



# MAX Series

## User Manual

### Pepwave Products:

MAX 700 / HD2 / HD2 IP67 / HD2 Mini / HD2 MBX / HD Dome / HD Dome Pro / HD4 / HD4 MBX / MBX Mini / HD4 IP67 / Transit / Transit Duo / Transit 5G / Transit Core / Transit Mini / Transit Pro E / Transit Pro / BR1 Classic / BR1 MK2 / BR1 Slim / BR1 ENT / BR1 M2M / / BR1 Mini (HW2) / BR1 Mini (HW3) / BR1 Mini Core / BR1 ESN / BR1 Pro LTE / BR1 Pro (CAT-20) / BR1 Pro 5G / BR2 Pro / BR1 IP55 / BR1 IP67 / BR2 IP55 / On-The-Go / HD2 with MediaFast / HD4 with MediaFast / SpeedFusion Engine / UBR LTE / UBR Plus / PDX

Pepwave Firmware 8.2.1  
November 2022

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## 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!



<https://youtu.be/13M-JHRAICA>

## Glossary

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

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

# 1 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 compared 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](https://www.peplink.com/products).

## 1.1 Supported Network Features

### 1.1.1 WAN

- Ethernet WAN connection in full/half duplex
- Static IP support for PPPoE
- Built-in 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](https://changeip.com), [dyndns.org](https://dyndns.org), [no-ip.org](https://no-ip.org), [tzo.com](https://tzo.com) and [DNS-O-Matic](https://DNS-O-Matic.com))
- Ping, DNS lookup, and HTTP-based health check

### 1.1.2 LAN

- Wi-Fi AP
- Ethernet LAN ports
- DHCP server on LAN

- Extended DHCP option support
- Static routing rules
- VLAN on LAN support

### **1.1.3 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)
- 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

### **1.1.4 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

### **1.1.5 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

### **1.1.6 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

### **1.1.7 AP Controller**

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

#### **1.1.8 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

## 1.2 Other Supported Features

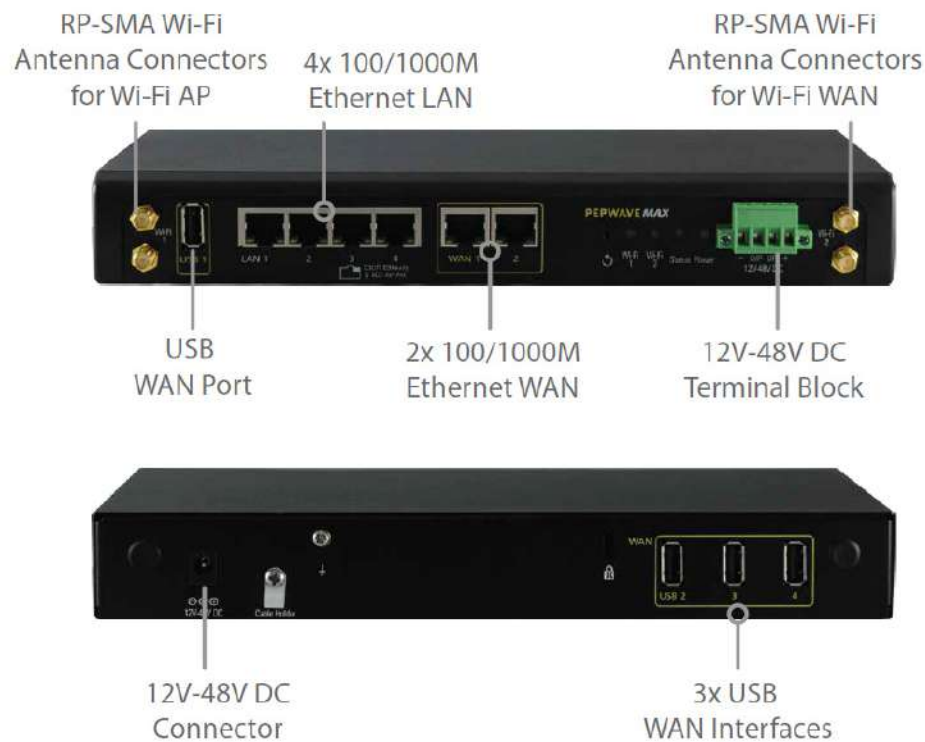
- User-friendly web-based administration interface
- HTTP and HTTPS support for web admin interface (default redirection to HTTPS)
- Configurable web administration port and administrator password
- Firmware upgrades, configuration backups, ping, and traceroute via web admin interface
- Remote web-based configuration (via WAN and LAN interfaces)
- Time server synchronization
- SNMP
- Email notification
- Read-only user access 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, and BR1 variants

## 2 Pepwave MAX Mobile Router Overview

### 2.1 MAX 700

#### 2.1.1 Panel Appearance



**Note:**

- For proper Wi-Fi performance and operations, please ensure all 4 Wi-Fi antenna connectors (labeled Wi-Fi 1 and Wi-Fi 2) have antennas attached.
- The LED indicators of Wi-Fi 1 & 2 shown as below is referring to the default settings of Wi-Fi Operation mode is WAN + AP under the AP.

## 2.1.2 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 Indicators |     |                      |
|---------------------|-----|----------------------|
| Wi-Fi 1             | OFF | WiFi AP is disabled. |
|                     | ON  | WiFi AP is enabled.  |

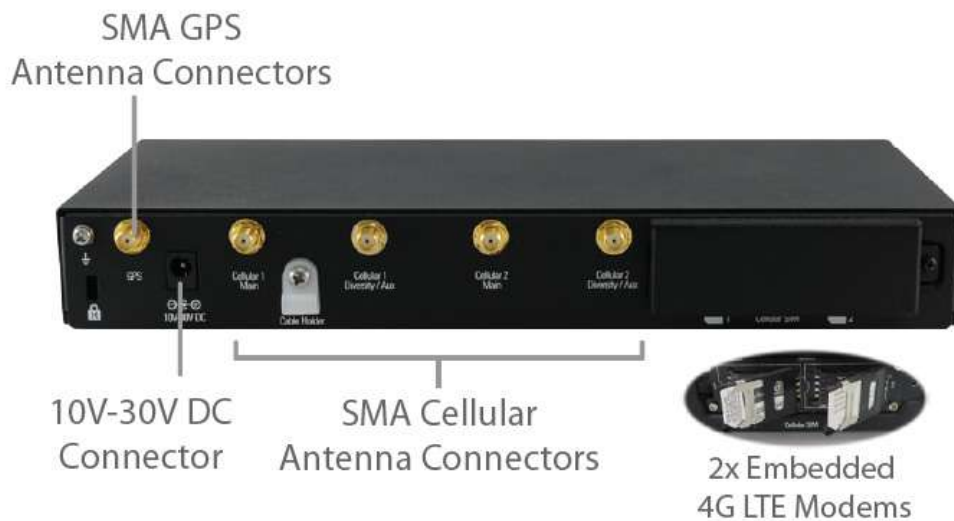
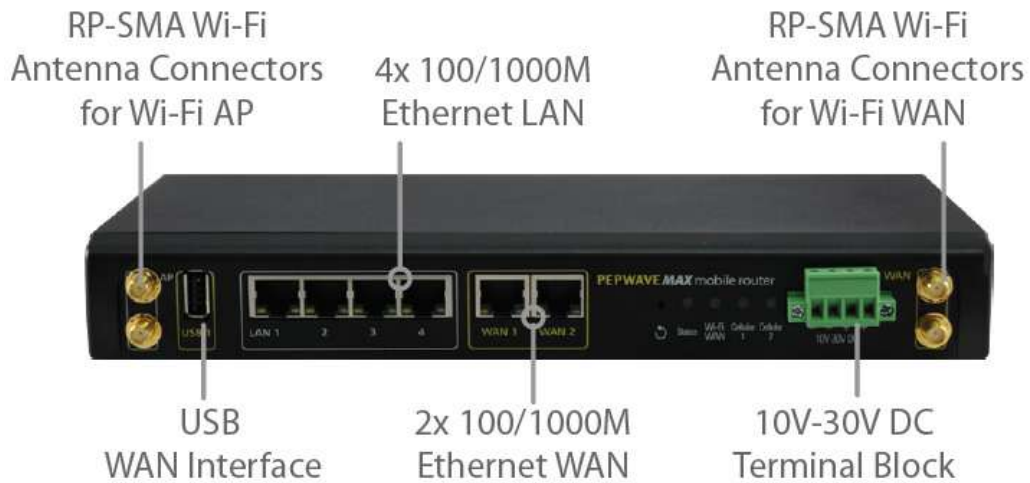
| Wi-Fi WAN Indicators |                 |                                                  |
|----------------------|-----------------|--------------------------------------------------|
| Wi-Fi 2              | OFF             | Disabled Intermittent                            |
|                      | 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                                   |
| Orange LED                 | Blinking             | Data is transferring                                  |
|                            | OFF                  | No data is being transferred or port is not connected |
| Port Type                  | Auto MDI/MDI-X ports |                                                       |

## 2.2 MAX HD2

For certification information, please refer to [Appendix B: Declaration](#)

### 2.2.1 Panel Appearance



### 2.2.2 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 WAN Indicators |                 |                                                  |
|----------------------|-----------------|--------------------------------------------------|
| Wi-Fi WAN            | 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 1 /<br>Cellular 2 | OFF             | Disabled or no SIM card inserted |
|                            | Blinking slowly | Connecting to network(s)         |
|                            | Green           | Connected to network(s)          |

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

## 2.3 MAX HD2 IP67

### 2.3.1 Panel Appearance



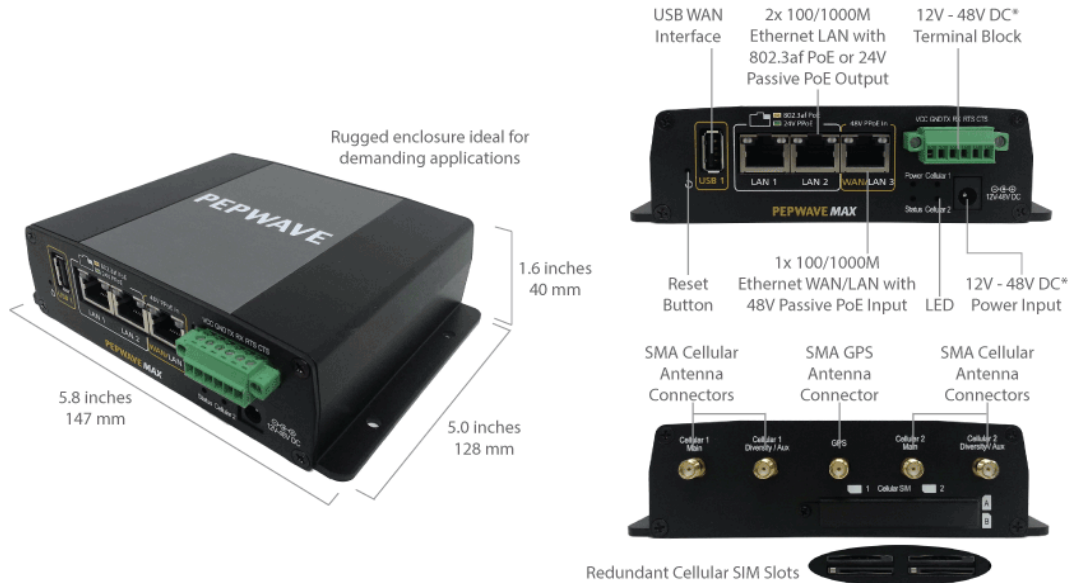
### 2.3.2 LED Indicators

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               |

## 2.4 MAX HD2 mini

### 2.4.1 Panel Appearance



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

### 2.4.2 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 1 /<br>Cellular 2 | OFF             | Disabled or no SIM card inserted |
|                            | Blinking slowly | Connecting to network(s)         |
|                            | Green           | Connected to network(s)          |

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

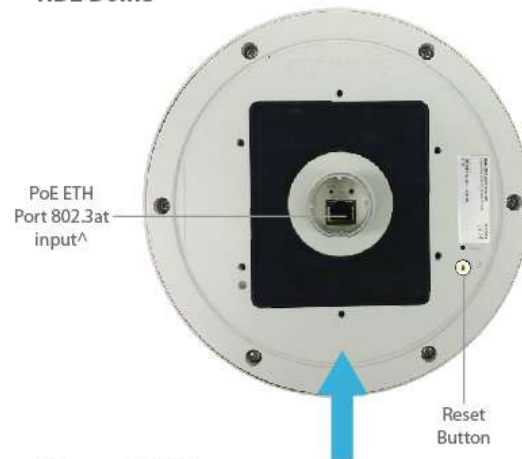
## 2.5 MAX HD Dome

### 2.5.1 Panel Appearance



#SIM Injector is available separately  
 ^Ethernet LAN port can be split into two LAN ports  
 using the included splitter (1x LAN 802.3af PoE out, 1x LAN PoE in)

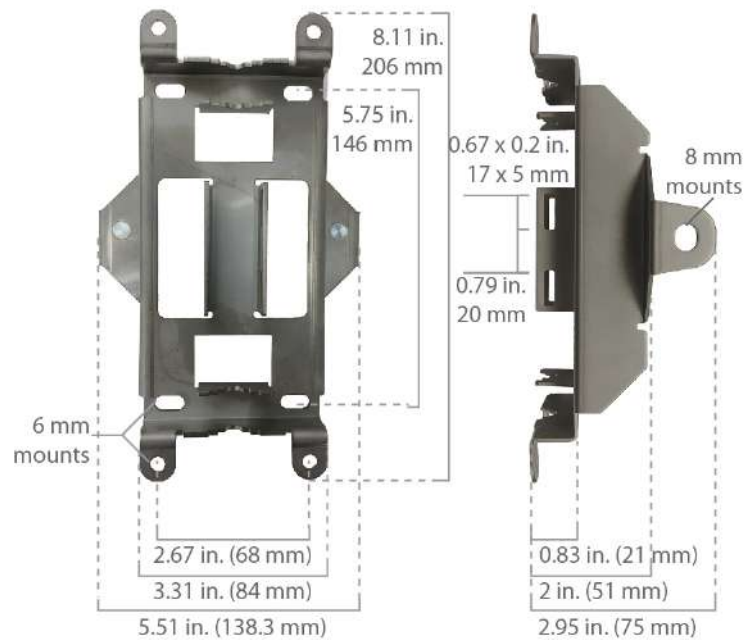
### HD2 Dome



### Ethernet Splitter

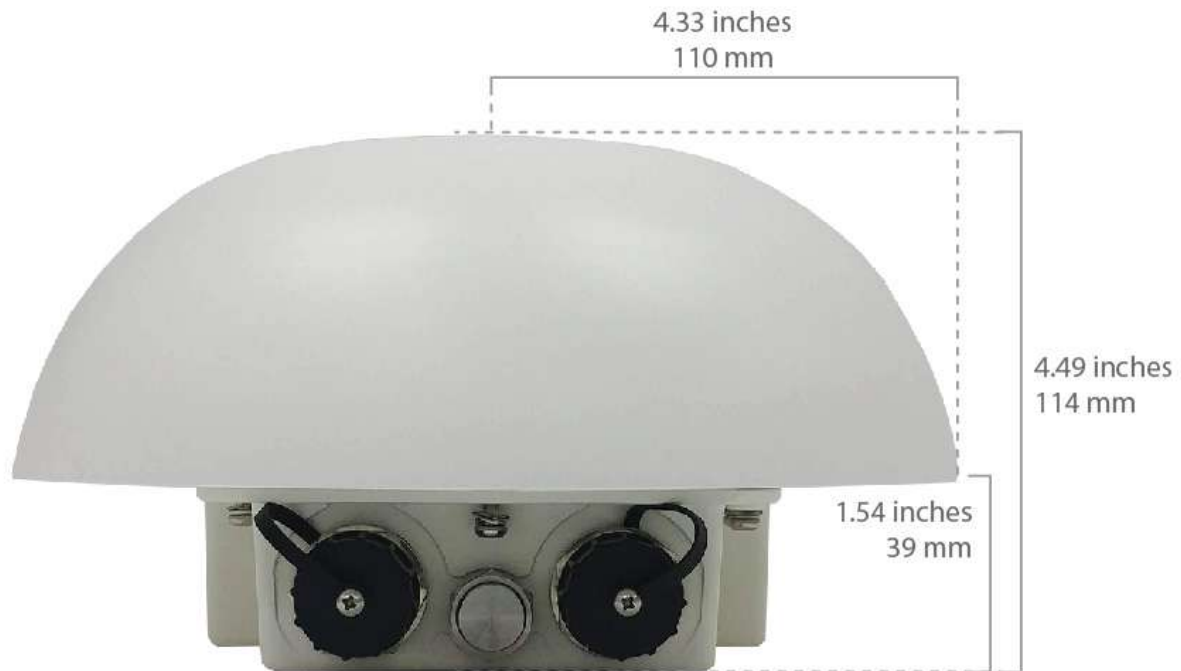


### Mounting Bracket

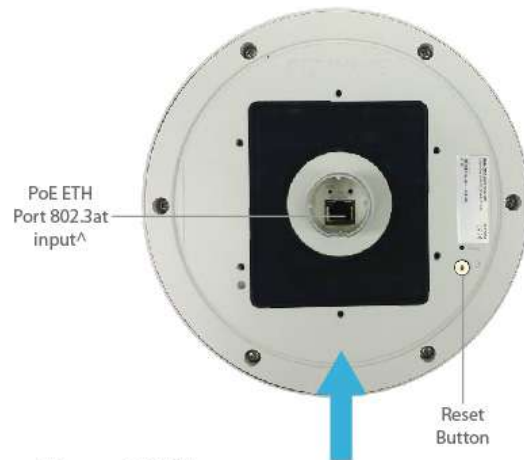


## 2.6 MAX HD Dome Pro

### 2.6.1 Panel Appearance



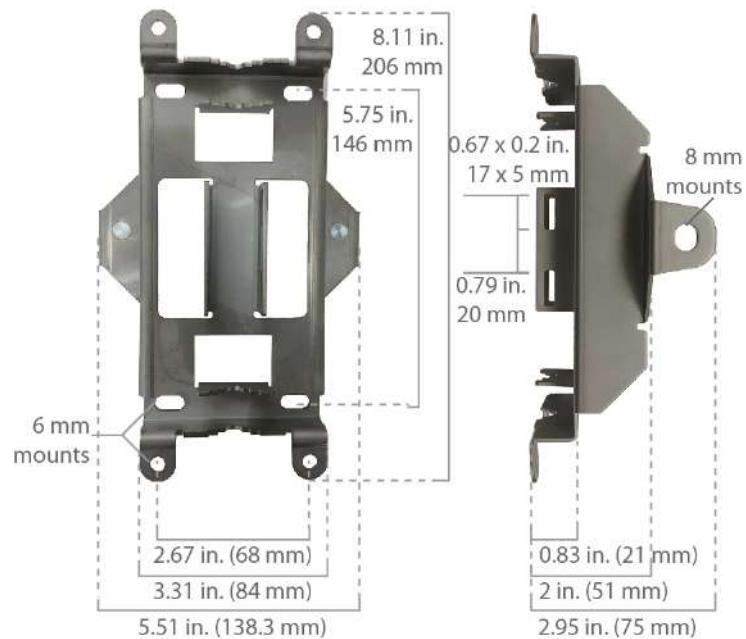
#SIM Injector is available separately  
 ^Ethernet LAN port can be split into two LAN ports  
 using the included splitter (1x LAN 802.3af PoE out, 1x LAN PoE in)



### Ethernet Splitter



### Mounting Bracket



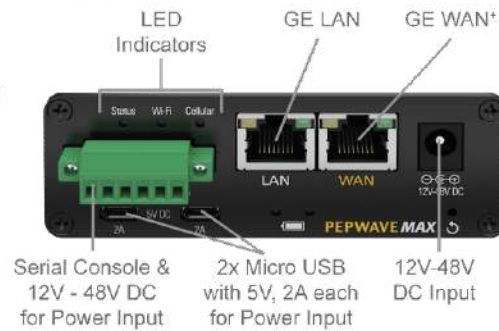
## 2.7 MAX Transit / MAX Transit Duo (CAT-12)

### 2.7.1 Panel Appearance

MAX-TST / MAX-TST-DUO (CAT-12)

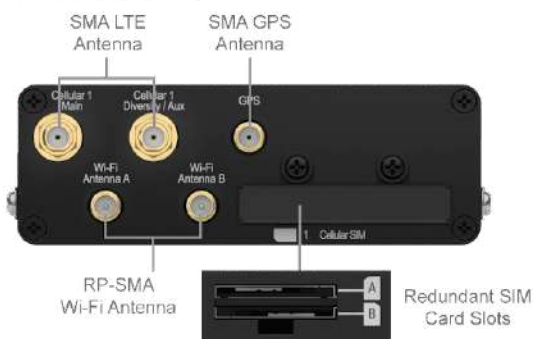


Front

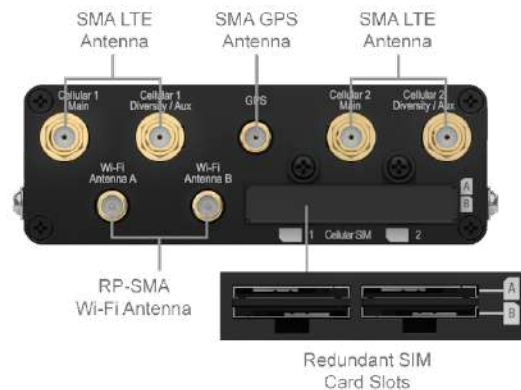


Back

MAX-TST (CAT-12)



MAX-TST-DUO (CAT-12)



### 2.7.2 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               |

| Cellular Indicators                 |                 |                                  |
|-------------------------------------|-----------------|----------------------------------|
| <b>Cellular 1 /<br/>Cellular 2*</b> | OFF             | Disabled or no SIM card inserted |
|                                     | Blinking slowly | Connecting to network(s)         |
|                                     | Green           | Connected to network(s)          |

\* For MAX-TST\_DUO

| Wi-Fi Indicators |          |                      |
|------------------|----------|----------------------|
| <b>Wi-Fi</b>     | OFF      | Wi-Fi AP is turn off |
|                  | Blinking | Wi-Fi AP is turn on  |

| LAN and Ethernet WAN Ports |                      |                                             |
|----------------------------|----------------------|---------------------------------------------|
| Green LED                  | ON                   | 1000 Mbps                                   |
|                            | OFF                  | 10 Mbps / 100 Mbps or port is not connected |
| Orange LED                 | ON                   | Port is connected without traffic           |
|                            | Blinking             | Data is transferring                        |
|                            | OFF                  | Port is not connected                       |
| <b>Port Type</b>           | Auto MDI/MDI-X ports |                                             |

## 2.8 MAX Transit (CAT-18)

### 2.8.1 Panel Appearance



### 2.8.2 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               |

| Cellular Indicators                 |                 |                                  |
|-------------------------------------|-----------------|----------------------------------|
| <b>Cellular 1 /<br/>Cellular 2*</b> | OFF             | Disabled or no SIM card inserted |
|                                     | Blinking slowly | Connecting to network(s)         |
|                                     | Green           | Connected to network(s)          |

\* For MAX-TST\_DUO

| Wi-Fi Indicators |          |                      |
|------------------|----------|----------------------|
| <b>Wi-Fi</b>     | OFF      | Wi-Fi AP is turn off |
|                  | Blinking | Wi-Fi AP is turn on  |

| LAN and Ethernet WAN Ports |                      |                                             |
|----------------------------|----------------------|---------------------------------------------|
| Green LED                  | ON                   | 1000 Mbps                                   |
|                            | OFF                  | 10 Mbps / 100 Mbps or port is not connected |
| Orange LED                 | ON                   | Port is connected without traffic           |
|                            | Blinking             | Data is transferring                        |
|                            | OFF                  | Port is not connected                       |
| <b>Port Type</b>           | Auto MDI/MDI-X ports |                                             |

## 2.9 MAX Transit 5G

### 2.9.1 Panel Appearance



### 2.9.2 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               |

| Cellular Indicators |                 |                                  |
|---------------------|-----------------|----------------------------------|
| Cellular 1 / Status | OFF             | Disabled or no SIM card inserted |
|                     | Blinking slowly | Connecting to network(s)         |
|                     | Green           | Connected to network(s)          |

| Wi-Fi Indicators |          |                      |
|------------------|----------|----------------------|
| Wi-Fi            | OFF      | Wi-Fi AP is turn off |
|                  | Blinking | Wi-Fi AP is turn on  |

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

## 2.10 MAX Transit Mini

### 2.10.1 Panel Appearance



### 2.10.2 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 |
|                     | Blinking slowly | Connecting to network(s)         |
|                     | Green           | Connected to network(s)          |

## 2.11 MAX Transit Pro E

### 2.11.1 Panel Appearance



### 2.11.2 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               |

| LAN 1 Port |          |                                                       |
|------------|----------|-------------------------------------------------------|
| Green LED  | ON       | POE Enabled                                           |
|            | OFF      | POE Disabled                                          |
| Orange LED | Blinking | 10 / 100 / 1000 Mbps and Data is transferring         |
|            | OFF      | No data is being transferred or port is not connected |

|                  |                      |
|------------------|----------------------|
| <b>Port Type</b> | Auto MDI/MDI-X ports |
|------------------|----------------------|

| LAN 2-3 Port and Ethernet WAN Port |                      |                                             |
|------------------------------------|----------------------|---------------------------------------------|
| <b>Green LED</b>                   | ON                   | 1000 Mbps                                   |
|                                    | OFF                  | 10 Mbps / 100 Mbps or port is not connected |
| <b>Orange LED</b>                  | ON                   | Port is connected without traffic           |
|                                    | Blinking             | Data is transferring                        |
|                                    | OFF                  | Port is not connected                       |
| <b>Port Type</b>                   | Auto MDI/MDI-X ports |                                             |

| Cellular Indicators |                 |                                  |
|---------------------|-----------------|----------------------------------|
| <b>Cellular</b>     | OFF             | Disabled or no SIM card inserted |
|                     | Blinking slowly | Connecting to network(s)         |
|                     | Green           | Connected to network(s)          |

## 2.12 MAX Transit Core

### 2.12.1 Panel Appearance



## 2.12.2 LED indicators

Status indicated in the front panel is as follows:

| LED Indicator    |                  |
|------------------|------------------|
| <b>Power LED</b> | OFF – Power off  |
|                  | GREEN – Power on |

| LAN 1 Port        |                                                             |
|-------------------|-------------------------------------------------------------|
| <b>Green LED</b>  | ON – POE Enabled                                            |
|                   | OFF - POE Disabled                                          |
| <b>Orange LED</b> | Blinking – 10 / 100 / 1000 Mbps with activity               |
|                   | OFF – No data is being transferred or port is not connected |
| <b>Port Type</b>  | Auto MDI/MDI-X ports                                        |

| LAN 2-3 Ports, WAN Port |                                                |
|-------------------------|------------------------------------------------|
| <b>Right LED</b>        | GREEN – 1000 Mbps                              |
|                         | OFF – 10 / 100 Mbps or ports are not connected |
| <b>Left LED</b>         | ORANGE – Port is connected without traffic     |
|                         | Blinking – Data is transferring                |
|                         | OFF – Port is not connected                    |
| <b>Port Type</b>        | Auto MDI/MDI-X ports                           |

| Console & USB Ports |                                 |
|---------------------|---------------------------------|
| <b>Console Port</b> | Reserved for engineering use    |
| <b>USB Ports</b>    | For connecting 4G/3G USB modems |

## 2.13 MAX Transit Pro

### 2.13.1 Panel Appearance



### 2.13.2 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               |

| Cellular Indicators         |                 |                                  |
|-----------------------------|-----------------|----------------------------------|
| Cellular 1 /<br>Cellular 2* | OFF             | Disabled or no SIM card inserted |
|                             | Blinking slowly | Connecting to network(s)         |
|                             | Green           | Connected to network(s)          |

| Wi-Fi Indicators |          |                      |
|------------------|----------|----------------------|
| Wi-Fi            | OFF      | Wi-Fi AP is turn off |
|                  | Blinking | Wi-Fi AP is turn on  |

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

## 2.14 MAX BR1 ESN

### 2.14.1 Panel Appearance



### 2.14.2 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 |
|                     | Blinking slowly | Connecting to network(s)         |
|                     | Green           | Connected to network(s)          |

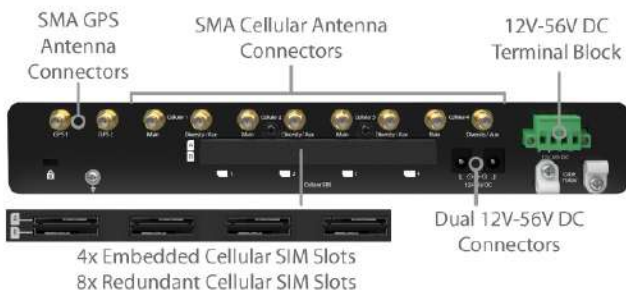
## 2.15 MAX HD2 and HD4 with MediaFast

### 2.15.1 Panel Appearance

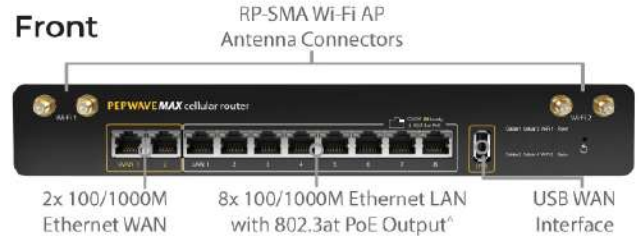


#### Back

##### HD4 with MediaFast



#### Front



##### HD2 with MediaFast



#### Note:

- For proper Wi-Fi performance and operations, please ensure all 4 Wi-Fi antenna connectors (labeled Wi-Fi 1 and Wi-Fi 2) have antennas attached.
- The LED indicators of Wi-Fi 1 & 2 shown as below is referring to the default settings of Wi-Fi Operation mode is WAN + AP under the AP. For more details, please refer to the section 25.4.

### 2.15.2 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 WAN Indicators |                 |                                                  |
|----------------------|-----------------|--------------------------------------------------|
| Wi-Fi 1              | 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 |

| Wi-Fi AP Indicators |     |                      |
|---------------------|-----|----------------------|
| Wi-Fi 2             | OFF | WiFi AP is disabled. |
|                     | ON  | WiFi AP is enabled.  |

| Cellular Indicators    |                 |                                  |
|------------------------|-----------------|----------------------------------|
| Cellular 1 / 2 / 3 / 4 | OFF             | Disabled or no SIM card inserted |
|                        | Blinking slowly | Connecting to network(s)         |
|                        | Green           | Connected to network(s)          |

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

| Ethernet WAN Ports |                      |                                             |
|--------------------|----------------------|---------------------------------------------|
| Green LED          | ON                   | 1000 Mbps                                   |
|                    | OFF                  | 10 Mbps / 100 Mbps or port is not connected |
|                    | ON                   | Port is connected without traffic           |
| Orange LED         | Blinking             | Data is transferring                        |
|                    | OFF                  | Port is not connected                       |
| Port Type          | Auto MDI/MDI-X ports |                                             |

## 2.16 MAX HD4

### 2.16.1 Panel Appearance



**Note:**

- For proper Wi-Fi performance and operations, please ensure all 4 Wi-Fi antenna connectors (labeled Wi-Fi 1 and Wi-Fi 2) have antennas attached.
- The LED indicators of Wi-Fi 1 & 2 shown as below is referring to the default settings of Wi-Fi Operation mode is WAN + AP under the AP. For more details, please refer to the section 25.4

## 2.16.2 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 WAN Indicators |                 |                                                  |
|----------------------|-----------------|--------------------------------------------------|
| Wi-Fi 1              | 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 |

| Wi-Fi AP Indicators |     |                      |
|---------------------|-----|----------------------|
| Wi-Fi 2             | OFF | WiFi AP is disabled. |
|                     | ON  | WiFi AP is enabled.  |

| Cellular Indicators       |                 |                                  |
|---------------------------|-----------------|----------------------------------|
| Cellular 1 / 2 /<br>3 / 4 | OFF             | Disabled or no SIM card inserted |
|                           | Blinking slowly | Connecting to network(s)         |
|                           | Green           | Connected to network(s)          |

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

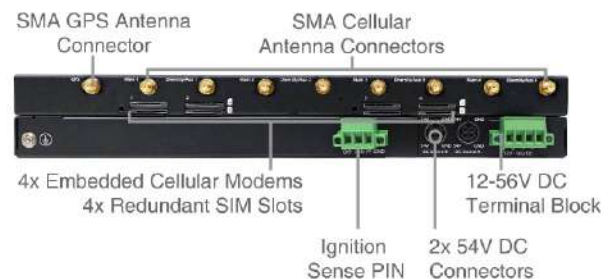
| Ethernet WAN Ports |    |           |
|--------------------|----|-----------|
| Green LED          | ON | 1000 Mbps |

|            |                      |                                             |
|------------|----------------------|---------------------------------------------|
| Orange LED | OFF                  | 10 Mbps / 100 Mbps or port is not connected |
|            | ON                   | Port is connected without traffic           |
|            | Blinking             | Data is transferring                        |
|            | OFF                  | Port is not connected                       |
| Port Type  | Auto MDI/MDI-X ports |                                             |

## 2.17 MAX HD4 MBX (CAT-12)

For certification information, please refer to [Appendix B: Declaration](#)

### 2.17.1 Panel Appearance



\*WAN 3 is configured as a LAN port by default, configuration is changeable on the Web Admin.

\*2x 54V DC input is needed for all 8x LAN ports to have 802.3at PoE. Plugging in 1x 54V DC input will result in 4x LAN ports having 802.3at PoE

#### Note:

- For proper Wi-Fi performance and operations, please ensure all 4 Wi-Fi antenna connectors (labeled Wi-Fi 1 and Wi-Fi 2) have antennas attached.

- The LED indicators of Wi-Fi 1 & 2 shown as below is referring to the default settings of Wi-Fi Operation mode is WAN + AP under the AP. For more details, please refer to the section 25.4

### 2.17.2 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 WAN Indicators |                 |                                         |
|----------------------|-----------------|-----------------------------------------|
| Wi-Fi 1              | OFF             | Disabled Intermittent                   |
|                      | Blinking slowly | Connecting to network(s)                |
|                      | Blinking        | Connected to network(s) with traffic    |
|                      | ON              | Connected to network(s) without traffic |

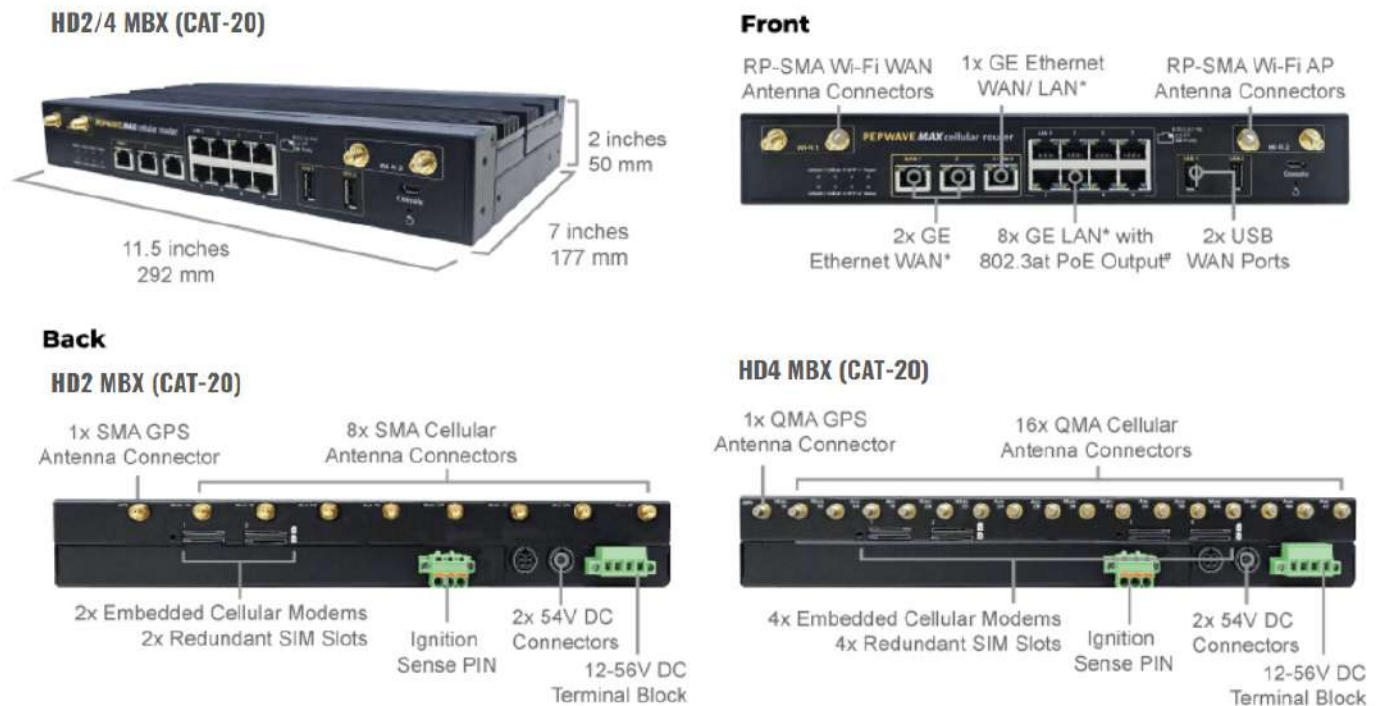
| Wi-Fi AP Indicators |     |                      |
|---------------------|-----|----------------------|
| Wi-Fi 2             | OFF | WiFi AP is disabled. |
|                     | ON  | WiFi AP is enabled.  |

| Cellular Indicators       |                 |                                  |
|---------------------------|-----------------|----------------------------------|
| Cellular 1 / 2 /<br>3 / 4 | OFF             | Disabled or no SIM card inserted |
|                           | Blinking slowly | Connecting to network(s)         |
|                           | Green           | Connected to network(s)          |

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

## 2.18 MAX HD2/4 MBX (CAT-20)

### 2.18.1 Panel Appearance



#### Note:

- For proper Wi-Fi performance and operations, please ensure all 4 Wi-Fi antenna connectors (labeled Wi-Fi 1 and Wi-Fi 2) have antennas attached.
- The LED indicators of Wi-Fi 1 & 2 shown as below is referring to the default settings of Wi-Fi Operation mode is WAN + AP under the AP. For more details, please refer to the section 25.4

### 2.18.2 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 WAN Indicators |                 |                                         |
|----------------------|-----------------|-----------------------------------------|
| <b>Wi-Fi 1</b>       | OFF             | Disabled Intermittent                   |
|                      | Blinking slowly | Connecting to network(s)                |
|                      | Blinking        | Connected to network(s) with traffic    |
|                      | ON              | Connected to network(s) without traffic |

| Wi-Fi AP Indicators |     |                      |
|---------------------|-----|----------------------|
| <b>Wi-Fi 2</b>      | OFF | WiFi AP is disabled. |
|                     | ON  | WiFi AP is enabled.  |

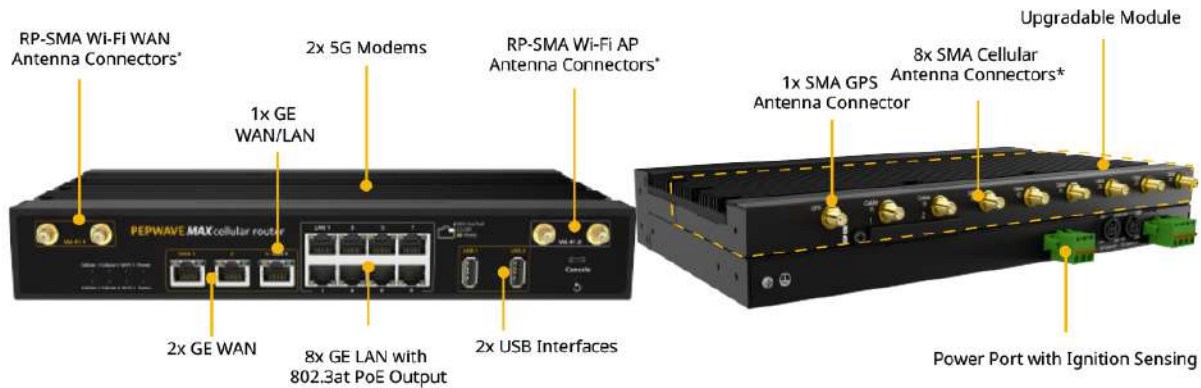
| Cellular Indicators               |                 |                                  |
|-----------------------------------|-----------------|----------------------------------|
| <b>Cellular 1 / 2 /<br/>3 / 4</b> | OFF             | Disabled or no SIM card inserted |
|                                   | Blinking slowly | Connecting to network(s)         |
|                                   | Green           | Connected to network(s)          |

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

## 2.19 MAX HD2/4 MBX (5G)

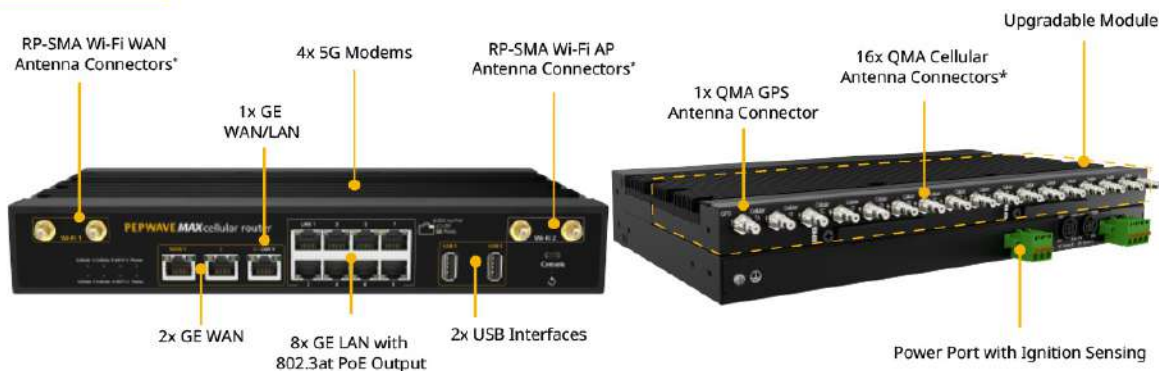
### 2.19.1 Panel Appearance

#### HD2 MBX 5G



\* For the best performance and reliability, all RF connectors must be connected to the same type and performance antennas.

#### HD4 MBX 5G



\* For the best performance and reliability, all RF connectors must be connected to the same type and performance antennas.

#### Note:

- For proper Wi-Fi performance and operations, please ensure all 4 Wi-Fi antenna connectors (labeled Wi-Fi 1 and Wi-Fi 2) have antennas attached.
- The LED indicators of Wi-Fi 1 & 2 shown as below is referring to the default settings of Wi-Fi Operation mode is WAN + AP under the AP. For more details, please refer to the section 25.4

## 2.19.2 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 WAN Indicators |                 |                                         |
|----------------------|-----------------|-----------------------------------------|
| Wi-Fi 1              | OFF             | Disabled Intermittent                   |
|                      | Blinking slowly | Connecting to network(s)                |
|                      | Blinking        | Connected to network(s) with traffic    |
|                      | ON              | Connected to network(s) without traffic |

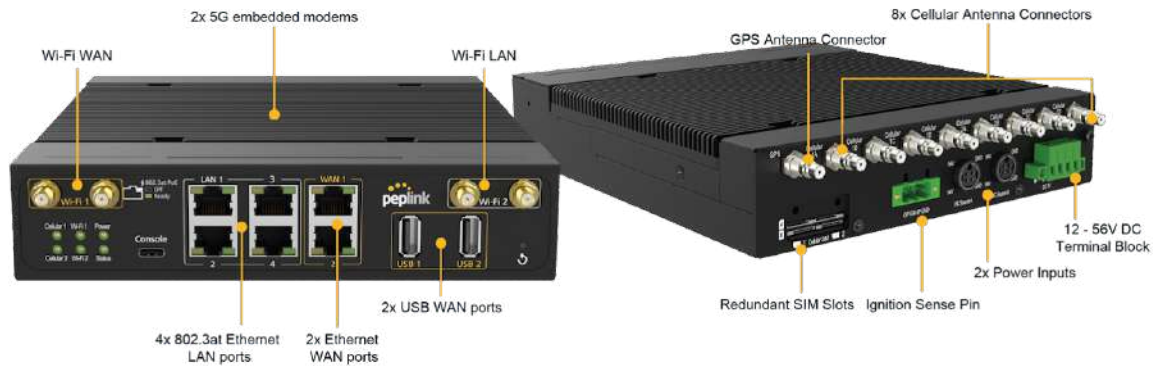
| Wi-Fi AP Indicators |     |                      |
|---------------------|-----|----------------------|
| Wi-Fi 2             | OFF | WiFi AP is disabled. |
|                     | ON  | WiFi AP is enabled.  |

| Cellular Indicators       |                 |                                  |
|---------------------------|-----------------|----------------------------------|
| Cellular 1 / 2 /<br>3 / 4 | OFF             | Disabled or no SIM card inserted |
|                           | Blinking slowly | Connecting to network(s)         |
|                           | Green           | Connected to network(s)          |

| 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                                  |

## 2.20 MAX MBX Mini

### 2.20.1 Panel Appearance



#### Note:

- For proper Wi-Fi performance and operations, please ensure all 4 Wi-Fi antenna connectors (labeled Wi-Fi 1 and Wi-Fi 2) have antennas attached.
- The LED indicators of Wi-Fi 1 & 2 shown as below is referring to the default settings of Wi-Fi Operation mode is WAN + AP under the AP. For more details, please refer to the section 25.4

### 2.20.2 LED Indicators

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

| LED Indicator    |                  |
|------------------|------------------|
| <b>Power LED</b> | OFF – Power off  |
|                  | GREEN – Power on |

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

| WAN Ports        |                                           |
|------------------|-------------------------------------------|
| <b>Right LED</b> | GREEN – 1000 Mbps                         |
|                  | ORANGE – 100 Mbps                         |
|                  | OFF – 10 Mbps                             |
| <b>Left LED</b>  | Solid – Port is connected without traffic |
|                  | Blinking – Data is transferring           |
|                  | OFF – Port is not connected               |
| <b>Port Type</b> | Auto MDI/MDI-X ports                      |

| Wi-Fi WAN Indicators |                 |                                         |
|----------------------|-----------------|-----------------------------------------|
| <b>Wi-Fi 1</b>       | OFF             | Disabled                                |
|                      | Blinking slowly | Intermittent                            |
|                      | Blinking        | Connecting to network(s)                |
|                      | ON              | Connected to network(s) with traffic    |
|                      |                 | Connected to network(s) without traffic |

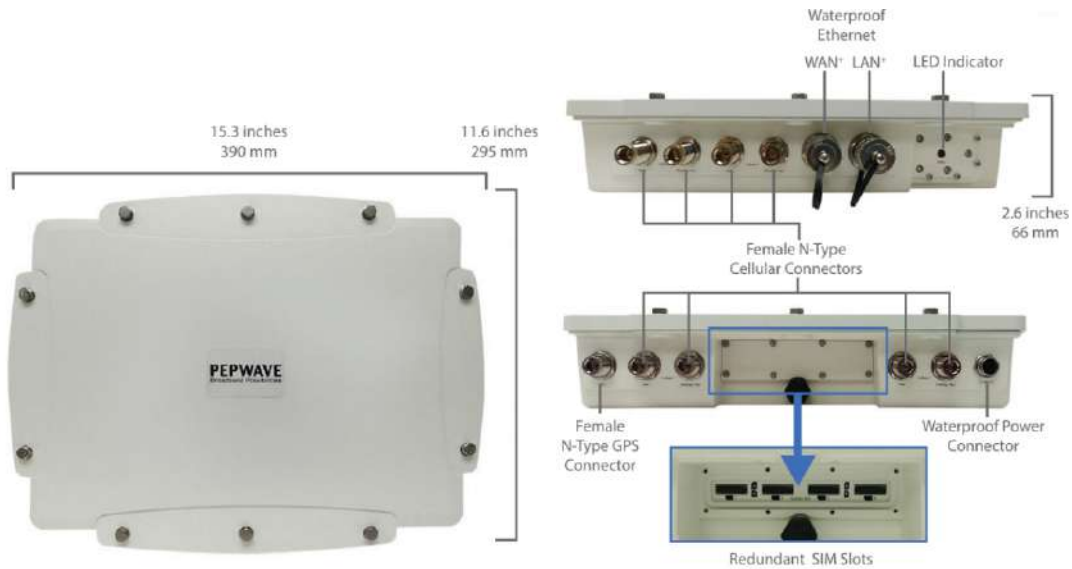
| Wi-Fi AP Indicators |     |                      |
|---------------------|-----|----------------------|
| <b>Wi-Fi 2</b>      | OFF | WiFi AP is disabled. |
|                     | ON  | WiFi AP is enabled.  |

| Cellular Indicators   |                 |                                  |
|-----------------------|-----------------|----------------------------------|
| <b>Cellular 1 / 2</b> | OFF             | Disabled or no SIM card inserted |
|                       | Blinking slowly | Connecting to network(s)         |
|                       | Green           | Connected to network(s)          |

| Console & USB Ports |                                 |
|---------------------|---------------------------------|
| <b>Console Port</b> | Reserved for engineering use    |
| <b>USB Ports</b>    | For connecting 4G/3G USB modems |

## 2.21 MAX HD4 IP67

### 2.21.1 Panel Appearance



### 2.21.2 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               |

## 2.22 MAX BR1 Classic

For certification information, please refer to [Appendix B: Declaration](#)

### 2.22.1 Panel Appearance



### 2.22.2 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               |

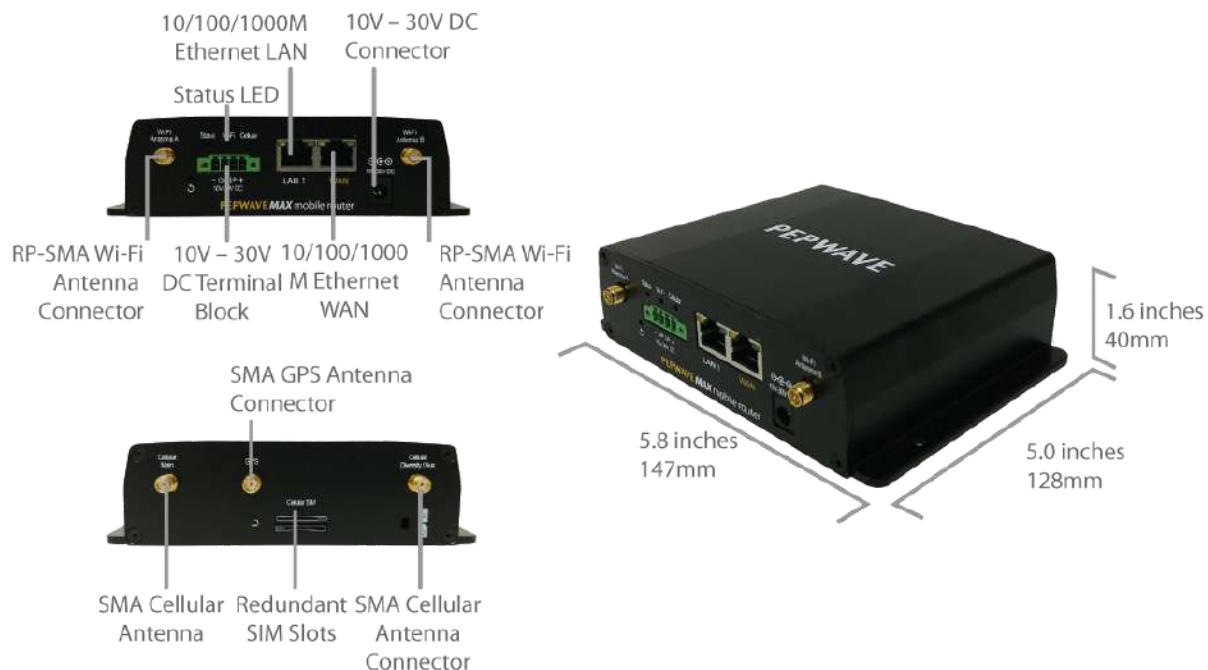
| Wi-Fi Indicators |                 |                                                  |
|------------------|-----------------|--------------------------------------------------|
| Wi-Fi            | OFF             | Disabled intermittent                            |
|                  | Blinking slowly | 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 |
|                     | Blinking slowly | Connecting to network(s)         |
|                     | Green           | Connected to network(s)          |

## 2.23 MAX BR1 MK2

For certification information, please refer to [Appendix B: Declaration](#)

### 2.23.1 Panel Appearance



### 2.23.2 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               |

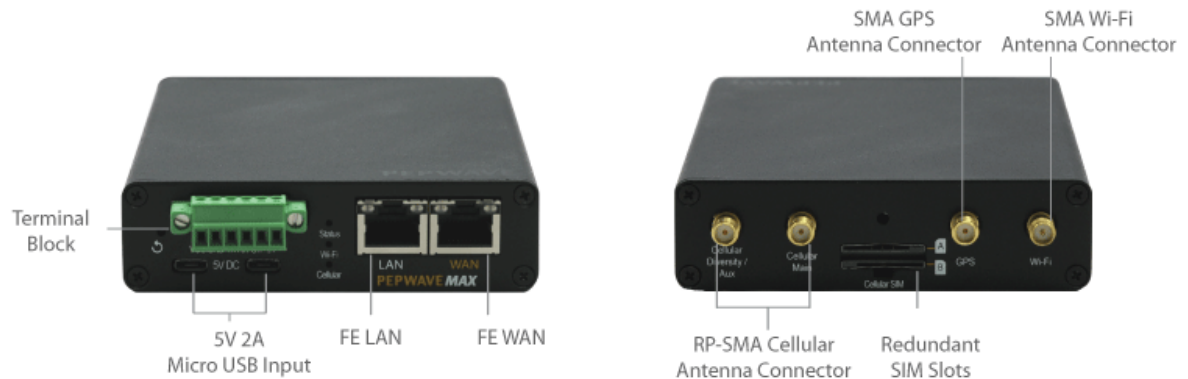
| Wi-Fi Indicators |                 |                                                  |
|------------------|-----------------|--------------------------------------------------|
| Wi-Fi            | OFF             | Disabled intermittent                            |
|                  | Blinking slowly | 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 |
|                     | Blinking slowly | Connecting to network(s)         |
|                     | Green           | Connected to network(s)          |

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

## 2.24 MAX BR1 Slim

### 2.24.1 Panel Appearance



### 2.24.2 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 |
|                     | Blinking slowly | Connecting to network(s)         |
|                     | Green           | 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 |                                   |

## 2.25 MAX BR1 Mini (HW2)

For certification information, please refer to [Appendix B: Declaration](#)

### 2.25.1 Panel Appearance



## 2.25.2 LED Indicators

| 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 |
|                     | Blinking slowly | Connecting to network(s)         |
|                     | Green           | Connected to network(s)          |

| 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 |

## 2.26 MAX BR1 Mini (HW3)

### 2.26.1 Panel Appearance



### 2.26.2 LED Indicators

| 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 |
|                     | Blinking slowly | Connecting to network(s)         |
|                     | Green           | Connected to network(s)          |

| Wi-Fi Indicators |     |                      |
|------------------|-----|----------------------|
| Wi-Fi            | OFF | Wi-Fi AP is turn off |
|                  | ON  | Wi-Fi AP is turn on  |

## 2.27 MAX BR1 Mini Core

### 2.27.1 Panel Appearance



### 2.27.2 LED Indicators

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

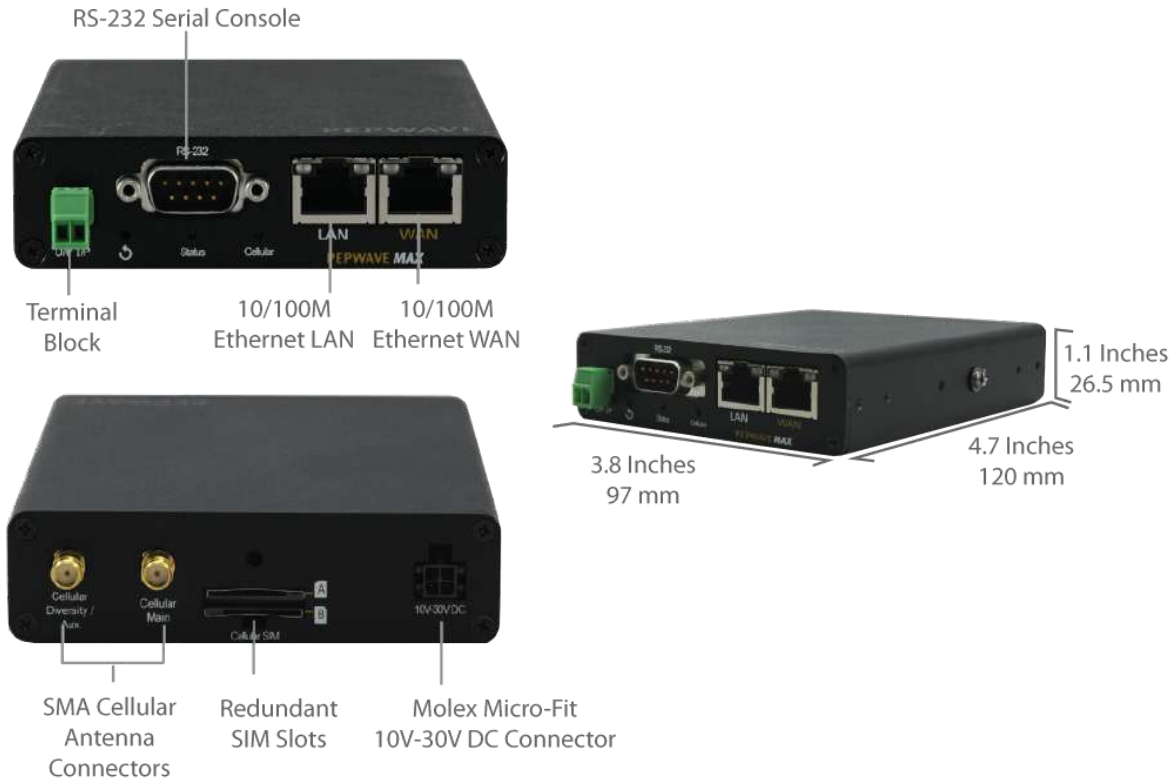
| Status Indicators |              |                     |
|-------------------|--------------|---------------------|
| Status            | OFF          | System initializing |
|                   | Red          | Booting up or busy  |
|                   | Blinking red | Boot up error       |
|    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

| Cellular Indicators |                 |                                  |
|---------------------|-----------------|----------------------------------|
| Cellular            | OFF             | Disabled or no SIM card inserted |
|                     | Blinking slowly | Connecting to network(s)         |
|                     | Green           | Connected to network(s)          |

## 2.28 MAX BR1 M2M

### 2.28.1 Panel Appearance



### 2.28.2 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 |
|                     | Blinking slowly | Connecting to network(s)         |
|                     | Green           | 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 |                                   |

## 2.29 MAX BR1 ENT

### 2.29.1 Panel Appearance



### 2.29.2 LED Indicators

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

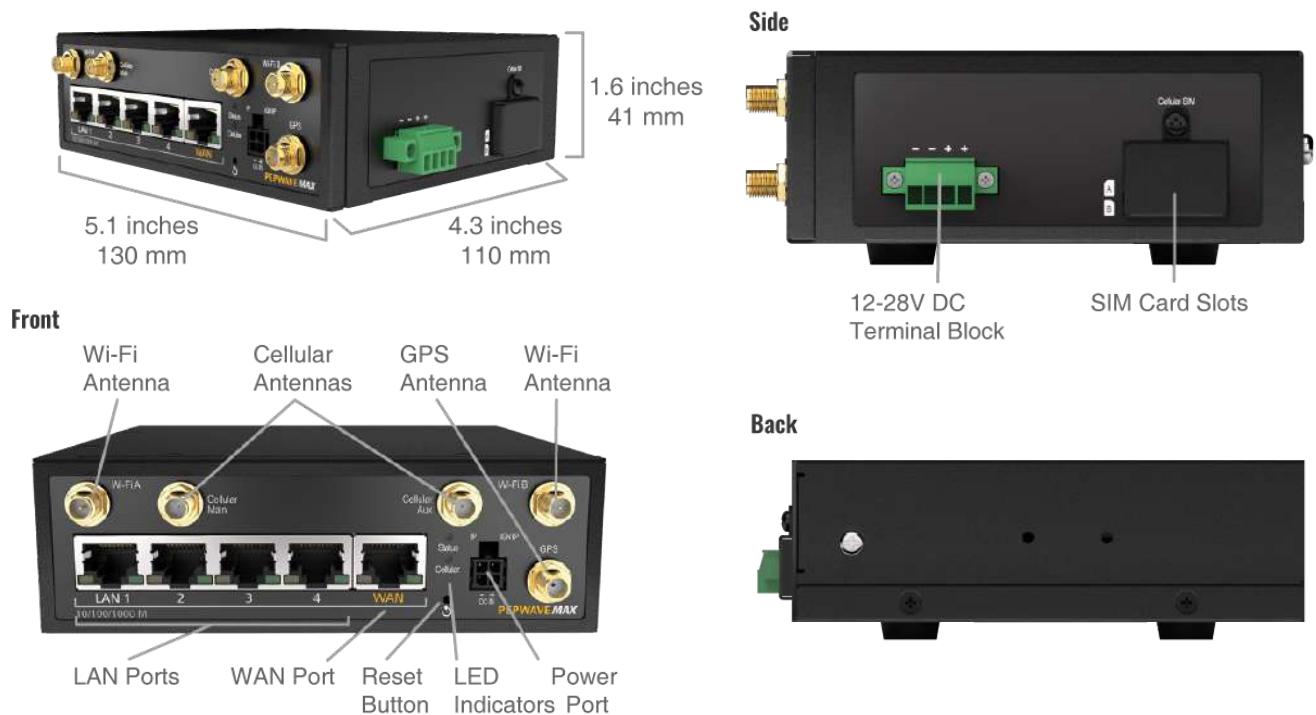
| Status Indicators |              |                     |
|-------------------|--------------|---------------------|
| Status            | OFF          | System initializing |
|                   | Red          | Booting up or busy  |
|                   | Blinking red | Boot up error       |
|    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

| Cellular Indicators |                 |                                  |
|---------------------|-----------------|----------------------------------|
| Cellular            | OFF             | Disabled or no SIM card inserted |
|                     | Blinking slowly | Connecting to network(s)         |
|                     | Green           | Connected to network(s)          |

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

## 2.30 MAX BR1 Pro

### 2.30.1 Panel Appearance



### 2.30.2 LED Indicators

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

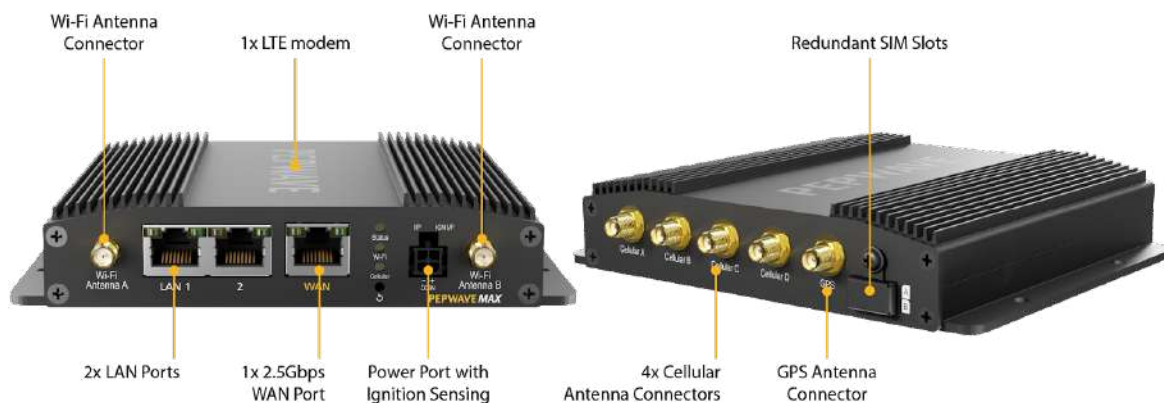
| Status Indicators |              |                     |
|-------------------|--------------|---------------------|
| Status            | OFF          | System initializing |
|                   | Red          | Booting up or busy  |
|                   | Blinking red | Boot up error       |
|    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

| Cellular Indicators |                 |                                  |
|---------------------|-----------------|----------------------------------|
| Cellular            | OFF             | Disabled or no SIM card inserted |
|                     | Blinking Slowly | Connecting to network(s)         |
|                     | Green           | Connected to network(s)          |

| LAN and Ethernet WAN Ports |                      |                                                       |
|----------------------------|----------------------|-------------------------------------------------------|
| Green LED                  | ON                   | 1000 Mbps                                             |
|                            | OFF                  | 10 Mbps / 100 Mbps or port is not connected           |
| Orange LED                 | ON                   | Port is connected without traffic                     |
|                            | Blinking             | Data is transferring                                  |
|                            | OFF                  | No data is being transferred or port is not connected |
| Port Type                  | Auto MDI/MDI-X ports |                                                       |

## 2.31 MAX BR1 Pro (CAT-20)

### 2.31.1 Panel Appearance



### 2.31.2 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 |
|                     | Blinking Slowly | Connecting to network(s)         |
|                     | Green           | Connected to network(s)          |

| Wi-Fi Indicators |     |                                  |
|------------------|-----|----------------------------------|
| Wi-Fi / Wi-Fi AP | OFF | Disabled intermittent            |
|                  | ON  | Connected to wireless network(s) |

| LAN Ports  |                      |                                                       |
|------------|----------------------|-------------------------------------------------------|
| Green LED  | ON                   | 1000 Mbps                                             |
|            | OFF                  | 10 Mbps / 100 Mbps or port is not connected           |
| Orange LED | ON                   | Port is connected without traffic                     |
|            | Blinking             | Data is transferring                                  |
|            | OFF                  | No data is being transferred or port is not connected |
| Port Type  | Auto MDI/MDI-X ports |                                                       |

| WAN Port  |                      |                                                       |
|-----------|----------------------|-------------------------------------------------------|
| Right LED | ON                   | 1000 Mbps                                             |
|           | OFF                  | 10 Mbps / 100 Mbps or port is not connected           |
| Left LED  | ON                   | Port is connected without traffic                     |
|           | Blinking             | Data is transferring                                  |
|           | OFF                  | No data is being transferred or port is not connected |
| Port Type | Auto MDI/MDI-X ports |                                                       |

## 2.32 MAX BR1 Pro 5G

### 2.32.1 Panel Appearance



### 2.32.2 LED Indicators

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

| Status Indicators |              |                     |
|-------------------|--------------|---------------------|
| <b>Status</b>     | OFF          | System initializing |
|                   | Red          | Booting up or busy  |
|                   | Blinking red | Boot up error       |
|                   | Green        | Ready               |

| Cellular Indicators |                 |                                  |
|---------------------|-----------------|----------------------------------|
| <b>Cellular</b>     | OFF             | Disabled or no SIM card inserted |
|                     | Blinking Slowly | Connecting to network(s)         |
|                     | Green           | Connected to network(s)          |

| Wi-Fi Indicators        |     |                                  |
|-------------------------|-----|----------------------------------|
| <b>Wi-Fi / Wi-Fi AP</b> | OFF | Disabled intermittent            |
|                         | ON  | Connected to wireless network(s) |

| LAN Ports        |     |                                             |
|------------------|-----|---------------------------------------------|
| <b>Green LED</b> | ON  | 1000 Mbps                                   |
|                  | OFF | 10 Mbps / 100 Mbps or port is not connected |

|                   |                      |                                                       |
|-------------------|----------------------|-------------------------------------------------------|
| <b>Orange LED</b> | ON                   | Port is connected without traffic                     |
|                   | Blinking             | Data is transferring                                  |
|                   | OFF                  | No data is being transferred or port is not connected |
| <b>Port Type</b>  | Auto MDI/MDI-X ports |                                                       |

| WAN Port         |                      |                                                       |
|------------------|----------------------|-------------------------------------------------------|
| <b>Right LED</b> | ON                   | 1000 Mbps                                             |
|                  | OFF                  | 10 Mbps / 100 Mbps or port is not connected           |
| <b>Left LED</b>  | ON                   | Port is connected without traffic                     |
|                  | Blinking             | Data is transferring                                  |
|                  | OFF                  | No data is being transferred or port is not connected |
| <b>Port Type</b> | Auto MDI/MDI-X ports |                                                       |

## 2.33 MAX BR2 Pro

### 2.33.1 Panel Appearance



### 2.33.2 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 |
|                     | Blinking Slowly | Connecting to network(s)         |
|                     | Green           | Connected to network(s)          |

| Wi-Fi Indicators |     |                                  |
|------------------|-----|----------------------------------|
| Wi-Fi / Wi-Fi AP | OFF | Disabled intermittent            |
|                  | ON  | Connected to wireless network(s) |

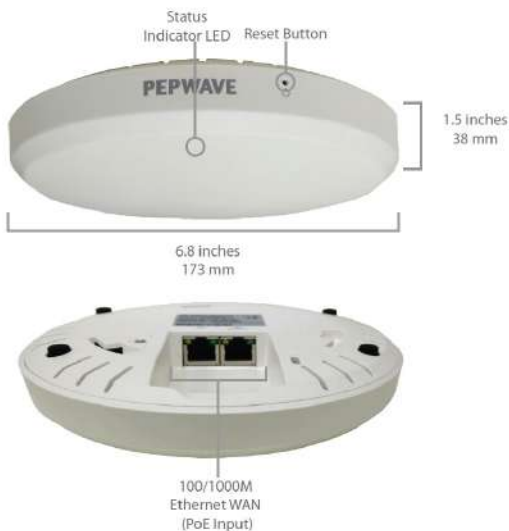
| LAN Ports  |     |                                             |
|------------|-----|---------------------------------------------|
| Green LED  | ON  | 1000 Mbps                                   |
|            | OFF | 10 Mbps / 100 Mbps or port is not connected |
| Orange LED | ON  | Port is connected without traffic           |

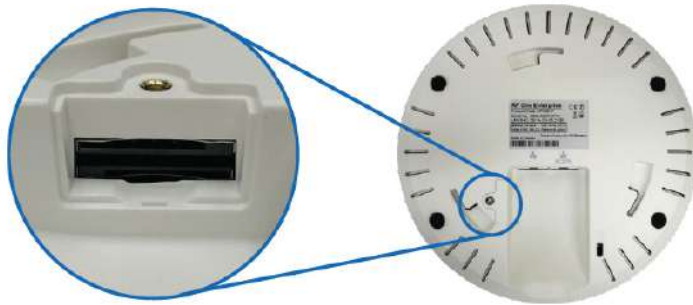
|           |                      |                                                       |
|-----------|----------------------|-------------------------------------------------------|
| Port Type | Blinking             | Data is transferring                                  |
|           | OFF                  | No data is being transferred or port is not connected |
|           | Auto MDI/MDI-X ports |                                                       |

| WAN Port  |                      |                                                       |
|-----------|----------------------|-------------------------------------------------------|
| Right LED | ON                   | 1000 Mbps                                             |
|           | OFF                  | 10 Mbps / 100 Mbps or port is not connected           |
| Left LED  | ON                   | Port is connected without traffic                     |
|           | Blinking             | Data is transferring                                  |
|           | OFF                  | No data is being transferred or port is not connected |
| Port Type | Auto MDI/MDI-X ports |                                                       |

## 2.34 MAX Hotspot

### 2.34.1 Panel Appearance





Screw Open the Panel to  
Reveal Redundant SIM Slots

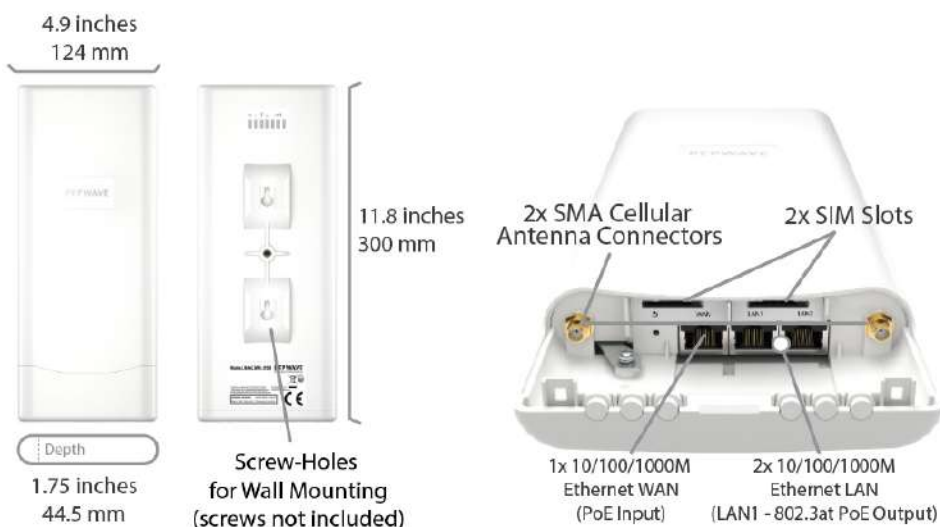
### 2.34.2 LED Indicators

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

| LAN and Ethernet WAN Ports |                      |                                                       |
|----------------------------|----------------------|-------------------------------------------------------|
| Green LED                  | ON                   | 1000 Mbps                                             |
|                            | OFF                  | 10 Mbps / 100 Mbps or port is not connected           |
| Orange LED                 | ON                   | Port is connected without traffic                     |
|                            | Blinking             | Data is transferring                                  |
|                            | OFF                  | No data is being transferred or port is not connected |
| Port Type                  | Auto MDI/MDI-X ports |                                                       |

## 2.35 MAX BR1 IP55

### 2.35.1 Panel Appearance

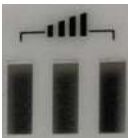


## 2.35.2 LED Indicators

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               |

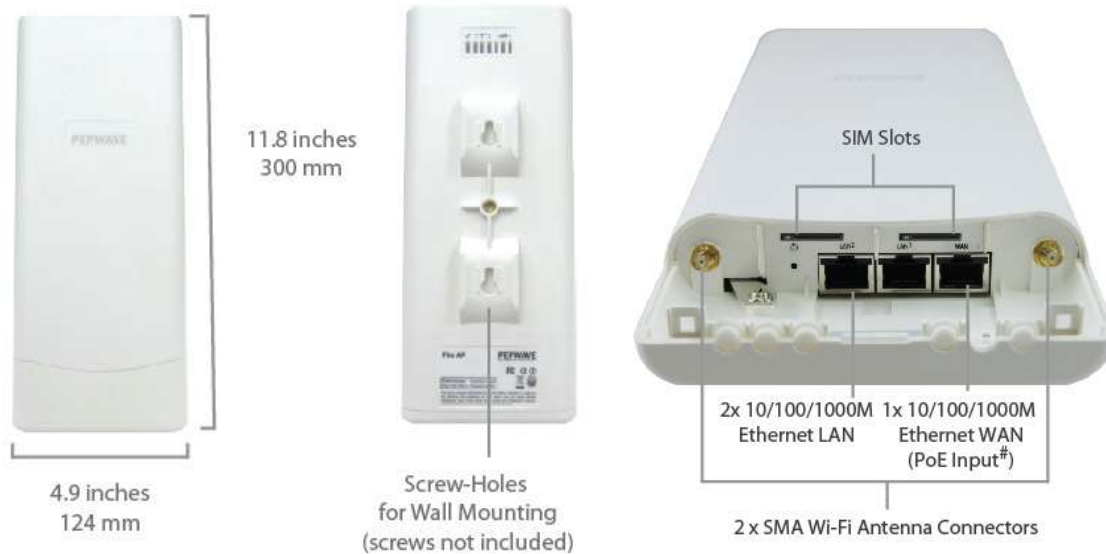
| LAN and Ethernet WAN Ports |                      |                                             |
|----------------------------|----------------------|---------------------------------------------|
| Green LED                  | ON                   | 1000Mbps                                    |
|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

| Cellular Indicators                                                                                    |          |                                                |
|--------------------------------------------------------------------------------------------------------|----------|------------------------------------------------|
| <b>Cellular</b><br> | OFF      | Disabled or no SIM card inserted               |
|                                                                                                        | Blinking | Connecting to network(s) in Standby Mode       |
|                                                                                                        | Green    | Connected to network(s) in Priority 1 (Active) |

| LAN and WAN Indicators                                                              |       |                                              |
|-------------------------------------------------------------------------------------|-------|----------------------------------------------|
|  | Green | Powered-on device connected to Ethernet port |
|                                                                                     | OFF   | No device connected to Ethernet port         |

## 2.36 MAX BR2 IP55

### 2.36.1 Panel Appearance



### 2.36.2 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               |

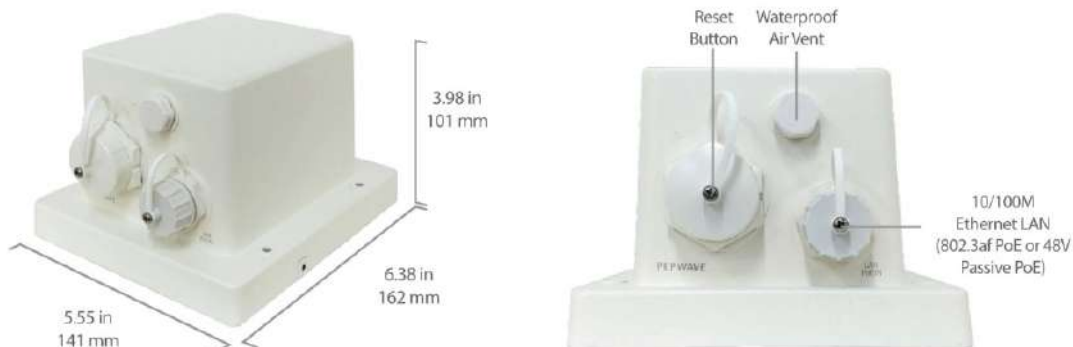
| Wi-Fi Indicators |                 |                                                  |
|------------------|-----------------|--------------------------------------------------|
| Wi-Fi            | OFF             | Disabled Intermittent                            |
|                  | Blinking slowly | 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                   | 1000Mbps                                    |
|                            | OFF                  | 10 Mbps / 100 Mbps or port is not connected |
| Orange LED                 | ON                   | Port is connected without traffic           |
|                            | Blinking             | Data is transferring                        |
|                            | OFF                  | Port is not connected                       |
| Port Type                  | Auto MDI/MDI-X ports |                                             |

## 2.37 MAX BR1 IP67

### 2.37.1 Panel Appearance



## 2.38 MAX On-The-Go

### 2.38.1 Panel Appearance



### 2.38.2 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     |

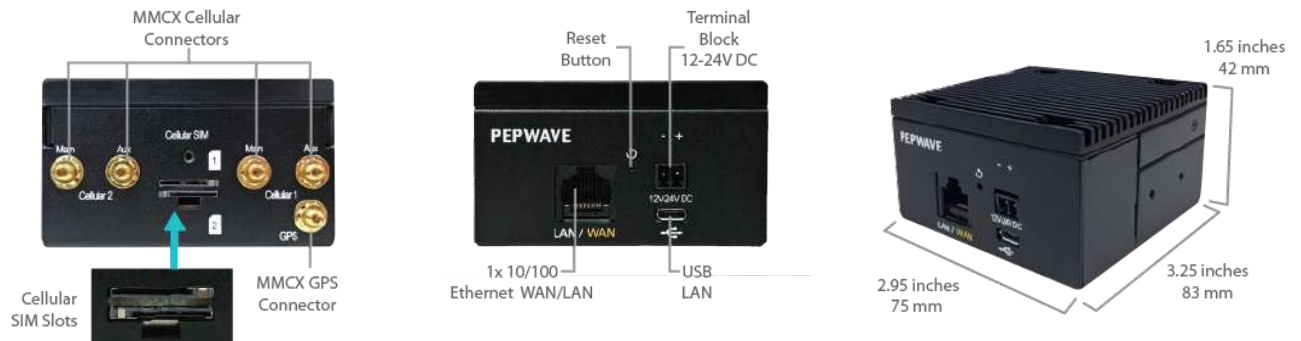
| Wi-Fi Indicators |       |                      |
|------------------|-------|----------------------|
| Wi-Fi            | OFF   | Disconnected from AP |
|                  | Green | Connected to AP      |

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

| LAN and Ethernet WAN Ports |                      |                                   |
|----------------------------|----------------------|-----------------------------------|
| Green LED                  | ON                   | 100 Mbps                          |
|                            | OFF                  | 10 Mbps                           |
| Orange LED                 | ON                   | Port is connected without traffic |
|                            | Blinking             | Data is transferring              |
| Port Type                  | Auto MDI/MDI-X ports |                                   |

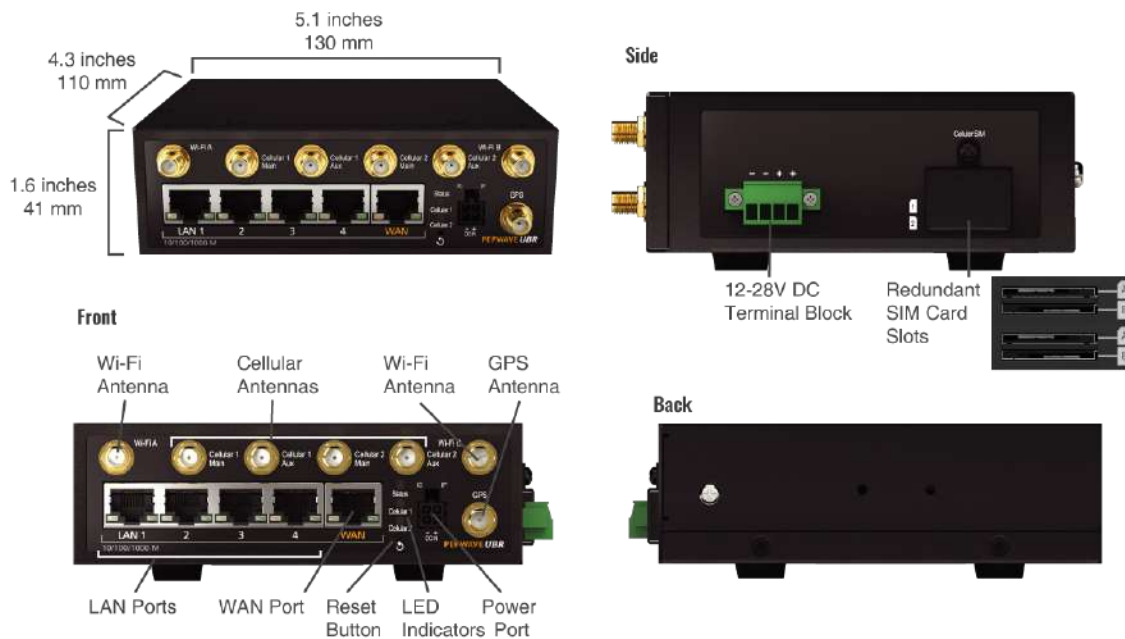
## 2.39 SpeedFusion Engine

### 2.39.1 Panel Appearance



## 2.40 UBR LTE

### 2.40.1 Panel Appearance



## 2.40.2 LED Indicators

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

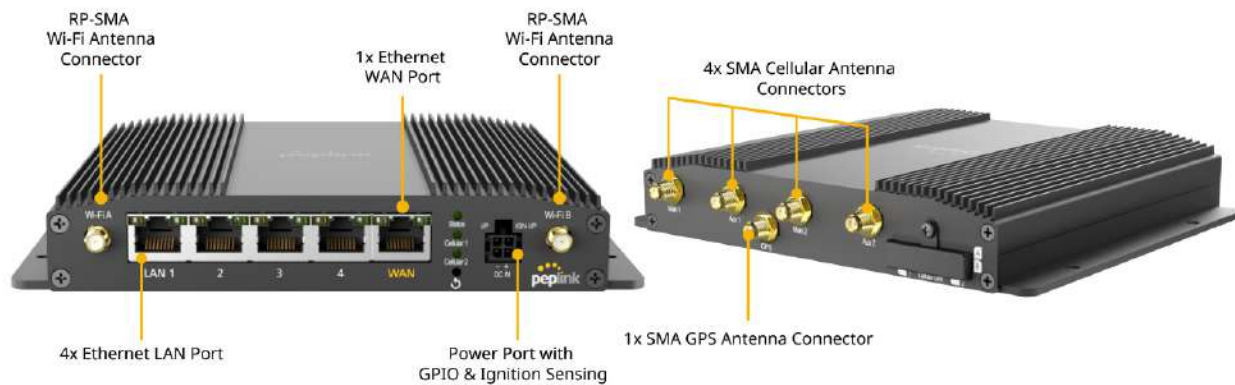
| Status Indicators |              |                     |
|-------------------|--------------|---------------------|
| Status            | OFF          | System initializing |
|                   | Red          | Booting up or busy  |
|                   | Blinking Red | Boot up error       |
|    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

| LAN and Ethernet WAN Ports |                      |                                                       |
|----------------------------|----------------------|-------------------------------------------------------|
| Green LED                  | ON                   | 1000 Mbps                                             |
|                            | OFF                  | 10 Mbps / 100 Mbps or port is not connected           |
| Orange LED                 | ON                   | Port is connected without traffic                     |
|                            | Blinking             | Data is transferring                                  |
|                            | OFF                  | No data is being transferred or port is not connected |
| Port Type                  | Auto MDI/MDI-X ports |                                                       |

| Cellular Indicators |                 |                                  |
|---------------------|-----------------|----------------------------------|
| Cellular            | OFF             | Disabled or no SIM card inserted |
|                     | Blinking Slowly | Connecting to network(s)         |
|                     | Green           | Connected to network(s)          |

## 2.41 UBR Plus

### 2.41.1 Panel Appearance



### 2.41.2 LED Indicators

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

| Status Indicators |              |                     |
|-------------------|--------------|---------------------|
| <b>Status</b>     | OFF          | System initializing |
|                   | Red          | Boot up or busy     |
|                   | Blinking Red | Boot up error       |
|                   | Green        | Ready               |

| LAN and Ethernet WAN Ports |                      |                                                       |
|----------------------------|----------------------|-------------------------------------------------------|
| <b>Green LED</b>           | ON                   | 1000 Mbps                                             |
|                            | OFF                  | 10 Mbps / 100 Mbps or port is not connected           |
| <b>Orange LED</b>          | ON                   | Port is connected without traffic                     |
|                            | Blinking             | Data is transferring                                  |
|                            | OFF                  | No data is being transferred or port is not connected |
| <b>Port Type</b>           | Auto MDI/MDI-X ports |                                                       |

| Cellular Indicators |     |                                  |
|---------------------|-----|----------------------------------|
| <b>Cellular</b>     | OFF | Disabled or no SIM card inserted |

|                 |                          |
|-----------------|--------------------------|
| Blinking Slowly | Connecting to network(s) |
| Green           | Connected to network(s)  |

## 2.42 PDX

### 2.42.1 Panel Appearance



### 2.42.2 LED Indicators

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

| Status Indicators |              |                      |
|-------------------|--------------|----------------------|
| Status            | OFF          | No battery installed |
|                   | Red          | Charging             |
|                   | Blinking red | Low Battery          |
|                   | Green        | Full Charged         |

## 3 Advanced Feature Summary

### 3.1 Drop-in Mode and LAN Bypass: Transparent Deployment



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

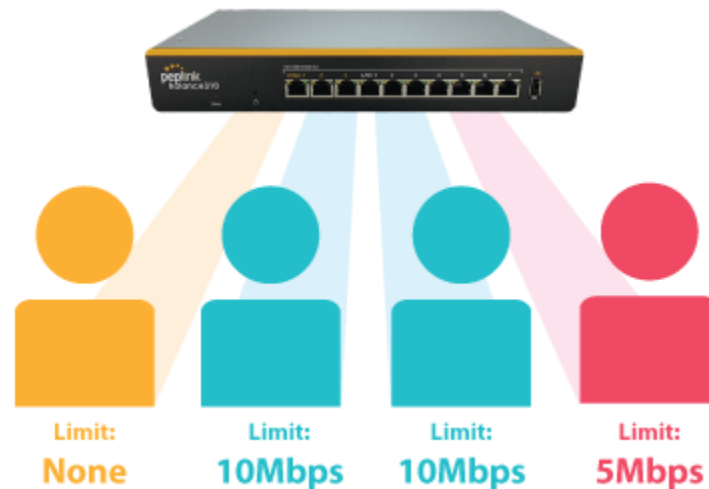
*Note: Drop-in mode is compatible for All MAX models except MAX BR1 IP67*

### 3.2 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.

### 3.3 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.

### 3.4 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)*

### 3.5 USB Modem and Android Tethering



For increased WAN diversity, plug in a USB LTE modem as a 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)*

### 3.6 Built-In Remote User VPN Support



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

[Click here for the full instructions on setting up L2TP with IPsec.](#)

[Click here for the full instructions on setting up OpenVPN connections](#)

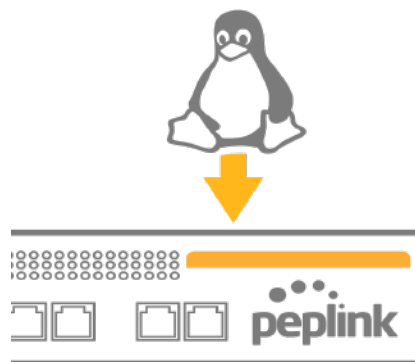
### 3.7 SIM-card USSD support



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](#)

### 3.8 KVM Virtualization



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

[Click here for the full instructions on how to set up KVM](#)

[Click here for the full instructions on how to set up KVM with USB Storage](#)

### 3.9 DPI Engine

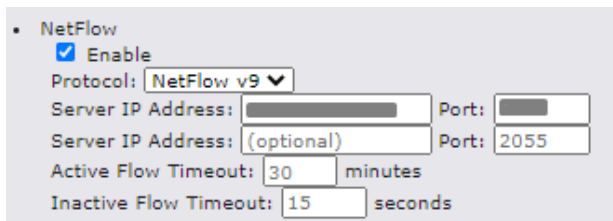
The DPI report written in the updated KB article will show further information on InControl2 through breaking down application categories into subcategories.

<https://forum.peplink.com/t/updated-ic2-deep-packet-inspection-dpi-reports-and-everything-you-need-to-know-about-it/29658>

### 3.10 NetFlow

NetFlow protocol is used to track network traffic. Tracking information from NetFlow can be sent to the NetFlow collector, which analyzes data and generates reports for review.

*Note: To enable this feature, go to <https://<Device's IP>/cgi-bin/MANGA/support.cgi>*



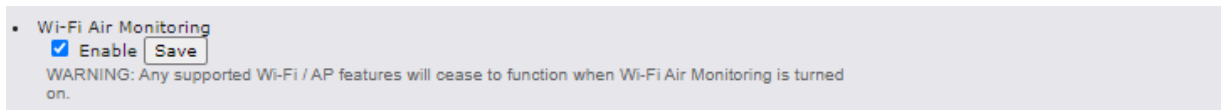
NetFlow configuration interface showing the following options:

- ☒ Enable
- Protocol: **NetFlow v9** (dropdown menu)
- Server IP Address: [text input] Port: [text input]
- Server IP Address: (optional) [text input] Port: 2055
- Active Flow Timeout: 30 minutes
- Inactive Flow Timeout: 15 seconds

### 3.11 Wi-Fi Air Monitoring

Pepwave routers support Wi-Fi “Air Monitoring Mode” which is used to troubleshoot remotely and proactively monitor Wi-Fi and WAN performance. The report can be viewed under InControl 2 > Reports > AirProbe Reports after enabling Wi-Fi Air Monitoring.

*Note: To enable this feature, go to <https://<Device's IP>/cgi-bin/MANGA/support.cgi>*



Wi-Fi Air Monitoring configuration interface showing the following options:

- ☒ Enable **Save** (button)
- WARNING: Any supported Wi-Fi / AP features will cease to function when Wi-Fi Air Monitoring is turned on.

### 3.12 SP Default Configuration

The SP Default Configuration feature written in the updated KB article allows for the provisioning of custom made settings (a.k.a. InControl2 configuration) via the Ethernet LAN port and is ideal for those wanting to do a bulk deployment of many Peplink devices.

*Note: If you would like to use this feature, please contact your purchase point (Eg. VAD).*

### 3.13 Peplink Relay

Cloud Service Providers often restrict access to certain applications. With SFC Relay, you can route traffic before going out to the Internet, allowing access to previously restricted applications experienced with the public SpeedFusion Cloud nodes. Available as an add-on for your home router or as an upgradable license to your Peplink router, SFC Relay is sure to impress you and any peers you give access to.

<https://forum.peplink.com/t/configure-speedfusion-cloud-relay-server-and-client/6215ca9b017e48e0f3ff2479/>

### 3.14 DNS over HTTPS (DoH)

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

### 3.15 Peplink InTouch

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

To watch a demonstration and read the FAQ, visit

<https://www.peplink.com/enterprise-solutions/intouch/>

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

## 4 Installation

The following section details connecting Pepwave routers to your network.

### 4.1 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 5G/4G LTE 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 11 or above, Mozilla Firefox 24 or above, Apple Safari 7 or above, and Google Chrome 18 or above.

### 4.2 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.

## 4.3 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**.

## 5 Mounting the Unit

### 5.1 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.

### 5.2 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.



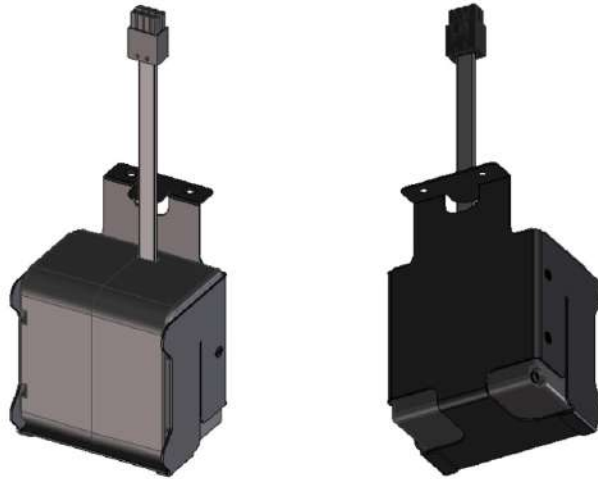
### 5.3 IP67 Installation Guide

Installation instructions for IP67 devices can be found here:

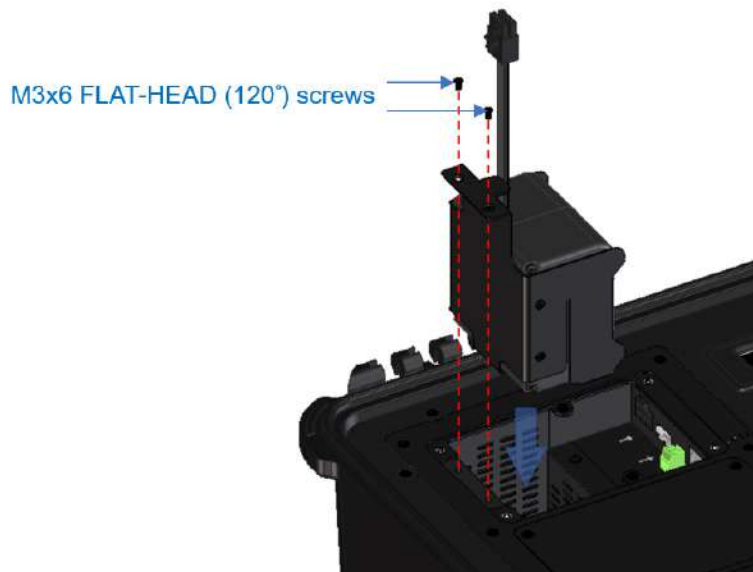
[http://download.peplink.com/manual/IP67\\_Installation\\_Guide.pdf](http://download.peplink.com/manual/IP67_Installation_Guide.pdf)

## 5.4 PDX Accessory Kit Installation Guide

### 5.4.1 Battery Set appearance



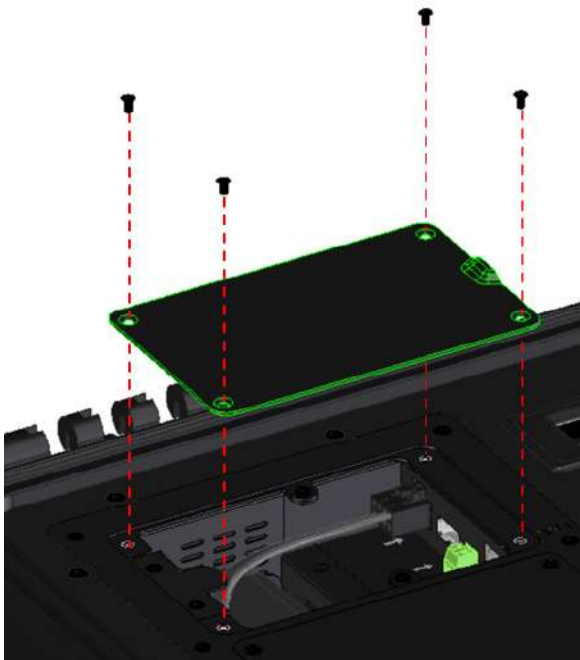
- Step 1: Lock the battery set in the slot with 2 pcs M3 screws.



- Step 2: Plug power cable into the socket



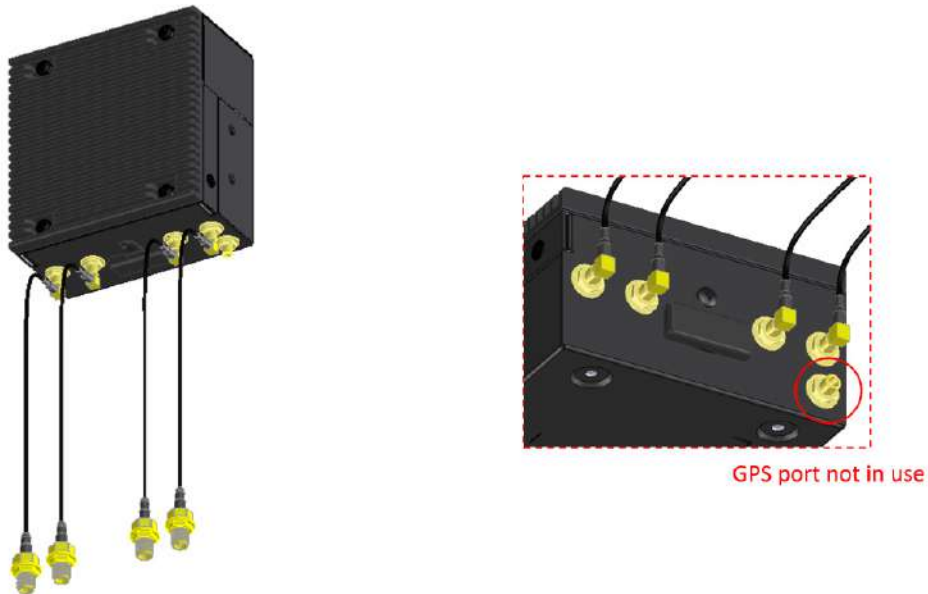
- STEP 3: Lock the slot cover with 4 pcs M3 screws.



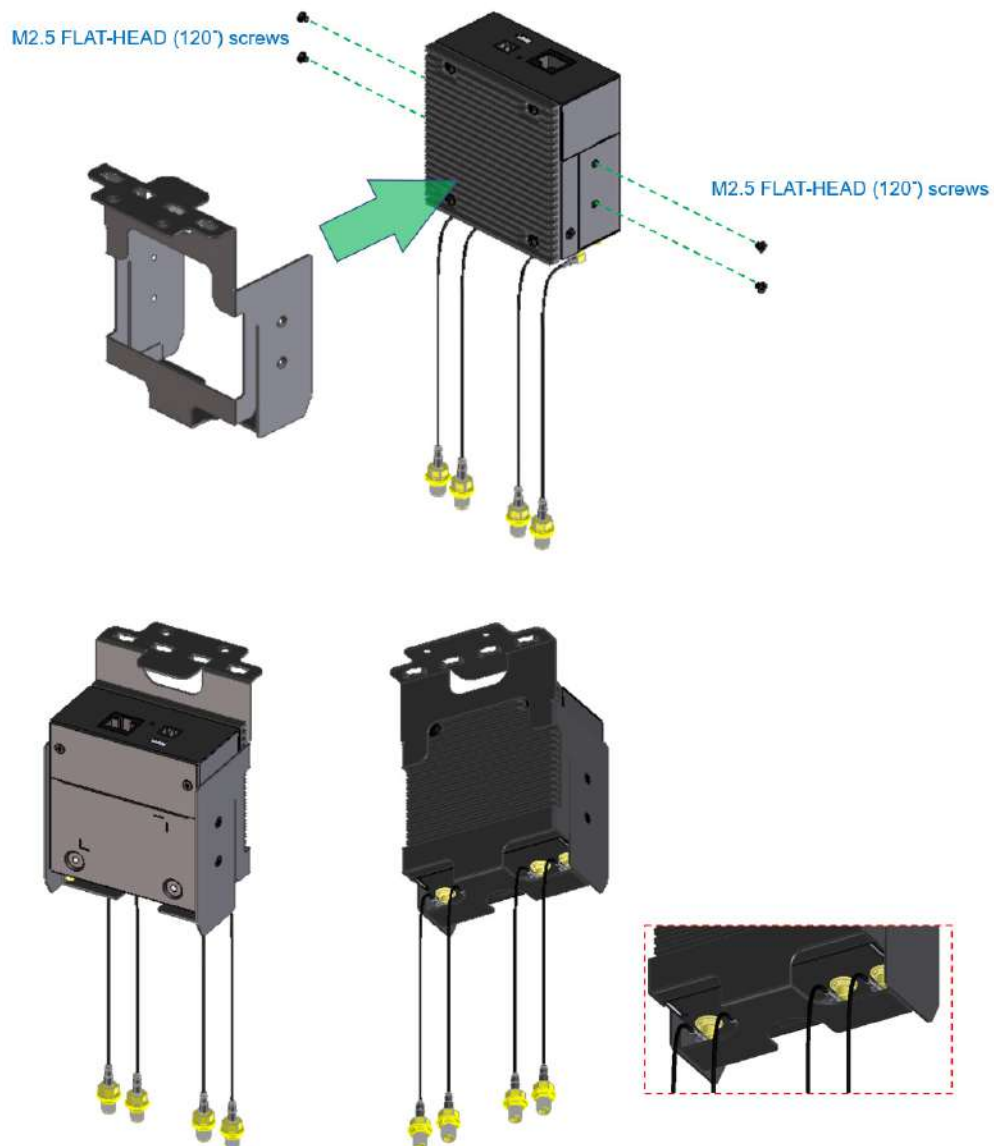
## 5.4.2 SFE-DUO Set appearance



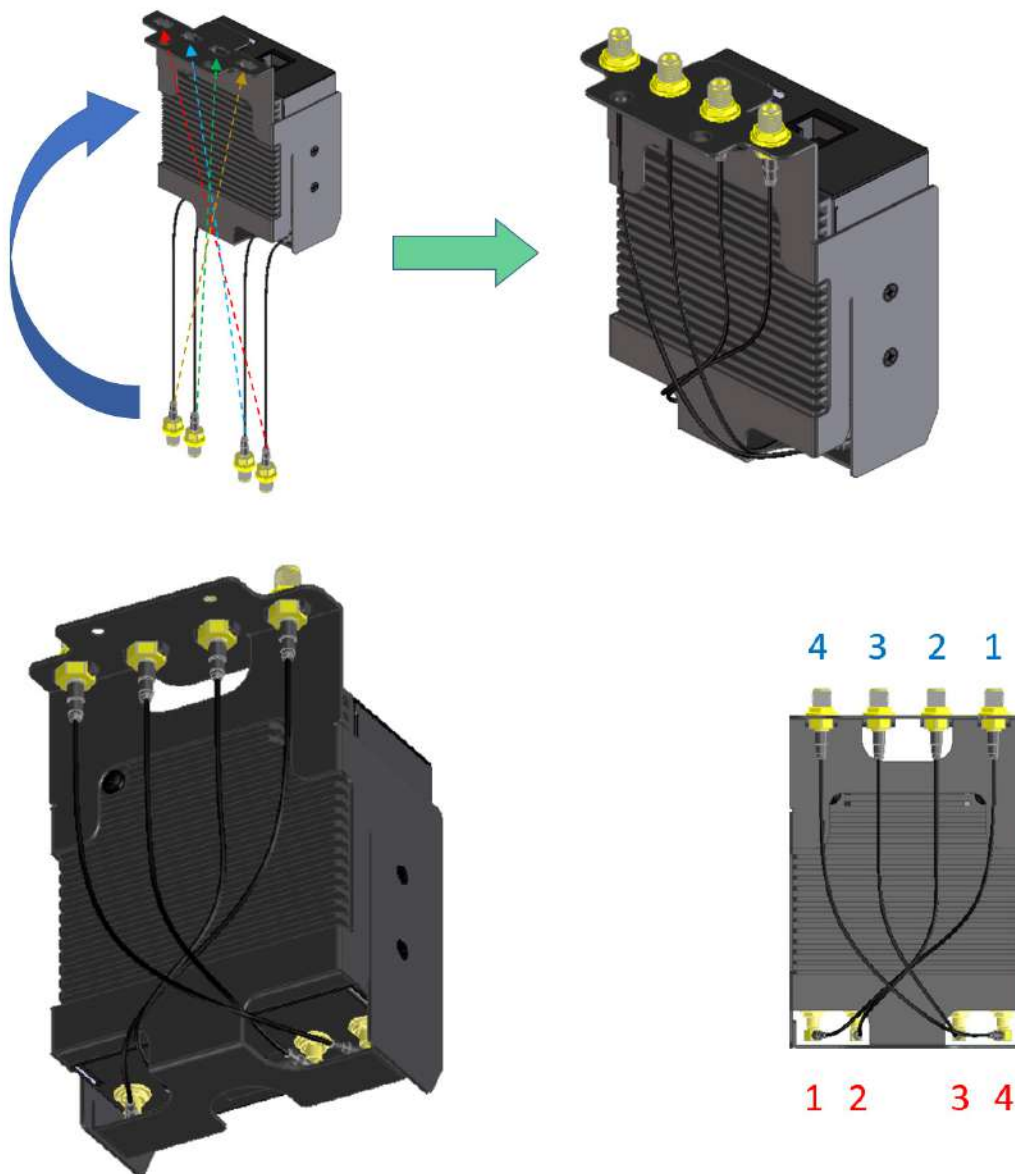
- STEP 1: Assemble SMA cables to the device



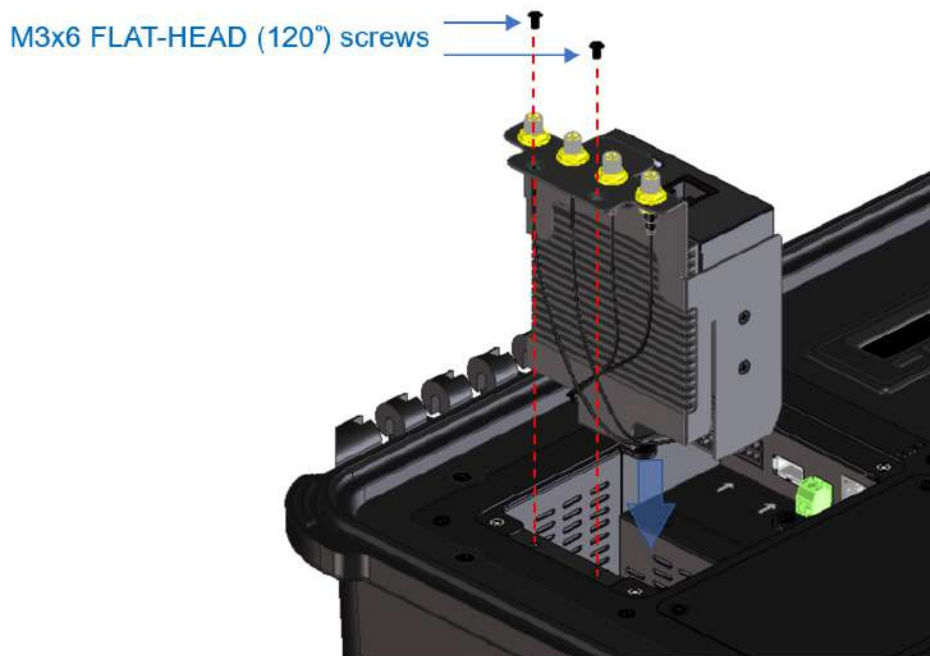
- STEP 2: Assemble bracket to the device



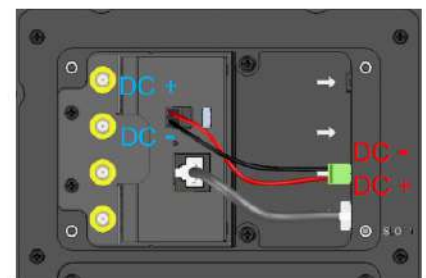
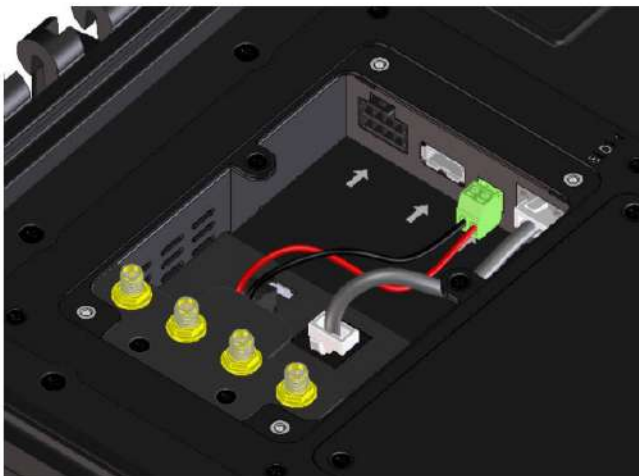
- STEP 3: Assemble SMA connectors to the bracket



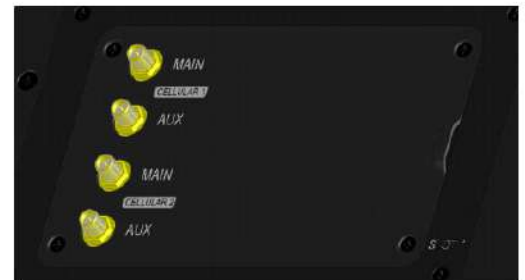
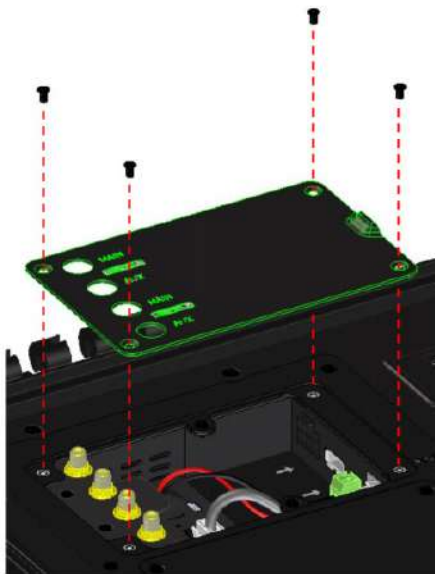
- STEP 4: Lock the SFE-Duo set in the slot with 2 pcs M3 screws.



- STEP 5: Connect DC power & ETH port



- STEP 6: Lock the slot cover with 4 pcs M3 screws.



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## 6 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

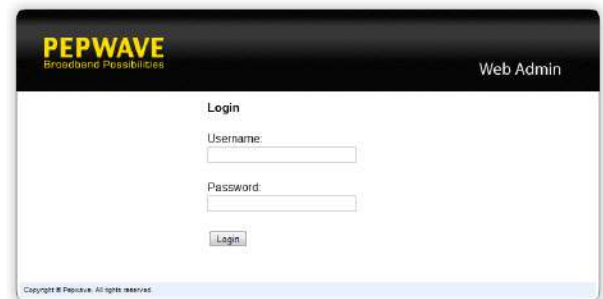
(This is the default LAN IP address for Pepwave routers.)

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

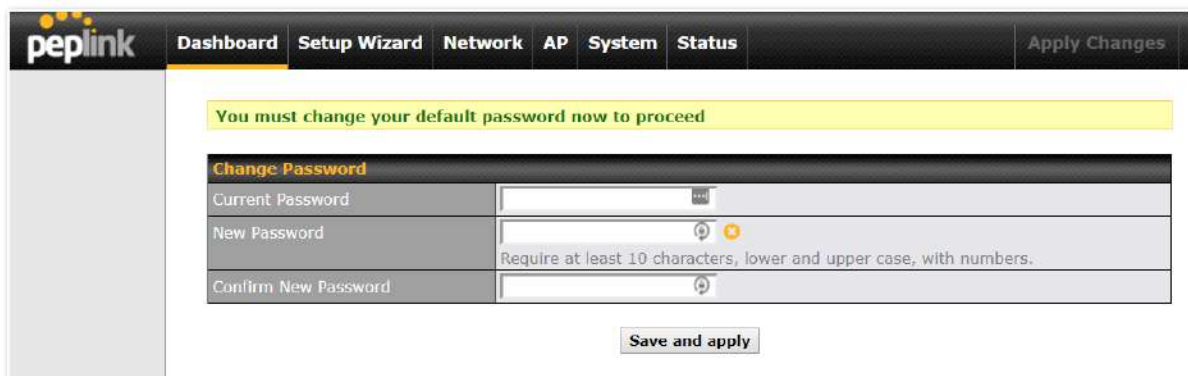
**Username:** admin

**Password:** admin

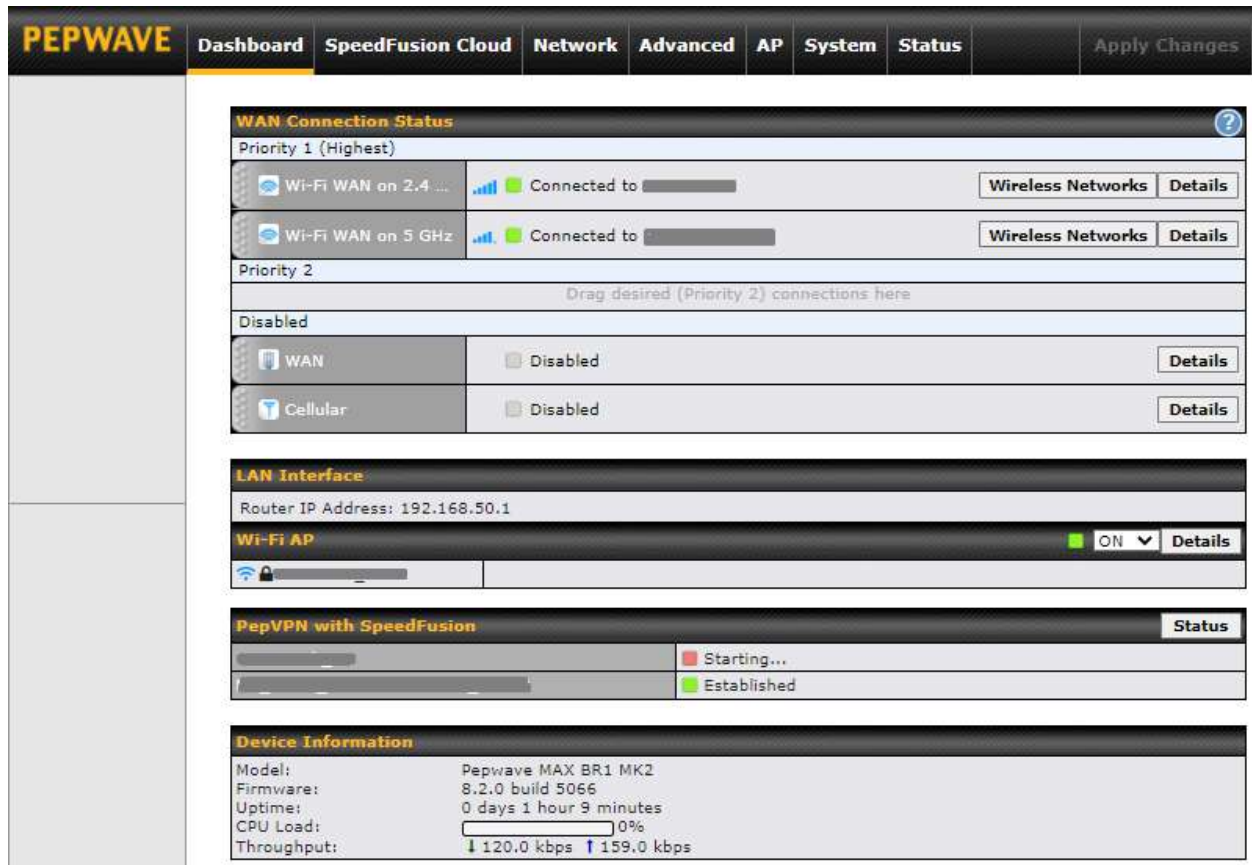
(This is the default username and password for Pepwave routers).



- You must change the default password on the first successful login.
- Password requirements are: A minimum of 10 lower AND upper case characters, including at least 1 number.
- When HTTP is selected, the URL will be redirected to HTTPS by default.



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



The screenshot shows the Peplink PEPWAVE web admin interface. The top navigation bar includes tabs for Dashboard, SpeedFusion Cloud, Network, Advanced, AP, System, and Status, along with an 'Apply Changes' button. The main content area is divided into several sections:

- WAN Connection Status:** This section shows two priority levels. Priority 1 (Highest) includes 'Wi-Fi WAN on 2.4 GHz' and 'Wi-Fi WAN on 5 GHz', both connected to a network. Priority 2 is currently empty, with a prompt to 'Drag desired (Priority 2) connections here'. Below this, 'WAN' and 'Cellular' connections are shown as disabled.
- LAN Interface:** Displays the 'Router IP Address: 192.168.50.1'.
- Wi-Fi AP:** Shows the status as 'ON' with a dropdown menu and a 'Details' button.
- PepVPN with SpeedFusion:** Displays two VPN connections. The first is in a 'Starting...' state, and the second is 'Established'.
- Device Information:** Provides details about the device: Model (Pepwave MAX BR1 MK2), Firmware (8.2.0 build 5066), Uptime (0 days 1 hour 9 minutes), CPU Load (0%), and Throughput (120.0 kbps down, 159.0 kbps 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**.

**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.

## 7 SpeedFusion Connect

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



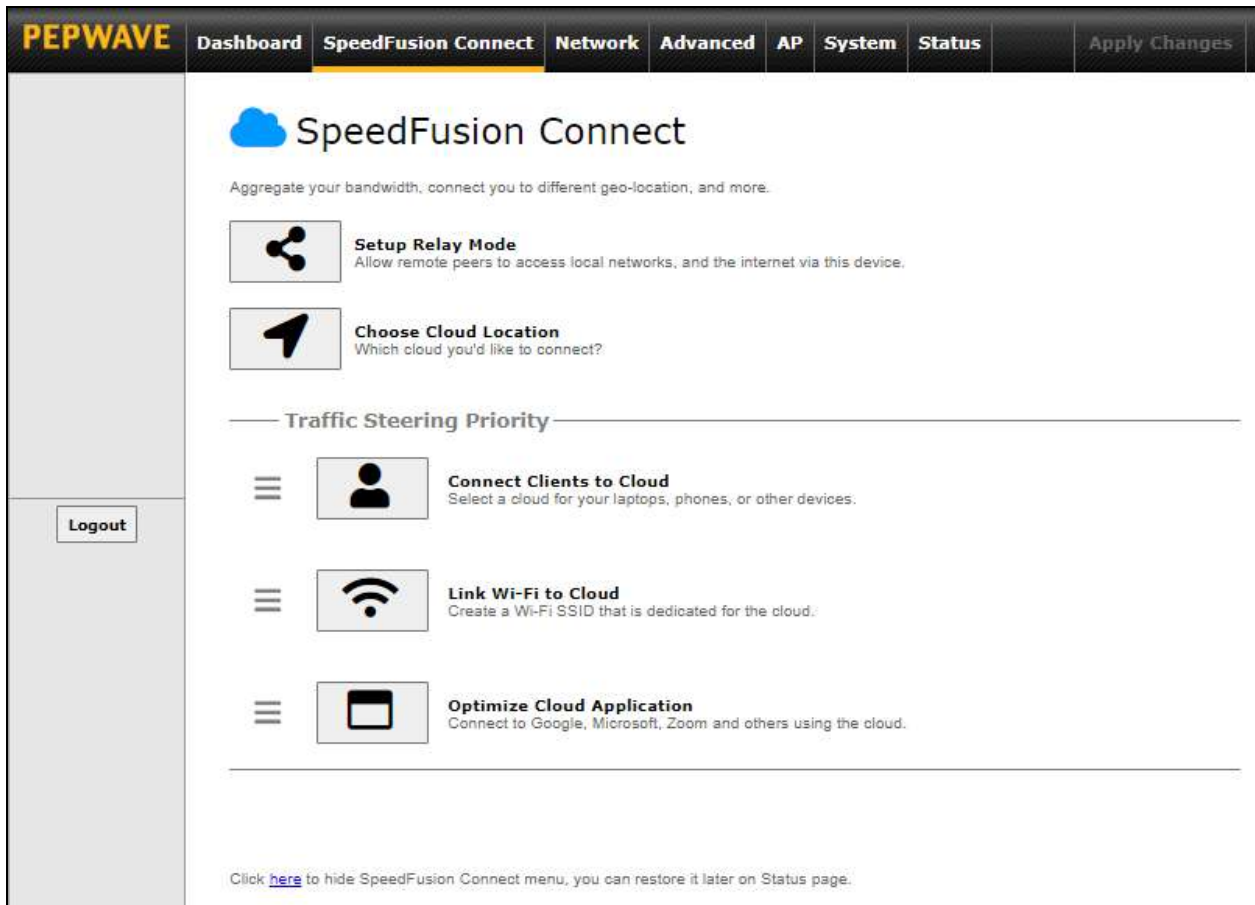
\*SpeedFusion Connect is supported in firmware version 8.1.0 and above. SpeedFusion Connect is a subscription basis. SpeedFusion Connect license can be purchased at <https://estore.peplink.com/> > **SpeedFusion Service** > **SpeedFusion Connect**.

### 7.1 Activate SpeedFusion Connect Service

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

## 7.2 Enable SpeedFusion Connect

Access the Web Admin of the device you want to create as the Peplink Relay Server, navigating to the **"SpeedFusion Connect"** tab.



The screenshot shows the Peplink PEPWAVE Web Admin interface. The top navigation bar includes tabs for Dashboard, SpeedFusion Connect (selected), Network, Advanced, AP, System, Status, and an Apply Changes button. The main content area is titled "SpeedFusion Connect" and includes a sub-header "Aggregate your bandwidth, connect you to different geo-location, and more." Below this, there are four main sections: "Setup Relay Mode" (with a share icon), "Choose Cloud Location" (with a location pin icon), "Traffic Steering Priority" (with a horizontal line), and "Connect Clients to Cloud" (with a person icon). The "Connect Clients to Cloud" section has a sub-header "Select a cloud for your laptops, phones, or other devices." Below this, there are two more sections: "Link Wi-Fi to Cloud" (with a Wi-Fi icon) and "Optimize Cloud Application" (with a laptop icon). The "Optimize Cloud Application" section has a sub-header "Connect to Google, Microsoft, Zoom and others using the cloud." At the bottom, there is a link to "Click [here](#) to hide SpeedFusion Connect menu, you can restore it later on Status page."

To set up a Peplink Relay Server, select **"Setup Home Sharing"** > Choose the **Cloud Location** you wish to connect to > Click on the **green tick button** to confirm the change.



The screenshot shows the Peplink PEPWAVE Web Admin interface, specifically the "SpeedFusion Connect > Setup Relay Mode" page. The page title is "SpeedFusion Connect > Setup Relay Mode" and the sub-header is "Allow remote peers to access local networks, and the internet via this device." Below this, there is a table with two columns: "SpeedFusion Connect" and "Cloud Location". The "Cloud Location" column has a dropdown menu showing "Singapore (SIN)" and a green tick button (confirm) next to it. A red arrow points to the green tick button.

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

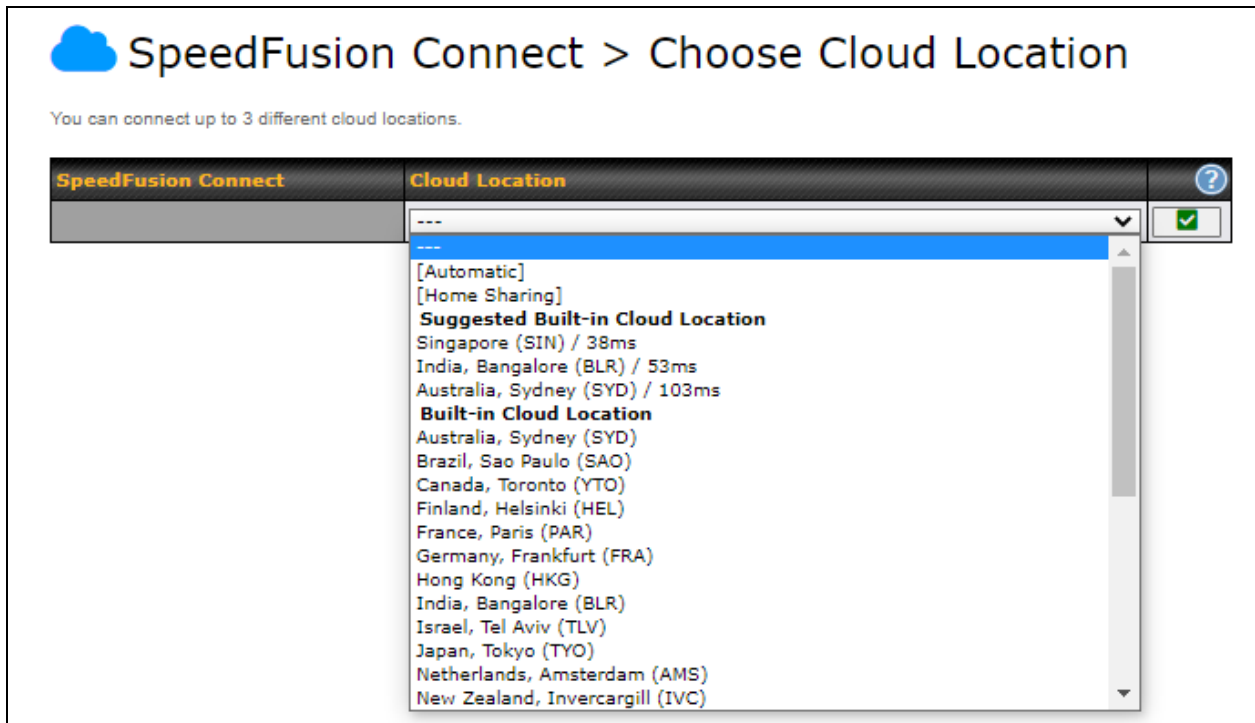


**SpeedFusion Connect > Setup Relay Mode**

Allow remote peers to access local networks, and the internet via this device.

| SpeedFusion Connect | Cloud Location                                                |
|---------------------|---------------------------------------------------------------|
| SFH-SHARE-SIN       | Relay Sharing Code: <input type="text"/> <a href="#">COPY</a> |

To connect to SpeedFusion Cloud, you can select a **Cloud Location** of your choice, or simply **Automatic**, then the device will establish a connection to the nearest cloud server.



**SpeedFusion Connect > Choose Cloud Location**

You can connect up to 3 different cloud locations.

| SpeedFusion Connect | Cloud Location                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |
|---------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
|                     | <div> <div>---</div> <div> [Automatic]<br/> [Home Sharing]<br/> <b>Suggested Built-in Cloud Location</b><br/> Singapore (SIN) / 38ms<br/> India, Bangalore (BLR) / 53ms<br/> Australia, Sydney (SYD) / 103ms<br/> <b>Built-in Cloud Location</b><br/> Australia, Sydney (SYD)<br/> Brazil, Sao Paulo (SAO)<br/> Canada, Toronto (YTO)<br/> Finland, Helsinki (HEL)<br/> France, Paris (PAR)<br/> Germany, Frankfurt (FRA)<br/> Hong Kong (HKG)<br/> India, Bangalore (BLR)<br/> Israel, Tel Aviv (TLV)<br/> Japan, Tokyo (TYO)<br/> Netherlands, Amsterdam (AMS)<br/> New Zealand, Invercargill (IVC) </div> </div> |

Choose **Automatic** > Click on the green tick button to confirm the change.



**SpeedFusion Connect > Choose Cloud Location**

You can connect up to 3 different cloud locations.

| SpeedFusion Connect | Cloud Location                                                               |
|---------------------|------------------------------------------------------------------------------|
|                     | <div> <div>---</div> <div> <input checked="" type="checkbox"/> </div> </div> |

Or you may select **Home Sharing** and use your **Relay Sharing Code** to create a profile if you have set up a Peplink Relay Client on another device.



## SpeedFusion Connect > Choose Cloud Location

You can connect up to 3 different cloud locations.

| SpeedFusion Connect | Cloud Location           |                                     |
|---------------------|--------------------------|-------------------------------------|
|                     | [Home Sharing]           |                                     |
|                     | e.g. 1234-5678-1234-5678 | <input checked="" type="checkbox"/> |

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

**PEPWAVE**
Dashboard
SpeedFusion Connect
Network
Advanced
AP
System
Status
Apply Changes

Saved! Changes will be effective after clicking the 'Apply Changes' button.



## SpeedFusion Connect > Choose Cloud Location

| SpeedFusion Connect | Cloud Location |                                     |
|---------------------|----------------|-------------------------------------|
| SFC                 | [Automatic]    | <input checked="" type="checkbox"/> |
|                     | ---            | <input type="checkbox"/>            |

**PEPWAVE**
Dashboard
SpeedFusion Connect
Network
Advanced
AP
System
Status
Apply Changes

Changes applied successfully.



## SpeedFusion Connect > Choose Cloud Location

| SpeedFusion Connect | Cloud Location |                                     |
|---------------------|----------------|-------------------------------------|
| SFC                 | [Automatic]    | <input checked="" type="checkbox"/> |
|                     | ---            | <input type="checkbox"/>            |

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

The screenshot shows the PEPWAVE dashboard with the following sections:

- WAN Connection Status:**
  - Priority 1 (Highest):
    - WAN: No Cable Detected
    - Wi-Fi WAN: Connected to [redacted] (Wireless Networks button)
  - Priority 2: Drag desired (Priority 2) connections here
  - Disabled: Cellular (Disabled)
- LAN Interface:**
  - Router IP Address: 192.168.50.1
  - Wi-Fi AP: OFF (Details button)
  - Wi-Fi AP has been disabled (No Wi-Fi AP)
- SpeedFusion Connect:** (Highlighted with a red box)
  - SFC: Established
  - Data usage allowance: 200.00 GB (Expiry date: [redacted])

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

The screenshot shows the PEPWAVE dashboard with the following sections:

- SpeedFusion Connect > Choose Cloud Location:**
  - SpeedFusion Connect: SFC (indicated by a red arrow)
  - Cloud Location: [Automatic] (with a dropdown menu showing ---)
  - Buttons: [X] (cancel), [checkmark] (confirm)

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

**PEPWAVE** Dashboard **SpeedFusion Connect** Network Advanced AP System Status Apply Changes

**SFC** [X]

**SpeedFusion Connect Profile**

Enable ☒

Cloud Location [Automatic] v

1 - Default +

**Tunnel Options**

|                          |                                                                           |       |  |
|--------------------------|---------------------------------------------------------------------------|-------|--|
| Local / Remote Tunnel ID | 1 (default tunnel)                                                        |       |  |
| Tunnel Name              | Default                                                                   |       |  |
| Data Port                | <input checked="" type="radio"/> Auto <input type="radio"/> Custom        |       |  |
| Bandwidth Limit          | <input type="checkbox"/>                                                  |       |  |
| WAN Smoothing            | Overall Redundancy Level                                                  | Off v |  |
|                          | Maximum Level on the Same Link                                            | Off v |  |
| Forward Error Correction | Off v                                                                     |       |  |
| Receive Buffer           | 0 ms                                                                      |       |  |
| Packet Fragmentation     | <input checked="" type="radio"/> Always <input type="radio"/> Use DF Flag |       |  |

Logout

**PEPWAVE** Dashboard **SpeedFusion Connect** Network Advanced AP System Status Apply Changes

**SFC** [X]

**SpeedFusion Connect Profile**

Enable ☒

Cloud Location [Automatic] v

1 - Default 2 - WAN Smoo... [X] +

**Tunnel Options**

|                          |                                                                           |          |  |
|--------------------------|---------------------------------------------------------------------------|----------|--|
| Local / Remote Tunnel ID | 2                                                                         |          |  |
| Tunnel Name              | WAN Smoothing                                                             |          |  |
| Data Port                | <input checked="" type="radio"/> Auto <input type="radio"/> Custom        |          |  |
| Bandwidth Limit          | <input type="checkbox"/>                                                  |          |  |
| WAN Smoothing            | Overall Redundancy Level                                                  | Normal v |  |
|                          | Maximum Level on the Same Link                                            | Normal v |  |
| Forward Error Correction | Off v                                                                     |          |  |
| Receive Buffer           | 0 ms                                                                      |          |  |
| Packet Fragmentation     | <input checked="" type="radio"/> Always <input type="radio"/> Use DF Flag |          |  |

Logout

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

**PEPWAVE**
Dashboard
SpeedFusion Connect
Network
Advanced
AP
System
Status
Apply Changes

WAN Connection Status

Priority 1 (Highest)

WAN

No Cable Detected

Details

Wi-Fi WAN

Connected to

Wireless Networks

Details

Priority 2

Drag desired (Priority 2) connections here

Disabled

Cellular

Disabled

Details

LAN Interface

Router IP Address: 192.168.50.1

Wi-Fi AP

OFF

Details

Wi-Fi AP has been disabled

(No Wi-Fi AP)

SpeedFusion Connect

SFC (1 - Default)

Established

SFC (2 - WAN Smoothing)

Established

Data usage allowance: 200.00 GB (Expiry date: )

Logout

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

**PEPWAVE** Dashboard SpeedFusion Connect Network **Advanced** AP System Status Apply Changes

Advanced

- SpeedFusion
- IPsec VPN
- GRE Tunnel
- Outbound Policy**
- Port Forwarding

NAT Mappings

ContentHub

QoS

- User Groups
- Bandwidth Control
- Application

Firewall

- Access Rules
- Content Blocking

Routing Protocols

- OSPF & RIPv2
- BGP

Remote User Access

Misc. Settings

- High Availability
- RADIUS Server
- Certificate Manager

**Rules** (Drag and drop rows by the left to change rule order)

| Service | Algorithm | Source | Destination | Protocol / Port |  |
|---------|-----------|--------|-------------|-----------------|--|
| Default |           |        |             | (Auto)          |  |

**Add a New Custom Rule**

Service Name: to-Internet

Enable: ☒

Source: IP Address 192.168.50.11

Destination: Any

Protocol: Any :: Protocol Selection ::

Algorithm: Priority

Priority Order: Highest Priority, Cloud: SFC (1 - Defau..., Cloud: SFC (2 - WAN ..., WAN: WAN, WAN: Cellular, WAN: Wi-Fi WAN, Lowest Priority

When No Connections are Available: Drop the Traffic

Terminate Sessions on Connection Recovery: ☐ Enable

Save Cancel

**PEPWAVE** Dashboard SpeedFusion Connect Network **Advanced** AP System Status Apply Changes

Advanced

- SpeedFusion
- IPsec VPN
- GRE Tunnel
- Outbound Policy**
- Port Forwarding

NAT Mappings

ContentHub

QoS

User Groups

Bandwidth Control

Application

Access Rules

Content Blocking

OSPF & RIPv2

BGP

High Availability

RADIUS Server

Certificate Manager

**Rules** (Drag and drop rows by the left to change rule order)

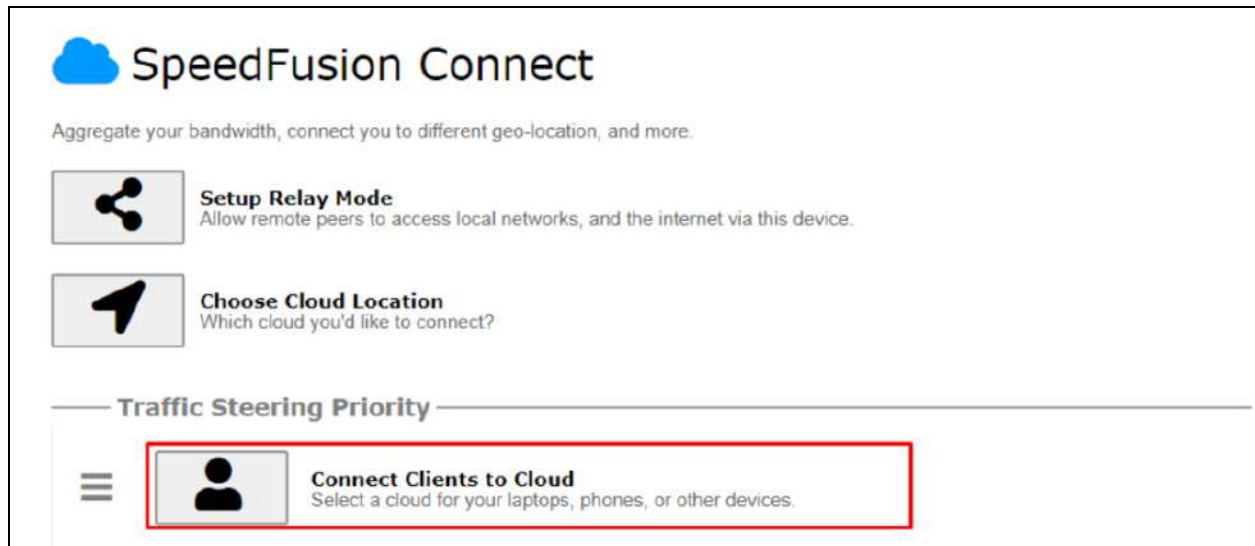
| Service     | Algorithm                     | Source                   | Destination | Protocol / Port |   |
|-------------|-------------------------------|--------------------------|-------------|-----------------|---|
| to-Internet | Priority VPN: SFC (1 - Def... | IP Address 192.168.50.11 | Any         | Any             | X |
| Default     |                               |                          |             | (Auto)          |   |

Add Rule

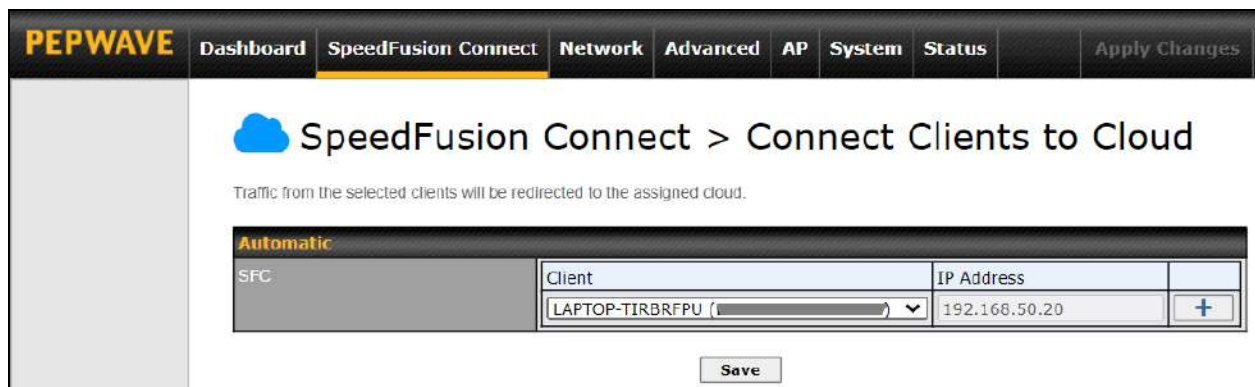
Saved! Changes will be effective after clicking the 'Apply Changes' button.

## 7.3 Connect Clients to Cloud

SpeedFusion Connect provides a convenient way to route the LAN client to the cloud from **SpeedFusion Connect > Connect Clients to Cloud**.

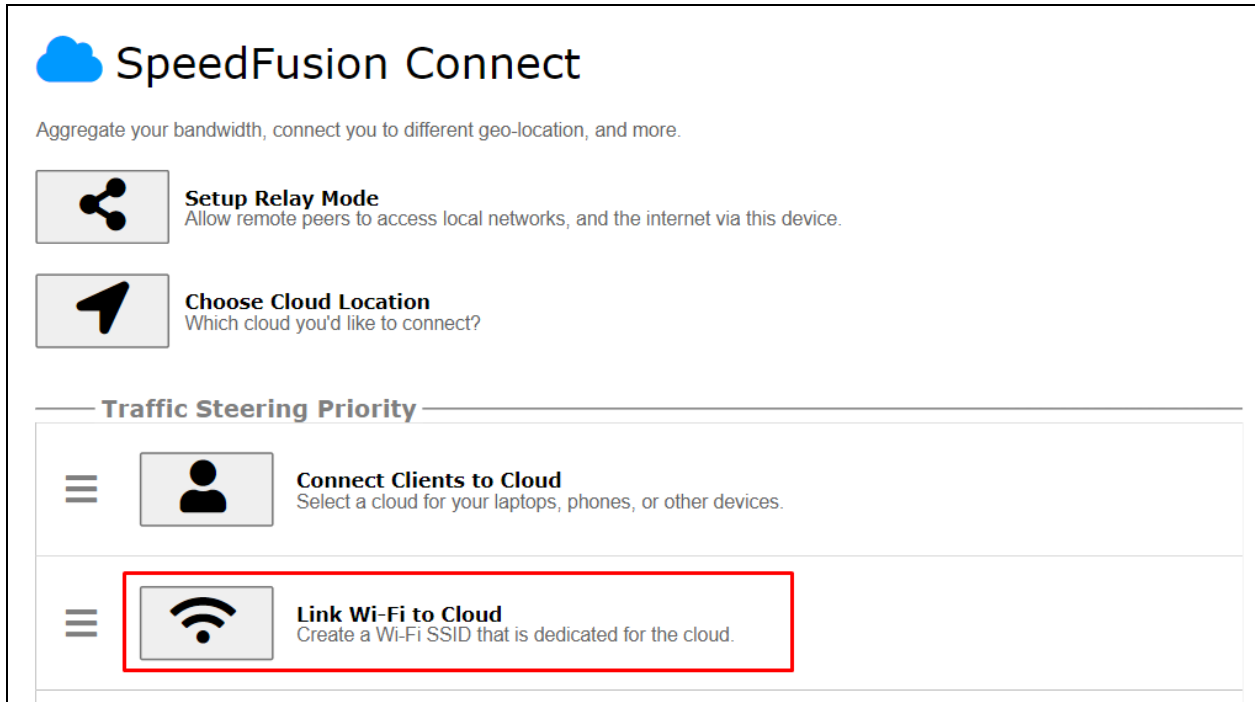


Choose a client from the drop down list > Click + > Save > Apply Changes.



## 7.4 Link Wi-Fi to Cloud

SpeedFusion Connect provides a convenient way to route the Wi-Fi client to the cloud from **SpeedFusion Connect > Link Wi-Fi to Cloud**.



**SpeedFusion Connect**  
Aggregate your bandwidth, connect you to different geo-location, and more.

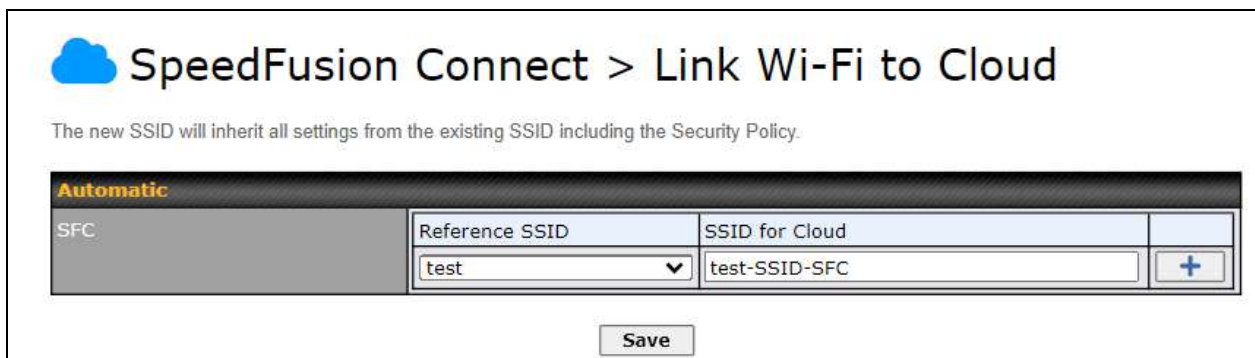
- Setup Relay Mode**  
Allow remote peers to access local networks, and the internet via this device.
- Choose Cloud Location**  
Which cloud you'd like to connect?

---

**Traffic Steering Priority**

- Connect Clients to Cloud**  
Select a cloud for your laptops, phones, or other devices.
- Link Wi-Fi to Cloud**  
Create a Wi-Fi SSID that is dedicated for the cloud.

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

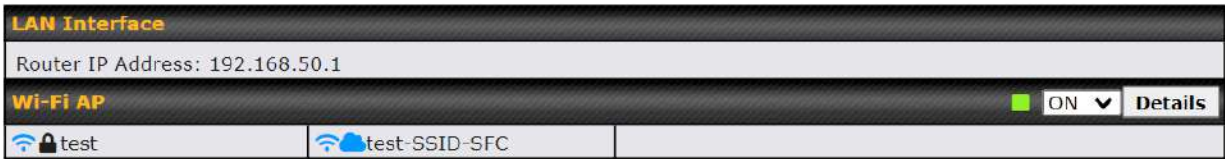


**SpeedFusion Connect > Link Wi-Fi to Cloud**  
The new SSID will inherit all settings from the existing SSID including the Security Policy.

| Automatic |                |                |   |
|-----------|----------------|----------------|---|
| SFC       | Reference SSID | SSID for Cloud |   |
|           | test           | test-SSID-SFC  | + |

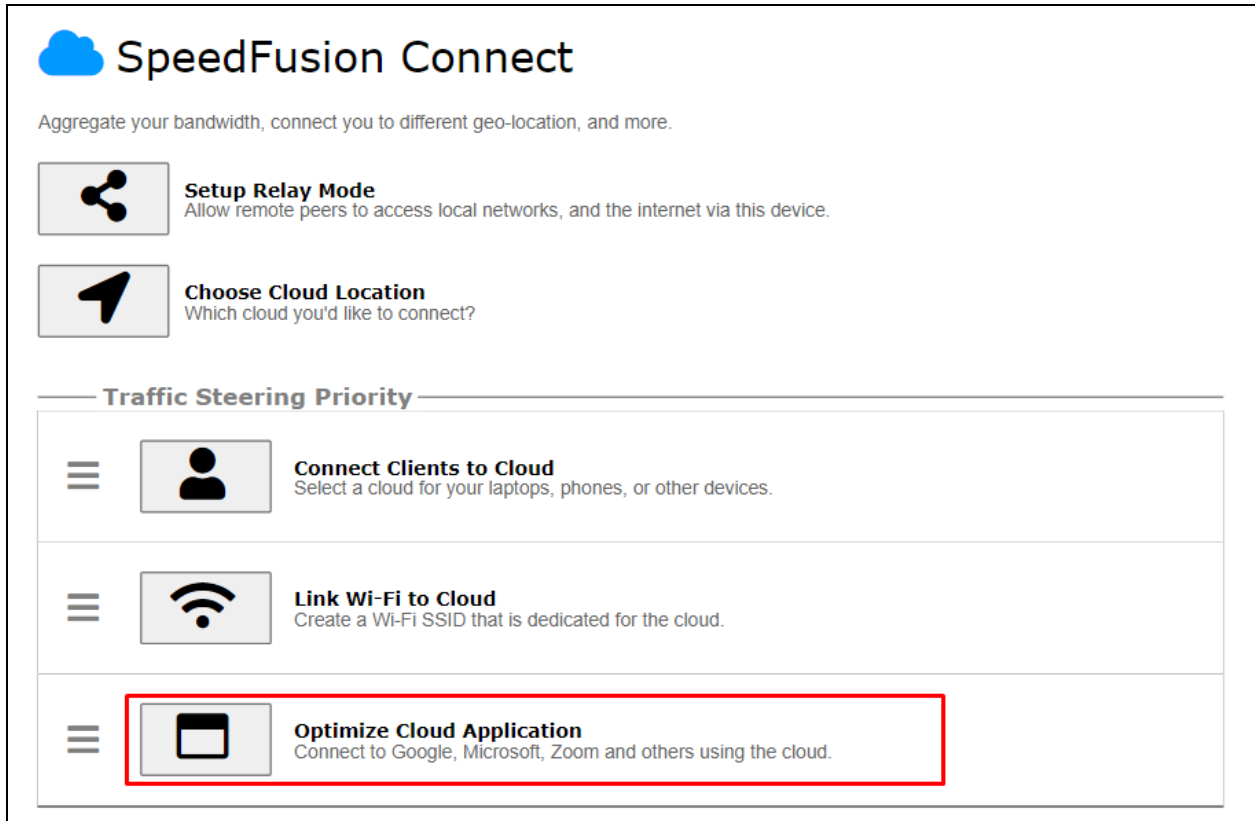
**Save**

SpeedFusion Connect SSID will be shown on **Dashboard**.



## 7.5 Optimize Cloud Application

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



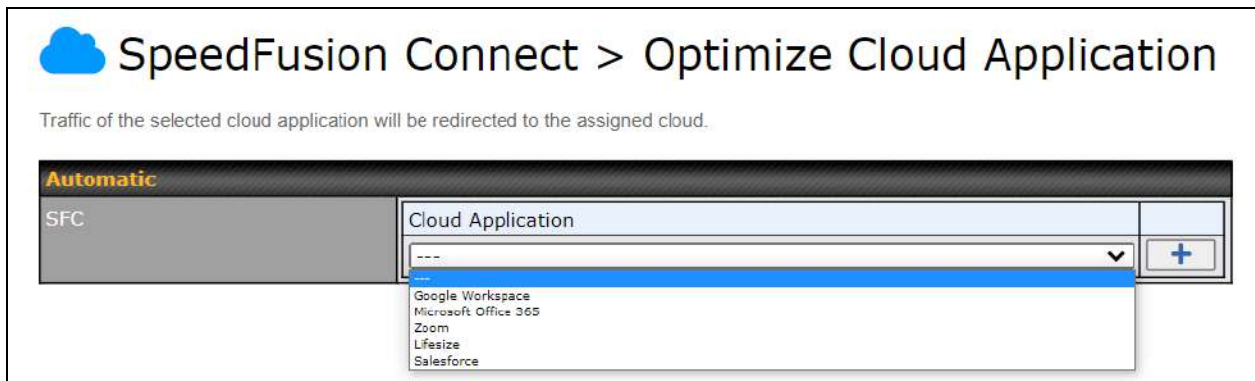
**SpeedFusion Connect**  
Aggregate your bandwidth, connect you to different geo-location, and more.

- Setup Relay Mode**  
Allow remote peers to access local networks, and the internet via this device.
- Choose Cloud Location**  
Which cloud you'd like to connect?

**Traffic Steering Priority**

- Connect Clients to Cloud**  
Select a cloud for your laptops, phones, or other devices.
- Link Wi-Fi to Cloud**  
Create a Wi-Fi SSID that is dedicated for the cloud.
- Optimize Cloud Application**  
Connect to Google, Microsoft, Zoom and others using the cloud.

Select a Cloud application to route through SpeedFusion Cloud from the drop down list > Click  > Save > Apply Changes. Click the  to remove a selected Cloud application to route through SpeedFusion Cloud.



**SpeedFusion Connect > Optimize Cloud Application**  
Traffic of the selected cloud application will be redirected to the assigned cloud.

| Automatic | Cloud Application    |                                                                                       |
|-----------|----------------------|---------------------------------------------------------------------------------------|
| SFC       | ---                  |  |
|           | Google Workspace     |                                                                                       |
|           | Microsoft Office 365 |                                                                                       |
|           | Zoom                 |                                                                                       |
|           | Lifesize             |                                                                                       |
|           | Salesforce           |                                                                                       |

## 8 Configuring the LAN Interface(s)

### 8.1 Basic Settings

LAN interface settings are located at **Network>LAN>Network Settings**. Navigating to that page will show 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      |  |
| <a href="#">New LAN</a> |      |                 |                                                                                     |

This represents the LAN interfaces that are active on your router (including VLAN). A gray “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 gray “X”.

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

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

| IP Settings |                                                    |
|-------------|----------------------------------------------------|
| IP Address  | <input type="text" value="255.255.255.0"/> (/24) ▼ |

| IP Settings       |                                                                  |
|-------------------|------------------------------------------------------------------|
| <b>IP Address</b> | 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"/> |

| Network Settings          |                                                        |
|---------------------------|--------------------------------------------------------|
| <b>Name</b>               | Enter a name for the LAN.                              |
| <b>VLAN ID</b>            | Enter a number for your VLAN.                          |
| <b>Inter-VLAN routing</b> | Check this box to enable routing between virtual LANs. |

| Layer 2 PepVPN Bridging                  |                                                                                                                                           |
|-----------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------|
| PepVPN Profiles to Bridge                  | No profile is available                                                                                                                   |
| Remote Network Isolation                   | <input type="checkbox"/>                                                                                                                  |
| Spanning Tree Protocol                                                                                                      | <input type="checkbox"/>                                                                                                                  |
| DHCP Option 82 Injection                                                                                                    | <input checked="" type="checkbox"/>                                                                                                       |
| Override IP Address when bridge connected  | <input checked="" type="radio"/> Do not override <input type="radio"/> Static <input type="radio"/> By DHCP <input type="radio"/> As None |

| Layer 2 PepVPN Bridging                          |                                                                                                                                                                                                                                                                                                            |
|--------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>PepVPN Profiles to Bridge</b>                 | 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.                                                                 |
| <b>Remote Network Isolation</b>                  | Enable this option if you want to block network traffic between the remote networks, this will not affect the connectivity between them and this local LAN.                                                                                                                                                |
| <b>Spanning Tree Protocol</b>                    | Click the box will enable STP for this layer 2 profile bridge.                                                                                                                                                                                                                                             |
| <b>Override IP Address when bridge connected</b> | <p>Select "Do not override" if the LAN IP address and local DHCP server should remain unchanged after the Layer 2 PepVPN is up.</p> <p>If you choose to override the 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.</p> |
| <b>DHCP Option 82</b>                            | <p>Click on the question Mark if you want to enable DHCP Option 82.</p> <p>This allows the device to inject Option 82 with Router Name information before forwarding the DHCP Request packet to a PepVPN peer, such that the DHCP Server can identify where the request originates from.</p>               |

| DHCP Server             |                                                                                   |                                                                                                                                                                                                                                                                                                 |                                                                                     |        |             |                         |  |     |                   |  |                                                                                     |
|-------------------------|-----------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|--------|-------------|-------------------------|--|-----|-------------------|--|-------------------------------------------------------------------------------------|
| DHCP Server             |  | <input checked="" type="checkbox"/> Enable                                                                                                                                                                                                                                                      |                                                                                     |        |             |                         |  |     |                   |  |                                                                                     |
| DHCP Server Logging     |                                                                                   | <input type="checkbox"/>                                                                                                                                                                                                                                                                        |                                                                                     |        |             |                         |  |     |                   |  |                                                                                     |
| IP Range                |                                                                                   | <input type="text"/> - <input type="text"/> 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" style="text-align: center;">No Extended DHCP Option</td> </tr> <tr> <td colspan="2" style="text-align: center;">Add</td> </tr> </tbody> </table>                                     |                                                                                     | Option | Value       | No Extended DHCP Option |  | Add |                   |  |                                                                                     |
| Option                  | Value                                                                             |                                                                                                                                                                                                                                                                                                 |                                                                                     |        |             |                         |  |     |                   |  |                                                                                     |
| No Extended DHCP Option |                                                                                   |                                                                                                                                                                                                                                                                                                 |                                                                                     |        |             |                         |  |     |                   |  |                                                                                     |
| Add                     |                                                                                   |                                                                                                                                                                                                                                                                                                 |                                                                                     |        |             |                         |  |     |                   |  |                                                                                     |
| DHCP Reservation        |  | <table border="1"> <thead> <tr> <th>Name</th> <th>MAC Address</th> <th>Static IP</th> <th></th> </tr> </thead> <tbody> <tr> <td></td> <td>00:00:00:00:00:00</td> <td></td> <td></td> </tr> </tbody> </table> |                                                                                     | Name   | MAC Address | Static IP               |  |     | 00:00:00:00:00:00 |  |  |
| Name                    | MAC Address                                                                       | Static IP                                                                                                                                                                                                                                                                                       |                                                                                     |        |             |                         |  |     |                   |  |                                                                                     |
|                         | 00:00:00:00:00:00                                                                 |                                                                                                                                                                                                                                                                                                 |  |        |             |                         |  |     |                   |  |                                                                                     |

| DHCP Server Settings              |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |
|-----------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>DHCP Server</b>                | 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.                                                                                                                                                                                                                                                                                                                                                   |
| <b>DHCP Server Logging</b>        | Enable logging of DHCP events in the eventlog by selecting the checkbox.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |
| <b>IP Range &amp; Subnet Mask</b> | These settings allocate a range of IP addresses that will be assigned to LAN computers by the Pepwave router's DHCP server.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |
| <b>Lease Time</b>                 | 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.                                                                                                                                                                                                                                                                                                                                                        |
| <b>DNS Servers</b>                | This option allows you to input the DNS server addresses to be offered to DHCP clients. If <b>Assign DNS server automatically</b> is selected, the Pepwave router's built-in DNS server address (i.e., LAN IP address) will be offered.                                                                                                                                                                                                                                                                                                                                                                       |
| <b>WINS Servers</b>               | <p>This option allows you to optionally specify a Windows Internet Name Service (WINS) server. You may choose to use the <b>built-in WINS server</b> or <b>external WINS servers</b>.</p> <p>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 <b>WINS Server</b> 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 <b>Status&gt;WINS Clients</b>.</p> |
| <b>BOOTP</b>                      | Check this box to enable BOOTP on older networks that still require it.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |
| <b>Extended DHCP Option</b>       | In addition to standard DHCP options (e.g., DNS server address, gateway address, subnet mask), you can specify the value of additional extended DHCP options, as defined in RFC 2132. With these extended options enabled, you can                                                                                                                                                                                                                                                                                                                                                                            |

pass additional configuration information to LAN hosts.

To define an extended DHCP option, click the **Add** button, choose the option to define and enter its value. For values that are in IP address list format, you can enter one IP address per line in the provided text area input control. Each option can be defined once only.

### DHCP Reservation

This setting reserves the assignment of fixed IP addresses for a list of computers on the LAN. The computers to be assigned fixed IP addresses on the LAN are identified by their MAC addresses. The fixed IP address assignment is displayed as a cross-reference list between the computers' names, MAC addresses, and fixed IP addresses.

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

#### LAN Physical Settings

Speed

Auto

### 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

| Destination Network | Subnet Mask         | Gateway |                                                                                       |
|---------------------|---------------------|---------|---------------------------------------------------------------------------------------|
|                     | 255.255.255.0 (/24) |         |  |

### 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.

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

| Virtual Network Mapping ? |               |                    |   |
|---------------------------|---------------|--------------------|---|
| One-to-One NAT ?          | Local Network | Virtual Network    |   |
|                           |               |                    | + |
| Many-to-One NAT ?         | Local Network | Virtual IP Address |   |
|                           |               |                    | + |

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

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

For further details on virtual network mapping watch this video:

<https://youtu.be/C1FMdZCn3Z8>

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

| WINS Server Settings |                          |
|----------------------|--------------------------|
| Enable               | <input type="checkbox"/> |

| WINS Server Settings |                                                                                                                      |
|----------------------|----------------------------------------------------------------------------------------------------------------------|
| <b>Enable</b>        | Check the box to enable the WINS server. A list of WINS clients will be displayed at <b>Status&gt;WINS Clients</b> . |

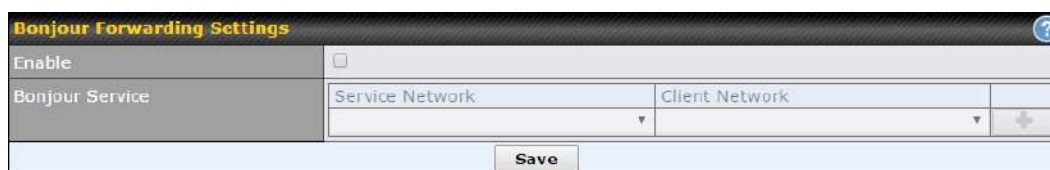
| DNS Proxy Settings                                                       |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |   |            |                |                                |           |                                |   |                                    |  |                                     |  |                                     |  |                              |  |            |             |                              |  |
|--------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---|------------|----------------|--------------------------------|-----------|--------------------------------|---|------------------------------------|--|-------------------------------------|--|-------------------------------------|--|------------------------------|--|------------|-------------|------------------------------|--|
| 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> <th></th> </tr> </thead> <tbody> <tr> <td></td> <td></td> <td>+</td> </tr> </tbody> </table>                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |   | 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><input type="checkbox"/> WAN 1</td> <td>10.88.3.1</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> <tr> <th>Connection</th> <th>DNS Servers</th> </tr> <tr> <td><input type="checkbox"/> LAN</td> <td></td> </tr> </tbody> </table> |   | Connection | Current Status | <input type="checkbox"/> WAN 1 | 10.88.3.1 | <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 |  | Connection | DNS Servers | <input type="checkbox"/> LAN |  |
| Connection                                                               | Current Status                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |   |            |                |                                |           |                                |   |                                    |  |                                     |  |                                     |  |                              |  |            |             |                              |  |
| <input type="checkbox"/> WAN 1                                           | 10.88.3.1                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |   |            |                |                                |           |                                |   |                                    |  |                                     |  |                                     |  |                              |  |            |             |                              |  |
| <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                                             |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |   |            |                |                                |           |                                |   |                                    |  |                                     |  |                                     |  |                              |  |            |             |                              |  |
| Connection                                                               | DNS Servers                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |   |            |                |                                |           |                                |   |                                    |  |                                     |  |                                     |  |                              |  |            |             |                              |  |
| <input type="checkbox"/> LAN                                             |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |   |            |                |                                |           |                                |   |                                    |  |                                     |  |                                     |  |                              |  |            |             |                              |  |
| Preferred connections are shown with <input checked="" type="checkbox"/> |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |   |            |                |                                |           |                                |   |                                    |  |                                     |  |                                     |  |                              |  |            |             |                              |  |

| DNS Proxy Settings                       |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |
|------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Enable</b>                            | To enable the DNS proxy feature, check this box, and then set up the feature at <b>Network&gt;LAN&gt;DNS Proxy Settings</b> . A DNS proxy server can be enabled to serve DNS requests originating from LAN/PPTP/SpeedFusion™ peers. Requests are forwarded to the <b>DNS servers/resolvers</b> defined for each WAN connection.                                                                                                                                                    |
| <b>DNS Caching</b>                       | 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, <b>DNS Caching</b> is disabled.                                                                                                            |
| <b>Include Google Public DNS Servers</b> | When this option is <b>enabled</b> , 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.                                                                                                                                                                                                              |
| <b>Local DNS Records</b>                 | 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  to create a new record. Press  to remove a record. |
| <b>DNS Resolvers <sup>A</sup></b>        | Check the box to enable the WINS server. A list of WINS clients will be displayed at <b>Network&gt;LAN&gt;DNS Proxy Settings&gt;DNS Resolvers</b> . 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.<br>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.

<sup>A</sup> - 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 protocol. Once VLAN configuration is complete, click **Save** to store your changes.



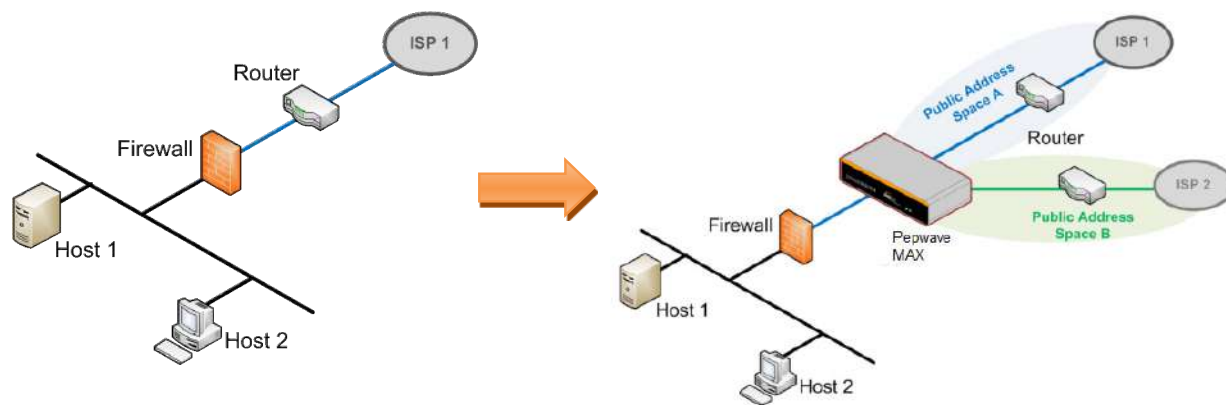
| Bonjour Forwarding Settings |                          |                |
|-----------------------------|--------------------------|----------------|
| Enable                      | <input type="checkbox"/> |                |
| Bonjour Service             | Service Network          | Client Network |
|                             |                          |                |
| Save                        |                          |                |

| Bonjour Forwarding Settings |                                                                                                                                                                                                                                                                                                                                         |
|-----------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Enable</b>               | Check this box to turn on Bonjour forwarding.                                                                                                                                                                                                                                                                                           |
| <b>Bonjour Service</b>      | Choose <b>Service</b> and <b>Client</b> networks from the drop-down menus, and then click  to add the networks. To delete an existing Bonjour listing, click  . |

## Drop-In Mode

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

The following diagram illustrates drop-in mode setup:



Check the box Enable to enable the Drop-in Mode. After enabling this feature and selecting the WAN for Drop-in mode, various settings including the WAN's connection method and IP address will be automatically updated.

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

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

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

| Drop-In Mode Settings                                                                                                                                                                                                                                                                                                                       |                                                                                                                                                                                                                                                                                                                                                                                                   |                                  |                     |             |  |                      |                       |                                  |
|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------|---------------------|-------------|--|----------------------|-----------------------|----------------------------------|
| Enable                                                                                                                                                                                                                                                                                                                                      | <input checked="" type="checkbox"/>                                                                                                                                                                                                                                                                                                                                                               |                                  |                     |             |  |                      |                       |                                  |
| WAN for Drop-In Mode                                                                                                                                                                                                                                                                                                                        | <div> <span>?</span> <span>WAN ▼</span> </div> <div> <input checked="" type="checkbox"/> Apply NAT on VLAN networks outgoing Internet traffic<br/>           VLAN network(s) may route their outgoing Internet traffic to this unit. When this checkbox is checked their traffic will be NAT'd before forwarding out of this WAN. Leave this checkbox checked if you are not sure.         </div> |                                  |                     |             |  |                      |                       |                                  |
| Share Drop-In IP                                                                                                                                                                                                                                                                                                                            | <span>?</span> <input checked="" type="checkbox"/>                                                                                                                                                                                                                                                                                                                                                |                                  |                     |             |  |                      |                       |                                  |
| Shared IP Address                                                                                                                                                                                                                                                                                                                           | <div> <span>?</span> <div> <input type="text"/> 255.255.255.0 (/24) ▼ </div> </div>                                                                                                                                                                                                                                                                                                               |                                  |                     |             |  |                      |                       |                                  |
| Static Route                                                                                                                                                                                                                                                                                                                                | <table border="1"> <thead> <tr> <th>Destination Network</th> <th>Subnet Mask</th> <th></th> </tr> </thead> <tbody> <tr> <td><input type="text"/></td> <td>255.255.255.0 (/24) ▼</td> <td><input type="button" value="+"/></td> </tr> </tbody> </table>                                                                                                                                            |                                  | Destination Network | Subnet Mask |  | <input type="text"/> | 255.255.255.0 (/24) ▼ | <input type="button" value="+"/> |
| Destination Network                                                                                                                                                                                                                                                                                                                         | Subnet Mask                                                                                                                                                                                                                                                                                                                                                                                       |                                  |                     |             |  |                      |                       |                                  |
| <input type="text"/>                                                                                                                                                                                                                                                                                                                        | 255.255.255.0 (/24) ▼                                                                                                                                                                                                                                                                                                                                                                             | <input type="button" value="+"/> |                     |             |  |                      |                       |                                  |
| WAN Default Gateway                                                                                                                                                                                                                                                                                                                         | <div> <span>?</span> <div> <input type="text"/> </div> <div> <input checked="" type="checkbox"/> I have other host(s) on WAN segment           </div> <div>             IP Address <input type="text"/> - <input type="text"/> </div> <div> <input type="button" value="↓"/> </div> <div> <input type="text"/> </div> <div> <input type="button" value="×"/> </div> </div>                        |                                  |                     |             |  |                      |                       |                                  |
| WAN DNS Servers                                                                                                                                                                                                                                                                                                                             | <div> <span>?</span> <div>             DNS server 1: <input type="text"/> </div> <div>             DNS server 2: <input type="text"/> </div> </div>                                                                                                                                                                                                                                               |                                  |                     |             |  |                      |                       |                                  |
| <p>NOTE: The DHCP Server Settings will be overwritten.</p> <p>The following WAN settings will be overwritten: Connection Method, MTU, Health Check, Additional Public IP, and Dynamic DNS Settings.</p> <p>The PPTP Server will be disabled.</p> <p>Tip: please review the DNS Forwarding setting under the Service Forwarding section.</p> |                                                                                                                                                                                                                                                                                                                                                                                                   |                                  |                     |             |  |                      |                       |                                  |

| Drop-in Mode Settings                |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |
|--------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Enable</b>                        | Drop-in mode eases the installation of the Pepwave MAX 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.                                                                                                                                                                                                                                                                                                                                   |
| <b>WAN for Drop-In Mode</b>          | Select the WAN port to be used for drop-in mode. If <b>WAN</b> is selected, the high availability feature will be disabled automatically.                                                                                                                                                                                                                                                                                                                                                                                                                                     |
| <b>Shared Drop-In IP<sup>A</sup></b> | <p>When this option is enabled, the passthrough IP address will be used to connect to WAN hosts (email notification, remote syslog, etc.). The MAX will listen for this IP address when WAN hosts access services provided by the MAX (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 MAX will listen for this IP address when LAN hosts access services provided by the MAX (web admin access from the WAN, DNS proxy, etc.).</p> |
| <b>Shared IP</b>                     | Access to this IP address will be passed through to the LAN port if this device is                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |

|                            |                                                                                                                                                                                                                                                                                                                                                                                                                     |
|----------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Address<sup>A</sup></b> | not serving the service being accessed. The shared IP address will be used in connecting to hosts on the WAN (e.g., email notification, remote syslog, etc.) The device will also listen on the IP address when hosts on the WAN access services served on this device (e.g., web admin accesses from WAN, DNS server, etc.)                                                                                        |
| <b>WAN Default Gateway</b> | Enter the WAN router's IP address in this field. If there are more hosts in addition to the router on the WAN segment, click the  button next to "WAN Default Gateway" and check the other <b>host(s) on the WAN segment</b> box and enter the IP address of the hosts that need to access LAN devices or be accessed by others. |
| <b>WAN DNS Servers</b>     | Enter the selected WAN's corresponding DNS server IP addresses.                                                                                                                                                                                                                                                                                                                                                     |

<sup>A</sup> - Advanced feature, please click the  button on the top right-hand corner to activate.

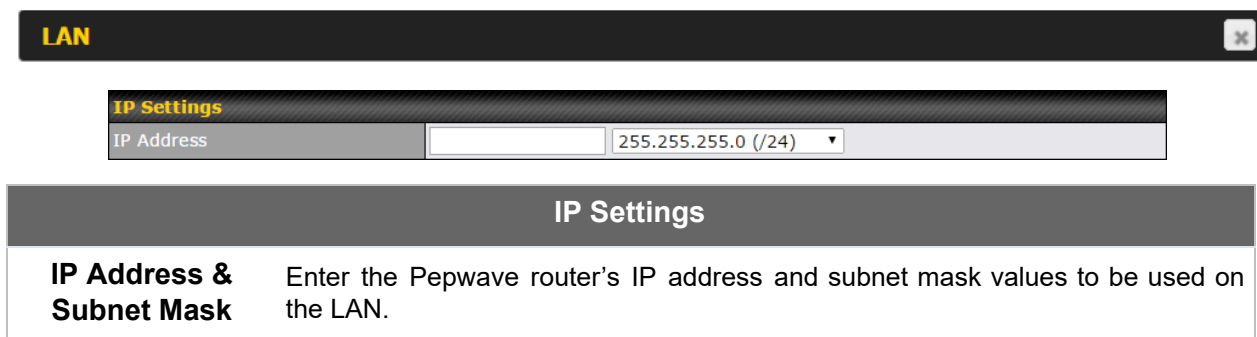
To enable VLAN configuration, click the  button in the **IP Settings** section.



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.



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



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

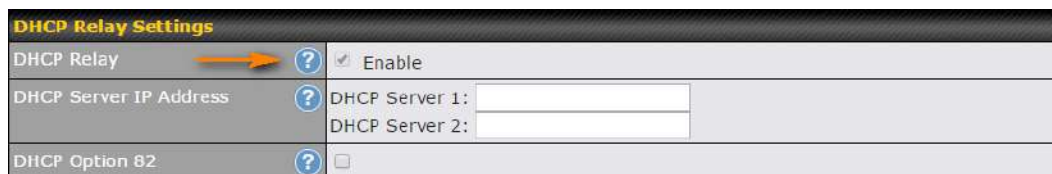
| Network Settings          |                                                        |
|---------------------------|--------------------------------------------------------|
| <b>Name</b>               | Enter a name for the LAN.                              |
| <b>VLAN ID</b>            | Enter a number for the LAN.                            |
| <b>Inter-VLAN routing</b> | Check this box to enable routing between virtual LANs. |
| <b>Captive Portal</b>     | Check this box to turn on captive portals.             |

| DHCP Server Settings    |                                                                                                                                                                                                     |                                                                                                                                                                                                                                     |                                            |        |             |                         |                      |                      |                      |
|-------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------|--------|-------------|-------------------------|----------------------|----------------------|----------------------|
| DHCP Server             | <input checked="" type="checkbox"/>                                                                                                                                                                 | Enable                                                                                                                                                                                                                              |                                            |        |             |                         |                      |                      |                      |
| IP Range                | <input type="text"/>                                                                                                                                                                                | -                                                                                                                                                                                                                                   | <input type="text"/> 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> <tr> <td colspan="2">Add</td> </tr> </tbody> </table> |                                                                                                                                                                                                                                     |                                            | Option | Value       | No Extended DHCP Option |                      | Add                  |                      |
| Option                  | Value                                                                                                                                                                                               |                                                                                                                                                                                                                                     |                                            |        |             |                         |                      |                      |                      |
| No Extended DHCP Option |                                                                                                                                                                                                     |                                                                                                                                                                                                                                     |                                            |        |             |                         |                      |                      |                      |
| Add                     |                                                                                                                                                                                                     |                                                                                                                                                                                                                                     |                                            |        |             |                         |                      |                      |                      |
| DHCP Reservation        | <input checked="" type="checkbox"/>                                                                                                                                                                 | <table border="1"> <thead> <tr> <th>Name</th> <th>MAC Address</th> <th>Static IP</th> </tr> </thead> <tbody> <tr> <td><input type="text"/></td> <td><input type="text"/></td> <td><input type="text"/></td> </tr> </tbody> </table> |                                            | Name   | MAC Address | Static IP               | <input type="text"/> | <input type="text"/> | <input type="text"/> |
| Name                    | MAC Address                                                                                                                                                                                         | Static IP                                                                                                                                                                                                                           |                                            |        |             |                         |                      |                      |                      |
| <input type="text"/>    | <input type="text"/>                                                                                                                                                                                | <input type="text"/>                                                                                                                                                                                                                |                                            |        |             |                         |                      |                      |                      |

| DHCP Server Settings              |                                                                                                                                                                                                                                                                                                                                                                                                                                                        |
|-----------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>DHCP Server</b>                | <p>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.</p> <p>To enable DHCP bridge relay, please click the  icon on this menu item.</p> |
| <b>IP Range &amp; Subnet Mask</b> | These settings allocate a range of IP addresses that will be assigned to LAN computers by the Pepwave router's DHCP server.                                                                                                                                                                                                                                                                                                                            |
| <b>Lease Time</b>                 | This setting specifies the length of time throughout which an IP address of a DHCP client remains valid. Upon expiration of <b>Lease Time</b> , the assigned IP address will no longer be valid and the IP address assignment must be renewed.                                                                                                                                                                                                         |

|                             |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |
|-----------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>DNS Servers</b>          | This option allows you to input the DNS server addresses to be offered to DHCP clients. If <b>Assign DNS server automatically</b> is selected, the Pepwave router's built-in DNS server address (i.e., LAN IP address) will be offered.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |
| <b>WINS Servers</b>         | 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 <b>DHCP WINS Servers</b> 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 <b>Status&gt;WINS Clients</b> .                                                                                                                                                                                                                                                                                                                                                      |
| <b>BOOTP</b>                | Check this box to enable BOOTP on older networks that still require it.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |
| <b>Extended DHCP Option</b> | 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 <b>Add</b> 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.                                                                                                                                                                                                                                                                                                                                            |
| <b>DHCP Reservation</b>     | <p>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.</p> <p><b>Name</b> (an optional field) allows you to specify a name to represent the device. MAC addresses should be in the format of <b>00:AA:BB:CC:DD:EE</b>. Press  to create a new record. Press  to remove a record. Reserved clients information can be imported from the <b>Client List</b>, located at <b>Status&gt;Client List</b>. For more details, please refer to <b>Section 22.3</b>.</p> |

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



The screenshot shows the 'DHCP Relay Settings' form. It has a title bar 'DHCP Relay Settings'. Below it, there are three rows: 'DHCP Relay' with a checkbox 'Enable' and a help icon; 'DHCP Server IP Address' with two input fields for 'DHCP Server 1' and 'DHCP Server 2', and a help icon; and 'DHCP Option 82' with a checkbox and a help icon. An orange arrow points to the help icon next to 'DHCP Relay'.

| DHCP Relay Settings   |                                                                                                                                                                   |
|-----------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Enable</b>         | Check this box to turn on DHCP relay. Click the  icon to disable DHCP relay. |
| <b>DHCP Server IP</b> | 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      |

|                       |                                                                                                                                                                                                                                                                              |
|-----------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Address</b>        | active-passive DHCP server configurations, enter active and passive DHCP server relay IP addresses in <b>DHCP Server 1</b> and <b>DHCP Server 2</b> .                                                                                                                        |
| <b>DHCP Option 82</b> | DHCP 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.

## 8.2 Port Settings

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

| Port Settings |                                     |                           |                                     |           |       |
|---------------|-------------------------------------|---------------------------|-------------------------------------|-----------|-------|
| Port Name     | Enable                              | Speed                     | Advertise Speed                     | Port Type | VLAN  |
| LAN Port 1    | <input checked="" type="checkbox"/> | Auto <input type="text"/> | <input checked="" type="checkbox"/> | Trunk ▾   | Any ▾ |
| LAN Port 2    | <input checked="" type="checkbox"/> |                           |                                     | Trunk ▾   | Any ▾ |
| LAN Port 3    | <input checked="" type="checkbox"/> |                           |                                     | Trunk ▾   | Any ▾ |
| LAN Port 4    | <input checked="" type="checkbox"/> |                           |                                     | Trunk ▾   | Any ▾ |

On this screen, you can enable specific ports, as well as determine the speed of the LAN ports, whether each port is a trunk or access port, can well as which VLAN each link belongs to, if any.

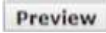
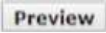
## 8.3 Captive Portal

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

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

| Captive Portal Settings     |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |                |               |             |                                                     |                    |                                                                          |        |                          |                   |                                                     |                          |                                                                          |                             |                              |
|-----------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------|---------------|-------------|-----------------------------------------------------|--------------------|--------------------------------------------------------------------------|--------|--------------------------|-------------------|-----------------------------------------------------|--------------------------|--------------------------------------------------------------------------|-----------------------------|------------------------------|
| <b>Enable</b>               | Check <b>Enable</b> and then, optionally, select the LANs/VLANs that will use the captive portal.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |                |               |             |                                                     |                    |                                                                          |        |                          |                   |                                                     |                          |                                                                          |                             |                              |
| <b>Hostname</b>             | 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 <b>Default</b> .                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |                |               |             |                                                     |                    |                                                                          |        |                          |                   |                                                     |                          |                                                                          |                             |                              |
| <b>Access Mode</b>          | Click <b>Open Access</b> to allow clients to freely access your router. Click <b>User Authentication</b> to force your clients to authenticate before accessing your router.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |                |               |             |                                                     |                    |                                                                          |        |                          |                   |                                                     |                          |                                                                          |                             |                              |
| <b>RADIUS Server</b>        | <p>This authenticates your clients through a RADIUS server. After selecting this option, you will see the following fields:</p> <table border="1"> <tbody> <tr> <td>Authentication</td><td>RADIUS Server</td></tr> <tr> <td>Auth Server</td><td><input type="text"/> Port 1812 <span>Default</span></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="checkbox"/></td></tr> <tr> <td>Accounting Server</td><td><input type="text"/> Port 1813 <span>Default</span></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> </tbody> </table> <p>Fill in the necessary information to complete your connection to the server and enable authentication.</p> | Authentication | RADIUS Server | Auth Server | <input type="text"/> Port 1812 <span>Default</span> | Auth Server Secret | <input type="text"/> <input checked="" type="checkbox"/> Hide Characters | CoA-DM | <input type="checkbox"/> | Accounting Server | <input type="text"/> Port 1813 <span>Default</span> | 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 <span>Default</span>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |                |               |             |                                                     |                    |                                                                          |        |                          |                   |                                                     |                          |                                                                          |                             |                              |
| Auth Server Secret          | <input type="text"/> <input checked="" type="checkbox"/> Hide Characters                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |                |               |             |                                                     |                    |                                                                          |        |                          |                   |                                                     |                          |                                                                          |                             |                              |
| CoA-DM                      | <input type="checkbox"/>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |                |               |             |                                                     |                    |                                                                          |        |                          |                   |                                                     |                          |                                                                          |                             |                              |
| Accounting Server           | <input type="text"/> Port 1813 <span>Default</span>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |                |               |             |                                                     |                    |                                                                          |        |                          |                   |                                                     |                          |                                                                          |                             |                              |
| Accounting Server Secret    | <input type="text"/> <input checked="" type="checkbox"/> Hide Characters                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |                |               |             |                                                     |                    |                                                                          |        |                          |                   |                                                     |                          |                                                                          |                             |                              |
| Accounting Interim Interval | <input type="text"/> seconds                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |                |               |             |                                                     |                    |                                                                          |        |                          |                   |                                                     |                          |                                                                          |                             |                              |
| <b>LDAP Server</b>          | This authenticates your clients through a LDAP server. Upon selecting this option, you will see the following fields:                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |                |               |             |                                                     |                    |                                                                          |        |                          |                   |                                                     |                          |                                                                          |                             |                              |

|                         |                                                                                                                                                                                                                                                                                                                                                                                                                       |
|-------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
|                         | <div> <div>Authentication</div> <div>LDAP Server</div> <div>LDAP Server</div> <div>Port: 389</div> <div>Default</div> <div><input type="checkbox"/> Use DN/Password to bind to LDAP Server</div> <div>Base DN</div> <div>Base Filter</div> </div> <p>Fill in the necessary information to complete your connection to the server and enable authentication.</p>                                                       |
| <b>Access Quota</b>     | Set a time and data cap to each user's Internet usage.                                                                                                                                                                                                                                                                                                                                                                |
| <b>Quota Reset Time</b> | This menu determines how your usage quota resets. Setting it to <b>Daily</b> will reset it at a specified time every day. Setting a number of <b>minutes after quota reached</b> establish a timer for each user that begins after the quota has been reached.                                                                                                                                                        |
| <b>Allowed Networks</b> | Add networks that can bypass the captive Portal in this field. 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. |
| <b>Allowed Clients</b>  | Add MAC address and /or IP addresses for client devices that are allowed to bypass the Captive Portal. Clients accessing these domains and IP addresses will not be redirected to the splash page.                                                                                                                                                                                                                    |
| <b>Splash Page</b>      | Here, you can choose between using the Pepwave router's built-in captive portal and redirecting clients to a URL you define.                                                                                                                                                                                                                                                                                          |

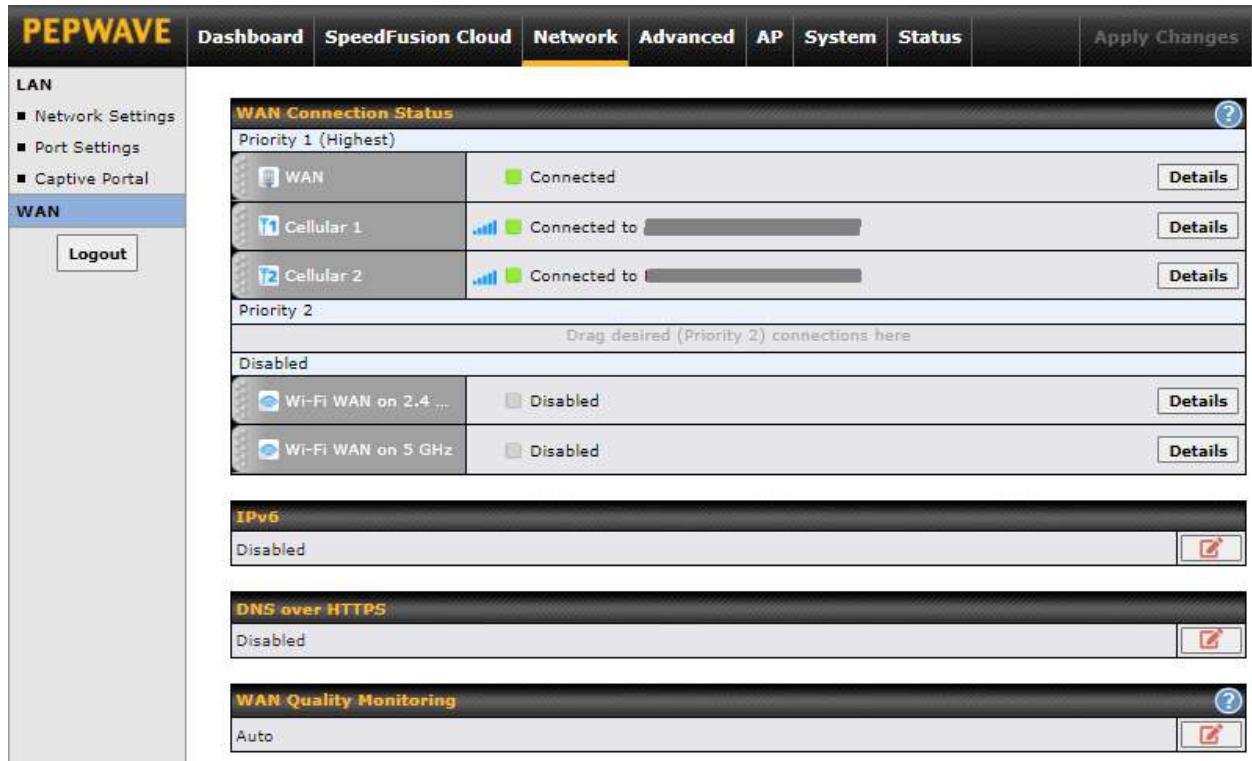
The **Portal Customization** menu has two options:  and . Clicking  displays a pop-up previewing the captive portal that your clients will see. Clicking  displays the following menu:

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

| Portal Customization          |                                                                                                                                                                          |
|-------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Logo Image</b>             | Click the <b>Choose File</b> button to select a logo to use for the built-in portal.                                                                                     |
| <b>Message</b>                | If you have any additional messages for your users, enter them in this field.                                                                                            |
| <b>Terms &amp; Conditions</b> | 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. |
| <b>Custom Landing Page</b>    | Fill in this field to redirect clients to an external URL.                                                                                                               |

## 9 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.



The screenshot displays the PEPWAVE web interface for configuring WAN settings. The top navigation bar includes links to Dashboard, SpeedFusion Cloud, Network (selected), Advanced, AP, System, and Status, along with an Apply Changes button. The left sidebar shows LAN settings (Network Settings, Port Settings, Captive Portal) and the selected WAN section with a Logout button. The main content area is titled 'WAN Connection Status' and features a table of WAN connections. Under 'Priority 1 (Highest)', there are three entries: WAN (Connected), Cellular 1 (Connected to [signal bar]), and Cellular 2 (Connected to [signal bar]). Under 'Priority 2', there is a prompt to 'Drag desired (Priority 2) connections here'. Below this, there are two 'Disabled' entries: 'Wi-Fi WAN on 2.4 ...' and 'Wi-Fi WAN on 5 GHz'. Further down, there are sections for 'IPv6' (Disabled), 'DNS over HTTPS' (Disabled), and 'WAN Quality Monitoring' (Auto). Each entry has a 'Details' button for further configuration.

To enable 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.

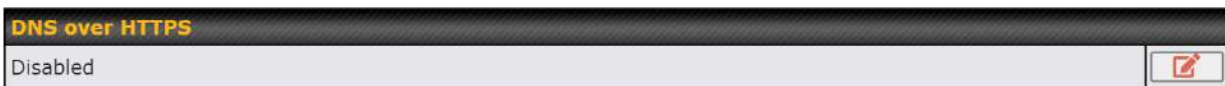
## IPv6



The screenshot shows a settings bar for 'IPv6' with a status of 'Disabled' and an edit icon on the right.

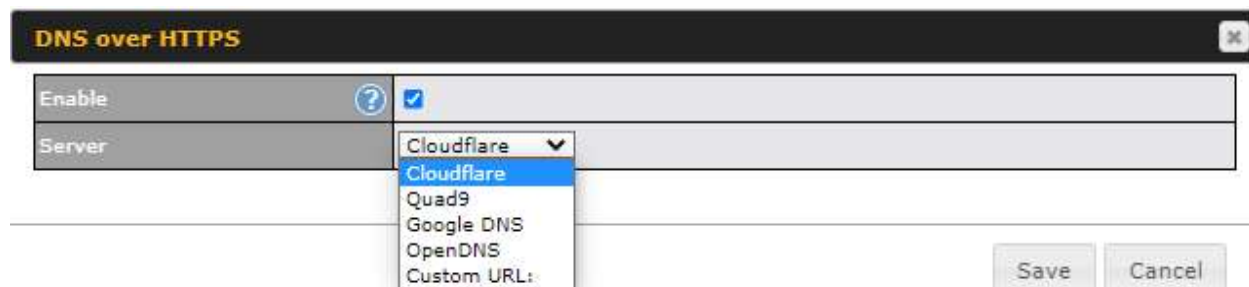
You can also enable IPv6 support in this section.

## DNS over HTTPS (DoH)



The screenshot shows a settings bar for 'DNS over HTTPS' with a status of 'Disabled' and an edit icon on the right.

You can enable DoH (DNS over HTTPS) support in this section.

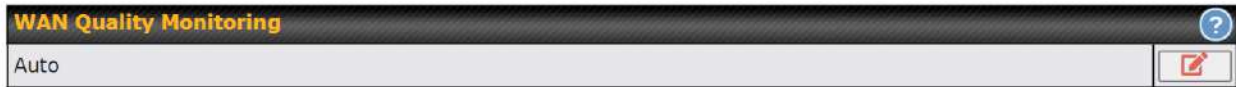


The screenshot shows the 'DNS over HTTPS' configuration dialog. The 'Enable' checkbox is checked. The 'Server' dropdown menu is open, showing options: Cloudflare, Quad9, Google DNS, OpenDNS, and Custom URL. 'Save' and 'Cancel' buttons are at the bottom right.

| DNS over HTTPS |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |
|----------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Enable</b>  | When this option is enabled, the DNS proxy server will use HTTPS connections to forward DNS requests to the DoH resolver; it will not fallback to traditional UDP DNS options.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |
| <b>Server</b>  | <p>The options to configure DoH with a predefined server are:</p> <ul style="list-style-type: none"> <li>Cloudflare - The DNS server IP addresses for <b>Cloudflare</b> will be using 1.1.1.1, which is unfiltered.</li> <li>Quad9 - The DNS server IP addresses for <b>Quad9</b> will be using 9.9.9.9 and 142.112.112.112, which is malware blocking and DNSSEC.</li> <li>Google DNS - The DNS server IP addresses for <b>Google DNS</b> will be using 8.8.8.8 and 8.8.4.4, which is RFC8484 standard.</li> <li>OpenDNS - The DNS server IP addresses for <b>OpenDNS</b> will be using 208.67.222.222 and 208.67.220.220, which is standard DNS.</li> <li>Custom URL - You may select <b>Custom URL</b>:, and enter the <b>resolver URL</b> and <b>IP address</b>.</li> </ul> |

## WAN Quality Monitoring

This settings advice how WAN Quality information is being gathered.



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

## 9.1 Ethernet WAN

### 9.1.1 DHCP Connection

There are four possible connection methods:

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

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.).

| WAN Connection Settings      |                                                                                                                                                                                                                              |
|------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| WAN Connection Name          | WAN                                                                                                                                                                                                                          |
| Connection Method            | <input type="radio"/> DHCP <input type="radio"/> Static IP <input type="radio"/> PPPoE <input type="radio"/> L2TP <input type="radio"/> GRE                                                                                  |
| Routing Mode                 | <input checked="" type="radio"/> NAT <input type="radio"/> Static IP <input type="radio"/> GRE                                                                                                                               |
| Hostname (Optional)          | <input type="text"/><br><input type="checkbox"/> Use custom hostname                                                                                                                                                         |
| Management IP Address        | <input type="text"/> 255.255.255.0 (/24)                                                                                                                                                                                     |
| DNS Servers                  | <input checked="" type="checkbox"/> Obtain DNS server address automatically<br><input type="checkbox"/> Use the following DNS server address(es)<br>DNS Server 1: <input type="text"/><br>DNS Server 2: <input type="text"/> |
| IP Passthrough               | <input type="checkbox"/>                                                                                                                                                                                                     |
| Independent from Backup WANs | <input type="checkbox"/>                                                                                                                                                                                                     |
| Standby State                | <input checked="" type="radio"/> Remain connected <input type="radio"/> Disconnect                                                                                                                                           |
| Reply to ICMP Ping           | <input checked="" type="radio"/> Yes <input type="radio"/> No                                                                                                                                                                |
| Upload Bandwidth             | <input type="text"/> 1 Gbps                                                                                                                                                                                                  |
| Download Bandwidth           | <input type="text"/> 1 Gbps                                                                                                                                                                                                  |

| 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 <b>IP Forwarding</b> option, if your network requires it. |
| 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.                                                                                          |

|                                     |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |
|-------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Management IP Address</b>        | <p><b>Management IP Address</b> is available for configuration when you click the link in the help  icon via the Hostname.</p> <p>This option allows you to configure the management IP address for the DHCP WAN connection.</p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |
| <b>DNS Servers</b>                  | <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 <b>Obtain DNS server address automatically</b> 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 <b>Use the following DNS server address(es)</b> is selected, you may enter custom DNS server addresses for this WAN connection into the <b>DNS Server 1</b> and <b>DNS Server 2</b> fields.</p>                                                                                                                                                                                                                                                                                                                                          |
| <b>IP Passthrough</b>               | <p>When this <b>IP Passthrough</b> option is active, after the ethernet WAN connection is up, the router's DHCP server will offer the connection's IP address to one LAN client. All incoming or outgoing traffic will be routed without NAT.</p> <p>Regardless the WAN connection's state, the router always binds to the LAN IP address (Default: 192.168.50.1). So when the ethernet WAN is connected, the LAN client could access the router's web admin by manually configuring its IP address to the same subnet as the router's LAN IP address (e.g. 192.168.50.10).</p> <p>Note: when this option is firstly enabled, the LAN client may not be able to refresh its IP address to the ethernet WAN IP address in a timely fashion. The LAN client may have to manually renew its IP address from DHCP server. After this option is enabled, the DHCP lease time will be 2 minutes. I.e. the LAN client could refresh its IP address and access the network at most one minute after the ethernet WAN connection goes up.</p> |
| <b>Independent from Backup WANs</b> | <p>If this is checked, the connection will be working independent from other Backup WAN connections. Those in <b>Backup Priority</b> will ignore the status of this WAN connection, and will be used when none of the other higher priority connections are available.</p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |
| <b>Standby State</b>                | <p>This option allows you to choose whether to remain connected when this WAN connection is no longer in the highest priority and has entered the standby state. When <b>Remain connected</b> is chosen, upon bringing up this WAN connection to active, it will be immediately available for use.</p> <p>If this WAN connection is charged by connection time, you may want to set</p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |

|                           |                                                                                                                                                                                                                                                                              |
|---------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
|                           | <p>this option to <b>Disconnect</b> so that connection will be made only when needed.</p> <p>PepVPN may use connected standby WAN for failover if link failure detected on the higher priority WAN, you can set this option to Disconnect to avoid data passing through.</p> |
| <b>Reply to ICMP PING</b> | <p>If the checkbox is <b>unticked</b>, this option is disabled and the system will not reply to any ICMP ping echo requests to the WAN IP addresses of this WAN connection.</p> <p>Default: <b>ticked</b> (Yes)</p>                                                          |
| <b>Upload Bandwidth</b>   | <p>This field refers to the maximum upload speed.</p> <p>This value is referenced when default weight is chosen for outbound traffic and traffic prioritization. A correct value can result in effective traffic prioritization and efficient use of upstream bandwidth.</p> |
| <b>Download Bandwidth</b> | <p>This field refers to the maximum download speed.</p> <p>Default weight control for outbound traffic will be adjusted according to this value.</p>                                                                                                                         |

### 9.1.2 Static IP Connection

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

| WAN Connection Settings      |                                                                                                                                                          |
|------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------|
| WAN Connection Name          | WAN                                                                                                                                                      |
| Connection Method            | Static IP ▼                                                                                                                                              |
| Routing Mode                 | <input checked="" type="radio"/> NAT                                                                                                                     |
| IP Address                   |                                                                                                                                                          |
| Subnet Mask                  | 255.255.255.0 (/24) ▼                                                                                                                                    |
| Default Gateway              |                                                                                                                                                          |
| DNS Servers                  | <input checked="" type="checkbox"/> Use the following DNS server address(es)<br>DNS Server 1: <input type="text"/><br>DNS Server 2: <input type="text"/> |
| IP Passthrough               | <input type="checkbox"/>                                                                                                                                 |
| Independent from Backup WANs | <input type="checkbox"/>                                                                                                                                 |
| Standby State                | <input checked="" type="radio"/> Remain connected <input type="radio"/> Disconnect                                                                       |
| Reply to ICMP Ping           | <input checked="" type="radio"/> Yes <input type="radio"/> No                                                                                            |
| Upload Bandwidth             | 1 Gbps ▼                                                                                                                                                 |
| Download Bandwidth           | 1 Gbps ▼                                                                                                                                                 |

| Static IP Settings                                |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |
|---------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Routing Mode</b>                               | 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 <b>IP Forwarding</b> option, if your network requires it.                                                                                                                                                                                                                                                                                                                                                                                                                                             |
| <b>IP Address / Subnet Mask / Default Gateway</b> | 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.                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |
| <b>DNS Servers</b>                                | <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 <b>Obtain DNS server address automatically</b> 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 <b>Use the following DNS server address(es)</b> is selected, you may enter custom DNS server addresses for this WAN connection into the <b>DNS Server 1</b> and <b>DNS Server 2</b> fields.</p> |

### 9.1.3 PPPoE Connection

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

| WAN Connection Settings      |                                                                                                                                                                                                                              |
|------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| WAN Connection Name          | <input type="text" value="WAN"/>                                                                                                                                                                                             |
| Connection Method            | <span>?</span> <span>PPPoE ▼</span>                                                                                                                                                                                          |
| Routing Mode                 | <span>?</span> <input checked="" type="radio"/> NAT                                                                                                                                                                          |
| PPPoE User Name              | <input type="text"/>                                                                                                                                                                                                         |
| PPPoE Password               | <input type="password"/>                                                                                                                                                                                                     |
| Confirm PPPoE Password       | <input type="password"/>                                                                                                                                                                                                     |
| Service Name (Optional)      | <input type="text"/><br><small>Leave it blank unless it is provided by ISP</small>                                                                                                                                           |
| IP Address (Optional)        | <span>?</span> <input type="text"/><br><small>Leave it blank unless it is provided by ISP</small>                                                                                                                            |
| Keep-Alive Interval          | <span>?</span> <input type="text" value="6"/> seconds(s)                                                                                                                                                                     |
| Keep-Alive Retry             | <span>?</span> <input type="text" value="6"/>                                                                                                                                                                                |
| DNS Servers                  | <input checked="" type="checkbox"/> Obtain DNS server address automatically<br><input type="checkbox"/> Use the following DNS server address(es)<br>DNS Server 1: <input type="text"/><br>DNS Server 2: <input type="text"/> |
| Independent from Backup WANs | <span>?</span> <input type="checkbox"/>                                                                                                                                                                                      |
| Standby State                | <span>?</span> <input checked="" type="radio"/> Remain connected <input type="radio"/> Disconnect                                                                                                                            |
| Reply to ICMP Ping           | <span>?</span> <input checked="" type="radio"/> Yes <input type="radio"/> No                                                                                                                                                 |
| Upload Bandwidth             | <span>?</span> <input type="text" value="1"/> Gbps ▼                                                                                                                                                                         |
| Download Bandwidth           | <span>?</span> <input type="text" value="1"/> Gbps ▼                                                                                                                                                                         |

| PPPoE Settings                   |                                                                                                                                                                                                                                                |
|----------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Routing Mode</b>              | 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 <b>IP Forwarding</b> option, if your network requires it. |
| <b>PPPoE Username / Password</b> | 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.                                                                              |
| <b>Confirm PPPoE Password</b>    | Verify your password by entering it again in this field.                                                                                                                                                                                       |
| <b>Service Name (Optional)</b>   | Service name is provided by the ISP.<br><b>Note: Leave this field blank unless it is provided by your ISP.</b>                                                                                                                                 |
| <b>IP Address</b>                | If your ISP provides a PPPoE IP address, enter it here.                                                                                                                                                                                        |

|                    |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |
|--------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>(Optional)</b>  | <b>Note: Leave this field blank unless it is provided by your ISP.</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |
| <b>DNS Servers</b> | <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 <b>Obtain DNS server address automatically</b> 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 <b>Use the following DNS server address(es)</b> is selected, you may enter custom DNS server addresses for this WAN connection into the <b>DNS Server 1</b> and <b>DNS Server 2</b> fields.</p> |

### 9.1.4 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.

| WAN Connection Settings      |                                                                                                                                                                                                                              |
|------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| WAN Connection Name          | WAN                                                                                                                                                                                                                          |
| Connection Method            | L2TP                                                                                                                                                                                                                         |
| Routing Mode                 | <input checked="" type="radio"/> NAT                                                                                                                                                                                         |
| 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<br><input type="checkbox"/> Use the following DNS server address(es)<br>DNS Server 1: <input type="text"/><br>DNS Server 2: <input type="text"/> |
| Independent from Backup WANs | <input type="checkbox"/>                                                                                                                                                                                                     |
| Standby State                | <input checked="" type="radio"/> Remain connected <input type="radio"/> Disconnect                                                                                                                                           |
| Reply to ICMP Ping           | <input checked="" type="radio"/> Yes <input type="radio"/> No                                                                                                                                                                |
| Upload Bandwidth             | 1 Gbps                                                                                                                                                                                                                       |
| Download Bandwidth           | 1 Gbps                                                                                                                                                                                                                       |

| L2TP Settings                   |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |
|---------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Routing Mode</b>             | 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 <b>IP Forwarding</b> option, if your network requires it.                                                                                                                                                                                                                                                                                                                                                                                                                                              |
| <b>L2TP Username / Password</b> | Enter the required information in these fields in order to connect via L2TP to your ISP.<br>The parameter values are determined by and can be obtained from your ISP.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |
| <b>Confirm L2TP Password</b>    | Verify your password by entering it again in this field.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |
| <b>Server IP Address / Host</b> | L2TP server address is a parameter which is provided by your ISP.<br><b>Note: Leave this field blank unless it is provided by your ISP.</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |
| <b>Address Type</b>             | Your ISP will also indicate whether the server IP address is Dynamic or Static. Please click the appropriate value.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |
| <b>DNS Servers</b>              | <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 <b>Obtain DNS server address automatically</b> results in the DNS servers assigned by the PPPoE server to be used for outbound DNS lookups over the WAN connection.<br/>(The DNS servers are obtained along with the WAN IP address assigned from the PPPoE server.)</p> <p>When <b>Use the following DNS server address(es)</b> is selected, you can enter custom DNS server addresses for this WAN connection into the <b>DNS server 1</b> and <b>DNS server 2</b> fields.</p> |

### 9.1.5 GRE Connection

This connection method is suitable if your ISP provides a static WAN IP and Tunnel IP via GRE.

| WAN Connection Settings      |                                                                                                                                                          |
|------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------|
| WAN Connection Name          | <input type="text" value="WAN"/>                                                                                                                         |
| Connection Method            | <span>?</span> GRE ▼                                                                                                                                     |
| Routing Mode                 | <span>?</span> <input checked="" type="radio"/> NAT                                                                                                      |
| WAN IP Address               | <input type="text"/>                                                                                                                                     |
| WAN Subnet Mask              | <input type="text" value="255.255.255.0 (/24)"/> ▼                                                                                                       |
| WAN Default Gateway          | <input type="text"/>                                                                                                                                     |
| Remote GRE Host              | <input type="text"/>                                                                                                                                     |
| Tunnel Local IP Address      | <input type="text"/>                                                                                                                                     |
| Tunnel Remote IP Address     | <input type="text"/>                                                                                                                                     |
| Outgoing NAT IP Address      | <input type="text"/>                                                                                                                                     |
| DNS Servers                  | <input checked="" type="checkbox"/> Use the following DNS server address(es)<br>DNS Server 1: <input type="text"/><br>DNS Server 2: <input type="text"/> |
| Independent from Backup WANs | <span>?</span> <input type="checkbox"/>                                                                                                                  |
| Standby State                | <span>?</span> <input checked="" type="radio"/> Remain connected <input type="radio"/> Disconnect                                                        |
| Reply to ICMP Ping           | <span>?</span> <input checked="" type="radio"/> Yes <input type="radio"/> No                                                                             |
| Upload Bandwidth             | <span>?</span> <input type="text" value="1"/> Gbps ▼                                                                                                     |
| Download Bandwidth           | <span>?</span> <input type="text" value="1"/> Gbps ▼                                                                                                     |

| L2TP Settings                                         |                                                                                                                                                                                                                                                |
|-------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Routing Mode</b>                                   | 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 <b>IP Forwarding</b> option, if your network requires it. |
| <b>WAN IP Address / Subnet Mask / Default Gateway</b> | 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.                             |
| <b>Remote GRE Host</b>                                | This field allows you to enter the IP address of the remote GRE.                                                                                                                                                                               |
| <b>Tunnel Local IP Address</b>                        | This field allows you to enter the IP address of the local tunnel for the GRE tunnel connection.                                                                                                                                               |
| <b>Tunnel Remote IP Address</b>                       | This field allows you to enter the IP address of the remote tunnel for the GRE tunnel connection.                                                                                                                                              |

## DNS Servers

Each ISP may provide a set of DNS servers for DNS lookups. This setting specifies the DNS (Domain Name System) servers to be used when a DNS lookup is routed through this connection.

Selecting **Obtain DNS server address automatically** results in the DNS servers assigned by the 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.

## 9.2 Cellular WAN



To access cellular WAN settings, click **Network>WAN>Details**.

| WAN Connection Status |                                                |                        |
|-----------------------|------------------------------------------------|------------------------|
|                       | SIM Card A                                     | SIM Card B             |
| IMSI                  | (No SIM Card Detected) (In Use)                | (No SIM Card Detected) |
| ICCID                 | -                                              | -                      |
| MTN                   | -                                              | -                      |
| MEID                  | HEX: 35907406039576<br>DEC: 089865933400234870 |                        |
| IMEI                  | 359074060395763                                |                        |

| WAN Connection Status |                                                                                                                                                                                                                                                                                  |
|-----------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>IMSI</b>           | This is the International Mobile Subscriber Identity which uniquely identifies the SIM card. This is applicable to 3G modems only.                                                                                                                                               |
| <b>ICCID</b>          | This is a unique number assigned to a SIM card used in a cellular device.                                                                                                                                                                                                        |
| <b>MEID</b>           | 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. |
| <b>IMEI</b>           | This is the unique ID for identifying the modem in GSM/HSPA mode.                                                                                                                                                                                                                |

| WAN Connection Settings     |                                                                                                                                                                                                                              |
|----------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| WAN Connection Name                                                                                            | <input type="text" value="Cellular 1"/>                                                                                                                                                                                      |
| Routing Mode                  | <input checked="" type="radio"/> NAT                                                                                                                                                                                         |
| DNS Servers                                                                                                    | <input checked="" type="checkbox"/> Obtain DNS server address automatically<br><input type="checkbox"/> Use the following DNS server address(es)<br>DNS Server 1: <input type="text"/><br>DNS Server 2: <input type="text"/> |
| Independent from Backup WANs  | <input type="checkbox"/>                                                                                                                                                                                                     |
| Standby State                 | <input checked="" type="radio"/> Remain connected <input type="radio"/> Disconnect                                                                                                                                           |
| Idle Disconnect                                                                                                | <input type="checkbox"/>                                                                                                                                                                                                     |
| Reply to ICMP Ping            | <input checked="" type="radio"/> Yes <input type="radio"/> No                                                                                                                                                                |

| Connection Settings                 |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |
|-------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>WAN Connection Name</b>          | Indicate a name you wish to give this WAN connection                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |
| <b>Routing Mode</b>                 | <p>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.</p> <p>In the case if you need to choose IP Forwarding for your scenario. Click the  button to enable IP Forwarding.</p>                                                                                                                                                                                                                                                 |
| <b>DNS Servers</b>                  | <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 assigned by the WAN DHCP server being used for outbound DNS lookups over the connection. (The DNS servers are obtained along with the WAN IP address assigned by the DHCP server.)</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> |
| <b>Independent from Backup WANs</b> | If this is checked, the connection will be working independent from other Backup WAN connections. Those in Backup Priority will ignore the status of this WAN connection, and will be used when none of the other higher priority connections are available.                                                                                                                                                                                                                                                                                                                                                                                            |
| <b>Standby State</b>                | 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 <b>Remain connected</b> is chosen, bringing up this WAN connection to active makes it immediately available for use.                                                                                                                                                                                                                                                                                                                                                 |

## Idle Disconnect

If this is checked, the connection will disconnect when idle after the configured Time value.  
This option is disabled by default.

| Cellular Settings           |                                                                                                                                                                                                                                                          |                                                                                                                                                                                                                                               |
|-----------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| SIM Card                    | <input checked="" type="radio"/> Both SIMs<br><input type="radio"/> SIM A Only<br><input type="radio"/> SIM B Only<br><input type="radio"/> Alternate periodically between SIM A Only and SIM B Only<br><input type="radio"/> Use Remote SIM Only        |                                                                                                                                                                                                                                               |
| Preferred SIM Card          | <input checked="" type="radio"/> No preference <input type="radio"/> SIM A <input type="radio"/> SIM B                                                                                                                                                   |                                                                                                                                                                                                                                               |
|                             | SIM Card A                                                                                                                                                                                                                                               | SIM Card B                                                                                                                                                                                                                                    |
| Carrier Selection           | <input checked="" type="radio"/> Auto                                                                                                                                                                                                                    | <input checked="" type="radio"/> Auto                                                                                                                                                                                                         |
| LTE/3G                      | <input checked="" type="radio"/> LTE Only                                                                                                                                                                                                                | <input checked="" type="radio"/> Auto                                                                                                                                                                                                         |
| Optimal Network Discovery   | <input type="checkbox"/>                                                                                                                                                                                                                                 | <input type="checkbox"/>                                                                                                                                                                                                                      |
| Band Selection              | Auto                                                                                                                                                                                                                                                     | Auto                                                                                                                                                                                                                                          |
| Data Roaming                | <input checked="" type="checkbox"/> Any countries                                                                                                                                                                                                        | <input type="checkbox"/>                                                                                                                                                                                                                      |
| Authentication              | Auto                                                                                                                                                                                                                                                     | Auto                                                                                                                                                                                                                                          |
| Operator Settings           | <input checked="" type="radio"/> Auto <input type="radio"/> Custom                                                                                                                                                                                       | <input checked="" type="radio"/> Auto <input type="radio"/> Custom                                                                                                                                                                            |
| APN                         |                                                                                                                                                                                                                                                          |                                                                                                                                                                                                                                               |
| Username                    |                                                                                                                                                                                                                                                          |                                                                                                                                                                                                                                               |
| Password                    |                                                                                                                                                                                                                                                          |                                                                                                                                                                                                                                               |
| Confirm Password            |                                                                                                                                                                                                                                                          |                                                                                                                                                                                                                                               |
| SIM PIN (Optional)          | <input type="text"/><br><input type="text"/> (Confirm)                                                                                                                                                                                                   | <input type="text"/><br><input type="text"/> (Confirm)                                                                                                                                                                                        |
| Bandwidth Allowance Monitor | <input checked="" type="checkbox"/> Enable                                                                                                                                                                                                               | <input type="checkbox"/> Enable                                                                                                                                                                                                               |
| Action                      | Email notification is currently disabled. You can get notified when usage hits 75%/95% of monthly allowance by enabling <a href="#">Email Notification</a> .<br><input checked="" type="checkbox"/> Disconnect when usage hits 100% of monthly allowance | Email notification is currently disabled. You can get notified when usage hits 75%/95% of monthly allowance by enabling <a href="#">Email Notification</a> .<br><input type="checkbox"/> Disconnect when usage hits 100% of monthly allowance |
| Start Day                   | On 1st of each month at 00:00 midnight                                                                                                                                                                                                                   | On 1st of each month at 00:00 midnight                                                                                                                                                                                                        |
| Monthly Allowance           | <input type="text"/> GB                                                                                                                                                                                                                                  | <input type="text"/> GB                                                                                                                                                                                                                       |

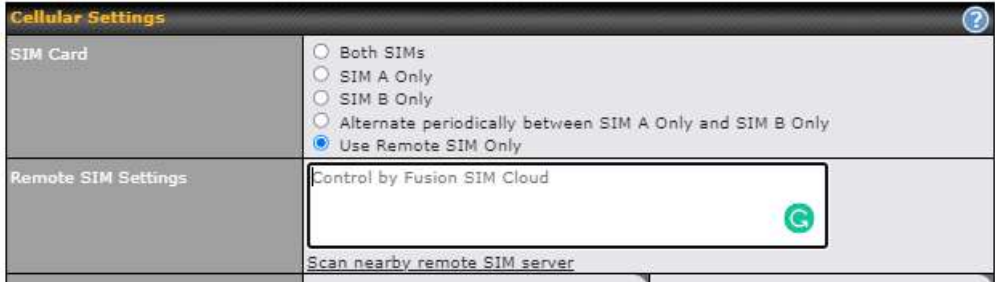
## Cellular Settings

### SIM Card

Indicate which SIM card this cellular WAN will use. Only applies to cellular WAN with redundant SIM cards. For routers that support the SIM Injector, you may select the "Use Remote SIM Only" to provision a SIM from a SIM Injector. Further details on the SIM Injector found is available here: <https://www.peplink.com/products/sim-injector/>.

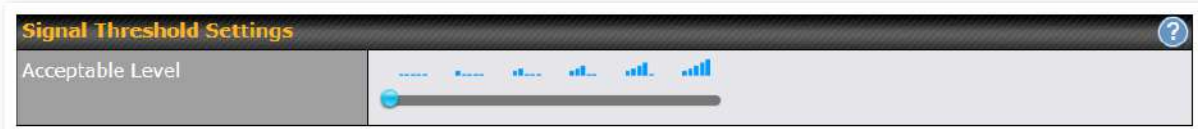
### Preferred SIM

If "Both SIMs" were selected on the above field, then you can designate the priority

|                                  |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |
|----------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Card</b>                      | of the SIM card slots here.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |
| <b>Remote SIM Settings</b>       | <p>If “<b>Use Remote SIM Only</b>” is selected in the SIM card section, the <b>Remote SIM Settings</b> will be shown.</p>  <p>You may need to enable the remote SIM Host settings in the Remote SIM management, see the <b>section 22.10</b> or <b>Appendix B</b> for more details on FusionSIM. After that, click on “<b>Scan nearby remote SIM server</b>” to show the serial number(s) of the connected SIM Injector(s).</p> <p>If you want to select a specific SIM, in the Cellular Settings, type “:” and then the number of the SIM slot, eg.1111-2222-3333:7.</p> |
| <b>LTE/3G</b>                    | This drop-down menu allows restricting cellular to particular band. Click the  button to enable the selection of specific bands.                                                                                                                                                                                                                                                                                                                                                                                                                                       |
| <b>Optimal Network Discovery</b> | Cellular WANs by default will only handover from 3G to LTE network when there is no active data traffic, enable this option will make it run the handover procedures after fallback to 3G for a defined effective period, even this may interrupt the connectivity for a short while.                                                                                                                                                                                                                                                                                                                                                                       |
| <b>Band Selection</b>            | When set to <b>Auto</b> , band selection allows for automatically connecting to available, supported bands (frequencies) .<br>When set to Manual, you can manually select the bands (frequencies) the SIM will connect to.                                                                                                                                                                                                                                                                                                                                                                                                                                  |
| <b>Data Roaming</b>              | This checkbox enables data roaming on this particular SIM card. When data roaming is enabled this option allows you to select in which countries the SIM has a data connection. The option is configured by using MMC (country) codes. Please check your service provider’s data roaming policy before proceeding.                                                                                                                                                                                                                                                                                                                                          |
| <b>Authentication</b>            | Choose from <b>PAP Only</b> or <b>CHAP Only</b> to use those authentication methods exclusively. Select <b>Auto</b> to automatically choose an authentication method.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |
| <b>Operator Settings</b>         | This setting allows you to configure the APN settings of your connection. If <b>Auto</b> 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 <b>Custom</b> to enter your carrier’s <b>APN</b> , <b>Login</b> , <b>Password</b> , and <b>Dial Number</b> settings manually. The correct values can be obtained from your carrier. The default and recommended setting is <b>Auto</b> .                                                                                                     |

|                                         |                                                                                                                                                                                                                                                                                                                                                                                                                                      |
|-----------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>APN / Login / Password / SIM PIN</b> | When <b>Auto</b> is selected, the information in these fields will be filled automatically. Select <b>Custom</b> to customize these parameters. The parameter values are determined by and can be obtained from the ISP.                                                                                                                                                                                                             |
| <b>Bandwidth Allowance Monitor</b>      | Check the box <b>Enable</b> 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.                                                                                                                                                                                                   |
| <b>Action</b>                           | If email notification is enabled, you will be notified by email when usage hits 75% and 95% of the monthly allowance. If <b>Disconnect when usage hits 100% of monthly allowance</b> 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. |
| <b>Start Day</b>                        | This option allows you to define which day of the month each billing cycle begins.                                                                                                                                                                                                                                                                                                                                                   |
| <b>Monthly Allowance</b>                | This field is for defining the maximum bandwidth usage allowed for the WAN connection each month.                                                                                                                                                                                                                                                                                                                                    |

## Signal Threshold Settings

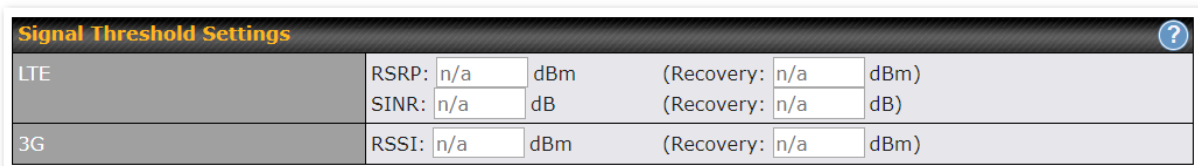


If signal threshold is defined, this connection will be treated as down when a weaker than threshold signal is determined.

The following values are used by the threshold scale:

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

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



| Signal Threshold Settings |       |                                  |     |            |                                  |      |
|---------------------------|-------|----------------------------------|-----|------------|----------------------------------|------|
| LTE                       | RSRP: | <input type="text" value="n/a"/> | dBm | (Recovery: | <input type="text" value="n/a"/> | dBm) |
|                           | SINR: | <input type="text" value="n/a"/> | dB  | (Recovery: | <input type="text" value="n/a"/> | dB)  |
| 3G                        | RSSI: | <input type="text" value="n/a"/> | dBm | (Recovery: | <input type="text" value="n/a"/> | dBm) |

## 9.3 Wi-Fi WAN

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

| WAN Connection Settings      |                                                                                    |
|------------------------------|------------------------------------------------------------------------------------|
| WAN Connection Name          | Wi-Fi WAN                                                                          |
| Independent from Backup WANs | <input type="checkbox"/>                                                           |
| Standby State                | <input checked="" type="radio"/> Remain connected <input type="radio"/> Disconnect |
| Reply to ICMP Ping           | <input checked="" type="radio"/> Yes <input type="radio"/> No                      |

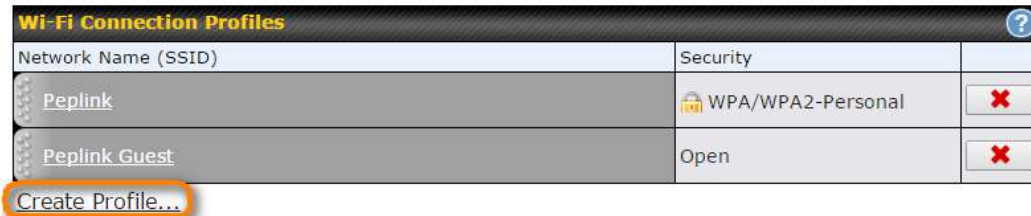
| WAN Connection Settings             |                                                                                                                                                                                                                                                                                                                                                                           |
|-------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>WAN Connection Name</b>          | Enter a name to represent this WAN connection.                                                                                                                                                                                                                                                                                                                            |
| <b>Independent from Backup WANs</b> | If this is checked, the connection will be working independent from other Backup WAN connections. Those in Backup Priority will ignore the status of this WAN connection, and will be used when none of the other higher priority connections are available.                                                                                                              |
| <b>Standby State</b>                | This setting specifies the state of the WAN connection while in standby. The available options are <b>Remain Connected</b> (hot standby) and <b>Disconnect</b> (cold standby).                                                                                                                                                                                            |
| <b>MTU</b>                          | This setting specifies the maximum transmission unit. By default, MTU is set to <b>Custom 1440</b> . You may adjust the MTU value by editing the text field. Click <b>Default</b> to restore the default MTU value. Select <b>Auto</b> and the appropriate MTU value will be automatically detected. The auto-detection will run each time the WAN connection establishes |
| <b>Reply to ICMP PING</b>           | 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 Width               | Auto                                                               |
| Channel                     | <input checked="" type="radio"/> Auto <input type="radio"/> Custom |
| Output Power                | Max <input type="checkbox"/> Boost                                 |
| Data Rate                   | <input checked="" type="radio"/> Auto <input type="radio"/> Fixed  |
| Roaming                     | <input type="checkbox"/> Enable                                    |
| Connect to Any Open Mode AP | <input type="radio"/> Yes <input checked="" type="radio"/> No      |
| Beacon Miss Counter         | 5                                                                  |
| Channel Scan Interval       | 50 ms                                                              |

| Wi-Fi WAN Settings                 |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |
|------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Channel Width</b>               | Select the channel width for this Wi-Fi WAN. 20MHz will have greater support for older devices using 2.4Ghz, while 40MHz is appropriate for networks with newer devices that connect using 5Ghz                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |
| <b>Channel</b>                     | <p>Determine whether the channel will be automatically selected. If you select custom, the following table will appear:</p> <div> <div>Scan Channels</div> <div> <div>Clear All</div> <div>2.4GHz:</div> <div> <input checked="" type="checkbox"/> 1 <input checked="" type="checkbox"/> 2 <input checked="" type="checkbox"/> 3 <input checked="" type="checkbox"/> 4 <input checked="" type="checkbox"/> 5 </div> <div> <input checked="" type="checkbox"/> 6 <input checked="" type="checkbox"/> 7 <input checked="" type="checkbox"/> 8 <input checked="" type="checkbox"/> 9 <input checked="" type="checkbox"/> 10 </div> <div> <input checked="" type="checkbox"/> 11 </div> </div> <div>OK Cancel</div> </div> |
| <b>Output Power</b>                | If you are setting up a network with many Wi-Fi devices in close proximity, then you can configure the output power here. Click the “boost” button for additional power. However, with that option ticked, output power may exceed local regulatory limits.                                                                                                                                                                                                                                                                                                                                                                                                                                                            |
| <b>Data Rate</b>                   | Selecting Auto will enable the router to automatically determine the best data rate, while manually selecting a rate will force devices to connect using the fixed rate.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |
| <b>Roaming</b>                     | Checking this box will enable Wi-Fi roaming. Click the  icon for additional options.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |
| <b>Connect to Any Open Mode AP</b> | This option is to specify whether the Wi-Fi WAN will connect to any open mode access points it finds.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |
| <b>Beacon Miss Counter</b>         | This sets the threshold for the number of missed beacons.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |
| <b>Channel Scan Interval</b>       | Configure Channel Scan Interval in ms.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |

### 9.3.1 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

Create Wi-Fi Connection Profile

Wi-Fi Connection

|                     |                                                                                                                                                                                                                   |
|---------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Network Name (SSID) | <input type="text"/>                                                                                                                                                                                              |
| Security            | WPA2/WPA3-Personal ▼                                                                                                                                                                                              |
| Shared Key          | <input type="text"/> <input checked="" type="checkbox"/> Hide Characters                                                                                                                                          |
| Preferred BSSID     | <input type="checkbox"/>                                                                                                                                                                                          |
| Connection Method   | <div>?</div> DHCP ▼                                                                                                                                                                                               |
| DNS Servers         | <input type="checkbox"/> Obtain DNS server address automatically<br><input type="checkbox"/> Use the following DNS server address(es)<br>DNS Server 1: <input type="text"/><br>DNS Server 2: <input type="text"/> |

OK

Cancel

| 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.                   |

|                         |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |
|-------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Security</b>         | <p>This option allows you to select which security policy is used for this wireless network. Available options:</p> <ul style="list-style-type: none"> <li>• <b>Open</b></li> <li>• <b>WPA3 -Personal (AES:CCMP)</b></li> <li>• <b>WPA2/WPA3 -Personal (AES:CCMP)</b></li> <li>• <b>WPA2 – Personal: AES:CCMP</b></li> <li>• <b>WPA2 – Enterprise: AES: CCMP</b></li> <li>• <b>WPA/ WPA2 – Personal: TKIP/AES:CCMP</b></li> <li>• <b>WPA/ WPA2 – Enterprise: TKIP/AES:CCMP</b></li> </ul> |
| <b>Shared Key</b>       | Enter the password for the wireless network.                                                                                                                                                                                                                                                                                                                                                                                                                                              |
| <b>Preferred BSSID</b>  | Configure the BSSID. The BSSID is the MAC address of the wireless access point (WAP).                                                                                                                                                                                                                                                                                                                                                                                                     |
| <b>Connected Method</b> | Choose DHCP or Static IP.                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |
| <b>DNS Servers</b>      | Configure the DNS servers that this WAN connection should use.                                                                                                                                                                                                                                                                                                                                                                                                                            |

## 9.4 WAN Connection Settings (Common)

The remaining WAN-related settings are common to the WAN connection:

| Physical Interface Settings |                                                                                                                      |
|-----------------------------|----------------------------------------------------------------------------------------------------------------------|
| Port Speed                  | <input type="text" value="Auto"/>                                                                                    |
| MTU                         | <input type="radio"/> Auto <input checked="" type="radio"/> Custom <input type="text" value="1440"/>                 |
| MSS                         | <input checked="" type="radio"/> Auto <input type="radio"/> Custom                                                   |
| MAC Address Clone           | <input checked="" type="radio"/> Default <input type="radio"/> Custom <input type="text" value="10:56:CA:15:92:5D"/> |
| VLAN                        | <input type="checkbox"/>                                                                                             |

| Physical Interface Settings |                                                                                                                                                                                                                                                                                                                                                                                                                                                   |
|-----------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Speed</b>                | <p>This is the port speed of the WAN connection. It should be set to the same speed as the connected device in case of any port negotiation problems.</p> <p>When a static speed is set, you may choose whether to advertise its speed to the peer device or not. Advertise Speed is selected by default. You can choose not to advertise the port speed if the port has difficulty in negotiating with the peer device.</p> <p>Default: Auto</p> |

|                          |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |
|--------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>MTU</b>               | This field is for specifying the Maximum Transmission Unit value of the WAN connection. An excessive MTU value can cause file downloads stall shortly after connected. You may consult your ISP for the connection's MTU value. Default value is 1440.                                                                                                                                                                                                                                                                                                                                                                                                                                          |
| <b>MSS</b>               | <p>This field is for specifying the Maximum Segment Size of the WAN connection.</p> <p>When Auto is selected, MSS will be depended on the MTU value. When Custom is selected, you may enter a value for MSS. This value will be announced to remote TCP servers for maximum data that it can receive during the establishment of TCP connections.</p> <p>Some Internet servers are unable to listen to MTU setting if ICMP is filtered by firewall between the connections.</p> <p>Normally, MSS equals to MTU minus 40. You are recommended to reduce the MSS only if changing of the MTU value cannot effectively inform some remote servers to size down data size.</p> <p>Default: Auto</p> |
| <b>MAC Address Clone</b> | Some service providers (e.g. cable network) identify the client's MAC address and require client to always use the same MAC address to connect to the network. If it is the case, you may change the WAN interface's MAC address to the client PC's one by entering the PC's MAC address to this field. If you are not sure, click the Default button to restore to the default value.                                                                                                                                                                                                                                                                                                          |
| <b>VLAN</b>              | Check the box to assign a VLAN to the interface.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |

## 9.5 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                                                                                                                                                                                      |                                                                                                                                                                                                                                                                                                                                               |
|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Method</b>                                                                                                                                                                                              | This setting specifies the health check method for the WAN connection. This value can be configured as <b>Disabled</b> , <b>PING</b> , <b>DNS Lookup</b> , or <b>HTTP</b> . The default method is <b>DNS Lookup</b> . For mobile Internet connections, the value of <b>Method</b> can be configured as <b>Disabled</b> or <b>SmartCheck</b> . |
| Health Check Disabled                                                                                                                                                                                      |                                                                                                                                                                                                                                                                                                                                               |
| Health Check Method                                                                                                                                                                                        | <div> <span>?</span> <input type="text" value="Disabled"/> </div> <div>Health Check disabled. Network problem cannot be detected.</div>                                                                                                                                                                                                       |
| <p>When <b>Disabled</b> is chosen in the <b>Method</b> field, the WAN connection will always be considered as up. The connection will <b>NOT</b> be treated as down in the event of IP routing errors.</p> |                                                                                                                                                                                                                                                                                                                                               |

### Health Check Method: PING

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

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

|                     |                                                                                             |
|---------------------|---------------------------------------------------------------------------------------------|
| Health Check Method |  HTTP    |
| URL 1               |  http:// |

|              |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |
|--------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>URL1</b>  | <b>WAN Settings&gt;WAN Edit&gt;Health Check Settings&gt;URL1</b><br>The URL will be retrieved when performing an HTTP health check. When <b>String to Match</b> 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 <b>String to Match</b> 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. |
| <b>URL 2</b> | <b>WAN Settings&gt;WAN Edit&gt;Health Check Settings&gt;URL2</b><br>If <b>URL2</b> 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  |                                                                                                                                                                                                                                                                                                                                                                                                                              |
|------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Timeout</b>               | This setting specifies the timeout in seconds for ping/DNS lookup requests. The default timeout is <b>5 seconds</b> .                                                                                                                                                                                                                                                                                                        |
| <b>Health Check Interval</b> | This setting specifies the time interval in seconds between ping or DNS lookup requests. The default health check interval is <b>5 seconds</b> .                                                                                                                                                                                                                                                                             |
| <b>Health Check Retries</b>  | 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 <b>3</b> . Using the default <b>Health Retries</b> setting of <b>3</b> , the corresponding WAN connection will be treated as down after three consecutive timeouts.                                                           |
| <b>Recovery Retries</b>      | 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, <b>Recover Retries</b> is set to <b>3</b> . 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.**

## 9.6 Bandwidth Allowance Monitoring

| Bandwidth Allowance Monitor   |                                                                                                                                                                                                                                                          |
|-------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Bandwidth Allowance Monitor ? | <input checked="" type="checkbox"/> Enable                                                                                                                                                                                                               |
| Action ?                      | Email notification is currently disabled. You can get notified when usage hits 75%/95% of monthly allowance by enabling <a href="#">Email Notification</a> .<br><input checked="" type="checkbox"/> Disconnect when usage hits 100% of monthly allowance |
| Start Day ?                   | On <input type="text" value="1st"/> of each month at 00:00 midnight                                                                                                                                                                                      |
| Monthly Allowance ?           | <input type="text"/> GB                                                                                                                                                                                                                                  |

| Bandwidth Allowance Monitor |                                                                                                                                                                                                                                                                                                                                                                                                                                                           |
|-----------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Action</b>               | <p>If <b>Email Notification</b> is enabled, you will be notified by email when usage hits 75% and 95% of the monthly allowance.</p> <p>If <b>Disconnect when usage hits 100% of monthly allowance</b> 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.</p> |
| <b>Start Day</b>            | This option allows you to define which day of the month each billing cycle begins.                                                                                                                                                                                                                                                                                                                                                                        |
| <b>Monthly Allowance</b>    | This field is for defining the maximum bandwidth usage allowed for the WAN connection each month.                                                                                                                                                                                                                                                                                                                                                         |

### Disclaimer

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

## 9.7 Additional Public IP address

| Additional Public IP Settings |                                                                                                                                                                                                                                                                                                                                                                                 |
|-------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>IP Address List</b>        | <p><b>IP Address List</b> 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 <b>Down Arrow</b> button to populate IP address entries to the <b>IP Address List</b>.</p> |

## 9.8 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 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 | <input type="text" value="changeip.com"/> |
| User ID                      | <input type="text"/>                      |
| Password                     | <input type="password"/>                  |
| Confirm Password             | <input type="password"/>                  |
| Hosts                        | <input type="text"/>                      |

### Dynamic DNS Settings

#### Dynamic DNS

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...

#### Account Name / Email Address

Support custom Dynamic DNS servers by entering its URL. Works with any service compatible with DynDNS API.

Select **Disabled** to disable this feature.

#### Password / TZO Key

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

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 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.

## 10 Advanced Wi-Fi Settings

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

| AP Settings         |                                                                                                                                                 |
|---------------------|-------------------------------------------------------------------------------------------------------------------------------------------------|
| SSID                | <input checked="" type="checkbox"/> 2.4 GHz <input checked="" type="checkbox"/> 5 GHz           Integrated AP supports 2.4 GHz only.<br>Testing |
| Operating Country   | United States ▼                                                                                                                                 |
| Preferred Frequency | <input checked="" type="radio"/> 2.4 GHz <input type="radio"/> 5 GHz<br>Integrated AP supports 2.4 GHz only.                                    |

| AP Settings                |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |
|----------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>SSID</b>                | You can select the wireless networks for 2.4 GHz or 5 GHz separately for each SSID.                                                                                                                                                                                                                                                                                                                                                                                                                                                                |
| <b>Operating Country</b>   | <p>This drop-down menu specifies the national/regional regulations which the Wi-Fi radio should follow.</p> <ul style="list-style-type: none"> <li>If a North American region is selected, RF channels 1 to 11 will be available and the maximum transmission power will be 26 dBm (400 mW).</li> <li>If European region is selected, RF channels 1 to 13 will be available. The maximum transmission power will be 20 dBm (100 mW).</li> </ul> <p><b>Note:</b> Users are required to choose an option suitable to local laws and regulations.</p> |
| <b>Preferred Frequency</b> | Indicate the preferred frequency to use for clients to connect.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |

### Important Note

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

|                                  | 2.4 GHz                                                                                         | 5 GHz                                                                                                                                           |
|----------------------------------|-------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------|
| Protocol                         | 802.11ng                                                                                        | 802.11n/ac                                                                                                                                      |
| Channel Width                    | 20 MHz ▾                                                                                        | Auto ▾                                                                                                                                          |
| Channel                          | Auto ▾ <input type="button" value="Edit"/><br>Channels: 1 2 3 4 5 6 7 8 9 10 11                 | Auto ▾ <input type="button" value="Edit"/><br>Channels: 36 40 44 48 52 56 60 64 100 104 108 112 116 120 124 128 132 136 140 149 153 157 161 165 |
| Auto Channel Update              | Daily at 03 ▾ :00<br><input checked="" type="checkbox"/> Wait until no active client associated | Daily at 03 ▾ :00<br><input checked="" type="checkbox"/> Wait until no active client associated                                                 |
| Output Power                     | Fixed: Max ▾ <input type="checkbox"/> Boost                                                     | Fixed: Max ▾ <input type="checkbox"/> Boost                                                                                                     |
| Client Signal Strength Threshold | 0 -95 dBm (0: Unlimited)                                                                        | 0 -95 dBm (0: Unlimited)                                                                                                                        |
| Maximum number of clients        | 0 (0: Unlimited)                                                                                | 0 (0: Unlimited)                                                                                                                                |

### AP Settings (part 2)

|                                         |                                                                                                                                                                                                                                                                              |
|-----------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Protocol</b>                         | This option allows you to specify whether 802.11b and/or 802.11g client association requests will be accepted. Available options are <b>802.11ng</b> and <b>802.11na</b> . By default, <b>802.11ng</b> is selected.                                                          |
| <b>Channel Width</b>                    | Available options are <b>20 MHz</b> , <b>40 MHz</b> , and <b>Auto (20/40 MHz)</b> . Default is <b>Auto (20/40 MHz)</b> , which allows both widths to be used simultaneously.                                                                                                 |
| <b>Channel</b>                          | This option allows you to select which 802.11 RF channel will be utilized. <b>Channel 1 (2.412 GHz)</b> is selected by default.                                                                                                                                              |
| <b>Auto Channel Update</b>              | Indicate the time of day at which update automatic channel selection.                                                                                                                                                                                                        |
| <b>Output Power</b>                     | This option is for specifying the transmission output power for the Wi-Fi AP. There are 4 relative power levels available – <b>Max</b> , <b>High</b> , <b>Mid</b> , and <b>Low</b> . The actual output power will be bound by the regulatory limits of the selected country. |
| <b>Client Signal Strength Threshold</b> | Clients with signal strength lower than this value will not be allowed to connect.                                                                                                                                                                                           |
| <b>Maximum number of clients</b>        | This setting determines the maximum number of clients that can connect to this Wi-Fi frequency.                                                                                                                                                                              |

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**.

|                           |                                                                                                                                                                                                                                 |
|---------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Management VLAN ID        |  Untagged LAN (No VLAN) ▼                                                                                                                      |
| Operating Schedule        | Always on ▼                                                                                                                                                                                                                     |
| Beacon Rate               |  1 Mbps ▼ 6 Mbps will be used for 5 GHz radio                                                                                                  |
| Beacon Interval           |  100 ms ▼                                                                                                                                      |
| DTIM                      |  1 <input type="button" value="Default"/>                                                                                                      |
| RTS Threshold             | 0 <input type="button" value="Default"/>                                                                                                                                                                                        |
| Fragmentation Threshold   | 0 (0: Disable) <input type="button" value="Default"/>                                                                                                                                                                           |
| Distance / Time Converter | <br>4050 m<br><small>Note: Input distance for recommended values</small>                                                                       |
| Slot Time                 |  <input type="radio"/> Auto <input checked="" type="radio"/> Custom 9 <input type="button" value="Default"/> <input type="button" value="μs"/> |
| ACK Timeout               |  48 <input type="button" value="Default"/> <input type="button" value="μs"/>                                                                   |
| Frame Aggregation         | <input type="checkbox"/>                                                                                                                                                                                                        |

### Advanced AP Settings

#### Management VLAN ID

This field specifies the VLAN ID to tag to management traffic, such as communication traffic between the AP and the AP Controller. The value is zero by default, which means that no VLAN tagging will be applied.

Note: Change this value with caution as alterations may result in loss of connection to the AP Controller.

#### Operating Schedule

Choose from the schedules that you have defined in System>Schedule. Select the schedule for the integrated AP to follow from the drop-down menu.

#### Beacon Rate <sup>A</sup>

This option is for setting the transmit bit rate for sending a beacon. By default, **1Mbps** is selected.

#### Beacon Interval <sup>A</sup>

This option is for setting the time interval between each beacon. By default, **100ms** is selected.

#### DTIM <sup>A</sup>

This field allows you to set the frequency for the beacon to include delivery traffic indication messages. The interval is measured in milliseconds. The default value is set to **1 ms**.

#### RTS Threshold <sup>A</sup>

The RTS (Request to Clear) threshold determines the level of connection required before the AP starts sending data. The recommended standard of the RTS threshold is around 500.

#### Fragmentation Threshold <sup>A</sup>

This setting determines the maximum size of a packet before it gets fragmented into multiple pieces.

#### Distance / Time Converter

Select the range you wish to cover with your Wi-Fi, and the router will make recommendations for the Slot Time and ACK Timeout.

#### Slot Time <sup>A</sup>

This field is for specifying the unit wait time before transmitting a packet. By default, this field is set to **9 μs**.

### ACK Timeout <sup>A</sup>

This field is for setting the wait time to receive an acknowledgement packet before performing a retransmission. By default, this field is set to **48 μs**.

### Frame Aggregation <sup>A</sup>

This option allows you to enable frame aggregation to increase transmission throughput.

<sup>A</sup> - Advanced feature, please click the  button on the top right-hand corner to activate.

| Web Administration Settings (on External AP) |                                                                     |
|----------------------------------------------|---------------------------------------------------------------------|
| Enable                                       | <input checked="" type="checkbox"/>                                 |
| Web Access Protocol                          | <input type="radio"/> HTTP <input checked="" type="radio"/> HTTPS   |
| Management Port                              | <input type="text" value="443"/>                                    |
| HTTP to HTTPS Redirection                    | <input checked="" type="checkbox"/>                                 |
| Admin Username                               | <input type="text" value="admin"/>                                  |
| Admin Password                               | <input type="text" value="601202b1afc6"/> <button>Generate</button> |

## Web Administration Settings

### Enable

Ticking this box enables web admin access for APs located on the WAN.

### Web Access Protocol

Determines whether the web admin portal can be accessed through HTTP or HTTPS

### Management Port

Determines the port at which the management UI can be accessed.

### Admin Username

Determines the username to be used for logging into the web admin portal

### Admin Password

Determines the password for the web admin portal on external AP.

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      | <input type="text" value="20/40 MHz"/>                          |
| Bit Rate           | <input type="text" value="Auto"/>                               |
| Output Power       | <input type="text" value="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.

## 11 MediaFast Configuration

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

### 11.1 Setting Up MediaFast Content Caching

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



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

**Secure Content Caching**

Enable ☐ Note: Please enable MediaFast for Secure Content Caching

Domains / IP Addresses ☐ Cache all ☒ Whitelist ☐ Blacklist

googlevideo.com  
youtube.com

Source IP Subnet ☐ Any ☐ Custom

The **Secure Content Caching** menu operates identically to the **MediaFast** menu, except it is for secure content caching accessible through https://.

In order for Mediafast devices to cache and deliver HTTPS content, every client needs to have the necessary certificates installed\*.

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

**Cache Control**

Content Type ☒ Video ☒ Audio ☒ Images ☒ OS / Application Updates

Cache Lifetime Settings

| File Extension | Lifetime (days) |
|----------------|-----------------|
|                |                 |

+

| Cache Control                  |                                                                                                                                                                                                |
|--------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Content Type</b>            | Check these boxes to cache the listed content types or leave boxes unchecked to disable caching for the listed types.                                                                          |
| <b>Cache Lifetime Settings</b> | 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. |

## 11.2 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**.

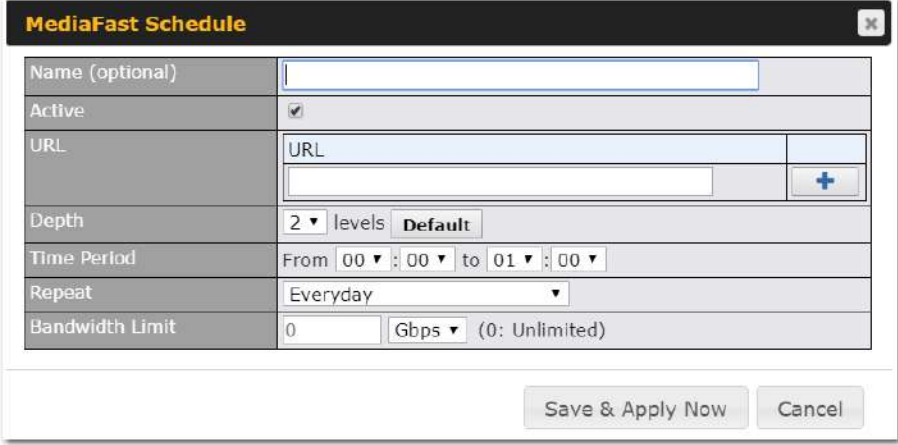
| Prefetch Schedule                                                |             |               |               |               |                                                                                     |               |                                                                                                                                                                                                                                                             |
|------------------------------------------------------------------|-------------|---------------|---------------|---------------|-------------------------------------------------------------------------------------|---------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Name                                                             | Status      | Next Run Time | Last Run Time | Last Duration | Result                                                                              | Last Download | Actions                                                                                                                                                                                                                                                     |
| ▶ Course Progress                                                | Downloading | 04-11 06:00   | 04-09 02:03   | -             |  | 0 B           |    |
| ▶ National Geog                                                  | Ready       | 04-11 00:00   | 04-09 00:00   | 00:01         |  | 4.98 kB       |    |
| ▶ Syllabus                                                       | Downloading | 04-11 06:00   | 04-09 06:00   | -             |  | 0 B           |    |
| ▶ Vimeo                                                          | Ready       | 04-11 00:00   | 04-09 02:03   | 00:01         |  | 115.91 kB     |    |
| ▶ ted                                                            | Ready       | 04-11 00:00   | 04-09 00:00   | 00:01         |  | 62.26 kB      |    |
| <a href="#">New Schedule</a>                                     |             |               |               |               |                                                                                     |               |                                                                                                                                                                                                                                                             |
| Tools                                                            |             |               |               |               |                                                                                     |               |                                                                                                                                                                                                                                                             |
| <a href="#">Clear Web Cache</a> <a href="#">Clear Statistics</a> |             |               |               |               |                                                                                     |               |                                                                                                                                                                                                                                                             |

| Prefetch Schedule Settings         |                                                                                                                                                                                                                                                                                                                                                                                                                     |
|------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Name</b>                        | This field displays the name given to the scheduled download.                                                                                                                                                                                                                                                                                                                                                       |
| <b>Status</b>                      | Check the status of your scheduled download here.                                                                                                                                                                                                                                                                                                                                                                   |
| <b>Next Run Time/Last Run Time</b> | These fields display the date and time of the next and most recent occurrences of the scheduled download.                                                                                                                                                                                                                                                                                                           |
| <b>Last Duration</b>               | 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.                                                                                                      |
| <b>Result</b>                      | This field indicates whether downloads are in progress (  ) or complete (  ).                                                                                                                                                             |
| <b>Last Download</b>               | 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. |
| <b>Actions</b>                     | <p>To begin a scheduled download immediately, click .</p> <p>To cancel a scheduled download, click .</p> <p>To edit a scheduled download, click .</p>    |

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



The dialog box titled "MediaFast Schedule" contains the following fields and controls:

- Name (optional):** A text input field.
- Active:** A checkbox that is checked.
- URL:** A text input field with a blue highlight, followed by a "+" button.
- Depth:** A dropdown menu showing "2" and a "levels" label, followed by a "Default" button.
- Time Period:** A field showing "From 00 : 00 to 01 : 00" with dropdown arrows for each time segment.
- Repeat:** A dropdown menu showing "Everyday".
- Bandwidth Limit:** A field showing "0" followed by a "Gbps" dropdown and "(0: Unlimited)".

At the bottom right of the dialog are two buttons: "Save & Apply Now" and "Cancel".

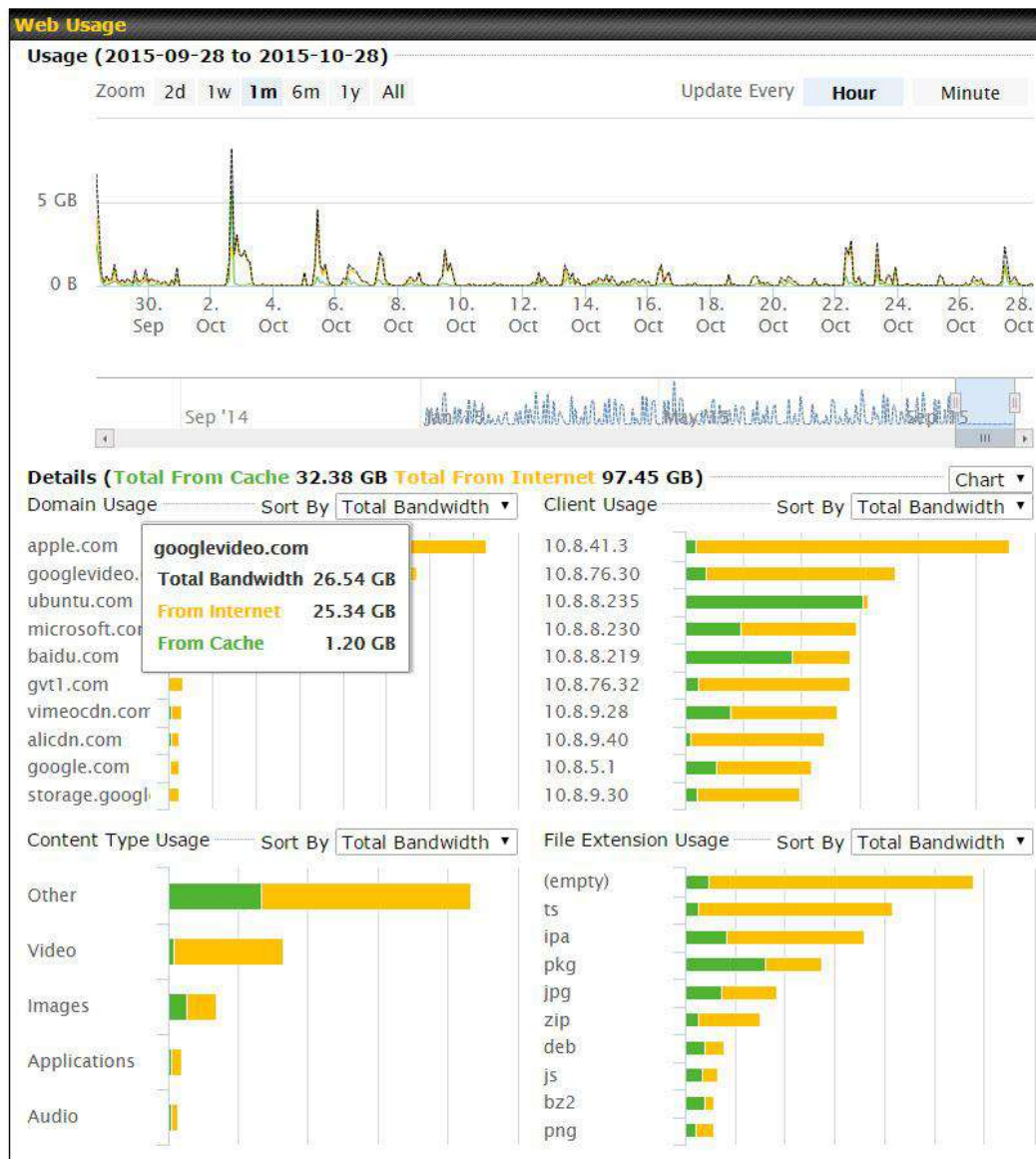
Simply provide the requested information to create your schedule.

**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.

## 11.3 Viewing MediaFast Statistics

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



## 12 ContentHub

ContentHub allows you to deliver webpages and applications to users connected to the SSID using the local storage on your router, like the Max HD2/HD4 with Mediafast, which can store up to 8GB of media. Users will be able to access news, articles, videos, and access your web app without the need for internet access.

The ContentHub can be used to provide infotainment to connected users on transport.

### 12.1 Configuring the ContentHub

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

ContentHub storage has not been configured. Click [here](#) to review storage configuration

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



| ContentHub                   |        |                                     |              |              |        |         |
|------------------------------|--------|-------------------------------------|--------------|--------------|--------|---------|
| Enable                       |        | <input checked="" type="checkbox"/> |              |              |        |         |
| <button>Save</button>        |        |                                     |              |              |        |         |
| Schedule                     |        |                                     |              |              |        |         |
| Websites                     | Source | Next Update                         | Last Updated | Elapsed Time | Status | Actions |
| No Schedule                  |        |                                     |              |              |        |         |
| <button>New Website</button> |        |                                     |              |              |        |         |

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

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

### 12.2 Configure a website for ContentHub

This option allows you to sync a website to the Pepwave router. This website will then be published with the specified domain from the router itself and makes the content available to the client via the HTTP/HTTPS protocol.

Only FTP sync is supported for this type of ContentHub content.

The content should be uploaded to an FTP server before you sync it with ContentHub.

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

Schedule

|                 |                                                                            |
|-----------------|----------------------------------------------------------------------------|
| Active          | <input checked="" type="checkbox"/>                                        |
| Type            | <input checked="" type="radio"/> Website <input type="radio"/> Application |
| Protocol        | HTTP                                                                       |
| Domain/Path     | http://                                                                    |
| Source          | <div>ftp ://</div> <div>Username:</div> <div>Password:</div>               |
| Period          | <div>Everyday</div> <div>From 00 : 00 to 01 : 00</div>                     |
| Bandwidth Limit | 0 Gbps (0: Unlimited)                                                      |

Save & Apply Now

Cancel

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

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

| Schedule            |                          |             |              |              |        |           |
|---------------------|--------------------------|-------------|--------------|--------------|--------|-----------|
| Websites            | Source                   | Next Update | Last Updated | Elapsed Time | Status | Actions   |
| ▼ http://mytest.com |                          |             |              |              |        | + ✎ ✕     |
| /(root)             | ftp://10.8.76.254/web... | -           | -            | -            |        | ⬇️ ↗️ ✎ ✕ |
| New Website         |                          |             |              |              |        |           |

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

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

| Schedule            |                          |             |              |              |        |                                                                               |
|---------------------|--------------------------|-------------|--------------|--------------|--------|-------------------------------------------------------------------------------|
| Websites            | Source                   | Next Update | Last Updated | Elapsed Time | Status | Actions                                                                       |
| ▼ http://mytest.com |                          |             |              |              |        | + ✎ ✕                                                                         |
| /(root)             | ftp://10.8.76.254/web... | -           | 05-23 03:41  | 00:00:11     | ✓      | ⬇️ ↗️ ✎ ✕                                                                     |
| New Website         |                          |             |              |              |        |                                                                               |
|                     |                          |             |              |              |        | <b>Status details</b> <a href="#">Close</a><br>Completed<br>+1 / 0 / -0 files |

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

## 12.3 Configure an application for ContentHub

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

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

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

**PEPWAVE** Dashboard SpeedFusion Cloud Network Advanced AP **System** Status Apply Changes

**System**

- Admin Security
- Firmware
- Time
- Schedule
- Email Notification
- Event Log
- SNMP
- InControl
- Configuration
- Feature Add-ons
- Reboot

**Tools**

- Ping
- Traceroute
- Wake-on-LAN
- WAN Analysis
- Storage Manager
- **Package Manager**

(Last Update: Tue May 23 04:02:36 UTC 2017)

**Package List** Update All

|                                                                                                  |  |
|--------------------------------------------------------------------------------------------------|--|
| <b>Node.js</b><br>Version: 6.9.2 (17178)<br>Size: 8.99 MB<br>Date: Fri Feb 24 07:45:28 UTC 2017  |  |
| <b>Python</b><br>Version: 2.7.12 (17178)<br>Size: 20.29 MB<br>Date: Fri Feb 24 07:45:28 UTC 2017 |  |
| <b>Ruby</b><br>Version: 2.3.3 (17178)<br>Size: 31.44 MB<br>Date: Fri Feb 24 07:45:30 UTC 2017    |  |

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

**Schedule** ✕

|                 |                                                                            |
|-----------------|----------------------------------------------------------------------------|
| Active          | <input checked="" type="checkbox"/>                                        |
| Type            | <input type="radio"/> Website <input checked="" type="radio"/> Application |
| Protocol        | HTTP                                                                       |
| Domain          | http://                                                                    |
| Method          | <input checked="" type="radio"/> Sync <input type="radio"/> File Upload    |
| Source          | ftp ://<br>Username:<br>Password:                                          |
| Period          | Everyday<br>From 00 : 00 to 01 : 00                                        |
| Bandwidth Limit | 0 Gbps (0: Unlimited)                                                      |

Save & Apply Now Cancel

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

Application type content need to be packed as explained below:

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

## 13 Docker

MediaFast enabled routers can host Docker containers when running Firmware 7.1 or later.

Docker is an open platform for developing, shipping, and running applications.

From Firmware version 7.1.0 and upwards, it is possible to install and run Docker Containers on your Pepwave routers with MediaFast, such as the MAX HD2 and the MAX HD4.

Due to the nature of Docker and its unlimited variables, this feature is supported by Pepwave up to the point of creating a running Docker Container.

Information about Docker can be found on the Docker Documentation site:

<https://docs.docker.com/> 2

This will allow you to run a file sharing platform (ownCloud), a web server (WordPress, Joomla!), a learning platform (Moodle), or a visualisation tool for viewing large scale data (Kibana).

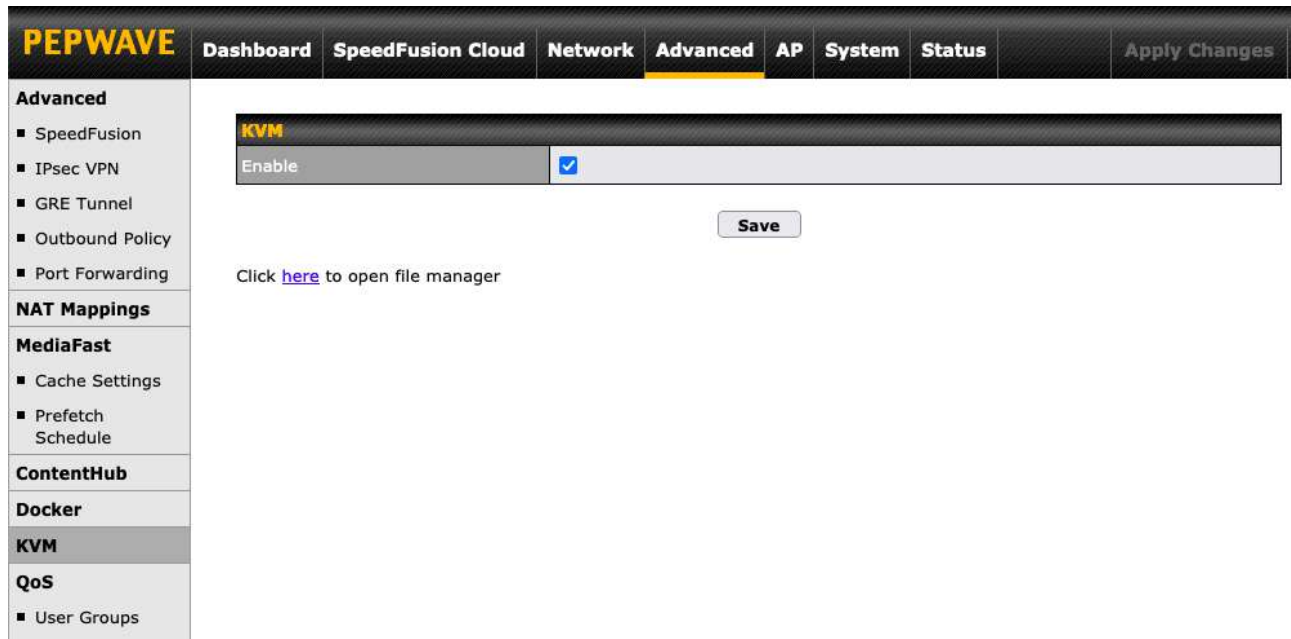
When creating a new Docker Container, the Pepwave router will search through the Docker Hub repository. <https://hub.docker.com/explore/> 7

For detailed configuration instructions, refer to our knowledge base:

<https://forum.peplink.com/t/how-to-run-a-docker-application-on-a-peplink-mediafast-router/16021>

## 14 KVM

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



**PEPWAVE** | Dashboard | SpeedFusion Cloud | Network | **Advanced** | AP | System | Status | Apply Changes

**Advanced**

- SpeedFusion
- IPsec VPN
- GRE Tunnel
- Outbound Policy
- Port Forwarding

**NAT Mappings**

**MediaFast**

- Cache Settings
- Prefetch Schedule

**ContentHub**

**Docker**

**KVM**

**QoS**

- User Groups

**KVM**

Enable ☒

Save

Click [here](#) to open file manager

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

1. [How to install a Virtual Machine on Peplink/Pepwave - MediaFast/ContentHub Routers](#)
2. [How to Install Virtual Machine with USB storage on Peplink/Pepwave - MediaFast/ContentHub Routers](#)

## 15 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.

## 15.1 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) | ?                                                                                   |
|---------------------------------------------------------------------------------------------|----------------|--------------------|-------------------------------------------------------------------------------------|
|  EL Office | 8345-5F7A-DE97 |                    |  |
| <input type="button" value="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

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.

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 Pepwave or Peplink device via the available WAN connections. Each profile is for making a VPN connection with one remote Pepwave or Peplink Device.

| PepVPN Profile                            |                                                                                                                                                          |           |                |                      |                      |
|-------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------|-----------|----------------|----------------------|----------------------|
| Name                                      | <input type="text"/>                                                                                                                                     |           |                |                      |                      |
| Enable                                    | <input checked="" type="checkbox"/>                                                                                                                      |           |                |                      |                      |
| Encryption                                | <input checked="" type="radio"/> 256-bit AES <input type="radio"/> OFF                                                                                   |           |                |                      |                      |
| Authentication                            | <input checked="" type="radio"/> Remote ID / Pre-shared Key                                                                                              |           |                |                      |                      |
| Remote ID / Pre-shared Key                | <table border="1"> <tr> <td>Remote ID</td> <td>Pre-shared Key</td> </tr> <tr> <td><input type="text"/></td> <td><input type="text"/></td> </tr> </table> | Remote ID | Pre-shared Key | <input type="text"/> | <input type="text"/> |
| Remote ID                                 | Pre-shared Key                                                                                                                                           |           |                |                      |                      |
| <input type="text"/>                      | <input type="text"/>                                                                                                                                     |           |                |                      |                      |
| NAT Mode                                  | <input type="checkbox"/>                                                                                                                                 |           |                |                      |                      |
| Remote IP Address / Host Names (Optional) | <input type="text"/><br><small>If this field is empty, this field on the remote unit must be filled</small>                                              |           |                |                      |                      |
| Cost                                      | <input type="text" value="10"/>                                                                                                                          |           |                |                      |                      |
| Data Port                                 | <input checked="" type="radio"/> Auto <input type="radio"/> Custom <input type="text"/>                                                                  |           |                |                      |                      |
| Bandwidth Limit                           | <input type="checkbox"/>                                                                                                                                 |           |                |                      |                      |
| WAN Smoothing                             | <input type="text" value="Off"/>                                                                                                                         |           |                |                      |                      |
| Forward Error Correction                  | <input type="text" value="Off"/>                                                                                                                         |           |                |                      |                      |
| Receive Buffer                            | <input type="text" value="0"/> ms                                                                                                                        |           |                |                      |                      |
| Packet Fragmentation                      | <input checked="" type="radio"/> Always <input type="radio"/> Use DF Flag                                                                                |           |                |                      |                      |
| Use IP ToS                                | <input type="checkbox"/>                                                                                                                                 |           |                |                      |                      |
| Latency Difference Cutoff                 | <input type="text" value="500"/> ms                                                                                                                      |           |                |                      |                      |

| PepVPN Profile Settings           |                                                                                                                                                                                                                                                                                                                                                                                                                       |
|-----------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Name</b>                       | 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 ( ).                                                                                                                                                                                                   |
| <b>Active</b>                     | When this box is checked, this VPN connection profile will be enabled. Otherwise, it will be disabled.                                                                                                                                                                                                                                                                                                                |
| <b>Encryption</b>                 | By default, VPN traffic is encrypted with <b>256-bit AES</b> . If <b>Off</b> is selected on both sides of a VPN connection, no encryption will be applied.                                                                                                                                                                                                                                                            |
| <b>Authentication</b>             | Select from <b>By Remote ID Only</b> , <b>Preshared Key</b> , or <b>X.509</b> to specify the method the Pepwave MAX will use to authenticate peers. When selecting <b>By Remote ID Only</b> , be sure to enter a unique peer ID number in the <b>Remote ID</b> field.                                                                                                                                                 |
| <b>Remote ID / Pre-shared Key</b> | This optional field becomes available when <b>Remote ID / Pre-shared Key</b> is selected as the Pepwave router's VPN <b>Authentication</b> method, as explained above. <b>Pre-shared Key</b> 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 |

|                                                  |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |
|--------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
|                                                  | <p>match. When the peer is running firmware 5.0+, this setting will be ignored.</p> <p>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.</p>                                                                                                                                                                                                                                                                                                                                             |
| <b>Remote ID/Remote Certificate</b>              | <p>These optional fields become available when <b>X.509</b> is selected as the Pepwave MAX'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 <b>Show Details</b> link below the field.</p>                                                                                                                                                                                                                                                                                                                                           |
| <b>Allow Shared Remote ID</b>                    | <p>When this option is enabled, the router will allow multiple peers to run using the same remote ID.</p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |
| <b>NAT Mode</b>                                  | <p>Check this box to allow the local DHCP server to assign an IP address to the remote peer. When <b>NAT Mode</b> is enabled, all remote traffic over the VPN will be tagged with the assigned IP address using network address translation.</p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |
| <b>Remote IP Address / Host Names (Optional)</b> | <p>If <b>NAT Mode</b> 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.</p> <p>This field is optional. With this field filled, the Pepwave MAX will initiate connection to each of the remote IP addresses until it succeeds in making a connection. If the field is empty, the Pepwave MAX will wait for connection from the remote peer. Therefore, at least one of the two VPN peers must specify this value. Otherwise, VPN connections cannot be established.</p> |
| <b>Cost</b>                                      | <p>Define path cost for this profile.</p> <p>OSPF will determine the best route through the network using the assigned cost.</p> <p>Default: 10</p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |
| <b>Data Port</b>                                 | <p>This field is used to specify a UDP port number for transporting outgoing VPN data. If <b>Default</b> 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 <b>Custom</b> is selected, enter an outgoing port number from 1 to 65535.</p> <p>Click the  icon to configure data stream using TCP protocol [EXPERIMENTAL]. In the case TCP protocol is used, the exposed TCP session option can be authorised to work with TCP accelerated WAN link.</p>                                                                     |
| <b>Bandwidth Limit</b>                           | <p>Define maximum download and upload speed to each individual peer. This functionality requires the peer to use PepVPN version 4.0.0 or above.</p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |
| <b>WAN Smoothing</b>                             | <p>While using PepVPN, utilize multiple WAN links to reduce the impact of packet loss and get the lowest possible latency at the expense of extra bandwidth consumption. This is suitable for streaming applications where the average bitrate requirement is much lower than the WAN's available bandwidth.</p>                                                                                                                                                                                                                                                                                                                                                                                                     |

|                                              |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |
|----------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
|                                              | <p>Off - Disable WAN Smoothing.</p> <p>Normal - The total bandwidth consumption will be at most 2x of the original data traffic.</p> <p>Medium - The total bandwidth consumption will be at most 3x of the original data traffic.</p> <p>High - The total bandwidth consumption depends on the number of connected active tunnels.</p>                                                                                                                                                 |
| <b>Forward Error Correction</b>              | <p>Forward Error Correction (FEC) can help to recover packet loss by using extra bandwidth to send redundant data packets. Higher FEC level will recover packets on a higher loss rate link.</p> <p>The expected overhead of Low is 13.3% and High is 26.7%.</p> <p>Require peer using PepVPN version 8.0.0 and above.</p>                                                                                                                                                             |
| <b>Receive Buffer</b>                        | <p>Receive Buffer can help to reduce out-of-order packets and jitter, but will introduce extra latency to the tunnel. Default is 0 ms, which disables the buffer, and maximum buffer size is 2000 ms.</p>                                                                                                                                                                                                                                                                              |
| <b>Packet Fragmentation</b>                  | <p>If the packet size is larger than the tunnel's MTU, it will be fragmented inside the tunnel in order to pass through.</p> <p>Select Always to fragment any packets that are too large to send, or Use DF Flag to only fragment packets with Don't Fragment bit cleared. This can be useful if your application does Path MTU Discovery, usually sending large packets with DF bit set, if allowing them to go through by fragmentation, the MTU will not be detected correctly.</p> |
| <b>Use IP ToS<sup>A</sup></b>                | <p>Checking this button enables the use of IP ToS header field.</p>                                                                                                                                                                                                                                                                                                                                                                                                                    |
| <b>Latency Difference Cutoff<sup>A</sup></b> | <p>Traffic will be stopped for links that exceed the specified millisecond value with respect to the lowest latency link. (e.g. Lowest latency is 100ms, a value of 500ms means links with latency 600ms or more will not be used)</p>                                                                                                                                                                                                                                                 |

<sup>A</sup> - 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



| Traffic Distribution         |                                                                                   |                            |
|------------------------------|-----------------------------------------------------------------------------------|----------------------------|
| Policy                       |  | Dynamic Weighted Bonding ▼ |
| Congestion Latency Level     |  | Default ▼                  |
| Ignore Packet Loss Event     |  | <input type="checkbox"/>   |
| Disable Bufferbloat Handling |  | <input type="checkbox"/>   |
| Disable TCP ACK Optimization |  | <input type="checkbox"/>   |
| Packet Jitter Buffer         |  | 150 ms                     |

| Traffic Distribution                |                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |
|-------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Policy</b>                       | <p>This option allows you to select the desired out-bound traffic distribution policy:</p> <ul style="list-style-type: none"> <li>Bonding - Aggregate multiple WAN-to-WAN links into a single higher throughput tunnel.</li> <li>Dynamic Weighted Bonding - Aggregates WAN-to-WAN links with similar latencies.</li> </ul> <p>By default, Bonding is selected as a traffic distribution policy.</p>                                                             |
| <b>Congestion Latency Level</b>     | <p>For most WANs, especially on cellular networks, the latency will increase when the link becomes more congested.</p> <p>Setting the <b>Congestion Latency Level</b> to <b>Low</b> will treat the link as congested more aggressively.</p> <p>Setting it to <b>High</b> will allow the latency to increase more before treating it as congested.</p>                                                                                                           |
| <b>Ignore Packet Loss Event</b>     | <p>By default, when there is packet loss, it is considered as a congestion event. If this is not the case, select this option to ignore the packet loss event.</p>                                                                                                                                                                                                                                                                                              |
| <b>Disable Bufferbloat Handling</b> | <p>Bufferbloat is a phenomenon on the WAN side when it is congested. The latency can become very high due to buffering on the uplink. By default, the Dynamic Weighted Bonding policy will try its best to mitigate bufferbloat by reducing TCP throughput when the WAN is congested. However, as a side effect, the tunnel might not achieve maximum bandwidth.</p> <p>Selecting this option will <b>disable</b> the bufferbloat handling mentioned above.</p> |
| <b>Disable TCP ACK Optimization</b> | <p>By default, TCP ACK will be forwarded to remote peers as fast as possible. This will consume more bandwidth, but may help to improve TCP performance as well.</p> <p>Selecting this option will <b>disable</b> the TCP ACK optimization mentioned above.</p>                                                                                                                                                                                                 |
| <b>Packet Jitter Buffer</b>         | <p>The default jitter buffer is 150ms, and can be modified from 0ms to 500ms. The jitter buffer may increase the tunnel latency. If you want to keep the latency as low as possible, you can set it to 0ms to disable the buffer.</p> <p><b>Note:</b> If the Receive Buffer is set, the Packet Jitter Buffer will be automatically disabled.</p>                                                                                                                |

| WAN Connection Priority <span>?</span> |               |           |                   |                      |                                        |
|----------------------------------------|---------------|-----------|-------------------|----------------------|----------------------------------------|
|                                        | 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:

Send All Traffic To

☒ Balance 2942-1257-1241

DNS Server  
8.8.8.8  
8.8.4.4

☒ Backup Site Balance-4810-1825-068E-4810

DNS Server  
8.8.8.8  
8.8.4.4

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.

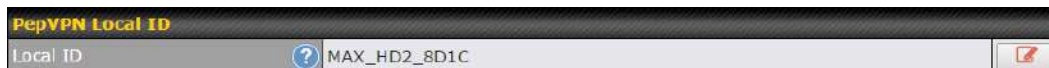
### Outbound Policy/PepVPN Outbound Custom Rules

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.



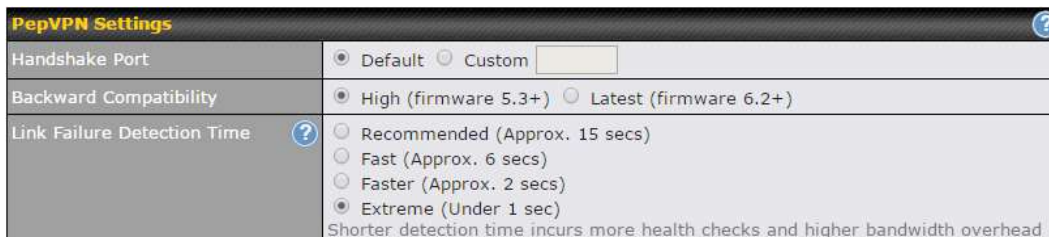
The screenshot shows two configuration windows. The top window, titled 'Outbound Policy', has a dropdown menu set to 'According to custom rules' and an edit icon. The bottom window, titled 'PepVPN Outbound Custom Rules', is a table with columns: Service, Algorithm, Source, Destination, and Protocol. The 'Destination' column contains the text '(Auto)'. Below the table is an 'Add Rule' button.



The screenshot shows the 'PepVPN Local ID' configuration window. It has a label 'Local ID' followed by a text field containing 'MAX\_HD2\_8D1C' and a question mark icon. To the right is an edit icon.

### PepVPN 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**.



The screenshot shows the 'PepVPN Settings' configuration window. It has three main sections: 'Handshake Port' with radio buttons for 'Default' (selected) and 'Custom' (with an adjacent text field); 'Backward Compatibility' with radio buttons for 'High (firmware 5.3+)' (selected) and 'Latest (firmware 6.2+)'; and 'Link Failure Detection Time' with radio buttons for 'Recommended (Approx. 15 secs)' (selected), 'Fast (Approx. 6 secs)', 'Faster (Approx. 2 secs)', and 'Extreme (Under 1 sec)'. A note at the bottom states: 'Shorter detection time incurs more health checks and higher bandwidth overhead'.

### PepVPN Settings

|                                    |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |
|------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Handshake Port<sup>A</sup></b>  | To designate a custom handshake port (TCP), click the <b>custom</b> radio button and enter the port number you wish to designate.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |
| <b>Backward Compatibility</b>      | Determine the level of backward compatibility needed for PepVPN tunnels. The use of the <b>Latest</b> setting is recommended as it will improve the performance and resilience of SpeedFusion connections.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |
| <b>Link Failure Detection Time</b> | <p>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.</p> <p>When <b>Recommended</b> (default) is selected, a health check packet is sent every five seconds, and the expected detection time is 15 seconds.</p> <p>When <b>Fast</b> is selected, a health check packet is sent every three seconds, and the expected detection time is six seconds.</p> <p>When <b>Faster</b> is selected, a health check packet is sent every second, and the expected detection time is two seconds.</p> |

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

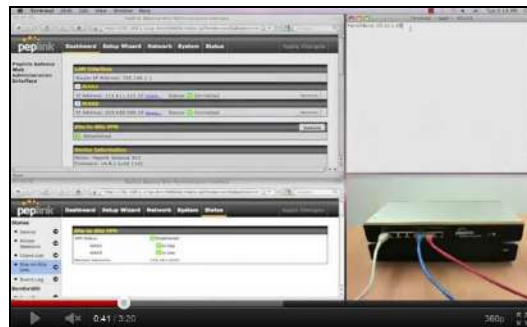
<sup>A</sup> - Advanced feature, please click the  button on the top right-hand corner to activate.

### 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.

### Tip

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



<http://youtu.be/TLQgdpPSY88>

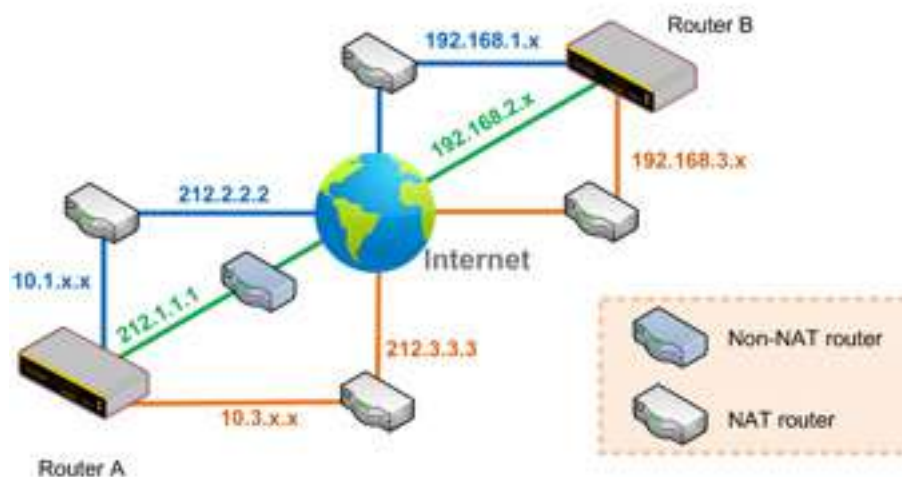
## 15.2 The Pepwave Router Behind a NAT Router

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.

## 15.3 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.

## 16 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.

### 16.1 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.

| Name                                  | <input type="text"/>                                                                                                                                                                                                                                                                     |                                  |             |  |                      |                     |                                  |  |  |
|---------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------|-------------|--|----------------------|---------------------|----------------------------------|--|--|
| Active                                | <input checked="" type="checkbox"/>                                                                                                                                                                                                                                                      |                                  |             |  |                      |                     |                                  |  |  |
| IKE Version                           | <input checked="" type="radio"/> IKEv1 <input type="radio"/> IKEv2                                                                                                                                                                                                                       |                                  |             |  |                      |                     |                                  |  |  |
| Connect Upon Disconnection of         | <input checked="" type="checkbox"/>                                                                                                                                                                                                                                                      | WAN                              |             |  |                      |                     |                                  |  |  |
| Remote Gateway IP Address / Host Name | <input type="text"/>                                                                                                                                                                                                                                                                     |                                  |             |  |                      |                     |                                  |  |  |
| IPsec Type                            | <input checked="" type="radio"/> Policy-based <input type="radio"/> Route-based                                                                                                                                                                                                          |                                  |             |  |                      |                     |                                  |  |  |
| Local Networks                        | Propose the following networks to remote gateway:<br><input checked="" type="checkbox"/> 192.168.50.0/24<br><input type="checkbox"/> <input type="text"/><br>Apply the following NAT policies:<br><input type="checkbox"/> Local Network <input checked="" type="checkbox"/> NAT Network |                                  |             |  |                      |                     |                                  |  |  |
| Remote Networks                       | <table border="1"> <thead> <tr> <th>Network</th> <th>Subnet Mask</th> <th></th> </tr> </thead> <tbody> <tr> <td><input type="text"/></td> <td>255.255.255.0 (/24)</td> <td><input type="button" value="+"/></td> </tr> </tbody> </table>                                                 | Network                          | Subnet Mask |  | <input type="text"/> | 255.255.255.0 (/24) | <input type="button" value="+"/> |  |  |
| Network                               | Subnet Mask                                                                                                                                                                                                                                                                              |                                  |             |  |                      |                     |                                  |  |  |
| <input type="text"/>                  | 255.255.255.0 (/24)                                                                                                                                                                                                                                                                      | <input type="button" value="+"/> |             |  |                      |                     |                                  |  |  |
| Authentication                        | <input checked="" type="radio"/> Preshared Key                                                                                                                                                                                                                                           |                                  |             |  |                      |                     |                                  |  |  |
| Mode                                  | <input checked="" type="radio"/> Main Mode (All WANs need to have Static IP)<br><input type="radio"/> Aggressive Mode                                                                                                                                                                    |                                  |             |  |                      |                     |                                  |  |  |
| Force UDP Encapsulation               | <input type="checkbox"/>                                                                                                                                                                                                                                                                 |                                  |             |  |                      |                     |                                  |  |  |
| Preshared Key                         | <input type="text"/><br><input checked="" type="checkbox"/> Hide Characters                                                                                                                                                                                                              |                                  |             |  |                      |                     |                                  |  |  |
| Local ID                              | <input type="text"/>                                                                                                                                                                                                                                                                     |                                  |             |  |                      |                     |                                  |  |  |
| Remote ID                             | <input type="text"/>                                                                                                                                                                                                                                                                     |                                  |             |  |                      |                     |                                  |  |  |
| Phase 1 (IKE) Proposal                | 1 AES-256 & SHA1<br>2 -----                                                                                                                                                                                                                                                              |                                  |             |  |                      |                     |                                  |  |  |
| Phase 1 DH Group                      | 1 Group 2<br>2 -----                                                                                                                                                                                                                                                                     |                                  |             |  |                      |                     |                                  |  |  |
| Phase 1 SA Lifetime                   | 3600 seconds                                                                                                                                                                                                                                                                             |                                  |             |  |                      |                     |                                  |  |  |
| Phase 2 (ESP) Proposal                | 1 AES-256 & SHA1<br>2 -----                                                                                                                                                                                                                                                              |                                  |             |  |                      |                     |                                  |  |  |
| Phase 2 PFS Group                     | None                                                                                                                                                                                                                                                                                     |                                  |             |  |                      |                     |                                  |  |  |
| Phase 2 SA Lifetime                   | 28800 seconds                                                                                                                                                                                                                                                                            |                                  |             |  |                      |                     |                                  |  |  |

| IPsec VPN Settings |                                                                                                              |
|--------------------|--------------------------------------------------------------------------------------------------------------|
| <b>Name</b>        | This field is for specifying a local name to represent this connection profile.                              |
| <b>Active</b>      | When this box is checked, this IPsec VPN connection profile will be enabled. Otherwise, it will be disabled. |

|                                              |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |
|----------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>IKE Version</b>                           | Two versions of the IKE standards are available: <ul style="list-style-type: none"> <li>• IKEv1</li> <li>• IKEv2</li> </ul>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |
| <b>Connect Upon Disconnection of</b>         | Check this box and select a WAN to connect to this VPN automatically when the specified WAN is disconnected.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |
| <b>Remote Gateway IP Address / Host Name</b> | Enter the remote peer's public IP address. For <b>Aggressive Mode</b> , this is optional.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |
| <b>IPsec Type</b>                            | <p>Policy-based - (default) All the matched traffic as defined in Local Networks and Remote Networks will be routed to this IPsec connection, this cannot be overridden by other routing methods.</p> <p>Route-based - Outbound Policy rule is required to route traffic to this tunnel and comes with more flexibility to control how to route traffic compared to Policy-based. If you want to modify the traffic selector instead of using the default (0.0.0.0/0).</p> <p><b>Note:</b> This option is available for certain following models only:</p> <ul style="list-style-type: none"> <li>• MAX: BR1 ENT, Transit, 700 HW3 or above, HD2 HW5 or above, HD4</li> </ul>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |
| <b>Local Networks</b>                        | <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 &gt; 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 &gt; 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> |
| <b>Remote</b>                                | Enter the LAN and subnets that are located at the remote site here.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |

| Networks                                |                                                                                                                                                                                                                                                                                                                                                                                      |
|-----------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Authentication</b>                   | To access your VPN, clients will need to authenticate by your choice of methods. Choose between the <b>Preshared Key</b> and <b>X.509 Certificate</b> methods of authentication.                                                                                                                                                                                                     |
| <b>Mode</b>                             | Choose <b>Main Mode</b> if both IPsec peers use static IP addresses. Choose <b>Aggressive Mode</b> if one of the IPsec peers uses dynamic IP addresses.                                                                                                                                                                                                                              |
| <b>Force UDP Encapsulation</b>          | For forced UDP encapsulation regardless of NAT-traversal, tick this checkbox.                                                                                                                                                                                                                                                                                                        |
| <b>Pre-shared Key</b>                   | 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.                                                                                                                                                                                                              |
| <b>Remote Certificate (pem encoded)</b> | Available only when <b>X.509 Certificate</b> is chosen as the <b>Authentication</b> method, this field allows you to paste a valid X.509 certificate.                                                                                                                                                                                                                                |
| <b>Local ID</b>                         | In <b>Main Mode</b> , this field can be left blank. In <b>Aggressive Mode</b> , if <b>Remote Gateway IP Address</b> is filled on this end and the peer end, this field can be left blank. Otherwise, this field is typically a U-FQDN.                                                                                                                                               |
| <b>Remote ID</b>                        | In <b>Main Mode</b> , this field can be left blank. In <b>Aggressive Mode</b> , if <b>Remote Gateway IP Address</b> is filled on this end and the peer end, this field can be left blank. Otherwise, this field is typically a U-FQDN.                                                                                                                                               |
| <b>Phase 1 (IKE) Proposal</b>           | In <b>Main Mode</b> , this allows setting up to six encryption standards, in descending order of priority, to be used in initial connection key negotiations. In <b>Aggressive Mode</b> , only one selection is permitted.                                                                                                                                                           |
| <b>Phase 1 DH Group</b>                 | 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.<br><b>Group 2: 1024-bit</b> is the default value.<br><b>Group 5: 1536-bit</b> is the alternative option.                                                                       |
| <b>Phase 1 SA Lifetime</b>              | This setting specifies the lifetime limit of this Phase 1 Security Association. By default, it is set at <b>3600</b> seconds.                                                                                                                                                                                                                                                        |
| <b>Phase 2 (ESP) Proposal</b>           | In <b>Main Mode</b> , 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 <b>Aggressive Mode</b> , only one selection is permitted.                                                                                                                                                        |
| <b>Phase 2 PFS Group</b>                | 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.<br><b>None</b> - 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. |

|                            |                                                                                                                                                                  |
|----------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------|
|                            | <p><b>Group 2:</b> 1024-bit Diffie-Hellman group. The larger the group number, the higher the security.</p> <p><b>Group 5: 1536-bit</b> is the third option.</p> |
| <b>Phase 2 SA Lifetime</b> | This setting specifies the lifetime limit of this Phase 2 Security Association. By default, it is set at <b>28800</b> seconds.                                   |

| WAN Connection Priority |               |
|-------------------------|---------------|
| Priority                | WAN Selection |
| 1                       | WAN 1 ▼       |
| 2                       | ----- ▼       |

| WAN Connection Priority |                                                                |
|-------------------------|----------------------------------------------------------------|
| <b>WAN Connection</b>   | Select the appropriate WAN connection from the drop-down menu. |

## 16.2 GRE Tunnel

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

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

| GRE Tunnel Profiles    | Remote Networks |  |
|------------------------|-----------------|--|
| No GRE profile defined |                 |  |
| New Profile            |                 |  |

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

**GRE Tunnel Profile**
✕

|                                 |                                                                                                                                       |                                                                      |   |
|---------------------------------|---------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------|---|
| <b>Name</b>                     | <input style="width: 90%;" type="text"/>                                                                                              |                                                                      |   |
| <b>Active</b>                   | <input checked="" type="checkbox"/>                                                                                                   |                                                                      |   |
| <b>Remote GRE IP Address</b>    | <input style="width: 90%;" type="text"/>                                                                                              |                                                                      |   |
| <b>Tunnel Local IP Address</b>  | <input style="width: 90%;" type="text"/>                                                                                              |                                                                      |   |
| <b>Tunnel Remote IP Address</b> | <input style="width: 90%;" type="text"/>                                                                                              |                                                                      |   |
| <b>Tunnel Subnet Mask</b>       | <input checked="" type="radio"/> Auto<br><input type="radio"/> <input style="width: 100px;" type="text" value="255.255.255.0 (/24)"/> |                                                                      |   |
| <b>Connection</b>               | WAN <span style="float: right;">▼</span>                                                                                              |                                                                      |   |
| <b>Remote Networks</b>          | Network                                                                                                                               | Subnet Mask                                                          |   |
|                                 | <input style="width: 90%;" type="text"/>                                                                                              | <input style="width: 90%;" type="text" value="255.255.255.0 (/24)"/> | + |



### GRE Tunnel Profile Settings

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

## 17 Outbound Policy

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.

**Outbound Policy**
?

Custom

**Rules** ( Drag and drop rows by the left to change rule order )
?

| Service                            | Algorithm                | Source | Destination | Protocol / Port |                |
|------------------------------------|--------------------------|--------|-------------|-----------------|----------------|
| PepVPN / OSPF / BGP / RIPv2 Routes |                          |        |             |                 |                |
| SpeedFusion Cloud Routes           |                          |        |             |                 |                |
| testing                            | Enforced VPN: SFG-NYC    | Any    | Any         | TCP 443         | <span>✖</span> |
| HTTPS Persistence                  | Persistence (Src) (Auto) | Any    | Any         | TCP 443         | <span>✖</span> |
| Default                            | (Auto)                   |        |             |                 |                |
| <div>Add Rule</div>                |                          |        |             |                 |                |

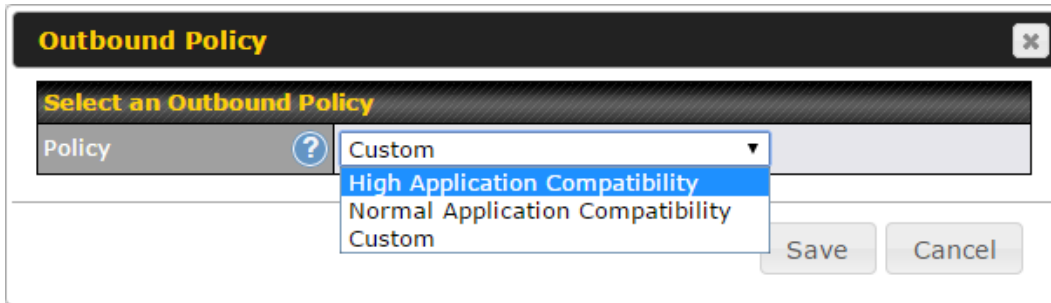
**Expert Mode**
?

Enabled

## 17.1 Outbound Policy

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

**Advanced>Outbound Policy>** or **Advanced>PepVPN>Outbound Policy**. Click the  button beside the **Outbound Policy** box:



There are three main selections for the outbound traffic policy:

- High Application Compatibility
- Normal Application Compatibility
- Custom

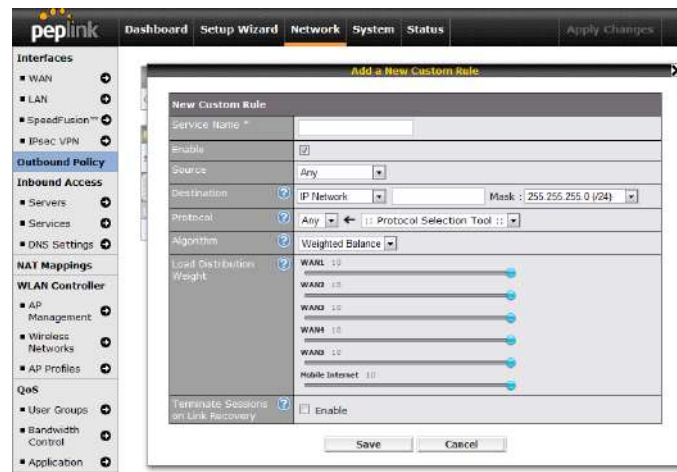
Note that some Pepwave routers provide only the **Send All Traffic To** setting here. See **Section 12.1** for details.

| Outbound Policy Settings                |                                                                                                                                                                                                                                                                                                                                            |
|-----------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>High Application Compatibility</b>   | 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 highest application compatibility.                                                                                                                            |
| <b>Normal Application Compatibility</b> | 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. |
| <b>Custom</b>                           | 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](http://youtu.be/rKH4AS_bQnE)

## 17.2 Adding Rules for Outbound Policy

The menu underneath enables you to define Outbound policy rules:

Rules ( ? Drag and drop rows by the left to change rule order)

| Service             | Algorithm                | Source | Destination | Protocol / Port |              |
|---------------------|--------------------------|--------|-------------|-----------------|--------------|
| HTTPS_Persistence   | Persistence (Src) (Auto) | Any    | Any         | TCP 443         | <div>✖</div> |
| Default             | (Auto)                   |        |             |                 |              |
| <div>Add Rule</div> |                          |        |             |                 |              |

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.

Edit Default Custom Rule

|                                   |                                                                                                                                                |
|-----------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------|
| Default Rule                      | <input checked="" type="radio"/> Custom <input type="radio"/> Auto                                                                             |
| Algorithm                         | Weighted Balance                                                                                                                               |
| Load Distribution Weight          | <div> <div>WAN 1 10</div> <div>WAN 2 10</div> <div>WAN 3 10</div> <div>WAN 4 10</div> <div>WAN 5 10</div> <div>Mobile Internet 10</div> </div> |
| When No Connections are Available | <div> Drop the Traffic Drop the Traffic Use Any Available Connections </div>                                                                   |

Save
Cancel

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.

Add a New Custom Rule

|                                   |                                                                                                                                   |                      |                           |
|-----------------------------------|-----------------------------------------------------------------------------------------------------------------------------------|----------------------|---------------------------|
| Service Name                      | <input type="text"/>                                                                                                              |                      |                           |
| Enable                            | <input checked="" type="checkbox"/>                                                                                               | Always on            |                           |
| Source                            | Any                                                                                                                               |                      |                           |
| Destination                       | IP Network                                                                                                                        | <input type="text"/> | Mask: 255.255.255.0 (/24) |
| Protocol                          | Any                                                                                                                               | Protocol Selection   |                           |
| Algorithm                         | Weighted Balance                                                                                                                  |                      |                           |
| Load Distribution Weight          | <div>WAN 1 10</div> <div>WAN 2 10</div> <div>WAN 3 10</div> <div>WAN 4 10</div> <div>WAN 5 10</div> <div>Mobile Internet 10</div> |                      |                           |
| When No Connections are Available | Drop the Traffic                                                                                                                  |                      |                           |

Save
Cancel

| New Custom Rule Settings |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |
|--------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Service Name</b>      | This setting specifies the name of the outbound traffic rule.                                                                                                                                                                                                                                                                                                                                                                                                                    |
| <b>Enable</b>            | <p>This setting specifies whether the outbound traffic rule takes effect. When <b>Enable</b> 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 <b>Enable</b> is unchecked, the rule does not take effect: the Pepwave router disregards the other parameters of the rule.</p> <p>Click the drop-down menu next to the checkbox to apply a time schedule to this custom rule.</p> |
| <b>Source</b>            | <p>This setting specifies the source IP Address, IP Network, MAC Address or Grouped Network for traffic that matches the rule.</p> <div> <div> Source Destination Protocol </div> <div> Any Any IP Address IP Network MAC Address Grouped Network </div> </div>                                                                                                                                                                                                                  |
| <b>Destination</b>       | This setting specifies the destination IP address, IP network, Domain name, SpeedFusion Cloud, PepVPN Profile or Grouped network for traffic that matches the rule.                                                                                                                                                                                                                                                                                                              |

|                          |   |                   |
|--------------------------|---|-------------------|
| Destination              | ? | IP Network        |
| Protocol                 | ? | Any               |
| Algorithm                | ? | IP Address        |
| Load Distribution Weight | ? | IP Network        |
|                          |   | Domain Name       |
|                          |   | SpeedFusion Cloud |
|                          |   | PepVPN Profile    |
|                          |   | Grouped Network   |

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

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

## Protocol and Port

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

- Any
- TCP
- UDP
- IP
- DSCP

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

## Algorithm

This setting specifies the behavior of the 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):

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

For a full explanation of each Algorithm, please see the following article:

<https://forum.peplink.com/t/exactly-how-do-peplinks-load-balancing-algorithms-work/8059>

## Load Distribution Weight

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

|                                                         |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |
|---------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <p><b>When No connections are available</b></p>         | <p>This field allows you to configure the default action when all the selected Connections are not available.</p> <p><b>Drop the Traffic</b> - Traffic will be discarded.</p> <p><b>Use Any Available Connections</b> - Traffic will be routed to any available Connection, even it is not selected in the list.</p> <p><b>Fall-through to Next Rule</b> - Traffic will continue to match the next Outbound Policy rule just like this rule is inactive.</p>                                                                                                                                         |
| <p><b>Terminate Sessions on Connection Recovery</b></p> | <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 <b>Priority</b> 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> |

### 17.2.1 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**.

|                          |                                                                                                             |
|--------------------------|-------------------------------------------------------------------------------------------------------------|
| Algorithm                | Weighted Balance                                                                                            |
| Load Distribution Weight | <p>WAN 1 10</p> <p>WAN 2 10</p> <p>Wi-Fi WAN 10</p> <p>Cellular 1 10</p> <p>Cellular 2 10</p> <p>USB 10</p> |

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

For example, with the following weight settings:

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

- USB: 10

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

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

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

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

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

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

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

### 17.2.2 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                | Persistence                                                                                                                                      |
| Persistence Mode         | <input checked="" type="radio"/> By Source <input type="radio"/> By Destination                                                                  |
| Load Distribution        | <input type="radio"/> Auto <input checked="" type="radio"/> Custom                                                                               |
| Load Distribution Weight | <div> <div>WAN 1 10</div> <div>WAN 2 10</div> <div>Wi-Fi WAN 10</div> <div>Cellular 1 10</div> <div>Cellular 2 10</div> <div>USB 10</div> </div> |

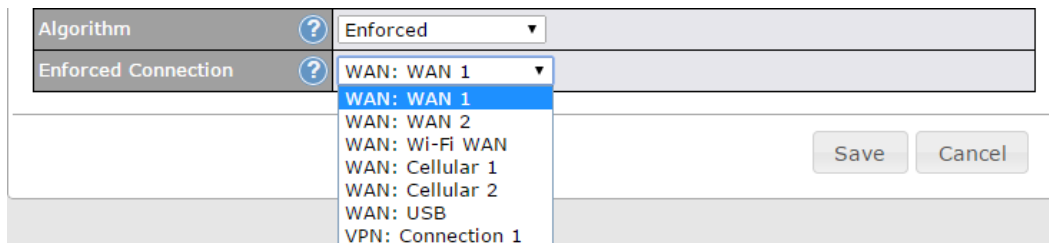
There are two persistent modes: **By Source** and **By Destination**.

|                        |                                                                                                                                                                                                                                                 |
|------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>By Source:</b>      | 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.                               |
| <b>By Destination:</b> | 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.

### 17.2.3 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.

### 17.2.4 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.

|                                             |                                 |            |
|---------------------------------------------|---------------------------------|------------|
| Algorithm ?                                 | Priority ▼                      |            |
| Priority Order ?                            | Highest Priority                | Not In Use |
|                                             | WAN: WAN                        |            |
|                                             | WAN: Cellular 1                 |            |
|                                             | WAN: Cellular 2                 |            |
|                                             | WAN: USB                        |            |
|                                             | WAN: LAN 1 as WAN               |            |
|                                             | WAN: GRE WAN 1                  |            |
|                                             | WAN: GRE WAN 2                  |            |
|                                             | WAN: OpenVPN WAN 1              |            |
|                                             | Lowest Priority                 |            |
| When No Connections are Available ?         | Drop the Traffic ▼              |            |
| Terminate Sessions on Connection Recovery ? | <input type="checkbox"/> Enable |            |

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.

## 17.2.5 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.

|                  |                  |  |
|------------------|------------------|--|
| 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.

### 17.2.6 Algorithm: Least Used

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

### 17.2.7 Algorithm: Lowest Latency

|            |                                                                                                                                                                                                                                                       |
|------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Algorithm  | Lowest Latency<br><small>Note: Use of Lowest Latency will incur additional network usage.</small>                                                                                                                                                     |
| Connection | <input checked="" type="checkbox"/> WAN 1<br><input checked="" type="checkbox"/> WAN 2<br><input checked="" type="checkbox"/> Wi-Fi WAN<br><input type="checkbox"/> Cellular 1<br><input type="checkbox"/> Cellular 2<br><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
- A latency sensitive application must be routed through the lowest latency WAN, regardless of the WAN's available bandwidth.

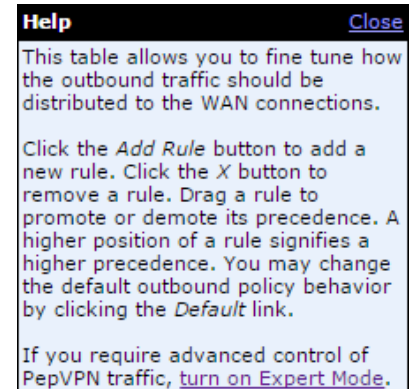
## 17.2.8 Expert Mode

**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.



## 18 Port Forwarding

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**.

| Service                     | IP Address(es) | Server | Protocol |
|-----------------------------|----------------|--------|----------|
| No Services Defined         |                |        |          |
| <a href="#">Add Service</a> |                |        |          |

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

| Enable                                                      | <input checked="" type="radio"/> Yes <input type="radio"/> No                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |                                    |                                      |                                    |                                      |                                           |                                                                |  |  |                                |  |  |  |                                    |  |  |  |                                     |  |  |  |                                     |  |  |  |                              |  |  |  |
|-------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------|--------------------------------------|------------------------------------|--------------------------------------|-------------------------------------------|----------------------------------------------------------------|--|--|--------------------------------|--|--|--|------------------------------------|--|--|--|-------------------------------------|--|--|--|-------------------------------------|--|--|--|------------------------------|--|--|--|
| Service Name                                                | <input type="text" value="Service_1"/>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |                                    |                                      |                                    |                                      |                                           |                                                                |  |  |                                |  |  |  |                                    |  |  |  |                                     |  |  |  |                                     |  |  |  |                              |  |  |  |
| IP Protocol                                                 | <input type="button" value="TCP"/> <input type="button" value="←"/> :: Protocol Selection Tool :: <input type="button" value="→"/>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |                                    |                                      |                                    |                                      |                                           |                                                                |  |  |                                |  |  |  |                                    |  |  |  |                                     |  |  |  |                                     |  |  |  |                              |  |  |  |
| Port                                                        | <input type="button" value="Any Port"/>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |                                    |                                      |                                    |                                      |                                           |                                                                |  |  |                                |  |  |  |                                    |  |  |  |                                     |  |  |  |                                     |  |  |  |                              |  |  |  |
| Inbound IP Address(es)<br>(Require at least one IP address) | <table> <tr> <th colspan="2">Connection / IP Address(es)</th><th><input type="button" value="All"/></th><th><input type="button" value="Clear"/></th></tr> <tr> <td><input checked="" type="checkbox"/> WAN 1</td><td><input checked="" type="checkbox"/> 10.88.3.158 (Interface IP)</td><td></td><td></td></tr> <tr> <td><input type="checkbox"/> WAN 2</td><td></td><td></td><td></td></tr> <tr> <td><input type="checkbox"/> Wi-Fi WAN</td><td></td><td></td><td></td></tr> <tr> <td><input type="checkbox"/> Cellular 1</td><td></td><td></td><td></td></tr> <tr> <td><input type="checkbox"/> Cellular 2</td><td></td><td></td><td></td></tr> <tr> <td><input type="checkbox"/> USB</td><td></td><td></td><td></td></tr> </table> | Connection / IP Address(es)        |                                      | <input type="button" value="All"/> | <input type="button" value="Clear"/> | <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 |  |  |  |
| Connection / IP Address(es)                                 |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        | <input type="button" value="All"/> | <input type="button" value="Clear"/> |                                    |                                      |                                           |                                                                |  |  |                                |  |  |  |                                    |  |  |  |                                     |  |  |  |                                     |  |  |  |                              |  |  |  |
| <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                                           | <input type="text" value="120.78.95.7"/>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |                                    |                                      |                                    |                                      |                                           |                                                                |  |  |                                |  |  |  |                                    |  |  |  |                                     |  |  |  |                                     |  |  |  |                              |  |  |  |

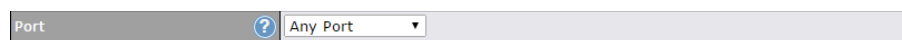
| Port Forwarding Settings |                                                                                                                                                                                                                                                                                                                                                                                      |
|--------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Enable</b>            | This setting specifies whether the inbound service takes effect. When <b>Enable</b> 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. |
| <b>Service Name</b>      | 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.

The **Port** setting specifies the port(s) that correspond to the service, and can be configured to behave in one of the following manners:

### Any Port, Single Port, Port Range, Port Map, and Range Mapping



**Any Port:** all traffic that is received by the Pepwave router via the specified protocol is forwarded to the servers specified by the **Servers** setting. For example, with **IP Protocol** set to **TCP**, and **Port** set to **Any Port**, all TCP traffic is forwarded to the configured servers.



**Single Port:** traffic that is received by the Pepwave router via the specified protocol at the specified port is forwarded via the same port to the servers specified by the **Servers** setting. For example, with **IP Protocol** set to **TCP**, and **Port** set to **Single Port** and **Service Port** 80, TCP traffic received on port 80 is forwarded to the configured servers via port 80.



**Port Range:** traffic that is received by the Pepwave router via the specified protocol at the specified port range is forwarded via the same respective ports to the LAN hosts specified by the **Servers** setting. For example, with **IP Protocol** set to **TCP**, and **Port** set to **Port Range** and **Service Ports** 80-88, TCP traffic received on ports 80 through 88 is forwarded to the configured servers via the respective ports.



**Port Mapping:** traffic that is received by Pepwave router via the specified protocol at the specified port is forwarded via a different port to the servers specified by the **Servers** setting.

For example, with **IP Protocol** set to **TCP**, and **Port** set to **Port Mapping**, **Service Port** 80, and **Map to Port** 88, TCP traffic on port 80 is forwarded to the configured servers via port 88.

(Please see below for details on the **Servers** setting.)



**Range Mapping:** traffic that is received by the Pepwave router via the specified protocol at the specified port range is forwarded via a different port to the servers specified by the **Servers** setting.

## Port

|                               |                                                                                                                |
|-------------------------------|----------------------------------------------------------------------------------------------------------------|
| <b>Inbound IP Address(es)</b> | This setting specifies the WAN connections and Internet IP address(es) from which the service can be accessed. |
| <b>Server IP Address</b>      | This setting specifies the LAN IP address of the server that handles the requests for the service.             |

## 18.1 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 type="checkbox"/> Enable |
| NAT-PMP                             | <input 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**.

## 19 NAT Mappings

NAT mappings allow IP address mapping of all inbound and outbound NAT'd 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           |  <input type="text"/>                                                                                                                                                                                                                                                                                                                                                                                          |       |                              |       |                |           |                |            |                |            |                |     |                |
| Inbound Mappings  |  <div> <b>Connection / Inbound IP Address(es)</b> <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       </div>                                                                                                   |       |                              |       |                |           |                |            |                |            |                |     |                |
| Outbound Mappings |  <div> <b>Connection / Outbound IP Address</b> <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> </div> | 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 |                                                                                                                                                                                                                                                                       |
|----------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>LAN Client(s)</b> | NAT mapping rules can be defined for a single LAN <b>IP Address</b> , an <b>IP Range</b> , or an <b>IP Network</b> .                                                                                                                                                  |
| <b>Address</b>       | 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 <b>IP Address</b> is selected.            |
| <b>Range</b>         | 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 <b>IP Range</b> is selected. |
| <b>Network</b>       | 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 <b>IP Network</b> is selected.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |
| <b>Inbound Mappings</b>  | <p>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 <b>IP Address</b> is selected in the <b>LAN Client(s)</b> field.</p> <p>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.</p>                                                                                                             |
| <b>Outbound Mappings</b> | <p>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).</p> <p>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 <b>Outbound Policy</b> section. Also note that WAN connections in drop-in mode or IP forwarding mode are not shown here.</p> |

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

#### Important Note

Inbound firewall rules override the **Inbound Mappings** settings.

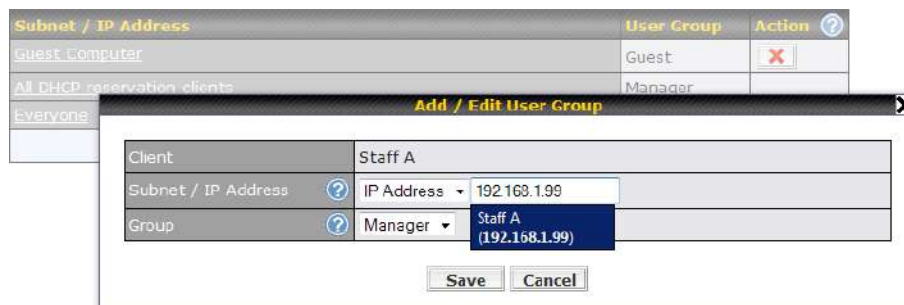
## 20 QoS

### 20.1 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      |                                                                                                                                                                                                                                                                                                                             |
|----------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Subnet / IP Address</b> | From the drop-down menu, choose whether you are going to define the client(s) by an <b>IP Address</b> or a <b>Subnet</b> . If <b>IP Address</b> is selected, enter a name defined in DHCP reservation table or a LAN client's IP address. If <b>Subnet</b> is selected, enter a subnet address and specify its subnet mask. |
| <b>Group</b>               | This field is to define which <b>User Group</b> 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.

## 20.2 Bandwidth Control

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

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

| Group Bandwidth Reservation |                                      |                                      |               |
|-----------------------------|--------------------------------------|--------------------------------------|---------------|
| Enable                      | <input checked="" type="checkbox"/>  |                                      |               |
|                             | <div> <div></div> <div></div> </div> | <div> <div></div> <div></div> </div> |               |
|                             | Manager                              | Staff                                | Guest         |
| Bandwidth %                 | 50%                                  | 30%                                  | 20%           |
| WAN 1                       | 500.0M/500.0M                        | 300.0M/300.0M                        | 200.0M/200.0M |
| WAN 2                       | 500.0M/500.0M                        | 300.0M/300.0M                        | 200.0M/200.0M |

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

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

## 20.3 Application

### 20.3.1 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 | ✖ |
| All Email Protocols                  | ↑ High   | ↑ High   | ↑ High | ✖ |
| MySQL                                | ↑ High   | — Normal | ↓ Low  | ✖ |
| SIP                                  | ↑ High   | ↓ Low    | ↓ Low  | ✖ |
| Add                                  |          |          |        |   |

### 20.3.2 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.

Add / Edit Application

Type

☒ Supported Applications
☐ Custom Applications

Category

Audio Video Streaming

Application

Audio Video Streaming

Database

Email

File Sharing / Transfer

IM

Miscellaneous

Remote Access

Security / Tunneling

VoIP

OK

Cancel

Add / Edit Application

Type

☐ Supported Applications
☒ Custom Applications

Application Name

Scope / Protocol

TCP

Port

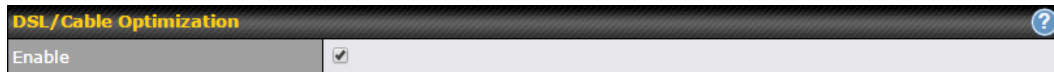
Single Port

OK

Cancel

### 20.3.3 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.



## 21 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)
- Internal Network (VLAN to VLAN)

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.

**Outbound Firewall Rules** ( Drag and drop rows by the left to change rule order)

| Rule     | Protocol | Source | Destination | Action |  |
|----------|----------|--------|-------------|--------|--|
| Default  | Any      | Any    | Any         | ✓      |  |
| Add Rule |          |        |             |        |  |

**Inbound Firewall Rules** ( Drag and drop rows by the left to change rule order)

| Rule     | Protocol | WAN | Source | Destination | Action |  |
|----------|----------|-----|--------|-------------|--------|--|
| Default  | Any      | Any | Any    | Any         | ✓      |  |
| Add Rule |          |     |        |             |        |  |

**Internal Network Firewall Rules** ( Drag and drop rows by the left to change rule order)

| Rule     | Protocol | Source | Destination | Action |  |
|----------|----------|--------|-------------|--------|--|
| Default  | Any      | Any    | Any         | ✓      |  |
| Add Rule |          |        |             |        |  |

**Intrusion Detection and DoS Prevention**

Disabled

**Local Service Firewall Rules** ( Drag and drop rows by the left to change rule order)

| Rule     | Service | WAN | Source | Action |  |
|----------|---------|-----|--------|--------|--|
| Default  | Any     | Any | Any    | ✓      |  |
| Add Rule |         |     |        |        |  |

## 21.1 Outbound and Inbound Firewall Rules

### 21.1.1 Access Rules

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

| Outbound Firewall Rules ( Drag and drop rows by the left to change rule order) |          |        |             |                                                                                     |                                                                                     |
|--------------------------------------------------------------------------------|----------|--------|-------------|-------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|
| Rule                                                                           | Protocol | Source | Destination | Action                                                                              |                                                                                     |
| test                                                                           | Any      | Any    | Any         |  |  |
| Default                                                                        | Any      | Any    | Any         |  |                                                                                     |
| Add Rule                                                                       |          |        |             |                                                                                     |                                                                                     |

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

Add a New Outbound Firewall Rule

New Firewall Rule

Rule Name

Enable

☒ Always on

Protocol

Any   :: Protocol Selection Tool ::

Source IP & Port

Any Address 

Destination IP & Port

Any Address 

Action

☒ Allow ☐ Deny 

Event Logging

☐ Enable 

Save

Cancel

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

| Inbound Firewall Rules ( Drag and drop rows by the left to change rule order) |          |     |        |             |                                                                                       |
|-------------------------------------------------------------------------------|----------|-----|--------|-------------|---------------------------------------------------------------------------------------|
| Rule                                                                          | Protocol | WAN | Source | Destination | Action                                                                                |
| test                                                                          | Any      | Any | Any    | Any         |  |
| Default                                                                       | Any      | Any | Any    | Any         |  |
| Add Rule                                                                      |          |     |        |             |                                                                                       |

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

Add a New Inbound Firewall Rule

### New Firewall Rule

|                       |                                                                   |
|-----------------------|-------------------------------------------------------------------|
| Rule Name             |                                                                   |
| 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                                   |

Save
Cancel

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

| Internal Network Firewall Rules ( Drag and drop rows by the left to change rule order) |          |        |             |        |  |
|----------------------------------------------------------------------------------------|----------|--------|-------------|--------|--|
| Rule                                                                                   | Protocol | Source | Destination | Action |  |
| test                                                                                   | Any      | Any    | Any         |        |  |
| Default                                                                                | Any      | Any    | Any         |        |  |
| Add Rule                                                                               |          |        |             |        |  |

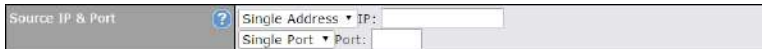
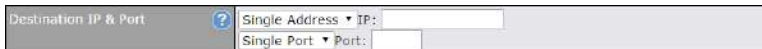
Click **Add Rule** to display the following window:

Add a New Internal Network Firewall Rule

### New Firewall Rule

|               |                                                                   |
|---------------|-------------------------------------------------------------------|
| Rule Name     |                                                                   |
| Enable        | <input checked="" type="checkbox"/> Always on                     |
| Protocol      | Any :: Protocol Selection ::                                      |
| Source        | Any Address                                                       |
| Destination   | Any Address                                                       |
| Action        | <input checked="" type="radio"/> Allow <input type="radio"/> Deny |
| Event Logging | <input type="checkbox"/> Enable                                   |

Save
Cancel

| Inbound / Outbound / Internal Network Firewall Settings |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |
|---------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Rule Name</b>                                        | This setting specifies a name for the firewall rule.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |
| <b>Enable</b>                                           | <p>This setting specifies whether the firewall rule should take effect. If the box is checked, the firewall rule takes effect. If the traffic matches the specified protocol/IP/port, actions will be taken by the Pepwave router based on the other parameters of the rule. If the box is not checked, the firewall rule does not take effect. The Pepwave router will disregard the other parameters of the rule.</p> <p>Click the dropdown menu next to the checkbox to place this firewall rule on a time schedule.</p>                                                                                                                              |
| <b>WAN Connection (Inbound)</b>                         | Select the WAN connection that this firewall rule should apply to.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |
| <b>Protocol</b>                                         | <p>This setting specifies the protocol to be matched. Via a drop-down menu, the following protocols can be specified:</p> <ul style="list-style-type: none"> <li>• <b>Any</b></li> <li>• <b>TCP</b></li> <li>• <b>UDP</b></li> <li>• <b>ICMP</b></li> <li>• <b>DSCP</b></li> <li>• <b>IP</b></li> </ul> <p>Alternatively, the <b>Protocol Selection Tool</b> drop-down menu can be used to automatically fill in the protocol and port number of common Internet services (e.g., HTTP, HTTPS, etc.)</p> <p>After selecting an item from the <b>Protocol Selection Tool</b> drop-down menu, the protocol and port number remains manually modifiable.</p> |
| <b>Source IP &amp; Port</b>                             | <p>This specifies the source IP address(es) and port number(s) to be matched for the firewall rule. A single address, or a network, can be specified as the <b>Source IP &amp; Port</b> setting, as indicated by the following screenshot:</p>  <p>In addition, a single port, or a range of ports, can be specified for the <b>Source IP &amp; Port</b> settings.</p>                                                                                                                                                                                               |
| <b>Destination IP &amp; Port</b>                        | <p>This specifies the destination IP address(es) and port number(s) to be matched for the firewall rule. A single address, or a network, can be specified as the <b>Destination IP &amp; Port</b> setting, as indicated by the following screenshot:</p>  <p>In addition, a single port, or a range of ports, can be specified for the <b>Destination IP &amp; Port</b> settings.</p>                                                                                                                                                                                |
| <b>Action</b>                                           | This setting specifies the action to be taken by the router upon encountering traffic                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |

that matches the both of the following:

- Source IP & port
- Destination IP & port

With the value of **Allow** for the **Action** setting, the matching traffic passes through the router (to be routed to the destination). If the value of the **Action** setting is set to **Deny**, the matching traffic does not pass through the router (and is discarded).

### Event Logging

This setting specifies whether or not to log matched firewall events. The logged messages are shown on the page **Status>Event Log**. A sample message is as follows:

Aug 13 23:47:44 Denied CONN=Ethernet WAN SRC=20.3.2.1  
DST=192.168.1.20 LEN=48 PROTO=TCP SPT=2260 DPT=80

- **CONN:** The connection where the log entry refers to
- **SRC:** Source IP address
- **DST:** Destination IP address
- **LEN:** Packet length
- **PROTO:** Protocol
- **SPT:** Source port
- **DPT:** Destination port

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

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

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

| Outbound Firewall Rules ( Drag and drop rows to change rule order) |          |                |                     |        |                                                                                       |
|--------------------------------------------------------------------|----------|----------------|---------------------|--------|---------------------------------------------------------------------------------------|
| Rule                                                               | Protocol | Source IP Port | Destination IP Port | Policy |                                                                                       |
| No web access                                                      | TCP      | Any Any        | Any 80              | Deny   |  |
| No FTP access                                                      |          | Any Any        | Any 21              | Deny   |  |
| Default                                                            | Any      | Any            | Any                 | Allow  |                                                                                       |
| Add Rule                                                           |          |                |                     |        |                                                                                       |

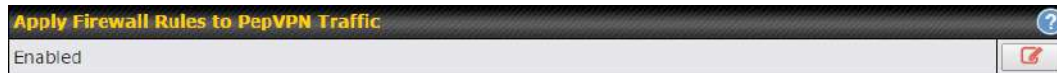
To remove a rule, click the  button.

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 Outbound, Inbound and Internal Network access.

### Tip

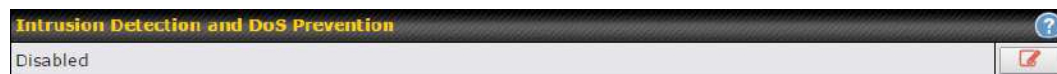
If the default inbound rule is set to **Allow** for NAT-enabled WANs, no inbound Allow firewall rules will be required for inbound port forwarding and inbound NAT mapping rules. However, if the default inbound rule is set as **Deny**, a corresponding Allow firewall rule will be required.

## 21.1.2 Apply Firewall Rules to PepVpn Traffic



When this option is enabled, Outbound Firewall Rules will be applied to PepVPN traffic. To turn on this feature, click , check the **Enable** check box, and press the **Save** button.

## 21.1.3 Intrusion Detection and DoS Prevention



Pepwave routers can detect and prevent intrusions and denial-of-service (DoS) attacks from the Internet. To turn on this feature, click , check the **Enable** check box, and press the **Save** button.

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

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

## 21.2 Content Blocking

**Application Blocking**
?

Please Select Application...
+

**Web Blocking**
?

Preset Category

☐ High
☐ Moderate
☐ Low
☒ Custom

☐ Abortion
☐ Alcohol
☐ Dating
☐ Entertainment
☐ Gambling
☐ Instant Messaging
☐ Lingerie
☐ Nudity
☐ Phishing
☐ Radio
☐ Search Engines
☐ Sports
☐ Update Sites
☐ Viruses
☐ Webmail

☐ Adware
☐ Anti-Spyware
☐ Drugs
☐ File Hosting
☐ Games
☐ Job Search/Employment
☐ Malware
☐ News/Media
☐ Pornography
☐ Remote Access
☐ Sexuality Education
☐ Spyware
☐ Vacation
☐ Weapons
☐ WebTV

☐ Aggressive
☐ Chatroom
☐ Ecommerce/Shopping
☐ P2P/File sharing
☐ Hacking
☐ Kids Time Wasting
☐ Manga/Anime/Webcomic
☐ Auctions
☐ Proxy/Anonymizer
☐ Ringtones
☐ Social Networking
☐ Tobacco
☐ Violence
☐ Weather

Customized Domains

cbs.com
+

Exempted Domains from Web Blocking
+

**Exempted User Groups**
?

Manager
☐ Exempt

Staff
☐ Exempt

Guest
☐ Exempt

**Exempted Subnets**
?

Network
Subnet Mask

255.255.255.0 (/24)
+

**URL Logging**

Enable
☐

Log Server Host
Port:

### 21.2.1 Application Blocking

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

### 21.2.2 Web Blocking

Defines website domain names to be blocked from LAN/PPTP/PepVPN peer clients' access

except for those on the Exempted User Groups or Exempted Subnets defined below.

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

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

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

### 21.2.3 Customized Domains

Enter an appropriate website address, and the Pepwave MAX will block and disallow LAN/PPTP/SpeedFusion™ peer clients to access these websites. Exceptions can be added using the instructions in Sections 20.1.3.2 and 20.1.3.3.

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

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

### 21.2.4 Exempted User Groups

Check and select pre-defined user group(s) who can be exempted from the access blocking rules. User groups can be defined at **QoS>User Groups** section. Please refer to **Section 17.1** for details.

### 21.2.5 Exempted Subnets

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

### 21.2.6 URL Logging

Click **enable**, and then enter the ip address and port (if applicable) where your remote syslog server is located.

## 22 Routing Protocols

### 22.1 OSPF & RIPv2

The Pepwave supports OSPF and RIPv2 dynamic routing protocols.

Click the **Advanced** tab from the top bar, and then click the **Routing Protocols > OSPF & RIPv2** item on the sidebar to reach the following menu:

| OSPF                |                |                                                                                     |
|---------------------|----------------|-------------------------------------------------------------------------------------|
| Router ID           | LAN IP Address |  |
| Area                | Interfaces     |                                                                                     |
| 0.0.0.0             | PepVPN         |  |
| <a href="#">Add</a> |                |                                                                                     |

| PepVPN OSPF Area |                                                                                     |
|------------------|-------------------------------------------------------------------------------------|
| 0.0.0.0          |  |

| RIPv2                                                                               |  |
|-------------------------------------------------------------------------------------|--|
| No RIPv2 Defined.                                                                   |  |
|  |  |

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

**OSPF settings**
✕

|                       |                                                                                                                                                                                                                                                                                                                                                      |
|-----------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Area ID</b>        | <input type="text" value="0.0.0.0"/>                                                                                                                                                                                                                                                                                                                 |
| <b>Link Type</b>      | <input checked="" type="radio"/> Broadcast <input type="radio"/> Point-to-Point                                                                                                                                                                                                                                                                      |
| <b>Authentication</b> | <div>None ▾</div>                                                                                                                                                                                                                                                                                                                                    |
| <b>Interfaces</b>     | <div> <input type="checkbox"/> Untagged LAN<br/> <input type="checkbox"/> V167 (192.168.167.1/24)<br/> <input type="checkbox"/> WAN 1<br/> <input type="checkbox"/> WAN 2<br/> <input type="checkbox"/> WAN 3<br/> <input type="checkbox"/> WAN 4<br/> <input type="checkbox"/> WAN 5<br/> <input checked="" type="checkbox"/> PepVPN         </div> |

Save

Cancel

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

To access RIPv2 settings, click on .

**RIPv2 settings**
✕

|                       |                                                                                                                                                                                                                                                                                                      |
|-----------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Authentication</b> | <div>None ▾</div>                                                                                                                                                                                                                                                                                    |
| <b>Interfaces</b>     | <div> <input type="checkbox"/> Untagged LAN<br/> <input type="checkbox"/> V167 (192.168.167.1/24)<br/> <input type="checkbox"/> WAN 1<br/> <input type="checkbox"/> WAN 2<br/> <input type="checkbox"/> WAN 3<br/> <input type="checkbox"/> WAN 4<br/> <input type="checkbox"/> WAN 5         </div> |

Save

Cancel

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

| OSPF & RIPv2 Route Advertisement                                                |                                                                                   |                                            |                                                                                                         |
|---------------------------------------------------------------------------------|-----------------------------------------------------------------------------------|--------------------------------------------|---------------------------------------------------------------------------------------------------------|
| PepVPN Route Isolation                                                          |  | <input type="checkbox"/> Enable            |                                                                                                         |
| Network Advertising                                                             |  | ---                                        |                      |
| All LAN/VLAN networks will be advertised when no network advertising is chosen. |                                                                                   |                                            |                                                                                                         |
| Static Route Advertising                                                        |  | <input checked="" type="checkbox"/> Enable |                                                                                                         |
|                                                                                 |                                                                                   | Excluded Networks                          | Subnet Mask                                                                                             |
|                                                                                 |                                                                                   | <input type="text"/>                       | 255.255.255.0 (/24)  |
| <input type="button" value="Save"/>                                             |                                                                                   |                                            |                                                                                                         |

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

## 22.2 BGP

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

| BGP                                | AS    | Neighbors   |                                                                                       |
|------------------------------------|-------|-------------|---------------------------------------------------------------------------------------|
| Uplink                             | 64520 | 172.16.51.1 |  |
| <input type="button" value="Add"/> |       |             |                                                                                       |

Click the "" to delete a BGP profile.

Click "**Add**" to create a new BGP profile.

**BGP Profile**
✕

| BGP Profile                                                |                                                                                                                                            |                                          |                |                                          |                                          |   |
|------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------|----------------|------------------------------------------|------------------------------------------|---|
| Profile Name                                               | <input style="width: 90%;" type="text"/>                                                                                                   |                                          |                |                                          |                                          |   |
| Enable                                                     | <input checked="" type="checkbox"/>                                                                                                        |                                          |                |                                          |                                          |   |
| Interface                                                  | <div style="border: 1px solid #ccc; padding: 2px; display: flex; align-items: center;">WAN <span style="margin-left: 10px;">▼</span></div> |                                          |                |                                          |                                          |   |
| Router ID                                                  | <input checked="" type="radio"/> WAN IP Address<br><input type="radio"/> Custom: <input style="width: 100px;" type="text"/>                |                                          |                |                                          |                                          |   |
| Autonomous System                                          | <input style="width: 90%;" type="text"/>                                                                                                   |                                          |                |                                          |                                          |   |
| Neighbor <span style="float: right;">?</span>              | IP Address                                                                                                                                 | Autonomous System                        | Multihop / TTL | Password                                 | AS-Path Prepending                       |   |
|                                                            | <input style="width: 90%;" type="text"/>                                                                                                   | <input style="width: 90%;" type="text"/> | disable        | <input style="width: 90%;" type="text"/> | <input style="width: 90%;" type="text"/> | + |
| Hold Time <span style="float: right;">?</span>             | <div style="border: 1px solid #ccc; padding: 2px; display: flex; align-items: center;">240</div>                                           |                                          |                |                                          |                                          |   |
| Next Hop Self <span style="float: right;">?</span>         | <input type="checkbox"/>                                                                                                                   |                                          |                |                                          |                                          |   |
| iBGP Local Preference <span style="float: right;">?</span> | <div style="border: 1px solid #ccc; padding: 2px; display: flex; align-items: center;">100</div>                                           |                                          |                |                                          |                                          |   |
| BFD <span style="float: right;">?</span>                   | <input type="checkbox"/> Enable                                                                                                            |                                          |                |                                          |                                          |   |

| BGP                        |                                                                                                                                                                                                                                                                                                                                            |
|----------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Name</b>                | This field specifies the name that represents this profile.                                                                                                                                                                                                                                                                                |
| <b>Enable</b>              | When this box is checked, this BGP profile will be enabled. If it is left unchecked, it will be disabled.                                                                                                                                                                                                                                  |
| <b>Interface</b>           | The interface in which the BGP neighbor is located.                                                                                                                                                                                                                                                                                        |
| <b>Autonomous System</b>   | The Autonomous System Number (ASN) assigned to this profile.                                                                                                                                                                                                                                                                               |
| <b>Neighbor</b>            | BGP Neighbors and their details.                                                                                                                                                                                                                                                                                                           |
| <b>IP address</b>          | The IP address of the Neighbor.                                                                                                                                                                                                                                                                                                            |
| <b>Autonomous System</b>   | The Neighbor's ASN.                                                                                                                                                                                                                                                                                                                        |
| <b>Multihop/TTL</b>        | This field determines the Time-to-live (TTL) of BGP packets. Leave this field blank if the BGP neighbor is directly connected, otherwise you must specify a TTL value. This option should be used if the configured Neighbor's IP address does not match the selected Interface's network subnets. The TTL value must be between 2 to 255. |
| <b>Password</b>            | (Optional) Assign a password for MD5 authentication of BGP sessions.                                                                                                                                                                                                                                                                       |
| <b>AS-Path Prepending:</b> | AS path to be prepended to the routes received from this Neighbor. Values must be ASN and separated by commas. For example: inputting "64530,64531" will prepend "64530, 64531" to received routes.                                                                                                                                        |

|                              |                                                                                                                                                                                                                                                                                                                                             |
|------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Hold Time</b>             | Wait time in seconds for a keepalive message from a Neighbor before considering the BGP connection as stalled.<br>The value must be either 0 (infinite hold time) or between 3 and 65535 inclusively.<br>Default: 240                                                                                                                       |
| <b>Next Hop Self</b>         | Enable this option to advertise your own source address as the next hop when propagating routes.                                                                                                                                                                                                                                            |
| <b>iBGP Local Preference</b> | This is the metric advertised to iBGP Neighbors to indicate the preference for external routes. The value must be between 0 to 4294967295 inclusively.<br>Default: 100                                                                                                                                                                      |
| <b>BFD</b>                   | Enable this option to add Bidirectional Forwarding Detection for path failure. All directly connected Neighbors that use the same physical interface share the same BFD settings. All multihop Neighbors share the same multihop BFD settings. You can configure BFD settings in the BGP profile listing page after this option is enabled. |

| Route Advertisement      |   |                                            |                                  |
|--------------------------|---|--------------------------------------------|----------------------------------|
| Network Advertising      | ? | <div>---</div> <div>+</div>                |                                  |
| Static Route Advertising | ? | <input checked="" type="checkbox"/> Enable |                                  |
|                          |   | Excluded Networks                          | Subnet Mask                      |
|                          |   | <div></div>                                | 255.255.255.0 (/24) <div>+</div> |
| Custom Route Advertising | ? | Networks                                   | Subnet Mask                      |
|                          |   | <div></div>                                | 255.255.255.0 (/24) <div>+</div> |
| Advertise OSPF Route     | ? | <input type="checkbox"/>                   |                                  |
| Set Community            | ? | Community                                  | Route Prefix                     |
|                          |   | <div></div>                                | <div></div> <div>+</div>         |

|                                 |                                                                                                                                 |
|---------------------------------|---------------------------------------------------------------------------------------------------------------------------------|
| <b>Network Advertising</b>      | Select the Networks that will be advertised to the BGP Neighbor.                                                                |
| <b>Static Route Advertising</b> | Enable this option to advertise static LAN routes. Static routes that match the Excluded Networks table will not be advertised. |
| <b>Custom Route Advertising</b> | Additional routes to be advertised to the BGP Neighbor.                                                                         |
| <b>Advertise OSPF Route</b>     | When this box is checked, every learnt OSPF route will be advertised.                                                           |
| <b>Set Community</b>            | Assign a prefix to a Community.<br><br>Community:                                                                               |

Two numbers in new-format.  
e.g. 65000:21344

Well-known communities:  
no-export 65535:65281  
no-advertise 65535:65282  
no-export-subconfed 65535:65283  
no-peer 65535:65284

Route Prefix:  
Comma separated networks.  
e.g. 172.168.1.0/24,192.168.1.0/28

| Route Import        |                                                      |                       |                          |                                  |
|---------------------|------------------------------------------------------|-----------------------|--------------------------|----------------------------------|
| Filter Mode         | <input type="button" value="?"/> <div>Accept ▼</div> |                       |                          |                                  |
| Restricted Networks | Network                                              | Subnet Mask           | Exact Match              |                                  |
|                     |                                                      | 255.255.255.0 (/24) ▼ | <input type="checkbox"/> | <input type="button" value="+"/> |

### Filter Mode

This field allows for the selection of the filter mode for route import.

**None:** All BGP routes will be accepted.

**Accept:** Routes in "Restricted Networks" will be accepted, routes not in the list will be rejected.

**Reject:** Routes in "Restricted Networks" will be rejected, routes not in the list will be accepted.

### Restricted Networks

This field specifies the network(s) in the "route import" entry.

**Exact Match:** When this box is checked, only routes with the same Network and Subnet Mask will be filtered.

Otherwise, routes within the Networks and Subnets will be filtered.

| Route Export                |                                                           |                       |                          |                                  |
|-----------------------------|-----------------------------------------------------------|-----------------------|--------------------------|----------------------------------|
| Filter Mode                 | <input type="button" value="?"/> <div>Accept ▼</div>      |                       |                          |                                  |
| Restricted Networks         | Network                                                   | Subnet Mask           | Exact Match              |                                  |
|                             |                                                           | 255.255.255.0 (/24) ▼ | <input type="checkbox"/> | <input type="button" value="+"/> |
| Export to other BGP Profile | <input type="button" value="?"/> <input type="checkbox"/> |                       |                          |                                  |
| Export to OSPF              | <input type="button" value="?"/> <input type="checkbox"/> |                       |                          |                                  |

### Filter Mode

This field allows for the selection of the filter mode for route export.

**None:** All BGP routes will be accepted.

**Accept:** Routes in "Restricted Networks" will be accepted, routes not in the list will

|                                    |                                                                                                                                                                                                                                                                             |
|------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
|                                    | <p>be rejected.</p> <p><b>Reject:</b> Routes in "Restricted Networks" will be rejected, routes not in the list will be accepted.</p>                                                                                                                                        |
| <b>Restricted Networks</b>         | <p>This field specifies the network(s) in the "route export" entry.</p> <p><b>Exact Match:</b> When this box is checked, only routes with the same Network and Subnet Mask will be filtered.</p> <p>Otherwise, routes within the Networks and Subnets will be filtered.</p> |
| <b>Export to other BGP Profile</b> | <p>When this box is checked, routes learnt from this BGP profile will be exported to other BGP profiles.</p>                                                                                                                                                                |
| <b>Export to OSPF</b>              | <p>When this box is checked, routes learnt from this BGP profile will be exported to the OSPF routing protocol.</p>                                                                                                                                                         |

## 23 Remote User Access

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

### 23.1 L2TP with IPsec

| Remote User Access Settings |                                                                                                           |
|-----------------------------|-----------------------------------------------------------------------------------------------------------|
| Enable                      | <input checked="" type="checkbox"/>                                                                       |
| VPN Type                    | <input checked="" type="radio"/> L2TP with IPsec <input type="radio"/> PPTP <input type="radio"/> OpenVPN |
| Preshared Key               | <input type="text"/> <input type="button" value="?"/> <input checked="" type="checkbox"/> Hide Characters |

| L2TP with IPsec Remote User Access Settings |                                                                                                                                                                                                   |
|---------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Pre-shared Key</b>                       | Enter your pre shared key in the text field. Please note that remote devices will need this preshared key to access the Balance.                                                                  |
| <b>Listen On</b>                            | This setting is for specifying the WAN IP addresses that allow remote user access.                                                                                                                |
| <b>Disable Weak Ciphers</b>                 | Click the  button to show and enable this option.<br>When checked, weak ciphers such as 3DES will be disabled. |

Continue to configure the authentication method.

### 23.2 OpenVPN

| Remote User Access Settings |                                                                                                                                                                                             |
|-----------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Enable                      | <input checked="" type="checkbox"/>                                                                                                                                                         |
| VPN Type                    | <input type="radio"/> L2TP with IPsec <input type="radio"/> PPTP <input checked="" type="radio"/> OpenVPN<br>You can obtain the OpenVPN client profile from the <a href="#">status page</a> |

Select OpenVPN and continue to configure the authentication method.

The OpenVPN Client profile can be downloaded from the **Status > device** page after the configuration has been saved.

|                        |                                                                  |
|------------------------|------------------------------------------------------------------|
| OpenVPN Client Profile | <a href="#">Route all traffic</a>   <a href="#">Split tunnel</a> |
|------------------------|------------------------------------------------------------------|

You have a choice between 2 different OpenVPN Client profiles:

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

## 23.3 PPTP

| Remote User Access Settings |                                                                                                           |
|-----------------------------|-----------------------------------------------------------------------------------------------------------|
| Enable                      | <input checked="" type="checkbox"/>                                                                       |
| VPN Type                    | <input type="radio"/> L2TP with IPsec <input checked="" type="radio"/> PPTP <input type="radio"/> OpenVPN |

No additional configuration required.

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

Continue to configure authentication method.

## 23.4 Authentication Methods

|                    |                       |          |   |
|--------------------|-----------------------|----------|---|
| Connect to Network | Untagged LAN ▼        |          |   |
| Authentication     | Local User Accounts ▼ |          |   |
| User Accounts      | Username              | Password | + |

| Authentication Method     |                                                                           |
|---------------------------|---------------------------------------------------------------------------|
| <b>Connect to Network</b> | Select the VLAN network for remote users to enable remote user access on. |
| <b>Authentication</b>     | Determine the method of authenticating remote users                       |

### User accounts:

This setting allows you to define the Remote User Accounts.

Click Add to input username and password to create an account. After adding the user accounts, you can click on a username to edit the account password.

**Note:**

The username must contain lowercase letters, numerics, underscore(\_), dash(-), at sign(@), and period(.) only.

The password must be between 8 and 12 characters long.

**LDAP Server:**

|                    |                                                                                                  |
|--------------------|--------------------------------------------------------------------------------------------------|
| Connect to Network |  Untagged LAN ▾ |
| 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"/>                                                                             |

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

**Radius Server:**

|                          |                                                                          |
|--------------------------|--------------------------------------------------------------------------|
| Authentication           | RADIUS Server ▾                                                          |
| Auth Protocol            | MS-CHAP v2 ▾                                                             |
| Auth Server              | <input type="text"/> Port 1812 <input type="button" value="Default"/>    |
| Auth Server Secret       | <input type="text"/> <input checked="" type="checkbox"/> Hide Characters |
| Accounting Server        | <input type="text"/> Port 1813 <input type="button" value="Default"/>    |
| Accounting Server Secret | <input type="text"/> <input checked="" type="checkbox"/> Hide Characters |

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

**Active Directory:**

|                    |                                                                                                    |
|--------------------|----------------------------------------------------------------------------------------------------|
| Connect to Network |  Untagged LAN ▾ |
| Authentication     | Active Directory ▾                                                                                 |
| Server Hostname    | <input type="text"/>                                                                               |
| Domain             | <input type="text"/>                                                                               |
| Admin Username     | <input type="text"/>                                                                               |
| Admin Password     | <input type="text"/> <input checked="" type="checkbox"/> Hide Characters                           |

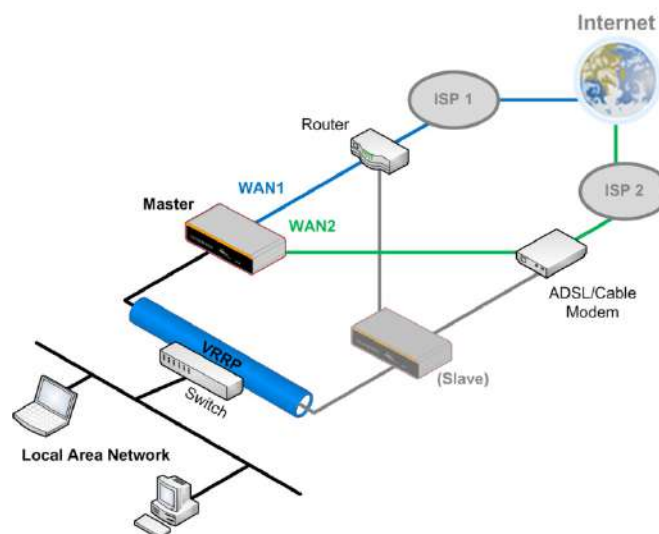
Enter the matching Active Directory details to allow for Active Directory server authentication.

## 24 Miscellaneous Settings

The miscellaneous settings include configuration for High Availability, Certificate Manager, service forwarding, service passthrough, GPS forwarding, GPIO, Groupe Networks and SIM Toolkit (depending the feature is supported on the model of Peplin router that is being used).

### 24.1 High Availability

Many Pepwave routers support high availability (HA) configurations via an open standard virtual router redundancy protocol (VRRP, RFC 3768). In an HA configuration, two Pepwave routers provide redundancy and failover in a master-slave arrangement. In the event that the master unit is down, the slave unit becomes active. High availability will be disabled automatically where there is a drop-in connection configured on a LAN bypass port.



In the diagram, the WAN ports of each Pepwave router connect to the router and to the modem. Both Pepwave routers connect to the same LAN switch via a LAN port.

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

- In an HA configuration, the two Pepwave routers communicate with each other using VRRP over the LAN.
- The two Pepwave routers broadcast heartbeat signals to the LAN at a frequency of one heartbeat signal per second.
- In the event that no heartbeat signal from the master Pepwave router is received in 3 seconds (or longer) since the last heartbeat signal, the slave Pepwave router becomes active.
- The slave Pepwave router initiates the WAN connections and binds to a previously

configured LAN IP address.

- At a subsequent point when the master Pepwave router recovers, it will once again become active.

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

Interface for Master Router

| High Availability                |                                                                     |
|----------------------------------|---------------------------------------------------------------------|
| Enable                           | <input checked="" type="checkbox"/>                                 |
| Group Number                     | <input type="text"/>                                                |
| Preferred Role                   | <input checked="" type="radio"/> Master <input type="radio"/> Slave |
| Resume Master Role Upon Recovery | <input checked="" type="checkbox"/>                                 |
| Virtual IP Address               | <input type="text"/>                                                |
| LAN Administration IP Address    | 192.168.86.1                                                        |
| Subnet Mask                      | 255.255.255.0                                                       |

Interface for Slave Router

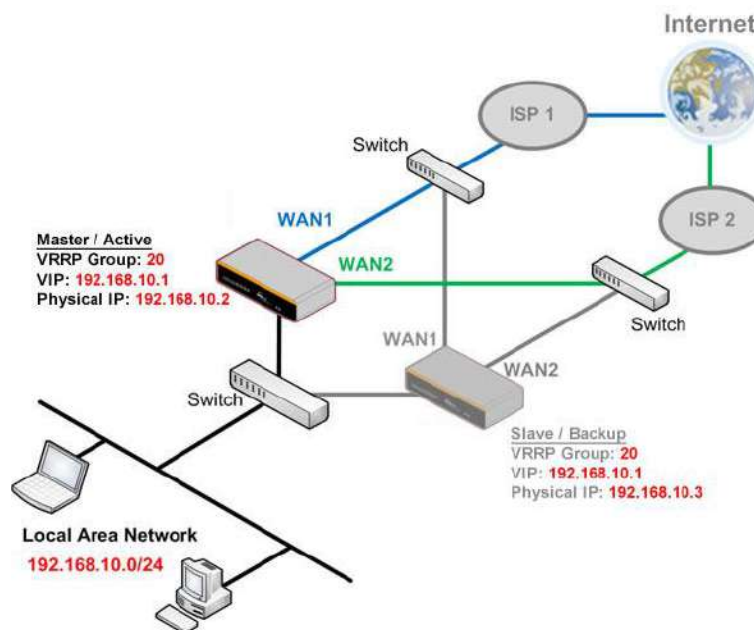
| High Availability                   |                                                                     |
|-------------------------------------|---------------------------------------------------------------------|
| Enable                              | <input checked="" type="checkbox"/>                                 |
| Group Number                        | <input type="text"/>                                                |
| Preferred Role                      | <input type="radio"/> Master <input checked="" type="radio"/> Slave |
| Configuration Sync.                 | <input type="checkbox"/> Master Serial Number: <input type="text"/> |
| Establish Connections in Slave Role | <input type="checkbox"/>                                            |
| Virtual IP Address                  | <input type="text"/>                                                |
| LAN Administration IP Address       | 192.168.86.1                                                        |
| Subnet Mask                         | 255.255.255.0                                                       |

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

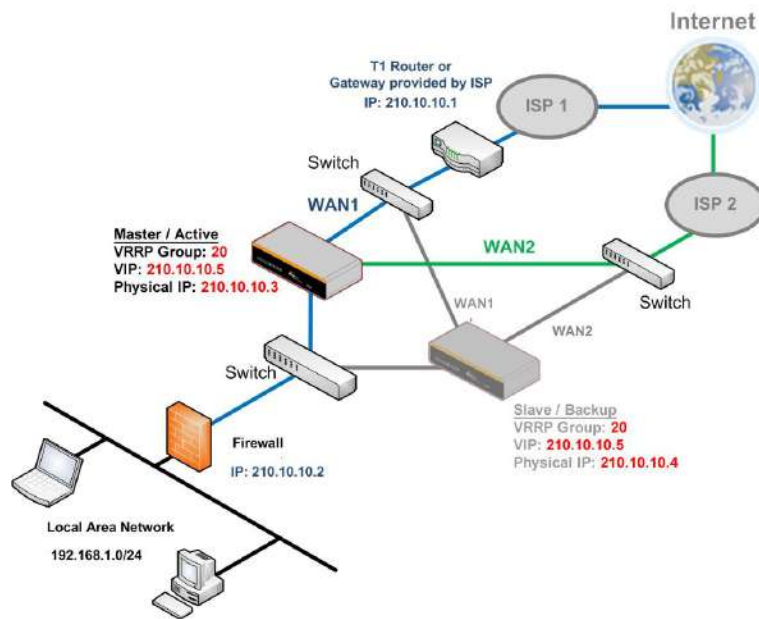
|                                                          |                                                                                                                                              |
|----------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Administration IP</b> must be under the same network. |                                                                                                                                              |
| <b>LAN Administration IP</b>                             | This setting specifies a LAN IP address to be used for accessing administration functionality. This address should be unique within the LAN. |
| <b>Subnet Mask</b>                                       | This setting specifies the subnet mask of the LAN.                                                                                           |

### Important Note

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



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



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

## 24.2 Certificate Manager

| Certificate                  |                               |  |
|------------------------------|-------------------------------|--|
| SpeedFusion/IPsec VPN        | No Certificate                |  |
| Web Admin SSL                | Default Certificate is in use |  |
| Captive Portal SSL           | Default Certificate is in use |  |
| OpenVPN CA                   | Default Certificate is in use |  |
| Wi-Fi WAN Client Certificate |                               |  |
| No Certificates defined      |                               |  |
|                              |                               |  |
| Wi-Fi WAN CA Certificate     |                               |  |
| No Certificates defined      |                               |  |
|                              |                               |  |

This section allows for certificates to be assigned to the local VPN, Web Admin SSL, Captive Portal SSL, OpenVPN CA, Wi-Fi WAN Client certificate and Wi-Fi WAN CA Certificate.

The following knowledge base article describes how to create self-signed certificates and import it to a Peplink Product.

<https://forum.peplink.com/t/how-to-create-a-self-signed-certificate-and-import-it-to-a-peplink-product/>

## 24.3 Service Forwarding

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



| SMTP Forwarding Setup |                                 |
|-----------------------|---------------------------------|
| SMTP Forwarding       | <input type="checkbox"/> Enable |

| Web Proxy Forwarding Setup |                                 |
|----------------------------|---------------------------------|
| Web Proxy Forwarding       | <input type="checkbox"/> Enable |

| DNS Forwarding Setup                             |                                 |
|--------------------------------------------------|---------------------------------|
| Forward Outgoing DNS Requests to Local DNS Proxy | <input type="checkbox"/> Enable |

| Custom Service Forwarding Setup |                                 |
|---------------------------------|---------------------------------|
| Custom Service Forwarding       | <input type="checkbox"/> Enable |

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

### 24.3.1 SMTP Forwarding

Some ISPs require their users to send e-mails via the ISP's SMTP server. All outgoing SMTP connections are blocked except those connecting to the ISP's. Pepwave routers support intercepting and redirecting all outgoing SMTP connections (destined for TCP port 25) via a WAN connection to the WAN's corresponding SMTP server.



| SMTP Forwarding Setup |                          |             |           |
|-----------------------|--------------------------|-------------|-----------|
| SMTP Forwarding       |                          | Enable      |           |
| Connection            | Enable Forwarding?       | SMTP Server | SMTP Port |
| 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                   | <input type="checkbox"/> |             |           |

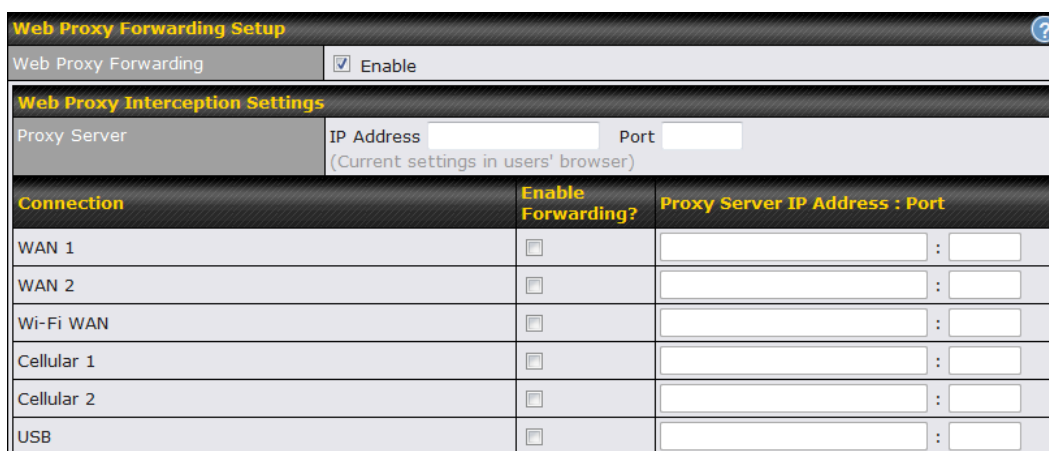
To enable the feature, select **Enable** under **SMTP Forwarding Setup**. Check **Enable Forwarding** for the WAN connection(s) that needs forwarding. Under **SMTP Server**, enter the ISP's e-mail server host name or IP address. Under **SMTP Port**, enter the TCP port number for each WAN.

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

#### Note

If you want to route all SMTP connections only to particular WAN connection(s), you should create a custom rule in outbound policy (see **Section 14.2**).

### 24.3.2 Web Proxy Forwarding



| Web Proxy Forwarding Setup      |                          |                                                                                                   |
|---------------------------------|--------------------------|---------------------------------------------------------------------------------------------------|
| Web Proxy Forwarding            |                          | Enable                                                                                            |
| Web Proxy Interception Settings |                          |                                                                                                   |
| Proxy Server                    |                          | IP Address <input type="text"/> Port <input type="text"/><br>(Current settings in users' browser) |
| Connection                      | Enable Forwarding?       | Proxy Server IP Address : Port                                                                    |
| WAN 1                           | <input type="checkbox"/> | <input type="text"/> : <input type="text"/>                                                       |
| WAN 2                           | <input type="checkbox"/> | <input type="text"/> : <input type="text"/>                                                       |
| Wi-Fi WAN                       | <input type="checkbox"/> | <input type="text"/> : <input type="text"/>                                                       |
| Cellular 1                      | <input type="checkbox"/> | <input type="text"/> : <input type="text"/>                                                       |
| Cellular 2                      | <input type="checkbox"/> | <input type="text"/> : <input type="text"/>                                                       |
| USB                             | <input type="checkbox"/> | <input type="text"/> : <input type="text"/>                                                       |

When this feature is enabled, the Pepwave router will intercept all outgoing connections destined for the proxy server specified in **Web Proxy Interception Settings**, choose a WAN connection with reference to the outbound policy, and then forward them to the specified web proxy server and port number. Redirected server settings for each WAN can be set here. If forwarding is disabled for a WAN, web proxy connections for the WAN will be simply forwarded to the connection's original destination.

### 24.3.3 DNS Forwarding

| DNS Forwarding Setup                             |                                            |
|--------------------------------------------------|--------------------------------------------|
| Forward Outgoing DNS Requests to Local DNS Proxy | <input checked="" type="checkbox"/> Enable |

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

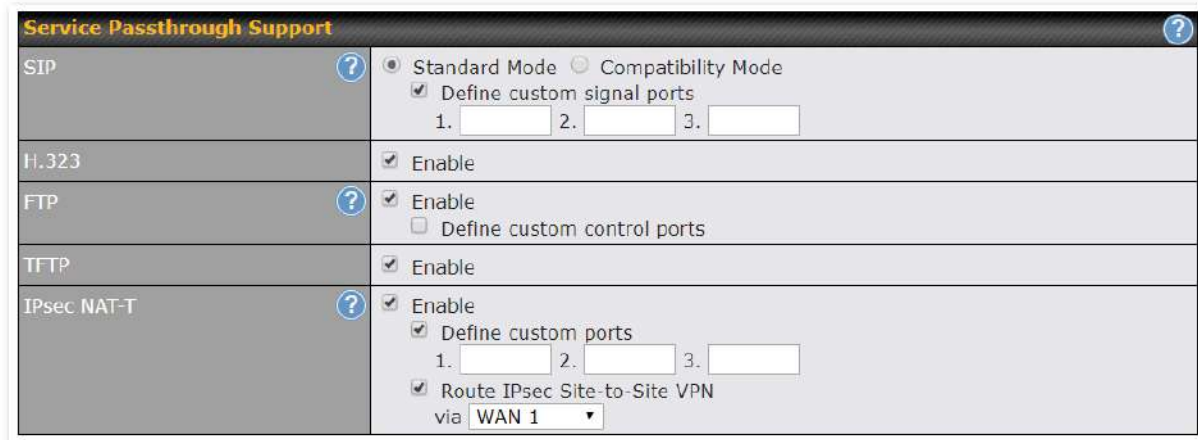
### 24.3.4 Custom Service Forwarding

| Custom Service Forwarding Setup |                                            |                      |                                                                                       |
|---------------------------------|--------------------------------------------|----------------------|---------------------------------------------------------------------------------------|
| Custom Service Forwarding       | <input checked="" type="checkbox"/> Enable |                      |                                                                                       |
| Settings                        | TCP Port                                   | Server IP Address    | Server Port                                                                           |
|                                 | <input type="text"/>                       | <input type="text"/> | <input type="text"/> <input type="button" value="+"/> |

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

## 24.4 Service Passthrough

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



The screenshot shows the 'Service Passthrough Support' configuration window. It contains a table with the following settings:

| Service Passthrough Support |                                                                                                                                                                                                                                                                                                |
|-----------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| SIP                         | <input checked="" type="radio"/> Standard Mode <input type="radio"/> Compatibility Mode<br><input checked="" type="checkbox"/> Define custom signal ports<br>1. <input type="text"/> 2. <input type="text"/> 3. <input type="text"/>                                                           |
| H.323                       | <input checked="" type="checkbox"/> Enable                                                                                                                                                                                                                                                     |
| FTP                         | <input checked="" type="checkbox"/> Enable<br><input type="checkbox"/> Define custom control ports                                                                                                                                                                                             |
| TFTP                        | <input checked="" type="checkbox"/> Enable                                                                                                                                                                                                                                                     |
| IPsec NAT-T                 | <input checked="" type="checkbox"/> Enable<br><input checked="" type="checkbox"/> Define custom ports<br>1. <input type="text"/> 2. <input type="text"/> 3. <input type="text"/><br><input checked="" type="checkbox"/> Route IPsec Site-to-Site VPN<br>via <input type="text" value="WAN 1"/> |

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

| Service Passthrough Support |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |
|-----------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>SIP</b>                  | Session initiation protocol, aka SIP, is a voice-over-IP protocol. The Pepwave router can act as a SIP application layer gateway (ALG) which binds connections for the same SIP session to the same WAN connection and translate IP address in the SIP packets correctly in NAT mode. Such passthrough support is always enabled, and there are two modes for selection: <b>Standard Mode</b> and <b>Compatibility Mode</b> . If your SIP server's signal port number is non-standard, you can check the box <b>Define custom signal ports</b> and input the port numbers to the text boxes. |
| <b>H.323</b>                | With this option enabled, protocols that provide audio-visual communication sessions will be defined on any packet network and pass through the Pepwave router.                                                                                                                                                                                                                                                                                                                                                                                                                              |
| <b>FTP</b>                  | FTP sessions consist of two TCP connections; one for control and one for data. In a multi-WAN situation, they must be routed to the same WAN connection. Otherwise, problems will arise in transferring files. By default, the Pepwave router monitors TCP control connections on port 21 for any FTP connections and binds TCP connections of the same FTP session to the same WAN. If you have an FTP server listening on a port number other than 21, you can check <b>Define custom control ports</b> and enter the port numbers in the text boxes.                                      |
| <b>TFTP</b>                 | The Pepwave router monitors outgoing TFTP connections and routes any incoming TFTP data packets back to the client. Select <b>Enable</b> if you want to enable TFTP passthrough support.                                                                                                                                                                                                                                                                                                                                                                                                     |