3G USB modems

7.3 Peplink MediaFast 750

7.3.1 Panel Appearance



7.3.2 LED Indicators

Status indicated in the front panel is as follows:

LED Indicator	
Power LED	OFF – Power off
	Green – Power on

LAN 1-3 Ports, WAN 1-5 Ports	
Right LED	Orange – 1000 Mbps
	Green – 100 Mbps
	OFF – 10 Mbps
Left LED	Solid – Port is connected without traffic
	Blinking – Data is transferring
	OFF – Port is not connected
Port Type	Auto MDI/MDI-X ports

Console & USB Ports	
Console Port	Reserved for engineering use
USB Ports	For connecting 4G/3G USB modems

8 Peplink Flex-Module Supported Models

8.1 Peplink EPX

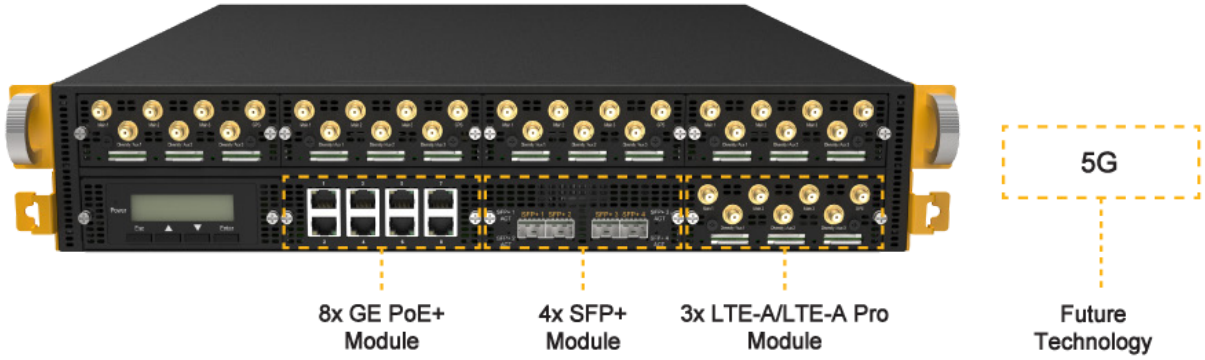
The EPX is a rapidly deployable, powerful, and versatile SD-WAN router that connects a wide range of WAN options from LTE-A, satellite modems, to fixed line networks this can be used simultaneously to allow bonding using our SpeedFusion technology.
With its modular construction, the EPX is suitable for any deployment.

8.1.1 Main Chassis

EPX Main Chassis	
Power Input	AC Input 100V - 240V
Power Consumption (Main Chassis only)	215W
Throughput	30Gbps
PepVPN/SpeedFusion Throughput (256-bit AES)	2Gbps
Dimensions	18.9 x 21.7 x 3.6 inches - 480 x 550 x 90 mm
Weight (No Modules)	31.3 pounds - 14.2 kilograms
Operating Temperature	32° – 113°F (0° – 45°C)
Humidity	5% – 90% (non-condensing)
Certifications	FCC, IC, CE-RED EN 50155: Railway Applications EN 61373:1999 IEC 61373:1999 : Shock and Vibration Resistance EN 50121: Rolling Stock EMC, Signalling and Telecom Apparatus
Warranty	1-Year Limited Warranty

8.1.2 Panel Appearance

Front



Back

8.1.3 LED Indicators

Status indicated in the LAN/WAN port module is as follows:
Note: some EPX configurations are not shipped with this module

LED Indicator	
Power LED	OFF – Power off
	Green – Power on

LAN Port, WAN Ports	
Right LED	Orange – Enabled as WAN port
	Green – PoE enabled
	OFF – PoE is disabled
Left LED	Solid – Port is connected without traffic
	Blinking – Data is transferring
	OFF – Port is not connected
Port Type	Auto MDI/MDI-X ports

Console & USB Ports	
Console Port	CLI Console connection
USB Ports	For connecting a 4G/3G USB modem

8.2 Peplink SDX

The SDX is a Modular Enterprise Grade Router. In addition to popular features such as SpeedFusion SD-WAN and InControl centralized management, the SDX has an expandable module that you can change according to your needs.
The SDX includes two integrated SFP+ WAN Ports, as well as eight PoE-enabled LAN Ports. These ports are available no matter which module you use.

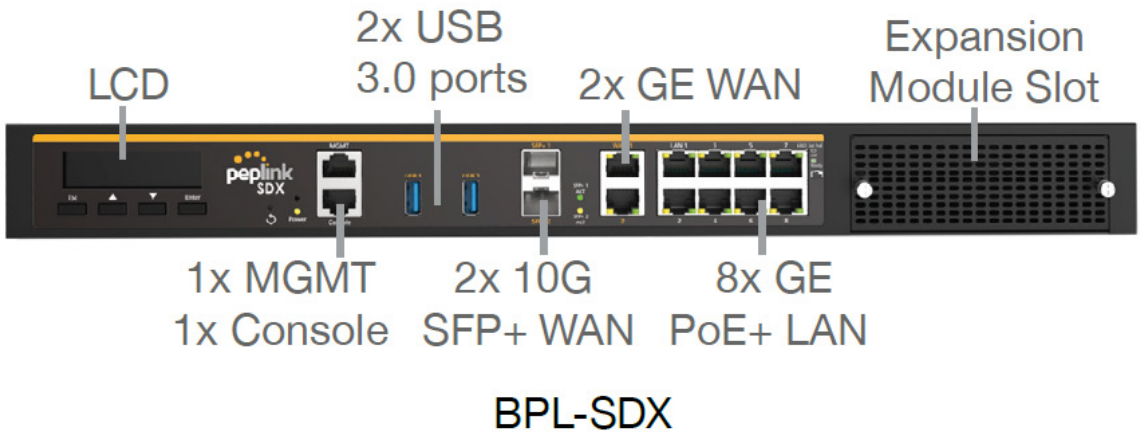
8.2.1 Main Chassis

SDX Main Chassis	
Power Input	AC Input 100V - 240V
Power Consumption	80W System* , 330W PoE+ Power Budget
Throughput	12 Gbps
PepVPN/SpeedFusion Throughput	No Encryption: 1 Gbps 256-bit AES: 600 Mbps
Dimensions	17.2 x 13.3 x 1.7 inches - 438 x 340 x 44 mm
Weight (No Modules)	11.7 pounds - 5.3 kilograms
Operating Temperature	32° – 104°F (0° – 40°C)
Humidity	5% – 90% (non-condensing)
Certifications	FCC, IC, CE

* 80W consumption for the main chassis, 20W consumption for the optional module.

8.2.2 Panel Appearance

Front:



Back:

8.2.3 LED Indicators

LED Indicator	
Power LED	OFF – Power off
	Green – Power on

WAN Ports	
Right LED	Green – 1000 Mbps
	OFF – 10 Mbps / 100 Mbps or the port is not connected
Left LED	Solid – Port is connected without traffic
	Blinking – Data is transferring

	OFF – Port is not connected
Port Type	Auto MDI/MDI-X ports

LAN Ports	
Right LED	Green – PoE enabled
	OFF – PoE is disabled
Left LED	Solid – Port is connected without traffic
	Blinking – Data is transferring
	OFF – Port is not connected
Port Type	Auto MDI/MDI-X ports

Console, MGMT & USB Ports	
Console Port	CLI console connection
USB Ports	For connecting 4G/3G USB modems for additional WAN connections
MGMT Port	Management port

8.3 Peplink SDX Pro

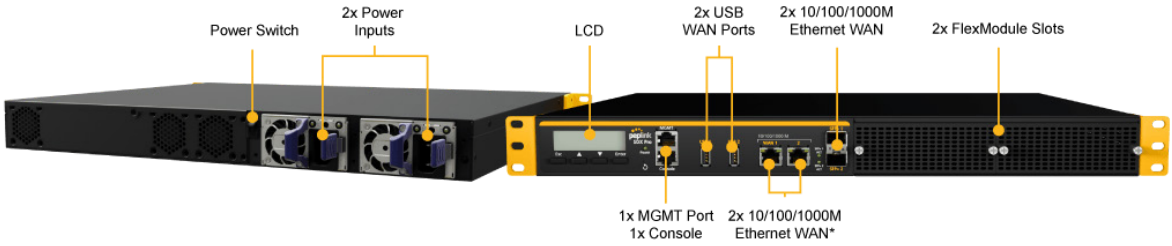
In addition to the power of the SDX, the SDX Pro offers greater flexibility and functionality. It has two FlexModule slots, enabling you to customize the device with different modules to suit any deployment. It supports edge computing so it can deliver websites, applications, and docker containers to connected devices.

8.3.1 Main Chassis

SDX Pro Main Chassis	
Power Input	AC Input 100V - 240V
Power Consumption	140W System* , 420W PoE+ Power Budget
Throughput	24 Gbps
PepVPN/SpeedFusion Throughput	No Encryption: 1 Gbps 256-bit AES: 600 Mbps
Dimensions	17.2 x 13.8 x 1.7 inches - 438 x 350 x 44 mm
Weight (No Modules)	15.9 pounds - 7.2 kilograms
Operating Temperature	32° – 104°F (0° – 40°C)
Humidity	10% – 85% (non-condensing)
Certifications	FCC, IC, CE

* 140W consumption for the main chassis, 20W consumption for the optional module.

8.3.2 Panel Appearance



* WAN ports are configured as a LAN ports by default, configuration is changeable on the Web Admin

8.3.3 LED Indicators

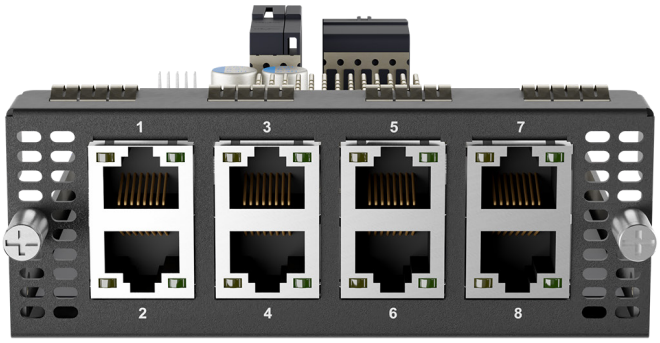
LED Indicator	
Power LED	OFF – Power off
	Green – Power on

WAN Ports	
Right LED	Green – 1000 Mbps
	OFF – 10 Mbps / 100 Mbps or port is not connected
Left LED	Solid – Port is connected without traffic
	Blinking – Data is transferring
	OFF – Port is not connected
Port Type	Auto MDI/MDI-X ports

Console, MGMT & USB Ports	
Console Port	CLI console connection
USB Ports	For connecting 4G/3G USB modems for additional WAN connections
MGMT Port	Management port

8.4 Flex Module Expansion Modules

8.4.1 8x GE PoE+ Module (EXM-8C)



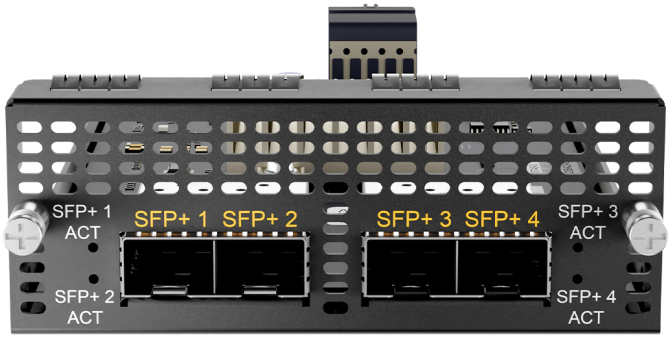
8x GE PoE Module	
Interface	8x 10/100/1000M Ethernet Ports * Capable of PoE+
Power Consumption	15W (255W max. with 802.3at/af PoE+ Output)
Dimensions	4.1 x 7.4 x 1.5 inches 103 x 188 x 38 mm
Weight	1.1 pounds (475 grams)

* Module can be configured with LAN or WAN ports as needed.

LED Indicator:

Ethernet Ports	
Right LED	Orange – Enabled as WAN port
	Green – PoE enabled
	OFF – PoE is disabled
Left LED	Solid – Port is connected without traffic
	Blinking – Data is transferring
	OFF – Port is not connected
Port Type	Auto MDI/MDI-X ports

8.4.2 4x SFP+ Module (EXM-4F)



4x SFP+ Module	
Interface	4x SFP+ Ports *
Power Consumption	11W
Dimensions	4.1 x 7.4 x 1.5 inches 103 x 188 x 38 mm
Weight	0.83 pounds (375 grams)

8.4.3 3x LTE-A Module (EXM-3LTEA)

3x LTE-A Module	
Interface	3x Embedded LTE-A Cellular Modems with Redundant SIM Slots
Antenna Connectors	6x SMA Cellular Antenna Connectors 1x SMA GPS Antenna Connector
Power Consumption	20W
Dimensions	4.1 x 7.4 x 1.5 inches 103 x 188 x 38 mm
Weight	0.83 pounds (375 grams)

8.4.4 4x LTE-A Module (EXM-4LTEA)

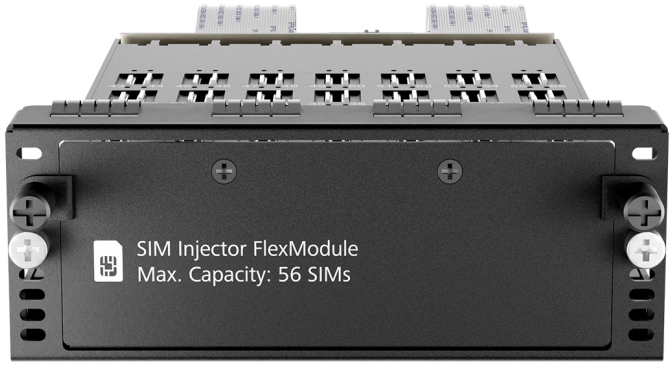
3x LTE-A Module	
Interface	4x Embedded LTE-A Cellular Modems with Redundant SIM Slots
Antenna Connectors	8x SMA Cellular Antenna Connectors 1x SMA GPS Antenna Connector
Power Consumption	20W
Dimensions	4.1 x 7.4 x 1.5 inches 103 x 188 x 38 mm
Weight	0.83 pounds (375 grams)

8.4.5 CAT-18. 2x LTE-A Module (EXM-2GLTE-G)

2x LTE-A Module	
Interface	2x Embedded LTE-A Cellular Modems with Redundant 4FF Nano SIM Slots
Antenna Connectors	8x SMA Cellular Antenna Connectors 1x SMA GPS Antenna Connector
Power Consumption	20W
Dimensions	4.1 x 7.4 x 1.5 inches 103 x 188 x 38 mm
Weight	0.83 pounds (375 grams)

8.4.6 SIM Injector FlexModule (EXM-SIM-BK56)

*** Compatible with EPX, SDX Pro**



SIM Injector FlexModule	
SIM Slot Capacity	56 4FF Nano SIM Cards
Power Consumption	15W
Dimensions	4.1 x 7.4 x 1.5 inches 103 x 188 x 38 mm
Weight	1.30 pounds (600 grams)

8.4.7 2x 5G Module (EXM-2X5GD)

2x 5G Module	
Interface	2x Embedded Cellular Modems with Redundant 4FF Nano SIM Slots
Antenna Connectors	8x SMA Cellular Antenna Connectors 1x SMA GPS Antenna Connector
Power Consumption	20W
Dimensions	4.1 x 7.4 x 1.5 inches 103 x 188 x 38 mm
Weight	0.83 pounds (375 grams)

9 OLED Display Menu

> HA State: Master/Slave
>> > LAN IP
>> > VIP
> System Status
>> > System
>>> > Firmware ver. (shows firmware version)
>>> > Serial number (shows serial number)
>>> > System time (shows current time)
>>> > System uptime (shows system uptime since last reboot)
>>> > CPU load (shows current CPU loading, 0-100%)
>>> > LAN
>>>> > Status (shows LAN port physical status)
>>>> > IP address (shows LAN IP address)
>>>> > Subnet mask (shows LAN subnet mask)
>> > Link status (shows Connected/Disconnected, IP address list)
>>> > WAN1
>>> > WAN2
>>> > WAN3*
>> > VPN status (shows Connected/Disconnected)
>>> >*VPN Profile 1*
>>> >*VPN Profile 2*
>>> >…
>>> >*VPN Profile n*
>> > Link usage
>>> > Throughput in (shows transfer rate in Kbps)
>>>> > WAN1
>>>> > WAN2
>>>> > WAN3*
>>> > Throughput out (shows transfer rate in Kbps)
>>>> > WAN1
>>>> > WAN2
>>>> > WAN3*
>> > Data Transfered (shows volume transferred since last reboot in MB)
>>> > WAN1
>>> > WAN2
>>> > WAN3*
> Maintenance
>> > Reboot > Reboot? (Yes/No) (to reboot the unit)
>> > Factory default > Factory default? (Yes/No) (to restore factory defaults)
> LAN config
>> > Port speed (shows port speed: Auto, 10baseT-FD, 10baseT-HD, 100baseTx-FD, 100baseTx-HD, 1000baseTx-FD)
>>> > LAN
>>> > WAN1
>>> > WAN2
>>> > WAN3*

*Layout continues as such for all available WAN ports

10 Installation

The following section details connecting the Peplink Balance to your network:

10.1 Preparation

Before installing your Peplink Balance, please prepare the following:

- At least one Internet/WAN access account
- For each network connection, one 10/100BaseT UTP cable with RJ45 connector, one 1000BaseT Cat5E UTP cable for the Gigabit port, or one USB modem for the USB WAN port
- A computer with the TCP/IP network protocol and a web browser installed— Supported browsers include Microsoft Internet Explorer 11 or above, Mozilla Firefox 24 or above, Apple Safari 7 or above, and Google Chrome 18 or above.

10.2 Constructing the Network

At the high level, construct the network according to the following steps:

1. With an Ethernet cable, connect a computer to one of the LAN ports on the Peplink Balance. For Peplink Balance models that support multiple connections, repeat with different cables connect up to 4 computers.
2. With another Ethernet cable, connect the WAN/broadband modem to one of the WAN ports on the Peplink Balance. Repeat using different cables to connect from two to 13 WAN/broadband connections or connect a USB modem to the USB WAN port.
3. Connect the provided power adapter or cord to the power connector on the Peplink Balance, and then plug the power adapter into a power outlet.

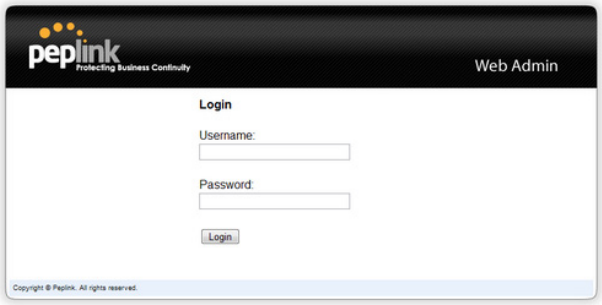
11 Basic Configuration

11.1 Connecting to the Web Admin Interface

Start a web browser on a computer that is connected with the Peplink Balance through the LAN.

To connect to the web admin of the Peplink Balance, enter the following LAN IP address in the address field of the web browser:

https://192.168.1.1

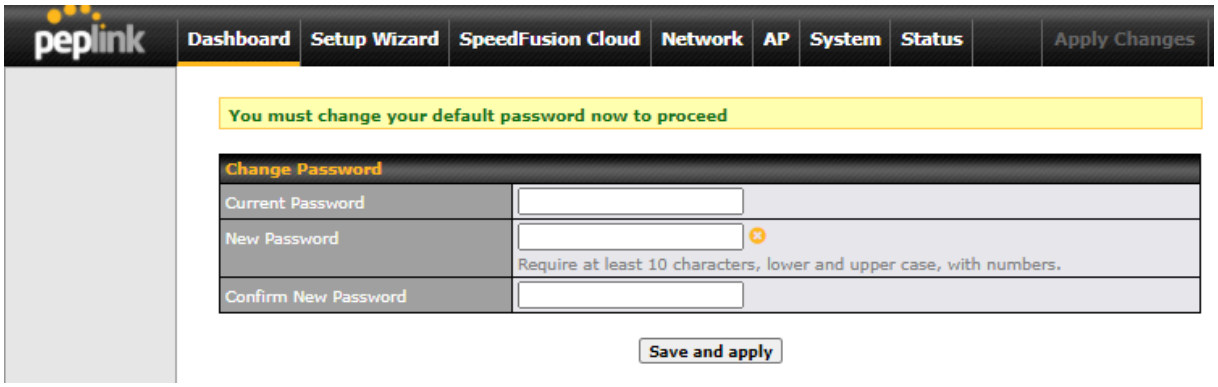


(This is the default LAN IP address of the Peplink Balance.) Enter the following to access the web admin interface.

Username: admin
Password: admin

(This is the default admin user login of the Peplink Balance.)
You must change the default password on the first successful logon.
Password requirements are: A minimum of 10 lower AND upper case characters, including at least 1 number.

When HTTP is selected, the URL will be redirected to HTTPS by default.



After successful login, the **Dashboard** of the web admin interface will be displayed.

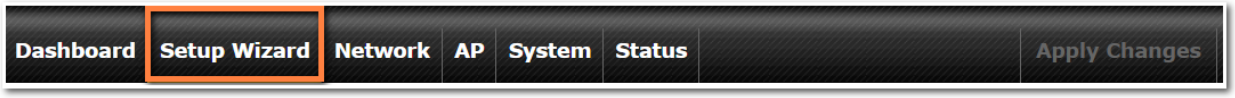
Important Note

The **Save** button causes the changes to be saved. Configuration changes (e.g., WAN, LAN, admin settings, etc.) take effect after clicking the **Apply Changes** button on each page's top-right corner.

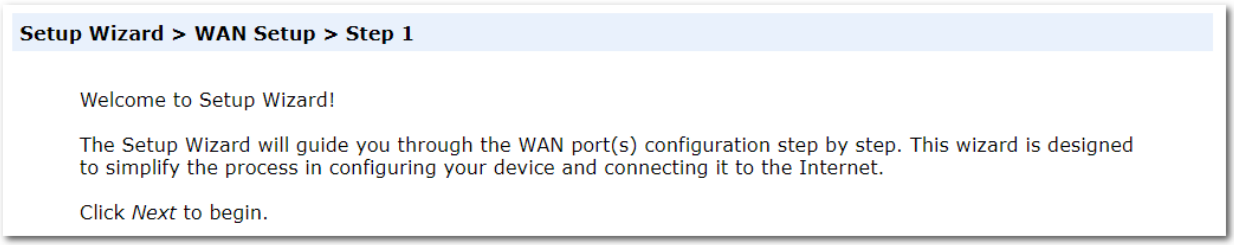
11.2 Configuration with the Setup Wizard

The Setup Wizard simplifies the task of configuring WAN connection(s) by guiding the configuration process step-by-step.

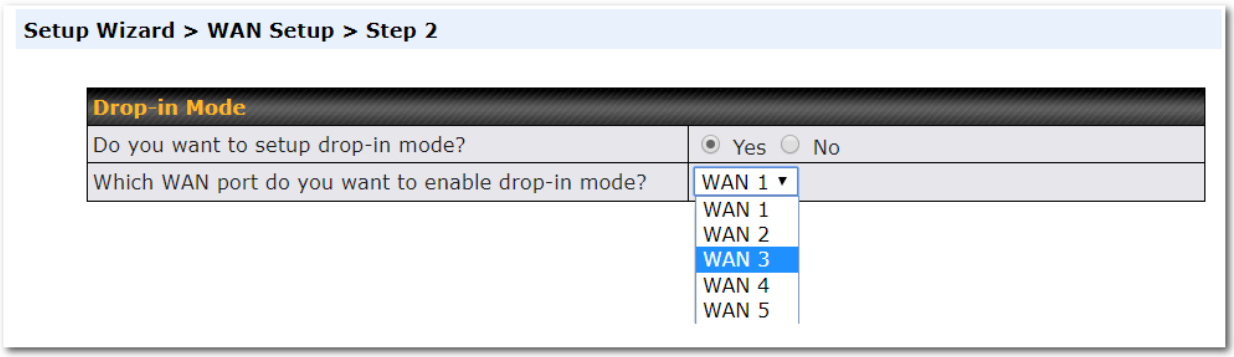
To begin, click **Setup Wizard** after connecting to the web admin interface.



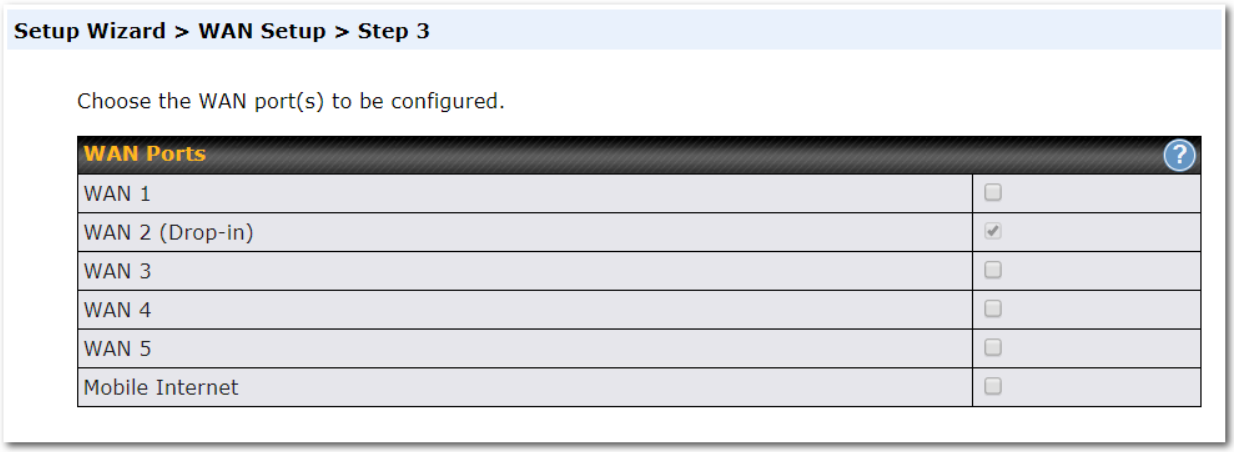
Click **Next >>** to begin.



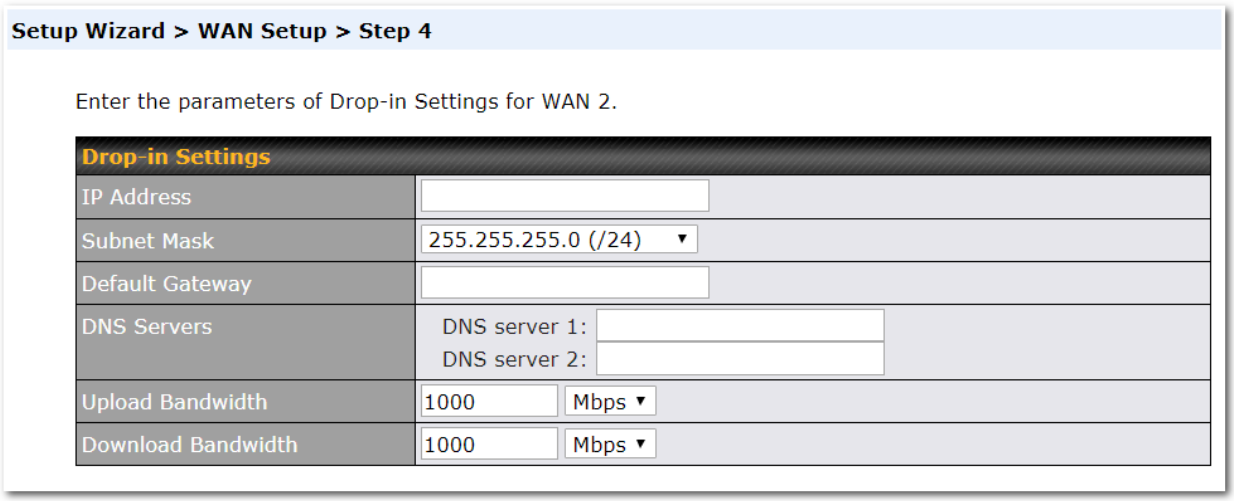
Select **Yes** if you want to set up drop-in mode using the Setup Wizard.



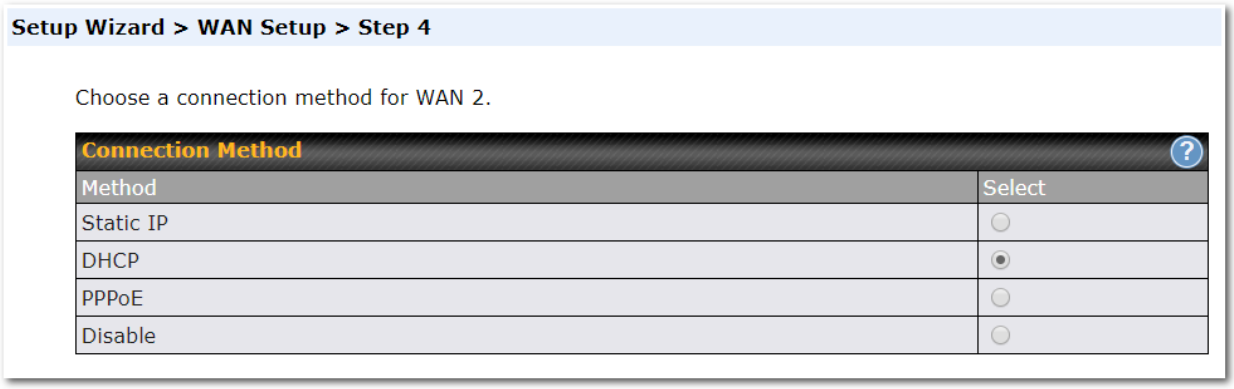
Click on the appropriate checkbox(es) to select the WAN connection(s) to be configured. If you have chosen to configure drop-in mode using the Setup Wizard, the WAN port to be configured in drop-in mode will be checked by default.



If drop-in mode is going to be configured, the setup wizard will move on to **Drop-in Settings**.

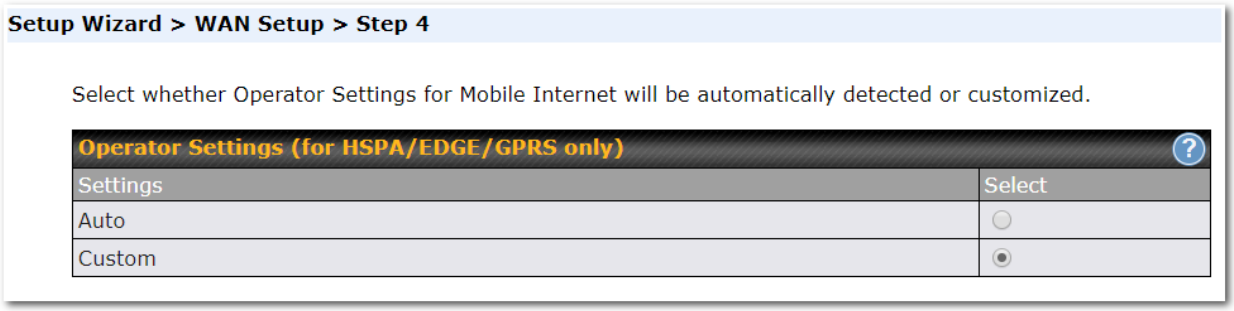


If you are not using drop-in mode, select the connection method for the WAN connection(s) from the following screen:

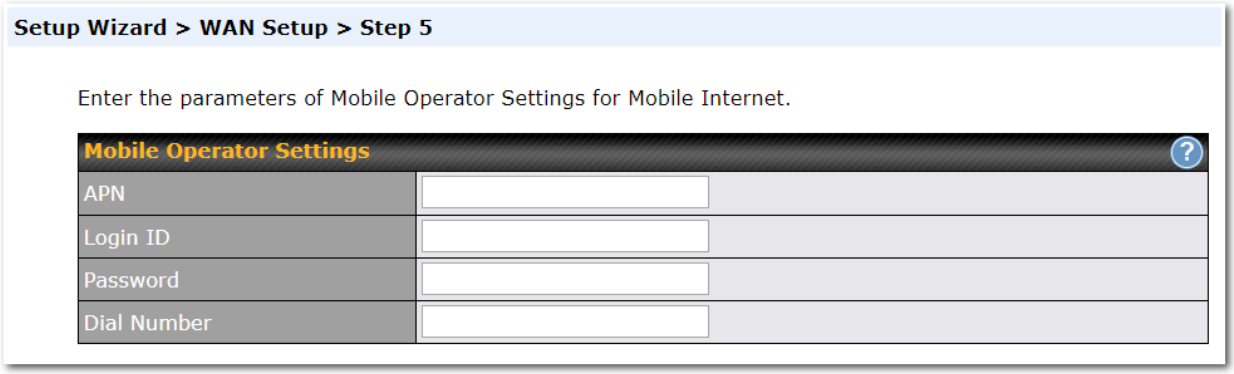


Depending on the selection of connection type, further configuration may be needed. For example, PPPoE and static IP require additional settings for the selected WAN port. Please refer to **Section 13, Configuring the WAN Interface(s)** for details on setting up DHCP, static IP, and PPPoE.

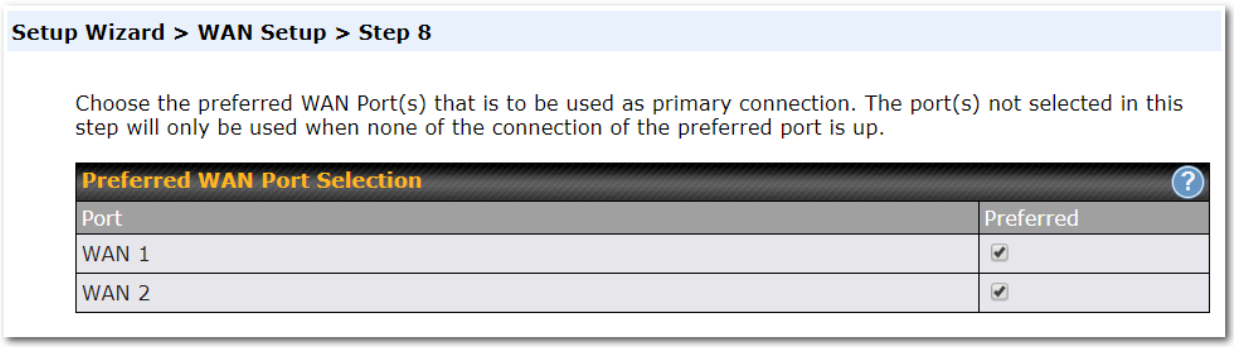
If **Mobile Internet Connection** is checked, the setup wizard will move on to **Operator Settings**.



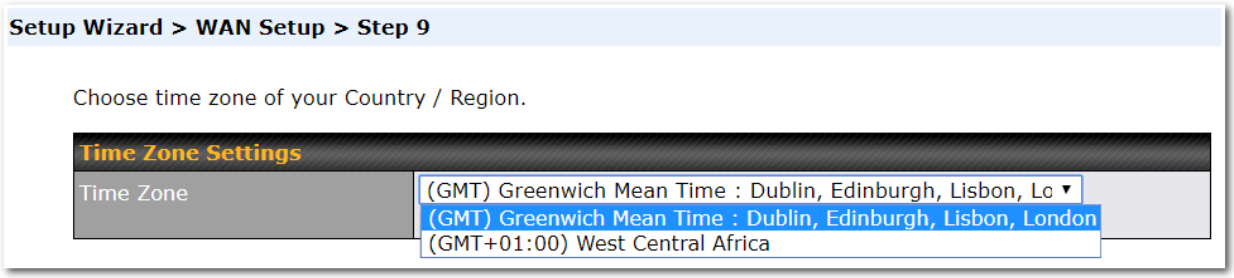
If **Custom Mobile Operator Settings** is selected, APN parameters are required. Some service providers may charge a fee for connecting to a different APN. Please consult your service provider for the correct settings.



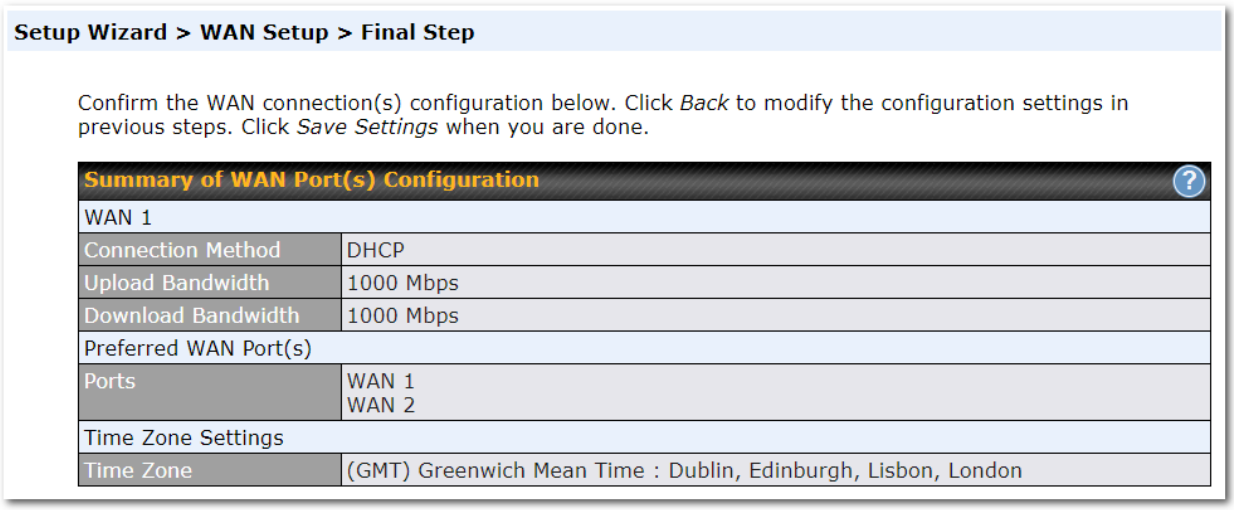
Click on the appropriate check box(es) to select the preferred WAN connection(s). Connection(s) not selected in this step will be used as a backup only. Click **Next >>** to continue.



Choose the time zone of your country/region. Check the box **Show all** to display all time zone options.



Check in the following screen to make sure all settings have been configured correctly, and then click "**Save Settings"** to confirm.



Setup Wizard > WAN Setup > Final Step

Confirm the WAN connection(s) configuration below. Click *Back* to modify the configuration settings in previous steps. Click *Save Settings* when you are done.

Summary of WAN Port(s) Configuration	
WAN 1	
Connection Method	DHCP
Upload Bandwidth	1000 Mbps
Download Bandwidth	1000 Mbps
Preferred WAN Port(s)	
Ports	WAN 1 WAN 2
Time Zone Settings	
Time Zone	(GMT) Greenwich Mean Time : Dublin, Edinburgh, Lisbon, London

After finishing the last step in the setup wizard, click **Apply Changes** on the page header to allow the configuration changes to take effect.

12 SpeedFusion Connect Protect

With Peplink products, your device is able to connect to SpeedFusion Connect Protect without the use of a second endpoint. This service has wide access to a number of SpeedFusion endpoints hosted from around the world, providing your device with unbreakable connectivity wherever you are.*

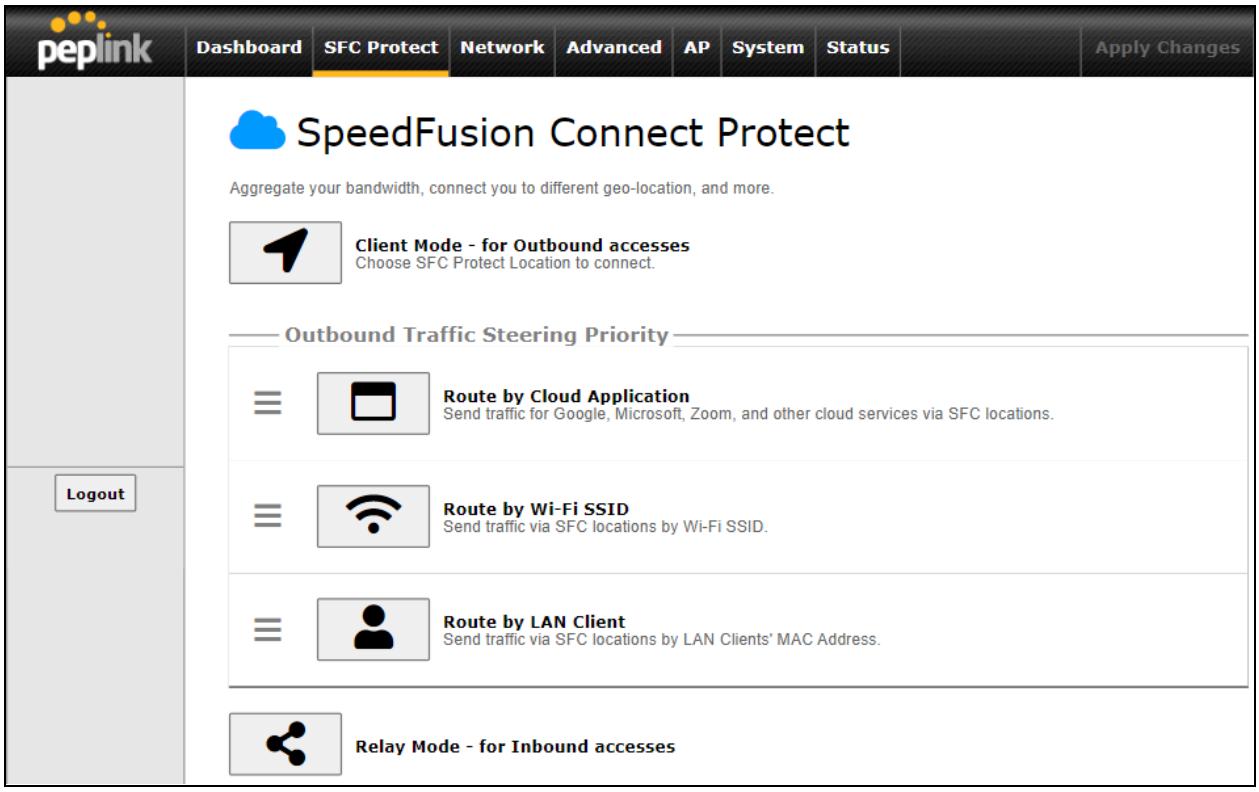
*SpeedFusion Connect is supported in firmware version 8.1.0 and above. SpeedFusion Connect Protect is a subscription basis. SpeedFusion Connect Protect license can be purchased at https://estore.peplink.com/ **> SpeedFusion Service > SpeedFusion Connect Protect**.

12.1 Activate SpeedFusion Connect Protect

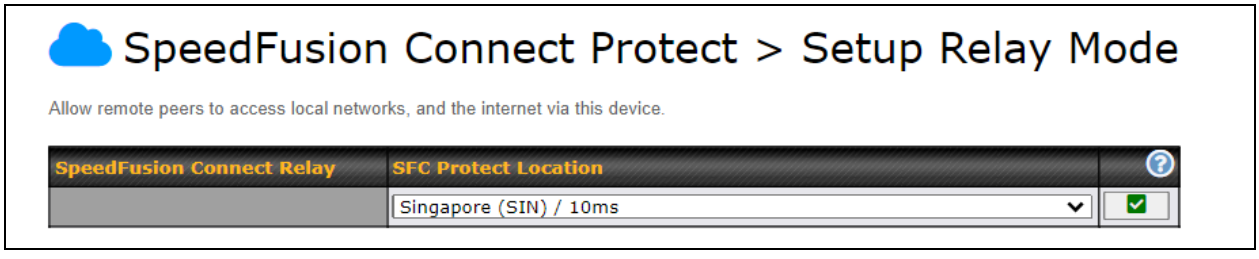
All Care plans now come with SpeedFusion Connect Protect included. This data allowance will automatically begin and end in accordance with your warranty. No activation is required.

12.2 Enable SpeedFusion Connect Protect

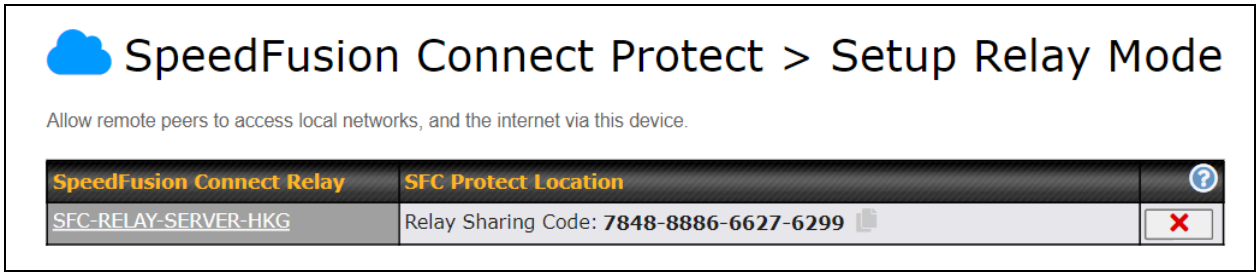
Access the Web Admin of the device you want to create as the Peplink Relay server or client, navigating to the "**SFC Protect**" tab.



To setup a Peplink Relay Mode, select "**Relay Mode - for Inbound accesses**" > Choose the **SFC Protect Location** you wish to connect to > Click on the **Green tick button** to confirm the change.

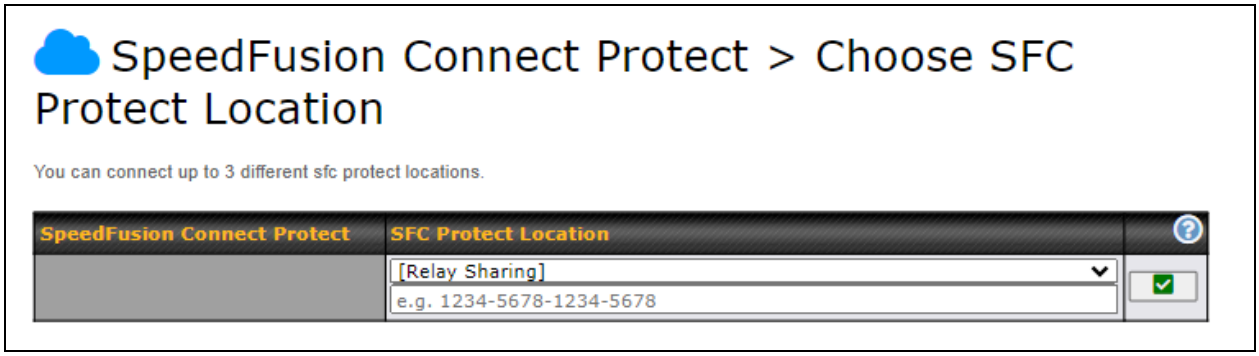


The Relay Sharing Code will be generated, and other peers can use this code to establish a SpeedFusion Connect Protect that will forward the traffics to this device, allowing them to access local networks and the internet via your WAN connection.

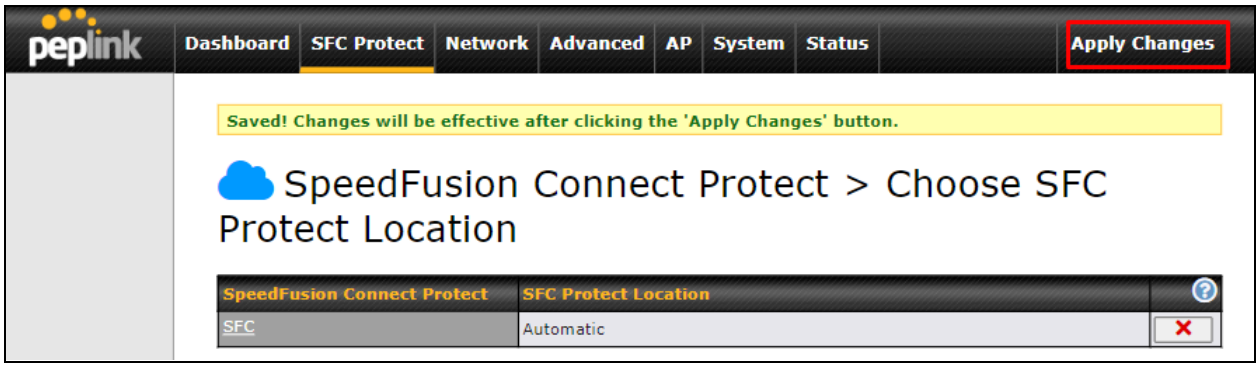


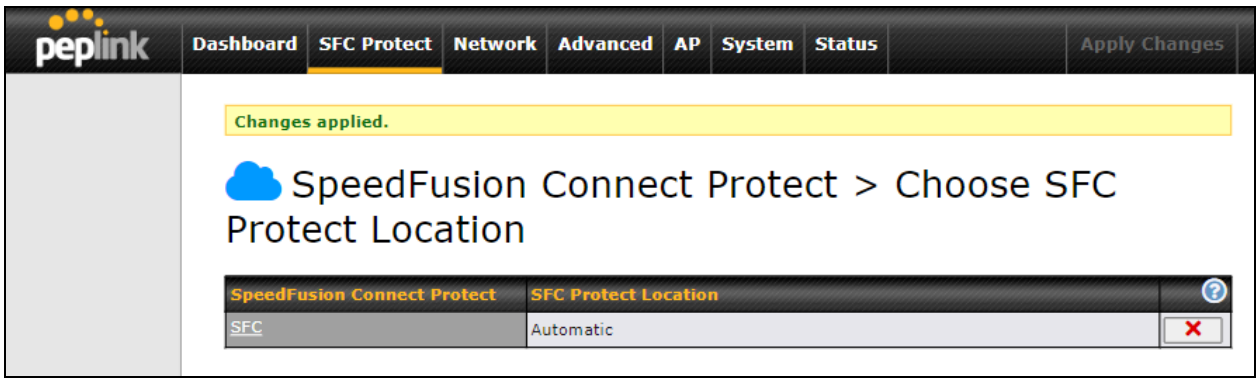
To connect to SpeedFusion Connect Protect, you can select a **SFC Protect Location** of your choice, or simply and **Automatic** then the device will establish connection to the neareset SFC Protect server.
Choose **Automatic > Click on the green tick button** to confirm the change.

Or you may select **Relay Mode** and use your **Relay Sharing Code** to create a profile if you have setup SpeedFusion Connect Relay service on another device.

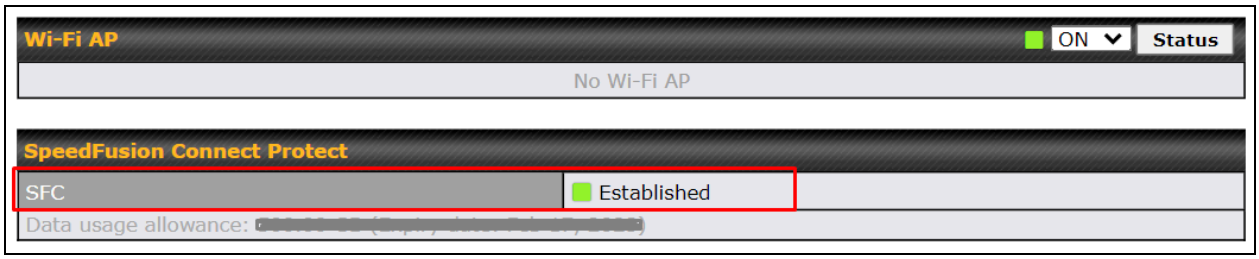


Click on **Apply Changes** to save the change.

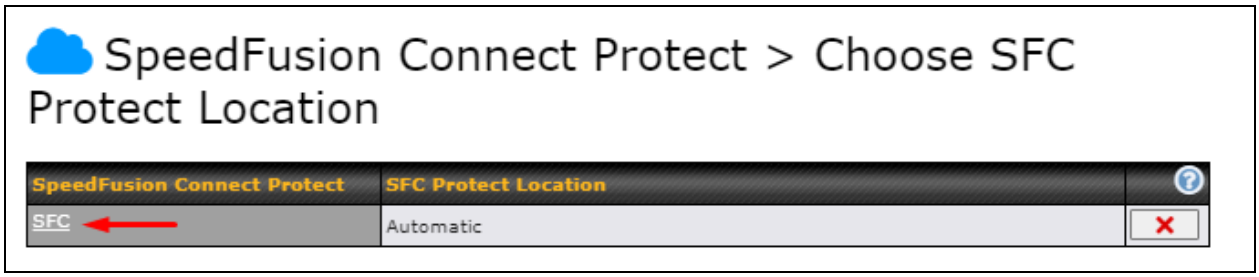




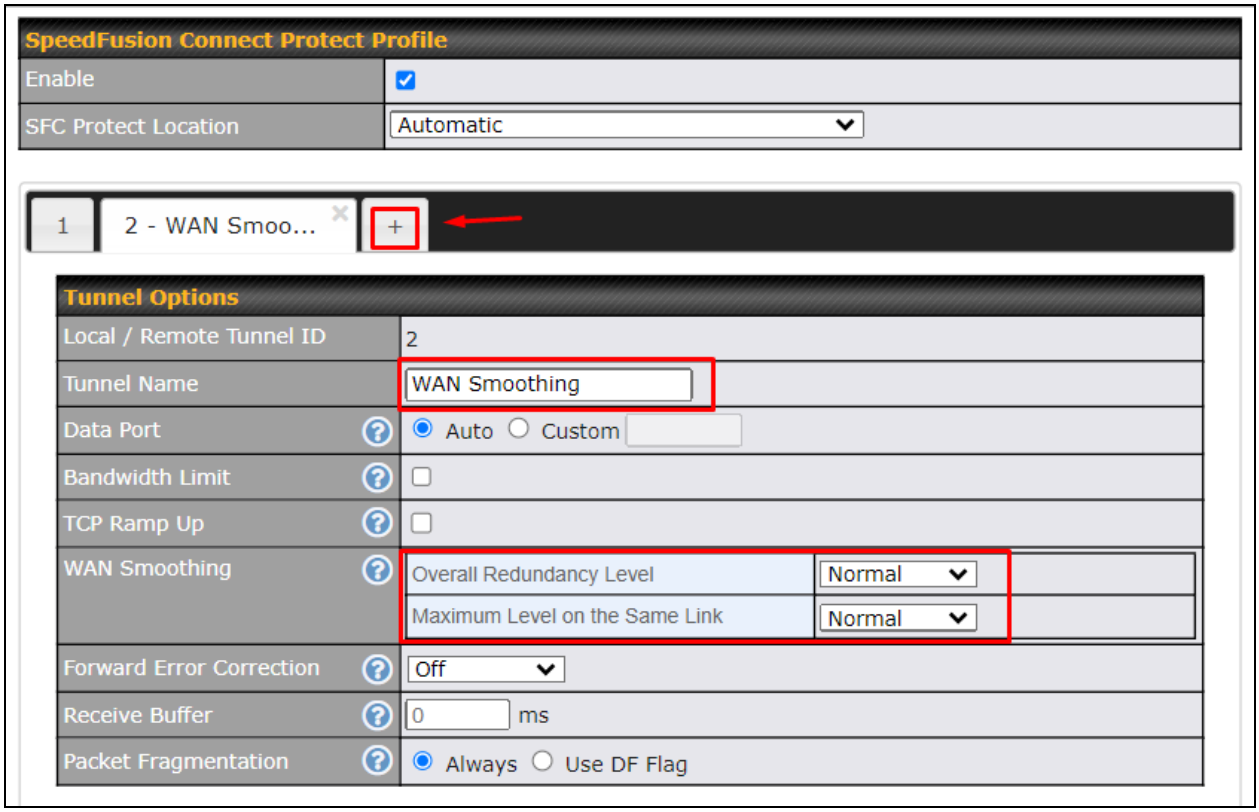
By default, the router will build a SpeedFusion tunnel to the SpeedFusion Connect Protect.



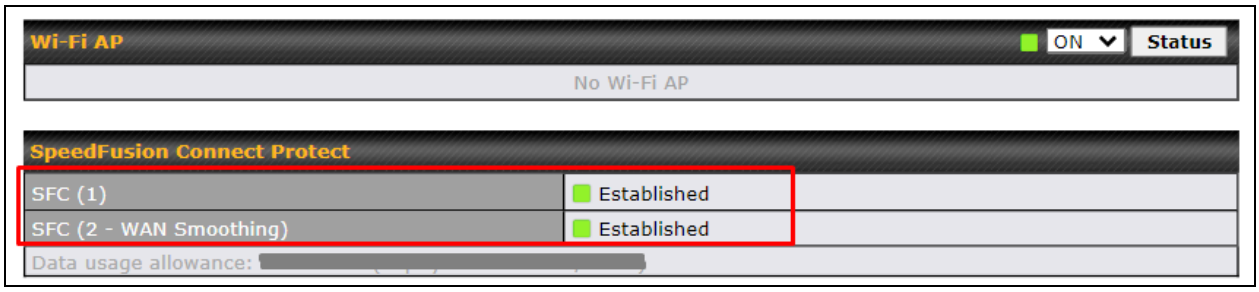
If you are running a latency sensitive service like video streaming or VOIP, a WAN Smoothing sub-tunnel can be created. Navigate to **SpeedFusion Connect Protect > Choose SFC Cloud Protect Location > SFC**.



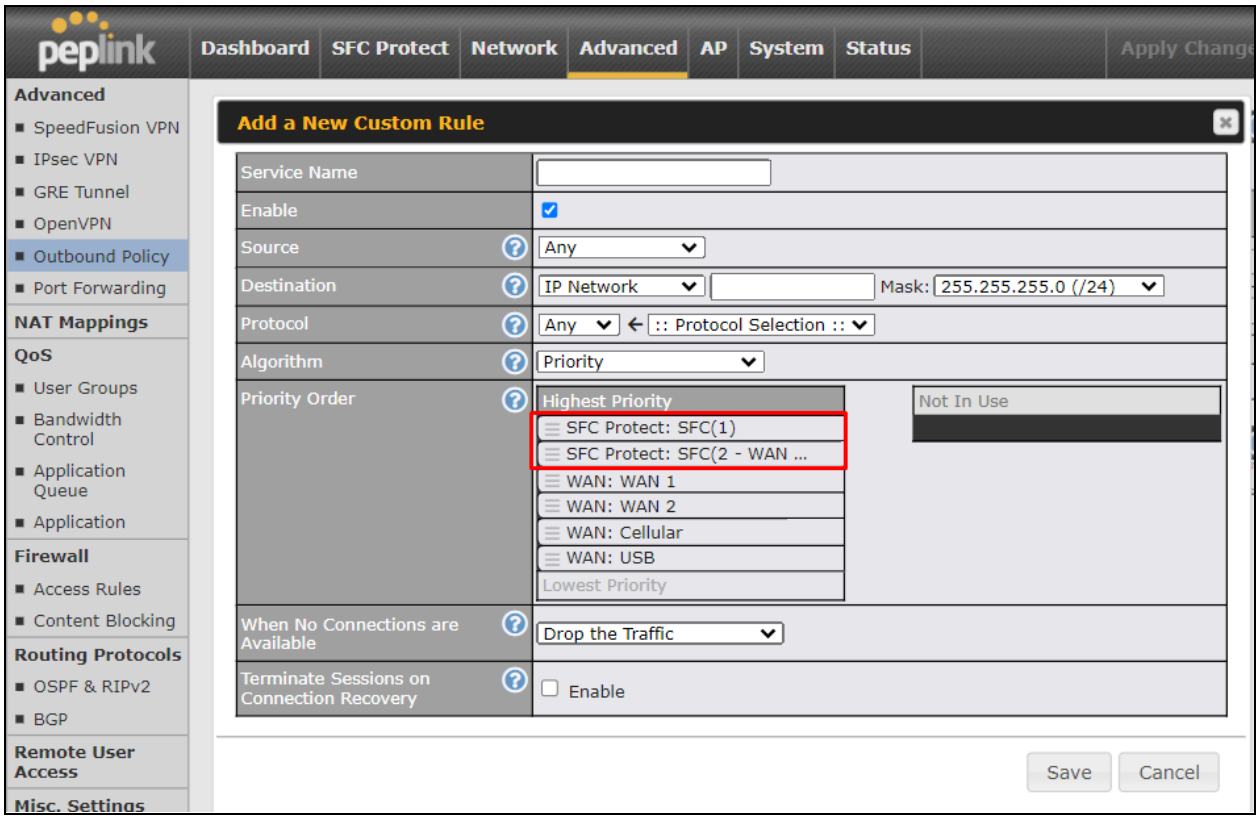
A SpeedFusion Connect Protect Profile configuration window will pop out. Click on the **+** sign to create the WAN Smoothing sub-tunnel.

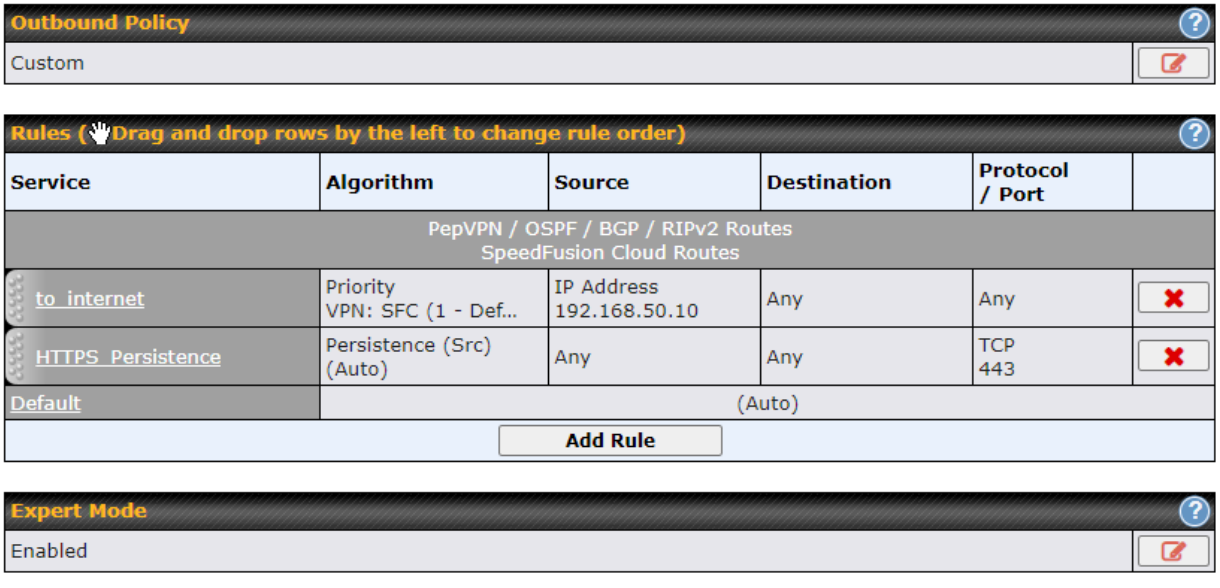


Click on **Save** and **Apply Changes** to save the configuration. Now, the router has 2 SpeedFusion tunnels to the SpeedFusion Connect Protect.



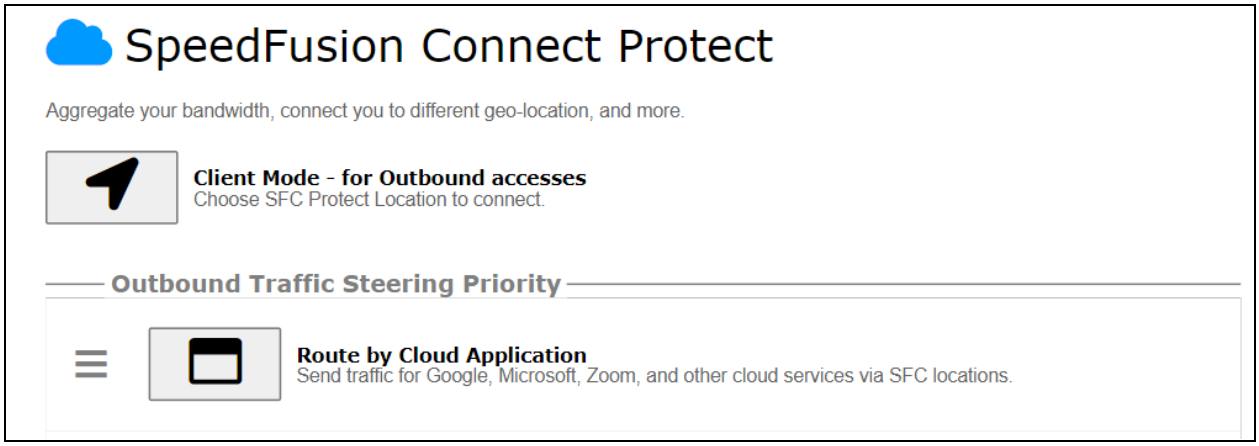
Create an outbound policy to steer the internet traffic to go into SFC Proect. Please go to **Advanced > Outbound Policy**, click on **Add Rule** to create a new outbound policy.





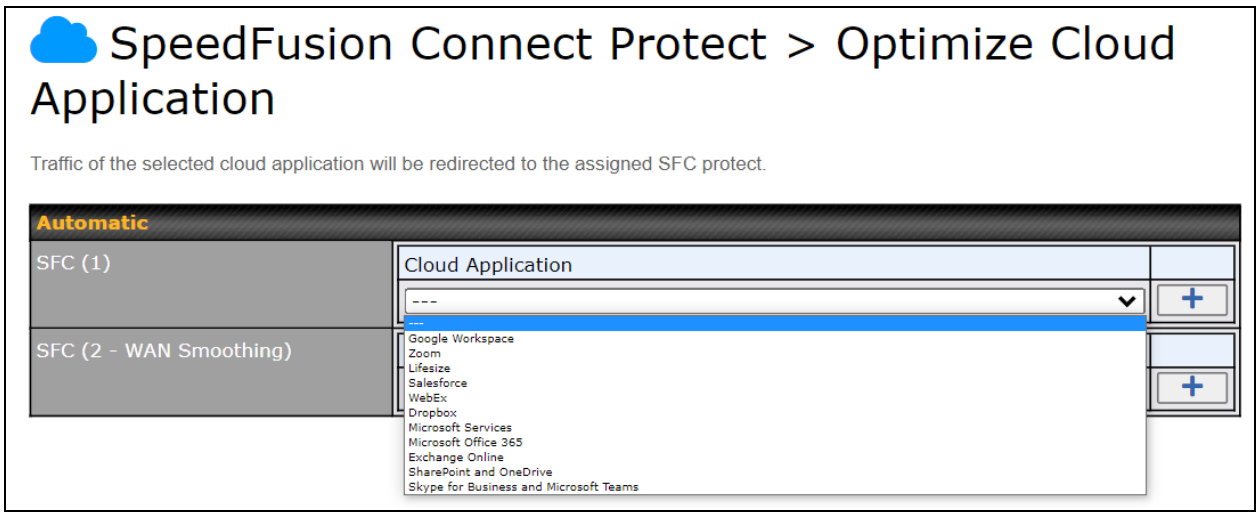
12.3 Route by Cloud Application

Optimize Cloud Application allows you to route Internet traffic through SpeedFusion Connect Protect based on the application. Go to **SpeedFusion Connect > Optimize Cloud Application**.



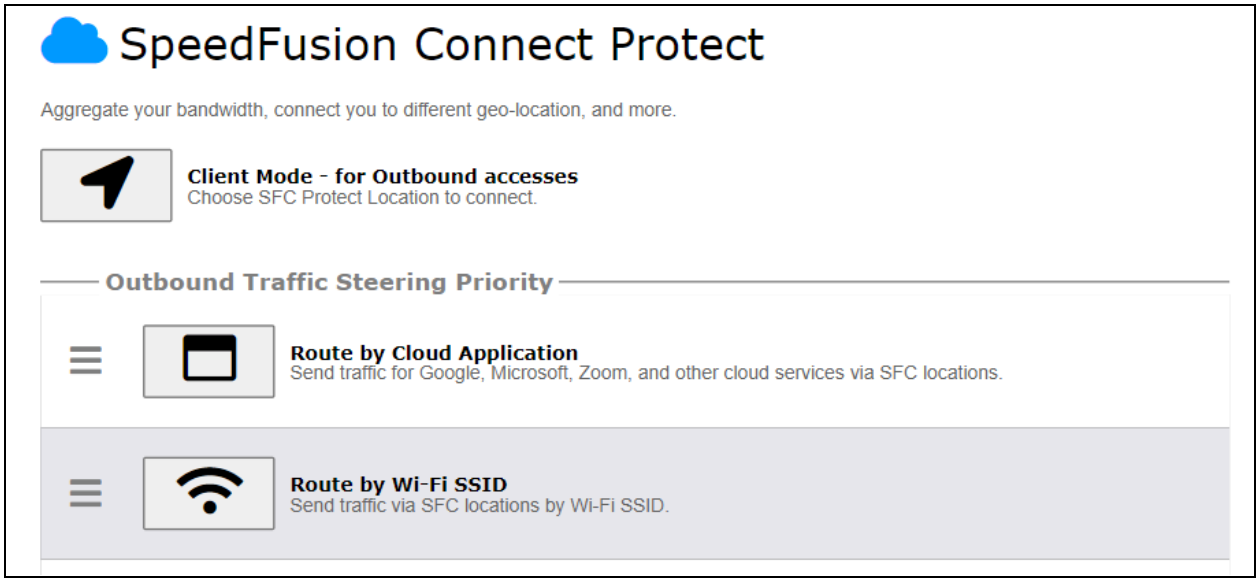
Select a Cloud application to route through SpeedFusion Connect Protect from the drop down list **>** Click **>** Save > Apply Changes.

Click the to remove a selected Cloud application from routing through SpeedFusion Connect Protect.

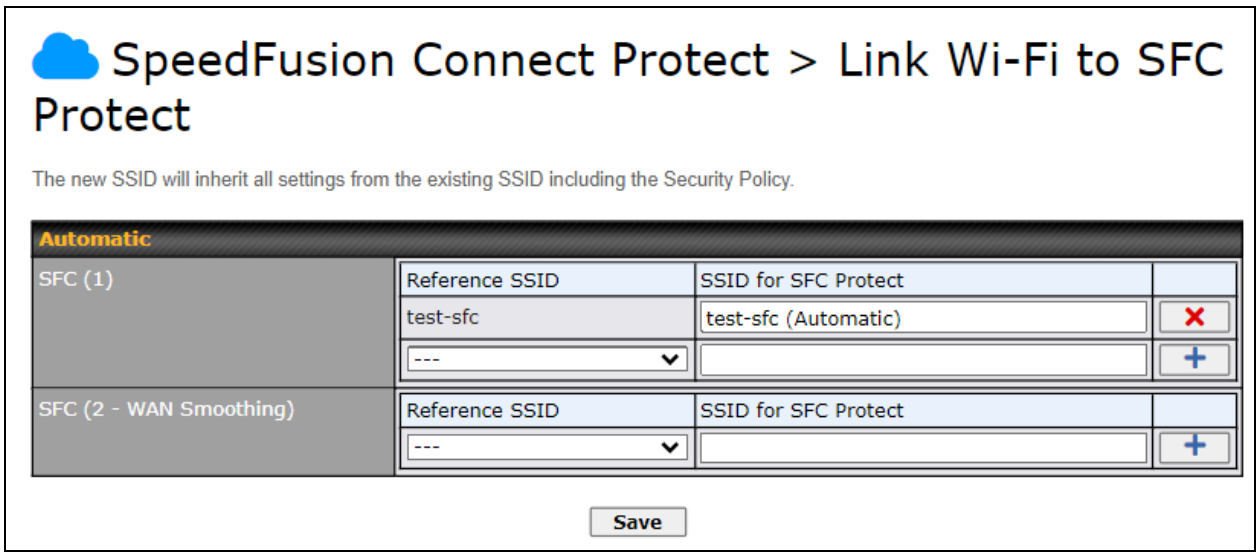


12.4 Route by Wi-Fi SSID

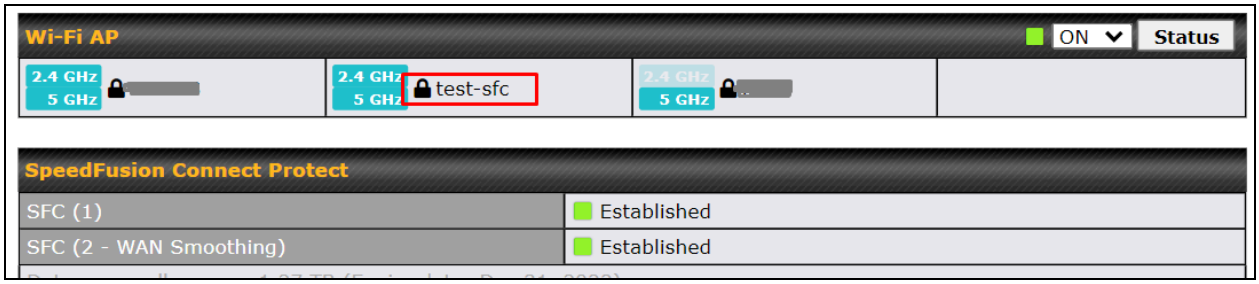
SFC Protect provides a convenient way to route the Wi-Fi client to the cloud from **SpeedFusion Connect Protect > Route by Wi-Fi SSID**.
Note: This option is available for Balance 20X, Balance 30 Pro, and Balance One.



Create a new SSID for SFC Protect. The new SSID will inherit all settings from one of the existing SSIDs including the Security Policy. Then click **Save** followed by **Apply Changes**.

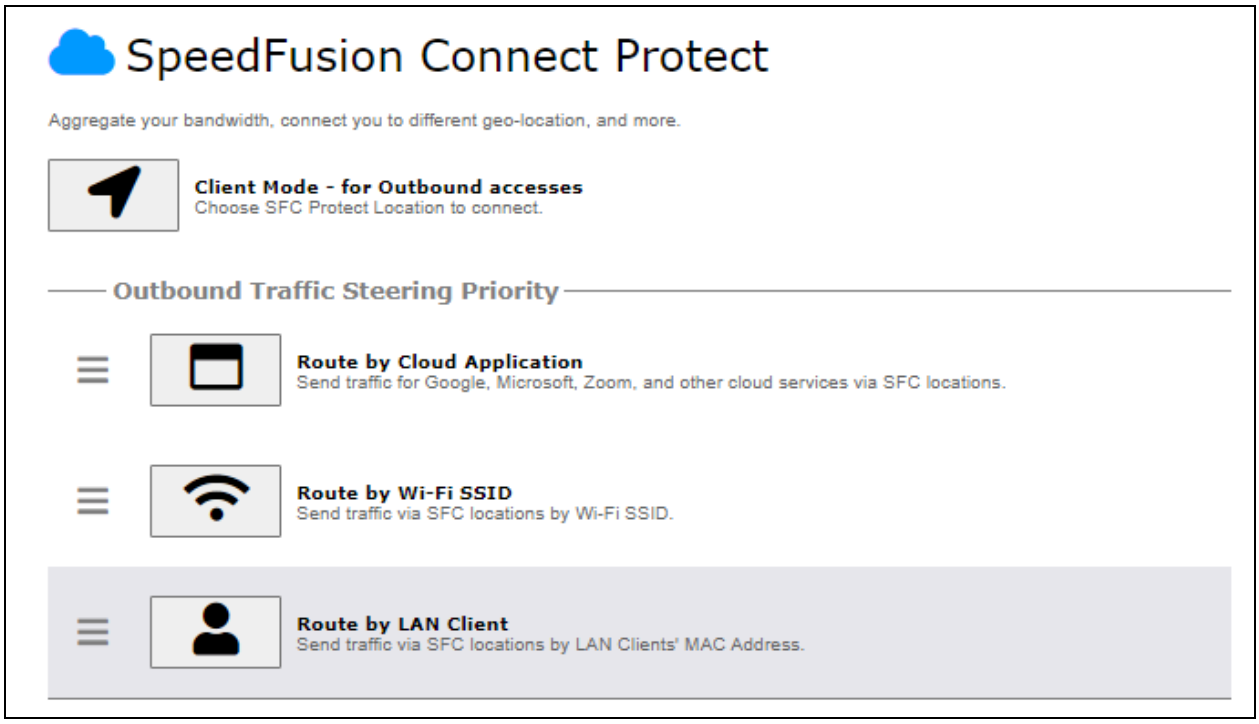


SFC Protect SSID will be shown on **Dashboard**.

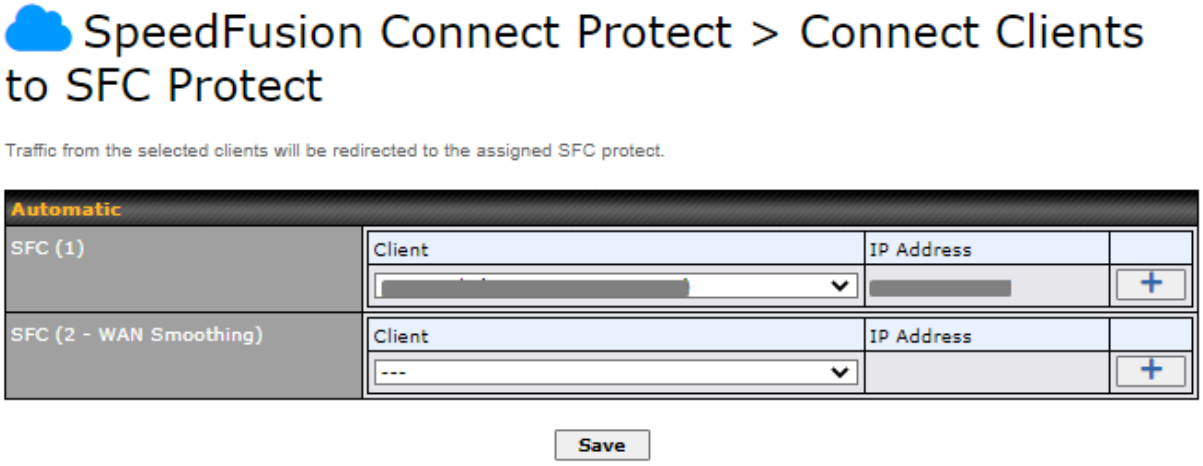


12.5 Route by LAN Client

SFC Protect provides a convenient way to route the LAN client to the cloud from **SpeedFusion Connect Protect > Route by LAN Client**.



Choose a client from the drop down list > Click **+** > Save > Apply Changes.

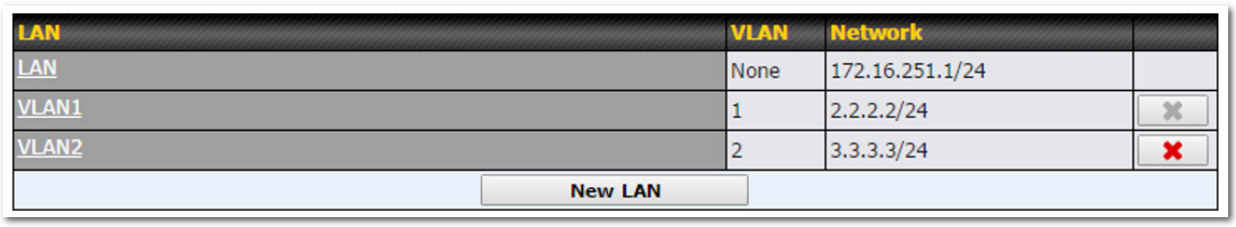


13 Network Tab

13.1 LAN

13.1.1 Network Settings

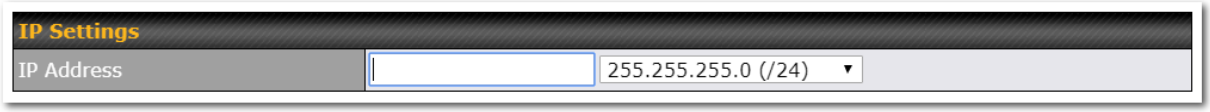
LAN interface settings are located at **Network > LAN > Network Settings**. Navigating to that page will show the following dashboard:



This represents the LAN interfaces that are active on your router (including VLAN). A grey "X" means that the VLAN is used in other settings and cannot be deleted. You can find which settings are using the VLAN by hovering over the grey "X".

Alternatively, a red "X" means that there are no settings using the VLAN. You can delete that VLAN by clicking the red "X"

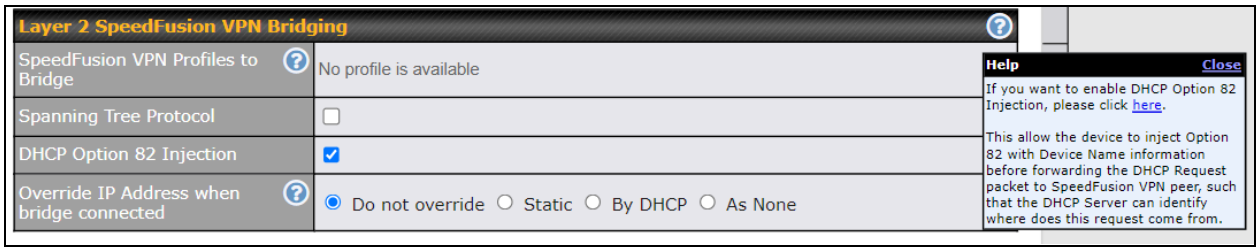
Clicking on any of the existing LAN interfaces (or creating a new one) will show the following :



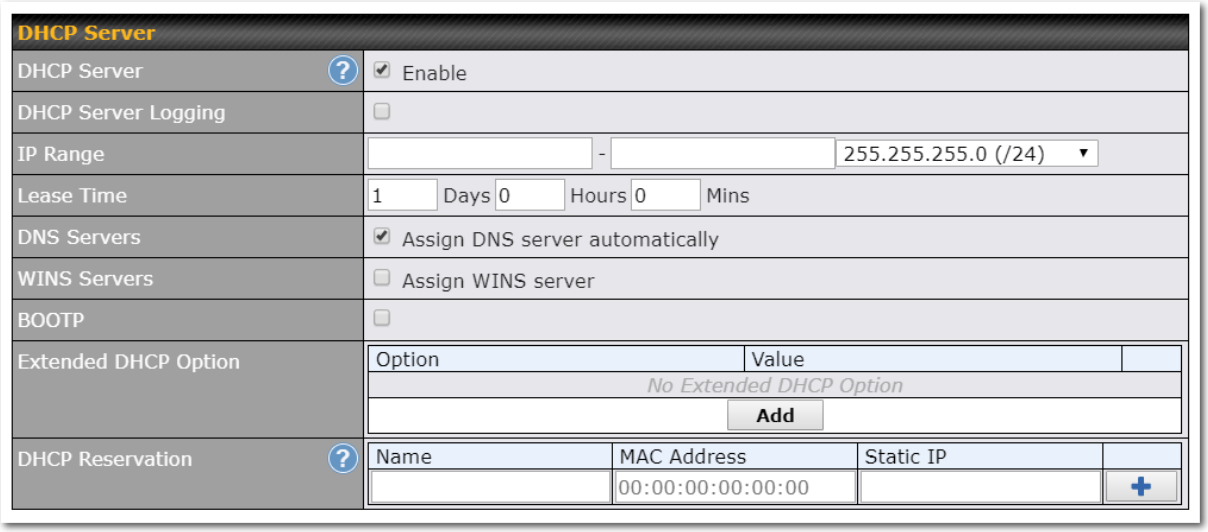
IP Settings	
IP Address	The IP address and subnet mask of the Pepwave router on the LAN.

Network Settings	
Name	Enter a name for the LAN.
VLAN ID	Enter a number for your VLAN

Inter-VLAN routing	Check this box to enable routing between virtual LANs.

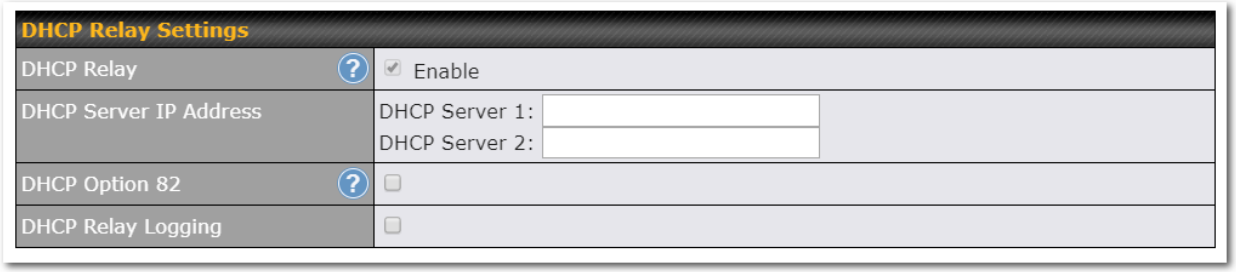


Layer 2 SpeedFusion VPN Bridging	
PepVPN Profiles to Bridge	The remote network of the selected PepVPN profiles will be bridged with this local LAN, creating a Layer 2 PepVPN, they will be connected and operate like a single LAN, and any broadcast or multicast packets will be sent over the VPN.
Spanning Tree Protocol	Click the box will enable STP for this layer 2 profile bridge.
DHCP Option 82	Click on the question Mark if you want to enable DHCP Option 82. This allows the device to inject Option 82 with Router Name information before forwarding the DHCP Request packet to a PepVPN peer, such that the DHCP Server can identify where the request originates from.
Override IP Address when bridge connected	Select "Do not override" if the LAN IP address and local DHCP server should remain unchanged after the Layer 2 PepVPN is up. If you choose to override IP address when the VPN is connected, the device will not act as a router, and most Layer 3 routing functions will cease to work.



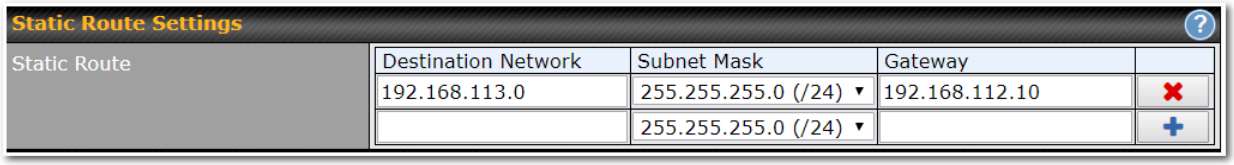
DHCP Server Settings	
DHCP Server	When this setting is enabled, the DHCP server automatically assigns an IP address to each computer that is connected via LAN and configured to obtain an IP address via DHCP. The Pepwave router's DHCP server can prevent IP address collision on the LAN. To enable DHCP bridge relay, please click the icon on this menu item.
DHCP Server Logging	Enable logging of DHCP events in the eventlog by selecting the checkbox.
IP Range	These settings allocate a range of IP addresses that will be assigned to LAN computers by the Pepwave router's DHCP server.
Lease Time	This setting specifies the length of time throughout which an IP address of a DHCP client remains valid. Upon expiration of the lease time, the assigned IP address will no longer be valid and renewal of the IP address assignment will be required.
DNS Servers	This option allows you to input the DNS server addresses to be offered to DHCP clients. If **Assign DNS server automatically** is selected, the Pepwave router's built-in DNS server address (i.e., LAN IP address) will be offered.
WINS Servers	This option allows you to optionally specify a Windows Internet Name Service (WINS) server. You may choose to use the **built-in WINS server** or **external WINS servers**. When this unit is connected using SpeedFusion™, other VPN peers can share this unit's built-in WINS server by entering this unit's LAN IP address in their DHCP **WINS Server** setting. Afterward, all PC clients in the VPN can resolve the NetBIOS names of other clients in remote peers. If you have enabled this option, a list of WINS clients will be displayed at **Status>WINS Clients**.
BOOTP	Check this box to enable BOOTP on older networks that still require it.
Extended DHCP Option	In addition to standard DHCP options (e.g., DNS server address, gateway address, subnet mask), you can specify the value of additional extended DHCP options, as defined in RFC 2132. With these extended options enabled, you can pass additional configuration information to LAN hosts. To define an extended DHCP option, click the **Add** button, choose the option to define and enter its value. For values that are in IP address list format, you can enter one IP address

	per line in the provided text area input control. Each option can be defined once only.
DHCP Reservation	This setting reserves the assignment of fixed IP addresses for a list of computers on the LAN. The computers to be assigned fixed IP addresses on the LAN are identified by their MAC addresses. The fixed IP address assignment is displayed as a cross-reference list between the computers' names, MAC addresses, and fixed IP addresses. **Name** (an optional field) allows you to specify a name to represent the device. MAC addresses should be in the format of **00:AA:BB:CC:DD:EE**. Press + to create a new record. Press ✖ to remove a record. Reserved client information can be imported from the **Client List**, located at **Status>Client List**. For more details, please refer to **Section 22.3.**



DHCP Relay Settings	
DHCP Relay	Enter the address of the DHCP server here. DHCP requests will be relayed to it.
DHCP Server IP Address	DHCP requests from the LAN are relayed to the entered DHCP server. For active-passive DHCP server configurations, enter active and passive DHCP server IPs into the **DHCP Server 1** and **DHCP Server 2** fields.
DHCP Option 82	This feature includes device information as relay agent for the attached client when forwarding DHCP requests from a DHCP client to a DHCP server. Device MAC address and network name are embedded to circuit ID and Remote ID in option 82.
DHCP Relay Logging	Check this box to log DHCP relay activity.

13.1.2 Network Settings (Common Settings)



Static Route Settings	
Static Route	This table is for defining static routing rules for the LAN segment. A static route consists of the network address, subnet mask, and gateway address. The address and subnet mask values are in *w.x.y.z* format. The local LAN subnet and subnets behind the LAN will be advertised to the VPN. Remote routes sent over the VPN will also be accepted. Any VPN member will be able to route to the local subnet. Click + to create a new route. Click ✖ to remove a route. Entries in this list will allow traffic to route to a different subnet that is connected to the LAN interface. Any traffic destined for a network/mask pair will be directed to the corresponding gateway instead of routed through WANs.

[A] - Advanced feature, please click the button on the top right hand corner of the Static Route session to activate and configure Virtual Network Mapping to resolve network address conflict with remote peers.

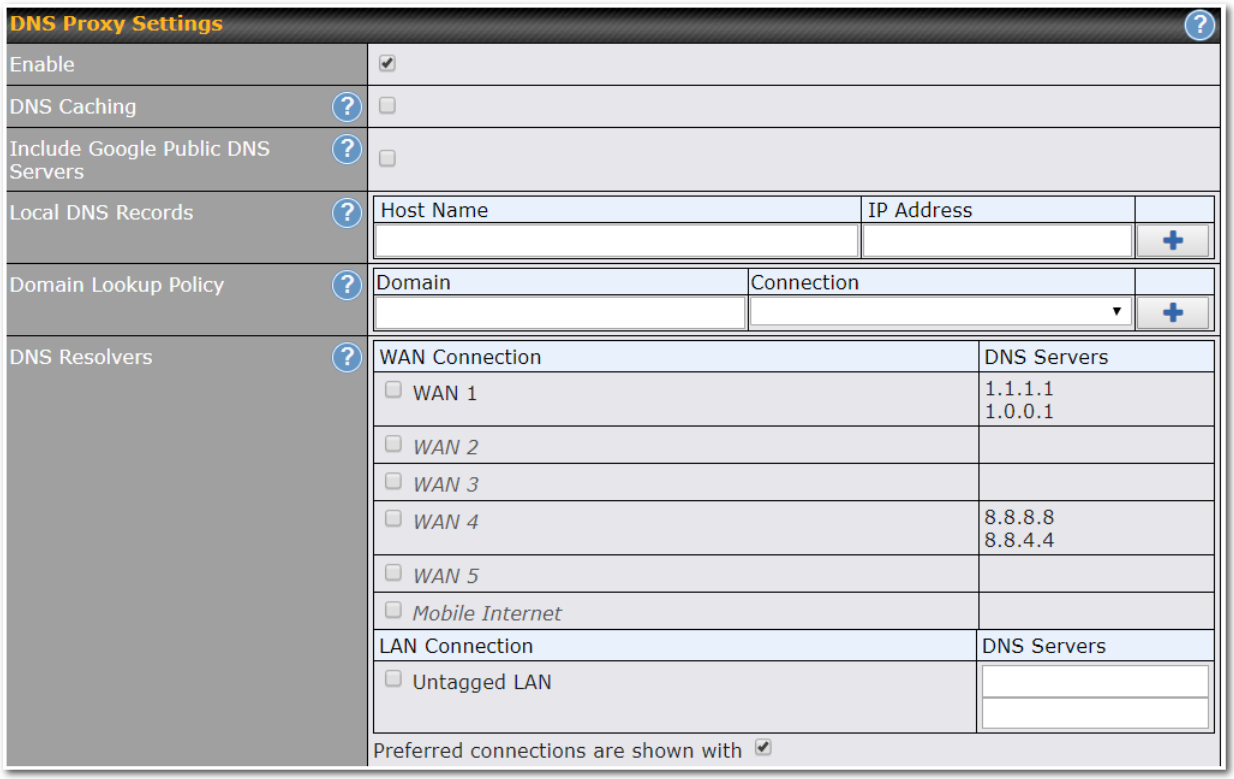
In case of a network address conflict with remote peers (i.e. PepVPN / IPsec VPN / IP Forwarding WAN are considered as remote connections), you can define Virtual Network Mapping to resolve it.

Note: OSPF & RIPv2 settings should be updated as well to avoid advertising conflicted networks.

For further details on virtual network mapping watch this video: https://youtu.be/C1FMdZCn3Z8

Virtual Network Mapping	
One-to-One NAT	Every IP Address in the Local Network has a corresponding unique Virtual IP Address for NAT. Traffic originating from the Local Network to remote connections will be SNAT'ed and behave like coming from the defined Virtual Network. While traffic initiated by remote peers to the Virtual Network will be DNAT'ed accordingly.
Many-to-One NAT	The subnet range defined in Local Network will be mapped to a single Virtual IP Address for NAT. Traffic can only be initiated from local to remote, and these traffic will be NAT'ed and behaves like coming from the same Virtual IP Address.

Enter any needed DNS proxy settings. Once all settings have been entered, click **Save** to store your changes.

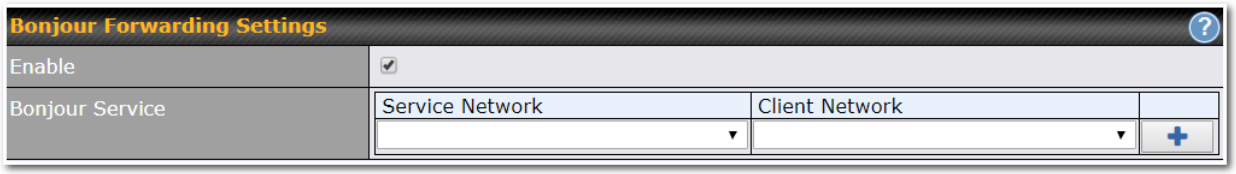


DNS Proxy Settings	
Enable	To enable the DNS proxy feature, check this box, and then set up the feature at **Network>LAN>DNS Proxy Settings**. A DNS proxy server can be enabled to serve DNS requests originating from LAN/PPTP/SpeedFusion™ peers. Requests are forwarded to the **DNS servers/resolvers** defined for each WAN connection.
DNS Caching	This field is to enable DNS caching on the built-in DNS proxy server. When the option is enabled, queried DNS replies will be cached until the records' TTL has been reached. This feature can improve DNS response time by storing all received DNS results for faster DNS lookup. However, it cannot return the most updated result for frequently updated DNS records. By default, **DNS Caching** is disabled.
Include Google Public DNS Servers	When this option is enabled, the DNS proxy server will forward DNS requests to Google's public DNS servers, in addition to the DNS servers defined in each WAN. This could increase the DNS service's availability. This setting is disabled by default.
Local DNS Records	This table is for defining custom local DNS records. A static local DNS record consists of a host name and IP address. When looking up the host name from the LAN to LAN IP of the Peplink Balance, the corresponding IP address will be returned. To display the option to set TTL manually, click . Click to create a new record. Click to remove a

	record.
Domain Lookup Policy	DNS proxy will look up the domain names defined here using only the specified connections.
DNS Resolvers[A]	Check the box to enable the WINS server. A list of WINS clients will be displayed at **Network>LAN>DNS Proxy Settings>DNS Resolvers**. This field specifies which DNS resolvers will receive forwarded DNS requests. If no WAN/VPN/LAN DNS resolver is selected, all of the WAN's DNS resolvers will be selected. If a SpeedFusion™ peer is selected, you may enter the VPN peer's DNS resolver IP address(es). Queries will be forwarded to the selected connections' resolvers. If all of the selected connections are down, queries will be forwarded to all resolvers on healthy WAN connections.

[A] - Advanced feature, please click the button on the top right-hand corner to activate.

Finally, if needed, configure your Bonjour forwarding settings. Once all settings have been entered, click **Save** to store your changes.

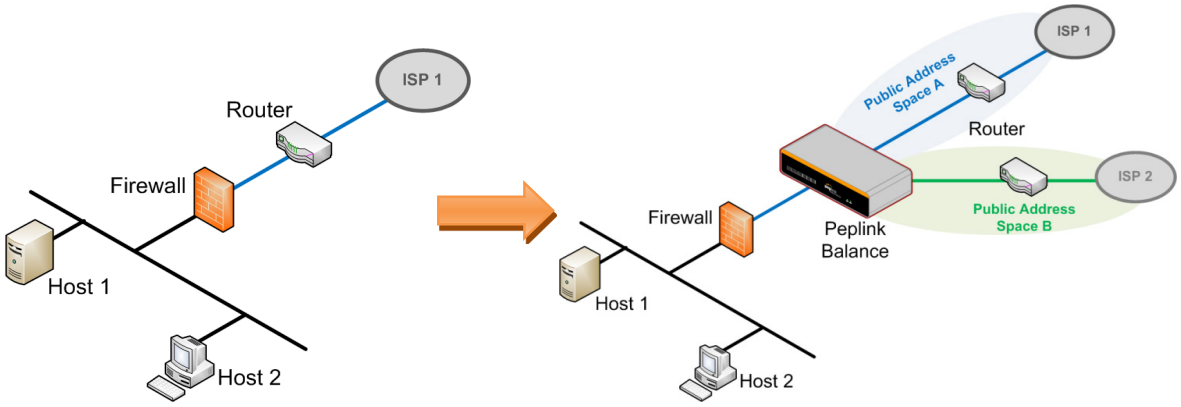


Bonjour Forwarding Settings	
Enable	Check this box to turn on Bonjour forwarding.
Bonjour Service	Choose **Service** and **Client** networks from the drop-down menus, and then click + to add the networks. To delete an existing Bonjour listing, click ✖. Bonjour Forwarding is supported on All Balance models, MAX 700, HD2, HD4

Drop-In Mode

Drop-in mode (or transparent bridging mode) eases the installation of the Peplink Balance on a live network between the firewall and router, such that changes to the settings of existing equipment are not required.

The following diagram illustrates drop-in mode setup:

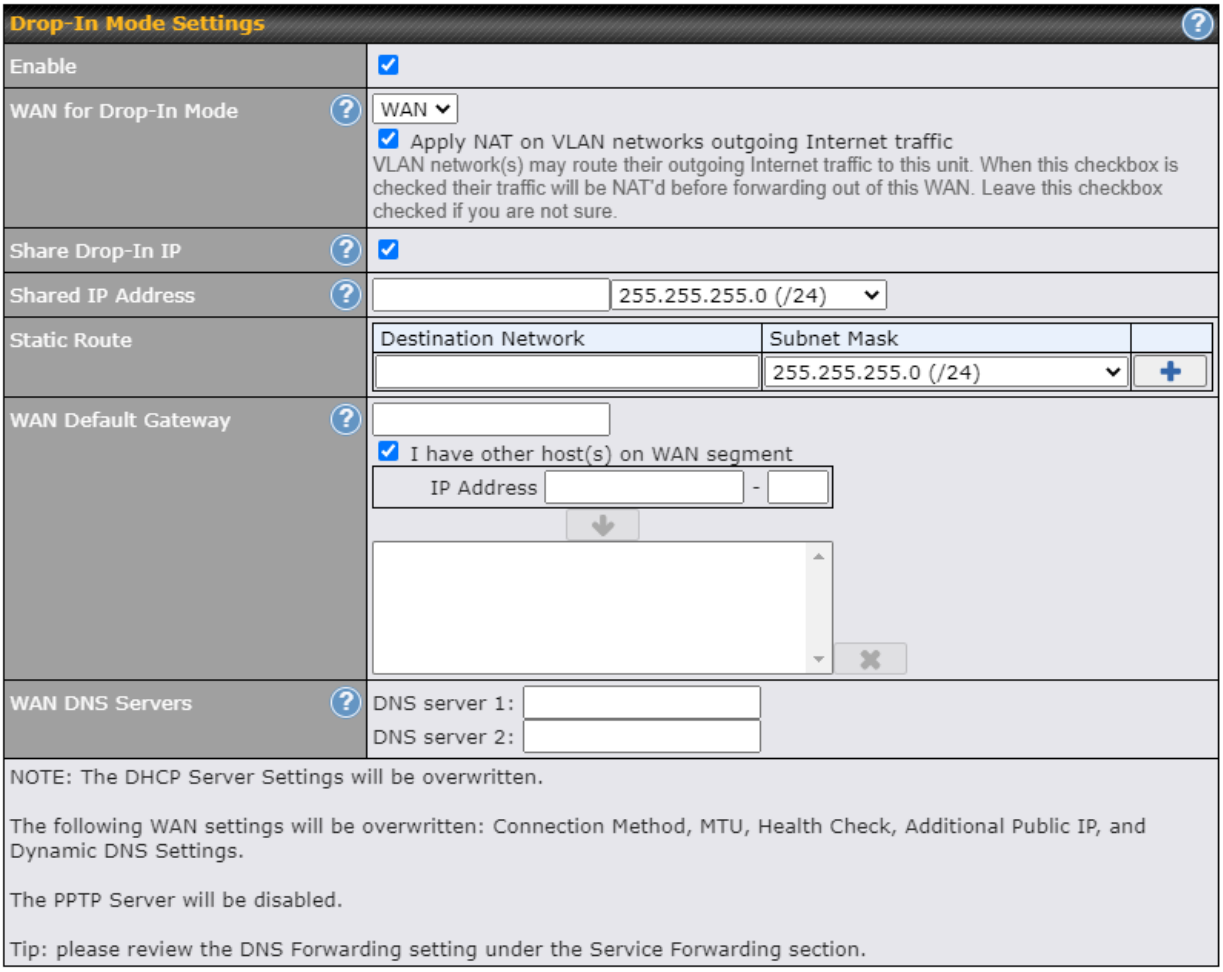


Enable drop-in mode using the Setup Wizard. After enabling this feature and selecting the WAN for drop-in mode, various settings, including the WAN's connection method and IP address, will be automatically updated.

When drop-in mode is enabled, the LAN and the WAN for drop-in mode ports will be bridged. Traffic between the LAN hosts and WAN router will be forwarded between the devices. In this case, the hosts on both sides will not notice any IP or MAC address changes.

After successfully setting up the Peplink Balance as part of the network using drop-in mode, it will, depending on model, support one or more WAN connections. Some MediaFast units also support multiple WAN connections after activating drop-in mode, though a SpeedFusion license may be required to activate more than one WAN port.

Please note the Drop-In Mode is mutually exclusive with VLAN.



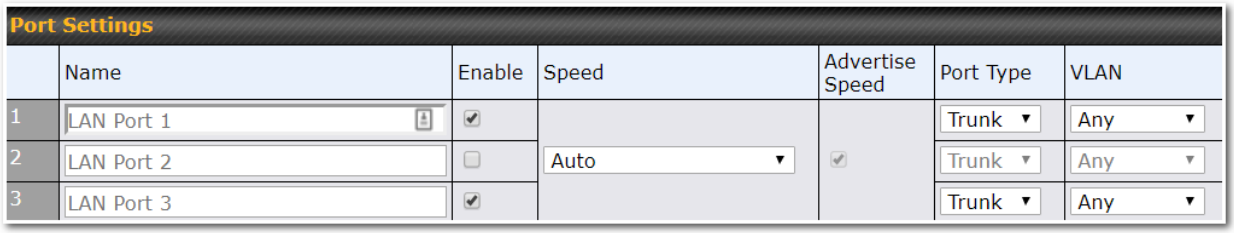
Drop-in Mode Settings	
Enable	Drop-in mode eases the installation of the Peplink Balance on a live network between the existing firewall and router, such that no configuration changes are required on existing equipment. Check the box to enable the drop-in mode feature. Please refer to **Section 12, Drop-in Mode** for details.
WAN for Drop-In Mode	Select the WAN port to be used for drop-in mode. If **WAN 1 with LAN Bypass** is selected, the high availability feature will be disabled automatically.
Shared Drop-In IP[A]	When this option is enabled, the passthrough IP address will be used to connect to WAN hosts (email notification, remote syslog, etc.). The Balance will listen for this IP address when WAN hosts access services provided by the Balance (web admin access from the WAN, DNS server requests, etc.). To connect to hosts on the LAN (email notification, remote syslog, etc.), the default gateway address will be used. The Balance will listen for this IP address when LAN hosts access services provided by the Balance (web admin access from the WAN, DNS proxy, etc.).
Shared IP	Access to this IP address will be passed through to the LAN port if this device is not serving the service being accessed. The shared IP address will be used in connecting to hosts on

Address[A]	the WAN (e.g., email notification, remote syslog, etc.) The device will also listen on the IP address when hosts on the WAN access services served on this device (e.g., web admin accesses from WAN, DNS server, etc.)
WAN Default Gateway	Enter the WAN router's IP address in this field. If there are more hosts in addition to the router on the WAN segment, click the button next to "WAN Default Gateway" and check the I **have other host(s) on WAN segment** box and enter the IP address of the hosts that need to access LAN devices or be accessed by others.
WAN DNS Servers	Enter the selected WAN's corresponding DNS server IP addresses.

[A] - Advanced feature, please click the button on the top right-hand corner to activate.

13.1.3 Port Settings

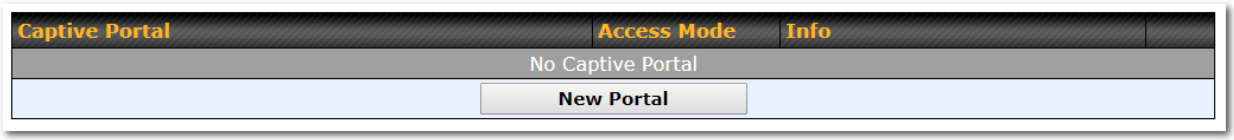
To configure port settings, navigate to **Network > Port Settings**



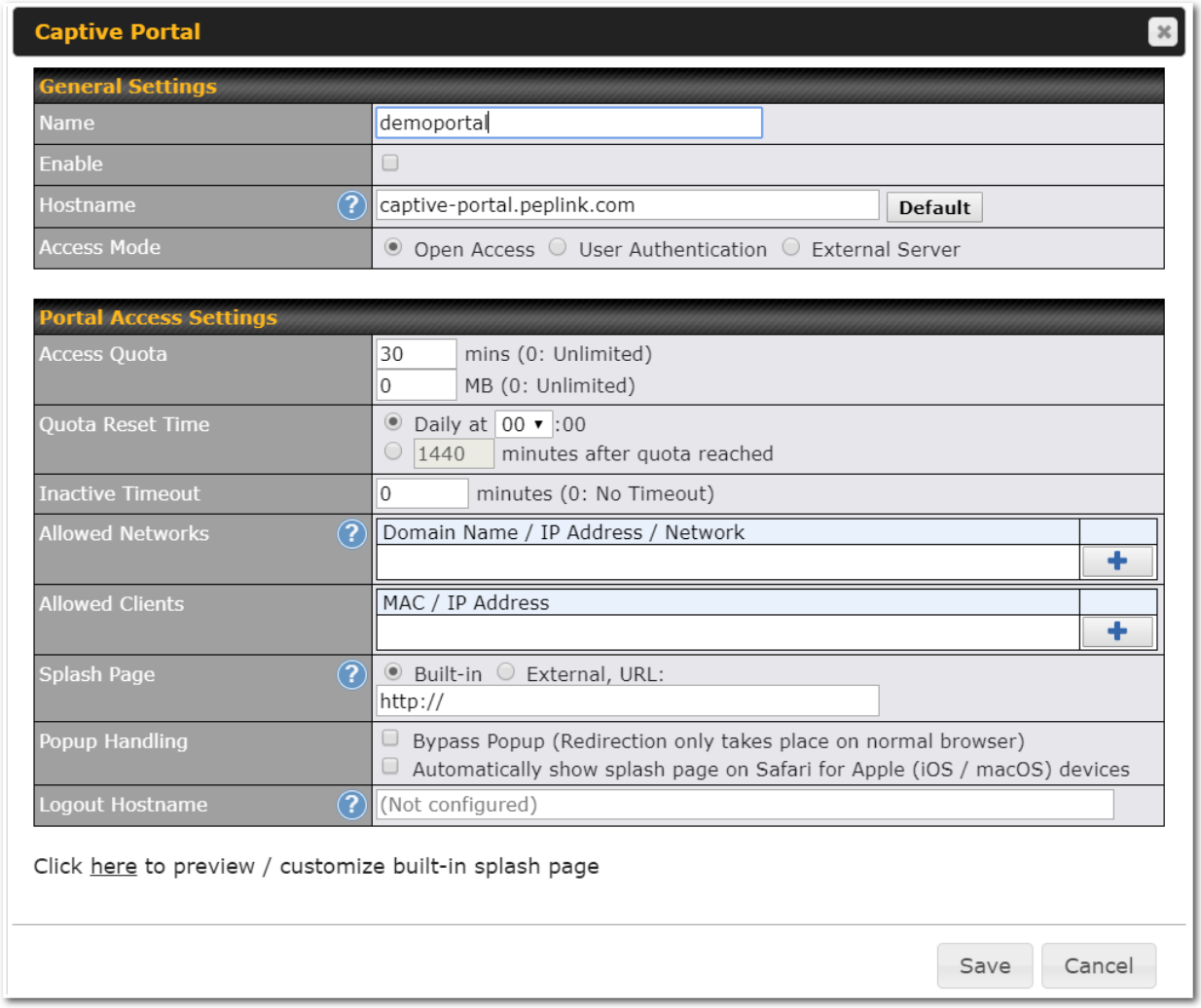
This section allows you to:

- Enable or disable specific LAN ports
- Configure the negotiation speed of the LAN ports
- Configure the port type (Trunk or Access)
- Assign a VLAN to a LAN port (in Access mode)

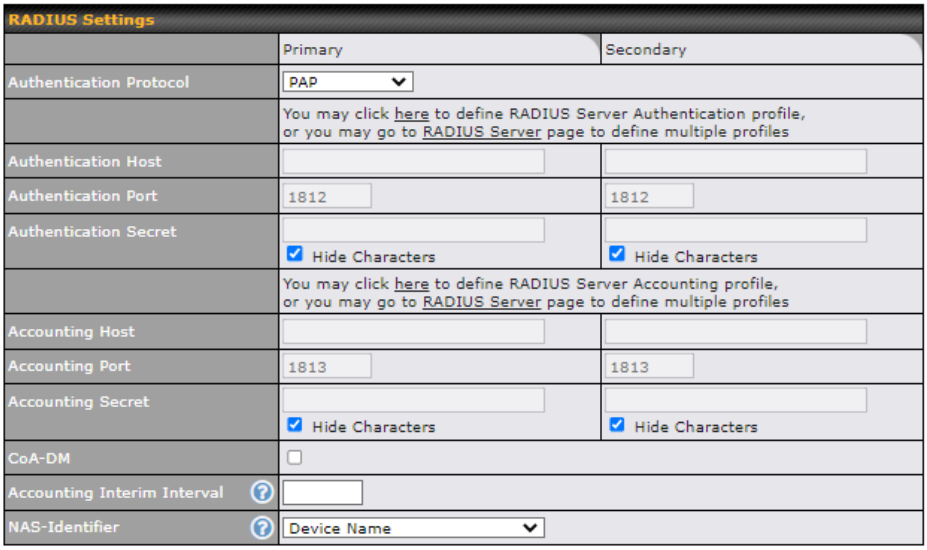
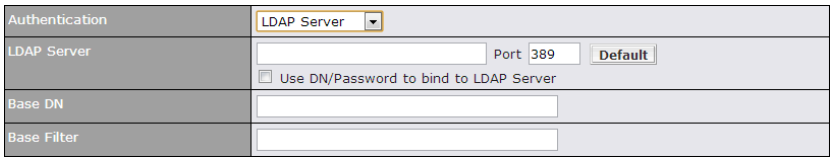
13.1.4 Captive Portal



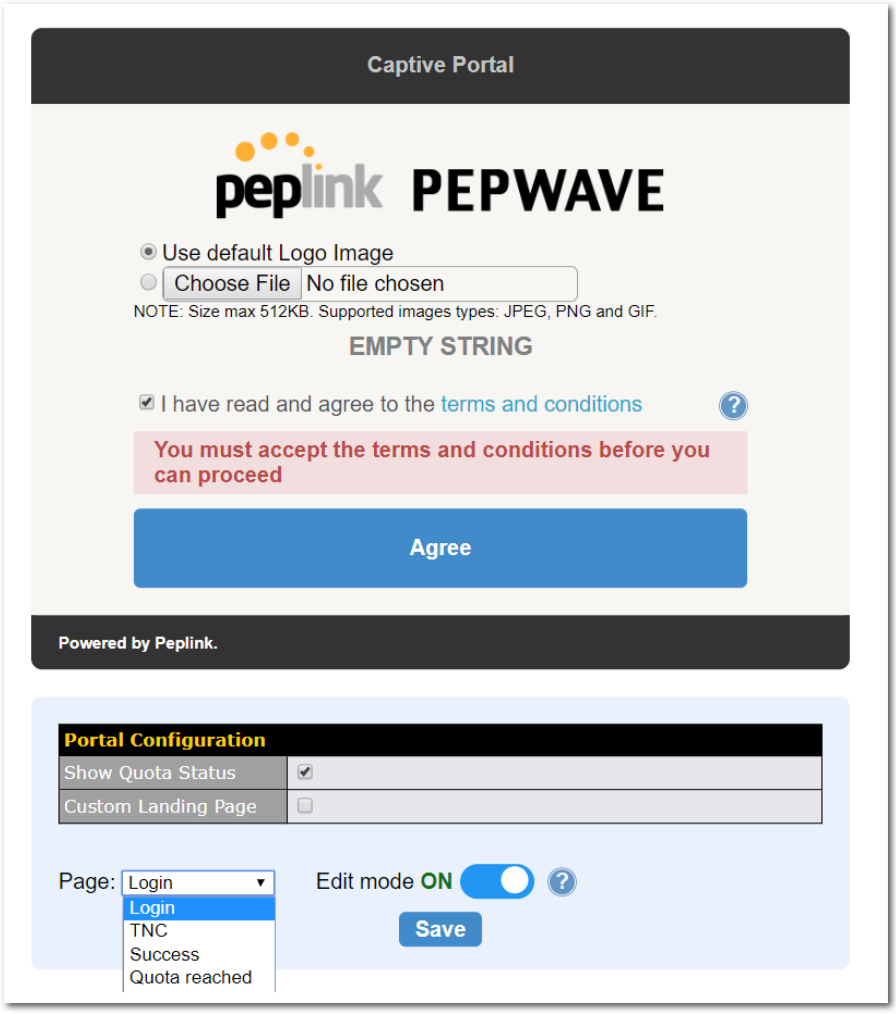
The captive portal serves as a gateway that clients have to pass if they wish to access the Internet using your router. To configure, navigate to **Network > Captive Portal**.



Captive Portal Settings	
Name	Enter the name for the Captive Portal.
Enable	Check **Enable** and then, optionally, select the LANs/VLANs that will use the captive portal.
Hostname	To customize the portal's form submission and redirection URL, enter a new URL in this field. To reset the URL to factory settings, click **Default**.
Access Mode	Click **Open Access** to allow clients to freely access your router. Click **User Authentication** to force your clients to authenticate before accessing your router. Select **External Server** to use the Captive Portal with a HotSpot system**.** As described in the following knowledgebase article: https://forum.peplink.com/t/using-hotspotsystem-wi-fi-on-pepwave-max-routers/

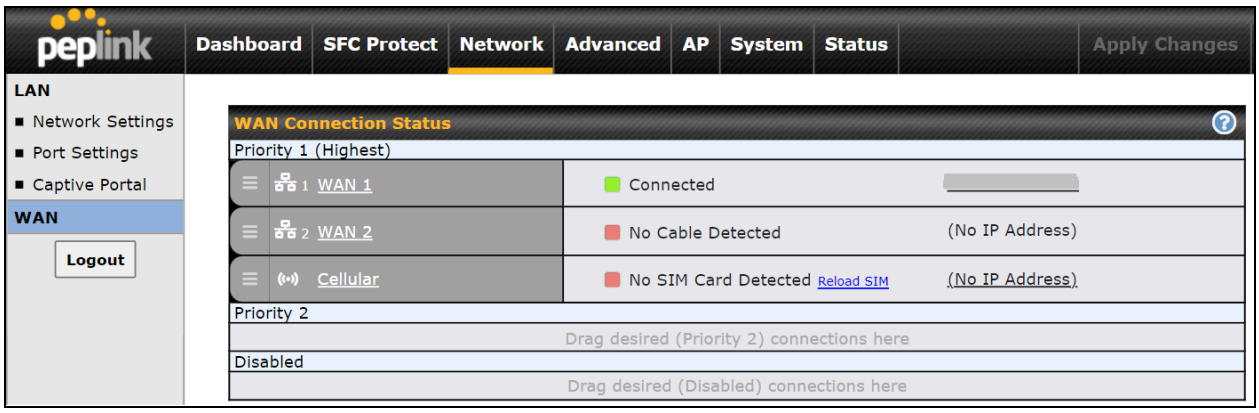
RADIUS Server	This authenticates your clients through a RADIUS server. After selecting this option, you will see the following fields:  Fill in the necessary information to complete your connection to the server and enable authentication.
LDAP Server	This authenticates your clients through a LDAP server. Upon selecting this option, you will see the following fields:  Fill in the necessary information to complete your connection to the server and enable authentication.
Access Quota	Set a time and data cap to each user's Internet usage.
Quota Reset Time	This menu determines how your usage quota resets. Setting it to **Daily** will reset it at a specified time every day. Setting a number of **minutes after quota reached** establish a timer for each user that begins after the quota has been reached.
Inactive Timeout	Clients will get disconnected when the inactive the configured time is reached. Default 0: no timeout
Allowed Networks	To whitelist a network, enter the domain name / IP address here and click  . To delete an existing network from the list of allowed networks, click the  button next to the listing.

Allowed Clients	To whitelist a client, enter the MAC address / IP address here and click + . To delete an existing client from the list of allowed clients, click the ✖ button next to the listing.
Splash Page	Here, you can choose between using the Balance's built-in captive portal and redirecting clients to a URL you define.
Popup Handling	Configurable options for popup handling: - Bypass Popup (Redirection only takes place on normal browser) - Automatically show splash page on Safari for Apple (iOS / macOS) devices
Logout Hostname	A hostname that can be used to logout captive portal when being accessed on browser.
Customize splash page	Click on the provided link in the Captive portal profile to customize the splash page. A new browser tab is opened with a WYSIWYG editor of the splash page o edit the content, click on the corresponding element after switching Edit Mode to ON.



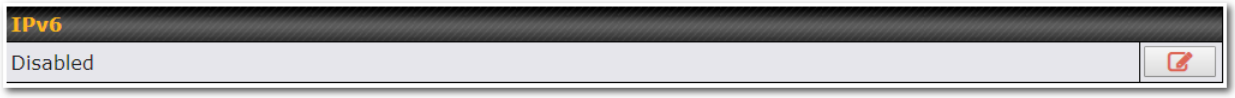
13.2 WAN

From **Network > WAN,** choose a WAN connection by clicking it.



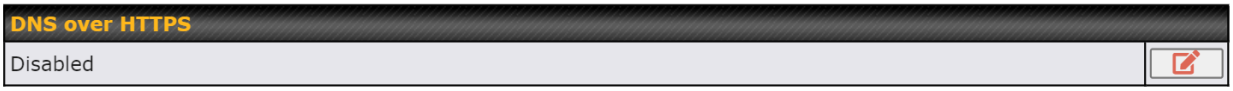
IPv6

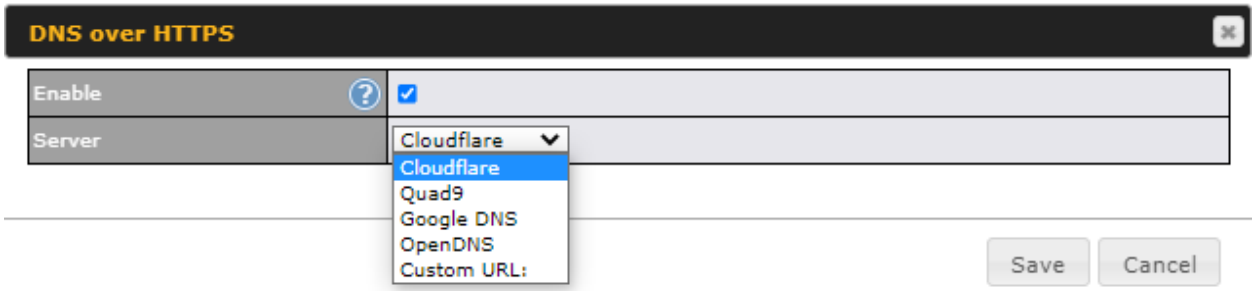
You can also enable IPv6 support in this section.



DNS over HTTPS (DoH)

You can enable the DoH support in this section.

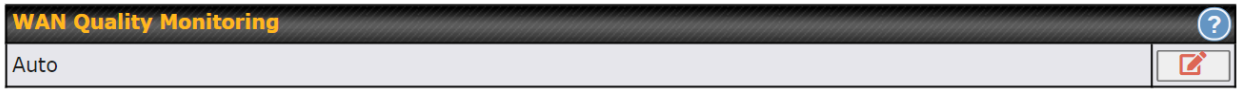




DNS over HTTPS	
Enable	When this option is enabled, the DNS proxy server will use HTTPS connections to forward DNS requests to the DoH resolver; it will not fallback to traditional UDP DNS options.
Server	The options to configure DoH with a predefined server are: • Cloudflare - The DNS server IP addresses for **Cloudflare** will be using 1.1.1.1, which is unfiltered. • Quad9 - The DNS server IP addresses for **Quad9** will be using 9.9.9.9 and 142.112.112.112, which is malware blocking and DNSSEC. • Google DNS - The DNS server IP addresses for **Google DNS** will be using 8.8.8.8 and 8.8.4.4, which is RFC8484 standard. • OpenDNS - The DNS server IP addresses for **OpenDNS** will be using 208.67.222.222 and 208.67.220.220, which is standard DNS. • Custom URL - You may select **Custom URL:**, and enter the **resolver URL** and **IP address**.

WAN Quality Monitoring

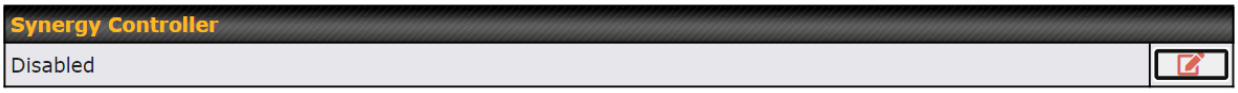
This settings advice how WAN Quality information is being gathered.



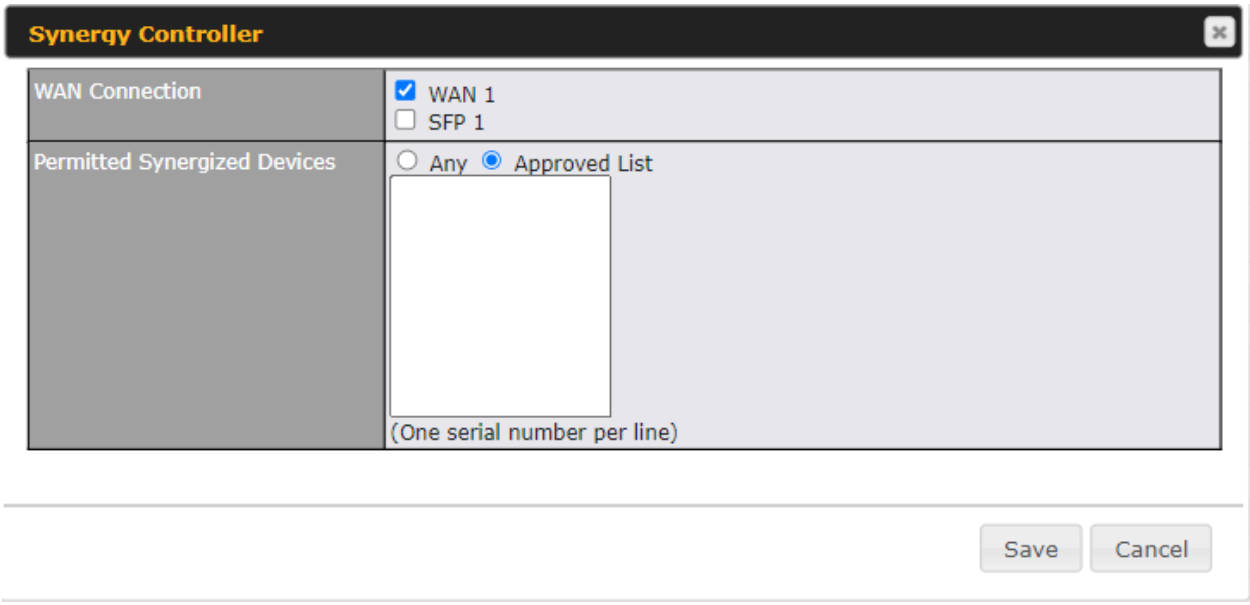
By default, WAN Quality will always be observed and gathered automatically. With customized choice of WAN connections, the device will always observe WAN Quality of those selected WAN connections. Other WAN connections may stop observing WAN Quality information if it is not necessary for the underlying features.

Synergy Mode

You can enable the Synergy Controller in this section.



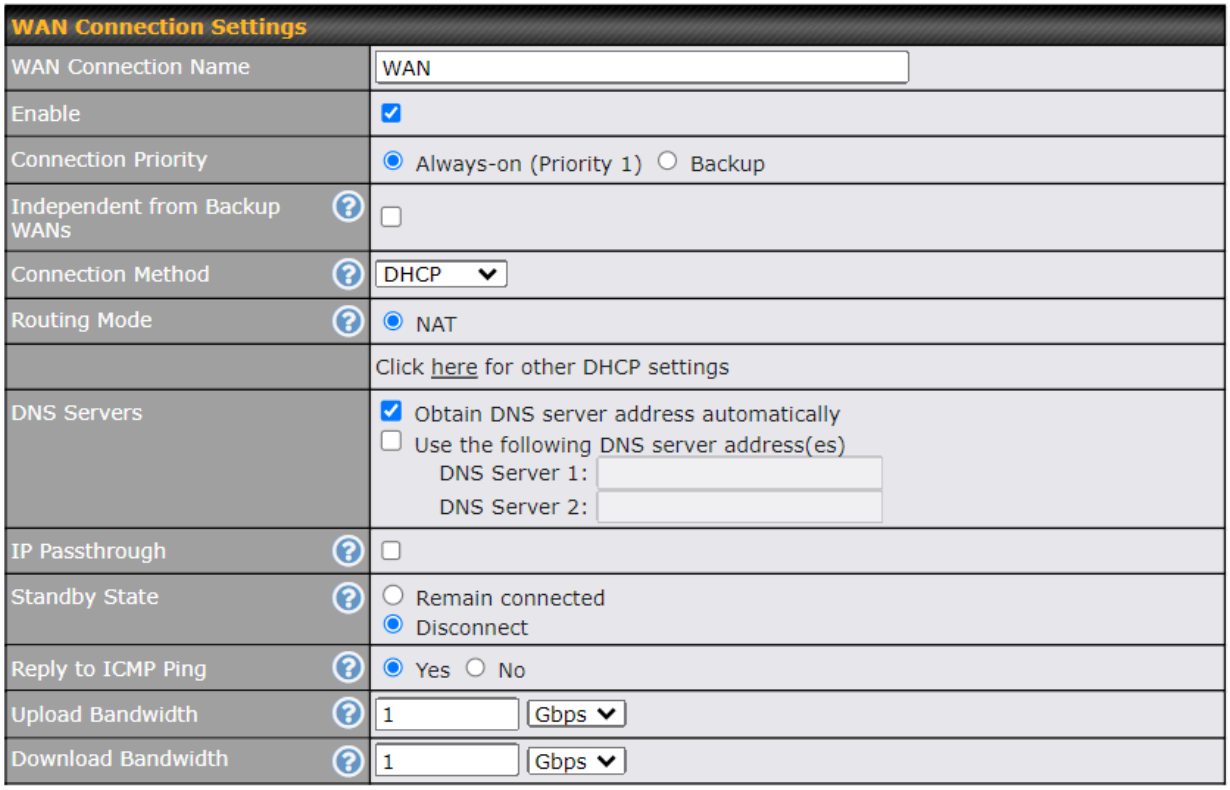
You may click this  to enable the Synergy Controller. By default, the setting is disabled.



You may select the WAN connection to use as a Synegy Link which will connect to synergized devices.

13.2.1 Ethernet WAN

Clicking an Ethernet WAN connection will result in the following screen:



WAN Connection Settings	
WAN Connection Name	Enter a name to represent this WAN connection.
Enable	This setting enables the WAN connection. If schedules have been defined, you will be able to select a schedule to apply to the connection.
Connection Priority	This option allows you to configure the WAN connection whether for normal daily usage or as a backup connection only. If **Always-on** is chosen, the WAN connection will be kept on continuously, regardless of the priority of other WAN connections. If **Backup** is chosen, the WAN connection will depend on other WAN connections. It will not be used when one or more higher priority dependent WAN connections are connected.
Connection Method	TThere are five possible connection methods for Ethernet WAN: • **DHCP**

Connection Method	DHCP
Routing Mode	NAT
Hostname (Optional)	Use custom hostname

- **Static IP**

Connection Method	Static IP
Routing Mode	NAT
IP Address	
Subnet Mask	255.255.255.0 (/24)
Default Gateway	

- **PPPoE**

Connection Method	PPPoE
Routing Mode	NAT
PPPoE User Name	
PPPoE Password	
Confirm PPPoE Password	
Service Name (Optional)	Leave it blank unless it is provided by ISP
IP Address (Optional)	Leave it blank unless it is provided by ISP
Keep-Alive Interval	6 seconds(s)
Keep-Alive Retry	6

- **L2TP**

Connection Method	L2TP
Routing Mode	NAT
L2TP User Name	
L2TP Password	
Confirm L2TP Password	
Server IP Address / Host	
Address Type	Dynamic IP Static IP

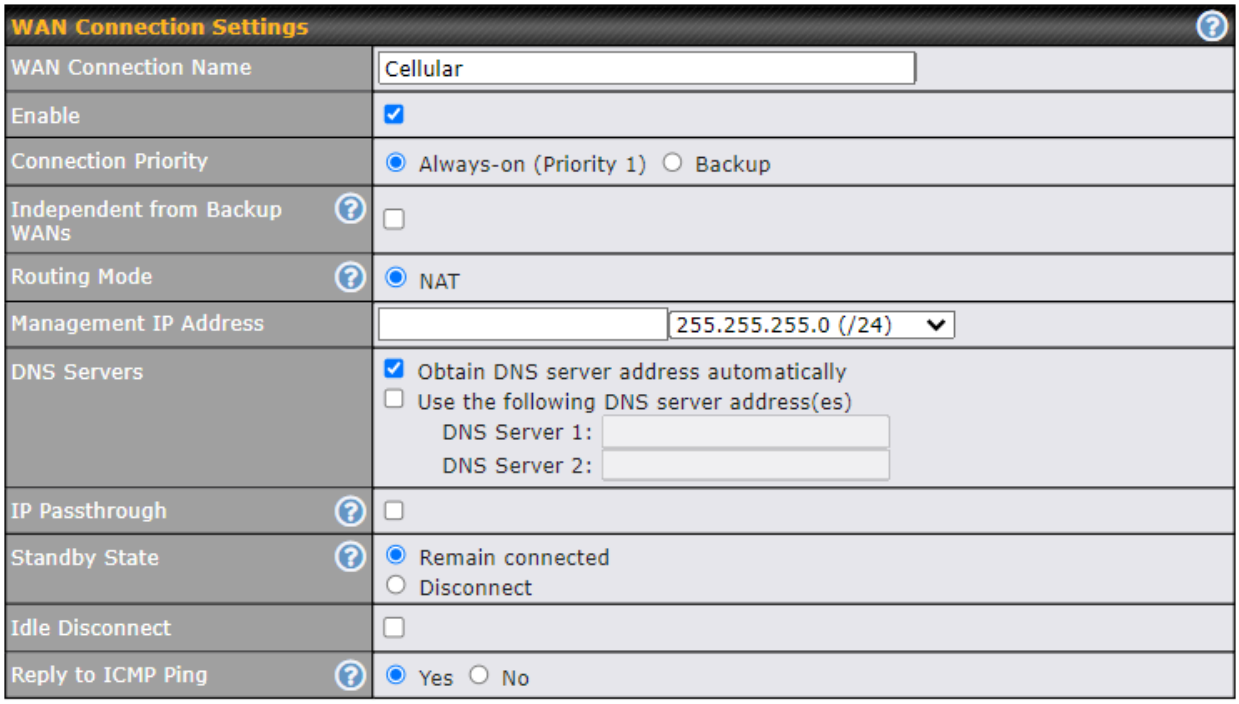
- **GRE**

Connection Method	GRE
Routing Mode	NAT
WAN IP Address	
WAN Subnet Mask	255.255.255.0 (/24)
WAN Default Gateway	
Remote GRE Host	
Tunnel Local IP Address	
Tunnel Remote IP Address	
Outgoing NAT IP Address	

	The connection method and details are determined by, and can be obtained from the ISP. See the following sections for details on each connection method. DNS server settings can be configured in the corresponding menu for each connection method.
Routing Mode	This field shows that **NAT** (network address translation) will be applied to the traffic routed over this WAN connection. **IP Forwarding** is available when you click the link in the help  icon.
Management IP Address	**Management IP Address** is available for configuration when you click **here** for other DHCP settings. This option allows you to configure the management IP address for the DHCP WAN connection.
Custom Hostname	If your service provider's DHCP server requires you to supply a hostname value upon acquiring an IP address, you may enter the value here. If your service provider does not provide you with a hostname, you can safely bypass this option.
DNS Servers	Each ISP may provide a set of DNS servers for DNS lookups. This setting specifies the DNS (Domain Name System) servers to be used when a DNS lookup is routed through this connection. Selecting Obtain DNS server address automatically results in the DNS servers assigned by the WAN DHCP server being used for outbound DNS lookups over the connection. (The DNS servers are obtained along with the WAN IP address assigned by the DHCP server.) When the following DNS server address(es) is selected, you may enter custom DNS server addresses for this WAN connection into the DNS server 1 and DNS server 2 fields.
Independent from Backup WANs	If this is checked, the connection will be working independent from other Backup WAN connections. Those in Backup Priority will ignore the status of this WAN connection, and will be used when none of the other higher priority connections are available.
Reply to ICMP PING	If the checkbox is **unticked**, this option is disabled and the system will not reply to any ICMP ping echo requests to the WAN IP addresses of this WAN connection. Default: **ticked** (Yes)
Upload Bandwidth	This field refers to the maximum upload speed. This value is referenced when default weight is chosen for outbound traffic and traffic prioritization. A correct value can result in effective traffic prioritization and efficient use of upstream bandwidth.
Download Bandwidth	This field refers to the maximum download speed. Default weight control for outbound traffic will be adjusted according to this value.

13.2.2 Cellular WAN

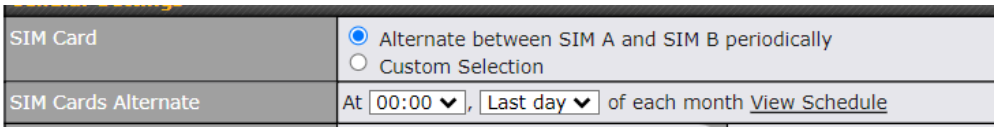
Clicking an Cellular WAN connection will result in the following screens:



WAN Connection Settings	
WAN Connection Name	Indicate a name you wish to give this WAN connection
Enable	Click the checkbox to toggle the on and off state of this connection.
Connection Priority	This option allows you to configure the WAN connection whether for normal daily usage or as a backup connection only. If **Always-on** is chosen, the WAN connection will be kept on continuously, regardless of the priority of other WAN connections. If **Backup** is chosen, the WAN connection will depend on other WAN connections. It will not be used when one or more higher priority dependent WAN connections are connected.
Independent from Backup WANs	If this is checked, the connection will be working independent from other Backup WAN connections. Those in Backup Priority will ignore the status of this WAN connection, and will be used when none of the other higher priority connections are available.
Routing Mode	This option allows you to select the routing method to be used in routing IP frames via the WAN connection. The mode can be either NAT (Network Address Translation) or IP Forwarding. In the case if you need to choose IP Forwarding for your scenario. Click the button to enable IP Forwarding.

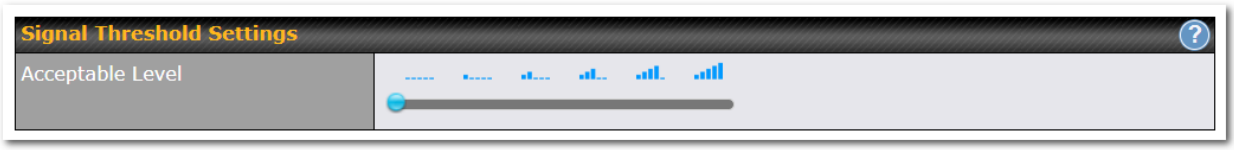
Management IP Address	**Management IP Address** is available for configuration when you click **here** for other DHCP settings. This option allows you to configure the management IP address for the DHCP WAN connection.
DNS Servers	Each ISP may provide a set of DNS servers for DNS lookups. This setting specifies the DNS (Domain Name System) servers to be used when a DNS lookup is routed through this connection. Selecting Obtain DNS server address automatically results in the DNS servers assigned by the WAN DHCP server being used for outbound DNS lookups over the connection. (The DNS servers are obtained along with the WAN IP address assigned by the DHCP server.) When Use the following DNS server address(es) is selected, you may enter custom DNS server addresses for this WAN connection into the DNS server 1 and DNS server 2 fields.
IP Passthrough	When this IP Passthrough option is active, after the cellular WAN connection is up, the router's DHCP server will offer the connection's IP address to one LAN client. All incoming or outgoing traffic will be routed without NAT. Regardless the WAN connection's state, the router always binds to the LAN IP address (Default: 192.168.50.1). So when the cellular WAN is connected, the LAN client could access the router's web admin by manually configuring its IP address to the same subnet as the router's LAN IP address (e.g. 192.168.50.10). Note: when this option is firstly enabled, the LAN client may not be able to refresh its IP address to the cellular WAN IP address in a timely fashion. The LAN client may have to manually renew its IP address from DHCP server. After this option is enabled, the DHCP lease time will be 2 minutes. I.e. the LAN client could refresh its IP address and access the network at most one minute after the cellular WAN connection goes up.
Standby State	IThis option allows you to choose whether to remain connected when this WAN connection is no longer in the highest priority and has entered the standby state. When Remain connected is chosen, upon bringing up this WAN connection to active, it will be immediately available for use. If this WAN connection is charged by connection time, you may want to set this option to Disconnect so that connection will be made only when needed. SpeedFusion VPN may use connected standby WAN for failover if link failure detected on the higher priority WAN, you can set this option to Disconnect to avoid data passing through.
Idle Disconnect	If this is checked, the connection will disconnect when idle after the configured Time value. This option is disabled by default.
Reply to ICMP PING	If the checkbox is **unticked**, this option is disabled and the system will not reply to any ICMP ping echo requests to the WAN IP addresses of this WAN connection. Default: **ticked** (Yes)

Cellular Settings		
SIM Card	○ Alternate between SIM A and SIM B periodically ● Custom Selection ☑ SIM A Priority: 1 ☑ SIM B Priority: 1 ☑ RemoteSIM Priority: 1 ☑ SpeedFusion Connect 5G/LTE Priority: 1	
RemoteSIM Settings	Control by FusionSIM Cloud Scan nearby RemoteSIM server	
Failback to Preferred SIM when	☑ Device is idle Idle Timeout: 3 Time value is global. A change will affect all WAN profiles. ☐ Non-preferred SIM is connected for 10 minutes	
	SIM Card A	SIM Card B
Carrier Selection	● Auto ○ Manual Select ○ Custom PLMN	● Auto ○ Manual Select ○ Custom PLMN
5G/LTE/3G	Auto	Auto
Optimal Network Discovery	☐	☐
Band Selection	Auto	Auto
Data Roaming	☐	☐
Authentication	Auto	Auto
Operator Settings	● Auto ○ Custom	● Auto ○ Custom
APN	diginet	
Username		
Password		
Confirm Password		
SIM PIN (Optional)	(Confirm)	(Confirm)
Bandwidth Allowance Monitor	☑ Enable	☐ Enable
Action	Email notification is currently disabled. You can get notified when usage hits 75%/95% of monthly allowance by enabling Email Notification. ☑ Disconnect when usage hits 100% of monthly allowance	Email notification is currently disabled. You can get notified when usage hits 75%/95% of monthly allowance by enabling Email Notification. ☑ Disconnect when usage hits 100% of monthly allowance
Start Day	On 1st of each month at 00:00 midnight	On 1st of each month at 00:00 midnight
Monthly Allowance	GB	GB

Cellular Settings	
SIM Card	If "**Alternate between SIM A and SIM B periodically**" is selected, the SIM card will be switching according to the schedule time in the SIM Cards Alternate. If "**Custom Selection**" is selected, you can designate the priority of the SIM cards (SIM A/ SIM B/ Remote SIM/ SpeedFusion Connect) and connect to. For routers that support the SIM Injector, you may select the "Remote SIM" to provision a SIM from a SIM Injector. Further details on the SIM Injector found is available here: https://www.peplink.com/products/sim-injector/.
Remote SIM Settings	If "**RemoteSIM**" is selected in the SIM card section, the **RemoteSIM Settings** will be shown. You may need to enable the remote SIM Host settings in the Remote SIM management, see the **Appendix C** for more details on FusionSIM. After that, click on "**Scan nearby remote SIM server**" to show the serial number(s) of the connected SIM Injector(s). If you want to select a specific SIM, in the Cellular Settings, type "**:**" and then the number of the SIM slot, eg.1111-2222-3333:7.
Fallback to Prefered SIM when	This option is allowing to switch to another SIM cards when the Cellular WAN reached faillback timeout.
SIM Cards Alternate	If "**Alternate between SIM A and SIM B periodically**" is selected in the SIM Card section, the SIM Cards Alternate will be shown:  You may set the schedule time for for switching between SIM A only and SIM B only.
Carrier Selection	This drop-down menu allows restricting network on particular carrier. Click the button to choose the manual select or custom PLMN.
5G/LTE/3G	This drop-down menu allows restricting cellular to particular band. Click the button to enable the selection of specific bands.
Optimal Network Discovery	Cellular WAsN by default will only handover from 3G to LTE network when there is no active data traffic, enable this option will make it run the handover procedures after fallback to 3G for a defined effective period, even this may interrupt the connectivity for a short while.
Band Selection	When set to **Auto,** band selection allows for automatically connecting to available, supported bands (frequencies) . When set to Manual, you can manually select the bands (frequencies) the SIM will connect to.
Data Roaming	This checkbox enables data roaming on this particular SIM card. When data roaming is enabled this option allows you to select in which countries the SIM has a data connection. The option is configured by using MMC (country) codes.Please check your service provider's data roaming policy before proceeding.
Authentication	Choose from **PAP Only** or **CHAP Only** to use those authentication methods exclusively. Select **Auto** to automatically choose an authentication method.

Operator Settings	This setting allows you to configure the APN settings of your connection. If **Auto** is selected, the mobile operator should be detected automatically. The connected device will be configured and connection will be made automatically. If there is any difficulty in making connections, you may select **Custom** to enter your carrier's **APN**, **Login**, **Password**, and **Dial Number** settings manually. The correct values can be obtained from your carrier. The default and recommended setting is **Auto**.
APN / Login / Password / SIM PIN	When **Auto** is selected, the information in these fields will be filled automatically. Select **Custom** to customize these parameters. The parameter values are determined by and can be obtained from the ISP.
Bandwidth Allowance Monitor	Check the box Enable to enable bandwidth usage monitoring on this WAN connection for each billing cycle. When this option is not enabled, bandwidth usage of each month is still being tracked but no action will be taken.
Action	If email notification is enabled, you will be notified by email when usage hits 75% and 95% of the monthly allowance. If **Disconnect when usage hits 100% of monthly allowance** is checked, this WAN connection will be disconnected automatically when the usage hits the monthly allowance. It will not resume connection unless this option has been turned off or the usage has been reset when a new billing cycle starts.
Start Day	This option allows you to define which day of the month each billing cycle begins.
Monthly Allowance	This field is for defining the maximum bandwidth usage allowed for the WAN connection each month.

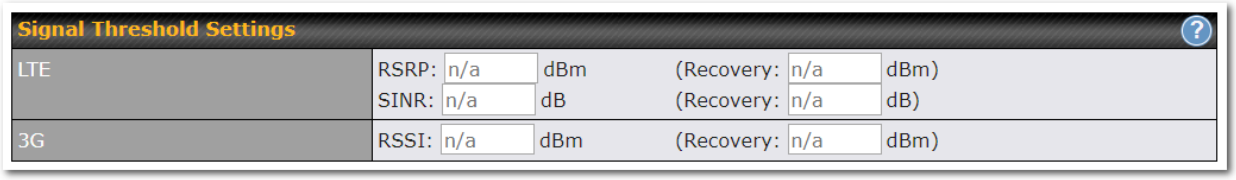
Signal Threshold Settings



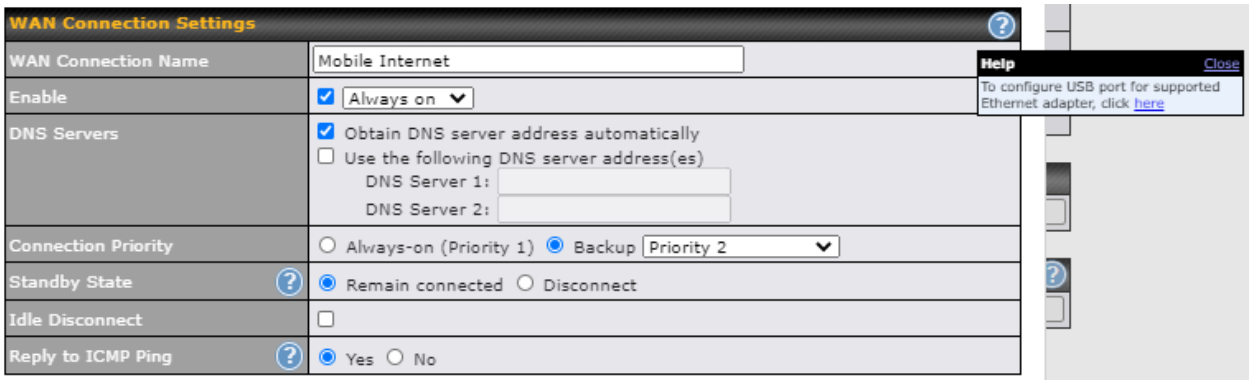
If signal threshold is defined, this connection will be treated as down when a weaker than threshold signal is determined.
The following values are used by the threshold scale:

	0 bars	1 bar	2 bars	3 bars	4 bars	5 bars
LTE / RSSRP	-140	-128	-121	-114	-108	-98
3G / RSSI	-120	-100	-95	-90	-85	-75

To define the threshold manually using specific signal strength values, please click on the question Mark and the following field will be visible.



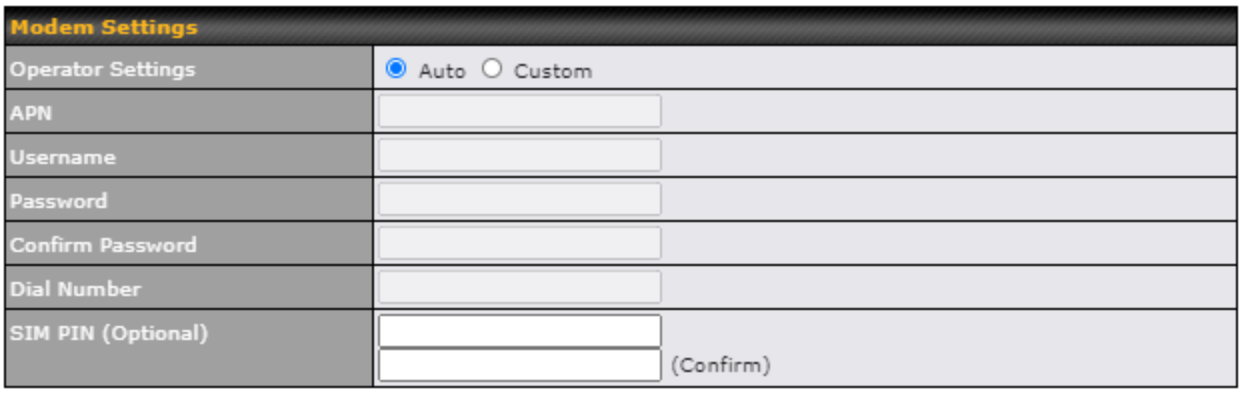
13.2.3 USB WAN



WAN Connection Settings	
WAN Connection Name	Indicate a name you wish to give this WAN connection
Enable	This setting enables the WAN connection. If schedules have been defined, you will be able to select a schedule to apply to the connection.
DNS Server	Each ISP may provide a set of DNS servers for DNS lookups. This setting specifies the DNS (Domain Name System) servers to be used when a DNS lookup is routed through this connection. Selecting **Obtain DNS server address automatically** results in the DNS servers assigned by the WAN DHCP server being used for outbound DNS lookups over the connection. (The DNS servers are obtained along with the WAN IP address assigned by the DHCP server.) When **Use the following DNS server address(es)** is selected, you may enter custom DNS server addresses for this WAN connection into the **DNS server 1** and **DNS server 2** fields.
Connection Priority	This option allows you to configure the WAN connection whether for normal daily usage or as a backup connection only. If **Always-on** is chosen, the WAN connection will be kept on continuously, regardless of the priority of other WAN connections. If **Backup** is chosen, the WAN connection will depend on other WAN connections. It will not be used when one or more higher priority dependent WAN connections are connected.
Standby State	This option allows you to choose whether to remain the connection connected or disconnect it when this WAN connection is no longer in the highest priority and has entered the standby

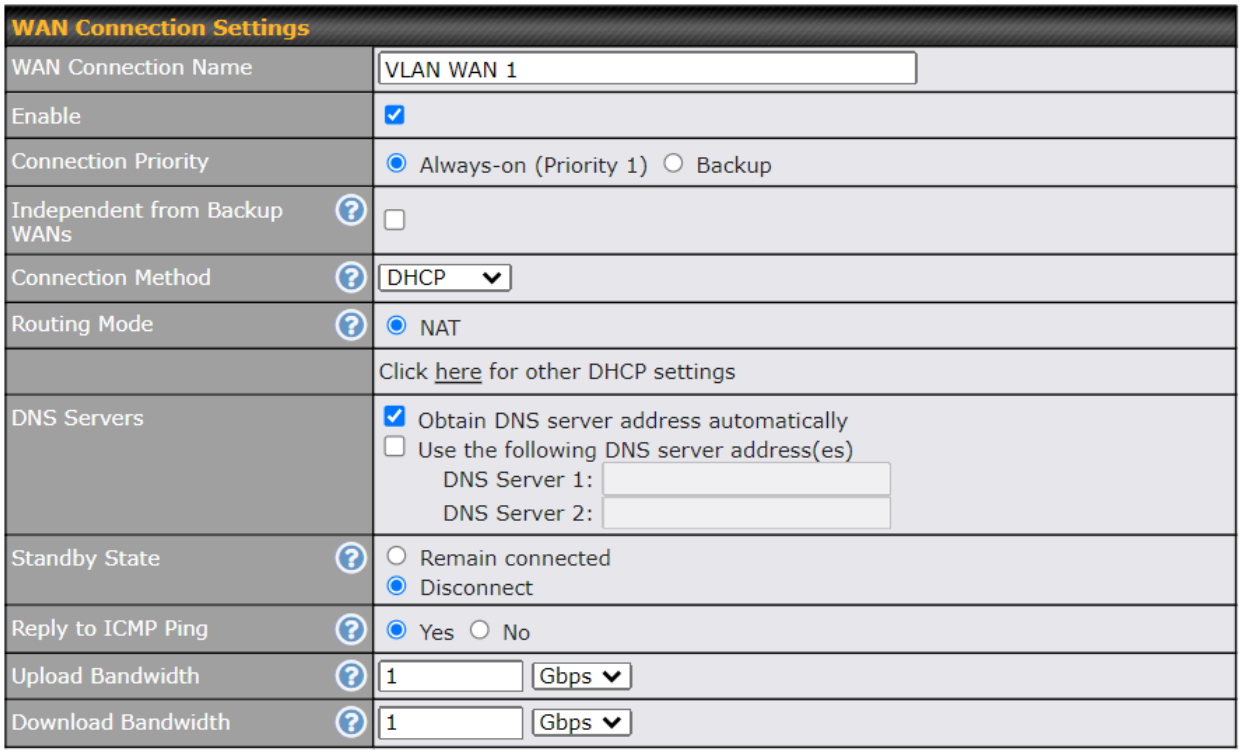
	state.
Idle Disconnect	If this is checked, the connection will disconnect when idle after the configured Time value. This option is disabled by default.
Reply to ICMP Ping	If the checkbox is **unticked**, this option is disabled and the system will not reply to any ICMP ping echo requests to the WAN IP addresses of this WAN connection. Default: **ticked** (Yes)

By default, the USB port is "USB Modem" mode. If you need to use it to connect to USB Ethernet Adapter, you need to change it to "USB Ethernet" mode, by enabling the hidden feature . Once this feature is enabled, the interface will behave as normal Ethernet WAN. The options that are the same as the ethernet WAN connection configuration are shown in the Ethernet WAN section.



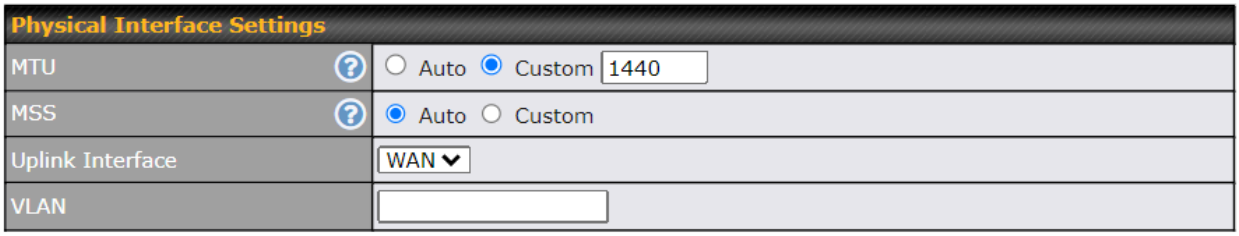
ModemSettings	
Operator Settings	This setting allows you to configure the APN settings of your connection. If **Auto** is selected, the mobile operator should be detected automatically. The connected device will be configured and connection will be made automatically. If there is any difficulty in making connections, you may select **Custom** to enter your carrier's **APN**, **Login**, **Password**, and **Dial Number** settings manually. The correct values can be obtained from your carrier. The default and recommended setting is **Auto**.
APN / Login / Password / SIM PIN	When **Auto** is selected, the information in these fields will be filled automatically. Select **Custom** to customize these parameters. The parameter values are determined by and can be obtained from the ISP.

13.2.4 Virtual WAN on VLAN



WAN Connection Settings	
WAN Connection Name	Indicate a name you wish to give this WAN connection
Enable	This setting enables the WAN connection. If schedules have been defined, you will be able to select a schedule to apply to the connection.
Connection Priority	This option allows you to configure the WAN connection whether for normal daily usage or as a backup connection only. If **Always-on** is chosen, the WAN connection will be kept on continuously, regardless of the priority of other WAN connections. If **Backup** is chosen, the WAN connection will depend on other WAN connections. It will not be used when one or more higher priority dependent WAN connections are connected.
Independent from Backup WANs	If this is checked, the connection will be working independent from other Backup WAN connections. Those in Backup Priority will ignore the status of this WAN connection, and will be used when none of the other higher priority connections are available.
Connection Method	This option allows you to select the connection method for this WAN connection. The available option are DHCP and Static IP.

Routing Mode	This field shows that **NAT** (network address translation) will be applied to the traffic routed over this WAN connection. **IP Forwarding** is available when you click the link in the help icon.
DNS Server	Each ISP may provide a set of DNS servers for DNS lookups. This setting specifies the DNS (Domain Name System) servers to be used when a DNS lookup is routed through this connection. Selecting **Obtain DNS server address automatically** results in the DNS servers assigned by the WAN DHCP server being used for outbound DNS lookups over the connection. (The DNS servers are obtained along with the WAN IP address assigned by the DHCP server.) When **Use the following DNS server address(es)** is selected, you may enter custom DNS server addresses for this WAN connection into the **DNS server 1** and **DNS server 2** fields.
Standby State	This option allows you to choose whether to remain the connection connected or disconnect it when this WAN connection is no longer in the highest priority and has entered the standby state.
Reply to ICMP Ping	If the checkbox is **unticked**, this option is disabled and the system will not reply to any ICMP ping echo requests to the WAN IP addresses of this WAN connection. Default: **ticked** (Yes)
Upload Bandwidth	This field refers to the maximum upload speed. This value is referenced when default weight is chosen for outbound traffic and traffic prioritization. A correct value can result in effective traffic prioritization and efficient use of upstream bandwidth.
Download Bandwidth	This field refers to the maximum download speed. Default weight control for outbound traffic will be adjusted according to this value.

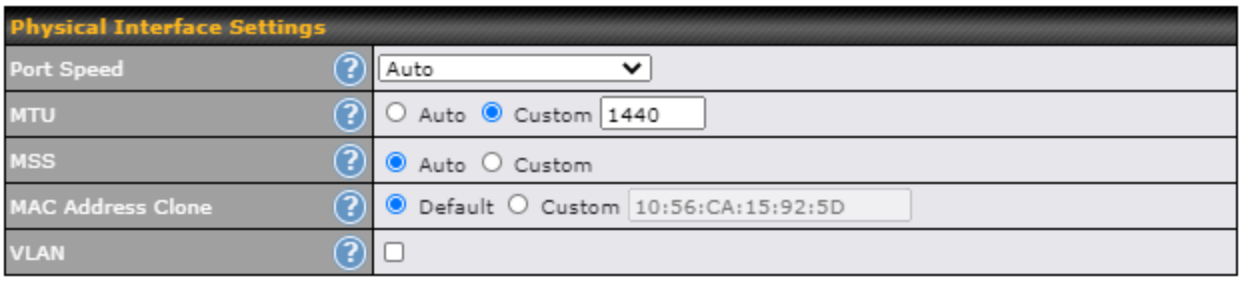


Physical Interface Settings	
MTU	This field is for specifying the Maximum Transmission Unit value of the WAN connection. An excessive MTU value can cause file downloads stall shortly after connected. You may consult your ISP for the connection's MTU value. Default value is 1440.
MSS	This field is for specifying the Maximum Segment Size of the WAN connection. When Auto is selected, MSS will be depended on the MTU value. When Custom is selected, you may enter a value for MSS. This value will be announced to remote TCP servers for maximum data that it can receive during the establishment of TCP connections. Some Internet servers are unable to listen to MTU setting if ICMP is filtered by firewall

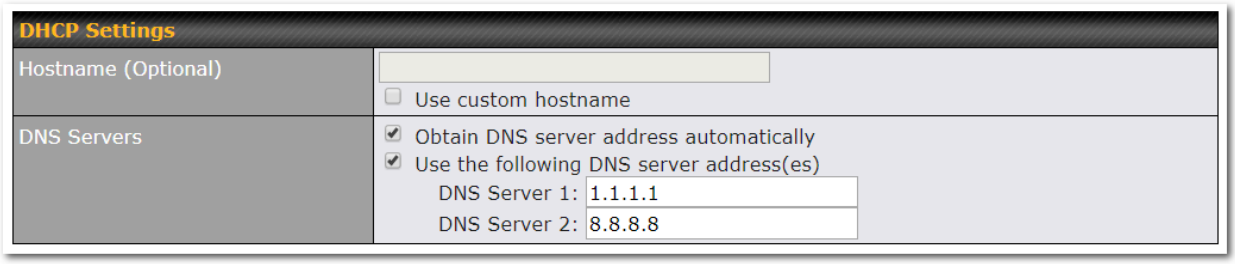
	between the connections. Normally, MSS equals to MTU minus 40. You are recommended to reduce the MSS only if changing of the MTU value cannot effectively inform some remote servers to size down data size. Default: Auto
Uplink Interface	This field is for selecting the WAN / LAN as the uplink interface of the Virtual WAN on VLAN connection.
VLAN	Enter the correct VLAN ID for the Virtual WAN on VLAN.

13.2.5 WAN Connection Settings (Common)

The remaining WAN-related settings are common to both Ethernet and cellular WAN



Physical Interface Settings	
Speed	This is the port speed of the WAN connection. It should be set to the same speed as the connected device in case of any port negotiation problems. When a static speed is set, you may choose whether to advertise its speed to the peer device or not. Advertise Speed is selected by default. You can choose not to advertise the port speed if the port has difficulty in negotiating with the peer device. Default: Auto
MTU	This field is for specifying the Maximum Transmission Unit value of the WAN connection. An excessive MTU value can cause file downloads stall shortly after connected. You may consult your ISP for the connection's MTU value. Default value is 1440.
MSS	This field is for specifying the Maximum Segment Size of the WAN connection. When Auto is selected, MSS will be depended on the MTU value. When Custom is selected, you may enter a value for MSS. This value will be announced to remote TCP servers for maximum data that it can receive during the establishment of TCP connections. Some Internet servers are unable to listen to MTU setting if ICMP is filtered by firewall between the connections. Normally, MSS equals to MTU minus 40. You are recommended to reduce the MSS only if changing of the MTU value cannot effectively inform some remote servers to size down data size. Default: Auto
MAC Address Clone	Some service providers (e.g. cable network) identify the client's MAC address and require client to always use the same MAC address to connect to the network. If it is the case, you may change the WAN interface's MAC address to the client PC's one by entering the PC's MAC address to this field. If you are not sure, click the Default button to restore to the default value.
VLAN	Check the box to assign a VLAN to the interface.



DHCP Settings	
Hostname (Optional)	If your service provider's DHCP server requires you to supply a hostname value upon acquiring an IP address, you may enter the value here. If your service provider does not provide you with a hostname, you can safely bypass this option.
DNS Servers	Each ISP may provide a set of DNS servers for DNS lookups. This setting specifies the DNS (Domain Name System) servers to be used when a DNS lookup is routed through this connection. Selecting **Obtain DNS server address automatically** results in the DNS servers assigned by the WAN DHCP server being used for outbound DNS lookups over the connection. (The DNS servers are obtained along with the WAN IP address assigned by the DHCP server.) When **Use the following DNS server address(es)** is selected, you may enter custom DNS server addresses for this WAN connection into the **DNS server 1** and **DNS server 2** fields.

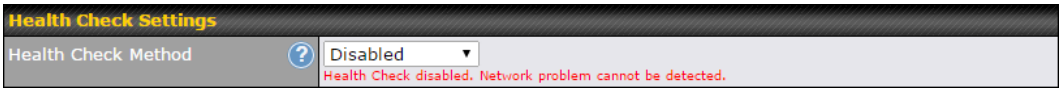
13.2.6 WAN Health Check

To ensure traffic is routed to healthy WAN connections only, the Peplink Balance can periodically check the health of each WAN connection.
Health Check settings for each WAN connection can be independently configured via **Network > WAN > *Connection name* > Health Check Settings.**

Enable Health Check by selecting PING, DNS Lookup, or HTTP from the Health Check Method drop-down menu.

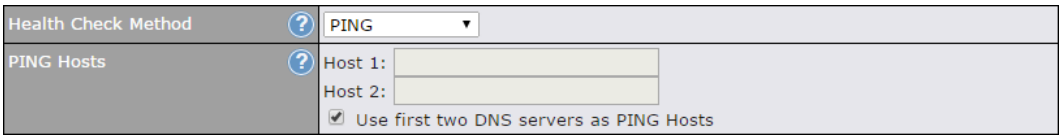
Health Check Settings	
Method	This setting specifies the health check method for the WAN connection. This value can be configured as **Disabled**, **PING**, **DNS Lookup**, or **HTTP**. The default method is **DNS Lookup**. For mobile Internet connections, the value of **Method** can be configured as **Disabled** or **SmartCheck**.

Health Check Disabled



When **Disabled** is chosen in the **Method** field, the WAN connection will always be considered as up. The connection will **NOT** be treated as down in the event of IP routing errors.

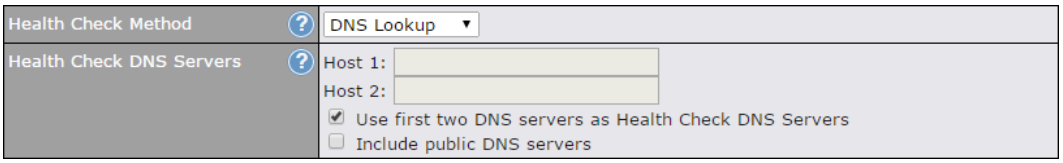
Health Check Method: PING



ICMP ping packets will be issued to test the connectivity with a configurable target IP address or hostname. A WAN connection is considered as up if ping responses are received from either one or both of the ping hosts.

PING Hosts	This setting specifies IP addresses or hostnames with which connectivity is to be tested via ICMP ping. If **Use first two DNS servers as Ping Hosts** is checked, the target ping host will be the first DNS server for the corresponding WAN connection. Reliable ping hosts with a high uptime should be considered. By default, the first two DNS servers of the WAN connection are used as the ping hosts.

Health Check Method: DNS Lookup



DNS lookups will be issued to test connectivity with target DNS servers. The connection will be treated as up if DNS responses are received from one or both of the servers, regardless of whether the result was positive or negative.

Health Check DNS Servers

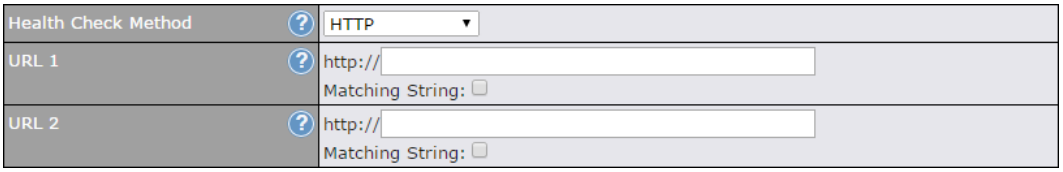
This field allows you to specify two DNS hosts' IP addresses with which connectivity is to be tested via DNS Lookup.

If **Use first two DNS servers as Health Check DNS Servers** is checked, the first two DNS servers will be the DNS lookup targets for checking a connection's health. If the box is not checked, **Host 1** must be filled, while a value for **Host 2** is optional.

If **Include public DNS servers** is selected and no response is received from all specified DNS servers, DNS lookups will also be issued to some public DNS servers. A WAN connection will be treated as down only if there is also no response received from the public DNS servers.

Connections will be considered as up if DNS responses are received from any one of the health check DNS servers, regardless of a positive or negative result. By default, the first two DNS servers of the WAN connection are used as the health check DNS servers.

Health Check Method: HTTP



HTTP connections will be issued to test connectivity with configurable URLs and strings to match.

URL1

WAN Settings>WAN Edit>Health Check Settings>URL1

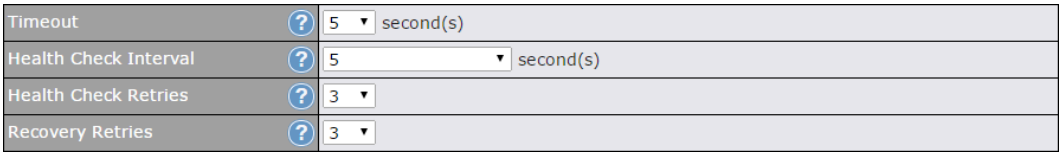
The URL will be retrieved when performing an HTTP health check. When **String to Match** is left blank, a health check will pass if the HTTP return code is between 200 and 299 (Note: HTTP redirection codes 301 or 302 are treated as failures). When **String to Match** is filled, a health check will pass if the HTTP return code is between 200 and 299 and if the HTTP response content contains the string.

URL 2

WAN Settings>WAN Edit>Health Check Settings>URL2

If **URL2** is also provided, a health check will pass if either one of the tests passed.

Other Health Check Settings



Timeout	This setting specifies the timeout in seconds for ping/DNS lookup requests. The default timeout is **5 seconds**.
Health Check Interval	This setting specifies the time interval in seconds between ping or DNS lookup requests. The default health check interval is **5 seconds**.
Health Check Retries	This setting specifies the number of consecutive ping/DNS lookup timeouts after which the Peplink Balance will treat the corresponding WAN connection as down. Default health retries is set to **3**. Using the default **Health Retries** setting of **3**, the corresponding WAN connection will be treated as down after three consecutive timeouts.
Recovery Retries	This setting specifies the number of consecutive successful ping/DNS lookup responses that must be received before the Peplink Balance treats a previously down WAN connection as up again. By default, **Recover Retries** is set to **3**. Using the default setting, a WAN connection that is treated as down will be considered as up again upon receiving three consecutive successful ping/DNS lookup responses.

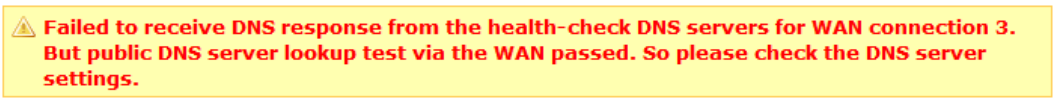
Note

If a WAN connection goes down, all of the WAN connections not set with a **Connection Type** of **Always-on** will also be brought up until any one of higher priority WAN connections is up and found to be healthy. This design could increase overall network availability.

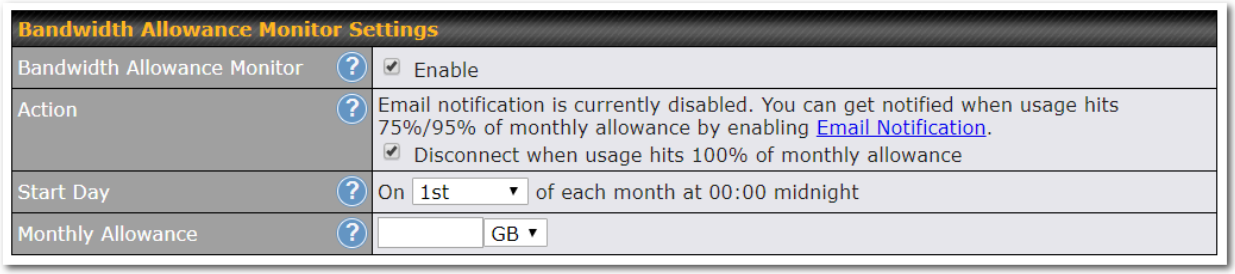
For example, if WAN1, WAN2, and WAN3 have connection types of **Always-on**, **Backup Priority Group 1**, and **Backup Priority Group 2**, respectively, when WAN1 goes down, WAN2 and WAN3 will try to connect. If WAN3 is connected first, WAN2 will still be kept connecting. If WAN2 is connected, WAN3 will disconnect or stop connecting.

Automatic Public DNS Server Check on DNS Test Failure

When the health check method is set to **DNS Lookup** and checks fail, the Balance will automatically perform DNS lookups on some public DNS servers. If the tests are successful, the WAN may not be down, but rather the target DNS server malfunctioned. You will see the following warning message on the main page:



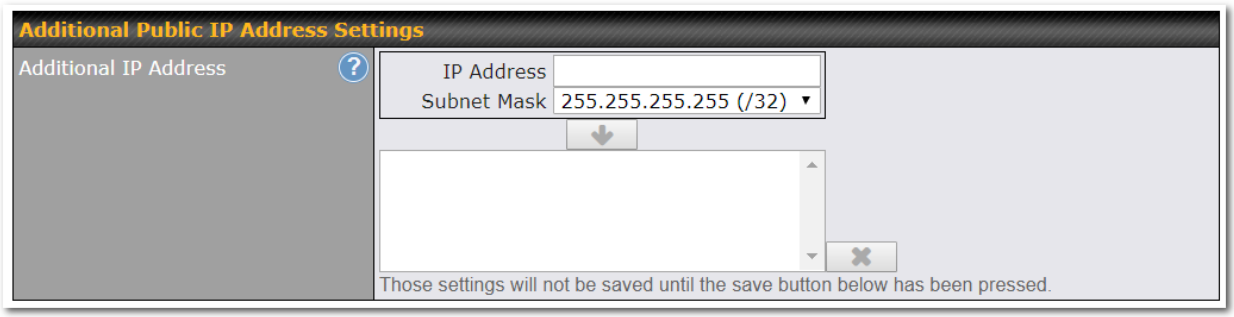
13.2.7 Bandwidth Allowance Monitor Settings



Bandwidth Allowance Monitor	
Action	If **Email Notification** is enabled, you will be notified by email when usage hits 75% and 95% of the monthly allowance. If **Disconnect when usage hits 100% of monthly allowance** is checked, this WAN connection will be disconnected automatically when the usage hits the monthly allowance. It will not resume connection unless this option has been turned off or the usage has been reset when a new billing cycle starts.
Start Day	This option allows you to define which day of the month each billing cycle begins.
Monthly Allowance	This field is for defining the maximum bandwidth usage allowed for the WAN connection each month.

Disclaimer
Due to different network protocol overheads and conversions, the amount of data reported by this Peplink device is not representative of actual billable data usage as metered by your network provider. Peplink disclaims any obligation or responsibility for any events arising from the use of the numbers shown here.

13.2.8 Additional Public IP Settings



Additional Public IP Settings	
IP Address List	**IP Address List** represents the list of fixed Internet IP addresses assigned by the ISP in the event that more than one Internet IP address is assigned to this WAN connection. Enter the fixed Internet IP addresses and the corresponding subnet mask, and then click the **Down Arrow** button to populate IP address entries to the **IP Address List**.

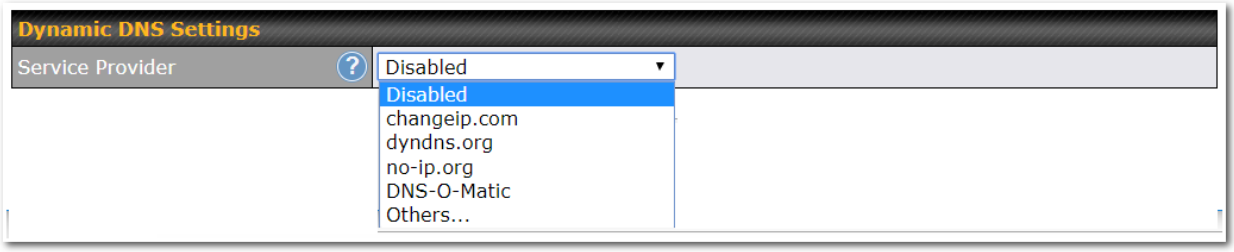
13.2.9 Dynamic DNS Settings

Peplink Balance routers allow registering domain name relationships to dynamic DNS service providers. Through registration with dynamic DNS service provider(s), the default public Internet IP address of each WAN connection can be associated with a hostname. With dynamic DNS service enabled for a WAN connection, you can connect to your WAN's IP address externally even if its IP address is dynamic. You must register for an account from the listed dynamic DNS service providers before enabling this option.

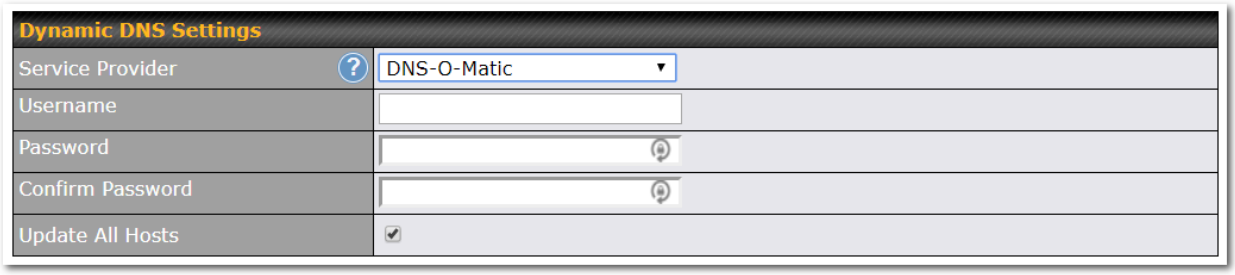
If the WAN connection's IP address is a reserved private IP address (i.e., behind a NAT router), the public IP of each WAN will be automatically reported to the DNS service provider.

Either upon a change in IP addresses or every 23 days without link reconnection, the Peplink Balance will connect to the dynamic DNS service provider to update the provider's IP address records.

The settings for dynamic DNS service provider(s) and the association of hostname(s) are configured via **Network>Interfaces>WAN>*Connection name*>Dynamic DNS Settings**.



If your desired provider is not listed, you may check with **DNS-O-Matic**. This service supports updating 30 other dynamic DNS service providers. (Note: Peplink is not affiliated with DNS-O-Matic.)



Dynamic DNS Settings	
Service Provider	This setting specifies the dynamic DNS service provider to be used for the WAN. Supported providers are: • changeip.com • dyndns.org • no-ip.org • tzo.com • DNS-O-Matic • Others… support custom Dynamic DNS servers by entering its URL. Works with any service compatible with DynDNS API. Select **Disabled** to disable this feature.
User ID / Username / Email	This setting specifies the registered user name for the dynamic DNS service.
Password	This setting specifies the password for the dynamic DNS service.
Update All Hosts	Check this box to automatically update all hosts.
Hosts	This setting specifies a list of hostnames or domains to be associated with the public Internet IP address of the WAN connection.

Important Note

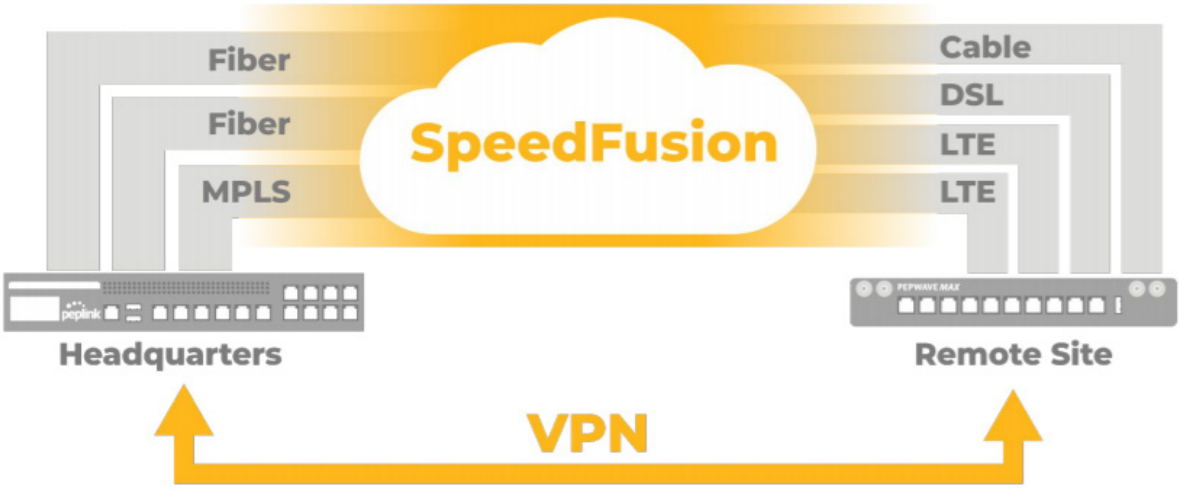
In order to use dynamic DNS services, appropriate hostname registration(s), as well as a valid account with a supported dynamic DNS service provider, are required.

A dynamic DNS update is performed whenever a WAN's IP address is changed, such as when an IP is changed after a DHCP IP refresh or reconnection.

Due to dynamic DNS service providers' policies, a dynamic DNS host expires automatically when the host record has not been not updated for a long time. Therefore, the Peplink Balance performs an update every 23 days, even if a WAN's IP address did not change.

14 Advanced Tab

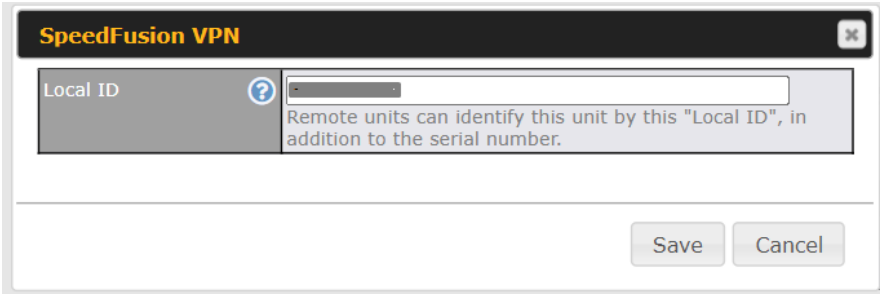
14.1 SpeedFusion VPN



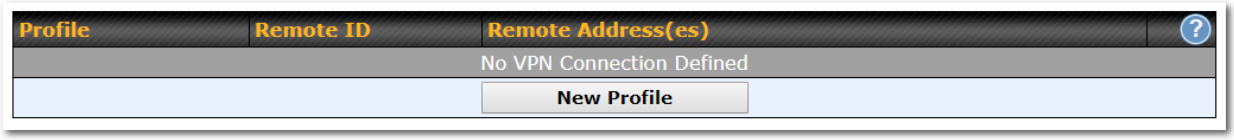
Peplink Balance SpeedFusion™ Bandwidth Bonding is our patented technology that enables our SD-WAN routers to bond multiple Internet connections to increase site-to-site bandwidth and reliability. SpeedFusion securely connects one or more branch offices to your company's main headquarters or to other branches. The data, voice, and video communications between these locations are kept confidential across the public Internet.

The SpeedFusion™ of the Peplink Balance is specifically designed for multi-WAN environments. With SpeedFusion, in case of failures and network congestion at one or more WANs, other WANs can be used to continue carrying the network traffic. Peplink Balance routers can bond all WAN connections' bandwidth for routing SpeedFusion™ traffic. Unless all the WAN connections of one site are down, the Peplink Balance can keep the VPN up and running.
Bandwidth bonding is enabled by default.

To begin, navigate to **Advanced > SpeedFusion VPN** and enter a Local ID and click save.



This device will be identified by other SpeedFusion VPN Peers by this local ID. The following menus will appear:



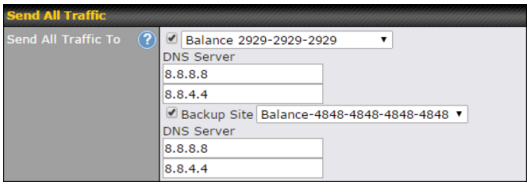
SpeedFusion VPN Profile

This table displays all defined profiles. Click the **New Profile** button to create a new profile for making a VPN connection to a remote unit via available WAN connections. Each pair of VPN connection requires its own profile.

The local LAN subnet and subnets behind the LAN (defined under Static Route on the LAN Settings page) will be advertised to the VPN. All VPN members will be able to route to local subnets.

Send All Traffic To

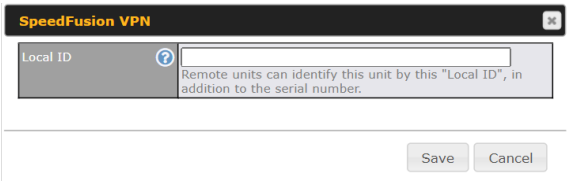
This feature allows you to redirect all traffic to a specified SpeedFusion VPN connection. Click the button to select your connection and the following menu will appear:



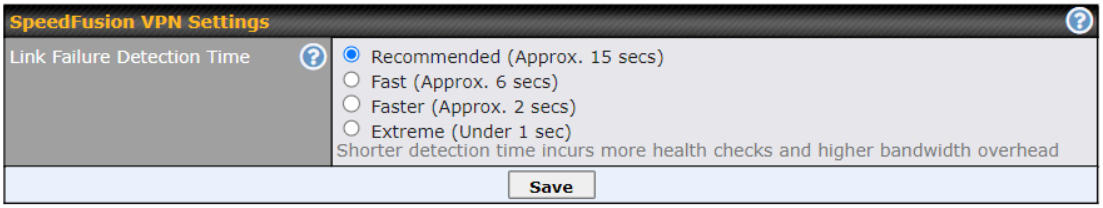
You could also specify a DNS server to resolve incoming DNS requests. Click the checkbox next to **Backup Site** to designate a backup SpeedFusion profile that will take over should the main SpeedFusion VPN connection fail.

SpeedFusion VPN Local ID

This feature allows you to change the local ID of a SpeedFusion VPN connection. Click the button to select your connection and the following menu will appear:



After updating the local ID, click **Save** to store your changes.



Link Failure Detection Time

Link Failure Detection Time

The bonded VPN can detect routing failures on the path between two sites over each WAN connection. Failed WAN connections will not be used to route VPN traffic. Health check packets are sent to the remote unit to detect any failure. The more frequently checks are sent, the shorter the detection time, although more bandwidth will be consumed.

When **Recommended** (default) is selected, a health check packet is sent every five seconds, and the expected detection time is 15 seconds.

When **Fast** is selected, a health check packet is sent every three seconds, and the expected detection time is six seconds.

When **Faster** is selected, a health check packet is sent every second, and the expected detection time is two seconds.

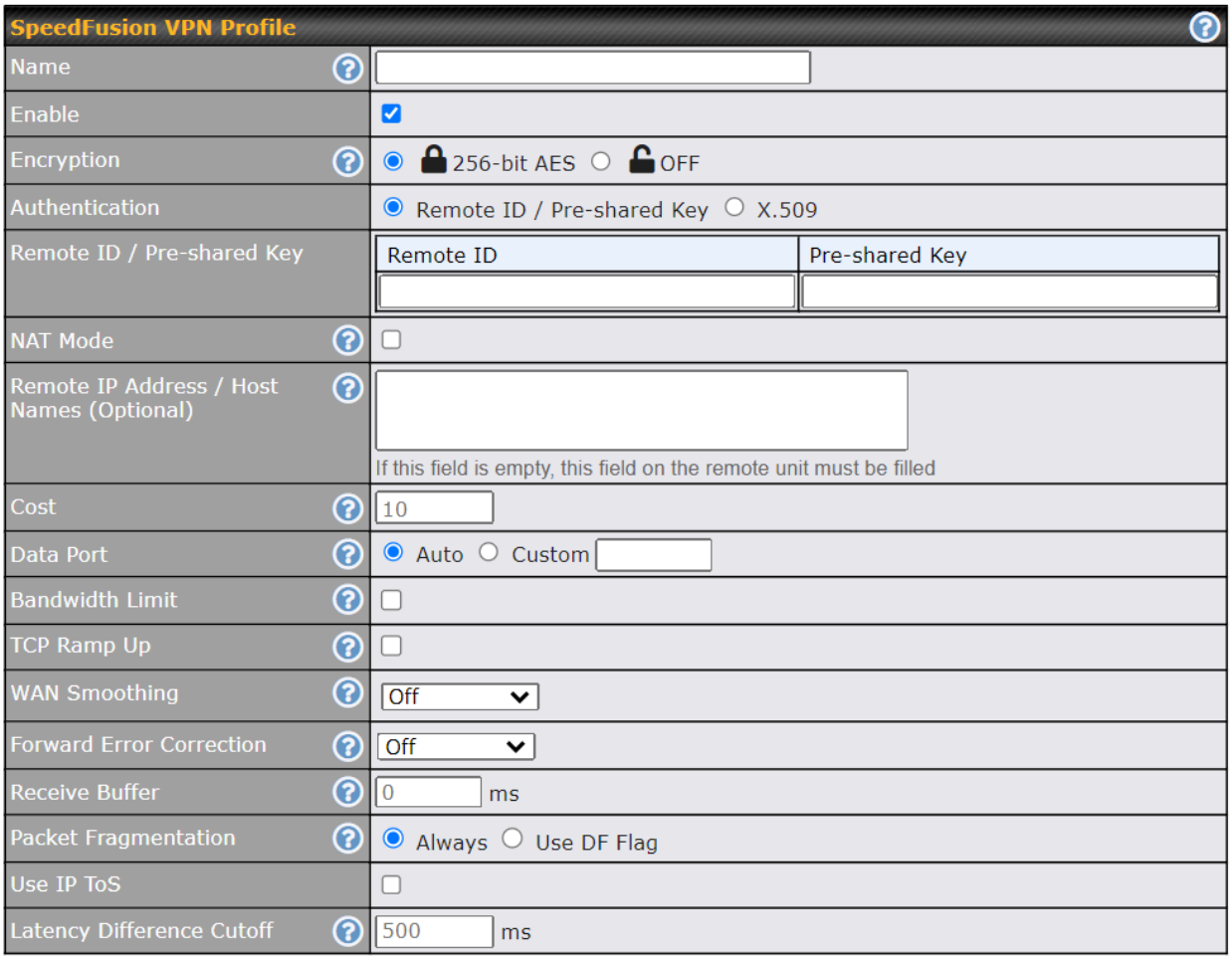
When **Extreme** is selected, a health check packet is sent every 0.1 second, and the expected detection time is less than one second.

Important Note

Peplink proprietary SpeedFusion™ uses TCP port 32015 and UDP port 4500 for establishing VPN connections. If you have a firewall in front of your Peplink Balance devices, you will need to add firewall rules for these ports and protocols to allow inbound and outbound traffic to pass through the firewall.

SpeedFusion VPN Profile Configuration

Click the **New Profile** button, or click one of the existing profiles, and the following menus will appear:



A list of defined SpeedFusion VPN connection profiles and a **Link Failure Detection Time** option will be shown. Click the **New Profile** button to create a new VPN connection profile for making a VPN connection to a remote Peplink Balance via the available WAN connections. Each profile is for making a VPN connection with one remote Peplink Balance.

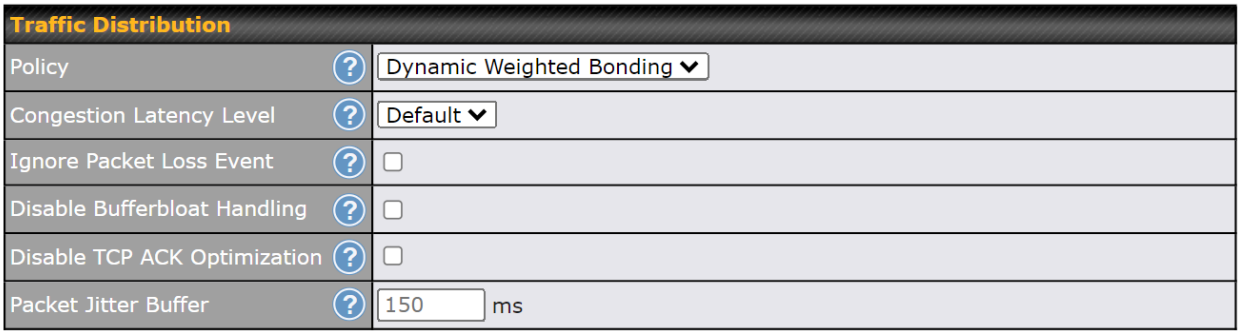
SpeedFusion VPN Profile	
Name	This field is for specifying a name to represent this profile. The name can be any combination of alphanumeric characters (0-9, A-Z, a-z), underscores (_), dashes (-), and/or non-leading/trailing spaces ( ). Click the icon next to the **SpeedFusion VPN Profile** title bar to use the IP ToS field of your data packet on SpeedFusion VPN WAN traffic.

Enable	When this box is checked, this VPN connection profile will be enabled. Otherwise, it will be disabled.
Encryption	By default, VPN traffic is encrypted with **256-bit AES**. If **Off** is selected on both sides of a VPN connection, no encryption will be applied.
Authentication	Select from **By Remote ID Only**, **Preshared Key**, or **X.509** to specify the method the Peplink Balance will use to authenticate peers. When selecting **By Remote ID Only**, be sure to enter a unique peer ID number in the **Remote ID** field.
Remote ID / Pre-shared Key	This optional field becomes available when **Remote ID / Pre-shared Key** is selected as the Peplink Balance's VPN **Authentication** method, as explained above. **Pre-shared Key** defines the pre-shared key used for this particular VPN connection. The VPN connection's session key will be further protected by the pre-shared key. The connection will be up only if the pre-shared keys on each side match. When the peer is running firmware 5.0+, this setting will be ignored. Enter Remote IDs either by typing out each Remote ID and Pre-shared Key, or by pasting a CSV. If you wish to paste a CSV, click the icon next to the "Remote ID / Preshared Key" setting.
Remote ID/Remote Certificate	These optional fields become available when **X.509** is selected as the Peplink Balance's VPN authentication method, as explained above. To authenticate VPN connections using X.509 certificates, copy and paste certificate details into these fields. To get more information on a listed X.509 certificate, click the **Show Details** link below the field.
Allow Shared Remote ID	When this option is enabled, the router will allow multiple peers to run using the same remote ID.
NAT Mode	Check this box to allow the local DHCP server to assign an IP address to the remote peer. When **NAT Mode** is enabled, all remote traffic over the VPN will be tagged with the assigned IP address using network address translation.
Remote IP Address / Host Names (Optional)	If **NAT Mode** is not enabled, you can enter a remote peer's WAN IP address or hostname(s) here. If the remote uses more than one address, enter only one of them here. Multiple hostnames are allowed and can be separated by a space character or carriage return. Dynamic-DNS host names are also accepted. This field is optional. With this field filled, the Peplink Balance will initiate connection to each of the remote IP addresses until it succeeds in making a connection. If the field is empty, the Peplink Balance will wait for connection from the remote peer. Therefore, at least one of the two VPN peers must specify this value. Otherwise, VPN connections cannot be established. Click the icon to customize the handshake port of the remote Host (TCP)
Cost	Define path cost for this profile. OSPF will determine the best route through the network using the assigned cost. Default: 10
Data Port	This field is used to specify a UDP port number for transporting outgoing VPN data. If **Default** is selected, UDP port 4500 will be used. Port 32015 will be used if the remote unit uses Firmware prior to version 5.4 or if port 4500 is unavailable. If **Custom** is selected, enter an outgoing port number from 1 to 65535.

	Click the icon to configure data stream using TCP protocol [EXPERIMENTAL]. In the case TCP protocol is used, the exposed TCP session option can be authorised to work with TCP accelerated WAN link.
Bandwidth Limit	Define maximum download and upload speed to each individual peer. This functionality requires the peer to use PepVPN version 4.0.0 or above.
TCP Ramp Up	For every new TCP connection, Normal WAN Smoothing will be applied for a short period of time to prevent packet loss during TCP Slow Start, which in some conditions will ramp up TCP throughput faster.
WAN Smoothing	While using PepVPN, utilize multiple WAN links to reduce the impact of packet loss and get the lowest possible latency at the expense of extra bandwidth consumption. This is suitable for streaming applications where the average bitrate requirement is much lower than the WAN's available bandwidth. Off - Disable WAN Smoothing. Normal - The total bandwidth consumption will be at most 2x of the original data traffic. Medium - The total bandwidth consumption will be at most 3x of the original data traffic. High - The total bandwidth consumption depends on the number of connected active tunnels.
Forward Error Correction	Forward Error Correction (FEC) can help to recover packet loss by using extra bandwidth to send redundant data packets. Higher FEC level will recover packets on a higher loss rate link. The expected overhead of Low is 13.3% and High is 26.7%. Require peer using PepVPN version 8.0.0 and above.
Receive Buffer	Receive Buffer can help to reduce out-of-order packets and jitter, but will introduce extra latency to the tunnel. Default is 0 ms, which disables the buffer, and maximum buffer size is 2000 ms.
Packet Fragmentation	If the packet size is larger than the tunnel's MTU, it will be fragmented inside the tunnel in order to pass through. Select Always to fragment any packets that are too large to send, or Use DF Flag to only fragment packets with Don't Fragment bit cleared. This can be useful if your application does Path MTU Discovery, usually sending large packets with DF bit set, if allowing them to go through by fragmentation, the MTU will not be detected correctly.
Use IP ToS[A]	If Use IP ToS is enabled, the ToS value of the data packets will be copied to the PepVPN header during encapsulation.
Latency Difference Cutoff[A]	Traffic will be stopped for links that exceed the specified millisecond value with respect to the lowest latency link. (e.g. Lowest latency is 100ms, a value of 500ms means links with latency 600ms or more will not be used)

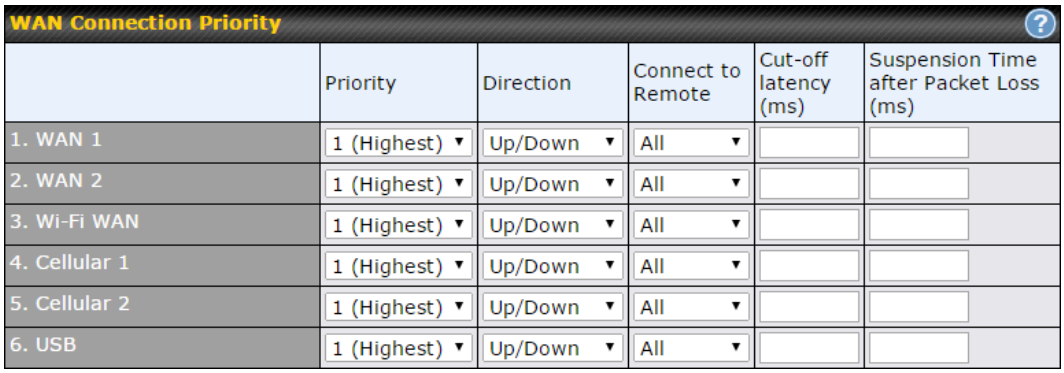
[A] - Advanced feature, please click the button on the top right-hand corner to activate.

To enable Layer 2 Bridging between PepVPN profiles, navigate to **Network>LAN>*LAN Profile Name***



Traffic Distribution	
Policy	This option allows you to select the desired out-bound traffic distribution policy: • Bonding - Aggregate multiple WAN-to-WAN links into a single higher throughput tunnel. • Dynamic Weighted Bonding - Aggregates WAN-to-WAN links with similar latencies. By default, Bonding is selected as a traffic distribution policy.
Congestion Latency Level	For most WANs, especially on cellular networks, the latency will increase when the link becomes more congested. Setting the **Congestion Latency Level** to **Low** will treat the link as congested more aggressively. Setting it to **High** will allow the latency to increase more before treating it as congested.
Ignore Packet Loss Event	By default, when there is packet loss, it is considered as a congestion event. If this is not the case, select this option to ignore the packet loss event.
Disable Bufferbloat Handling	Bufferbloat is a phenomenon on the WAN side when it is congested. The latency can become very high due to buffering on the uplink. By default, the Dynamic Weighted Bonding policy will try its best to mitigate bufferbloat by reducing TCP throughput when the WAN is congested. However, as a side effect, the tunnel might not achieve maximum bandwidth. Selecting this option will **disable** the bufferbloat handling mentioned above.
Disable TCP ACK Optimization	By default, TCP ACK will be forwarded to remote peers as fast as possible. This will consume more bandwidth, but may help to improve TCP performance as well. Selecting this option will **disable** the TCP ACK optimization mentioned above.

Packet Jitter Buffer	The default jitter buffer is 150ms, and can be modified from 0ms to 500ms. The jitter buffer may increase the tunnel latency. If you want to keep the latency as low as possible, you can set it to 0ms to disable the buffer. **Note**: If the Receive Buffer is set, the Packet Jitter Buffer will be automatically disabled.



WAN Connection Priority	
WAN Connection Priority	If your device supports it, you can specify the priority of WAN connections to be used for making VPN connections. WAN connections set to **OFF** will never be used. Only available WAN connections with the highest priority will be used. To enable asymmetric connections, connection mapping to remote WANs, cut-off latency, and packet loss suspension time, click the button.

Peplink also published a whitepaper about Speedfusion which can be downloaded from the following url:
http://download.peplink.com/resources/whitepaper-speedfusion-and-best-practices-2019.pdf

14.2 IPsec VPN

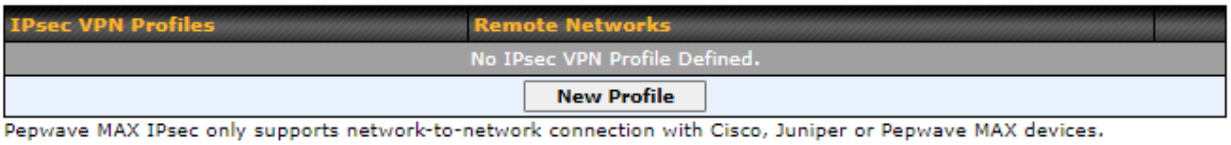
Peplink Balance IPsec VPN functionality securely connects one or more branch offices to your company's main headquarters or to other branches. Data, voice, and video communications between these locations are kept safe and confidential across the public Internet.

All Peplink products can make multiple IPsec VPN connections with Peplink routers, as well as Cisco and Juniper routers.

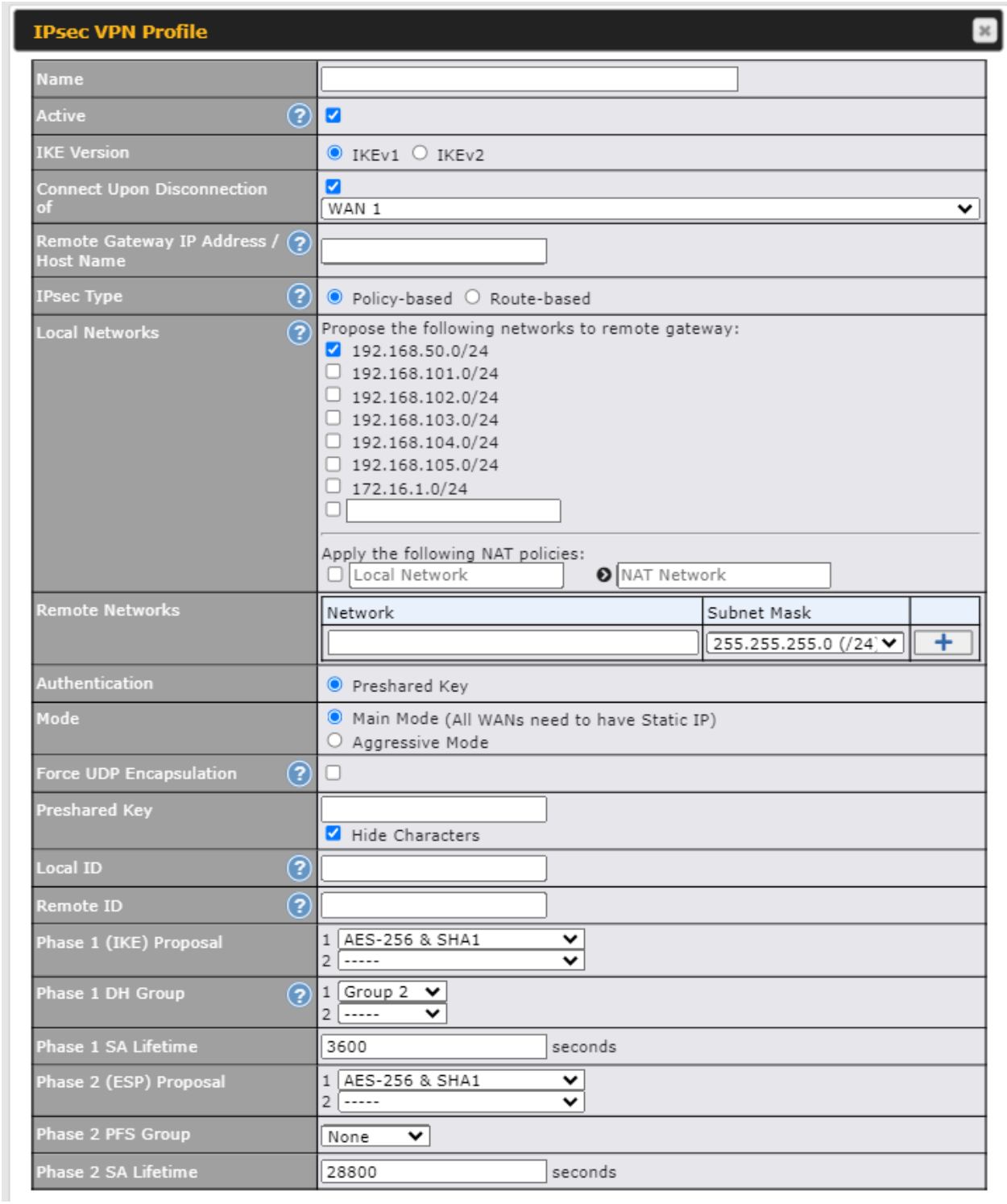
Note that all LAN subnets and the subnets behind them must be unique. Otherwise, VPN members will not be able to access each other.

All data can be routed over the VPN with a selection of encryption standards, such as 3DES, AES-128, and AES-256.

To configure, navigate to **Advanced > IPsec VPN**.



Click the **New Profile** button to create new IPsec VPN profiles that make VPN connections to remote Peplink Balance, Cisco, or Juniper Routers via available WAN connections. To edit any of the profiles, click on its associated connection name in the leftmost column.



IPsec VPN Profile

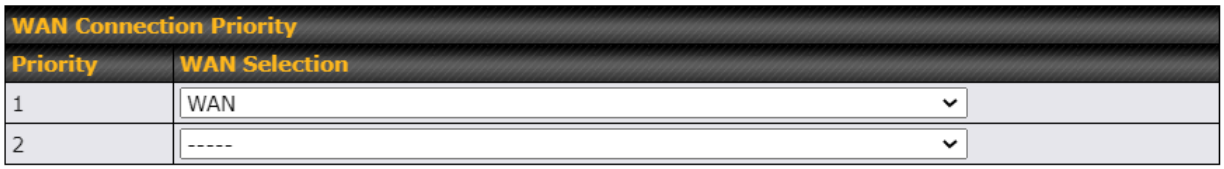
Name	
Active	☑
IKE Version	◉ IKEv1 ○ IKEv2
Connect Upon Disconnection of	☑ WAN 1
Remote Gateway IP Address / Host Name	
IPsec Type	◉ Policy-based ○ Route-based
Local Networks	Propose the following networks to remote gateway: ☑ 192.168.50.0/24 ☐ 192.168.101.0/24 ☐ 192.168.102.0/24 ☐ 192.168.103.0/24 ☐ 192.168.104.0/24 ☐ 192.168.105.0/24 ☐ 172.16.1.0/24 ☐ Apply the following NAT policies: ☐ Local Network → NAT Network
Remote Networks	Network: Subnet Mask: 255.255.255.0 (/24) +
Authentication	◉ Preshared Key
Mode	◉ Main Mode (All WANs need to have Static IP) ○ Aggressive Mode
Force UDP Encapsulation	☐
Preshared Key	☑ Hide Characters
Local ID	
Remote ID	
Phase 1 (IKE) Proposal	1 AES-256 & SHA1 2 -----
Phase 1 DH Group	1 Group 2 2 -----
Phase 1 SA Lifetime	3600 seconds
Phase 2 (ESP) Proposal	1 AES-256 & SHA1 2 -----
Phase 2 PFS Group	None
Phase 2 SA Lifetime	28800 seconds

IPsec VPN Settings	
Name	This field is for specifying a local name to represent this connection profile.
Active	When this box is checked, this IPsec VPN connection profile will be enabled. Otherwise, it will be disabled.
IKE Version	Two versions of the IKE standards are available: ● IKEv1 ● IKEv2
Connect Upon Disconnection of	Check this box and select a WAN to connect to this VPN automatically when the specified WAN is disconnected. To activate this function, click the button next to the "Active" option.
Remote Gateway IP Address / Host Name	Enter the remote peer's public IP address. For **Aggressive Mode**, this is optional.
IPsec Type	Policy-based - (default) All the matched traffic as defined in Local Networks and Remote Networks will be routed to this IPsec connection, this cannot be overridden by other routing methods. Route-based - Outbound Policy rule is required to route traffic to this tunnel and comes with more flexibility to control how to route traffic compared to Policy-based. If you want to modify the traffic selector instead of using the default (0.0.0.0/0). **Note**: This option is only available for the following models: ● Balance: 30 LTE/Pro, One/Two, 210/310 HW4 or above, 305/380 or above ● MediaFast ● X series
Local Networks	Enter the local LAN subnets here. If you have defined static routes, they will be shown here. Using NAT, you can map a specific local network / IP address to another, and the packets received by remote gateway will appear to be coming from the mapped network / IP address. This allows you to establish IPsec connection to a remote site that has one or more subnets overlapped with local site. Two types of NAT policies can be defined: **One-to-One NAT policy**: if the defined subnet in Local Network and NAT Network has the same size, for example, policy "192.168.50.0/24 > 172.16.1.0/24" will translate the local IP address 192.168.50.10 to 172.16.1.10 and 192.168.50.20 to 172.16.1.20. This is a bidirectional mapping which means clients in remote site can initiate connection to the local clients using the mapped address too. **Many-to-One NAT policy**: if the defined NAT Network on the right hand side is an IP address (or having a network prefix /32), for example, policy "192.168.1.0/24 > 172.168.50.1/32" will translate all clients in 192.168.1.0/24 network to 172.168.50.1. This is a unidirectional mapping which means clients in remote site will not be able to initiate a

	connection to the local clients.
Remote Networks	Enter the LAN and subnets that are located at the remote site here.
Authentication	To access your VPN, clients will need to authenticate by your choice of methods. Choose between the **Preshared Key** and **X.509 Certificate** methods of authentication.
Mode	Choose **Main Mode** if both IPsec peers use static IP addresses. Choose **Aggressive Mode** if one of the IPsec peers uses dynamic IP addresses.
Force UDP Encapsulation	For forced UDP encapsulation regardless of NAT-traversal, tick this checkbox.
Pre-shared Key	This defines the peer authentication pre-shared key used to authenticate this VPN connection. The connection will be up only if the pre-shared keys on each side match.
Remote Certificate (pem encoded)	Available only when **X.509 Certificate** is chosen as the **Authentication** method, this field allows you to paste a valid X.509 certificate.
Local ID	In **Main Mode**, this field can be left blank. In **Aggressive Mode**, if **Remote Gateway IP Address** is filled on this end and the peer end, this field can be left blank. Otherwise, this field is typically a U-FQDN.
Remote ID	In **Main Mode**, this field can be left blank. In **Aggressive Mode**, if **Remote Gateway IP Address** is filled on this end and the peer end, this field can be left blank. Otherwise, this field is typically a U-FQDN.
Phase 1 (IKE) Proposal	In **Main Mode**, this allows setting up to six encryption standards, in descending order of priority, to be used in initial connection key negotiations. In **Aggressive Mode**, only one selection is permitted.
Phase 1 DH Group	This is the Diffie-Hellman group used within IKE. This allows two parties to establish a shared secret over an insecure communications channel. The larger the group number, the higher the security. **Group 2**: **1024-bit** is the default value. **Group 5**: **1536-bit** is the alternative option.
Phase 1 SA Lifetime	This setting specifies the lifetime limit of this Phase 1 Security Association. By default, it is set at **3600** seconds.
Phase 2 (ESP) Proposal	In **Main Mode**, this allows setting up to six encryption standards, in descending order of priority, to be used for the IP data that is being transferred. In **Aggressive Mode**, only one selection is permitted.
Phase 2 PFS Group	Perfect forward secrecy (PFS) ensures that if a key was compromised, the attacker will be able to access only the data protected by that key. **None** - Do not request for PFS when initiating connection. However, since there is no valid reason to refuse PFS, the system will allow the connection to use PFS if requested by the remote peer. This is the default value. **Group 2**: 1024-bit Diffie-Hellman group. The larger the group number, the higher the security.

	Group 5: **1536-bit** is the third option.
Phase 2 SA Lifetime	This setting specifies the lifetime limit of this Phase 2 Security Association. By default, it is set at **28800** seconds.

IPsec VPN on the Peplink Balance is specially designed for multi-WAN environments. For instance, if a user sets up multiple IPsec profiles for his multi-WAN environment and WAN1 is connected and healthy, IPsec traffic will go through this link. However, should unforeseen problems (e.g.,unplugged cables or ISP problems) cause WAN1 to go down, our IPsec implementation will make use of WAN2 and WAN3 for failover

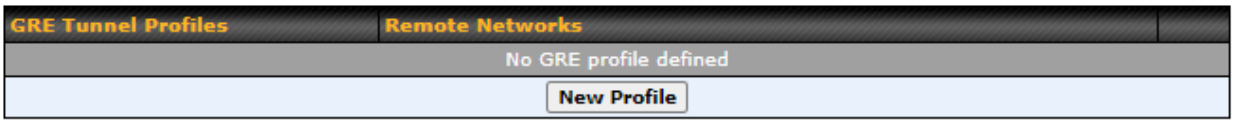


IPsec Status shows the current connection status of each connection profile and is displayed at **Status > IPsec VPN.**

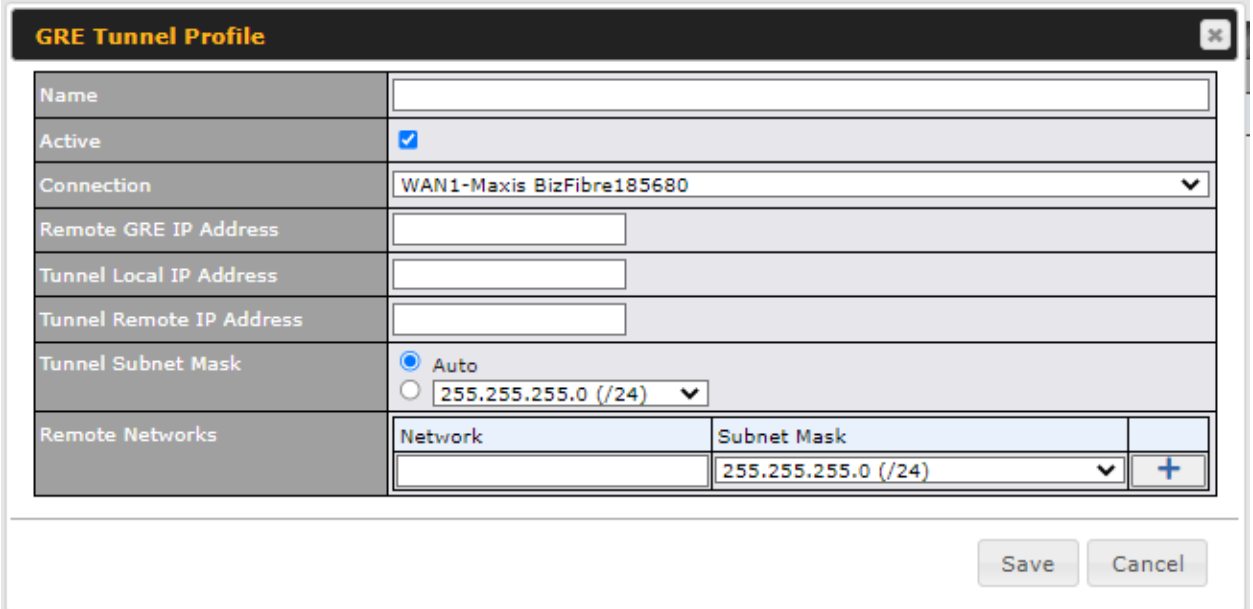
14.3 GRE Tunnel

Generic Routing Encapsulation (GRE) is a tunneling protocol that can encapsulate a wide variety of network layer protocols inside virtual point-to-point links over an Internet Protocol network. A GRE tunnel is similar to IPSec or PepVPN.

To configure a GRE Tunnel, navigate to **Advanced > GRE Tunnel**.



Click the **New Profile** button to create new GRE tunnel profiles that establish tunnel connections to remote tunnel endpoints via available WAN connections. To edit the profiles, click on its associated connection name in the leftmost column.

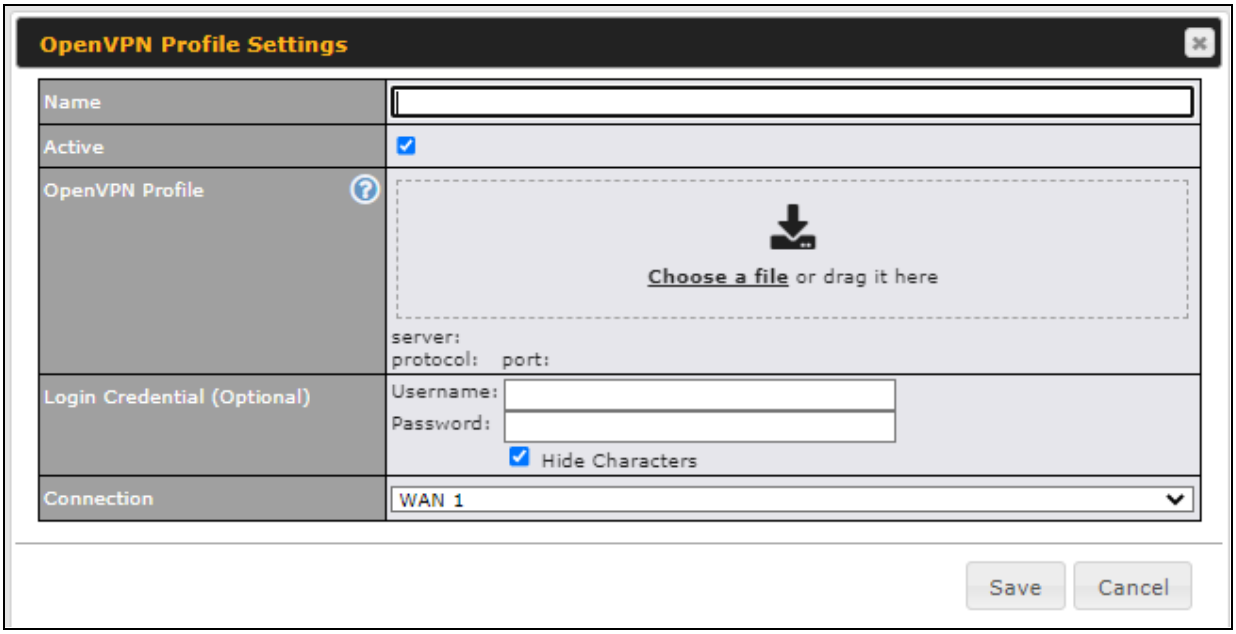


GRE Tunnel Profile Settings	
Name	This field is for specifying a name to represent this GRE Tunnel connection profile.
Active	When this box is checked, this GRE Tunnel connection profile will be enabled. Otherwise, it will be disabled.
Connection	Select the appropriate WAN connection from the drop-down menu.
Remote GRE IP Address	This field is for entering the remote GRE's IP address
Tunnel Local IP Address	This field is for specifying the tunnel source IP address.
Tunnel Remote IP Address	This field is for specifying the tunnel destination IP address
Tunnel Subnet Mask	This field is to select the subnet mask that is to be used for the GRE tunnel.
Remote Networks	Input the LAN and subnets that are located at the remote site here.

14.4 OpenVPN

OpenVPN is a site to site VPN mode that can encapsulate a wide variety of network layer protocols inside virtual point-to-point links over an Internet Protocol network.

To configure a OpenVPN, navigate to **Advanced > OpenVPN** and click the **New Profile**.



OpenVPN Profile Settings	
Name	This field is for specifying a name to represent this OpenVPN profile.
Active	When this box is checked, this OpenVPN connection profile will be enabled. Otherwise, it will be disabled.
OpenVPN Profile	Upload the OpenVPN configuration (.ovpn) file from your service provider.
Login Credential (Optional)	This option is an optional for you to enter the username and password to login for the OpenVPN connection if the profile need to login.
Connection	Select the appropriate WAN connection from the drop-down menu.

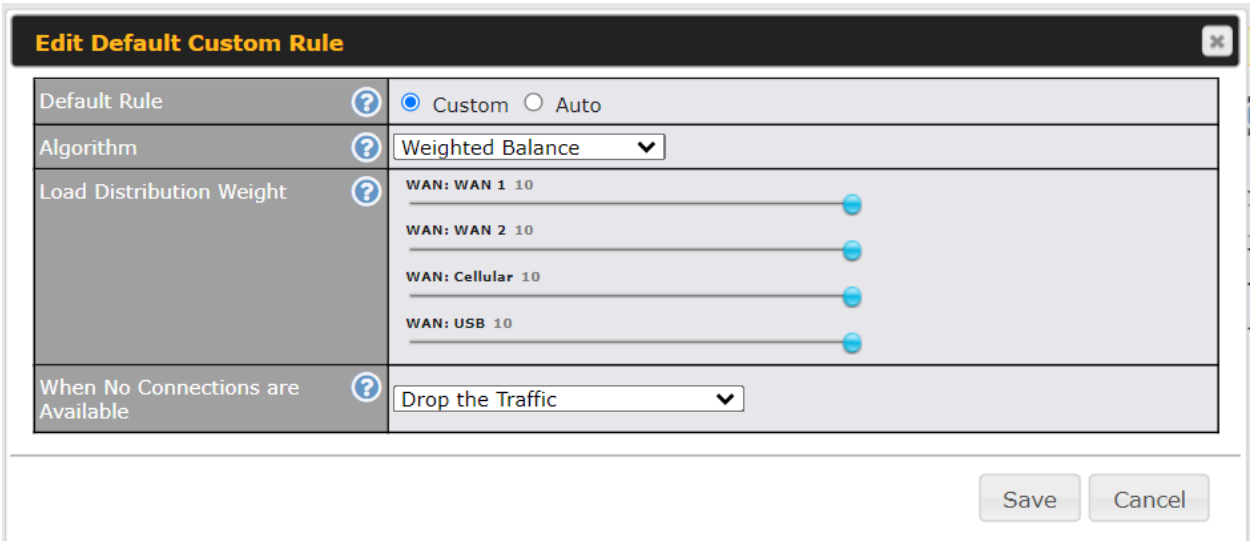
14.5 Outbound Policy

Outbound policies for managing and load balancing outbound traffic are located at

Advanced > Outbound Policy. The menu underneath enables you to define Outbound policy rules:

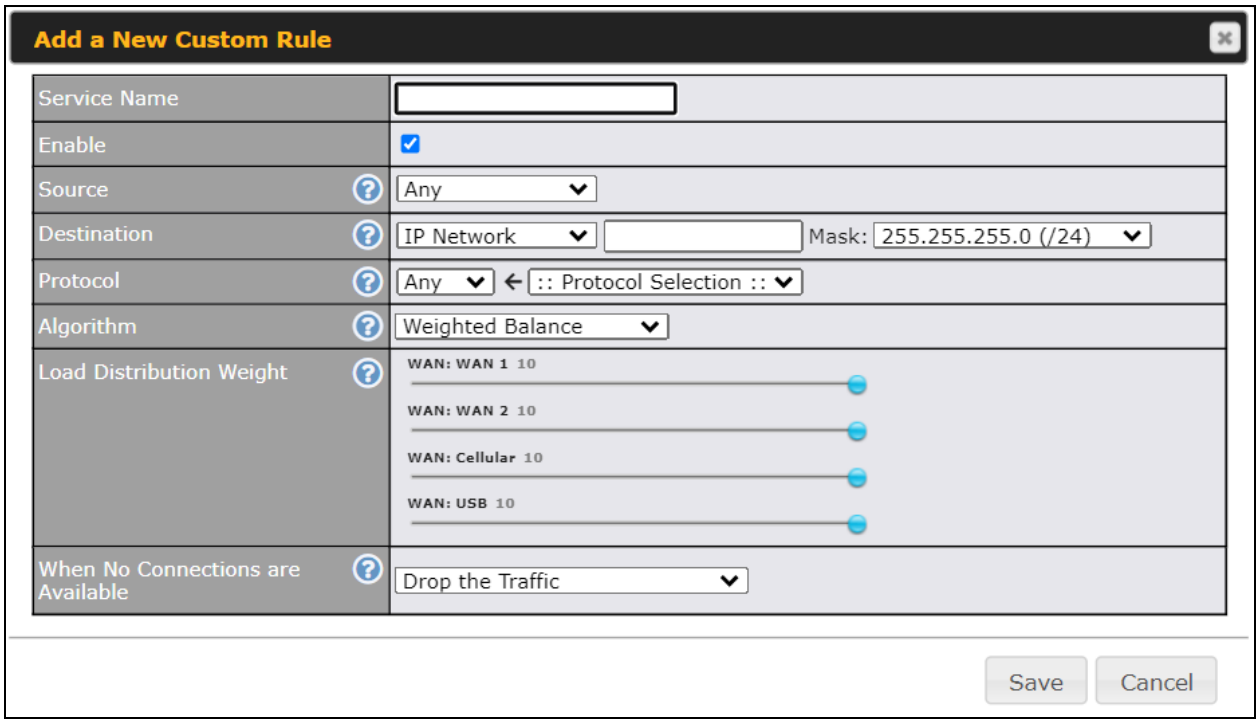
The bottom-most rule is **Default**. Edit this rule to change the device's default manner of controlling outbound traffic for all connections that do not match any of the rules above it. Under the **Service** heading, click **Default** to change these settings.

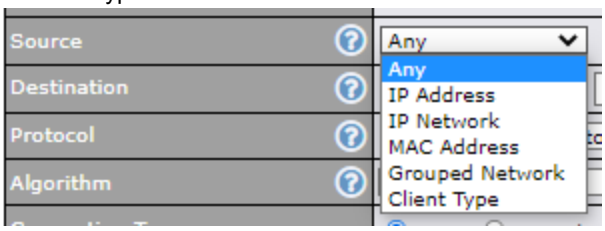
To rearrange the priority of outbound rules, drag and drop them into the desired sequence.

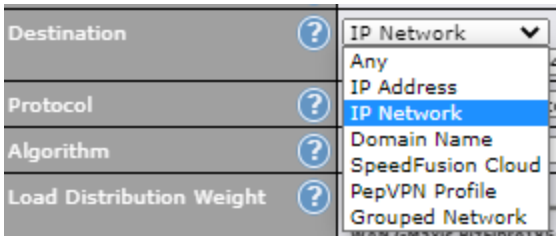


By default, **Auto** is selected as the **Default Rule**. You can select **Custom** to change the algorithm to be used. Please refer to the upcoming sections for the details on the available algorithms.

To create a custom rule, click **Add Rule** at the bottom of the table.



New Custom Rule Settings	
Service Name	This setting specifies the name of the outbound traffic rule.
Enable	This setting specifies whether the outbound traffic rule takes effect. When **Enable** is checked, the rule takes effect: traffic is matched and actions are taken by the Pepwave router based on the other parameters of the rule. When **Enable** is unchecked, the rule does not take effect: the Pepwave router disregards the other parameters of the rule. Click the drop-down menu next to the checkbox to apply a time schedule to this custom rule.
Source	This setting specifies the source IP address, IP Network, MAC Address, Grouped network or Client Type for traffic that matches the rule. 
Destination	This setting specifies the destination IP address, IP network, Domain name, SpeedFusion Cloud, PepVPN Profile or Grouped network for traffic that matches the rule.



If **Domain Name** is chosen and a domain name, such as *foobar.com*, is entered, any outgoing accesses to *foobar.com* and **.foobar.com* will match this criterion. You may enter a wildcard (.*) at the end of a domain name to match any host with a name having the domain name in the middle. If you enter *foobar.*,* for example, *www.foobar.com*, *www.foobar.co.jp*, or *foobar.co.uk* will also match. Placing wildcards in any other position is not supported.

NOTE: if a server has one Internet IP address and multiple server names, and if one of the names is defined here, access to any one of the server names will also match this rule.

Protocol and Port

This setting specifies the IP protocol and port of traffic that matches this rule. Via a drop-down menu, the following protocols can be specified:

- Any
- TCP
- UDP
- IP
- DSCP

Alternatively, the **Protocol Selection Tool** drop-down menu can be used to automatically fill in the protocol and port number of common Internet services (e.g., HTTP, HTTPS, etc.) After selecting an item from the **Protocol Selection Tool** drop-down menu, the protocol and port number remains manually modifiable.

Algorithm

This setting specifies the behavior of the Ppelink router for the custom rule.
One of the following values can be selected

- Weighted Balance
- Persistence
- Enforced
- Priority
- Overflow
- Least Used
- Lowest Latency
- Fastest Response Time

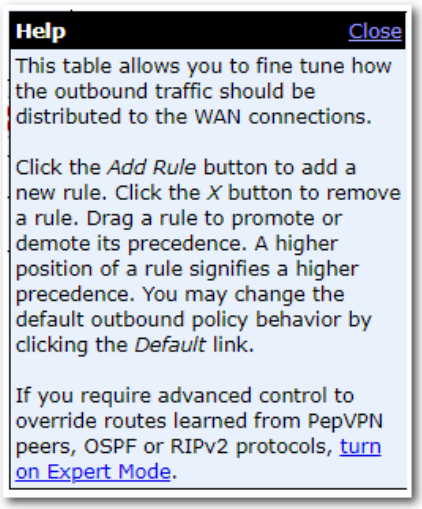
For a full explanation of each Algorithm, please see the following article:
https://forum.peplink.com/t/exactly-how-do-peplinks-load-balancing-algorithmns-work/8059

Load Distribution Weight

This is to define the outbound traffic weight ratio for each WAN connection.

When No connections are available	This field allows you to configure the default action when all the selected Connections are not available. **Drop the Traffic** - Traffic will be discarded. **Use Any Available Connections** - Traffic will be routed to any available Connection, even it is not selected in the list. **Fall-through to Next Rule** - Traffic will continue to match next Outbound Policy rule just like this rule is inactive.
Terminate Sessions on Link Recovery	This setting specifies whether to terminate existing IP sessions on a less preferred WAN connection in the event that a more preferred WAN connection is recovered. This setting is applicable to the **Priority** algorithms. By default, this setting is disabled. In this case, existing IP sessions will not be terminated or affected when any other WAN connection is recovered. When this setting is enabled, existing IP sessions may be terminated when another WAN connection is recovered, such that only the preferred healthy WAN connection(s) is used at any point in time.

Expert Mode



Expert Mode is available on some Pepwave routers for use by advanced users. To enable the feature, click on the help icon and click **turn on Expert Mode**.

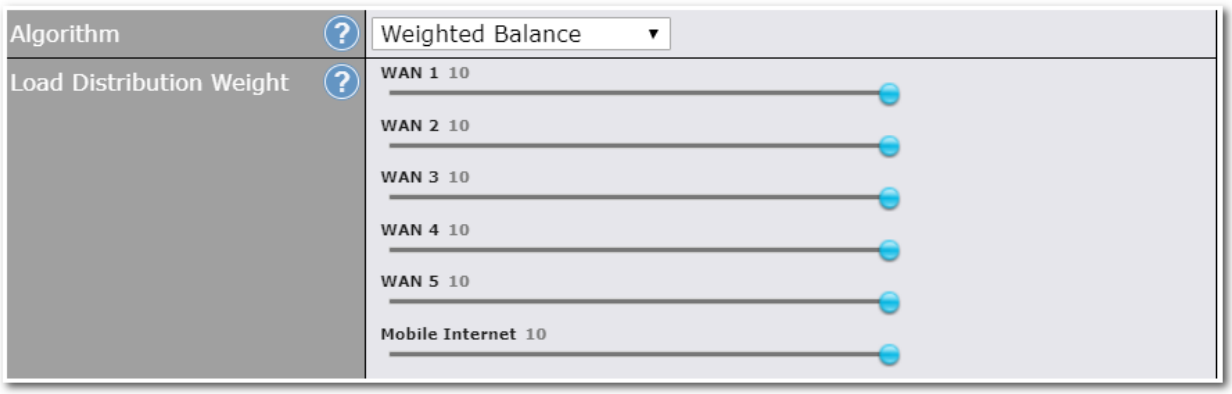
In Expert Mode, a new special rule, **SpeedFusion™ Routes**, is displayed in the **Custom Rules** table. This rule represents all SpeedFusion™ routes learned from remote VPN peers. By default, this bar is on the top of all custom rules. This position means that traffic for remote VPN subnets will be routed to the corresponding VPN peer. You can create custom **Priority** or **Enforced** rules and move them

above the bar to override the SpeedFusion™ routes.

Upon disabling Expert Mode, all rules above the bar will be removed.

Algorithm: Weighted Balance

This setting specifies the ratio of WAN connection usage to be applied on the specified IP protocol and port. This setting is applicable only when **Algorithm** is set to **Weighted Balance**.



The amount of matching traffic that is distributed to a WAN connection is proportional to the weight of the WAN connection relative to the total weight. Use the sliders to change each WAN's weight.

For example, with the following weight settings:

- Ethernet WAN1: 10
- Ethernet WAN2: 10
- Wi-Fi WAN: 10
- Cellular 1: 10
- Cellular 2: 10
- USB: 10

Total weight is 60 = (10 +10 + 10 + 10 + 10 + 10).

Matching traffic distributed to Ethernet WAN1 is 16.7% = (10 / 60 x 100%.

Matching traffic distributed to Ethernet WAN2 is 16.7% = (10 / 60) x 100%.

Matching traffic distributed to Wi-Fi WAN is 16.7% = (10 / 60) x 100%.

Matching traffic distributed to Cellular 1 is 16.7% = (10 / 60) x 100%.

Matching traffic distributed to Cellular 2 is 16.7% = (10 / 60) x 100%.

Matching traffic distributed to USB is 16.7% = (10 / 60) x 100%.

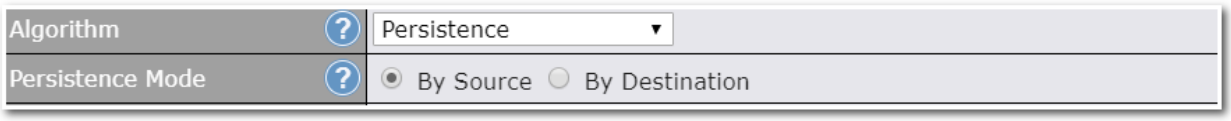
Algorithm: Persistence

The configuration of persistent services is the solution to the few situations where link load distribution for Internet services is undesirable. For example, for security reasons, many e-banking and other secure websites terminate the session when the client computer's Internet IP address changes mid-session.

In general, different Internet IP addresses represent different computers. The security concern is that an IP address change during a session may be the result of an unauthorized intrusion attempt. Therefore, to prevent damages from the potential intrusion, the session is terminated upon the detection of an IP address change.

Pepwave routers can be configured to distribute data traffic across multiple WAN connections. Also, the Internet IP depends on the WAN connections over which communication actually takes place. As a result, a LAN client computer behind the Pepwave router may communicate using multiple Internet IP addresses. For example, a LAN client computer behind a Pepwave router with three WAN connections may communicate on the Internet using three different IP addresses.

With the persistence feature, rules can be configured to enable client computers to persistently utilize the same WAN connections for e-banking and other secure websites. As a result, a client computer will communicate using one IP address, eliminating the issues mentioned above.



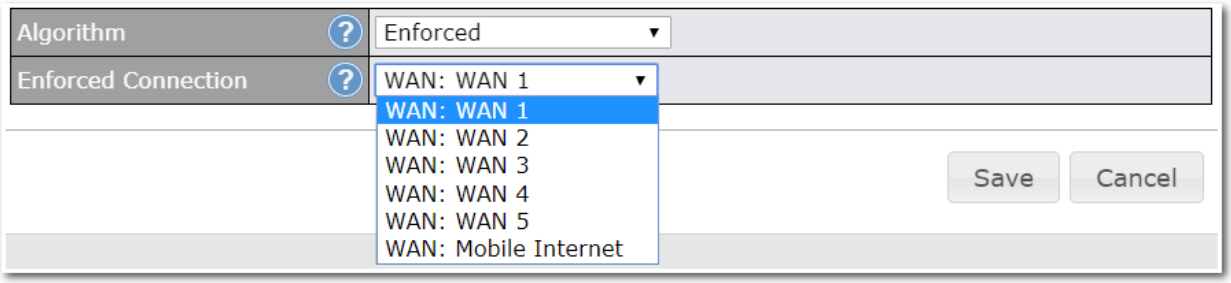
There are two persistent modes: **By Source** and **By Destination**.

By Source:	The same WAN connection will be used for traffic matching the rule and originating from the same machine, regardless of its destination. This option will provide the highest level of application compatibility.
By Destination:	The same WAN connection will be used for traffic matching the rule, originating from the same machine, and going to the same destination. This option can better distribute loads to WAN connections when there are only a few client machines.

The default mode is **By Source**. When there are multiple client requests, they can be distributed (persistently) to WAN connections with a weight. If you choose **Auto** in **Load Distribution**, the weights will be automatically adjusted according to each WAN's **Downstream Bandwidth** which is specified in the WAN settings page). If you choose **Custom**, you can customize the weight of each WAN manually by using the sliders.

Algorithm: Enforced

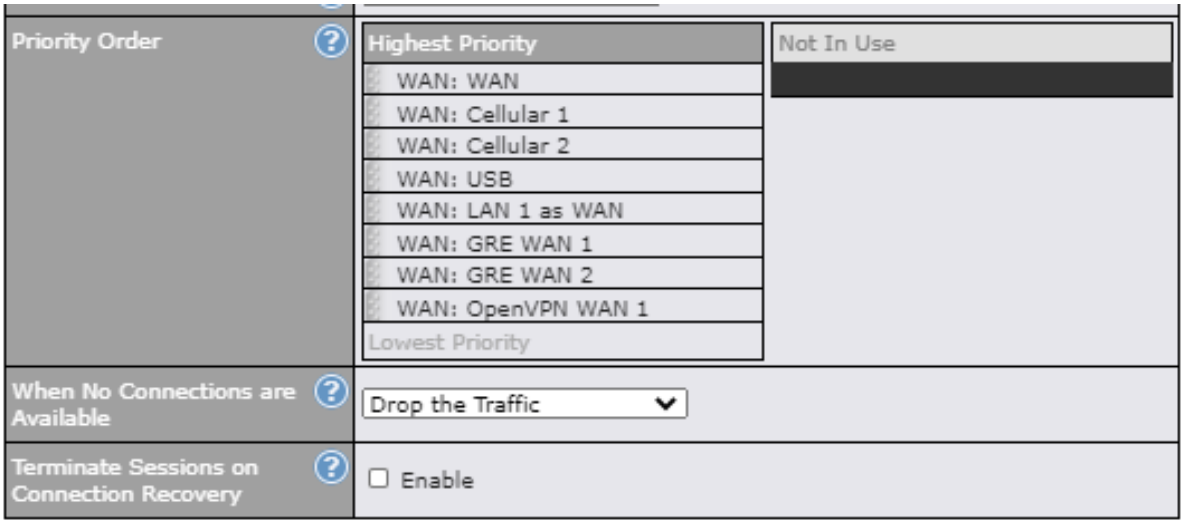
This setting specifies the WAN connection usage to be applied on the specified IP protocol and port. This setting is applicable only when **Algorithm** is set to **Enforced**.



Matching traffic will be routed through the specified WAN connection, regardless of the health check status of the WAN connection. Outbound traffic can also be enforced to go through a specified SpeedFusion™ connection.

Algorithm: Priority

This setting specifies the priority of the WAN connections used to route the specified network service. The highest priority WAN connection available will always be used for routing the specified type of traffic. A lower priority WAN connection will be used only when all higher priority connections have become unavailable.

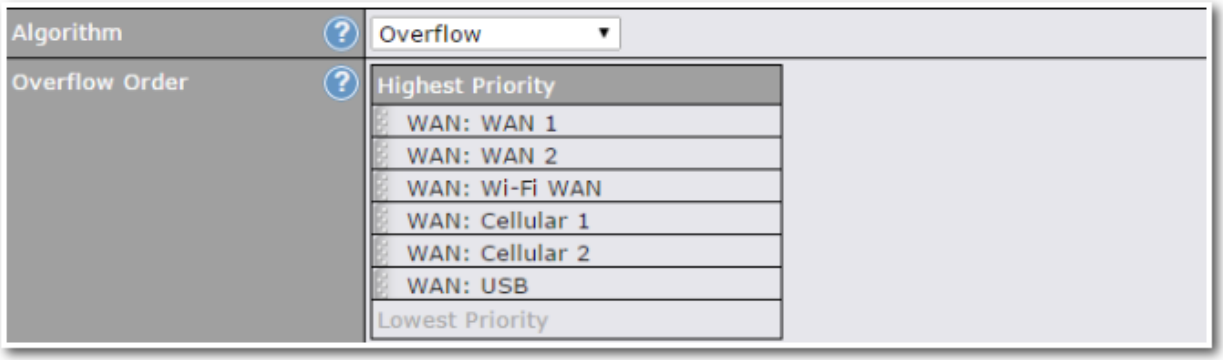


Starting from Firmware 5.2, outbound traffic can be prioritized to go through SpeedFusion™ connection(s). By default, VPN connections are not included in the priority list.

Tip
Configure multiple distribution rules to accommodate different kinds of services.

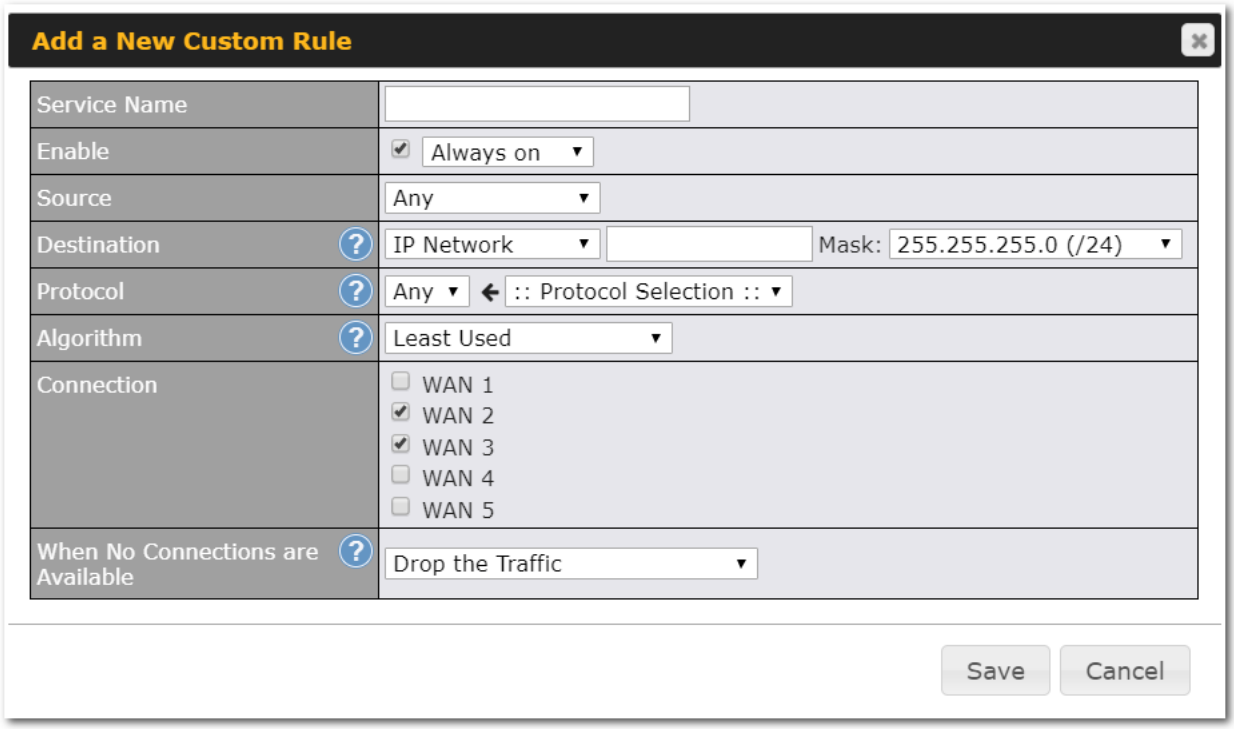
Algorithm: Overflow

The traffic matching this rule will be routed through the healthy WAN connection that has the highest priority and is not in full load. When this connection gets saturated, new sessions will be routed to the next healthy WAN connection that is not in full load.



Drag and drop to specify the order of WAN connections to be used for routing traffic. Only the highest priority healthy connection that is not in full load will be used.

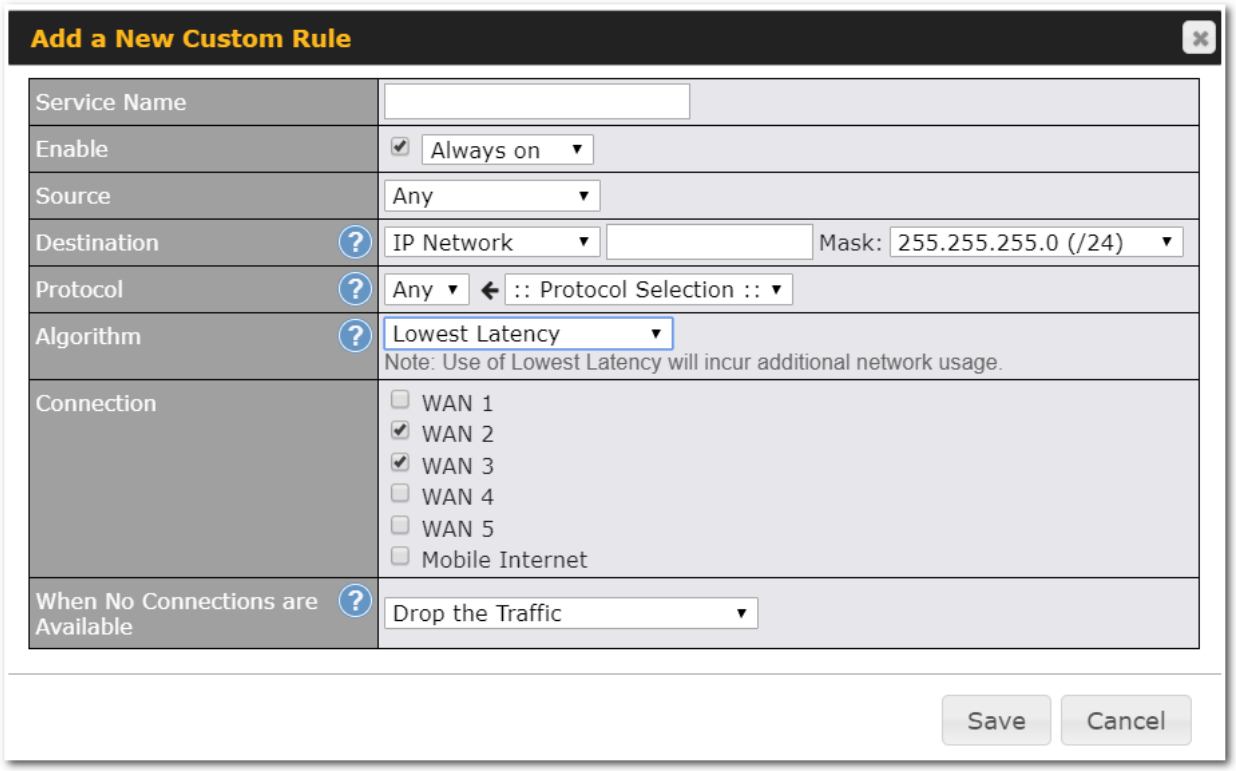
Algorithm: Least Used



The traffic matching this rule will be routed through the healthy WAN connection that is selected in **Connection** and has the most available download bandwidth. The available download bandwidth of a WAN connection is calculated from the total download bandwidth specified on

the WAN settings page and the current download usage. The available bandwidth and WAN selection is determined every time an IP session is made.

Algorithm: Lowest Latency



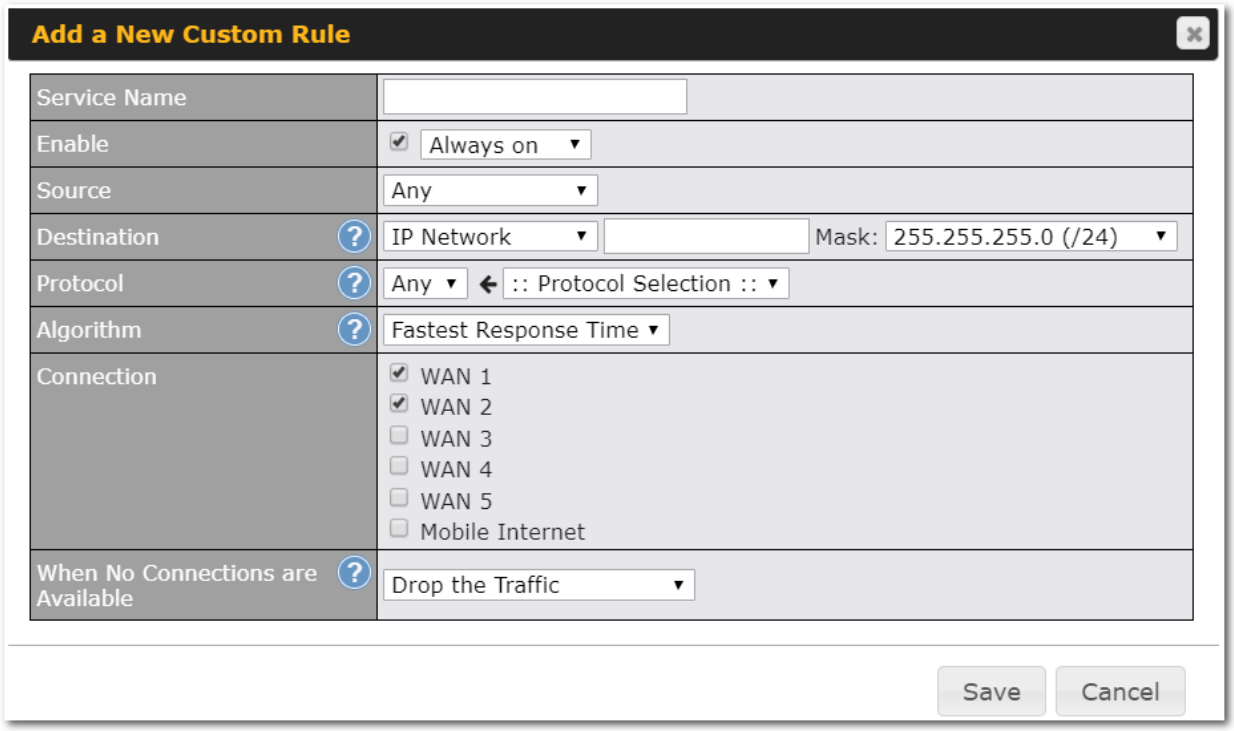
The traffic matching this rule will be routed through the healthy WAN connection that is selected in **Connection** and has the lowest latency. Latency checking packets are issued periodically to a nearby router of each WAN connection to determine its latency value. The latency of a WAN is the packet round trip time of the WAN connection. Additional network usage may be incurred as a result.

Tip

The roundtrip time of a 6M down/640k uplink can be higher than that of a 2M down/2M up link because the overall round trip time is lengthened by its slower upload bandwidth, despite its higher downlink speed. Therefore, this algorithm is good for two scenarios:

- All WAN connections are symmetric; or
- A latency sensitive application must be routed through the lowest latency WAN, regardless of the WAN's available bandwidth.

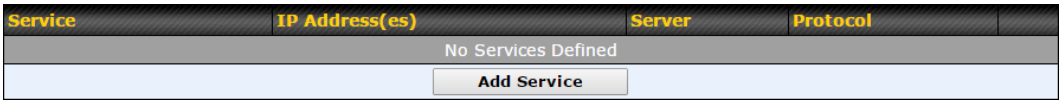
Algorithm : Fastest Response Time



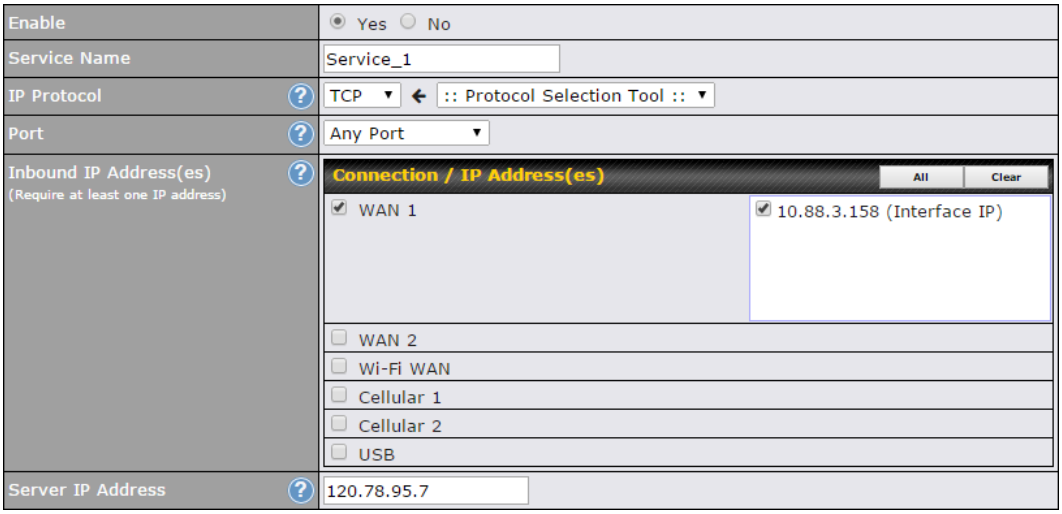
The Fastest response Time algorithm works as follows:
When a network session is created, the first outgoing packet of that particular session is duplicated to all the available WANs.
When the first response is received from a remote server, any further traffic for this session will be routed over that particular WAN connection for the fastest possible response time.
If any slower responses are received on other connections afterwards, they will be discarded.

14.6 Port Forwarding

Peplink routers can act as a firewall that blocks, by default, all inbound access from the Internet. By using port forwarding, Internet users can access servers behind the Pepwave router. Inbound port forwarding rules can be defined at **Advanced > Port Forwarding**.



To define a new service, click **Add Service**.



Port Forwarding Settings	
Enable	This setting specifies whether the inbound service takes effect. When **Enable** is checked, the inbound service takes effect: traffic is matched and actions are taken by the Pepwave router based on the other parameters of the rule. When this setting is disabled, the inbound service does not take effect: the Pepwave router disregards the other parameters of the rule.
Service Name	This setting identifies the service to the system administrator. Valid values for this setting consist of only alphanumeric and underscore "_" characters.
IP Protocol	The **IP Protocol** setting, along with the **Port** setting, specifies the protocol of the service as TCP, UDP, ICMP, or IP. Traffic that is received by the Pepwave router via the specified protocol at the specified port(s) is forwarded to the LAN hosts specified by the **Servers** setting. Please see below for details on the **Port** and **Servers** settings. Alternatively, the **Protocol Selection Tool** drop-down menu can be used to automatically fill in the protocol and a single port number of common Internet services (e.g. HTTP, HTTPS, etc.). After selecting an item from the **Protocol Selection Tool** drop-down menu, the protocol and port number remain manually modifiable.

Port	The **Port** setting specifies the port(s) that correspond to the service, and can be configured to behave in one of the following manners: **Any Port**, **Single Port**, **Port Range**, **Port Map**, and **Range Mapping**  **Any Port**: all traffic that is received by the Pepwave router via the specified protocol is forwarded to the servers specified by the **Servers** setting. For example, with **IP Protocol** set to **TCP**, and **Port** set to **Any Port**, all TCP traffic is forwarded to the configured servers.  **Single Port**: traffic that is received by the Pepwave router via the specified protocol at the specified port is forwarded via the same port to the servers specified by the **Servers** setting. For example, with **IP Protocol** set to **TCP**, and **Port** set to **Single Port** and **Service Port** 80, TCP traffic received on port 80 is forwarded to the configured servers via port 80.  **Port Range**: traffic that is received by the Pepwave router via the specified protocol at the specified port range is forwarded via the same respective ports to the LAN hosts specified by the **Servers** setting. For example, with **IP Protocol** set to **TCP**, and **Port** set to **Port Range** and **Service Ports** 80-88, TCP traffic received on ports 80 through 88 is forwarded to the configured servers via the respective ports.  **Port Mapping**: traffic that is received by Pepwave router via the specified protocol at the specified port is forwarded via a different port to the servers specified by the **Servers** setting. For example, with **IP Protocol** set to **TCP**, and **Port** set to **Port Mapping**, **Service Port** 80, and **Map to Port** 88, TCP traffic on port 80 is forwarded to the configured servers via port 88. (Please see below for details on the **Servers** setting.)  **Range Mapping**: traffic that is received by the Pepwave router via the specified protocol at the specified port range is forwarded via a different port to the servers specified by the **Servers** setting.
Inbound IP Address(es)	This setting specifies the WAN connections and Internet IP address(es) from which the service can be accessed.
Server IP Address	This setting specifies the LAN IP address of the server that handles the requests for the service.

14.7 Inbound Access

Inbound access is also known as inbound port address translation. On a NAT WAN connection, all inbound traffic to the server behind the Peplink unit requires inbound access rules.

By the custom definition of servers and services for inbound access, Internet users can access the servers behind Peplink Balance. Advanced configurations allow inbound access to be distributed among multiple servers on the LAN.

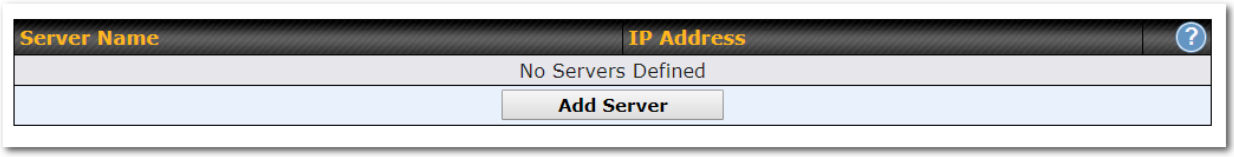
Important Note

Inbound access applies only to WAN connections that operate in NAT mode. For WAN connections that operate in drop-in mode or IP forwarding, inbound traffic is forwarded to the LAN by default.

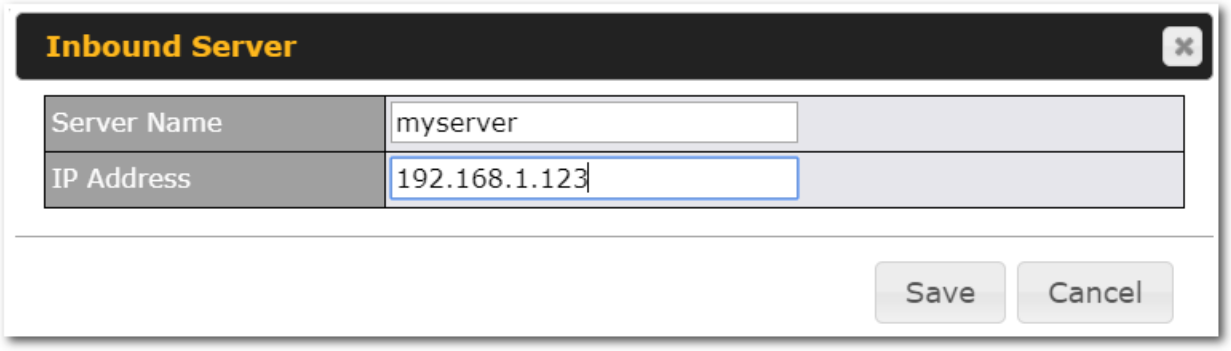
14.7.1 Servers

The settings to configure servers on the LAN are located at **Advanced > Inbound Access > Servers**.

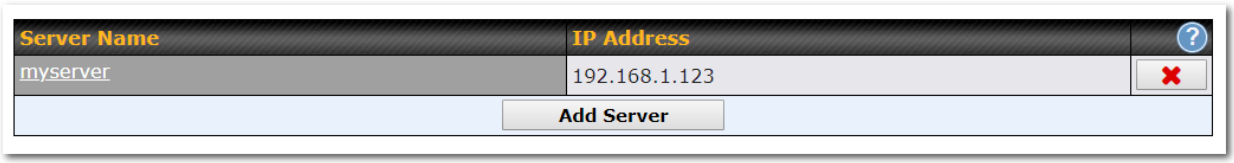
Inbound connections from the Internet will be forwarded to the specified Inbound IP address(es) based on the protocol and port number. When more than one server is defined, requests will be distributed to the servers in the weight ratio specified for each server.



To define a new server, click **Add Server**, which displays the following screen:



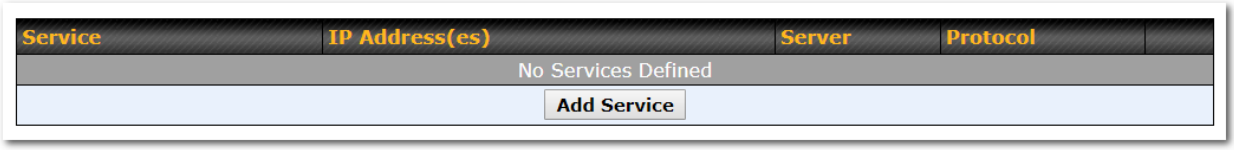
Enter a valid server name and its corresponding LAN IP address. Upon clicking **Save** after entering required information, the following screen appears.



To define additional servers, click **Add Server** and repeat the above steps.

14.7.2 Services

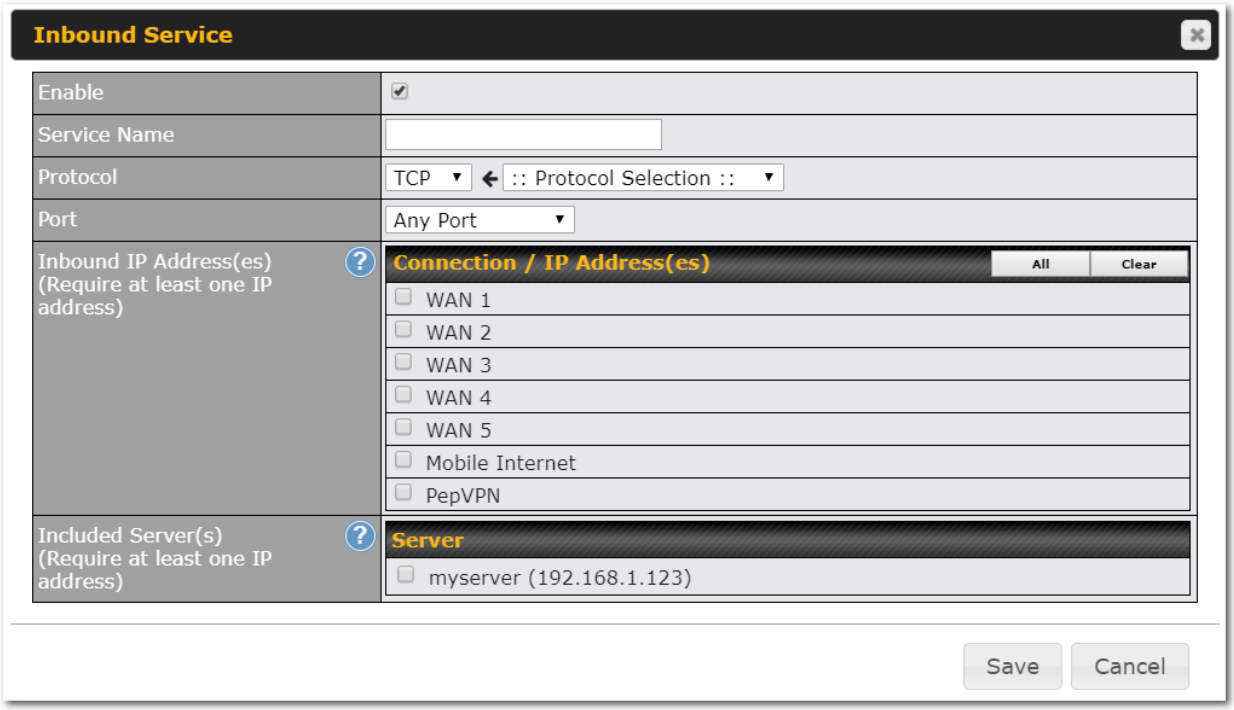
Services are defined at **Advanced > Inbound Access > Services**.

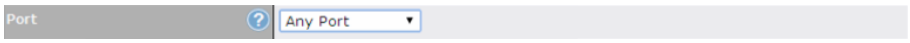
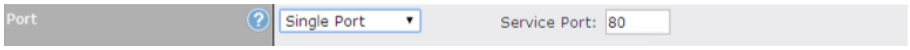
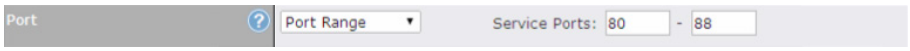


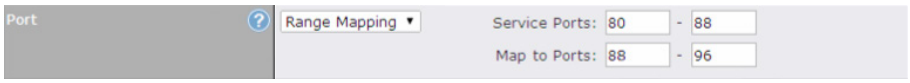
Tip

At least one server must be defined before services can be added.

To define a new service, click the **Add Service** button, upon which the following menu appears:



Services Settings	
Enable	This setting specifies whether the inbound service rule takes effect. When **Yes** is selected, the inbound service rule takes effect. If the inbound traffic matches the specified IP protocol and port, action will be taken by the Peplink Balance based on the other parameters of the rule. When **No** is selected, the inbound service rule does not take effect. The Peplink Balance will disregard the other parameters of the rule.
Service Name	This setting identifies the service to the system administrator. Only alphanumeric and the underscore "_" characters are valid.
IP Protocol	The **IP Protocol** setting, along with the **Port** setting, specifies the protocol of the service as TCP, UDP, ICMP, or IP. Inbound traffic that matches the specified **IP Protocol** and **Port**(s) will be forwarded to the LAN hosts specified by the **Servers** setting. Upon choosing a protocol, the **Protocol Selection Tool** drop-down menu can be used to automatically the port information of common Internet services (e.g. HTTP, HTTPS, etc.). After selecting an item from the **Protocol Selection Tool** drop-down menu, the protocol and the port number will remain manually modifiable.
Port	The **Port** setting specifies the port(s) that correspond to the service, and can be configured to behave in one of the following manners: **Any Port**, **Single Port**, **Port Range**, **Port Map**, and **Range Mapping**  **Any Port**: all traffic that is received by the Peplink Balance via the specified protocol is forwarded to the servers specified by the **Servers** setting. For example, if I**P Protocol** is set to **TCP** and **Port** is set to **Any Port**, then all TCP traffic will be forwarded to the configured servers.  **Single Port**: traffic that is received by the Peplink Balance via the specified protocol at the specified port is forwarded via the same port to the servers specified by the **Servers** setting. For example, if I**P Protocol** is set to **TCP**, **Port** is set to **Single Port,** and **Service Port** is set to 80, then TCP traffic received on Port 80 will be forwarded to the configured servers via port 80.  **Port Range**: traffic that is received by the Peplink Balance via the specified protocol at the specified port range is forwarded via the same respective ports to the LAN hosts specified by the **Servers** setting. For example, if **IP Protocol** is set to **TCP**, **Port** is set to **Port Range,** and **Service Port** set to 80-88, then TCP traffic received on ports 80 through 88 will be forwarded to the configured servers via the respective ports.  **Port Mapping**: traffic that is received by the Peplink Balance via the specified protocol at the specified port is forwarded via a different port to the servers specified by the Servers setting. For example, if **IP Protocol** is set to **TCP**, **Port** is set to **Port Mapping**, **Service Port** is set to 80, and **Map to Port** is set to 88, then TCP traffic on port 80 is forwarded to the configured servers via port 88. (Please see below for details on the **Servers** setting.)

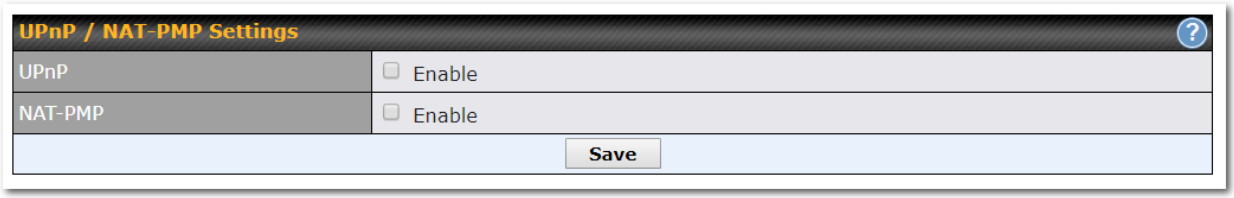
	 **Range Mapping**: traffic that is received by Peplink Balance via the specified protocol at the specified port range is forwarded via a different port to the servers specified by the **Servers** setting.
Inbound IP Address(es)	This setting specifies the WAN connections and Internet IP address(es) from which the service can be accessed.
Included Server(s)	This setting specifies the LAN servers that handle requests for the service, and the relative weight values. The amount of traffic that is distributed to a server is proportional to the weight value assigned to the server relative to the total weight. Example: With the following weight settings on a Peplink Balance: • demo_server_1: 10 • demo_server_2: 5 The total weight is 15 = (10 + 5) Matching traffic distributed to demo_server_1:67% = (10 / 15) x 100% Matching traffic distributed to demo_server_2:33% = (5 / 15) x 100%

UPnP / NAT-PMP Settings

UPnP and NAT-PMP are network protocols which allow a computer connected to the LAN port to automatically configure the router to allow parties on the WAN port to connect to itself. That way, the process of inbound port forwarding becomes automated.

When a computer creates a rule using these protocols, the specified TCP/UDP port of all WAN connections' default IP address will be forwarded.

Check the corresponding box(es) to enable UPnP and/or NAT-PMP. Enable these features only if you trust the computers connected to the LAN ports.



When the options are enabled, a table listing all the forwarded ports under these two protocols can be found at **Advanced > Services > UPnP / NAT-PMP**.

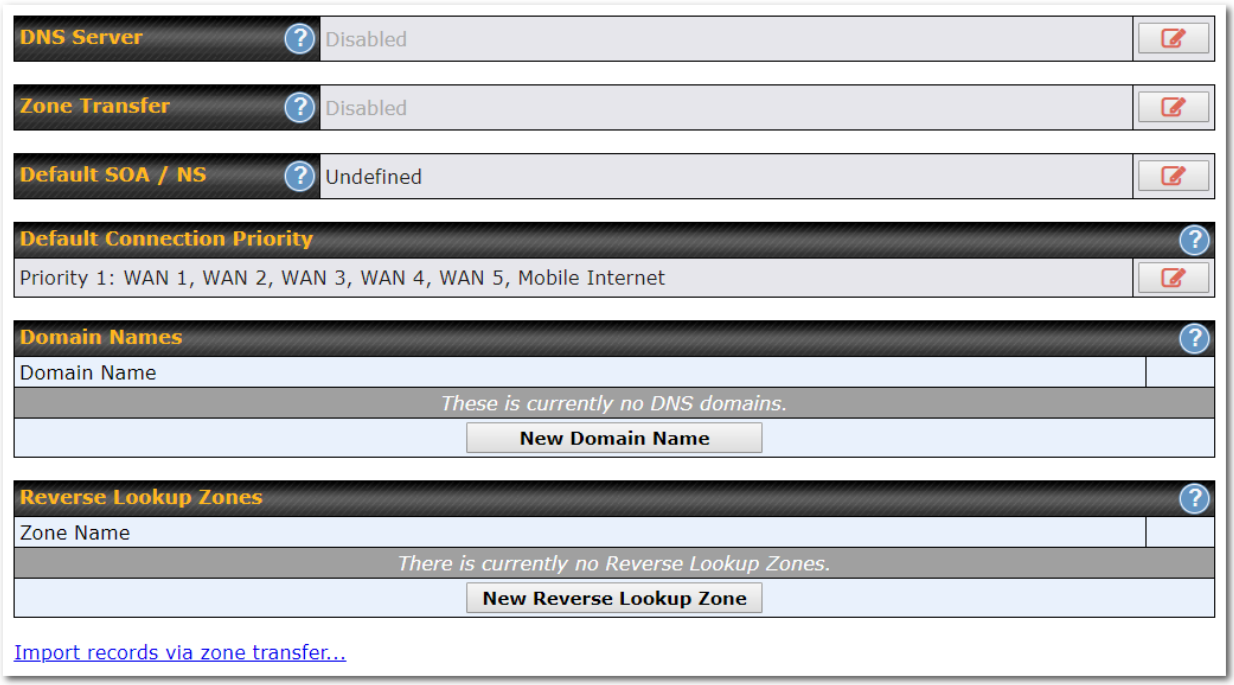
14.7.3 DNS Settings

The built-in DNS server functionality of the Peplink Balance facilitates inbound load balancing. With this functionality, NS/SOA DNS records for a domain name can be delegated to the Internet IP address(es) of the Peplink Balance. Upon receiving a DNS query, the Peplink Balance can return (as an "A" record) the IP address for the domain name on the most appropriate healthy WAN connection. It can also act as a generic DNS server for hosting "A", "CNAME", "MX", "TXT" and "NS" records.

The settings for defining the DNS records to be hosted by the Peplink Balance are located at **Advanced > Inbound Access > DNS Settings**.

Note: DNS names may only contain alphanumeric characters (A-Z and 0-9), hyphens (-), and periods (.). The period is only allowed when it is used to delimit the components of domain style names.
For more information, see the following websites:

- rfc952
- rfc1123

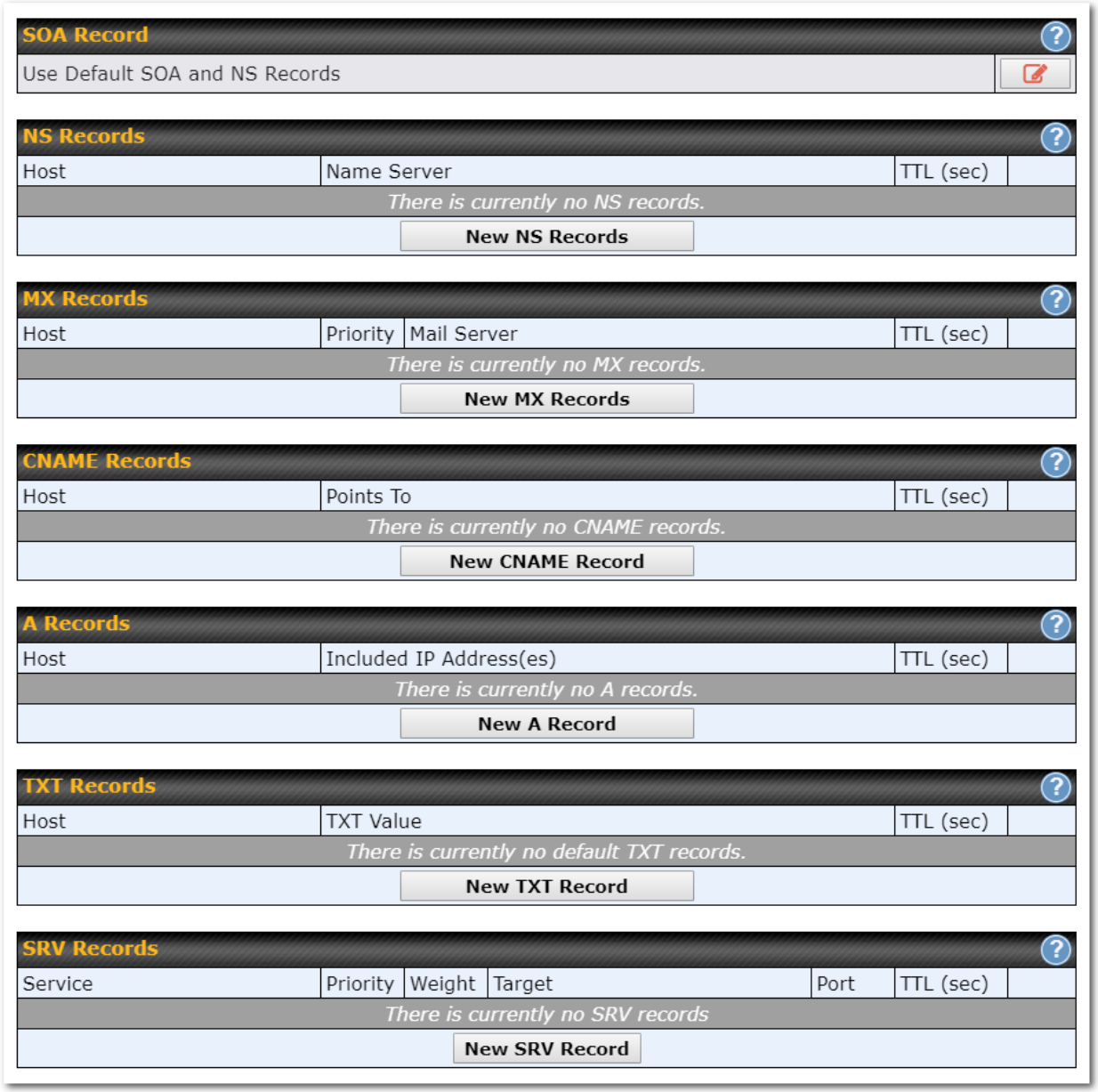


DNS Settings	
DNS Servers	This setting specifies the WAN IP addresses on which the DNS server of the Peplink Balance should listen. If no addresses are selected, the inbound link load balancing feature will be disabled and the Peplink Balance will not respond to DNS requests.

	To specify and/or modify the IP addresses on which the DNS server should listen, click the button that corresponds to **DNS Server**, and a selection screen will be displayed: To specify the Internet IP addresses on which the DNS server should listen, select the desired WAN connection then select the desired associated IP addresses. (Multiple items in the list can be selected by holding CTRL and clicking on the items.) Click **Save** to save the settings when configuration is complete.
Zone Transfer	This setting specifies the IP address(es) of the secondary DNS server(s)authorized to retrieve zone records from the DNS server of the Peplink Balance. The zone transfer server of the Peplink Balance listens on TCP port 53. The Peplink Balance serves both the clients that are accessing from the specified IP addresses, and the clients that are accessing its LAN interface.
Routing Control by Subnet Database	When this function is enabled, the system will check to see if an incoming DNS client is within any WAN's ISP subnet. Only the matched WAN(s)'s IP addresses will be returned. Note that this feature is available only when a subnet database has been defined.
Default SOA / NS	Click the button to define a default SOA / NS record for all domain names. When defining a default SOA record, **Name Server IP Address** is optional. If left blank, the Address (A) record for the same server should be defined manually in each domain. For defining default NS records, the host *[domain]* indicates that this record is for the domain name itself without a sub-domain prefix. To add a secondary NS server, just create a second NS record with the **Host** field left empty. When the entered name server is a fully qualified domain name (FQDN), the **IP Address** field will be disabled.
Default Connection Priority	**Default Connection Priority** defines the default priority group of each WAN connection in resolving A records. It applies to Address (A) records which have the **Connection Priority** set to **Default**. Please refer to **Section 17.3.9** for details. The WAN connection(s) with the highest priority (smallest number) will be chosen. Those with lower priorities will not be chosen in resolving A records unless the higher priority ones become unavailable. To specify the primary and backup connections, click the button that corresponds to **Default Connection Priority**. A selection screen will appear. Each WAN connection is associated with a priority number. Click **Save** to save the settings when configuration is complete.
Domain name	This section shows a list of domain names to be hosted by the Peplink Balance. Each domain can have its “NS”, “MX” and “TXT” records, and its sub-domains’ “A” and “CNAME” records. Add a new record by clicking the **New Domain Name** button. Click on a domain name to edit. Press the red X to remove a domain name.

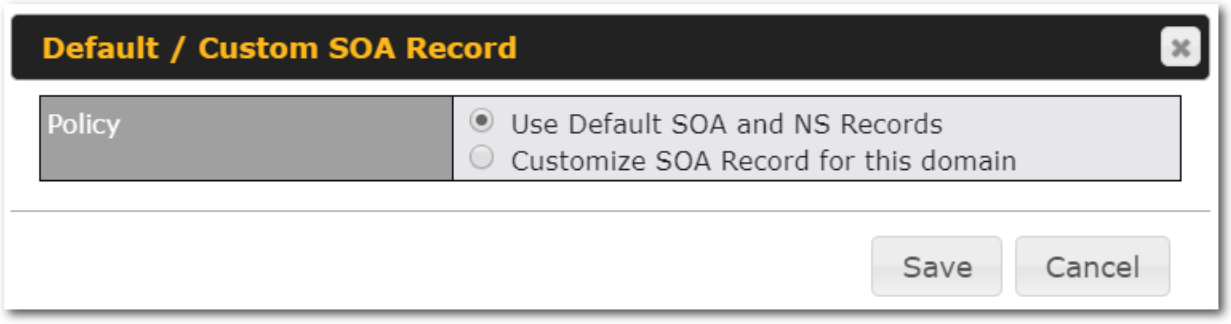
New Domain Name

Upon clicking the New Domain Name button, and the following screen will appear:

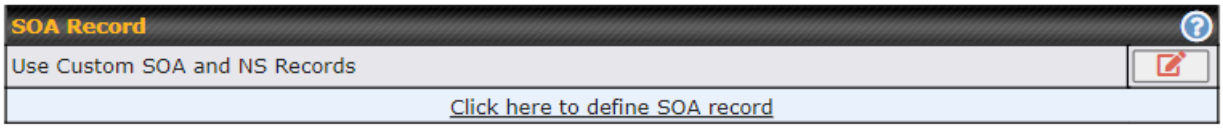


This page is for defining the domain's SOA, NS, MX, CNAME, A, TXT, and SRV records. Seven tables are presented in this page for defining the five types of records.

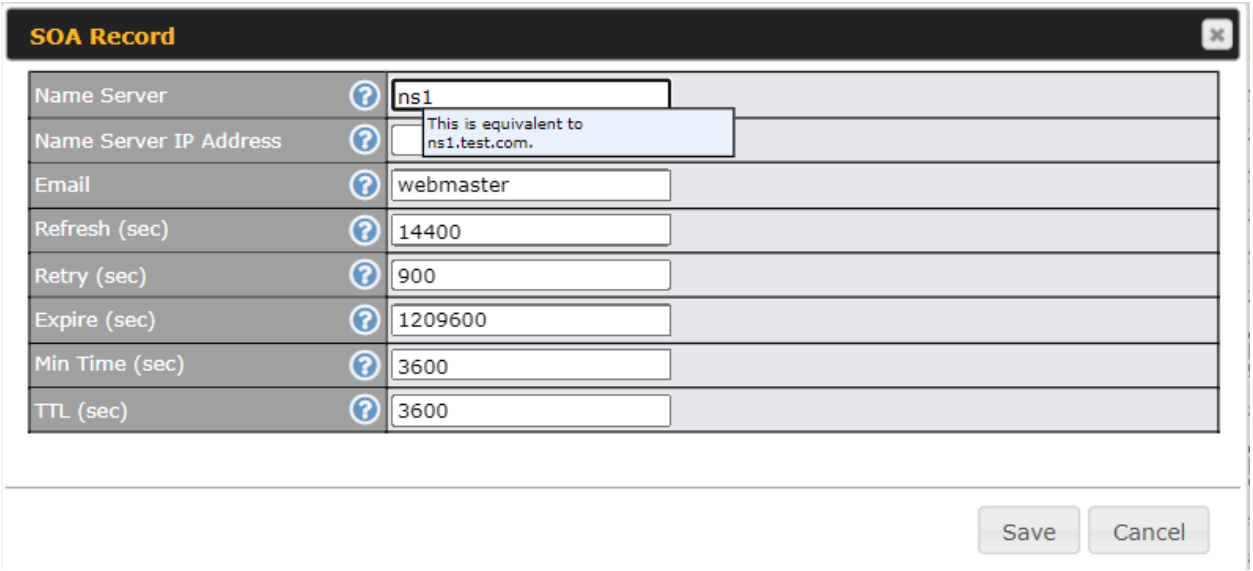
SOA Record



Click on the icon to choose whether to use the pre-defined default SOA record and NS records. If the option **Use Default SOA and NS Records** is selected, any changes made in the default SOA/NS records will be applied to this domain automatically. Otherwise, select the option **Customize SOA Record** for this domain to customize this domain's SOA and NS records.



You can click the link **Click here to define SOA record** to create or click on the **Name Server** field to edit the SOA record.



This table displays the current SOA record. When the option **Customize SOA Record for this domain** is selected, you can click the link **Click here to define SOA record** to create or click on the **Name Server** field to edit the SOA record.

In the SOA record, you have to fill out the fields **Name Server**, **Name Server IP Address**, **Email**, **Refresh**, **Retry**, **Expire**, **Min Time**, and **TTL**.

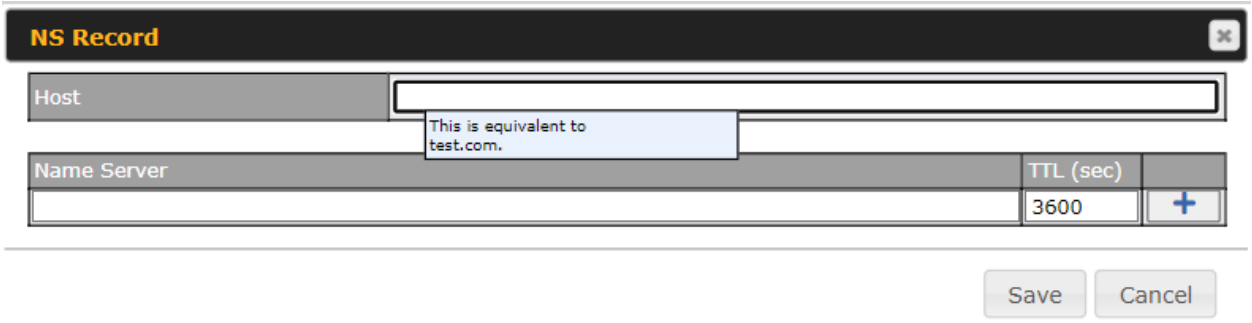
Default values are set for SOA and NS records,

- **Name Server IP Address:** This is the IP address of the authoritative name server. An entry in this field is optional. If the Balance is the authoritative name server of the domain, this field's value should be the WAN connection's name server IP address that is registered in the DNS registrar. If this field is entered, a corresponding A record for the name server will be created automatically. If it is left blank, the A record for the name server must be created manually.
- **E-mail**: Defines the e-mail address of the person responsible for this zone. Note: format should be *mailbox-name.domain.com*, e.g., *hostmaster.example.com*.
- **Refresh**: Indicates the length of time (in seconds) when the slave will try to refresh the zone from the master.
- **Retry**: Defines the duration (in seconds) between retries if the slave (secondary) fails to contact the master and the refresh (above) has expired.
- **Expire**: Indicates the time (in seconds) when the zone data is no longer authoritative. This option applies to slave DNS servers only.
- **Min Time**: Is the negative caching time which defines the time (in seconds) after an error record is cached.
- **TTL (Time-to-Live)**: Defines the duration (in seconds) that the record may be cached.

NS Records

The **NS Records** table shows the NS servers and TTL that correspond to the domain. The NS record of the name server defined in the SOA record is automatically added here.

To add a new NS record, click the **New NS Records** button in the **NS Records** box. Then the table will expand to look like the following:

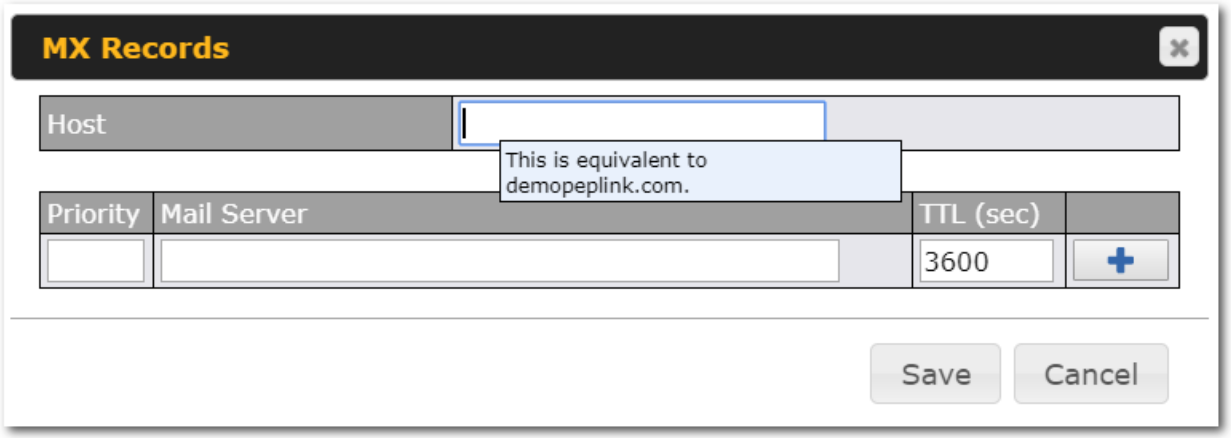


When creating an NS record for the domain itself (not a sub-domain), the **Host** field should be left blank.

Enter a name server host name and its IP address into the corresponding boxes. The host name can be a non-FQDN (fully qualified domain name). Please be sure that a corresponding A record is created. Click the + button on the right to finish and to add other name servers. Click the **Save** button to save your changes.

MX Records

The **MX Record** table shows the domain's MX records. To add a new MX record, click the **New MX Records** button in the **MX Records** box. Then the table will expand to look like the following:



When creating an MX record for the domain itself (not a sub-domain), the **Host** field should be left blank.

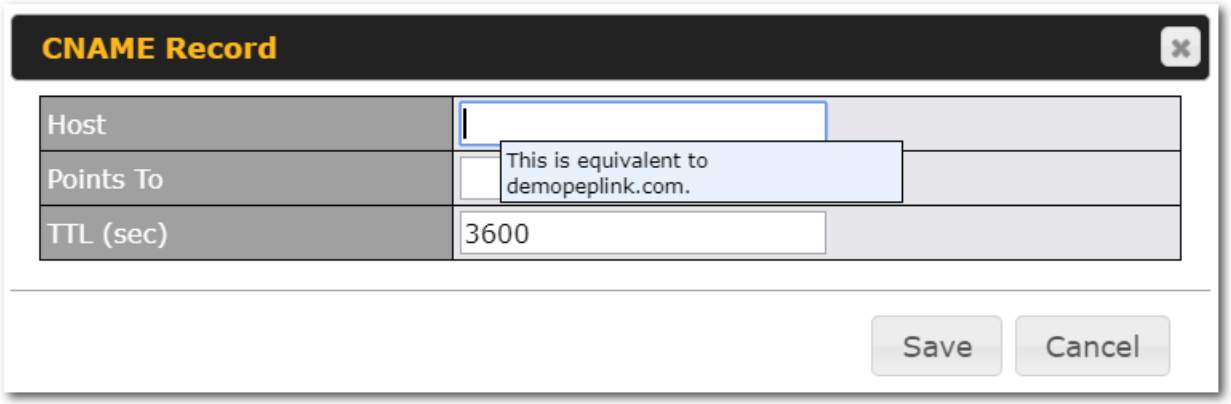
For each record, **Priority** *and* **Mail Server** name must be entered. **Priority** typically ranges from 10 to 100. Smaller numbers have a higher priority. After finishing adding MX records, click the **Save** button.

CNAME Records

The **CNAME Record** table shows the domain's CNAME records. To add a new CNAME record, click the **New CNAME Records** button in the **CNAME Record** box.

CNAME records are typically used for defining classless reverse lookup zones. Subnetted reverse lookup zones are further described in RFC 2317, "Classless IN-ADDR.ARPA delegation."

Then the table will expand to look like the following:



When creating a CNAME record for the domain itself (not a sub-domain), the **Host** field should be left

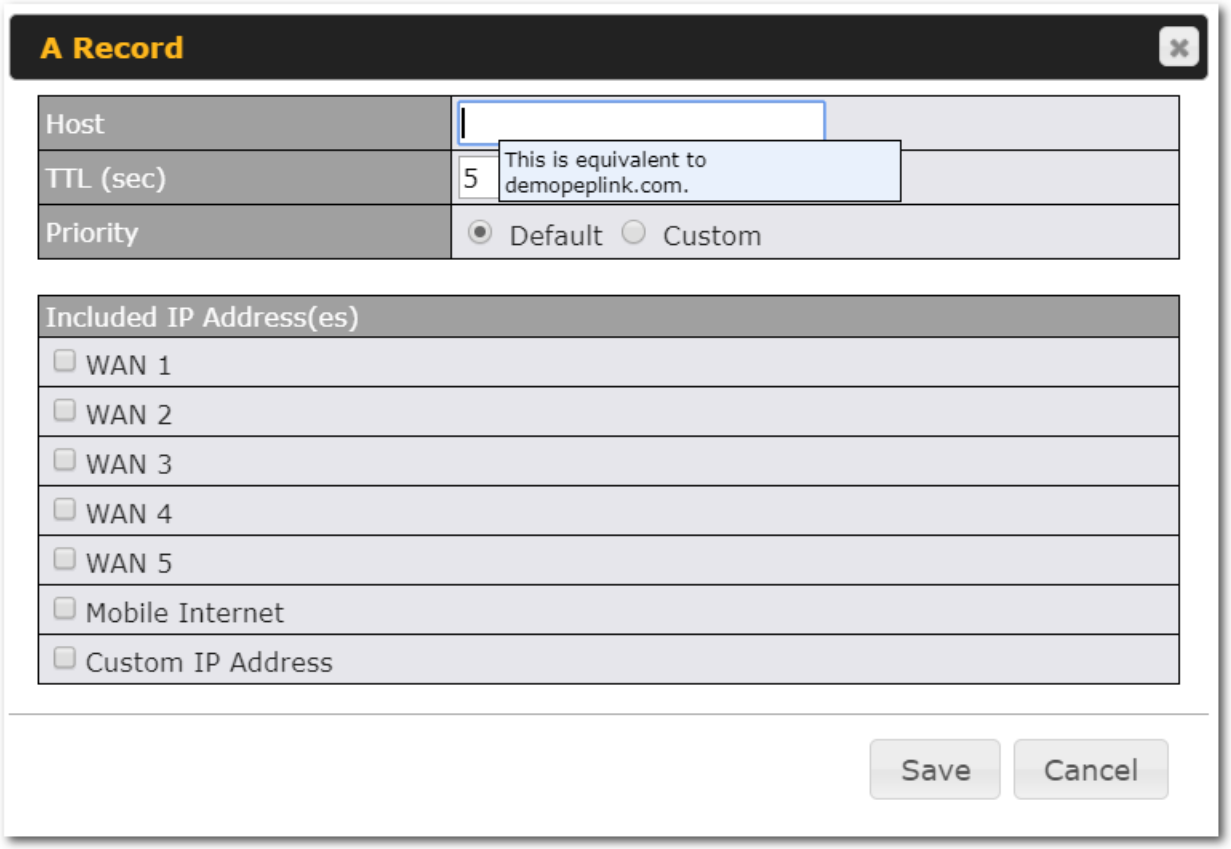
blank.

The wildcard character "*"is supported in the **Host** field. The reference of "*.domain.name*" will be returned for every name ending with "*.domain.name*" except names that have their own records.

The **TTL** field tells the time to live of the record in external DNS caches.

A Records

This table shows the A records of the domain name. To add an A record, click the **New A Record** button. The following screen will appear:



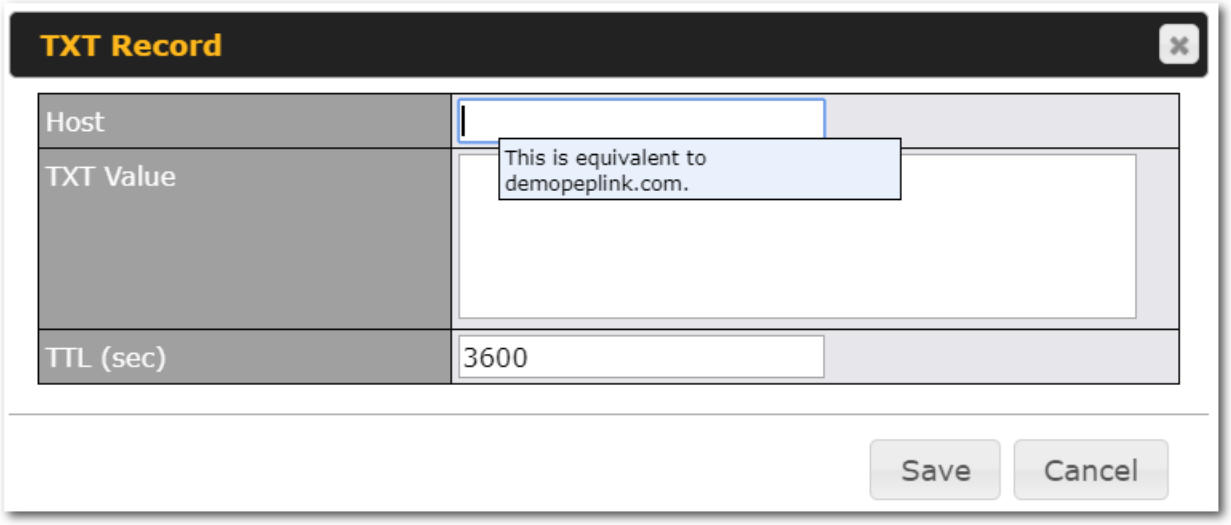
A record may be automatically added for the SOA records with a name server IP address provided.

A Record	
Host Name	This field specifies the A record of this sub-domain to be served by the Peplink Balance. The wildcard character "*" is supported. The IP addresses of "*.domain.name" will be returned for every name ending with ".domain.name" except names that have their own records.
TTL	This setting specifies the time to live of this record in external DNS caches. In order to reflect any dynamic changes on the IP addresses in case of link failure and recovery, this value should be set to a smaller value, e.g., 5 secs, 60 secs, etc.

Priority	This option specifies the priority of different connections. Select the **Default** option to apply the **Default Connection Priority** (refer to the table shown on the main DNS settings page) to an A record. To customize priorities, choose the **Custom** option and a priority selection table will be shown at the bottom.
Included IP Address(es)	This setting specifies lists of WAN-specific Internet IP addresses that are candidates to be returned when the Peplink Balance responds to DNS queries for the domain name specified by **Host Name**. The IP addresses listed in each box as **default** are the Internet IP addresses associated with each of the WAN connections. Static IP addresses that are not associated with any WAN can be entered into the **Custom IP** list. A PTR record is also created for each custom IP. For WAN connections that operate under drop-in mode, there may be other routable IP addresses in addition to the default IP address. Therefore, the Peplink Balance allows custom Internet IP addresses to be added manually via filling the text box on the right-hand side and clicking the button. Only the checked IP addresses in the lists are candidates to be returned when responding to a DNS query. If a WAN connection is down, the corresponding set of IP addresses will not be returned. However, the IP addresses in the **Custom IP Address** field will always be returned. If the **Connection Priority** field is set to **Custom**, you can also specify the usage priority of each WAN connection. Only selected IP address(es) of available connection(s) with the highest priority, and custom IP addresses will be returned. By default, **Connection Priority** is set to **Default**.

TXT Records

This table shows the TXT record of the domain name.



To add a new TXT record, click the **New TXT Record** button in the **TXT Records** box. Click the **Edit** button to edit the record. The time-to-live value and the TXT record's value can be entered. Click the **Save** button to finish.

When creating a TXT record for the domain itself (not a sub-domain), the **Host** field should be

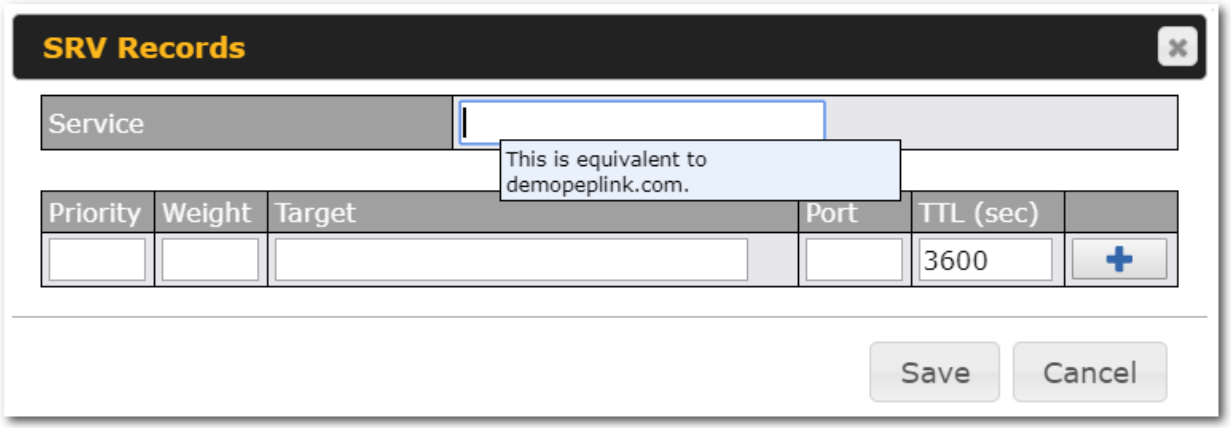
left blank.

The maximum size of the TXT Value is 255 bytes.

After editing the five types of records, you can leave the page by simply going to another section of the web admin interface.

SRV Records

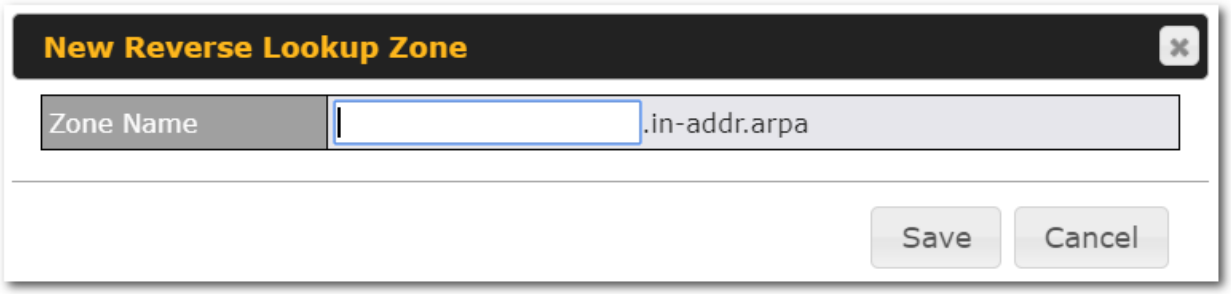
To add a new SRV record, click the **New SRV Record** button in the **SRV Records** box.



- **Service:** The symbolic name of the desired service.
- **Priority**: Indicates the priority of the target; the smaller the value, the higher the priority.
- **Weight**: A relative weight for records with the same priority.
- **Target**: The canonical hostname of the machine providing the service.
- **Port**: Enter the TCP or UDP port number on which the service is to be found.

Reverse Lookup Zones

Reverse lookup zones can be configured in **Advanced > Inbound Access > DNS Settings**.

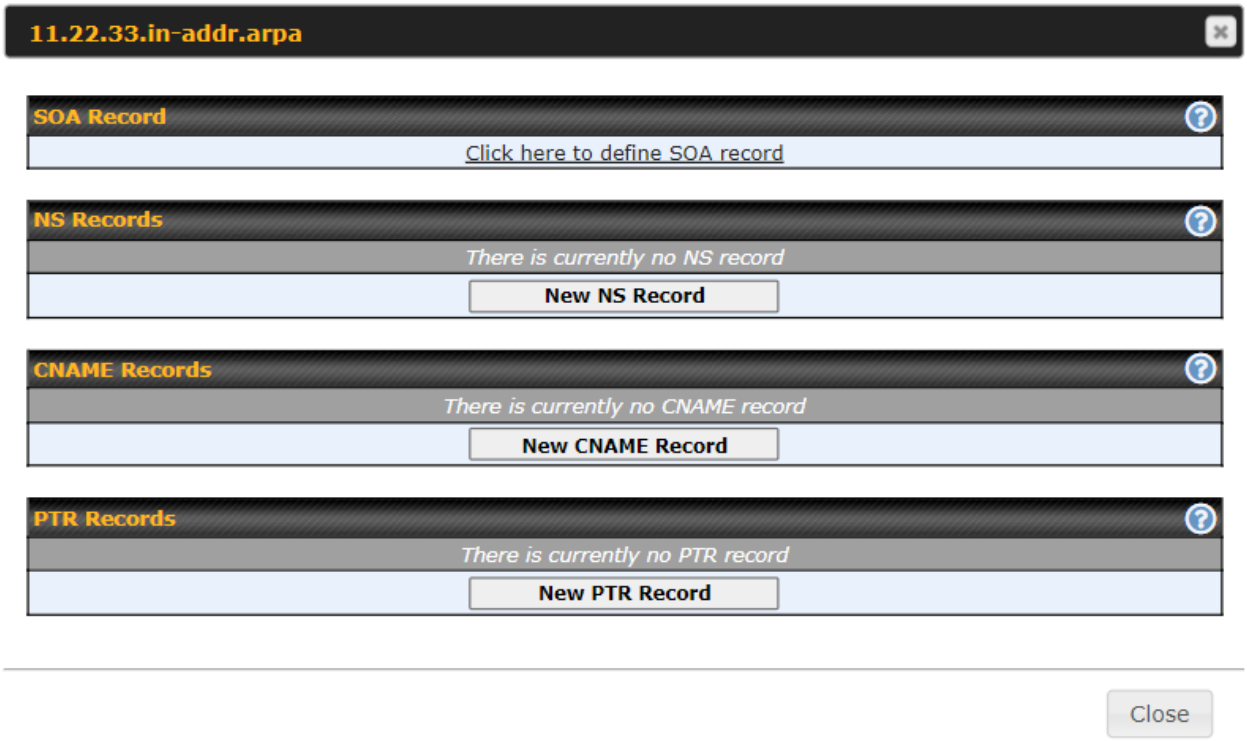


Reverse lookup refers to performing a DNS query to find one or more DNS names associated with a given IP address.

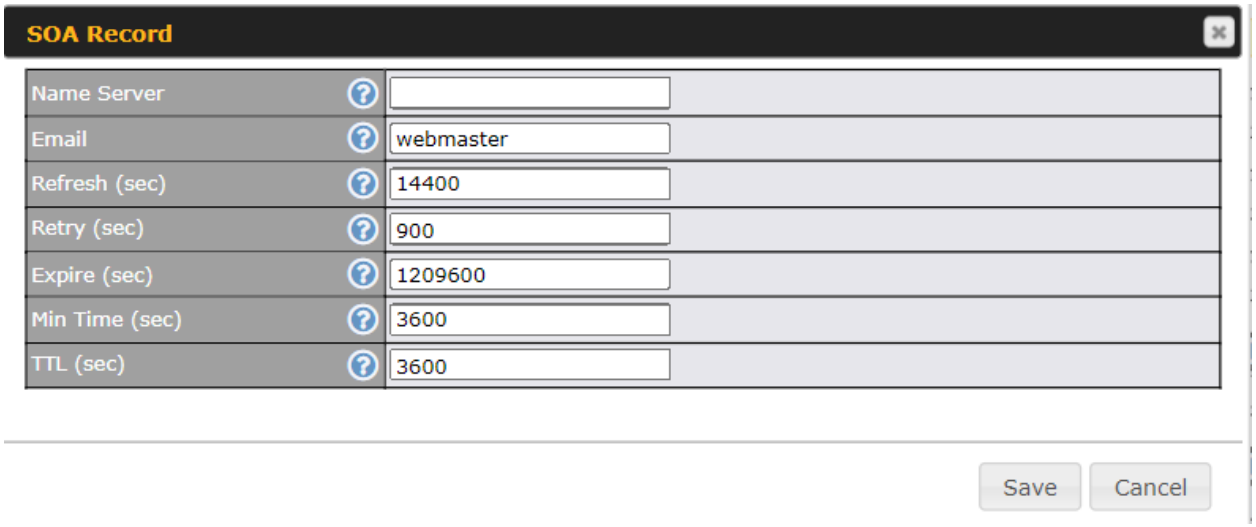
The DNS stores IP addresses in the form of specially formatted names as pointer (PTR) records using special domains/zones. The zone is *in-addr.arpa*.

To enable DNS clients to perform a reverse lookup for a host, perform two steps:

- Create a reverse lookup zone that corresponds to the subnet network address of the host.
  In the reverse lookup zone, add a pointer (PTR) resource record that maps the host IP address to the host name.
- Click the **New Reverse Lookup Zone** button and enter a reverse lookup zone name. If you are delegated the subnet *11.22.33.0/24*, the **Zone Name** should be *33.22.11.in-arpa.addr*. PTR records for *11.22.33.1, 11.22.33.2, ... 11.22.33.254* should be defined in this zone where the host IP numbers are *1, 2, ... 254*, respectively.



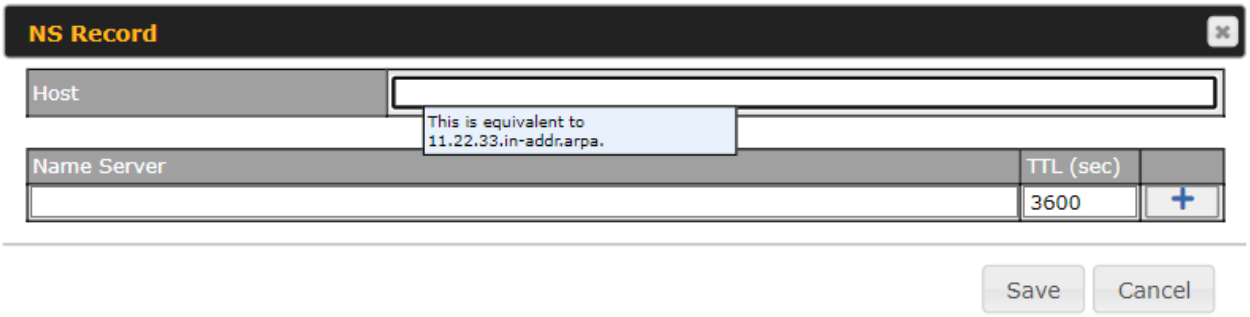
SOA Record



Displays the current SOA record. You can click the link **Click here to define SOA record** to create or click on the **Name Server** field to edit the SOA record.

In the SOA record, you must fill out the field's **Name Server**, **Email**, **Refresh**, **Retry**, **Expire**, **Min Time**, and **TTL**.

NS Records

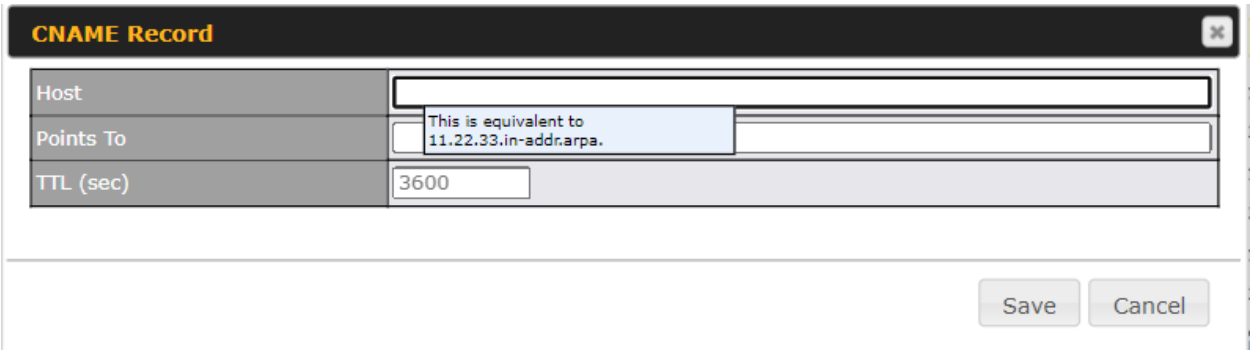


This table lists all defined NS records. The NS record of the name server defined in the SOA record is automatically added here. To create a new NS record, click the **New NS Records** button.

When creating an NS record for the Reverse Lookup Zone itself (not a sub-domain or dedicated zone), the Host field should be left blank.

Name Server field must be an **FQDN**.

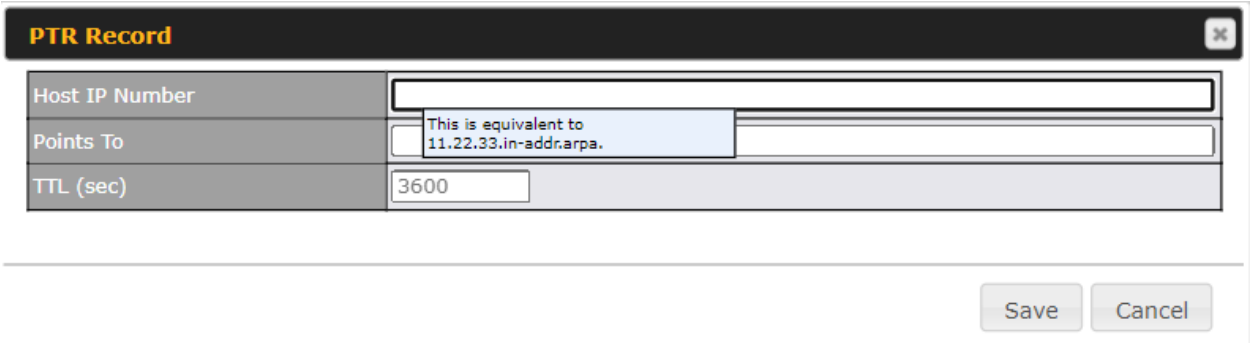
CNAME Records



Lists all CNAME records. To create a new CNAME record, click the **New CNAME Record** button.

CNAME records are typically used for defining classless reverse lookup zones. Subnetted reverse lookup zones are further described in RFC 2317, "Classless IN-ADDR.ARPA delegation."

PTR Records



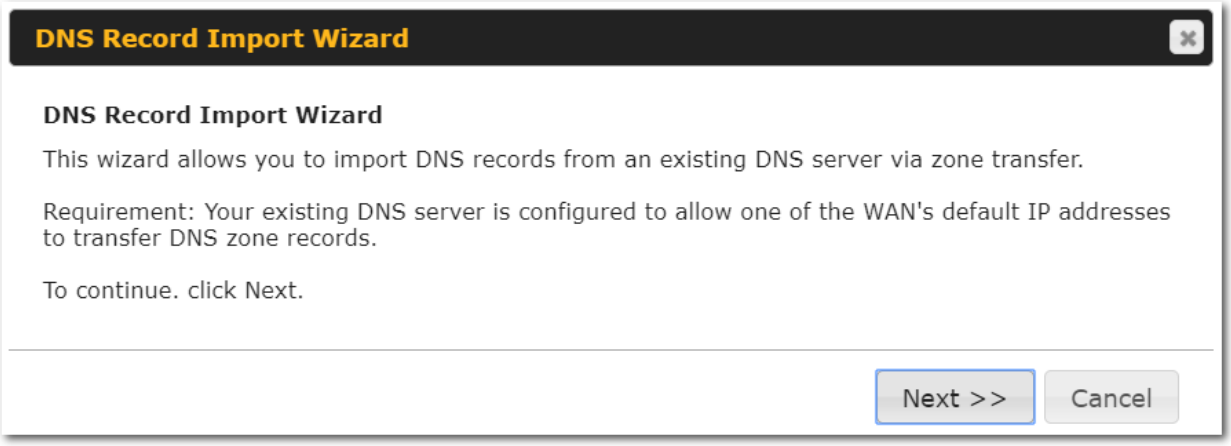
To create a new PTR record, click the **New PTR Record** button.

For **Host IP Number** field, enter the last integer in the IP address of a PTR record. For example. for the IP address *11.22.33.44*, where the reverse lookup zone is *33.22.11*.in-arpa.addr , the Host IP Number should be *44* .

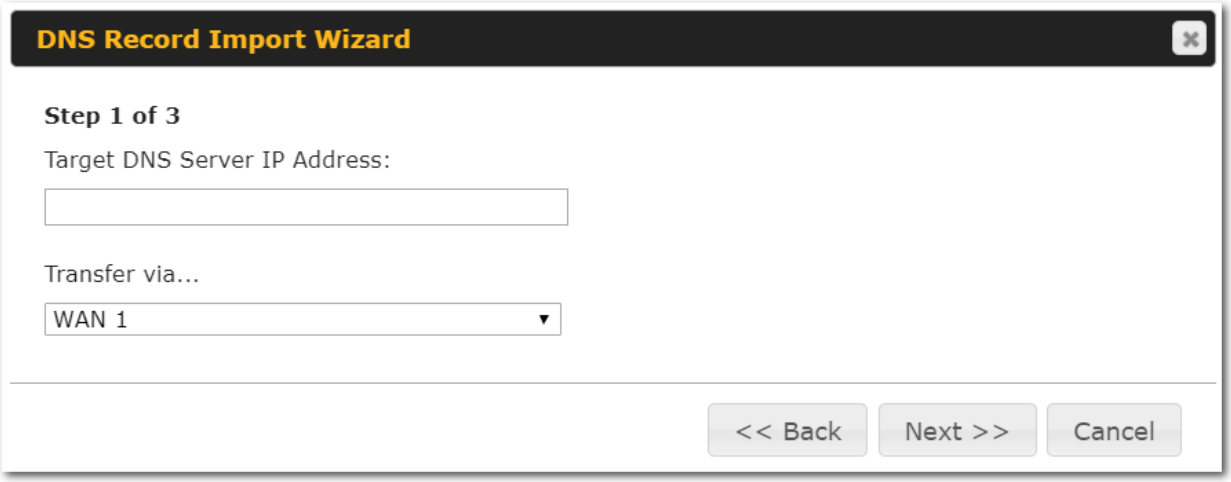
The **Points To** field defines the host name which the PTR record should be pointed to. It must be a FQDN.

DNS Record Import Wizard

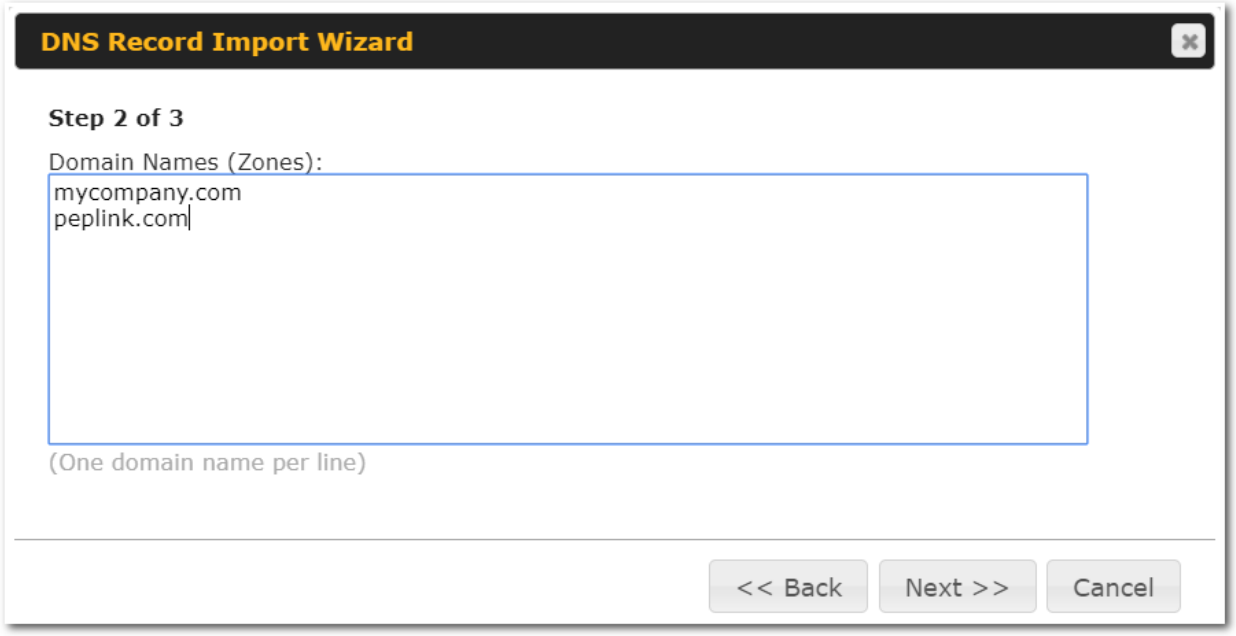
At the bottom of the DNS settings page, the link **Import records via zone transfer…**is used to import DNS record using an import wizard.



- Select **Next >>** to continue.



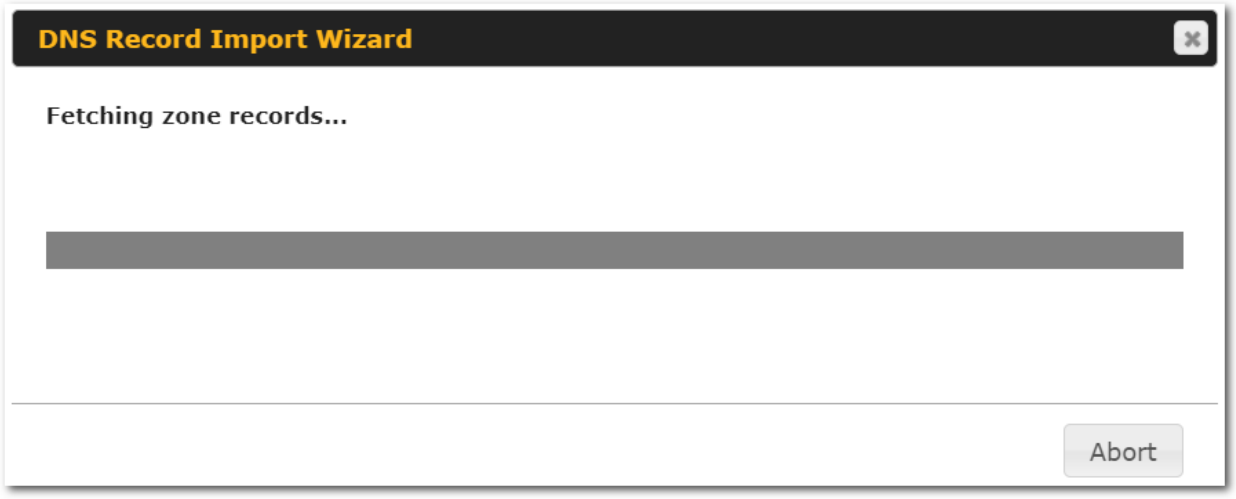
- In the **Target DNS Server IP Address** field, enter the IP address of the DNS server.
- In the **Transfer via…**field, choose the connection which you would like to transfer through.
- Select **Next >>** to continue.

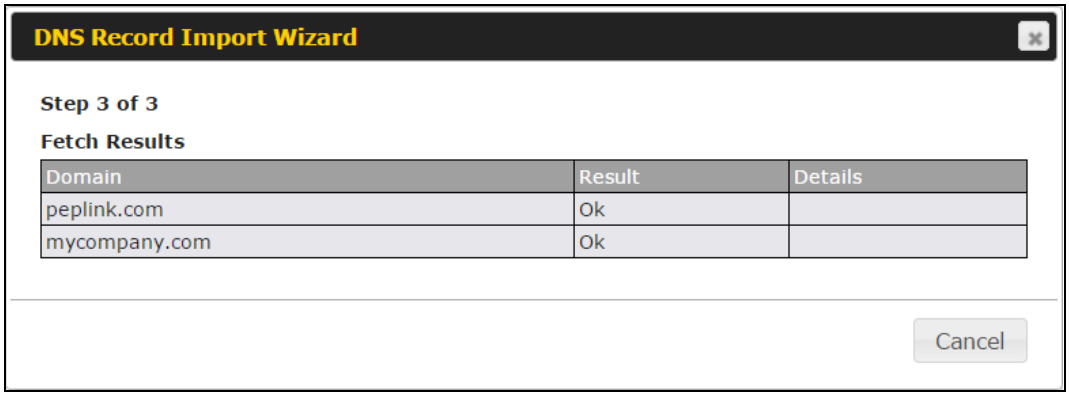


- In the blank space, enter the **Domain Names (Zones)** which you would like to assign the IP address entered in the previous step. Enter one domain name per line.
- Select **Next >>** to continue.

Important Note

If you have entered domain(s) which already exist in your settings, a warning message will appear. Select **Next >>** to overwrite the existing record or **<< Back** to go back to the previous step.





After the zone records process have been fetched, the fetch results would be shown as above. You can view import details by clicking the corresponding hyperlink on the right-hand side.

Zone: mytest.com

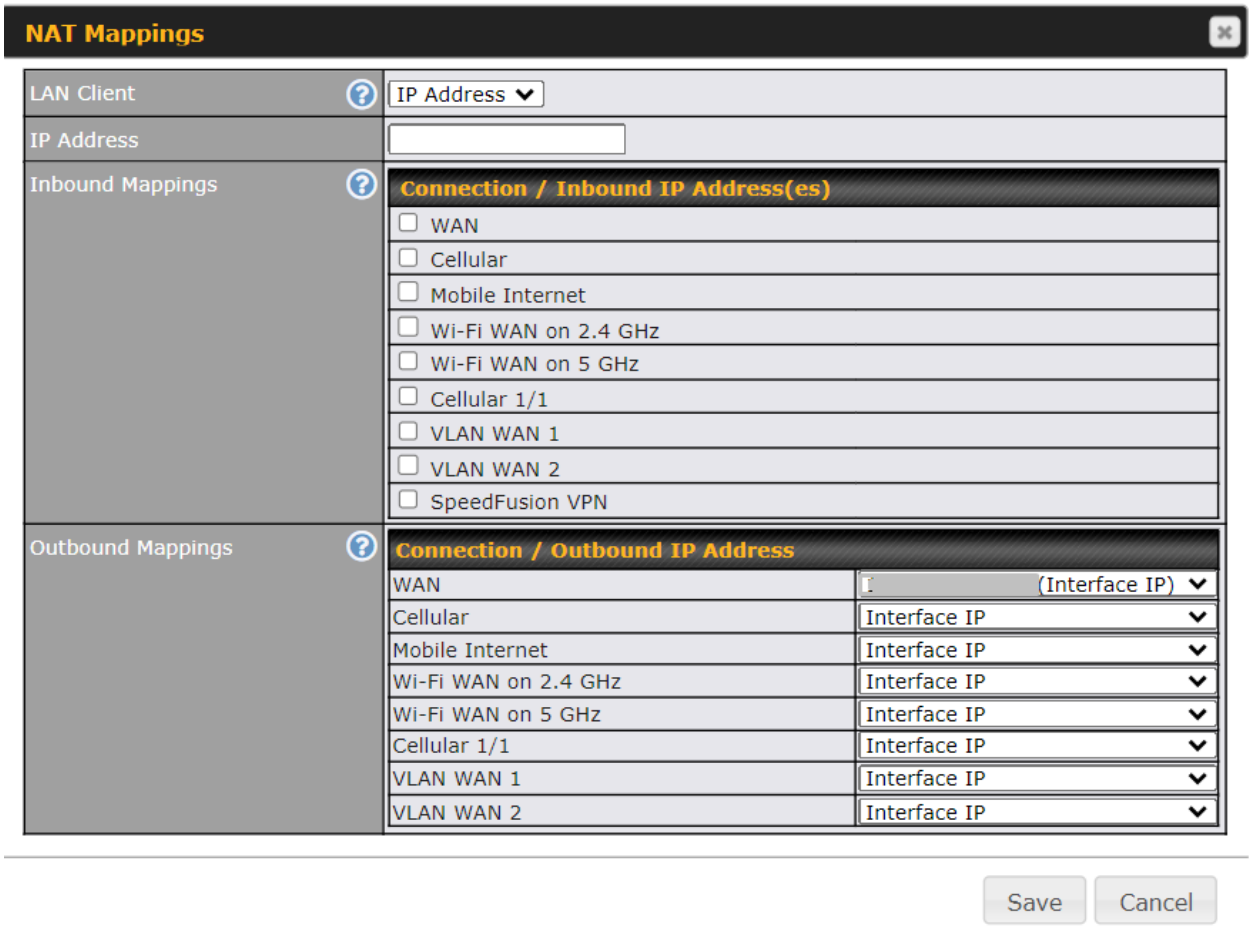
Record Type	Name	Value
SOA	mytest.com	ns1.mytest.com.
NS	mytest.com	ns1.mytest.com.
NS	mytest.com	ns2.mytest.com.
NS	mytest.com	ns3.mytest.com.
NS	mytest.com	ns4.mytest.com.
MX	mytest.com	mail01.mytest.com.
MX	mytest.com	1.us.testinglabs.com.
MX	mytest.com	backup.mytest.com.
MX	mytest.com	2.us.testinglabs.com.
A	backup.mytest.com	210.120.111.12
A	download.mytest.com	33.11.22.33
A	guest.mytest.com	126.132.111.0

14.8 NAT Mappings

The Peplink Balance allows the IP address mapping of all inbound and outbound NATed traffic to and from an internal client IP address.

NAT mappings can be configured at **Advanced > NAT Mappings**.

To add a rule for NAT mappings, click **Add NAT Rule** and the following screen will be displayed:



NAT Mapping Settings	
LAN Client	NAT Mapping rules can be defined for a single LAN **IP Address**, an **IP Range**, or an **IP Network**.

IP Address	This refers to the LAN host's private IP address. The system maps this address to a number of public IP addresses (specified below) in order to facilitate inbound and outbound traffic. This option is only available when **IP Address** is selected.
IP Range	The IP range is a contiguous group of private IP addresses used by the LAN host. The system maps these addresses to a number of public IP addresses (specified below) to facilitate outbound traffic. This option is only available when **IP Range** is selected.
IP Network	The IP network refers to all private IP addresses and ranges managed by the LAN host. The system maps these addresses to a number of public IP addresses (specified below) to facilitate outbound traffic. This option is only available when **IP Network** is selected.
Inbound Mappings	This setting specifies the WAN connections and corresponding WAN-specific Internet IP addresses on which the system should bind. Any access to the specified WAN connection(s) and IP address(es) will be forwarded to the LAN host. This option is only available when **IP Address** is selected in the **LAN Client** field. Note 1: Inbound mapping is not needed for WAN connections in drop-in mode or IP forwarding mode. Note 2: Each WAN IP address can be associated to one NAT mapping only.
Outbound Mappings	This setting specifies the WAN IP addresses should be used when an IP connection is made from a LAN host to the Internet.This option is only available when **IP Range** or **IP Network** is selected in the **LAN Client** field. Each LAN host in an IP range or IP network will be evenly mapped to one of each selected WAN's IP addresses (for better IP address utilization) in a persistent manner (for better application compatibility). Note 1: If you do not want to use a specific WAN for outgoing accesses, you should still choose default here, then customize the outbound access rule in the **Outbound Policy** section. Note 2: WAN connections in drop-in mode or IP forwarding mode are not shown here.

Click **Save** to save the settings when configuration has been completed.

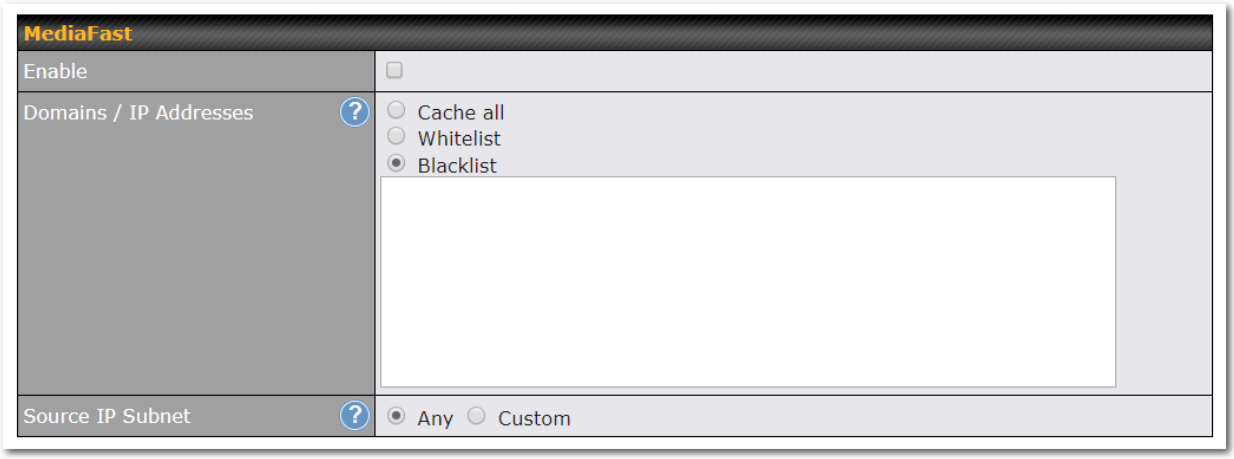
Important Note
Inbound firewall rules override inbound mapping settings.

14.9 MediaFast

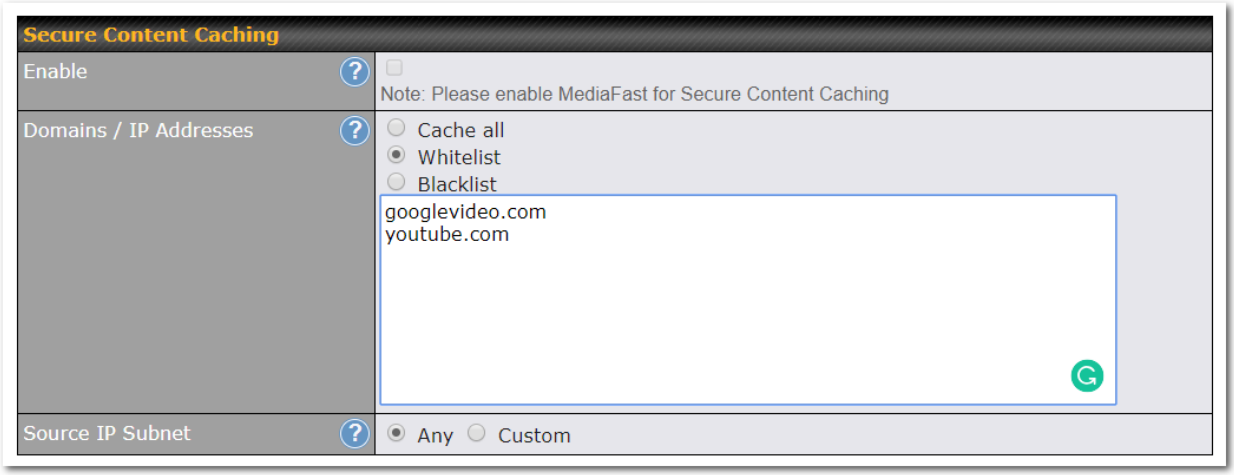
MediaFast settings can be configured by navigating to **Advanced > MediaFast**.

14.9.1 Cache Settings

To access MediaFast content caching settings, select **Advanced > MediaFast > Cache Settings**.

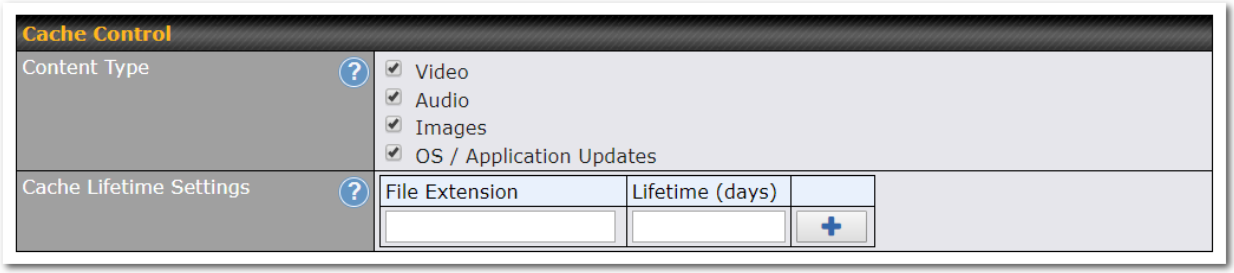


MediaFast	
Enable	Click the checkbox to enable MediaFast content caching.
Domains / IP Addresses	Choose to **Cache on all domains**, or enter domain names and then choose either **Whitelist** (cache the specified domains only) or **Blacklist** (do not cache the specified domains).
Source IP Subnet	This setting allows caching to be enabled on custom subnets only. If "Any" is selected, then caching will apply to all subnets.



The **Secure Content Caching** menu operates identically to the **MediaFast** menu, except it is for secure content cachting accessible through https://.
In order for Mediafast devices to cache and deliver HTTPS content, every client needs to have the necessary certificates installed*.

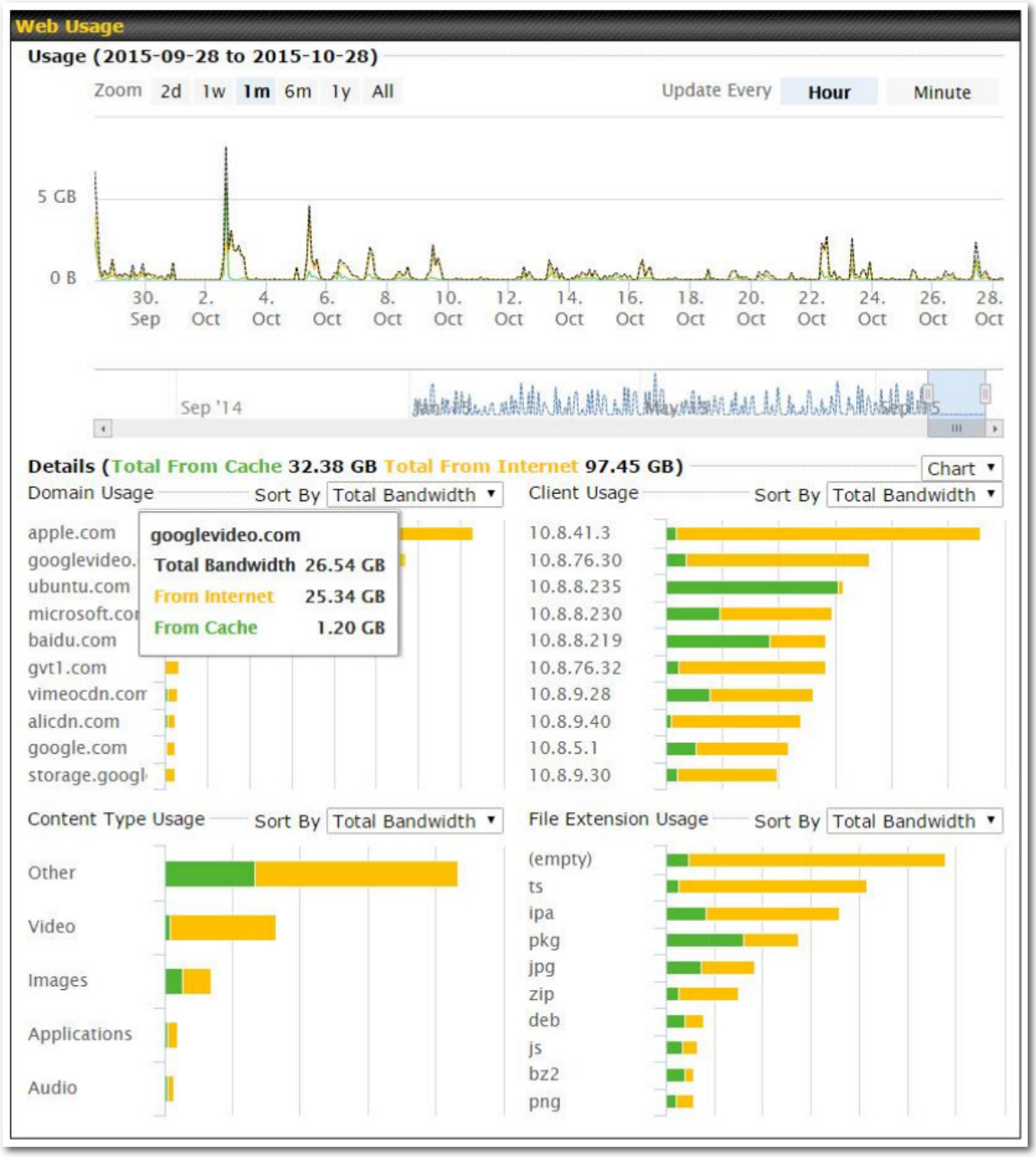
*See https://forum.peplink.com/t/certificate-installation-for-mediafast-https-caching/



Cache Control	
Content Type	Check these boxes to cache the listed content types or leave boxes unchecked to disable caching for the listed types.
Cache Lifetime Settings	Enter a file extension, such as JPG or DOC. Then enter a lifetime in days to specify how long files with that extension will be cached. Add or delete entries using the controls on the right.

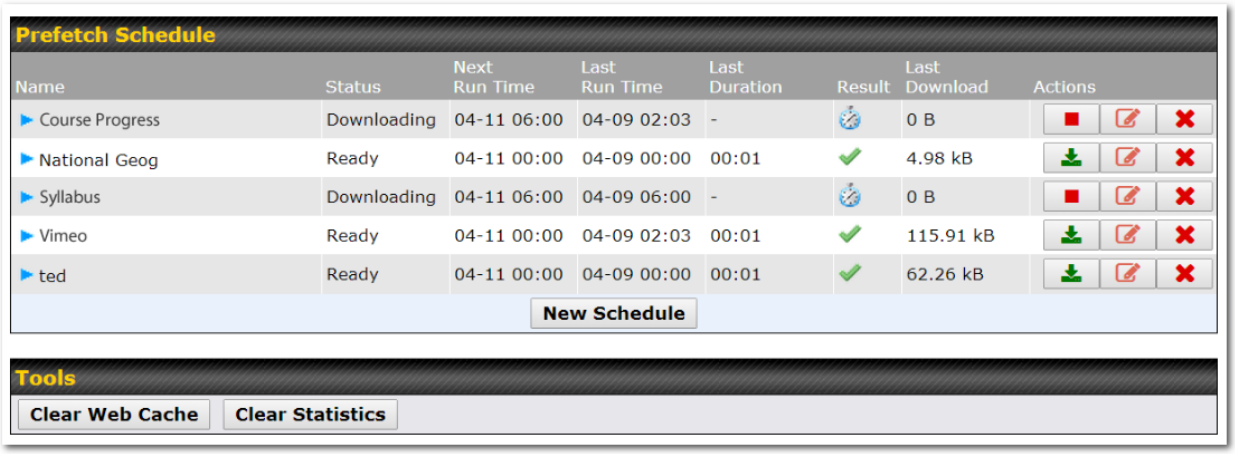
Viewing MediaFast Statistics

To get details on storage and bandwidth usage, select **Status > MediaFast**.

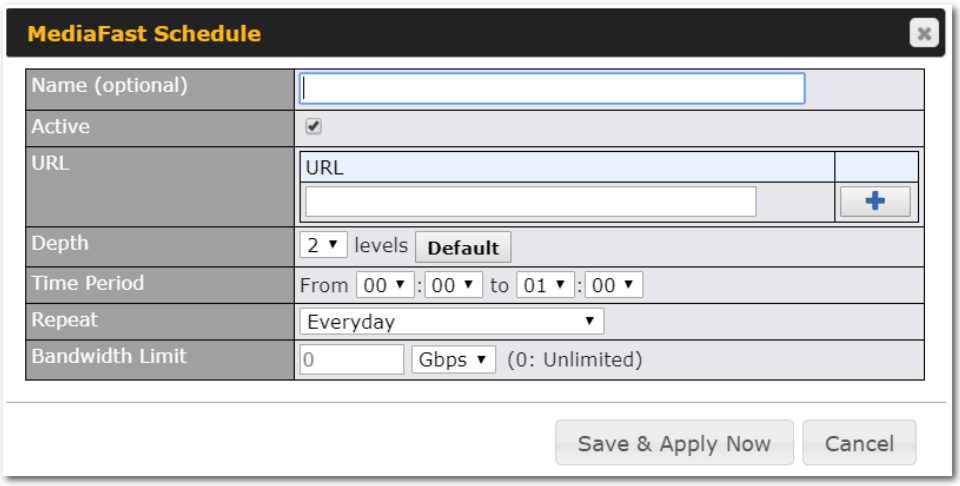


14.9.2 Prefetch Schedule

Content prefetching allows you to download content on a schedule that you define, which can help to preserve network bandwidth during busy times and keep costs down. To access MediaFast content prefetching settings, select **Advanced > MediaFast > Prefetch Schedule**.



Prefetch Schedule Settings	
Name	This field displays the name given to the scheduled download.
Status	Check the status of your scheduled download here.
Next Run Time/Last Run Time	These fields display the date and time of the next and most recent occurrences of the scheduled download.
Last Duration	Check this field to ensure that the most recent download took as long as expected to complete. A value that is too low might indicate an incomplete download or incorrectly specified download target, while a value that is too long could mean a download with an incorrectly specified target or stop time.
Result	This field indicates whether downloads are in progress ( ) or complete ( ).
Last Download	Check this field to ensure that the most recent download file size is within the expected range. A value that is too low might indicate an incomplete download or incorrectly specified download target, while a value that is too long could mean a download with an incorrectly specified target or stop time. This field is also useful for quickly seeing which downloads are consuming the most storage space.
Actions	To begin a scheduled download immediately, click . To cancel a scheduled download, click . To edit a scheduled download, click . To delete a scheduled download, click .
New Schedule	Click to begin creating a new scheduled download. Clicking the button will cause the following screen to appear:



Simply provide the requested information to create your schedule.

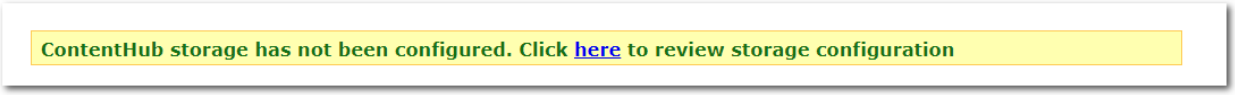
Clear Web Cache	Click to clear all cached content. Note that this action cannot be undone.
Clear Statistics	Click to clear all prefetch and status page statistics.

14.10 Edge Computing

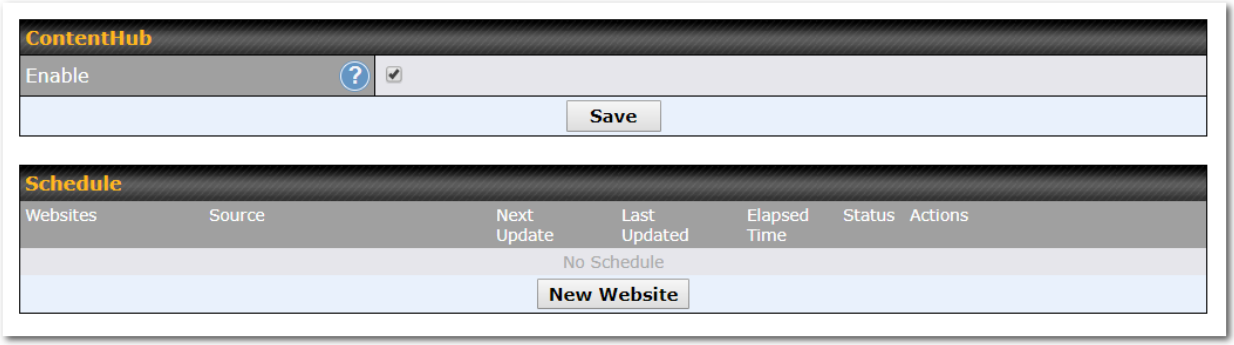
14.10.1 Application

ContentHub allows you to deliver webpages and applications to users connected to the SSID using the local storage on your router. Users will be able to access news, articles, videos, and access your web app without the need for internet access.
The ContentHub can be used to provide infotainment to connected users on transport.

ContentHub storage needs to be configured before content can be uploaded to the ContentHub. Click on the link on the information panel to configure storage.



To access ContentHub, navigate to **Advanced > Application** and check the **Enable** box.:

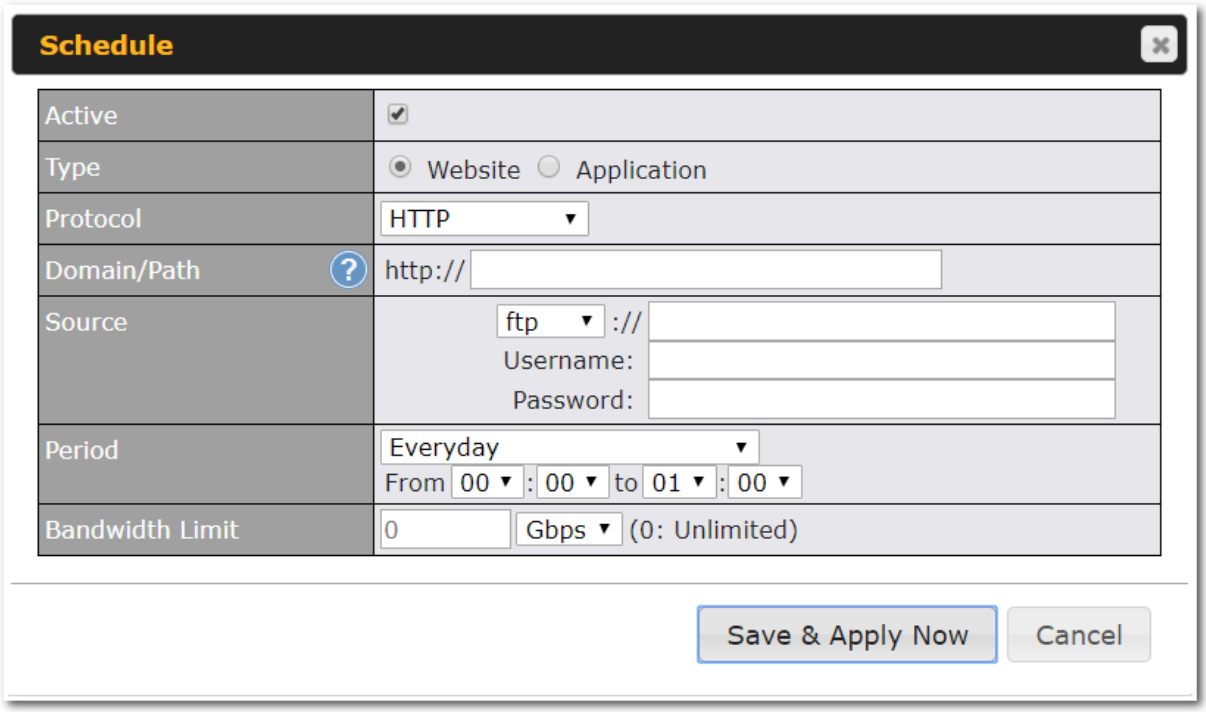


On an external server, configure content (a website or application) that will be synced to the ContentHub. For example, an html5 website.

To configure a website or application as content, follow the steps below.

Configure a website for the ContentHub
This option allows you to sync a website to the Peplink router. This website will then be published with the specified domain from the router itself and makes the content available to the client via the HTTP/HTTPS protocol.
Only FTP sync is supported for this type of ContentHub content.
The content should be uploaded to an FTP server before you sync it with ContentHub.

Click **New Website** and a window with the following configuration options will appear:

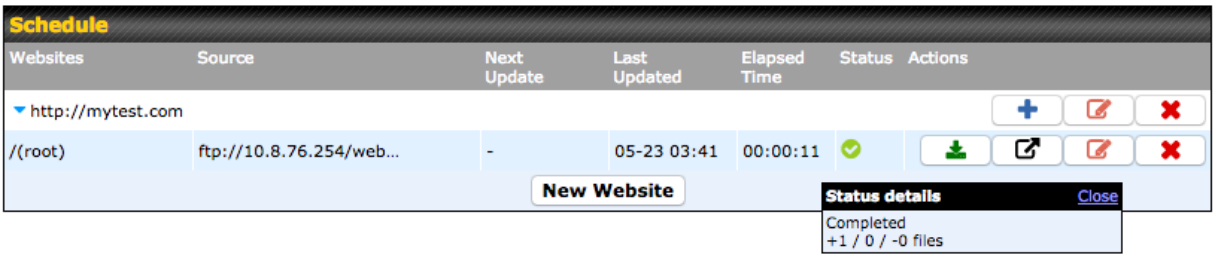


Schedule	
Active	Checking the box toggles the activation of the content.
Type	Select the type of content: Website or Application.
Protocol	Configure the protocol to be used: HTTP, HTTPS or both.
Domain/Path	Enter the URL for the ContenHub to use as the domain name for client access (such as http://mytest.com).
Method	Only applicable for **Application** type content. Choose between sync or file upload.
Source	Enter the details of the server that the content will be downloaded from. Enter credentials under **Username** and **Password**.
Period	This field determines how often the router will search for updates to the source content.
Bandwidth Limit	Set a bandwidth limit for clients.

Click "**Save & Apply Now**" to activate the changes. A screenshot of the display after configuration is shown below:

The content will be synced regularly according to the time set in the **Period** that was configured earlier.

If you want to activate the sync manually, you can click the “  ” icon. The “Status” column will display the sync progress. When the sync is completed, a summary will be displayed, as shown in the screenshot below:



To access the content, open a browser in the MFA’s client and enter the domain details that were configured earlier (such as http://mytest.com).

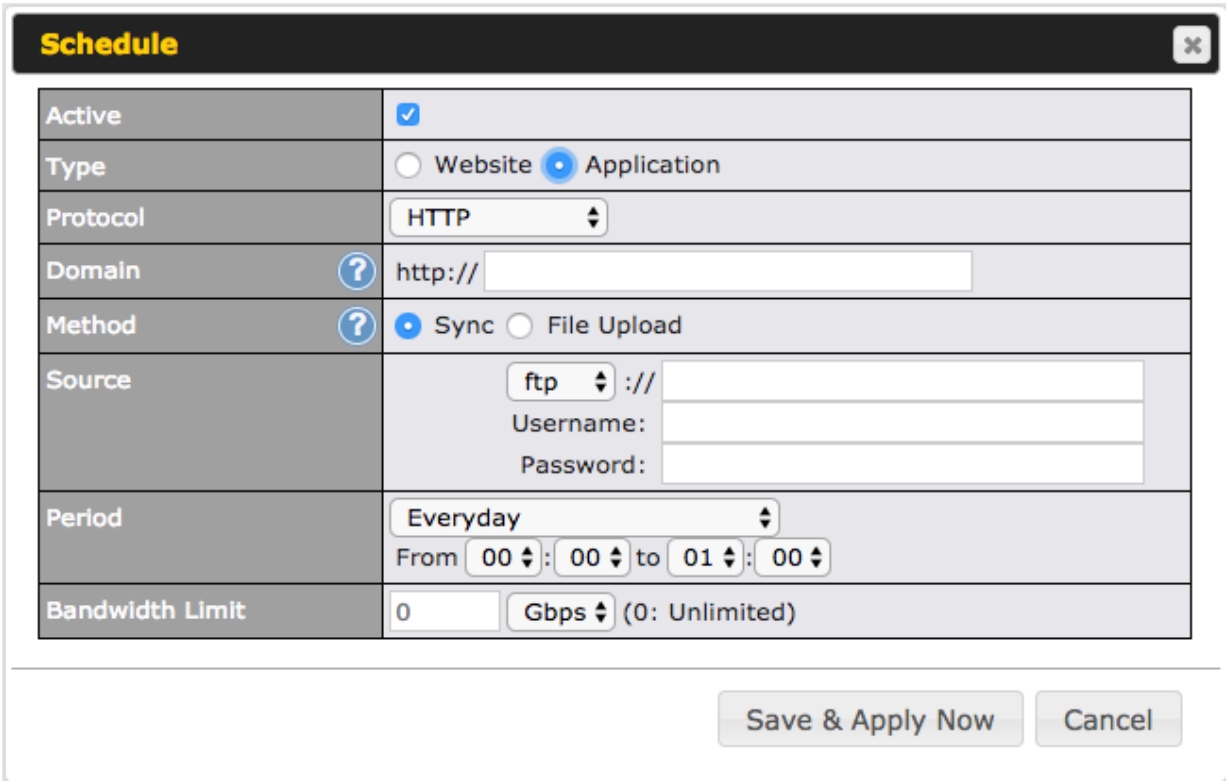
Configure an application for the ContentHub

MediaFast routers allow you to configure and publish any application from the router itself by using one of the supported frameworks below:

- Python (version 2.7.12)
- Ruby (version 2.3.3)
- Node.js (version 6.9.2)

Install the desired framework under “Package Manager” as shown below:

After installing the framework, change the ”Type” to “Application” and configure the website.



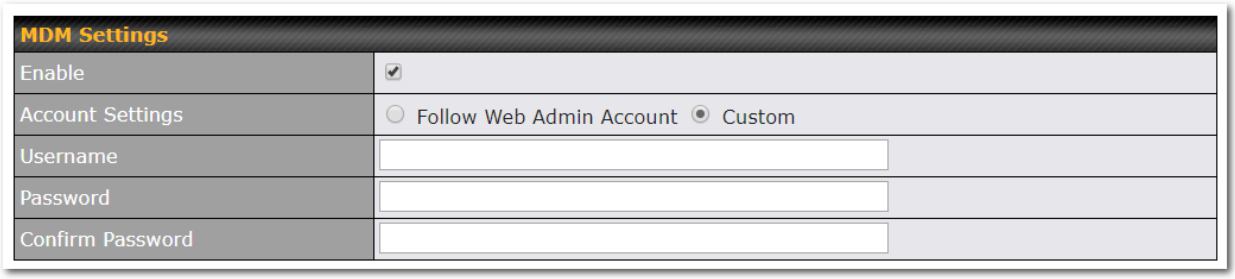
The setting is the same as the Website type (refer to the description in the section above).

Application type content need to be packed as explained below:

1. Implement two bash script files, start.sh and stop.sh in the root folder, to start and stop your application. The MediaFast router will only execute start.sh and stop.sh when the corresponding website is enabled and disabled respectively.
2. Compress the application files and the bash script to .tar.gz format.
3. Upload this tar file to the router.

MDM Settings

In addition to performing content caching, MediaFast-enabled routers can also serve as an MDM, administrating to client devices. To access MDM Settings, navigate to **Advanced > MDM Settings**:



MDM Settings	
Enable	Click this checkbox to enable MDM on your router.
Account Settings	Click **Follow Web Admin Account** to allow client devices to use the built-in administrator account when performing MDM. Set **Custom** to specify a username and password your router will use to log into your client devices.

Please refer to the knowledgebase for information about enrolling client devices to MDM:
https://forum.peplink.com/t/how-to-enroll-a-device-to-the-mdm-server/8454

14.10.2 Docker

MediaFast enabled routers can host Docker containers when running Firmware 7.1 or later.
Docker is an open platform for developing, shipping, and running applications.
From Firmware version 7.1.0 and upwards, it is possible to install and run Docker Containers on your Peplink Mediafast 500 or 750 router.

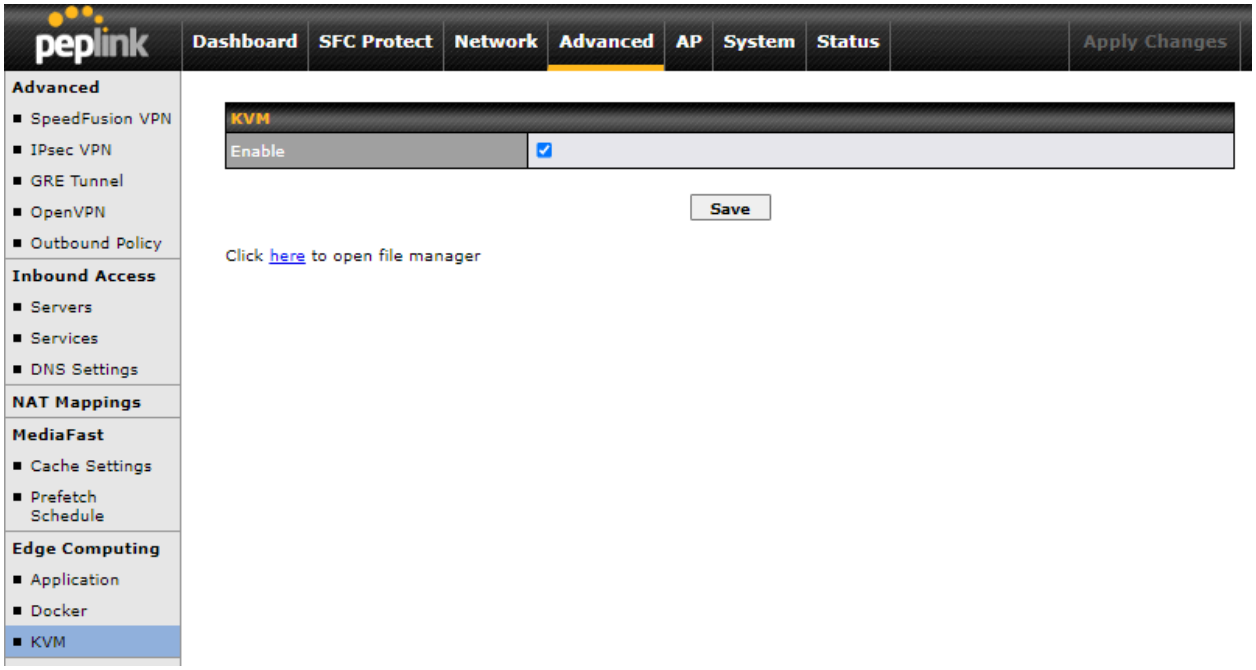
Due to the nature of Docker and its unlimited variables, this feature is supported by Pepwave up to the point of creating a running Docker Container.
Information about Docker can be found on the Docker Documentation site:
https://docs.docker.com/ 2

This will allow you to run a file sharing platform (ownCloud), a web server (WordPress, Joomla!) , a learning platform (Moodle), or a visualisation tool for viewing large scale data (Kibana).
When creating a new Docker Container, the Pepwave router will search through the Docker Hub repository. https://hub.docker.com/explore/ 7

For detailed configuration instructions, refer to our knowledge base:
https://forum.peplink.com/t/how-to-run-a-docker-application-on-a-peplink-mediafast-router/16021/

14.10.3 KVM

MediaFast enabled routers now support KVM. Users will have to download and install Virtual Machine Manager to manage the KVM virtual machines. Through this, users are able to virtualise a Linux environment.



For detailed configuration instructions, refer to our knowledge base articles:

1. How to install a Virtual Machine on Peplink/Pepwave - MediaFast/ContentHub Routers

2. How to Install Virtual Machine with USB storage on Peplink/Pepwave - MediaFast/ContentHub Routers

14.11 QoS

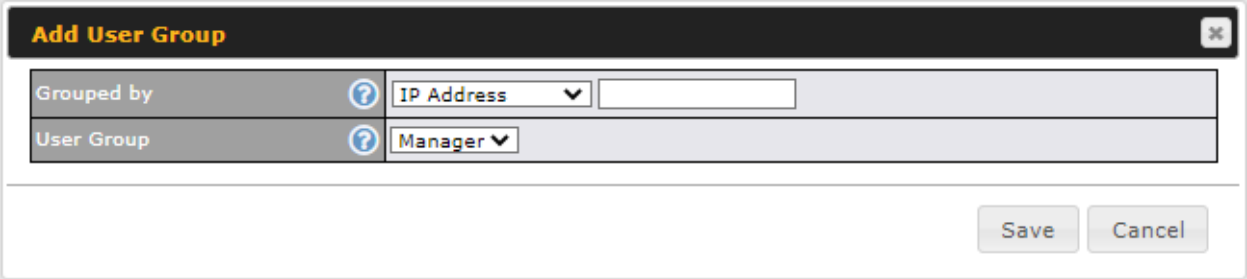
14.11.1 User Groups

LAN and PPTP clients can be categorized into three user groups - **Manager, Staff, and Guest**. This menu allows you to define rules and assign client IP addresses or subnets to a user group. You can apply different bandwidth and traffic prioritization policies on each user group in the **Bandwidth Control** and **Application** sections.

The table is automatically sorted, and the table order signifies the rules' precedence. The smaller and more specific subnets are put towards the top of the table and have higher precedence; larger and less specific subnets are placed towards the bottom.

Click the **Add** button to define clients and their user group. Click the ✖ button to remove the defined rule.

Two default rules are predefined and put at the bottom. They are **All DHCP reservation clients** and **Everyone**, and they cannot be removed. The **All DHCP reservation client represents** the LAN clients defined in the DHCP Reservation table on the LAN settings page. **Everyone** represents all clients that are not defined in any rule above. Click on a rule to change its group. The QoS settings are located at **Advanced > QoS > User Group**.



Add User Group	
Grouped by	From the drop-down menu, choose whether you are going to define the client(s) by an **IP Address** or a **Subnet**. If **IP Address** is selected, enter a name defined in DHCP reservation table or a LAN client's IP address. If **Subnet** is selected, enter a subnet address and specify its subnet mask.
User Group	This field is to define which **User Group** the specified subnet / IP address belongs to.

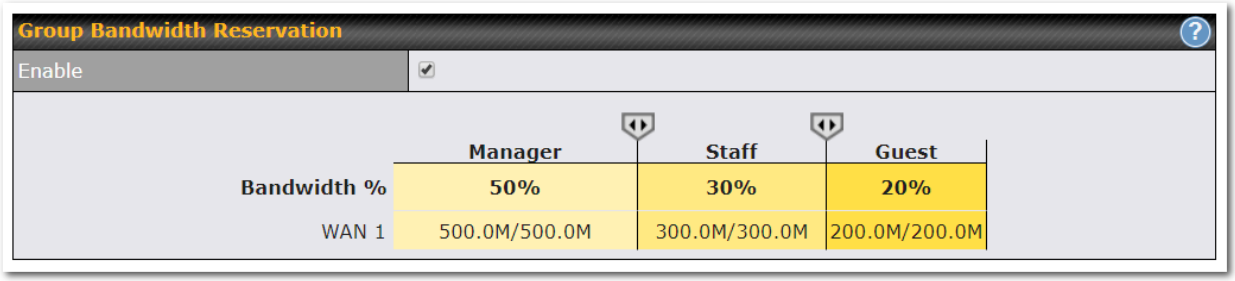
Once users have been assigned to a user group, their internet traffic will be restricted by rules defined for that particular group. Please refer to the following two sections for details.

14.11.2 Bandwidth Control

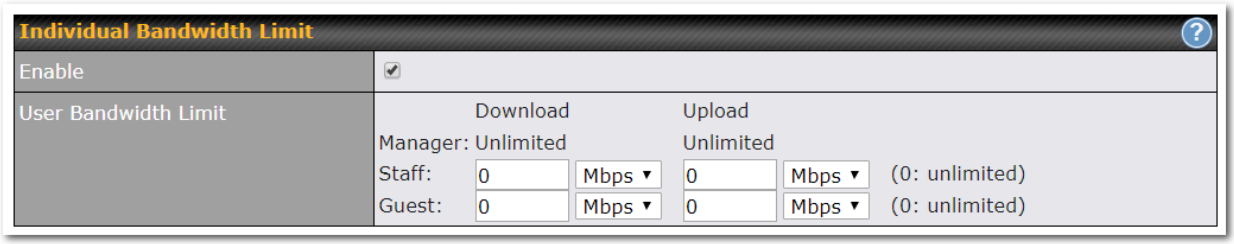
This section is to define how much minimum bandwidth will be reserved to each user group when a WAN connection is **in full load**. When this feature is enabled, a slider with two indicators will be shown. You can move the indicators to adjust each group's weighting. The

lower part of the table shows the corresponding reserved download and uploads bandwidth value of each connection.

By default, **50%** of bandwidth has been reserved for Manager, **30%** for Staff, and **20%** for Guest.

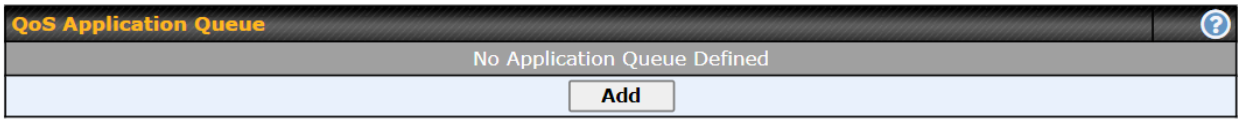


You can define a maximum download speed (over all WAN connections) and upload speed (for each WAN connection) that each individual Staff and Guest member can consume. No limit can be imposed on individual Managers. By default, download and upload bandwidth limits are set to unlimited (set as **0)**.

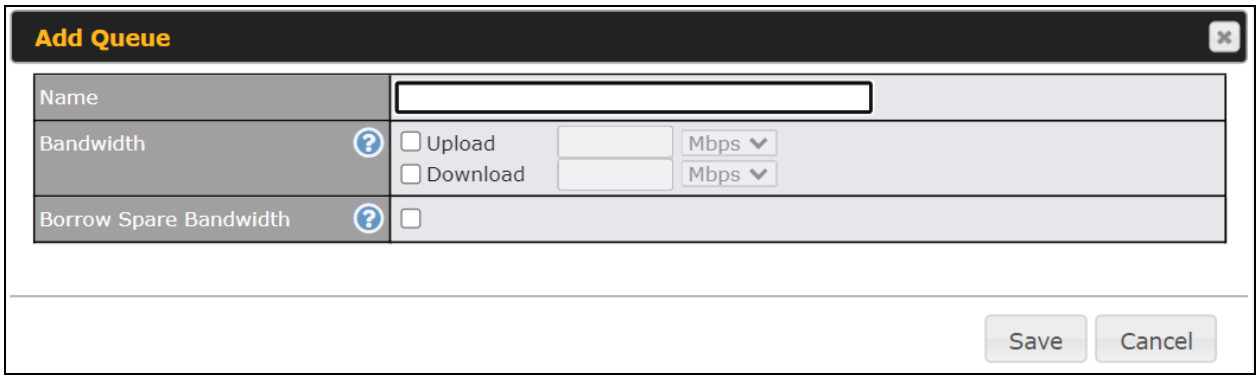


14.11.3 Application Queue

This section is to define the QoS Application Queue. You can set guaranteed bandwidth for a queue and assign it to applications.



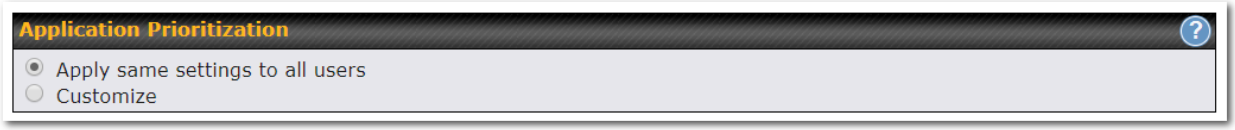
Click the Add button to create the QoS Application Queue.



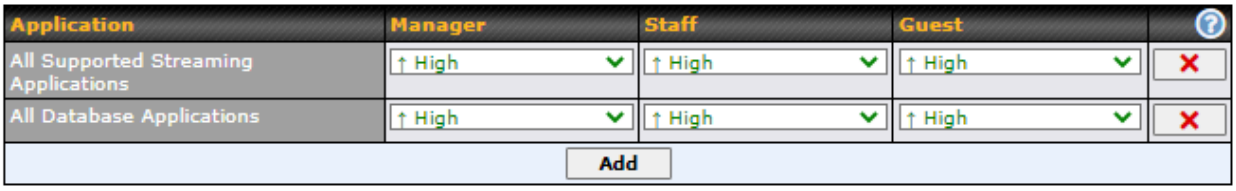
Add Queue	
Name	This setting specifies a name for the QoS Application Queue.
Bandwidth	Bandwidth to be reserved (for each WAN connection) for this queue. When WAN is congested, this bandwidth will remain available for applications assigned to this queue.
Borrow Spare Bandwidth	Enable this option if you want this queue to utilize WAN's unused bandwidth.

14.11.4 Application

You can choose whether to apply the same prioritization settings to all user groups or customize the settings for each group.



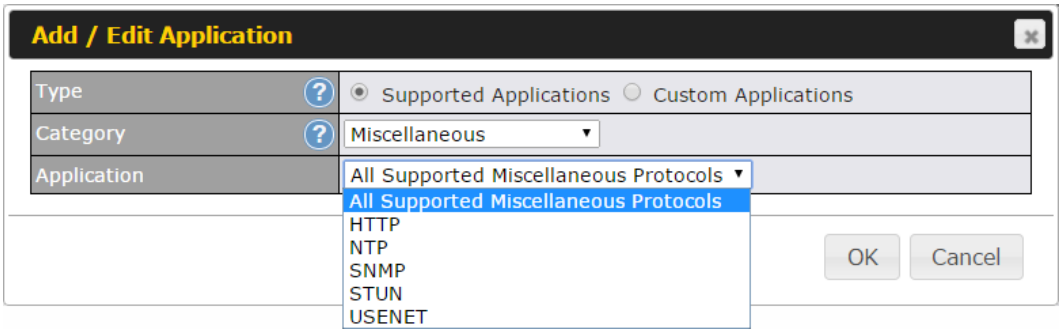
Three priority levels can be set for application prioritization: ↑**High**,— **Normal**, and↓**Low**. The Peplink Balance can detect various application traffic types by inspecting the packet content. Select an application by choosing a supported application, or by defining a custom application manually. The priority preference of supported applications is placed at the top of the table. Custom applications are at the bottom.



Prioritization for Custom Application

Click the **Add** button to define a custom application. Click the button  in the **Action** column to delete the custom application in the corresponding row.

When **Supported Applications** is selected, the Peplink Balance will inspect network traffic and prioritize the selected applications. Alternatively, you can select **Custom Applications** and define the application by providing the protocol, scope, port number, and DSCP value.

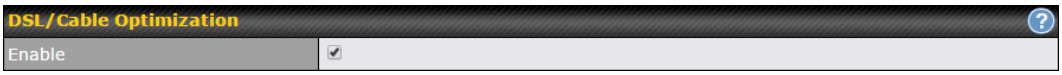


Category and **Application** availability will be different across different Peplink Balance models.

DSL/Cable Optimization

DSL/cable-based WAN connections have lower upload bandwidth and higher download bandwidth.

When a DSL/cable circuit's uplink is congested, the download bandwidth will be affected. Users will not be able to download data at full speed until the uplink becomes less congested. **DSL/Cable Optimization** can relieve such an issue. When it is enabled, the download speed will become less affected by the upload traffic. By default, this feature is disabled.



SpeedFusion VPN Traffic Optimization

To enable this option to allow SpeedFusion VPN traffic has highest priority when WAN is congested.

14.12 Firewall

A firewall is a mechanism that selectively filters data traffic between the WAN side (the Internet) and the LAN side of the network. It can protect the local network from potential hacker attacks, access to offensive websites, and/or other inappropriate uses.

The firewall functionality of Peplink Balance supports the selective filtering of data traffic in both directions:

Outbound (LAN to WAN)
Inbound (WAN to LAN)
Internal Network (VLAN to VLAN)
Local Service

The firewall also supports the following functionality:

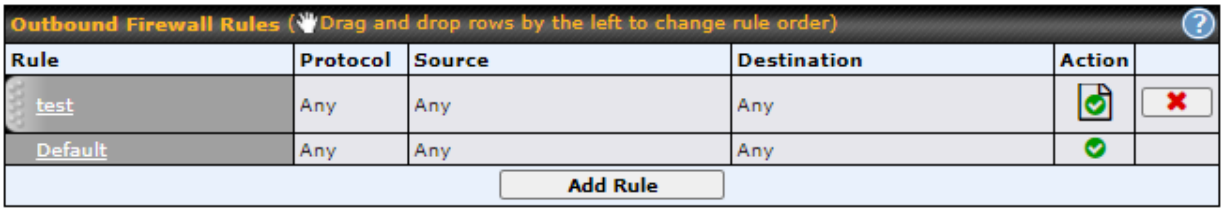
- Intrusion detection and DoS prevention
- Web blocking

With SpeedFusion™ enabled, the firewall rules also apply to VPN tunneled traffic. The Firewall function can be found at **Advance > Firewall**

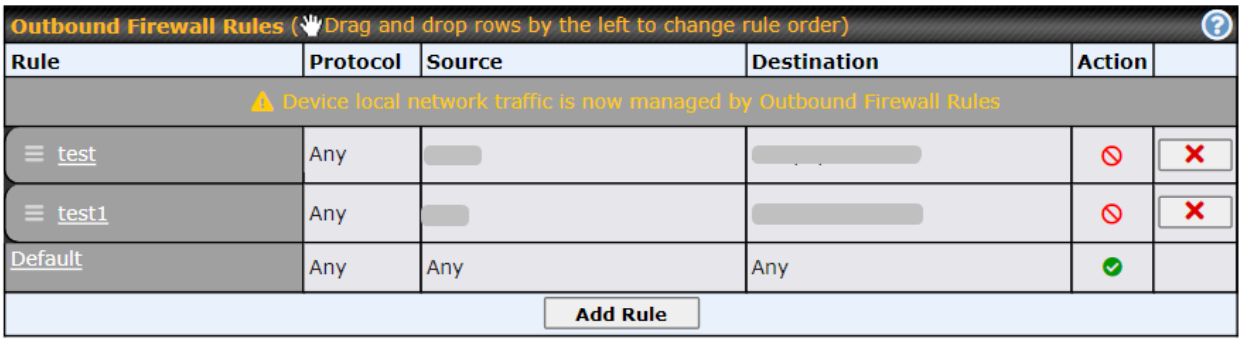
14.12.1 Access Rules

Outbound Firewall Rules

The outbound firewall settings are located at **Advanced > Firewall > Access Rules**.



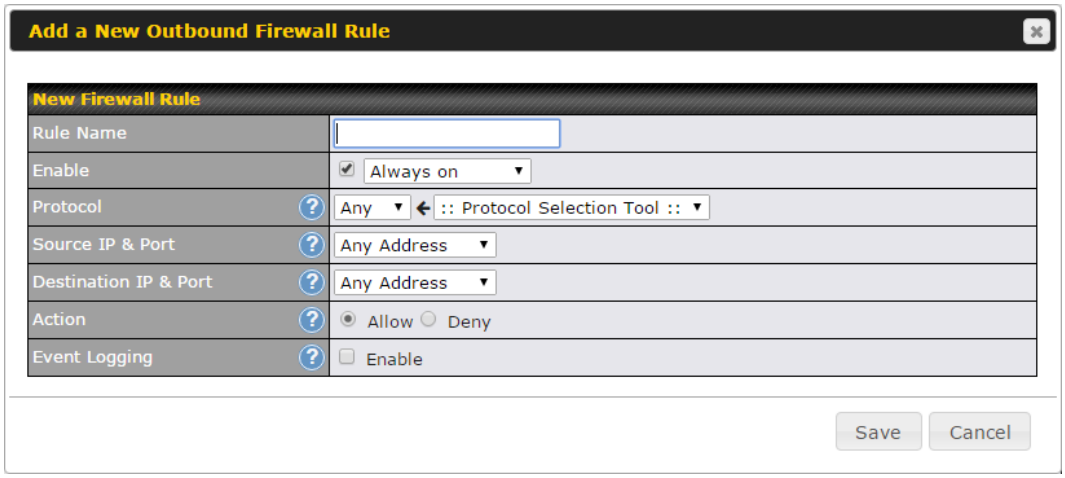
To enable or disable the Outbound Firewall to manage device local network traffic, click on the help icon and click here, the sceen will shows below.



Note

To utilize the Outbound Firewall Rule to block the Peplink device from contacting InControl 2. may refer to the link below:
https://forum.peplink.com/t/faq-prevent-device-reaching-incontrol-2./63f48fdfd466df34ab475f55/

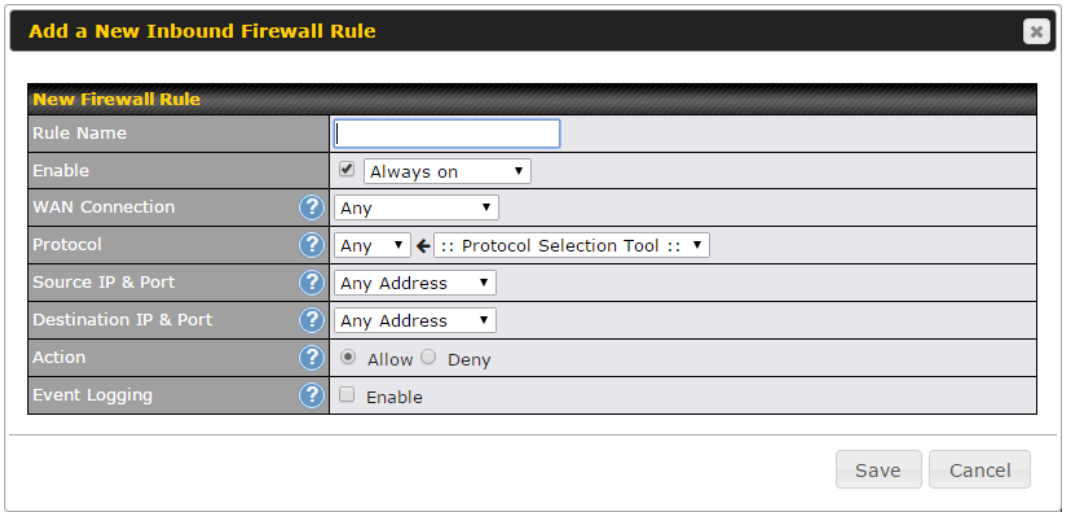
Click **Add Rule** to display the following screen:



Inbound Firewall Rules

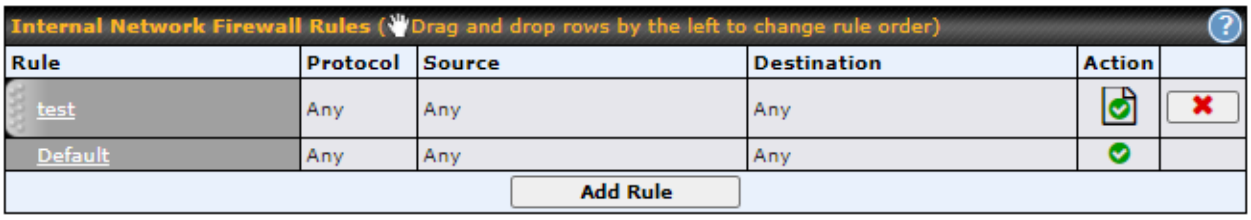
The inbound firewall settings are located at **Advanced > Firewall > Access Rules**.

Click **Add Rule** to display the following window:

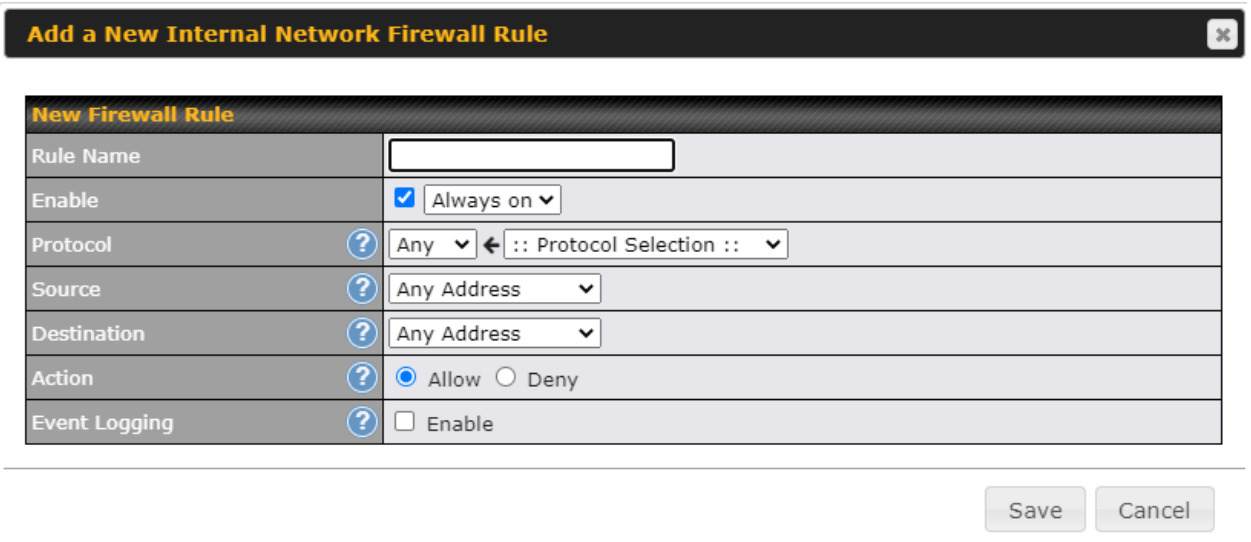


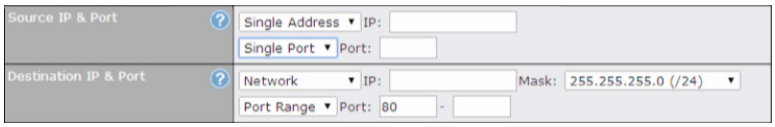
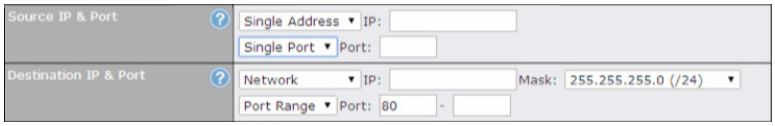
Internal Network Firewall Rules

The Internal Network firewall settings are located at **Advanced > Firewall > Access Rules**.



Click **Add Rule** to display the following window:



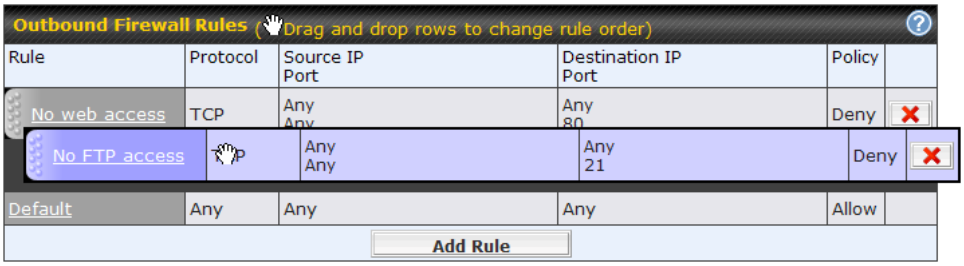
Inbound / Outbound / Internal Network Firewall Settings	
Rule Name	This setting specifies a name for the firewall rule.
Enable	This setting specifies whether the firewall rule should take effect. If the box is checked, the firewall rule takes effect. If the traffic matches the specified protocol/IP/port, actions will be taken by Peplink Balance based on the other parameters of the rule. If the box is not checked, the firewall rule does not take effect. The Peplink Balance will disregard the other parameters of the rule. Click the dropdown menu next to the checkbox to place this firewall rule on a time schedule.
WAN Connection (Inbound)	Select the WAN connection that this firewall rule should apply to.
Protocol	This setting specifies the protocol to be matched. Via a drop-down menu, the following protocols can be specified: • **Any** • **TCP** • **UDP** • **ICMP** • **IP** • **DSCP** Alternatively, the **Protocol Selection Tool** drop-down menu can be used to automatically fill in the protocol and port number of common Internet services (e.g., HTTP, HTTPS, etc.) After selecting an item from the **Protocol Selection Tool** drop-down menu, the protocol and port number remains manually modifiable.
Source and Port	This specifies the source IP address(es) and port number(s) to be matched for the firewall rule. A single address, or a network, can be specified as the **Source IP & Port** setting, as indicated with the following screenshots:  In addition, a single port, or a range of ports, can be specified for the **Source** settings.
Destination and Port	This specifies the destination IP address(es) and port number(s) to be matched for the firewall rule. A single address, or a network, can be specified as the **Destination IP & Port** setting, as indicated with the following screenshots:  In addition, a single port, or a range of ports, can be specified for the settings.

Action	This setting specifies the action to be taken by the router upon encountering traffic that matches the both of the following: • Source IP & port • Destination IP & port With the value of **Allow** for the **Action** setting, the matching traffic passes through the router (to be routed to the destination). If the value of the **Action** setting is set to **Deny**, the matching traffic does not pass through the router (and is discarded).
Event Logging	This setting specifies whether or not to log matched firewall events. The logged messages are shown on the page **Status>Event Log**. A sample message is as follows: Aug 13 23:47:44 Denied CONN=Ethernet WAN SRC=20.3.2.1 DST=192.168.1.20 LEN=48 PROTO=TCP SPT=2260 DPT=80 • **CONN:** The connection where the log entry refers to • **SRC:** Source IP address • **DST:** Destination IP address • **LEN:** Packet length • **PROTO:** Protocol • **SPT:** Source port • **DPT:** Destination port

Click **Save** to store your changes. To create an additional firewall rule, click **Add Rule** and repeat the above steps.

To change a rule's priority, simply drag and drop the rule:

- Hold the left mouse button on the rule.
- Move it to the desired position.
- Drop it by releasing the mouse button.



To remove a rule, click the button.

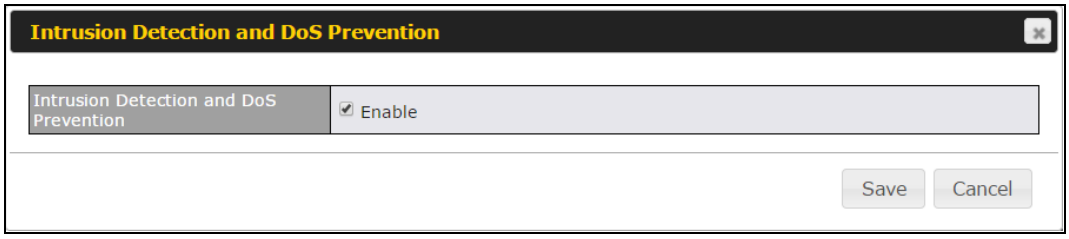
Rules are matched from top to the bottom. If a connection matches any one of the upper rules, the matching process will stop. If none of the rules match the connection, the **Default** rule will be applied.

The **Default** rule is **Allow** for Outbound, Inbound and Internal Network access.

Tip

If the default inbound rule is set to **Allow** for NAT-enabled WANs, no inbound Allow firewall rules will be required for inbound port forwarding and inbound NAT mapping rules. However, if the default inbound rule is set as **Deny**, a corresponding Allow firewall rule will be required.

Intrusion Detection and DoS Prevention



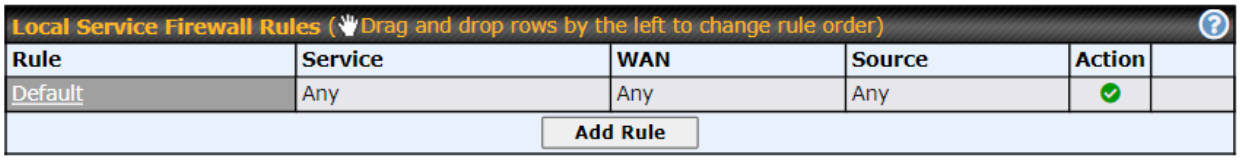
The Balance can detect and prevent intrusions and denial-of-service (DoS) attacks from the Internet. To turn on this feature, click , check the **Enable** check box for the **Intrusion Detection and DoS Prevention**, and press the **Save** button.

When this feature is enabled, the Balance will detect and prevent the following kinds of intrusions and denial-of-service attacks.

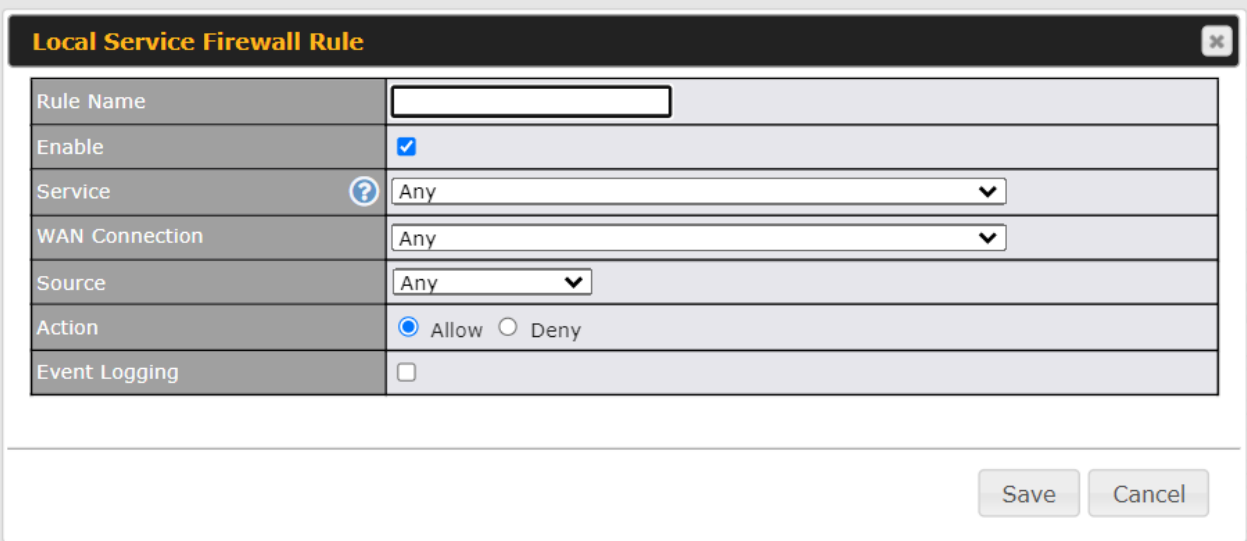
- Port scan
  - NMAP FIN/URG/PSH
  - Xmas tree
  - Another Xmas tree
  - Null scan
  - SYN/RST
  - SYN/FIN
- SYN flood prevention
- Ping flood attack prevention

Local Service Firewall Rules

For every WAN inbound traffic to local service, rules will be matched to take the defined action. The Local Service firewall settings are located at **Advanced > Firewall > Access Rules**.



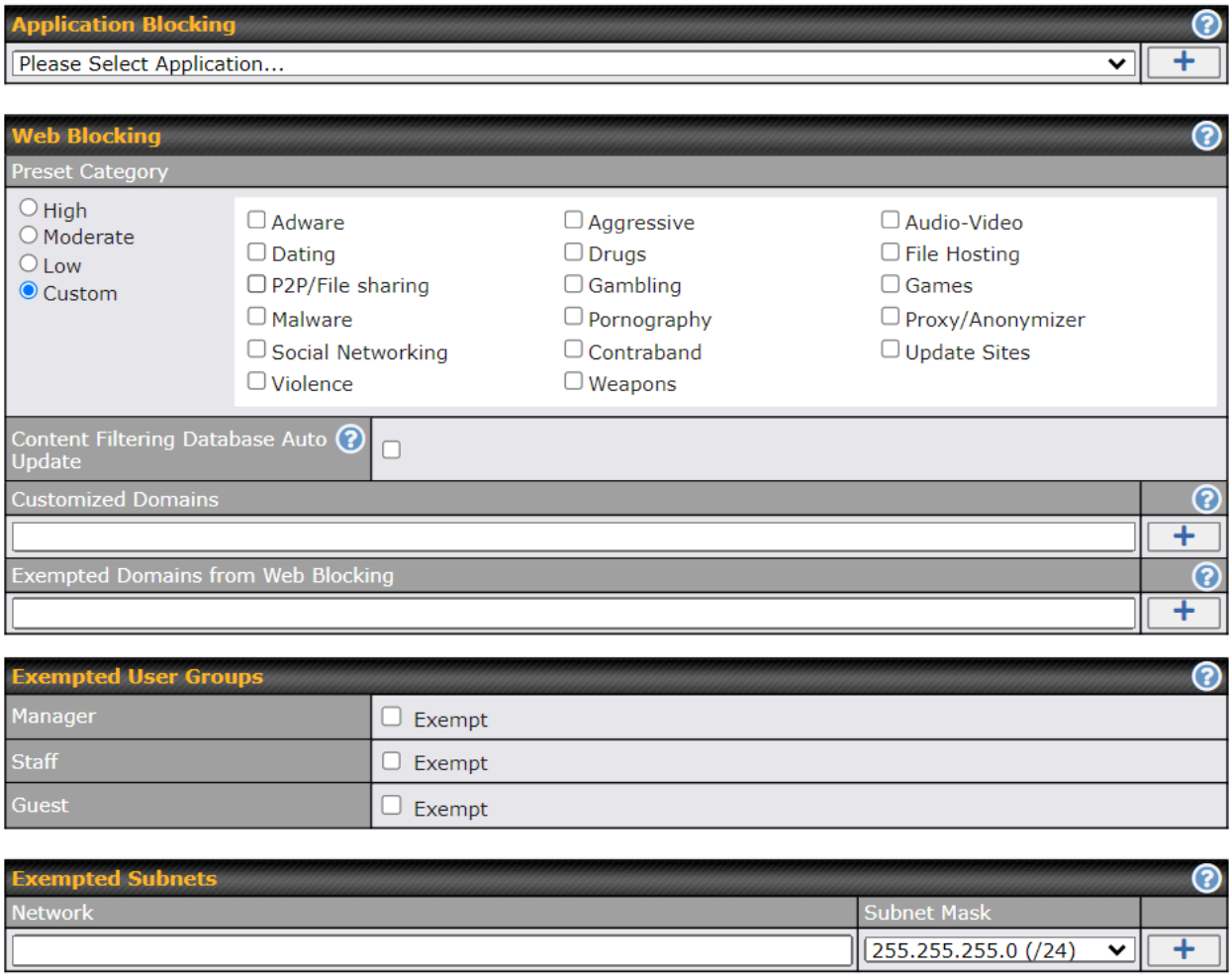
Click **Add Rule** to display the following window:



Local Service Firewall Settings	
Rule Name	This setting specifies a name for the firewall rule.
Enable	This setting specifies whether the firewall rule should take effect. If the box is checked, the firewall rule takes effect. If the traffic matches the specified protocol/IP/port, actions will be taken by Peplink Balance based on the other parameters of the rule. If the box is not checked, the firewall rule does not take effect. The Peplink Balance will disregard the other parameters of the rule. Click the dropdown menu next to the checkbox to place this firewall rule on a time schedule.
Service	This option allows you to define the supported local service to be matched. If Any is chosen, the firewall rule will match to all supported local services from the list. Via a drop-down menu, the following services can be specified: • Any • SpeedFusion / PepVPN Handshake • SpeedFusion / PepVPN Data Port • Web Admin Access • DNS Server • SNMP Server • KVM Management Port • KVM VNC Port • FusionSIM Agent / Remote SIM Proxy
WAN Connection	Select the WAN connection that this firewall rule should apply to.
Source	This specifies the source IP address and IP Network to be matched for the firewall rule.
Action	With the value of **Allow** for the **Action** setting, the matching traffic passes through the router (to be routed to the destination). If the value of the **Action** setting is set to **Deny**, the matching traffic does not pass through the router (and is discarded).

Event Logging	This setting specifies whether or not to log matched firewall events. The logged messages are shown on the page **Status>Event Log**. A sample message is as follows: Aug 13 23:47:44 Denied CONN=Ethernet WAN SRC=20.3.2.1 DST=192.168.1.20 LEN=48 PROTO=TCP SPT=2260 DPT=80 • **CONN:** The connection where the log entry refers to • **SRC:** Source IP address • **DST:** Destination IP address • **LEN:** Packet length • **PROTO:** Protocol • **SPT:** Source port • **DPT:** Destination port

14.12.2 Content Blocking



Application Blocking

Choose applications to be blocked from LAN/PPTP/PepVPN peer clients' access, except for those on the Exempted User Groups or Exempted Subnets defined below.

Web Blocking

Defines website domain names to be blocked from LAN/PPTP/PepVPN peer clients' access except for those on the Exempted User Groups or Exempted Subnets defined below.

If "foobar.com" is entered, any web site with a host name ending in foobar.com will be blocked, e.g. www.foobar.com, foobar.com, etc. However, "myfoobar.com" will not be blocked.

You may enter the wild card ".*" at the end of a domain name to block any web site with a host name having the domain name in the middle. If you enter "foobar.*", then "www.foobar.com", "www.foobar.co.jp", or "foobar.co.uk" will be blocked. Placing the wild card in any other position is not supported.

The device will inspect and look for blocked domain names on all HTTP and HTTPS traffic.

Customized Domains

Enter an appropriate website address, and the Peplink Balance will block and disallow LAN/PPTP/SpeedFusion™ peer clients to access these websites. Exceptions can be added using the instructions in **Sections 21.2.1.4** and **21.2.1.5.**

You may enter the wild card ".*" at the end of a domain name to block any web site with a host name having the domain name in the middle. For example, If you enter "foobar.*," then "www.foobar.com," "www.foobar.co.jp," or "foobar.co.uk" will be blocked. Placing the wild card in any other position is not supported.

The Peplink Balance will inspect and look for blocked domain names on all HTTP traffic. Secure web (HTTPS) traffic is not supported.

Exempted User Groups

Check and select pre-defined user group(s) who can be exempted from the access blocking rules. User groups can be defined at **QoS > User Groups** section. Please refer to **Section 20.1** for details.

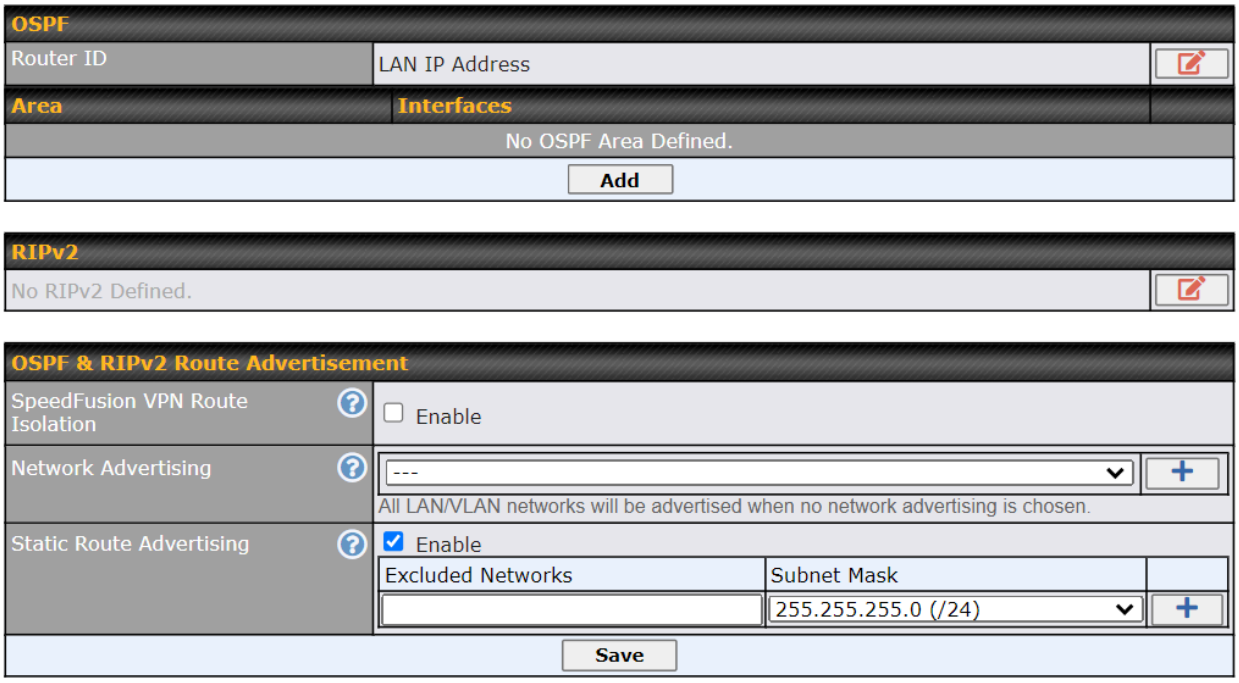
Exempted Subnets

With the subnet defined in the field, clients on the particular subnet(s) can be exempted from the access blocking rules.

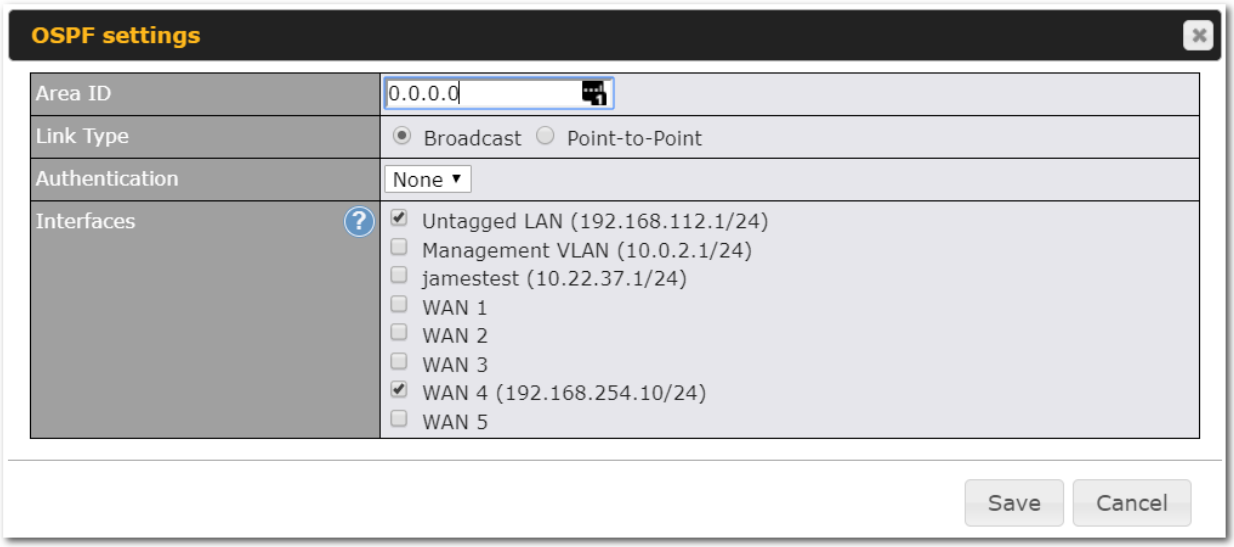
14.13 Routing Protocols

14.13.1 OSPF & RIPv2

The Peplink Balance supports OSPF and RIPv2 dynamic routing protocols. Click the **Adanced** tab from the top bar, and then click the **Routing Protocols > OSPF & RIPv2** item on the sidebar to reach the following menu:

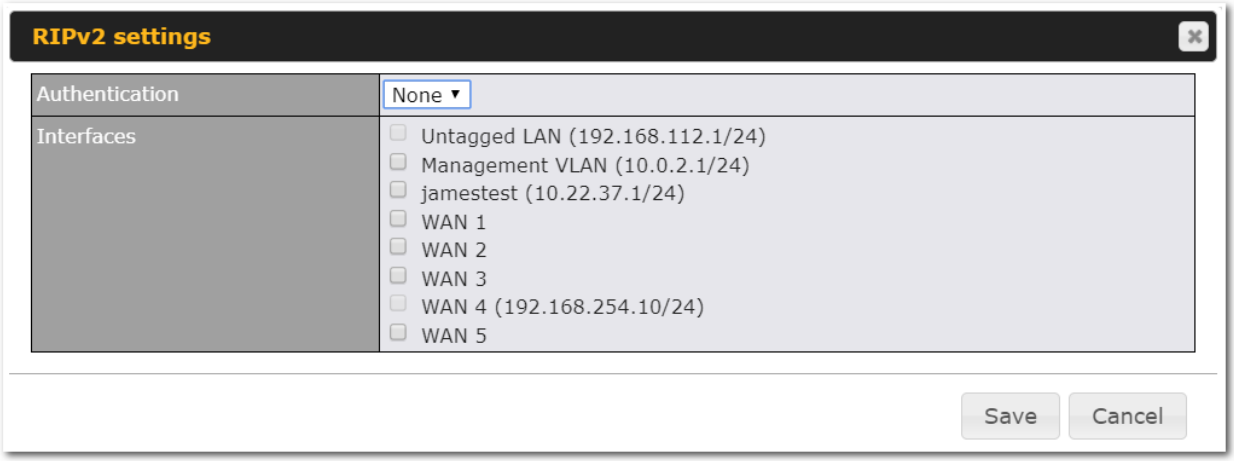


OSPF	
Router ID	This field determines the ID of the router. By default, this is specified as the WAN IP address. If you want to specify your own ID, enter it into the **Custom** field.
Area	This is an overview of the OSPF areas that you have defined. Clicking on the name under Area allows you to configure the connection. To define a new area, click **Add**. To delete an existing area, click on the ✖.

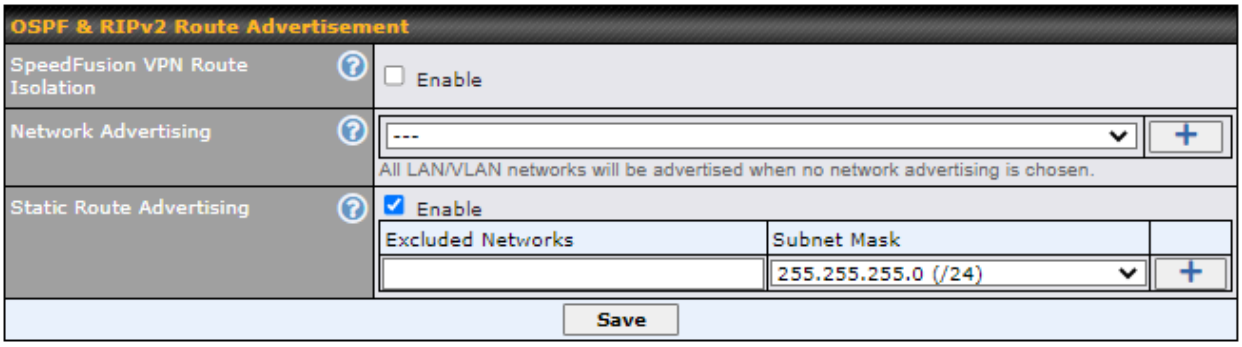


OSPF Settings	
Area ID	Assign a name to be applied to this group. Machines linked to this group will send and receive related OSPF packets, while unlinked machines will ignore them.
Link Type	Choose the type of network that this area will use.
Authentication	If an authentication method is used, select one from this drop-down menu. Available options are **MD5** and **Text**. Authentication key(s) may be input next to the drop-down menu after selecting an authentication method.
Interfaces	Select the interface(s) that this area will use to listen to and deliver OSPF packets.

To access RIPv2 settings, click on .



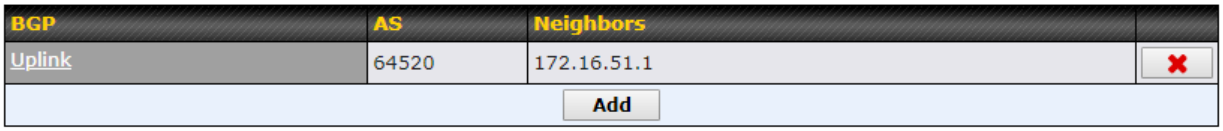
RIPv2 Settings	
Authentication	If an authentication method is used, select one from this drop-down menu. Available options are **MD5** and **Text**. Authentication key(s) may be input next to the drop-down menu after selecting an authentication method.
Interfaces	Select the interface(s) that this area will use to listen to and deliver RIPv2 packets.



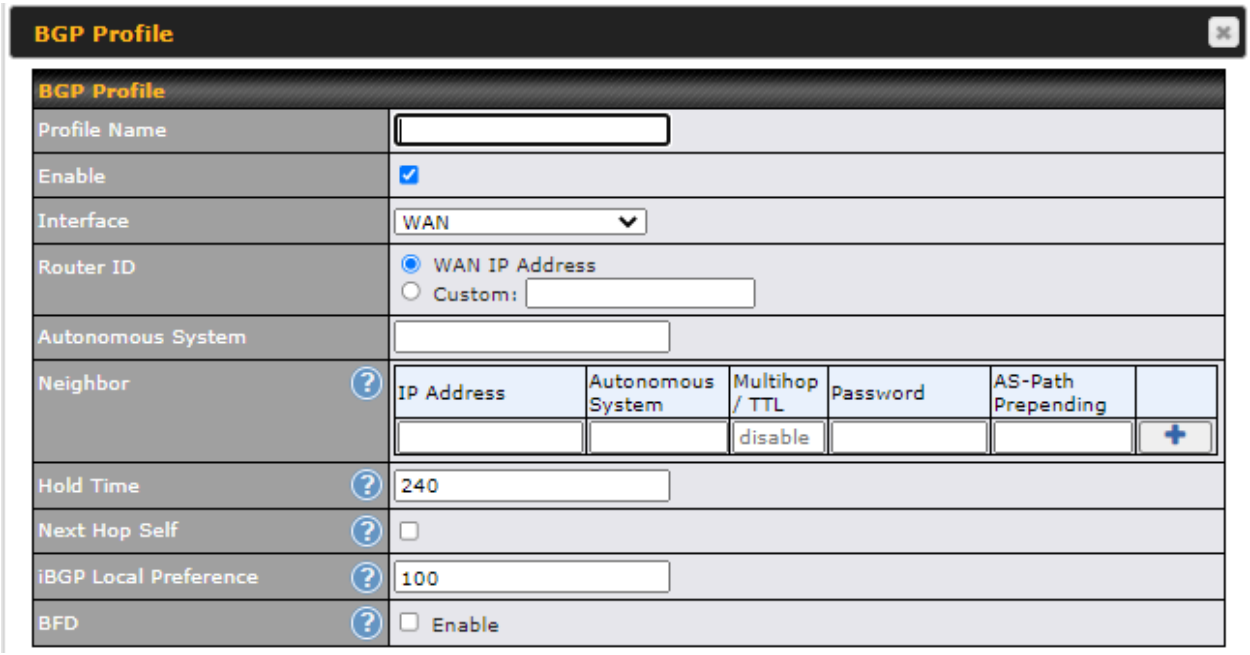
OSPF & RIPv2 Route Advertisement	
SpeedFusion VPN Route Isolation	Isolate SpeedFusion VPN peers from each other. Received SpeedFusion VPN routes will not be forwarded to other SpeedFusion VPN peers to reduce bandwidth consumption..
Network Advertising	Networks to be advertised over OSPF & RIPv2. If no network is selected, all LAN / VLAN networks will be advertised by default.
Static Route Advertising	Enabling OSPF & RIPv2 Route Advertising allows it to advertise LAN static routes over OSPF & RIPv2. Static routes on the Excluded Networks table will not be advertised.

14.13.2 BGP

Click the **Advanced** tab along the top bar, and then click the **BGP** item on the sidebar to configure BGP.

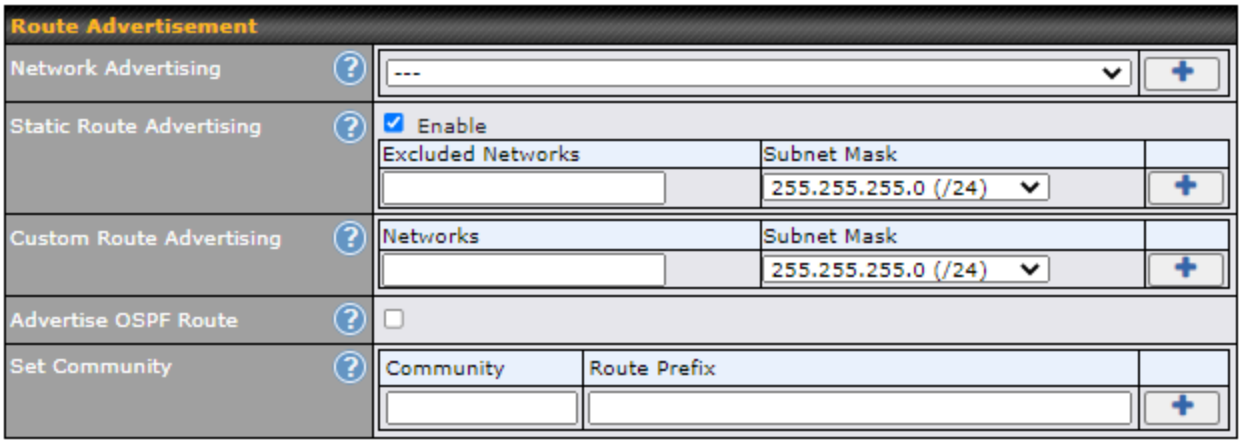


Click the "**x**" to delete a BGP profile.
Click "**Add**" to create a new BGP profile.



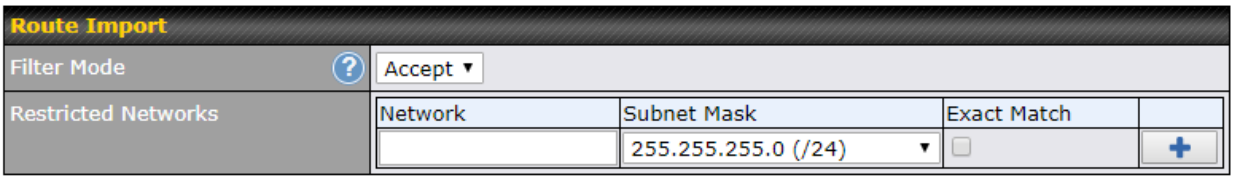
BGP Profile	
Name	This field specifies the name that represents this profile.
Enable	When this box is checked, this BGP profile will be enabled. If it is left unchecked, it will be disabled.
Interface	The interface in which the BGP neighbor is located.
Router ID	This field specifies the unique IP as the identifier of the local device running BGP.
Autonomous System	The Autonomous System Number (ASN) assigned to this profile.
Neighbor	BGP Neighbors and their details.
IP address	The IP address of the Neighbor.

Autonomous System	The Neighbor's ASN.
Multihop/TTL	This field determines the Time-to-live (TTL) of BGP packets. Leave this field blank if the BGP neighbor is directly connected, otherwise you must specify a TTL value. This option should be used if the configured Neighbor's IP address does not match the selected Interface's network subnets. The TTL value must be between 2 to 255.
Password	(Optional) Assign a password for MD5 authentication of BGP sessions.
AS-Path Prepending:	AS path to be prepended to the routes received from this Neighbor. Values must be ASN and separated by commas. For example: inputting "64530,64531" will prepend "64530, 64531" to received routes.
Hold Time	Wait time in seconds for a keepalive message from a Neighbor before considering the BGP connection as stalled. The value must be either 0 (infinite hold time) or between 3 and 65535 inclusively. Default: 240
Next Hop Self	Enable this option to advertise your own source address as the next hop when propagating routes.
iBGP Local Preference	This is the metric advertised to iBGP Neighbors to indicate the preference for external routes. The value must be between 0 to 4294967295 inclusively. Default: 100
BFD	Enable this option to add Bidirectional Forwarding Detection for path failure. All directly connected Neighbors that use the same physical interface share the same BFD settings. All mulithop Neighbors share the same multihop BFD settings. You can configure BFD settings in the BGP profile listing page after this option is enabled.

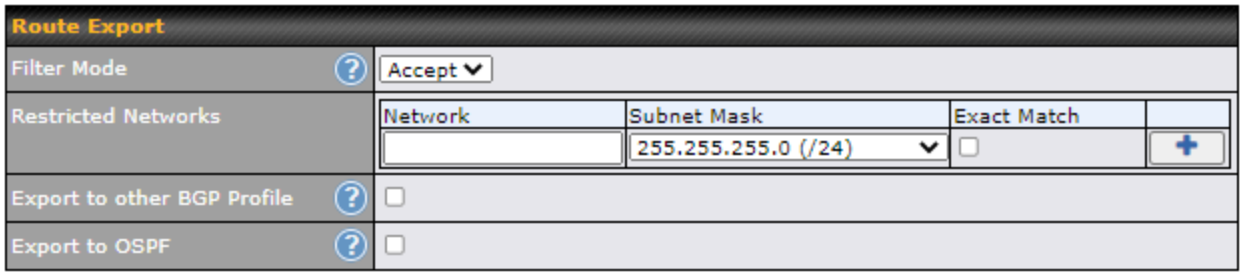


Route Advertisement	
Network Advertising	Select the Networks that will be advertised to the BGP Neighbor.
Static Route	Enable this option to advertise static LAN routes. Static routes that match the Excluded

Advertising	Networks table will not be advertised.
Custom Route Advertising	Additional routes to be advertised to the BGP Neighbor.
Advertise OSPF Route	When this box is checked, every learnt OSPF route will be advertised.
Set Community	Assign a prefix to a Community Community: Two numbers in new-format. e.g. 65000:21344 Well-known communities: no-export 65535:65281 no-advertise 65535:65282 no-export-subconfed 65535:65283 no-peer 65535:65284 Route Prefix: Comma separated networks. e.g. 172.168.1.0/24,192.168.1.0/28



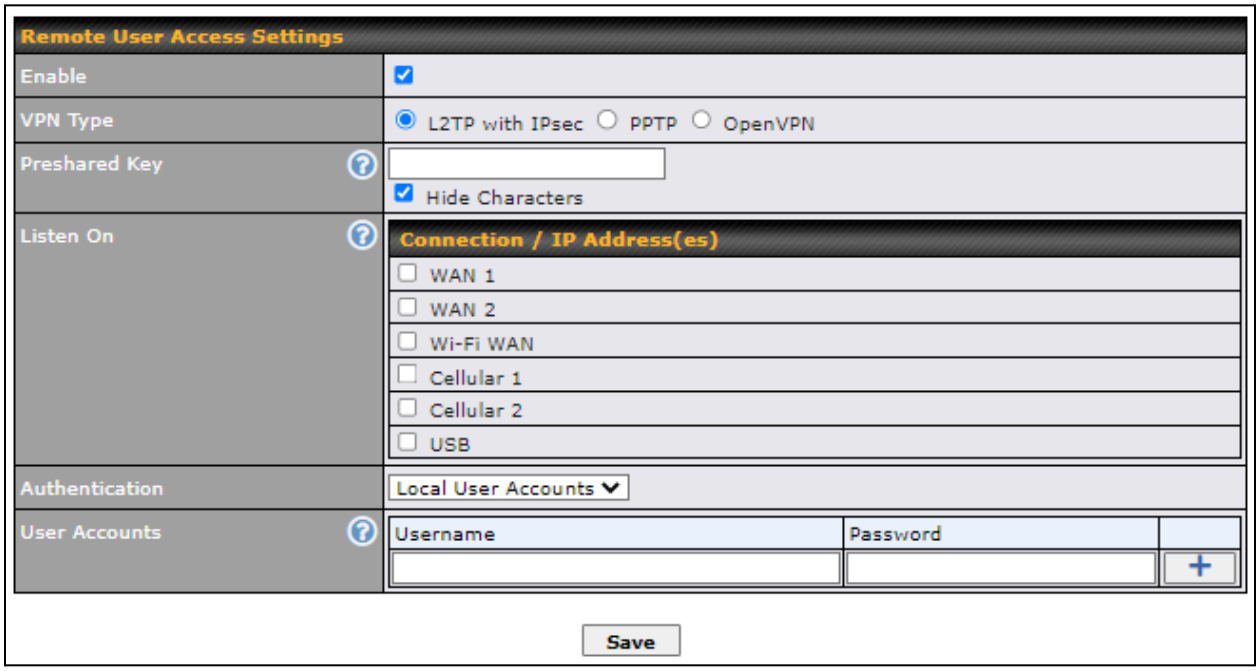
Route Import Settings	
Filter Mode	This field allows for the selection of the filter mode for route import. **None**: All BGP routes will be accepted. **Accept**: Routes in "Restricted Networks" will be accepted, routes not in the list will be rejected. **Reject**: Routes in "Blocked Networks" will be rejected, routes not in the list will be accepted.
Restricted Networks / Blocked Networks	This field specifies the network(s) in the “route import” entry. **Exact Match:** When this box is checked, only routes with the same Network and Subnet Mask will be filtered. Otherwise, routes within the Networks and Subnets will be filtered.

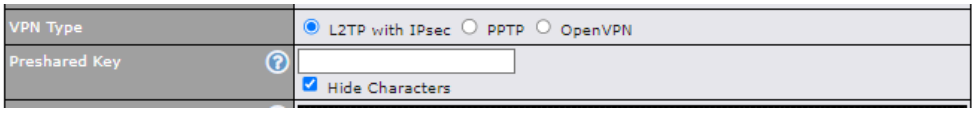


Filter Mode	This field allows for the selection of the filter mode for route export. **None**: All BGP routes will be accepted. **Accept**: Routes in "Restricted Networks" will be accepted, routes not in the list will be rejected. **Reject**: Routes in "Blocked Networks" will be rejected, routes not in the list will be accepted.
Restricted Networks / Blocked Networks	This field specifies the network(s) in the “route export” entry. **Exact Match:** When this box is checked, only routes with the same Network and Subnet Mask will be filtered. Otherwise, routes within the Networks and Subnets will be filtered.
Export to other BGP Profile	When this box is checked, routes learnt from this BGP profile will be exported to other BGP profiles.
Export to OSPF	When this box is checked, routes learnt from this BGP profile will be exported to the OSPF routing protocol.

14.14 Remote User Access

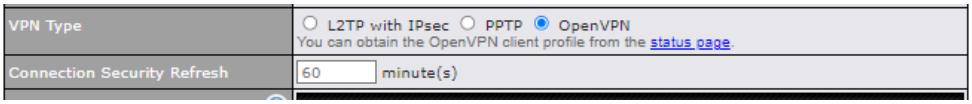
A remote-access VPN connection allows an individual user to connect to a private business network from a remote location using a laptop or desktop computer connected to the Internet. Networks routed by a Peplink router can be remotely accessed via OpenVPN, L2TP with IPsec or PPTP. To configure this feature, navigate to **Advanced > Remote User Access** and choose the required VPN type.



Remote User Access Settings	
Enable	When this box is checked, this Remote User Access profile will be enabled. If it is left unchecked, it will be disabled.
VPN Type	This field allows you to select the VPN type for the remote user access connection. The available options are: • L2TP with IPsec  If L2TP with IPsec is selected, it may need to enter the pre-shared key for the remote user access. • PPTP  If PPTP selected, there is no additional configuration required. The Point-to-Point Tunneling

Protocol (PPTP) is an obsolete method for implementing virtual private networks. PPTP has many well known security issues

- OpenVPN



If the OpenVPN is selected, the OpenVPN Client profile can be downloaded from the **Status > Device** page after the configuration has been saved.

You have a choice between 2 different OpenVPN Client profiles:

- **"Route all traffic" profile**
  Using this profile, VPN clients will send all the traffic through the OpenVPN tunnel
- **"Split tunnel" profile**
  Using this profile, VPN clients will ONLY send those traffic designated to the untagged LAN and VLAN segment through the OpenVPN tunnel.

Pre-shared Key

If **L2TP with IPsec** is selected in the VPN Type, enter the pre shared key in the text field. Please note that remote devices will need this preshared key to access the Balance.

Disabled Weak Ciphers

You may click the button to show in the Pre-shared key and enable this option.

When checked, weak ciphers such as 3DES will be disabled.

Please note: Legacy and Android devices may not able to connect.

Connection Security Refresh

If **OpenVPN** is selected in the VPN Type, this settings is for specifying the interval for refreshing the connection.

Listen On

This setting is for specifying the WAN IP addresses that allow remote user access.

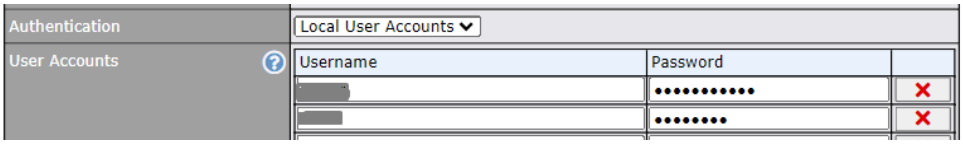
Port

If **OpenVPN** is selected in the VPN Type, the **Port** setting specifies the port(s) that correspond to the service.

Authentication

Determine the method of authenticating remote users:

- **Local User Accounts**

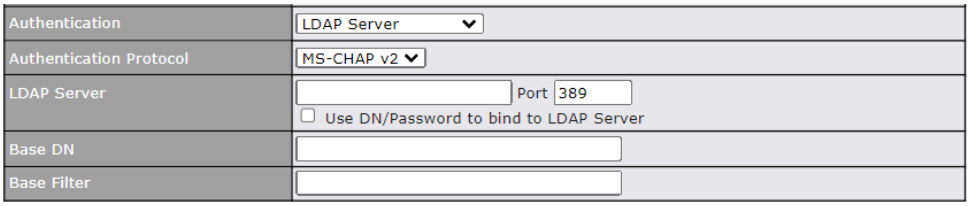


This setting allows you to define the Remote User Accounts. Click **Add** to input username and password to create an account. After adding the user accounts, you can click on a username to edit the account password.

Note:

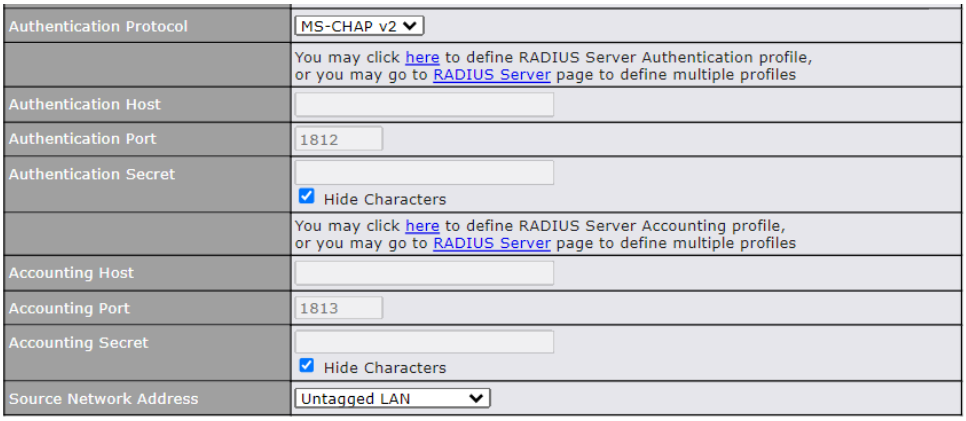
The username must contain lowercase letters, numerics, underscore(_), dash(-), at sign(@), and period(.) only.
The password must be between 8 and 12 characters long

- **LDAP Server**



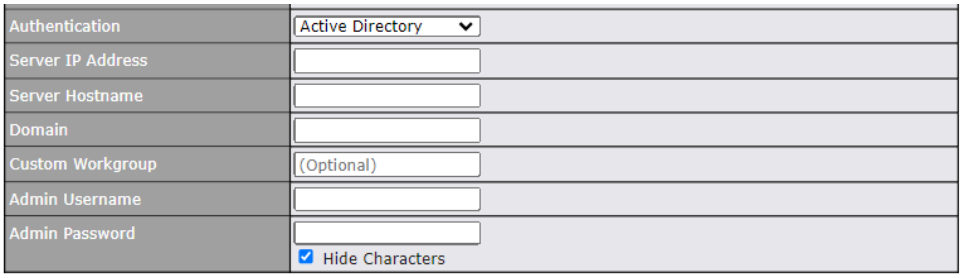
Enter the matching LDAP server details to allow for LDAP server authentication.

- **Radius Server**



Enter the matching Radius server details to allow for Radius server authentication.

- **Active Diretory**



Enter the matching Active Directory details to allow for Active Directory server authentication.

14.15 Misc. Settings

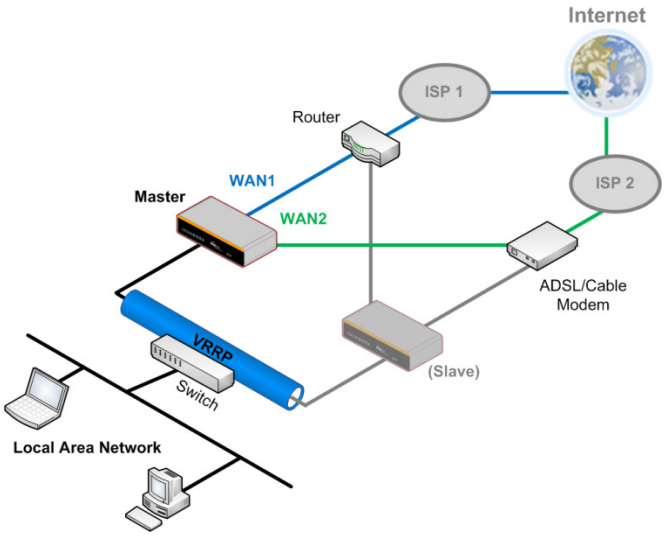
14.15.1 High Availability

Peplink Balance supports high availability (HA) configurations via an open standard virtual router redundancy protocol (VRRP, RFC 3768).

In an HA configuration, two same-model Peplink Balance units provide redundancy and failover in a master-slave arrangement. In the event that the master unit is down, the slave unit becomes active.

High availability will be disabled automatically where there is a drop-in connection configured on a LAN bypass port.

The following diagram illustrates an HA configuration with two Peplink Balance units and two Internet connections:



In the diagram, the WAN ports of each Peplink Balance unit connect to the router and to the modem. Both Peplink Balance units connect to the same LAN switch via a LAN port.

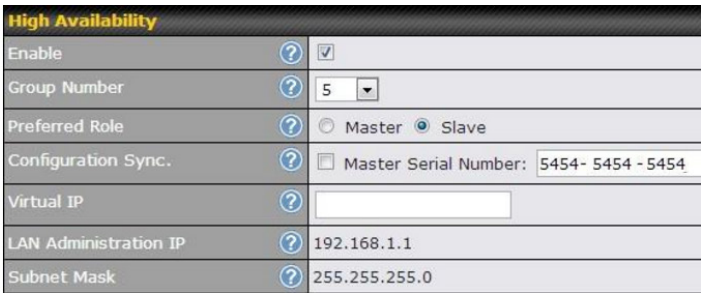
An elaboration on the technical details of the implementation of virtual router redundancy protocol (VRRP, RFC 3768) by the Balance follows:

- In an HA configuration, the two Peplink Balance units communicate with each other using VRRP over the LAN.
- The two Peplink Balance units broadcast heartbeat signals to the LAN at a frequency of one heartbeat signal per second.
- In the event that no heartbeat signal from the master Peplink Balance unit is received in 3 seconds (or longer) since the last heartbeat signal, the slave Peplink Balance unit becomes active.
- The slave Peplink Balance unit initiates the WAN connections and binds to a previously configured LAN IP address.
- At a subsequent point when the master Peplink Balance unit recovers, it will once again become active.

You can configure high availability at **Advanced > Misc. Settings > High Availability**.

Interface for Master Router

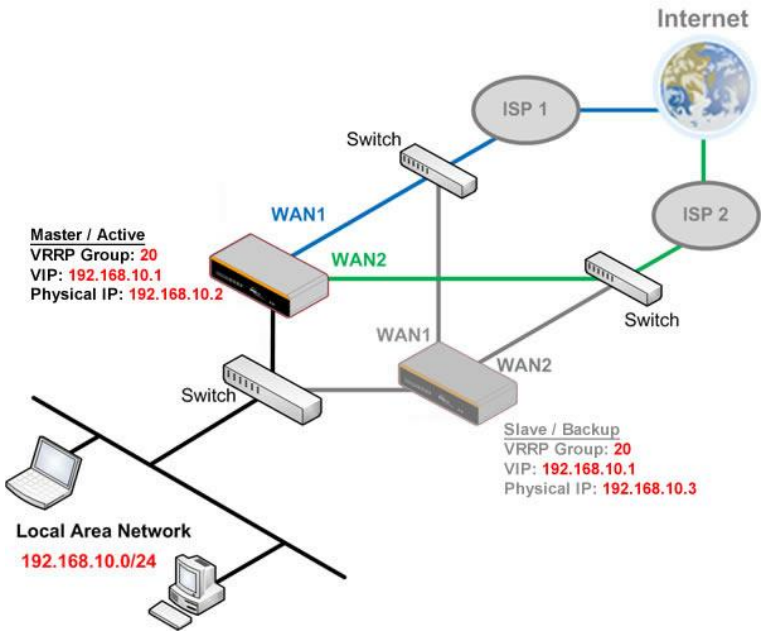
Interface for Slave Router



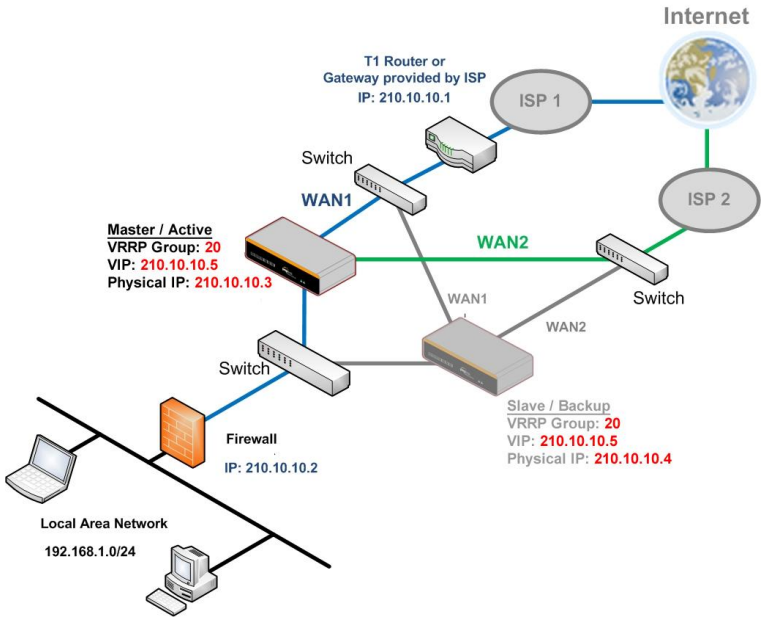
High Availability	
Enable	Checking this box specifies that the Peplink Balance unit is part of a high availability configuration.
Group Number	This number identifies a pair of Peplink Balance units operating in a high availability configuration. The two Peplink Balance units in the pair must have the same **Group Number** value.
Preferred Role	This setting specifies whether the Peplink Balance unit operates in master or slave mode. Click the corresponding radio button to set the role of the unit. One of the units in the pair must be configured as the master, and the other unit must be configured as the slave.
Resume Master Role Upon Recovery	This option is displayed when **Master** mode is selected in **Preferred Role**. If this option is enabled, once the device has recovered from an outage, it will take over and resume its **Master** role from the slave unit.
Configuration Sync.	This option is displayed when **Slave** mode is selected in **Preferred Role**. If this option is enabled and the **Master Serial Number** entered matches with the actual master unit's, the master unit will automatically transfer the configuration to this unit. Please make sure the **LAN IP Address** and the **Subnet Mask** fields are set correctly in the LAN settings page. You can refer to the **Event Log** for the configuration synchronization status.
Master Serial Number	If **Configuration Sync.** is checked, the serial number of the master unit is required here for the feature to work properly.
Virtual IP	The HA pair must share the same **Virtual IP**. The **Virtual IP** and the **LAN Administration IP** must be under the same network.
LAN Administration IP	This setting specifies a LAN IP address to be used for accessing administration functionality. This address should be unique within the LAN.
Subnet Mask	This setting specifies the subnet mask of the LAN.

Important Note

For Balance routers in NAT mode, the virtual IP (VIP) should be set as the default gateway for all hosts sitting on the LAN segment. For example, a firewall sitting behind the Balance should set its default gateway as the virtual IP instead of the IP of the master Balance.



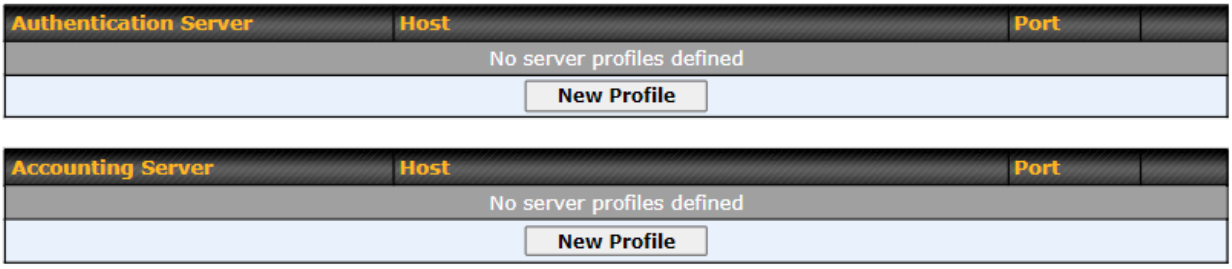
In drop-in mode, no other configuration needs to be set.



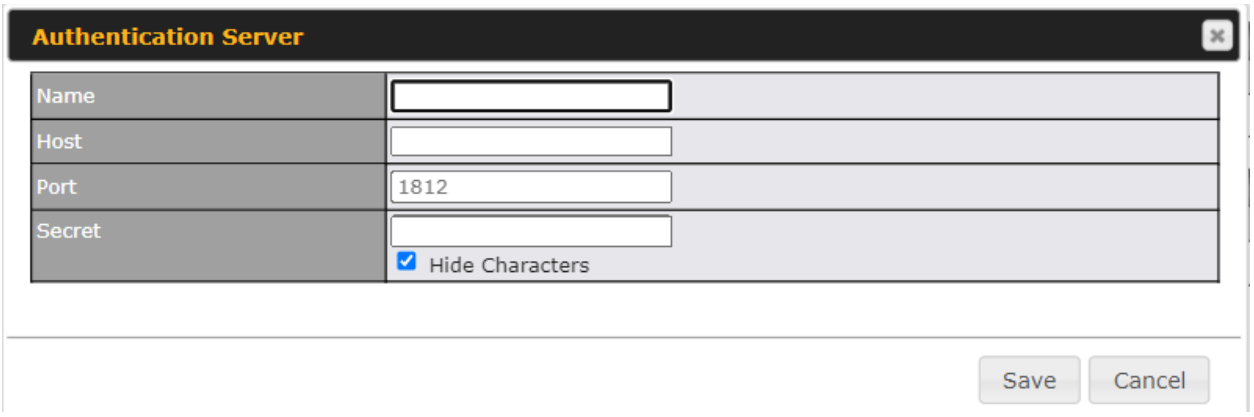
Please note that the drop-in WAN cannot be configured as a LAN bypass port while it is configured for high availability.

14.15.2 RADIUS Server

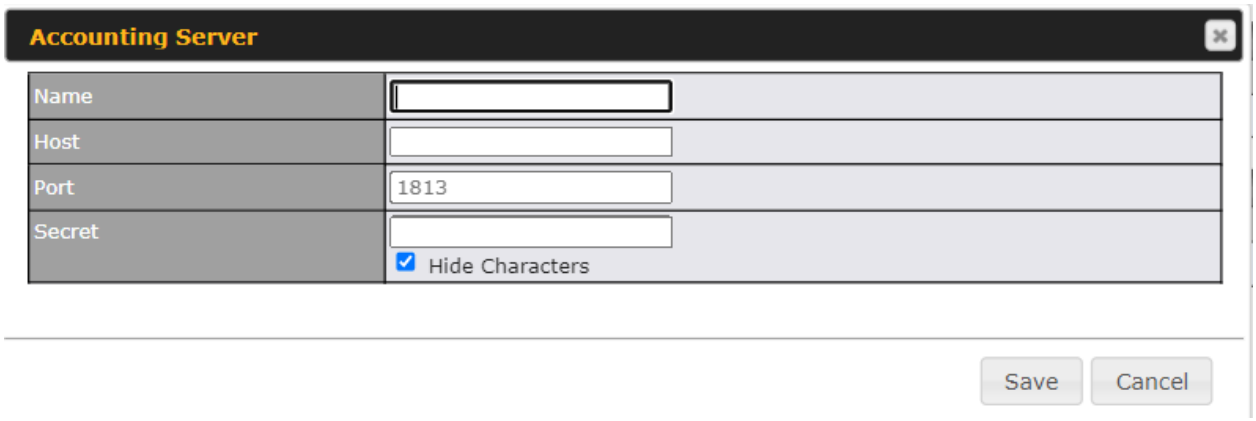
RADIUS Server settings are located at **Advanced > Misc. Settings > RADIUS Server**.



To configure the Authentication Server and Accounting Server, click **New Profile** to display the following screen:

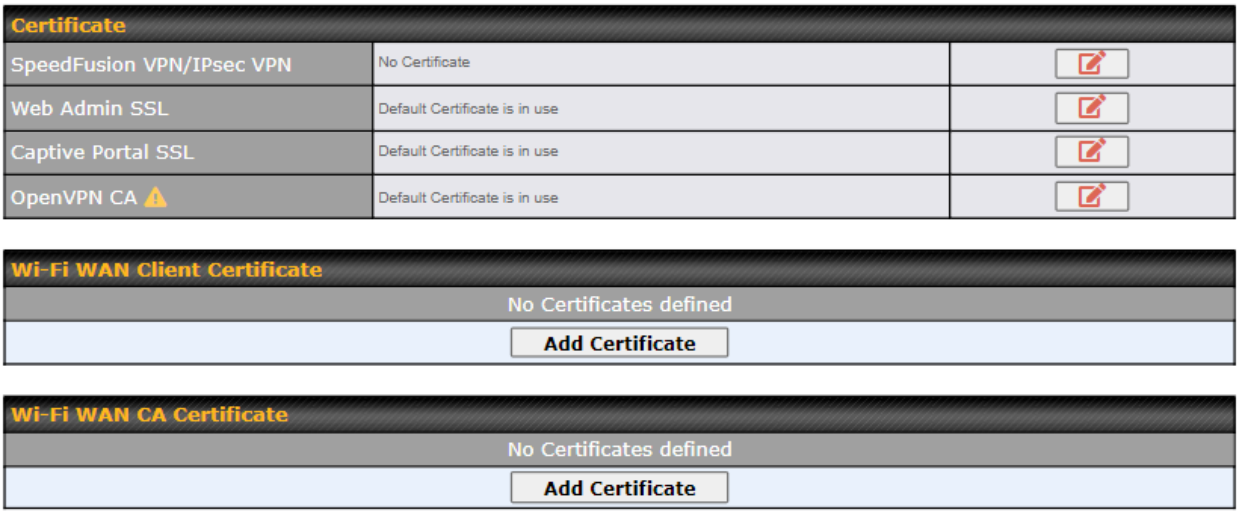


Authentication Server	
Name	This field is for specifying a name to represent this profile.
Host	Specifies the IP address or hostname of the RADIUS server host.
Port	This setting specifies the UDP destination port for authentication requests. By default, the port number is 1812.
Secret	This field is for entering the secret key for communicating to the RADIUS server.



Accounting Server	
Name	This field is for specifying a name to represent this profile.
Host	Specifies the IP address or hostname of the RADIUS server host.
Port	This setting specifies the UDP destination port for accounting requests. By default, the port number is 1813.
Secret	This field is for entering the secret key for communicating to the RADIUS server.

14.15.3 Certificate Manager



This section allows you to assign certificates for the local VPN, OpenVPN, Captive Portal, Mediafast, ContentHub, Wi-Fi WAN (Client and CA) and web admin SSL for extra security.

Read the following knowledgebase article for full instructions on how to create and import a self-signed certificate:
https://forum.peplink.com/t/how-to-create-a-self-signed-certificate-and-import-it-to-a-peplink-product/

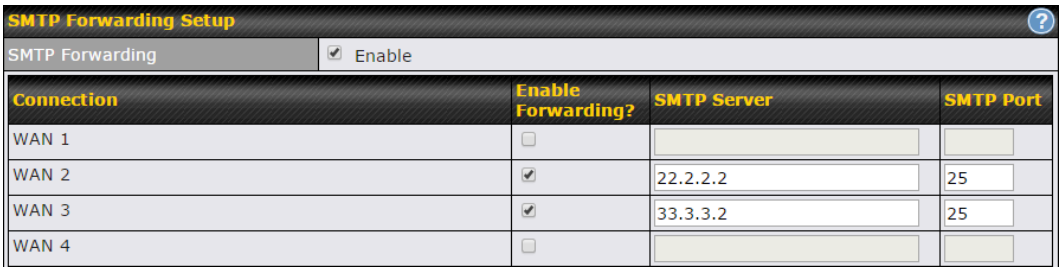
14.15.4 Service Forwarding

Service forwarding settings are located at **Advanced > Misc. Settings > Service Forwarding**.

Service Forwarding	
SMTP Forwarding	When this option is enabled, all outgoing SMTP connections destined for any host at TCP port 25 will be intercepted. These connections will be redirected to a specified SMTP server and port number. SMTP server settings for each WAN can be specified after selecting **Enable**.
Web Proxy Forwarding	When this option is enabled, all outgoing connections destined for the proxy server specified in **Web Proxy Interception Settings** will be intercepted. These connections will be redirected to a specified web proxy server and port number. Web proxy interception settings and proxy server settings for each WAN can be specified after selecting **Enable**.
DNS Forwarding	When this option is enabled, all outgoing DNS lookups will be intercepted and redirected to the built-in DNS name server. If any LAN device is using the DNS name servers of a WAN connection, you may want to enable this option to enhance the DNS availability without modifying the DNS server setting of the clients. The built-in DNS name server will distribute DNS lookups to corresponding DNS servers of all available WAN connections. In this case, DNS service will not be interrupted, even if any WAN connection is down.
Custom Service Forwarding	When custom service forwarding is enabled, outgoing traffic with the specified TCP port will be forwarded to a local or remote server by defining its IP address and port number.

SMTP Forwarding

Some ISPs require their users to send e-mails via the ISP's SMTP server. All outgoing SMTP connections are blocked except those connecting to the ISP's. The Peplink Balance supports the interception and redirection of all outgoing SMTP connections (destined for TCP port 25) via a WAN connection to the WAN's corresponding SMTP server.



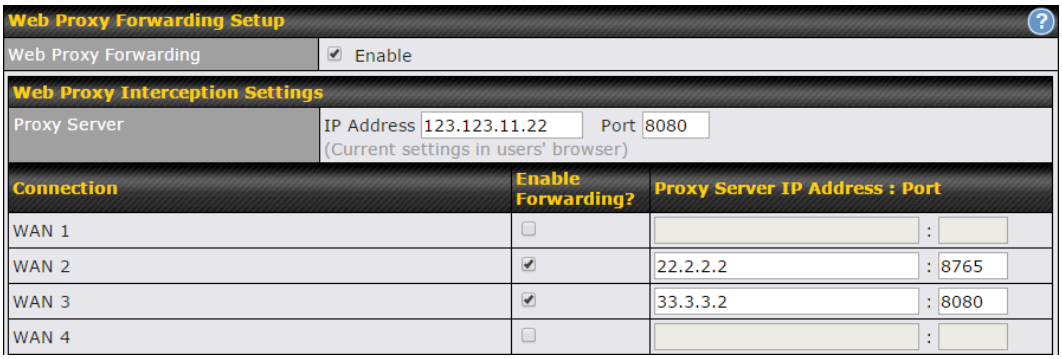
To enable the feature, select **Enable** under **SMTP Forwarding Setup**. Check **Enable Forwarding** for the WAN connection(s) that needs forwarding. Under **SMTP Server**, enter the ISP's e-mail server host name or IP address. Under **SMTP Port**, enter the TCP port number for each WAN.

The Peplink Balance will intercept SMTP connections. Choose a WAN port according to the outbound policy, and then forward the connection to the SMTP server, if the chosen WAN has enabled forwarding. If the forwarding is disabled for a WAN connection, SMTP connections for the WAN will be simply be forwarded to the connection's original destination.

Note

If you want to route all SMTP connections only to particular WAN connection(s), you should create a custom rule in outbound policy (see **Section 16.1**).

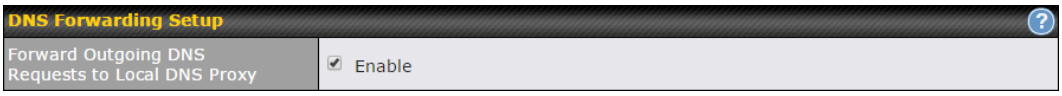
Web Proxy Forwarding



When this feature is **Enabled**, the Peplink Balance will intercept all outgoing connections destined for the proxy server specified in **Web Proxy Server Interception Settings**. Then it will choose a WAN connection according to the outbound policy and forward the connection to the specified web proxy server and port number. Redirected server settings for each WAN can be

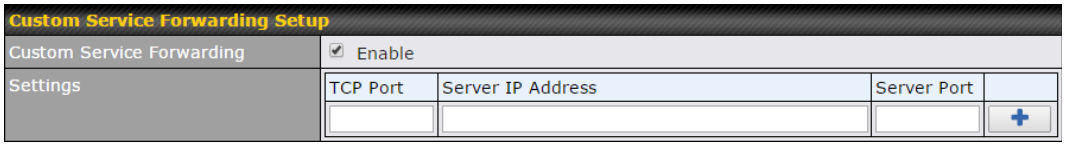
set here. If forwarding is disabled for a WAN, then web proxy connections for that WAN will simply be forwarded to the connection's original destination.

DNS Forwarding



When DNS forwarding is **Enabled**, all clients' outgoing DNS requests will also be intercepted and forwarded to the built-in DNS proxy server.

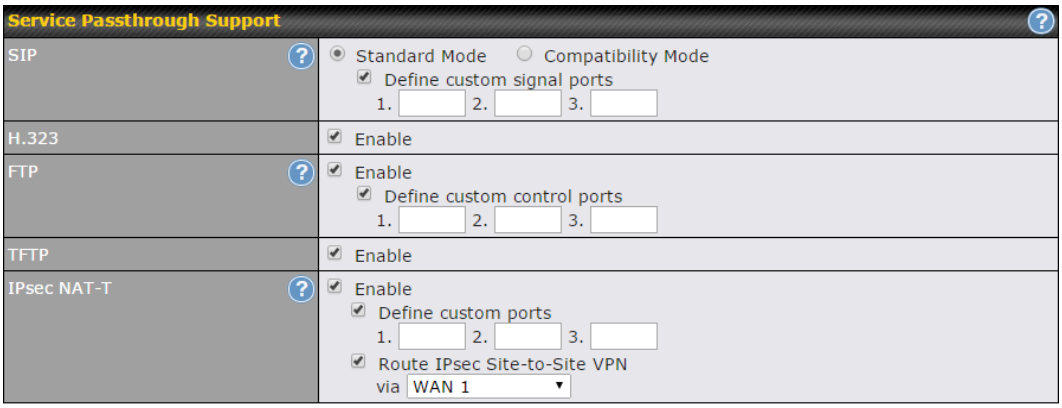
Custom Service Forwarding



After clicking the **Enable** checkbox, enter your TCP port for traffic heading to the router, and then specify the IP Address and Port of the server you wish to forward to the service to.

14.15.5 Service Passthrough

Service passthrough settings can be found at **Advanced > Misc. Settings > Service Passthrough**.

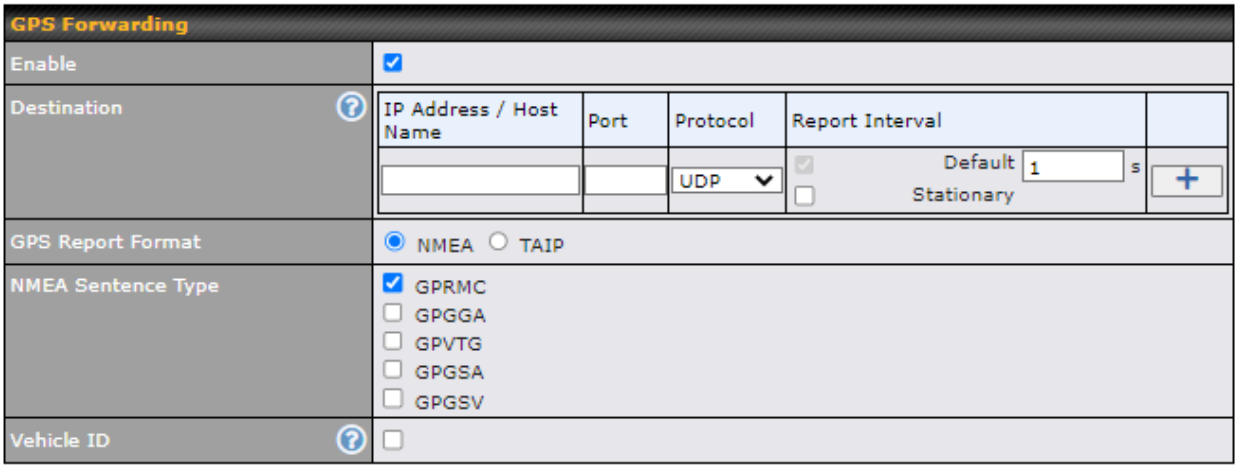


Some Internet services need to be specially handled in a multi-WAN environment. The Peplink Balance can handle these services such that Internet applications do not notice it is behind a multi-WAN router. Settings for service passthrough support are available here.

Service Passthrough Support	
SIP	Session initiation protocol, aka SIP, is a voice-over-IP protocol. The Peplink Balance can act as a SIP application layer gateway (ALG) which binds connections for the same SIP session to the same WAN connection and translate IP address in the SIP packets correctly in NAT mode. Such passthrough support is always enabled and there are two modes for selection: **Standard Mode** and **Compatibility Mode**. If your SIP server's signal port number is non-standard, you can check the box **Define custom signal ports** and input the port numbers to the text boxes.
H.323	With this option enabled, protocols that provide audio-visual communication sessions will be defined on any packet network and passthrough the Balance.
FTP	FTP sessions consist of two TCP connections; one for control and one for data. In a multi-WAN situation, they must be routed to the same WAN connection. Otherwise, problems will arise in transferring files. By default, the Peplink Balance monitors TCP control connections on port 21 for any FTP connections and binds TCP connections of the same FTP session to the same WAN. If you have an FTP server listening on a port number other than 21, you can check **Define custom control ports** and enter the port numbers in the text boxes.
TFTP	The Peplink Balance monitors outgoing TFTP connections and routes any incoming TFTP data packets back to the client. Select **Enable** if you want to enable TFTP passthrough support.
IPsec NAT-T	This field is for enabling the support of IPsec NAT-T passthrough. UDP ports 500, 4500, and 10000 are monitored by default. You may add more custom data ports that your IPsec system uses by checking **Define custom ports**. If the VPN contains IPsec site-to-site VPN traffic, check **Route IPsec Site-to-Site VPN** and choose the WAN connection to route the traffic to.

14.15.6 GPS Forwarding

Using the GPS forwarding feature, some Peplink routers can automatically send GPS reports to a specified server. To set up GPS forwarding, navigate to **Advanced > GPS Forwarding**.

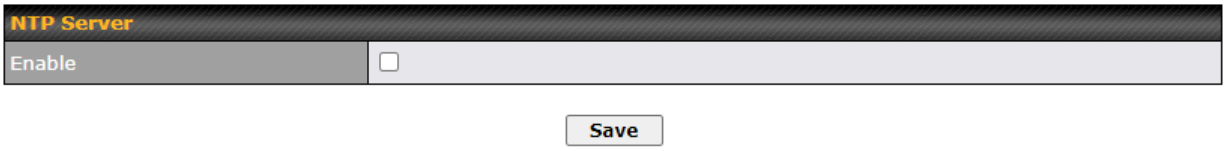


GPS Forwarding	
Enable	Check this box to turn on GPS forwarding.
Server	Enter the name/IP address of the server that will receive GPS data. Also specify a port number, protocol (**UDP** or **TCP**), and a report interval of between 1 and 10 seconds. Click + to save these settings.
GPS Report Format	Choose from NMEA or TAIP format for sending GPS reports.
NMEA Sentence Type	If you've chosen to send GPS reports in NMEA format, select one or more sentence types for sending the data (**GPRMC**, **GPGGA**, **GPVTG**, **GPGSA**, and **GPGSV**).
Vehicle ID	The vehicle ID will be appended in the last field of the NMEA sentence. Note that the NMEA sentence will become customized and non-standard.
TAIP Sentence Type/TAIP ID (optional)	If you've chosen to send GPS reports in TAIP format, select one or more sentence types for sending the data (**PV—Position / Velocity Solution** and **CP—Compact Velocity Solution**). You can also optionally include an ID number in the **TAIP ID** field.

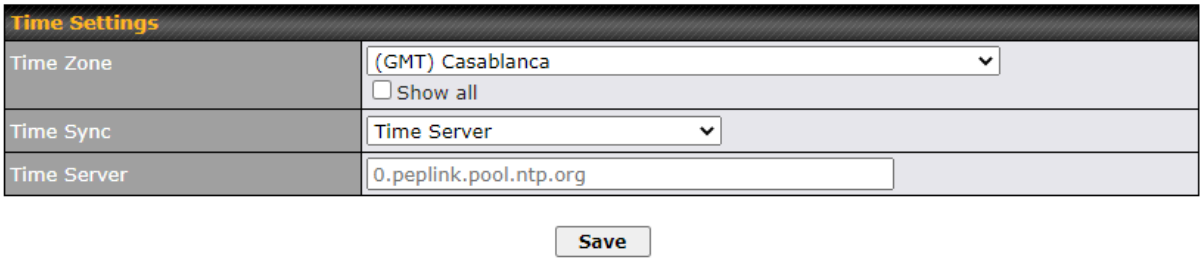
14.15.7 NTP Server

Peplink routers can now serve as a local NTP server. Upon start up, it is now able to provide connected devices with the accurate time, precise UTC from either an external NTP server or via GPS and ensuring that connected devices always receive the correct time.

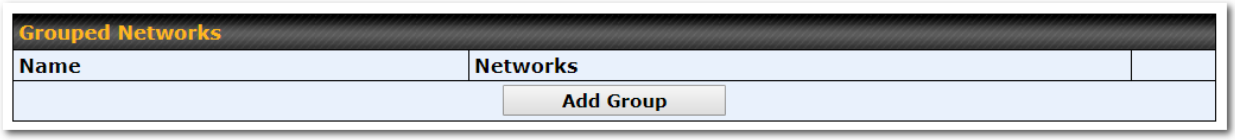
NTP Server setting can be found via: **Advanced > Misc. Settings > NTP Server**



Time Settings can be found at **System>Time>Time Settings**

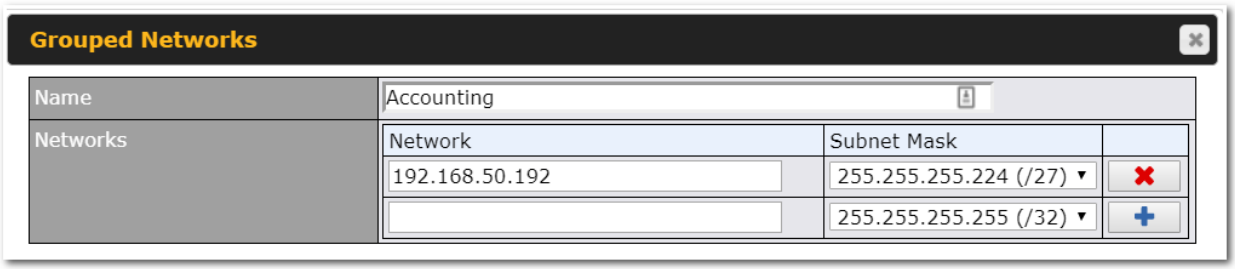


14.15.8 Grouped Networks

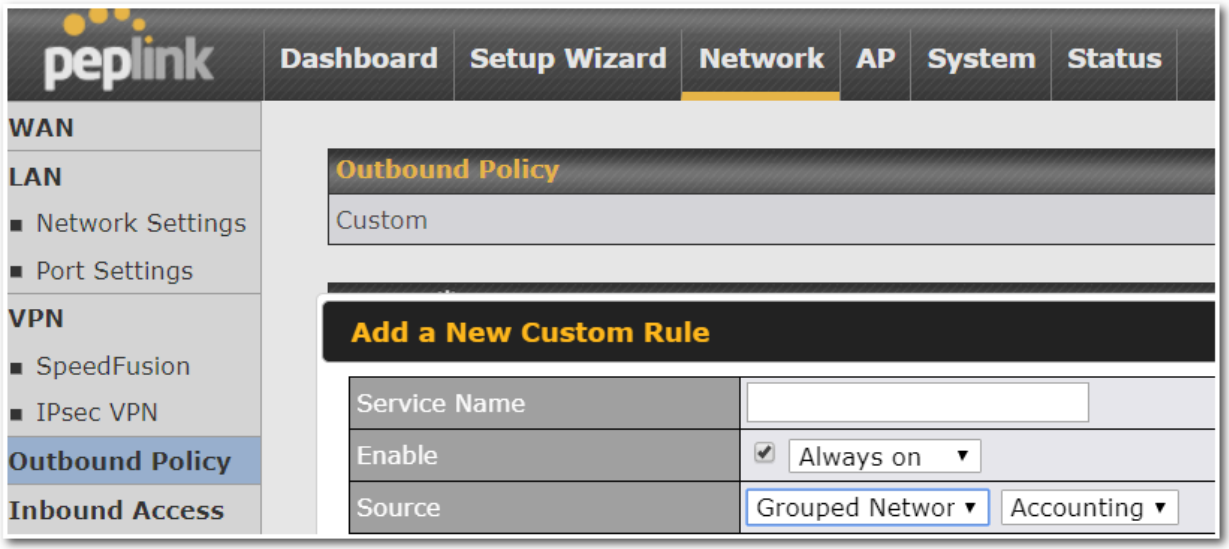


Using "Grouped Networks" you can group and name a range of IP addresses, which can then be used to define firewall rules or outbound policies.

Start by clicking on "**Add Group**" then fill in the appropriate field.
In this example we'll create a group "*accounting*"
Click save when you have finished adding the required networks.



The grouped network "*accounting*" can now be used to configure a group policy or firewall rule.



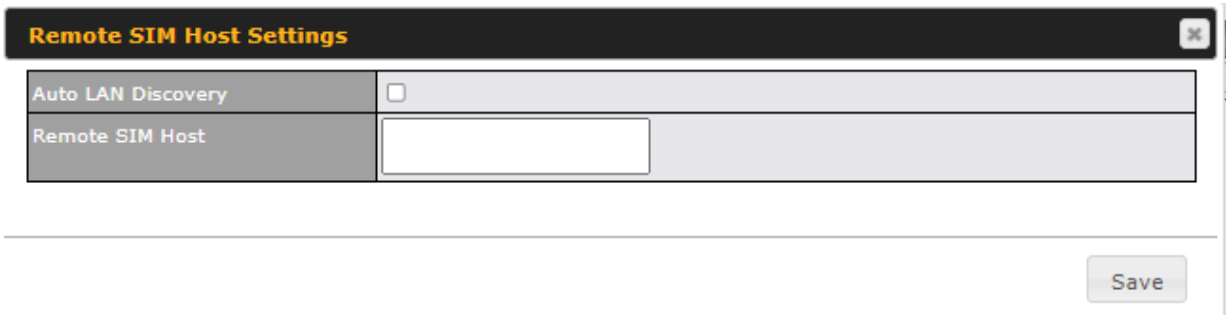
14.15.9 Remote SIM Management

Remote SIM management is accessible via **Advanced > Misc Settings > Remote SIM Management**. By default, this feature is disabled.

Please note that a limited number of Peplink routers support the SIM Injector, may refer to the link: https://www.peplink.com/products/sim-injector/ or Appendix C for more details on FusionSIM Manual.

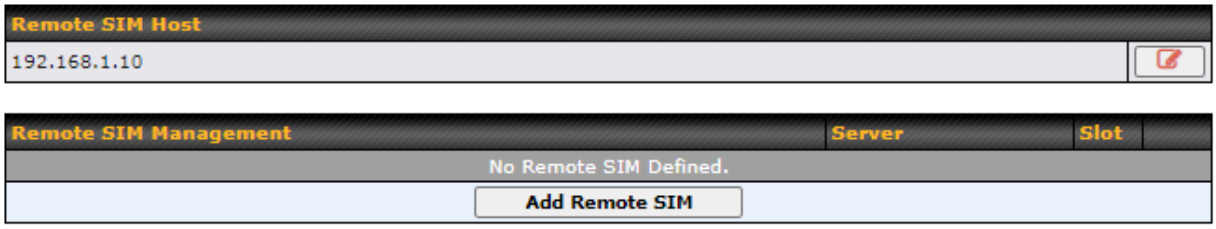
Remote SIM Host Settings

You may click  to configure the remote SIM host settings for the remote SIM server.

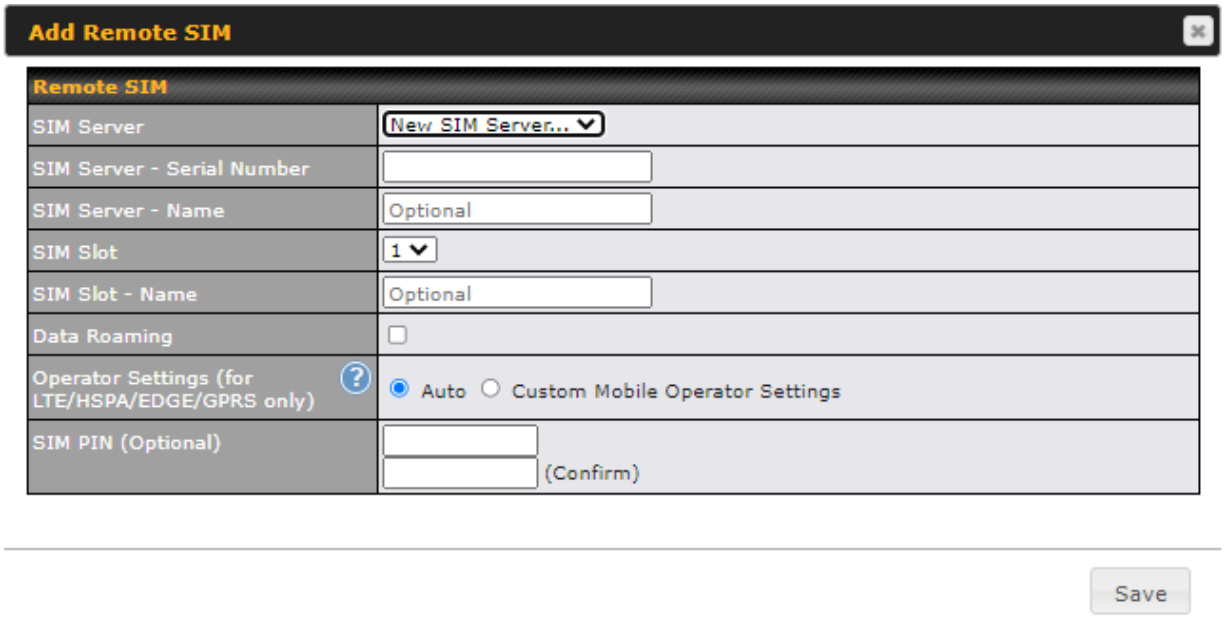


Remote SIM Host Settings	
Active LAN	Check this box to enable Auto LAN discovery of the remote SIM server.

Discovery	
Remote SIM Host	Enter the public IP address of the SIM Injector. If you enter IP addresses here, it is not necessary to tick the "**Auto LAN Discovery**" box above.



You may define the Remote SIM information by clicking the "**Add Remote SIM**". Here, you can enable **Data Roaming** and **custom APN** for your SIM cards.



Add Remote SIM Settings	
SIM Server	Add a new SIM Server
SIM Server - Serial Number	Enter the serial number of SIM Server
SIM Server - Name	This optional field allows you define a name for the SIM Server
SIM Slot	Click the drop-down menu and choose which SIM slot you want to connect.

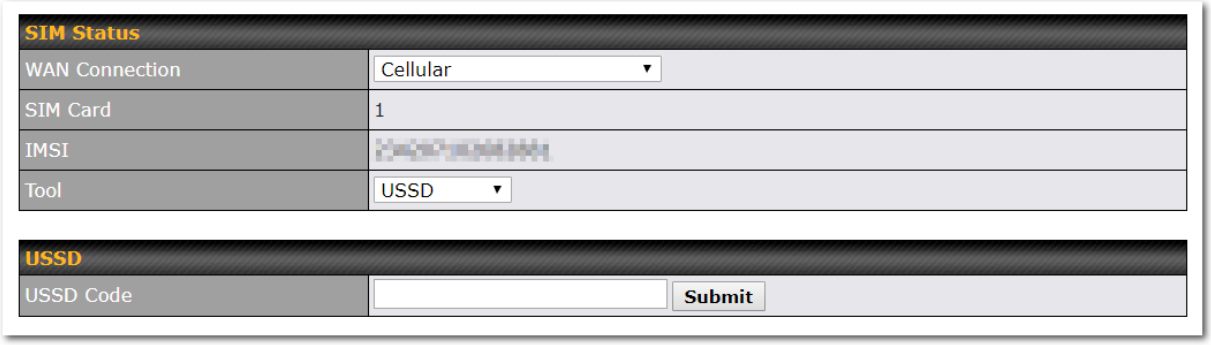
SIM Slot - Name	This optional field allows you define a name for the SIM slot.
Data Roaming	Enables data roaming on this particular SIM card.
Operator Settings (for LTE//HSPA/EDGE/GPRS Only)	This setting allows you to configure the APN settings of your connection. If **Auto** is selected, the mobile operator should be detected automatically. The connected device will be configured and connection will be made automatically. If there is any difficulty in making a connection, you may select **Custom** to enter your carrier's APN, Username and Password settings manually. The correct values can be obtained from your carrier. The default and recommended setting is Auto.

14.15.10 SIM Toolkit

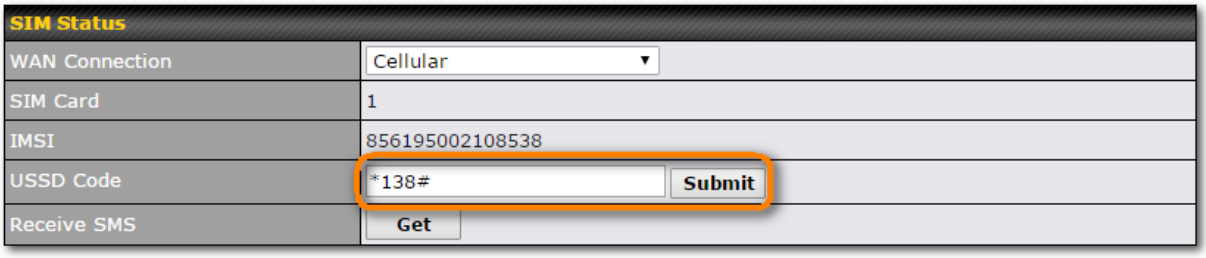
The SIM Toolkit can be found via **Advanced > Misc Settings > SIM Toolkit**.This supports two functionalities, USSD and SMS.

USSD

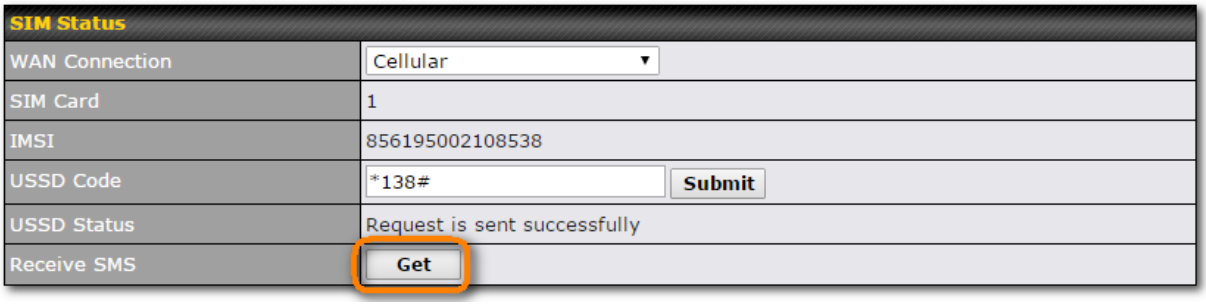
Unstructured Supplementary Service Data (USSD) is a protocol used by mobile phones to communicate with their service provider's computers. One of the most common uses is to query the available balance.



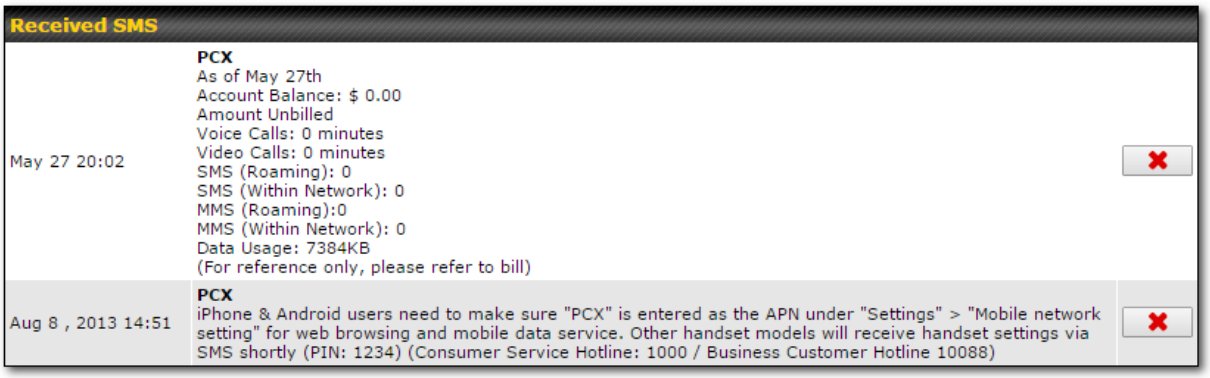
Enter your USSD code under the **USSD Code** text field and click **Submit**.



You will receive a confirmation. To check the SMS response, click **Get**.

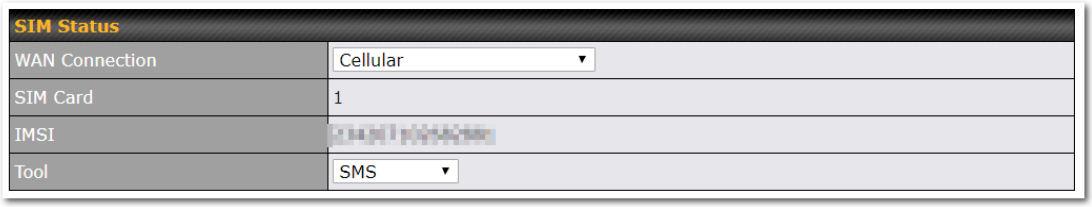


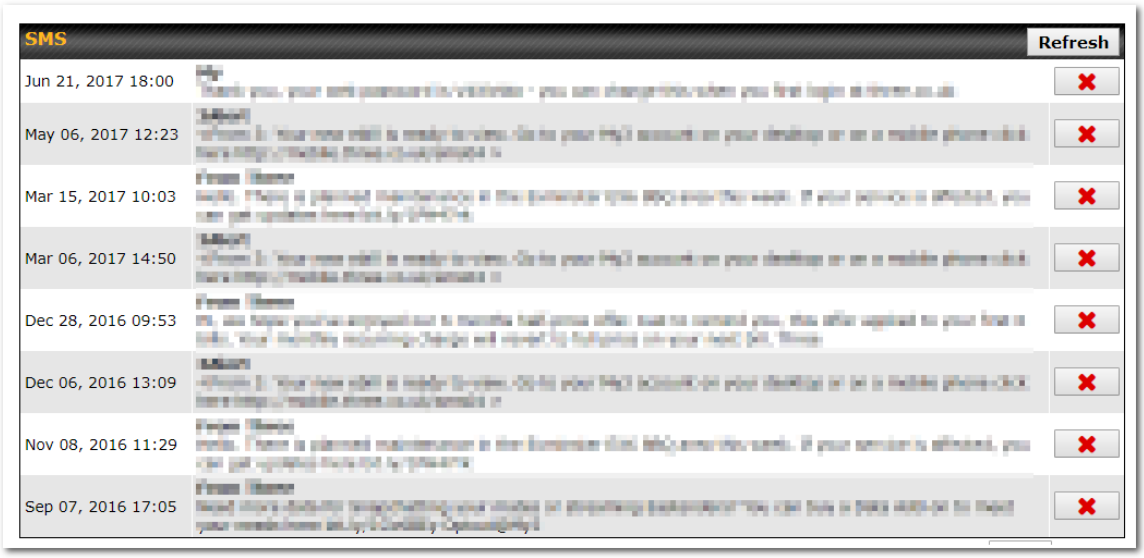
After a few minutes you will receive a response to your USSD code



SMS

The SMS option allows you to read SMS (text) messages that have been sent to the SIM in your Peplink router.

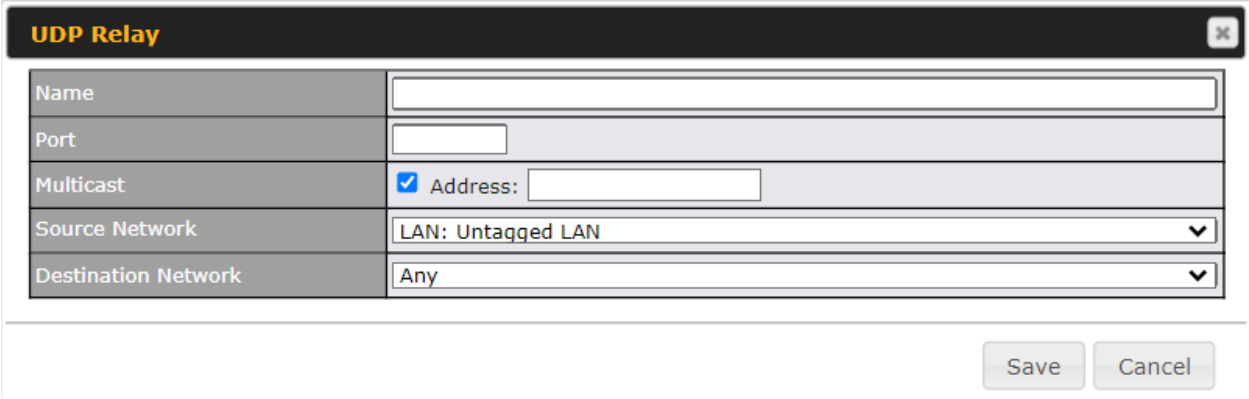




14.15.11 UDP Relay

You may define the UDP relay by clicking the **Advanced > Misc Settings > UDP Relay**. You can click  to enable the UDP relay to relay UDP Broadcast or Multicast traffic for LAN/VLAN/SpeedFusion VPN.

Click "*New UDP Relay Rule*" to define the relay rule.



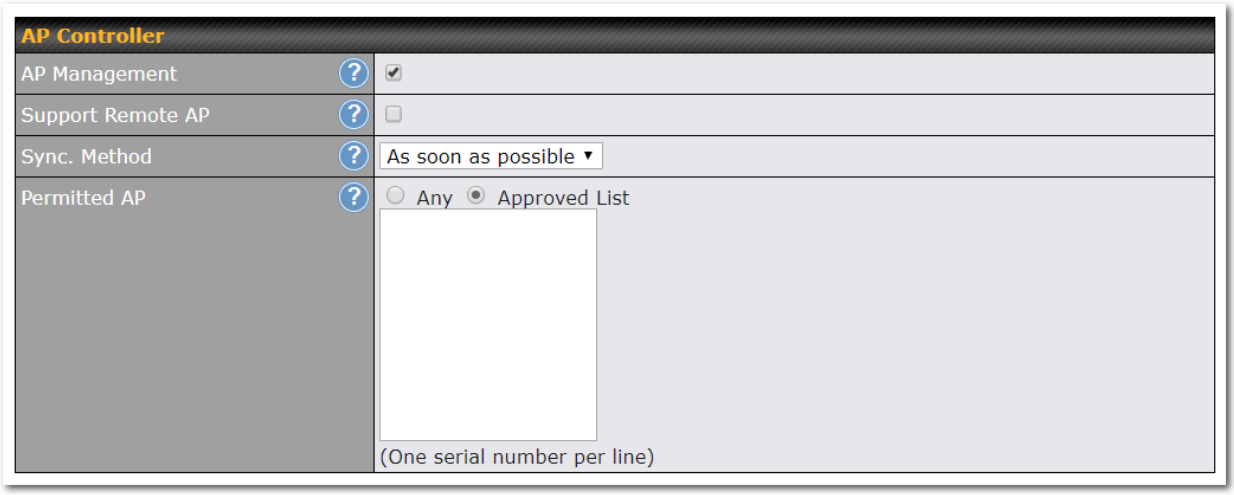
UDP Relay	
Name	This field is for specifying a name to represent this profile.
Port	This feid is to enter the specific port number for the UDP relay
Multicast	If Multicast is not selected, it will broadcast relay rule. If Multicast is selected, you may need to enter a valid multicast address.
Secure Network	Select the specific connection as a source network to where the device is to relay UDP Broadcast packets.
Destination Network	You may select the specific connection from the drop-down list or may custom combination network as a destination network that receives the UDP packet relays.

15 AP Tab

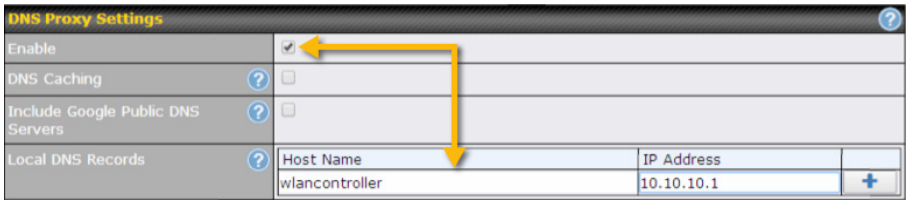
15.1 AP

15.1.1 AP Controller

Clicking on the **AP** tab will default to this menu, where you can view basic AP management options:

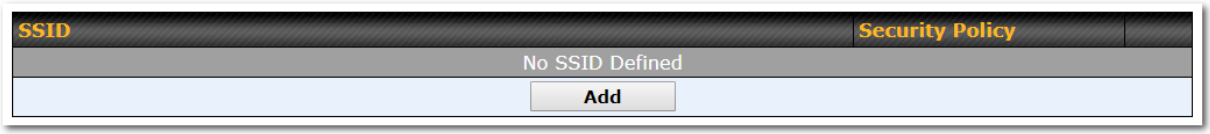


AP Controller	
AP Management	The AP controller for managing Pepwave APs can be enabled by checking this box. When this option is enabled, the AP controller will wait for management connections originating from APs over the LAN on TCP and UDP port 11753. It will also wait for captive portal connections on TCP port 443. An extended DHCP option, **CAPWAP Access Controller addresses** (field 138), will be added to the DHCP server. A local DNS record, **AP Controller**, will be added to the local DNS proxy.
Support Remote AP	The AP controller supports remote management of Pepwave APs. When this option is enabled, the AP controller will wait for management connections originating from remote APs over the WAN on TCP and UDP port 11753. It will also wait for captive portal connections on TCP port 443. The DHCP server and/or local DNS server of the remote AP's network should be configured in the **DNS Proxy Settings menu** under **Network>LAN**. The procedure is as follows: 1. Define an extended DHCP option, **CAPWAP Access Controller addresses** (field 138), in the DHCP server, where the values are the AP controller's public IP addresses; and/or 2. Create a local DNS record for the AP controller with a value corresponding to the AP controller's public IP address.

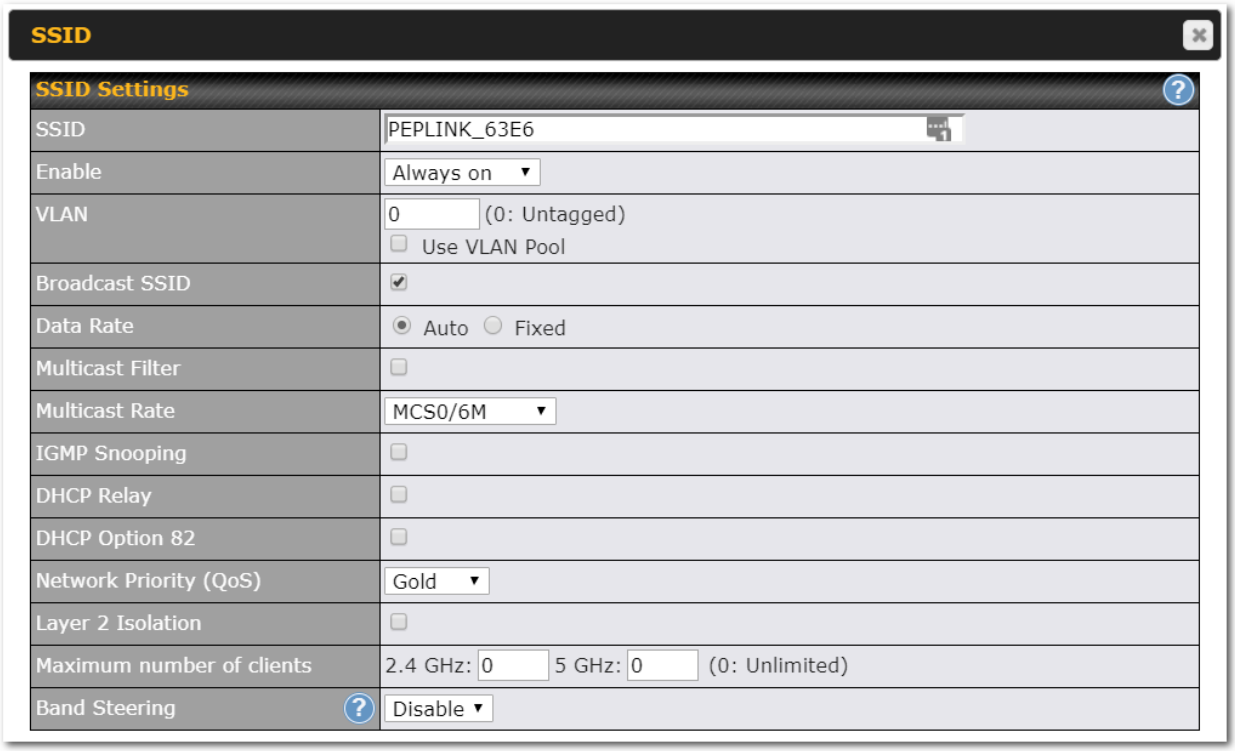


Sync. Method	Select the required option to synchronize the managed AP's. Options are: • As soon as possible (default) • Progressively (synchronize AP's in groups) • One at a time (synchronize one AP at a time)
Permitted AP	Access points to manage can be specified here. If **Any** is selected, the AP controller will manage any AP that reports to it. If **Approved List** is selected, only APs with serial numbers listed in the provided text box will be managed.

15.1.2 Wireless SSID



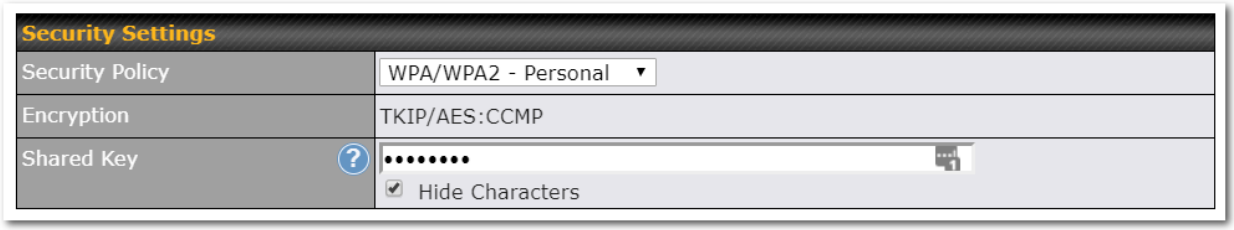
Current SSID information appears in the **SSID** section. To edit an existing SSID, click its name in the list. To add a new SSID, click **Add**. Note that the following settings vary by model.
The below settings show a new SSID window with Advanced Settings enabled (these are available by selecting the question mark in the top right corner).



SSID Settings	
SSID	This setting specifies the SSID of the virtual AP to be scanned by Wi-Fi clients.
Enable	Click the drop-down menu to apply a time schedule to this interface
VLAN	This setting specifies the VLAN ID to be tagged on all outgoing packets generated from this wireless network (i.e., packets that travel from the Wi-Fi segment through the Pepwave AP One unit to the Ethernet segment via the LAN port). The default value of this setting is **0**, which means VLAN tagging is disabled (instead of tagged with zero). Use of a VLAN pool is enabled by selecting the checkbox.
Broadcast SSID	This setting specifies whether or not Wi-Fi clients can scan the SSID of this wireless network. **Broadcast SSID** is enabled by default.
Data Rate [A]	Select **Auto** to allow the Pepwave router to set the data rate automatically, or select **Fixed** and choose a rate from the displayed drop-down menu.
Multicast Filter[A]	This setting enables the filtering of multicast network traffic to the wireless SSID.
Multicast Rate[A]	This setting specifies the transmit rate to be used for sending multicast network traffic. The selected **Protocol** and **Channel Bonding** settings will affect the rate options and values available here.
IGMP Snooping [A]	To allow the Pepwave router to listen to internet group management protocol (IGMP) network traffic, select this option.

DHCP Relay	Put the address of the DHCP server in this field.. DHCP requests will be relayed to this DHCP server
DHCP Option 82 [A]	If you use a distributed DHCP server/relay environment, you can enable this option to provide additional information on the manner in which clients are physically connected to the network.
Layer 2 Isolation [A]	**Layer 2** refers to the second layer in the ISO Open System Interconnect model. When this option is enabled, clients on the same VLAN, SSID, or subnet are isolated to that VLAN, SSID, or subnet, which can enhance security. Traffic is passed to upper communication layer(s). By default, the setting is disabled.
Maximum Number of Clients	Indicate the maximum number of clients that should be able to connect to each frequency.
Band Steering	To reduce 2.4 GHz band overcrowding, AP with band steering steers clients capable of 5 GHz operation to 5 GHz frequency. Choose between: **Force** - Clients capable of 5 GHz operation are only offered with 5 GHz frequency. **Prefer** - Clients capable of 5 GHz operation are encouraged to associate with 5 GHz frequency. If the clients insist to attempt on 2.4 GHz frequency, 2.4 GHz frequency will be offered. **Disable** - Default

[A] - Advanced feature. Click the button on the top right-hand corner to activate.



Security Settings

Security Policy

This setting configures the wireless authentication and encryption methods. Available options:

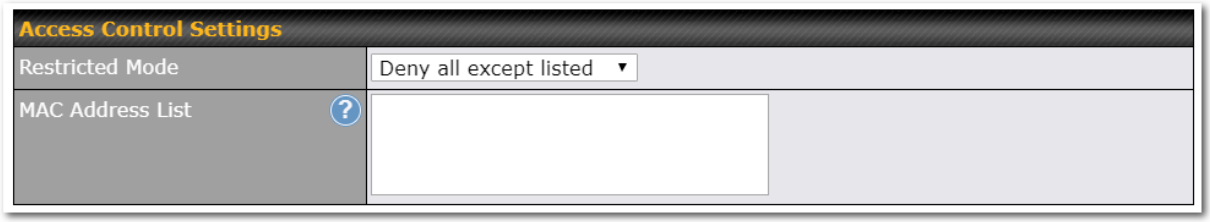
- **Open** (No Encryption)
- **Enhanced Open** (OWE)
- **WPA3 - Personal** (AES:CCMP)
- **WPA3 - Enterprise** (AES:CCMP)
- **WPA2/WPA3 - Personal** (AES:CCMP)
- **WPA2 - Personal** (AES:CCMP)
- **WPA2 – Enterprise** (AES:CCMP)
- **WPA/WPA2 - Personal** (TKIP/AES: CCMP)
- **WPA/WPA2 – Enterprise** (TKIP/AES: CCMP)

When **WPA/WPA2 - Enterprise** is configured, RADIUS-based 802.1 x authentication is enabled. Under this configuration, the **Shared Key** option should be disabled. When using this method, select the appropriate version using the **V1**/**V2** controls. The security level of this method is known to be very high.

When **WPA/WPA2 - Personal** is configured, a shared key is used for data encryption and authentication. When using this configuration, the **Shared Key** option should be enabled. Key length must be between eight and 63 characters (inclusive). The security level of this method is known to be high.

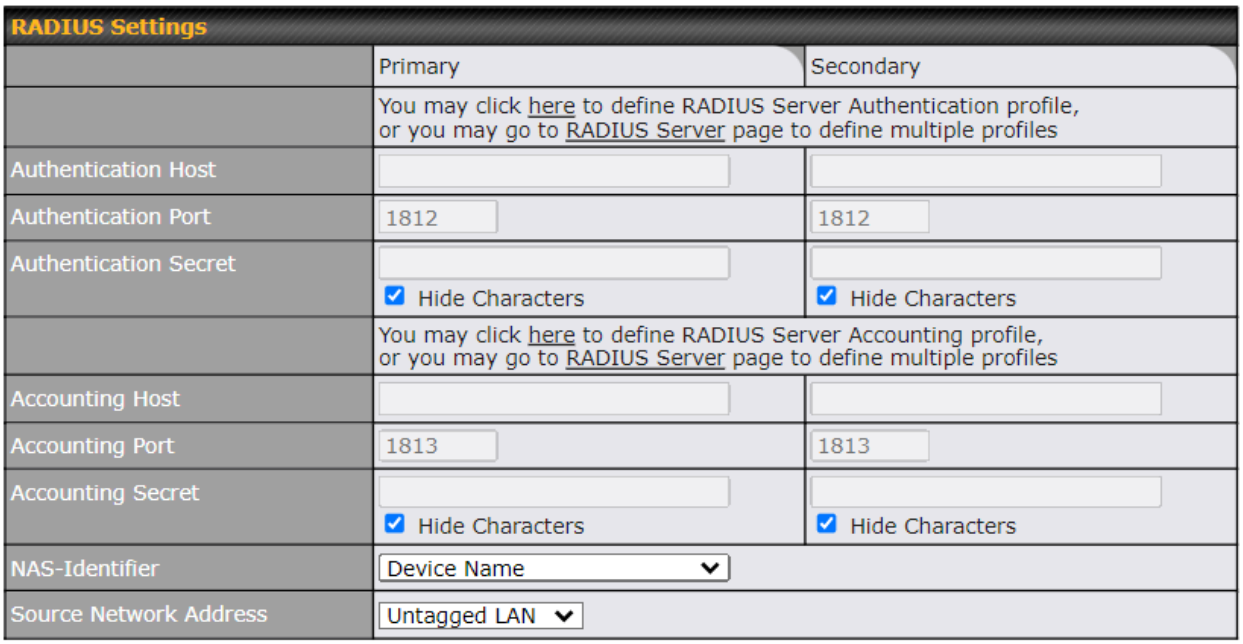
NOTE:

When **WPA2/WPA3- Personal** is configured, if a managed AP which is NOT WPA3 PSK capable, the AP Controller will not push those WPA3 and WPA2/WPA3 SSID to that AP.

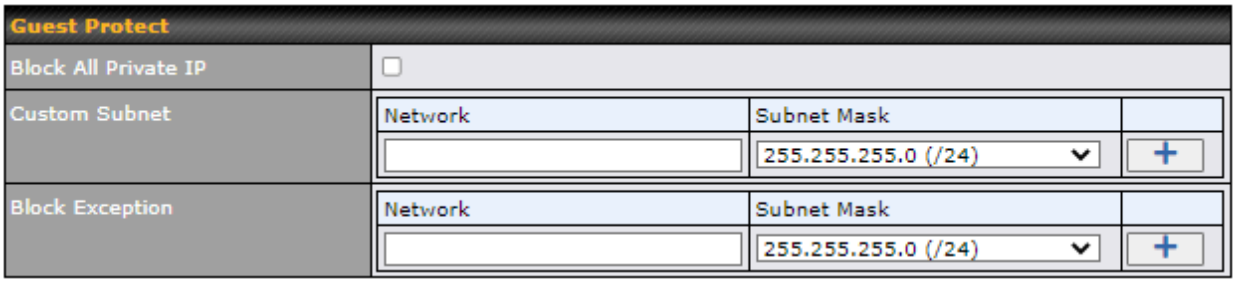


Access Control Settings

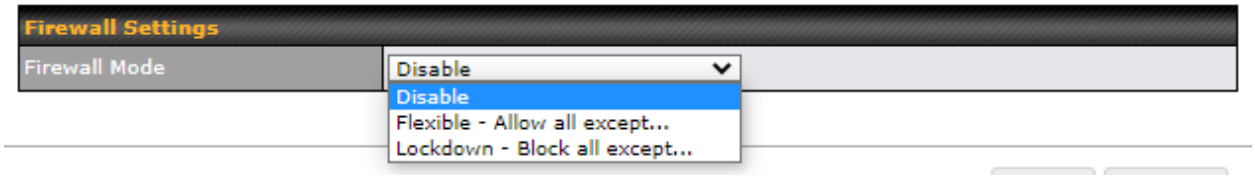
Restricted Mode	The settings allow the administrator to control access using MAC address filtering. Available options are **None**, **Deny all except listed**, **Accept all except listed** and **Radius MAC Authentication.**
MAC Address List	Connections coming from the MAC addresses in this list will be either denied or accepted based on the option selected in the previous field. If more than one MAC address needs to be entered, you can use a carriage return to separate them.



RADIUS Settings	
Authentication Host	This field is for specifying the IP address of the primary RADIUS server for Authentication and, if applicable, the secondary RADIUS server.
Authentication Port	In the field, the UDP authentication port(s) used by your RADIUS server(s) or click the **Default** is **1812**.
Authentication Secret	This settings is enter the RADIUS shared secret for the primary server and, if applicable, the secondary RADIUS server.
Accounting Host	This field is for specifying the IP address of the primary RADIUS server for Accounting and, if applicable, the secondary RADIUS server.
Accounting Port	In the field, enter the UDP accounting port(s) used by your RADIUS server(s) or click the **Default** is **1813**.
Accounting Secret	This settings is enter the RADIUS shared secret for the primary server and, if applicable, the secondary RADIUS server.
NAS-Identifier	Choose between **Device Name**, **LAN MAC address**, **Device Serial Number** and **Custom Value**



Guest Protect	
Block All Private IP	Check this box to deny all connection attempts by private IP addresses.
Custom Subnet	To create a custom subnet for guest access, enter the IP address and choose a subnet mask from the drop-down menu.
Block Exception	To block access from a particular subnet, enter the IP address and choose a subnet mask from the drop-down menu.

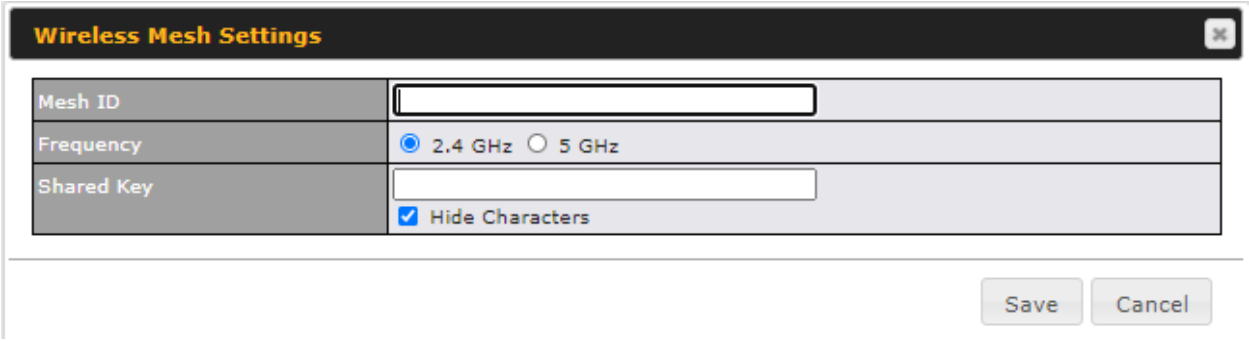


Firewall Settings	
Firewall Mode	The settings allow administrators to control access to the SSID based on Firewall Rules. Available options are **Disable,Lockdown - Block all except...** and **Flexible -Allow all except...**
Firewall Exceptions	Create Firewall Rules based on **Port, IP Network, MAC address** or **Domain Name**

15.1.3 Wireless Mesh

Wireless Mesh Support is available on devices running 802.11ac (Wi-Fi 5) and above. Along with the AP Controller, mesh network extensions can be established, which can expand network coverage. Note that the Wireless Mesh settings need to match the Mesh ID and Shared Key of the other devices on the same selected frequency band.

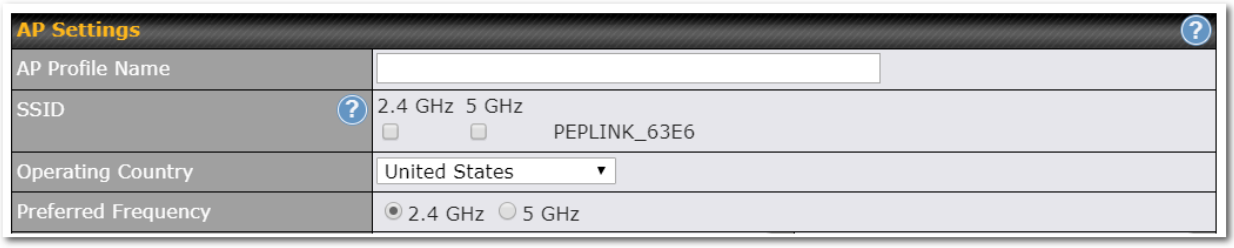
To create a new Wireless Mesh profile, go to **AP** > **Wireless Mesh**, and click **Add**.



Wireless Mesh Settings	
Mesh ID	Enter a name to represent the Mesh profile.
Frequency	Select the 2.4GHz or 5GHz frequency to be used.

Shared Key	Enter the shared key in the text field. Please note that it needs to match the shared keys of the other APs in the Wireless Mesh settings. Click **Hide / Show Characters** to toggle visibility.

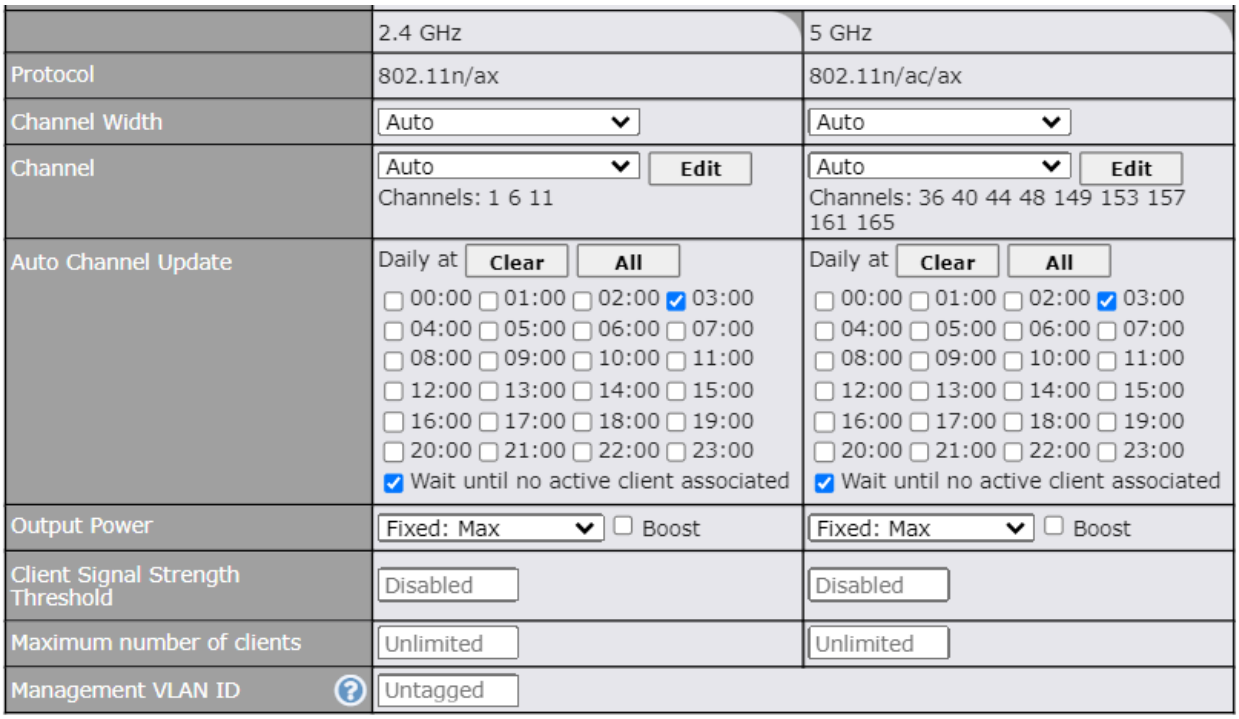
15.1.4 Profiles



AP Settings	
AP Profile Name	Define the AP Profile name
SSID	You can select the wireless networks for 2.4 GHz or 5 GHz separately for each SSID.
Operating Country	This drop-down menu specifies the national/regional regulations which the Wi-Fi radio should follow. • If a North American region is selected, RF channels 1 to 11 will be available and the maximum transmission power will be 26 dBm (400 mW). • If European region is selected, RF channels 1 to 13 will be available. The maximum transmission power will be 20 dBm (100 mW). NOTE: Users are required to choose an option suitable to local laws and regulations.
Preferred Frequency	Indicate the preferred frequency to use for clients to connect.

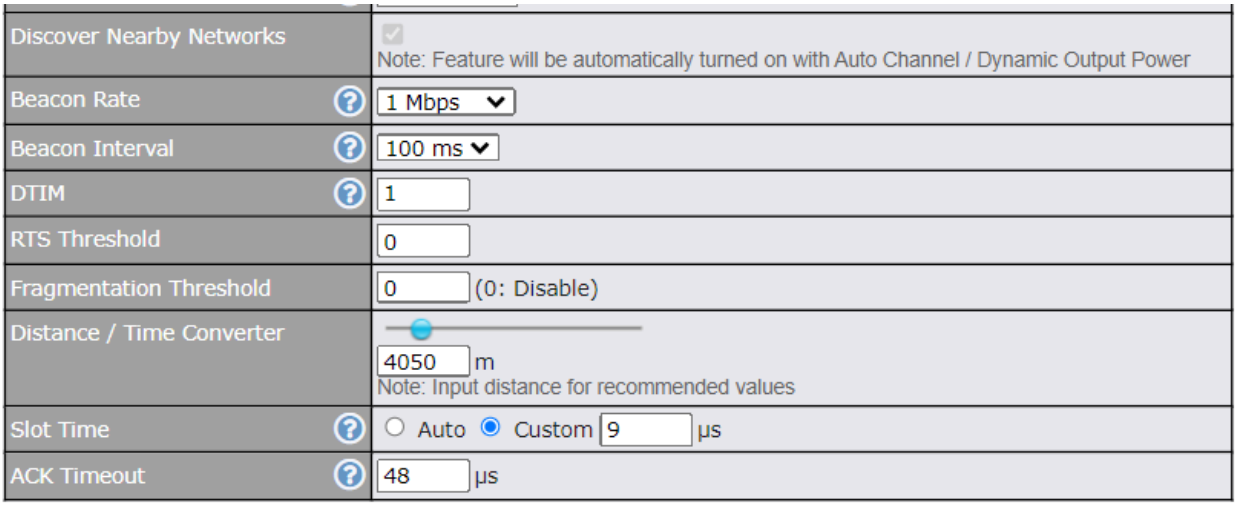
Important Note

Per FCC regulation, the country selection is not available on all models marketed in the US. All US models are fixed to US channels only.



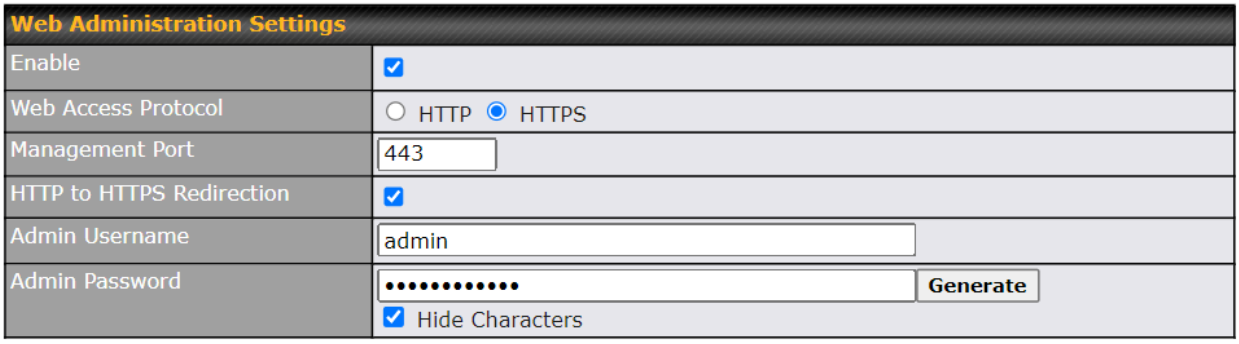
AP Settings (part 2)	
Protocol	This option allows you to specify whether 802.11b and/or 802.11g client association requests will be accepted. Available options are **802.11ng** and **802.11na**. By default, **802.11ng** is selected.
Channel Width	Available options are **20 MHz**, **40 MHz**, and **Auto (20/40 MHz)** . Default is **Auto (20/40 MHz),** which allows both widths to be used simultaneously.
Channel	This option allows you to select which 802.11 RF channel will be utilized. **Channel 1 (2.412 GHz)** is selected by default.
Auto Channel Update	Indicate the time of day at which update automatic channel selection.
Output Power	This option is for specifying the transmission output power for the Wi-Fi AP. There are 4 relative power levels available – **Max**, **High**, **Mid**, and **Low**. The actual output power will be bound by the regulatory limits of the selected country.
Client Signal Strength Threshold	Clients with signal strength lower than this value will not be allowed to connect.
Maximum number of clients	This setting determines the maximum number of clients that can connect to this Wi-Fi frequency.
Management VLAN ID	This field specifies the VLAN ID to tag to management traffic, such as communication traffic between the AP and the AP Controller. The value is zero by default, which means that no VLAN tagging will be applied. **NOTE**: Change this value with caution as alterations may result in loss of connection to the AP Controller.

Advanced Wi-Fi AP settings can be displayed by clicking the on the top right-hand corner of the **Wi-Fi AP Settings** section, which can be found at **AP > Settings**. Other models will display a separate section called **Wi-Fi AP Advanced Settings**, which can be found at **AP > Profile**.

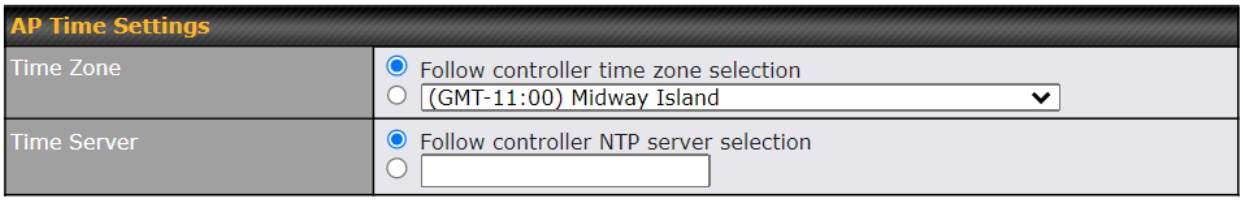


Advanced AP Settings	
Discovery Nearby Networks [A]	This option is to turn on and off to scan the nearby the AP. **Note**: Feature will be automatically turned on with Auto Channel / Dynamic Output Power
Beacon Rate [A]	This option is for setting the transmit bit rate for sending a beacon. By default, **1Mbps** is selected.
Beacon Interval [A]	This option is for setting the time interval between each beacon. By default, **100ms** is selected.
DTIM [A]	This field allows you to set the frequency for the beacon to include delivery traffic indication messages. The interval is measured in milliseconds. The default value is set to **1 ms**.
RTS Threshold [A]	The RTS (Request to Clear) threshold determines the level of connection required before the AP starts sending data. The recommended standard of the RTS threshold is around 500.
Fragmentation Threshold [A]	This setting determines the maximum size of a packet before it gets fragmented into multiple pieces.
Distance / Time Convertor	Select the range you wish to cover with your Wi-Fi, and the router will make recommendations for the Slot Time and ACK Timeout.
Slot Time [A]	This field is for specifying the unit wait time before transmitting a packet. By default, this field is set to **9 µs**.
ACK Timeout [A]	This field is for setting the wait time to receive an acknowledgement packet before performing a retransmission. By default, this field is set to **48 µs**.

[A] - Advanced feature, please click the button on the top right-hand corner to activate



Web Administration Settings	
Enable	Ticking this box enables web admin access for APs located on the WAN.
Web Access Protocol	Determines whether the web admin portal can be accessed through HTTP or HTTPS
Management Port	Determines the port at which the management UI can be accessed.
HTTP to HTTPS redirection	Redirects HTTP request to HTTPS
Admin Username	Determines the username to be used for logging into the web admin portal
Admin Password	Determines the password for the web admin portal on external AP.



This allow user to configure AP Time Settings (both Timezone and NTP) in AP Controller.

AP Time Settings	
Time Zone	Ths field is to select the time zone for the AP controller.
Time Server	Ths field is to select the time server for the AP controller.

Controller Management Settings	
Manage Unreachable Action	☐

This settings is to allow user to manage external AP's controller unreachable action. When **Manage Unreachable Action** is checked, there will have 2 options which are "**None**" and "**Radio Off**".

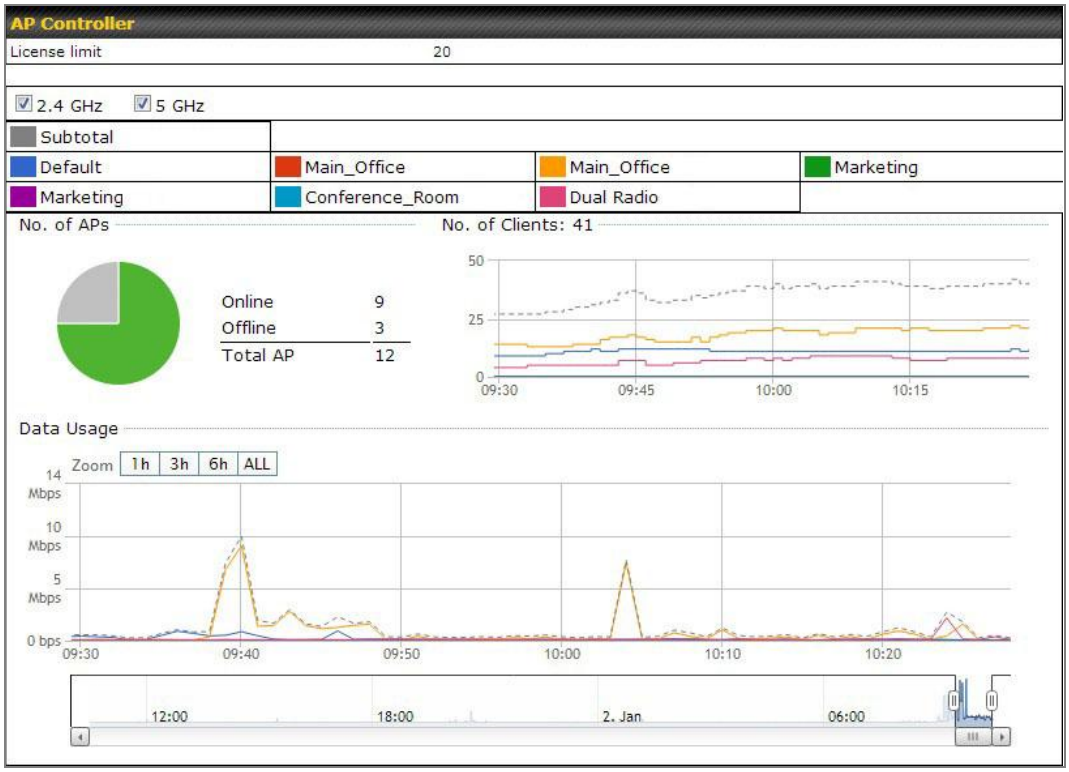
AP Controller Settings	
Client Load Balancing	☐

This is an option to enable client load balancing for AP Controller. When the option is enabled, it is trying to balance the station count on APs within the same profile.

15.2 AP Controller Status

15.2.1 Info

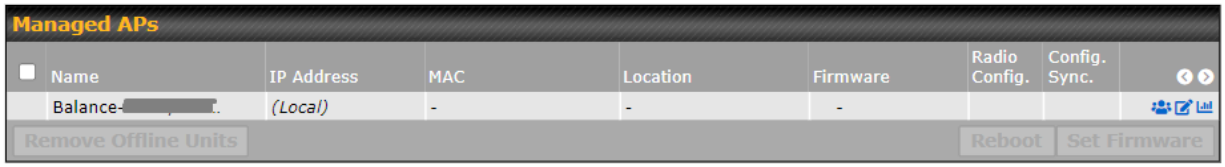
A comprehensive overview of your AP can be accessed by navigating to **AP > Controller Status > Info**.



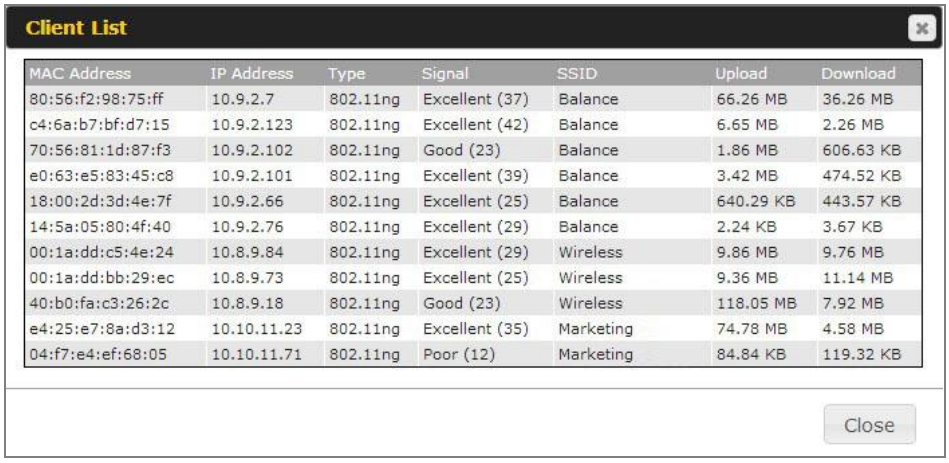
AP Controller	
License Limit	This field displays the maximum number of AP your Balance router can control. You can purchase licenses to increase the number of AP you can manage.
Frequency	Underneath, there are two check boxes labeled **2.4 Ghz** and **5 Ghz**. Clicking either box will toggle the display of information for that frequency. By default, the graphs display the number of clients and data usage for both 2.4GHz and 5 GHz frequencies.
SSID	The colored boxes indicate the SSID to display information for. Clicking any colored box will toggle the display of information for that SSID. By default, all the graphs show information for all SSIDs.
No. of APs	This pie chart and table indicates how many APs are online and how many are offline.
No.of Clients	This graph displays the number of clients connected to each network at any given time. Mouse over any line on the graph to see how many clients connected to a specific SSID for that point in time.
Data Usage	This graph enables you to see the data usage of any SSID for any given time period. Mouse over any line on the graph to see the data usage by each SSID for that point in time. Use the buttons next to **Zoom** to select the time scale you wish to view. In addition, you could use the sliders at the bottom to further refine your timescale.

15.2.2 Access Point

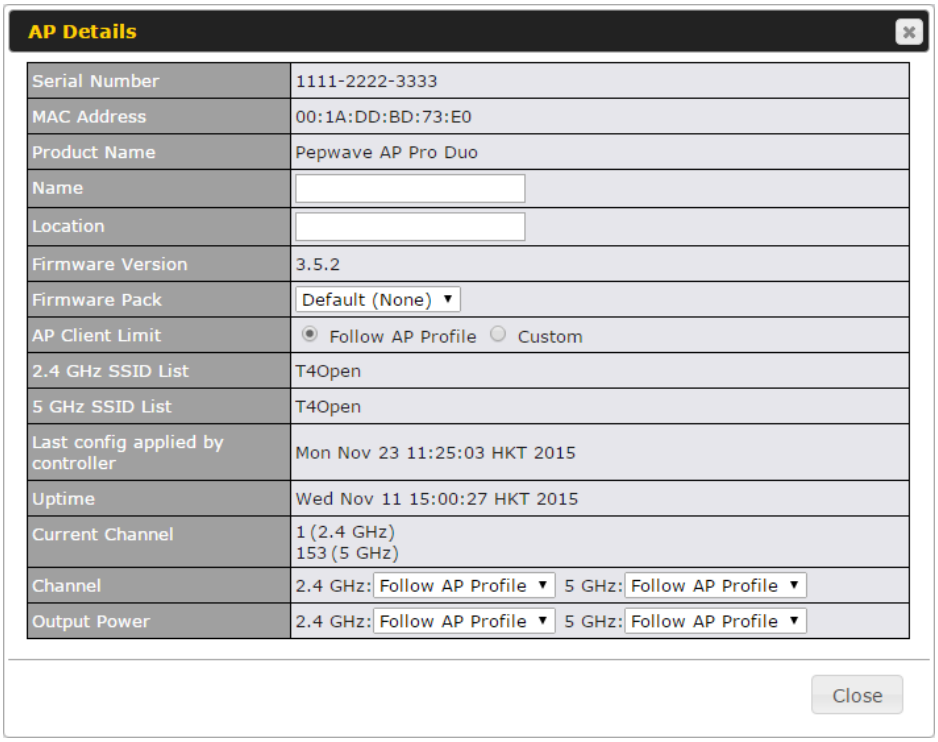
A detailed breakdown of data usage for each AP is available at **AP > Controller Status > Access Point**.



Managed APs	
Managed APs	This table shows the detailed information on each AP, including channel, number of clients, upload traffic, and download traffic. Click the blue arrows at the left of the table to expand and collapse information on each device group. On the right of the table, you will see the following icons: . Click the icon to see a usage table for each client:

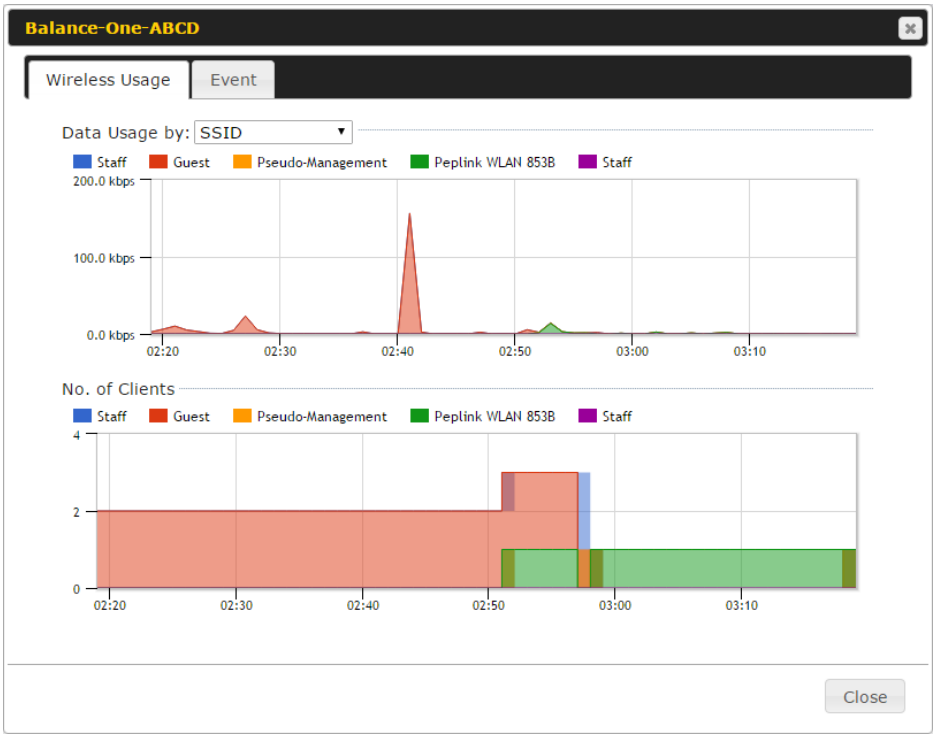


Click the icon to configure each client



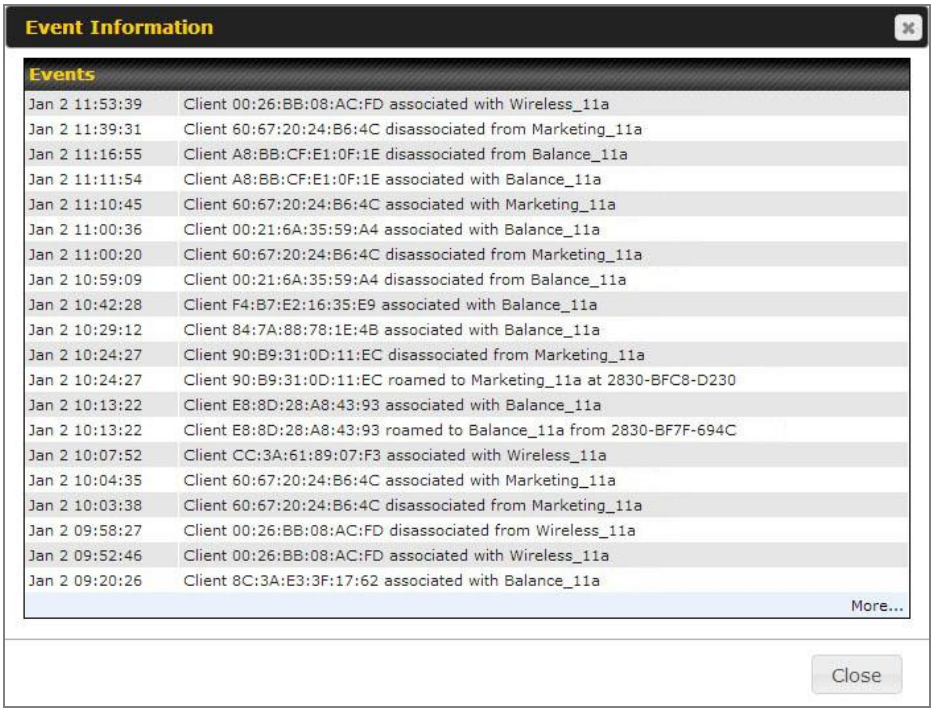
For easier network management, you can give each client a name and designate its location. You can also designate which firmware pack (if any) this client will follow, as well as the channels on which the client will broadcast.

Click the icon to see a graph displaying usage:



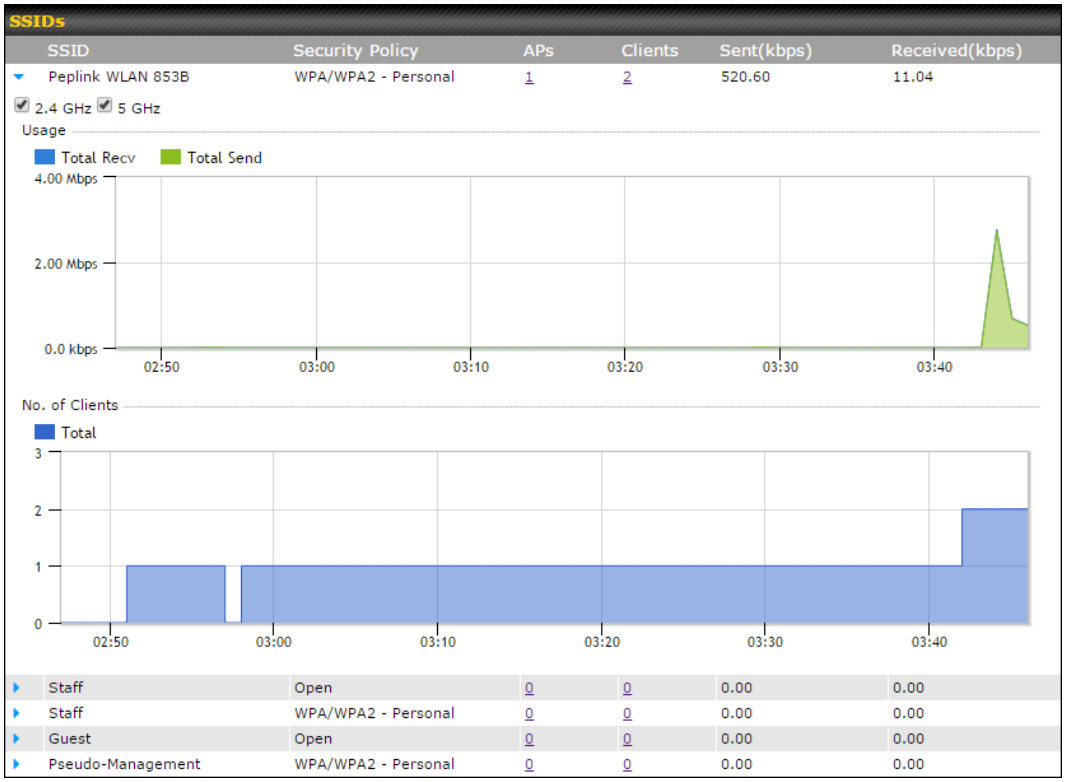
Click any point in the graphs to display detailed usage and client information for that device, using that SSID, at that point in time. On the **Data Usage by** menu, you can display the information by SSID or by AP send/receive rate.

Click the **Event** tab next to **Wireless Usage** to view a detailed event log for that particular device:



15.2.3 Wireless SSID

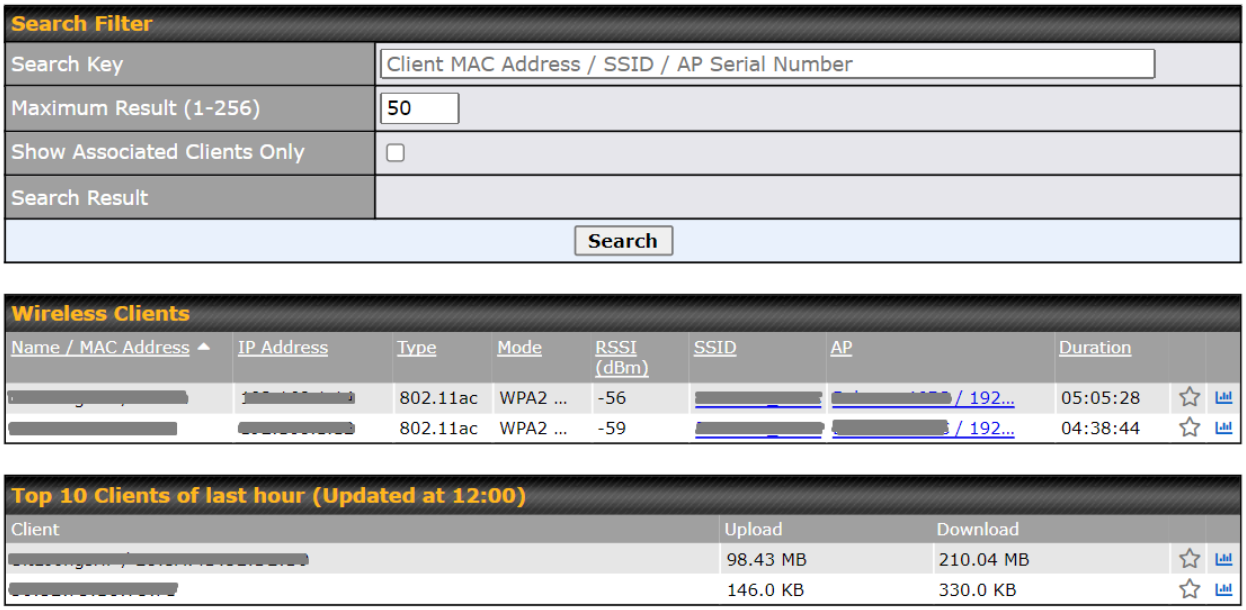
In-depth wireless SSID reports are available under **AP > Controller Status > Wireless SSID**.



Click the blue arrow on any SSID to obtain more detailed usage information on each SSID.

15.2.4 Wireless Client

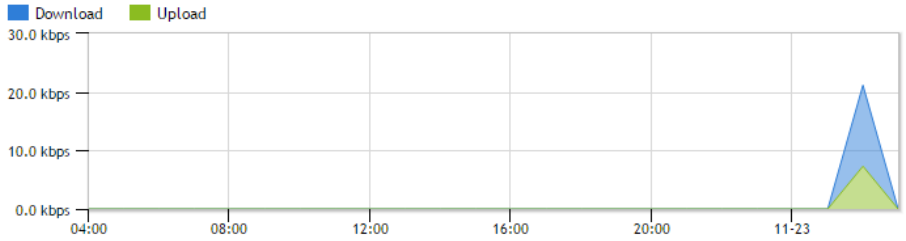
You can search for specific Wi-Fi users by navigating to **AP > Controller Status > Wireless Client**.



Here, you will be able to see your network's heaviest users as well as search for specific users. Click the ☆ icon to bookmark specific users, and click the icon for additional details about each user:

Client C0:EE:FB:20:13:36

Information	
Status	Associated
Access Point	1111-2222-3333
SSID	Peplink WLAN 853B
IP Address	192.168.1.34
Duration	00:27:31
Usage (Upload / Download)	141.28 MB / 4.35 MB
RSSI	-48
Rate (Upload / Download)	150M / 48M
Type	802.11na



SSID	AP	From	To	Upload	Download
Peplink WLAN 853B	192C-1835-642F	Nov 23 03:43:04	-	141.28 MB	4.35 MB
Peplink WLAN 853B	192C-1835-642F	Nov 23 02:58:36	Nov 23 03:47:52	173.7 KB	94.2 KB
Peplink WLAN 853B	192C-1835-642F	Nov 23 02:52:15	Nov 23 02:58:15	105.9 KB	62.5 KB

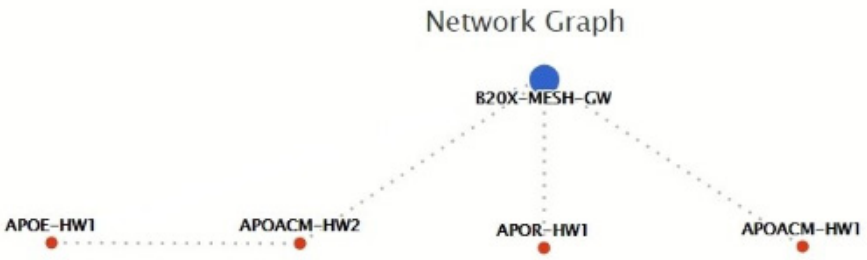
Close

15.2.5 Mesh / WDS

Mesh / WDS allows you to monitor the status of your wireless distribution system (WDS) or Mesh, and track activity by MAC address by navigating to **AP > Controller Status > Mesh / WDS**. This table shows the detailed information of each AP, including protocol, transmit rate (sent / received), signal strength, and duration.

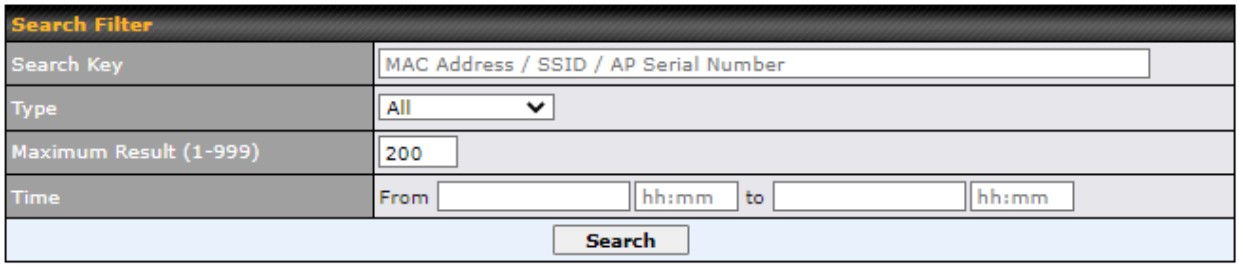
Mesh / WDS

Type	Peer MAC	Protocol	Rate (Send)	Rate (Receive)	Signal (dBm)	Duration
APOACM-HW1/						
Mesh ( )		802.11ac	325M	650M	-56	19:13:35
APOACM-HW2/						
Mesh ( )		802.11ac	650M	351M	-63	00:49:20
Mesh ( )		802.11ac	390M	325M	-67	01:35:09
APOE-HW1/						
Mesh ( )		802.11ac	58.5M	130M	-69	00:45:22
APOR-HW1/						
Mesh ( )		802.11ac	325M	866.7M	-53	19:14:44
B20X-MESH-GW/						
Mesh ( )		802.11ac	433M	650M	-69	19:14:44
Mesh ( )		802.11ac	325M	390M	-66	01:35:42
Mesh ( )		802.11ac	351M	650M	-70	19:13:45
Mesh ( )		802.11ac	130M	117M	-88	00:45:52



15.2.6 Nearby Device

A listing of near devices can be accessed by navigating to **AP > Controller Status > Nearby Device**.



Nearby Devices

Mark	Type	MAC Address	SSID	Channel	Encryption	Last Seen	Mark as
	Station Probe	DC:21:48:1D:D3:1F	-	1		1 minute ago	
	Station Probe	D0:04:B0:1B:B7:7F	-	1		1 minute ago	
	Station Probe	C8:B2:9B:63:B3:43	-	1		1 minute ago	
	Station Probe	54:14:F3:C0:5D:C3	-	1		1 minute ago	
	Station Probe	54:14:F3:BD:F5:9C	-	1		1 minute ago	
	Station Probe	E8:1D:A8:2E:0D:0C	-	36		1 minute ago	
	Station Probe	C8:B2:9B:63:C2:CA	-	1		1 minute ago	
	Station Probe	54:14:F3:BF:28:C7	-	1		2 minutes ago	
	Station Probe	10:56:CA:83:43:C8	-	1		2 minutes ago	
	Station Probe	F8:5E:A0:A4:68:F7	-	36		2 minutes ago	
	Station Probe	E8:1C:BA:73:F9:BF	-	1		2 minutes ago	
	Station Probe	40:B0:76:37:4A:AC	-	36		3 minutes ago	
	Station Probe	C8:CB:9E:62:C8:E3	-	36		3 minutes ago	
	Station Probe	C8:58:C0:FB:0F:81	-	1		4 minutes ago	
	Station Probe	00:21:6B:D5:B5:7E	-	1		5 minutes ago	
	AP	10:56:CA:A0:40:8D	test	52	WPA2	5 minutes ago	
	Station Probe	00:DB:DF:D2:C5:71	-	1		6 minutes ago	
	Station Probe	08:6A:C5:64:0E:C9	-	1		6 minutes ago	
	Station Probe	F0:67:28:99:15:FD	-	1		7 minutes ago	
	Station Probe	34:2E:B7:D5:8F:31	-	1		7 minutes ago	

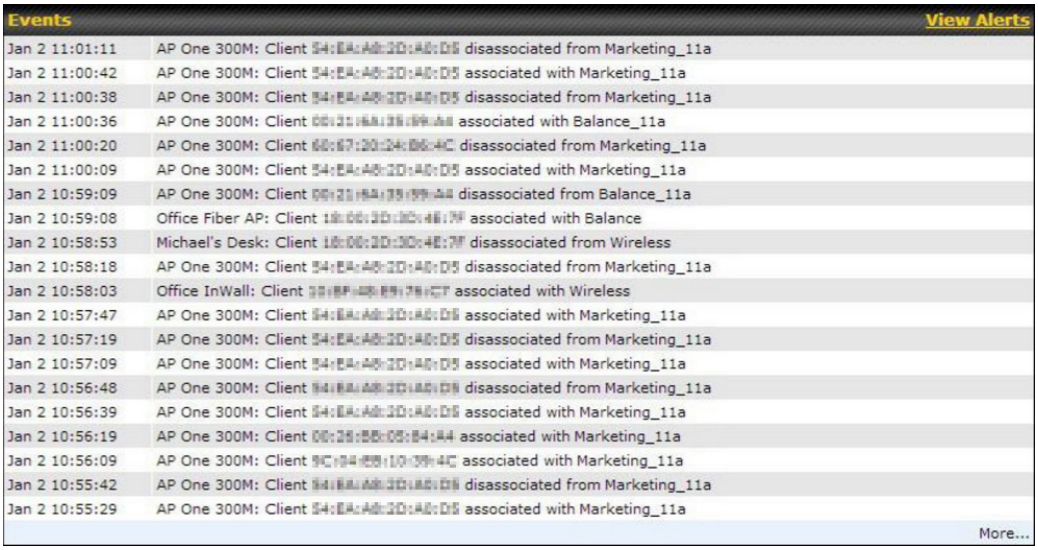
Prev 1-20 (200) Next

Nearby Devices

Hovering over the device MAC address will result in a popup with information on how this device was detected. Click the ✓ ☹ icons and the device will be moved to the bottom table of identified devices.

15.2.7 Event Log

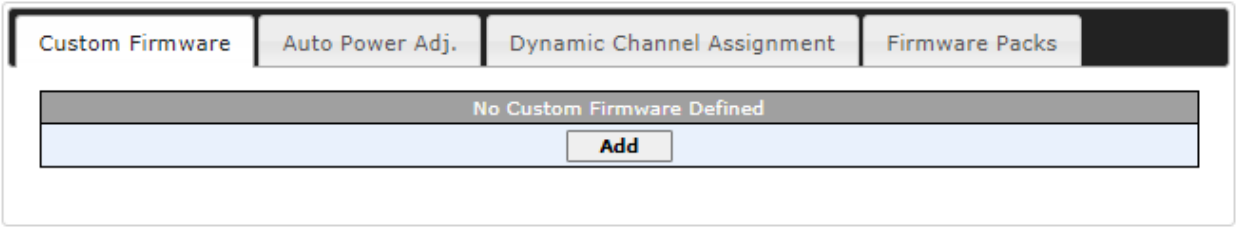
You can access the AP Controller Event log by navigating to **AP > Controller Status > Event Log**.



Events
This event log displays all activity on your AP network, down to the client level. Use to filter box to search by MAC address, SSID, AP Serial Number, or AP Profile name. Click **View Alerts** to see only alerts, and click the **More…** link for additional records.

15.3 Toolbox

Additional tools for managing firmware packs, power adjustment, and channel assignment can be found at **AP > Toolbox**.



Firmware Packs

This is the first menu that will appear. Here, you can manage the firmware of your AP. Clicking on  will display information regarding each firmware pack. To receive new firmware packs, you can either press Check for Updates to download new packs or you can press Manual Upload to manually upload a firmware pack. Press Default... to define which firmware pack is default.

16 System Tab

16.1 System

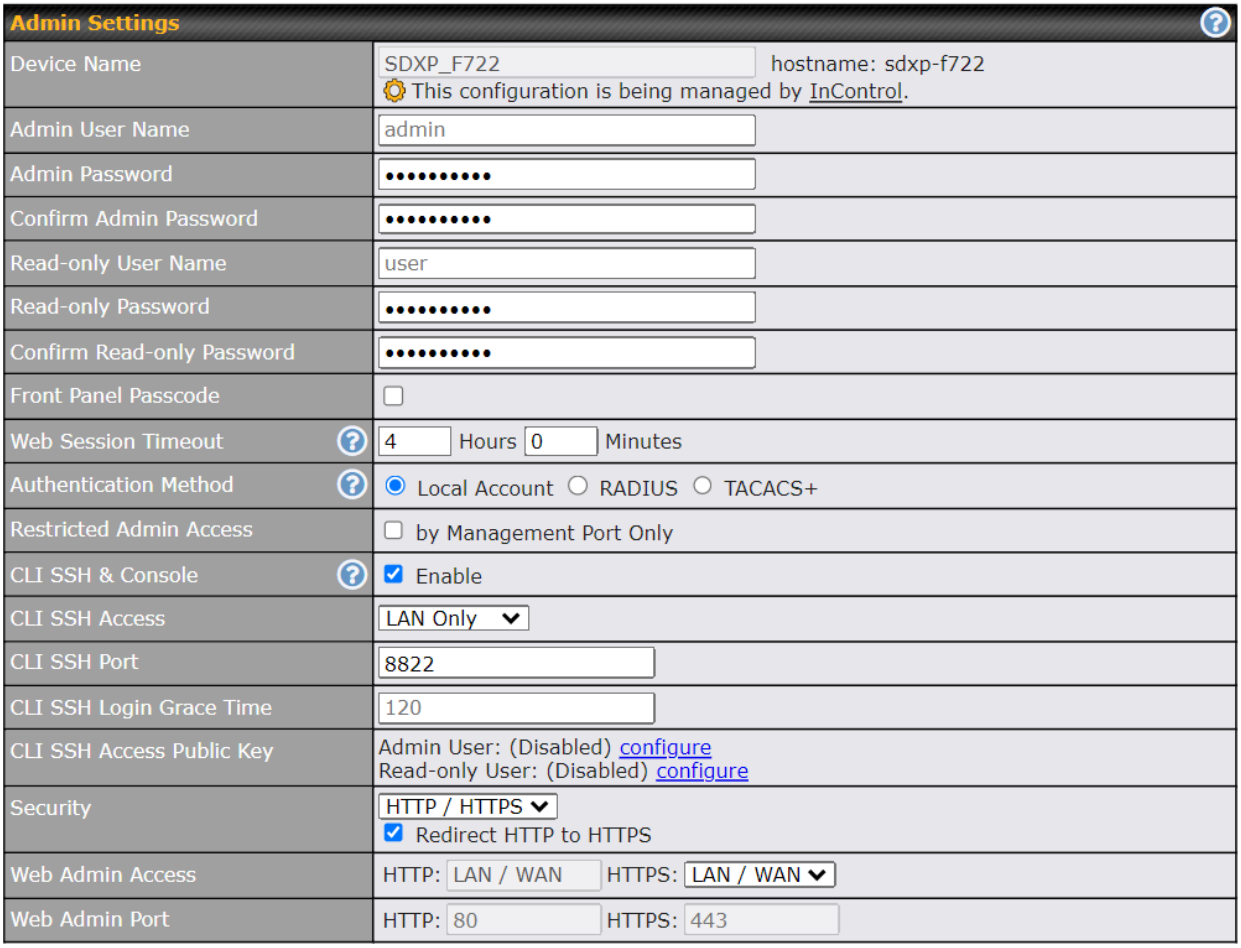
16.1.1 Admin Security

There are two types of user accounts available for accessing the web admin: *admin* and *user*. They represent two user levels: the admin level has full administrative access, while the user level is read-only. The user level can access only the device's status information; users cannot make any changes on the device.

A web login session will be logged out automatically when it has been idle longer than the **Web Session Timeout**. Before the session expires, you may click the **Logout** button in the web admin to exit the session.

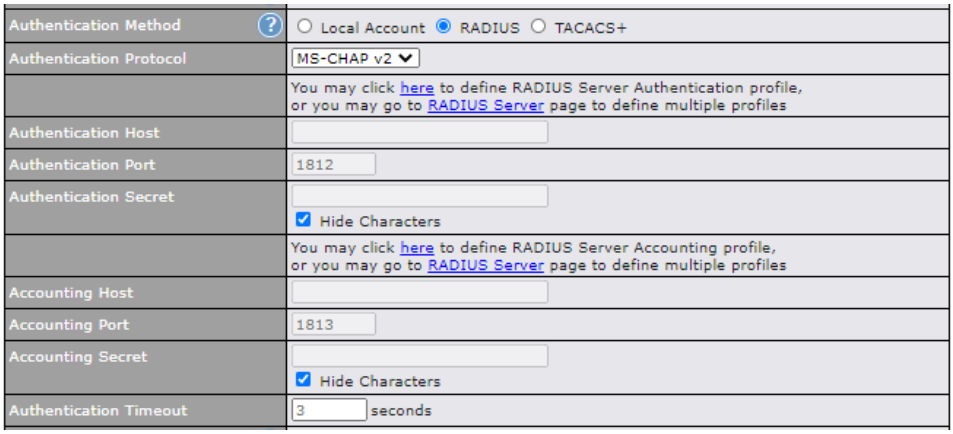
0 hours 0 minutes signifies an unlimited session time. This setting should be used only in special situations, as it will lower the system security level if users do not log out before closing the browser. The **default** is 4 hours, 0 minutes.

For security reasons, after logging in to the web admin Interface for the first time, it is recommended to change the administrator password. Configuring the administration interface to be accessible only from the LAN can further improve system security. Administrative settings configuration is located at **System > Admin Security**.



Admin Settings	
Device Name	This field allows you to define a name for this Pepwave router. By default, **Device Name** is set as **Balance_XXXX**, where *XXXX* refers to the last 4 digits of the unit's serial number.
Admin User Name	**Admin User Name** is set as *admin* by default, but can be changed, if desired.
Admin Password	This field allows you to specify a new administrator password.
Confirm Admin Password	This field allows you to verify and confirm the new administrator password.
Read-only User Name	**Read-only User Name** is set as *user* by default, but can be changed, if desired.

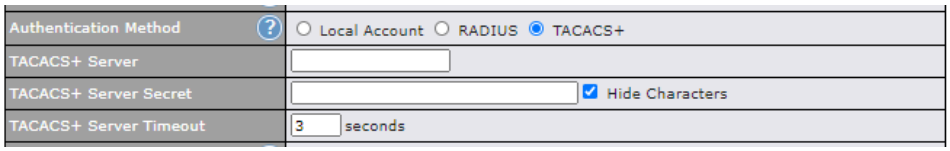
Read-only Password	This field allows you to specify a new user password. Once the user password is set, the read-only user feature will be enabled.
Confirm Read-only Password	This field allows you to verify and confirm the new user password.
Front Panel Passcode	This option is available for those device come with a LCD front panel. With this box is checked, it allows you to set the front panel passcode. By default, the setting is disabled.
Web Session Timeout	This field specifies the number of hours and minutes that a web session can remain idle before the Pepwave router terminates its access to the web admin interface. By default, it is set to **4 hours**.
Authentication Method	With this box is checked, the web admin will authenticate using an external RADIUS server. Authenticated users are treated as either "admin" with full read-write permission or “user” with read-only access. Local admin and user accounts will be disabled. When the device is not able to communicate with the external RADIUS server, local accounts will be enabled again for emergency access. Additional authentication options will be available once this box is checked. Available options: • Local Account • RADIUS



Authentication Protocol	This specifies the authentication protocol used. Available options are **MS-CHAP v2** and **PAP**.
Authentication Host	This specifies the IP address or hostname of the RADIUS server host.
Authentication Port	This setting specifies the UDP destination port for authentication requests.
Authentication Secret	This field is for entering the secret key for accessing the RADIUS server.

Accounting Host	This specifies the IP address or hostname of the RADIUS server host.
Accounting Port	This setting specifies the UDP destination port for accounting requests.
Accounting Secret	This field is for entering the secret key for accessing the accounting server.
Authentication Timeout	This option specifies the time value for authentication timeout

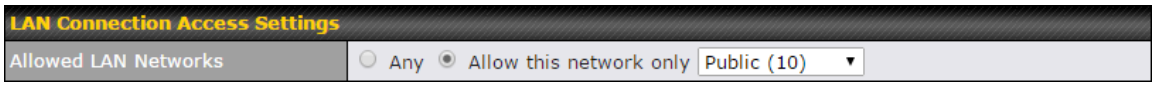
- TACACS+



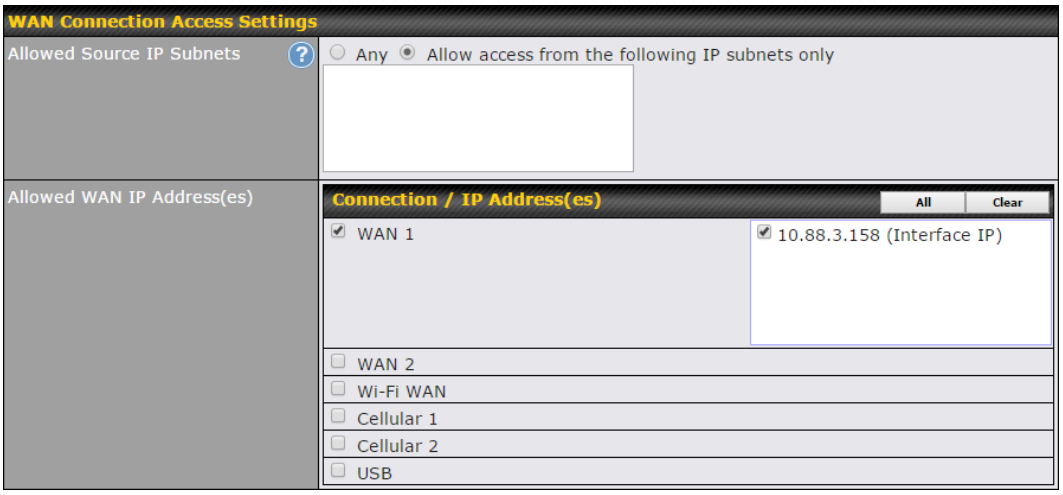
TACACS+ Server	This specifies the access address of the external TACACS+ server.
TACACS+ Server Secret	This field is for entering the secret key for accessing the RADIUS server.
TACACS+ Server Timeout	This option specifies the time value for TACACS+ timeout

Restricted Admin Access	When the "**by Management Port Only**" is enabled, this option allows you to access the device WebAdmin/SSH by physical connect to the MGMT port.
CLI SSH & Console	The CLI (command line interface) can be accessed via SSH. This field enables CLI support. For additional information regarding CLI, please refer to **Section 15.3.**
CLI SSH Access	This menu allows you to choose between granting access to LAN and WAN clients, or to LAN clients only.
CLI SSH Port	This field determines the port on which clients can access CLI SSH.
CLI SSH Login Grace Time	This option specifies the time for CLI SSH login. The default value is 120.
CLI SSH Access Public Key	This field is for entering the Public Key for Admin Users and Read-only Users to access CLI SSH.
Security	This option is for specifying the protocol(s) through which the web admin interface can be

	accessed: • HTTP • HTTPS • HTTP/HTTPS HTTP to HTTPS redirection is enabled by default to force HTTPS access to the web admin interface.
Web Admin Access	This option is for specifying the network interfaces through which the web admin interface can be accessed: • LAN only • LAN/WAN If LAN/WAN is chosen, the **WAN Connection Access Settings** form will be displayed.
Web Admin Port	This field is for specifying the port number on which the web admin interface can be accessed.



LAN Connection Access Settings	
Allowed LAN Networks	This field allows you to permit only specific networks or VLANs to access the Web UI.



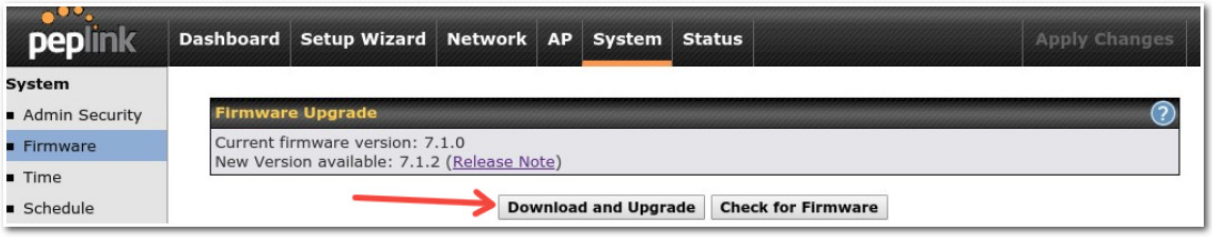
WAN Connection Access Settings	
Allowed Source IP Subnets	This field allows you to restrict web admin access only from defined IP subnets. • **Any** - Allow web admin accesses to be from anywhere, without IP address restriction. • **Allow access from the following IP subnets only** - Restrict web admin access only from the defined IP subnets. When this is chosen, a text input area will be

	displayed beneath: The allowed IP subnet addresses should be entered into this text area. Each IP subnet must be in form of *w.x.y.z/m*, where *w.x.y.z* is an IP address (e.g., *192.168.0.0*), and *m* is the subnet mask in CIDR format, which is between 0 and 32 inclusively (For example, *192.168.0.0/24*). To define multiple subnets, separate each IP subnet one in a line. For example: • 192.168.0.0/24 • 10.8.0.0/16
Allowed WAN IP Address(es)	This is to choose which WAN IP address(es) the web server should listen on.

16.1.2 Firmware

Upgrading firmware can be done in one of three ways.
Using the router's interface to automatically check for an update, using the router's interface to manually upgrade the firmware, or using InControl2 to push an upgrade to a router.
The automatic upgrade can be done from **System** > **Firmware**.

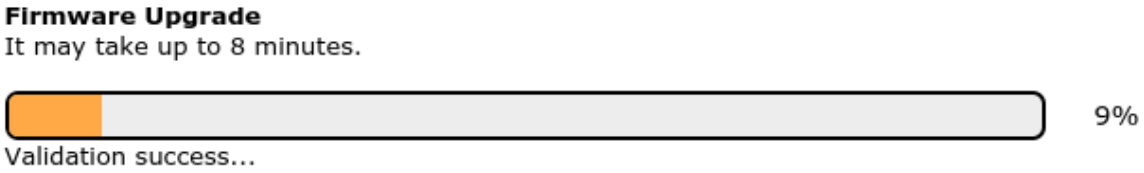
If an update is found the buttons will change to allow you to **Download and Update** the firmware.



Click on the **Download and Upgrade** button. A prompt will be displayed advising to download the Current Active Configuration. Please click on the underlined download text. After downloading the current config click the **Ok** button to start the upgrade process.

The router will download and then apply the firmware. The time that this process takes will depend on your internet connection's speed.

The firmware will now be applied to the router*. The amount of time it takes for the firmware to upgrade will also depend on the router that's being upgraded.

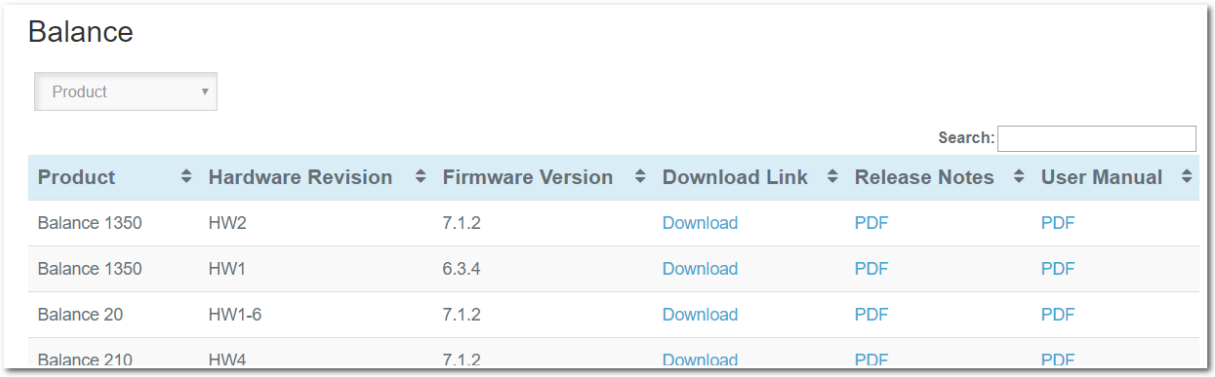


***Upgrading the firmware will cause the router to reboot.**

Web admin interface: install updates manually

In some cases, a special build may be provided via a ticket or it may be found in the forum. Upgrading to the special build can be done using this method, or using IC2 if you are using that to manage your firmware upgrades. A manual upgrade using the GA firmware posted on the site may also be recommended or required for a couple of reasons.

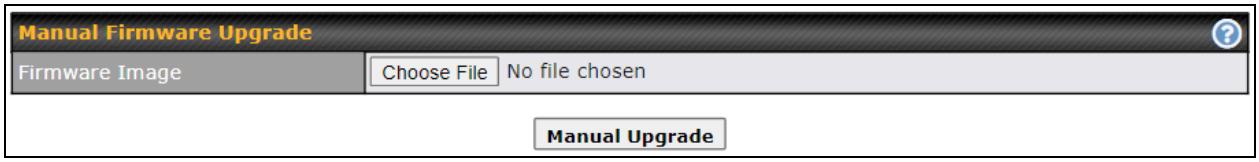
All of the Peplink/Pepwave GA firmware can be found here Navigate to the relevant product line (ie. Balance, Max, FusionHub, SOHO, etc). Some product lines may have a dropdown that lists all of the products in that product line. Here is a screenshot from the Balance line.



If the device has more than one firmware version the current hardware revision will be required to know what firmware to download.

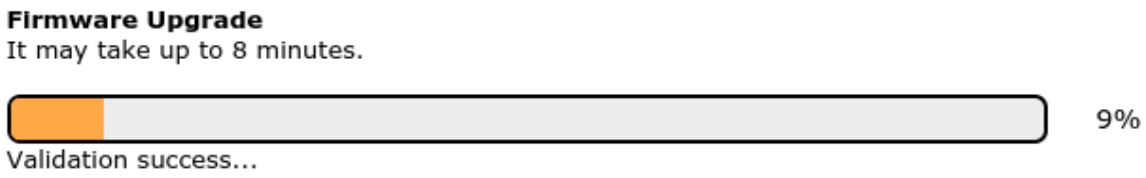
Navigate to **System > Firmware** and click the Choose File button under the Manual Firmware Upgrade section. Navigate to the location that the firmware was downloaded to select the ".img" file and click the Open button.

Click on the Manual Upgrade button to start the upgrade process.



A prompt will be displayed advising to download the Current Active Configuration. Please click on the underlined download text. After downloading the current config click the Ok button to

start the upgrade process. The firmware will now be applied to the router*. The amount of time it takes for the firmware to upgrade will depend on the router that's being upgraded.



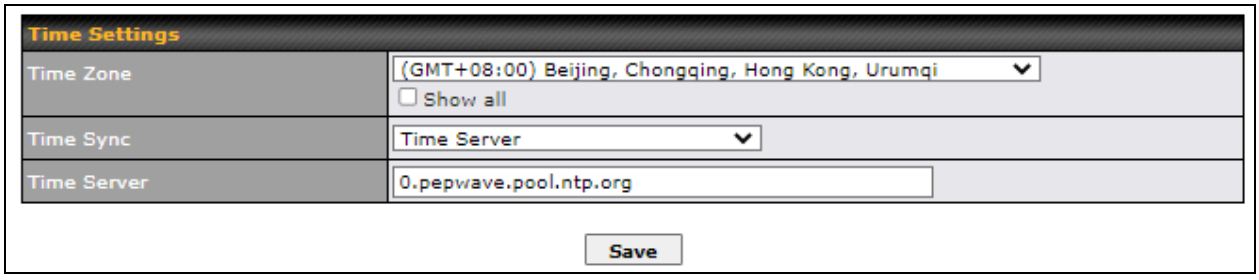
***Upgrading the firmware will cause the router to reboot.**

The InControl method

Described in this knowledgebase article on our forum.

16.1.3 Time

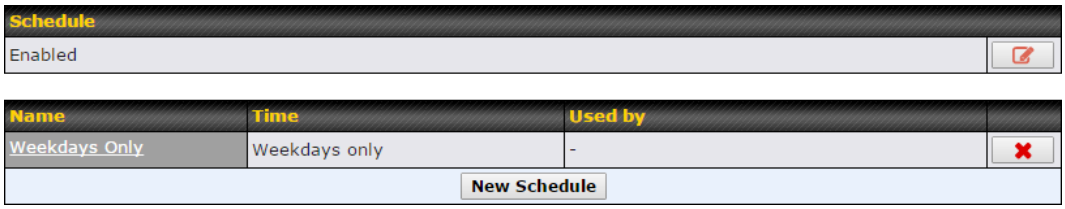
The time server functionality enables the system clock of the Peplink Balance to be synchronized with a specified time server. The settings for time server configuration are located at **System > Time**.



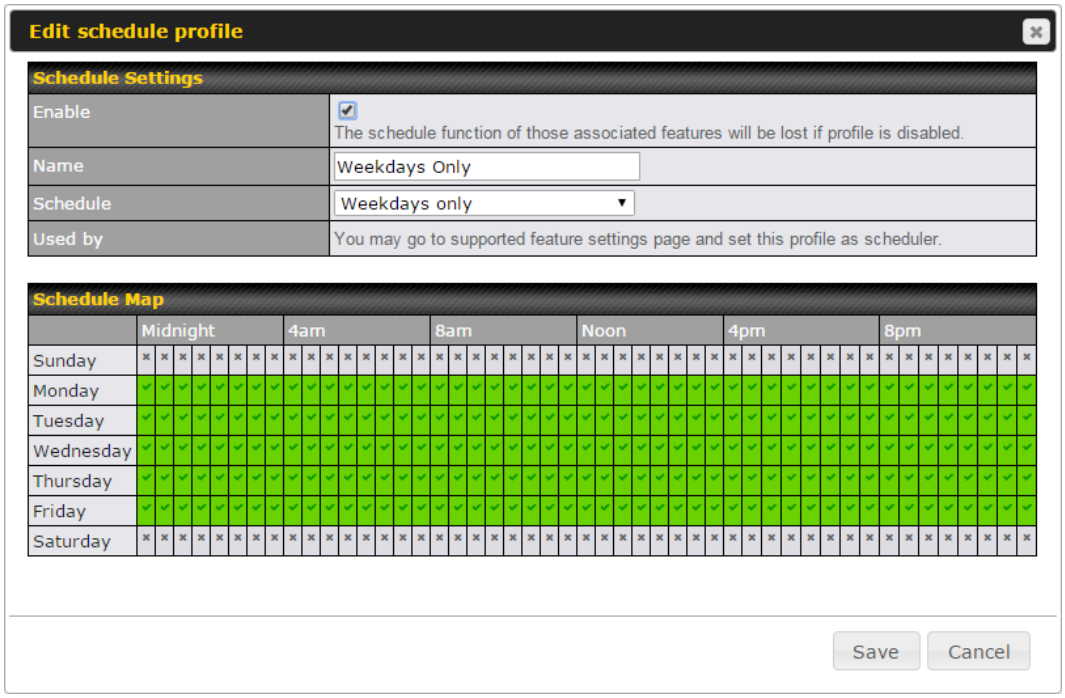
Time Settings	
Time Zone	This specifies the time zone (along with the corresponding Daylight Savings Time scheme) in which Peplink Balance operates. The **Time Zone** value affects the time stamps in the event log of the Peplink Balance and e-mail notifications. Check **Show all** to show all time zone options.
Time Sync	This field allows to select your time sync mode, the available options are: • Time Server • GPS • GPS with Time Server as fallback
Time Server	This setting specifies the NTP network time server to be utilized by the Peplink Balance.

16.1.4 Schedule

Enable and disable different functions (such as WAN connections, outbound policy, and firewalls at different times, based on a user-scheduled configuration profile. The settings for this are located at **System > Schedule**



Enable scheduling, and then click on your schedule name or on the **New Schedule** button to begin.

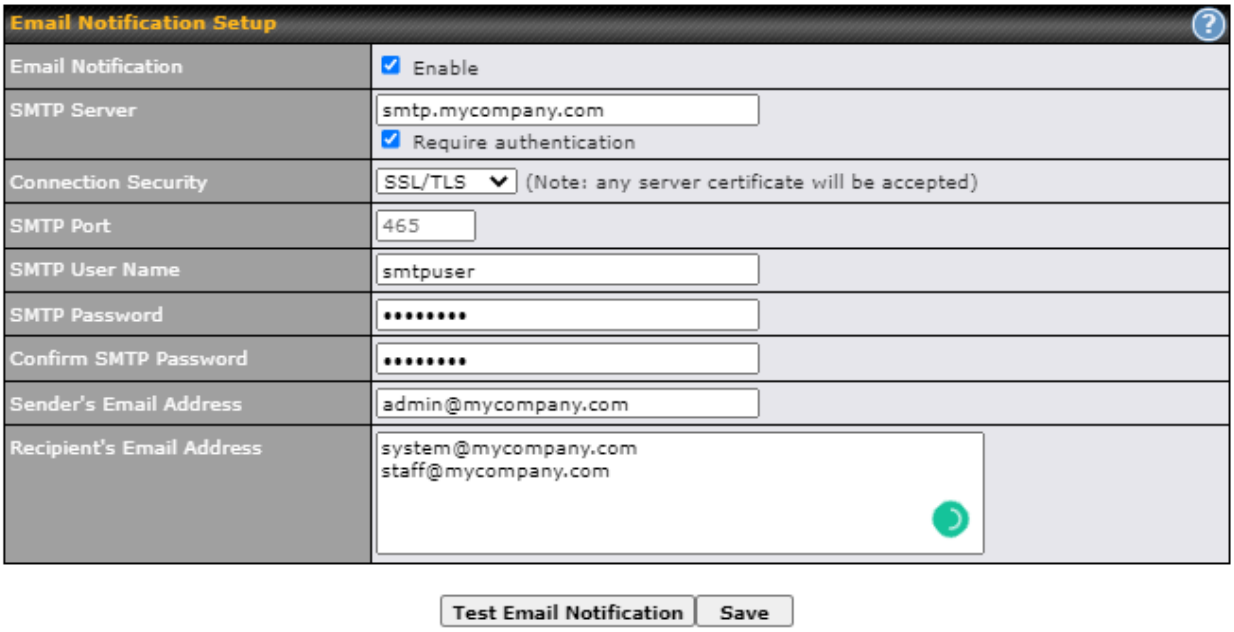


Edit Schedule Profile	
Enabling	Click this checkbox to enable this schedule profile. Note that if this is disabled, then any associated features will also have their scheduling disabled.
Name	Enter your desired name for this particular schedule profile.
Schedule	Click the drop-down menu to choose pre-defined schedules as your starting point. Please note that upon selection, previous changes on the schedule map will be deleted.

Schedule Map	Click on the desired times to enable features at that time period. You can hold your mouse for faster entry.

16.1.5 Email Notification

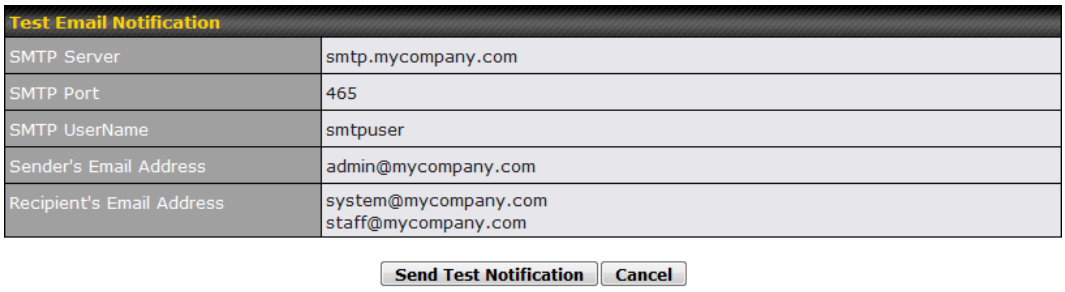
The email notification functionality of the Peplink Balance provides a system administrator with up-to-date information on network status. The settings for configuring email notification are found at **System > Email Notification**.



Email Notification Settings	
Email Notification	This setting specifies whether or not to enable email notification. If **Enable** is checked, the Peplink Balance will send email messages to system administrators when the WAN status changes or when new firmware is available. If **Enable** is not checked, email notification is disabled and the Peplink Balance will not send email messages.
SMTP Server	This setting specifies the SMTP server to be used for sending email. If the server requires authentication, check **Require authentication**.
Connection Security	This setting specifies via a drop-down menu one of the following valid Connection Security: • None • STARTTLS • SSL/TLS
SMTP Port	This field is for specifying the SMTP port number. By default, this is set to **25**. If Connection Security is selected "**STARTTLS**", the default port number will be set to **587**. If Connection Security is selected "**SSL/TLS**", the default port number will be set to **465**. You may customize the port number by editing this field.

SMTP User Name / Password	This setting specifies the SMTP username and password while sending email. These options are shown only if **Require authentication** is checked in the **SMTP Server** setting.
Confirm SMTP Password	This field allows you to verify and confirm the new administrator password.
Sender's Email Address	This setting specifies the email address which the Peplink Balance will use to send its reports.
Recipient's Email Address	This setting specifies the email address(es) to which the Peplink Balance will send email notifications. For multiple recipients, separate each email using the enter key.

After you have finished setting up email notifications, you can click the **Test Email Notification** button to test the settings before saving. After **Test Email Notification** is clicked, you will see this screen to confirm the settings:



Click **Send Test Notification** to confirm. In a few seconds, you will see a message with detailed test results.

Test email sent.
(NOTE: Settings are not saved. To confirm the update, click 'Save' button.)

Email Notification Setup	
Email Notification	☑ Enable
SMTP Server	[redacted] ☑ Require authentication
Connection Security	SSL/TLS (Note: any server certificate will be accepted)
SMTP Port	465
SMTP User Name	[redacted]
SMTP Password	••••••••••••••••
Confirm SMTP Password	••••••••••••••••
Sender's Email Address	[redacted]
Recipient's Email Address	[redacted]

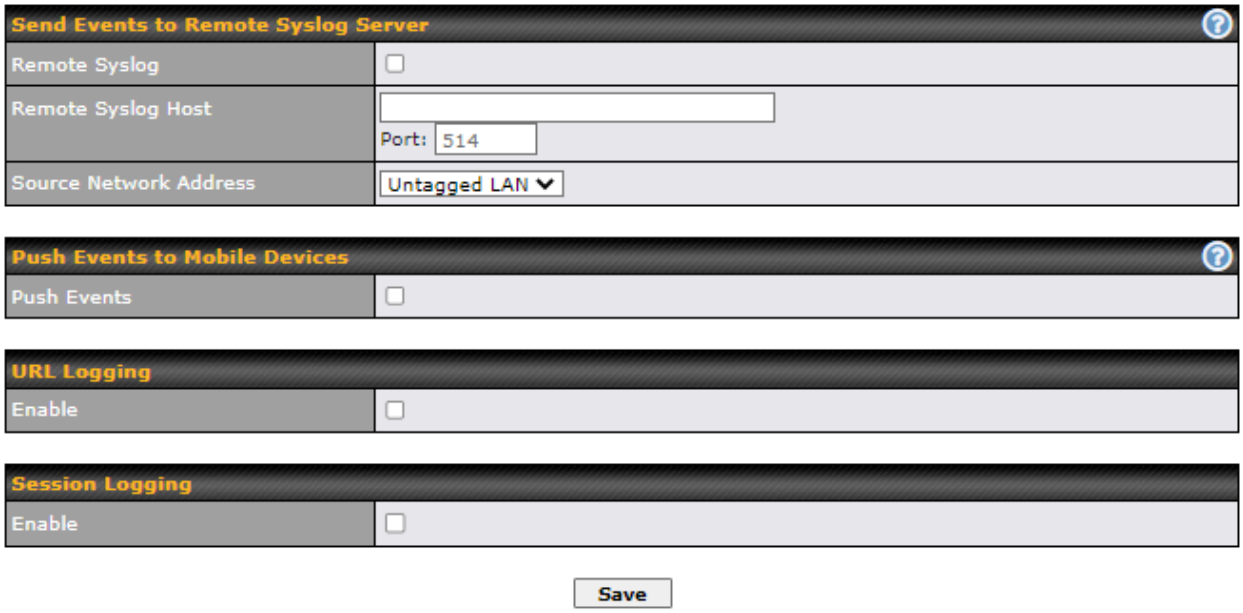
Test Email Notification | Save

Test Result

```
[INFO] Try email through auto detected connection
[INFO] SMTP through SSL connected
[<-] 220 smtp.gmail.com ESMTP h11sm3907691pjg.46 - gsmtp
[->] EHLO balance.peplink.com
[<-] 250-smtp.gmail.com at your service, [14.192.209.255]
[<-] 250-SIZE 35882577
[<-] 250-8BITMIME
[<-] 250-AUTH LOGIN PLAIN XOAUTH2 PLAIN-CLIENTTOKEN OAUTHBEARER XOAUTH
[<-] 250-ENHANCEDSTATUSCODES
[<-] 250-PIPELINING
[<-] 250-CHUNKING
[<-] 250 SMTPUTF8
[->] AUTH PLAIN AGdwc2dhbjk0QGdtYWlsLmNvbQBwdnJ6bWF6cGhtYXJpanpp
```


16.1.6 Event Log

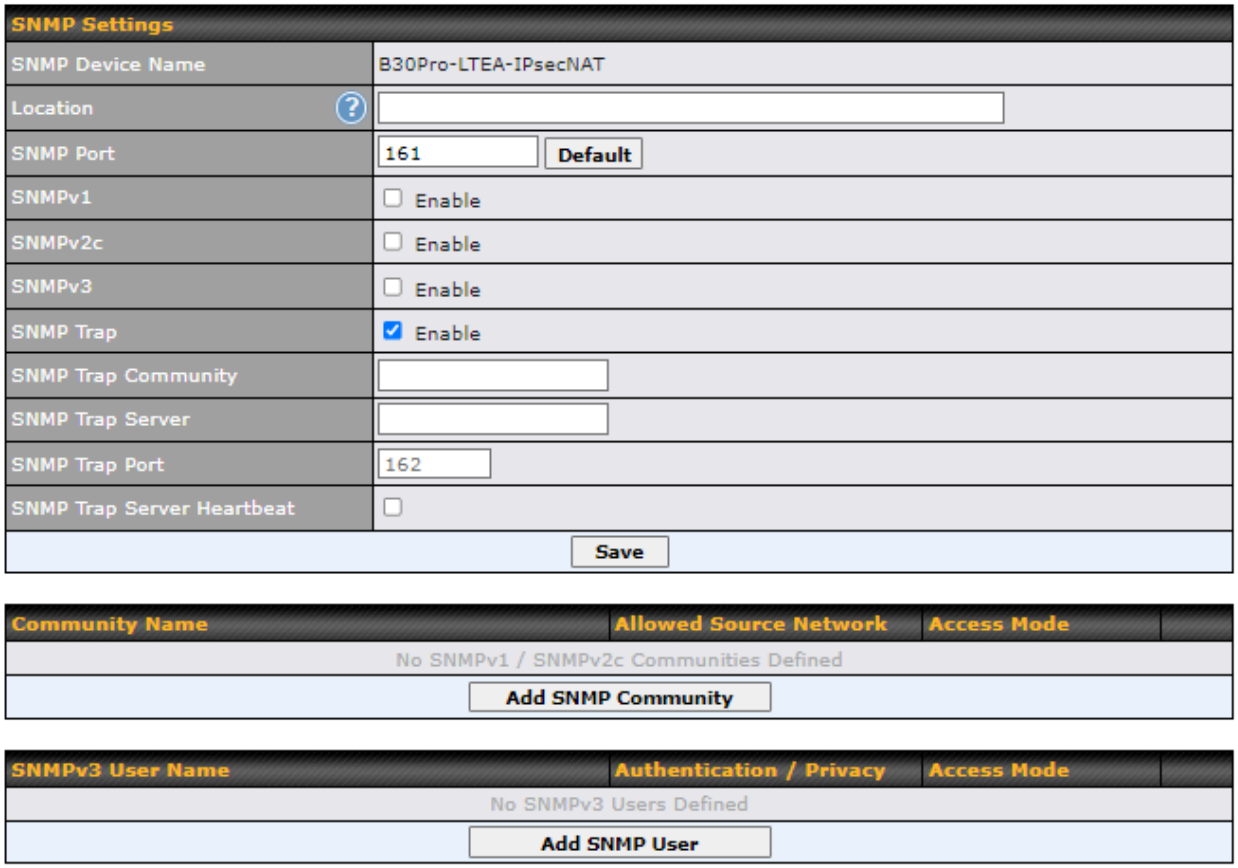
Event log functionality enables event logging at a specified remote syslog server. The settings for configuring the remote system log can be found at **System>Event Log**.



Remote Syslog Settings	
Remote Syslog	This setting specifies whether or not to log events at the specified remote syslog server.
Remote Syslog Host	This setting specifies the IP address or hostname of the remote syslog server.
Source Network Address	Via drop-down list, you may choose the LAN interface for Event Log, URL Logging, Sessions Logging and RADIUS.
Push Events	The Peplink Balance can also send push notifications to mobile devices that have our Mobile Router Utility installed. Check the box to activate this feature.
URL Logging	This setting is to enable event logging at the specified log server.
URL Logging Host	This setting specifies the IP address or hostname of the URL log server.
Session Logging	This setting is to enable event logging at the specified log server.
Session Logging Host	This setting specifies the IP address or hostname of the Session log server.
peplink PEPWAVE	For more information on the Router Utility, go to: www.peplink.com/products/router-utility

16.1.7 SNMP

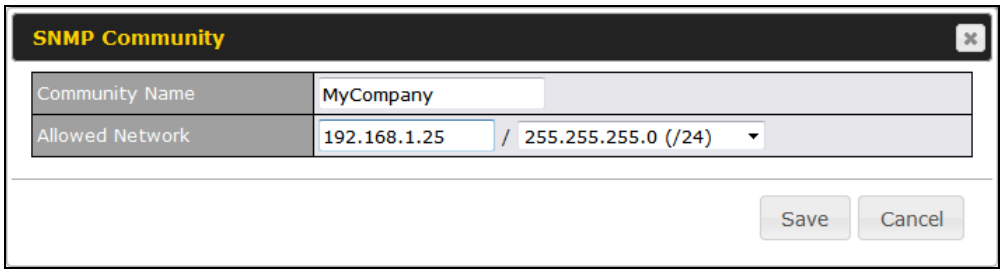
SNMP or simple network management protocol is an open standard that can be used to collect information about the Peplink Balance unit. SNMP configuration is located at **System > SNMP**.



SNMP Settings	
SNMP Device Name	This field shows the router name defined at **System>Admin Security**.
SNMP Port	This option specifies the port which SNMP will use. The default port is **161**.
SNMPv1	This option allows you to enable SNMP version 1.
SNMPv2	This option allows you to enable SNMP version 2.
SNMPv3	This option allows you to enable SNMP version 3.
SNMP Trap	This option allows you to enable SNMP Trap. If enabled, the following entry fields will appear.
SNMP Trap	This setting specifies the SNMP Trap community name.

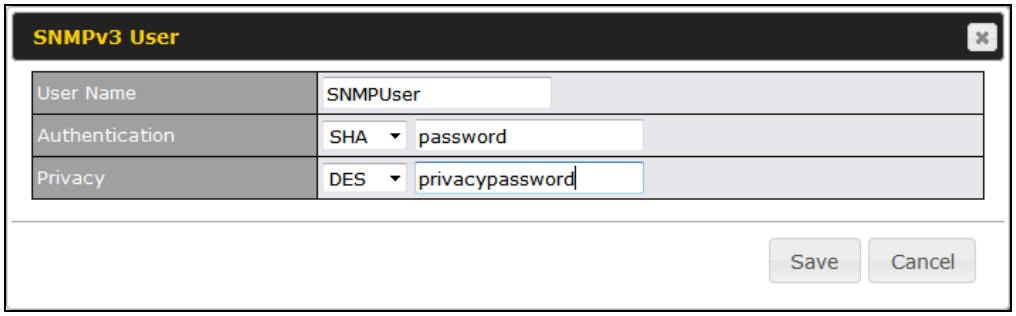
Community	
SNMP Trap Server	Enter the IP address of the SNMP Trap server
SNMP Trap Port	This option specifies the port which the SNMP Trap server will use. The default port is **162**.
SNMP Trap Server Heartbeat	This option allows you to enable and configure the heartbeat interval for the SNMP Trap server.

To add a community for either SNMPv1 or SNMPv2, click the **Add SNMP Community** button in the **Community Name** table, upon which the following screen is displayed:



SNMP Community Settings	
Community Name	This setting specifies the SNMP community name.
Allowed Source Subnet Address	This setting specifies a subnet from which access to the SNMP server is allowed. Enter subnet address here (e.g., *192.168.1.0*) and select the appropriate subnet mask.

To define a user name for SNMPv3, click **Add SNMP User** in the **SNMPv3 User Name** table, upon which the following screen is displayed:



SNMPv3 User Settings	
User Name	This setting specifies a user name to be used in SNMPv3.
Authentication Protocol	This setting specifies via a drop-down menu one of the following valid authentication protocols: • NONE • MD5 • SHA When MD5 or SHA is selected, an entry field will appear for the password.
Privacy Protocol	This setting specifies via a drop-down menu one of the following valid privacy protocols: • NONE • DES When DES is selected, an entry field will appear for the password.

16.1.8 SMS Control

SMS Control allows the user to control the device using SMS even if the modem does not have a data connection. The settings for configuring the SMS Control can be found at **System>SMS Control**.

Note: Supported Models

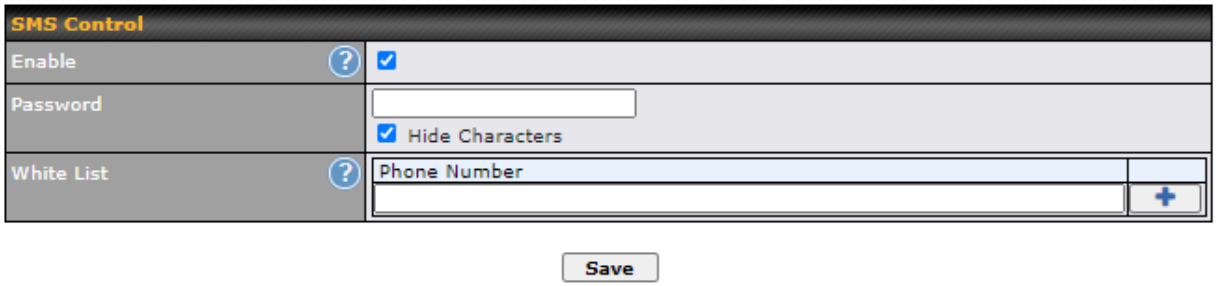
- **Balance/MAX**: *-LTE-E, *-LTEA-W, *-LTEA-P, *-LTE-MX
- **EPX**: *-LW*, *-LP*

When this box is checked, the device will be allowed to take actions according to received commands via SMS.

Make sure your mobile plan supports SMS, and note that some plans may incur additional charges for this.

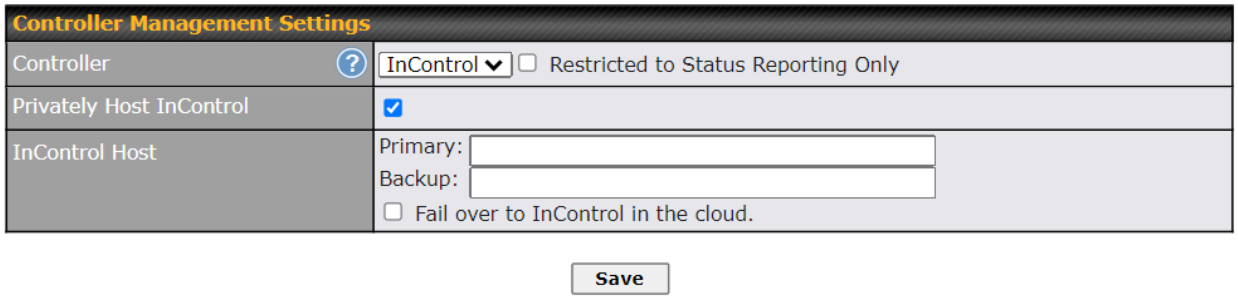
SMS Control can reboot devices and configure cellular settings over signalling channels, even if the modem does not have an active data connection.

For details of supported SMS command sets, please refer to our knowledge base.



SMS Control Settings	
Enable	Click the checkbox to enable the SMS Control.
Password	This setting sets the password for authentication - maximum of 32 characters, which cannot include semicolon (;).
White List	Optionally, you can add phone number(s) to the whitelist. Only matching phone numbers are allowed to issue SMS commands. Phone numbers must be in the E.164 International Phone Numbers format.

16.1.9 InControl



InControl is a cloud-based service which allows you to manage all of your Peplink and Pepwave devices with one unified system. With it, you can generate reports, gather statistics, and configure your devices automatically. All of this is now possible with InControl.

When this checkbox is checked, the device's status information will be sent to the Peplink InControl system. This device's usage data and configuration will be sent to the system if you enable the features in the system.

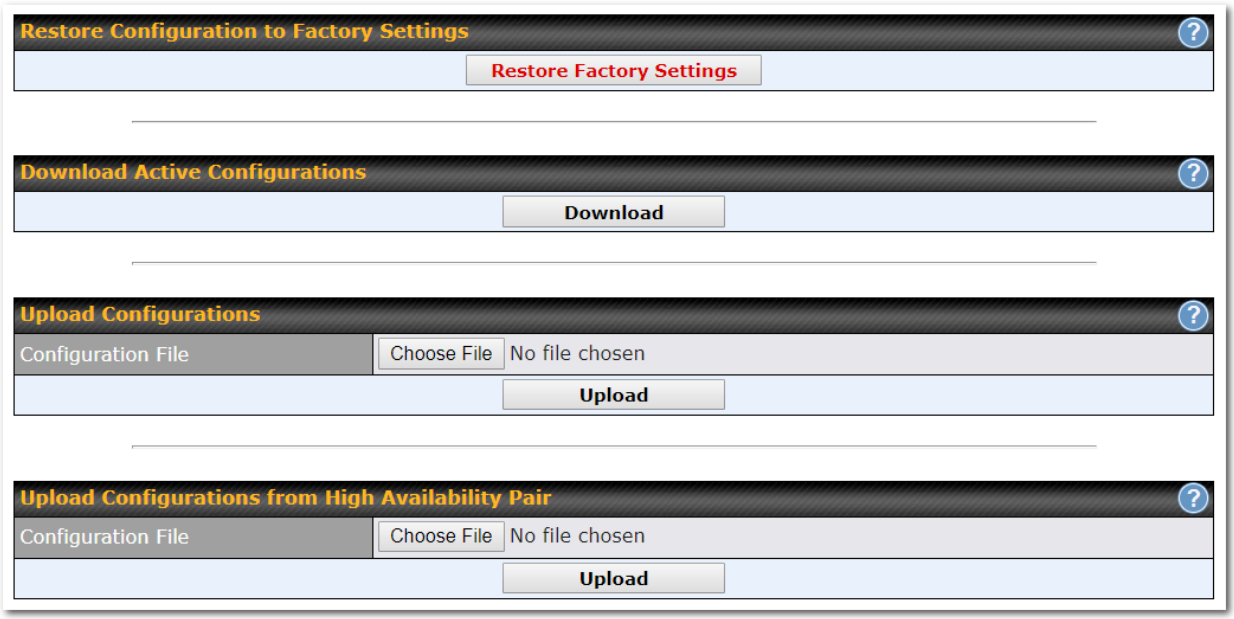
When the box **Restricted to Status Reporting Only** is ticked, the router will only report its status, but can't be managed or configured by InControl.

Alternatively, you can also privately host InControl. Simply check the "Privately Host InControl" box and enter the IP Address of your InControl Host. If you have multiple hosts, you may enter the primary and backup IP addresses for the InControl Host and tick the "Fail over to InControl in the cloud" box. The device will connect to either the primary InControl Host or the secondary/backup ICA/IC2.

You can sign up for an InControl account at https://incontrol2.peplink.com/. You can register your devices under the account, monitor their status, see their usage reports, and receive offline notifications.

16.1.10 Configuration

Backing up Peplink Balance settings immediately after successful completion of initial setup is strongly recommended. The functionality to download and upload Peplink Balance settings is found at **System > Configuration**.



Configuration	
Restore Configuration to Factory Settings	The **Restore Factory Settings** button is to reset the configuration to factory default settings. After clicking the button, you will need to click the **Apply Changes** button on the top right corner to make the settings effective.
Download Active Configurations	Click **Download** to backup the current active settings.
Upload Configurations	To restore or change settings based on a configuration file, click **Choose File** to locate the configuration file on the local computer, and then click **Upload**. The new settings can then be applied by clicking the **Apply Changes** button on the page header, or you can cancel the procedure by pressing **discard** on the main page of the web admin interface.
Upload Configurations from High Availability Pair	In a high availability (HA) configuration, the Balance unit can quickly load the configuration of its HA counterpart. To do so, click the **Upload** button. After loading the settings, configure the LAN IP address of the Peplink Balance unit so that it is different from the HA counterpart.

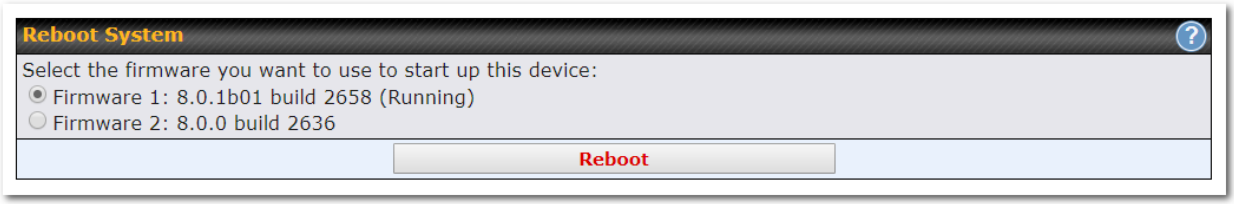
16.1.11 Feature Add-ons

Some balance models have features that can be activated upon purchase. Once the purchase is complete, you will receive an activation key. Enter the key in the **Activation Key** field, click **Activate**, and then click **Apply Changes**.

16.1.12 Reboot

This page provides a reboot button for restarting the system. For maximum reliability, the Peplink Balance Series can be equipped with two copies of firmware, and each copy can be a different version. You can select the firmware version you would like to reboot the device with. The firmware marked with **(Running)** is the current system boot up firmware.

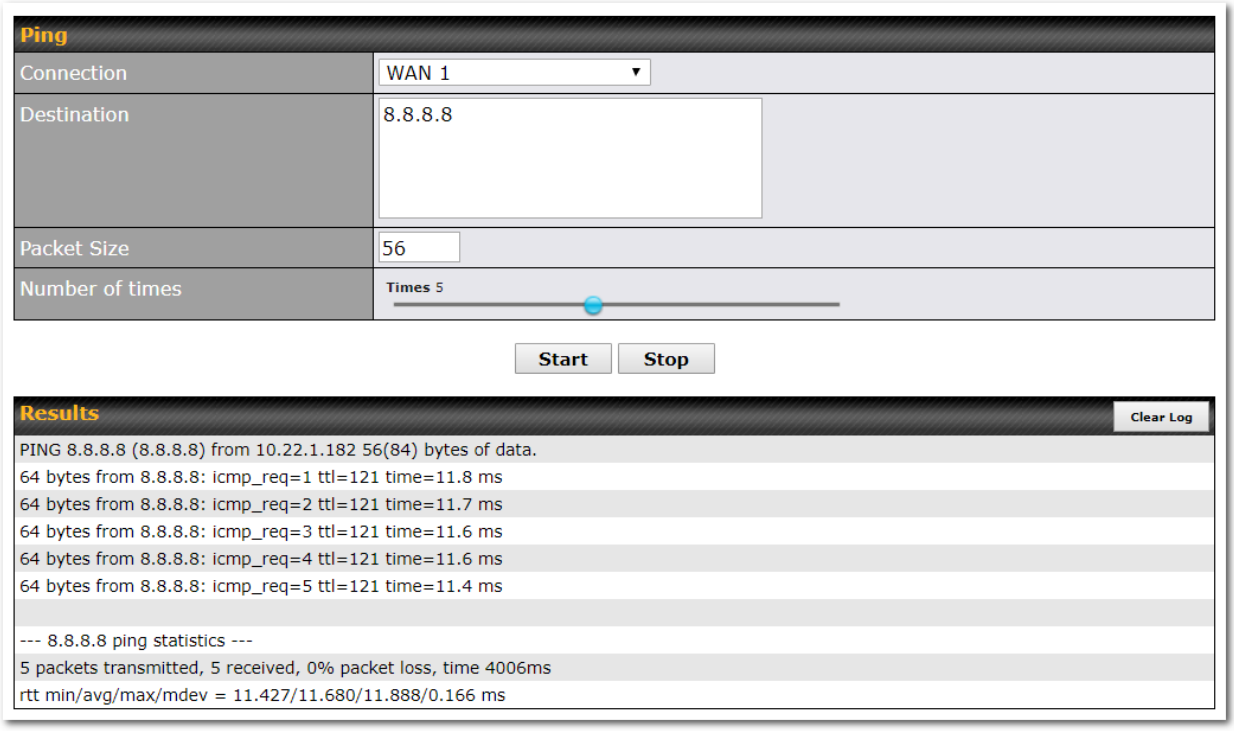
Please note that a firmware upgrade will always replace the inactive firmware partition.



16.2 Tools

16.2.1 Ping

The ping test tool sends pings through a specific Ethernet interface or a SpeedFusion™ VPN connection. You can specify the number of pings in the field **Number of times** to a maximum number of 10 times. **Packet Size** can be set to a maximum of 1472 bytes. The ping utility is located at **System > Tools > Ping,** illustrated below:

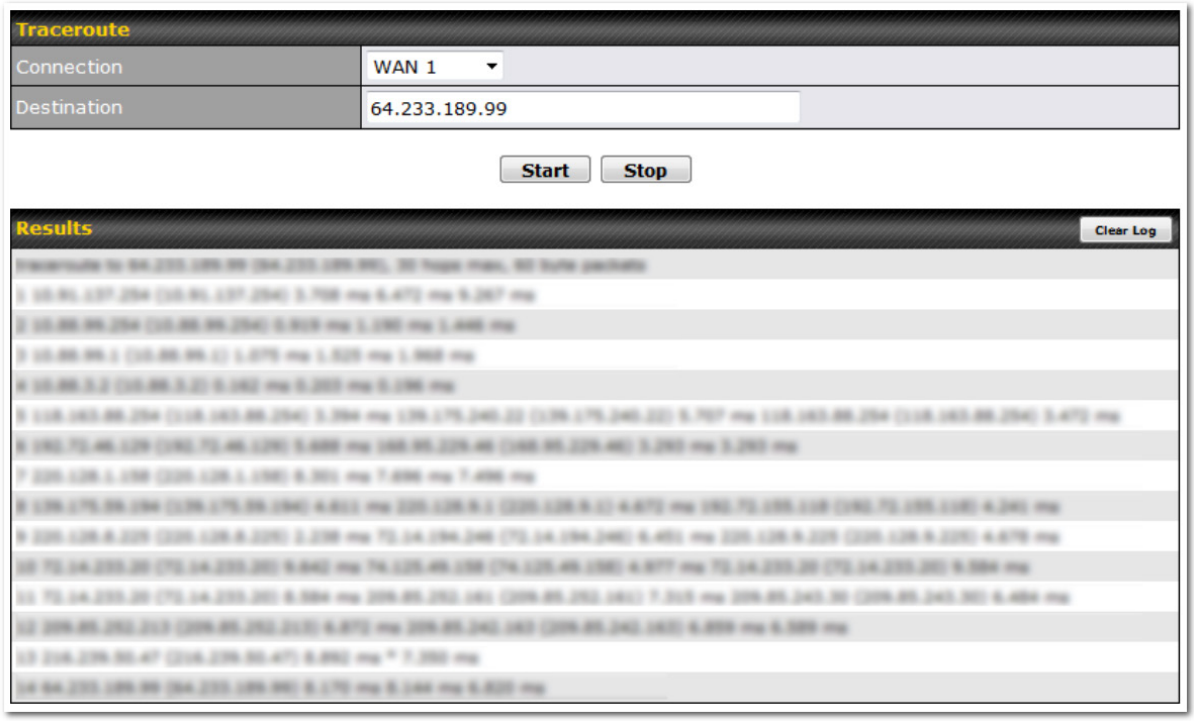


Tip

A system administrator can use the ping utility to manually check the connectivity of a particular LAN/WAN connection.

16.2.2 Traceroute

The traceroute test tool traces the routing path to the destination through a particular Ethernet interface or a SpeedFusion™ connection. The traceroute test utility is located at **System > Tools > Traceroute**.

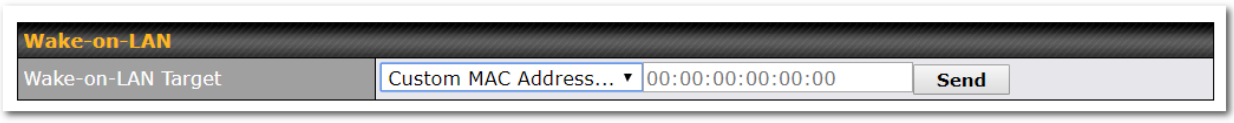


Tip

A system administrator can use the traceroute utility to analyze the connection path of a LAN/WAN connection.

16.2.3 Wake-on-LAN

Peplink routers can send special “magic packets” to any client specified from the Web UI. To access this feature, navigate to **System > Tools > Wake-on-LAN**

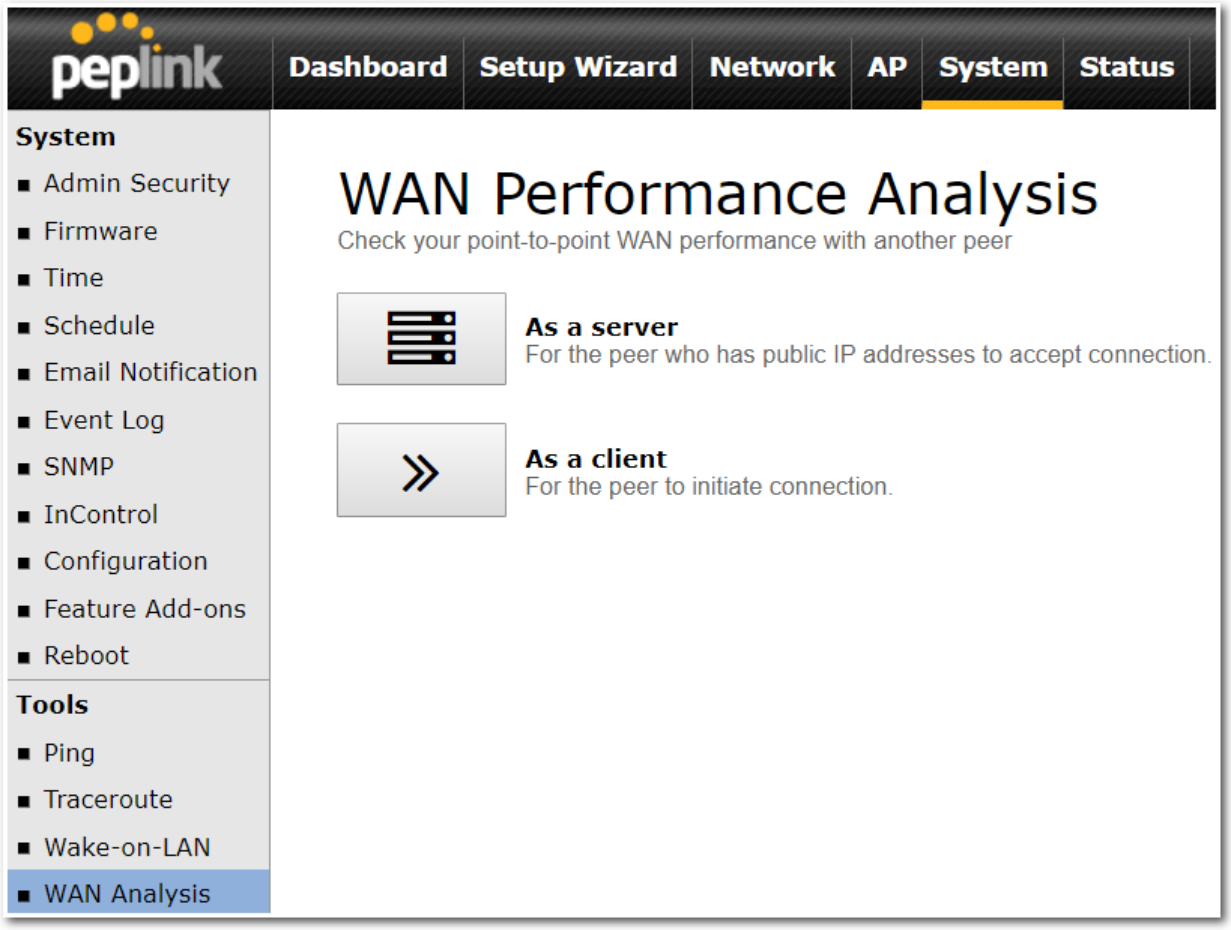


Select a client from the drop-down list and click **Send** to send a “magic packet”

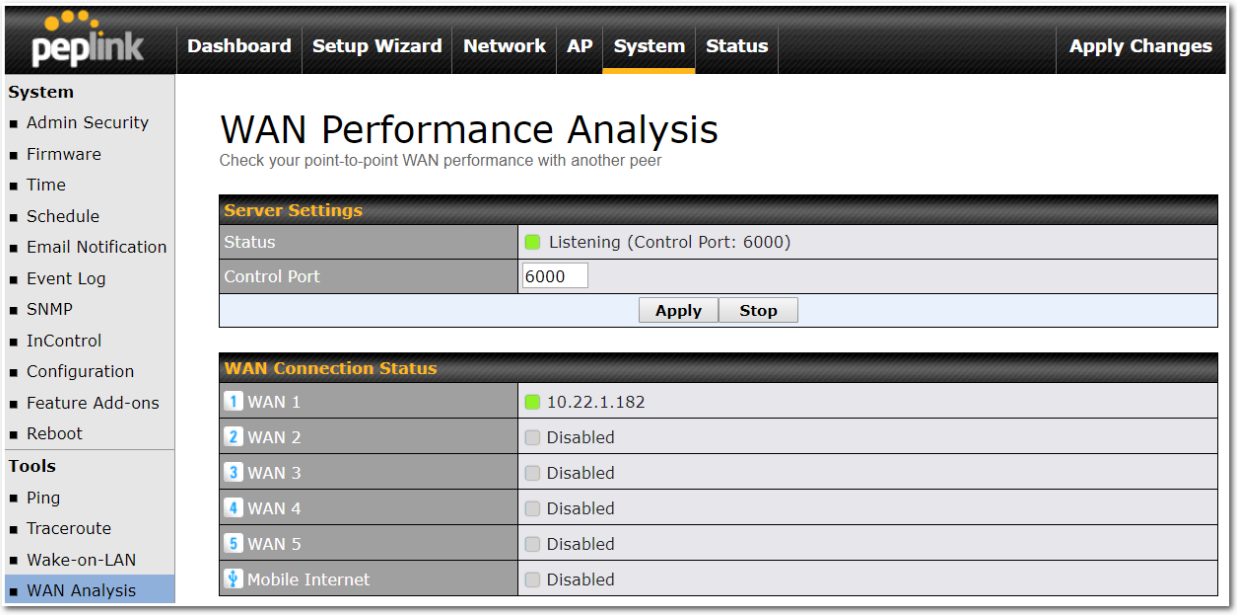
16.2.4 WAN Analysis

The WAN Analysis feature allows you to run a WAN to WAN speed test between 2 Peplink devices .

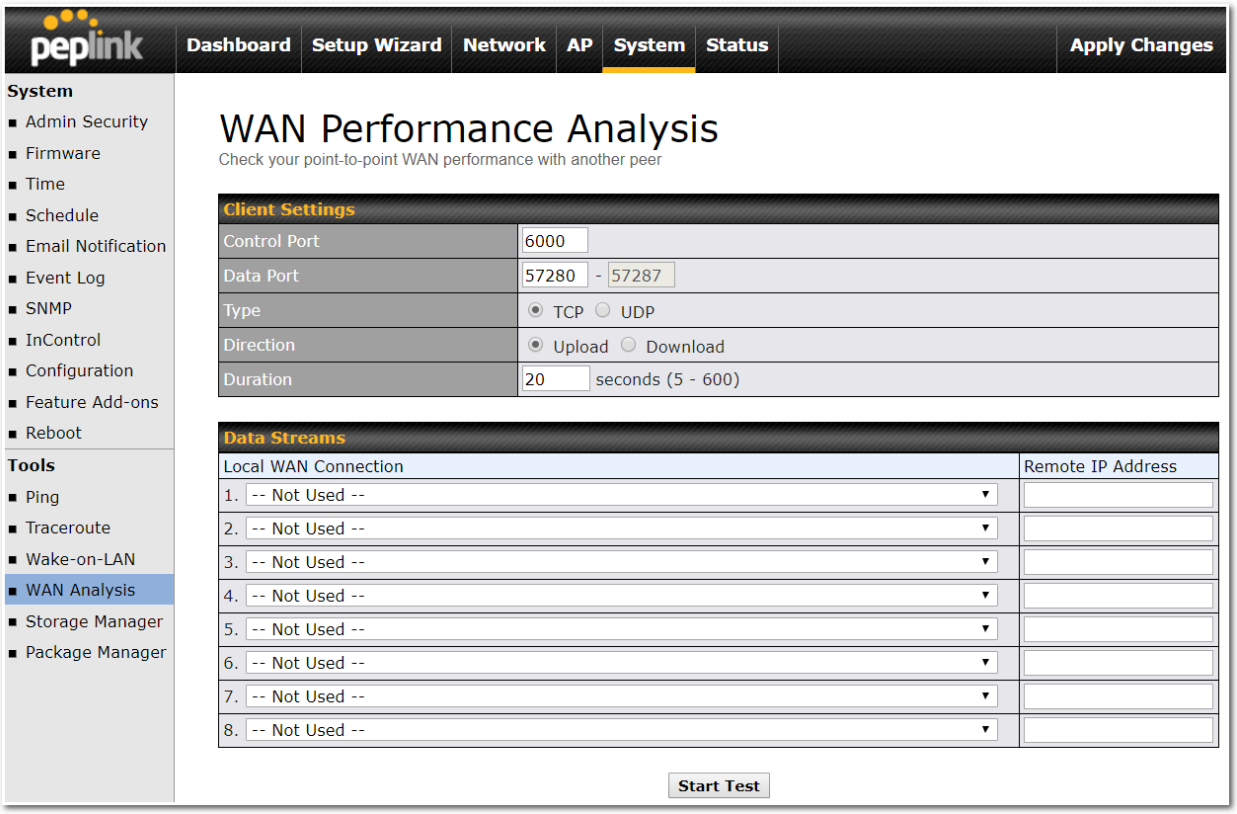
You can set a device up as a **Server** or a **Client**. One device must be set up as a server to run the speed tests and the server must have a public IP address.



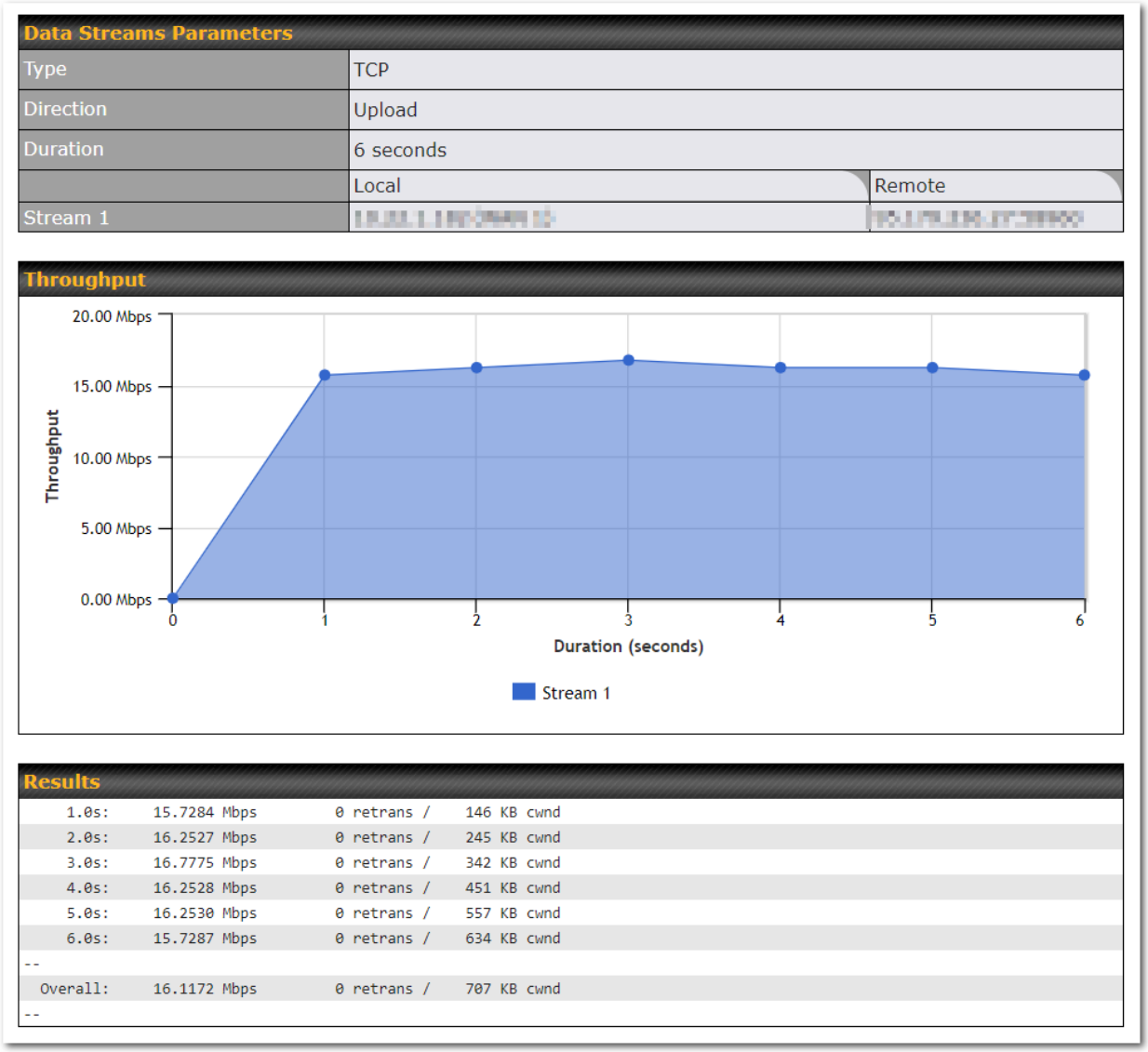
The default port is 6000 and can be changed if required. The IP address of the WAN interface will be shown in the **WAN Connection Status** section.



The client side has a few more settings that can be changed. Make sure that the **Control Port** matches what's been entered on the server side. Select the WAN(s) that will be used for testing and enter the Servers WAN IP address. Once all of the options have been set, click the **Start Test** button.



The test output will show the **Data Streams Parameters**, the **Throughput** as a graph, and the **Results**.



Data Streams Parameters

Type	TCP	
Direction	Upload	
Duration	6 seconds	
	Local	Remote
Stream 1	[redacted]	[redacted]

Throughput

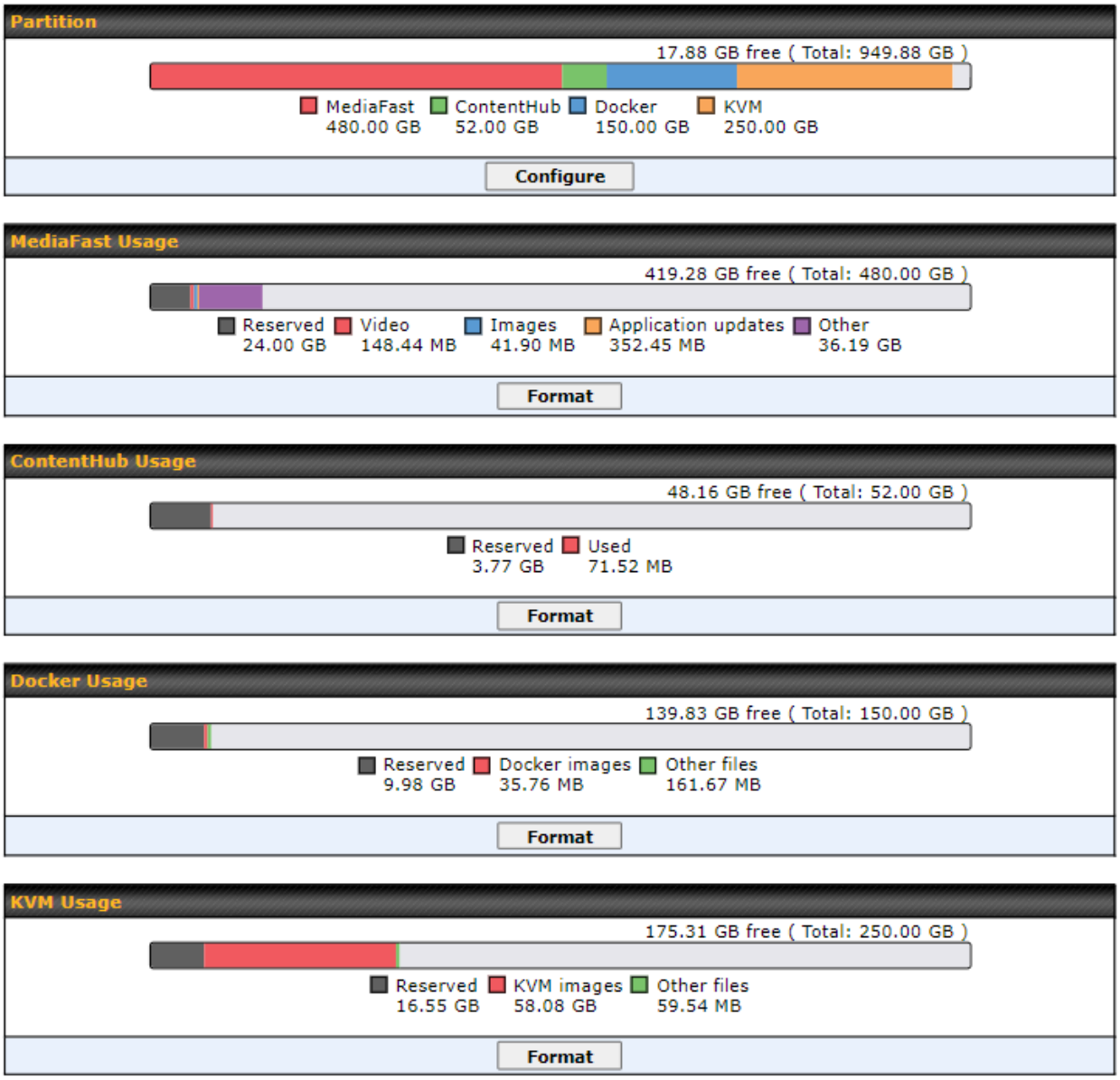
Results

```
    1.0s:     15.7284 Mbps        0 retrans /   146 KB cwnd
    2.0s:     16.2527 Mbps        0 retrans /   245 KB cwnd
    3.0s:     16.7775 Mbps        0 retrans /   342 KB cwnd
    4.0s:     16.2528 Mbps        0 retrans /   451 KB cwnd
    5.0s:     16.2530 Mbps        0 retrans /   557 KB cwnd
    6.0s:     15.7287 Mbps        0 retrans /   634 KB cwnd
--
  Overall:    16.1172 Mbps        0 retrans /   707 KB cwnd
--
```

The test can be run again once it's complete by clicking the **Start** button or you can click **Close** and change the parameters for the test.

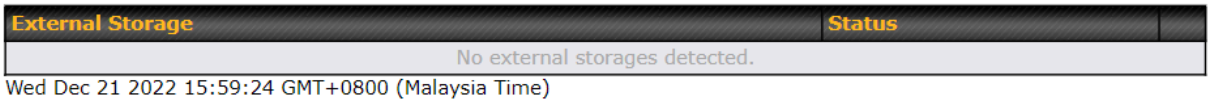
16.2.5 Storage Manager

The Peplink Mediafast router allows to configure the storage on the router's hard disk which allocate storage for MediaFast, ContentHub, Docker and KVM. Click the "**Format**", it will erase all MediaFast, ContentHub, Docker and KVM data stored.



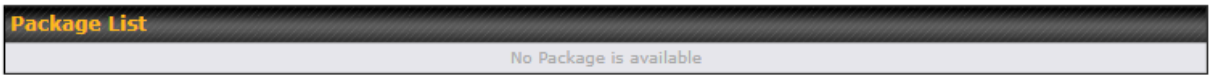
16.2.6 External Storage

This section is to show the status of external storage.



16.2.7 Package Manager

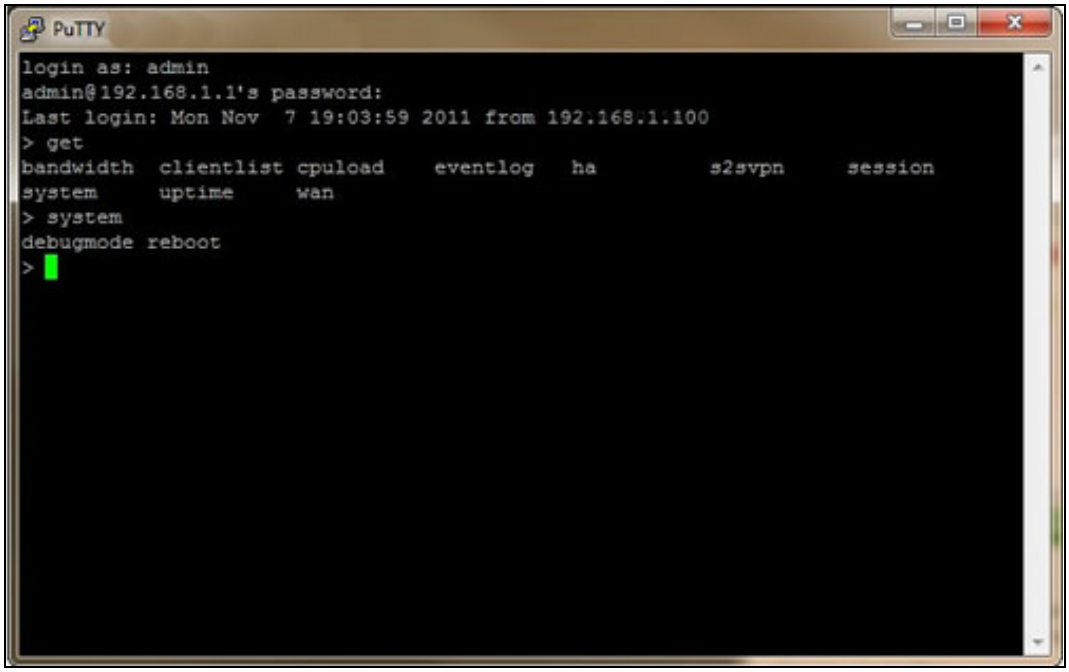
This section is to Install the desired framework in “Package Manager”:



16.3 CLI (Command Line) Support

The serial console connector on some Peplink Balance units is RJ-45. To access the serial console port, prepare a RJ-45 to DB-9 console cable. Connect the RJ-45 end to the unit's console port and the DB-9 end to a terminal's serial port. The port setting will be *115200,8N1*.

The serial console connector on other Peplink Balance units is a DB-9 male connector. To access the serial console port, connect a null modem cable with a DB-9 connector on both ends to a terminal with the port setting of *115200,8N1*.



17 Status Tab

17.1 Status

17.1.1 Device

System information is located at **Status > Device**.

System Information	
Device Name	
Model	Peplink Balance One
Product Code	BPL-ONE
Hardware Revision	1
Serial Number	
Firmware	8.3.0 build 5514
SpeedFusion VPN Version	9.2.0
Modem Support Version	1026 (Modem Support List)
Host Name	
Uptime	3 days 21 hours 28 minutes
System Time	Mon Feb 20 03:06:50 +01 2023
Diagnostic Report	Download
Remote Assistance	Turn On for 7 days

MAC Address	
LAN	
WAN 1	
WAN 2	
PepVPN NAT Mode	

Legal

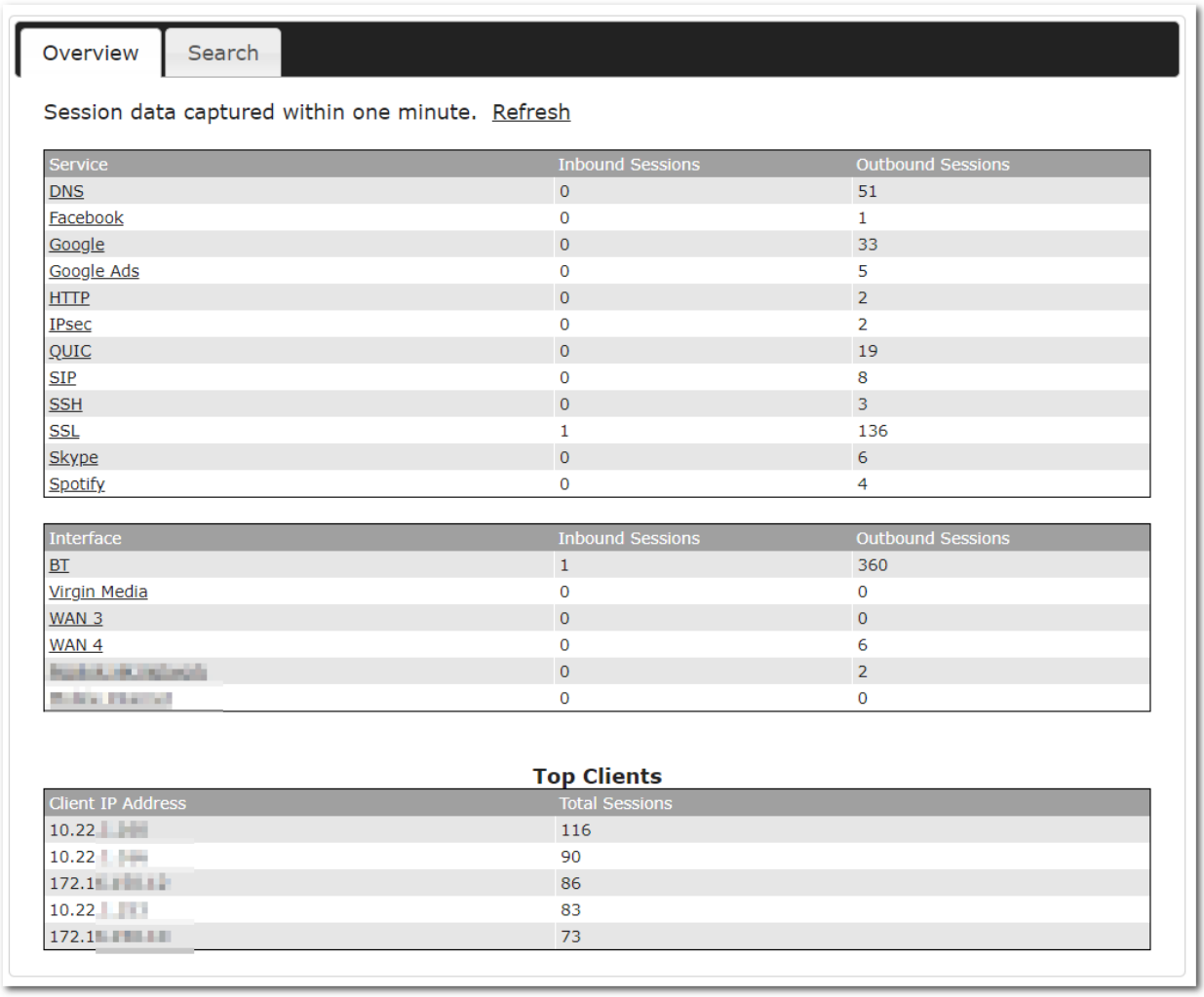
System Information	
Device Name	This is the name specified in the **Device Name** field located at **System > Admin Security**.
Model	This shows the model name and number of this device.
Product Code	If your model uses a product code, it will appear here.
Hardware Revision	This shows the hardware version of this device.
Serial Number	This shows the serial number of this device.
Firmware	This shows the firmware version this device is currently running.
SpeedFusion VPN	This shows the current SpeedFusion VPN version.
Modem Support Version	This shows the modem support version. For a list of supported modems, click **Modem Support List**.
Host Name	The host name assigned to the Pepwave router appears here.
Uptime	This shows the length of time since the device has been rebooted.
System Time	This shows the current system time.
Diagnostic Report	The **Download** link is for exporting a diagnostic report file required for system investigation.
Remote Assistance	This option is to **Turn on** remote assistance with the time duration.

The second table shows the MAC address of each LAN/WAN interface connected.

Important Note
If you encounter issues and would like to contact the Peplink Support Team (http://www.peplink.com/contact/), please download the diagnostic report file and attach it along with a description of your issue.

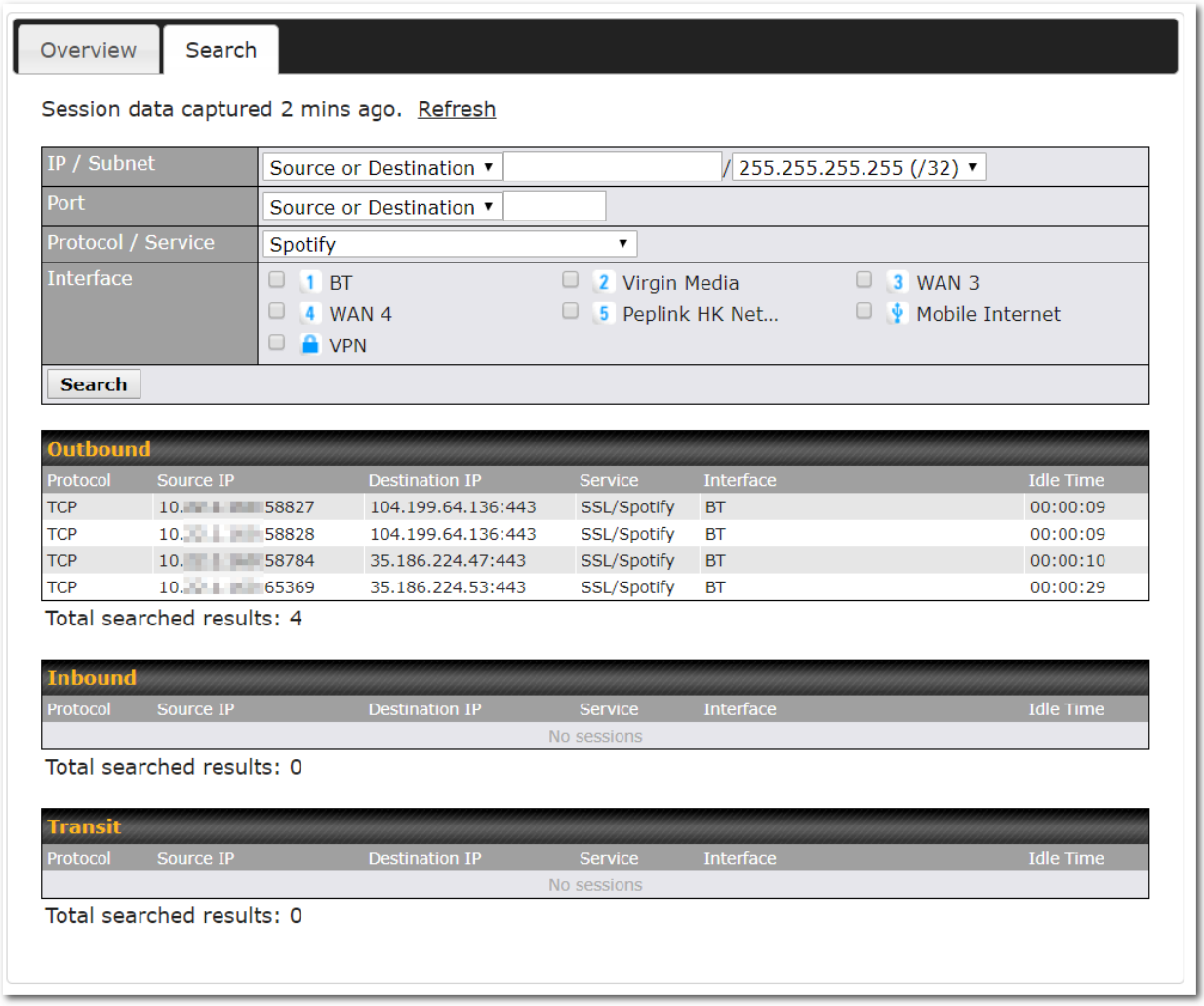
17.1.2 Active Sessions

Information on active sessions can be found at **Status > Active Sessions > Overview**.



This screen displays the number of sessions initiated by each application. Click on each service listing for additional information. This screen also indicates the number of sessions initiated by each WAN port. Finally, you can see which clients are initiating the most sessions.

In addition, you can also perform a filtered search for specific sessions. You can filter by subnet, port, protocol, and interface. To perform a search, navigate to **Status > Active Sessions > Search**.

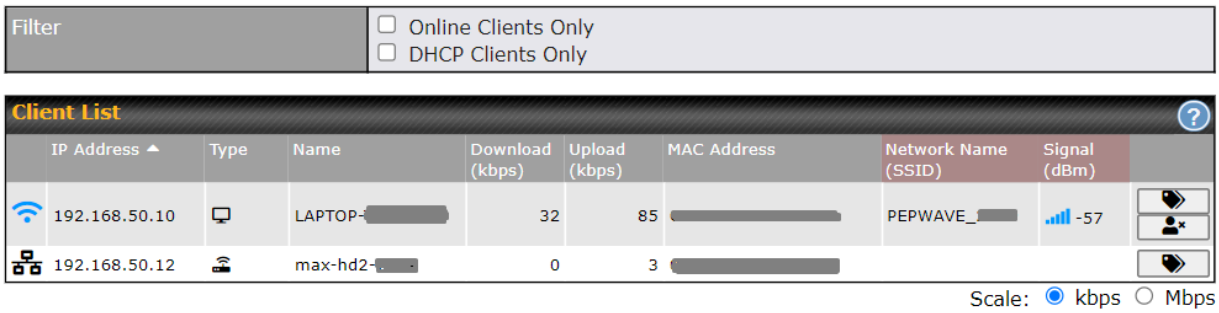


This **Active Sessions** section displays the active inbound / outbound sessions of each WAN connection on the Peplink Balance. A filter is available to help sort out the active session information. Enter a keyword in the field or check one of the WAN connection boxes for filtering.

17.1.3 Client List

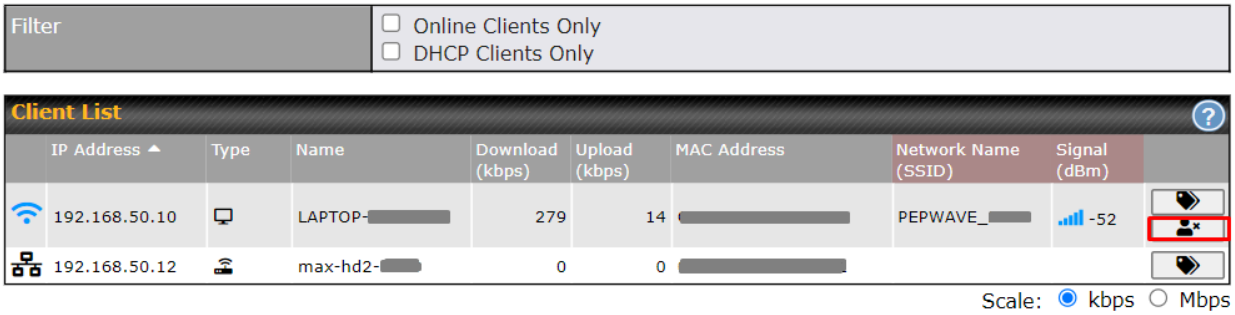
The client list table is located at **Status > Client List**. It lists DHCP and online client IP addresses, type, names (retrieved from the DHCP reservation table or defined by users), current download and upload rate, and MAC address.

Clients can be imported into the DHCP reservation table by clicking the button on the right. Further update the record after the import by going to **Network > LAN**.

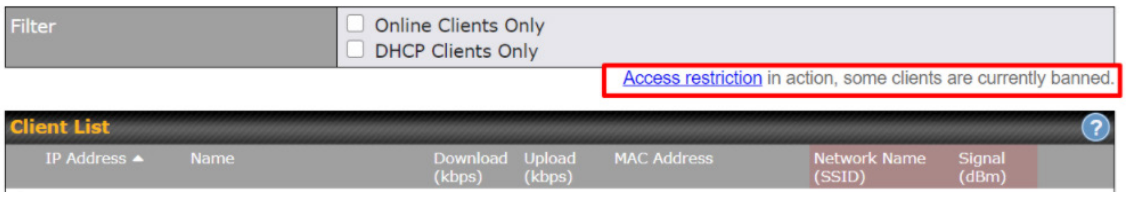


If the PPTP server SpeedFusion™, or AP controller is enabled, you may see the corresponding connection name listed in the **Name** field.

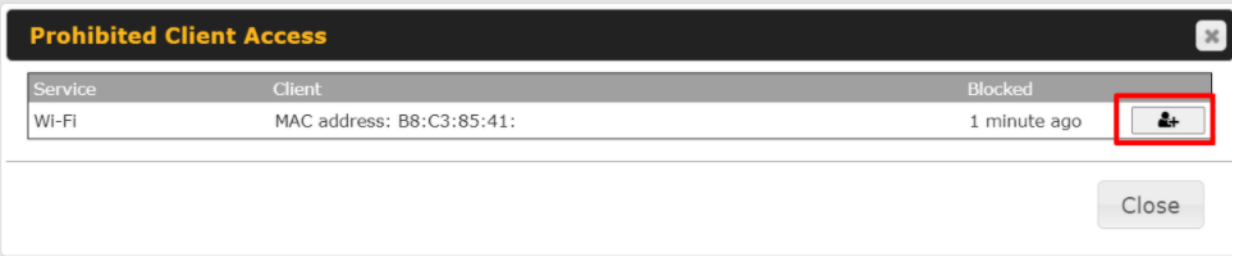
In the client list table, there is a “Ban Client” feature which is used to disconnect the Wi-Fi and Remote User Access clients by clicking the button on the right.



There is a blocklist on the same page after you banned the Wi-Fi or Remote User Access clients.

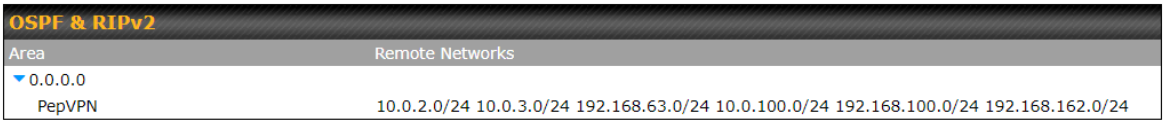


You may also unblock the Wi-Fi or Remote User Access clients when the client devices need to reconnect the network by clicking the button on the right.



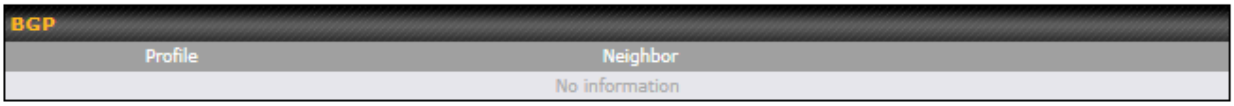
17.1.4 OSPF & RIPv2

Information on OSPF and RIPv2 routing setup can be found at **Status > OSPF & RIPv2**.



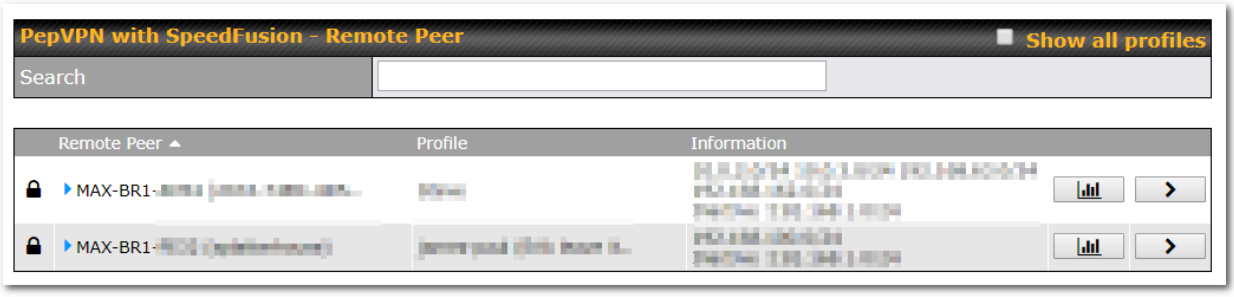
17.1.5 BGP

Information on BGP routing setup can be found at **Status >BGP**.

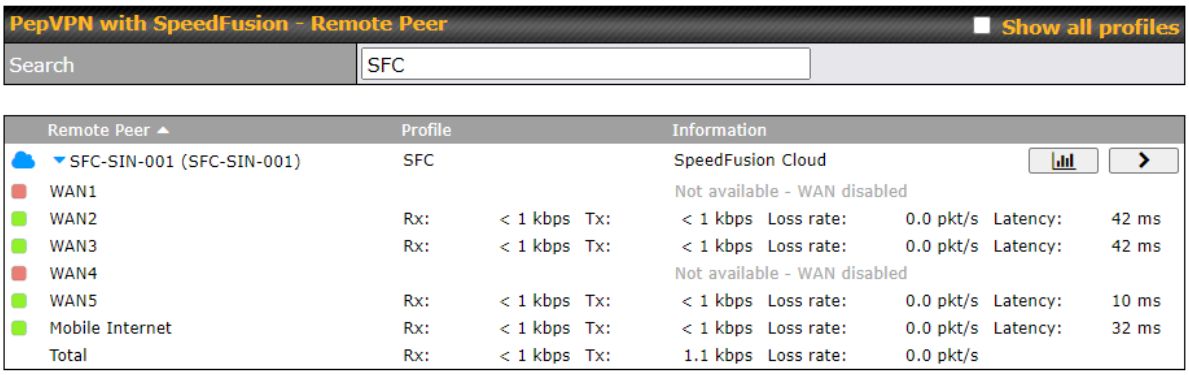


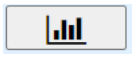
17.1.6 SpeedFusion VPN

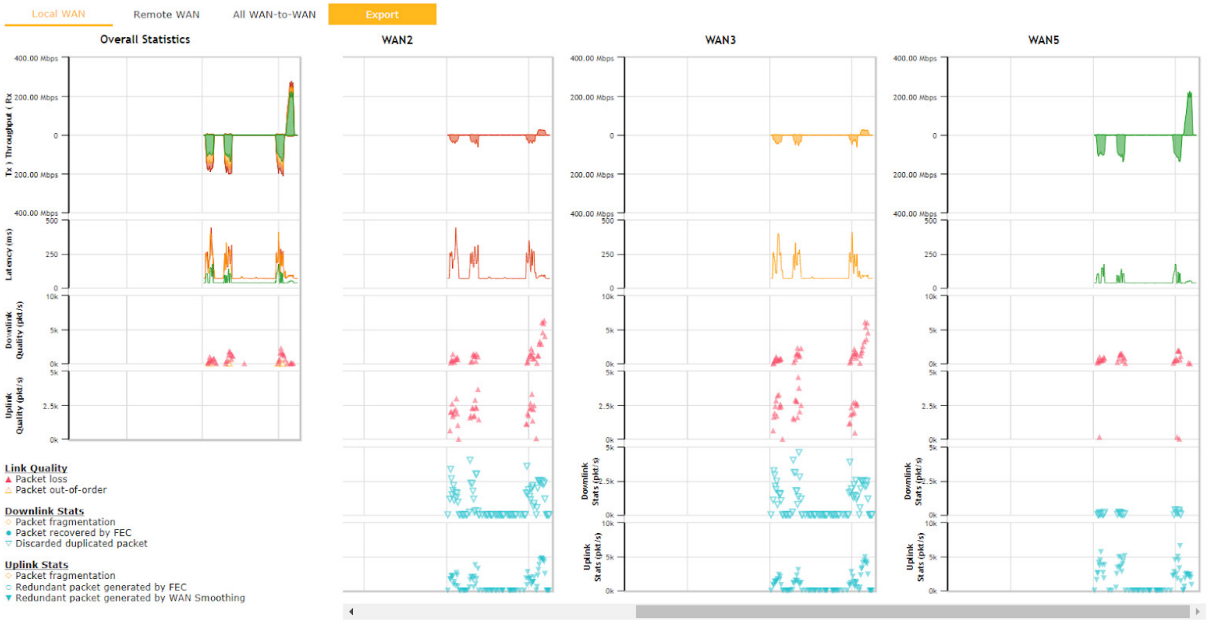
SpeedFusion VPN shows the current connection status of each connection profile and is displayed at **Status > SpeedFusion VPN.**



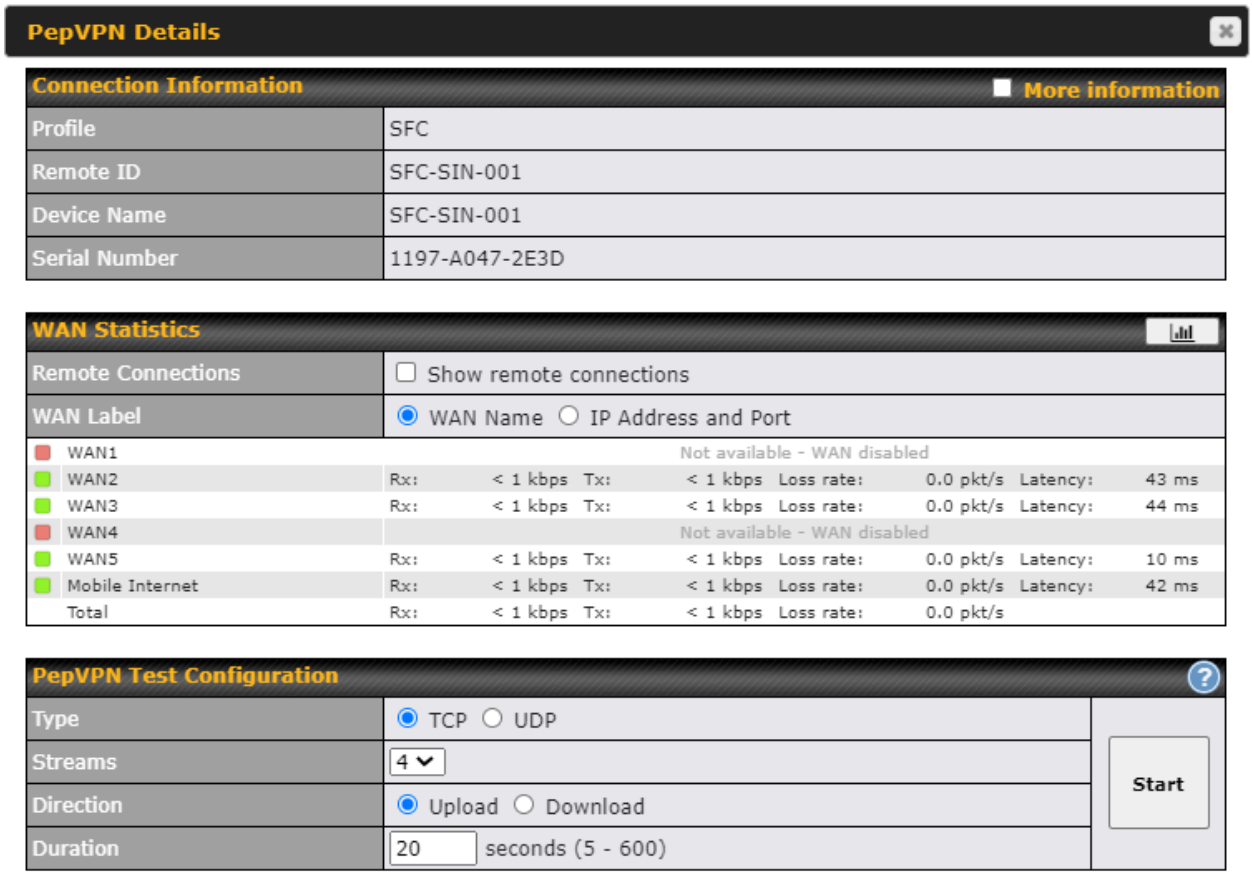
Click on the corresponding peer name to explore the WAN connection(s) status and subnet information of each VPN peer.



Click the  button for PepVPN/SpeedFusion chart displaying real-time throughput, latency, and drop-rate information for each WAN connection.



When pressing the button for a PepVPN/SpeedFusion Tunnel Bandwidth Test Tool, the following menu will appear:

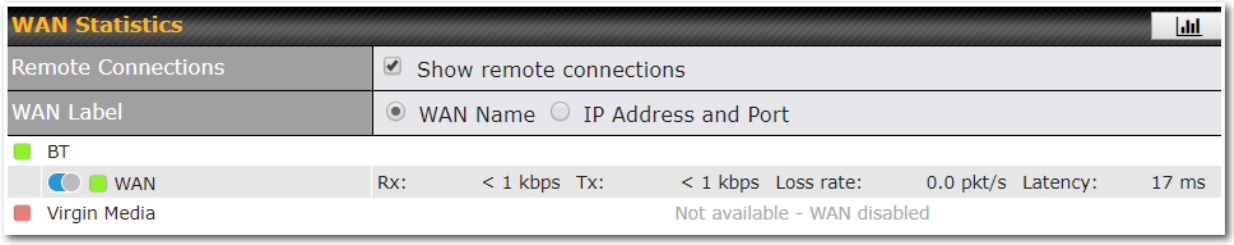


The **connection information** shows the details of the selected PepVPN profile, consisting of the Profile name, **Router ID**, **Router Name** and **Serial Number** of the remote router
Advanced features for the PepVPN profile will also be shown when the **More Information** checkbox is selected.

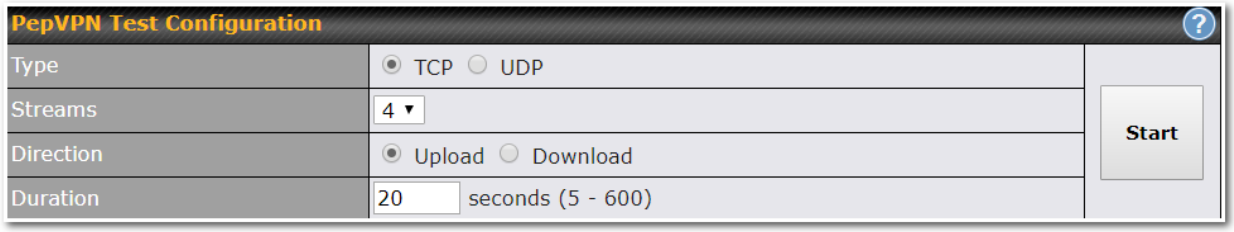
The **WAN statistics** show information about the local and remote WAN connections (when **show Remote connections**) is selected.
The available details are **WAN Name, IP address** and **port** used for the Speedfusion connection. **Rx and Tx rates, Loss rate and Latency**.

Connections can be temporarily disabled by sliding the switch button next to a WAN connection to the left.
The wan-to-wan connection disabled by the switch is temporary and will be re-enabled after 15 minutes without any action.

This can be used when testing the PepVPN speed between two locations to see if there is interference or network congestion between certain WAN connections.



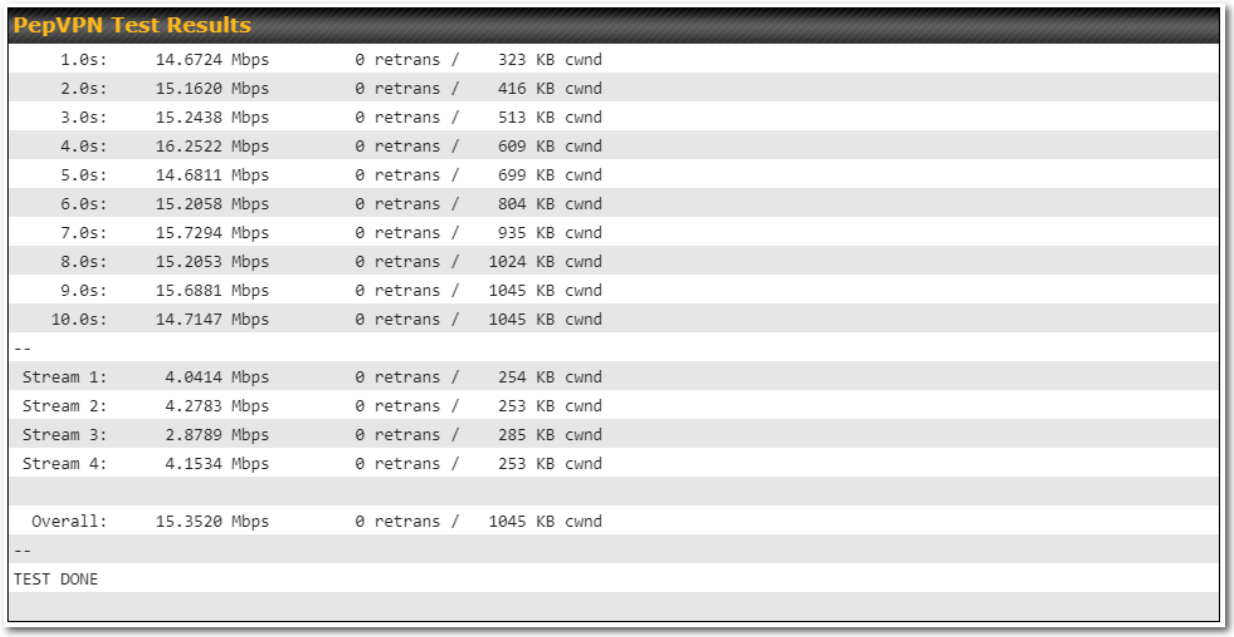
The PepVPN/SpeedFusion test configuration allows us to configure and perform thorough tests. This is usually done after the initial installation of the routers and in case there are problems with aggregation.



Press the Start button to perform throughput test according to the configured options.

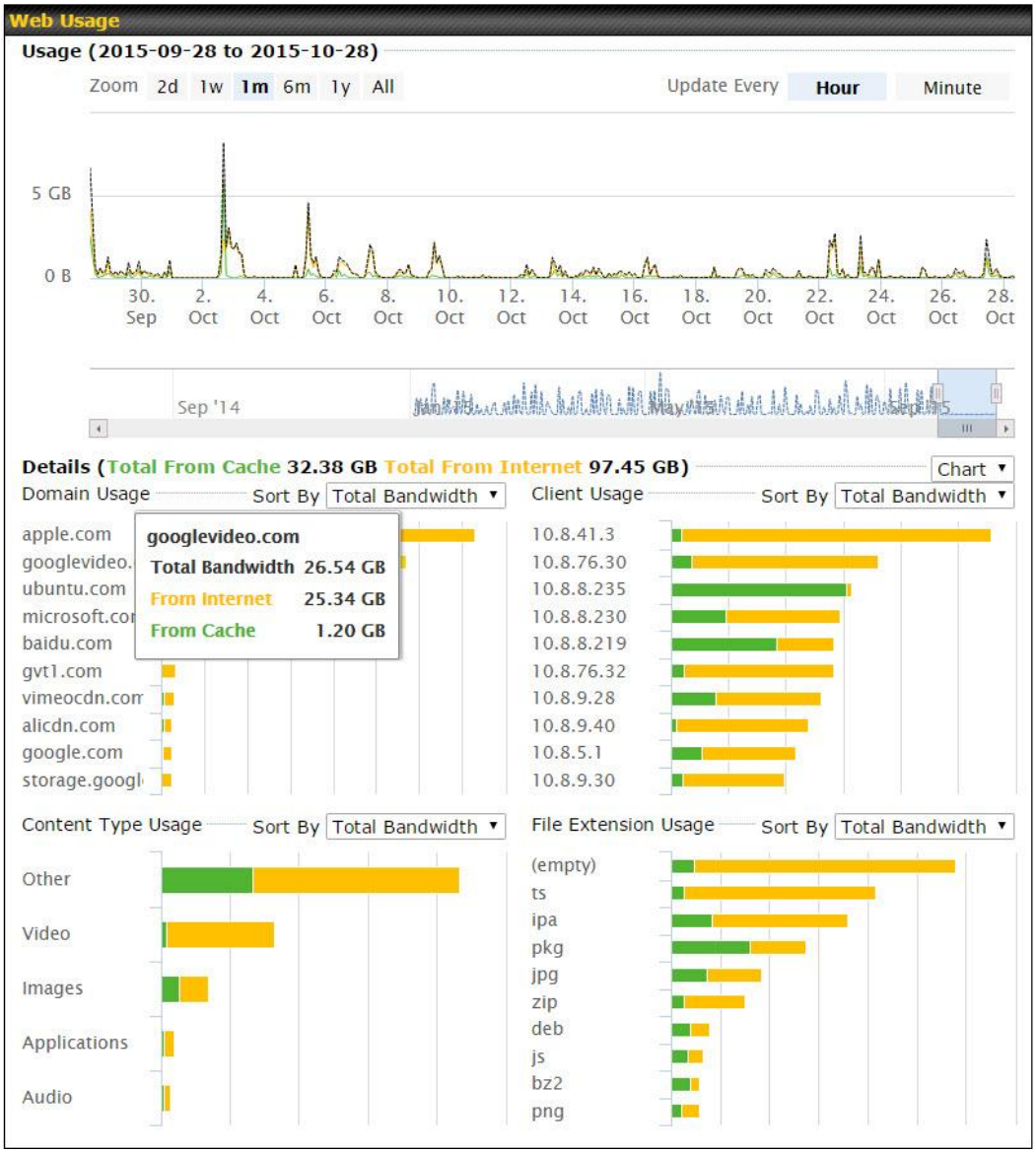
If TCP is selected, 4 parallel streams will be generated to get the optimal results by default. This can be customized by selecting a different value of streams.

Using more streams will typically get better results if the latency of the tunnel is high.



17.1.7 MediaFast

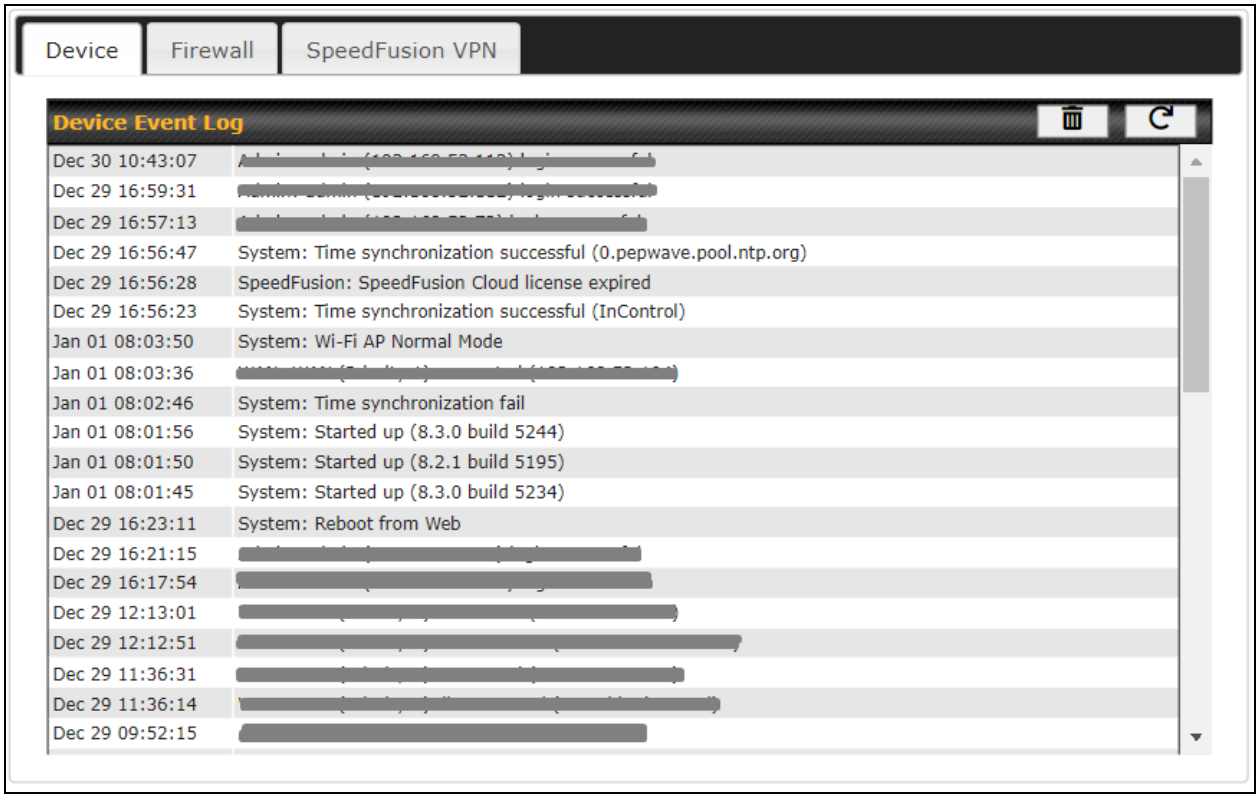
To get details on storage and bandwidth usage, select **Status > MediaFast**.



17.1.8 Event Log

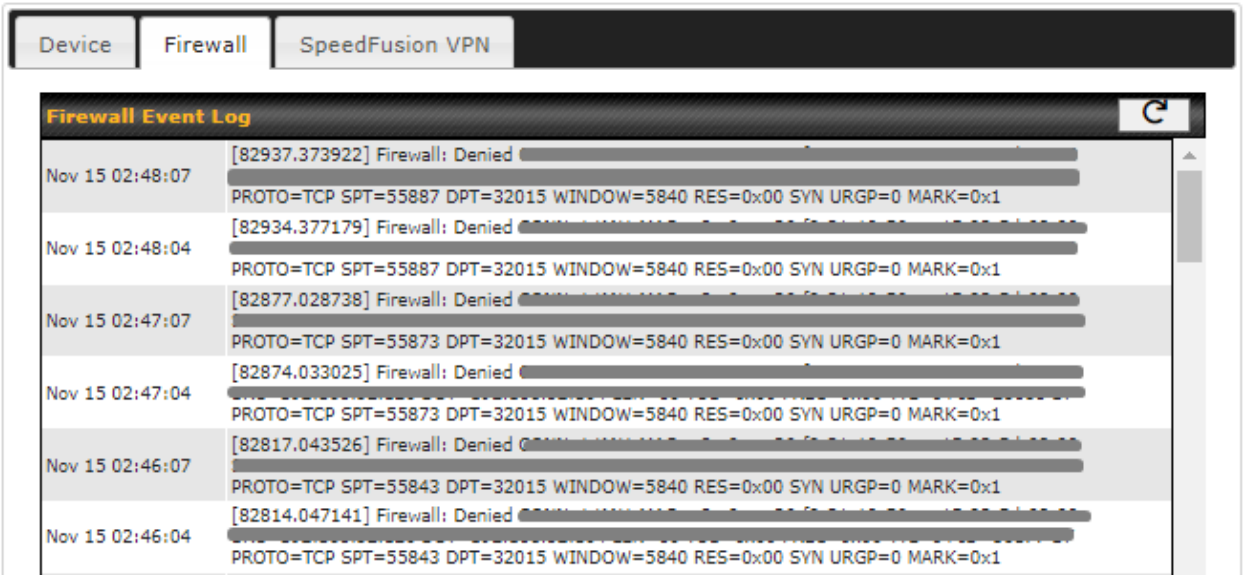
Event log information is located at **Status > Event Log**.

Device Event Log



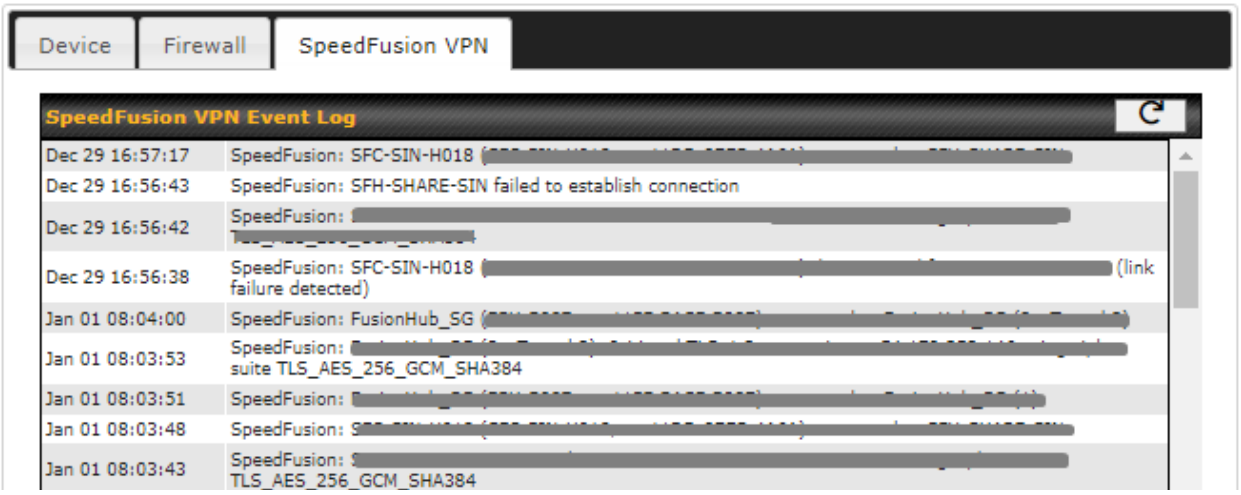
The log section displays a list of events that have taken place on the Peplink Balance unit. Click the  to refresh log entries automatically. Click the  button to clear the log.

Firewall Event Log



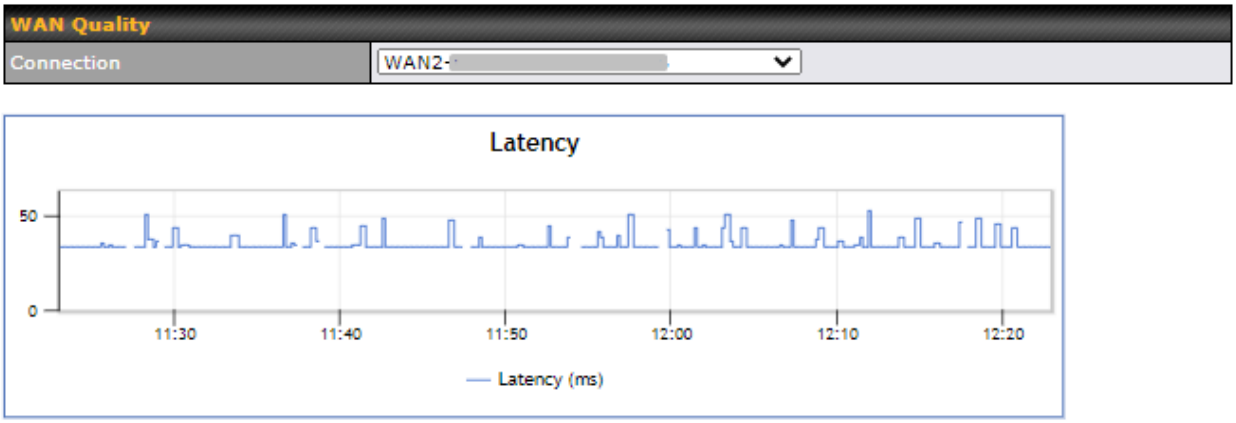
This section displays a list of events that have taken place within a firewall. Click the  button and the log will be refreshed.

SpeedFusion VPN Event Log



This section displays a list of events that have taken place within a SpeedFusion VPN connection. Click the  button and the log will be refreshed.

17.2 WAN Quality



The **Status > WAN Quality** allows to show detailed information about each connected WAN connection.

17.3 Usage Reports

This section shows the bandwidth usage statistics, located at **Status > Bandwidth**. Bandwidth usage at the LAN while the device is switched off (e.g., LAN bypass) is neither recorded nor shown.

17.3.1 Real-Time

The **Data transferred since installation** table indicates how much network traffic has been processed by the device since the first bootup. The **Data transferred since last reboot** table indicates how much network traffic has been processed by the device since the last bootup.

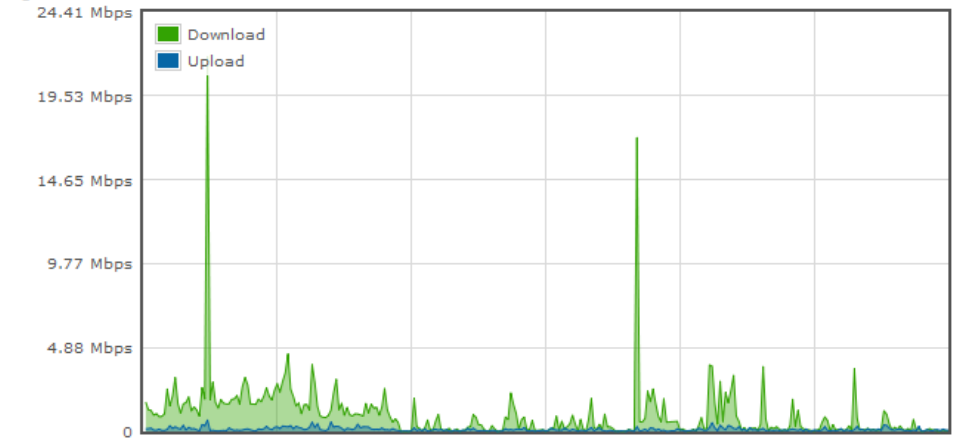
Data transferred since installation (Sun Oct 10 05:56:02 PST 2010)

	Download	Upload	Total
All WAN Connections	216.68 GB	91.70 GB	308.38 GB

Data transferred since last reboot [Hide Details]

	Download	Upload	Total
All WAN Connections	0.74 GB	0.63 GB	1.37 GB
WAN1	0.67 GB	0.61 GB	1.28 GB
WAN2	0.07 GB	0.02 GB	0.09 GB

Aggregated Transfer



Avg: 0.99 Mbps 0.12 Mbps Peak: 21.78 Mbps 0.67 Mbps Stacked

	Download	Upload	Total
Overall	61 kbps	75 kbps	136 kbps

17.3.2 Hourly

This page shows the hourly bandwidth usage for all WAN connections, with the option of viewing each individual connection. Select the desired connection to check from the drop-down menu.

Date	Download	Upload	Total
13:00	5 047 MB	295 MB	5 342 MB
12:00	5 117 MB	439 MB	5 556 MB
11:00	2 414 MB	526 MB	2 940 MB
10:00	2 470 MB	812 MB	3 282 MB
09:00	725 MB	488 MB	1 213 MB
08:00	64 MB	211 MB	275 MB

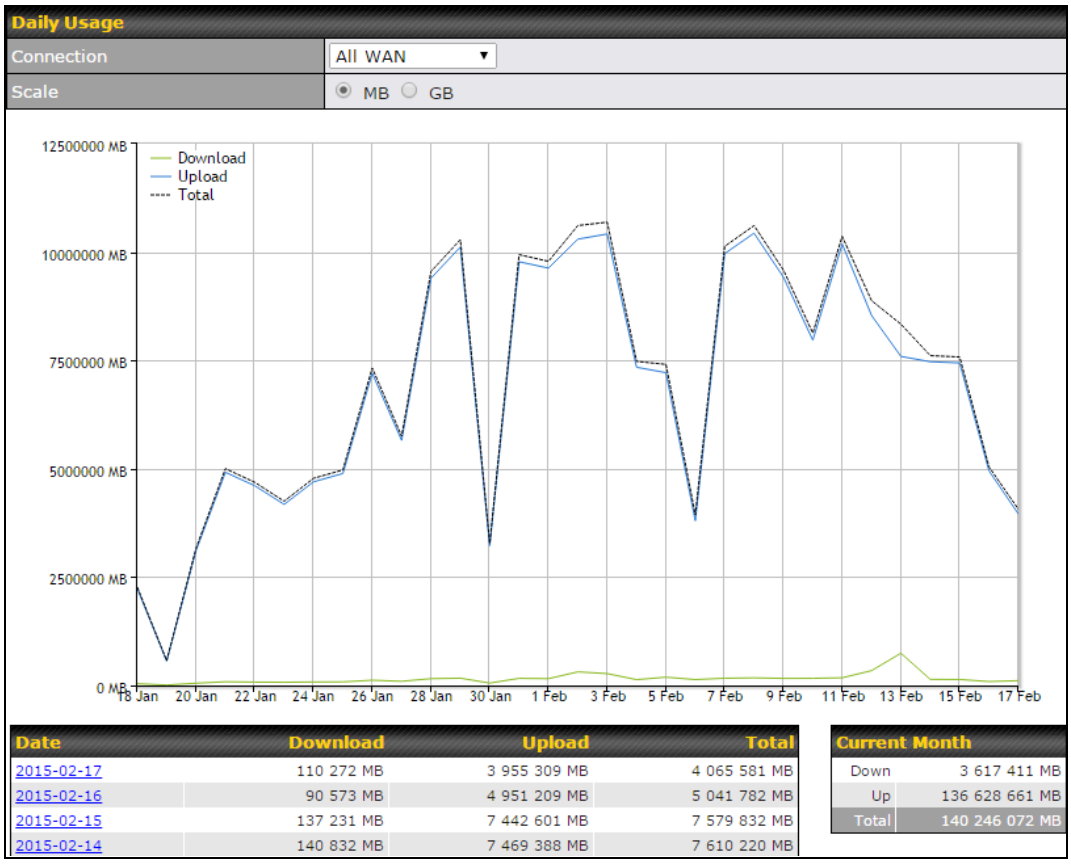
17.3.3 Daily

This page shows the daily bandwidth usage for all WAN connections, with the option of viewing each individual connection.

Select the connection to check from the drop-down menu. If you have enabled the **Bandwidth Monitoring** feature as shown in **Section 13.4,** the **Current Billing Cycle** table for that WAN connection will be displayed.

Click on a date to view the client bandwidth usage of that specific date. This feature is not available if you have selected to view the bandwidth usage of only a particular WAN connection. The scale of the graph can be set to display megabytes (**MB**) or gigabytes (**GB**).

Status



Date	Download	Upload	Total
2015-02-17	110 272 MB	3 955 309 MB	4 065 581 MB
2015-02-16	90 573 MB	4 951 209 MB	5 041 782 MB
2015-02-15	137 231 MB	7 442 601 MB	7 579 832 MB
2015-02-14	140 832 MB	7 469 388 MB	7 610 220 MB

Current Month	
Down	3 617 411 MB
Up	136 628 661 MB
Total	140 246 072 MB

Click on a specific date to receive a breakdown of all client usage for that date.

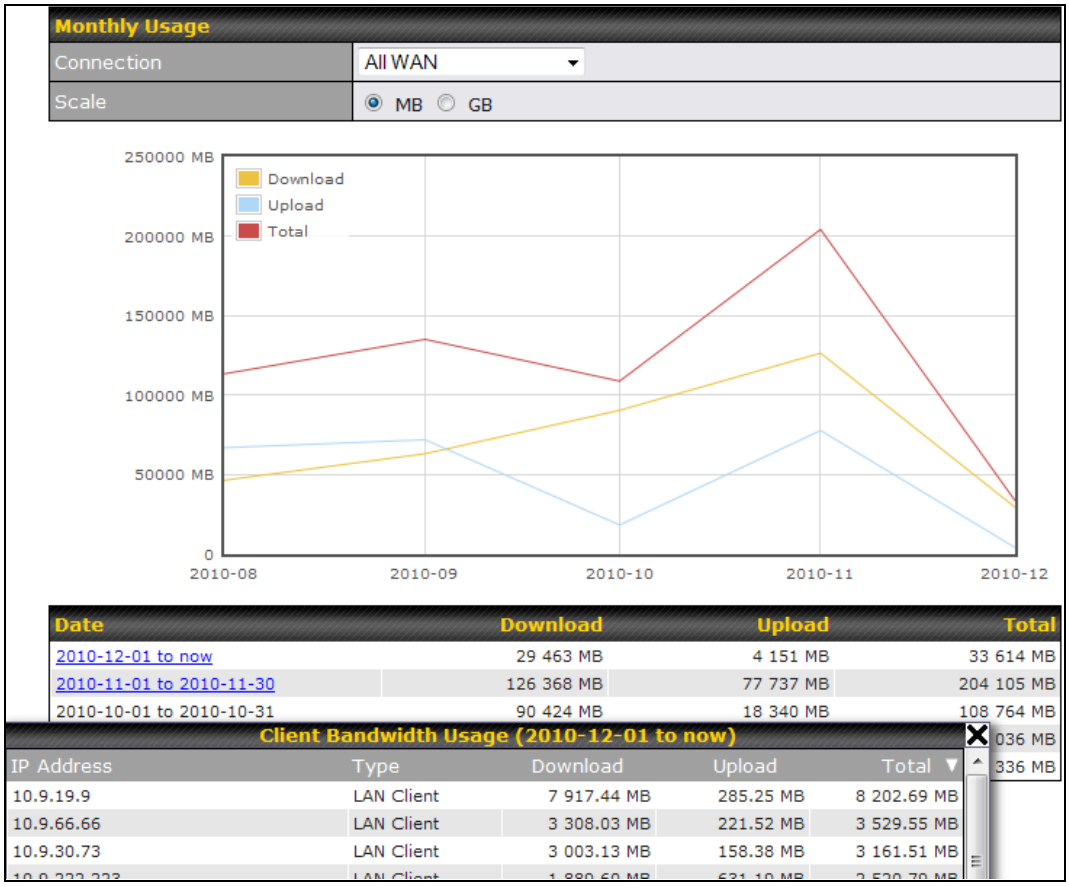
Client Bandwidth Usage (2015-02-15)

IP Address	Type	Download	Upload	Total
192.168.168.15	LAN Client	7 972.69 MB	1 217 122.81 MB	1 225 095.50 MB
192.168.168.14	LAN Client	7 432.25 MB	1 197 380.53 MB	1 204 812.79 MB
192.168.168.22	LAN Client	5 676.90 MB	617 109.49 MB	622 786.39 MB
192.168.168.21	LAN Client	5 693.38 MB	615 629.07 MB	621 322.46 MB
192.168.168.12	LAN Client	2 156.79 MB	339 779.46 MB	341 936.25 MB
192.168.168.16	LAN Client	2 107.10 MB	333 980.14 MB	336 087.23 MB
192.168.168.18	LAN Client	16.75 MB	9.50 MB	26.25 MB
192.168.167.14	LAN Client	4.74 MB	8.35 MB	13.09 MB
192.168.167.13	LAN Client	4.73 MB	8.35 MB	13.08 MB
192.168.168.19	LAN Client	0.02 MB	0.02 MB	0.03 MB
192.168.168.20	LAN Client	0.00 MB	0.00 MB	0.00 MB
192.168.168.11	LAN Client	0.00 MB	0.00 MB	0.00 MB

17.3.4 Monthly

This page shows the monthly bandwidth usage for each WAN connection. If you have enabled **Bandwidth Monitoring** feature as shown in **Section 13.4**, you can check the usage of each particular connection and view the information by **Billing Cycle** or by **Calendar Month**.

Click the first two rows to view the client bandwidth usage in the last two months. This feature is not available if you have chosen to view the bandwidth of an individual WAN connection. The scale of the graph can be set to display megabytes (**MB**) or gigabytes (**GB**).



Click on a specific month to receive a breakdown of all client usage for that month.

Appendix A. Restoration of Factory Defaults

To restore the factory default settings on a Peplink Balance unit, perform the following:

For Balance models with a reset button:

1. Locate the reset button on the Peplink Balance unit.
2. With a paperclip, press and keep the reset button pressed.

Hold for approximately 10 seconds for factory reset (Note: The LED status light shows in RED, until the status light off and release the button)

After the Peplink Balance router finishes rebooting, the factory default settings will be restored.

For Balance/MediaFast models with an OLED menu:

- Use the buttons on the front panel to control the OLED menu to go to **Maintenance**>**Factory Defaults**, and then choose **Yes** to confirm.

Afterwards, the factory default settings will be restored.

Important Note
All previous configurations and bandwidth usage data will be lost after restoring factory default settings. Regular backup of configuration settings is strongly recommended.

Appendix B. Routing under DHCP, Static IP, and PPPoE

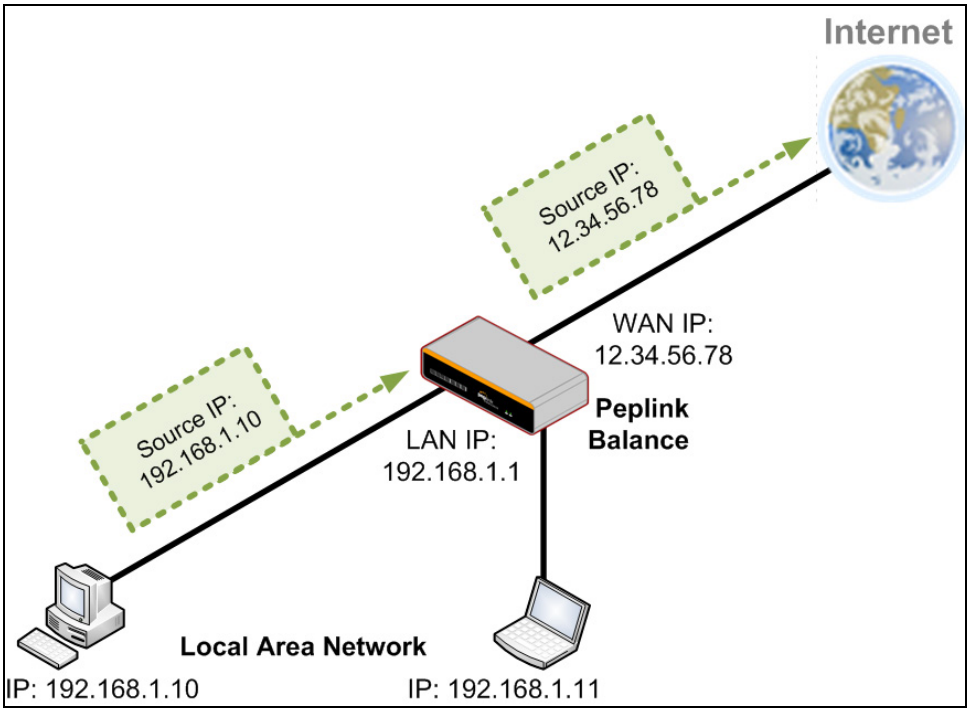
The information in this appendix applies only to situations where the Peplink Balance operates a WAN connection under DHCP, Static IP, or PPPoE.

B.1 Routing Via Network Address Translation (NAT)

When the Peplink Balance is operating under NAT mode, the source IP addresses of outgoing IP packets are translated to the WAN IP address of the Peplink Balance. With NAT, all LAN devices share the same WAN IP address to access the Internet (i.e., the WAN IP address of the Peplink Balance).

Operating the Peplink Balance in NAT mode requires only one WAN (Internet) IP address. In addition, operating in NAT mode also has security advantages because LAN devices are hidden behind the Peplink Balance. They are not directly accessible from the Internet and hence less vulnerable to attacks.

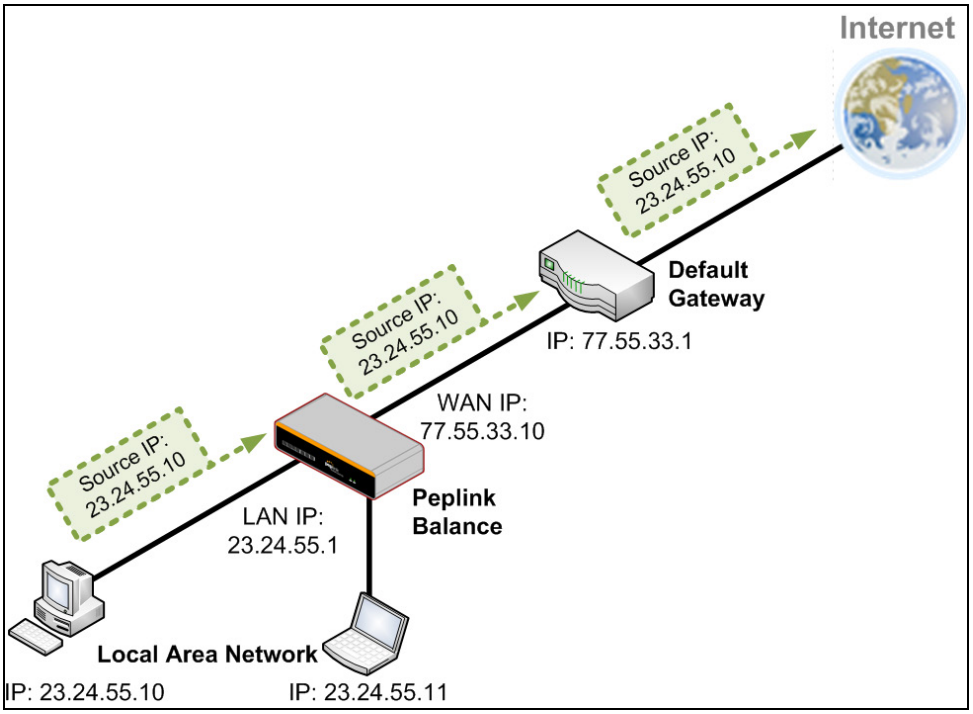
The following figure shows the packet flow in NAT mode:



B.2 Routing Via IP Forwarding

When the Peplink Balance is operating under IP forwarding mode, the IP addresses of IP packets are unchanged; the Peplink Balance forwards both inbound and outbound IP packets without changing their IP addresses.

The following figure shows the packet flow in IP forwarding mode:



Appendix C. FusionSIM Manual

Peplink has developed a unique technology called FusionSIM, which allows SIM cards to remotely link to a cellular router. This can be done via cloud or within the same physical network. There are a few key scenarios to fit certain applications.

The purpose of this manual is to provide an introduction on where to start and how to set up for the most common scenarios and uses.

Requirements

1. A Cellular router that supports FusionSIM technology
2. SIM Injector
3. SIM card

Notes:

- Always check for the latest Firmware version for both the cellular router and the SIM Injector. You can also check for the latest Firmware version on the device's WEB configuration page.
- A list of products that support FusionSIM can be found on the SIM Injector WEB page. Please check under the section **Supported models**.

SIM Injector reset and login details

How to reset a SIM Injector:

- Hold the reset button for 5-10 seconds. Once the LED status light turns RED, the reset button can be released. SIM Injector will reboot and start with the factory default settings.

The default WEB login settings:

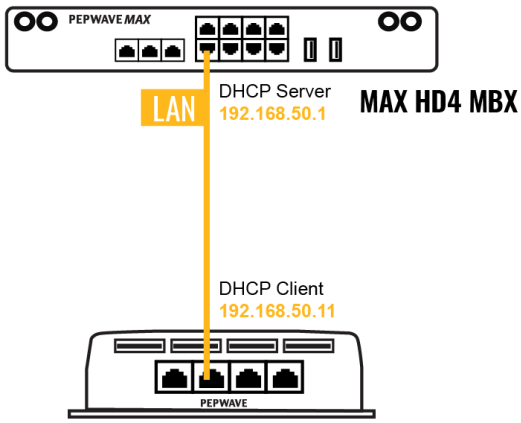
- **User**: admin
- **Password**: admin
- IP address: the device only has a DHCP client and no fallback IP address. Therefore, it is advised to check every time what IP address is assigned to the SIM Injector.

Notes:

- The SIM Injector can be monitored via InControl 2. Configuration is not supported.

Scenario 1: SIM Injector in LAN of Cellular Router

Setup topology



This is the most basic scenario in which the SIM Injector is connected directly to the cellular router's LAN port via an ethernet cable. This allows for the cellular router to be positioned for the best possible signal. Meanwhile, the SIM cards can be conveniently located in other locations such as the office, passenger area, or the bridge of a ship. The SIM Injector allows for easily swapping SIM cards without needing to access a cellular router.

IMPORTANT: Cellular WAN will not fallback to the local SIM if it is configured to use the SIM Injector.

Configuring the SIM Injector

1. Connect the SIM Injector to the LAN port of the cellular router.
2. Insert SIM cards into the SIM Injector. The SIM cards will be automatically detected.

IMPORTANT: SIM cards inserted into SIM Injector must not have a PIN code.

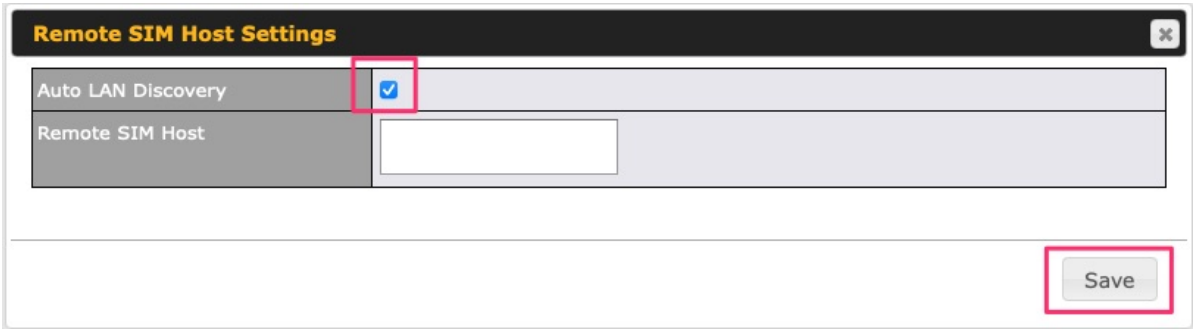
Note 1: The SIM Injector gets its IP address via DHCP and doesn't have a static IP address. To find it's address, please check the DHCP lease on the cellular router.

Configuring the Cellular Router

Step 1. Enable the SIM Injector communication protocol.

1a. If you are using a Balance cellular router, go to the **Network** tab (top navigation bar).
1b. If you are using a MAX cellular router, go to the **Advanced** tab (top navigation bar).
2. Under **Misc. settings** (left navigation bar) find **Remote SIM Management**.
3. In **Remote SIM Management**, click on the edit icon next to **Remote SIM is Disabled**.

4. Check the **Auto LAN discovery** checkbox and click **Save** and **Apply Changes**.

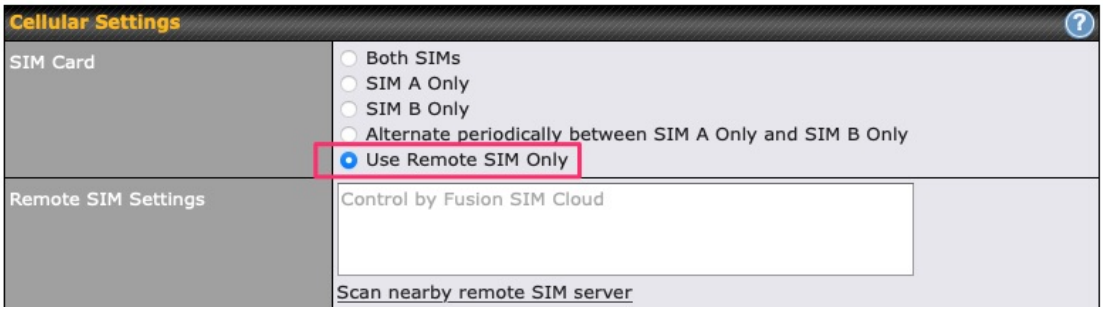


5. Click **Save** and then **Apply Changes**.

Step 2. Enable RemoteSIM for the selected Cellular interface.

1. Go to **Network** (top navigation bar), then **WAN** (left navigation bar) and click **Details** for a selected cellular WAN. This will open the WAN Connection Settings page.

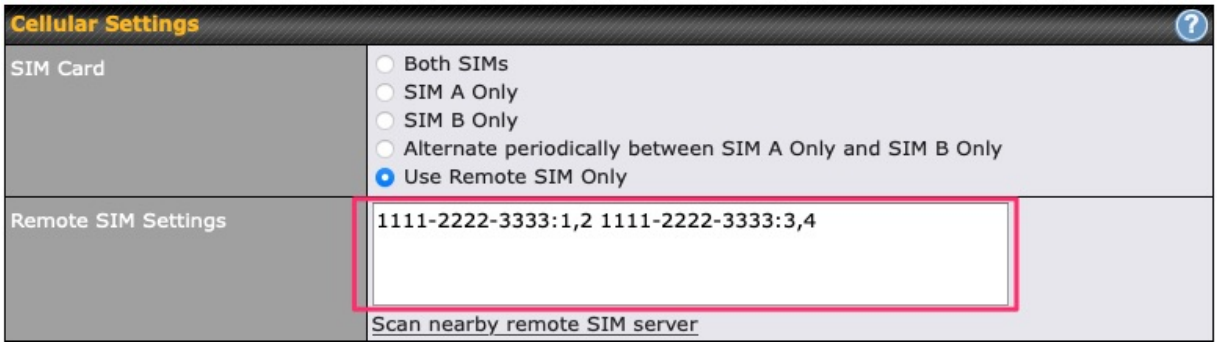
2. Scroll down to **Cellular settings**.
3. In the **SIM Card** section, select **Use Remote SIM Only**.



4. Enter configuration settings in **Remote SIM Settings** section. Click on **Scan nearby remote SIM server** to show the serial number(s) of the connected SIM Injector(s). Available configuration options for cellular interface are shown below:

A. Defining SIM Injector(s)
   - Format: <S/N>
   - Example 1: 1111-2222-3333
   - Example 2: 1111-2222-3333 4444-5555-6666

B. Defining SIM Injector(s) SIM slot(s):
   - Format: <S/N:slot number>
   - Example 1: 1111-2222-3333:7,5 (the Cellular Interface will use SIM in slot 7, then 5)
   - Example 2: 1111-2222-3333:1,2 1111-2222-3333:3,4 (the cellular Interface will use SIM in slot 1, then in 2 from the first SIM Injector, and then it will use 3 and 4 from the second SIM Injector).



Note: It is recommended to use different SIM slots for each cellular interface.

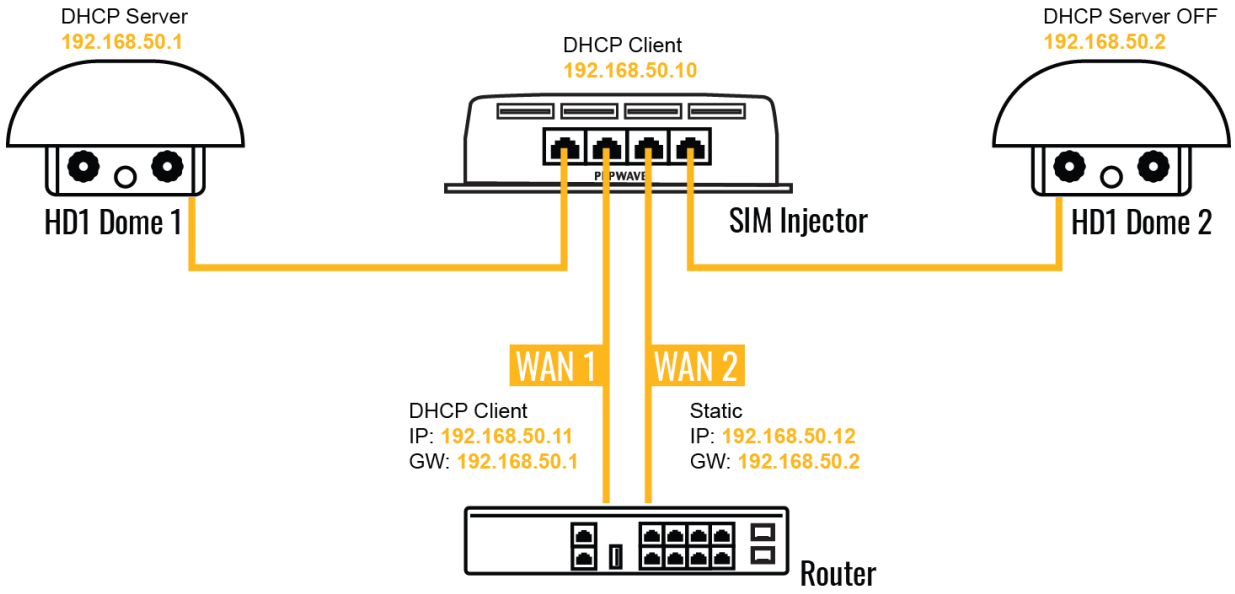
5. Click **Save** and **Apply Changes**.

Step 3. (Optional) Custom SIM cards settings.

1a. For a Balance router, go to the **Network** (Top tab).
1b. For a MAX router, go to the **Advanced** (Top tab).
2. Under **Misc. settings** (Left-side tab) find **Remote SIM Management**.
3. Click on the **Add Remote SIM** button, fill in all the required info and click **Save**. This section allows defining custom requirements for a SIM card located in a certain SIM slot:
   - Enable/Disable roaming (by default roaming is disabled).
   - Add Custom mobile operator settings (APN, user name, password).
4. Repeat configuration for all SIM cards which need custom settings.
5. Click **Apply Changes** to take effect.

Scenario 2: SIM Injector in WAN of main Router and multiple Cellular Routers

Setup topology



In this scenario, each HD Dome creates a WAN connection to the main router. A single SIM Injector is used to provide SIM cards for each HD Dome. The HD Dome can be replaced with any Peplink cellular router supporting RemoteSIM technology.

This scenario requires the completion of the configuration steps shown in Scenario 1 in addition to the configuration steps explained below.

Additional configurations for Cellular Routers

Step 1. Disable the DHCP server.

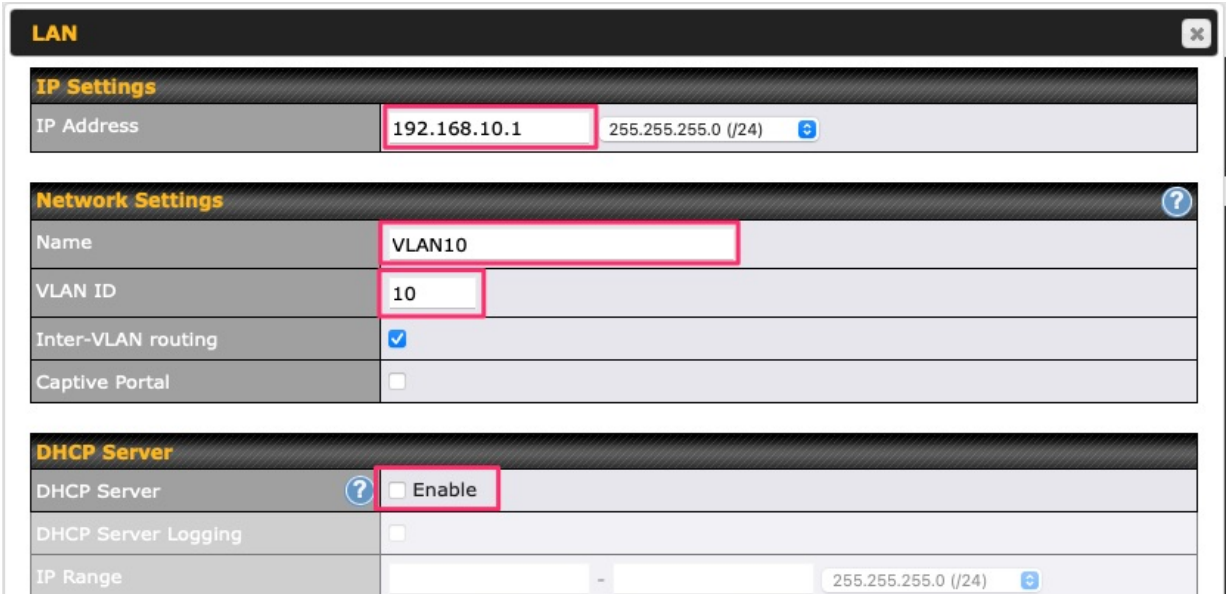
- HD Dome 1 should act as a DHCP server.
- HD Dome 2 should be configured to have a static IP address with DHCP disabled.
- Both routers should be in the same subnet (e.g. 192.168.50.1 and 192.168.50.2).

1. Go to **Network** (Top tab), then **Network Settings** (Left-side tab), and click on **Untagged LAN**. This will open up the LAN settings page.
2. Change the IP address to 192.168.50.2.
3. In the **DHCP Server** section, uncheck the checkbox to disable DHCP Server.
4. Click **Save** and **Apply Changes**.

Step 2. Ethernet port configuration

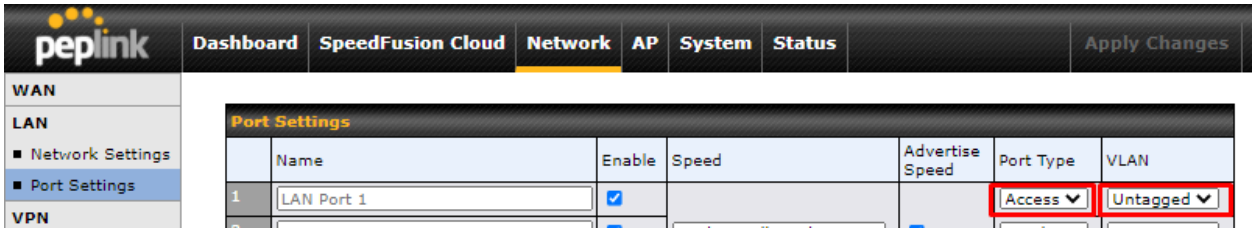
The Ethernet port must be set to **ACCESS** mode for each HD Dome. To do this, dummy VLANs need to be created first.

1. Go to **Network** (Top tab), then **Network Settings** (Left-side tab), and click on **New LAN**. This will open the settings page to create a dummy VLAN.
2. The image below shows the values that need to be changed to create a new VLAN:



Note: set different IP addresses for each HD dome (e.g. 192.168.10.1 and 192.168.10.2).

3. Click Save and **Apply Changes**.
4. Go to **Network** (Top tab), then **Port Settings** (Left-side tab).
5. Set the Port Type to **Access** and set VLAN to **Untagged LAN** (see picture below).



6. Click **Save** and **Apply Changes**.

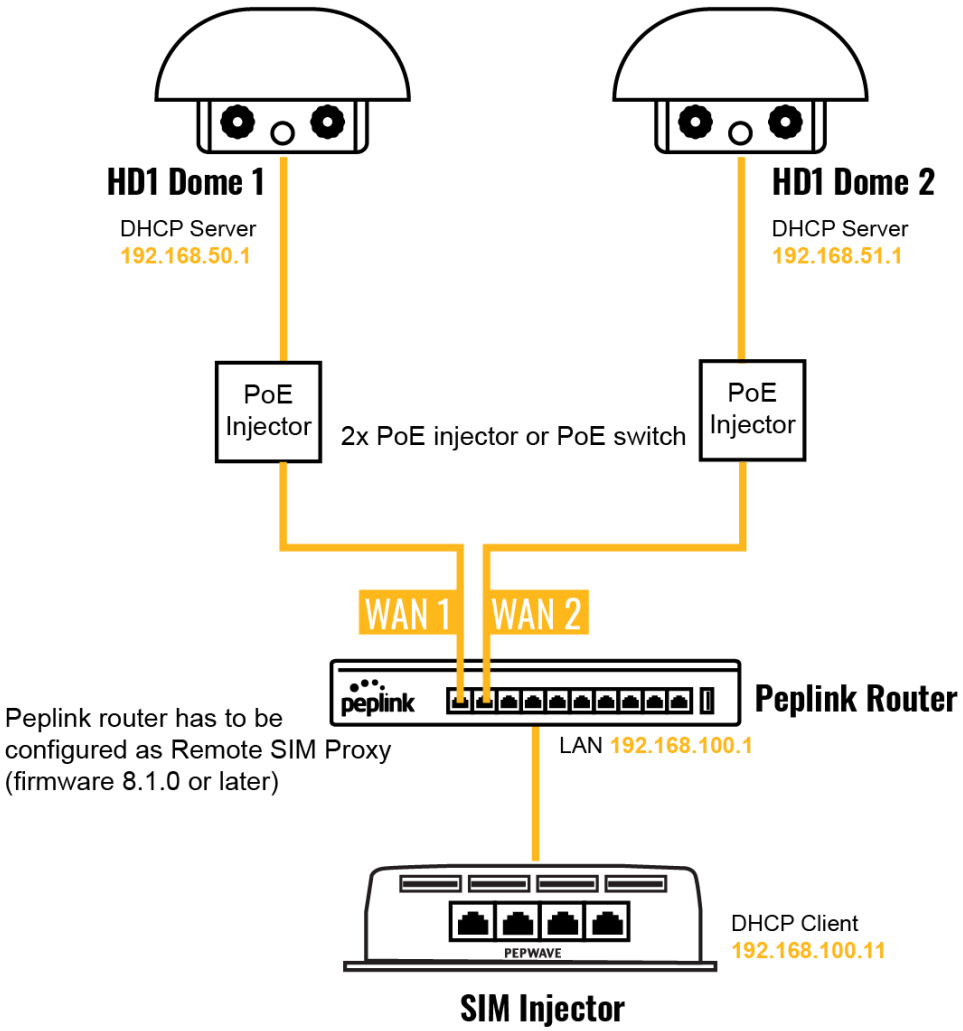
Configuration requirements for the main Router

Requirements for the main router are:

- Configure **WAN 1** as a DHCP client.
- **WAN 1** will automatically get the Gateway IP address from HD Dome 1.
- Configure **WAN 2** as a Static IP and set it to 192.168.50.12.
- Configure **WAN 2** Gateway to 192.168.50.2. Same as the HD Dome 2's IP address.

Scenario 3: SIM Injector in LAN of main Router and multiple Cellular Routers

Setup topology



In this scenario, SIMs are provided to the HD Domes via the main router. In this example, the **Remote SIM Proxy** functionality needs to be enabled on the main router.

Notes:

- HD Dome can be replaced with any other cellular router that supports RemoteSIM.

- It is recommended to use Peplink Balance series or X series routers as the main router.

This scenario requires the completion of the configuration steps for the cellular router and the SIM Injector as in Scenario 1. The configuration for the main router is explained below.

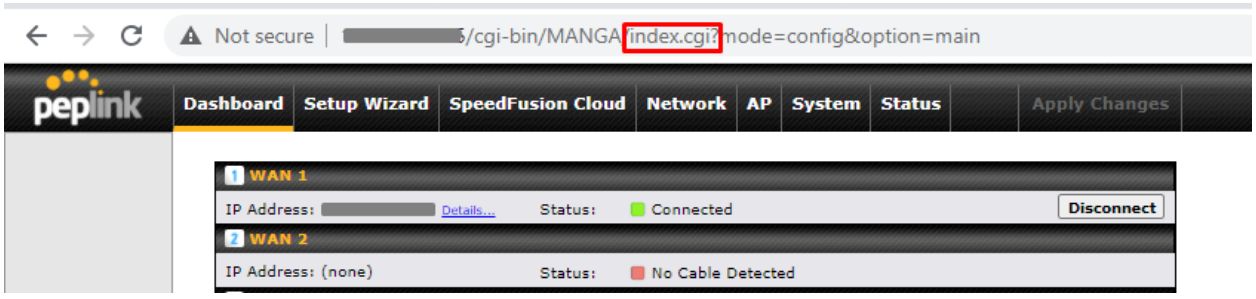
Main Router configuration

IMPORTANT: Main router LAN side and Cellular Routers must be configured using different subnets, e.g. 192.168.**50**.1/24 and 192.168.**100**.1/24.

Note: please make sure the Peplink router is running Firmware 8.1.0 or above.

1. Open the main router WEB interface and change:
From <IP address>/cgi-bin/MANGA/**index.cgi** to <IP address>/cgi-bin/MANGA/**support.cgi**.

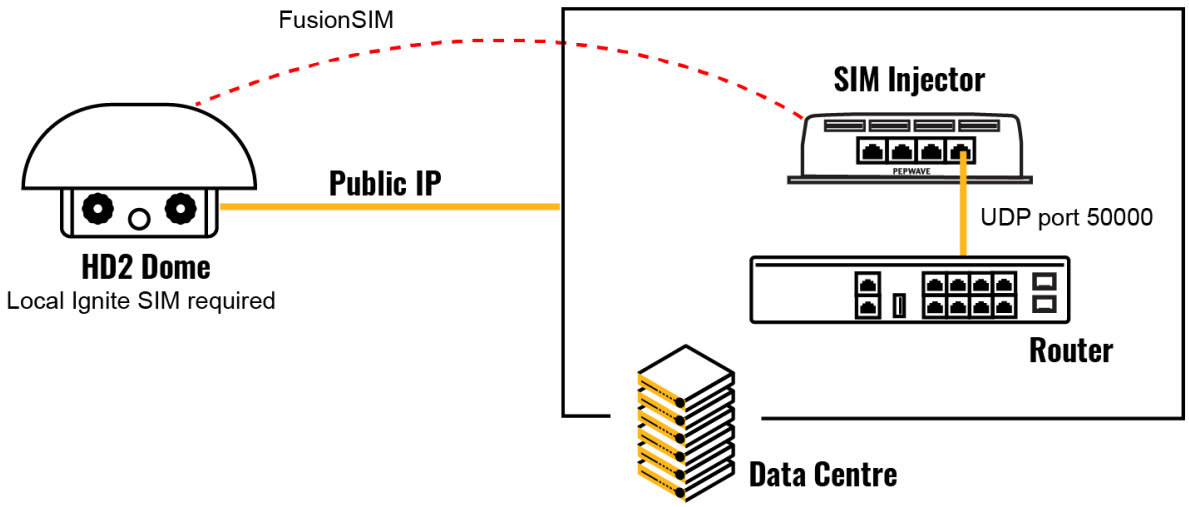
This will open the support.cgi page.



2. Scroll down to find **Remote SIM Proxy** and click on **[click to configure]** that is located next to it.
3. Check the **Enable** checkbox.
4. Click on **Save**.
5. Go back to the index.cgi page and click on **Apply Changes**.

Scenario 4: SIM Injector in a remote location

Setup topology



Requirements for installing a SIM Injector in a remote location:

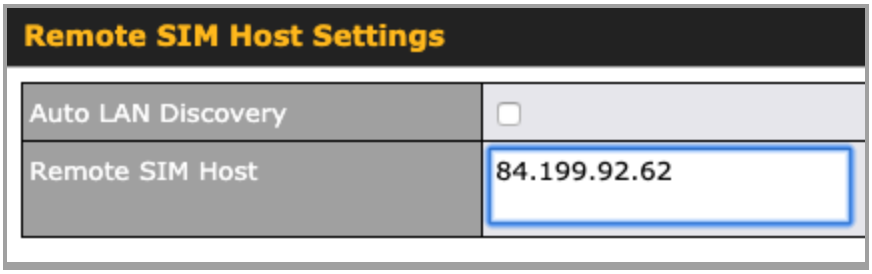
- Cellular router communicates with the SIM Injector via UDP port 50000. Therefore this port must be reachable via public IP over the Internet.
- The one way latency between the cellular router and the SIM Injector should be **up to 250 ms.** A higher latency may lead to stability issues.
- The cellular router must have Internet connection to connect to the SIM Injector. It can be another Internet connection via Ethernet or Fiber if possible, or a secondary cellular interface with a local SIM (Ignite SIM).
- Due to its high latency, it is not recommended to use satellite WAN for connecting to a SIM Injector in remote locations.

SIM Injector configuration is the same as in Scenario 1.

Cellular Router configuration

Step 1. Enable the SIM Injector communication protocol.

1a. For a Balance cellular router, go to the **Network** (Top tab).
1b. For a MAX cellular router, go to the **Advanced** (Top tab).
2. Under **Misc. settings** (Left-side tab), find **Remote SIM Management**.
3. In **Remote SIM Management**, click on the edit icon next to **Remote SIM is Disabled.**
4. Enter the public IP of the SIM Injector and click **Save** and **Apply Changes**.



Notes:

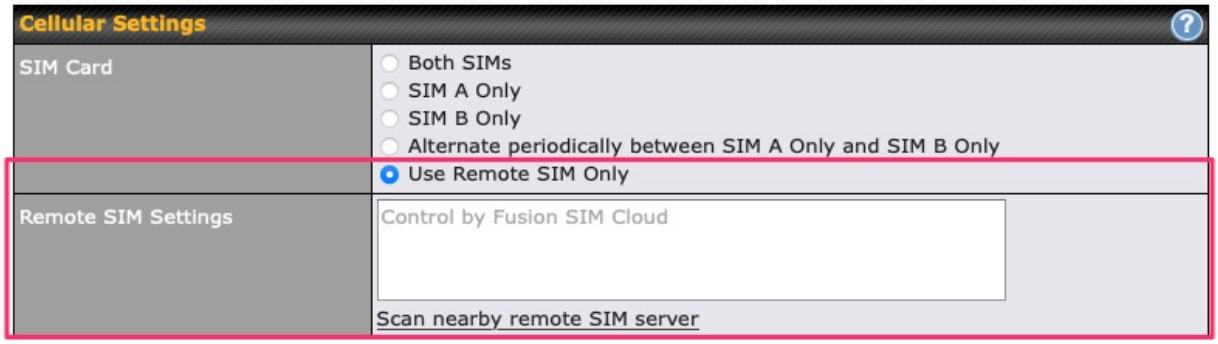
- Do NOT check **Auto LAN Discovery**.
- Adding a SIM Injector serial number to the **Remote SIM Host** field is a mistake!

Step 2. RemoteSIM and custom SIM card settings configurations are the same as in Scenario 1.

How to check if a Pepwave Cellular Router supports Remote SIM

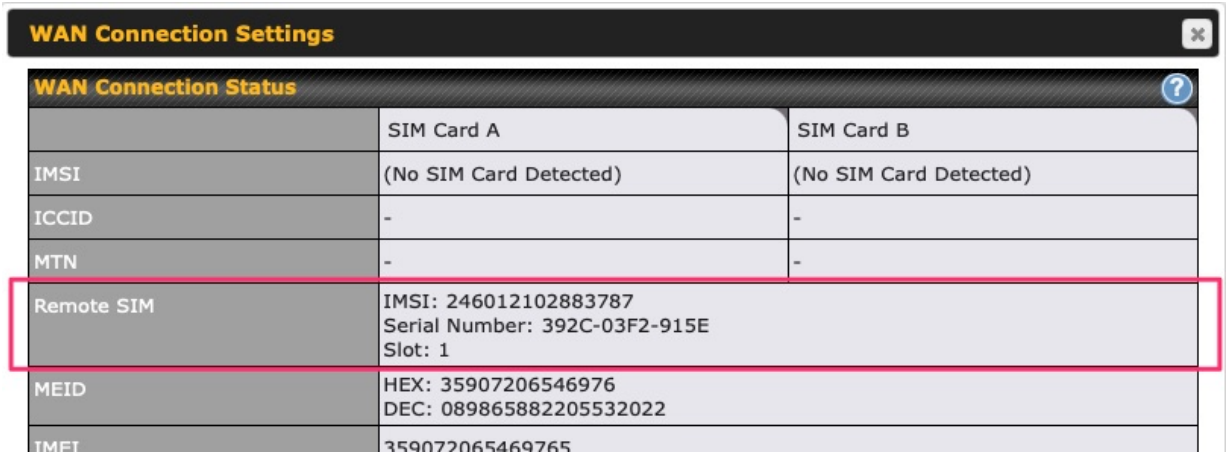
1. Go to **Network** (Top tab), then **WAN** (Left-side tab), and click **Details** on any cellular WAN. This will open the WAN Connection Settings page.
2. Scroll down to **Cellular settings**.

If you can see the **Remote SIM Settings** section, then the cellular router supports RemoteSIM.



Monitor the status of the Remote SIM

1. Go to **Network** (Top tab), then **WAN** (Left-side tab), and click **Details** on the cellular WAN which was configured to use RemoteSIM.
2. Check the **WAN Connection Status** section. Within the cell WAN details, there is a section for **Remote SIM** (SIM card IMSI, SIM Injector serial number and SIM slot).



Appendix D. Case studies

MPLS Alternative

Our SpeedFusion enabled routers can be used to bond multiple low-cost/commodity Internet connections to replace an expensive managed business Internet connection, private leased line, MPLS, and frame relay without sacrificing reliability and availability.

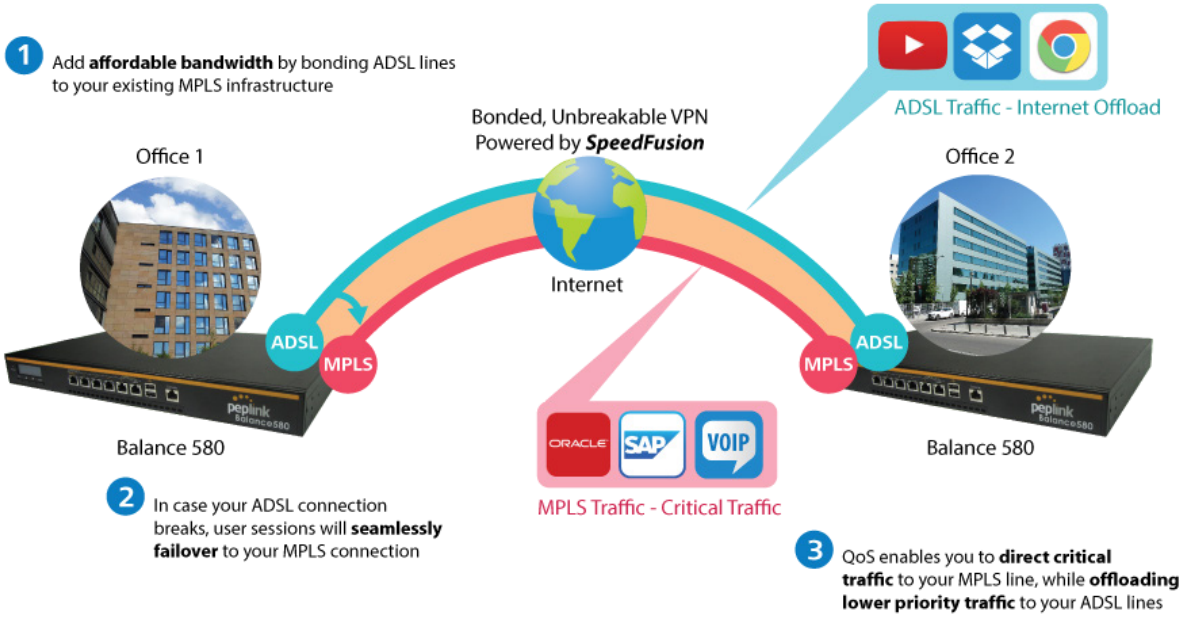
Below are typical deployments for using our Balance routers to replace expensive MPLS connections with commodity connections, such as ADSL, 3G, and 4G LTE links.

Special features of Balance 580: have high availability capability
Special features of Balance 2500: have high availability capability and capable of connecting to optical fiber based LAN through SFP+ connector

Our WAN-bonding routers which comprise our Balance series and MediaFast series
are capable of connecting multiple devices, and end users' networks to the Internet through multiple Internet connections.

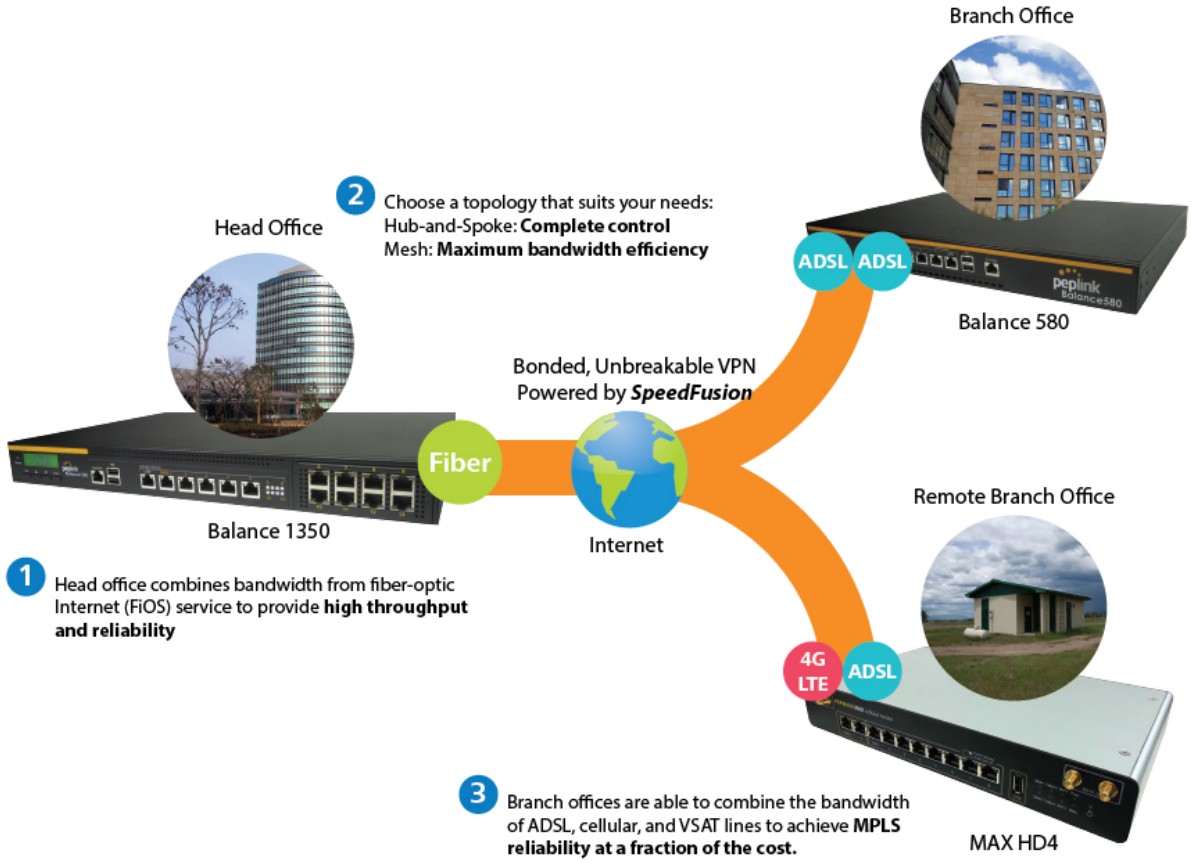
Our MediaFast series routers have been helping students at many education institutions to enjoy uninterrupted learning

Option 1: MPLS Supplement



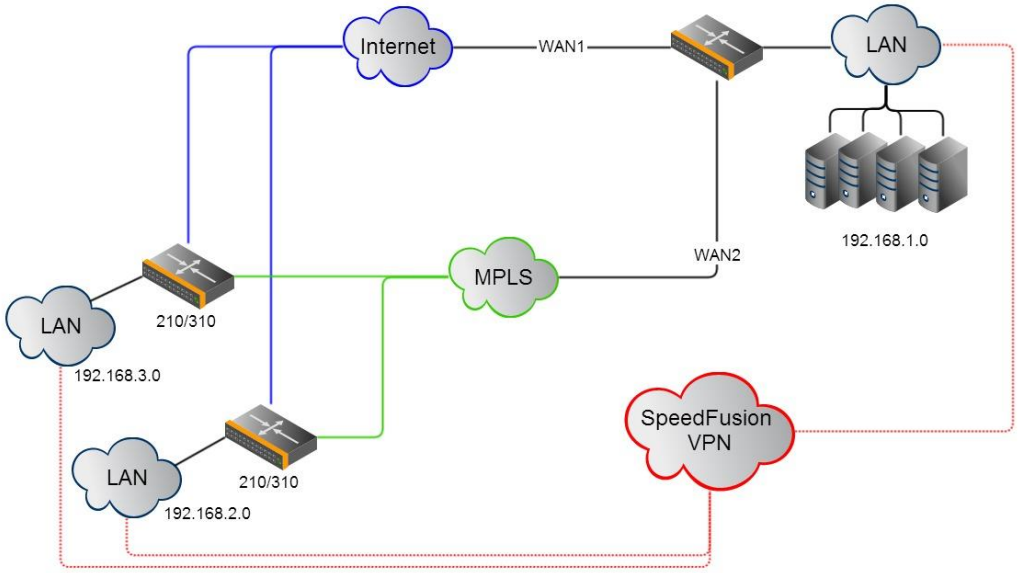
Affordably increase your bandwidth by adding commodity ADSL links to your MPLS connection. SpeedFusion technology bonds all your connections together, enabling session-persistent, user-transparent hot failover. QoS support, bandwidth control, and traffic prioritization gives you total control over your network.

Option 2: MPLS Alternative



Achieve faster speeds and greater reliability while paying only 20% of MPLS costs by connecting multiple ADSL, 3G, and 4G LTE links. Choose a topology that suits your requirements: a hub-and-spoke topology maximizes control over your network, while a meshed topology can reduce your bandwidth overhead by enabling your devices to form Unbreakable VPN connections directly with each other.

Here is an example of to supplement of existing Multi-Office MPLS network with DSL bonding through SpeedFusion using a Balance 580 at the headquarters and Balance 210/310 at branch offices.



Environment:

- This organization has one head office with two branch offices, with most of the crucial information stored in a server room at the head office.
- They are connecting the offices together using a managed MPLS Solution. However, the MPLS Network is operating at capacity and upgrading the links is cost prohibitive.
- As the organization grows, it needs a cost-efficient way to add more bandwidth to its wide area network.
- Internet access at the remote sites is sent via a web proxy at head office for corporate web filtering compliance.

Requirement:

- User sessions need to remain uninterrupted
- More bandwidth is required at the head office location for direct internet access.

Recommended Solution:

- Form a SpeedFusion tunnel between the branch offices and head office to bond the MPLS and additional DSL lines.
- SpeedFusion allows for hot failover, maintaining a persistent session while switching connections.
- The DSLs at head office can be used for direct internet access providing lots of cheap internet bandwidth.
- Head office can use outbound policies to send internet traffic out over the DSLs and only use the MPLS connection for speedfusion, freeing up bandwidth.

Devices Deployed: Balance 210, Balance 310, Balance 580

Harrington Industrial Plastics

Overview

Harrington Plastics, the US's largest industrial plastics distributor, was looking to upgrade its network equipment. Harrington's team came across Peplink and started thinking about MPLS alternatives. By choosing Peplink, they saved a fortune on upgrades and ended up with yearly savings of up to $100,000.

Requirements

- Zero network outages
- Flexible resilience options
- Cost-effective solution

Solution

- Peplink Balance 1350
- Peplink Balance 380
- Unbreakable VPN

Benefits

- Extreme savings of $100,000 per year

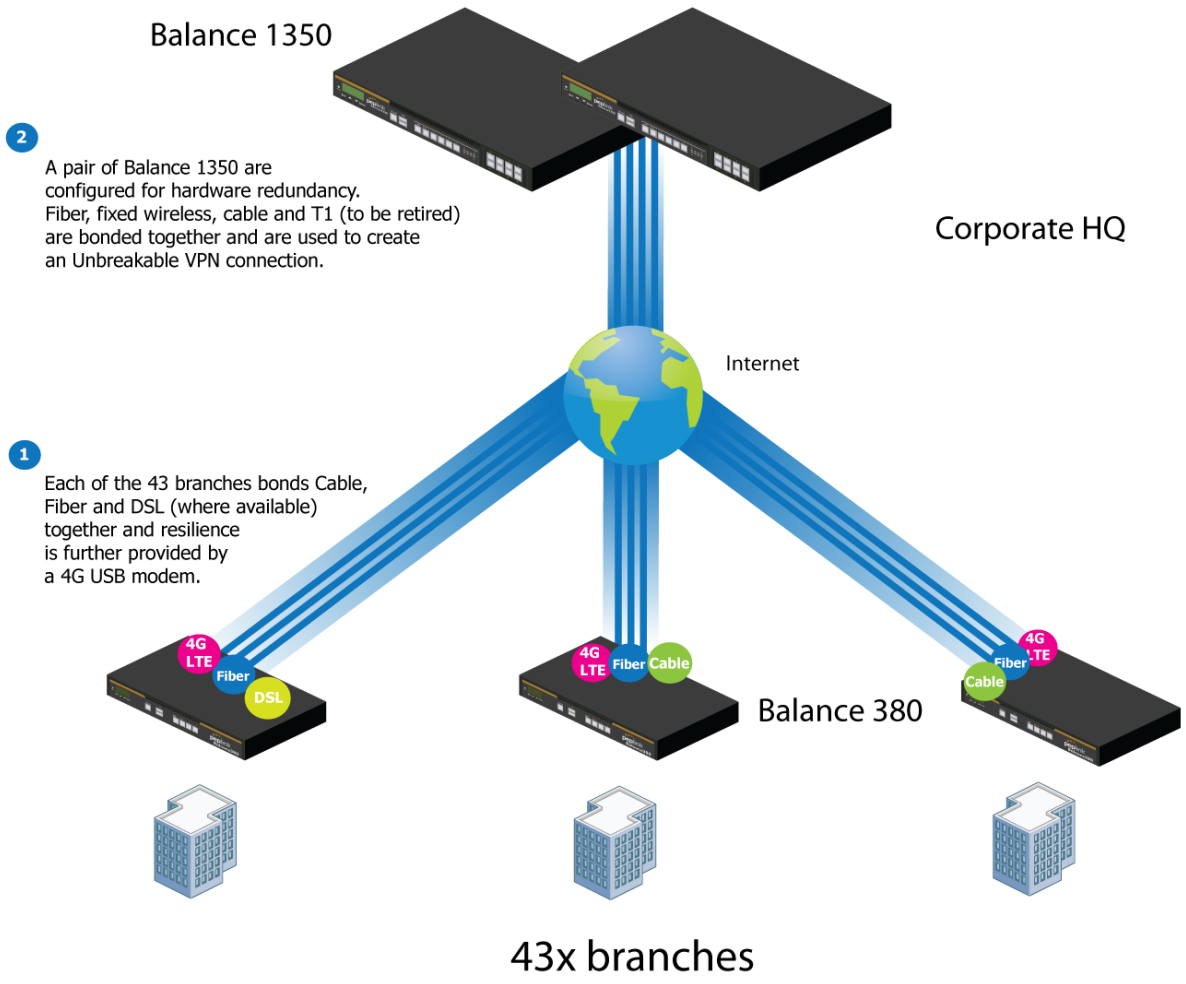
- 4x the bandwidth
- Seamless hardware failover
- Highly available network due to WAN diversity
- Highly cost-effective compared to competing solutions
- Easy resilience achieved by adding 4G USB modems

Time For An Upgrade

Harrington Industrial Plastics decided it was time to upgrade its network equipment. Its existing solution used redundant MPLS for site-to-site traffic and broadband connections for Internet access. Harrington is the US's largest distributor of industrial plastics piping, serving all industries with corrosive and high-purity applications. It requires peak performance at all times in order to serve its large customer base and 43 busy branches.

Quick Deployment and Unbreakable Connectivity

In evaluating an upgrade to its network infrastructure, it was only natural that Harrington settled on the best in the industry — Peplink. Peplink partner Frontier Computer Corporation was chosen to help design and deploy the solution. Since Peplink gear is so easy to configure and install, Harrington was able to design, prototype and roll out the entire solution to the corporate headquarters and all 43 branches within just one year.



The corporate office houses a pair of redundant Balance 1350s for hardware resilience. Served by 4 separate links from multiple service providers, the network's chance of an outage is practically zero. All 43 branches are now equipped with a fleet of Balance 380s, bonding a combination of DSL, cable and fiber-optic links together with an additional 4G USB modem for added resilience. These work together to create an Unbreakable VPN connection to the Balance 1350s at the corporate office, connecting the final dot.

Dependable, Resilient Networking that's also Very Budget-friendly

Harrington Industrial Plastics couldn't be happier. They now benefit from an extremely reliable and cost-effective network. Supplying additional resilience is as easy as plugging in a 4G USB modem. Where the MPLS 768kb deployed previously had cost them $192000 a year for all 40 sites, their new solution is now only costing them $92000. Their total bandwidth has been bumped from 36 Mbps to 138 Mbps.

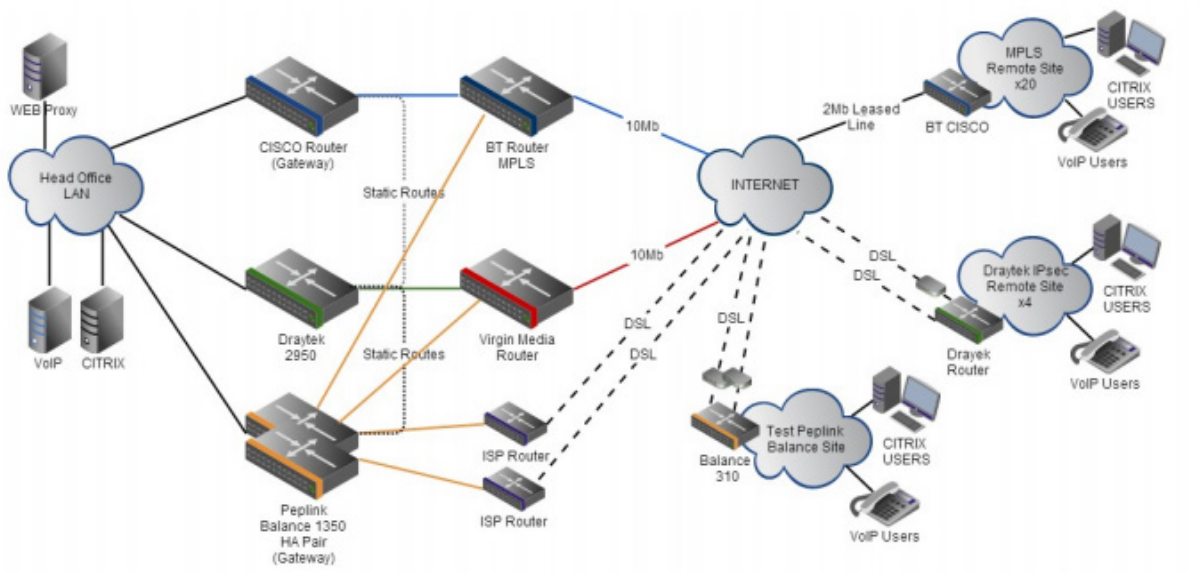
PLUSS

Peplink + Citrix + VoIP Adds Up to Fast, Cost-Effective WAN for Pluss

A Peplink customer since 2006, Pluss is a social enterprise that each year makes gainful employment a reality for more than 5000 disabled and disadvantaged UK citizens. With 37 locations and 300+ active users, Pluss makes heavy use of its WAN infrastructure, which until recently was built on managed MPLS lines.

Hoping to cut expenses and, if possible, boost performance at the same time, Steve Taylor, IT Manager at Pluss, set out to find a solution that would allow Pluss to replace costly MPLS service with a commodity alternative, such as DSL or EFM.

Steve found the solution Pluss needed in Peplink products, especially the Balance series of high-performance enterprise routers and SpeedFusion bonding technology. Pluss now powers its entire WAN infrastructure with simple-to-install, highly reliable, and cost-effective Peplink gear, which allows it to aggregate DSL and other commodity connections and replace expensive leased lines.



Colégio Next - Enabling eLearning

Colégio Next, a recognized Apple Distinguished School - deploys over 500 iPads to its 600 students as a teaching and learning tool.

Despite being equipped with iPads, teachers and students alike were not making use of them.

The reason for this was because of the slow network access speeds. Apps would not download and course contents were inaccessible. Often, having more than a couple students connected to the same Wi-Fi access point was enough to bring it to its knees.

Colégio Next needed a unique solution, so they contacted Peplink.

Requirements

- Solve network congestion problem caused by 600 students over rural Internet connections
- Wi-Fi that can handle 50+ users per classroom
- An affordable network infrastructure that can provide simultaneous access to media-rich educational content

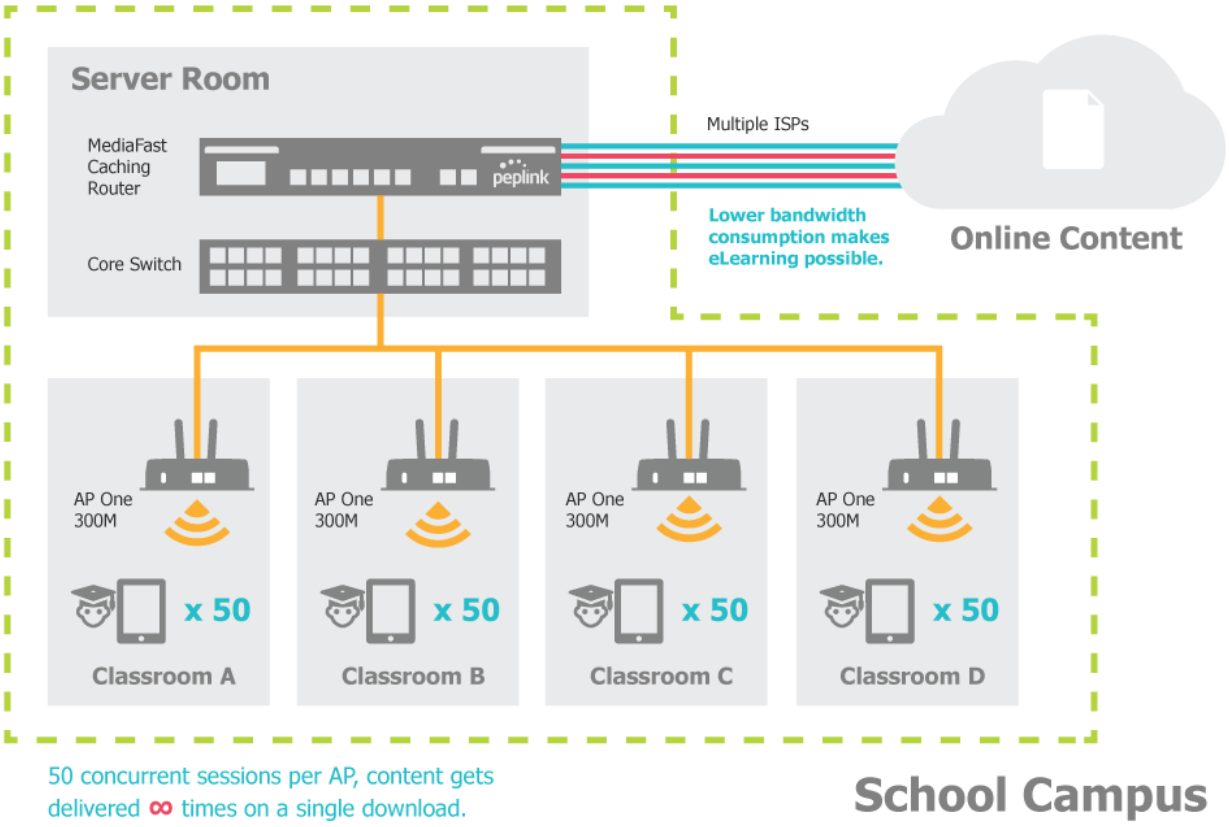
Solution

- Peplink MediaFast
- Multi-WAN Content-caching router, tailor-made for Education networking.
- AP One 300M
- Enterprise grade AP, 5GHz Wi-Fi, up to 60 concurrent users.

Benefits

- Instant, simultaneous access to media-rich educational content for 500+ iPads
- Wi-Fi connection stability for 50+ users per classroom, not achievable by other tested equipment
- Teachers, students and guests can be assigned access priority to available bandwidth, further preventing congestion
- iOS updates (often 2GB size) no longer congest the network as they are downloaded only once, cached on the MediaFast and then distributed to all iOS devices

- AP Controller makes MAC Address Filtering easy. Students are assigned to designated APs by their devices' MAC Address in order to prevent saturating any single AP.
- Flawless iPad AirPlay mirroring at all times
- iPads are used all day, reaching their full potential with a fast and stable network all the time
- Students are far more engaged and teachers rely on their iPads all day



Performance Optimization

Scenario

In this scenario, email and web browsing are the two main Internet services used by LAN users.

The mail server is external to the network. The connections are ADSL (WAN1, with slow uplink and fast downlink) and Metro Ethernet (WAN2, symmetric).

Solution

For optimal performance with this configuration, individually set the WAN load balance according to the characteristics of each service.

- Web browsing mainly downloads data; sending emails mainly consumes upload bandwidth.
- Both connections offer good download speeds; WAN2 offers good upload speeds.
- Define WAN1 and WAN2's inbound and outbound bandwidths to be 30M/2M and 50M/50M, respectively. This will ensure that outbound traffic is more likely to be routed through WAN2.
- For HTTP, set the weight to 3:4.
- For SMTP, set the weight to 1:8, such that users will have a greater chance to be routed via WAN2 when sending email.

Maintaining the Same IP Address Throughout a Session

Scenario

Some IP address-sensitive websites (for example, Internet banking) use both client IP address and cookie matching for session identification. Since load balancing uses different IP addresses, the session is dropped when a mismatched IP is detected, resulting in frequent interruptions while visiting such sites.

Solution

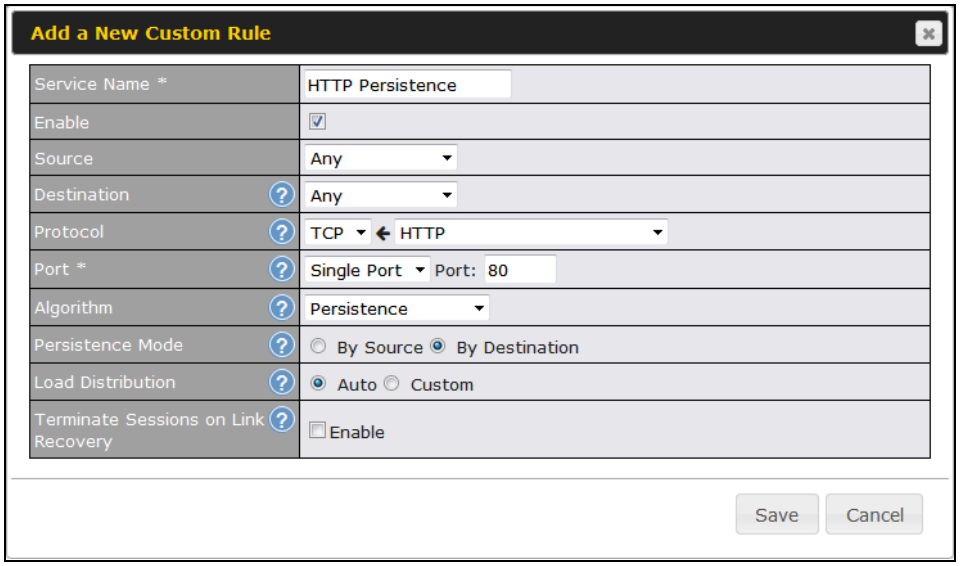
Make use of the persistence functionality of the Peplink Balance. With persistence configured and the **By Destination** option selected, the Peplink Balance will use a consistent WAN connection for source-destination pairs of IP addresses, preventing sessions from being dropped.

With persistence configured and the option **By Source** is selected, the Peplink Balance uses a consistent WAN connection for same-source IP addresses. This option offers higher application compatibility but may inhibit the load balancing function unless there are many clients using the Internet.

Settings

Set persistence in at **Advanced>Outbound Policy**.

Click **Add Rule**, select **HTTP** (TCP port 80) for web service, and select **Persistence**. Click **Save** and then **Apply Changes**, located at the top right corner, to complete the process.



Tip

A network administrator can use the traceroute utility to manually analyze the connection path of a particular WAN connection.

Bypassing the Firewall to Access Hosts on LAN

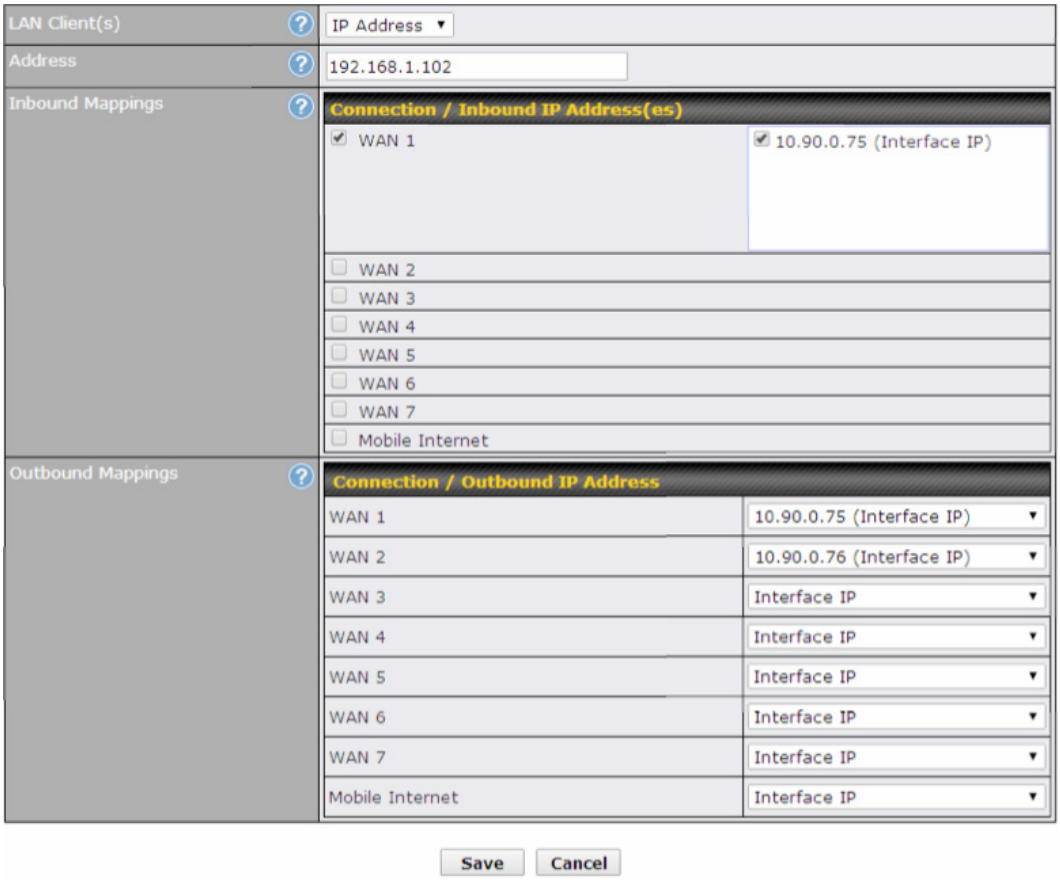
Scenario

There are times when remote access to computers on the LAN is desirable; for example, when hosting web sites, online businesses, FTP download and upload areas, etc. In such cases, it may be appropriate to create an inbound NAT mapping for the network to allow some hosts on the LAN to be accessible from outside of the firewall.

Solution

The web admin interface can be used to add an inbound NAT mapping to a host and to bind the host to the WAN connection(s) of your choice. To begin, navigate to **Network>NAT Mappings**.

In this example, the host with an IP address of 192.168.1.102 is bound to 10.90.0.75 of WAN1:



Click **Save** and then **Apply Changes**, located at the top right corner, to complete the process.

Inbound Access Restriction

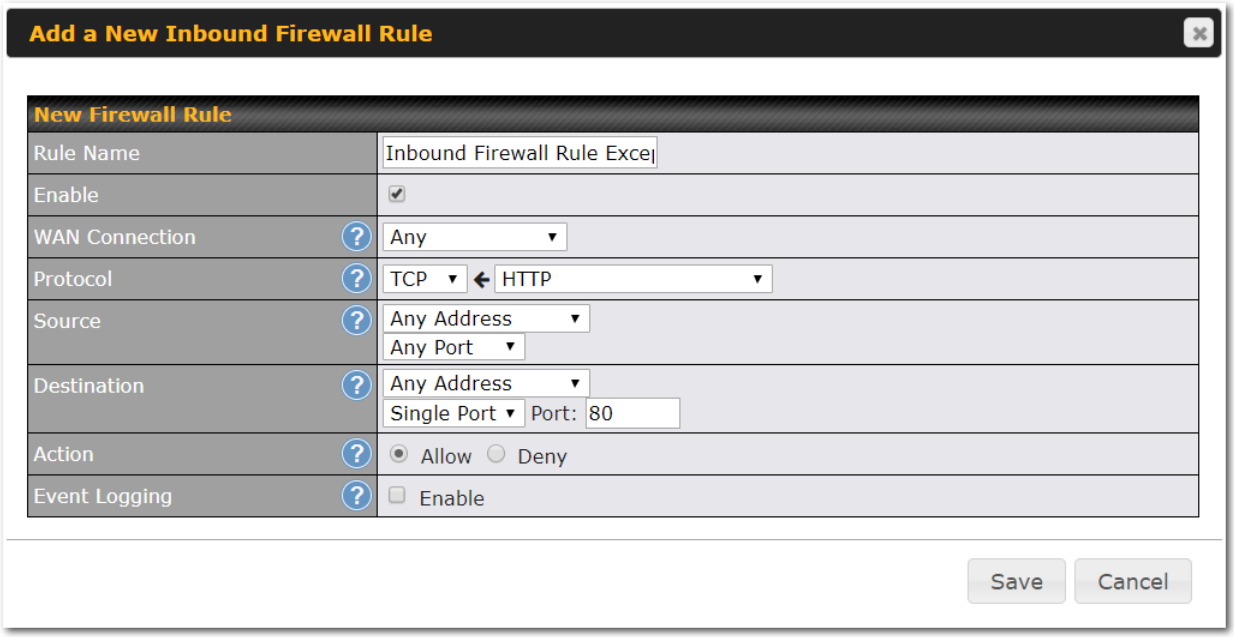
Scenario

A firewall is required in order to protect the network from potential hacker attacks and other Internet security threats.

Solution

Firewall functionality is built into the Peplink Balance. By default, inbound access is unrestricted. Enabling a basic level of protection involves setting up firewall rules.

For example, in order to protect your private network from external access, you can set up a firewall rule between the Internet and your private network. To do so, navigate to **Network>Firewall>Access Rules**. Then click the **Add Rule** button in the **Inbound Firewall Rules** table and change the settings according to the following screenshot:



After the fields have been entered as in the screenshot, click **Save** to add the rule. Afterwards, change the default inbound rule to **Deny** by clicking the **default** rule in the **Inbound Firewall Rules** table. Click **Apply Changes** on the top right corner to complete the process.

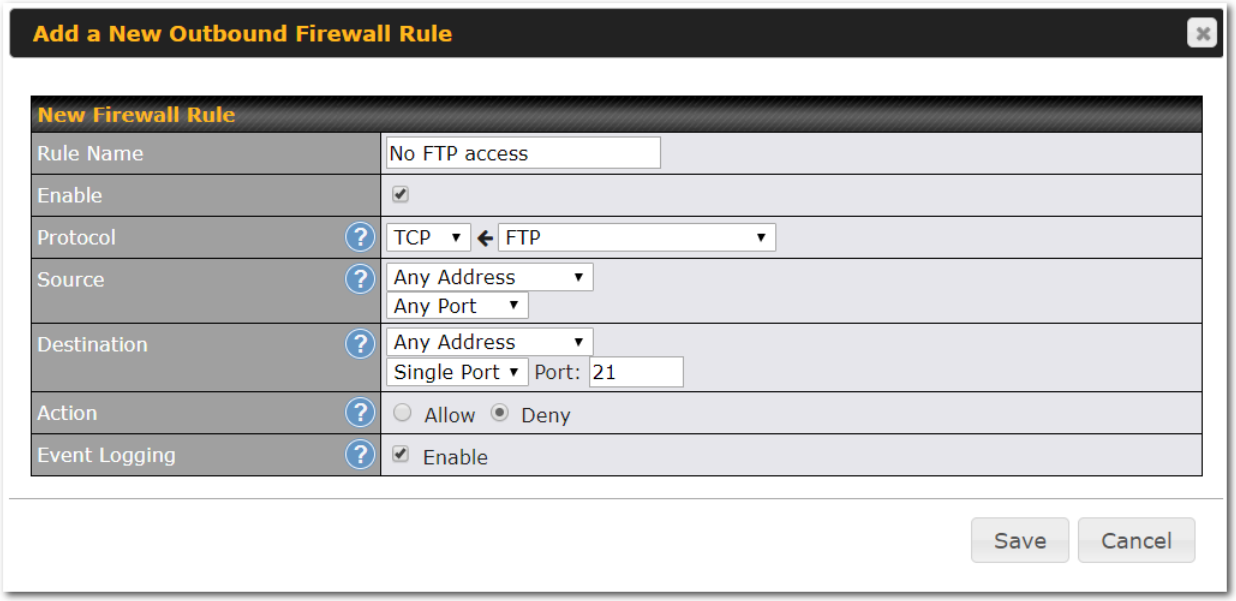
Outbound Access Restriction

Scenario

For security reasons, it may be appropriate to restrict outbound access. For example, you may want to prevent LAN users from using ftp to transfer files to and from the Internet. This can easily be achieved by setting up an outbound firewall rule with the Peplink Balance.

Solution

To setup a firewall between the Internet and private network for outbound access, navigate to **Network>Firewall>Access Rules**. Click the **Add Rule** button in the **Outbound Firewall Rules** table, and then adjust settings according the screenshot:



After the fields have been entered as in the screenshot, click **Save** to add the rule. Click **Apply Changes** on the top right corner to complete the process.

Appendix E. Overview of ports used by Peplink SD-WAN routers and other Peplink services

Default Port Number	Usage	Service	Inbound/Outbound	Default Status
UDP 5246	Data flow	InControl	Outbound	Enabled
TCP 443	HTTPS service	InControl	Outbound	Enabled
TCP 5246	Optional, used when TCP 443 is not responding	InControl	Outbound	Enabled
TCP 5246	Remote Web Admin	InControl Virtual Appliance	Outbound	Enabled
TCP 4500	VPN Data (TCP Mode)	PepVPN / SpeedFusion	Inbound / Outbound*	Disabled
TCP 32015	VPN handshake	PepVPN / SpeedFusion	Inbound / Outbound*	Disabled
UDP 4500	VPN Data	PepVPN / SpeedFusion	Inbound / Outbound*	Disabled
UDP 32015º	VPN Data (alternative)	PepVPN / SpeedFusion	Inbound / Outbound*	Disabled
TCP/UDP 4500+N-1^	VPN Sub-Tunnels Data	PepVPN / SpeedFusion	Inbound / Outbound*	Disabled
UDP 32015+N-1^	VPN Sub-Tunnels Data (alternative)	PepVPN / SpeedFusion	Inbound / Outbound*	Disabled
UDP 4500	VPN Data	IPsec	Inbound / Outbound*	Disabled
UDP 500	VPN initiation	IPsec	Inbound / Outbound*	Disabled
UDP 500	L2TP	Remote User Access	Inbound	Disabled
UDP 1701	L2TP	Remote User Access	Inbound	Disabled
UDP 4500	L2TP	Remote User Access	Inbound	Disabled
UDP 1194	OpenVPN	Remote User Access	Inbound	Disabled
IP 47	PPTP (GRE)	Remote User Access	Inbound	Disabled
TCP 2222	Remote Assistance Direct connection	Peplink Troubleshooting Assistance	Outbound	Enabled
TCP 80	HTTP traffic	Web Admin Interface	Inbound	Enabled

		access		
TCP 443	HTTPS traffic	Web Admin Interface access (secure)	Inbound	Enabled
TCP 8822	SSH	SSH	Inbound	Disabled
UDP 161	SNMP Get	SNMP monitoring	Inbound	Disabled
UDP 162	SNMP Trap	SNMP monitoring	Outbound	Disabled
TCP, UDP 1812	Radius Authentication	Radius	Outbound	Disabled
TCP, UDP 1813	Radius Accounting	Radius	Outbound	Disabled
UDP 123	Network Time Protocol	NTP	Inbound Outbound	Disabled Enabled
TCP 60660	Real-time location data in NMEA format	GPS	Outbound	Disabled

Disclaimer:

- By default, only TCP 32015 and UDP 4500 are needed for PepVPN / SpeedFusion.
- Inbound / Outbound* - Inbound = For Server mode; Outbound = For Client mode
- UDP 32015º - If IPsec VPN or L2TP/IPsec RUA is enabled, the UDP 4500 is occupied, so PepVPN / SpeedFusion will automatically switch to UPD 32015 as VPN data port .
- UDP 32015+N-1^ / TCP/UDP 4500+N-1^ - When using Sub-Tunnels, multiple ports are in use (1 for each Sub-Tunnel profile).
- The default UDP data ports used when using (N number of Sub-Tunnel profiles) are: 4500…4500+N-1, or (when port 4500 is in use by IPsec or L2TP/IPsec) 32015… 32015+N-1".

Appendix F. Troubleshooting

Problem 1

Outbound load is only distributed over one WAN connection.

Solution

Outbound load balancing can only be distribute traffic evenly between available WAN connections if many outbound connections are made. If there is only one user on the LAN and only one download session is made from his/her browser, the WAN connections cannot be fully utilized.

For a single user, download management applications are recommended. The applications can split a file into pieces and download the pieces simultaneously. Examples include: DownThemAll (Firefox Extension), iGetter (Mac), etc.

If the outbound traffic is going across the SpeedFusion™ tunnel, (i.e., transferring a file to a VPN peer) the bandwidth of all WAN connections will be bonded. In this case, all bandwidth will be utilized and a file will be transferred across all available WAN connections.

For additional details, please refer to this FAQ:

https://forum.peplink.com/t/speed-test-tool-for-combined-download-speed-in-multi-wan-environment/8457

Problem 2

I am using a download manager program (e.g., Download Accelerator Plus, DownThemAll, etc.). Why is the download speed still only that of a single link?

Solution

First, check whether all WAN connections are up. Second, ensure your download manager application has split the file into 3 parts or more. It is also possible that all of 2 or even 3 download sessions were being distributed to the same link by chance.

Problem 3

I am using some websites to look up my public IP address, e.g., www.whatismyip.com. When I press the browser's Refresh button, the server almost always returns the same address. Isn't the IP address supposed to be changing for every refresh?

Solution

The web server has enabled the **Keep Alive** function, which ensures that you use the same TCP session to query the server. Try to test with a website that does not enable **Keep Alive**.

Problem 4

What can I do if I suspect a problem on my LAN connection?

Solution

You can test the LAN connection using ping. For example, if you are using DOS/Windows, at the command prompt, type *ping 192.168.1.1.* This pings the Peplink Balance device (provided

that Peplink Balance's IP is 192.168.1.1) to test whether the connection to the Peplink Balance is OK.

Problem 5

What can I do if I suspect a problem on my Internet/WAN connection?

Solution

You can test the WAN connection using ping, as in the solution to Problem 4. As we want to isolate the problems from the LAN, ping will be performed from the Peplink Balance. By using **Ping**/**Traceroute** under the **Status** tab of the Peplink Balance, you may able to find the source of problem.

Problem 6

When I upload files to a server via FTP, the transfer stalls after a few kilobytes of data are sent. What should I do?

Solution

The maximum transmission unit (MTU) or MSS setting may need to be adjusted. By default, the MTU is set at 1440. Choose **Auto** for all of your WAN connections. If that does not solve the problem, you can try the MTU 1492 if a connection is DSL. If problem still persists, change the size to progressive smaller values until your problem is resolved (e.g., 1462, 1440, 1420, 1400, etc).

Additional troubleshooting resources:

Peplink Community Forums: https://forum.peplink.com/

Appendix G. Declaration

Details of the declaration can be found here.

