

Pepwave MAX and Surf User Manual

Pepwave Products:

MAX 700/HD2/HD2 IP67/HD2 mini/HD4/Transit/Hotspot/BR1/BR1 MK2/
BR1 Mini/BR1 Slim/BR1 ENT/BR1 Pro LTE/BR1 IP55/BR2 IP55/On-The-Go/MAX
HD2/HD4 with MediaFast/Device Connector/ Surf SOHO

Pepwave Firmware 6.3
September 2017

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1 Introduction and Scope

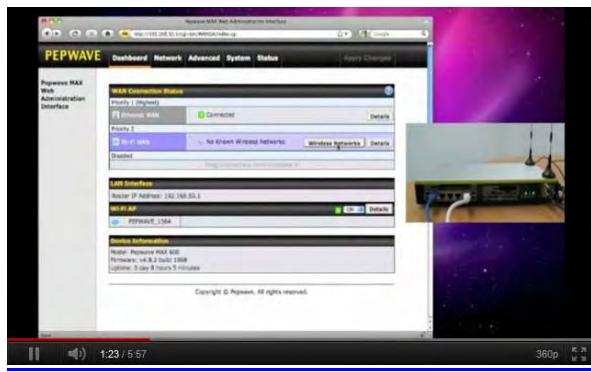
Pepwave routers provide link aggregation and load balancing across multiple WAN connections, allowing a combination of technologies like 3G HSDPA, EVDO, 4G LTE, Wi-Fi, external WiMAX dongle, and satellite to be utilized to connect to the Internet.

The MAX wireless SD-WAN router series has a wide range of products suitable for many different deployments and markets. Entry level SD-WAN models such as the MAX BR1 are suitable for SMEs or branch offices. High-capacity SD-WAN routers such as the MAX HD2 are suitable for larger organizations and head offices.

This manual covers setting up Pepwave routers and provides an introduction to their features and usage.

Tips

Want to know more about Pepwave routers? Visit our YouTube Channel for a video introduction!



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2 Glossary

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

Term	Definition
3G	3rd Generation standards for wireless communications
4G	4th Generation standards for wireless communications
DHCP	Dynamic Host Configuration Protocol
DNS	Domain Name System
EVDO	Evolution-Data Optimized
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
VRRP	Virtual Router Redundancy Protocol
WAN	Wide Area Network
WINS	Windows Internet Name Service
WLAN	Wireless Local Area Network

3 Product Features

Pepwave routers enable all LAN users to share broadband Internet connections, and they provide advanced features to enhance Internet access. Our Max BR wireless routers support multiple SIM cards. They can be configured to switch from using one SIM card to another SIM card according to different criteria, including wireless network reliability and data usage.

Our MAX HD series wireless routers are embedded with multiple 4G LTE modems, and allow simultaneous wireless Internet connections through multiple wireless networks. The wireless Internet connections can be bonded together using our SpeedFusion technology. This allows better reliability, larger bandwidth, and increased wireless coverage comparing to use only one 4G LTE modem.

Below is a list of supported features on Pepwave routers. Features vary by model. For more information, please see peplink.com/products.

3.1 Supported Network Features

3.1.1 WAN

- Ethernet WAN connection in full/half duplex
- Static IP support for PPPoE
- Built-in HSPA and EVDO cellular modems
- USB mobile connection(s)
- Wi-Fi WAN connection
- Network address translation (NAT)/port address translation (PAT)
- Inbound and outbound NAT mapping
- IPsec NAT-T and PPTP packet passthrough
- MAC address clone and passthrough
- 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

3.1.2 LAN

- Wi-Fi AP
- Ethernet LAN ports
- DHCP server on LAN
- Extended DHCP option support
- Static routing rules
- VLAN on LAN support

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3.1.3 VPN

- PepVPN with SpeedFusion™
- PepVPN performance analyzer
- X.509 certificate support
- VPN load balancing and failover among selected WAN connections
- Bandwidth bonding and failover among selected WAN connections
- IPsec VPN for network-to-network connections (works with Cisco and Juniper only)
- Ability to route Internet traffic to a remote VPN peer
- Optional pre-shared key setting
- SpeedFusion™ throughput, ping, and traceroute tests
- PPTP server
- PPTP and IPsec passthrough

3.1.4 Firewall

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

3.1.5 Captive Portal

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

3.1.6 Outbound Policy

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

3.1.7 AP Controller

- Configure and manage Pepwave AP devices

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- Review the status of connected APs

3.1.8 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/cable optimization

3.2 Other Supported Features

- User-friendly web-based administration interface
- HTTP and HTTPS support for web admin interface
- Configurable web administration port and administrator password
- Firmware upgrades, configuration backups, ping, and traceroute via web admin interface
- Remote web-based configuration (via WAN and LAN interfaces)
- Time server synchronization
- SNMP
- Email notification
- Read-only user for web admin
- Shared IP drop-in mode
- Authentication and accounting by RADIUS server for web admin
- Built-in WINS servers*
- Syslog
- SIP passthrough
- PPTP packet passthrough
- Event log
- Active sessions
- Client list
- WINS client list *
- UPnP / NAT-PMP
- Real-time, hourly, daily, and monthly bandwidth usage reports and charts
- IPv6 support
- Support USB tethering on Android 2.2+ phones

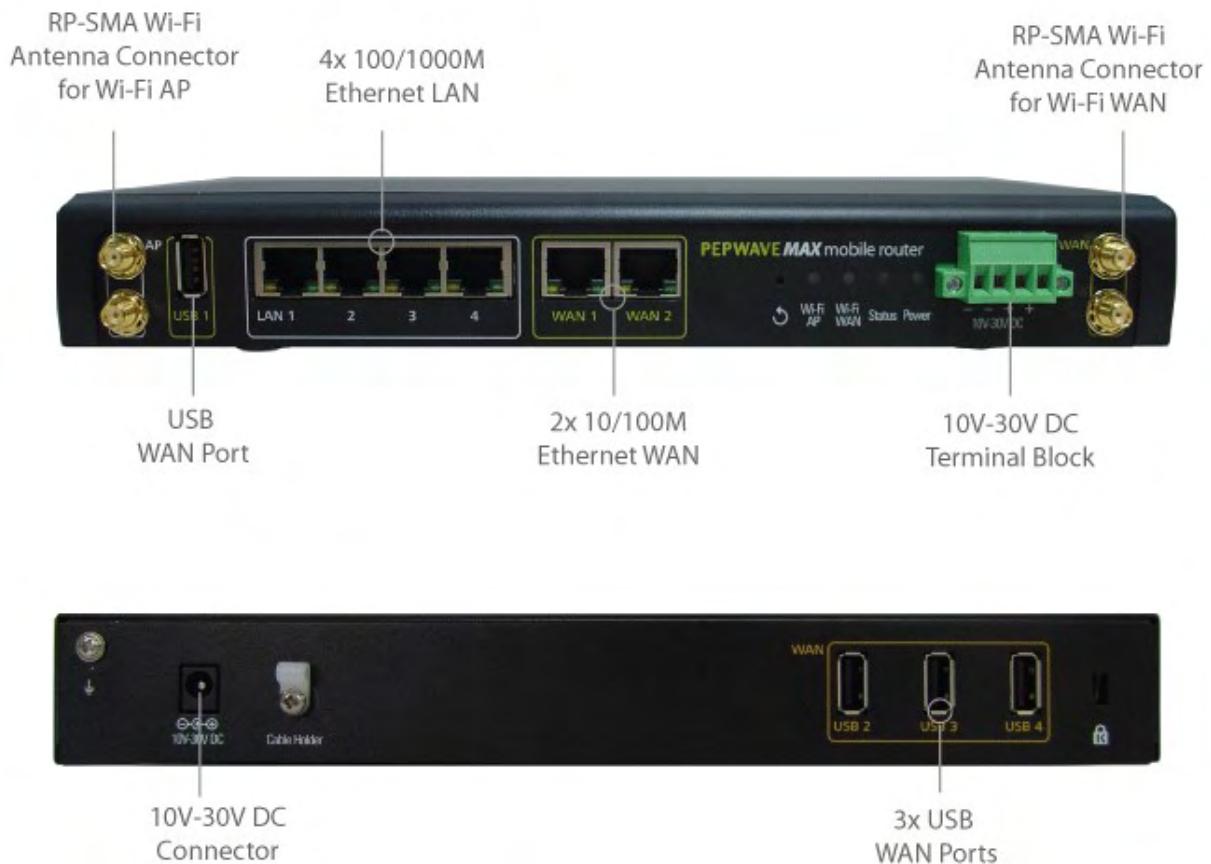
* Not supported on MAX Surf-On-The-Go, Surf SOHO, and BR1 variants

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4 Pepwave MAX Mobile Router Overview

4.1 MAX 700

4.1.1 Panel Appearance



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4.1.2 LED Indicators

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

Status Indicators		
Status	OFF	System initializing
	Red	Booting up or busy
	Blinking red	Boot up error
	Green	Ready

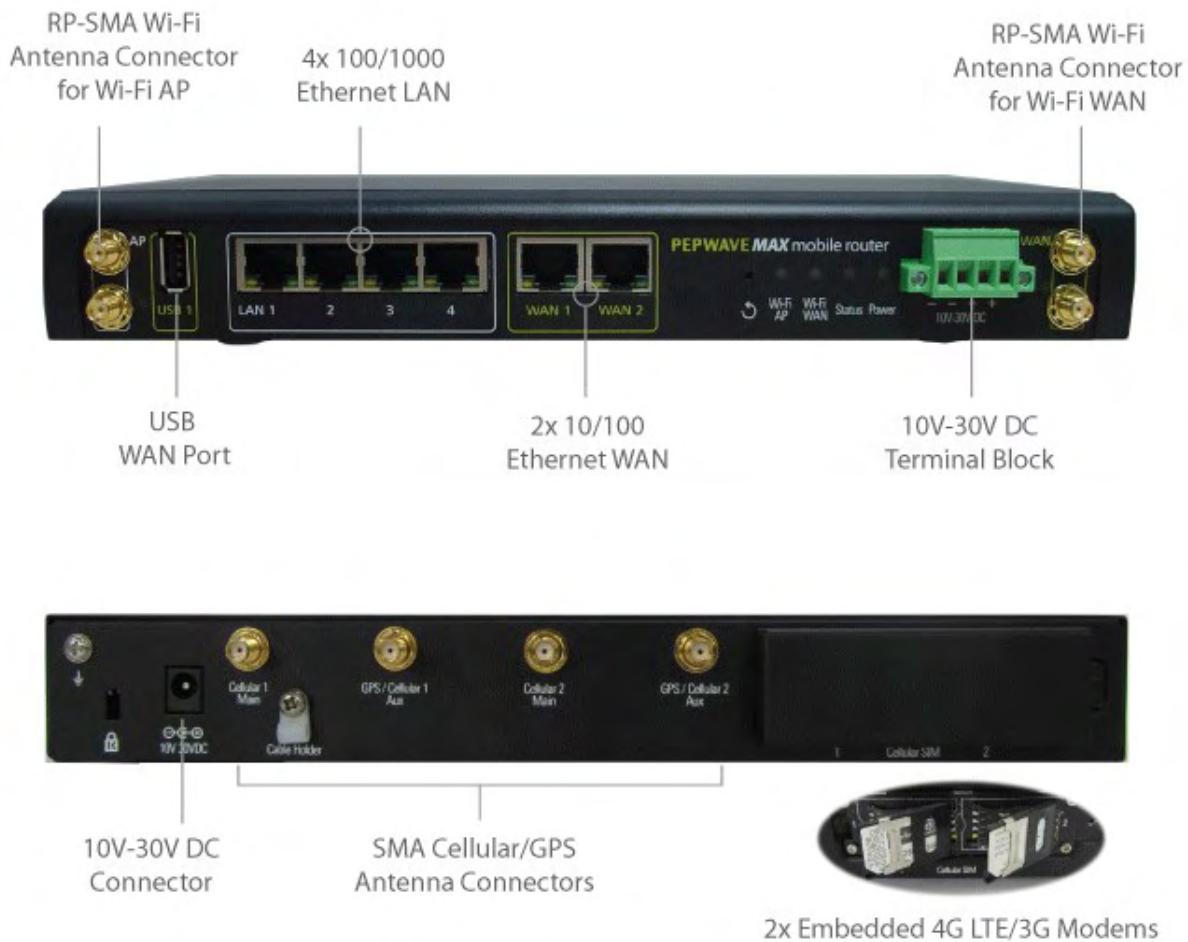
Wi-Fi AP and Wi-Fi WAN Indicators		
Wi-Fi WAN	OFF	Disconnected
	Blinking slowly	Connecting to network
	Blinking	Connected to network with traffic
Wi-Fi AP	ON	Connected to network without traffic
	OFF	Disabled
	Blinking slowly	Enabled but no client connected
	Blinking	Connected to network with traffic
	ON	Client(s) connected to wireless network

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

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4.2 MAX HD2

4.2.1 Panel Appearance



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4.2.2 LED Indicators

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

Status Indicators		
Status	Indicator	Description
	OFF	System initializing
	Red	Booting up or busy
	Blinking red	Boot up error
	Green	Ready

Wi-Fi AP and Wi-Fi WAN Indicators		
Wi-Fi WAN / Cellular 1 / Cellular 2	Indicator	Description
	OFF	Disabled Intermittent
	Blinking slowly	Connecting to wireless network(s)
	Blinking	Connected to wireless network(s) with traffic
	ON	Connected to wireless network(s) without traffic

LAN and Ethernet WAN Ports		
Port Type	Indicator	Description
Green LED	ON	10 / 100 / 1000 Mbps
	Blinking	Data is transferring
Orange LED	OFF	No data is being transferred or port is not connected

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4.3 MAX HD2 IP67

4.3.1 Panel Appearance



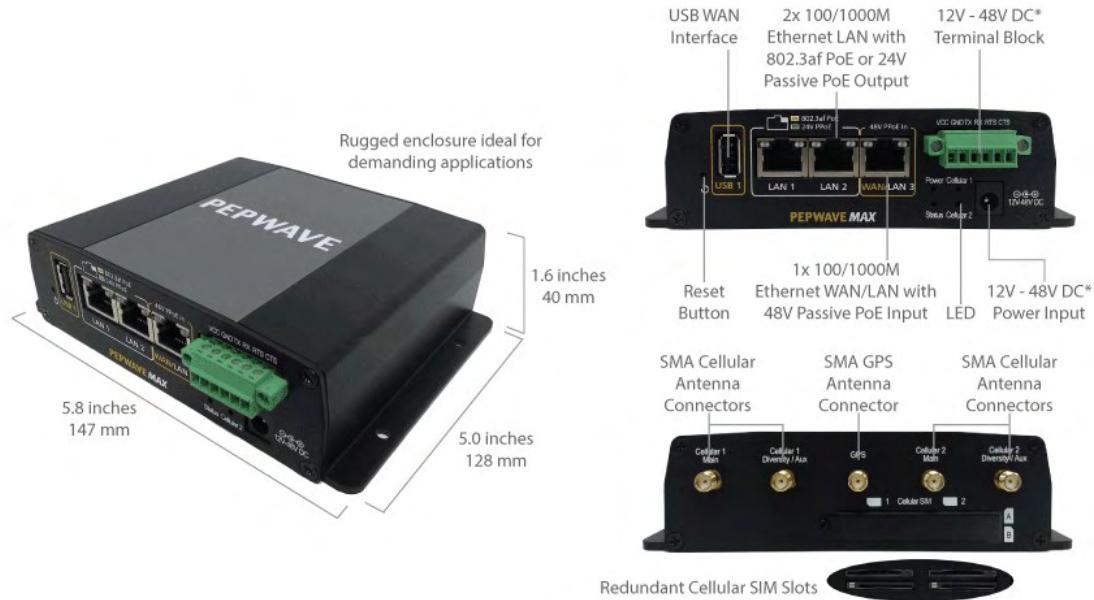
The statuses indicated by the front panel LEDs are as follows:

Status Indicators		
Status	OFF	System initializing
	Red	Booting up or busy
	Blinking red	Boot up error
	Green	Ready

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4.4 MAX HD2 mini

4.4.1 Panel Appearance



* With 48V DC power, all 3 Ethernet ports can act as 802.3af PoE or 24V Passive PoE outputs

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4.4.2 LED Indicators

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

Status Indicators		
Status	Color	Description
	OFF	System initializing
	Red	Booting up or busy
	Blinking red	Boot up error
	Green	Ready

Cellular WAN Indicators		
Cellular 1 / Cellular 2	Indicator	Description
	OFF	Disabled intermittent
	Blinking slowly	Connecting to wireless network(s)
	Blinking	Connected to wireless network(s) with traffic
	ON	Connected to wireless network(s) without traffic

LAN and Ethernet WAN Ports		
Port Type	Indicator	Description
Green LED	ON	10 / 100 / 1000 Mbps
	Blinking	Data is transferring
Orange LED	OFF	No data is being transferred or port is not connected

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4.5 MAX Transit

4.5.1 Panel Appearance



4.5.2 LED Indicators

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

Status Indicators		
Status	OFF	System initializing
	Red	Booting up or busy
	Blinking red	Boot up error
	Green	Ready

Cellular WAN Indicators		
Cellular 1 / Cellular 2*	OFF	Disabled intermittent
Cellular 1 / Cellular 2*	Blinking slowly	Connecting to wireless network(s)
Cellular 1 / Cellular 2*	Blinking	Connected to wireless network(s) with traffic
Cellular 1 / Cellular 2*	ON	Connected to wireless network(s) without traffic

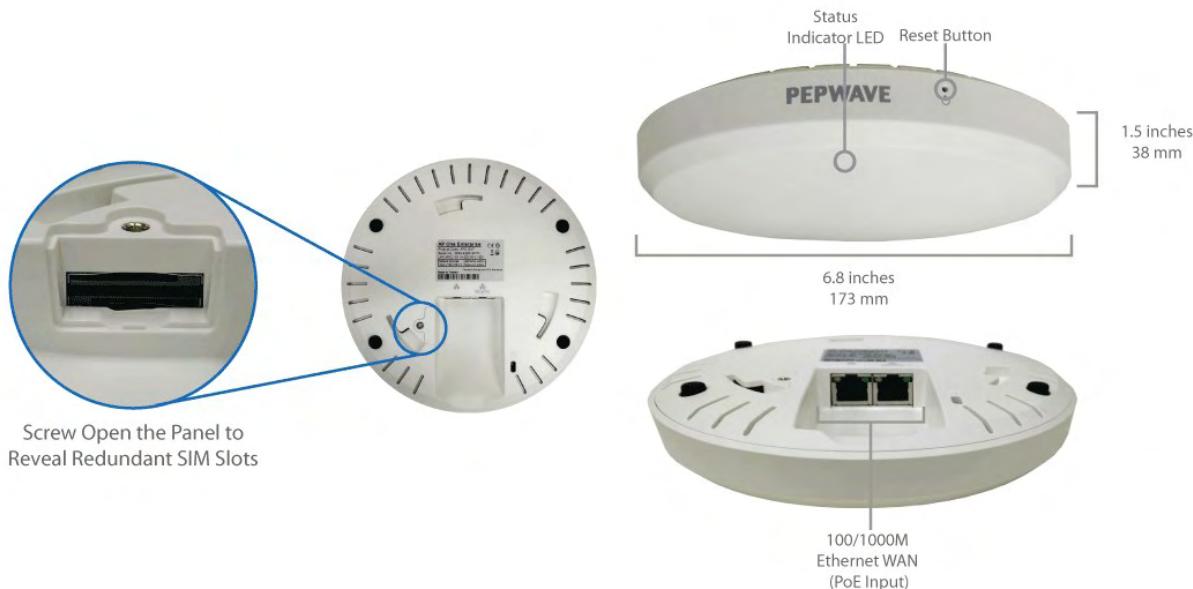
* For MAX-TST_DUO

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

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4.6 MAX Hotspot

4.6.1 Panel Appearance



4.6.2 LED Indications

LED Indicators		
Status		RED – Access point initializing GREEN – Access point ready
LAN and Ethernet WAN Ports		
Green LED	ON	100 Mbps
	OFF	10 Mbps
Orange LED	ON	Port is connected without traffic
	Blinking	Data is transferring
	OFF	Port is not connected
Port Type	Auto MDI/MDI-X ports	

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4.7 MAX HD4

4.7.1 Panel Appearance



4.7.2 LED Indicators

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

Status Indicators		
Status	OFF	System initializing
	Red	Booting up or busy
	Blinking red	Boot up error
	Green	Ready

Wi-Fi AP and Wi-Fi WAN Indicators		
Wi-Fi WAN / Cellular 1 / Cellular 2	OFF	Disabled Intermittent
	Blinking slowly	Connecting to wireless network(s)
	Blinking	Connected to wireless network(s) with traffic
	ON	Connected to wireless network(s) without traffic

LAN and Ethernet WAN Ports		
Green LED	ON	10 / 100 / 1000 Mbps
	Blinking	Data is transferring
Orange LED	OFF	No data is being transferred or port is not connected

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Port Type	Auto MDI/MDI-X ports
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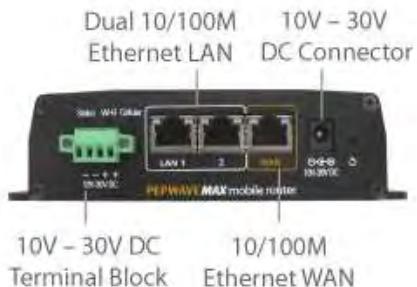
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4.8 MAX BR1 / MAX BR1 MK2

4.8.1 Panel Appearance



MAX-BR1-LTE Version



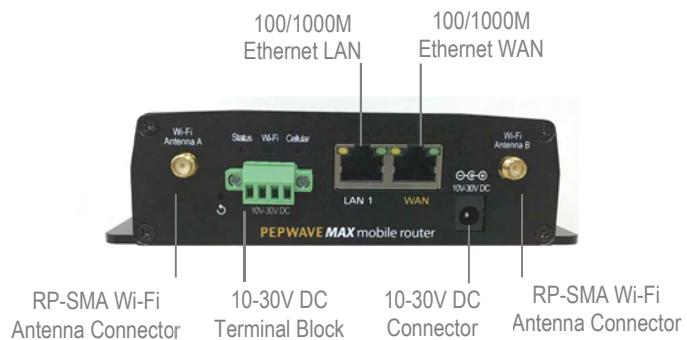
MAX-BR1 Version



MAX BR1 MK2



SMA Cellular Antenna Connector
SMA GPS Antenna Connector



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4.8.2 LED Indicators

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

Status Indicators		
Status	OFF	System initializing
	Red	Booting up or busy
	Blinking red	Boot up error
	Green	Ready

Wi-Fi Indicators		
Wi-Fi	OFF	Disabled intermittent
	Blinking slowly	Connecting to wireless network(s)
	Blinking	Connected to wireless network(s) with traffic
	ON	Connected to wireless network(s) without traffic

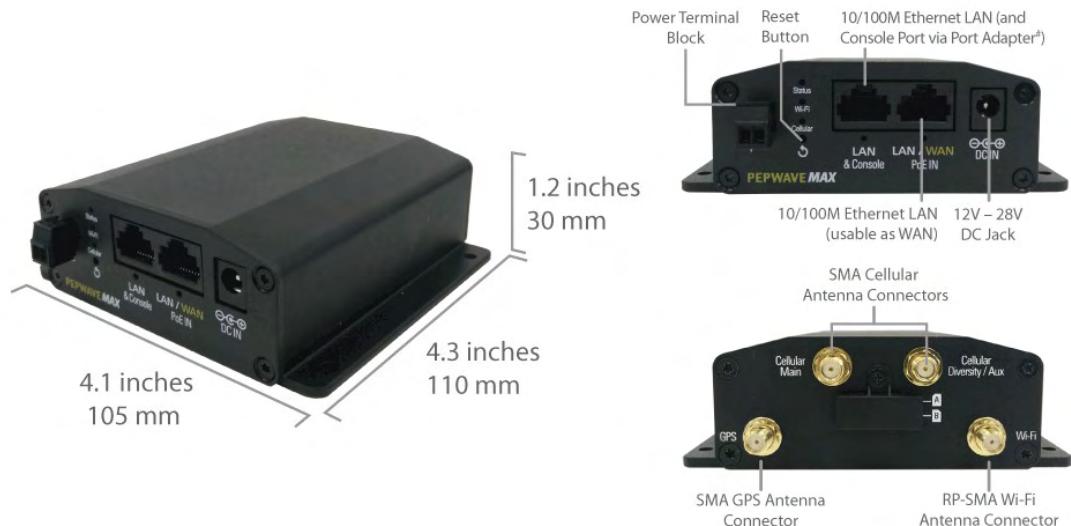
Cellular Indicators		
Cellular	OFF	Disabled or no SIM card inserted
	ON	Connecting or connected to network(s)

LAN and Ethernet WAN Ports		
Green LED	ON	100 Mbps / 1000Mbps (MK2)
	OFF	10 Mbps / 100Mbps (MK2)
	ON	Port is connected without traffic
Orange LED	Blinking	Data is transferring
	OFF	Port is not connected
Port Type	Auto MDI/MDI-X ports	

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4.9 MAX BR1 Mini

4.9.1 Panel Appearance



4.9.2 LED Indicators

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

Status Indicators		
Status	OFF	System initializing
	Red	Booting up or busy
	Blinking red	Boot up error
	Green	Ready

Wi-Fi Indicators		
Wi-Fi	OFF	Disabled intermittent
	Blinking slowly	Connecting to wireless network(s)
	Blinking	Connected to wireless network(s) with traffic
	ON	Connected to wireless network(s) without traffic

Cellular Indicators		
Cellular	OFF	Disabled or no SIM card inserted
	ON	Connecting or connected to network(s)

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Specifications

	MAX BR1 Mini
WAN Interface	1x 10/100M Ethernet Port 1x Embedded LTE Modem with Redundant SIM Slot
LAN Interface	1x 10/100M Ethernet Port
Wi-Fi Interface	802.11b/g/n Wi-Fi WAN or AP
Router Throughput	100Mbps
Recommended Users	1-60
Cellular and GPS Antenna Connector	2x SMA Antenna Connectors 1x SMA GPS Antenna Connector 1x Wi-Fi Connector
Power Input	DC Jack/Terminal Block: 12V – 28V DC Passive PoE Input (WAN Port)
Power Consumption	12W (max.)
Dimensions	4.1 x 4.3 x 1.2 inches 105 x 110 x 30 mm
Weight	0.54 pound 244 grams
Operating Temperature	40°C - 50°C
Humidity	15% – 95% (non-condensing)

A torque requirement of hex connection:

- **GPS - Torque requirement is 7.5+/-0.2kg f-cm**
- **Cellular Main - Torque requirement is 7.5+/-0.2kg f-cm**
- **Cellular Diversity/AUX - Torque requirement is 7.5+/-0.2kg f-cm**

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4.10 MAX BR1 Slim

4.10.1 Panel Appearance



4.10.2 LED Indicators

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

Status Indicators		
Status	Indicator	Description
	OFF	System initializing
	Red	Booting up or busy
	Blinking red	Boot up error
	Green	Ready

Wi-Fi Indicators		
Wi-Fi	Indicator	Description
	OFF	Disabled intermittent
	Blinking slowly	Connecting to wireless network(s)
	Blinking	Connected to wireless network(s) with traffic
	ON	Connected to wireless network(s) without traffic

Cellular Indicators		
Cellular	Indicator	Description
	OFF	Disabled or no SIM card inserted
	ON	Connecting or connected to network(s)

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-

LAN and Ethernet WAN Ports		
Green LED	ON	100 Mbps
	OFF	10 Mbps
Orange LED	ON	Port is connected without traffic
	Blinking	Data is transferring
Port Type	OFF	Port is not connected
	Auto MDI/MDI-X ports	

-

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4.11 MAX BR1 ENT

4.11.1 Panel Appearance



4.11.2 LED Indicators

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

Status Indicators		
Status	Indicator	Description
	OFF	System initializing
	Red	Booting up or busy
	Blinking red	Boot up error
	Green	Ready

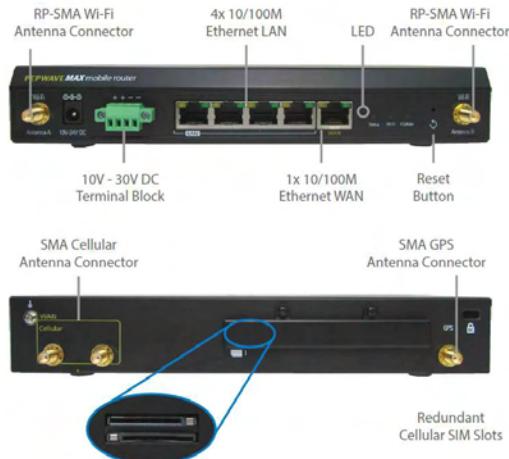
Cellular Indicators		
Cellular	Indicator	Description
	OFF	Disabled or no SIM card inserted
	ON	Connecting or connected to network(s)

LAN and Ethernet WAN Ports		
Port Type	Indicator	Description
Green LED	ON	100 Mbps
	OFF	10 Mbps
	ON	Port is connected without traffic
Orange LED	Blinking	Data is transferring
	OFF	Port is not connected

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4.12 MAX BR1 Pro LTE

4.12.1 Panel Appearance



4.12.2 LED Indicators

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

Status Indicators		
Status	OFF	System initializing
	Red	Booting up or busy
	Blinking red	Boot up error
	Green	Ready

Cellular Indicators		
Cellular	OFF	Disabled or no SIM card inserted
	ON	Connecting or connected to network(s)

LAN and Ethernet WAN Ports		
Port Type	Green LED	Orange LED
	ON	100 Mbps
	OFF	10 Mbps
	ON	Port is connected without traffic
	Blinking	Data is transferring
	OFF	Port is not connected

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4.13 MAX BR1/2 IP55

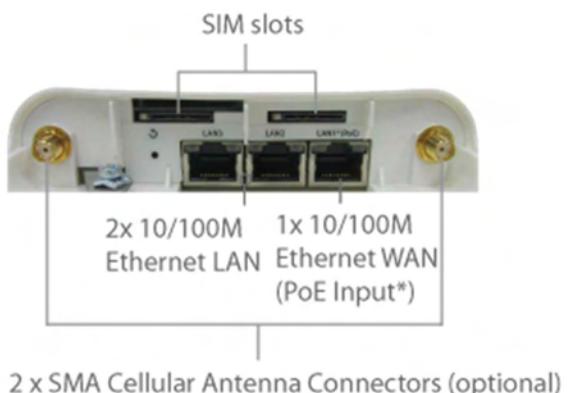
4.13.1 Panel Appearance



Built-In, Software-Selectable 10dBi MIMO Directional and 4dBi Omni Wi-Fi antennas



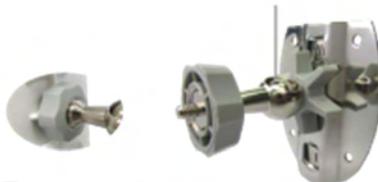
Screw-Holes
for Wall Mounting
(screws not included)



* Requires 48V Pepwave Passive PoE input. Available separately.

Accessory – Wall/Pole Mount with Ball Joint for IP55 Outdoor Products ^

Flexible ball joint allows for high-precision installation



To connect to MAX BR1 IP55/BR2 IP55

^ Available separately.

4.13.2 LED Indicators

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

Status Indicators		
Status	OFF	System initializing
	Red	Booting up or busy
	Blinking red	Boot up error
	Green	Ready

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Wi-Fi Indicators		
Wi-Fi	OFF	Disabled Intermittent
	Blinking slowly	Connecting to wireless network(s)
	Blinking	Connected to wireless network(s) with traffic
	ON	Connected to wireless network(s) without traffic

Cellular Indicators		
Cellular	OFF	Disabled or no SIM card inserted
	ON	Connecting or connected to network(s)

LAN and Ethernet WAN Ports		
Green LED	ON	100 Mbps
	OFF	10 Mbps
Orange LED	ON	Port is connected without traffic
	Blinking	Data is transferring
	OFF	Port is not connected
Port Type	Auto MDI/MDI-X ports	

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4.14 MAX On-The-Go

4.14.1 Panel Appearance



4.14.2 LED Indicators

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

Cellular Indicators		
WAN	OFF	Modem is not attached to the port
	Green	Modem is attached to the port

Wi-Fi Indicators		
Wi-Fi	OFF	Disconnected from AP
	Green	Connected to AP

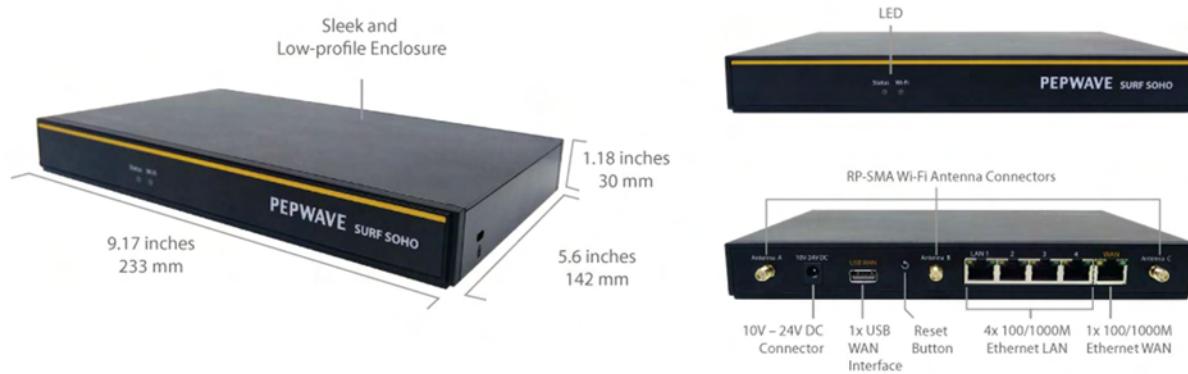
Status Indicators		
Status	OFF	System initializing
	Red	Booting up or busy
	Green	Ready

LAN and Ethernet WAN Ports		
Port Type	Green LED	ON 100 Mbps
		OFF 10 Mbps
	Orange LED	ON Port is connected without traffic
		Blinking Data is transferring

Pepwave MAX and Surf User Manual

4.15 Surf SOHO

4.15.1 Panel Appearance



4.15.2 LED Indicators

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

Wi-Fi and Status Indicators		
Wi-Fi	OFF	Disabled Intermittent
	Blinking	Enabled but no client connected
	ON	Client(s) connected to wireless network
	Continuous blinking	Transferring data to wireless network
Status	OFF	System initializing
	Red	Booting up or busy
	Green	Ready state

LAN and Ethernet WAN Ports		
Green LED	ON	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	

Wi-Fi Signal		
Off	No connection	
Signal strength	Wi-Fi signal strength (low, medium, and high)	

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5 Advanced Feature Summary

5.1 Drop-in Mode and LAN Bypass: Transparent Deployment



As your organization grows, it needs more bandwidth. But modifying your network would require effort better spent elsewhere. In **Drop-in Mode**, you can conveniently install your Peplink router without making any changes to your network. And if the Peplink router loses power for any reason, **LAN Bypass** will safely and automatically bypass the Peplink router to resume your original network connection.

Compatible with: MAX 700, MAX HD2 (All variants), HD4 (All Variants)

5.2 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.

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5.3 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.

5.4 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.

Compatible with: MAX 700, MAX HD2 (All variants), HD4 (All Variants)

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5.5 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.

Compatible with: MAX 700, HD2 (all variants except IP67), HD4 (All variants)

5.6 Built-In Remote User VPN Support



Use 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 full instructions on setting up L2TP with IPsec.

5.7 SIM-card USSD support



Cellular-enabled routers can now use USSD to check their SIM card's balance, process pre-paid cards, and configure carrier-specific services. [Click here for full instructions on using USSD.](#)

6 Installation

The following section details connecting Pepwave routers to your network.

6.1 Preparation

Before installing your Pepwave router, please prepare the following as appropriate for your installation:

- At least one Internet/WAN access account and/or Wi-Fi access information
- Depending on network connection type(s), one or more of the following:
 - **Ethernet WAN:** A 10/100/1000BaseT UTP cable with RJ45 connector
 - **USB:** A USB modem
 - **Embedded modem:** A SIM card for GSM/HSPA service
 - **Wi-Fi WAN:** Wi-Fi antennas
 - **PC Card/Express Card WAN:** A PC Card/ExpressCard for the corresponding card slot
- A computer installed with the TCP/IP network protocol and a supported web browser. Supported browsers include Microsoft Internet Explorer 8.0 or above, Mozilla Firefox 10.0 or above, Apple Safari 5.1 or above, and Google Chrome 18 or above.

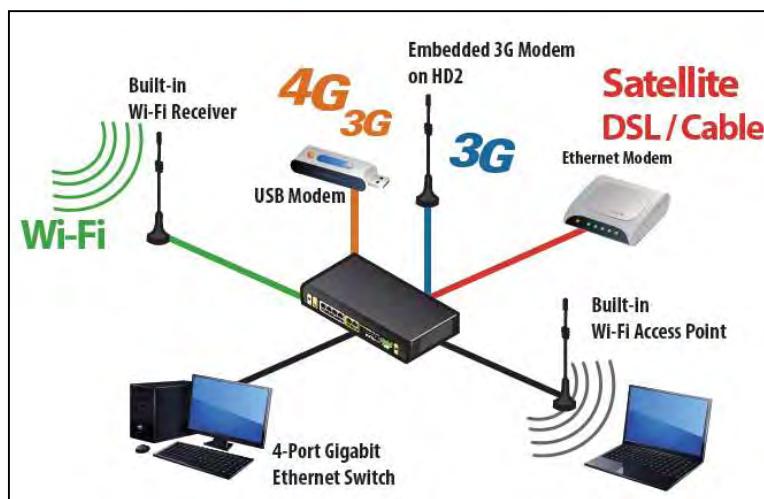
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6.2 Constructing the Network

At a 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 Pepwave router. Repeat with different cables for up to 4 computers to be connected.
2. With another Ethernet cable or a USB modem/Wi-Fi antenna/PC Card/Express Card, connect to one of the WAN ports on the Pepwave router. Repeat the same procedure for other WAN ports.
3. Connect the power adapter to the power connector on the rear panel of the Pepwave router, and then plug it into a power outlet.

The following figure schematically illustrates the resulting configuration:



6.3 Configuring the Network Environment

To ensure that the Pepwave router works properly in the LAN environment and can access the Internet via WAN connections, please refer to the following setup procedures:

- LAN configuration

For basic configuration, refer to **Section 8, Connecting to the Web Admin Interface.**

For advanced configuration, go to **Section 9, Configuring the LAN Interface(s).**

- WAN configuration

For basic configuration, refer to **Section 8, Connecting to the Web Admin Interface.**

For advanced configuration, go to **Section 9.2, Captive Portal.**

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7 Mounting the Unit

7.1 Wall Mount

The Pepwave MAX 700/HD2/On-The-Go can be wall mounted using screws. After adding the screw on the wall, slide the MAX in the screw hole socket as indicated below. Recommended screw specification: M3.5 x 20mm, head diameter 6mm, head thickness 2.4mm.

The Pepwave MAX BR1 requires four screws for wall mounting.

7.2 Car Mount

The Pepwave MAX700/HD2 can be mounted in a vehicle using the included mounting brackets. Place the mounting brackets by the two sides and screw them onto the device.



7.3 IP67 Installation Guide

Installation instructions for IP67 devices can be found here:
http://download.peplink.com/manual/IP67_Installation_Guide.pdf

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8 Connecting to the Web Admin Interface

1. Start a web browser on a computer that is connected with the Pepwave router through the LAN.
2. To connect to the router's web admin interface, enter the following LAN IP address in the address field of the web browser:

http://192.168.50.1

(This is the default LAN IP address for Pepwave routers.)

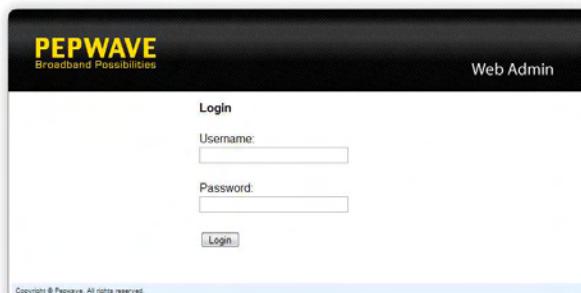
3. Enter the following to access the web admin interface.

Username: admin

Password: admin

(This is the default username and password for Pepwave routers. The admin and read-only user passwords can be changed at **System>Admin Security**.)

4. After successful login, the **Dashboard** will be displayed.



Three screenshots of the Pepwave MAX Dashboard. The top screenshot shows the "WAN Connection Status" section with two WAN connections (WAN 1 and WAN 2) listed under Priority 1, both in a "Connected" state. The middle screenshot shows the "LAN Interface" section with a Router IP Address of 192.168.50.1 and a Wi-Fi AP named PEPWAVE_8D1C. The bottom screenshot shows the "Device Information" section, which includes the Model (Pepwave MAX HD2), Firmware (6.2.0 build 2891), Uptime (1 day 16 hours 35 minutes), CPU Load (12%), and Throughput (0.0 Mbps down, 0.1 Mbps up).

The **Dashboard** shows current WAN, LAN, and Wi-Fi AP statuses. Here, you can change WAN connection priority and switch on/off the Wi-Fi AP. For further information on setting up these connections, please refer to **Sections 8 and 9**.

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Device Information displays details about the device, including model name, firmware version, and uptime. For further information, please refer to **Section 22**.

Important Note

Configuration changes (e.g. WAN, LAN, admin settings, etc.) will take effect only after clicking the **Save** button at the bottom of each page. The **Apply Changes** button causes the changes to be saved and applied.

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9 Configuring the LAN Interface(s)

9.1 Basic Settings

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

LAN	VLAN	Network	
LAN	None	172.16.251.1/24	
VLAN1	1	2.2.2.2/24	
VLAN2	2	3.3.3.3/24	
New LAN			

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 any of the existing LAN interfaces (or creating a new one) will result in the following

IP Settings		
IP Address	192.168.50.1	255.255.255.0 (/24)

IP Settings

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

Network Settings	
Name	<input type="text"/>
VLAN ID	<input type="text"/>
Inter-VLAN routing	<input checked="" type="checkbox"/>
Captive Portal	<input type="checkbox"/>

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.

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Captive Portal Check this box to turn on captive portals.

Drop-In Mode Settings	
Enable	<input checked="" type="checkbox"/>
WAN for Drop-In Mode	<input type="button" value="?"/> WAN 1 ▾
Share Drop-In IP	<input type="button" value="?"/> <input checked="" type="checkbox"/>
Shared IP Address	<input type="button" value="?"/> <input type="text"/> 255.255.255.0 (/24) ▾
WAN Default Gateway	<input type="button" value="?"/> <input type="text"/> <input checked="" type="checkbox"/> I have other host(s) on WAN segment Host IP Address(es) <input type="text"/> - <input type="text"/>  
WAN DNS Servers	<input type="button" value="?"/> DNS server 1: <input type="text"/> DNS server 2: <input type="text"/>

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Drop-in Mode Settings

Enable	Drop-in mode eases the installation of Peplink routers 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, if available on your model.
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.
Share Drop-In IP^A	<p>When this option is enabled, the passthrough IP address will be used to connect to WAN hosts (email notification, remote syslog, etc.). The Pepwave router will listen for this IP address when WAN hosts access services provided by the Pepwave router (web admin access from the WAN, DNS server requests, etc.).</p> <p>To connect to hosts on the LAN (email notification, remote syslog, etc.), the default gateway address will be used. The Pepwave router will listen for this IP address when LAN hosts access services provided by the Pepwave router (web admin access from the WAN, DNS proxy, etc.).</p>
Shared IP Address^A	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 the WAN (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 (web admin access from the 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, 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.

Layer 2 PepVPN Bridging		
PepVPN Profiles to Bridge	 Connection 1	
Spanning Tree Protocol	<input checked="" type="checkbox"/>	
Override IP Address when bridge connected		<input type="radio"/> Do not override <input type="radio"/> Static <input type="radio"/> By DHCP <input type="radio"/> As None

Layer 2 PepVPN 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.
Override IP	Select "Do not override" if the LAN IP address and local DHCP server should remain unchanged after the Layer 2 PepVPN is up.

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Address when bridge connected

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	<input type="checkbox"/> Enable						
IP Range	192.168.50.10 - 192.168.50.250						
Subnet Mask	255.255.255.0 (/24)						
Lease Time	1 Days 0 Hours 0 Mins						
DNS Servers	<input checked="" type="checkbox"/> Assign DNS server automatically						
WINS Server	<input checked="" type="checkbox"/> Assign WINS server <input type="radio"/> Built-in <input type="radio"/> External						
BOOTP	<input checked="" type="checkbox"/> Server IP Address: Boot File: Server Name: (Optional)						
Extended DHCP Option	<table border="1"><thead><tr><th>Option</th><th>Value</th></tr></thead><tbody><tr><td colspan="2">No Extended DHCP Option</td></tr><tr><td colspan="2"><input type="button" value="Add"/></td></tr></tbody></table>	Option	Value	No Extended DHCP Option		<input type="button" value="Add"/>	
Option	Value						
No Extended DHCP Option							
<input type="button" value="Add"/>							
DHCP Reservation	<table border="1"><thead><tr><th>Name</th><th>MAC Address</th><th>Static IP</th></tr></thead><tbody><tr><td></td><td></td><td></td></tr></tbody></table> <input type="button" value="+"/>	Name	MAC Address	Static IP			
Name	MAC Address	Static IP					

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.

IP Range & Subnet Mask

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.

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**.

WINS Server

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

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DHCP Reservation

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.

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.

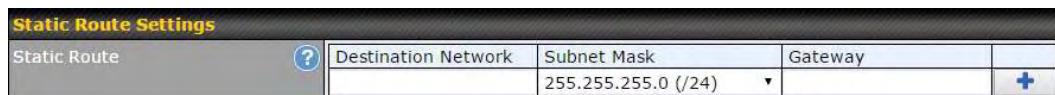
Name (an optional field) allows you to specify a name to represent the device. MAC addresses should be in the format of **00:AA:BB:CC:DD:EE**. Press  to create a new record. Press  to remove a record. Reserved client information can be imported from the **Client List**, located at **Status>Client List**. For more details, please refer to **Section 22.3**.



LAN Physical Settings

Speed

This is the port speed of the LAN interface. It should be set to the same speed as the connected device to avoid port negotiation problems. When a static speed is set, you may choose whether to advertise its speed to the peer device. **Auto** is selected by default. You can choose not to advertise the port speed if the port has difficulty negotiating with the peer device.



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 subnets. Press  to create a new route. Press  to remove a route.



WINS Server Settings

Enable

Check the box to enable the WINS server. A list of WINS clients will be displayed at **Status>WINS Clients**.

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DNS Proxy Settings																				
Enable	<input checked="" type="checkbox"/>																			
DNS Caching	<input type="checkbox"/>																			
Include Google Public DNS Servers	<input type="checkbox"/>																			
Local DNS Records	<table border="1"><thead><tr><th>Host Name</th><th>IP Address</th></tr></thead><tbody><tr><td></td><td></td></tr></tbody></table> <input type="button" value="+"/>		Host Name	IP Address																
Host Name	IP Address																			
DNS Resolvers	<table border="1"><thead><tr><th>Connection</th><th>Current Status</th></tr></thead><tbody><tr><td>WAN 1</td><td>10.88.3.1</td></tr><tr><td>WAN 2</td><td></td></tr><tr><td>Wi-Fi WAN</td><td></td></tr><tr><td>Cellular 1</td><td></td></tr><tr><td>Cellular 2</td><td></td></tr><tr><td>USB</td><td></td></tr><tr><td>Connection</td><td>DNS Servers</td></tr><tr><td>LAN</td><td></td></tr></tbody></table>		Connection	Current Status	WAN 1	10.88.3.1	WAN 2		Wi-Fi WAN		Cellular 1		Cellular 2		USB		Connection	DNS Servers	LAN	
Connection	Current Status																			
WAN 1	10.88.3.1																			
WAN 2																				
Wi-Fi WAN																				
Cellular 1																				
Cellular 2																				
USB																				
Connection	DNS Servers																			
LAN																				

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 help improve DNS lookup time. However, it cannot return the most up-to-date result for those 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 also 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 Pepwave router, the corresponding IP address will be returned. Press <input type="button" value="+"/> to create a new record. Press <input type="button" value="X"/> to remove a record.
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 Bonjour forwarding, Apple's zero configuration networking

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protocol. Once VLAN configuration is complete, click **Save** to store your changes.

Bonjour Forwarding Settings			
Enable	<input type="checkbox"/>		
Bonjour Service	Service Network	Client Network	<input type="button" value="+"/> <input type="button" value="X"/>
Save			

Bonjour Forwarding Settings

- | 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 <input type="button" value="+"/> to add the networks. To delete an existing Bonjour listing, click <input type="button" value="X"/> . |

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To enable VLAN configuration, click the  button in the **IP Settings** section.



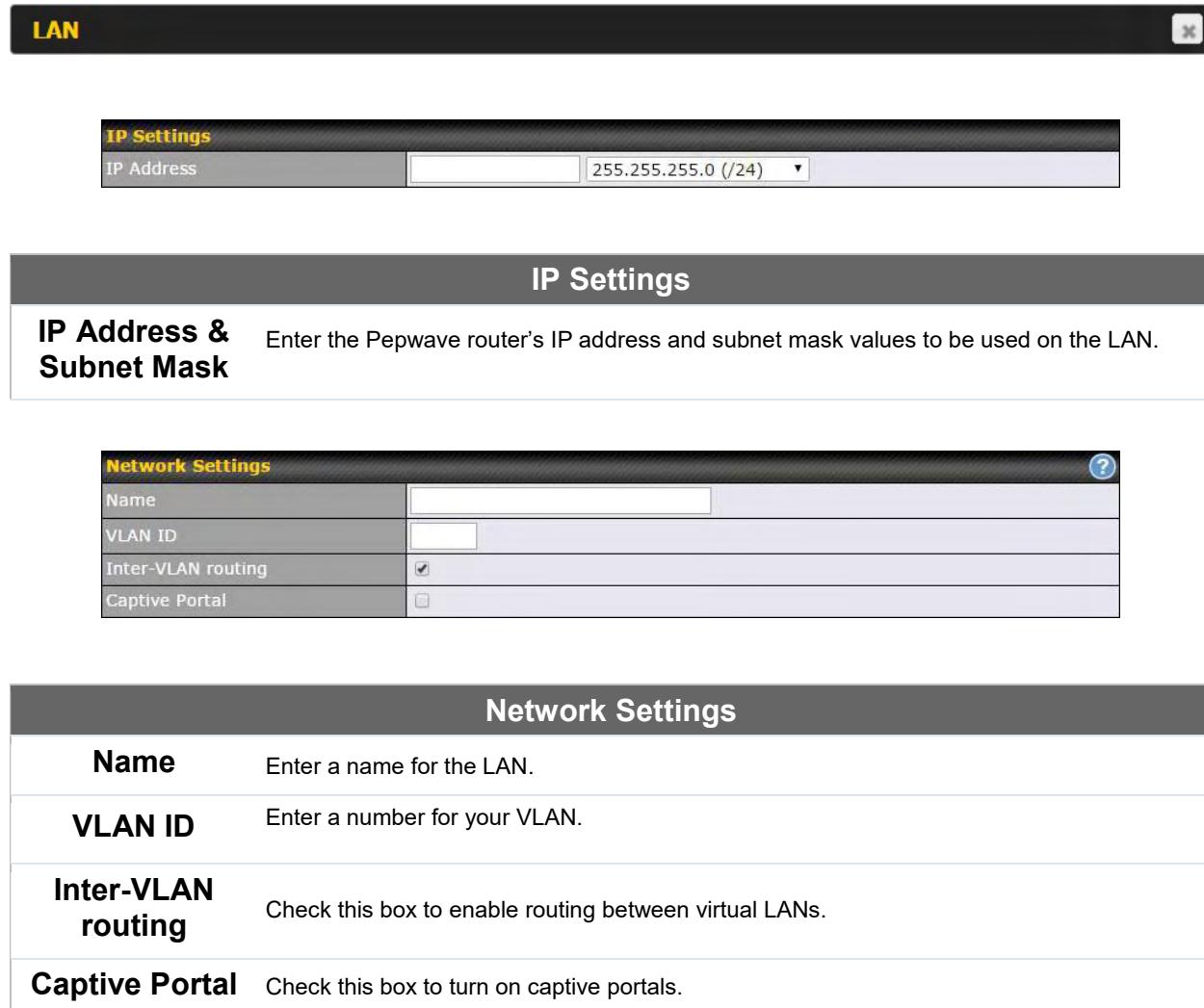
The screenshot shows the 'IP Settings' section of the Pepwave router's web interface. It includes fields for 'IP Address' (192.168.50.1) and 'Subnet Mask' (255.255.255.0 (/24)). A blue help icon is located in the top right corner of this section.

To add a new LAN, click the **New LAN** button. To change LAN settings, click the name of the LAN to change under the **LAN** heading.



LAN	VLAN	Network	?
Untagged LAN	None	192.168.50.1/24	
New LAN			

The following settings are displayed when creating a new LAN or editing an existing LAN.



The screenshot displays the LAN configuration page. At the top is a 'LAN' tab. Below it, the 'IP Settings' section is shown with fields for 'IP Address' and 'Subnet Mask'. The 'Network Settings' section follows, containing fields for 'Name', 'VLAN ID', 'Inter-VLAN routing' (with a checked checkbox), and 'Captive Portal' (with an unchecked checkbox). Below these are two tables: 'IP Address & Subnet Mask' (describing the Pepwave router's IP address and subnet mask values) and 'Network Settings' (containing fields for Name, VLAN ID, Inter-VLAN routing, and Captive Portal).

IP Address & Subnet Mask	Enter the Pepwave router's IP address and subnet mask values to be used 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.
Captive Portal	Check this box to turn on captive portals.

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DHCP Server Settings								
DHCP Server	<input checked="" type="checkbox"/> Enable							
IP Range	[] - [] 255.255.255.0 (/24)							
Lease Time	1	Days 0 Hours 0 Mins						
DNS Servers	<input checked="" type="checkbox"/> Assign DNS server automatically							
WINS Servers	<input type="checkbox"/> Assign WINS server							
BOOTP	<input type="checkbox"/>							
Extended DHCP Option	<table border="1"><thead><tr><th>Option</th><th>Value</th></tr></thead><tbody><tr><td colspan="2">No Extended DHCP Option</td></tr></tbody></table> <input type="button" value="Add"/>		Option	Value	No Extended DHCP Option			
Option	Value							
No Extended DHCP Option								
DHCP Reservation	<table border="1"><thead><tr><th>Name</th><th>MAC Address</th><th>Static IP</th></tr></thead><tbody><tr><td>[]</td><td>[]</td><td>[]</td></tr></tbody></table> <input type="button" value="+"/>		Name	MAC Address	Static IP	[]	[]	[]
Name	MAC Address	Static IP						
[]	[]	[]						

DHCP Server Settings

DHCP Server

When this setting is enabled, the Pepwave router's 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 collisions on the LAN.

To enable DHCP bridge relay, please click the  icon on this menu item.

IP Range & Subnet Mask

These settings allocate a range of IP address 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 **Lease Time**, the assigned IP address will no longer be valid and the IP address assignment must be renewed.

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 specify the 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 Servers** setting. Therefore, 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 then 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 clients information can be imported from the **Client List**, located at **Status>Client List**. For more details, please refer to **Section**

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22.3.

To configure DHCP relay, first click the  button found next to the **DHCP Server** option to display the settings.

DHCP Relay Settings	
DHCP Relay	 <input checked="" type="checkbox"/> Enable
DHCP Server IP Address	 DHCP Server 1: <input type="text"/>  DHCP Server 2: <input type="text"/>
DHCP Option 82	 <input type="checkbox"/>

DHCP Relay Settings	
Enable	Check this box to turn on DHCP relay. Click the  icon to disable DHCP relay.
DHCP Server IP Address	Enter the IP addresses of one or two DHCP servers in the provided fields. The DHCP servers entered here will receive relayed DHCP requests from the LAN. For active-passive DHCP server configurations, enter active and passive DHCP server relay IP addresses in DHCP Server 1 and DHCP Server 2 .
DHCP Option 82	DCHP Option 82 includes device information as relay agent for the attached client when forwarding DHCP requests from client to server. This option also embeds the device's MAC address and network name in circuit and remote IDs. Check this box to enable DHCP Option 82.

Once DHCP is set up, configure **LAN Physical Settings**, **Static Route Settings**, **WINS Server Settings**, and **DNS Proxy Settings** as noted above.

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9.2 Captive Portal

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

Captive Portal Settings	
Enable	<input checked="" type="checkbox"/> Untagged LAN
Hostname	<input type="text" value="captive-portal.peplink.com"/> <input type="button" value="Default"/>
Access Mode	<input checked="" type="radio"/> Open Access <input type="radio"/> User Authentication
Access Quota	30 mins (0: Unlimited) 0 MB (0: Unlimited)
Quota Reset Time	<input checked="" type="radio"/> Daily at 00 :00 <input type="radio"/> 1440 minutes after quota reached
Allowed Networks	<input type="text" value="Domain Name / IP Address"/> <input type="button" value="+"/>
Allowed Clients	<input type="text" value="MAC / IP Address"/> <input type="button" value="+"/>
Splash Page	<input checked="" type="radio"/> Built-in <input type="radio"/> External, URL: <input type="text" value="http://"/>

Captive Portal Settings															
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.														
RADIUS Server	This authenticates your clients through a RADIUS server. After selecting this option, you will see the following fields: <table border="1"><tr><td>Authentication</td><td>RADIUS Server</td></tr><tr><td>Auth Server</td><td><input type="text"/> Port 1812 <input type="button" value="Default"/></td></tr><tr><td>Auth Server Secret</td><td><input type="text"/> <input checked="" type="checkbox"/> Hide Characters</td></tr><tr><td>CoA-DM</td><td><input type="text"/></td></tr><tr><td>Accounting Server</td><td><input type="text"/> Port 1813 <input type="button" value="Default"/></td></tr><tr><td>Accounting Server Secret</td><td><input type="text"/> <input checked="" type="checkbox"/> Hide Characters</td></tr><tr><td>Accounting Interim Interval</td><td><input type="text"/> seconds</td></tr></table> Fill in the necessary information to complete your connection to the server and enable authentication.	Authentication	RADIUS Server	Auth Server	<input type="text"/> Port 1812 <input type="button" value="Default"/>	Auth Server Secret	<input type="text"/> <input checked="" type="checkbox"/> Hide Characters	CoA-DM	<input type="text"/>	Accounting Server	<input type="text"/> Port 1813 <input type="button" value="Default"/>	Accounting Server Secret	<input type="text"/> <input checked="" type="checkbox"/> Hide Characters	Accounting Interim Interval	<input type="text"/> seconds
Authentication	RADIUS Server														
Auth Server	<input type="text"/> Port 1812 <input type="button" value="Default"/>														
Auth Server Secret	<input type="text"/> <input checked="" type="checkbox"/> Hide Characters														
CoA-DM	<input type="text"/>														
Accounting Server	<input type="text"/> Port 1813 <input type="button" value="Default"/>														
Accounting Server Secret	<input type="text"/> <input checked="" type="checkbox"/> Hide Characters														
Accounting Interim Interval	<input type="text"/> seconds														
LDAP Server	This authenticates your clients through a LDAP server. Upon selecting this option, you will see the following fields: <table border="1"><tr><td>Authentication</td><td>LDAP Server</td></tr><tr><td>LDAP Server</td><td><input type="text"/> Port 389 <input type="button" value="Default"/> <input type="checkbox"/> Use DN/Password to bind to LDAP Server</td></tr><tr><td>Base DN</td><td><input type="text"/></td></tr><tr><td>Base Filter</td><td><input type="text"/></td></tr></table> Fill in the necessary information to complete your connection to the server and enable authentication.	Authentication	LDAP Server	LDAP Server	<input type="text"/> Port 389 <input type="button" value="Default"/> <input type="checkbox"/> Use DN/Password to bind to LDAP Server	Base DN	<input type="text"/>	Base Filter	<input type="text"/>						
Authentication	LDAP Server														
LDAP Server	<input type="text"/> Port 389 <input type="button" value="Default"/> <input type="checkbox"/> Use DN/Password to bind to LDAP Server														
Base DN	<input type="text"/>														
Base Filter	<input type="text"/>														

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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.
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.
Splash Page	Here, you can choose between using the Pepwave router's built-in captive portal and redirecting clients to a URL you define.

The **Portal Customization** menu has two options: and . Clicking displays a pop-up previewing the captive portal that your clients will see. Clicking displays the following menu:

Portal Customization	
Logo Image	<input checked="" type="radio"/> No image [Use default Logo Image] <input type="radio"/> Choose File No file chosen NOTE: Size max 512KB. Supported images types: JPEG, PNG and GIF.
Message	
Terms & Conditions	[Use default Terms & Conditions]
Custom Landing Page	<input checked="" type="checkbox"/> <input type="text" value="http://"/>

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Portal Customization	
Logo Image	Click the Choose File button to select a logo to use for the built-in portal.
Message	If you have any additional messages for your users, enter them in this field.
Terms & Conditions	If you would like to use your own set of terms and conditions, please enter them here. If left empty, the built-in portal will display the default terms and conditions.
Custom Landing Page	Fill in this field to redirect clients to an external URL.

10 Configuring the WAN Interface(s)

WAN Interface settings are located at **Network>WAN**. To reorder WAN priority, drag on the appropriate WAN by holding the left mouse button, move it to the desired priority (the first one would be the highest priority, the second one would be lower priority, and so on), and drop it by releasing the mouse button.



To disable a particular WAN connection, drag on the appropriate WAN by holding the left mouse button, move it to the **Disabled** row, and drop it by releasing the mouse button. You can also set priorities on the **Dashboard**. Click the **Details** button in the corresponding row to modify the connection setting.

Important Note

Connection details will be changed and become effective immediately after clicking the **Save and Apply** button.

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10.1 Ethernet WAN

From **Network>WAN**, choose a WAN connection and then click **Details**.

WAN Port	
WAN Connection Name	WAN 1 <input type="button" value="Default"/>
Schedule	Always on <input type="button"/>
Connection Method	DHCP <input type="button"/>
Routing Mode	<input checked="" type="radio"/> NAT <input type="radio"/>
IP Address	10.10.12.49
Subnet Mask	255.255.0.0
Default Gateway	10.10.10.1
Uptime	1795 mins
Hostname (Optional)	<input type="text"/> <input type="checkbox"/> Use custom hostname
DNS Servers	<input checked="" type="checkbox"/> Obtain DNS server address automatically 10.10.10.1 <input type="checkbox"/> Use the following DNS server address(es) DNS Server 1: <input type="text"/> DNS Server 2: <input type="text"/>

WAN Port (Section 1)

WAN Connection Name	Enter a name to represent this WAN connection.
Schedule	Click the drop-down menu to apply a time schedule to this interface
Connection Method	There are three possible connection methods for Ethernet WAN: <ul style="list-style-type: none">• DHCP• Static IP• PPPoE 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.
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 text.
IP Address/Subnet Mask/Default Gateway	Enter the WAN IP address and subnet mask, as well as the IP address of the default gateway, in these fields.

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Hostname	Enter a hostname for this WAN port if needed.
DNS Servers	Select a DNS server for this port to use. This port can either be automatically selected or manually designated.

Standby State	<input checked="" type="radio"/> Remain connected <input type="radio"/> Disconnect
Upstream Bandwidth	1 Gbps
Downstream Bandwidth	1 Gbps
Health Check Settings	
Health Check Method	PING
PING Hosts	Host 1: 8.8.8.8 Host 2: <input type="checkbox"/> Use first two DNS servers as PING Hosts
Timeout	5 second(s)
Health Check Interval	5 second(s)
Health Check Retries	3
Recovery Retries	3

WAN Port (Section 2)

Standby State	This setting specifies the standby state of the WAN connection. The available options are Remain connected and Disconnect . The default state is Remain Connected .
Upstream Bandwidth	This setting specifies the data bandwidth in the outbound direction from the LAN through the WAN interface.
Downstream Bandwidth	This setting specifies the data bandwidth in the inbound direction from the WAN interface to the LAN. This value is referenced as the default weight value when using the algorithm Least Used or the algorithm Persistence (Auto) in outbound policy with Managed by Custom Rules chosen (see Section 15.2).
Health Check Method	This setting specifies the health check method for the WAN connection. The value of method can be configured as Disabled , Ping , DNS Lookup , or HTTP . The default method is Disabled . See Section 10.4 for configuration details.
PING Hosts	These fields are for specifying the target DNS servers where DNS lookups will be sent to for health check. If the box 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 the connection healthiness. If the box is not checked, the field Host 1 must be filled and the field Host 2 is optional. The connection is considered to be up if DNS responses are received from any one of the

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	health check DNS servers, regardless of whether the result is positive or negative.
Timeout	If a health check test cannot be completed within the specified amount of time, the test will be treated as failed.
Health Check Interval	This is the number of consecutive check failures before treating a connection as down.
Health Check Retries	This is the number of consecutive check failures before treating a connection as down.
Recovery Retries	This is the number of responses required after a health check failure before treating a connection as up again.

Dynamic DNS Service Provider	<input type="button" value="Disabled"/>
Bandwidth Allowance Monitor	<input type="checkbox"/> Enable
Port Speed	<input type="button" value="Auto"/>
MTU	<input type="radio"/> Auto <input checked="" type="radio"/> Custom Value: <input type="text" value="1440"/> <input type="button" value="Default"/>

WAN Port (Section 3)

This setting specifies the dynamic DNS service provider to be used for the WAN based on supported dynamic DNS service providers:

Dynamic DNS Service Provider

- changeip.com
- dyndns.org
- no-ip.org
- tzo.com
- DNS-O-Matic

Select **Disabled** to disable this feature. See **Section 9.5** for configuration details.

Bandwidth Allowance Monitor

This option enables bandwidth usage monitoring on this WAN connection for each billing cycle. When this setting is not enabled, each month's bandwidth usage is tracked, but no action will be taken.

Port Speed

This setting specifies port speed and duplex configurations of the WAN port. By default, **Auto** is selected and the appropriate data speed is automatically detected by the Pepwave router. In the event of negotiation issues, the port speed can be manually specified. You can also choose whether or not to advertise the speed to the peer by selecting the **Advertise Speed** checkbox.

MTU

This setting specifies the maximum transmission unit. By default, MTU is set to **Custom 1440**. You may adjust the MTU value by editing the text field. Click **Default** to restore the

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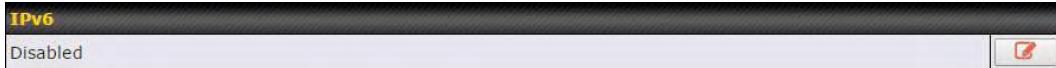
default MTU value. Select **Auto** and the appropriate MTU value will be automatically detected. Auto-detection will run each time the WAN connection establishes.

MSS	<input type="radio"/> Auto <input type="radio"/> Custom Value: <input type="text"/>						
MAC Address Clone	00 :1A :DD :BD :54 :41 <input type="button" value="Default"/>						
VLAN	<input checked="" type="checkbox"/> VLAN ID: <input type="text"/>						
Reply to ICMP PING	<input type="radio"/> Yes <input type="radio"/> No						
Additional Public IP Address	<table border="1"><tr><td>IP Address <input type="text"/></td><td>Subnet Mask <input type="text" value="255.255.255.0 (/24)"/></td></tr><tr><td colspan="2"><input type="button" value="Down Arrow"/></td></tr><tr><td colspan="2"><input type="button" value="Delete"/></td></tr></table>	IP Address <input type="text"/>	Subnet Mask <input type="text" value="255.255.255.0 (/24)"/>	<input type="button" value="Down Arrow"/>		<input type="button" value="Delete"/>	
IP Address <input type="text"/>	Subnet Mask <input type="text" value="255.255.255.0 (/24)"/>						
<input type="button" value="Down Arrow"/>							
<input type="button" value="Delete"/>							

WAN Port (Section 4)

MSS	This setting should be configured based on the maximum payload size that the local system can handle. The MSS (maximum segment size) is computed from the MTU minus 40 bytes for TCP over IPv4. If MTU is set to Auto , the MSS will also be set automatically. By default, MSS is set to Auto .
MAC Address Clone	Some service providers (e.g., cable providers) identify the client's MAC address and require the client to always use the same MAC address to connect to the network. In such cases, change the WAN interface's MAC address to the original client PC's MAC address via this field. The default MAC address is a unique value assigned at the factory. In most cases, the default value is sufficient. Clicking Default restores the MAC address to the default value.
VLAN	Click the square if you wish to enable VLAN functionality and enable multiple broadcast domains. Once you enable VLAN, you will be able to enter a name for your network.
Reply to ICMP PING	If this field is disabled, the WAN connection will not respond to ICMP ping requests. By default, this is enabled .
Additional Public IP Address	The 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 .

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IPv6	
IPv6	IPv6 support can be enabled on one of the available Ethernet WAN ports. On this screen, you can choose which WAN will support IPv6. To enable IPv6 support on a WAN, the WAN router must respond to stateless address auto configuration advertisements and DHCPv6 requests. IPv6 clients on the LAN will acquire their IPv6, gateway, and DNS server addresses from it.
	The device will also acquire an IPv6 address for performing ping/traceroute checks and accepting web admin accesses. Note: This feature is only available on the Pepwave MAX 700, HD2, and HD2 IP67.

10.1.1 DHCP Connection

There are four possible connection methods:

1. DHCP
2. Static IP
3. PPPoE
4. L2TP

The DHCP connection method is suitable if the ISP provides an IP address automatically using DHCP (e.g., satellite modem, WiMAX modem, cable, Metro Ethernet, etc.).

Connection Method	<input style="width: 15px; height: 15px;" type="button" value="?"/> DHCP ▾
Routing Mode	<input type="radio"/> NAT
IP Address	10.88.3.158
Subnet Mask	255.255.255.0
Default Gateway	10.88.3.253
Hostname (Optional)	<input type="text"/> <input type="checkbox"/> Use custom hostname
DNS Servers	<input checked="" type="checkbox"/> Obtain DNS server address automatically 10.88.3.1 <input type="checkbox"/> Use the following DNS server address(es) DNS Server 1: <input type="text"/> DNS Server 2: <input type="text"/>

DHCP Connection Settings

Routing Mode

NAT allows substituting the real address in a packet with a mapped address that is routable on the destination network. By clicking the help icon in this field, you can display the **IP Forwarding** option, if your network requires it.

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IP Address/ Subnet Mask/ Default Gateway	This information is obtained from the ISP automatically.
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 the value, you can safely bypass this option.
DNS Servers	<p>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.</p> <p>Selecting Obtain DNS server address automatically results in the DNS servers being assigned by the WAN DHCP server to be used for outbound DNS lookups over the connection. (The DNS servers are obtained along with the WAN IP address assigned from the DHCP server.)</p> <p>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.</p>

10.1.2 Static IP Connection

The static IP connection method is suitable if your ISP provides a static IP address to connect directly.

Connection Method	 Static IP ▾
Routing Mode	 <input checked="" type="radio"/> NAT
IP Address	10.88.3.158
Subnet Mask	255.255.255.0
Default Gateway	10.88.3.253
IP Address	<input type="text"/>
Subnet Mask	255.255.255.0 (/24) ▾
Default Gateway	<input type="text"/>
DNS Servers	<input checked="" type="checkbox"/> Use the following DNS server address(es) DNS Server 1: <input type="text"/> DNS Server 2: <input type="text"/>

Static IP Settings

Routing Mode NAT allows substituting the real address in a packet with a mapped address that is routable on the destination network. By clicking the help icon in this field, you can display the **IP Forwarding** option, if your network requires it.

**IP Address /
Subnet Mask /
Default
Gateway** These settings allow you to specify the information required in order to communicate on the Internet via a fixed Internet IP address. The information is typically determined by and can be obtained from the ISP.

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 being assigned by the WAN DHCP server to be used for outbound DNS lookups over the connection. (The DNS servers are obtained along with the WAN IP address assigned from the DHCP server.) When **Use the following DNS server address(es)** is

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selected, you may enter custom DNS server addresses for this WAN connection into the **DNS Server 1** and **DNS Server 2** fields.

10.1.3 PPPoE Connection

This connection method is suitable if your ISP provides a login ID/password to connect via PPPoE.

Connection Method	 PPPoE
Routing Mode	 NAT
IP Address	10.88.3.158
Subnet Mask	255.255.255.0
Default Gateway	10.88.3.253
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
DNS Servers	<input checked="" type="checkbox"/> Obtain DNS server address automatically 10.88.3.1 <input checked="" type="checkbox"/> Use the following DNS server address(es) DNS Server 1: [] DNS Server 2: []

PPPoE Settings

Routing Mode

NAT allows substituting the real address in a packet with a mapped address that is routable on the destination network. By clicking the help icon in this field, you can display the **IP Forwarding** option, if your network requires it.

IP Address / Subnet Mask / Default Gateway

This information is obtained from the ISP automatically.

PPPoE User Name / Password

Enter the required information in these fields in order to connect via PPPoE to the ISP.

The parameter values are determined by and can be obtained from the ISP.

Confirm PPPoE Password

Verify your password by entering it again in this field.

Service Name (Optional)

Service name is provided by the ISP.

Note: Leave this field blank unless it is provided by your ISP.

IP Address (Optional)

If your ISP provides a PPPoE IP address, enter it here.

Note: Leave this field blank unless it is provided by your ISP.

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

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in the DNS servers being assigned by the WAN DHCP server to be used for outbound DNS lookups over the connection. (The DNS servers are obtained along with the WAN IP address assigned from 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.

10.1.4 L2TP Connection

L2TP has all the compatibility and convenience of PPTP with greater security. Combine this with IPsec for a good balance between ease of use and security.

Connection Method	<input type="button" value="?"/> L2TP
Routing Mode	<input type="radio"/> NAT
IP Address	10.88.3.158
Subnet Mask	255.255.255.0
Default Gateway	10.88.3.253
L2TP User Name	[]
L2TP Password	[]
Confirm L2TP Password	[]
Server IP Address / Host	[]
Address Type	<input checked="" type="radio"/> Dynamic IP <input type="radio"/> Static IP
DNS Servers	<input checked="" type="checkbox"/> Obtain DNS server address automatically 10.88.3.1 <input checked="" type="checkbox"/> Use the following DNS server address(es) DNS Server 1: [] DNS Server 2: []

L2TP Settings

L2TP User Name / Password	Enter the required information in these fields in order to connect via L2TP to your ISP. The parameter values are determined by and can be obtained from your ISP.
Confirm L2TP Password	Verify your password by entering it again in this field.
Server IP Address / Host	L2TP server address is a parameter which is provided by your ISP. Note: Leave this field blank unless it is provided by your ISP.
Address Type	Your ISP will also indicate whether the server IP address is Dynamic or Static. Please click the appropriate value.
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 PPPoE server to be used for outbound DNS lookups over the WAN connection. (The DNS servers are obtained along with the WAN IP address assigned from the PPPoE server.)

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When **Use the following DNS server address(es)** is selected, you can enter custom DNS server addresses for this WAN connection into the **DNS server 1** and **DNS server 2** fields.

10.2 Cellular WAN



To access cellular WAN settings, click **Network>WAN>Details**.
(Available on the Pepwave MAX BR1, HD2, and HD2 IP67 only)

Connection Details

Cellular 1 Status	
IMSI	(No SIM Card Detected)
MEID	A100001F7DC038 270113180708241208
ESN	8052FC8A
IMEI	356144040031862

Cellular Status

IMSI	This is the International Mobile Subscriber Identity which uniquely identifies the SIM card. This is applicable to 3G modems only.
MEID	Some Pepwave routers support both HSPA and EV-DO. For Sprint or Verizon Wireless EV-DO users, a unique MEID identifier code (in hexadecimal format) is used by the carrier to associate the EV-DO device with the user. This information is presented in hex and decimal format.
ESN	This serves the same purpose as MEID HEX but uses an older format.
IMEI	This is the unique ID for identifying the modem in GSM/HSPA mode.

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WAN Connection Settings		
WAN Connection Name	Cellular 2	Default
Schedule	Always on	▼
Network Mode	<input checked="" type="radio"/> HSPA <input type="radio"/> Sprint,EV-DO <input type="radio"/> Verizon Wireless,EV-DO	
Subnet Selection	? <input checked="" type="radio"/> Auto	
Routing Mode	? <input checked="" type="radio"/> NAT	
DNS Servers	<input checked="" type="checkbox"/> Obtain DNS server address automatically <input type="checkbox"/> Use the following DNS server address(es) DNS Server 1: <input type="text"/> DNS Server 2: <input type="text"/>	

WAN Connection Settings

WAN Connection Name	Enter a name to represent this WAN connection.
Schedule	Click the drop-down menu to apply a time schedule to this interface if needed.
Network Mode	Users have to specify the network they are on accordingly.
Subnet Selection	Auto: The subnet mask will be set automatically. Force /31 Subnet: The subnet mask will be set as 255.255.255.254(/31), and the gateway IP address will be recalculated.
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 . Click the ? button to enable IP forwarding.
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 PPPoE server to be used for outbound DNS lookups over the WAN connection. (The DNS servers are obtained along with the WAN IP address assigned from the PPPoE server.) When Use the following DNS server address(es) is selected, you can enter custom DNS server addresses for this WAN connection into the DNS server 1 and DNS server 2 fields.

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Cellular Settings	
Network Selection	<input type="radio"/> Auto <input checked="" type="radio"/> Manual
3G/2G	<input data-bbox="572 494 600 530" type="button" value="?"/> Auto <input data-bbox="572 536 600 572" type="button" value="?"/>
Authentication	Auto <input data-bbox="719 578 747 614" type="button" value="?"/>
Band Selection	<input checked="" type="checkbox"/> WCDMA / HSDPA / HSUPA / HSPA+ (800 MHz) <input checked="" type="checkbox"/> WCDMA / HSDPA / HSUPA / HSPA+ (850 MHz) <input checked="" type="checkbox"/> WCDMA / HSDPA / HSUPA / HSPA+ (900 MHz) <input checked="" type="checkbox"/> WCDMA / HSDPA / HSUPA / HSPA+ (1700 MHz) <input checked="" type="checkbox"/> WCDMA / HSDPA / HSUPA / HSPA+ (1900 MHz) <input checked="" type="checkbox"/> WCDMA / HSDPA / HSUPA / HSPA+ (2100 MHz) <input checked="" type="checkbox"/> GSM / GPRS / EDGE (850 MHz) <input checked="" type="checkbox"/> GSM / GPRS / EDGE (900 MHz) <input checked="" type="checkbox"/> GSM / GPRS / EDGE (1800 MHz) <input checked="" type="checkbox"/> GSM / GPRS / EDGE (1900 MHz)
Data Roaming	<input type="checkbox"/>
Operator Settings	<input type="radio"/> Auto <input checked="" type="radio"/> Custom
APN	<input type="text"/>
Username	<input type="text"/>
Password	<input type="text"/>
SIM PIN (Optional)	<input data-bbox="572 1106 600 1142" type="button" value="?"/>
Bandwidth Allowance Monitor	<input checked="" type="checkbox"/> Enable
Action	<input type="checkbox"/> Disconnect when usage hits 100% Email notification is currently disabled. You can get notified when usage hits 75%/95% of monthly allowance by enabling Email Notification.
Start Day	On <input data-bbox="621 1296 665 1332" type="button" value="1st"/> of each month
Monthly Allowance	<input type="text"/> GB <input data-bbox="736 1339 763 1374" type="button" value="?"/>

Cellular Settings

Network Selection	By default, the MAX router will automatically choose a network to connect to. If you wish to use only certain networks, click the <input data-bbox="833 1522 861 1558" type="button" value="?"/> button beside the menu item.
3G/2G	This drop-down menu allows restricting cellular to particular band. Click the <input data-bbox="1274 1613 1302 1649" type="button" value="?"/> button to enable the selection of specific bands.
Authentication	Choose from PAP Only or CHAP Only to use those authentication methods exclusively. Select Auto to automatically choose an authentication method.
Data Roaming	This checkbox enables data roaming on this particular SIM card. Please check your service provider's data roaming policy before proceeding.

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Operator Settings	This setting applies to 3G/EDGE/GPRS modems only. It does not apply to EVDO/EVDO Rev. A modems. This 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 connection, 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.

General Settings	
Standby State	<input type="radio"/> Remain connected <input checked="" type="radio"/> Disconnected
Idle Disconnect	<input checked="" type="checkbox"/> 3 minutes Time value is global. A change will affect all WAN profiles.

General Settings	
Standby State	This option allows you to choose whether to remain connected or disconnected when this WAN connection is no longer in the highest priority and has entered the standby state. When Remain connected is chosen, bringing up this WAN connection to active makes it immediately available for use.
Idle Disconnect	When Internet traffic is not detected within the user-specified timeframe, the modem will automatically disconnect. Once the traffic is resumed by the LAN host, the connection will be re-activated.

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Health Check Settings	
Health Check Method	SmartCheck
Timeout	5 second(s)
Health Check Interval	10 second(s)
Health Check Retries	3
Recovery Retries	3

Health Check Settings

Health Check Method

This setting allows you to specify the health check method for the cellular connection. Available options are **Disabled**, **Ping**, **DNS Lookup**, **HTTP**, and **SmartCheck**. The default method is **DNS Lookup**. See **Section 10.4** for configuration details.

Timeout

If a health check test cannot be completed within the specified amount of time, the test will be treated as failed.

Health Check Interval

This is the time interval between each health check test.

Health Check Retries

This is the number of consecutive check failures before treating a connection as down.

Recovery Retries

This is the number of responses required after a health check failure before treating a connection as up again.

Dynamic DNS Settings	
Dynamic DNS Service Provider	Disabled

Dynamic DNS Settings

This setting specifies the dynamic DNS service provider to be used for the WAN based on supported dynamic DNS service providers:

Dynamic DNS Service Provider

- changeip.com
- dyndns.org
- no-ip.org
- tzo.com
- DNS-O-Matic

Select **Disabled** to disable this feature. See **Section 9.5** for configuration details.

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10.3 Wi-Fi WAN

To access Wi-Fi WAN settings, click **Network>WAN>Details**.

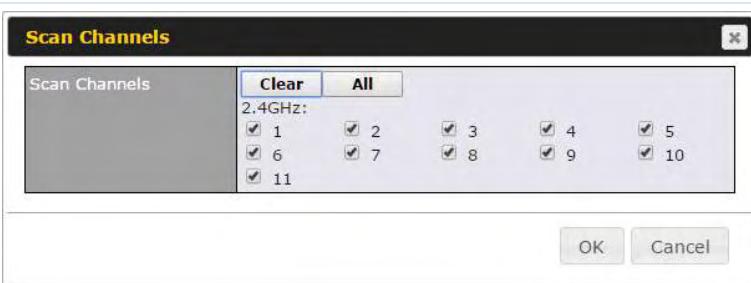
WAN Connection Settings		
WAN Connection Name	Wi-Fi WAN	<input type="button" value="Default"/>
Schedule	Always on	<input type="button" value=""/>
Standby State	<input checked="" type="radio"/> Remain connected <input type="radio"/> Disconnected	
MTU	<input type="radio"/> Auto <input checked="" type="radio"/> Custom Value: 1500	<input type="button" value="Default"/>
Reply to ICMP PING	<input type="radio"/> Yes <input checked="" type="radio"/> No	

Wi-Fi Connection Settings	
WAN Connection Name	Enter a name to represent this WAN connection.
Schedule	Click the drop-down menu to apply a time schedule to this interface.
Standby State	This setting specifies the state of the WAN connection while in standby. The available options are Remain Connected (hot standby) and Disconnect (cold standby).
MTU	This setting specifies the maximum transmission unit. By default, MTU is set to Custom 1440 . You may adjust the MTU value by editing the text field. Click Default to restore the default MTU value. Select Auto and the appropriate MTU value will be automatically detected. The auto-detection will run each time the WAN connection establishes
Reply to ICMP PING	If this setting is disabled, the WAN connection will not respond to ICMP ping requests. By default, this setting is enabled.

Wi-Fi WAN Settings		
Channel Selection	<input checked="" type="radio"/> Auto <input type="radio"/> Custom	
Roaming	<input type="checkbox"/>	
Connect to Any Open Mode AP	<input type="radio"/> Yes <input checked="" type="radio"/> No	

Wi-Fi WAN Settings	
Channel Selection	Determine whether the channel will be automatically selected. If you select custom, the following table will appear:

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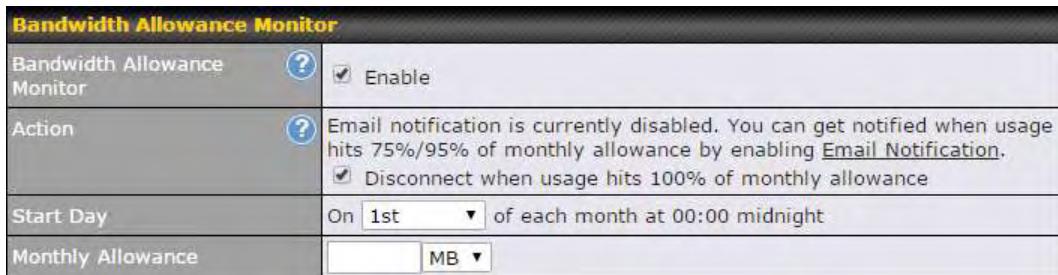


Roaming

Checking this box will enable Wi-Fi roaming. Click the icon for additional options.

Connect to Any Open Mode AP

This option is to specify whether the Wi-Fi WAN will connect to any open mode access points it finds.



Bandwidth Allowance Monitor

If **Error! Reference source not found.** is enabled, you will be notified by email when usage hits 75% and 95% of the monthly allowance.

Action

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.

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Health Check Settings	
Health Check Method	DNS Lookup
Health Check DNS Servers	Host 1: <input type="text"/> Host 2: <input type="text"/> <input checked="" type="checkbox"/> Use first two DNS servers as Health Check DNS Servers <input type="checkbox"/> Include public DNS servers
Timeout	5 second(s)
Health Check Interval	5 second(s)
Health Check Retries	3
Recovery Retries	3

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

Health Check Settings	
Health Check Method	Disabled
Health Check disabled. Network problem cannot be detected.	

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

Health Check Method	PING
PING Hosts	Host 1: <input type="text"/> Host 2: <input type="text"/> <input checked="" type="checkbox"/> Use first two DNS servers as PING Hosts

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

Health Check Method	DNS Lookup
Health Check DNS Servers	Host 1: <input type="text"/> Host 2: <input type="text"/> <input checked="" type="checkbox"/> Use first two DNS servers as Health Check DNS Servers <input type="checkbox"/> Include public DNS servers

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.

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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

Health Check Method	<input style="width: 15px; height: 15px; vertical-align: middle;" type="button" value="?"/> HTTP
URL 1	<input type="text" value="http://"/> <input type="checkbox"/> Matching String:
URL 2	<input type="text" value="http://"/> <input type="checkbox"/> Matching String:

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.

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Other Health Check Settings	
Timeout	5 second(s)
Health Check Interval	5 second(s)
Health Check Retries	3
Recovery Retries	3
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.

Dynamic DNS Settings	
Service Provider	DNS-O-Matic
Username	
Password	
Confirm Password	
Update All Hosts	<input type="checkbox"/>
Hosts / IDs	

Dynamic DNS Settings	
Service Provider	This setting specifies the dynamic DNS service provider to be used for the WAN. Supported providers are: <ul style="list-style-type: none">• changeip.com• dyndns.org• no-ip.org• tzo.com• DNS-O-Matic Select Disabled to disable this feature.
User ID / User Email	This setting specifies the registered user name for the dynamic DNS service.
Password / Pass /	This setting specifies the password for the dynamic DNS service.

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TZO Key

Update All Hosts Check this box to automatically update all hosts.

Hosts / Domain This setting specifies a list of hostnames or domains to be associated with the public Internet IP address of the WAN connection.

Important Note

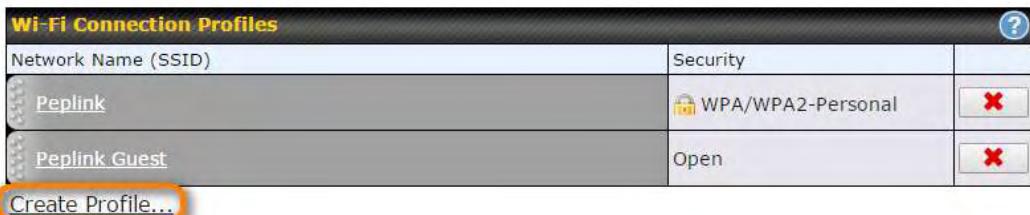
In order to use dynamic DNS services, appropriate hostname registration(s), as well as a valid account with a supported dynamic DNS service provider, are required.

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 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.

10.3.1 Creating Wi-Fi Connection Profiles

You can manually create a profile to connect to a Wi-Fi connection. This is useful for creating a profile for connecting to hidden-SSID access points. Click **Network>WAN>Details>Create Profile...** to get started.



This will open a window similar to the one shown below:



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Wi-Fi Connection Profile Settings

Type Select whether the network will connect automatically or manually.

Network Name (SSID) Enter a name to represent this Wi-Fi connection.

This option allows you to select which security policy is used for this wireless network. Available options:

- Open**

Security	Open
----------	------
- WEP**

Security	WEP
Encryption Key	<input type="text"/>
<input checked="" type="checkbox"/> Hide Characters	
- WPA/WPA2 – Personal**

Security	WPA/WPA2-Personal
Shared Key	<input type="text"/>
<input checked="" type="checkbox"/> Hide Characters	
- WPA/WPA2 – Enterprise**

Security	WPA/WPA2-Enterprise
Login ID	<input type="text"/>
Password	<input type="text"/>
Confirm Password	<input type="text"/>
EAP Method	PEAP
EAP Phase 2 Method	EAP/CHAP
EAP outer authentication identity	<input type="radio"/> Anonymous <input type="radio"/> User Credentials <input type="radio"/> Other: <input type="text"/>

Security

10.4 WAN Health Check

To ensure traffic is routed to healthy WAN connections only, the Pepwave router can periodically check the health of each WAN connection. The health check settings for each WAN connection can be independently configured via **Network>WAN>Details**.

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

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Health Check Method		Disabled		Health Check disabled. Network problem cannot be detected.
---------------------	--	----------	--	--

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

Health Check Method		PING	
PING Hosts		Host 1: <input type="text"/>	
		Host 2: <input type="text"/>	
		<input checked="" type="checkbox"/> Use first two DNS servers as PING Hosts	

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

Health Check Method		DNS Lookup	
Health Check DNS Servers		Host 1: <input type="text"/>	
		Host 2: <input type="text"/>	
		<input checked="" type="checkbox"/> Use first two DNS servers as Health Check DNS Servers	
		<input type="checkbox"/> Include public DNS servers	

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

Health Check Method		HTTP	
URL 1		http:// <input type="text"/>	Matching String: <input type="checkbox"/>
URL 2		http:// <input type="text"/>	Matching String: <input type="checkbox"/>

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

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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.

Timeout	10	second(s)
Health Check Interval	5	second(s)
Health Check Retries	3	
Recovery Retries	3	

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 Pepwave router 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 Pepwave router 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.

Automatic Public DNS Server Check on DNS Test Failure

When the health check method is set to **DNS Lookup** and health checks fail, the Pepwave router will automatically perform DNS lookups on 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:

**⚠ Failed to receive DNS response from the health-check DNS servers for WAN connection 3.
But public DNS server lookup test via the WAN passed. So please check the DNS server settings.**

10.5 Dynamic DNS Settings

Pepwave routers are capable of registering the 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 host name. With dynamic DNS service enabled for a WAN connection, you can connect to your WAN's IP address from the external, 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

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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 Pepwave router will connect to the dynamic DNS service provider to perform an IP address update within the provider's records.

The settings for dynamic DNS service provider(s) and the association of hostname(s) are configured via **Network>WAN>Details>Dynamic DNS Service Provider/Dynamic DNS Settings**.

Dynamic DNS Service Provider	changeip.com
User ID	
Password	
Confirm Password	
Hosts	

Dynamic DNS Settings

This setting specifies the dynamic DNS service provider to be used for the WAN based on supported dynamic DNS service providers:

- 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.

Dynamic DNS

Account Name / Email Address

This setting specifies the registered user name for the dynamic DNS service.

Password / TZO Key

This setting specifies the password for the dynamic DNS service.

Hosts / Domain

This field allows you to specify a list of host names or domains to be associated with the public Internet IP address of the WAN connection. If you need to enter more than one host, use a carriage return to separate them.

Important Note

In order to use dynamic DNS services, appropriate host name registration(s) and a valid account with a supported dynamic DNS service provider are required. A dynamic DNS update is performed whenever a WAN's IP address changes (e.g., the IP is changed after a DHCP IP refresh, reconnection, etc.). Due to dynamic DNS service

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providers' policy, a dynamic DNS host will automatically expire if the host record has not been updated for a long time. Therefore the Pepwave router performs an update every 23 days, even if a WAN's IP address has not changed.

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11 Advanced Wi-Fi Settings

Wi-Fi settings can be configured at **Advanced>Wi-Fi Settings** (or **AP>Settings** on some models). Note that menus displayed can vary by model.



Wi-Fi AP Settings	
Protocol	802.11ng ▾
Channel	1 (2.412 GHz) ▾
Channel Width	Auto ▾
Output Power	Max ▾ <input type="checkbox"/> Boost

Wi-Fi AP Settings	
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	This option allows you to select which 802.11 RF channel will be utilized. Channel 1 (2.412 GHz) is selected by default.
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.
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.

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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 **Advanced>Wi-Fi Settings**.

Beacon Rate	 1Mbps
Beacon Interval	 100ms
DTIM	 1
Slot Time	 9 
ACK Timeout	 48 
Frame Aggregation	<input checked="" type="checkbox"/> Enable
Guard Interval	<input type="radio"/> Short <input checked="" type="radio"/> Long

Wi-Fi AP Advanced Settings

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 .
Slot Time ^A	This field is for specifying the unit wait time before transmitting a packet. By default, this field is set to 9  .
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  .
Frame Aggregation ^A	This option allows you to enable frame aggregation to increase transmission throughput.
Guard Interval ^A	This is where you opt for a short or long guard period interval for your transmissions.

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

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Wi-Fi WAN settings can be configured at **Advanced>Wi-Fi Settings** (or **Advanced>Wi-Fi WAN** or some models).

Wi-Fi WAN Settings	
Channel Width	20/40 MHz ▾
Bit Rate	Auto ▾
Output Power	Max ▾ <input type="checkbox"/> Boost

Wi-Fi WAN Settings

Channel Width	Available options are 20/40 MHz and 20 MHz . Default is 20/40 MHz , which allows both widths to be used simultaneously.
Bit Rate	This option allows you to select a specific bit rate for data transfer over the device's Wi-Fi network. By default, Auto is selected.
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. Note that selecting the Boost option may cause the MAX's radio output to exceed local regulatory limits.

12 MediaFast Configuration

MediaFast settings can be configured from the **Network** menu.

12.1 Setting Up MediaFast Content Caching

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

The screenshot shows the 'Cache Control' configuration page. It includes sections for 'Domains / IP Addresses' (with options for Cache all, Whitelist, or Blacklist), 'Source IP Subnet' (allowing selection of Any or Custom subnet mask for specific IP ranges like 10.8.41.0/24 and 10.8.76.0/24), 'Content Type' (checkboxes for Video, Audio, Images, and OS / Application Updates), and 'Cache Lifetime Settings' (table for setting file extensions like jpg to a lifetime of 30 days).

Cache Control Settings	
Domain	Choose to Cache on all domains , or enter domain names and then choose either Cache the specified domains only or Do not cache the specified domains .
Source IP Subnet	This setting allows caching to be applied to the user-specified IP subnets. If "Any" is selected, then caching will apply to all subnets.
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.

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12.2 Scheduling Content Prefetching

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 >Prefetch Schedule**.

The screenshot shows the 'Prefetch Schedule' interface. At the top, there's a header bar with the title 'Prefetch Schedule'. Below it is a table with columns: Name, Status, Next Run Time, Last Run Time, Last Duration, Result, Last Download, and Actions. The table lists five scheduled tasks: 'Course Progress' (Downloading, 04-11 06:00, 04-09 02:03, -, In Progress, 0 B), 'National Geog' (Ready, 04-11 00:00, 04-09 00:00, 00:01, Complete, 4.98 kB), 'Syllabus' (Downloading, 04-11 06:00, 04-09 06:00, -, In Progress, 0 B), 'Vimeo' (Ready, 04-11 00:00, 04-09 02:03, 00:01, Complete, 115.91 kB), and 'ted' (Ready, 04-11 00:00, 04-09 00:00, 00:01, Complete, 62.26 kB). A 'New Schedule' button is at the bottom right of the table. Below the table is a 'Tools' section with 'Clear Web Cache' and 'Clear Statistics' buttons.

The screenshot shows the 'Prefetch Schedule Settings' interface. It features a table with rows for each scheduled task. Each row has a 'Name' column, a 'Status' column, and a 'Details' column containing specific configuration fields. The 'Details' columns include: 'Next Run Time/Last Run Time' (displaying dates and times), 'Last Duration' (with a note about expected completion time), 'Result' (with download status indicators), and 'Last Download' (with file size information).

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 (In Progress) or complete (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.

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Actions

To begin a scheduled download immediately, click .

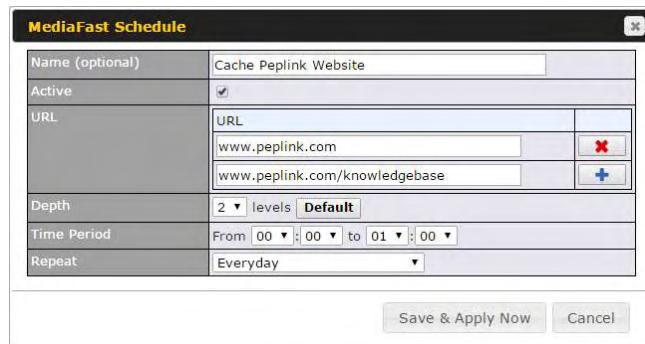
To cancel a scheduled download, click .

To edit a scheduled download, click .

To delete a scheduled download, click .

Click to begin creating a new scheduled download. Clicking the button will cause the following screen to appear:

New Schedule



MediaFast Schedule	
Name (optional)	Cache Peplink Website
Active	<input checked="" type="checkbox"/>
URL	URL www.peplink.com  www.peplink.com/knowledgebase 
Depth	2 levels Default
Time Period	From 00 to 01 00
Repeat	Everyday

Simply provide the requested information to create your schedule.

Clear Web Cache

To clear all cached content, click this button. Note that this action cannot be undone.

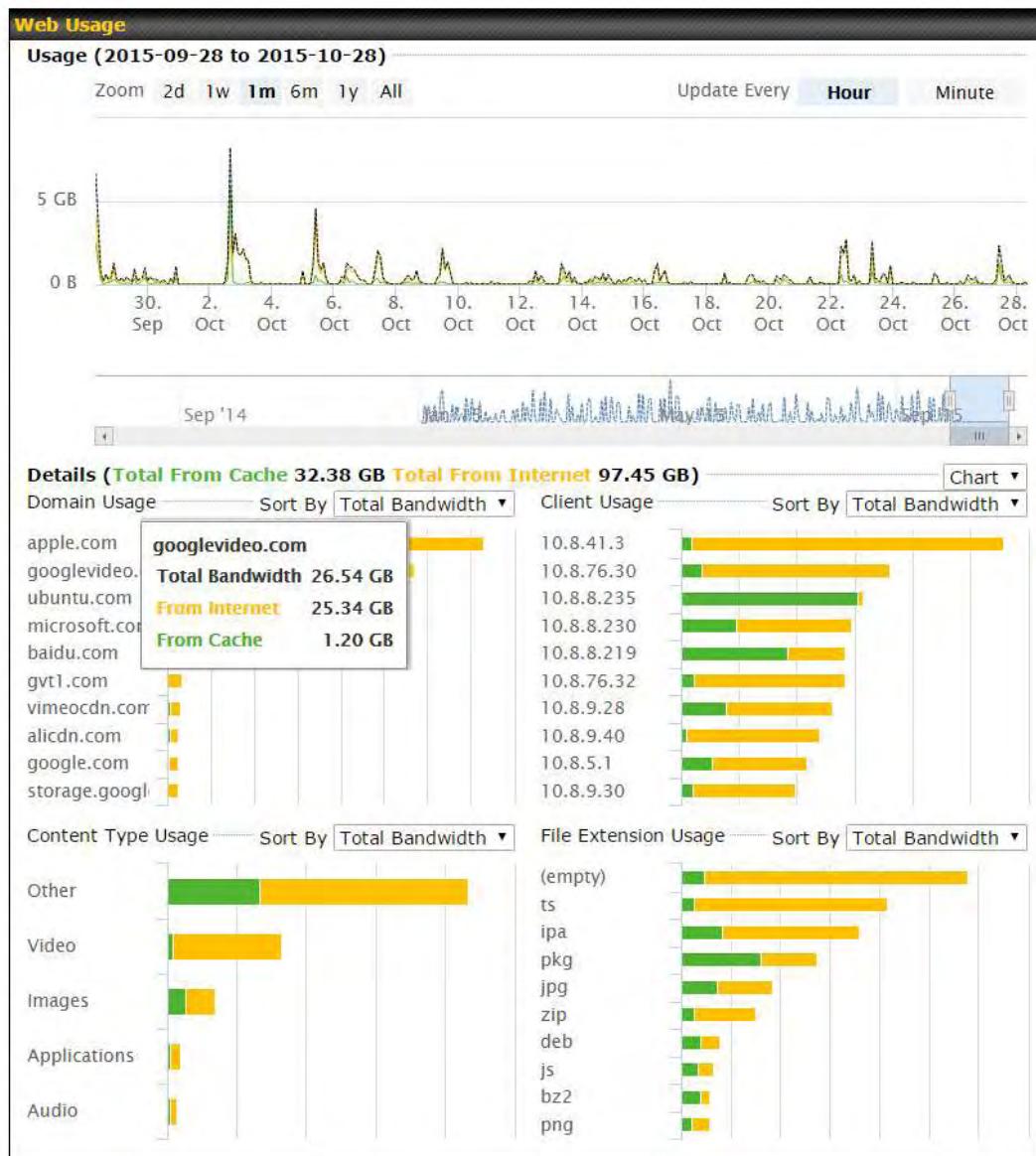
Clear Statistics

To clear all prefetch and status page statistics, click this button.

12.3 Viewing MediaFast Statistics

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

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13 Bandwidth Bonding SpeedFusion™ / PepVPN



Pepwave bandwidth bonding SpeedFusion™ is our patented technology that enables our SD-WAN routers to bond multiple Internet connections to increase site-to-site bandwidth and reliability. SpeedFusion functionality securely connects your Pepwave router to another Pepwave or Peplink device (Peplink Balance 210/310/380/580/710/1350 only). Data, voice, or video communications between these locations are kept confidential across the public Internet.

Bandwidth bonding SpeedFusion™ is specifically designed for multi-WAN environments. In case of failures and network congestion at one or more WANs, other WANs can be used to continue carrying the network traffic.

Different models of our SD-WAN routers have different numbers of site-to-site connections allowed. End-users who need to have more site-to-site connections can purchase a SpeedFusion license to increase the number of site-to-site connections allowed.

Pepwave routers can aggregate all WAN connections' bandwidth for routing SpeedFusion™ traffic. Unless all the WAN connections of one site are down, Pepwave routers can keep the VPN up and running.

VPN bandwidth bonding is supported in Firmware 5.1 or above. All available bandwidth will be utilized to establish the VPN tunnel, and all traffic will be load balanced at packet level across all links. VPN bandwidth bonding is enabled by default.

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13.1 PepVPN

To configure PepVPN and SpeedFusion, navigate to **Advanced>SpeedFusion™** or **Advanced>PepVPN**.

PepVPN with SpeedFusion™



InControl management enabled. Settings can now be configured on [InControl](#).

Profile	Remote ID	Remote Address(es)	?
FL Office	8345-5F7A-DE97		X
New Profile			

Send All Traffic To
No PepVPN profile selected

PepVPN
Local ID MAX_HD2_DEF1

Link Failure Detection
Link Failure Detection Time Recommended (Approx. 15 secs)
 Fast (Approx. 6 secs)
 Faster (Approx. 2 secs)
 Extreme (Under 1 sec)
Shorter detection time incurs more health checks and higher bandwidth overhead
[Save](#)

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 (branch offices and headquarters) will be able to route to local subnets.

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 using the 256-bit AES encryption standard. To configure, navigate to **Advanced>SpeedFusion™** or **Advanced>PepVPN** and click the **New Profile** button to create a new VPN profile (you may have to first save the displayed default profile in order to access the **New Profile** button). Each profile specifies the settings for making VPN connection with one remote Pepwave or Peplink device. Note that available settings vary by model.

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PepVPN Profile		
Name	<input type="text"/> Balance 2942-1257-1241	
Active	<input checked="" type="checkbox"/>	
SpeedFusion	Supported	
Encryption	<input checked="" type="radio"/> 256-bit AES <input type="radio"/> OFF	
Authentication	<input checked="" type="radio"/> Remote ID / Pre-shared Key <input type="radio"/> X.509	
Remote ID / Pre-shared Key	Remote ID Balance 9875-A63D-92AS	Pre-shared Key *****
NAT Mode	<input type="text"/> Untagged LAN ▾	
Remote IP Address / Host Names (Optional)	<input type="text"/> If this field is empty, this field on the remote unit must be filled	
Data Port	<input checked="" type="radio"/> Default <input type="radio"/> Custom <input type="text"/>	
Bandwidth Limit	<input type="text"/>	
Cost	<input type="text"/> 10	
WAN Smoothing	<input type="text"/> Off ▾	
Use IP ToS	<input type="checkbox"/>	

A list of defined SpeedFusion 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.

PepVPN Profile Settings	
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 ().
Active	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.

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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.
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.
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.
Cost	Define path cost for this profile. OSPF will determine the best route through the network using the assigned cost. Default: 10
WAN Smoothing^A	Select the degree to which WAN Smoothing will be implemented across your WAN links.

^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>Basic Settings>*LAN Profile Name*** and refer to instructions in section 9.1

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WAN Connection Priority					
	Priority	Direction	Connect to Remote	Cut-off latency (ms)	Suspension Time after Packet Loss (ms)
1. WAN 1	1 (Highest) ▾	Up/Down ▾	All ▾		
2. WAN 2	1 (Highest) ▾	Up/Down ▾	All ▾		
3. Wi-Fi WAN	1 (Highest) ▾	Up/Down ▾	All ▾		
4. Cellular 1	1 (Highest) ▾	Up/Down ▾	All ▾		
5. Cellular 2	1 (Highest) ▾	Up/Down ▾	All ▾		
6. USB	1 (Highest) ▾	Up/Down ▾	All ▾		

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.

Send All Traffic To

No PepVPN profile selected



Send All Traffic To

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

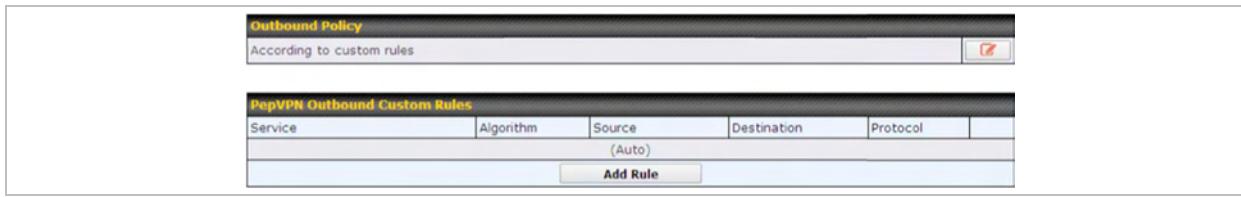


You could also specify a DNS server to resolve incoming DNS requests. Click the checkbox next to **Backup Site** to designate a backup SpeedFusion profile that will take over, should the main PepVPN connection fail.

Outbound Policy/PepVPN Outbound Custom Rules

Some models allow you to set outbound policy and custom outbound rules from **Advanced>PepVPN**. See **Section 14** for more information on outbound policy settings.

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PepVPN Local ID

Local ID

The local ID is a text string to identify this local unit when establishing a VPN connection. When creating a profile on a remote unit, this local ID must be entered in the remote unit's **Remote ID** field. Click the icon to edit **Local ID**.

PepVPN Settings

Handshake Port	<input checked="" type="radio"/> Default <input type="radio"/> Custom <input type="text"/>
Backward Compatibility	<input checked="" type="radio"/> High (firmware 5.3+) <input type="radio"/> Latest (firmware 6.2+)
Link Failure Detection Time	<input type="radio"/> Recommended (Approx. 15 secs) <input type="radio"/> Fast (Approx. 6 secs) <input type="radio"/> Faster (Approx. 2 secs) <input checked="" type="radio"/> Extreme (Under 1 sec) <small>Shorter detection time incurs more health checks and higher bandwidth overhead</small>

PepVPN Settings

Handshake Port^A	To designate a custom handshake port (TCP), click the custom radio button and enter the port number you wish to designate.
Backward Compatibility	Determine the level of backward compatibility needed for PepVPN tunnels. The use of the Latest setting is recommended as it will improve the performance and resilience of SpeedFusion connections.
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.

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

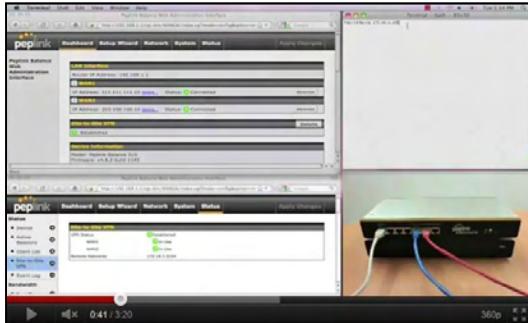
Important Note

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

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Tip

Want to know more about VPN sub-second session failover? Visit our YouTube Channel for a video tutorial!



<http://youtu.be/TLQgdpPSY88>

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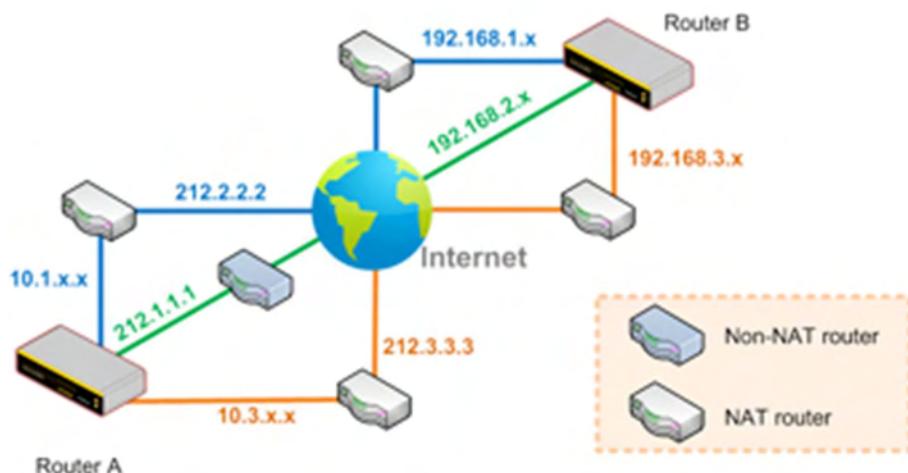
13.2 The Pepwave Router Behind a NAT Router

Pepwave routers support establishing SpeedFusion™ over WAN connections which are behind a NAT (network address translation) router.

To enable a WAN connection behind a NAT router to accept VPN connections, you can configure the NAT router in front of the WAN connection to inbound port-forward TCP port 32015 to the Pepwave router.

If one or more WAN connections on Unit A can accept VPN connections (by means of port forwarding or not), while none of the WAN connections on the peer Unit B can do so, you should enter all of Unit A's public IP addresses or hostnames into Unit B's **Remote IP Addresses / Host Names** field. Leave the field in Unit A blank. With this setting, a SpeedFusion™ connection can be set up and all WAN connections on both sides will be utilized.

See the following diagram for an example of this setup in use:



One of the WANs connected to Router A is non-NAT'd (212.1.1.1). The rest of the WANs connected to Router A and all WANs connected to Router B are NAT'd. In this case, the **Peer IP Addresses / Host Names** field for Router B should be filled with all of Router A's hostnames or public IP addresses (i.e., 212.1.1.1, 212.2.2.2, and 212.3.3.3), and the field in Router A can be left blank. The two NAT routers on WAN1 and WAN3 connected to Router A should inbound port-forward TCP port 32015 to Router A so that all WANs will be utilized in establishing the VPN.

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13.3 SpeedFusion™ Status

SpeedFusion™ status is shown in the **Dashboard**. The connection status of each connection profile is shown as below.

SpeedFusion™		Status
FL Office		Established
NY Office		Established

After clicking the **Status** button at the top right corner of the SpeedFusion™ table, you will be forwarded to **Status>SpeedFusion™**, where you can view subnet and WAN connection information for each VPN peer. Please refer to **Section 22.6** for details.

IP Subnets Must Be Unique Among VPN Peers

The entire interconnected SpeedFusion™ network is a single non-NAT IP network. Avoid duplicating subnets in your sites to prevent connectivity problems when accessing those subnets.

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14 IPsec VPN

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.

IPsec VPN on Pepwave routers is specially designed for multi-WAN environments. For instance, if a user sets up multiple IPsec profiles for a 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.

14.1 IPsec VPN Settings

Many Pepwave products can make multiple IPsec VPN connections with Peplink, Pepwave, 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 IPsec VPN on Pepwave devices that support it, navigate to **Advanced>IPsec VPN**.



A **NAT-Traversal** option and list of defined **IPsec VPN** profiles will be shown. **NAT-Traversal** should be enabled if your system is behind a NAT router. Click the **New Profile** button to create new IPsec VPN profiles that make VPN connections to remote Pepwave, Cisco, or Juniper routers via available WAN connections. To edit any of the profiles, click on its associated connection name in the leftmost column.



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Name	Profile 1												
Active	<input checked="" type="checkbox"/>												
Connect Upon Disconnection of	<input checked="" type="checkbox"/> WAN 2												
Remote Gateway IP Address / Host Name	12.12.12.12												
Local Networks	<p>Propose the following networks to remote gateway:</p> <p><input type="checkbox"/> 172.16.1.1/24 <input type="checkbox"/> 172.16.2.1/24 <input type="checkbox"/> 172.16.3.1/24 <input checked="" type="checkbox"/> 10.10.0.1/32 <input checked="" type="checkbox"/> 192.168.10.0/24 <input checked="" type="checkbox"/> 192.168.11.0/24 <input type="checkbox"/> []</p> <p>Apply the following NAT policies:</p> <table> <tr> <td><input checked="" type="checkbox"/> 172.16.1.0/24</td> <td><input checked="" type="checkbox"/> 192.168.10.0/24</td> </tr> <tr> <td><input checked="" type="checkbox"/> 172.16.2.0/24</td> <td><input checked="" type="checkbox"/> 10.10.0.1/32</td> </tr> <tr> <td><input checked="" type="checkbox"/> 172.16.3.11/32</td> <td><input checked="" type="checkbox"/> 192.168.11.101/32</td> </tr> <tr> <td><input checked="" type="checkbox"/> 172.16.3.21/32</td> <td><input checked="" type="checkbox"/> 192.168.11.201/32</td> </tr> <tr> <td><input type="checkbox"/> Local Network</td> <td><input type="checkbox"/> NAT Network</td> </tr> </table>			<input checked="" type="checkbox"/> 172.16.1.0/24	<input checked="" type="checkbox"/> 192.168.10.0/24	<input checked="" type="checkbox"/> 172.16.2.0/24	<input checked="" type="checkbox"/> 10.10.0.1/32	<input checked="" type="checkbox"/> 172.16.3.11/32	<input checked="" type="checkbox"/> 192.168.11.101/32	<input checked="" type="checkbox"/> 172.16.3.21/32	<input checked="" type="checkbox"/> 192.168.11.201/32	<input type="checkbox"/> Local Network	<input type="checkbox"/> NAT Network
<input checked="" type="checkbox"/> 172.16.1.0/24	<input checked="" type="checkbox"/> 192.168.10.0/24												
<input checked="" type="checkbox"/> 172.16.2.0/24	<input checked="" type="checkbox"/> 10.10.0.1/32												
<input checked="" type="checkbox"/> 172.16.3.11/32	<input checked="" type="checkbox"/> 192.168.11.101/32												
<input checked="" type="checkbox"/> 172.16.3.21/32	<input checked="" type="checkbox"/> 192.168.11.201/32												
<input type="checkbox"/> Local Network	<input type="checkbox"/> NAT Network												
Remote Networks	Network	Subnet Mask											
	192.167.11.193	255.255.255.0 (/24)	<input type="button" value="+"/>										
Authentication	<input checked="" type="radio"/> Preshared Key <input type="radio"/> X.509 Certificate												
Mode	<input checked="" type="radio"/> Main Mode (All WANs need to have Static IP) <input type="radio"/> Aggressive Mode												
Force UDP Encapsulation	<input type="checkbox"/>												
Preshared Key	***** <input checked="" type="checkbox"/> Hide Characters												
Local ID	<input type="text"/>												
Remote ID	<input type="text"/>												
Phase 1 (IKE) Proposal	1	AES-256 & SHA1	<input type="button" value="▼"/>										
	2	-----	<input type="button" value="▼"/>										
Phase 1 DH Group	<input checked="" type="checkbox"/> Group 2: MODP 1024 <input type="checkbox"/> Group 5: MODP 1536												
Phase 1 SA Lifetime	3600	seconds	<input type="button" value="Default"/>										
Phase 2 (ESP) Proposal	1	AES-256 & SHA1	<input type="button" value="▼"/>										
	2	-----	<input type="button" value="▼"/>										
Phase 2 PFS Group	<input checked="" type="radio"/> None <input type="radio"/> Group 2: MODP 1024 <input type="radio"/> Group 5: MODP 1536												
Phase 2 SA Lifetime	28800	seconds	<input type="button" value="Default"/>										

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

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	will be disabled.
Connect Upon Disconnection of	Check this box and select a WAN to connect to this VPN automatically when the specified WAN is disconnected.
Remote Gateway IP Address / Host Name	Enter the remote peer's public IP address. For Aggressive Mode , this is optional.
Local Networks	<p>Enter the local LAN subnets here. If you have defined static routes, they will be shown here.</p> <p>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 allow you to establish IPsec connection to a remote site that has one or more subnets overlapped with local site.</p> <p>Two types of NAT policies can be defined:</p> <p>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.</p> <p>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 connection to the local clients.</p>
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

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	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.

WAN Connection Priority	
Priority	WAN Selection
1	WAN 1
2	-----

WAN Connection Priority

WAN Connection Select the appropriate WAN connection from the drop-down menu.

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15 Outbound Policy Management

Pepwave routers can flexibly manage and load balance outbound traffic among WAN connections.

Important Note

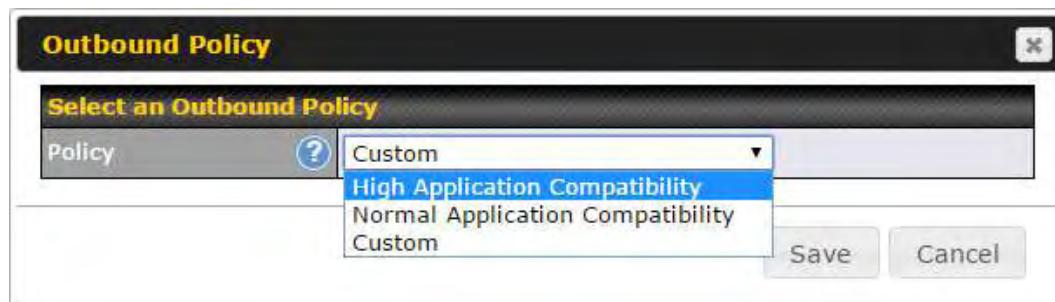
Outbound policy is applied only when more than one WAN connection is active.

The settings for managing and load balancing outbound traffic are located at **Advanced>Outbound Policy** or **Advanced>PepVPN**, depending on the model.



15.1 Outbound Policy

Outbound policies for managing and load balancing outbound traffic are located at **Network>Outbound Policy** or **Advanced>PepVPN>Outbound Policy**.



There are three main selections for the outbound traffic policy:

- High Application Compatibility
- Normal Application Compatibility
- Custom

Note that some Pepwave routers provide only the **Send All Traffic To** setting here. See **Section 12.1** for details.

Outbound Policy Settings	
High	Outbound traffic from a source LAN device is routed through the same WAN connection regardless of the destination Internet IP address and protocol. This option provides the

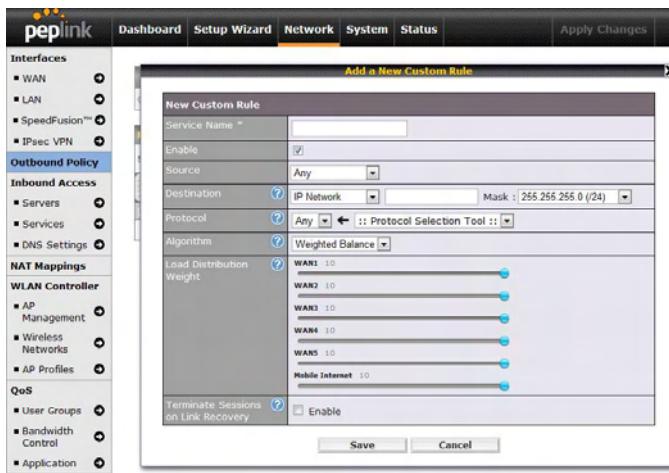
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Application Compatibility	highest application compatibility.
Normal Application Compatibility	Outbound traffic from a source LAN device to the same destination Internet IP address will be routed through the same WAN connection persistently, regardless of protocol. This option provides high compatibility to most applications, and users still benefit from WAN link load balancing when multiple Internet servers are accessed.
Custom	Outbound traffic behavior can be managed by defining rules in a custom rule table. A default rule can be defined for connections that cannot be matched with any of the rules.

The default policy is **Normal Application Compatibility**.

Tip

Want to know more about creating outbound rules? Visit our YouTube Channel for a video tutorial!



http://youtu.be/rKH4AS_bQnE

15.2 Custom Rules for Outbound Policy

Click in the **Outbound Policy** form. Choose **Custom** and press the **Save** button.

Rules (Drag and drop rows to change rule order)					
Service	Algorithm	Source	Destination	Protocol / Port	
HTTPS Persistence	Persistence (Src) (Auto)	Any	IP Network 192.168.50.0/24	TCP 443	

PepVPN Routes

Default	(Auto)
---------	--------

Add Rule

Expert Mode

Enabled

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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.

The screenshot shows the 'Edit Default Custom Rule' dialog box. It has a title bar 'Edit Default Custom Rule' and a close button 'x'. The main area contains several configuration options:

- Default Rule:** A radio button group with 'Custom' selected (radio button is checked) and 'Auto' as an option.
- Algorithm:** A dropdown menu set to 'Weighted Balance'.
- Load Distribution Weight:** A table showing weights for various interfaces:
 - WAN 1: 10
 - WAN 2: 10
 - Wi-Fi WAN: 10
 - Cellular 1: 10
 - Cellular 2: 10
 - USB: 10Each row has a small circular slider icon to its right.
- Terminate Sessions on Link Recovery:** A checkbox labeled 'Enable'.

At the bottom right are 'Save' and 'Cancel' buttons.

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. Note that some Pepwave routers display this button at **Advanced>PepVPN>PepVPN Outbound Custom Rules**.

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Add a New Custom Rule

Service Name *	<input type="text"/>
Enable	<input checked="" type="checkbox"/> Always on
Source	Any
Destination	IP Network 255.255.255.0 (/24)
Protocol	Any :: Protocol Selection Tool ::
Algorithm	Weighted Balance
Load Distribution Weight	WAN 1 10 WAN 2 10 Wi-Fi WAN 10 Cellular 1 10 Cellular 2 10 USB 10
Terminate Sessions on Link Recovery	<input type="checkbox"/> Enable

Save **Cancel**

New Custom Rule Settings

Service Name

This setting specifies the name of the outbound traffic rule.

Enable

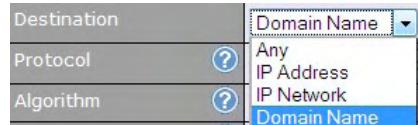
This setting specifies whether the outbound traffic rule takes effect. When **Enable** is checked, the rule takes effect: traffic is matched and actions are taken by the Pepwave router based on the other parameters of the rule. When **Enable** is unchecked, the rule does not take effect: the Pepwave 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, or MAC address for traffic that matches the rule.

This setting specifies the destination IP address, IP network, or domain name for traffic that matches the rule.



Destination

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, accesses to any one of the server names will also match this rule.

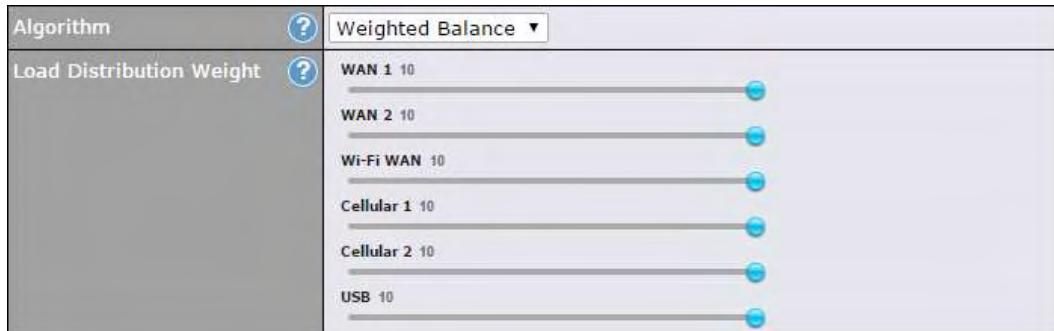
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Protocol and Port	This setting specifies the IP protocol and port of traffic that matches this rule.
Algorithm	<p>This setting specifies the behavior of the Pepwave router for the custom rule. One of the following values can be selected (note that some Pepwave routers provide only some of these options):</p> <ul style="list-style-type: none">• Weighted Balance• Persistence• Enforced• Priority• Overflow• Least Used• Lowest Latency <p>The upcoming sections detail the listed algorithms.</p>
Terminate Sessions on Link Recovery	<p>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 Weighted, Persistence, and 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.</p>

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15.2.1 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 $16.7\% = (10 / 60 \times 100\%)$.

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

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

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

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

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

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15.2.2 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.

Algorithm	<input type="button" value="?"/>	Persistence ▾												
Persistence Mode	<input type="button" value="?"/>	<input checked="" type="radio"/> By Source <input type="radio"/> By Destination												
Load Distribution	<input type="button" value="?"/>	<input type="radio"/> Auto <input checked="" type="radio"/> Custom												
Load Distribution Weight	<input type="button" value="?"/>	<table><tr><td>WAN 1 10</td><td><input type="range" value="10"/></td></tr><tr><td>WAN 2 10</td><td><input type="range" value="10"/></td></tr><tr><td>Wi-Fi WAN 10</td><td><input type="range" value="10"/></td></tr><tr><td>Cellular 1 10</td><td><input type="range" value="10"/></td></tr><tr><td>Cellular 2 10</td><td><input type="range" value="10"/></td></tr><tr><td>USB 10</td><td><input type="range" value="10"/></td></tr></table>	WAN 1 10	<input type="range" value="10"/>	WAN 2 10	<input type="range" value="10"/>	Wi-Fi WAN 10	<input type="range" value="10"/>	Cellular 1 10	<input type="range" value="10"/>	Cellular 2 10	<input type="range" value="10"/>	USB 10	<input type="range" value="10"/>
WAN 1 10	<input type="range" value="10"/>													
WAN 2 10	<input type="range" value="10"/>													
Wi-Fi WAN 10	<input type="range" value="10"/>													
Cellular 1 10	<input type="range" value="10"/>													
Cellular 2 10	<input type="range" value="10"/>													
USB 10	<input type="range" value="10"/>													

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

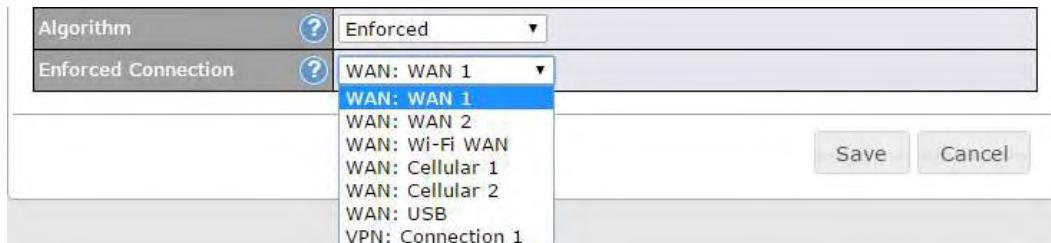
By Source:	The same WAN connection will be used for traffic matching the rule and originating from the same machine, regardless of its destination. This option will provide the highest level of application compatibility.
By Destination:	The same WAN connection will be used for traffic matching the rule, 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.

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15.2.3 Algorithm: Enforced

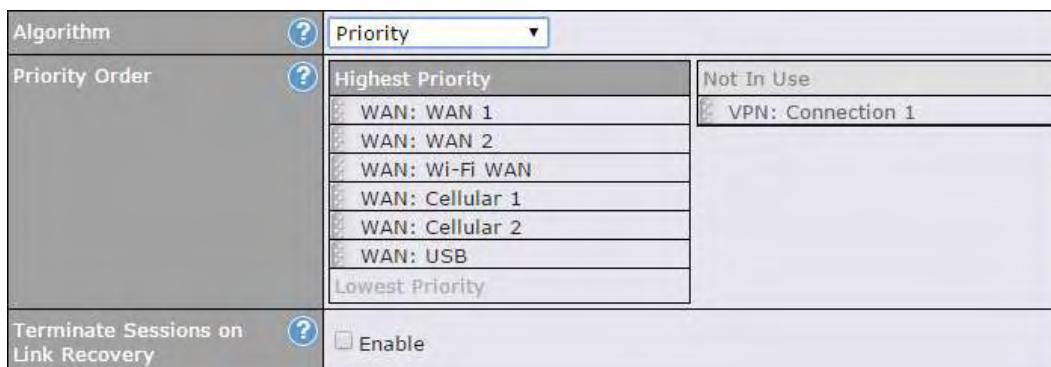
This setting specifies the WAN connection usage to be applied on the specified IP protocol and port. This setting is applicable only when **Algorithm** is set to **Enforced**.



Matching traffic will be routed through the specified WAN connection, regardless of the health check status of the WAN connection. Starting from Firmware 5.2, outbound traffic can be enforced to go through a specified SpeedFusion™ connection.

15.2.4 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.

15.2.5 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.

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Algorithm	Overflow
Overflow Order	Highest Priority WAN: WAN 1 WAN: WAN 2 WAN: Wi-Fi WAN WAN: Cellular 1 WAN: Cellular 2 WAN: USB Lowest Priority

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.

15.2.6 Algorithm: Least Used

Algorithm	Least Used
Connection	<input checked="" type="checkbox"/> WAN 1 <input checked="" type="checkbox"/> WAN 2 <input checked="" type="checkbox"/> Wi-Fi WAN <input type="checkbox"/> Cellular 1 <input type="checkbox"/> Cellular 2 <input type="checkbox"/> USB

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.

15.2.7 Algorithm: Lowest Latency

Algorithm	Lowest Latency
Connection	<input checked="" type="checkbox"/> WAN 1 <input checked="" type="checkbox"/> WAN 2 <input checked="" type="checkbox"/> Wi-Fi WAN <input type="checkbox"/> Cellular 1 <input type="checkbox"/> Cellular 2 <input type="checkbox"/> USB

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

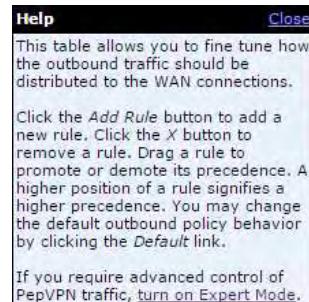
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- A latency sensitive application must be routed through the lowest latency WAN, regardless of the WAN's available bandwidth.

15.2.8 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.

This screenshot shows the 'Custom Rules' table interface. At the top, there is a header row with columns for Service, Algorithm, Source, Destination, Protocol / Port, and a delete icon. Below the header, a single row is visible, representing the 'HTTPS Persistence' rule. This row is highlighted with a purple background. The 'Service' column contains 'HTTPS Persistence', 'Algorithm' contains 'Persistence (Src) (Auto)', 'Source' is 'Any', 'Destination' is 'Any', 'Protocol / Port' is 'TCP 443', and the delete icon is crossed out with a red 'X'. Below this row, a grey banner displays the text 'PepVPN Routes'. At the bottom of the table, there is a 'Default' row and a 'Add Rule' button.

Service	Algorithm	Source	Destination	Protocol / Port	
HTTPS Persistence	Persistence (Src) (Auto)	Any	Any	TCP 443	
PepVPN Routes					
Default	(Auto)				
Add Rule					

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16 Inbound Access

16.1 Port Forwarding Service

Pepwave 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**.

Enable	<input checked="" type="radio"/> Yes <input type="radio"/> No												
Service Name	Service_1												
IP Protocol	TCP :: Protocol Selection Tool ::												
Port	Any Port												
Inbound IP Address(es) (Require at least one IP address)	<table border="1"><tr><td><input checked="" type="checkbox"/> WAN 1</td><td><input checked="" type="checkbox"/> 10.88.3.158 (Interface IP)</td></tr><tr><td><input type="checkbox"/> WAN 2</td><td></td></tr><tr><td><input type="checkbox"/> Wi-Fi WAN</td><td></td></tr><tr><td><input type="checkbox"/> Cellular 1</td><td></td></tr><tr><td><input type="checkbox"/> Cellular 2</td><td></td></tr><tr><td><input type="checkbox"/> USB</td><td></td></tr></table>	<input checked="" type="checkbox"/> WAN 1	<input checked="" type="checkbox"/> 10.88.3.158 (Interface IP)	<input type="checkbox"/> WAN 2		<input type="checkbox"/> Wi-Fi WAN		<input type="checkbox"/> Cellular 1		<input type="checkbox"/> Cellular 2		<input type="checkbox"/> USB	
<input checked="" type="checkbox"/> WAN 1	<input checked="" type="checkbox"/> 10.88.3.158 (Interface IP)												
<input type="checkbox"/> WAN 2													
<input type="checkbox"/> Wi-Fi WAN													
<input type="checkbox"/> Cellular 1													
<input type="checkbox"/> Cellular 2													
<input type="checkbox"/> USB													
Server IP Address	120.78.95.7												

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.

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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

Port	?	Any Port
------	---	----------

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.

Port	?	Single Port	Service Port: 80
------	---	-------------	------------------

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	?	Port Range	Service Ports: 80 - 88
------	---	------------	------------------------

Port

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	?	Port Mapping	Service Port: 80	Map to Port: 88
------	---	--------------	------------------	-----------------

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.)

Port	?	Range Mapping	Service Ports: 80 - 88	Map to Ports: 88 - 96
------	---	---------------	------------------------	-----------------------

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.

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16.1.1 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.

UPnP / NAT-PMP Settings	
UPnP	<input checked="" type="checkbox"/> Enable
NAT-PMP	<input checked="" type="checkbox"/> Enable
<input type="button" value="Save"/>	

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

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17 NAT Mappings

NAT mappings allow IP address mapping of all inbound and outbound NAT'dt traffic to and from an internal client IP address. Settings to configure NAT mappings are located at **Advanced>NAT Mappings**.

LAN Clients	Inbound Mappings	Outbound Mappings
192.168.1.23	(WAN 1):10.88.3.158 (Interface IP)	Use Interface IP only 
Add NAT Rule		

To add a rule for NAT mappings, click **Add NAT Rule**.

LAN Client(s)	IP Address												
Address													
Inbound Mappings	Connection / Inbound IP Address(es) <input type="checkbox"/> WAN 1 <input type="checkbox"/> WAN 2 <input type="checkbox"/> Wi-Fi WAN <input type="checkbox"/> Cellular 1 <input type="checkbox"/> Cellular 2 <input type="checkbox"/> USB												
Outbound Mappings	Connection / Outbound IP Address <table><tr><td>WAN 1</td><td>10.88.3.158 (Interface IP)</td></tr><tr><td>WAN 2</td><td>Interface IP</td></tr><tr><td>Wi-Fi WAN</td><td>Interface IP</td></tr><tr><td>Cellular 1</td><td>Interface IP</td></tr><tr><td>Cellular 2</td><td>Interface IP</td></tr><tr><td>USB</td><td>Interface IP</td></tr></table>	WAN 1	10.88.3.158 (Interface IP)	WAN 2	Interface IP	Wi-Fi WAN	Interface IP	Cellular 1	Interface IP	Cellular 2	Interface IP	USB	Interface IP
WAN 1	10.88.3.158 (Interface IP)												
WAN 2	Interface IP												
Wi-Fi WAN	Interface IP												
Cellular 1	Interface IP												
Cellular 2	Interface IP												
USB	Interface IP												

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

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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(s)** field.

Note that inbound mapping is not needed for WAN connections in drop-in mode or IP forwarding mode. Also note that each WAN IP address can be associated to one NAT mapping only.

Outbound Mappings

This setting specifies the WAN IP addresses that should be used when an IP connection is made from a LAN host to the Internet. 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 that 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. Also note that 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 the **Inbound Mappings** settings.

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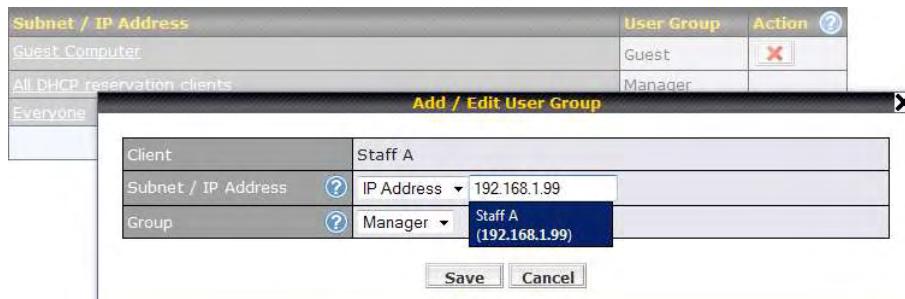
18 QoS

18.1 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 (note that the options available here vary by model).

The table is automatically sorted by rule 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 pre-defined 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.



Add / Edit User Group	
Subnet / IP Address	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.
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.

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18.2 Bandwidth Control

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 Manager members. By default, download and upload bandwidth limits are set to unlimited (set as 0).

Individual Bandwidth Limit			
Enable	<input checked="" type="checkbox"/>		
User Bandwidth Limit	Download Manager: Unlimited	Upload Unlimited	
Staff:	0 Mbps ▾	0 Mbps ▾	(0: unlimited)
Guest:	0 Mbps ▾	0 Mbps ▾	(0: unlimited)

18.3 Application

18.3.1 Application Prioritization

On many Pepwave routers, you can choose whether to apply the same prioritization settings to all user groups or customize the settings for each group.

Application Prioritization	
<input checked="" type="radio"/> Apply same settings to all users	<input type="radio"/> Customize

Three application priority levels can be set: **↑ High**, **— Normal**, and **↓ Low**. Pepwave routers 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.

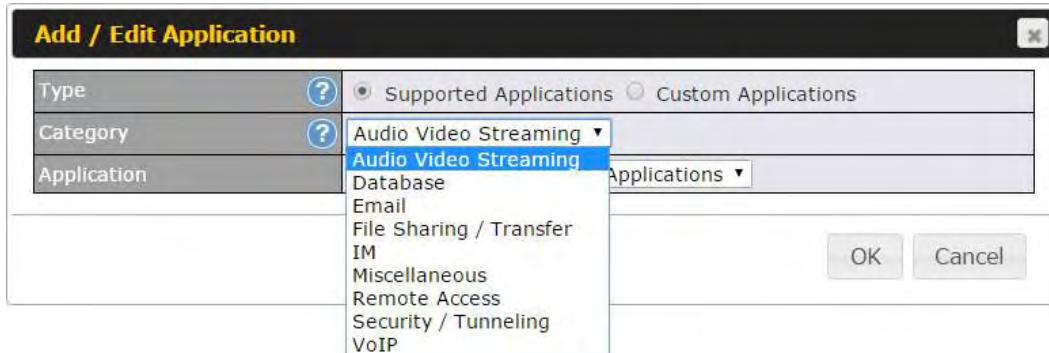
Application	Priority			?
	Manager	Staff	Guest	
All Supported Streaming Applications	↑ High	— Normal	↑ High	X
All Email Protocols	↑ High	↑ High	↑ High	X
MySQL	↑ High	— Normal	↓ Low	X
SIP	↑ High	↓ Low	↓ Low	X
	Add			

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18.3.2 Prioritization for Custom Applications

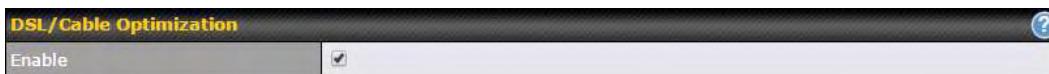
Click the **Add** button to define a custom application. Click the button  in the **Action** column to delete the custom application in the corresponding row.

When **Supported Applications** is selected, the Pepwave router 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.



18.3.3 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 enabled.



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19 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 Pepwave routers supports the selective filtering of data traffic in both directions:

- Outbound (LAN to WAN)
- Inbound (WAN to LAN)

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 screenshot displays four configuration panels:

- Outbound Firewall Rules**: A table with columns for Rule, Protocol, Source IP Port, Destination IP Port, and Policy. A single row is shown for "Default" with "Any" values across all fields and "Allow" as the policy. An "Add Rule" button is at the bottom.
- Inbound Firewall Rules**: A table with columns for Rule, Protocol, WAN, Source IP Port, Destination IP Port, and Policy. A single row is shown for "Default" with "Any" values across all fields and "Allow" as the policy. An "Add Rule" button is at the bottom.
- Apply Firewall Rules to PepVPN Traffic**: A simple configuration panel with a "Enabled" checkbox, which is checked.
- Intrusion Detection and DoS Prevention**: A simple configuration panel with a "Disabled" checkbox, which is unchecked.

19.1 Outbound and Inbound Firewall Rules

19.1.1 Access Rules

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

This screenshot shows the "Outbound Firewall Rules" configuration table, identical to the one in the main configuration panel above:

Rule	Protocol	Source IP Port	Destination IP Port	Policy
Default	Any	Any	Any	Allow

An "Add Rule" button is located at the bottom of the table.

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

The dialog box is titled "Add a New Outbound Firewall Rule". It contains the following fields:

New Firewall Rule	
Rule Name	<input type="text"/>
Enable	<input checked="" type="checkbox"/> Always on
Protocol	Any :: Protocol Selection Tool ::
Source IP & Port	Any Address
Destination IP & Port	Any Address
Action	<input checked="" type="radio"/> Allow <input type="radio"/> Deny
Event Logging	<input type="checkbox"/> Enable

At the bottom right are "Save" and "Cancel" buttons.

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

The table is titled "Inbound Firewall Rules" and includes a note: "Drag and drop rows to change rule order". It has columns for Rule, Protocol, WAN, Source IP Port, Destination IP Port, and Policy. One row is shown:

Rule	Protocol	WAN	Source IP Port	Destination IP Port	Policy
Default	Any	Any	Any	Any	Allow

A "Add Rule" button is located at the bottom center.

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

The dialog box is titled "Add a New Inbound Firewall Rule". It contains the same fields as the outbound rule dialog:

New Firewall Rule	
Rule Name	<input type="text"/>
Enable	<input checked="" type="checkbox"/>
WAN Connection	Any
Protocol	Any :: Protocol Selection Tool ::
Source IP & Port	Any Address
Destination IP & Port	Any Address
Action	<input checked="" type="radio"/> Allow <input type="radio"/> Deny
Event Logging	<input type="checkbox"/> Enable

At the bottom right are "Save" and "Cancel" buttons.

Rules are matched from top to bottom. If a connection matches any one of the upper rules, the matching process will stop. If none of the rules match, the **Default** rule will be applied. By default, the **Default** rule is set as **Allow** for both outbound and inbound access.