

Algorithm	 Overflow							
Overflow Order	 Highest Priority							
	<table border="1"> <tr><td>WAN: WAN 1</td></tr> <tr><td>WAN: WAN 2</td></tr> <tr><td>WAN: Wi-Fi WAN</td></tr> <tr><td>WAN: Cellular 1</td></tr> <tr><td>WAN: Cellular 2</td></tr> <tr><td>WAN: USB</td></tr> <tr><td>Lowest Priority</td></tr> </table>	WAN: WAN 1	WAN: WAN 2	WAN: Wi-Fi WAN	WAN: Cellular 1	WAN: Cellular 2	WAN: USB	Lowest Priority
WAN: WAN 1								
WAN: WAN 2								
WAN: Wi-Fi WAN								
WAN: Cellular 1								
WAN: Cellular 2								
WAN: USB								
Lowest Priority								

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

#### 15.2.6 Algorithm: Least Used

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

The traffic matching this rule will be routed through the healthy WAN connection that is selected in **Connection** and has the most available download bandwidth. The available download bandwidth of a WAN connection is calculated from the total download bandwidth specified on the WAN settings page and the current download usage. The available bandwidth and WAN selection is determined every time an IP session is made.

#### 15.2.7 Algorithm: Lowest Latency

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

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

#### Tip

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

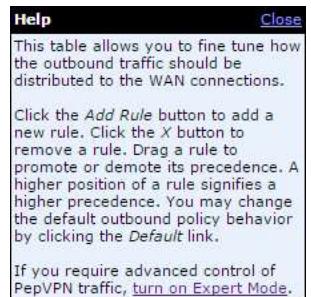
- All WAN connections are symmetric; or
- A latency sensitive application must be routed through the lowest latency WAN, regardless of the WAN's available bandwidth.

### 15.2.8 Expert Mode

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

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

above the bar to override the SpeedFusion™ routes.



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

Rules (Drag and drop rows to change rule order)					?
Service	Algorithm	Source	Destination	Protocol / Port	
HTTPS Persistence	Persistence (Src) (Auto)	Any	Any	TCP 443	X
<b>PepVPN Routes</b>					
Default	(Auto)				
<b>Add Rule</b>					

## 16 Inbound Access

### 16.1 Port Forwarding Service

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

Service	IP Address(es)	Server	Protocol
No Services Defined			
<b>Add Service</b>			

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

Enable	<input checked="" type="radio"/> Yes <input type="radio"/> No																
Service Name	Service_1																
IP Protocol	<input type="button" value="Protocol Selection Tool"/>																
Port	<input type="button" value="Protocol Selection Tool"/>																
Inbound IP Address(es) (Require at least one IP address)	<table border="1"> <thead> <tr> <th colspan="2">Connection / IP Address(es)</th> </tr> <tr> <th>All</th> <th>Clear</th> </tr> </thead> <tbody> <tr> <td><input checked="" type="checkbox"/> WAN 1</td> <td><input checked="" type="checkbox"/> 10.88.3.158 (Interface IP)</td> </tr> <tr> <td><input type="checkbox"/> WAN 2</td> <td></td> </tr> <tr> <td><input type="checkbox"/> Wi-Fi WAN</td> <td></td> </tr> <tr> <td><input type="checkbox"/> Cellular 1</td> <td></td> </tr> <tr> <td><input type="checkbox"/> Cellular 2</td> <td></td> </tr> <tr> <td><input type="checkbox"/> USB</td> <td></td> </tr> </tbody> </table>	Connection / IP Address(es)		All	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)																	
All	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	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.
<b>IP Protocol</b>	The <b>IP Protocol</b> setting, along with the <b>Port</b> 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 <b>Servers</b> setting. Please see below for details on the <b>Port</b> and <b>Servers</b> settings. Alternatively, the <b>Protocol Selection Tool</b> 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 <b>Protocol Selection Tool</b> 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

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

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

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

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

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

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

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

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

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

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

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

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

<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.

### 16.1.1 UPnP / NAT-PMP Settings

UPnP and NAT-PMP are network protocols which allow a computer connected to the LAN port

to automatically configure the router to allow parties on the WAN port to connect to itself. That way, the process of inbound port forwarding becomes automated.

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

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

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

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

## 17 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	<input checked="" type="checkbox"/>

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

LAN Client(s)	IP Address
Address	
Inbound Mappings	<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
Outbound Mappings	<b>Connection / Outbound IP Address</b> 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>	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.  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.
<b>Outbound Mappings</b>	This setting specifies the WAN IP addresses that should be used when an IP connection is made from a LAN host to the Internet. Each LAN host in an IP range or IP network will be evenly mapped to one of each selected WAN's IP addresses (for better IP address utilization) in a persistent manner (for better application compatibility).  Note that if you do not want to use a specific WAN for outgoing accesses, you should still choose default here, then customize the outbound access rule in the <b>Outbound Policy</b> section. Also note that WAN connections in drop-in mode or IP forwarding mode are not shown here.

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

#### Important Note

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

# 18 QoS

## 18.1 User Groups

LAN and PPTP clients can be categorized into three user groups: **Manager, Staff, and Guest**. This menu allows you to define rules and assign client IP addresses or subnets to a user group. You can apply different bandwidth and traffic prioritization policies on each user group in the **Bandwidth Control** and **Application** sections (note that the options available here vary by model).

The table is automatically sorted by rule precedence. The smaller and more specific subnets are put towards the top of the table and have higher precedence; larger and less specific subnets are placed towards the bottom.

Click the **Add** button to define clients and their user group. Click the  button to remove the defined rule. Two default rules are pre-defined and put at the bottom. They are **All DHCP reservation clients** and **Everyone**, and they cannot be removed. The **All DHCP reservation client represents** the LAN clients defined in the DHCP Reservation table on the LAN settings page. **Everyone** represents all clients that are not defined in any rule above. Click on a rule to change its group.

Subnet / IP Address	User Group	Action 
Guest Computer	Guest	
All DHCP reservation clients	Manager	
Everyone		
<b>Add / Edit User Group</b>		
Client	Staff A	
Subnet / IP Address	 IP Address  192.168.1.99	
Group	 Manager  Staff A (192.168.1.99)	
<b>Save</b> <b>Cancel</b>		

**Add / Edit User Group**

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

**Group** This field is to define which **User Group** the specified subnet / IP address belongs to.

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

## 18.2 Bandwidth Control

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

Group Bandwidth Reservation			
Enable	<input checked="" type="checkbox"/>		
	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

## 18.3 Application

### 18.3.1 Application Prioritization

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

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

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

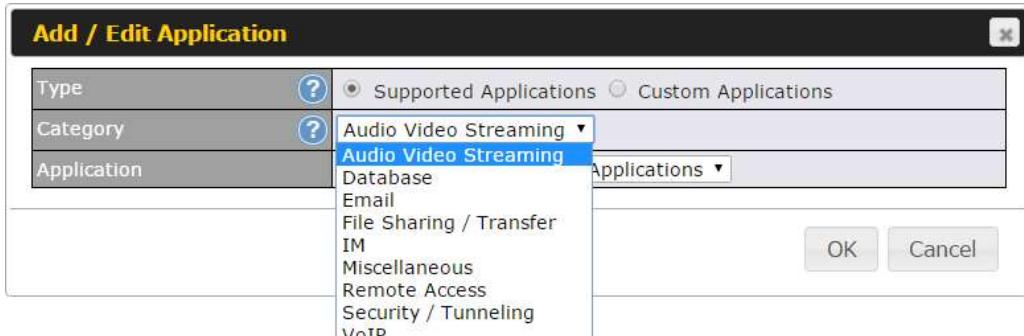
Application	Priority			Action
	Manager	Staff	Guest	
All Supported Streaming Applications	↑ High	— Normal	↑ High	X
All Email Protocols	↑ High	↑ High	↑ High	X
MySQL	↑ High	— Normal	↓ Low	X
SIP	↑ High	↓ Low	↓ Low	X
<b>Add</b>				

### 18.3.2 Prioritization for Custom Applications

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

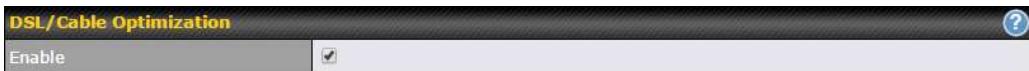
When **Supported Applications** is selected, the Pepwave router will inspect network traffic and

prioritize the selected applications. Alternatively, you can select **Custom Applications** and define the application by providing the protocol, scope, port number, and DSCP value.



### 18.3.3 DSL/Cable Optimization

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



## 19 Firewall

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

The firewall functionality of Pepwave routers supports the selective filtering of data traffic in both directions:

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

The firewall also supports the following functionality:

- Intrusion detection and DoS prevention
- Web blocking

With SpeedFusion™ enabled, the firewall rules also apply to VPN tunneled traffic.

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

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

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

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

**Apply Firewall Rules to PepVPN Traffic**

Enabled	<input checked="" type="checkbox"/>
---------	-------------------------------------

**Intrusion Detection and DoS Prevention**

Disabled	<input checked="" type="checkbox"/>
----------	-------------------------------------

## 19.1 Outbound and Inbound Firewall Rules

### 19.1.1 Access Rules

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

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

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

**Add Rule**

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

**Add a New Outbound Firewall Rule**

**New Firewall Rule**

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

**Save** **Cancel**

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

Inbound Firewall Rules (  Drag and drop rows to change rule order)						
Rule	Protocol	WAN	Source IP Port	Destination IP Port	Policy	
Default	Any	Any	Any	Any	Allow	
<a href="#">Add Rule</a>						

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

**Add a New Inbound Firewall Rule**

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

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

Inbound / Outbound Firewall Settings	
<b>Rule Name</b>	This setting specifies a name for the firewall rule.
<b>Enable</b>	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.
	Click the dropdown menu next to the checkbox to place this firewall rule on a time schedule.
<b>WAN Connection (Inbound)</b>	Select the WAN connection that this firewall rule should apply to.
<b>Protocol</b>	This setting specifies the protocol to be matched. Via a drop-down menu, the following protocols can be specified: <ul style="list-style-type: none"> <li>• TCP</li> <li>• UDP</li> <li>• ICMP</li> </ul>

- **IP**

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.

This specifies the source IP address(es) and port number(s) to be matched for the firewall rule. A single address, or a network, can be specified as the **Source IP & Port** setting, as indicated by the following screenshot:

**Source IP & Port**

In addition, a single port, or a range of ports, can be specified for the **Source IP & Port** settings.

This specifies the destination IP address(es) and port number(s) to be matched for the firewall rule. A single address, or a network, can be specified as the **Destination IP & Port** setting, as indicated by the following screenshot:

**Destination IP & Port**

In addition, a single port, or a range of ports, can be specified for the **Destination IP & Port** settings.

This setting specifies the action to be taken by the router upon encountering traffic that matches the both of the following:

**Action**

- 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).

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
```

**Event Logging**

- **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.

### Tip

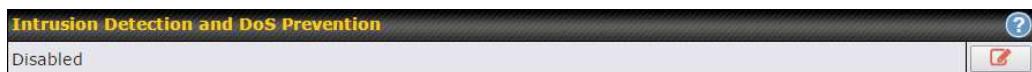
If the default inbound rule is set to **Allow** for NAT-enabled WANs, no inbound Allow firewall rules will be required for inbound port forwarding and inbound NAT mapping rules. However, if the default inbound rule is set as **Deny**, a corresponding Allow firewall rule will be required.

#### 19.1.2 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.

#### 19.1.3 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
  - NMAP FIN/URG/PSH
  - Xmas tree
  - Another Xmas tree
  - Null scan
  - SYN/RST
  - SYN/FIN
- SYN flood prevention
- Ping flood attack prevention

## 19.2 Content Blocking

The screenshot displays the Pepwave Content Blocking configuration interface. It includes the following sections:

- Application Blocking:** A dropdown menu labeled "Please Select Application..." and a "Add" button.
- Web Blocking:** A "Preset Category" section with radio buttons for High, Moderate, Low, and Custom. The Custom category is selected. A large list of content categories with checkboxes:
  - Abortion, Adware, Aggressive
  - Alcohol, Anti-Spyware, Chatroom
  - Dating, Drugs, Ecommerce/Shopping
  - Entertainment, File Hosting, P2P/File sharing
  - Gambling, Games, Hacking
  - Instant Messaging, Job Search/Employment, Kids Time Wasting
  - Lingerie, Malware, Manga/Anime/Webcomic
  - Nudity, News/Media, Auctions
  - Phishing, Pornography, Proxy/Anonymizer
  - Radio, Remote Access, Ringtones
  - Search Engines, Sexuality Education, Social Networking
  - Sports, Spyware, Tobacco
  - Update Sites, Vacation, Violence
  - Viruses, Weapons, Weather
  - Webmail, WebTV
- Customized Domains:** A table with a row for "cbs.com" with a delete ("X") and add (+) button.
- Exempted Domains from Web Blocking:** An empty table with an add (+) button.
- Exempted User Groups:** A table with rows for Manager, Staff, and Guest, each with an "Exempt" checkbox.
- Exempted Subnets:** A table with a row for "Network" and "Subnet Mask" set to "255.255.255.0 (/24)". An "Add" button is present.
- URL Logging:** A table with rows for "Enable" (checkbox) and "Log Server Host" (text input) and "Port" (dropdown).

### 19.2.1 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.

### 19.2.2 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 traffic. Secure web (HTTPS) traffic is not supported.

### 19.2.3 Customized Domains

Enter an appropriate website address, and the Peplink Balance will block and disallow LAN/PPTP/SpeedFusion™ peer clients to access these websites. Exceptions can be added using the instructions in Sections 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 Peplink Balance will inspect and look for blocked domain names on all HTTP traffic. Secure web (HTTPS) traffic is not supported.

### 19.2.4 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.

### 19.2.5 Exempted Subnets

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

### 19.2.6 URL Logging

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

## 20 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:

<b>OSPF</b>	
Router ID	LAN IP Address <input type="text"/>
<b>Area</b>	<b>Interfaces</b>
0.0.0.0	PepVPN <input type="button" value="X"/>
<input type="button" value="Add"/>	

<b>PepVPN OSPF Area</b>	
0.0.0.0	<input type="button" value="X"/>

<b>RIPv2</b>	
No RIPv2 Defined.	<input type="button" value="X"/>

## OSPF

<b>Router ID</b>	This field determines the ID of the router. By default, this is specified as the LAN IP address. If you want to specify your own ID, enter it in the <b>Custom</b> field.
<b>Area</b>	This is an overview of the OSPFv2 areas you have defined. Click on the area name to configure it. To set a new area, click <b>Add</b> . To delete an existing area, click <input type="button" value="X"/> .

**OSPF settings**

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

---

OSPF Settings	
<b>Area ID</b>	Determine the name of your <b>Area ID</b> to apply to this group. Machines linked to this group will send and receive related OSPF packets, while unlinked machines will ignore it.
<b>Link Type</b>	Choose the network type that this area will use.
<b>Authentication</b>	Choose an authentication method, if one is used, from this drop-down menu. Available options are <b>MD5</b> and <b>Text</b> . Enter the authentication key next to the drop-down menu.
<b>Interfaces</b>	Determine which interfaces this area will use to listen to and deliver OSPF packets

To access RIPv2 settings, click .

### RIPv2 settings

Authentication	<input type="button" value="None ▾"/>
Interfaces	<input type="checkbox"/> Untagged LAN <input type="checkbox"/> V167 (192.168.167.1/24) <input type="checkbox"/> WAN 1 <input type="checkbox"/> WAN 2 <input type="checkbox"/> WAN 3 <input type="checkbox"/> WAN 4 <input type="checkbox"/> WAN 5

RIPv2 Settings	
<b>Authentication</b>	Choose an authentication method, if one is used, from this drop-down menu. Available options are <b>MD5</b> and <b>Text</b> . Enter the authentication key next to the drop-down menu.
<b>Interfaces</b>	Determine which interfaces this group will use to listen to and deliver RIPv2 packets.

### OSPF & RIPv2 Route Advertisement

PepVPN Route Isolation	<input type="checkbox"/> Enable				
Network Advertising	<input type="checkbox"/> --- All LAN/VLAN networks will be advertised when no network advertising is chosen.				
Static Route Advertising	<input checked="" type="checkbox"/> Enable <table border="1"> <tr> <td>Excluded Networks</td> <td>Subnet Mask</td> </tr> <tr> <td><input type="text"/></td> <td>255.255.255.0 (/24)</td> </tr> </table>	Excluded Networks	Subnet Mask	<input type="text"/>	255.255.255.0 (/24)
Excluded Networks	Subnet Mask				
<input type="text"/>	255.255.255.0 (/24)				

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>	Enable this option to advertise LAN static routes over OSPF & RIPv2. Static routes that match the Excluded Networks table will not be advertised.

## 21 BGP

Click the **Advanced** tab from the top bar, and then click the **Routing Protocols>BGP** item on the sidebar to configure BGP.

BGP	AS	Neighbors	
Uplink	64520	172.16.51.1	
			<b>Add</b>

Click "x" to delete a BGP profile

Click "Add" to add a new BGP profile

BGP Profile						
Profile Name						
Enable	<input checked="" type="checkbox"/>					
Interface	WAN 1					
Router ID	<input checked="" type="radio"/> LAN IP Address <input type="radio"/> Custom: <input type="text"/>					
Autonomous System						
Neighbor	IP Address	Autonomous System	Multihop / TTL	Password	AS-Path Prepending	
Hold Time		240				

BGP	
<b>Name</b>	This field is for specifying a name to represent this profile.
<b>Enable</b>	When this box is checked, this BGP profile will be enabled. Otherwise, it will be disabled.
<b>Interface</b>	The interface where BGP neighbor is located
<b>Autonomous System</b>	The Autonomous System Number (ASN) of this profile
<b>Neighbor</b>	BGP Neighbor's details
<b>IP address</b>	Neighbor's IP address
<b>Autonomous System</b>	Neighbor's ASN
<b>Multihop/TTL</b>	Time-to-live (TTL) of BGP packet. Leave it blank if BGP neighbor is directly connected, otherwise you must specify a

	TTL value. Accurately, this option should be used if the configured neighbor IP address does not match the selected Interface's network subnets. TTL value must be between 2 to 255.
<b>Password</b>	Optional password for MD5 authentication of BGP sessions.
<b>AS-Path Prepending:</b>	AS path to be prepended to the routes received from this neighbor. The value must be a comma separated ASN. For example "64530,64531" will prepend "64530, 64531" to received routes.
<b>Hold Time</b>	Time in seconds to wait for a keepalive message from the neighbor before considering the BGP connection is stale. This value must be either 0 (infinite hold time) or between 3 and 65535 inclusively.

**Route Advertisement**

Network Advertising	<input type="button" value="?"/>	---	<input type="button" value="+"/>				
Static Route Advertising	<input type="button" value="?"/>	<input checked="" type="checkbox"/> Enable <table border="1"><tr><td>Excluded Networks</td><td>Subnet Mask</td></tr><tr><td></td><td>255.255.255.0 (/24)</td></tr></table> <input type="button" value="+"/>	Excluded Networks	Subnet Mask		255.255.255.0 (/24)	
Excluded Networks	Subnet Mask						
	255.255.255.0 (/24)						
Advertise OSPF Route	<input type="button" value="?"/>	<input type="checkbox"/>	<input type="button" value="+"/>				

<b>Network Advertising</b>	Networks to be advertised to BGP neighbor.
<b>Static Route Advertising</b>	Enable this option to advertise LAN static routes. Static routes that match the Excluded Networks table will not be advertised.
<b>Advertise OSPF Route</b>	When this box is checked, all learnt OSPF routes will be advertised.

**Route Import**

Filter Mode	<input type="button" value="?"/>	Accept ▾		
Restricted Networks	Network	Subnet Mask	Exact Match	<input type="button" value="+"/>
		255.255.255.0 (/24)	<input type="checkbox"/>	

<b>Filter Mode</b>	This option selects the route import filter mode. <b>None</b> : all BGP routes will be accepted. <b>Accept</b> : Routes in "Restricted Networks" will be accepted, routes not in the list will be rejected. <b>Reject</b> : Routes in "Restricted Networks" will be rejected, routes not in the list will
--------------------	--

	be accepted.
<b>Restricted Networks</b>	<p>This specifies the network in the “route import” entry</p> <p><b>Exact Match:</b> When this box is checked, only routes with the same Networks and Subnet Mask will be filtered.</p> <p>Otherwise, routes within the Networks and Subnet will be filtered.</p>

<b>Route Export</b>	
Export to other BGP Profile	 <input type="checkbox"/>
Export to OSPF	 <input type="checkbox"/>

<b>Export to other BGP Profile</b>	When this box is checked, routes learnt from this BGP profile will export to other BGP profiles.
<b>Export to OSPF</b>	When this box is checked, routes learnt from this BGP profile will export to the OSPF routing protocol.

## 22 Remote User Access

a Networks routed by a Peplink Balance can be remotely accessed via L2TP with IPsec or PPTP. To configure this feature, navigate to **Network > Remote User Access**

Remote User Access Settings														
Enable	<input checked="" type="checkbox"/>													
VPN Type	<input checked="" type="radio"/> L2TP with IPsec <input type="radio"/> PPTP IPsec NAT-Traversal will be enabled to ensure compatibility for most of the devices													
Preshared Key	<input type="text"/> <input checked="" type="checkbox"/> Hide Characters													
Listen On	<b>Connection / IP Address(es)</b> <table border="1"> <tr> <td><input checked="" type="checkbox"/> WAN 1</td> <td><input checked="" type="checkbox"/> 10.10.11.107 (Interface IP)</td> </tr> <tr> <td><input checked="" type="checkbox"/> WAN 2</td> <td><input checked="" type="checkbox"/> Interface IP</td> </tr> <tr> <td><input checked="" type="checkbox"/> Wi-Fi WAN</td> <td><input checked="" type="checkbox"/> Interface IP</td> </tr> <tr> <td><input checked="" type="checkbox"/> Cellular 1</td> <td><input checked="" type="checkbox"/> Interface IP</td> </tr> <tr> <td><input checked="" type="checkbox"/> Cellular 2</td> <td><input checked="" type="checkbox"/> Interface IP</td> </tr> <tr> <td><input checked="" type="checkbox"/> USB</td> <td><input checked="" type="checkbox"/> Interface IP</td> </tr> </table>		<input checked="" type="checkbox"/> WAN 1	<input checked="" type="checkbox"/> 10.10.11.107 (Interface IP)	<input checked="" type="checkbox"/> WAN 2	<input checked="" type="checkbox"/> Interface IP	<input checked="" type="checkbox"/> Wi-Fi WAN	<input checked="" type="checkbox"/> Interface IP	<input checked="" type="checkbox"/> Cellular 1	<input checked="" type="checkbox"/> Interface IP	<input checked="" type="checkbox"/> Cellular 2	<input checked="" type="checkbox"/> Interface IP	<input checked="" type="checkbox"/> USB	<input checked="" type="checkbox"/> Interface IP
<input checked="" type="checkbox"/> WAN 1	<input checked="" type="checkbox"/> 10.10.11.107 (Interface IP)													
<input checked="" type="checkbox"/> WAN 2	<input checked="" type="checkbox"/> Interface IP													
<input checked="" type="checkbox"/> Wi-Fi WAN	<input checked="" type="checkbox"/> Interface IP													
<input checked="" type="checkbox"/> Cellular 1	<input checked="" type="checkbox"/> Interface IP													
<input checked="" type="checkbox"/> Cellular 2	<input checked="" type="checkbox"/> Interface IP													
<input checked="" type="checkbox"/> USB	<input checked="" type="checkbox"/> Interface IP													
Connect to Network	Untagged LAN ▾													
Authentication	Local User Accounts ▾													
User Accounts	<table border="1"> <thead> <tr> <th>Username</th> <th>Password</th> <th></th> </tr> </thead> <tbody> <tr> <td>admin</td> <td>*****</td> <td><span style="color: red;">X</span></td> </tr> <tr> <td></td> <td></td> <td><span style="color: blue;">+</span></td> </tr> </tbody> </table>		Username	Password		admin	*****	<span style="color: red;">X</span>			<span style="color: blue;">+</span>			
Username	Password													
admin	*****	<span style="color: red;">X</span>												
		<span style="color: blue;">+</span>												

## Remote User Access Settings

<b>Enable</b>	Click the checkbox to enable Remote User Access.
<b>VPN Type</b>	Determine whether remote devices can connect to the Balance using L2TP with IPsec or PPTP. For greater security, we recommend you connect using L2TP with IPsec.
<b>Preshared Key</b>	Enter your preshared key in the text field. Please note that remote devices will

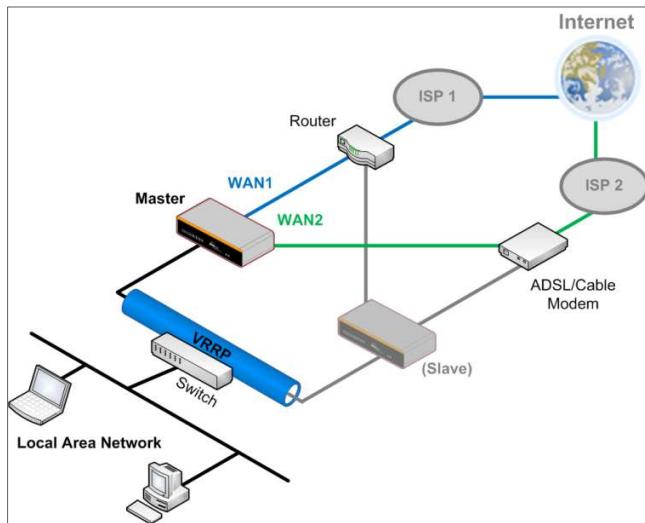
	need this preshared key to access the Balance.
<b>Listen On</b>	This setting is for specifying the WAN IP addresses where the PPTP server of the router should listen on.
<b>Connect to Network</b>	Select the VLAN network for remote users to enable remote user access on.
<b>Authentication</b>	Determine the method of authenticating remote users.
<b>User Accounts</b>	<p>This setting allows you to define the PPTP 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. Click the button X to delete the account in its corresponding row.</p> <p>Click the  button to switch to enter user accounts by pasting the information in CSV format.</p>

## Miscellaneous Settings

The miscellaneous settings include configuration for high availability, PPTP server, service forwarding, and service passthrough.

### 22.1 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

<b>High Availability</b>	
Enable	<input type="checkbox"/>
Group Number	5
Preferred Role	<input checked="" type="radio"/> Master <input type="radio"/> Slave
Resume Master Role Upon Recovery	<input type="checkbox"/>
Virtual IP	
LAN Administration IP	192.168.1.1
Subnet Mask	255.255.255.0

Interface for Slave Router

<b>High Availability</b>	
Enable	<input type="checkbox"/>
Group Number	5
Preferred Role	<input type="radio"/> Master <input checked="" type="radio"/> Slave
Configuration Sync.	<input type="checkbox"/> Master Serial Number: 54BF-5WEY-E37Q
Virtual IP	
LAN Administration IP	192.168.1.1
Subnet Mask	255.255.255.0

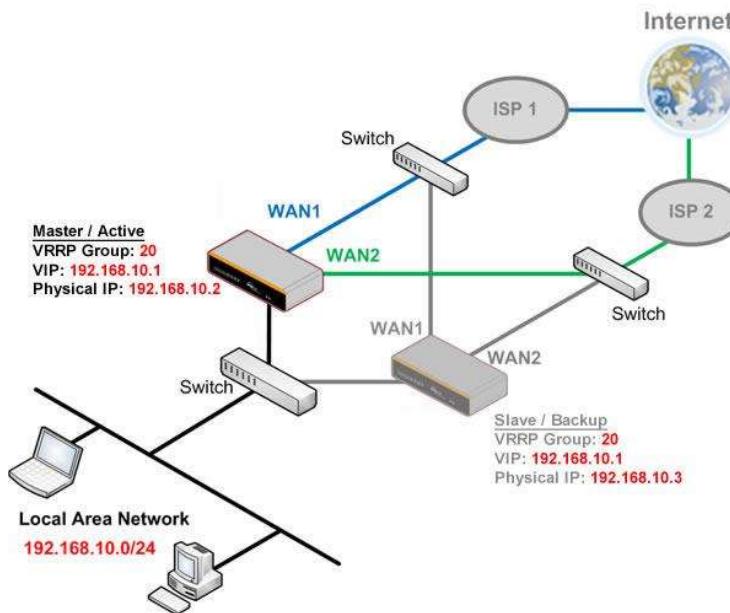
## High Availability

<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 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.

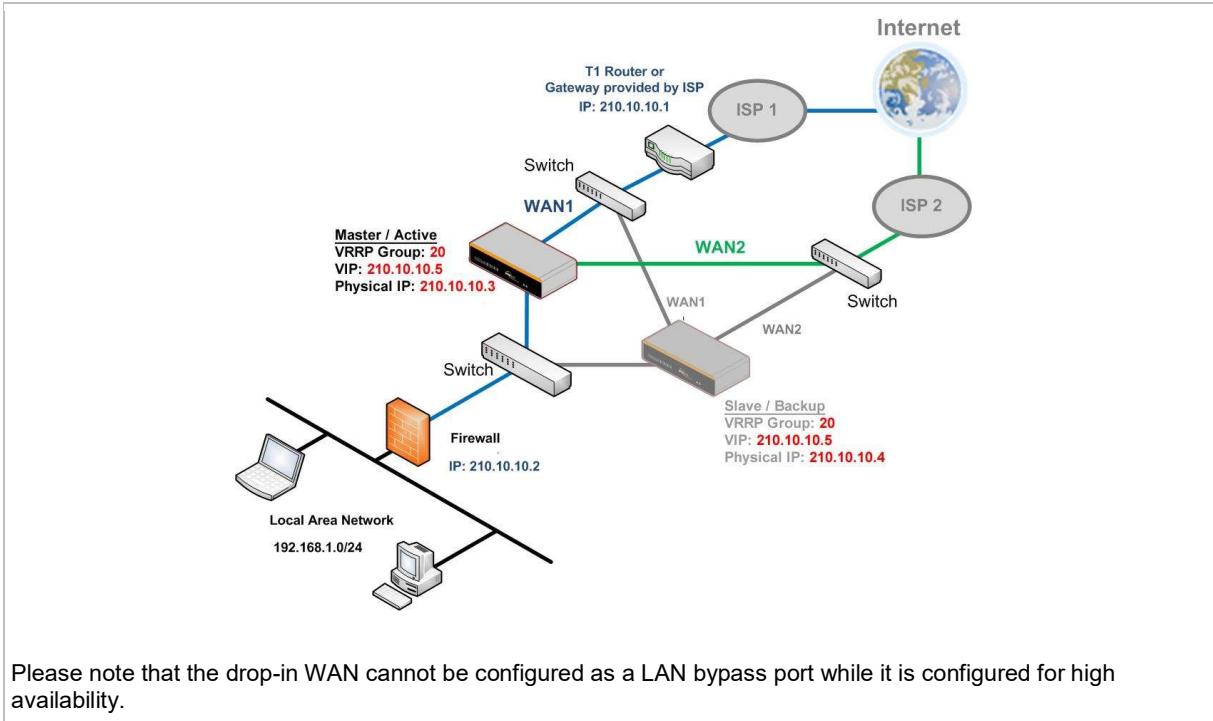
**Subnet Mask** This setting specifies the subnet mask of the LAN.

### 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.



## 22.2 PPTP Server



Pepwave routers feature a built-in PPTP server, which enables remote computers to conveniently and securely access the local network. PPTP server settings are located at **Advanced>Misc. Settings>PPTP Server**.

Check the box to enable PPTP server functionality. All connected PPTP sessions are displayed at **Status>Client List**. Please refer to **Section 22.3** for details. Note that available options vary by model.

**PPTP Server**

Enable	<input checked="" type="checkbox"/>												
Listen On	<p><b>Connection / IP Address(es)</b></p> <table border="1"> <tr> <td><input checked="" type="checkbox"/> WAN 1</td> <td><input checked="" type="checkbox"/> 10.88.3.158 (Interface IP)</td> </tr> <tr> <td><input checked="" type="checkbox"/> WAN 2</td> <td><input checked="" type="checkbox"/> Interface IP</td> </tr> <tr> <td><input checked="" type="checkbox"/> Wi-Fi WAN</td> <td><input checked="" type="checkbox"/> Interface IP</td> </tr> <tr> <td><input checked="" type="checkbox"/> Cellular 1</td> <td><input checked="" type="checkbox"/> Interface IP</td> </tr> <tr> <td><input checked="" type="checkbox"/> Cellular 2</td> <td><input checked="" type="checkbox"/> Interface IP</td> </tr> <tr> <td><input checked="" type="checkbox"/> USB</td> <td><input checked="" type="checkbox"/> Interface IP</td> </tr> </table>	<input checked="" type="checkbox"/> WAN 1	<input checked="" type="checkbox"/> 10.88.3.158 (Interface IP)	<input checked="" type="checkbox"/> WAN 2	<input checked="" type="checkbox"/> Interface IP	<input checked="" type="checkbox"/> Wi-Fi WAN	<input checked="" type="checkbox"/> Interface IP	<input checked="" type="checkbox"/> Cellular 1	<input checked="" type="checkbox"/> Interface IP	<input checked="" type="checkbox"/> Cellular 2	<input checked="" type="checkbox"/> Interface IP	<input checked="" type="checkbox"/> USB	<input checked="" type="checkbox"/> Interface IP
<input checked="" type="checkbox"/> WAN 1	<input checked="" type="checkbox"/> 10.88.3.158 (Interface IP)												
<input checked="" type="checkbox"/> WAN 2	<input checked="" type="checkbox"/> Interface IP												
<input checked="" type="checkbox"/> Wi-Fi WAN	<input checked="" type="checkbox"/> Interface IP												
<input checked="" type="checkbox"/> Cellular 1	<input checked="" type="checkbox"/> Interface IP												
<input checked="" type="checkbox"/> Cellular 2	<input checked="" type="checkbox"/> Interface IP												
<input checked="" type="checkbox"/> USB	<input checked="" type="checkbox"/> Interface IP												
Authentication	<p><input type="button" value="?"/> Local User Accounts ▾</p>												
User Accounts	<table border="1"> <tr> <td><input type="button" value="?"/> Username</td> <td><input type="button" value="?"/> Password</td> <td><input type="button" value="+"/></td> </tr> <tr> <td></td> <td></td> <td></td> </tr> </table>	<input type="button" value="?"/> Username	<input type="button" value="?"/> Password	<input type="button" value="+"/>									
<input type="button" value="?"/> Username	<input type="button" value="?"/> Password	<input type="button" value="+"/>											

## PPTP Server Settings

<b>Listen On</b>	This setting is for specifying the WAN connection(s) and IP address(es) that the PPTP server should listen on.
<b>Authentication</b>	<p>This setting is for specifying the user database source for PPTP authentication. Three sources can be selected: <b>Local User Accounts</b>, <b>LDAP Server</b>, or <b>RADIUS Server</b>.</p> <p><b>Local User Accounts</b> - User accounts are stored in the Pepwave router locally. You can add/modify/delete accounts in the <b>User Accounts</b> table.</p> <p><b>LDAP Server</b> - Authenticate with an external LDAP server. This has been tested with Open LDAP servers where passwords are NTLM hashed. Active Directory is not supported. (You can choose to use RADIUS to authenticate with a Windows server.)</p> <p><b>RADIUS Server</b> - Authenticate with an external RADIUS server. This has been tested with Microsoft Windows Internet Authentication Service and FreeRADIUS</p>

	servers where passwords are NTLM hashed or in plain text.
<b>User Accounts</b>	This setting allows you to define PPTP user accounts <b>for authentication via local user accounts</b> . Click <b>Add</b> 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. Click  to delete the account in its corresponding row.

## 22.3 Certificate Manager

Certificate Manager		
VPN Certificate	 No Certificate	<a href="#">Assign</a>
Web Admin SSL Certificate	 No Certificate	<a href="#">Assign</a>
Captive Portal SSL Certificate	No Certificate	<a href="#">Assign</a>

This section allows you to assign certificates for local VPN and web admin SSL. The local keys will not be transferred to another device by any means.

## 22.4 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.

#### Custom Service Forwarding

When custom service forwarding is enabled, outgoing traffic with the specified TCP port will be forwarded to a local or remote server by defining its IP address and port number.

### 22.4.1 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	<input checked="" type="checkbox"/> 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**).

## 22.4.2 Web Proxy Forwarding

The screenshot shows the 'Web Proxy Forwarding Setup' interface. At the top, there is a checkbox labeled 'Enable'. Below it, the 'Web Proxy Interception Settings' section has a 'Proxy Server' dropdown set to 'IP Address' and a note '(Current settings in users' browser)'. A table lists various WAN connections: WAN 1, WAN 2, Wi-Fi WAN, Cellular 1, Cellular 2, and USB. Each row has a 'Connection' column, an 'Enable Forwarding?' checkbox, and a 'Proxy Server IP Address : Port' column.

Connection	Enable Forwarding?	Proxy Server IP Address : 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"/>	:

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.

## 22.4.3 DNS Forwarding

The screenshot shows the 'DNS Forwarding Setup' interface. It features a single checkbox labeled 'Forward Outgoing DNS Requests to Local DNS Proxy' and an 'Enable' checkbox.

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

## 22.4.4 Custom Service Forwarding

The screenshot shows the 'Custom Service Forwarding Setup' interface. It includes a 'Custom Service Forwarding' section with an 'Enable' checkbox and a 'Settings' table. The table has columns for 'TCP Port', 'Server IP Address', and 'Server Port', with a '+' button for adding new entries.

Settings	TCP Port	Server IP Address	Server Port	+

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.

## 22.5 Service Passthrough

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

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

(Registered trademarks are copyrighted by their respective owner)

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.
<b>IPsec NAT-T</b>	This field is for enabling the support of IPsec NAT-T passthrough. UDP ports 500, 4500, and 10000 are monitored by default. You may add more custom data ports that your IPsec system uses by checking <b>Define custom ports</b> . If the VPN contains IPsec site-to-site VPN traffic, check <b>Route IPsec Site-to-Site VPN</b> and choose the WAN connection to route the traffic to.

## 22.6 GPS Forwarding

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

GPS Forwarding					
Enable	<input checked="" type="checkbox"/>				
Server	Server IP Address / Host Name	Port	Protocol	Report Interval (s)	<input type="button" value="+"/>
			UDP ▾	1	
GPS Report Format	<input checked="" type="radio"/> NMEA <input type="radio"/> TAIP				
NMEA Sentence Type	<input checked="" type="checkbox"/> GPRMC <input type="checkbox"/> GPGGA <input type="checkbox"/> GPVTG <input type="checkbox"/> GPGSA <input type="checkbox"/> GPGSV				
Vehicle ID (optional)	<input type="text"/> ?				

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

## 23 AP Controller

The AP controller acts as a centralized controller of Pepwave AP devices. With this feature,

users can customize and manage multiple APs from a single Pepwave router interface.

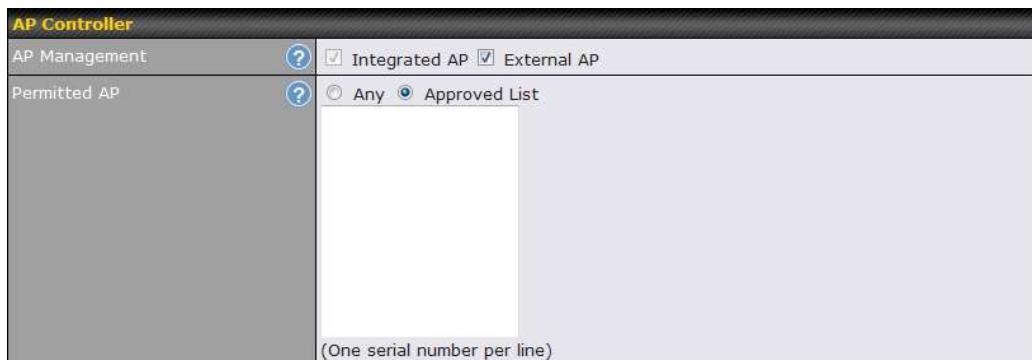
### Special Note

Each Pepwave router can control a limited number of routers without additional cost. To manage more, a Full Edition license is required. Please contact your Authorized Reseller or the Peplink Sales Team for more information and pricing details.

To configure, navigate to the **AP** tab.

## 23.1 Wireless SSID

This menu is the first one that appears after clicking the **AP** tab. This screen can also be reached by clicking **AP>Wireless SSID**. Note the appearance of this screen varies by model.



AP Controller	
<b>AP Management</b>	The AP controller for managing Pepwave APs can be enabled by checking this box. When this option is enabled, the AP controller will wait for management connections originating from APs over the LAN on TCP and UDP port 11753. It will also wait for captive portal connections on TCP port 443. An extended DHCP option, <b>CAPWAP Access Controller addresses</b> (field 138), will be added to the DHCP server. A local DNS record, <b>AP Controller</b> , will be added to the local DNS proxy.
<b>Permitted AP</b>	Access points to manage can be specified here. If <b>Any</b> is selected, the AP controller will manage any AP that reports to it. If <b>Approved List</b> is selected, only APs with serial numbers listed in the provided text box will be managed.

SSID	Security Policy	X
PEPWAVE_8D1C	WPA/WPA2 - Personal	X
<b>New SSID</b>		

Current SSID information appears in the **SSID** section. To edit an existing SSID, click its name in the list. To add a new SSID, click **Add**. Note that the following settings vary by model.

**SSID**

**SSID Settings**

SSID	<input type="text"/>
Enable	Always on
VLAN ID	Untagged LAN
Broadcast SSID	<input checked="" type="checkbox"/>
Data Rate	<input checked="" type="radio"/> Auto <input type="radio"/> Fixed
Multicast Filter	<input type="checkbox"/>
Multicast Rate	MCS0/6M
IGMP Snooping	<input type="checkbox"/>
Layer 2 Isolation	<input type="checkbox"/>
Maximum number of clients	2.4 GHz: <input type="text" value="0"/> 5 GHz: <input type="text" value="0"/> (0: Unlimited)
Band Steering	Disable

**Security Settings**

Security Policy	Open (No Encryption)
-----------------	----------------------

**Access Control Settings**

Restricted Mode	None
-----------------	------

**Save** **Cancel**

SSID Settings	
<b>SSID</b>	This setting specifies the SSID of the virtual AP to be scanned by Wi-Fi clients.
<b>Enable</b>	Click the drop-down menu to apply a time schedule to this interface
<b>VLAN ID</b>	This setting specifies the VLAN ID to be tagged on all outgoing packets generated from this wireless network (i.e., packets that travel from the Wi-Fi segment through the Pepwave AP One unit to the Ethernet segment via the LAN port). The default value of this setting is <b>0</b> , which means VLAN tagging is disabled (instead of tagged with zero).
<b>Broadcast SSID</b>	This setting specifies whether or not Wi-Fi clients can scan the SSID of this wireless network. <b>Broadcast SSID</b> is enabled by default.

<b>Data Rate</b> <sup>A</sup>	Select <b>Auto</b> to allow the Pepwave router to set the data rate automatically, or select <b>Fixed</b> and choose a rate from the displayed drop-down menu.
<b>Multicast Filter</b> <sup>A</sup>	This setting enables the filtering of multicast network traffic to the wireless SSID.
<b>Multicast Rate</b> <sup>A</sup>	This setting specifies the transmit rate to be used for sending multicast network traffic. The selected <b>Protocol</b> and <b>Channel Bonding</b> settings will affect the rate options and values available here.
<b>IGMP Snooping</b> <sup>A</sup>	To allow the Pepwave router to listen to internet group management protocol (IGMP) network traffic, select this option.
<b>DHCP Option 82</b> <sup>A</sup>	If you use a distributed DHCP server/relay environment, you can enable this option to provide additional information on the manner in which clients are physically connected to the network.
<b>Network Priority (QoS)</b> <sup>A</sup>	Select from <b>Gold</b> , <b>Silver</b> , and <b>Bronze</b> to control the QoS priority of this wireless network's traffic.
<b>Layer 2 Isolation</b> <sup>A</sup>	<b>Layer 2</b> refers to the second layer in the ISO Open System Interconnect model. When this option is enabled, clients on the same VLAN, SSID, or subnet are isolated to that VLAN, SSID, or subnet, which can enhance security. Traffic is passed to upper communication layer(s). By default, the setting is disabled.
<b>Maximum Number of Clients</b>	Indicate the maximum number of clients that should be able to connect to each frequency.
<b>Band Steering</b> <sup>A</sup>	Band steering allows the Pepwave router to steer AP clients from the 2.4GHz band to the 5GHz band for better usage of bandwidth. To make steering mandatory, select <b>Enforce</b> . To cause the Pepwave router to preferentially choose steering, select <b>Prefer</b> . The default for this setting is <b>Disable</b> .

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

Security Settings	
Security Policy	WPA2 - Personal
Encryption	AES:CCMP
Shared Key	<input type="text" value="*****"/> <input checked="" type="checkbox"/> Hide Characters

Security Settings	
<b>Security Policy</b>	This setting configures the wireless authentication and encryption methods. Available options are <b>Open (No Encryption)</b> , <b>WPA/WPA2 - Personal</b> ,

## WPA/WPA2 – Enterprise and Static WEP.

Access Control	
Restricted Mode	<input style="border: none; background-color: #D9E1F2; width: 100%; height: 25px; font-size: 10px;" type="button" value="Deny all except listed"/>
MAC Address List	<input style="border: none; width: 100%; height: 50px;" type="button" value=" "/>

### Access Control

The settings allow administrator to control access using MAC address filtering. Available options are **None**, **Deny all except listed**, **Accept all except listed**, and **RADIUS MAC Authentication**.

#### Restricted Mode

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

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

The configuration of **Static WEP** parameters enables pre-shared WEP key encryption. Authentication is not supported by this method. The security level of this method is known to be weak.

#### MAC Address List

Connection coming from the MAC addresses in this list will be either denied or accepted based the option selected in the previous field.

RADIUS Server Settings	Primary Server	Secondary Server
Host	<input type="text"/>	<input type="text"/>
Secret	<input type="text"/>	<input type="text"/>
Authentication Port	<input type="text" value="1812"/> <input type="button" value="Default"/>	<input type="text" value="1812"/> <input type="button" value="Default"/>
Accounting Port	<input type="text" value="1813"/> <input type="button" value="Default"/>	<input type="text" value="1813"/> <input type="button" value="Default"/>

### RADIUS Server Settings

#### Host

Enter the IP address of the primary RADIUS server and, if applicable, the secondary RADIUS server.

<b>Secret</b>	Enter the RADIUS shared secret for the primary server and, if applicable, the secondary RADIUS server.
<b>Authentication Port</b>	In field, enter the UDP authentication port(s) used by your RADIUS server(s) or click the <b>Default</b> button to enter <b>1812</b> .
<b>Accounting Port</b>	In field, enter the UDP accounting port(s) used by your RADIUS server(s) or click the <b>Default</b> button to enter <b>1813</b> .

## 23.2 Settings

On many Pepwave models, the AP settings screen (**AP>Settings**) looks similar to the example below:

AP Settings		
SSID	2.4 GHz <input checked="" type="checkbox"/> 5 GHz <input checked="" type="checkbox"/> Testing	Integrated AP supports 2.4 GHz only.
Operating Country	United States <input type="button" value="▼"/>	
Preferred Frequency	<input checked="" type="radio"/> 2.4 GHz <input type="radio"/> 5 GHz Integrated AP supports 2.4 GHz only.	
	2.4 GHz	5 GHz
Protocol	802.11ng	802.11n/ac
Channel Width	20 MHz <input type="button" value="▼"/>	Auto <input type="button" value="▼"/>
Channel	Auto <input type="button" value="▼"/> <input type="button" value="Edit"/>	Auto <input type="button" value="▼"/> <input type="button" value="Edit"/> Channels: 1 2 3 4 5 6 7 8 9 10 11 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 <input checked="" type="checkbox"/> Wait until no active client associated	Daily at 03 :00 <input checked="" type="checkbox"/> Wait until no active client associated
Output Power	Fixed: Max <input type="button" value="▼"/> <input type="checkbox"/> Boost	Fixed: Max <input type="button" value="▼"/> <input type="checkbox"/> Boost
Client Signal Strength Threshold	0 <input type="button" value="▼"/> -95 dBm (0: Unlimited)	0 <input type="button" value="▼"/> -95 dBm (0: Unlimited)
Maximum number of clients	0 <input type="button" value="▼"/> (0: Unlimited)	0 <input type="button" value="▼"/> (0: Unlimited)
Management VLAN ID	Untagged LAN (No VLAN) <input type="button" value="▼"/>	
Operating Schedule	Always on <input type="button" value="▼"/>	
Beacon Rate	1 Mbps <input type="button" value="▼"/> 6 Mbps will be used for 5 GHz radio	
Beacon Interval	100 ms <input type="button" value="▼"/>	
DTIM	1 <input type="button" value="Default"/>	
RTS Threshold	0 <input type="button" value="Default"/>	
Fragmentation Threshold	0 <input type="button" value="Default"/> (0: Disable) <input type="button" value="Default"/>	
Distance / Time Converter	<input style="width: 20px; height: 15px; vertical-align: middle;" type="button" value="—"/> 4050 m <small>Note: Input distance for recommended values</small>	
Slot Time	<input type="radio"/> Auto <input checked="" type="radio"/> Custom 9 <input type="button" value="μs"/> <input type="button" value="Default"/>	
ACK Timeout	48 <input type="button" value="μs"/> <input type="button" value="Default"/>	
Frame Aggregation	<input type="checkbox"/>	

## AP Settings

<b>SSID</b>	These buttons specify which wireless networks will use this AP profile. You can also select the frequencies at which each network will transmit. Please note that the Peplink Balance does not detect whether the AP is capable of transmitting at both frequencies. Instructions to transmit at unsupported frequencies will be ignored by the AP.
<b>Operating Country</b>	<p>This drop-down menu specifies the national / regional regulations which the AP 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> </ul>

	<ul style="list-style-type: none"> <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>NOTE: Users are required to choose an option suitable to local laws and regulations.</p> <p>Per FCC regulation, the country selection is not available on all models marketed in US. All US models are fixed to US channels only.</p>
<b>Preferred Frequency</b>	These buttons determine the frequency at which access points will attempt to broadcast. This feature will only work for APs that can transmit at both 5.4GHz and 5GHz frequencies.
<b>Protocol</b>	This section displays the 2.4 GHz protocols your APs are using.
<b>Channel Width</b>	There are three options: 20 MHz, 20/40 MHz, and 40 MHz. With this feature enabled, the Wi-Fi system can use two channels at once. Using two channels improves the performance of the Wi-Fi connection.
<b>Channel</b>	This drop-down menu selects the 802.11 channel to be utilized. Available options are from 1 to 11 and from 1 to 13 for the North America region and Europe region, respectively. (Channel 14 is only available when the country is selected as Japan with protocol 802.11b.) If <b>Auto</b> is set, the system will perform channel scanning based on the scheduled time set and choose the most suitable channel automatically.
<b>Auto Channel Update</b>	Indicate the time of day at which update automatic channel selection.
<b>Output Power<sup>A</sup></b>	<p>This drop-down menu determines the power at which the AP under this profile will broadcast. When fixed settings are selected, the AP will broadcast at the specified power level, regardless of context. When <b>Dynamic</b> settings are selected, the AP will adjust its power level based on its surrounding APs in order to maximize performance.</p> <p>The <b>Dynamic: Auto</b> setting will set the AP to do this automatically. Otherwise, the <b>Dynamic: Manual</b> setting will set the AP to dynamically adjust only if instructed to do so. If you have set <b>Dynamic:Manual</b>, you can go to <b>AP&gt;Toolbox&gt;Auto Power Adj.</b> to give your AP further instructions.</p> <p>If you click the <b>Boost</b> checkbox, the AP under this profile will transmit using additional power. Please note that using this option with several APs in close proximity will lead to increased interference.</p>
<b>Client Signal Strength Threshold<sup>A</sup></b>	This field determines that maximum signal strength each individual client will receive. The measurement unit is megawatts.
<b>Max number of Clients<sup>A</sup></b>	This field determines the maximum clients that can be connected to APs under this profile.
<b>Management VLAN ID</b>	This field specifies the VLAN ID to tag to management traffic, such as AP to AP controller communication traffic. The value is <b>0</b> by default, meaning 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.
<b>Operating Schedule</b>	Choose from the schedules that you have defined in <b>System&gt;Schedule</b> . Select the schedule for the integrated AP to follow from the drop-down menu.
<b>Beacon Rate<sup>A</sup></b>	This drop-down menu provides the option to send beacons in different transmit bit rates. The bit rates are <b>1Mbps</b> , <b>2Mbps</b> , <b>5.5Mbps</b> , <b>6Mbps</b> , and <b>11Mbps</b> .
<b>Beacon Interval<sup>A</sup></b>	This drop-down menu provides the option to set the time between each beacon send. Available options are <b>100ms</b> , <b>250ms</b> , and <b>500ms</b> .
<b>DTIM<sup>A</sup></b>	This field provides the option to set the frequency for beacon to include delivery traffic indication messages (DTIM). The interval unit is measured in milliseconds.
<b>RTS Threshold<sup>A</sup></b>	This field provides the option to set the minimum packet size for the unit to send an RTS using the RTS/CTS handshake. Setting <b>0</b> disables this feature.
<b>Fragmentation Threshold<sup>A</sup></b>	Determines the maximum size (in bytes) that each packet fragment will be broken down into. Set 0 to disable fragmentation.
<b>Distance/Time Converter<sup>A</sup></b>	Select the distance you want your Wi-Fi to cover in order to adjust the below parameters. Default values are recommended.
<b>Slot Time<sup>A</sup></b>	This field provides the option to modify the unit wait time before it transmits. The default value is <b>9μs</b> .
<b>ACK Timeout<sup>A</sup></b>	This field provides the option to set the wait time to receive acknowledgement packet before doing retransmission. The default value is <b>48μs</b> .
<b>Frame Aggregation<sup>A</sup></b>	With this feature enabled, throughput will be increased by sending two or more data frames in a single transmission.
<b>Frame Length</b>	This field is only available when <b>Frame Aggregation</b> is enabled. It specifies the frame length for frame aggregation. By default, it is set to <b>50000</b> .

<sup>A</sup> - Advanced feature. 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	443
HTTP to HTTPS Redirection	<input checked="" type="checkbox"/>
Admin Username	admin
Admin Password	25db591396e0 <input type="button" value="Generate"/>

## Web Administration Settings

<b>Enable</b>	Check the box to allow the Pepwave router to manage the web admin access information of the AP.
<b>Web Access Protocol</b>	These buttons specify the web access protocol used for accessing the web admin of the AP. The two available options are <b>HTTP</b> and <b>HTTPS</b> .
<b>Management Port</b>	This field specifies the management port used for accessing the device.
<b>HTTP to HTTPS Redirection</b>	This option will be available if you have chosen <b>HTTPS</b> as the <b>Web Access Protocol</b> . With this enabled, any HTTP access to the web admin will redirect to HTTPS automatically.
<b>Admin User Name</b>	This field specifies the administrator username of the web admin. It is set as <i>admin</i> by default.
<b>Admin Password</b>	This field allows you to specify a new administrator password. You may also click the <b>Generate</b> button and let the system generate a random password automatically.

Navigating to **AP>Settings** on some Pepwave models displays a screen similar to the one shown below:

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

<b>Wi-Fi Radio Settings</b>	
Operating Country	United States
Wi-Fi Antenna	<input type="radio"/> Internal <input checked="" type="radio"/> External
<b>Wi-Fi AP Settings</b>	
Protocol	802.11ng
Channel	1 (2.412 GHz)
Channel Width	Auto
Output Power	Max <input type="checkbox"/> Boost
Beacon Rate	1Mbps
Beacon Interval	100ms
DTIM	1
Slot Time	9 <input type="text"/> µs
ACK Timeout	48 <input type="text"/> µs
Frame Aggregation	<input checked="" type="checkbox"/> Enable
Guard Interval	<input type="radio"/> Short <input checked="" type="radio"/> Long

Wi-Fi Radio Settings	
<b>Operating Country</b>	This option sets the country whose regulations the Pepwave router follows.
<b>Wi-Fi Antenna</b>	Choose from the router's internal or optional external antennas, if so equipped.

### Important Note

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

### Wi-Fi AP Settings

<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</b>	This option allows you to select which 802.11 RF channel will be used. <b>Channel 1 (2.412 GHz)</b> is selected by default.
<b>Channel Width</b>	<b>Auto (20/40 MHz)</b> and <b>20 MHz</b> are available. The default setting is <b>Auto (20/40 MHz)</b> , which allows both widths to be used simultaneously.
<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>Beacon Rate<sup>A</sup></b>	This option is for setting the transmit bit rate for sending a beacon. By default, <b>1Mbps</b> is selected.
<b>Beacon Interval<sup>A</sup></b>	This option is for setting the time interval between each beacon. By default, <b>100ms</b> is selected.
<b>DTIM<sup>A</sup></b>	This field allows you to set the frequency for the beacon to include a delivery traffic indication message. The interval is measured in milliseconds. The default value is set to <b>1 ms</b> .
<b>Slot Time<sup>A</sup></b>	This field is for specifying the wait time before the Router transmits a packet. By default, this field is set to <b>9 µs</b> .
<b>ACK Timeout<sup>A</sup></b>	This field is for setting the wait time to receive an acknowledgement packet before performing a retransmission. By default, this field is set to <b>48 µs</b> .
<b>Frame Aggregation<sup>A</sup></b>	This option allows you to enable frame aggregation to increase transmission throughput.
<b>Guard Interval<sup>A</sup></b>	This setting allows choosing a short or long guard period interval for your transmissions.

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

## 24 AP Controller Status

### 24.1 Info

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

## Status > Info.



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

wish to view. In addition, you could use the sliders at the bottom to further refine your timescale.

Events		<a href="#">View Alerts</a>
Jan 2 11:01:11	AP One 300M: Client 54:EA:A8:2D:A0:D5 disassociated from Marketing_11a	
Jan 2 11:00:42	AP One 300M: Client 54:EA:A8:2D:A0:D5 associated with Marketing_11a	
Jan 2 11:00:38	AP One 300M: Client 54:EA:A8:2D:A0:D5 disassociated from Marketing_11a	
Jan 2 11:00:36	AP One 300M: Client 00:21:6A:35:59:A4 associated with Balance_11a	
Jan 2 11:00:20	AP One 300M: Client 60:67:20:24:B6:4C disassociated from Marketing_11a	
Jan 2 11:00:09	AP One 300M: Client 54:EA:A8:2D:A0:D5 associated with Marketing_11a	
Jan 2 10:59:09	AP One 300M: Client 00:21:6A:35:59:A4 disassociated from Balance_11a	
Jan 2 10:59:08	Office Fiber AP: Client 18:00:2D:3D:4E:7F associated with Balance	
Jan 2 10:58:53	Michael's Desk: Client 18:00:2D:3D:4E:7F disassociated from Wireless	
Jan 2 10:58:18	AP One 300M: Client 54:EA:A8:2D:A0:D5 disassociated from Marketing_11a	
Jan 2 10:58:03	Office InWall: Client 10:BF:48:E9:76:C7 associated with Wireless	
Jan 2 10:57:47	AP One 300M: Client 54:EA:A8:2D:A0:D5 associated with Marketing_11a	
Jan 2 10:57:19	AP One 300M: Client 54:EA:A8:2D:A0:D5 disassociated from Marketing_11a	
Jan 2 10:57:09	AP One 300M: Client 54:EA:A8:2D:A0:D5 associated with Marketing_11a	
Jan 2 10:56:48	AP One 300M: Client 54:EA:A8:2D:A0:D5 disassociated from Marketing_11a	
Jan 2 10:56:39	AP One 300M: Client 54:EA:A8:2D:A0:D5 associated with Marketing_11a	
Jan 2 10:56:19	AP One 300M: Client 00:26:BB:05:84:A4 associated with Marketing_11a	
Jan 2 10:56:09	AP One 300M: Client 9C:04:EB:10:39:4C associated with Marketing_11a	
Jan 2 10:55:42	AP One 300M: Client 54:EA:A8:2D:A0:D5 disassociated from Marketing_11a	
Jan 2 10:55:29	AP One 300M: Client 54:EA:A8:2D:A0:D5 associated with Marketing_11a	

[More...](#)

## Events

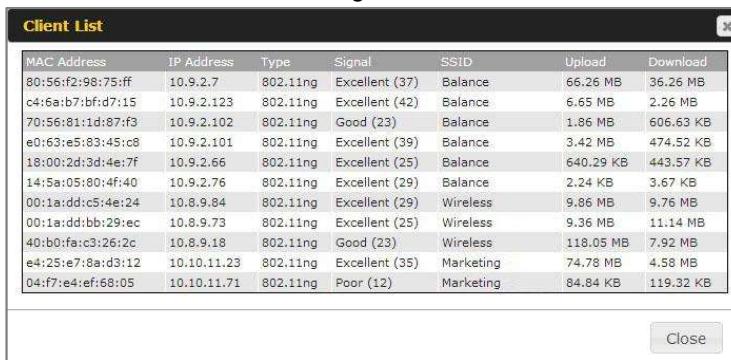
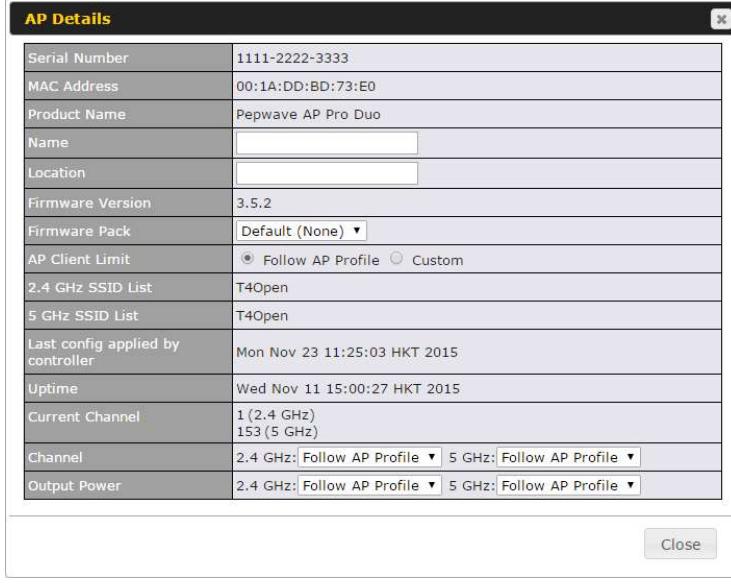
This event log displays all activity on your AP network, down to the client level. Click **View Alerts** to see only alerts, and click the **More...** link for additional records.

## 24.2 Access Point (Usage)

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

Search Filter					
AP Name / Serial Number / SSID	All				
	<input type="checkbox"/> Include Offline APs				
Search Result					
Managed APs					
<span style="font-size: small;">Expand</span>   <span style="font-size: small;">Collapse</span>					
Name	IP Address	MAC	Location	Firmware Pack ID	Configuration
Default (8/9 online)					
1000-AE00-0000	10.8.82.11	00:1A:DD:BD:73:E0	-	3.5.2	None ✓ - <span style="float: right;"> </span>

## Usage

<b>AP Name/Serial Number</b>	This field enables you to quickly find your device if you know its name or serial number. Fill in the field to begin searching. Partial names and serial numbers are supported.
<b>Online Status</b>	<p>This button toggles whether your search will include offline devices.</p> <p>This table shows the detailed information on each AP, including channel, number of clients, upload traffic, and download traffic. Click the blue arrows at the left of the table to expand and collapse information on each device group. You could also expand and collapse all groups by using the <b>Expand</b> and <b>Collapse</b> buttons.</p> <p>On the right of the table, you will see the following icons:</p>  <p>Click the  icon to see a usage table for each client:</p> 
<b>Managed Wireless Devices</b>	<p>Click the  icon to configure each client</p> 

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

Click the  icon to see a graph displaying usage:



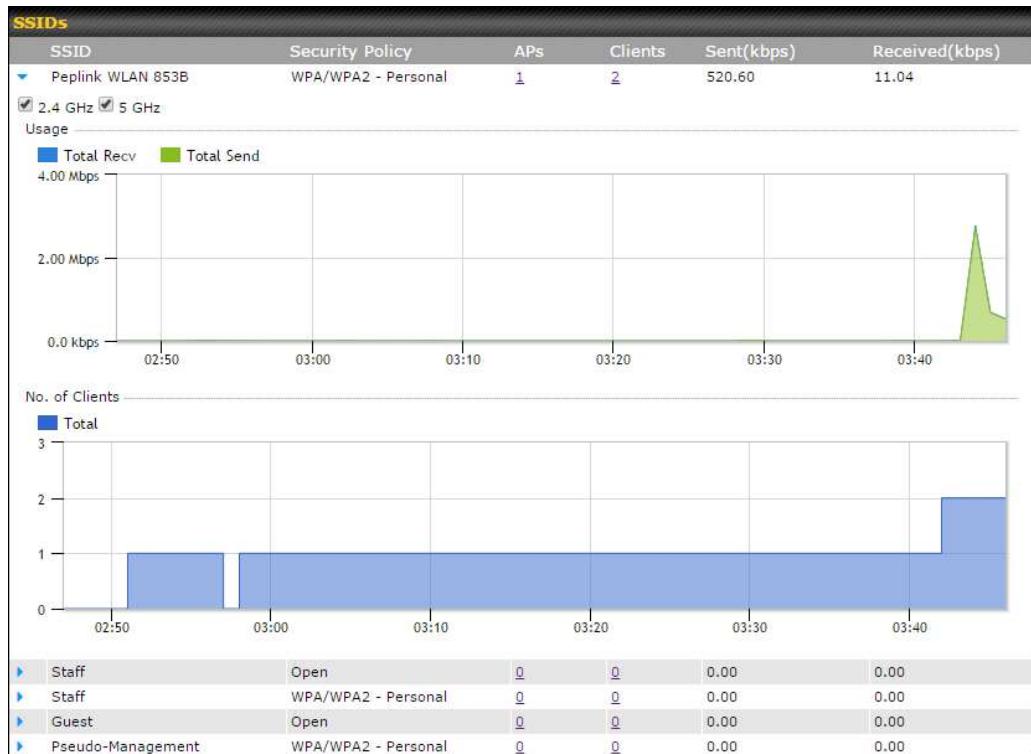
Click any point in the graphs to display detailed usage and client information for that device, using that SSID, at that point in time. On the **Data Usage by** menu, you can display the information by SSID or by AP send/receive rate.

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

Event Information	
Events	
Jan 2 11:53:39	Client 00:26:BB:08:AC:FD associated with Wireless_11a
Jan 2 11:39:31	Client 60:67:20:24:B6:4C disassociated from Marketing_11a
Jan 2 11:16:55	Client A8:BB:CF:E1:0F:1E disassociated from Balance_11a
Jan 2 11:11:54	Client A8:BB:CF:E1:0F:1E associated with Balance_11a
Jan 2 11:10:45	Client 60:67:20:24:B6:4C associated with Marketing_11a
Jan 2 11:00:36	Client 00:21:6A:35:59:A4 associated with Balance_11a
Jan 2 11:00:20	Client 60:67:20:24:B6:4C disassociated from Marketing_11a
Jan 2 10:59:09	Client 00:21:6A:35:59:A4 disassociated from Balance_11a
Jan 2 10:42:28	Client F4:B7:E2:16:35:E9 associated with Balance_11a
Jan 2 10:29:12	Client 84:7A:88:78:1E:4B associated with Balance_11a
Jan 2 10:24:27	Client 90:B9:31:0D:11:EC disassociated from Marketing_11a
Jan 2 10:24:27	Client 90:B9:31:0D:11:EC roamed to Marketing_11a at 2830-BFC8-D230
Jan 2 10:13:22	Client E8:8D:28:A8:43:93 associated with Balance_11a
Jan 2 10:13:22	Client E8:8D:28:A8:43:93 roamed to Balance_11a from 2830-BF7F-694C
Jan 2 10:07:52	Client CC:3A:61:89:07:F3 associated with Wireless_11a
Jan 2 10:04:35	Client 60:67:20:24:B6:4C associated with Marketing_11a
Jan 2 10:03:38	Client 60:67:20:24:B6:4C disassociated from Marketing_11a
Jan 2 09:58:27	Client 00:26:BB:08:AC:FD disassociated from Wireless_11a
Jan 2 09:52:46	Client 00:26:BB:08:AC:FD associated with Wireless_11a
Jan 2 09:20:26	Client 8C:3A:E3:3F:17:62 associated with Balance_11a

## 24.3 Wireless SSID

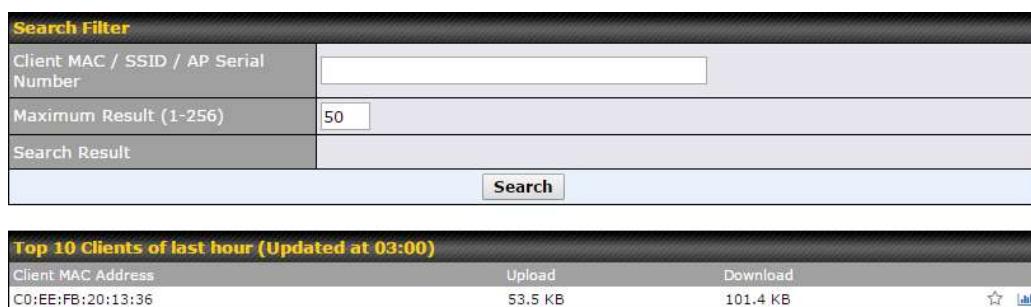
In-depth SSID reports are available under **AP > Controller Status > Wireless SSID**.



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

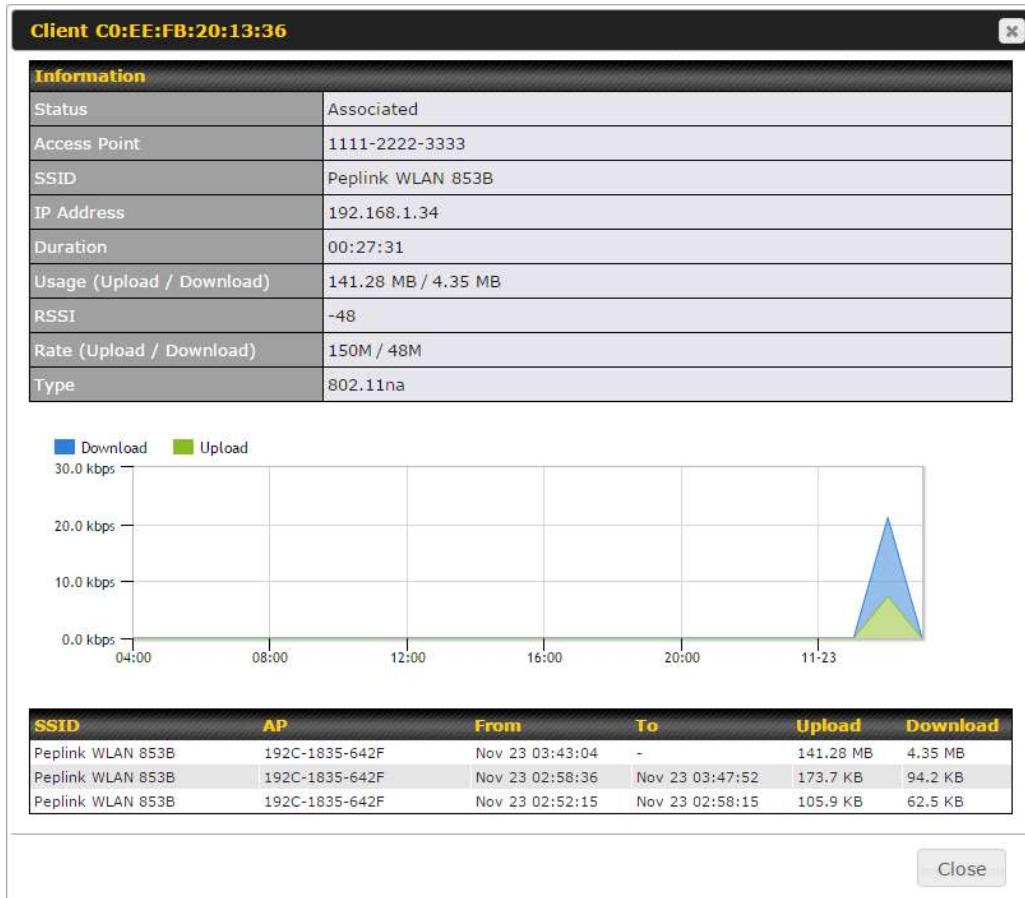
## 24.4 Wireless Client

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



Here, you will be able to see your network's heaviest users as well as search for specific users.

Click the  icon to bookmark specific users, and click the  icon for additional details about each user:



## 24.5 Nearby Device

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

Suspected Rogue APs						
BSSID	SSID	Channel	Encryption	Last Seen	Mark as	
00:1A:DD:EC:25:22	Wireless	11	WPA2	10 hours ago		
00:1A:DD:EC:25:23	Accounting	11	WPA2	10 hours ago		
00:1A:DD:EC:25:24	Marketing	11	WPA2	11 hours ago		
00:03:7F:00:00:00	MYB1PUSH	1	WPA & WPA2	11 minutes ago		
00:03:7F:00:00:01	MYB1	1	WPA2	15 minutes ago		
00:1A:DD:B9:60:88	PEPWAVE_CB7E	1	WPA & WPA2	5 minutes ago		
00:1A:DD:BB:09:C1	Micro_S1_1	6	WPA & WPA2	1 hour ago		
00:1A:DD:BB:52:A8	MAX HD2 Gobi	11	WPA & WPA2	2 minutes ago		
00:1A:DD:BF:75:81	PEPLINK_05B5	4	WPA & WPA2	1 minute ago		
00:1A:DD:BF:75:82	LK_05B5	4	WPA2	1 minute ago		
00:1A:DD:BF:75:83	LK_05B5_VLAN22	4	WPA2	1 minute ago		
00:1A:DD:C1:ED:E4	dev_captive_portal_test	1	WPA & WPA2	3 minutes ago		
00:1A:DD:C2:E4:C5	PEPWAVE_7052	11	WPA & WPA2	2 hours ago		
00:1A:DD:C3:F1:64	dev_captive_portal_test	6	WPA & WPA2	6 minutes ago		
00:1A:DD:C4:DC:24	ssid_test	8	WPA & WPA2	2 minutes ago		
00:1A:DD:C4:DC:25	SSID New	8	WPA & WPA2	2 minutes ago		
00:1A:DD:C5:46:04	Guest SSID	9	WPA2	2 minutes ago		
00:1A:DD:C5:47:04	PEPWAVE_67B8	1	WPA & WPA2	5 minutes ago		
00:1A:DD:C5:4E:24	G BR1 Portal	2	WPA2	2 minutes ago		
00:1A:DD:C6:9A:48	ssid_test	8	WPA & WPA2	2 hours ago		

### Suspected Rogue Devices

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

## 24.6 Event Log

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

Filter	
Search key	Client MAC Address / Wireless SSID / AP Serial Number / AP Profile Name
Time	From <input type="text"/> hh:mm to <input type="text"/> hh:mm
Alerts only	<input type="checkbox"/>
<b>Search</b>	

Events		<a href="#">View Alerts</a>
Jan 2 11:01:11	AP One 300M: Client 54:EA:A8:2D:A0:D5 disassociated from Marketing_11a	
Jan 2 11:00:42	AP One 300M: Client 54:EA:A8:2D:A0:D5 associated with Marketing_11a	
Jan 2 11:00:38	AP One 300M: Client 54:EA:A8:2D:A0:D5 disassociated from Marketing_11a	
Jan 2 11:00:36	AP One 300M: Client 00:21:6A:35:59:A4 associated with Balance_11a	
Jan 2 11:00:20	AP One 300M: Client 60:67:20:24:B6:4C disassociated from Marketing_11a	
Jan 2 11:00:09	AP One 300M: Client 54:EA:A8:2D:A0:D5 associated with Marketing_11a	
Jan 2 10:59:09	AP One 300M: Client 00:21:6A:35:59:A4 disassociated from Balance_11a	
Jan 2 10:59:08	Office Fiber AP: Client 18:00:2D:3D:4E:7F associated with Balance	
Jan 2 10:58:53	Michael's Desk: Client 18:00:2D:3D:4E:7F disassociated from Wireless	
Jan 2 10:58:18	AP One 300M: Client 54:EA:A8:2D:A0:D5 disassociated from Marketing_11a	
Jan 2 10:58:03	Office InWall: Client 10:BF:48:E9:76:C7 associated with Wireless	
Jan 2 10:57:47	AP One 300M: Client 54:EA:A8:2D:A0:D5 associated with Marketing_11a	
Jan 2 10:57:19	AP One 300M: Client 54:EA:A8:2D:A0:D5 disassociated from Marketing_11a	
Jan 2 10:57:09	AP One 300M: Client 54:EA:A8:2D:A0:D5 associated with Marketing_11a	
Jan 2 10:56:48	AP One 300M: Client 54:EA:A8:2D:A0:D5 disassociated from Marketing_11a	
Jan 2 10:56:39	AP One 300M: Client 54:EA:A8:2D:A0:D5 associated with Marketing_11a	
Jan 2 10:56:19	AP One 300M: Client 00:26:BB:05:84:A4 associated with Marketing_11a	
Jan 2 10:56:09	AP One 300M: Client 9C:04:EB:10:39:4C associated with Marketing_11a	
Jan 2 10:55:42	AP One 300M: Client 54:EA:A8:2D:A0:D5 disassociated from Marketing_11a	
Jan 2 10:55:29	AP One 300M: Client 54:EA:A8:2D:A0:D5 associated with Marketing_11a	

[More...](#)

## Events

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

## 25 Toolbox

Tools for managing firmware packs can be found at **AP>Toolbox**.

Firmware Packs				
	Pack ID	Release Date	Details	Action
	1126	2013-08-26		

[Check for Updates](#) [Manual Upload](#) [Default...](#) No default defined.

## Firmware Packs

Here, you can manage the firmware of your AP. Clicking on will result in information regarding each firmware pack. To receive new firmware packs, you can click **Check for Updates** to download new packs, or you can click **Manual Upload** to manually upload a firmware pack. Click **Default** to define which firmware pack is default.

# 26 System Settings

## 26.1 Admin Security

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



The image shows two side-by-side screenshots of the Pepwave web admin interface. The left screenshot, labeled "Admin account UI", shows a full administrative view with sections for WAN Connection Status, LAN Interface, and Device Information, along with a Logout button. The right screenshot, labeled "User account UI", shows a simplified view with sections for WAN Connection Status, LAN Interface, and Device Information, but lacks the LAN and WAN connection status details present in the admin UI. Both screenshots include a "Logout" button at the bottom.

Admin account UI

User account UI

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

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

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

Admin Settings		
Router Name	MAX_BR1_710D	hostname: max-br1-710d
Admin User Name	admin	
Admin Password	*****	
Confirm Admin Password	*****	
Read-only User Name	user	
User Password		
Confirm User Password		
Web Session Timeout	4	Hours 0 Minutes
Authentication by RADIUS	<input checked="" type="checkbox"/> Enable	
Auth Protocol	MS-CHAP v2 ▾	
Auth Server	Port	<input type="button" value="Default"/>
Auth Server Secret	<input checked="" type="checkbox"/> Hide Characters	
Auth Timeout	3	seconds
Accounting Server	Port	<input type="button" value="Default"/>
Accounting Server Secret	<input checked="" type="checkbox"/> Hide Characters	
CLI SSH	<input checked="" type="checkbox"/> Enable	
CLI SSH Port	8822	<input type="button" value="Default"/>
CLI SSH Access	LAN/WAN ▾	
Security	HTTP ▾	
Web Admin Port	80	<input type="button" value="Default"/>
Web Admin Access	LAN Only ▾	

Admin Settings	
<b>Router Name</b>	This field allows you to define a name for this Pepwave router. By default, <b>Router Name</b> is set as <b>MAX_XXXX</b> , where <b>XXXX</b> refers to the last 4 digits of the unit's serial number.
<b>Admin User Name</b>	<b>Admin User Name</b> is set as <i>admin</i> by default, but can be changed, if desired.
<b>Admin Password</b>	This field allows you to specify a new administrator password.
<b>Confirm Admin Password</b>	This field allows you to verify and confirm the new administrator password.
<b>Read-only User Name</b>	<b>Read-only User Name</b> is set as <i>user</i> by default, but can be changed, if desired.
<b>User Password</b>	This field allows you to specify a new user password. Once the user password is set, the read-only user feature will be enabled.
<b>Confirm User Password</b>	This field allows you to verify and confirm the new user password.

<b>Web Session Timeout</b>	This field specifies the number of hours and minutes that a web session can remain idle before the Pepwave router terminates its access to the web admin interface. By default, it is set to <b>4 hours</b> .
<b>Authentication by RADIUS</b>	With this box is checked, the web admin will authenticate using an external RADIUS server. Authenticated users are treated as either "admin" with full read-write permission or "user" with read-only access. Local admin and user accounts will be disabled. When the device is not able to communicate with the external RADIUS server, local accounts will be enabled again for emergency access. Additional authentication options will be available once this box is checked.
<b>Auth Protocol</b>	This specifies the authentication protocol used. Available options are <b>MS-CHAP v2</b> and <b>PAP</b> .
<b>Auth Server</b>	This specifies the access address and port of the external RADIUS server.
<b>Auth Server Secret</b>	This field is for entering the secret key for accessing the RADIUS server.
<b>Auth Timeout</b>	This option specifies the time value for authentication timeout.
<b>Accounting Server</b>	This specifies the access address and port of the external accounting server.
<b>Accounting Server Secret</b>	This field is for entering the secret key for accessing the accounting server.
<b>Network Connection</b>	This option is for specifying the network connection to be used for authentication. Users can choose from LAN, WAN, and VPN connections.
<b>CLI SSH</b>	The CLI (command line interface) can be accessed via SSH. This field enables CLI support. For additional information regarding CLI, please refer to <b>Section 21.16</b> .
<b>CLI SSH Port</b>	This field determines the port on which clients can access CLI SSH.
<b>CLI SSH Access</b>	This menu allows you to choose between granting access to LAN and WAN clients, or to LAN clients only.
<b>Security</b>	This option is for specifying the protocol(s) through which the web admin interface can be accessed: <ul style="list-style-type: none"> <li>• HTTP</li> <li>• HTTPS</li> <li>• HTTP/HTTPS</li> </ul>
<b>Web Admin Port</b>	This field is for specifying the port number on which the web admin interface can be accessed.
<b>Web Admin</b>	This option is for specifying the network interfaces through which the web admin

**Access** interface can be accessed:

- LAN only
- LAN/WAN

If LAN/WAN is chosen, the **WAN Connection Access Settings** form will be displayed.

The screenshot shows a configuration page for LAN connection access. At the top, there is a header bar with the title 'LAN Connection Access Settings'. Below this, a section titled 'Allowed LAN Networks' contains three input fields: 'Any' (radio button), 'Allow this network only' (radio button, which is selected), and a dropdown menu set to 'Public (10)'.

## Allowed LAN Networks

This field allows you to permit only specific networks or VLANs to access the Web UI.

The screenshot shows a configuration page for WAN connection access. On the left, a sidebar lists 'Allowed Source IP Subnets'. The main area has two sections: 'Allowed Source IP Subnets' (with a question mark icon) and 'Connection / IP Address(es)'. Under 'Connection / IP Address(es)', there is a table with two columns. The first column contains checkboxes for 'WAN 1', 'WAN 2', 'Wi-Fi WAN', 'Cellular 1', 'Cellular 2', and 'USB'. The second column contains the IP address '10.88.3.158 (Interface IP)' with a checked checkbox next to it. There are also 'All' and 'Clear' buttons at the top right of the table.

## WAN Connection Access Settings

This field allows you to restrict web admin access only from defined IP subnets.

- **Any** - Allow web admin accesses to be from anywhere, without IP address restriction.
- **Allow access from the following IP subnets only** - Restrict web admin access only from the defined IP subnets. When this is chosen, a text input area will be displayed beneath:

## Allowed Source IP Subnets

The allowed IP subnet addresses should be entered into this text area. Each IP subnet must be in form of  $w.x.y.z/m$ , where  $w.x.y.z$  is an IP address (e.g., 192.168.0.0), and  $m$  is the subnet mask in CIDR format, which is between 0 and 32 inclusively (For example, 192.168.0.0/24).

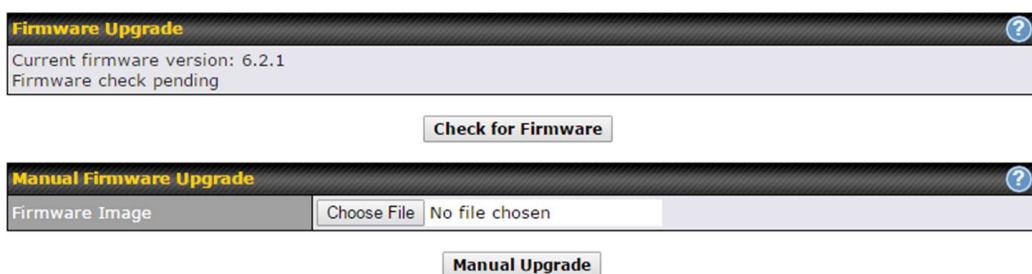
To define multiple subnets, separate each IP subnet one in a line. For example:

- 192.168.0.0/24
- 10.8.0.0/16

**Allowed WAN IP Address(es)** This is to choose which WAN IP address(es) the web server should listen on.

## 26.2 Firmware

Pepwave router firmware is upgradeable through the web admin interface. Firmware upgrade functionality is located at **System>Firmware**.



There are two ways to upgrade the unit. The first method is through an online download. The second method is to upload a firmware file manually.

To perform an online download, click on the **Check for Firmware** button. The Pepwave router will check online for new firmware. If new firmware is available, the Pepwave router will automatically download the firmware. The rest of the upgrade process will be automatically initiated.

You may also download a firmware image from the Peplink website and update the unit manually. To update using a firmware image, click **Choose File** to select the firmware file from the local computer, and then click **Manual Upgrade** to send the firmware to the Pepwave router. It will then automatically initiate the firmware upgrade process.

Please note that all Peplink devices can store two different firmware versions in two different partitions. A firmware upgrade will always replace the inactive partition. If you want to keep the inactive firmware, you can simply reboot your device with the inactive firmware and then perform the firmware upgrade.

### Important Note

The firmware upgrade process may not necessarily preserve the previous configuration, and the behavior varies on a case-by-case basis. Consult the release notes for the particular firmware version before installing. Do not disconnect the power during firmware upgrade process. Do not attempt to upload a non-firmware file or a firmware file that is not supported by Peplink. Upgrading the Pepwave router with an invalid firmware file will damage the unit and may void the warranty.

### Important Note

If the firmware is rolled back from 5.x to 4.x, the configurations will be lost.

## 26.3 Time

**Time Settings** enables the system clock of the Pepwave router to be synchronized with a specified time server. Time settings are located at **System>Time**.

Time Settings	
Time Zone	(GMT+07:00) Krasnoyarsk <input type="checkbox"/> Show all
Time Server	0.peplink.pool.ntp.org <input type="button" value="Default"/>
<input type="button" value="Save"/>	

Time Settings	
<b>Time Zone</b>	This specifies the time zone (along with the corresponding Daylight Savings Time scheme). The <b>Time Zone</b> value affects the time stamps in the Pepwave router's event log and e-mail notifications. Check <b>Show all</b> to show all time zone options.
<b>Time Server</b>	This setting specifies the NTP network time server to be utilized by the Pepwave router.

## 26.4 Schedule

Enable and disable different functions (such as WAN connections, outbound policy, and firewalls) at different times, based on a user-scheduled configuration profile. The settings for this are located at **System > Schedule**

Schedule		
Enabled	<input checked="" type="checkbox"/>	
Name	Time	Used by
Weekdays Only	Weekdays only	-
<input type="button" value="New Schedule"/>		

Enable scheduling, and then click on your schedule name or on the **New Schedule** button to begin.

Edit Schedule Profile	
<b>Enabling</b>	Click this checkbox to enable this schedule profile. Note that if this is disabled, then any associated features will also have their scheduling disabled.
<b>Name</b>	Enter your desired name for this particular schedule profile.
<b>Schedule</b>	Click the drop-down menu to choose pre-defined schedules as your starting point. Please note that upon selection, previous changes on the schedule map will be deleted.
<b>Schedule Map</b>	Click on the desired times to enable features at that time period. You can hold your mouse for faster entry.

## 26.5 Email Notification

Email notification functionality provides a system administrator with up-to-date information on network status. The settings for configuring email notifications are found at **System>Email Notification**.

Email Notification Setup	
Email Notification	<input checked="" type="checkbox"/> Enable
SMTP Server	smtp.mycompany.com <input checked="" type="checkbox"/> Require authentication
SSL Encryption	<input checked="" type="checkbox"/> (Note: any server certificate will be accepted)
SMTP Port	465 <input type="button" value="Default"/>
SMTP User Name	smtpuser
SMTP Password	*****
Confirm SMTP Password	*****
Sender's Email Address	admin@mycompany.com
Recipient's Email Address	system@mycompany.com staff@mycompany.com

Email Notification Settings	
<b>Email Notification</b>	This setting specifies whether or not to enable email notification. If <b>Enable</b> is checked, the Pepwave router will send email messages to system administrators when the WAN status changes or when new firmware is available. If <b>Enable</b> is not checked, email notification is disabled and the Pepwave router will not send email messages.
<b>SMTP Server</b>	This setting specifies the SMTP server to be used for sending email. If the server requires authentication, check <b>Require authentication</b> .
<b>SSL Encryption</b>	Check the box to enable SMTPTS. When the box is checked, <b>SMTP Port</b> will be changed to <b>465</b> automatically.
<b>SMTP Port</b>	This field is for specifying the SMTP port number. By default, this is set to <b>25</b> ; when <b>SSL Encryption</b> is checked, the default port number will be set to <b>465</b> . You may customize the port number by editing this field. Click <b>Default</b> to restore the number to its default setting.
<b>SMTP User Name / Password</b>	This setting specifies the SMTP username and password while sending email. These options are shown only if <b>Require authentication</b> is checked in the <b>SMTP Server</b> setting.
<b>Confirm SMTP Password</b>	This field allows you to verify and confirm the new administrator password.
<b>Sender's Email Address</b>	This setting specifies the email address the Pepwave router will use to send reports.
<b>Recipient's</b>	This setting specifies the email address(es) to which the Pepwave router will send

**Email Address** email notifications. For multiple recipients, separate each email addresses using the enter key.

After you have finished setting up email notifications, you can click the **Test Email Notification** button to test the settings before saving. After **Test Email Notification** is clicked, you will see this screen to confirm the settings:

Test Email Notification	
SMTP Server	smtp.mycompany.com
SMTP Port	465
SMTP UserName	smtouser
Sender's Email Address	admin@mycompany.com
Recipient's Email Address	system@mycompany.com staff@mycompany.com

[Send Test Notification](#) [Cancel](#)

Click **Send Test Notification** to confirm. In a few seconds, you will see a message with detailed test results.

**Test email sent. Email notification settings are not saved, it will be saved after clicked the 'Save' button.**

### Test Result

```
[INFO] Try email through connection #3
[<-] 220 ESMTP
[->] EHLO balance
[<-] 250-smtp Hello balance [210.210.210.210]
250-SIZE 1000000000
250-8BITMIME
250-PIPELINING
250-AUTH PLAIN LOGIN
250-STARTTLS
```

## 26.6 Event Log

Event log functionality enables event logging at a specified remote syslog server. The settings for configuring the remote system log can be found at **System>Event Log**.

Send Events to Remote Syslog Server	
Remote Syslog	<input checked="" type="checkbox"/>
Remote Syslog Host	<input type="text"/>

Push Events to Mobile Devices	
Push Events	<input checked="" type="checkbox"/>

[Save](#)

Event Log Settings	
<b>Remote Syslog</b>	This setting specifies whether or not to log events at the specified remote syslog server.
<b>Remote Syslog Host</b>	This setting specifies the IP address or hostname of the remote syslog server.
<b>Push Events</b>	The Pepwave router can also send push notifications to mobile devices that have our Mobile Router Utility installed. Check the box to activate this feature.
	For more information on the Router Utility, go to: <a href="http://www.peplink.com/products/router-utility">www.peplink.com/products/router-utility</a>

## 26.7 SNMP

SNMP or simple network management protocol is an open standard that can be used to collect information about the Pepwave router. SNMP configuration is located at **System>SNMP**.

SNMP Settings											
SNMP Device Name	MAX_HD2_8D1C										
SNMP Port	161	<input type="button" value="Default"/>									
SNMPv1	<input type="checkbox"/> Enable										
SNMPv2c	<input type="checkbox"/> Enable										
SNMPv3	<input type="checkbox"/> Enable										
<input type="button" value="Save"/>											
<table border="1"> <thead> <tr> <th>Community Name</th> <th>Allowed Source Network</th> <th>Access Mode</th> </tr> </thead> <tbody> <tr> <td colspan="3">No SNMPv1 / SNMPv2c Communities Defined</td> </tr> <tr> <td align="right" colspan="3"><input type="button" value="Add SNMP Community"/></td></tr> </tbody> </table>			Community Name	Allowed Source Network	Access Mode	No SNMPv1 / SNMPv2c Communities Defined			<input type="button" value="Add SNMP Community"/>		
Community Name	Allowed Source Network	Access Mode									
No SNMPv1 / SNMPv2c Communities Defined											
<input type="button" value="Add SNMP Community"/>											
<table border="1"> <thead> <tr> <th>SNMPv3 User Name</th> <th>Authentication / Privacy</th> <th>Access Mode</th> </tr> </thead> <tbody> <tr> <td colspan="3">No SNMPv3 Users Defined</td> </tr> <tr> <td align="right" colspan="3"><input type="button" value="Add SNMP User"/></td></tr> </tbody> </table>			SNMPv3 User Name	Authentication / Privacy	Access Mode	No SNMPv3 Users Defined			<input type="button" value="Add SNMP User"/>		
SNMPv3 User Name	Authentication / Privacy	Access Mode									
No SNMPv3 Users Defined											
<input type="button" value="Add SNMP User"/>											

SNMP Settings	
<b>SNMP Device Name</b>	This field shows the router name defined at <b>System&gt;Admin Security</b> .
<b>SNMP Port</b>	This option specifies the port which SNMP will use. The default port is <b>161</b> .
<b>SNMPv1</b>	This option allows you to enable SNMP version 1.

**SNMPv2** This option allows you to enable SNMP version 2.

**SNMPv3** This option allows you to enable SNMP version 3.

To add a community for either SNMPv1 or SNMPv2, click the **Add SNMP Community** button in the **Community Name** table, upon which the following screen is displayed:

The screenshot shows a dialog box titled "SNMP Community". It contains two input fields: "Community Name" with the value "My Company" and "Allowed Network" with the value "192.168.1.25 / 255.255.255.0 (/24)". At the bottom right are "Save" and "Cancel" buttons.

SNMP Community Settings	
<b>Community Name</b>	This setting specifies the SNMP community name.
<b>Allowed Source Subnet Address</b>	This setting specifies a subnet from which access to the SNMP server is allowed. Enter subnet address here (e.g., 192.168.1.0) and select the appropriate subnet mask.

To define a user name for SNMPv3, click **Add SNMP User** in the **SNMPv3 User Name** table,

SNMPv3 User	
User Name	SNMPUser
Authentication	SHA password
Privacy	DES privacypassword
<input type="button" value="Save"/> <input type="button" value="Cancel"/>	

upon which the following screen is displayed:

SNMPv3 User Settings	
<b>User Name</b>	This setting specifies a user name to be used in SNMPv3.
<b>Authentication Protocol</b>	<p>This setting specifies via a drop-down menu one of the following valid authentication protocols:</p> <ul style="list-style-type: none"> <li>• NONE</li> <li>• MD5</li> <li>• SHA</li> </ul> <p>When MD5 or SHA is selected, an entry field will appear for the password.</p>
<b>Privacy Protocol</b>	<p>This setting specifies via a drop-down menu one of the following valid privacy protocols:</p> <ul style="list-style-type: none"> <li>• NONE</li> <li>• DES</li> </ul> <p>When DES is selected, an entry field will appear for the password.</p>

## 26.8 InControl

InControl Management	
InControl Management	<input type="checkbox"/> Allow InControl Management
Privately Host InControl	<input checked="" type="checkbox"/>
InControl Host	<input type="text"/>

InControl is a cloud-based service which allows you to manage all of your Peplink and Pepwave devices with one unified system. With it, you can generate reports, gather statistics, and configure your devices automatically. All of this is now possible with InControl.

When this check box is checked, the device's status information will be sent to the Peplink InControl system. This device's usage data and configuration will be sent to the system if you enable the features in the system.

Alternately, you could also privately host InControl. Simply check the box beside the "Privately Host InControl" open, and enter the IP Address of your InControl Host.

You can sign up for an InControl account at <https://incontrol2.peplink.com/>. You can register your devices under the account, monitor their status, see their usage reports, and receive offline notifications.

## 26.9 Configuration

Backing up Pepwave router settings immediately after successful completion of initial setup is strongly recommended. The functionality to download and upload Pepwave router settings is found at **System>Configuration**. Note that available options vary by model.

Restore Configuration to Factory Settings	
<input type="button" value="Restore Factory Settings"/>	

Download Active Configurations	
<input type="button" value="Download"/>	

Upload Configurations	
Configuration File	<input type="button" value="Browse..."/> No file selected.
<input type="button" value="Upload"/>	

Upload Configurations from High Availability Pair	
Configuration File	<input type="button" value="Browse..."/> No file selected.
<input type="button" value="Upload"/>	

## Configuration

<b>Restore Configuration to Factory Settings</b>	The <b>Restore Factory Settings</b> button is to reset the configuration to factory default settings. After clicking the button, you will need to click the <b>Apply Changes</b> button on the top right corner to make the settings effective.
<b>Download Active Configurations</b>	Click <b>Download</b> to backup the current active settings.
<b>Upload Configurations</b>	To restore or change settings based on a configuration file, click <b>Choose File</b> to locate the configuration file on the local computer, and then click <b>Upload</b> . The new settings can then be applied by clicking the <b>Apply Changes</b> button on the page header, or you can cancel the procedure by pressing <b>discard</b> on the main page of the web admin interface.
<b>Upload Configurations from High Availability Pair</b>	In a high availability (HA) configuration, a Pepwave router can quickly load the configuration of its HA counterpart. To do so, click the <b>Upload</b> button. After loading the settings, configure the LAN IP address of the Pepwave router so that it is different from the HA counterpart.

## 26.10 Feature Add-ons

Some Pepwave routers have features that can be activated upon purchase. Once the purchase is complete, you will receive an activation key. Enter the key in the **Activation Key** field, click **Activate**, and then click **Apply Changes**.



## 26.11 Reboot

This page provides a reboot button for restarting the system. For maximum reliability, the Pepwave router can equip with two copies of firmware. Each copy can be a different version. You can select the firmware version you would like to reboot the device with. The firmware marked with **(Running)** is the current system boot up firmware.

**Please note that a firmware upgrade will always replace the inactive firmware partition.**



## 27 Tools

### 27.1 Ping

The ping test tool sends pings through a specified Ethernet interface or a SpeedFusion™ VPN connection. You can specify the number of pings in the field **Number of times**, to a maximum number of 10 times. **Packet Size** can be set to a maximum of 1472 bytes. The ping utility is located at **System>Tools>Ping**, illustrated below:

Ping	
Connection	WAN 1
Destination	10.10.10.1
Packet Size	56
Number of times	Times 5

**Start** **Stop**

Results	
PING 10.10.10.1 (10.10.10.1) from 10.88.3.158 56(84) bytes of data.	
64 bytes from 10.10.10.1: icmp_req=1 ttl=62 time=27.6 ms	
64 bytes from 10.10.10.1: icmp_req=2 ttl=62 time=26.5 ms	
64 bytes from 10.10.10.1: icmp_req=3 ttl=62 time=28.9 ms	
64 bytes from 10.10.10.1: icmp_req=4 ttl=62 time=28.3 ms	
64 bytes from 10.10.10.1: icmp_req=5 ttl=62 time=27.7 ms	
--- 10.10.10.1 ping statistics ---	
5 packets transmitted, 5 received, 0% packet loss, time 4005ms	
rtt min/avg/max/mdev = 26.516/27.855/28.933/0.814 ms	

**Clear Log**

#### Tip

A system administrator can use the ping utility to manually check the connectivity of a particular LAN/WAN connection.

### 27.2 Traceroute Test

The traceroute test tool traces the routing path to the destination through a particular Ethernet

interface or a SpeedFusion™ connection. The traceroute test utility is located at **System>Tools>Traceroute**.

Tip

A system administrator can use the traceroute utility to analyze the connection path of a LAN/WAN connection.

## 27.3 PepVPN Test

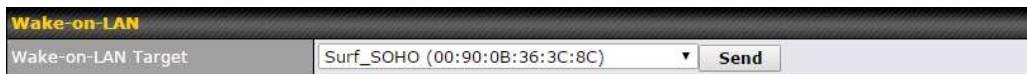
The **PepVPN Test** tool can help to test the throughput between different VPN peers.

You can define the **Test Type**, **Direction**, and **Duration** of the test, and press **Go!** to perform the throughput test. The VPN test utility is located at **System>Tools>PepVPN Test**, illustrated as follows:

PepVPN Throughput Test	
Profile	NY Office ▾
Type	<input checked="" type="radio"/> TCP <input type="radio"/> UDP
Direction	<input checked="" type="radio"/> Upload <input type="radio"/> Download
Duration	10 seconds (5 - 600)
<input style="border: 1px solid black; padding: 5px; margin: 10px auto; width: fit-content;" type="button" value="Go!"/>	

## 27.4 Wake-on-LAN

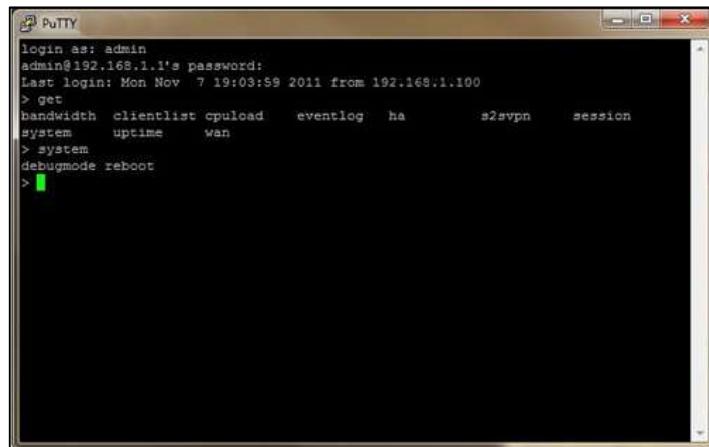
Peplink routers can send special “magic packets” to any client specified from the Web UI. To access this feature, navigate to **System > Tools > Wake-on-LAN**



Select a client from the drop-down list and click **Send** to send a “magic packet”

## 27.5 CLI (Command Line Interface Support)

The CLI (command line interface) can be accessed via SSH. This field enables CLI support. The below settings specify which TCP port and which interface(s) should accept remote SSH CLI access. The user name and password used for remote SSH CLI access are the same as those used for web admin access.



# 28 Status

## 28.1 Device

System information is located at **Status>Device**.

System Information	
Router Name	MAX_HD2_8D1C
Model	Pepwave MAX HD2
Hardware Revision	2
Serial Number	2830-A48A-8D1C
Firmware	6.2.0 build 2891
PepVPN Version	4.0.0
Modem Support Version	<a href="#">1017 (Modem Support List)</a>
Host Name	max-hd2-8d1c
Uptime	7 days 50 minutes
System Time	Mon Feb 23 11:14:13 WET 2015
Diagnostic Report	<a href="#">Download</a>
Remote Assistance	<a href="#">Turn on</a>

System Information	
<b>Router Name</b>	This is the name specified in the <b>Router Name</b> field located at <b>System&gt;Admin Security</b> .
<b>Model</b>	This shows the model name and number of this device.
<b>Product Code</b>	If your model uses a product code, it will appear here.
<b>Hardware Revision</b>	This shows the hardware version of this device.
<b>Serial Number</b>	This shows the serial number of this device.
<b>Firmware</b>	This shows the firmware version this device is currently running.
<b>PepVPN Version</b>	This shows the current PepVPN version.
<b>Modem Support Version</b>	This shows the modem support version. For a list of supported modems, click <a href="#">Modem Support List</a> .
<b>Host Name</b>	The host name assigned to the Pepwave router appears here.
<b>Uptime</b>	This shows the length of time since the device has been rebooted.
<b>System Time</b>	This shows the current system time.

<b>Diagnostic Report</b>	The <b>Download</b> link is for exporting a diagnostic report file required for system investigation.
<b>Remote Assistance</b>	Click <b>Turn on</b> to enable remote assistance.

Interface	MAC Address
LAN	00:1A:DD:BD:54:40
WAN 1	00:1A:DD:BD:54:41
WAN 2	00:1A:DD:BD:54:42

The second table shows the MAC address of each LAN/WAN interface connected. To view your device's End User License Agreement (EULA), click .

### Important Note

If you encounter issues and would like to contact the Pepwave Support Team (<http://www.peplink.com/contact/>), please download the diagnostic report file and attach it along with a description of your issue.

In Firmware 5.1 or before, the diagnostic report file can be obtained at **System>Reboot**.

## 28.2 GPS Data

The MAX HD2 and HD2 IP67 automatically store up to seven days of GPS location data in GPS eXchange format (GPX). To review this data using third-party applications, click **Status>Device** and then download your GPX file.

The Pepwave MAX BR1, HD2, and HD2 IP67 export real-time location data in NMEA format through the LAN IP address at TCP port 60660. It is accessible from the LAN or over a SpeedFusion connection. To access the data via a virtual serial port, install a virtual serial port driver. Visit <http://www.peplink.com/index.php?view=faq&id=294> to download the driver.

## 28.3 Active Sessions

Information on active sessions can be found at **Status>Active Sessions>Overview**.

Overview	Search	
Session data captured within one minute. <a href="#">Refresh</a>		
Service	Inbound Sessions	Outbound Sessions
<a href="#">AIM/ICQ</a>	0	1
<a href="#">BitTorrent</a>	0	32
<a href="#">DNS</a>	0	51
<a href="#">Flash</a>	0	1
<a href="#">HTTPS</a>	0	76
<a href="#">Jabber</a>	0	5
<a href="#">MSN</a>	0	11
<a href="#">NTP</a>	0	4
<a href="#">QQ</a>	0	1
<a href="#">Remote Desktop</a>	0	3
<a href="#">SSH</a>	0	12
<a href="#">SSL</a>	0	64
<a href="#">XMPP</a>	0	4
<a href="#">Yahoo</a>	0	1
Interface	Inbound Sessions	Outbound Sessions
<a href="#">WAN 1</a>	0	176
<a href="#">WAN 2</a>	0	32
<a href="#">Wi-Fi WAN</a>	0	51
<a href="#">Cellular 1</a>	0	64
<a href="#">Cellular 2</a>	0	0
<a href="#">USB</a>	0	0
Top Clients		
Client IP Address	Total Sessions	
<a href="#">10.9.66.66</a>	1069	
<a href="#">10.9.98.144</a>	147	
<a href="#">10.9.2.18</a>	63	
<a href="#">10.9.66.14</a>	56	
<a href="#">10.9.2.26</a>	33	

This screen displays the number of sessions initiated by each application. Click on each service listing for additional information. This screen also indicates the number of sessions initiated by each WAN port. In addition, you can see which clients are initiating the most sessions.

You can also perform a filtered search for specific sessions. You can filter by subnet, port, protocol, and interface. To perform a search, navigate to **Status>Active Sessions>Search**.

Overview Search

Session data captured within one minute. [Refresh](#)

IP / Subnet	Source or Destination ▾	/ 255.255.255.255 (/32) ▾
Port	Source or Destination ▾	
Protocol / Service	TCP ▾	
Interface	<input type="checkbox"/> WAN 1 <input type="checkbox"/> Cellular 1 <input type="checkbox"/> VPN	<input type="checkbox"/> WAN 2 <input type="checkbox"/> Cellular 2 <input type="checkbox"/> USB
<a href="#">Search</a>		

**Outbound**

Protocol	Source IP	Destination IP	Service	Interface	Idle Time
No sessions					

Total searched results: 0

**Inbound**

Protocol	Source IP	Destination IP	Service	Interface	Idle Time
No sessions					

Total searched results: 0

**Transit**

Protocol	Source IP	Destination IP	Service	Interface	Idle Time
No sessions					

Total searched results: 0

This **Active Sessions** section displays the active inbound/outbound sessions of each WAN connection on the Pepwave router. A filter is available to sort active session information. Enter a keyword in the field or check one of the WAN connection boxes for filtering.

## 28.4 Client List

The client list table is located at **Status>Client List**. It lists DHCP and online client IP addresses, names (retrieved from the DHCP reservation table or defined by users), current download and upload rate, and MAC address.

Clients can be imported into the DHCP reservation table by clicking the button on the right. You can update the record after import by going to **Network>LAN**.

Filter	<input type="checkbox"/> Online Clients Only <input type="checkbox"/> DHCP Clients Only
--------	--

**Client List**

IP Address ▾	Name	Download (kbps)	Upload (kbps)	MAC Address	Import
192.168.1.100		0	0 00:50:56:99:E1:76		

Scale:  kbps  Mbps

If the PPTP server (see **Section 19.2**), SpeedFusion™ (see **Section 12.1**), or AP controller (see **Section 20**) is enabled, you may see the corresponding connection name listed in the

Name field.

## 28.5 WINS Client

The WINS client list table is located at **Status>WINS Client**.

WINS Client List	
Name	IP Address
UserA	10.9.2.1
UserB	10.9.30.1
UserC	10.9.2.4

**Flush All**

The WINS client table lists the IP addresses and names of WINS clients. This option will only be available when you have enabled the WINS server (navigation: **Network>Interfaces>LAN**). The names of clients retrieved will be automatically matched into the Client List (see previous section). Click **Flush All** to flush all WINS client records.

WINS Client List	
Name	IP Address
UserA	10.9.2.1
UserB	10.9.30.1
UserC	10.9.2.4

**Flush All**

## 28.6 UPnP / NAT-PMP

The table that shows the forwarded ports under UPnP and NAT-PMP protocols is located at **Status>UPnP/NAT-PMP**. This section appears only if you have enabled UPnP / NAT-PMP as mentioned in **Section 16.1.1**.

Forwarded Ports						
External	Internal	Internal Address	Type	Protocol	Description	
47453	3392	192.168.1.100	UPnP	UDP	Application 031	X
35892	11265	192.168.1.50	NAT-PMP	TCP	NAT-PMP 58	X
4500	3560	192.168.1.20	UPnP	TCP	Application 013	X
5921	236	192.168.1.30	UPnP	TCP	Application 047	X
22409	8943	192.168.1.70	NAT-PMP	UDP	NAT-PMP 97	X
2388	27549	192.168.1.40	UPnP	TCP	Application 004	X

**Delete All**

Click  to delete a single UPnP / NAT-PMP record in its corresponding row. To delete all records, click **Delete All** on the right-hand side below the table.

### Important Note

UPnP / NAT-PMP records will be deleted immediately after clicking the button  or **Delete All**, without the need to click **Save** or **Confirm**.

## 28.7 SpeedFusion Status

Current SpeedFusion™ status information is located at **Status>SpeedFusion™**.

Details about SpeedFusion™ connection peers appears as below:

PepVPN with SpeedFusion - Remote Peer Details			<input type="checkbox"/> Show disconnected profiles
Remote Peer	Profile	Information	
  ADA0-FFFC-11F8	FH	192.168.77.0/24	 
  3ED2-8F63-1824	380-5 - NO NAT	192.168.3.0/24	 

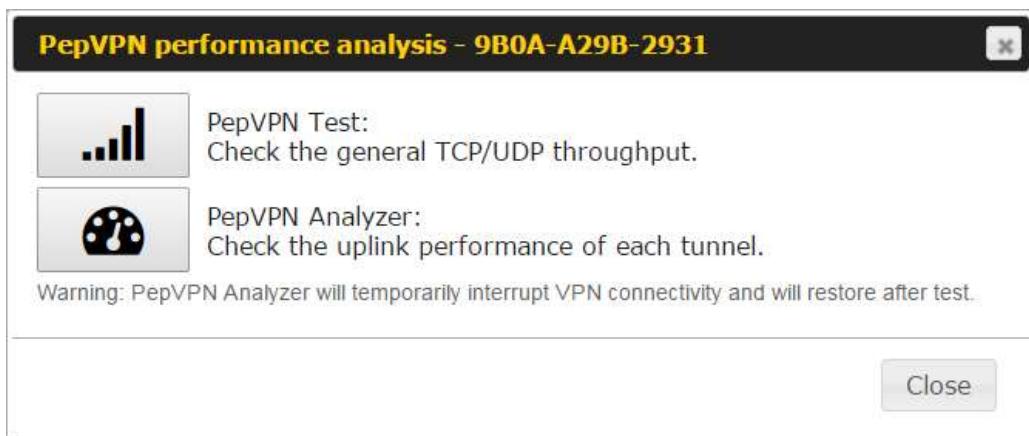
Click on the corresponding peer name to explore the WAN connection(s) status and subnet information of each VPN peer.

Remote Peer	Profile	Information	
  ADA0-FFFC-11F8	FH	192.168.77.0/24	 
 WAN 1	Rx: < 1 kbps Tx: < 1 kbps	Drop rate: 0.0 pkt/s Latency: 1 ms	
 WAN 2	Rx: < 1 kbps Tx: < 1 kbps	Drop rate: 0.0 pkt/s Latency: 1 ms	
 WAN 3	Rx: < 1 kbps Tx: < 1 kbps	Drop rate: 0.0 pkt/s Latency: 1 ms	
Total	Rx: < 1 kbps Tx: 1.1 kbps	Drop rate: 0.0 pkt/s	
  3ED2-8F63-1824	380-5 - NO NAT	192.168.3.0/24	 
 WAN 1	Rx: < 1 kbps Tx: < 1 kbps	Drop rate: 0.0 pkt/s Latency: 4 ms	
 WAN 2	Rx: < 1 kbps Tx: < 1 kbps	Drop rate: 0.0 pkt/s Latency: 4 ms	
 WAN 3	Rx: < 1 kbps Tx: < 1 kbps	Drop rate: 0.0 pkt/s Latency: 4 ms	
Total	Rx: 1.6 kbps Tx: < 1 kbps	Drop rate: 0.0 pkt/s	

Click the  button for a chart displaying real-time throughput, latency, and drop-rate information for each WAN connection.



When pressing the  button, the following menu will appear:



 **PepVPN Test:**  
Check the general TCP/UDP throughput.

After clicking the icon, the following menu appears:

Configuration						
Type	<input checked="" type="radio"/> TCP <input type="radio"/> UDP				Start	
Direction	<input checked="" type="radio"/> Upload <input type="radio"/> Download				Start	
Duration	10	seconds (5 - 600)				
<b>WAN Statistics</b>						
WAN 1	Rx:	2.5 kbps	Tx:	5.3 kbps	Drop rate: 0.0 pkt/s Latency: 186 ms	
WAN 3	Rx:	n/a	Tx:	n/a	Drop rate: n/a Latency: n/a	
WAN 4	Rx:	n/a	Tx:	n/a	Drop rate: n/a Latency: n/a	
Total	Rx:	2.5 kbps	Tx:	5.3 kbps	Drop rate: 0.0 pkt/s Latency: 186 ms	

Select the L2 protocol (TCP/UDP), direction, and duration and click the **Start** button to begin the general throughput test.

Results	
0.1250 MB / 1.00 sec =	1.0485 Mbps
1.0000 MB / 1.00 sec =	8.3888 Mbps
1.3125 MB / 1.00 sec =	11.0098 Mbps
3.0000 MB / 1.00 sec =	25.1465 Mbps
5.6875 MB / 1.00 sec =	47.7473 Mbps
6.0625 MB / 1.00 sec =	50.8562 Mbps
4.9375 MB / 1.00 sec =	41.4188 Mbps
4.5000 MB / 1.00 sec =	37.7487 Mbps
5.0000 MB / 1.00 sec =	41.9438 Mbps
5.6875 MB / 1.00 sec =	47.7099 Mbps
37.3167 MB / 10.05 sec =	31.1504 Mbps 8 %TX 9 %RX 47 retrans 132.62 msRTT
TEST DONE	



PepVPN Analyzer:  
Check the uplink performance of each tunnel.

The bandwidth bonding feature of PepVPN occurs when multiple WAN lines from one end merge with multiple WAN lines from the other end. For this to happen, each WAN line needs to form a connection with all the WAN lines on the opposite end. The function of the PepVPN analyzer is to report the throughput, packet loss, and latency of all possible combinations of connections. **Please note that the PepVPN Analyzer will temporarily interrupt VPN connectivity and will restore after test.**

After clicking the icon, the analyzer will require several minutes to perform its analysis depending the number of WAN links in the SpeedFusion™ Tunnel. Once the test the complete, the report will appear:

Results							
Estimated time: 150 s Time remaining: 0 s							
100%							
Local WAN1 > Remote WAN3	Local WAN1 > Remote WAN4	Local WAN1 > Remote WAN5	Local WAN1 > Remote WAN6	Tx Avg. (Mbps)	Tx Max. (Mbps)	Packet loss (%)	RTT (ms)
O				5.87	16.95	0.76	420.51
	O			20.72	26.39	1.59	29.89
		O		30.10	43.69	2.24	29.61
			O	45.01	55.93	2.16	28.24
O	O			24.87	33.56	0.86	49.86
O		O		19.30	31.28	0.01	49.78
	O	O		18.59	30.41	2.08	39.78
O	O	O		20.56	34.60	0.00	38.11
O			O	36.70	59.16	2.64	42.06
	O		O	19.98	30.40	4.40	38.01
O	O		O	31.63	42.99	0.72	37.99
		O	O	36.88	55.78	2.60	33.89
O		O	O	38.30	47.89	0.01	29.98
	O	O	O	33.21	55.23	2.69	30.48
O	O	O	O	30.02	46.66	3.77	28.68

"O" indicates that specific WAN / Tunnel is active for that particular test.

"Tx Avg." is the averaged throughput across the full 10 seconds time, while "Tx Max." is the averaged throughput of the fastest 30% of time.

## 28.8 Event Log

Event log information is located at **Status>Event Log**.

Device Event Log		
Device Event Log		<input checked="" type="checkbox"/> Auto Refresh
Feb 17 04:43:26	System: Changes applied	
Feb 16 10:27:01	System: Time synchronization successful	
Feb 16 10:26:25	WAN: WAN 1 connected (10.88.3.158)	
Feb 16 10:26:01	WAN: Priority changed (Priority 1 - WAN 1, WAN 2 / Priority 2 - Cellular 1, Cellular 2 / Disabled - Wi-Fi WAN)	
Feb 16 10:25:40	System: Started up (6.2.0 build 2891)	
Feb 16 10:17:27	System: Changes applied	
Feb 16 10:17:00	System: Time synchronization successful	
Feb 16 10:19:23	WAN: WAN 1 connected (10.88.3.158)	
Feb 16 10:18:58	WAN: Priority changed (Priority 1 - WAN 1, WAN 2 / Priority 2 - Cellular 1, Cellular 2 / Disabled - Wi-Fi WAN)	
Feb 16 10:18:37	System: Started up (6.2.0.201501210247-r12145 build)	
		End of log
<input type="button" value="Clear Log"/>		

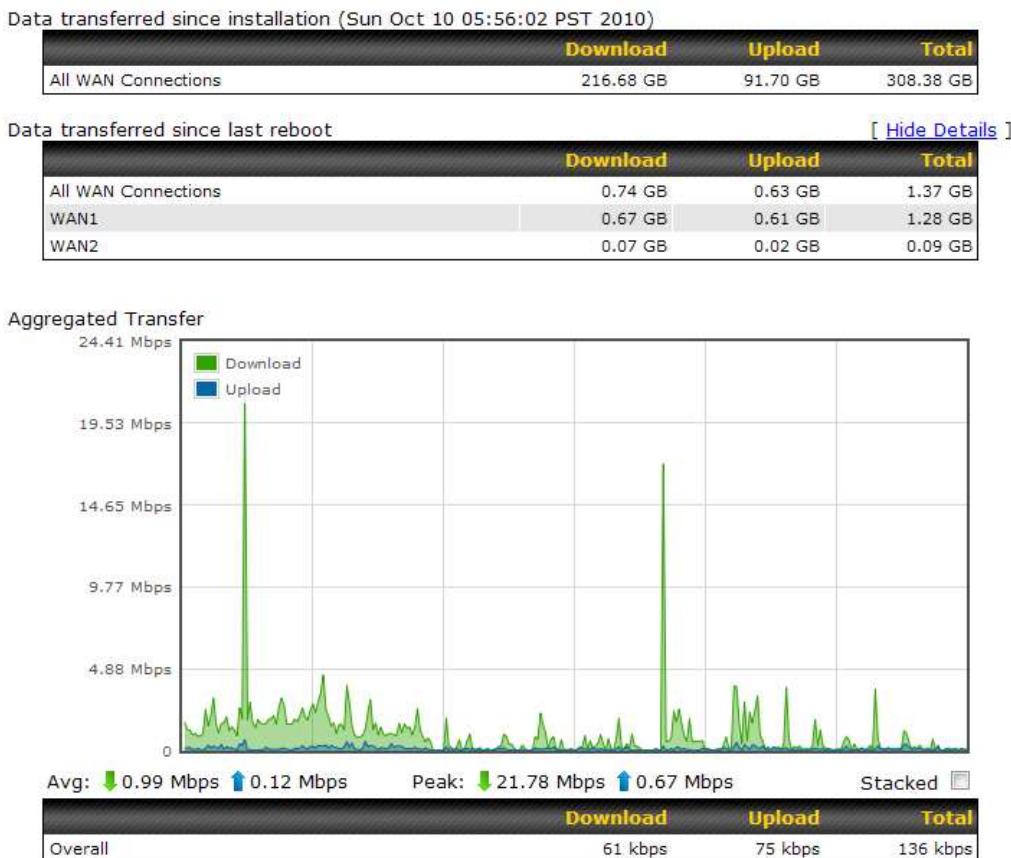
The log section displays a list of events that has taken place on the Pepwave router. Check **Auto Refresh** to refresh log entries automatically. Click the **Clear Log** button to clear the log.

## **29 Bandwidth Status**

This section shows bandwidth usage statistics and is located at **Status>Bandwidth**. Bandwidth usage at the LAN while the device is switched off (e.g., LAN bypass) is neither recorded nor shown.

## 29.1 Real-Time

The **Data transferred since installation** table indicates how much network traffic has been processed by the device since the first bootup. The **Data transferred since last reboot** table indicates how much network traffic has been processed by the device since the last bootup.



## 29.2 Hourly

This page shows the hourly bandwidth usage for all WAN connections, with the option of viewing each individual connection. Select the desired connection to check from the drop-down menu.

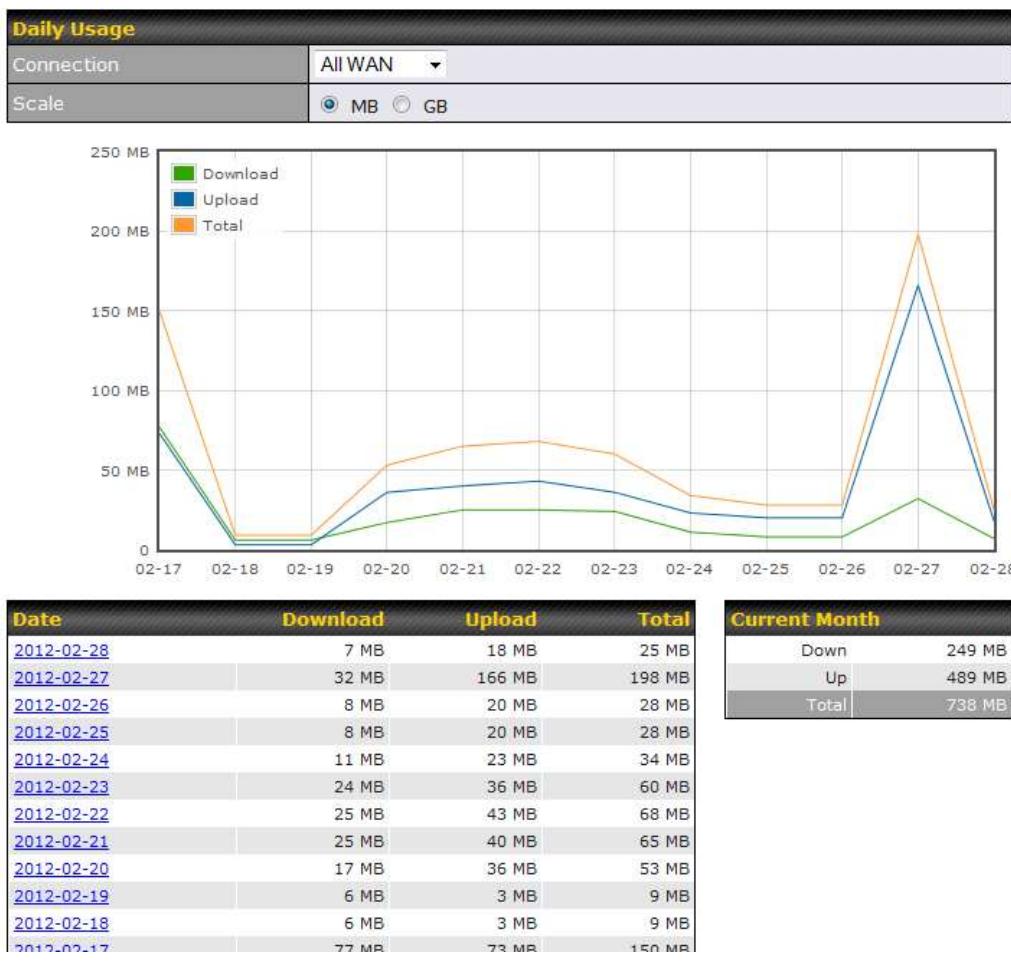
-in

## 29.3 Daily

This page shows the daily bandwidth usage for all WAN connections, with the option of viewing each individual connection.

Select the connection to check from the drop-down menu. If you have enabled the **Bandwidth Monitoring** feature, the **Current Billing Cycle** table for that WAN connection will be displayed.

Click on a date to view the client bandwidth usage of that specific date. This feature is not available if you have selected to view the bandwidth usage of only a particular WAN connection. The scale of the graph can be set to display megabytes (**MB**) or gigabytes (**GB**).

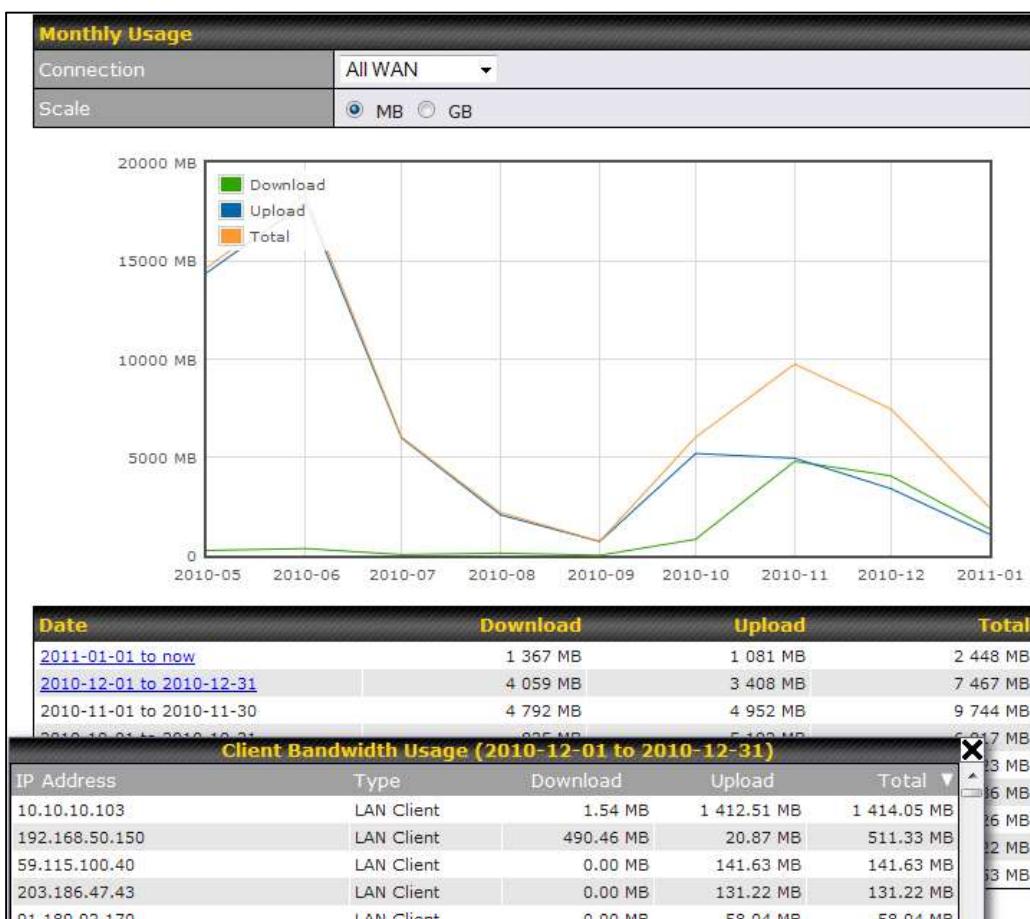


All WAN Daily Bandwidth Usage

## 29.4 Monthly

This page shows the monthly bandwidth usage for each WAN connection. If you have enabled the **Bandwidth Monitoring** feature, you can check the usage of each particular connection and view the information by **Billing Cycle** or by **Calendar Month**.

Click the first two rows to view the client bandwidth usage in the last two months. This feature is not available if you have chosen to view the bandwidth of an individual WAN connection. The scale of the graph can be set to display megabytes (**MB**) or gigabytes (**GB**).



All WAN Monthly Bandwidth Usage