FCC ID: XRN-MAX600

PEPWAVE
Broadband Possibilities

User Manual

Mobile Router

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1 Introduction and Scope

The Pepwave MAX Mobile Router provides link aggregation and load balancing across six WAN connections, allowing a combination of technologies like 3G HSDPA, EVDO, Wi-Fi, WiMAX, and Satellite to be utilized to connect to the Internet.

This manual presents how to set up the Pepwave MAX Mobile Router and provides an introduction to the features and usage of Pepwave MAX Mobile Router.

2 Glossary

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

Term	Definition
DHCP	Dynamic Host Configuration Protocol
DNS	Domain Name System
HTTP	Hyper-Text Transfer Protocol
ICMP	Internet Control Message Protocol
IP	Internet Protocol
LAN	Local Area Network
MAC Address	Media Access Control Address
MTU	Maximum Transmission Unit
MSS	Maximum Segment Size
NAT	Network Address Translation
PPPoE	Point to Point Protocol over Ethernet
SNMP	Simple Network Management Protocol
TCP	Transmission Control Protocol
UDP	User Datagram Protocol
VRRP	Virtual Router Redundancy Protocol
WAN	Wide Area Network

3 Product Features

The following is the list of supported features on Pepwave MAX Mobile Router:

3.1 Supported Network Features

3.1.1 WAN

- Multiple public IP support (DHCP, PPPoE, Static IP Address)
- Ethernet WAN 10/100 Mbps Connection in Full/Half Duplex
- USB WAN Connection
- PC Card WAN connection
- ExpressCard WAN connection
- Wi-Fi WAN Connection
- Network Address Translation (NAT) / Port Address Translation (PAT)
- Inbound and Outbound NAT mapping
- IPsec NAT-T and PPTP packet passthrough
- Multiple static IP addresses per WAN Connection
- MAC address clone
- Customizable MTU and MSS values
- WAN connection health check
- Dynamic DNS (Supported service providers: changeip.com, dyndns.org, no-ip.org and tzo.com)

3.1.2 LAN

- DHCP server on LAN
- Static routing rules

3.1.3 Site-to-Site VPN

- Secure yet easy to setup site-to-site VPN

3.1.4 Firewall

- Outbound (LAN to WAN) firewall rules
- Inbound (WAN to LAN) firewall rules per WAN connection
- Intrusion detection and prevention
- Specification of NAT mappings

3.1.5 Inbound Traffic Management

- TCP/UDP traffic redirection to dedicated LAN server(s)

3.1.6 Outbound Policy

- Link load distribution per TCP/UDP service
- Persistent routing for specified source and/or destination IP addresses per TCP/UDP service
- Traffic Prioritization and DSL optimization

3.2 Other Supported Features

- Easy-to-use web-based administration interface
- HTTP and HTTPS support for Web Administration Interface

- Configurable web administration port and administrator password
- Firmware upgrades, configuration backups, Ping, and Traceroute via Web Administration Interface
- Remote web based configuration (via WAN and LAN interfaces)
- Quality of Service for Voice over IP and Secure Web
- Time server synchronization
- SNMP
- Email notification
- Syslog
- SIP passthrough
- PPTP packet passthrough
- Web Logging
- Link Status (Active Sessions)

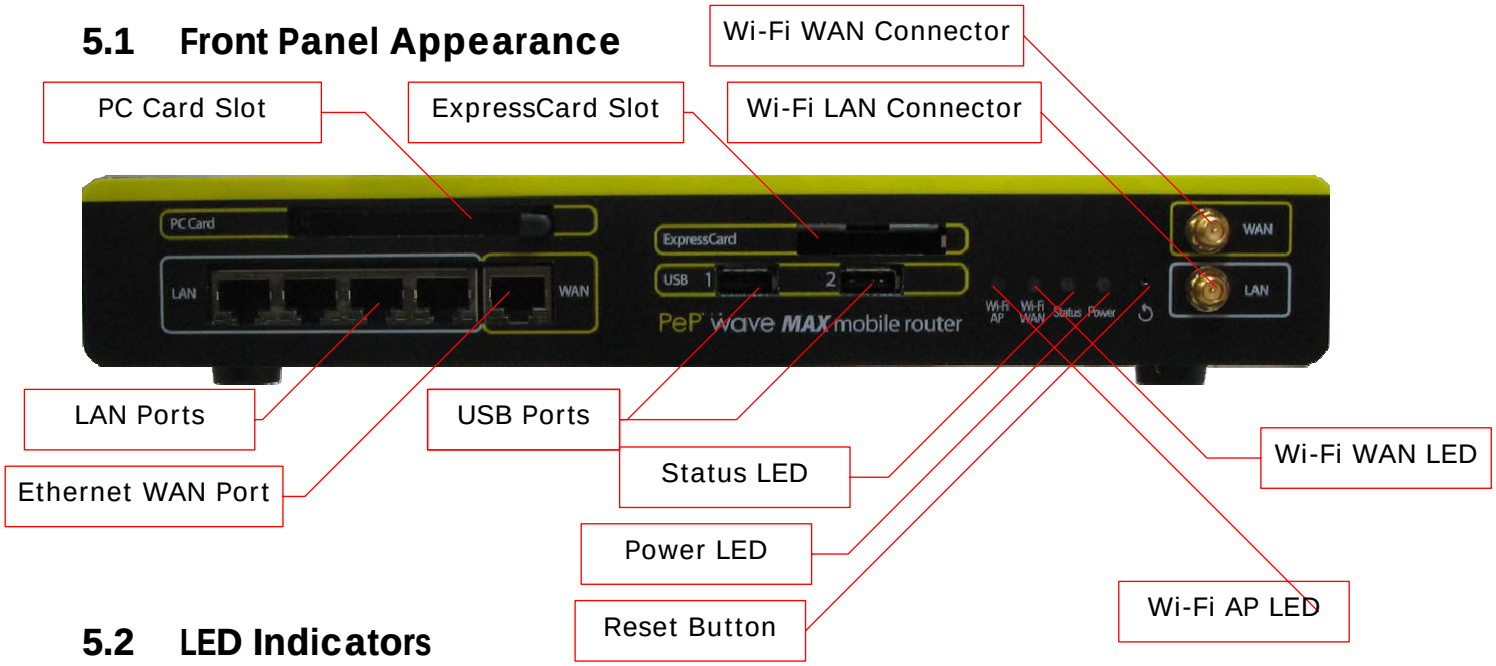
4 Package Content

The Pepwave MAX Mobile Router package includes the following:

- Pepwave MAX Mobile Router unit
- Power adapter
- 2 x Wi-Fi antenna
- Information slip
- Rack mount kit

5 Pepwave MAX Mobile Router Overview

5.1 Front Panel Appearance



5.2 LED Indicators

The statuses indicated by the Front Panel LEDs are as follows:

Power and Status Indicators	
Power	OFF – Power off Green – Power on
Status	OFF – System initializing Red – Booting up or busy Green – Ready state

Wi-Fi AP and Wi-Fi WAN Indicators	
Wi-Fi WAN	OFF – Disabled Intermittent Blinking – Not connected to wireless network ON – Connected to wireless network(s) without traffic Continuous Blinking – Data is transferring
Wi-Fi AP	OFF – Disabled Intermittent Blinking – Created wireless network with no client ON – Client(s) associated to wireless network Continuous Blinking – Data is transferring to wireless network

LAN and Ethernet WAN Ports	
Green LED	ON – 100 Mbps OFF – 10 Mbps
Yellow LED	Solid – Port is connected without traffic Blinking – Data is transferring OFF – Port is not connected
Note:	They are auto MDI/MDI-X ports

5.3 Rear Panel Appearance

(terminal block)

5.4 Unit Base Appearance

6 Installation

6.1 Connecting the Network with Pepwave MAX Mobile Router

6.1.1 Preparation

Before installing Pepwave MAX Mobile Router, please prepare the following:

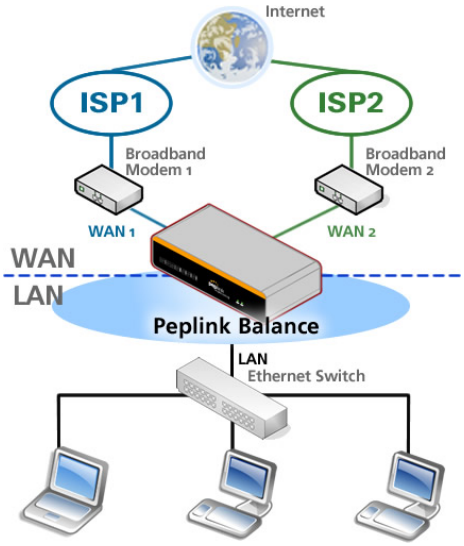
- At least one Internet/WAN access account.
- For WAN connection(s), one 10/100BaseT UTP cable with RJ45 connector for Ethernet port, or one 3G USB modem for the USB port, or one Wi-Fi antenna for the Wi-Fi WAN connector, or one PC Card/ExpressCard for the corresponding card slot.
- A computer with TCP/IP network protocol and a web browser installed. Supported browsers include Microsoft Internet Explorer 6.0 or above, Mozilla Firefox 2.0 or above, Apple Safari 3.1.1 or above, and Google Chrome 2.0 or above.

6.1.2 Constructing the Network

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

1. With a network cable, connect a computer to one of the LAN ports on the Pepwave MAX. Repeat with different cables for up to 4 computers to be connected.
2. With another network cable, connect the WAN/broadband modem to one of the WAN ports on the Pepwave MAX. Repeat using different cables for other WAN/broadband connections, or connect 3G USB modem to the USB port.
3. Connect to one of the WAN ports on the Pepwave MAX using one of the following:
    - A network cable (connect to the Ethernet WAN port)
    - PC Card
    - ExpressCard
    - USB modem (connect to the USB ports)
    - Wi-Fi antenna (connect to the Wi-Fi WAN port)
4. Connect the provided power adapter to the power connector on the Pepwave MAX, and then plug the power adapter into a power outlet.

The following figure schematically illustrates the configuration that results:



6.1.3 Configuring the Network Environment

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

- PC Configuration on the LAN

  Section 6.2, **Configuring Computers on the LAN**

- LAN Configuration

  For basic configuration, please refer to Section 7,

Connecting to Web Admin Interface.

Section 8, **Configuration of LAN Interface(s)**, covers advanced configuration.

- WAN Configuration

  For basic configuration, refer to Section 7,

Connecting to Web Admin Interface.

Section 9, **Configuration of WAN Interface(s)**, covers advanced configuration.

6.2 Configuring Computers on the LAN

The simplest way to setup the Local Area Network (LAN) is to enable the DHCP Server functionality of Pepwave MAX. With this setting, Pepwave MAX will automatically provide a suitable IP Address (and related information) to each computer connected to its LAN interface. (Please refer to Section 8, **Configuration of LAN Interface(s)**, for further details on the DHCP Server Settings.)

Follow the steps below to configure a computer on the LAN in order to use the DHCP Server functionality provided by Pepwave MAX:

6.2.1 Windows 95/98/ME/2000 DHCP Client Configuration

5. Select ***Start Menu > Settings > Control Panel > Internet Options***.
6. Select the ***Connection*** tab, and click the ***Setup*** button.
7. Select the option:

   I want to set up my Internet connection manually, or I want to connect through a local area network (LAN).
8. Click ***Next***.
9. Select the option:

   I connect through a local area network (LAN).
10. Click ***Next***.
11. On the subsequent Local area network Internet Configuration screen, ensure that all of the boxes are **unchecked**.
12. When prompted with the following:

    Do you want to set up an Internet mail account now?

    Select the option ***No***.
13. Click ***Finish*** to close the Internet Connection Wizard.

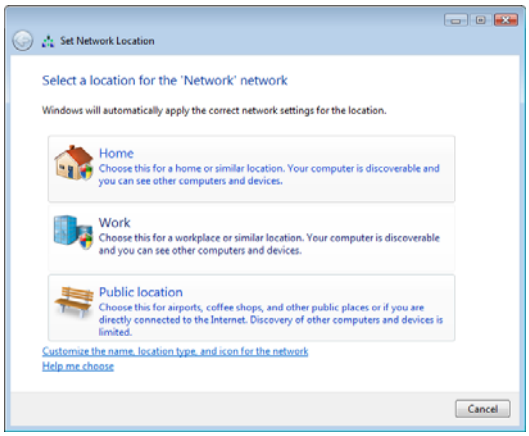
6.2.2 Windows XP DHCP Client Configuration

14. Select ***Start Menu > Control Panel > Network and Internet Connections***.
15. Select ***Set up or change your Internet Connection***.
16. Select the ***Connection*** tab, and click the ***Setup*** button.
17. On the ***Location Information*** pop-up menu, select ***Cancel***.
18. On the ***New Connection Wizard*** screen, click ***Next***.
19. Select ***Connect to the Internet*** and click ***Next***.
20. Select ***Set up my connection manually*** and click ***Next***.
21. Select the following checkbox:

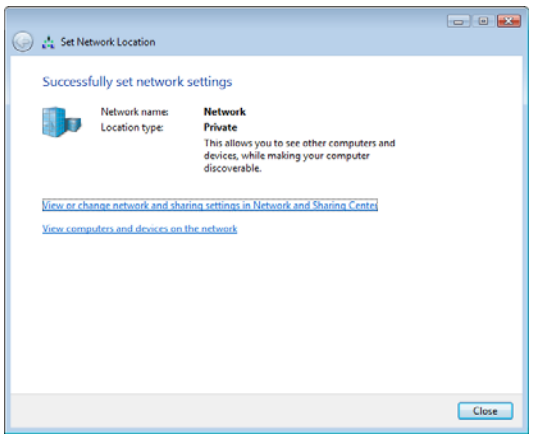
    Connect using a broadband connection that is always on.
22. Click ***Next***.
23. Click ***Finish*** to close the New Connection Wizard.

6.2.3 Windows Vista DHCP Client Configuration

1. Connect the computer to the Pepwave MAX's LAN interface with an Ethernet cable.
2. The following screen will be displayed on the computer screen. Choose "**Work**".



3. Click "**Close**" to finish.



6.2.4 Mac DHCP Client Configuration

1. Open TCP/IP Control Panel.
2. From the ***Connect via*** pop-up menu, select ***Ethernet***.
3. Select ***Using DHCP Server*** from the ***Configure*** pop-up menu.
   (The ***DHCP Client ID*** field can be left blank.)
4. Save the settings and close the TCP/IP Control Panel.

6.2.5 UNIX DHCP Client Configuration

Depending on the flavor of UNIX, the procedure may vary. The following steps are for Red Hat Enterprise Linux 3:

1. Login to the system as ***root***.
2. At the command prompt, type `netconfig`.
3. When prompted with the following:

   Would you like to set up networking?

   Respond with ***Yes***.
4. When prompted with the following:

   Please enter the IP configuration for this machine…

   Select the option:

   Use dynamic IP configuration (BOOTP/DHCP).
5. Select ***OK***.

7 Connecting to Web Admin Interface

1. Start a web browser on a computer that is connected with Pepwave MAX through LAN.
2. To connect to Web Administration Interface of Pepwave MAX, enter the following LAN IP address in the address field of the web browser:

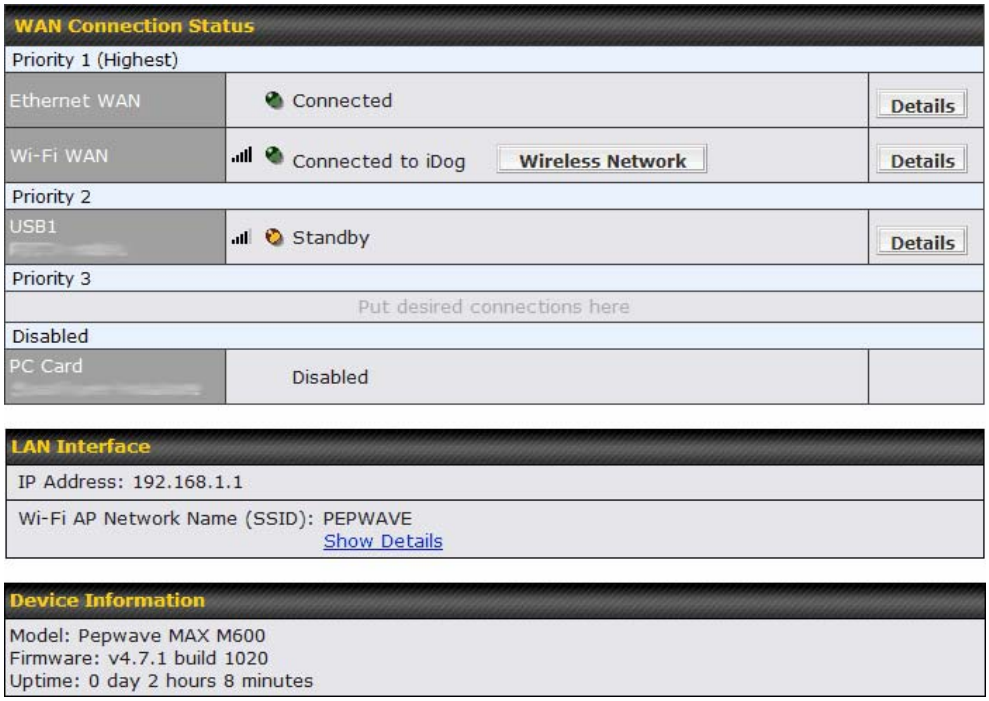
   `http://192.168.50.1`

   (This is the default LAN IP address of Pepwave MAX.)
3. When prompted for ***User Name*** and ***Password*** to access the Web Administration Interface, enter the following as ***User Name*** and ***Password*** to proceed.

   User Name: admin

   Password: admin

   (This is the default Username and Password of Pepwave MAX. The Admin Password can be changed in the page ***System > Admin Security*** of the Web Administration Interface.)
4. After successful login, the ***Dashboard*** of Web Administration Interface will be displayed. It looks similar to the following:



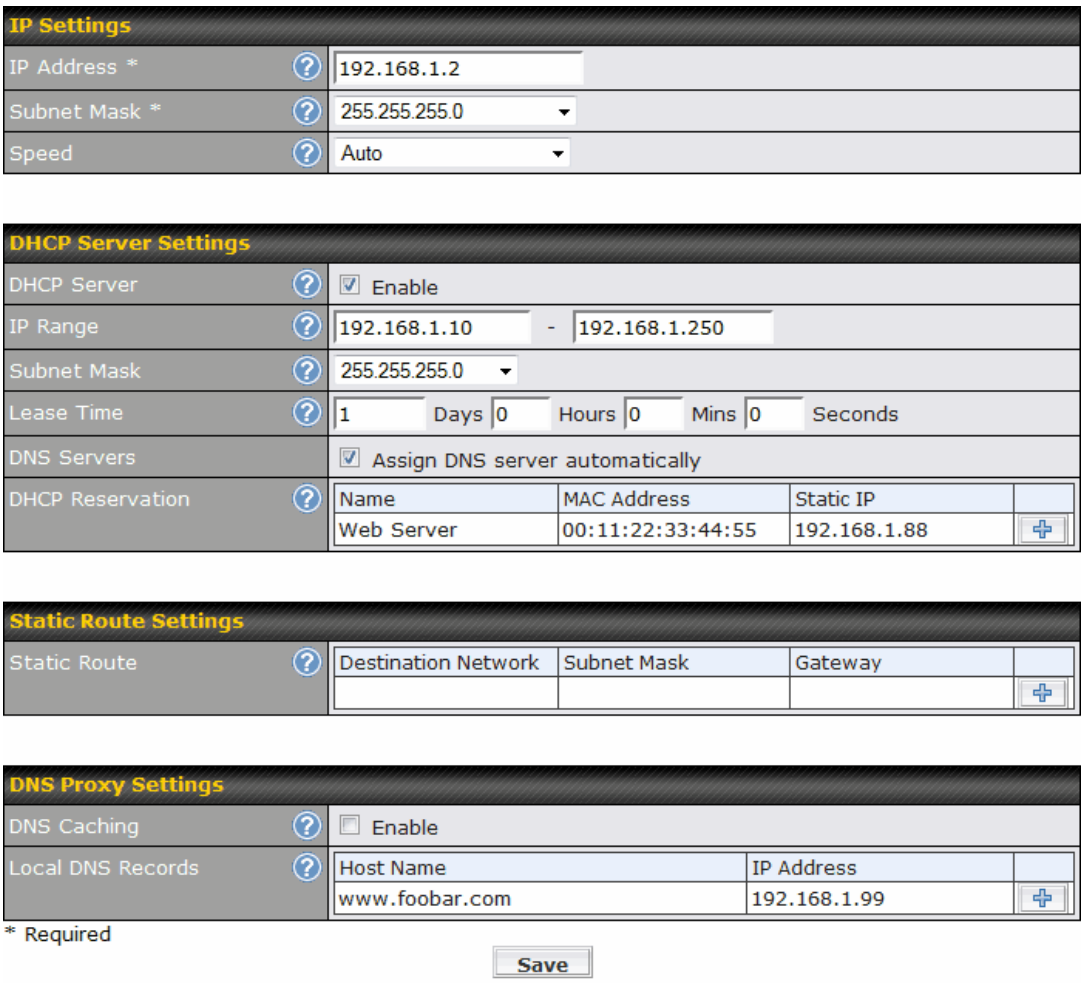
Important Note

Configuration changes (e.g. WAN, LAN, Admin settings, etc.) take effect after clicking the ***Apply Changes*** button on each page's header. The ***Apply Changes*** button causes the changes to be saved and applied.

8 Configuration of LAN Interface(s)

8.1 Basic Settings

The LAN Interface settings are located in ***Network > LAN > Basic Settings***:



IP Settings	
IP Address & Subnet Mask	The IP address of Pepwave MAX on LAN.
Speed	This setting specifies the speed of the LAN Ethernet Port. By default, the appropriate data speed is automatically detected by Pepwave MAX. In the event of negotiation issues, the port speed can be manually specified to circumvent the issues.

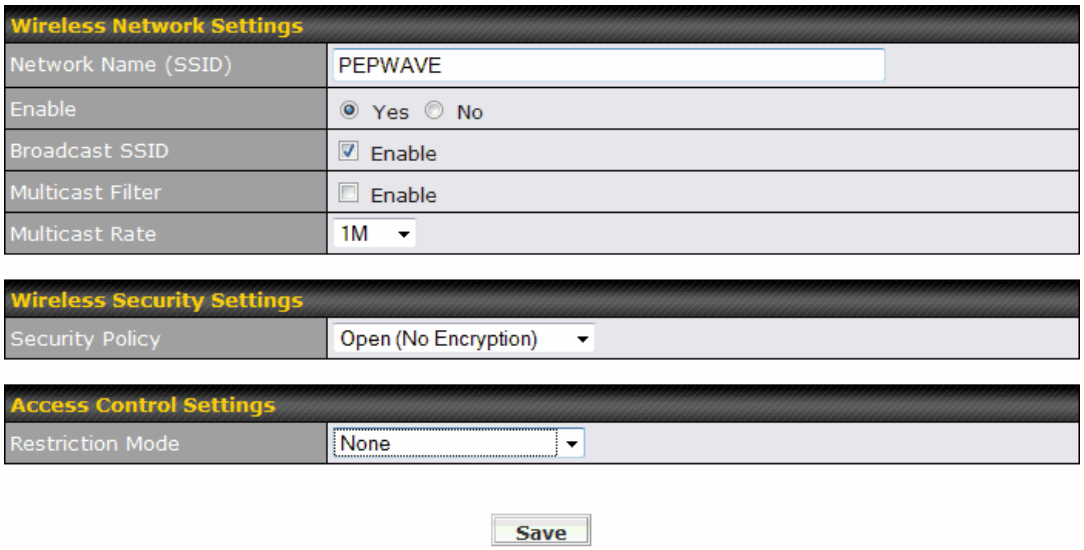
DHCP Server Settings	
DHCP Server	When this setting is enabled, the DHCP server of Pepwave MAX automatically assigns an IP address to each computer that is connected via LAN and configured to obtain an IP address via DHCP. Pepwave MAX's DHCP server prevents IP address collision on LAN.
IP Range & Subnet Mask	This setting allocates a range of IP address that will be assigned to LAN computers by the DHCP server of Pepwave MAX.
Lease Time	This setting specifies the length of time throughout which an IP address of a DHCP client remains valid. Upon expiration of the Lease Time, the assigned IP address will no longer be valid and the renewal of the IP address assignment will be required.
DNS Servers	This is to input the DNS server addresses to be offered to the DHCP clients. If ***Assign DNS server automatically*** is selected, the Pepwave MAX's built-in DNS server address (i.e. LAN IP address) will be offered.
DHCP Reservation	This setting reserves the assignment of fixed IP addresses for a list of computers on the LAN. The computers to be assigned fixed IP addresses on the LAN are identified by their MAC addresses. The fixed IP address assignment is displayed as a cross-referenced list between the computers' Name, MAC addresses and fixed IP addresses. The ***Name field*** (optional) is a name to represent the device. MAC addresses should be in the format of `00:AA:BB:CC:DD:EE` Press to create a new record. Press to remove a record.

Static Route Settings	
Static Route	This table is for defining static routing rules for the LAN segment. A static route consists of the network address, subnet mask, and gateway address. The address and subnet mask values are in the format of `w.x.y.z` Press to create a new route. Press to remove a route.

DNS Proxy Settings	
DNS Caching	This field is to enable DNS caching on the built-in DNS proxy server. When the option is enabled, queried DNS replies will be cached until the records' TTL reached. This feature could improve the DNS lookup time. But it cannot return the most updated result for those frequently updated DNS records. By default, it is disabled.
Local DNS Records	This table is for defining custom local DNS records. A static local DNS record consists of a Host Name and an IP Address. When looking up the Host Name from the LAN to LAN IP of Pepwave MAX, the corresponding IP Address will be returned. Press to create a new record. Press to remove a record.

8.2 Wi-Fi AP

The Wi-Fi LAN settings can be configured in ***Network > LAN > Wi-Fi AP***:



Wireless Network Settings	
Network Name (SSID)	This setting specifies a name for the wireless network.
Enable	When ***Yes*** is selected, this wireless network is enabled.
Broadcast SSID	

Multicast Filter	
Multicast Rate	

Wireless Security Settings	
Security Policy	This setting specifies which security policy will be used for this wireless network. The available options are ***Open (No Encryption)***, ***WPA/WPA2 – Personal***, ***WPA/WPA2 – Enterprise***, ***802.1X***, and ***Static WEP***.

Access Control Settings	
Restriction Mode	The setting specifies whether access control restriction will be applied. The available options are ***None***, ***Deny all except listed***, and ***Accept all except listed***.

9 Configuration of WAN Interface(s)

9.1 Ethernet WAN

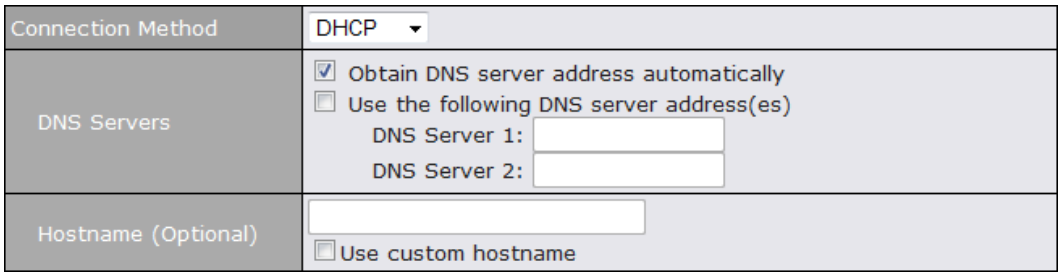
WAN Port	
IP Address	10.9.2.25
Default Gateway	10.9.1.1
DNS Servers	10.9.1.1
Stand-by State	(•) Remain connected ( ) Disconnected
Reply to ICMP PING	(•) Yes ( ) No
Speed	Auto
MTU	1440 Default
MSS	(•) Auto ( ) Custom
MAC Address Clone	00 : 11 : DD : AA : 55 : 66 Default
Connection Method	DHCP
DNS Servers	[x] Obtain DNS server address automatically [ ] Use the following DNS server address(es) DNS Server 1: DNS Server 2:
Hostname (Optional)	[ ] Use custom hostname
Dynamic DNS	changeip.com
Account Name	
Password	
Confirm Password	
Hosts (Carriage Return Separated)	
Health Check Method	DNS Lookup
Health Check DNS Servers	Host 1: Host 2: [x] Use first two DNS servers as Health Check DNS Servers
Timeout	5 second(s)
Health Check Interval	5 second(s)
Health Check Retries	3
Recovery Retries	3

Ethernet WAN Settings	
Stand-by State	This setting specifies the state of the Ethernet WAN connection. The available options are ***Remain Connected*** and ***Disconnected***.
Reply to ICMP PING	If this field is disabled, the WAN connection will not respond to ICMP Ping requests. By default, this is enabled.
Speed	This setting specifies port speed and duplex configurations of the WAN Port. By default, the appropriate data speed is automatically detected by Pepwave MAX. In the event of negotiation issues, the port speed can be manually specified to circumvent the issues.
MTU	This setting specifies the Maximum Transmission Unit. By default, MTU is set to ***1440***.
MSS	This setting should be configured based on the maximum payload size that the local system can handle. The MSS (Maximum Segment Size) is computed from the MTU minus 40 bytes for TCP over IPv4. If MTU is set to Auto, the MSS will also be set automatically. By default, MSS is set to ***Auto***.
MAC Address Clone	This setting allows configuring a user-specified MAC address. Some service providers (e.g. cable providers) identify the clients' MAC addresses and require the client to always connect using the same MAC address. In such cases, change the Pepwave MAX WAN interface MAC address to the original client PC's via this field. The default MAC Address is a unique value assigned at the factory. In most cases, the default value suffices. Clicking the ***Default*** button restores the MAC Address to the default value.
Connection Method	There are three possible connection methods for Ethernet WAN: • ***DHCP*** • ***Static IP*** • ***PPPoE*** The connection method and details are determined by, and can be obtained from, the ISP. See the Sections 9.1.1, 9.1.2, and 9.1.3 for details of each connection method.

Ethernet WAN Settings	
Dynamic DNS	This setting specifies the dynamic DNS service provider to be used for the WAN based on supported dynamic DNS service providers: • ***changeip.com*** • ***dyndns.org*** • ***no-ip.org*** • ***tzo.com*** Select ***Disabled*** to disable this feature. See Section 9.1.4 for configuration details.
Health Check Method	This setting specifies the health check method for the WAN connection. The value of method can be configured as ***Disabled***, ***Ping*** or ***DNS Lookup***. The default method is ***Disabled***. See Section 9.1.5 for configuration details.

9.1.1 DHCP Connection

The DHCP connection method is suitable if the ISP provides an IP address automatically by DHCP (e.g. Cable, Metro Ethernet, etc.).



DHCP Settings	
DNS Servers	Each ISP may provide a set of DNS servers for DNS lookups. This setting specifies the DNS (Domain Name System) Servers to be used when a DNS lookup is routed through this connection. Selecting ***Obtain DNS server address automatically*** results in the DNS Servers to be assigned by the WAN DHCP Server to be used for outbound DNS lookups over the connection. (The DNS Servers are obtained along with the WAN IP address assigned from the DHCP server.) When ***Use the following DNS server address(es)*** is selected, you may enter custom DNS server addresses for this WAN connection into the ***DNS server 1*** and ***DNS server 2*** fields.

Hostname	If your service provider's DHCP server requires you to supply a *hostname* value upon acquiring an IP address, you may enter the value here. If your service provider does not provide you with the value, you can safely bypass this option.

9.1.2 Static IP Connection

This Static IP connection method is suitable if ISP provides a static IP address to connect directly.

Connection Method	Static IP
IP Address	
Subnet Mask	255.255.255.0
Default Gateway	
DNS Servers	☑ Use the following DNS server address(es) DNS Server 1: DNS Server 2:

Static IP Settings	
IP Address / Subnet Mask / Default Gateway	These settings specify the information required in order to communicate on the Internet via a fixed Internet IP address. The information is typically determined by and can be obtained from the ISP.
DNS Servers	Each ISP may provide a set of DNS servers for DNS lookups. This field specifies the DNS (Domain Name System) Servers to be used when a DNS lookup is routed through this connection. You can input the ISP provided DNS server addresses into the ***DNS server 1*** and ***DNS server 2*** fields. If no address is entered here, this link will not be used for DNS lookups.

9.1.3 PPPoE Connection

The PPPoE connection method is suitable if the ISP provides a PPPoE login ID and password to connect via PPPoE.

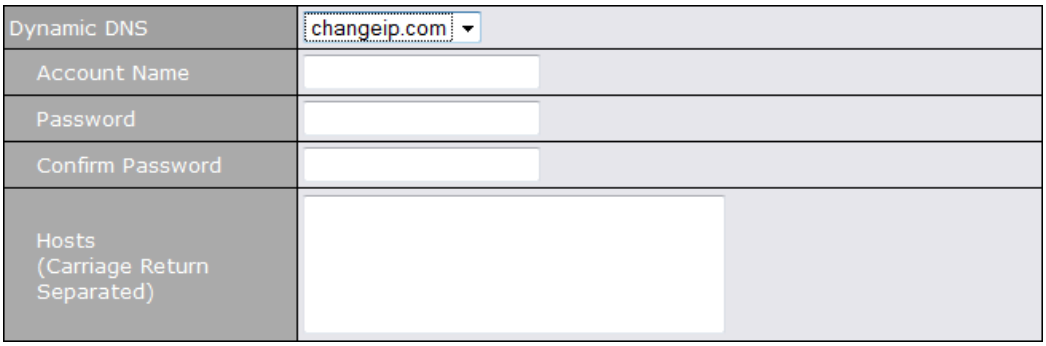
Login ID	
Password	
Confirm Password	
Service Name (Optional)	
DNS Servers	☑ Obtain DNS server address automatically ☐ Use the following DNS server address(es) DNS Server 1: DNS Server 2:

PPPoE Settings	
Login ID and Password	These settings specify the information required in order to connect via PPPoE to the ISP. The information is typically determined by and can be obtained from the ISP, and include the following: • ***Login ID*** • ***Password***
Service Name (Optional)	Service Name is a PPPoE parameter which is provided by the ISP. **Note: Leave this field blank unless it is provided by your ISP.**
DNS Servers	Each ISP may provide a set of DNS servers for DNS lookups. This setting specifies the DNS (Domain Name System) Servers to be used when a DNS lookup is routed through this connection. Selecting ***Obtain DNS server address automatically*** results in the DNS Servers assigned by the PPPoE server to be used for outbound DNS lookups over the WAN connection. (The DNS Servers are obtained along with the WAN IP address assigned from the PPPoE server.) When ***Use the following DNS server address(es)*** is selected, you can put custom DNS server addresses for this WAN connection into the ***DNS server 1*** and ***DNS server 2*** fields.

9.1.4 Dynamic DNS Settings

Pepwave MAX provides the functionality to register the domain name relationships to dynamic DNS service providers. Through registration with dynamic DNS service provider(s), the default public Internet IP address of each WAN connection can be associated with a host name.

Either upon a change in IP address or every 23 days without link reconnection, Pepwave MAX will connect to the dynamic DNS service provider to perform an IP address update within the provider's records.



Dynamic DNS Settings	
Account Name	This setting specifies the registered user name for the dynamic DNS service.
Password	This setting specifies the password for the dynamic DNS service.
Hosts	This setting specifies a list of host names or domains to be associated with the public Internet IP address of the WAN connection.

Important Note

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

A dynamic DNS update is performed whenever a WAN's IP address changed. E.g. IP is changed after a DHCP IP refresh, reconnection, etc.

Due to dynamic DNS service providers' policy, a dynamic DNS host would expire automatically because the host record was not updated for a long time. Therefore Pepwave MAX performs an update every 23 days even if a WAN's IP address did not change.

9.1.5 WAN Health Check

To ensure traffic is routed to healthy WAN connections only, Pepwave MAX provides the functionality to periodically check the health of each WAN connection.

Health Check Settings

Health Check Disabled

Health Check Method	Disabled

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

Health Check Method: Ping

Health Check Method	PING
PING Hosts	Host 1: Host 2: ☑ Use first two DNS servers as PING Hosts

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

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

Health Check Method: DNS Lookup

Health Check Method	DNS Lookup
Health Check DNS Servers	Host 1: Host 2: ☑ Use first two DNS servers as Health Check DNS Servers

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

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

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

9.2 Express Card / PC Card / USB1 / USB2

ExpressCard / PC Card / USB1 / USB2	
Wireless Adaptor	[redacted]
SIM Card IMSI	[redacted]
Carrier	[redacted]
Country	United States
Signal Strength	-85 dBm
IP Address	10.141.104.177
DNS Servers	[redacted]
Operator Settings	Auto Custom
APN	[redacted]
Login	-
Password	-
Dial Number	*99#
Health Checking Settings	
Method	SmartCheck
Timeout	5 second(s)
Health Check Interval	5 second(s)
Health Check Retries	3
Recovery Retries	3
Modem Specific Settings	
Network Type	3G preferred
GSM Frequency Band	All Bands

ExpressCard / PC Card / USB Settings	
Wireless Adaptor	
SIM Card IMSI / Carrier / Country	
Signal Strength	
IP Address	
DNS Servers	

ExpressCard / PC Card / USB Settings	
Operator Settings	
Heath Checking Settings	
Modem Specific Settings	

9.3 Wi-Fi WAN

Wi-Fi WAN	
Network Name (SSID)	[illegible] Show Scanned Network
MAC Address (BSSID)	00:11:44:DD:BB:11
Signal Strength	-45 dBm
IP Address	10.10.10.123
Default Gateway	10.10.10.1
DNS Servers	[illegible]
Stand-by State	Remain connected / Disconnected
Reply to ICMP PING	Yes / No
Health Check Method	DNS Lookup
Health Check DNS Servers	Host 1: Host 2: Use first two DNS servers as Health Check DNS Servers
Timeout	5 second(s)
Health Check Interval	5 second(s)
Health Check Retries	3
Wi-Fi Association Mode	Stronger Signal Strength / Profile Priority
Connect to Any Open Mode AP	Yes / No

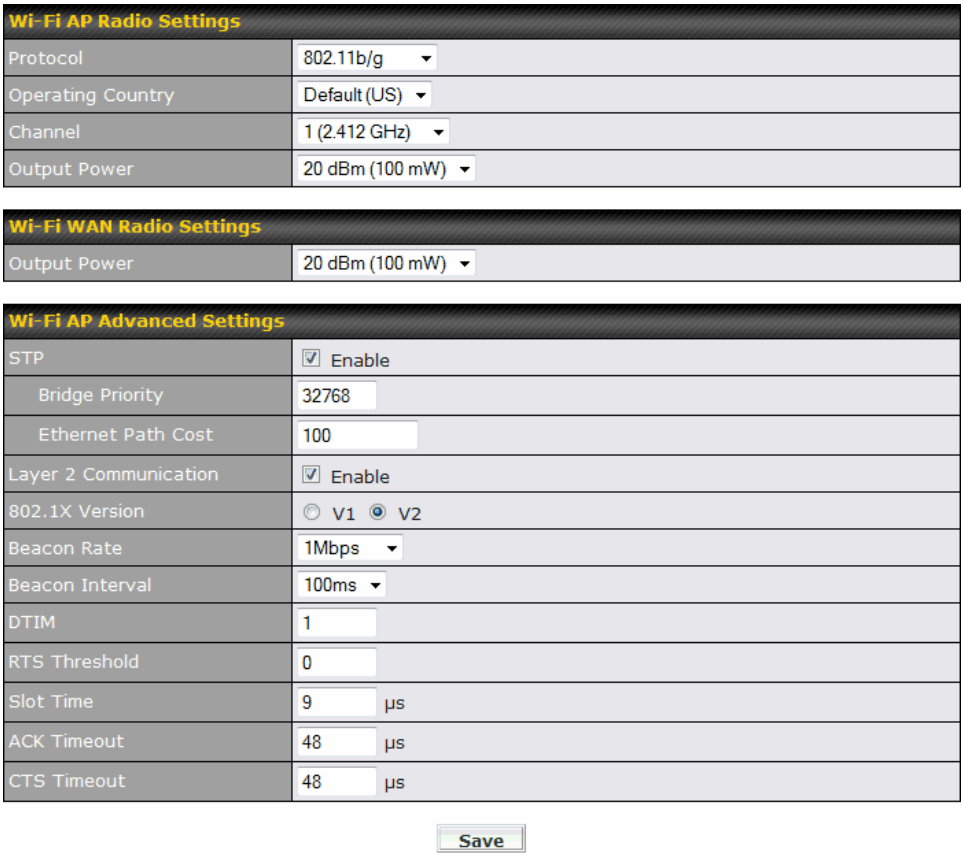
Wi-Fi Connection Profile (Drag and drop to change the profile priority)		
Network Name (SSID)	Security	
[illegible]	WPA/WPA2-Personal	
[illegible]	Open	
[illegible]	WPA/WPA2-Personal	
(Any Open Mode AP)	Open	

Create Profile...

Wi-Fi WAN Settings	
Network Name (SSID)	
MAC Address (BSSID)	
Signal Strength	
IP Address	
Default Gateway	
DNS Servers	
Stand-by State	
Reply to ICMP PING	
Health Check Method	
Wi-Fi Association Mode	
Connect to Any Open Mode AP	

10 Advanced Wi-Fi Settings

Advanced Wi-Fi settings are available and can be configured at ***Advanced > Adv. Wi-Fi Settings***:



Wi-Fi AP Radio Settings	
Protocol	
Operating Country	
Channel	
Output Power	

Wi-Fi WAN Radio Settings	
Output Power	

Wi-Fi AP Advanced Settings

STP	
Layer 2 Communication	
802.1X Version	
Beacon Rate	
Beacon Interval	
DTIM	
RTS Threshold	
Slot Time	
ACK Timeout	
CTS Timeout	

11 Site-to-Site VPN

Pepwave Site-to-Site VPN functionality securely connects your office to the company's main headquarters or to another branch. The data, voice, or video communications between these locations are kept confidential across the public Internet.

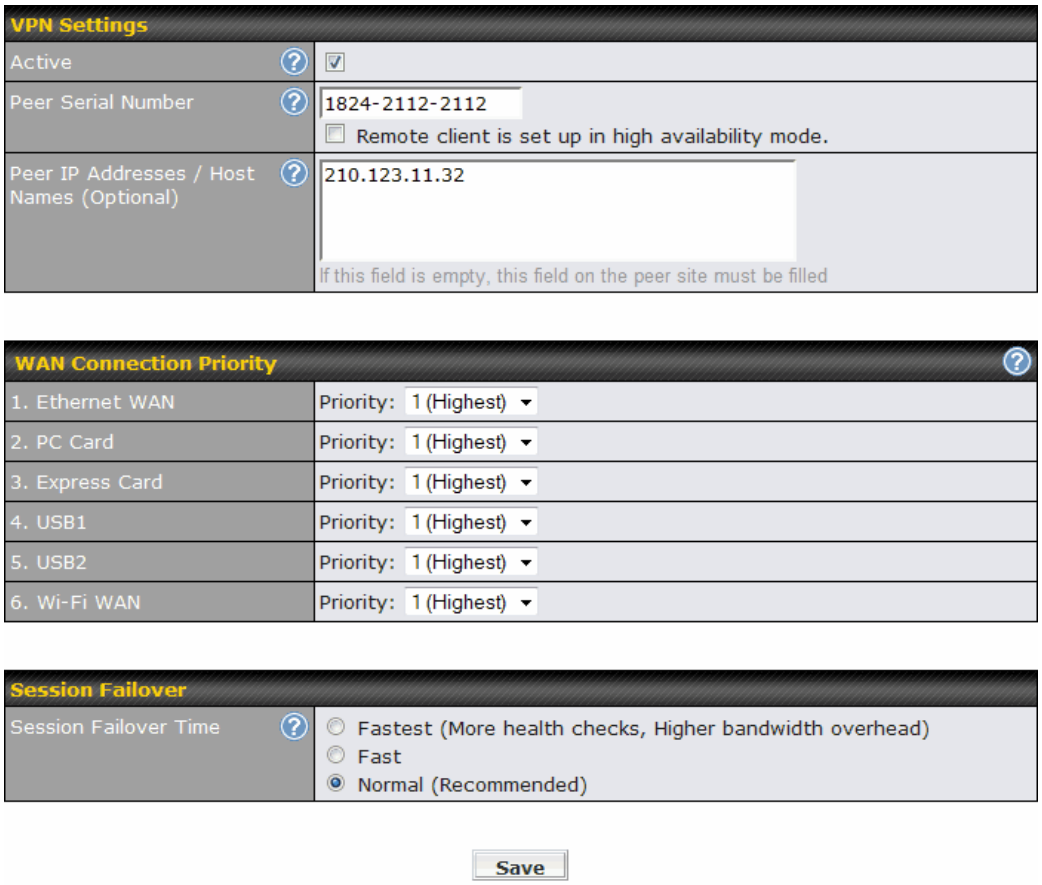
The Site-to-Site VPN of the Pepwave MAX is specifically designed for multi-WAN environment. The Pepwave MAX can aggregate all WAN connections' bandwidth for routing Site-to-Site VPN traffic. Unless all the WAN connections of one site are down, the Pepwave MAX can still maintain VPN up and running.

Tip
You can define firewall rules to control access within the VPN network. For outbound policy, you can create a custom outbound rule and choose ***Any*** for the ***WAN Connection*** field.

11.1 Configuration of Site-to-Site VPN

Pepwave MAX supports making single Site-to-Site VPN connection with a remote Pepwave MAX unit or a Peplink Balance 210/310/380/390/700/710.

To configure, navigate to ***Advanced > Site-to-Site VPN***:



VPN Settings	
Active	Check this box to enable the VPN.
Peer Serial Number	Pepwave MAX only establishes VPN connection with a remote peer that has a serial number specified here. If the remote peer is in high availability setup, you can check the box ***Remote client is set up in high availability mode.*** and enter the second unit's serial number into the second text box.
Peer IP Addresses / Host Names	Enter the remote peer's WAN IP address(es) or host name(s) here. Dynamic-DNS host names are accepted. This field is optional. With this field filled, the Pepwave MAX will initiate connection to each of the remote IP addresses until success. If the field is empty, the Pepwave MAX will wait for connection from the remote peer. Therefore, at least one side of the two VPN peers has to have the field filled. Otherwise, VPN connection cannot be established. Enter one IP address or host name per line.

WAN Connection Priority	
WAN Connection Priority	You can specify the priority of the WAN connections to be used for making VPN connections. WAN connections set to ***OFF*** will never be used. Only available WAN connections with the highest priority will be used for making VPN connections. Outgoing traffic will be distributed evenly if there is more than one connection having the same priority.

Session Failover	
Session Failover Time	The Site-to-Site VPN supports TCP/UDP session failover upon link or routing failure on a path between two sites. It can automatically detect any failure and route established sessions to a healthy link so that connected sessions can remain unaffected. Health check packets are sent between two sites in order to detect any failure. The more frequent checks it sends, the faster failover it can perform, but the higher bandwidth overhead will be consumed. If this settings on the two peers are different, the faster one will be used. Select ***Fastest*** when the highest failover speed is request. By default, ***Normal*** failover time is selected.

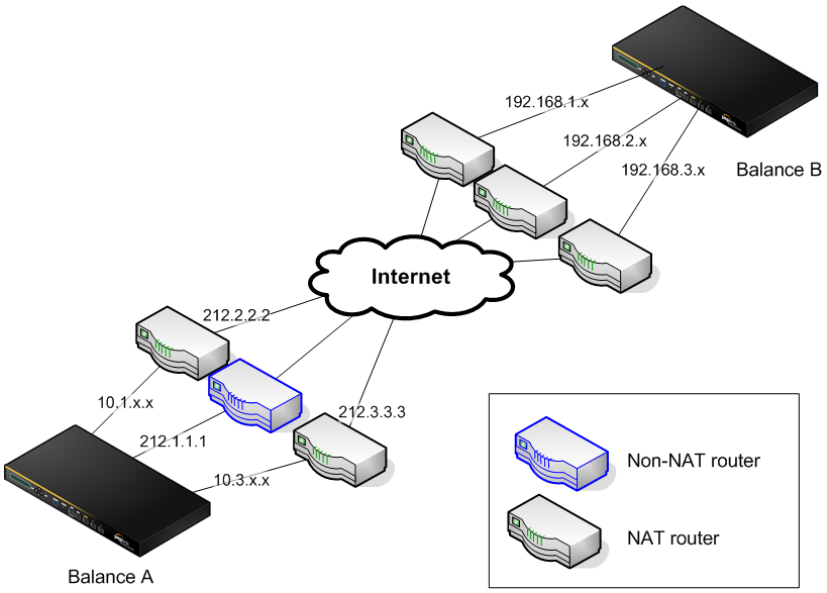
11.2 Pepwave MAX Behind NAT Router

The Pepwave MAX supports establishing Site-to-Site VPN over WAN connections which are behind a NAT (Network Address Translation) router.

To be able for a WAN connection behind a NAT router to accept VPN connections, you can configure the NAT router in front of the WAN connection to forward TCP port 32015 to it.

If one or more WAN connections on *Unit A* can accept VPN connections (by means of port forwarding or not) while none of the WAN connections on the peer *Unit B* can do so, you should put all public IP addresses or host names of the *Unit A* to the *Unit B*'s ***Peer IP Addresses / Host Names*** field. Leave the field in *Unit A* blank. With such setting, site-to-site VPN connection can be set up and all WAN connections on both sides will be utilized.

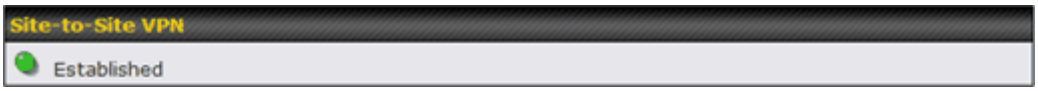
For example, see the following diagram:



One of the WANs of *Unit A* is non-NAT'd (212.1.1.1). The rest of the WANs on *Unit A* and all WANs on *Unit B* are NAT'd. In such case, the ***Peer IP Addresses / Host Names*** field on the *Unit B* should be filled with all of the *Unit A*'s public IP addresses (i.e. 212.1.1.1, 212.2.2.2 and 212.3.3.3), and the field on the *Unit A* should be left blank.

11.3 VPN Status

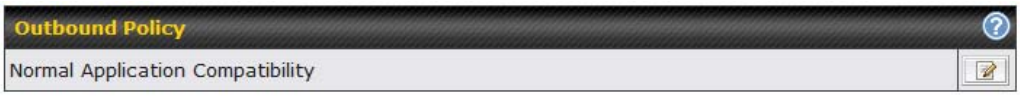
VPN Status is shown on the Dashboard as follows:



12 Outbound Policy

Pepwave MAX provides the functionality to flexibly manage and load balance outbound traffic among the WAN connections.

The settings for managing and load balancing outbound traffic are located in ***Advanced > Outbound Policy***:



There are three main selections for the Outbound Policy for Pepwave MAX:

- High Application Compatibility
- Normal Application Compatibility
- Managed by Custom Rules

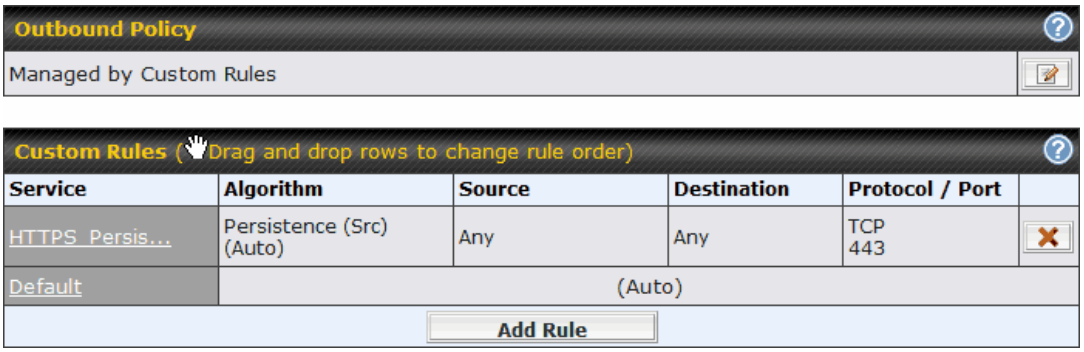
The selections are explained as follows:

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

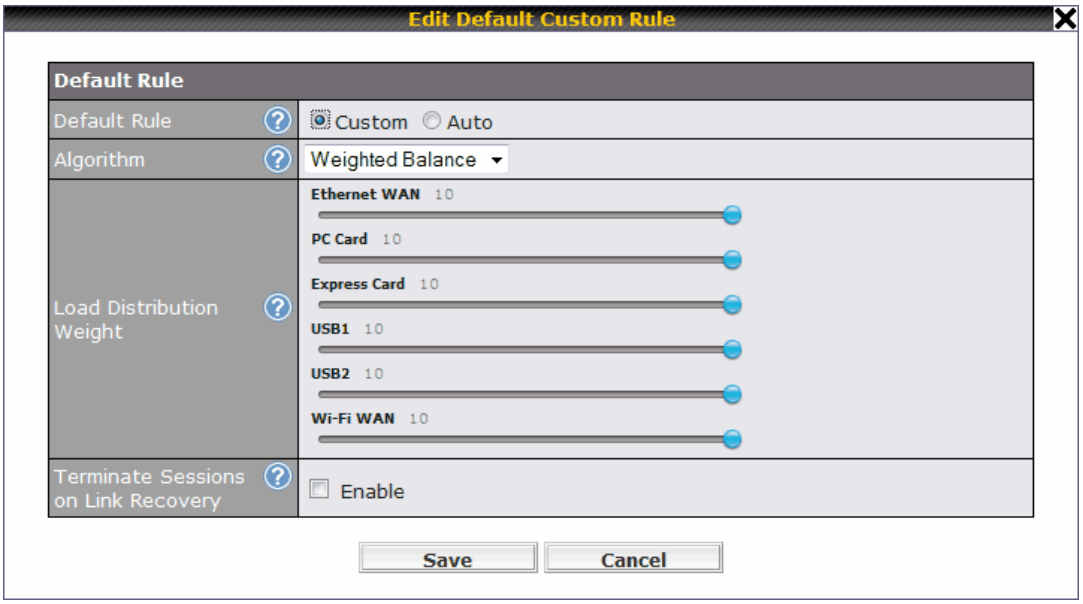
The default policy is Normal Application Compatibility.

12.1 Custom Rules For Outbound Traffic Management

Click  in the Outbound Policy form. Choose ***Managed by Custom Rules*** and press the ***Save*** button. The following screen will then be displayed.

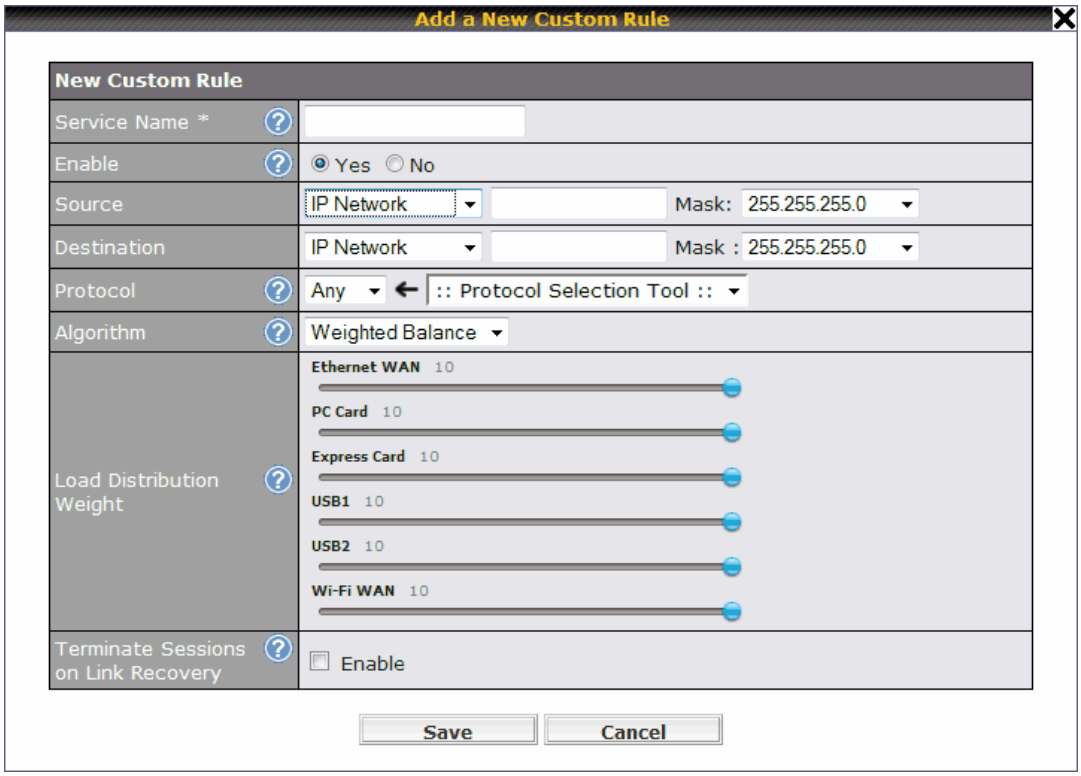


The bottom-most rule is ***Default***. Edit this rule to change the device's default way to control outbound traffic for all connections that does not match any rules above it. Click on the service name ***Default*** to change its settings.



By default, ***Auto*** is selected for the option ***Default Rule***. You can select ***Custom*** in order to change the Algorithm to be used. Please refer to the upcoming sections for the details of the available algorithms.

To create a custom rule, click ***Add Rule*** at the bottom of the table, and the following window will be displayed:

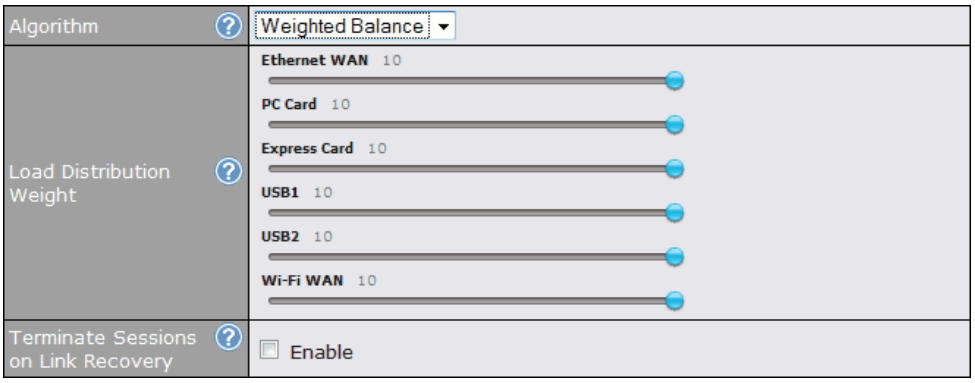


New Custom Rule Settings	
Service Name	This setting specifies the name of the custom rule.
Enable	This setting specifies whether the custom rule will take effect. When ***Yes*** is selected, the custom rule takes effect. If the outbound traffic matches the specified IP/Protocol/Port, action will be taken by Pepwave MAX based on the other parameters of the rule. When ***No*** is selected, the custom rule does not take effect. Pepwave MAX will disregard the other parameters of the rule.
Source	This setting specifies the source IP Address, IP Network or MAC Address for outbound traffic that matches the rule.
Destination	This setting specifies the destination IP Address or IP Network for outbound traffic that matches the rule.
Protocol and Port	This setting specifies the IP Protocol and Port of outbound traffic that matches this rule. You may select some common protocol from the ***Protocol Selection Tool*** drop-down menu.

New Custom Rule Settings	
Algorithm	This setting specifies the behavior of Pepwave MAX for the custom rule. One of the following values can be selected: • ***Weighted Balance*** • ***Persistence*** • ***Enforced*** • ***Priority*** • ***Least Used*** • ***Lowest Latency*** The upcoming sections present the details of the above **Algorithms**.
Terminate Sessions on Link Recovery	This setting specifies whether to terminate existing IP sessions on a less preferred WAN connection in the event that a more preferred WAN connection is recovered. This setting is applicable to the Algorithms: ***Weighted***, ***Persistence*** and ***Priority***. By default, this is disabled. In this case, all existing IP sessions will not be terminated or affected when any other WAN connection is recovered. If it is set to enabled, existing IP sessions may be terminated when another WAN connection is recovered such that only the preferred healthy WAN connection(s) are used at any point in time.

12.1.1 Algorithm: Weighted Balance

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



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

Example: With the following weight settings:

- Ethernet WAN: 10
- PC Card: 0

- Express Card: 0
- USB1: 10
- USB2: 0
- Wi-Fi WAN: 5

Total weight is 25 = (10 + 0 + 0 + 10 + 0 + 5)

Matching traffic distributed to Ethernet WAN is 40% = (10 / 25) x 100%

Matching traffic distributed to PC Card is 0% = (0 / 25) x 100%

Matching traffic distributed to Express Card is 0% = (0 / 25) x 100%

Matching traffic distributed to USB1 is 40% = (10 / 25) x 100%

Matching traffic distributed to USB2 is 0% = (0 / 25) x 100%

Matching traffic distributed to Wi-Fi WAN is 20% = (5 / 25) x 100%

12.1.2 Algorithm: Persistence

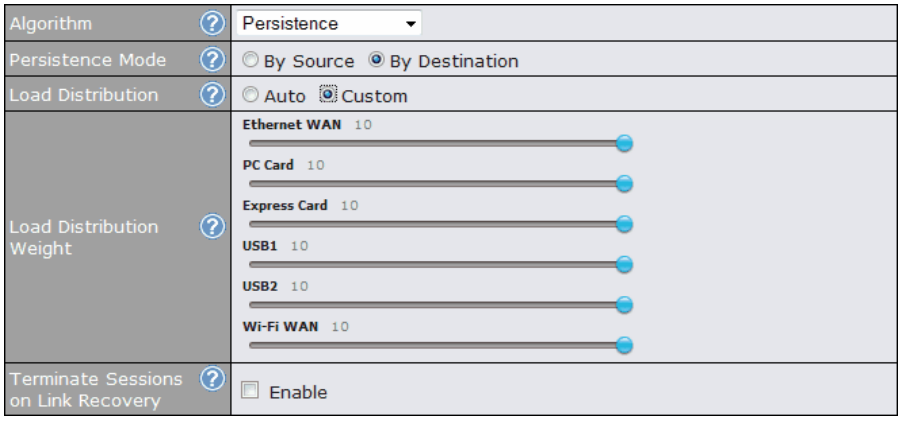
The configuration of using Persistence for algorithm is the solution to the few situations where link load distribution for Internet services is undesirable.

For example, many e-banking and other secure websites, for security reasons, terminate the session when the client computer's Internet IP address changes during the session.

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

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

With the algorithm Persistence of Pepwave MAX, rules can be configured to enable client computers to persistently utilize the same WAN connections for e-banking and other secure websites. As a result, a client computer will communicate with the other end using one IP address and eliminate the issues.



There are two modes for Persistence: ***By Source*** and ***By Destination***.

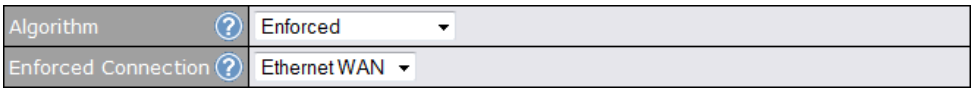
By Source	The same WAN connection will be used for traffic matching the rule and originating from the same machine regardless of its destination. This option will provide the highest level of application compatibility.
By Destination	The same WAN connection will be used for traffic matching the rule,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

The default mode is ***By Source***.

When there are multiple client requests, they can be distributed (persistently) to WAN connections with a weight. If you choose ***Auto*** in the field ***Load Distribution***, the weights will be automatically adjusted according to each WAN's *Downstream Bandwidth* which is specified in the WAN settings page (see Section 9 **Configuration of WAN Interface(s)**). If you choose ***Custom***, you can customize the weight of each WAN manually by using the sliders.

12.1.3 Algorithm: Enforced

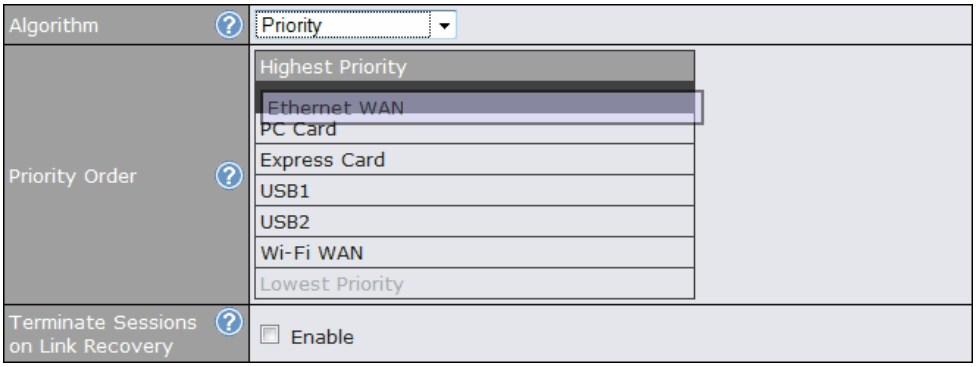
This setting specifies the WAN connection usage to be applied on the specified IP Protocol & Port, and is applicable only when the Algorithm is set to ***Enforced***.



Matching traffic will be routed through the specified WAN connection regardless of the connection's health check status.

12.1.4 Algorithm: Priority

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



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

12.1.5 Algorithm: Least Used

The traffic matching this rule will be routed through the healthy WAN connection with the most available downstream bandwidth. The available downstream bandwidth of a WAN connection is calculated from the total downstream bandwidth specified in the WAN settings page, and the current downstream usage. The available bandwidth and WAN selection is determined every time an IP session is made.

12.1.6 Algorithm: Lowest Latency

The traffic matching this rule will be routed through the healthy WAN connection with the lowest latency. Active pings are issued periodically to a nearby router of each WAN connection. The latency of a WAN is the ping round trip time of the WAN connection.

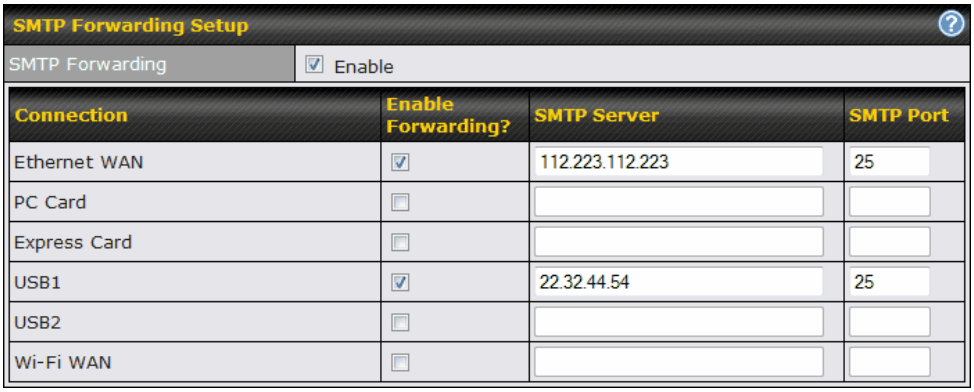
Tip
The round trip time of a *6M down / 640k up* link can be higher than that of a *2M down / 2M up* link. It is because the overall round trip time is lengthened by its slower upstream bandwidth despite of its higher downlink speed. Therefore this algorithm is good for two scenarios: 1. All WAN connections are symmetric; or 2. A latency sensitive application requires to be routed through the lowest latency WAN regardless the WAN's available bandwidth.

13 Service Forwarding

Service Forwarding settings are located at ***Advanced > Service Forwarding***:

13.1 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. The Pepwave MAX supports intercepting and redirecting all outgoing SMTP connections (destined for TCP port 25) via a WAN connection to the WAN's corresponding SMTP server.



SMTP Forwarding Setup

SMTP Forwarding	☑ Enable

Connection	Enable Forwarding?	SMTP Server	SMTP Port
Ethernet WAN	☑	112.223.112.223	25
PC Card	☐		
Express Card	☐		
USB1	☑	22.32.44.54	25
USB2	☐		
Wi-Fi WAN	☐		

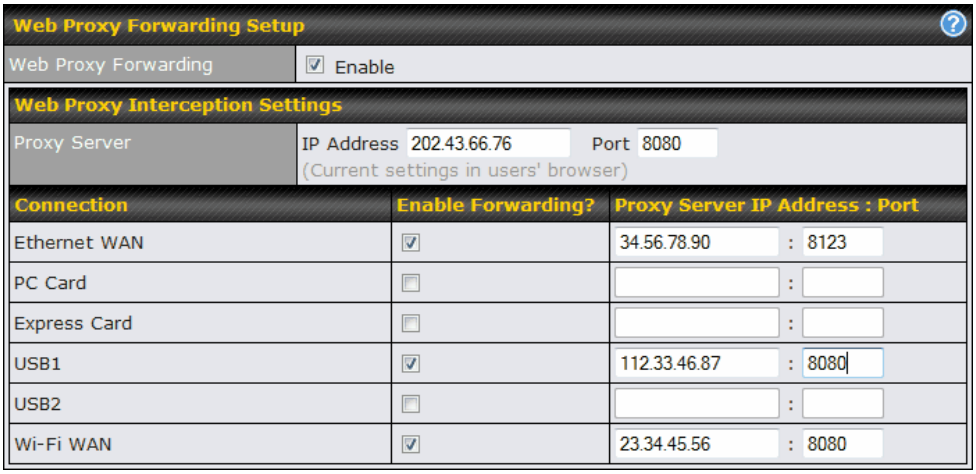
To enable the feature, select the *Enable* check box under *SMTP Forwarding Setup*. Check the box *Enable Forwarding?* for the WAN connection(s) that needs such forwarding. Enter the ISP's e-mail server address and TCP port number for each WAN.

The Pepwave MAX will intercept SMTP connections, choose a WAN with reference to the Outbound Policy, and then forward the connection to the forwarded 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 forwarded to the connection's original destination.

Note

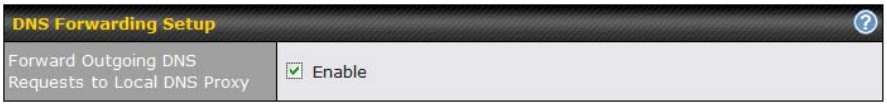
If you want to route all SMTP connections only to particular WAN connection(s), you should create a rule in Outbound Policy (see Section **Error! Reference source not found.**).

13.2 Web Proxy Forwarding



When this feature is enabled, the Pepwave MAX 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.

13.3 DNS Forwarding



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

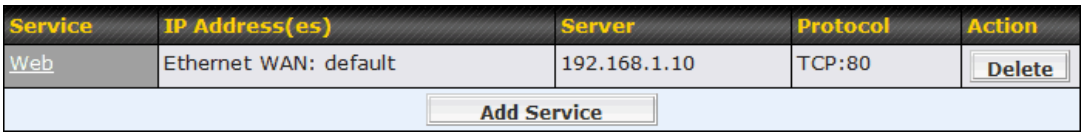
14 Port Forwarding

When operating under NAT mode, Pepwave MAX acts as a firewall that blocks, by default, all inbound access from the Internet.

By the *Port Forwarding*, Internet users can access the servers behind Pepwave MAX.

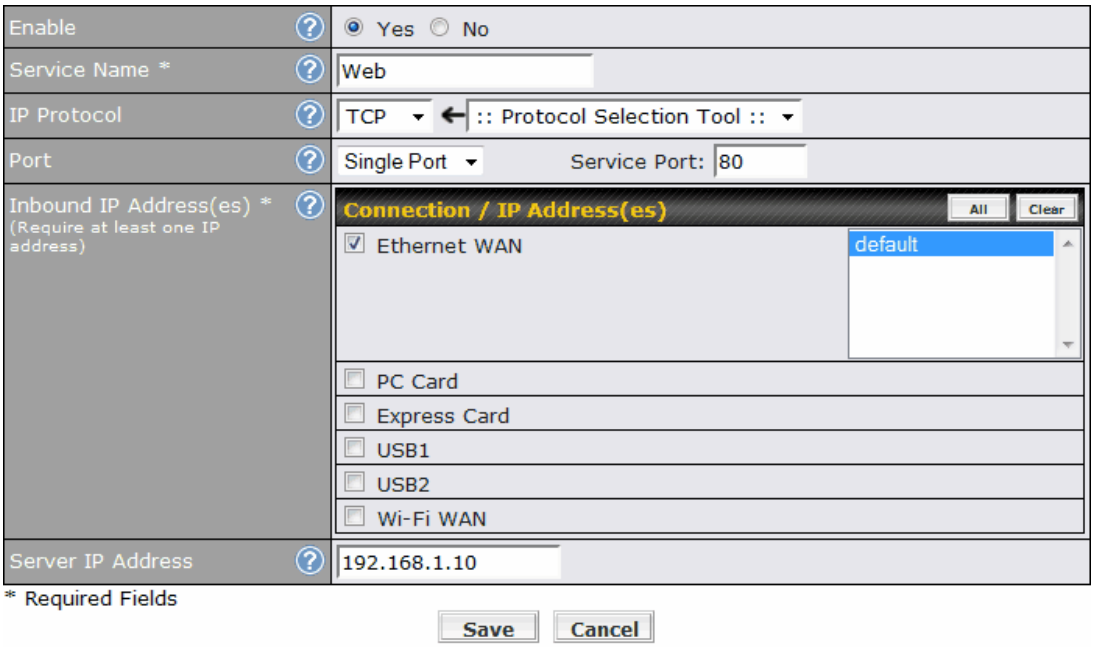
Important Note
Port Forwarding applies only to WAN connections that are operating under NAT mode. For WAN connections operating under IP forwarding, inbound traffic is forwarded to the LAN by default.

Inbound Port Forwarding rules can be defined at ***Advanced > Port Forwarding***:



Service	IP Address(es)	Server	Protocol	Action
Web	Ethernet WAN: default	192.168.1.10	TCP:80	Delete
	Add Service			

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



Port Forwarding Settings

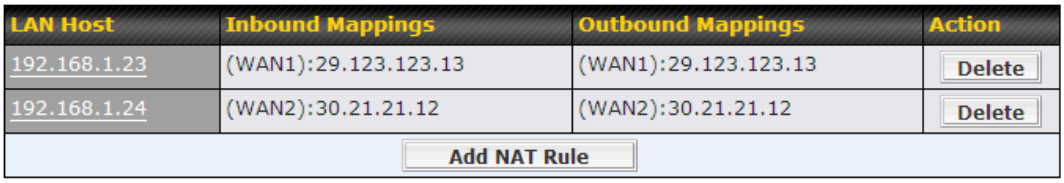
Port Forwarding Settings	
Enable	This setting specifies whether the inbound service rule takes effect. When ***Yes*** is selected, the inbound service rule takes effect. If the inbound traffic matches the specified IP Protocol and Port, action will be taken by Pepwave MAX based on the other parameters of the rule. When ***No*** is selected, the inbound service rule does not take effect. Pepwave MAX will disregard the other parameters of the rule.
Service Name	This setting identifies the service to the System Administrator. Valid values for this setting consist only of alphanumeric and the underscore "_" characters.
IP Protocol	The IP Protocol setting, along with the Port setting, specifies the protocol of the service as TCP, UDP, ICMP or IP. Traffic that is received by Pepwave MAX via the specified protocol at the specified port(s) is forwarded to the LAN hosts specified by the Servers setting. (Please see below for details on the Port and Servers settings.) Alternatively, the ***Protocol Selection Tool*** drop-down menu can be used to automatically fill in the Protocol and a single Port number of common Internet services (e.g. HTTP, HTTPS, etc.). After selecting an item from the ***Protocol Selection Tool*** drop-down menu, the Protocol and Port number remains manually modifiable.

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

15 NAT Mappings

The configuration of NAT Mappings allows the IP address mapping of all inbound and outbound NAT'ed traffic to and from an internal client IP address.

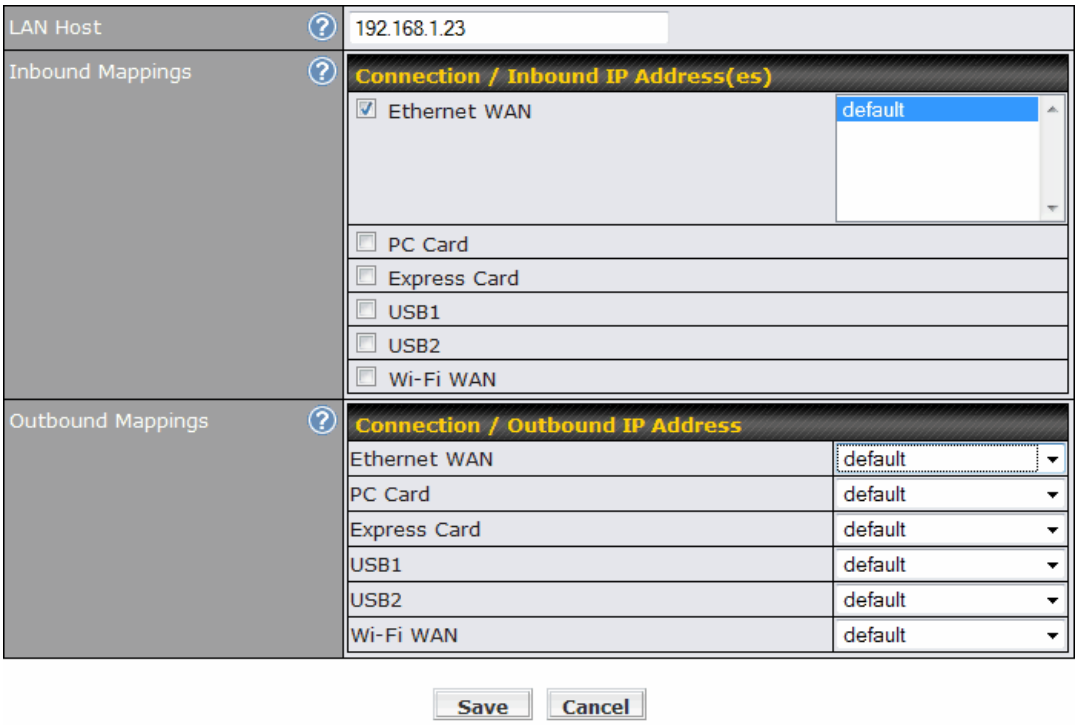
The settings to configure NAT Mappings are located at ***Advanced > NAT Mappings***:



LAN Host	Inbound Mappings	Outbound Mappings	Action
192.168.1.23	(WAN1):29.123.123.13	(WAN1):29.123.123.13	Delete
192.168.1.24	(WAN2):30.21.21.12	(WAN2):30.21.21.12	Delete

Add NAT Rule

To add a rule for NAT Mappings, click ***Add NAT Rule***, upon which the following screen will be displayed:



LAN Host	192.168.1.23
Inbound Mappings	Connection / Inbound IP Address(es): Ethernet WAN (default); PC Card; Express Card; USB1; USB2; Wi-Fi WAN
Outbound Mappings	Connection / Outbound IP Address: Ethernet WAN default; PC Card default; Express Card default; USB1 default; USB2 default; Wi-Fi WAN default

Save Cancel

NAT Mapping Settings	
LAN Host	This is the IP address of the host on the LAN that the system should map the selected connection IP address correspondences.
Inbound Mappings	This setting specifies the WAN connections and corresponding WAN-specific Internet IP addresses on which the system should bind on. Any access to the specified WAN connection(s) and IP address(es)

	will be forwarded to the LAN Host. Note 1: Inbound Mapping is not needed for WAN connections in IP forwarding mode. Note 2: Each WAN IP address can be associated to one NAT Mapping only.
Outbound Mappings	This setting specifies the IP address of each WAN connection to be used for any outgoing traffic originating from the LAN Host. Note 1: If you do not want to use a specific WAN for outgoing accesses, you should still choose ***Default*** here, then customize the outbound access rule in the *Outbound Policy* section. Note 2: WAN connections in 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 Mapping settings.

16 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, offensive Web sites, and/or other inappropriate uses.

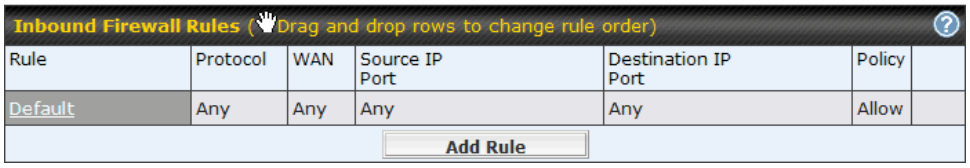
The firewall functionality of Pepwave MAX supports the selective filtering of data traffic in both directions:

- Outbound (LAN to WAN)
- Inbound (WAN to LAN)
- Intrusion Detection and DoS Prevention

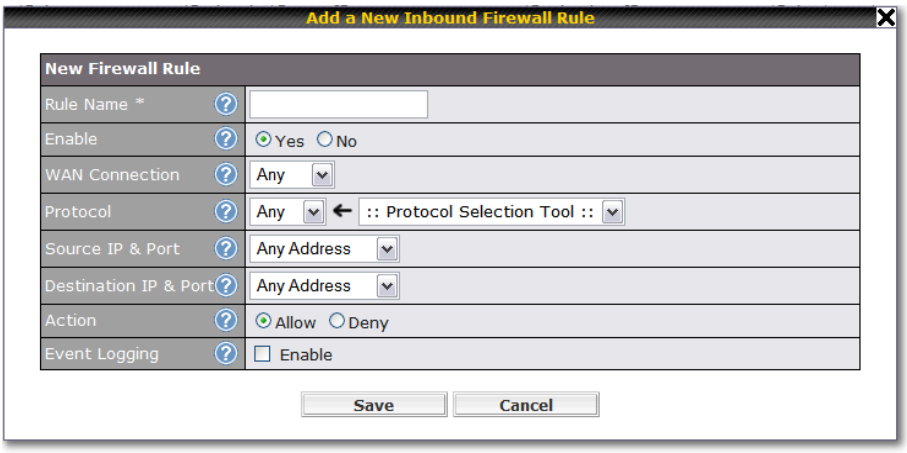
With Site-to-Site VPN enabled (see Section 11), the firewall rules also apply to VPN tunneled traffic.

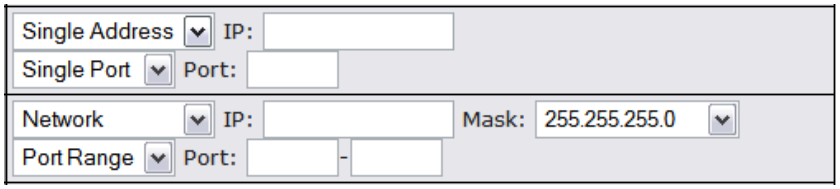
16.1 Outbound and Inbound Firewall

The outbound and inbound firewall settings are located in ***Advanced > Firewall***:



Upon clicking ***Add Rule***, the following screen appears:



Inbound / Outbound Firewall Settings	
Rule Name	This setting specifies a name for the firewall rule.
Enable	This setting specifies whether the firewall rule should take effect. When ***Yes*** is selected, the firewall rule takes effect. If the traffic matches the specified Protocol/IP/Port, actions will be taken by Pepwave MAX based on the other parameters of the rule. When ***No*** is selected, the firewall rule does not take effect. Pepwave MAX will disregard the other parameters of the rule.
WAN Connection	*This setting is applicable to Inbound Firewall Rules only.* This setting specifies which WAN connection(s) the rule applies to: • ***Any*** (applies to all WAN connections) • ***Ethernet WAN*** • ***PC Card*** • ***Express Card*** • ***USB1*** • ***USB2*** • ***Wi-Fi WAN***
Protocol	This setting specifies the protocol to be matched by the rule. Via a drop-down menu, the following protocols can be specified: • ***TCP*** • ***UDP*** • ***ICMP*** • ***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.
Source IP & Port	This specifies the source IP address(es) and port number(s) to be matched for a firewall rule. A single address, or a network, can be specified as the Source IP & Port setting, as indicated with the following screenshots:  In addition, a single port, or a range of ports, can be specified for the Source IP & Port setting.

Inbound / Outbound Firewall Settings	
Destination IP & Port	This specifies the destination IP address(es) and port number(s) to be matched for a firewall rule. A single address, or a network, can be specified as the Source IP & Port setting, as indicated with the following screenshots: Single Address IP: Single Port Port: Network IP: Mask: 255.255.255.0 Port Range Port: - In addition, a single port, or a range of ports, can be specified for the Source IP & Port setting.
Action	This setting specifies the action to be taken by Pepwave MAX upon encountering traffic that matches the both of the following: • Source IP & Port • Destination IP & Port With the value of ***Allow*** for the Action setting, the matching traffic passes through Pepwave MAX (to be routed to the destination). If the value of the Action setting is set to ***Deny***, the matching traffic does not pass through Pepwave MAX (and is discarded).
Event Logging	This setting specifies whether or not to log matched firewall events. The logged messages are shown on the page ***Status > Event Log***. A sample message is as follows: `Aug 13 23:47:44 Denied CONN=Ethernet WAN SRC=20.3.2.1 DST=192.168.1.20 LEN=48 PROTO=TCP SPT=2260 DPT=80` • ***CONN***: The connection where the log entry refers to • ***SRC***: Source IP address • ***DST***: Destination IP address • ***LEN***: Packet length • ***PROTO***: Protocol • ***SPT***: Source port • ***DPT***: Destination port

Upon clicking ***Save*** after entering required information, the following screen appears.

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

Rule	Protocol	Source IP Port	Destination IP Port	Policy	
No web access	TCP	Any Any	Any 80	Deny	✕
Default	Any	Any	Any	Allow	

Add Rule

To create an additional firewall rule, click ***Add Rule*** and repeat the above steps.

To reorder a rule's position, just drag the rule by holding the left mouse button, move it to the desired position, and place it by releasing the mouse button.

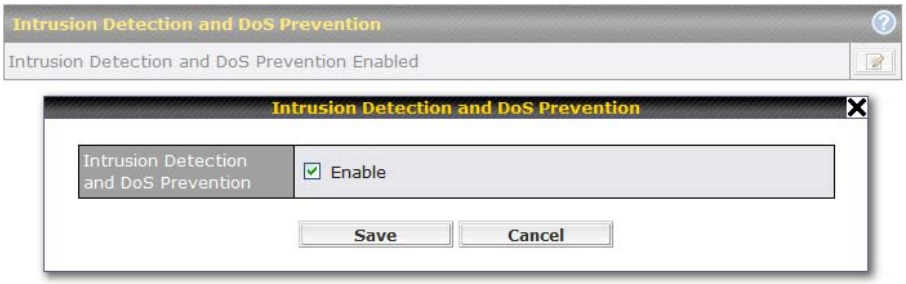
To remove a rule, click  .

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

By default, the *Default* rule is "Allow" for both outbound and inbound accesses.

Tip
If the default inbound rule is "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 "Deny", corresponding "Allow" firewall rules will be required.

16.2 Intrusion Detection and DoS Prevention



The Pepwave MAX supports detecting and preventing intrusions and Denial-of-Service (DoS) attacks from the Internet. To turn on this feature, click  , check the box *Enable* for the *Intrusion Detection and DoS Prevention* and press the *Save* button.

When this feature is enabled, the Pepwave MAX will detect and protect the network from 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

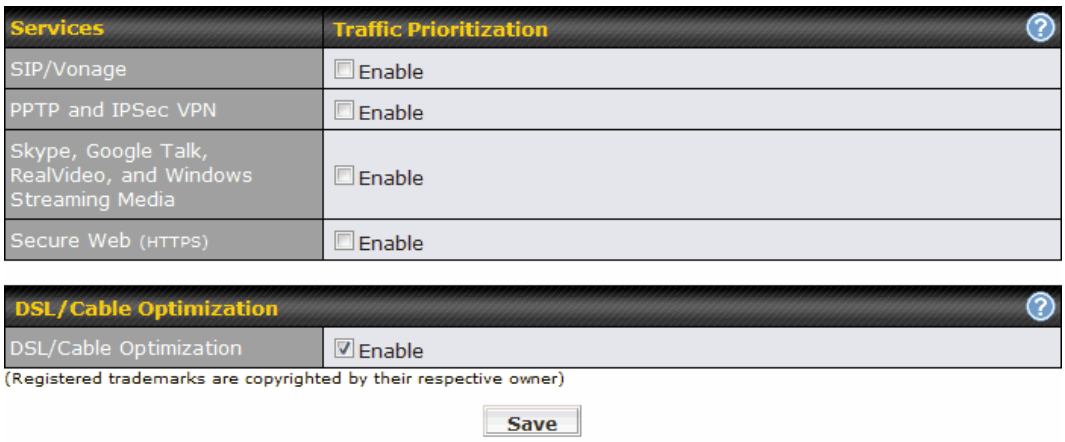
SYN Flood Prevention

Ping Flood Attack Prevention

17 Traffic Prioritization

Pepwave MAX provides the functionality to prioritize Voice over IP, VPN, video streaming, Secure Web over the other Internet traffic.

The settings for configuring Quality of Service are located at ***Advanced > Traffic Prioritization***:



Traffic Prioritization	
SIP/Vonage	When enabled, any SIP and Vonage voice traffic will be prioritized.
PPTP and IPSec VPN	When enabled, any PPTP and IPSec traffic will be prioritized
Skype, Google Talk, RealVideo, and Windows Streaming Media	When enabled, voice and video traffic of Skype, Google Talk, RealVideo and Windows Streaming Media will be prioritized. *(Registered trademarks are copyrighted by their respective owner)*

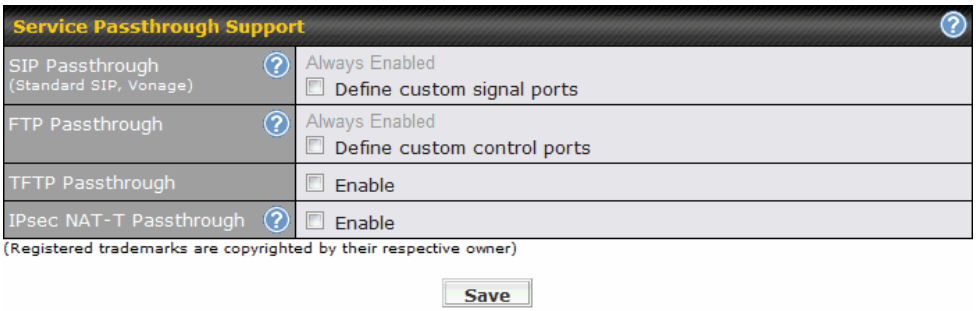
Secure Web (HTTPS)	When enabled, HTTPS (TCP port 443) traffic will be prioritized.

DSL/Cable Optimization	
DSL/Cable Optimization	For an asymmetric DSL (ADSL) or Cable based WAN connection, where the upstream bandwidth is lower than the downstream, with this option turned on, the WAN's downstream bandwidth can be fully utilized in any situation. When a DSL or a Cable circuit's uplink becomes busy, it is a fact that the downlink bandwidth is affected. Users cannot download data in full speed until the uplink becomes less congested. The DSL/Cable Optimization could relieve such problem. When it is enabled, the download speed will be less affected by upload traffic. Default: Enabled.

Please note that the Pepwave MAX prioritizes only outbound packets. E.g. for secure web prioritization, the system will prioritize uploading traffic for outgoing connections and downloading traffic for incoming connections.

18 Service Passthrough

Service Passthrough settings can be found in ***Advanced > Service Passthrough***:



Some Internet services required to be specially handled in a multi-WAN environment. The Pepwave MAX supports handling such services correctly such that Internet applications do not notice it is behind a multi-WAN router. Settings for Service Passthrough Support are available here.

Service Passthrough Support	
SIP Passthrough	Session Initiation Protocol, aka SIP, is a voice-over-IP protocol. Pepwave MAX 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. If your SIP server's signal port number is non-standard, you can check the box ***Define custom signal ports*** and input the port numbers to the text boxes.
FTP Passthrough	FTP sessions consist of two TCP connections; one for control and one for data. In multi-WAN situation, they have to be binded to the same WAN connection. Otherwise, problems will arise in transferring files. By default, the Pepwave MAX 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 the box ***Define custom control ports*** and enter the port numbers to the text boxes.
TFTP Passthrough	The Pepwave MAX monitors outgoing TFTP connections and routes any incoming TFTP data packets back to the client. Select ***Enable*** if you want to enable the TFTP passthrough support.
IPsec NAT-T Passthrough	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.

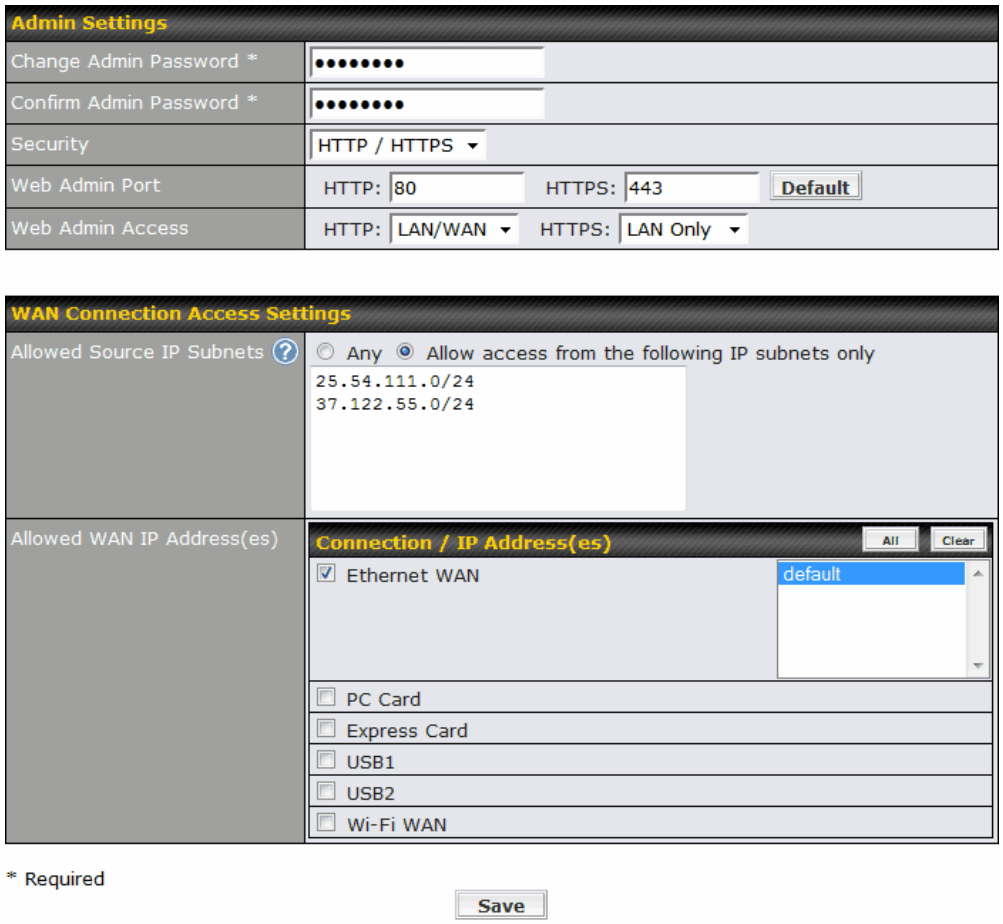
19 System Settings

19.1 Admin Security

For security reasons, after logging in to the administration interface at the first time, changing the administrator password is recommended.

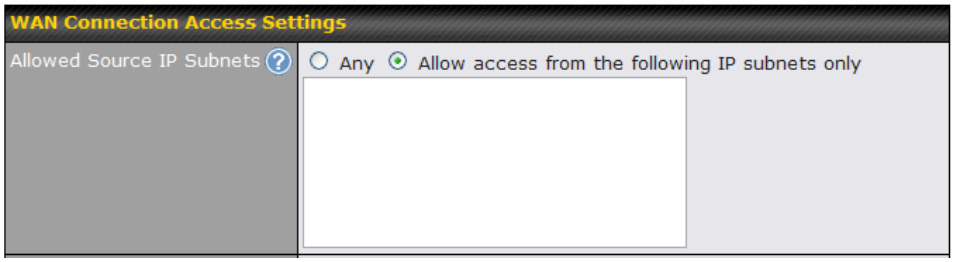
Configuring the administration interface to be accessible only from the LAN can further improve system security.

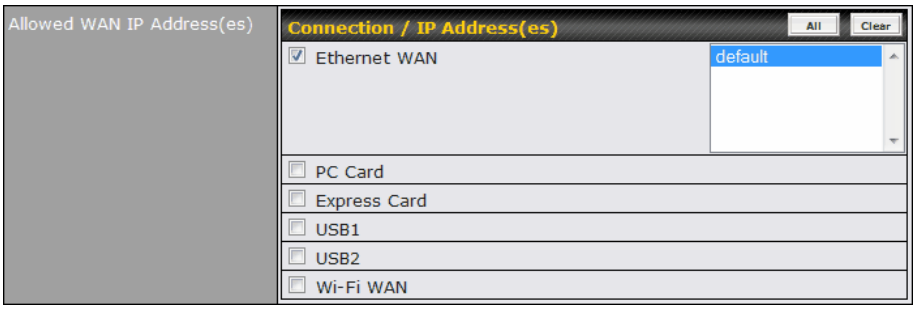
Administrative Settings configuration is located at ***System > Admin Security***:



Admin Settings	
Change Admin Password	This setting specifies a new administrator password.
Confirm Admin Password	This setting verifies and confirms the new administrator password.

Security	This setting specifies the protocol(s) through which the Web Administration Interface is accessible: • ***HTTP*** • ***HTTPS*** • ***HTTP/HTTPS***
Web Admin Port	This setting specifies the port number at which the Web Administration Interface is accessible.
Web Admin Access	This setting specifies the network interfaces through which the Web Administration Interface can be accessed: • ***LAN only*** • ***LAN/WAN*** If ***LAN/WAN*** is chosen, a ***WAN Connection Access Settings*** form will be displayed.

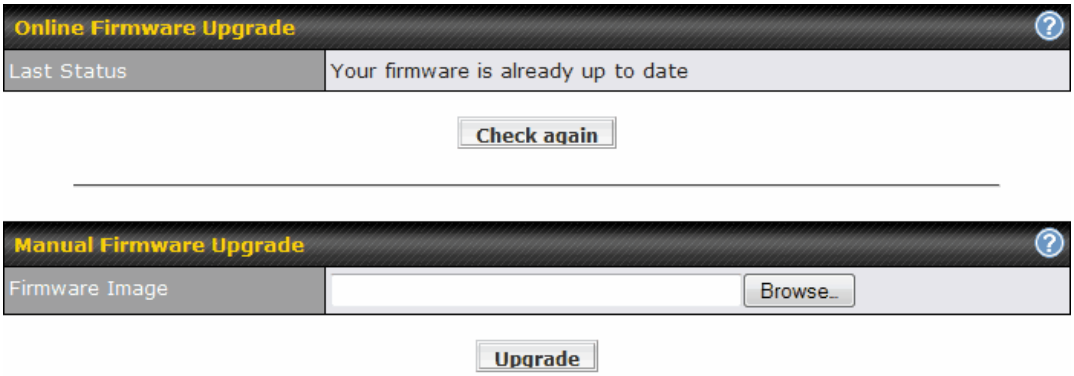
WAN Connection Access Settings	
Allowed Source IP Subnets	Allowed Source IP Subnets(s): To restrict web admin access only from defined IP subnets. ***Any*** Allow web admin accesses to be from anywhere, without IP address restriction. ***Allow access from the following IP subnets only*** Restrict web admin access only from the defined IP subnets. When this is chosen, a text input area will be displayed beneath:  The allowed IP subnet addresses should be entered into this text area. Each IP subnet must be in form of `w.x.y.z/m`, where `w.x.y.z` is an IP address (e.g. `192.168.0.0`), and m is the subnet mask in CIDR format, which is between 0 and 32 inclusively. For example: `192.168.0.0/24`

	To define multiple subnets, separate each IP subnet one in a line. For example: 192.168.0.0/24 10.8.0.0/16
Allowed WAN IP Addresses	This is to choose which WAN IP address(es) the web server should listen on. 

19.2 Firmware Upgrade

The firmware of Pepwave MAX is upgradeable through Web Administration Interface.

Firmware upgrade functionality is located at ***System > Firmware***:



There are two ways to upgrade the unit. The first method is online firmware upgrade. The system can check, download and upgrade over the Internet. The second method is to upload a firmware file manually.

Click on the ***Check again*** button to use online upgrade. With online upgrade, Pepwave MAX checks online for new firmware. If a new firmware is available, the firmware will be automatically downloaded by Pepwave MAX. The upgrade process will subsequently be automatically initiated.

You may also download a firmware image from the Pepwave web site (http://www.pepwave.com/) and update the unit manually. Click ***Browse*** to select the firmware file from the local computer, then click ***Upgrade*** to send the firmware to Pepwave MAX. Pepwave MAX will then automatically initiate the firmware upgrade process.

Firmware Upgrade Status

Status LED Information during firmware upgrade:

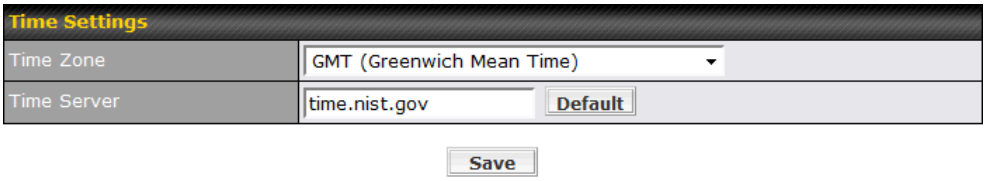
- OFF – Firmware upgrade in progress (DO NOT disconnect power.)
- Red – Unit is rebooting
- Green – Firmware upgrade successfully completed

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. 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 qualified, or not supported, by Pepwave. Upgrading a Pepwave MAX Mobile Router with an invalid firmware file will damage the unit, and may void the warranty.

19.3 Time

The Time Server functionality enables the system clock of Pepwave MAX to be synchronized with a specified Time Server.

The settings for Time Server configuration are located at ***System > Time***:

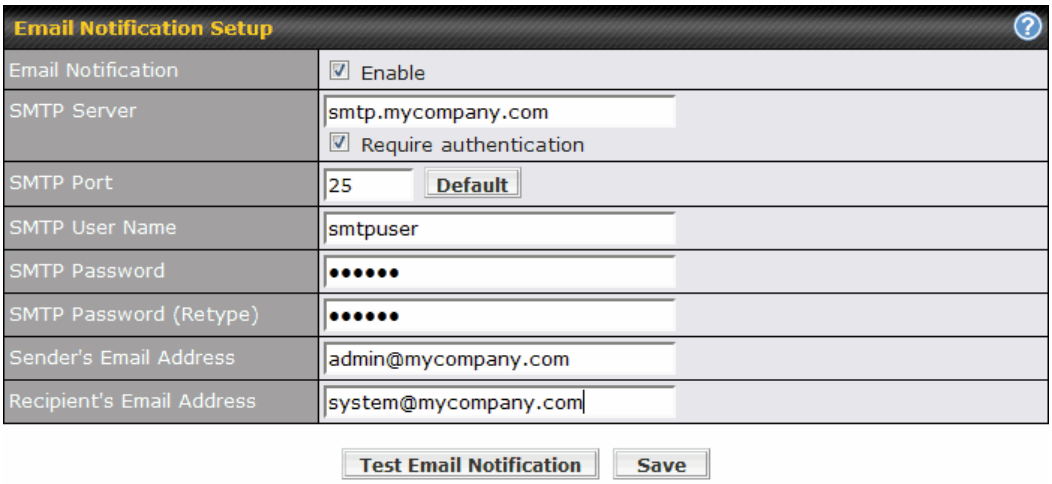


Time Server Settings	
Time Zone	This specifies the time zone (along with the corresponding Daylight Savings Time scheme) in which Pepwave MAX operates. The Time Zone value affects the time stamps in the Event Log of Pepwave MAX and E-mail notifications.
Time Server	This setting specifies the NTP network time server to be utilized by Pepwave MAX.

19.4 Email Notification

The Email Notification functionality of Pepwave MAX provides a System Administrator with up-to-date information on network status.

The settings for configuring Email Notification are found at ***System > Email Notification***:



Email Notification Settings	
Email Notification	This setting specifies whether or not to enable Email Notification. If the box ***Enable*** is checked, Pepwave MAX sends email messages to a System Administrator when the WAN status changes, or when new firmware is available. If the box ***Enable*** is not checked, Email Notification is disabled and Pepwave MAX will not send email messages.
SMTP Server	This setting specifies the SMTP server to be used for sending email. If the Server requires authentication, check the box ***Require authentication***.
SMTP User Name / Password	This setting specifies the SMTP username and password while sending email. These options are shown only if the ***Require authentication*** check box is checked in SMTP Server setting.
Sender's Email Address	This setting specifies the sender email address reported by the email messages sent by Pepwave MAX.
Recipient's Email Address	This setting specifies the email address to which Pepwave MAX should send the email messages to.

After you have completed the settings, you can click the ***Test Email Notification*** button to

test the settings before saving it. After it is clicked, you will see this screen to confirm the settings:

Test Email Notification	
SMTP Server	smtp.mycompany.com
SMTP Port	25
SMTP User Name	smtpuser
Sender's Email Address	admin@mycompany.com
Recipient's Email Address	system@mycompany.com

Yes No

Click ***Yes*** to confirm. Wait a few seconds, and you will see a return message and the detailed test result.

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 100000000
250-8BITMIME
250-PIPELINING
250-AUTH PLAIN LOGIN
250-STARTTLS
```

19.5 Remote Syslog

The Remote Syslog functionality of Pepwave MAX enables event logging at a specified remote Syslog server.

The settings for configuring Remote System Log are found at ***System > Remote Syslog***:

Remote Syslog Setup	
Remote Syslog	☐ Enable
Remote Syslog Host	Port: 514

Save

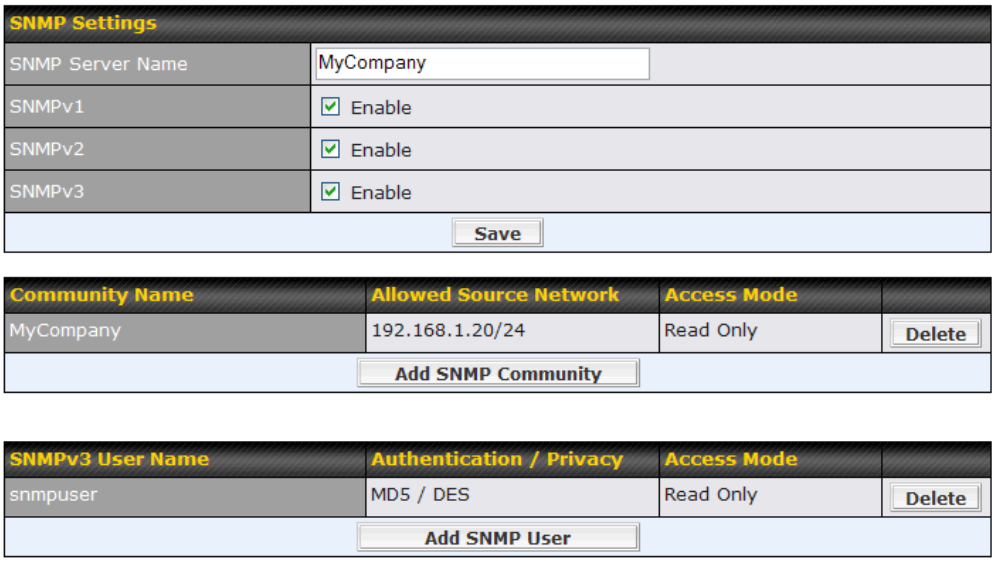
Remote Syslog Settings	
Remote Syslog	This setting specifies whether or not to log events at the specified remote Syslog server.
Remote	This setting specifies the IP address or host name of the remote

Syslog Host	Syslog server.
Port	This setting specifies the port number of the remote Syslog service. By default, the Port setting has value is 514.

19.6 SNMP

SNMP, or Simple Network Management Protocol, is an open standard that can be used to collect information from the Pepwave MAX Mobile Router.

SNMP configuration is located at ***System > SNMP***:



SNMP Settings	
SNMP Server Name	This setting specifies the SNMP server name.
SNMPv1	This setting specifies that SNMP version 1 is to be enabled.
SNMPv2c	This setting specifies that SNMP version 2 is to be enabled.
SNMPv3	This setting specifies that SNMP version 3 is to be enabled.

To add a community for either SNMPv1 or SNMPv2c, click the ***Add SNMP Community*** button in the ***Community Name*** table, upon which the following screen will be displayed:

SNMP Community Setting	
Community Name	MyCompany
Allowed Source Subnet Address	192.168.1.20
Allowed Source Subnet Mask	255.255.255.0

Save

SNMP Community Settings	
Community Name	This setting specifies the SNMP Community Name.
Allowed Source Subnet Address	This setting specifies a subnet from which access to the SNMP server is allowed. Enter subnet address here (e.g. `192.168.1.0`).
Allowed Source Subnet Mask	This setting specifies the subnet mask that corresponds to the subnet specified via Allowed Source Subnet Address (e.g. `255.255.255.0`).

To define a user name for SNMPv3, click ***Add SNMP User*** in the ***SNMPv3 User Name*** table, upon which the following screen is displayed:

SNMPv3 User Setting	
User Name	snmpuser
Authentication Protocol	MD5
Authentication Password	mypassword
Privacy Protocol	DES
Privacy Password	myprivpasswd

Save

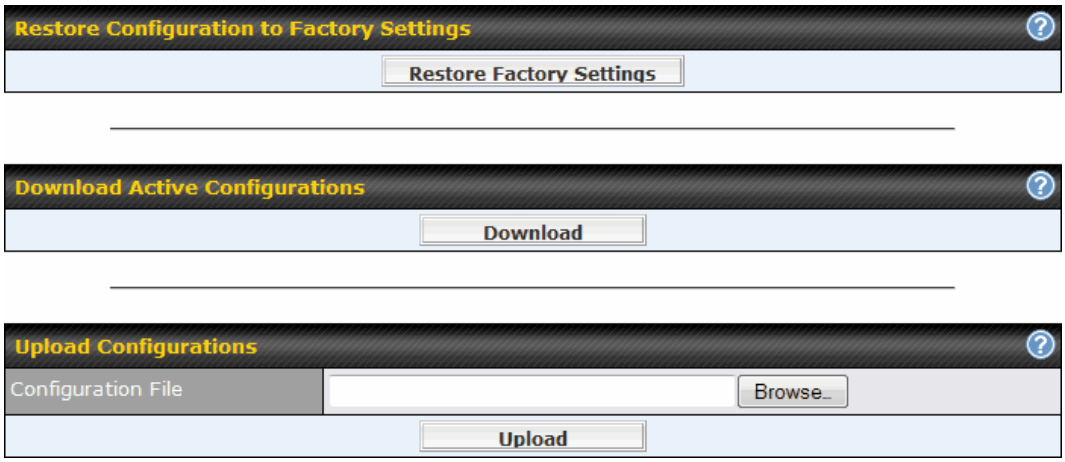
SNMPv3 User Settings	
User Name	This setting specifies a user name to be used in SNMPv3.
Authentication Protocol	This setting specifies via a drop-down menu the one of the following valid authentication protocols: • ***NONE*** • ***MD5*** • ***SHA***
Authentication Password	This setting specifies the authentication password, and is applicable only if the MD5 or SHA authentication protocol is selected.

Privacy Protocol	This setting specifies via a drop-down menu the one of the following valid privacy protocols: • ***NONE*** • ***DES***
Privacy Password	This setting specifies the privacy password, and is applicable only if the DES privacy protocol is selected.

19.7 Saving and Loading Configurations

Backing up the Pepwave MAX settings immediately after successful completion of the initial setup is strongly recommended.

The functionality to download and upload Pepwave MAX settings is found at ***System > Configuration***:



19.7.1 Restore Configuration to Factory Settings

The ***Restore Factory Settings*** button is to reset the configuration to the factory default settings. You have to click the ***Apply Changes*** button to make the settings effective.

19.7.2 Downloading Active Configurations

The ***Download*** button is to backup the current active settings. Click ***Download*** and save the configuration file.

19.7.3 Uploading Configurations

To restore or change settings based on a configuration file, click ***Browse*** to locate the configuration file on the local computer, and then click ***Upload***.

The new settings can then be applied by clicking the ***Apply Changes*** button on the page header, or discard at the Main page of Web Administration Interface.

19.8 Flash Management

The Pepwave MAX is equipped with dual flash memory modules. Each flash memory stores one firmware image. It does not only allow improved flexibility but also facilitates more effective management of the flash contents. It is possible to upgrade the firmware on the module/partition that is not designated for booting, so that the boot flash is unaffected by firmware upgrade process or any potential power failures throughout.

Flash module management is located at ***System > Flash Management***:

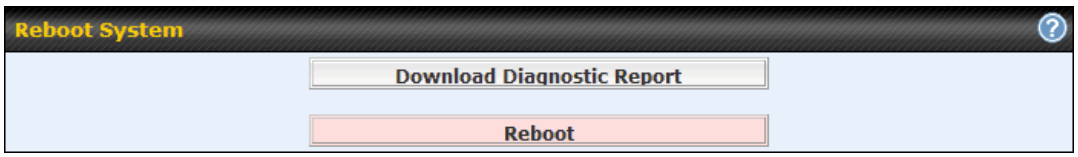
	Flash 1	Flash 2
Firmware Version	v4.7.1	v4.7.1
Flash Status	Bootable	Bootable
Boot from...	[Select this]	◇
Next Firmware Upgrade Target	◇	[Select this]

Flash Management	
Firmware Version	This displays the firmware version on each flash module/partition (i.e. ***Flash 1*** or ***Flash 2***)
Flash Status	This shows the status of the flash module.
Boot from...	The star indicates the flash module/partition from which Pepwave MAX will perform its next boot.
Next Firmware Upgrade Target	The star indicates the flash module that is the target of the next firmware upgrade. By default, the target of the next firmware upgrade is the flash module that is NOT designated for the next boot.

The configuration parameters will be applied upon clicking ***Apply Changes*** on the page header of Web Administration Interface.

19.9 Reboot

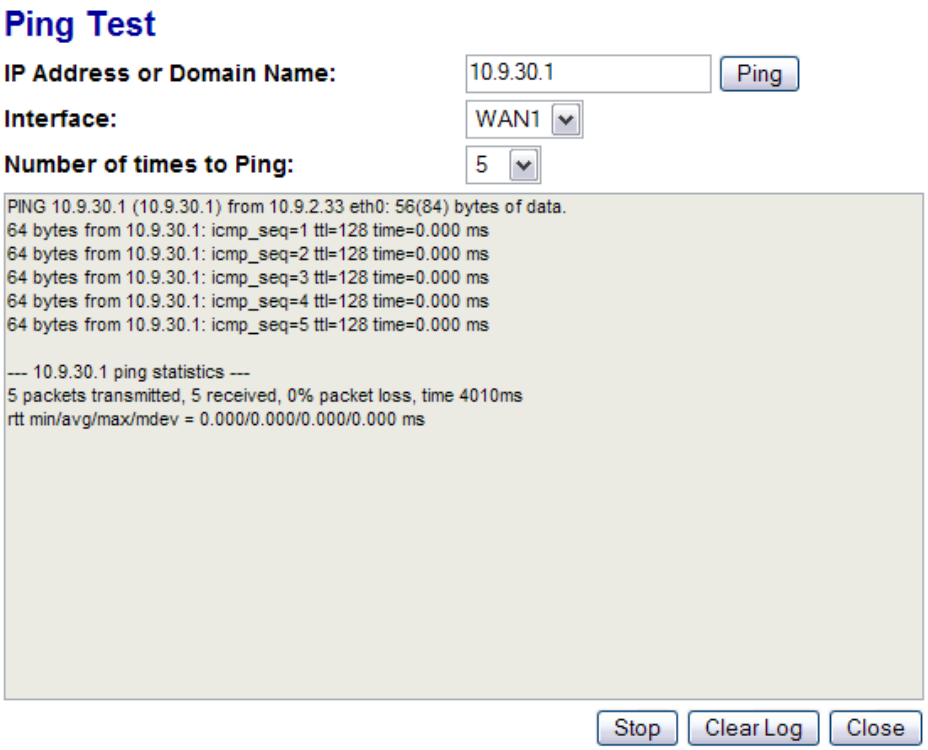
This page provides a Reboot button for restarting the system.



19.10 Ping Test

The Ping Test tool in Pepwave MAX performs Pings through a specified Ethernet interface.

The Ping utility is located at ***System > Tools > Ping***. The Ping utility is displayed as a pop-up window, illustrated as follows:

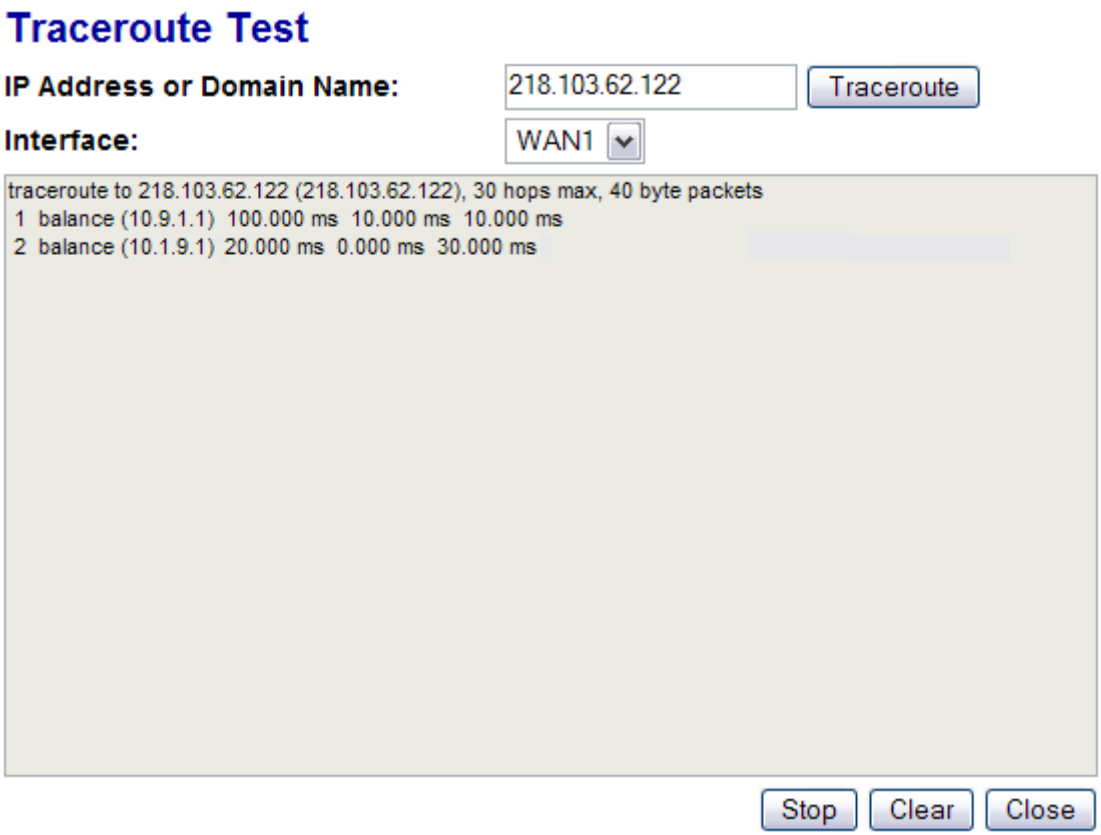


Tip
A System Administrator can use the Ping utility to manually check the connectivity of a particular LAN/WAN connection.

19.11 Traceroute Test

The Traceroute Test tool in Pepwave MAX traces the routing path to the destination through a particular Ethernet interface.

The Traceroute Test utility is located at ***System > Tools > Traceroute***. The Traceroute Test utility is displayed as a pop-up window, illustrated as follows:



Tip
A System Administrator can use the Traceroute utility to analyze the connection path of a LAN/WAN connection.

20 Status

The information section displays the information of Pepwave MAX on the ***Device***, ***Link Usage***, ***Active Sessions***, ***DHCP Clients***, and ***Event Log***.

20.1 Device

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

System Information	
System Time	Mon May 4 11:32:25 UTC 2009
Serial Number	282F-B937-B937
Current Firmware Version	v4.7.1

Interface	MAC Address
LAN	00:11:DD:AA:15:60
Ethernet WAN	00:11:DD:AA:15:61
Wi-Fi WAN	00:11:DD:AA:15:62

System Information	
System Time	This shows the current system time.
Serial Number	This shows the serial number of the Pepwave MAX unit.
Current Firmware Version	This shows the firmware version that the Pepwave MAX unit is currently running.

The second table shows the MAC address of each Ethernet interface.

20.2 Link Usage Status

Link usage status information is located at ***Status > Link Usage***:

Data transferred since last reboot [Add Trip Counter]

	Inbound (MBytes)	Outbound (MBytes)
1. Ethernet WAN	73	179
2. PC Card	0	0
4. USB1	15	3
5. USB2	0	0
6. Wi-Fi WAN	27	1

Bandwidth consumption

1. Ethernet WAN	Inbound (Kbps)	Outbound (Kbps)
Overall	2397	71
HTTP	2397	71
HTTPS	0	0
IMAP	0	0
POP3	0	0
SMTP	0	0
Others	0	0

Bandwidth consumption

2. PC Card	Inbound (Kbps)	Outbound (Kbps)
Overall	0	0
HTTP	0	0
HTTPS	0	0
IMAP	0	0
POP3	0	0
SMTP	0	0
Others	0	0

Bandwidth consumption

4. USB1	Inbound (Kbps)	Outbound (Kbps)
Overall	1278	47
HTTP	1278	47
HTTPS	0	0
IMAP	0	0
POP3	0	0
SMTP	0	0
Others	0	0

Bandwidth consumption

5. USB2	Inbound (Kbps)	Outbound (Kbps)
Overall	0	0
HTTP	0	0
HTTPS	0	0
IMAP	0	0
POP3	0	0
SMTP	0	0
Others	0	0

Bandwidth consumption

6. Wi-Fi WAN	Inbound (Kbps)	Outbound (Kbps)
Overall	1199	46
HTTP	1199	46
HTTPS	0	0
IMAP	0	0
POP3	0	0
SMTP	0	0
Others	0	0

The Link Usage Status section displays the cumulative amounts of data that have been transferred through each WAN connection, as well as the inbound and outbound rate of data transferred via various protocols.

If you click on the ***Add Trip Counter*** link, a new transfer volume table will be shown where the values are reset to zero. This will enable you to count the transferred volume from a specific time instead of from the system up time.

20.3 Active Sessions

Information on Active Sessions is at ***Status > Active Sessions***:

Inbound TCP			
Ethernet WAN			
Source IP	Destination IP	Connection Type	Idle Time
10.9.30.1:2584	10.9.2.25:80	www-http	00:00:01
10.10.10.105:56122	10.9.2.25:80	www-http	00:00:01
PC Card			
(No connections)			
Express Card			
(No connections)			
USB1			
(No connections)			
USB2			
(No connections)			
Wi-Fi WAN			
(No connections)			

Outbound TCP			
Ethernet WAN			
Source IP	Destination IP	Connection Type	Idle Time
10.9.2.25:80	10.10.10.113:50713	www-http	00:00:01
10.9.2.25:1032	118.142.3.70:52223		00:00:16
192.168.1.10:49800	207.46.106.29:1863		00:00:32
192.168.1.10:49865	65.54.228.50:1863		00:00:35
192.168.1.10:49866	64.4.37.22:1863		00:00:28
192.168.1.10:49871	10.10.10.131:3226		00:00:59
192.168.1.10:49887	207.46.112.39:443		00:00:30
192.168.1.10:49888	63.150.131.187:80	www-http	00:00:48
192.168.1.10:49889	63.150.131.155:80	www-http	00:00:44
192.168.1.10:49894	207.46.86.114:443		00:00:11
PC Card			
(No connections)			
Express Card			
(No connections)			
USB1			
(No connections)			
USB2			
(No connections)			
Wi-Fi WAN			
(No connections)			

Inbound UDP
Ethernet WAN
(No connections)
PC Card
(No connections)
Express Card
(No connections)
USB1
(No connections)
USB2
(No connections)
Wi-Fi WAN
(No connections)

Outbound UDP			
Ethernet WAN			
Source IP	Destination IP	Connection Type	Idle Time
10.9.2.25:1026	75.101.136.220:11753		00:00:15
10.9.2.25:4665	10.9.1.1:53	domain	00:00:28
10.9.2.25:4694	10.9.1.1:53	domain	00:00:23
10.9.2.25:4726	10.9.1.1:53	domain	00:00:18
10.9.2.25:4763	10.9.1.1:53	domain	00:00:13
10.9.2.25:4807	10.9.1.1:53	domain	00:00:08
10.9.2.25:4829	10.9.1.1:53	domain	00:00:03
192.168.1.10:49318	116.48.75.71:52268		00:00:06
192.168.1.10:49318	207.46.48.150:3544		00:00:06
192.168.1.10:57653	5.131.196.27:4167		00:00:09
192.168.1.10:58358	69.181.7.228:4167		00:00:09
192.168.1.10:58442	116.48.75.71:54942		00:00:11
192.168.1.10:58442	207.46.26.253:7001		00:00:11
192.168.1.10:59449	58.152.118.85:1410		00:00:15
PC Card			
(No connections)			
Express Card			
(No connections)			
USB1			
(No connections)			
USB2			
(No connections)			
Wi-Fi WAN			
Source IP	Destination IP	Connection Type	Idle Time
192.168.39.174:68	192.168.39.1:67	bootps	00:00:29

This Active Sessions section displays the active inbound and outbound, UDP and TCP sessions of each WAN connection on Pepwave MAX.

20.4 DHCP Clients

The ***DHCP Clients*** table is located at ***Status > DHCP Clients***. It lists DHCP client IP addresses and MAC addresses that the Pepwave MAX has offered IP addresses to since it is powered up.

DHCP Clients	
IP Address	MAC Address
192.168.1.10	00:1f:16:1f:16:1f

20.5 Event Log

Event Log information is located at ***Status > Event Log***:

Event Log	Show [50 | 100 | all] Refresh Clear Log
May 6 02:37:14	Link health check monitor started
May 6 02:37:17	Health check status changed: (Ethernet WAN: DOWN) (PC Card: DOWN[Link Down]) (Express Card: DOWN[Link Down]) (USB1: DOWN[Link Down]) (USB2: DOWN[Link Down]) (Wi-Fi WAN: DOWN[Link Down])
May 6 02:37:31	WAN Priority Changed: (Priority 1: Ethernet WAN, Wi-Fi WAN | Priority 2: USB2)
May 6 02:37:37	WAN Priority Changed: (Priority 1: Ethernet WAN, Wi-Fi WAN | Priority 2: USB1, USB2)
May 6 02:38:17	Health check status changed: (Ethernet WAN: UP)
May 6 02:38:23	Wi-Fi WAN associated with testb
May 6 02:38:29	Wi-Fi WAN disassociated from testb
May 6 02:38:33	Wi-Fi WAN associated with testb
May 6 02:38:34	Time synchronization successful
May 6 02:38:55	Health check status changed: (Wi-Fi WAN: UP)
May 6 02:38:56	Wi-Fi WAN connected to testb
May 6 03:37:30	WAN Priority Changed: (Priority 1: Ethernet WAN, Wi-Fi WAN | Priority 2: USB1, USB2)
May 6 03:37:36	WAN Priority Changed: (Priority 1: Ethernet WAN, Wi-Fi WAN | Priority 2: USB2)
May 6 03:38:07	WAN Priority Changed: (Priority 1: Ethernet WAN, Wi-Fi WAN | Priority 2: USB1)
May 6 03:38:38	WAN Priority Changed: (Priority 1: Ethernet WAN, Wi-Fi WAN | Priority 2: USB1, USB2)
May 6 04:20:22	Health check status changed: (Ethernet WAN: DOWN[Health Check Failure])
May 6 04:21:21	Health check status changed: (Ethernet WAN: UP)
May 6 04:23:50	Health check status changed: (Wi-Fi WAN: DOWN[Standby])
May 6 04:23:54	Wi-Fi WAN disassociated from testb
May 6 04:23:55	WAN Priority Changed: (Priority 1: Ethernet WAN | Priority 2: USB1, USB2 | Disabled: Wi-Fi WAN)
May 6 04:24:23	WAN Priority Changed: (Priority 1: Ethernet WAN | Priority 2: USB1, USB2, Wi-Fi WAN)
May 6 04:24:33	Wi-Fi WAN associated with testb
May 6 04:24:44	Wi-Fi WAN disassociated from testb
May 6 04:25:05	Wi-Fi WAN associated with testb
May 6 04:25:14	Wi-Fi WAN connected to testb

The log section displays a list of events that has taken place on the Pepwave MAX unit. Click the ***Refresh*** button to retrieve log entries again. Click the ***Clear Log*** button to clear the log. Select ***50***, ***100***, or ***all*** to show the corresponding number of events in the log.

Appendix A. Restoration of Factory Defaults

To restore the factory default settings on a Pepwave MAX unit, perform the following:

5. Locate the reset button on the Pepwave MAX unit.
6. With a paper clip, press and keep the reset button pressed for at least 10 seconds, until the unit reboots itself.

Afterwards, the factory default settings will be restored.

Important Note
All user settings will be lost after restoring the factory default settings. Regular backup of configuration parameters is strongly recommended.

Warning: two antennas must be separated by at lest 20 cm

Appendix B. Product Specifications

B.1 Pepwave MAX Mobile Router

Routing

- NAT
- Flexible Custom Outbound Routing Policy

WAN Support

- DHCP, Static IP, and PPPoE
- Outbound Link Load Balance

Device Management

- Wizard & Menu Driven Web Management Interface over HTTP / HTTPS
- Remote Reporting and Management
- Configurations Upload and Download

Internet Access Sharing

- SUA (Single User Account) / Multi-to-Multi NAT
- NAT supports PAT (Port Address Translation)

Security

- Rules-based Stateful Firewall, with IP, Protocol, and Port filtering
- VPN Encryption: 256-bit AES
- Intrusion Detection System

Physical Interface

- One RJ-45 for an IEEE 802.3u 10/100M WAN
- One PC Card Slot
- One ExpressCard Slot
- Two USB Ports
- One Wi-Fi WAN Connector
- One Wi-Fi AP Connector for LAN
- Four RJ-45 for an IEEE 802.3u 10/100M LAN

Power Specification

- AV Input 100-240V, DC Output 9-30V

Operating Environment

- Temperature: 0°C - 50°C
- Humidity: 10% - 90% (non-condensing)

FCC Statement:

This device complies with Part 15 of the FCC Rules. Operation is subject to the following two conditions:
(1) this device may not cause harmful interference, and
(2) this device must accept any interference received, including interference that may cause undesired operation.
Changes or modifications not expressly approved by the party responsible for compliance could void the user's authority to operate the equipment.

NOTE:
This equipment has been tested and found to comply with the limits for a Class B digital device, pursuant to Part 15 of the FCC Rules.
These limits are designed to provide reasonable protection against harmful interference in a residential installation. This equipment generates, uses and can radiate radio frequency energy and, if not installed and used in accordance with the instructions, may cause harmful interference to radio communications. However, there is no guarantee that interference will not occur in a particular installation. If this equipment does cause harmful interference to radio or television reception, which can be determined by turning the equipment off and on, the user is encouraged to try to correct the interference by one or more of the following measures:
-- Reorient or relocate the receiving antenna. -- Increase the separation between the equipment and receiver.
-- Connect the equipment into an outlet on a circuit different from that to which the receiver is connected.
-- Consult the dealer or an experienced radio/TV technician for help.

PEPWAVE
Broadband Possibilities

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