PEPWAVE
Broadband Possibilities

Surf SOHO Router
User Manual

August 2013

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1 Introduction and Scope

The Pepwave Surf SOHO is a professional-grade Wi-Fi router designed for home office, small business, and power users. With support for 4G LTE/3G, cable, DSL, and other broadband connections, the Surf SOHO makes it possible to deploy fast and secure 802.11abgn Wi-Fi hotspots anywhere. The Surf SOHO also features built-in long-range and optional external antennas, business-class VPN, cellular usage monitoring, and URL blocking, making it an ideal networking solution for a wide range of mobile and office uses.

This manual details setting up the Pepwave Surf SOHO router and provides an introduction to its features and usage.

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2 Glossary

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

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

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3 Product Features

The Surf SOHO enables all LAN users to share broadband Internet connections and provides advanced features to enhance Internet access. The following is the list of supported features on the Pepwave Surf SOHO router:

3.1 Supported Network Features

3.1.1 WAN

- Ethernet WAN connection in full/half duplex
- USB mobile connection(s)
- Wi-Fi WAN connection
- Network address translation (NAT) / port address translation (PAT)
- Inbound and outbound NAT mapping
- IPsec NAT-T and PPTP packet passthrough
- MAC address clone and passthrough
- Customizable MTU and MSS values
- WAN connection health check
- Dynamic DNS (supported service providers: changeip.com, dyndns.org, no-ip.org, tzo.com and DNS-O-Matic)
- Ping, DNS lookup, and HTTP-based health check

3.1.2 LAN

- Wi-Fi AP
- Ethernet LAN ports
- DHCP server on LAN
- Static routing rules

3.1.3 VPN

- PepVPN
- VPN load balancing and failover among selected WAN connections
- Bandwidth bonding & failover among selected WAN connections
- Ability to route Internet traffic to a remote VPN peer
- Optional pre-shared key setting
- Throughput, ping, and traceroute test

3.1.4 Firewall

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

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3.1.5 QoS

- Quality of service for different applications and custom protocols
- Application prioritization for custom protocols and DSL/cable optimization

3.2 Other Supported Features

- User-friendly web-based administration interface
- HTTP and HTTPS support for the Web Admin Interface
- Configurable web administration port and administrator password
- Firmware upgrades, configuration backups, ping, and traceroute via the Web Admin Interface
- Remote Web-based configuration (via WAN and LAN interfaces)
- Time server synchronization
- SNMP
- Email notification
- Read-only user for Web Admin
- Authentication and accounting by RADIUS server for Web Admin
- Syslog
- SIP passthrough
- PPTP packet passthrough
- Event log
- Active sessions
- Client list
- UPnP / NAT-PMP
- Real-time, hourly, daily and monthly bandwidth usage reports and charts

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4 Pepwave Surf SOHO Router Overview

4.1 Front Panel

4.1.1 LED Indicators

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

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

4.2 Rear Panel

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

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

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5 Installation

Following are instructions for connecting to the network with the Pepwave Surf SOHO router:

5.1 Preparation

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

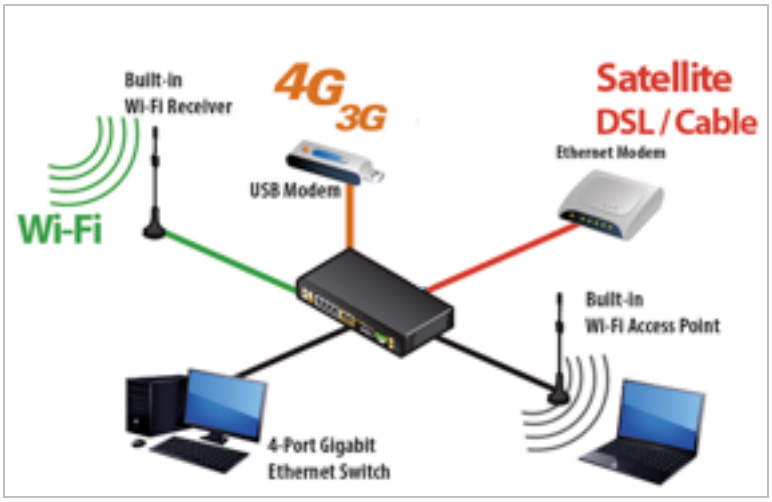
- At least one Internet/WAN access account and/or Wi-Fi access information
- Depending on network connection type(s), one or more of the following:
  - **Ethernet WAN**: A 10/100 BaseT UTP cable with RJ45 connector
  - **USB**: A USB modem
  - **Wi-Fi WAN**: Wi-Fi antennas
- A computer installed with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

5.2 Constructing the Network

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

1. With an Ethernet cable, connect a computer to one of the LAN ports on the Surf SOHO. Repeat with different cables for up to 3 additional computers.
2. Using another Ethernet cable, connect to the WAN port on the Surf SOHO or attach a Wi-Fi antenna for a wireless WAN connection.
3. Connect the included power adapter to the power connector on the rear panel of the Surf SOHO, and then plug it into a power outlet.

The following figure schematically illustrates the resulting configuration:



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5.3 Configuring the Network Environment

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

- LAN configuration:

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

  For advanced configuration, see **Configuring the LAN Interface(s)**.

- WAN configuration

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

  For advanced configuration, see **Configuring the of WAN Interface(s)**.

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6 Connecting to the Web Admin Interface

1. Start a Web browser on a computer that is connected with the Pepwave Surf SOHO over the LAN.
2. To connect to the Surf SOHO's Web Admin Interface, enter the following LAN IP address in the address field of the web browser:

   http://192.168.50.1

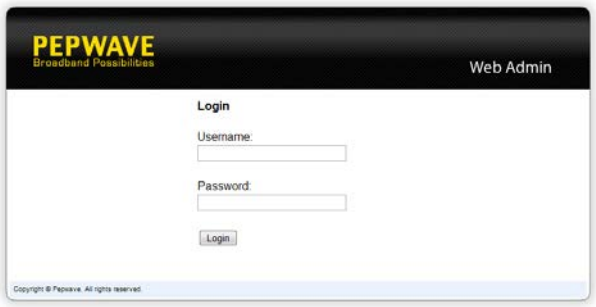
   (This is the default LAN IP address of the Pepwave Surf SOHO.)

3. Enter the following to access the Web Admin Interface.

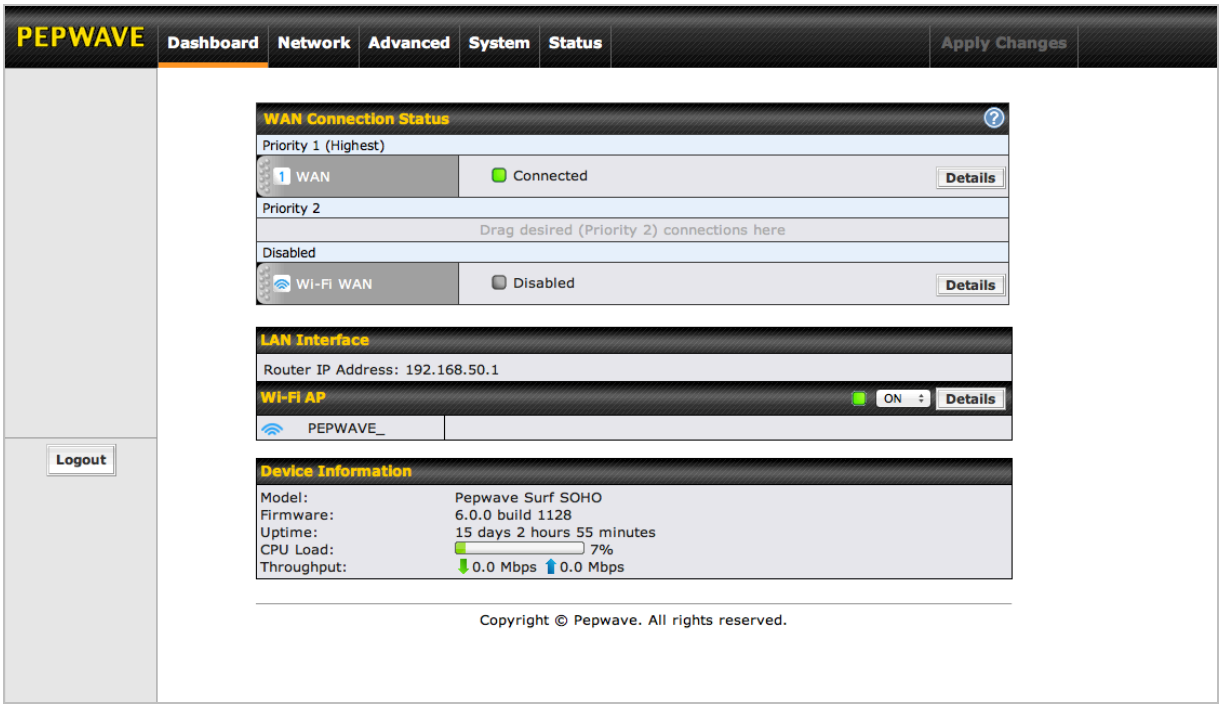
   Username: admin

   Password: admin

   (This is the default username and password. The **Admin Password** and **User Password** can be changed at ***System > Admin Security***.)



4. After successful login, the ***Dashboard*** of the Web Admin Interface will be displayed. It looks similar to the following:



The ***Dashboard*** shows the current WAN, LAN, and Wi-Fi AP settings and statuses. You can easily change WAN connection priority and switch on / off Wi-Fi AP functionality on this page. For further help on setting up these connections, please refer to Section 7.2 and 8.
In the **Device Information** section, you'll find details about your device, including model name, firmware

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version, and uptime.

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

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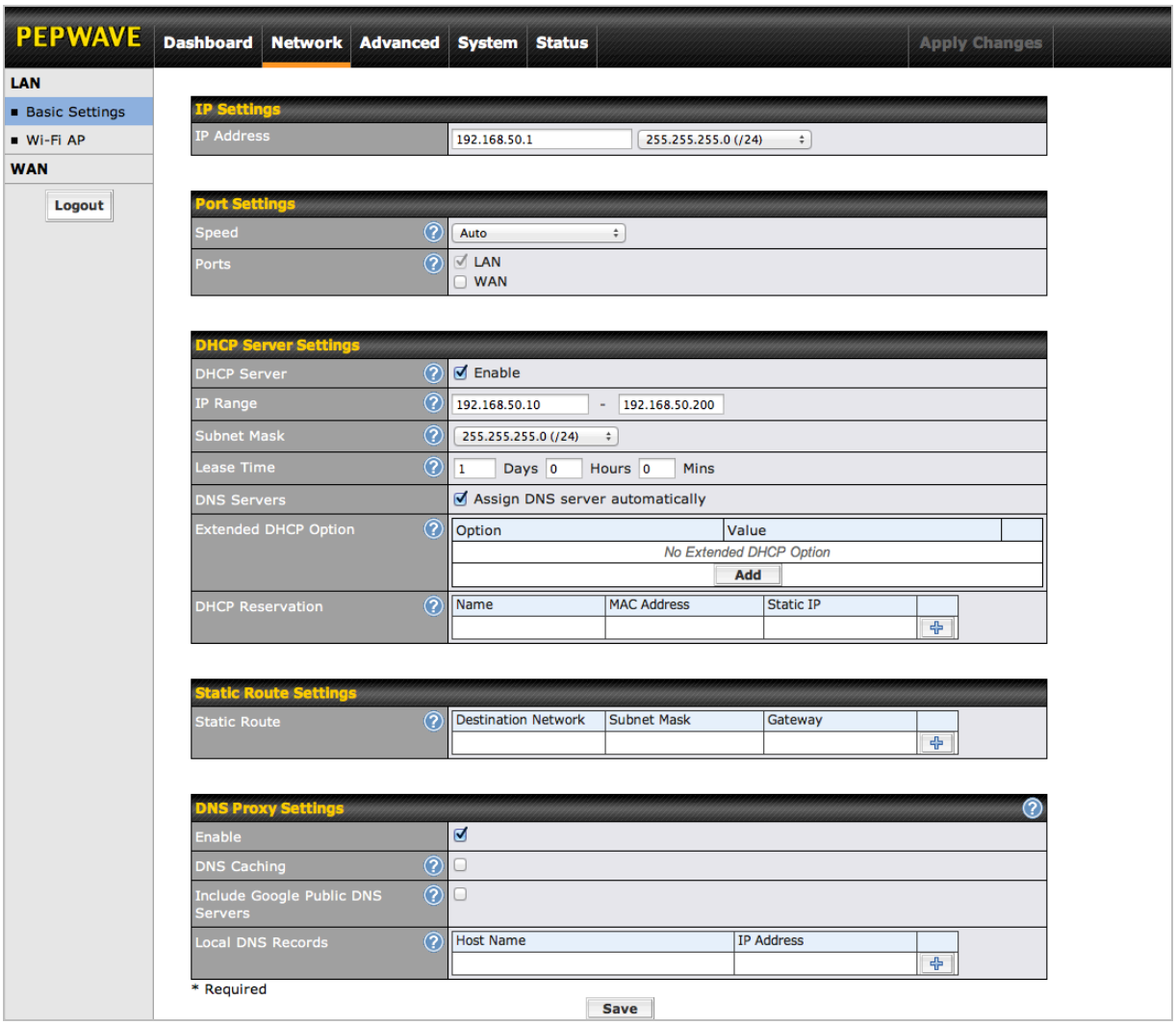
7 Configuring the LAN Interface(s)

7.1 Basic Settings

LAN interface settings are located at ***Network > LAN > Basic Settings***.



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IP Settings	
IP Address & Subnet Mask	This is the LAN IP address and subnet mask used to identify the Pepwave Surf SOHO on the network.

Port Settings	
Speed	This setting specifies the speed of the LAN Ethernet port. By default, **Auto** is selected, and the appropriate data speed is automatically detected. In the event of negotiation issues, the port speed can be manually specified. You can also choose whether or not to advertise the speed to the peer by selecting the **Advertise Speed** checkbox.
Ports	This field is for choosing which physical Ethernet port(s) act as the LAN interface, in addition to the dedicated LAN port.

DHCP Server Settings	
DHCP Server	When this setting is enabled, the Surf SOHO's built-in DHCP server automatically assigns an IP address to each computer that is connected via LAN and is configured to obtain an IP address via DHCP. Using the Pepwave Surf SOHO's DHCP server can prevent IP address collision on the LAN.
IP Range & Subnet Mask	These settings allocate a range of IP addresses that will be assigned to LAN computers by the built-in DHCP server.
Lease Time	This setting specifies the length of time throughout which the IP address of a DHCP client remains valid. Upon expiration of the **Lease Time**, the assigned IP address will no longer be valid, and renewal of the IP address assignment will be required.
DNS Servers	This option allows you to input the DNS server addresses to be offered to DHCP clients. If **Assign DNS server automatically** is selected, the Pepwave Surf SOHO's built-in DNS server address (i.e. LAN IP address) will be offered.
Extended DHCP Option	In addition to standard DHCP options (e.g., DNS server address, gateway address, and subnet mask), you can specify the value of extended DHCP options, as defined in RFC 2132, that allow you to pass additional configuration information to LAN hosts. To define an extended DHCP option, click the **Add** button, choose the option that you want to define, and enter its value. For values that are in IP address list format, enter one IP address per line in the provided text input control. Each option can be defined once only.
DHCP Reservation	This setting reserves the assignment of fixed IP addresses for a list of computers on the LAN. The computers to be assigned fixed IP addresses on the LAN are identified by their MAC addresses. The fixed IP address assignment is displayed as a cross-reference list between the computers' names, MAC addresses, and fixed IP addresses. The **Name** field (optional) can be used to define a name to represent the device. MAC addresses should be in the format of **00:AA:BB:CC:DD:EE**. Press to create a new record. Press to remove a record. Reserved clients information can be imported from the **Client List**, located at ***Status > Client List***. For more details, please refer to section 17.3.

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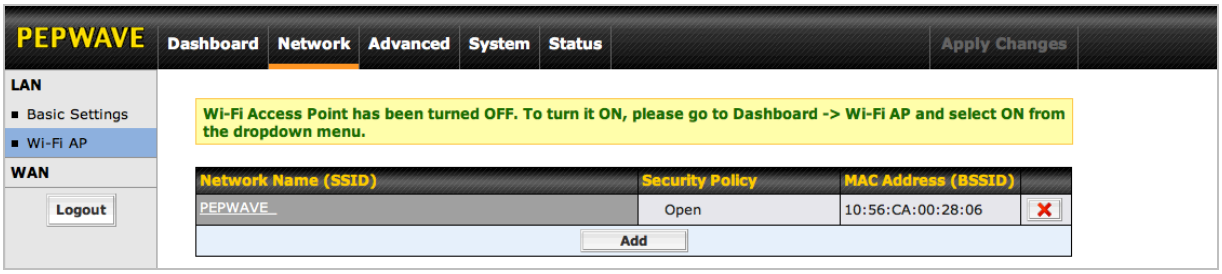
Static Route Settings	
Static Route	This table is for defining static routing rules for the LAN segment. A static route consists of the network address, subnet mask, and gateway address. The address and subnet mask values are in the format *w.x.y.z*. The local LAN subnet and subnets behind the LAN will be advertised to the VPN. Remote routes sent over the VPN will also be accepted. Any VPN member will be able to route to local subnets. Press to create a new route. Press to remove a route.

DNS Proxy Settings	
Enable	This check box enables the DNS proxy feature. A DNS proxy server can be enabled to serve DNS requests originating from LAN/PPTP/ SpeedFusion™ peers. Requests are forwarded to the DNS servers/resolvers defined in each WAN connection
DNS Caching	This check box enables DNS caching on the built-in DNS proxy server. When the option is enabled, queried DNS replies will be cached until the records' TTL has been reached. This feature can improve DNS lookup time. However, it cannot return the most up-to-date results for those frequently updated DNS records. By default, this setting is **disabled**.
Include Google Public DNS Servers	When this option is **enabled**, the DNS proxy server will also forward DNS requests to Google's public DNS servers, in addition to the DNS servers defined in each WAN. This could increase the DNS service's availability. By default, this setting 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 the Pepwave Surf SOHO, the corresponding IP address will be returned. Press to create a new record. Press to remove a record.

7.2 Wi-Fi AP

Wi-Fi LAN settings can be configured at ***Network > LAN > Wi-Fi AP***.

Wi-Fi AP can also be switched on / off on the ***Dashboard***.



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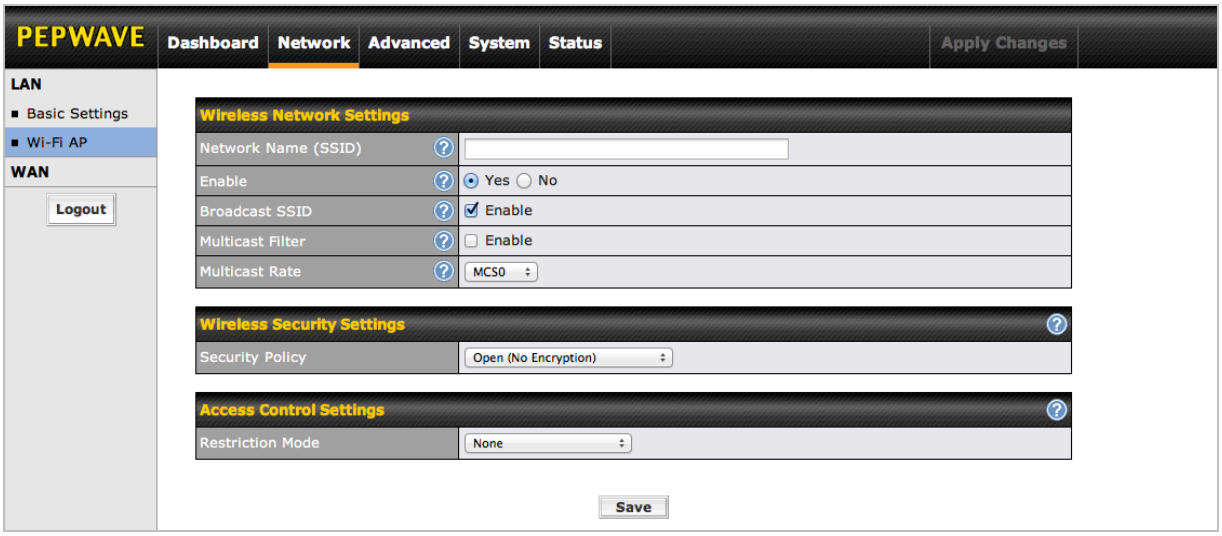
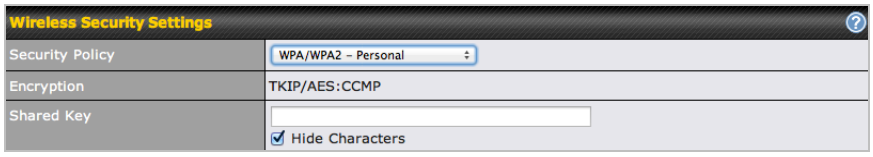
Click the **Add** button to create a new SSID.



Wireless Network Settings	
Network Name (SSID)	This setting allows you to specify a name to represent the virtual AP to be scanned by Wi-Fi clients.
Enable	When **Yes** is selected (default), this virtual AP is enabled. Select **No** to disable it. You can also choose to enable or disable this virtual AP on the ***Dashboard***.
Broadcast SSID	When **Enable** is checked, this SSID can be scanned by Wi-Fi clients. By default, this setting is **enabled**.
Multicast Filter	When **Enable** is checked, multicast network traffic to the wireless SSID will be filtered. By default, this setting is **disabled**.
Multicast Rate	This field allows you to specify the transmit rate to be used for sending multicast network traffic. By default, **Multicast Rate** is set to**1M**.

Wireless Security Settings	
Security Policy	This setting specifies which security policy will be used for this wireless network. Available options: • Open (No Encryption) • WPA/WPA2 – Personal 

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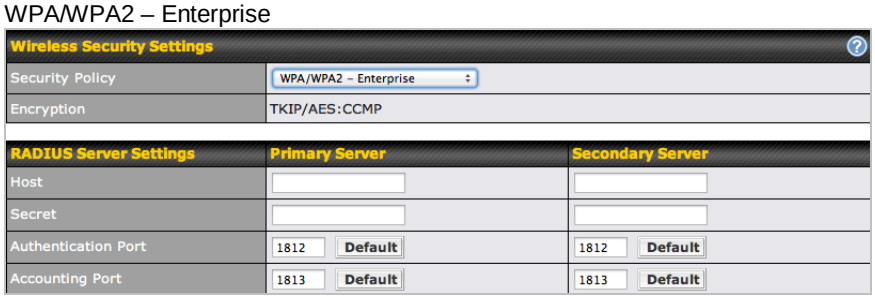
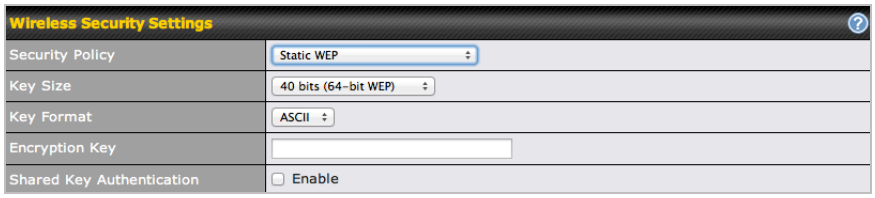
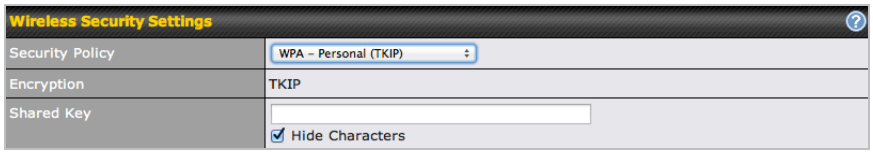
- WPA/WPA2 – Enterprise



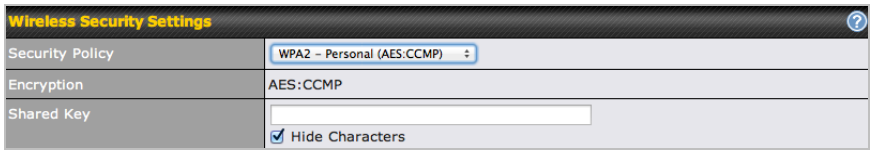
- Static WEP



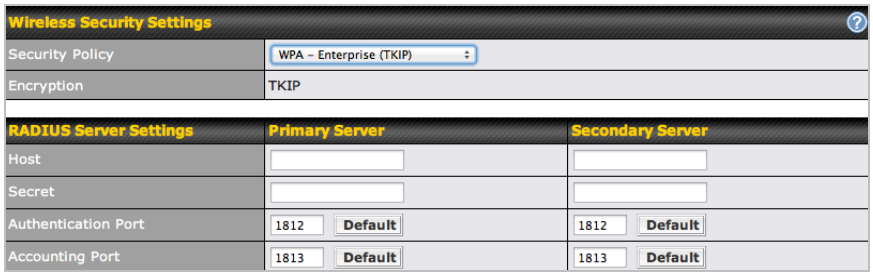
- WPA – Personal (TKIP)



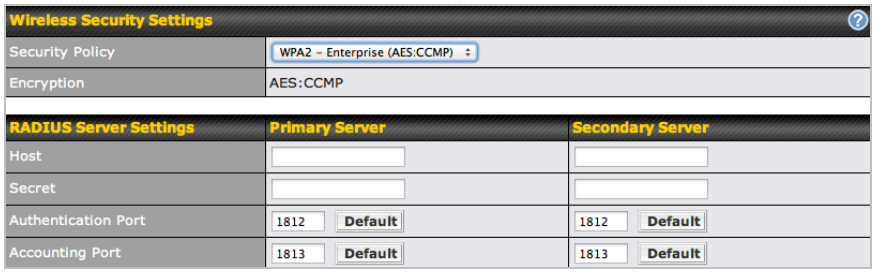
- WPA2 – Personal (AES:CCMP)



- WPA – Enterprise (TKIP)



- WPA2 – Enterprise (AES:CCMP)



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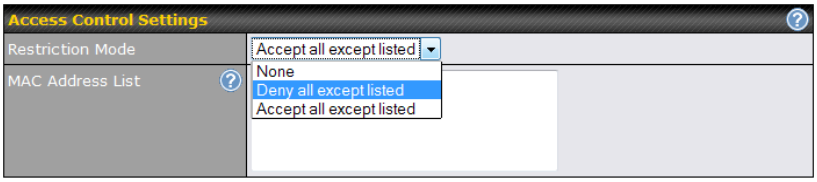
Access Control Settings

Restriction Mode



This option allows you to perform access control through MAC address filtering. Available options are **None**, **Deny all except listed**, and **Accept all except listed**.

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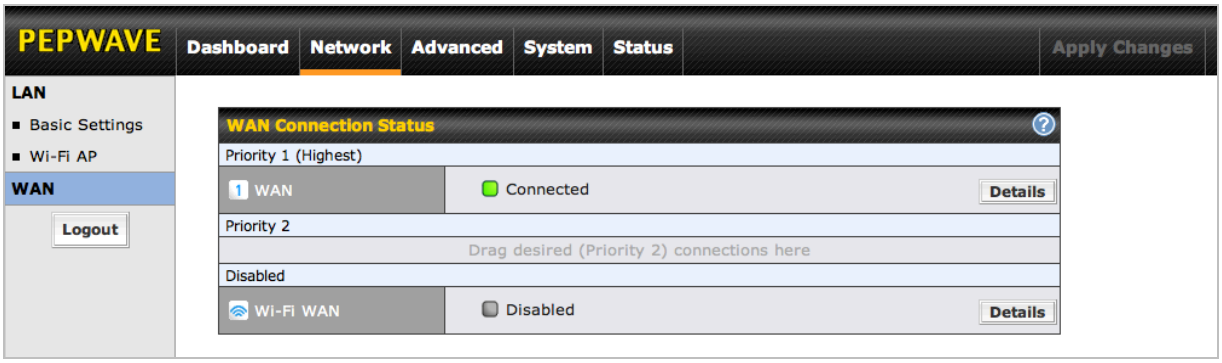
8 Configuring the WAN Interface(s)

WAN interface settings are located at ***Network > WAN***.

To change WAN priority, drag the appropriate WAN by holding the left mouse button, move it to the desired priority (the first one would be the highest priority, the second one would be lower priority, and so on), and drop it by releasing the mouse button.



To disable a particular WAN connection, just drag on the appropriate WAN by holding the left mouse button, move it the **Disabled** row, and drop it by releasing the mouse button. You can also set WAN priority on the ***Dashboard***.

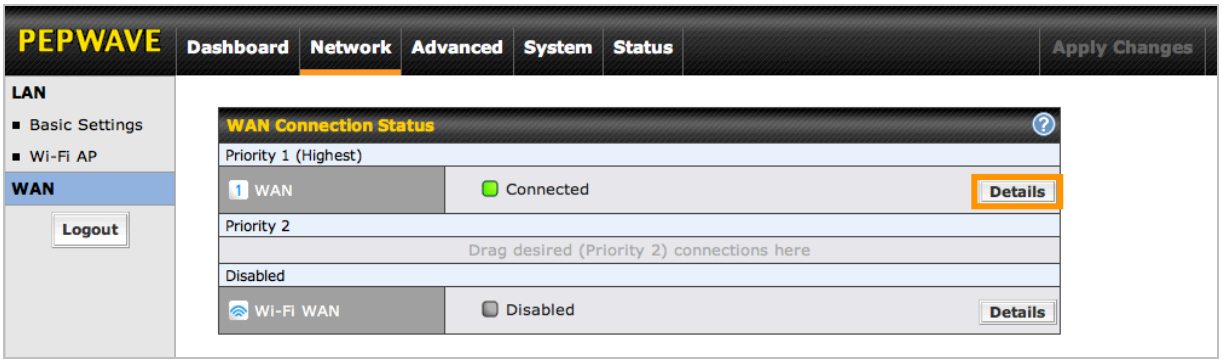
Click the **Details** button in the corresponding row to modify a WAN connection setting.

Important Note

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

8.1 Ethernet WAN

To change the settings for a WAN, click ***Network > WAN > WAN Details***.



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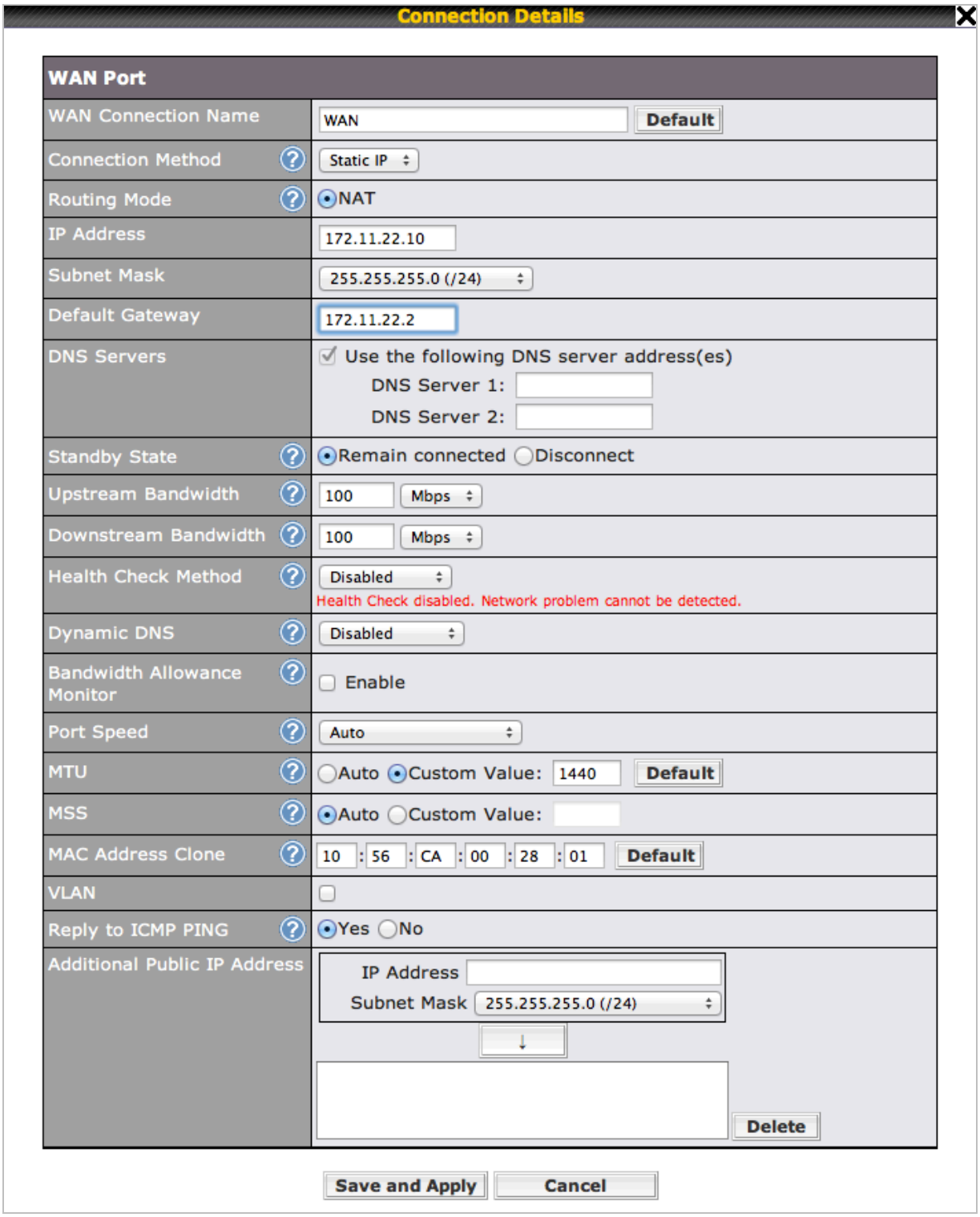
This will open a screen similar to the one shown below:



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Ethernet WAN Settings	
WAN Connection Name	This field is for defining a name to represent this WAN connection.
Connection Method	There are three possible connection methods for your Ethernet WAN: • **DHCP** • **Static IP** • **PPPoE** The connection method and details are determined by your ISP. See the Sections 8.1.1, 8.1.2, and 8.1.3 for details on each connection method.
Standby State	This setting specifies the state of the WAN connection. The available options are **Remain connected** and **Disconnect**. The default state is **Remain Connected**.
Upstream Bandwidth	This setting specifies the data bandwidth in the outbound direction from the LAN through the WAN interface.
Downstream Bandwidth	This setting specifies the data bandwidth in the inbound direction from the WAN interface to the LAN.
Health Check Method	This setting specifies the health check method for the WAN connection. This value can be configured as **Disabled**, **Ping**, or **DNS Lookup**. The default method is **Disabled**. See Section 8.3 for configuration details.
Dynamic DNS	This setting specifies the dynamic DNS service provider to be used for the WAN based on supported dynamic DNS service providers: • changeip.com • dyndns.org • no-ip.org • tzo.com • DNS-O-Matic Select **Disabled** to disable this feature. See Section 8.1.4 for configuration details.
Bandwidth Allowance Monitor	This option allows you to enable bandwidth usage monitoring on this WAN connection for each billing cycle. When this is not enabled, monthly bandwidth usage is tracked, but no action will be taken. See Section 8.4 for configuration details.
Port Speed	This setting specifies port speed and duplex configuration of the WAN Port. By default, **Auto** is selected and the appropriate data speed is automatically detected by the Pepwave Surf SOHO. In the event of negotiation issues, the port speed can be manually specified. You can also choose whether or not to advertise the speed to the peer by selecting the **Advertise Speed** checkbox.

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MTU	This setting specifies the maximum transmission unit. By default, **MTU** is set to **Custom 1440**. You may adjust the MTU value by editing the text field. Click **Default** to restore the default MTU value. Select **Auto** and the appropriate MTU value will be automatically detected. The auto-detection will run each time the WAN connection establishes.
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**, **MSS** will also be set automatically. By default, **MSS** is set to **Auto**.
MAC Address Clone	This setting allows you to configure the MAC address. Some service providers (e.g., cable providers) identify the client's MAC address and require the client to always use the same MAC address to connect to the network. In such cases, change the WAN interface's MAC address to match the original client PC's MAC address via this field. The default MAC address is a unique value assigned at the factory. In most cases, the default value is sufficient. Clicking the **Default** button restores the MAC address to the default value.
Reply to ICMP PING	If this field is disabled, the WAN connection will not respond to ICMP ping requests. By default, this setting is **enabled**.
Additional Public IP Address	The **IP Address** list represents the list of fixed Internet IP addresses assigned by your ISP in the event that more than one Internet IP address is assigned to this WAN connection. Enter the fixed Internet IP addresses and the corresponding subnet masks, and then click the down arrow button to populate IP address entries to the **IP Address** list.

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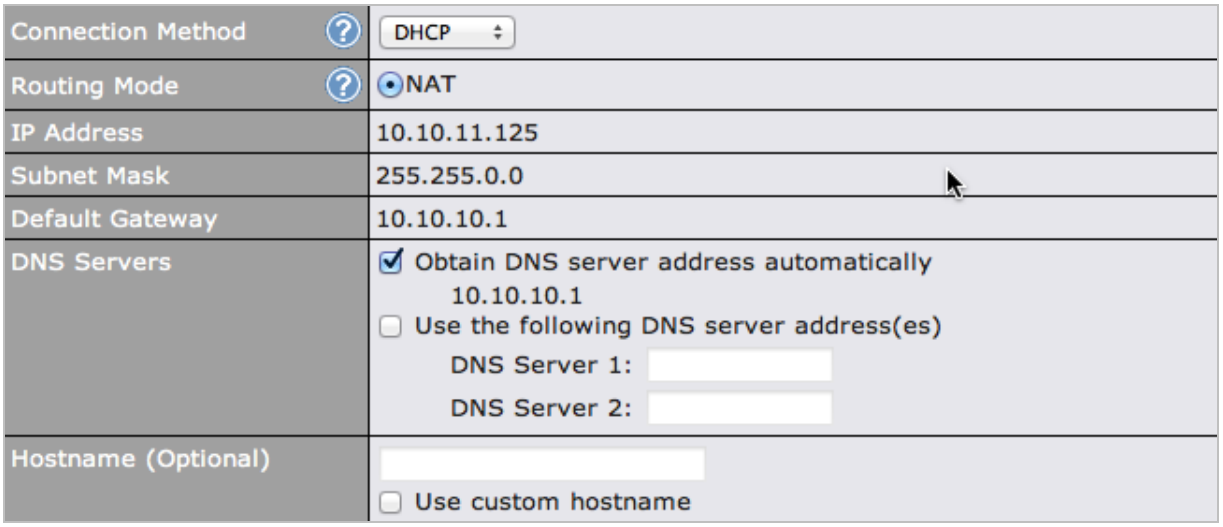
8.1.1 DHCP Connection

The DHCP connection method is suitable if your ISP provides an IP address automatically using DHCP (e.g., if you're connected using a satellite modem, WiMAX modem, cable modem, metro Ethernet, etc.).

There are three possible connection methods:

1. DHCP
2. Static IP
3. PPPoE



DHCP Settings	
Routing Mode	Network address translation (NAT) substitutes the real address in a packet with a mapped address that is routable on the destination network.
IP Address/ Subnet Mask/ Default Gateway	This information is obtained from your ISP automatically.
DNS Servers	Each ISP may provide a set of DNS servers for DNS lookups. This setting specifies the DNS (Domain Name System) servers to be used when a DNS lookup is routed through this connection. Selecting **Obtain DNS server address automatically** results in the DNS servers being assigned by the WAN DHCP server to be used for outbound DNS lookups over the connection. The DNS servers are obtained along with the WAN IP address assigned by the DHCP server. When **Use the following DNS server address(es)** is selected, you may enter custom DNS server addresses for this WAN connection into the **DNS Server 1** and **DNS Server 2** fields.
Hostname (Optional)	If your service provider's DHCP server requires you to supply a hostname value upon acquiring an IP address, you may enter the value here. If your service provider does not provide you with the value, you can safely bypass this option.

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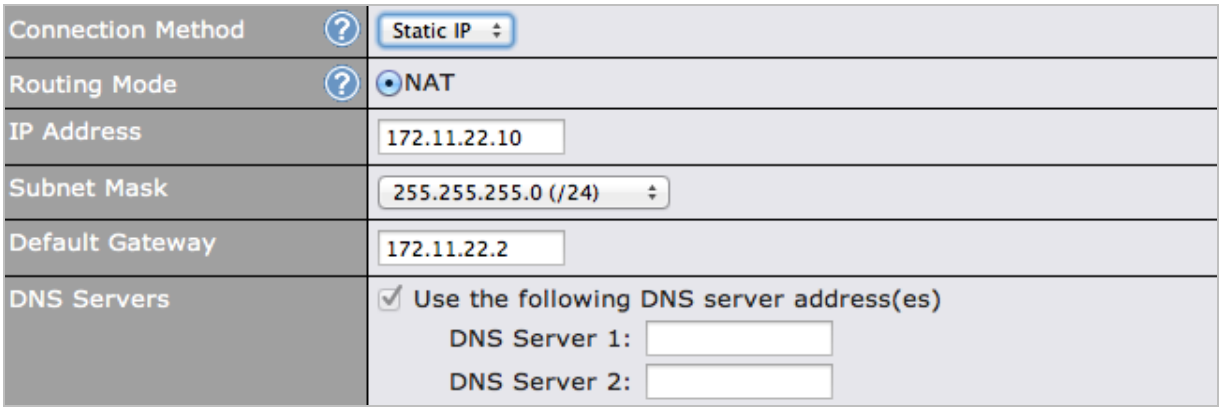
8.1.2 Static IP Connection

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



Static IP Settings	
Routing Mode	Network address translation (NAT) substitutes the real address in a packet with a mapped address that is routable on the destination network.
IP Address / Subnet Mask / Default Gateway	These settings allow you to specify the information required in order to communicate on the Internet via a fixed Internet IP address. The information is typically determined by your 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 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.

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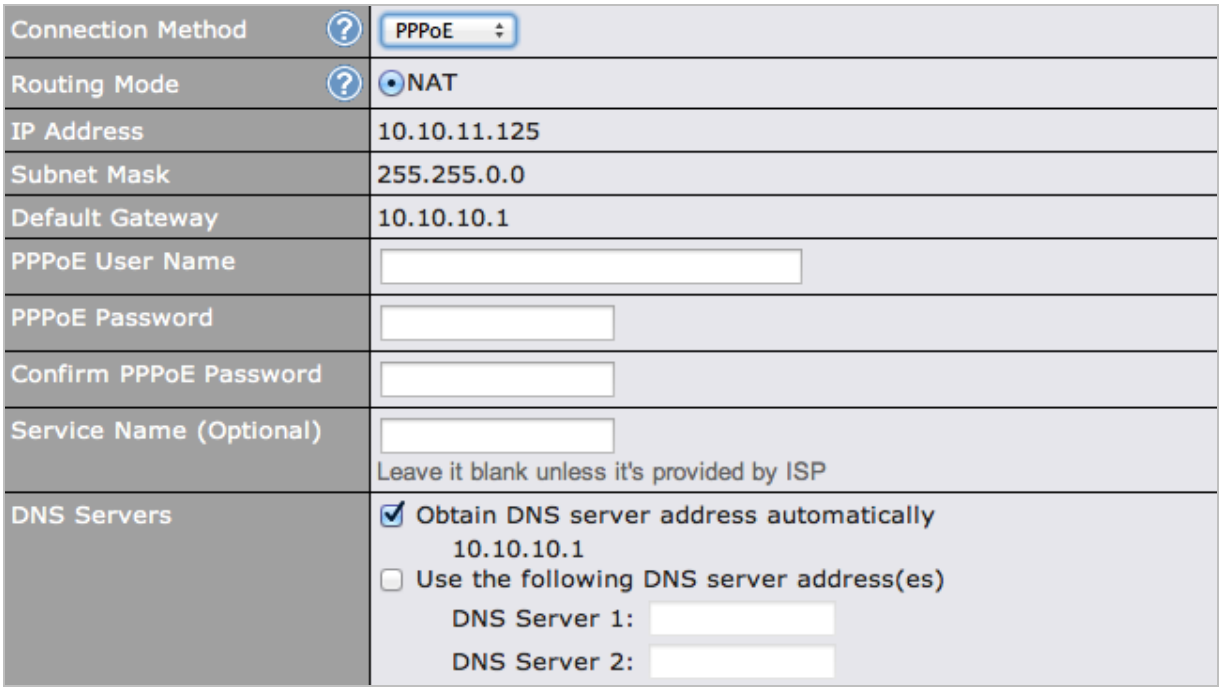
8.1.3 PPPoE Connection

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



PPPoE Settings	
Routing Mode	Network address translation (NAT) substitutes the real address in a packet with a mapped address that is routable on the destination network.
IP Address / Subnet Mask / Default Gateway	This information is obtained from your ISP automatically.
PPPoE User Name / Password	Enter the required information in these fields in order to connect via PPPoE to the ISP. The parameter values are determined by your ISP.
Confirm PPPoE Password	Verify your password by entering it again in this field.
Service Name	**Service Name** is provided by your 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 by the PPPoE server. When **Use the following DNS server address(es)** is selected, you can enter custom DNS server addresses for this WAN connection into the **DNS Server 1 and DNS Server 2** fields.

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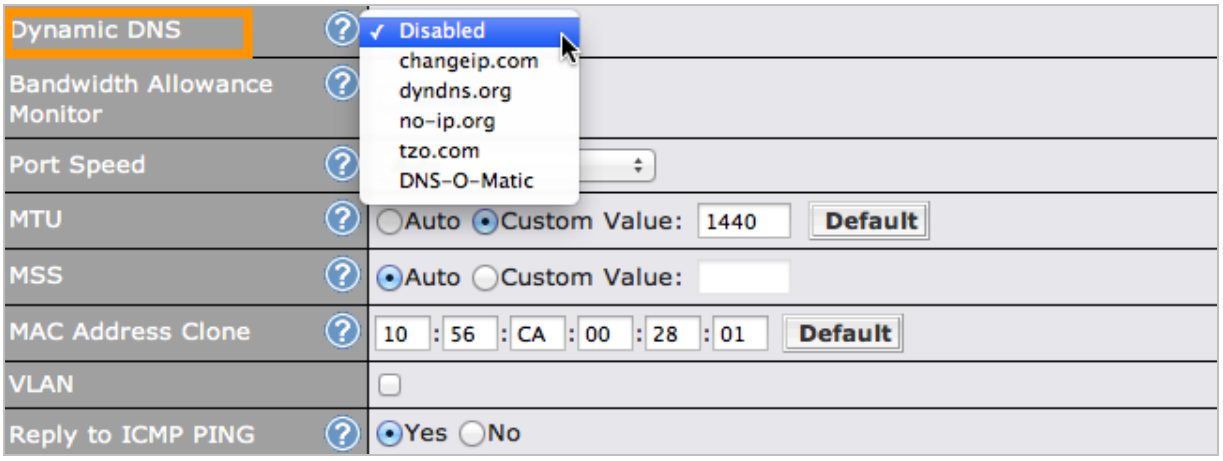
8.1.4 Dynamic DNS Settings

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

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

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

The settings for dynamic DNS service provider(s) and the association of host name(s) can be configured by clicking **Network > WAN > WAN Detail**.



Dynamic DNS Settings	
Dynamic DNS	This setting specifies the dynamic DNS service provider to be used for the WAN based on supported dynamic DNS service providers: • changeip.com • dyndns.org • no-ip.org • tzo.com • DNS-O-Matic Select **Disabled** to disable this feature.
Account Name / Email Address	This setting specifies the registered user name for the dynamic DNS service.
Password / TZO Key	This setting specifies the password for the dynamic DNS service.
Hosts / Domain	This field allows you to specify a list of host names or domains to be associated with the public Internet IP address of the WAN connection. If you need to enter more than one host, use a carriage return to separate them.

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Important Note

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

A dynamic DNS update is performed whenever a WAN's IP address changes (e.g., an IP is changed after a DHCP IP refresh, reconnection, etc.).

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

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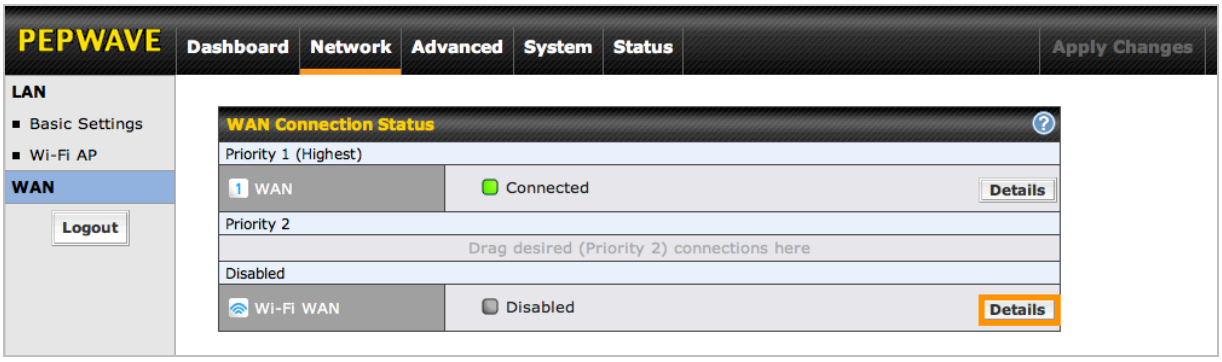
8.2 Wi-Fi WAN

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



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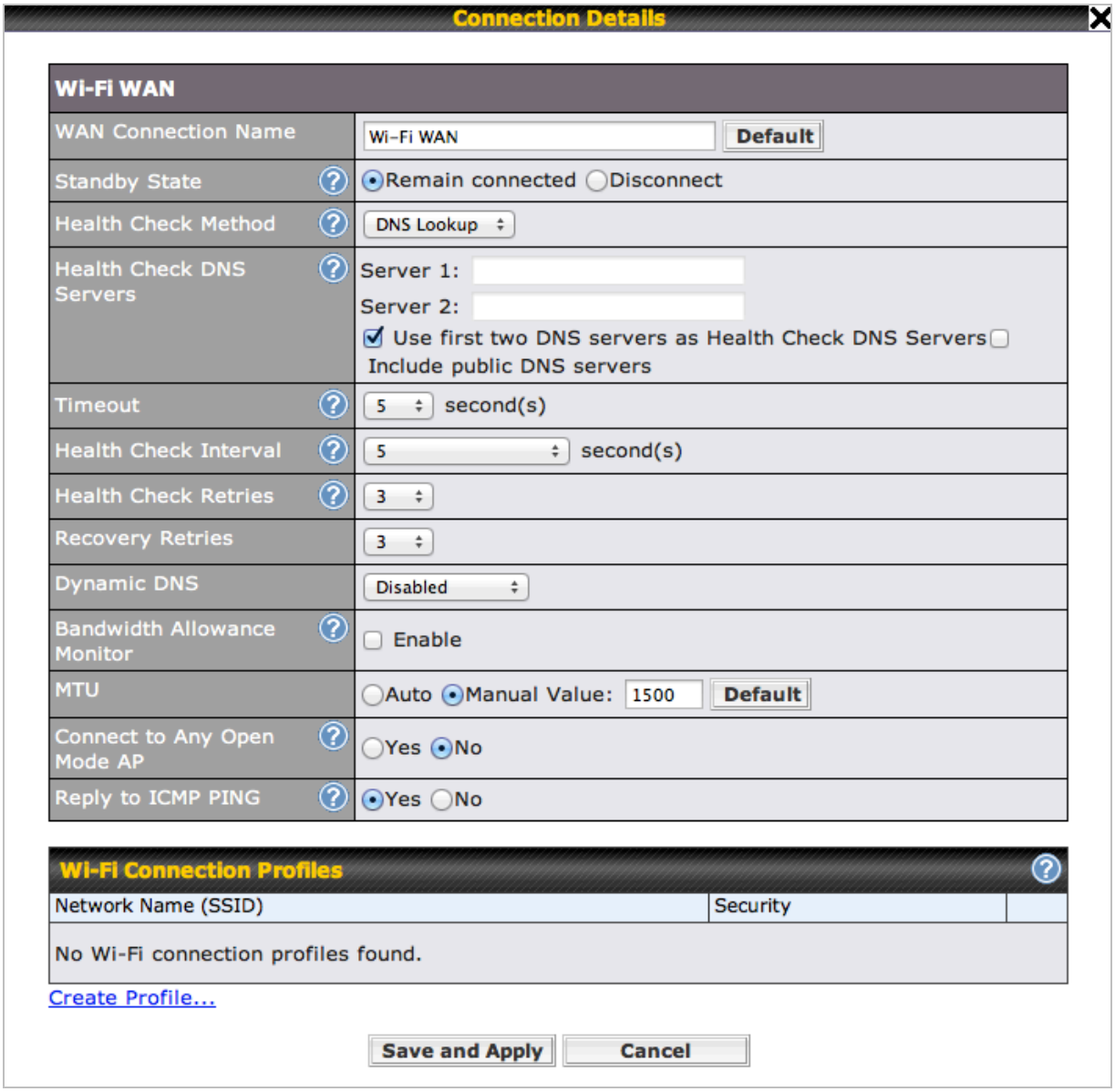

Wi-Fi WAN Settings	
WAN Connection Name	This field is for defining a name to represent this WAN connection.
Standby State	This setting specifies the state of the WAN connection while in standby. The available options are **Remain Connected** (hot standby) and **Disconnect** (cold standby).
Health Check Method	This setting allows you to specify the health check method for the WAN connection. The available options are **Disabled, Ping**, **and DNS Lookup**. The default setting is **Disabled**. See Section 8.3 for configuration details.

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Dynamic DNS	This setting specifies the dynamic DNS service provider to be used for the WAN based on supported dynamic DNS service providers: • changeip.com • dyndns.org • no-ip.org • tzo.com • DNS-O-Matic Select **Disabled** to disable this feature.
Bandwidth Allowance Monitor	This option allows you to enable bandwidth usage monitoring on this WAN connection for each billing cycle. When this is not enabled, monthly bandwidth usage is tracked, but no action will be taken. See Section 8.4 for configuration details.
MTU	This setting specifies the maximum transmission unit. By default, **MTU** is set to **Custom 1440**. You may adjust the MTU value by editing the text field. Click **Default** to restore the default MTU value. Select **Auto**, and the appropriate MTU value will be automatically detected. The auto-detection will run each time the WAN connection establishes.
Connect to Any Open Mode AP	This option is to specify whether the Wi-Fi WAN will connect to any open mode access point it finds. By default, this setting is **disabled**.
Reply to ICMP PING	If this setting is disabled, the WAN connection will not respond to ICMP ping requests. By default, this setting is **enabled**.

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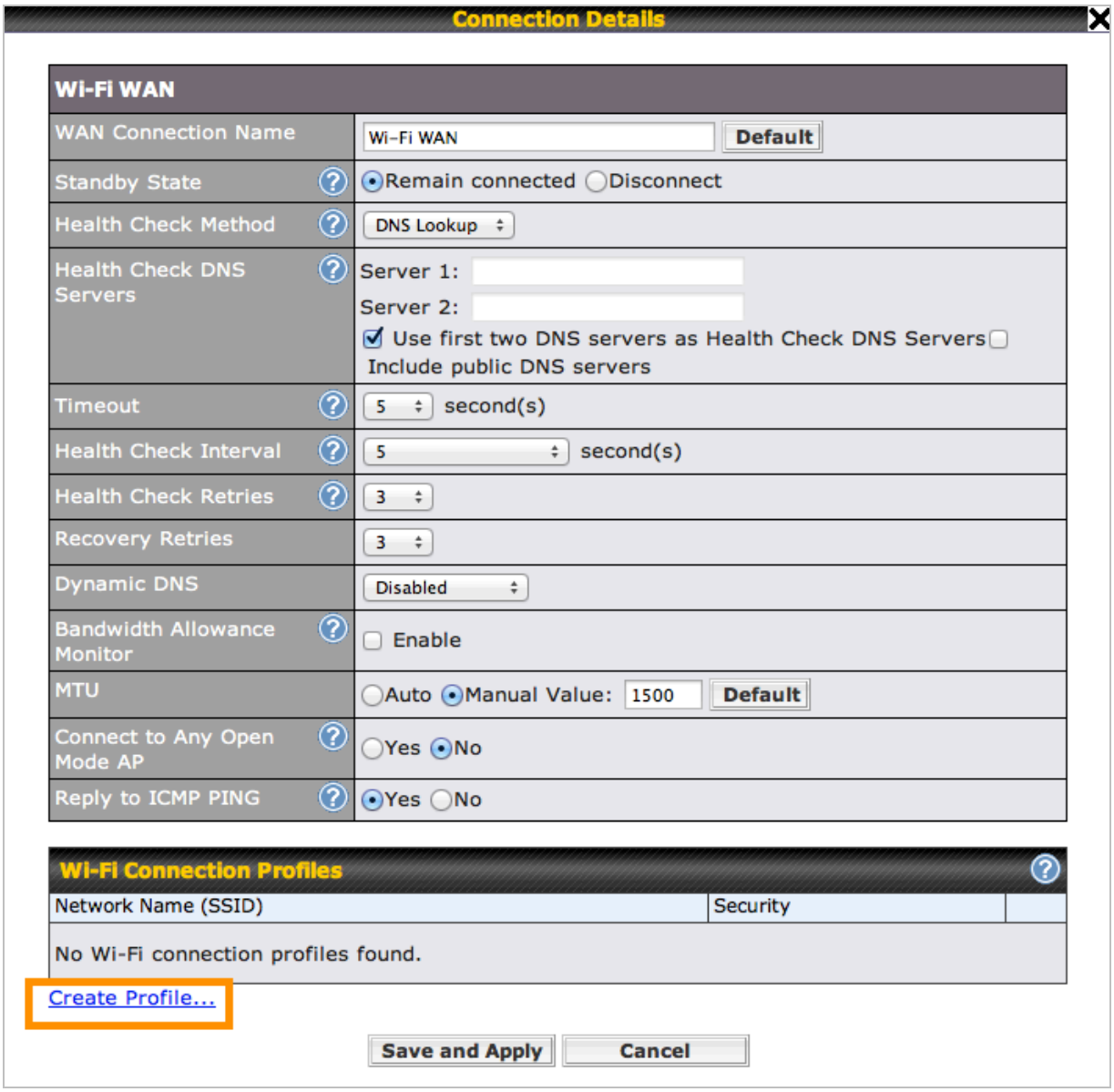
8.2.1 Creating Wi-Fi Connection Profiles

You can manually create a profile to connect to a Wi-Fi connection, which can be particularly useful for creating a profile for connecting to hidden-SSID access points. Click on the **Create Profile…** link that appears on the **Connection Details** page to get started.



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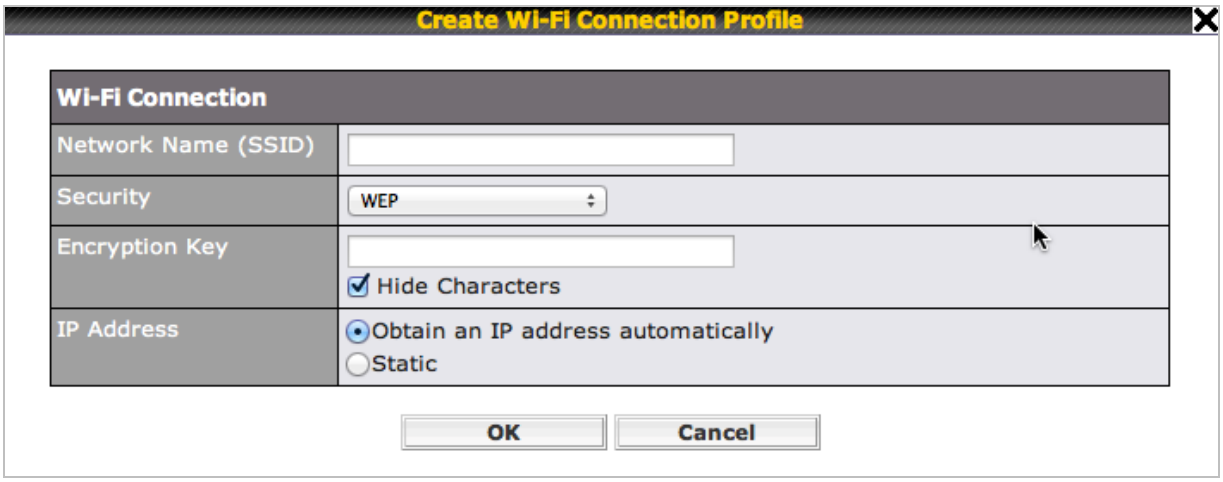
This will open a window similar to the one shown below:



Create Wi-Fi Connection Profile Settings	
Network Name (SSID)	This field is for defining a name to represent this Wi-Fi connection.
Security	This option allows you to select which security policy is used for this wireless network. Available options: • **Open** • **WEP** • **WPA/WPA2 – Personal** • **WPA/WPA2 – Enterprise** The settings to be displayed under this row will vary depending on the selected security policy.

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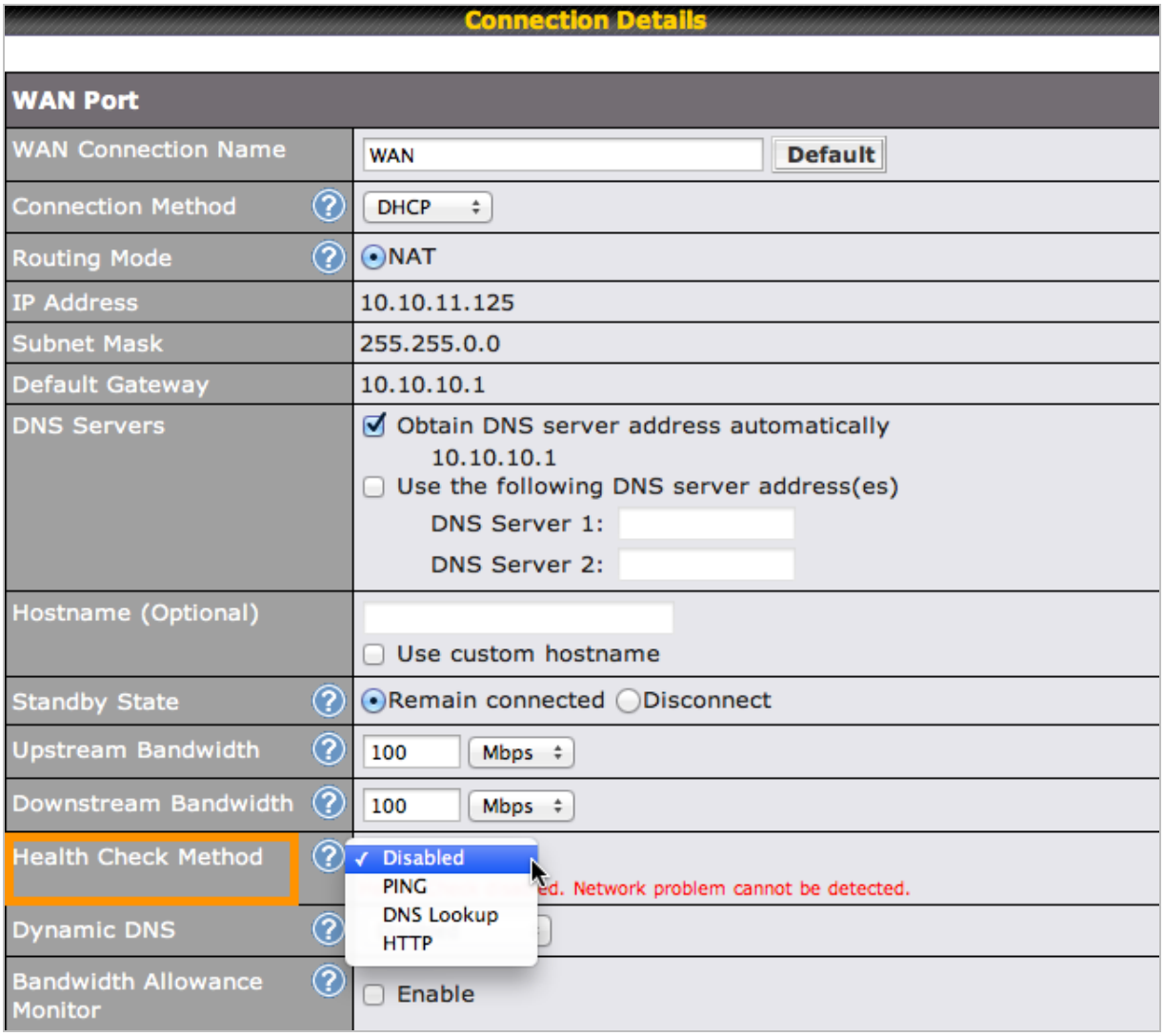
8.3 WAN Health Check

To ensure traffic is routed to healthy WAN connections only, the Pepwave Surf SOHO can periodically check the health of each WAN connection.

The health check settings for each WAN connection can be independently configured via ***Network > WAN > Details***.



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

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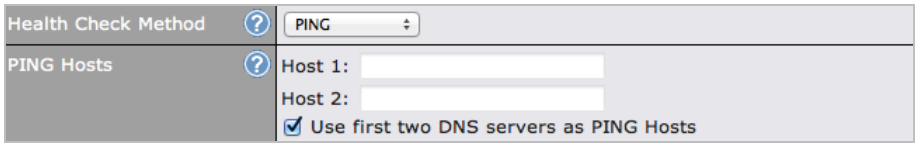
Health Check Settings	
Method	This setting specifies the health check method for the WAN connection. The value of **Method** can be configured as **Disabled**, **Ping**, or **DNS Lookup**. The default method is **DNS Lookup**. For Mobile Internet connection, the value of Method can be configured as **Disabled**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

Health Check Disabled

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

Health Check Method: PING



ICMP ping packets will be issued to test the connectivity with a configurable target IP address or 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

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.

Health Check DNS Servers	This field allows you to specify two DNS host IP addresses with which connectivity is to be tested via DNS lookup. If **Use first two DNS servers as Health Check DNS Servers** is checked, the first two DNS servers will be the DNS lookup targets for checking a connection's health. If the box is not checked, **Host 1** must be filled, while **Host 2** is optional. If the box **Include public DNS servers** is selected and no response is received from all specified DNS servers, DNS lookups will also be issued to some public DNS servers. A

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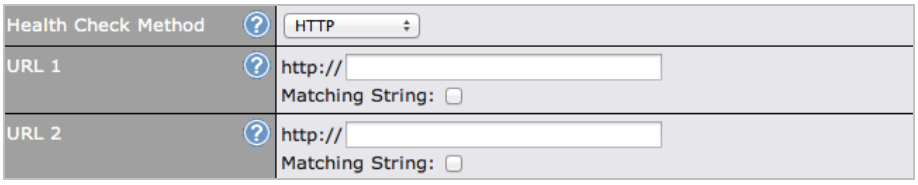
	WAN connection will be treated as down only if there is also no response received from the public DNS servers. Connections will be considered as up if DNS responses are received from any one of the health check DNS servers, regardless of a positive or negative result. By default, the first two DNS servers of the WAN connection are used as the **Health Check DNS Servers**.

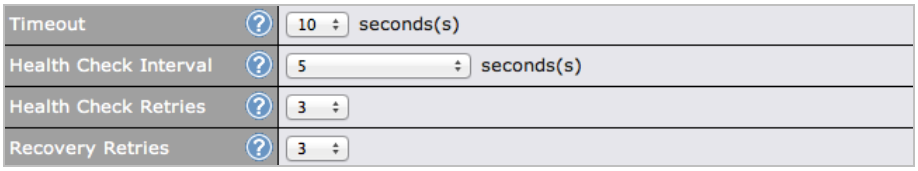
Health Check Method: HTTP



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

URL 1	The URL will be retrieved when performing an HTTP health check. When *String to Match* is left blank, a health check will pass if the HTTP return code is between 200 and 299 (Note: HTTP redirection codes 301 or 302 are treated as failures). When *String to Match* is filled, a health check will pass if the HTTP return code is between 200 and 299 and if the HTTP response content contains the string
URL 2	If URL 2 is also provided, a health check will pass if either one of the tests passed.

Other Health Check Settings



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

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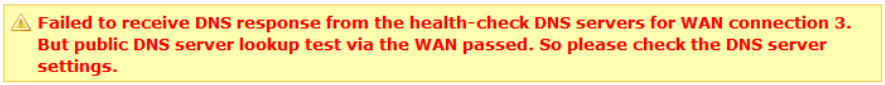
Automatic Public DNS Server Check on DNS Test Failure

If **Health Check Method** is set to **DNS Lookup** and DNS lookups fail, the Surf SOHO will automatically perform DNS lookups on some public DNS servers. If the tests are successful, the target DNS server may have malfunctioned. If this occurs, you will see the following warning message:



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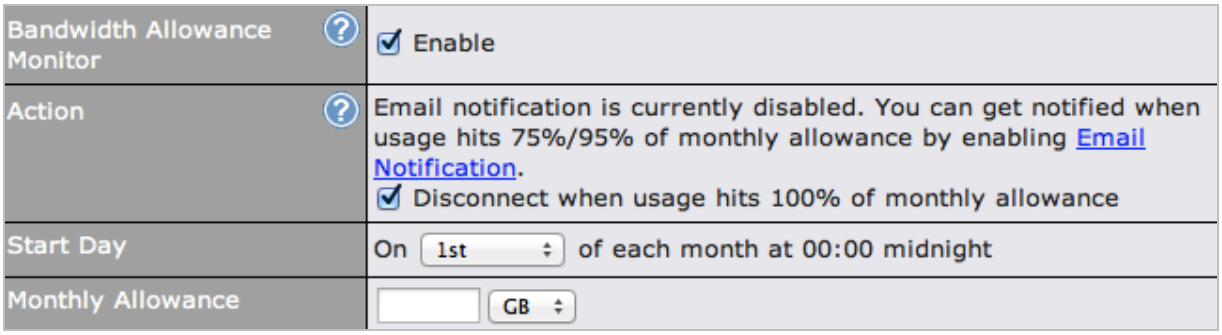
8.4 Bandwidth Allowance Monitor

The **Bandwidth Allowance Monitor** helps you track network usage.



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

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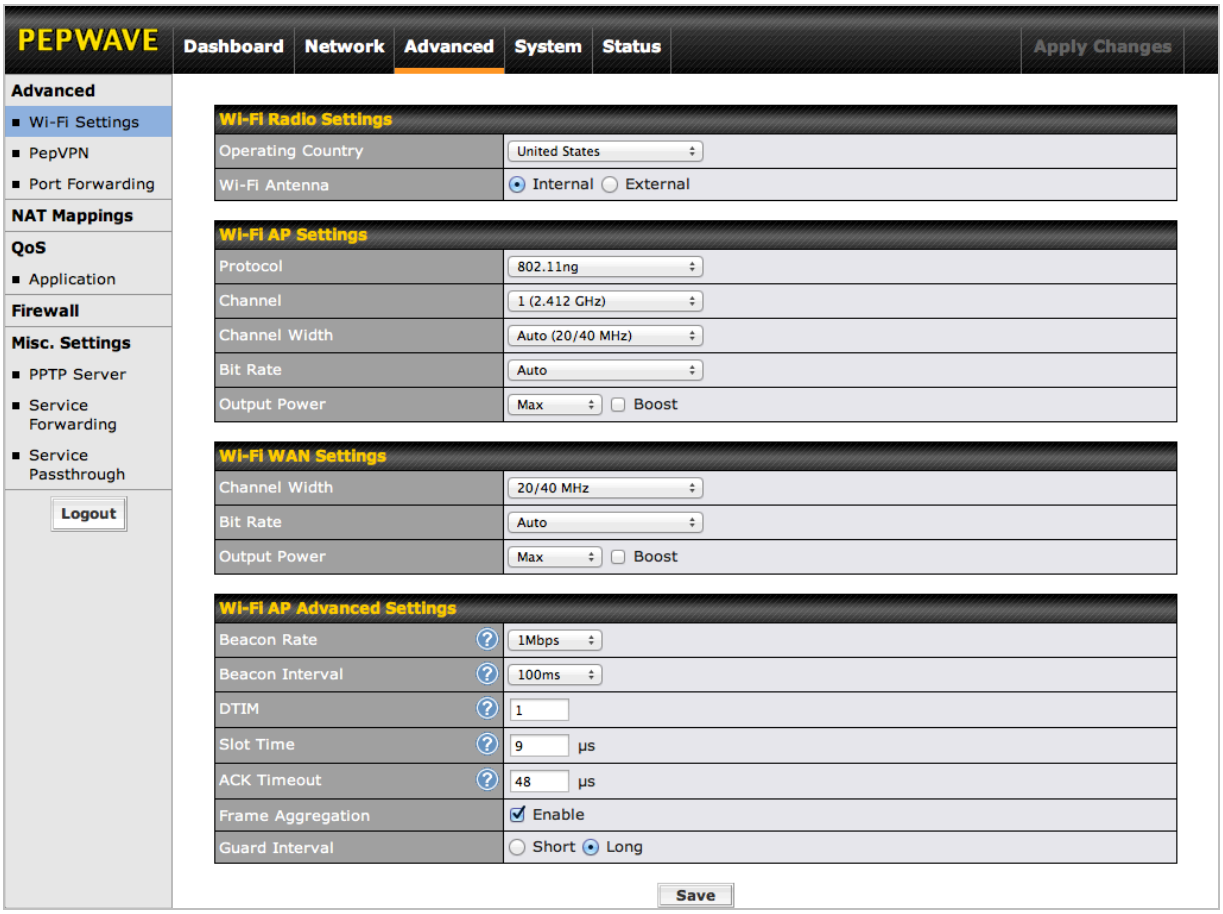
9 Wi-Fi Settings

Wi-Fi settings can be configured at ***Advanced > Wi-Fi Settings***.



Wi-Fi Radio Settings	
Operating Country	This option sets the country whose regulations the Pepwave Surf SOHO follows.
Wi-Fi Antenna	Choose from the Surf SOHO's internal or optional external antennas.

Wi-Fi AP Settings	
Protocol	This option allows you to specify whether 802.11b and/or 802.11g client association requests will be accepted. Available options are **802.11n/g**, **802.11b/g**, and **802.11n/a**. By default, **802.11n/g** is selected.
Channel	This option allows you to select which 802.11 RF channel will be used. **Channel 1 (2.412 GHz)** is selected by default.
Channel Width	Options **Auto (20/40 MHz)** and **20 MHz** are available. The default setting is **Auto (20/40 MHz),** which allows both widths to be used simultaneously.

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Bit Rate	This option allows you to select a specific bit rate for data transfer over the device's Wi-Fi network. By default, **Auto** is selected.
Output Power	This option is for specifying the transmission output power for the Wi-Fi AP. There are 4 relative power levels available – **Max**, **High**, **Mid**, and **Low**. The actual output power will be bound by the regulatory limits of the selected country.

Important Note

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

Wi-Fi WAN Settings	
Channel Width	Options **Auto (20/40 MHz)** and **20 MHz** are available. The default setting is **Auto (20/40 MHz),** which allows both widths to be used simultaneously.
Bit Rate	This option allows you to select a specific bit rate for data transfer over the device's Wi-Fi network. By default, **Auto** is selected.
Output Power	This option is for specifying the transmission output power for the Wi-Fi AP. There are 4 relative power levels available – **Max**, **High**, **Mid**, and **Low**. The actual output power will be bound by the regulatory limits of the selected country.

Wi-Fi AP Advanced Settings	
Beacon Rate	This option is for setting the transmit bit rate for sending a beacon. By default, **1Mbps** is selected.
Beacon Interval	This option is for setting the time interval between each beacon. By default, **100ms** is selected.
DTIM	This field allows you to set the frequency for the beacon to include a delivery traffic indication message. The interval is measured in milliseconds. The default value is set to **1 ms**.
Slot Time	This field is for specifying the wait time before the Surf SOHO transmits a packet. By default, this field is set to **9 µs**.
ACK Timeout	This field is for setting the wait time to receive an acknowledgement packet before performing a retransmission. By default, this field is set to **48 µs**.
Frame Aggregation	This option allows you to enable frame aggregation to increase transmission throughput.
Guard Interval	This setting allows choosing a short or long guard period interval for your transmissions.

Important Note

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

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10 Establishing VPNs with PepVPN

PepVPN is our foundation VPN engine. It is ideal for establishing a secure tunnel over any WAN link and is possibly the world's easiest VPN technology. PepVPN makes it even easier to migrate to SpeedFusion. It offers all the benefits of IPsec and other conventional tunneling protocols, plus a variety of performance and reliability features you won't find anywhere else.

Before establishing a VPN connection, first enter a value into the **Local ID** field. The value entered here will be used by remote partners when creating a profile used to establish a 256-bit AES-encrypted VPN connection with the Surf SOHO. Note that all IDs must be unique. To save the local ID and begin creating a new profile, discussed next, click **Save**.

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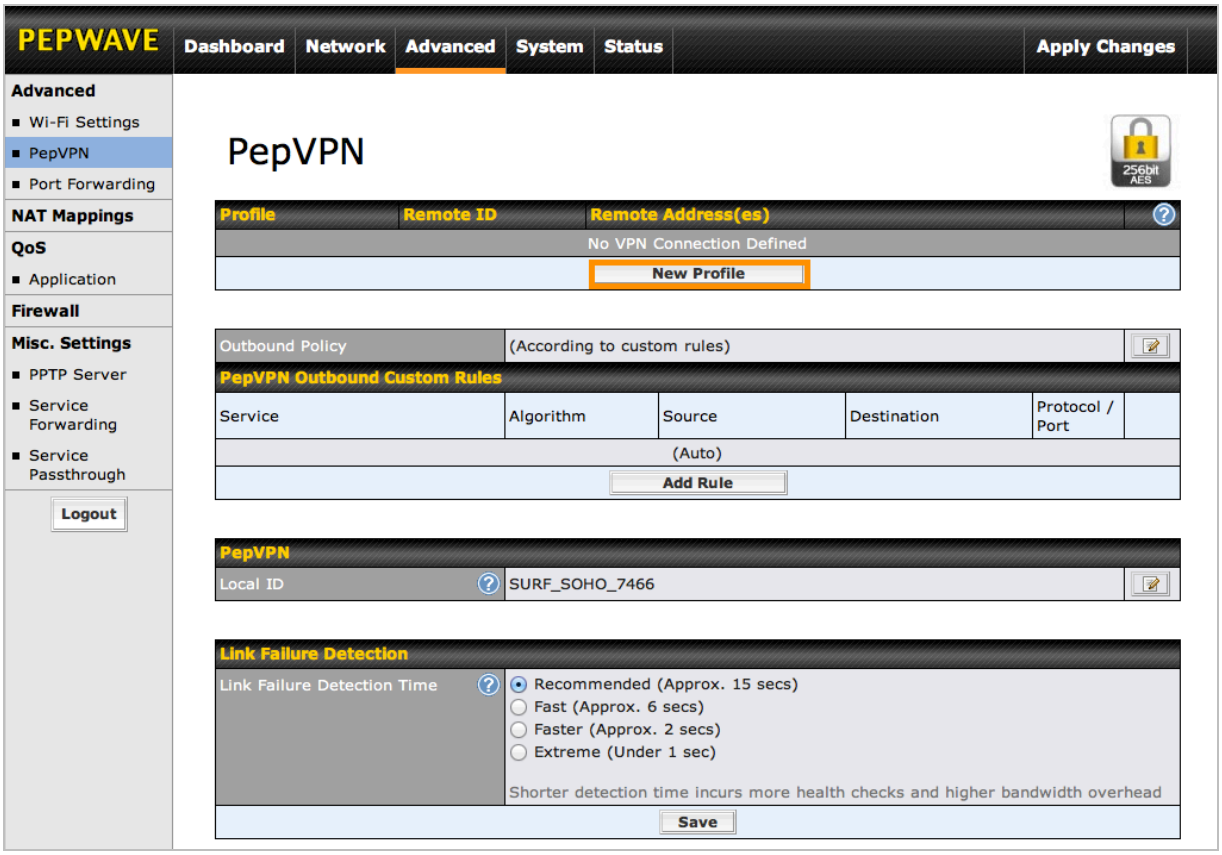
10.1 Creating a New PepVPN Profile

To begin creating a PepVPN profile, click the **New Profile** button displayed after saving a local ID, discussed above.



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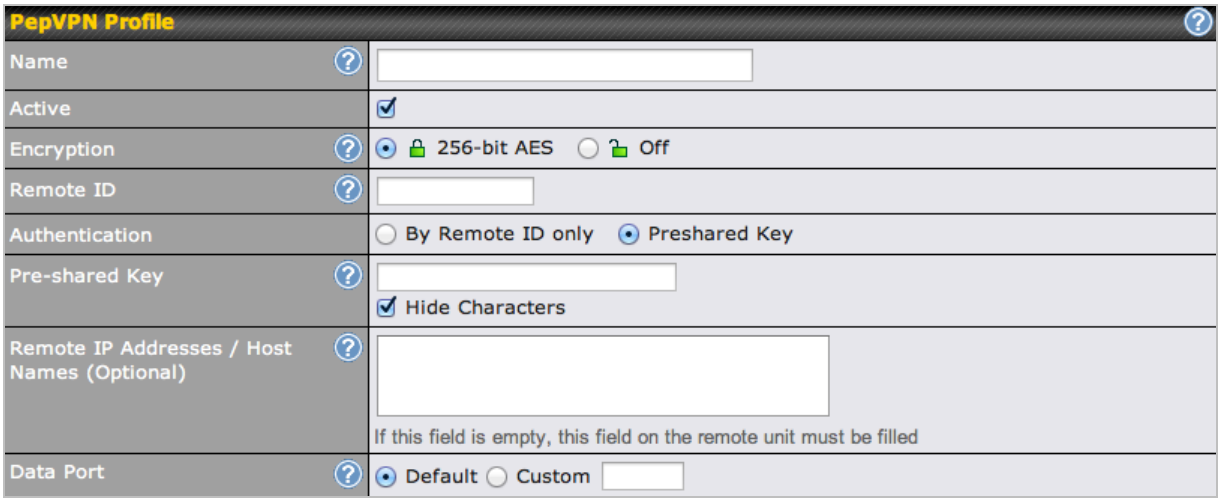
The following screen, where you can specify PepVPN profile settings, appears next:



PepVPN Profile	
Active	Check this box to enable the VPN.
Encryption	By default, VPN traffic is encrypted with 256-bit AES standard. If **Off** is selected on both sides of a VPN connection, no encryption will be applied.
Remote ID	The Pepwave Surf SOHO establishes a VPN connection with a remote peer that has a serial number or a remote ID entered here.
Pre-shared Key	This is an optional field which defines the pre-shared key used for this particular VPN connection. The VPN connection's session key will be further protected by the pre-shared key. The connection will be up only if the pre-shared keys on each side match. When the remote peer is running firmware 5.0 or 5.1, this setting will be ignored.
Remote 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 Surf SOHO will initiate a connection to each of the remote IP addresses until it succeeds. If the field is empty, the Pepwave Surf SOHO will wait for a connection from the remote peer. Therefore, at least one side of the two VPN peers must have the field filled. Otherwise, a VPN connection cannot be established. Enter one IP address or host name per line.
Data Port	If **Default** is selected, VPN data will go through UDP port 4500. Select **Custom** and enter a port number if a specific outgoing port is desired.

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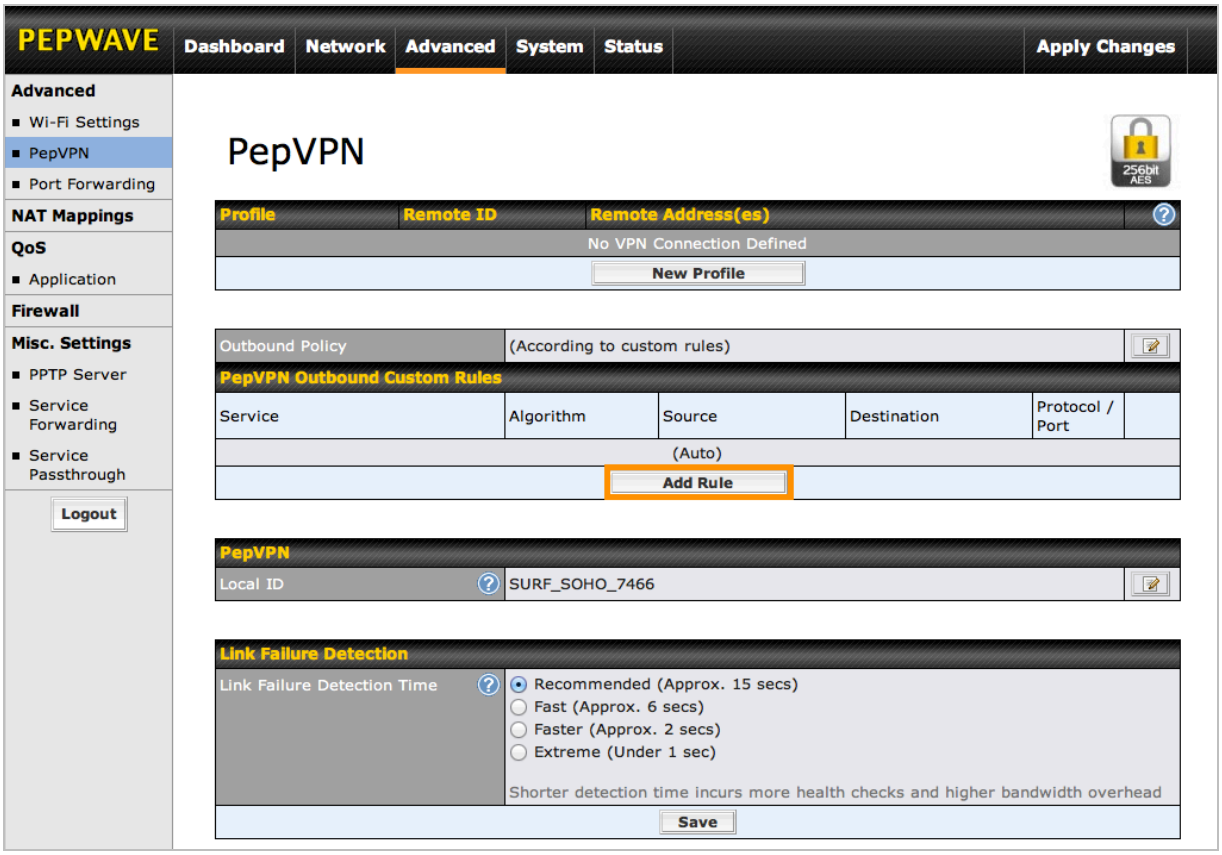
10.2 PepVPN Outbound Custom Rules

PepVPN supports setting outbound rules that apply to various services over the connection. To create a new rule, click the **Add Rule** button.



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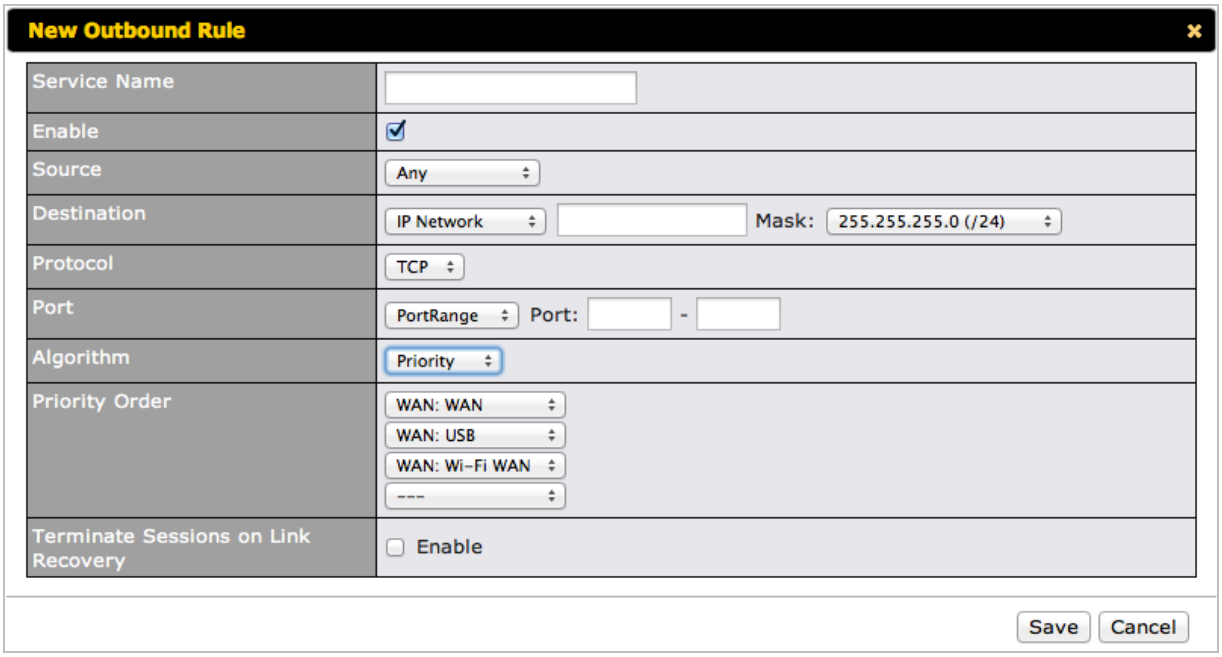
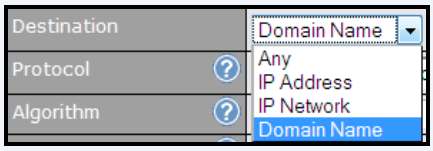
After clicking the **Add Rule** button, the following screen, where you can define a new outbound rule, will be displayed:



New Outbound Rule Settings	
Service Name	This setting specifies the name of the custom rule.
Enable	This setting specifies whether the outbound traffic rule takes effect. With an **Enable** value of **Yes**, the rule takes effect: traffic is matched and actions are taken by the Pepwave Surf SOHO based on the other parameters of the rule. With an **Enable** value of **No**, the Surf SOHO disregards 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, IP network, or domain name for traffic that matches the rule. 
Domain Name	If **Domain Name** is chosen and a domain name, such as foobar.com, is entered, any outgoing accesses to foobar.com and `*.foobar.com` will match this criterion. You may enter a wildcard (.*) at the end of a domain name to match any host with a name having the domain name in the middle. If you enter `.*,` for example, then www.foobar.com, www.foobar.co.jp, or foobar.co.uk will also match. Placing wildcards in any other position is not supported. NOTE: if a server has one Internet IP address and multiple server names, and if one of the names is defined here, then accesses to any one of the server names will also match this rule.

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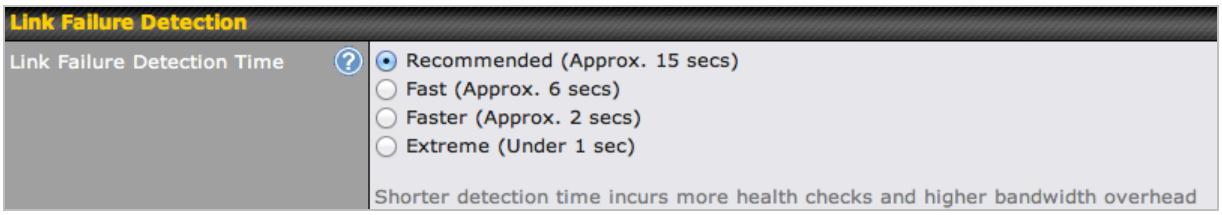
Protocol and Port	This setting specifies the IP protocol and port of outbound traffic that matches this rule. You may select from common protocols using the provided drop-down menu.
Algorithm	This setting specifies the behavior of Pepwave MAX for the custom rule. Choose from **Priority**, which prioritizes WAN connections in the listed order, or **Enforced**, which routes matching traffic regardless of the specified WAN connection's health check status.
Terminate Sessions on Link Recovery	This setting specifies whether to terminate existing IP sessions on a less preferred WAN connection in the event that a more preferred WAN connection is recovered. This setting is applicable to the **Priority** algorithm. By default, this setting is disabled. In this case, existing IP sessions will not be terminated or affected when any other WAN connection is recovered. If this setting is enabled, existing IP sessions may be terminated when another WAN connection is recovered such that only the preferred healthy WAN connection(s) is used at any point in time.

10.3 Link Failure Detection



Link Failure Detection	
Link Failure Detection Time	PepVPN can detect routing failures on the path between two sites over each WAN connection. Failed WAN connections will not be used to route VPN traffic. Health check packets are sent to the remote unit to detect any failure. The more frequently checks are sent, the shorter the detection time. However, this will result in higher bandwidth overhead. When **Recommended** is selected, a health check packet is sent every 5 seconds, and the expected detection time is 15 seconds. When **Fast** is selected, a health check packet is sent every 3 seconds, and the expected detection time is 6 seconds. When **Faster** is selected, a health check packet is sent every second, and the expected detection time is 2 seconds. When **Extreme** is selected, a health check packet is sent every tenth of a second, and the expected detection time is less than 1 second. By default, **Recommended** is selected.

Important Note

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

Tip

Want to know more about VPN Sub-Second Session Failover? Visit our YouTube Channel for a video tutorial!

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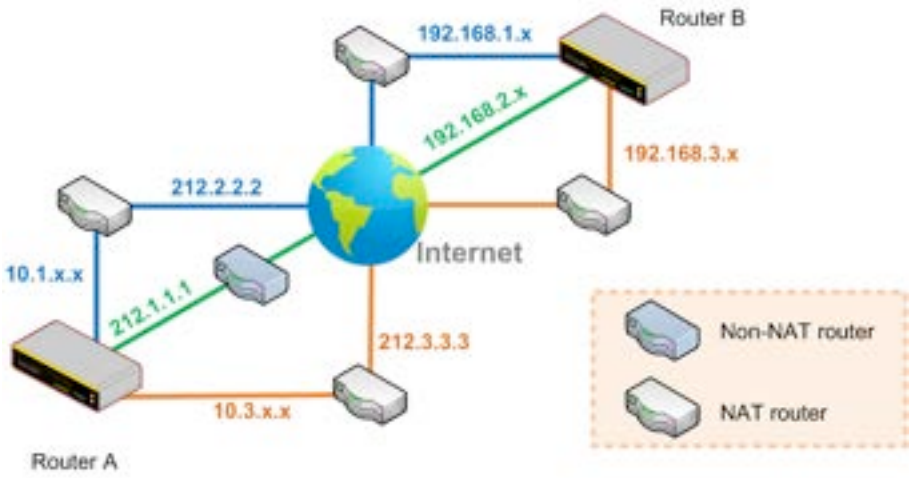
10.4 The Pepwave Surf SOHO behind a NAT Router

The Pepwave Surf SOHO supports PepVPN connections which are behind a NAT (network address translation) router.

To allow a WAN connection behind a NAT router to accept VPN connections, you must 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 enter all public IP addresses or host names of **Unit A** in **Unit B**'s **Remote IP Addresses / Host Names** field. Leave the field in **Unit A** blank. With this setting, a SpeedFusion™ connection can be set up, and all WAN connections on both sides will be used.

See the following diagram for an example:



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

IP subnets must be unique among VPN peers
The entire inter-connected PepVPN network is one single non-NAT IP network. No two subnets in two sites shall be duplicated. Otherwise, connectivity problems will be experienced in accessing those subnets.

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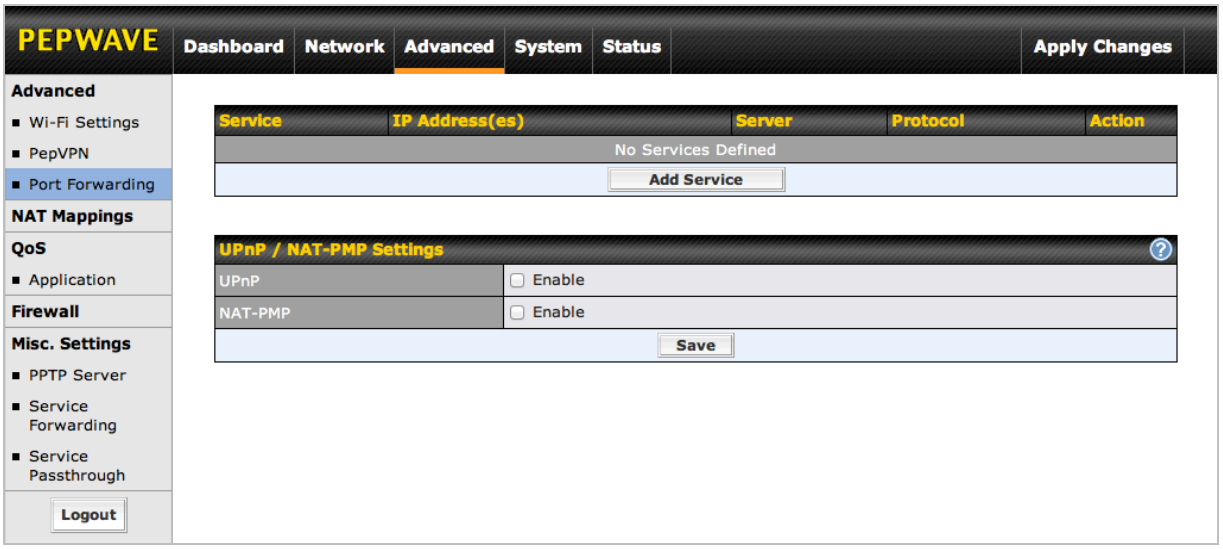
11 Port Forwarding

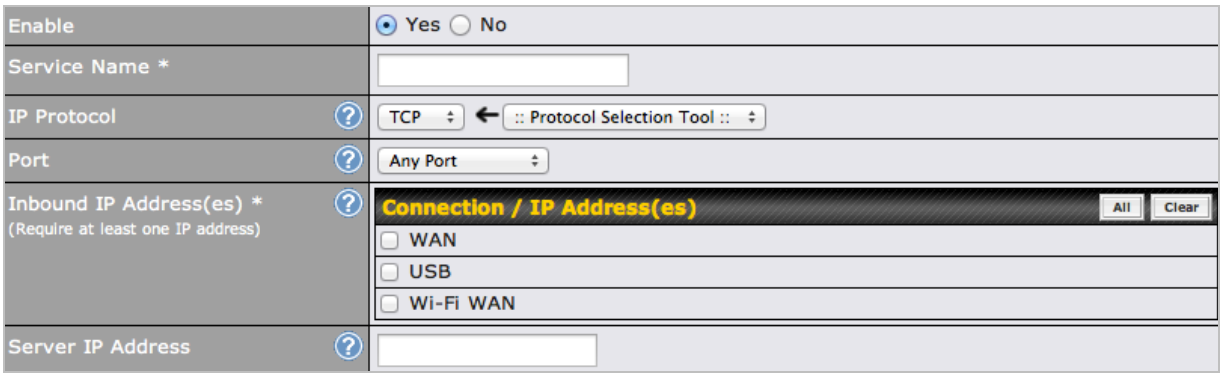
11.1 Port Forwarding Service

The Pepwave Surf SOHO can act as a firewall that blocks, by default, all inbound access from the Internet. By using port forwarding, Internet users can access the servers behind the Pepwave Surf SOHO.

Inbound port forwarding rules can be defined at ***Advanced > Port Forwarding***.



To define a new service, click the **Add Service** button, which displays the following screen:



Port Forwarding Settings	
Enable	When **Yes** is selected, the inbound service rule takes effect. If the inbound traffic matches the specified IP protocol and port, action will be taken by the Pepwave Surf SOHO based on the other parameters of the rule. When **No** is selected, the Pepwave Surf SOHO will disregard the other parameters of the rule.
Service Name	This setting identifies the service to the system administrator. Valid values consist of alphanumeric and the underscore "_" characters only.

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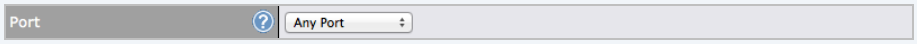
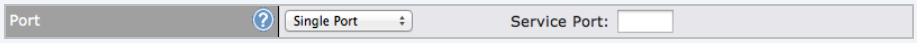
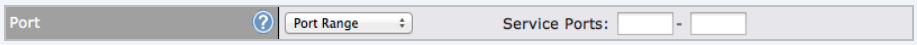
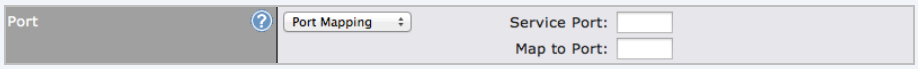
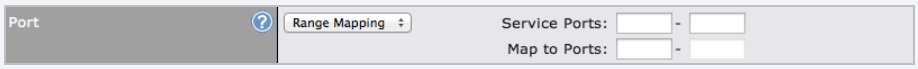
IP Protocol	The **IP Protocol** setting, along with the **Port** setting, specifies the protocol of the service as TCP, UDP, ICMP, or IP. Traffic that is received by the Pepwave Surf SOHO via the specified protocol at the specified port(s) is forwarded to the LAN host specified by the **Server IP Address** setting. Please see below for details on the **Port** and **Server IP Address** settings. Alternatively, the **Protocol Selection Tool** drop-down menu can be used to automatically fill in the protocol and a single port number for common Internet services (e.g., HTTP, HTTPS, etc.). After selecting an item from the **Protocol Selection Tool** drop-down menu, the protocol and port number remain manually modifiable.
Port	The **Port** setting specifies the port(s) that correspond to the service,. It 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 the Pepwave Surf SOHO via the specified protocol is forwarded to the server specified by the **Server IP Address** setting. For example, with **IP Protocol** set to **TCP**, and **Port** set to **Any Port**, all TCP traffic is forwarded to the configured servers.  **Single Port**: Traffic that is received by the Pepwave Surf SOHO via the specified protocol at the specified port is forwarded via the same port to the server specified by the **Server IP Address** setting. For example, with **IP Protocol** set to **TCP**, and **Port** set to **Single Port** and **Service Port 80**, TCP traffic received on port 80 is forwarded to the configured servers via port 80.  **Port Range**: Traffic that is received by the Pepwave Surf SOHO via the specified protocol at the specified port range is forwarded via the same respective ports to the LAN host specified by the **Server IP Address** 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 server via the respective ports.  **Port Mapping**: Traffic that is received by the Pepwave Surf SOHO via the specified protocol at the specified port is forwarded via a different port to the server specified by the **Server IP Address** 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.  **Range Mapping**: Traffic that is received by the Pepwave Surf SOHO via the specified protocol at the specified port range is forwarded via a different port to the server specified by the **Server IP Address** setting.
Inbound IP Address(es)	This setting specifies the WAN connections and Internet IP address(es) from which the service can be accessed. It is required to select at least one IP address.
Server IP Address	This setting specifies the LAN IP address of the server that handles the requests for the service.

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11.2 UPnP / NAT-PMP Settings

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

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

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

UPnP / NAT-PMP Settings	
UPnP	☑ Enable
NAT-PMP	☑ Enable

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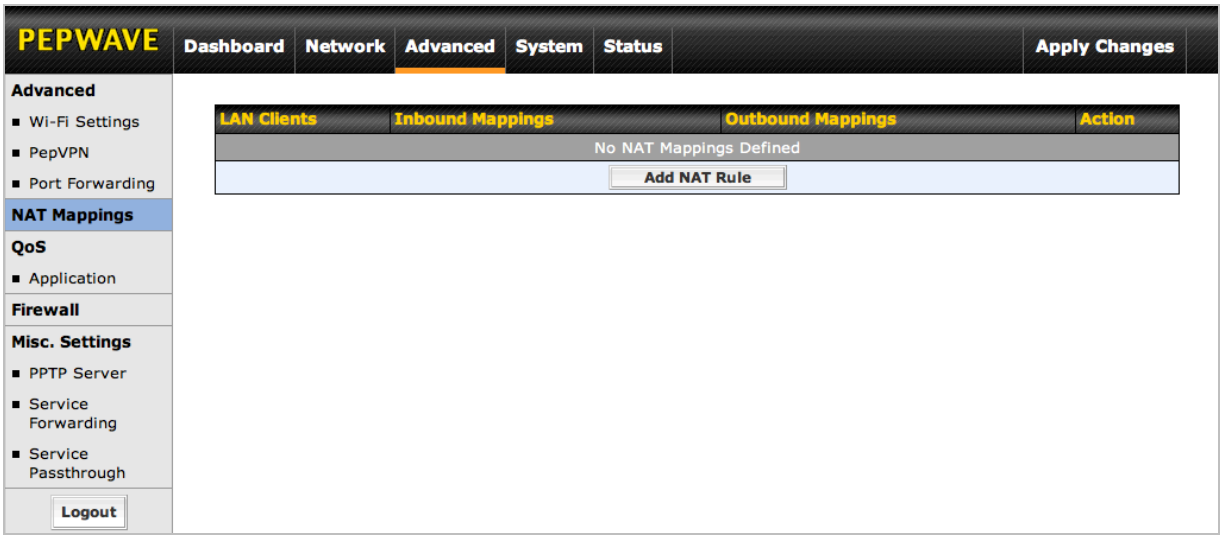
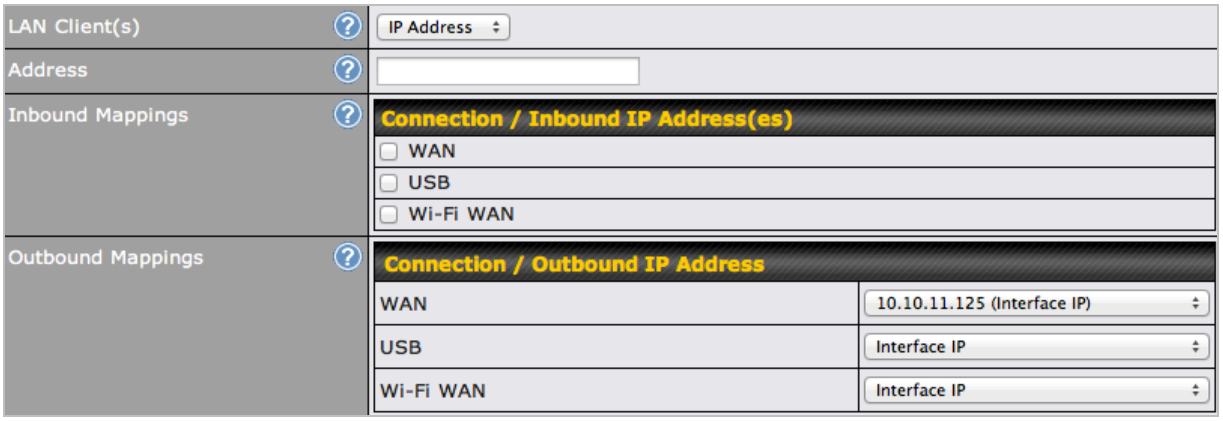
12 NAT Mappings

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

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



To add a rule for NAT Mappings, click **Add NAT Rule**, which displays the following screen:



NAT Mapping Settings	
LAN Client(s)	NAT mapping rules can be defined for a single LAN **IP Address**, an **IP Range**, or an **IP Network**.
Address	This refers to the LAN host's private IP address. The system maps this address to a number of public IP addresses, specified below, in order to facilitate inbound and outbound traffic. This option is only available when **IP Address** is selected.

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

Important Note
Inbound firewall rules override inbound mapping settings.

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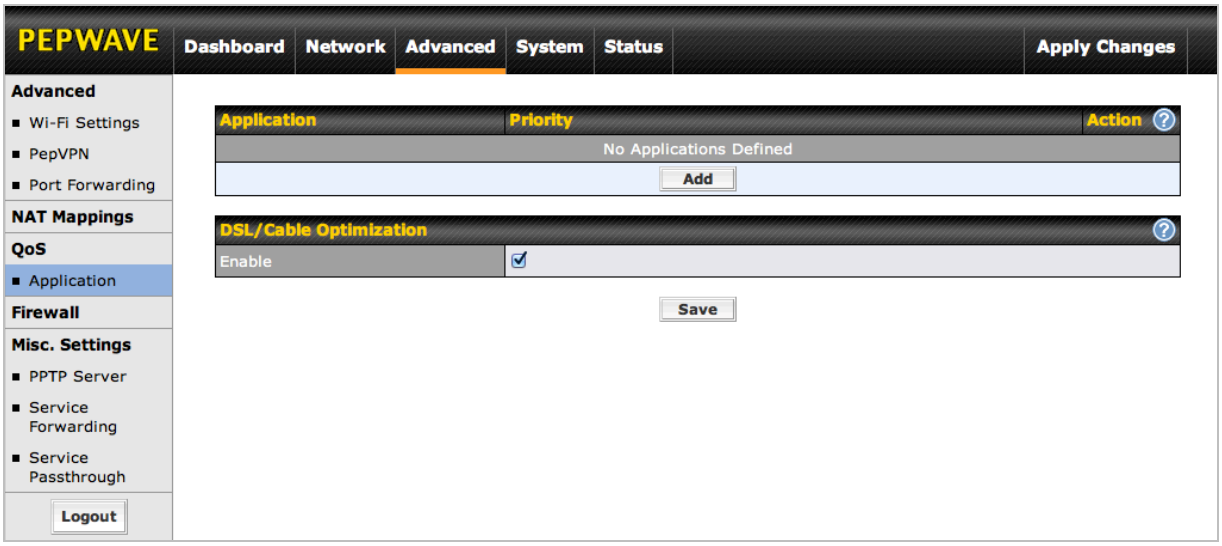
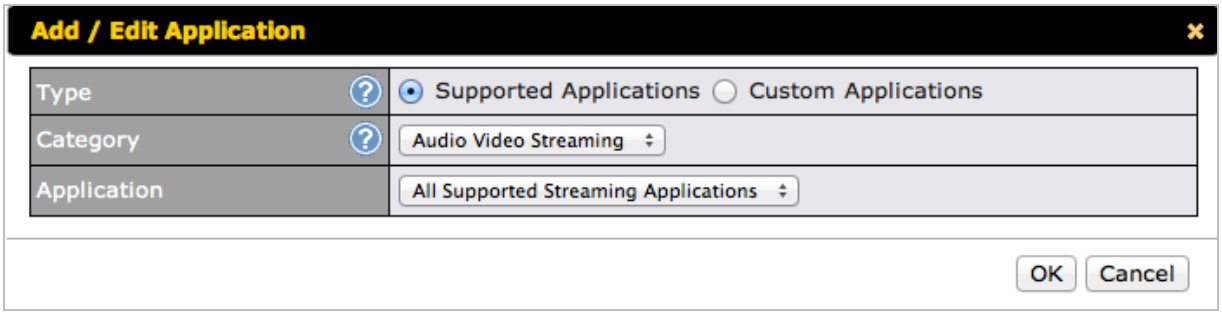
13 QoS

QoS settings can be defined at ***Advanced > QoS > Application***.



13.1 Application Prioritization

Click the **Add** button to prioritize traffic for a supported or custom application. Click the button in the **Action** column to delete the custom application in the corresponding row.

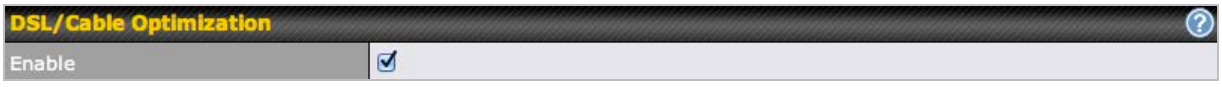


13.2 DSL/Cable Optimization

DSL/cable-based WAN connections limit upload bandwidth compared to download bandwidth. When this option is enabled, the download bandwidth of the WAN can be fully utilized in any situation.

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

By default, this feature is **enabled**.



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14 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 the Pepwave Surf SOHO supports the selective filtering of data traffic in both directions:

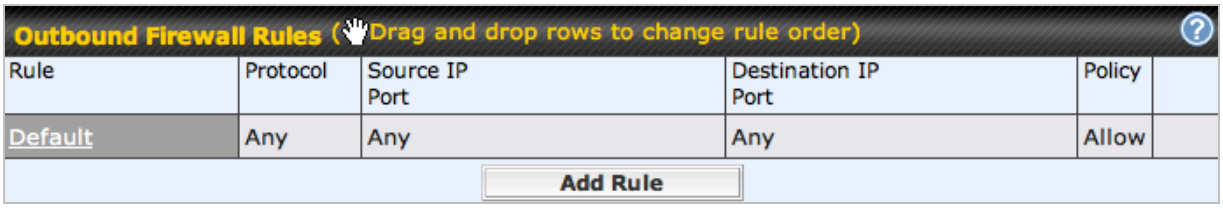
- Outbound (LAN to WAN)
- Inbound (WAN to LAN)
- Intrusion Detection and DoS Prevention

With PepVPN enabled (see Section 10), the firewall rules also apply to VPN tunneled traffic.

14.1 Outbound and Inbound Firewall

14.1.1 Access Rules

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



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

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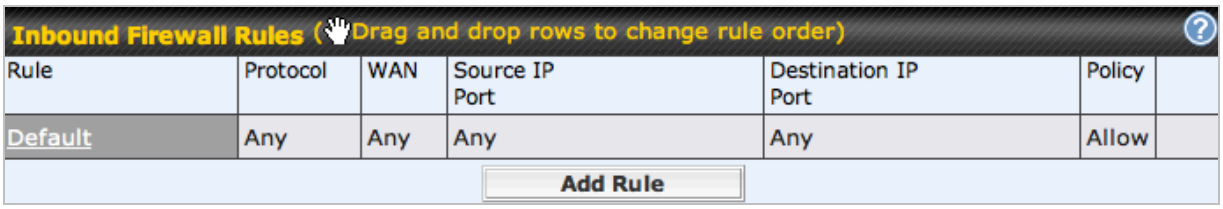
Inbound firewall settings are located at ***Advanced > Firewall > Inbound Firewall Rules.***



After clicking **Add Rule,** the following window will appear:

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 set to **Allow** for both outbound and inbound accesses.

Inbound / Outbound Firewall Settings	
Rule Name	This setting specifies a name for the firewall rule.
Enable	When **Yes** is selected, the firewall rule takes effect. If the traffic matches the specified protocol/IP/port, actions will be taken by the Pepwave Surf SOHO based on the other parameters of the rule. When **No** is selected, the Pepwave Surf SOHO 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: • **WAN** • **USB** • **Wi-Fi WAN**
Protocol	This setting specifies the protocol to be matched by the rule: • **TCP** • **UDP** • **ICMP** • **IP**

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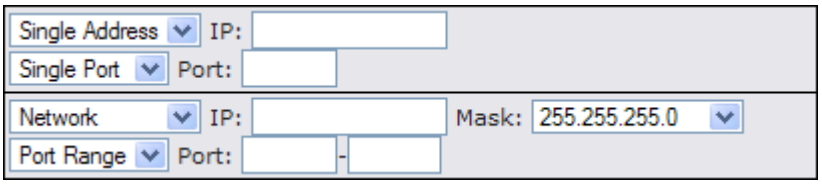
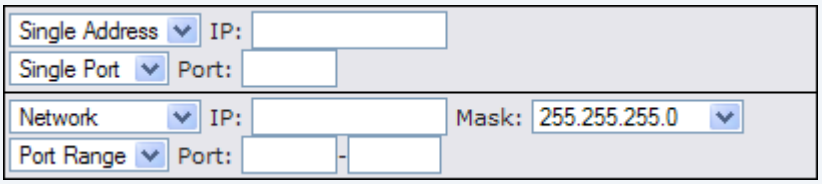
	Alternatively, the **Protocol Selection Tool** drop-down menu can be used to automatically fill in the protocol and port number of common Internet services (e.g., HTTP, HTTPS, etc.) After selecting an item from the **Protocol Selection Tool** drop-down menu, the protocol and port number remain manually 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 here:  In addition, a single port, or a range of ports, can be specified for the **Source IP & Port** setting.
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 here:  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 the Pepwave Surf SOHO 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, matching traffic passes through the Pepwave Surf SOHO (to be routed to the destination). • If the value of the **Action** setting is set to **Deny**, matching traffic does not pass through the Pepwave Surf SOHO 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

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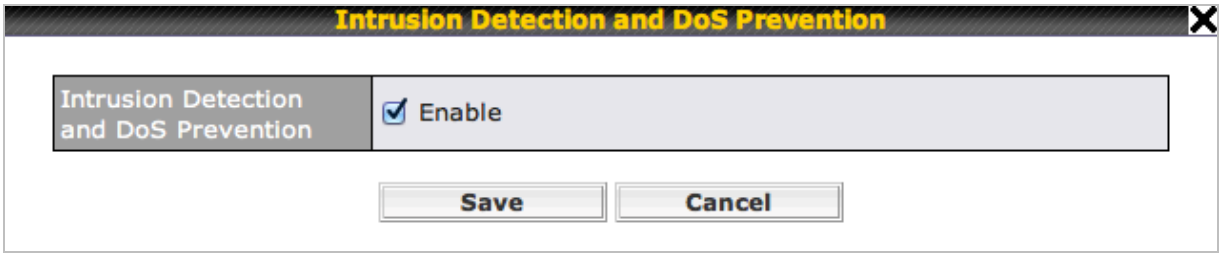
Tip

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

14.2 Intrusion Detection and DoS Prevention



The Pepwave Surf SOHO supports detecting and preventing intrusions and denial-of-service (DoS) attacks from the Internet. To turn on this feature, click , check **Enable** next to **Intrusion Detection and DoS Prevention**, and press the **Save** button.

When this feature is enabled, the Pepwave Surf SOHO 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
- Ping flood

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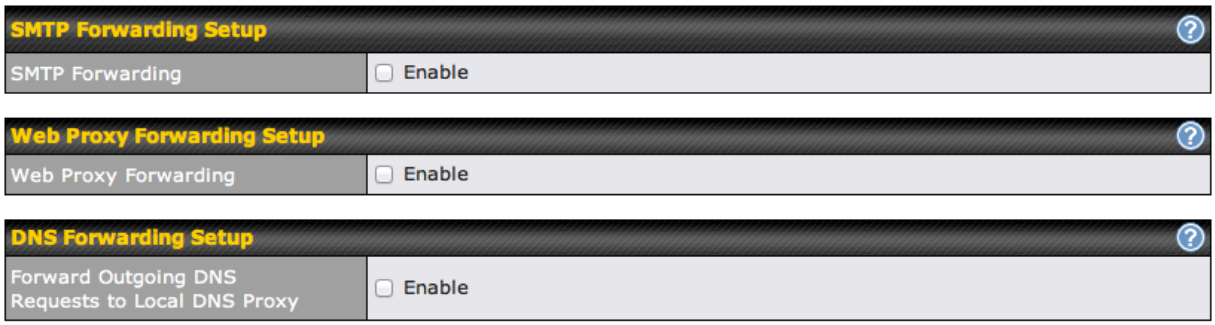
15 Miscellaneous Settings

The miscellaneous settings include configurations for service forwarding and service passthrough.

15.1 Service Forwarding

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



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

15.1.1 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 Surf SOHO supports intercepting and redirecting all outgoing SMTP connections destined for TCP port 25 via a WAN connection to the WAN's corresponding SMTP server.

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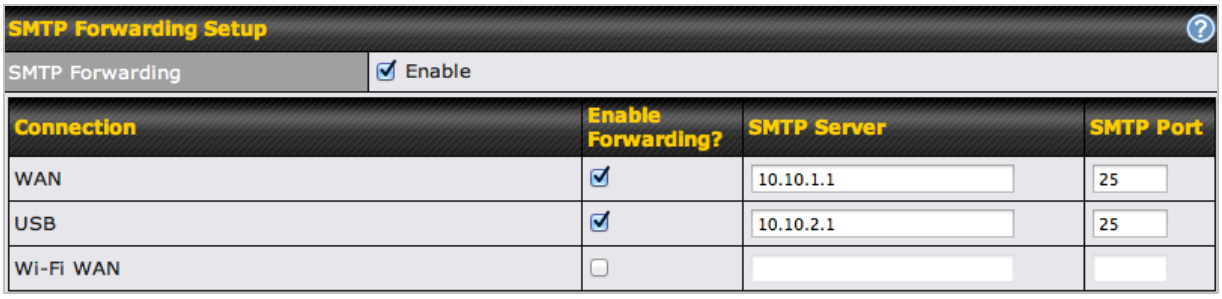


SMTP Forwarding Setup

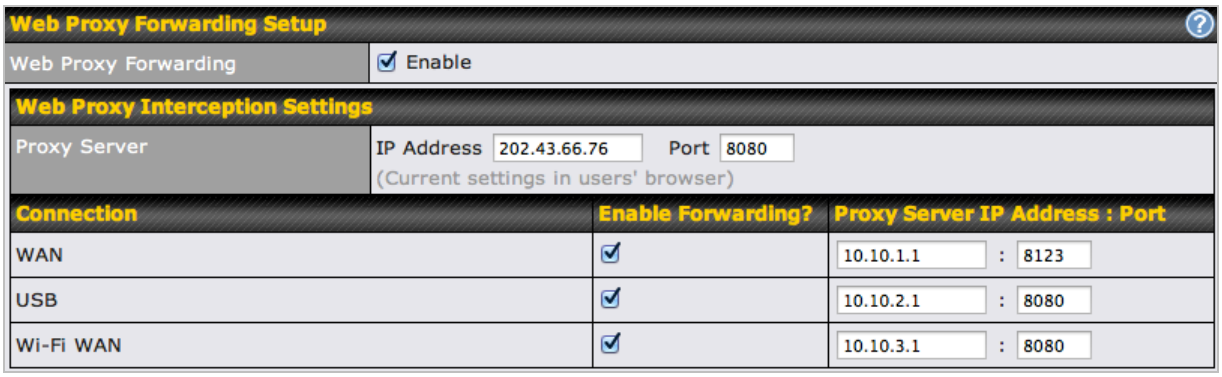
SMTP Forwarding	☑ Enable

Connection	Enable Forwarding?	SMTP Server	SMTP Port
WAN	☑	10.10.1.1	25
USB	☑	10.10.2.1	25
Wi-Fi WAN	☐		

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

The Pepwave Surf SOHO 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 forwarding is disabled for a WAN connection, SMTP connections for the WAN will be forwarded to the connection's original destination.

15.1.2 Web Proxy Forwarding



Web Proxy Forwarding Setup

Web Proxy Forwarding	☑ Enable

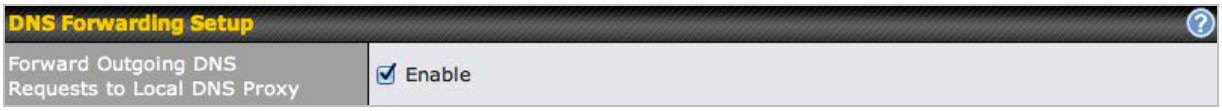
Web Proxy Interception Settings

Proxy Server	IP Address 202.43.66.76 Port 8080 (Current settings in users' browser)

Connection	Enable Forwarding?	Proxy Server IP Address : Port
WAN	☑	10.10.1.1 : 8123
USB	☑	10.10.2.1 : 8080
Wi-Fi WAN	☑	10.10.3.1 : 8080

When this feature is enabled, the Pepwave Surf SOHO will intercept all outgoing connections destined for the proxy server specified in **Web Proxy Interception Settings**, choose a WAN connection with reference to 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 forwarded to the connection's original destination.

15.1.3 DNS Forwarding



DNS Forwarding Setup

Forward Outgoing DNS Requests to Local DNS Proxy	☑ Enable

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

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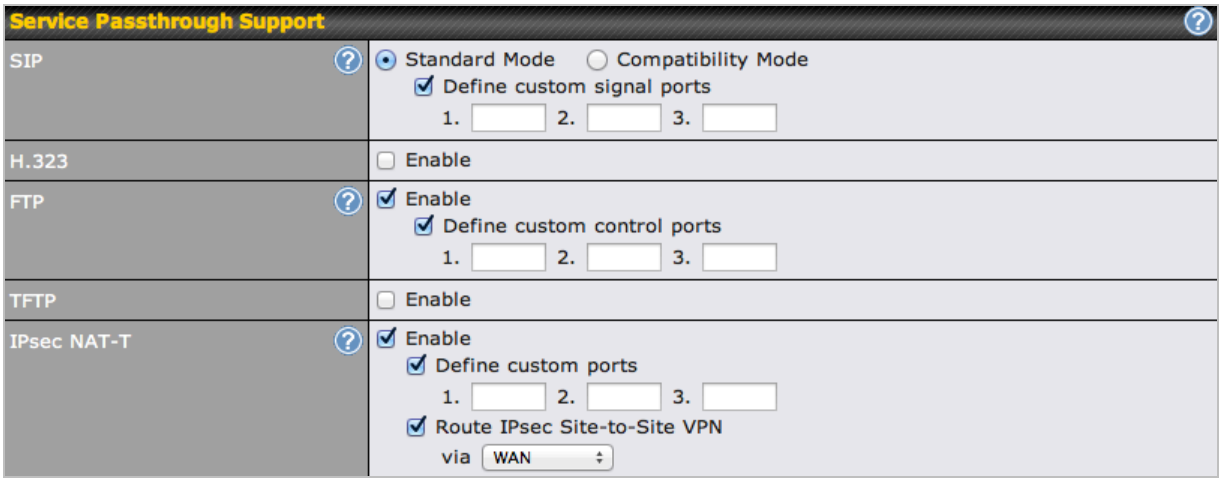
15.2 Service Passthrough

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



Some Internet services must be specially handled in a multi-WAN environment. The Pepwave Surf SOHO supports handling these services correctly such that Internet applications do not notice being behind a multi-WAN router. Settings for service passthrough support are available here.

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

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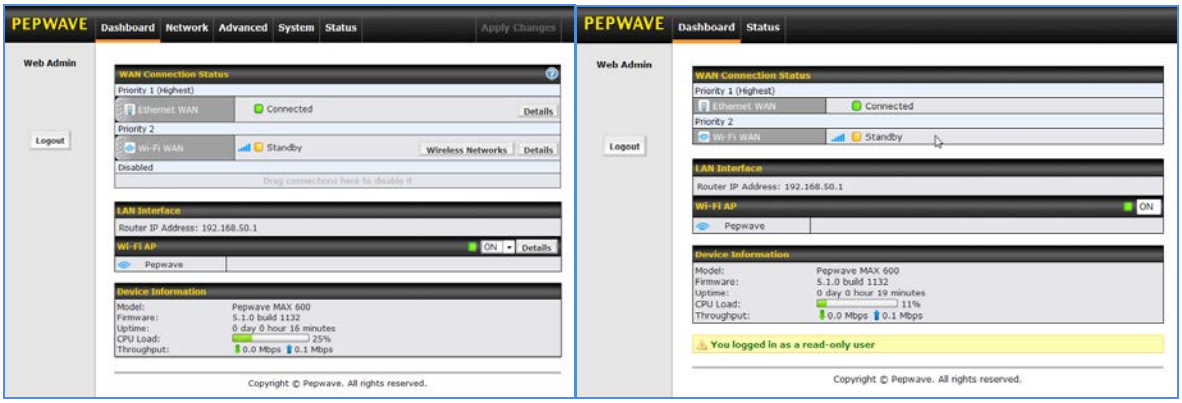
16 System Settings

16.1 Admin Security

There are two user accounts available for accessing the Web Admin. Usernames are **admin** and **user**. They represent two user levels: **admin** has full administration access, while **user** is a read-only account. The read-only account can only access the device's status information and cannot make any change to device settings.



Admin Account UI User Account UI

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

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

For security reasons, after logging in to the Web Admin Interface for the first time, it is recommended to change the administrator password.

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

Administrative settings configuration is located at ***System > Admin Security***.

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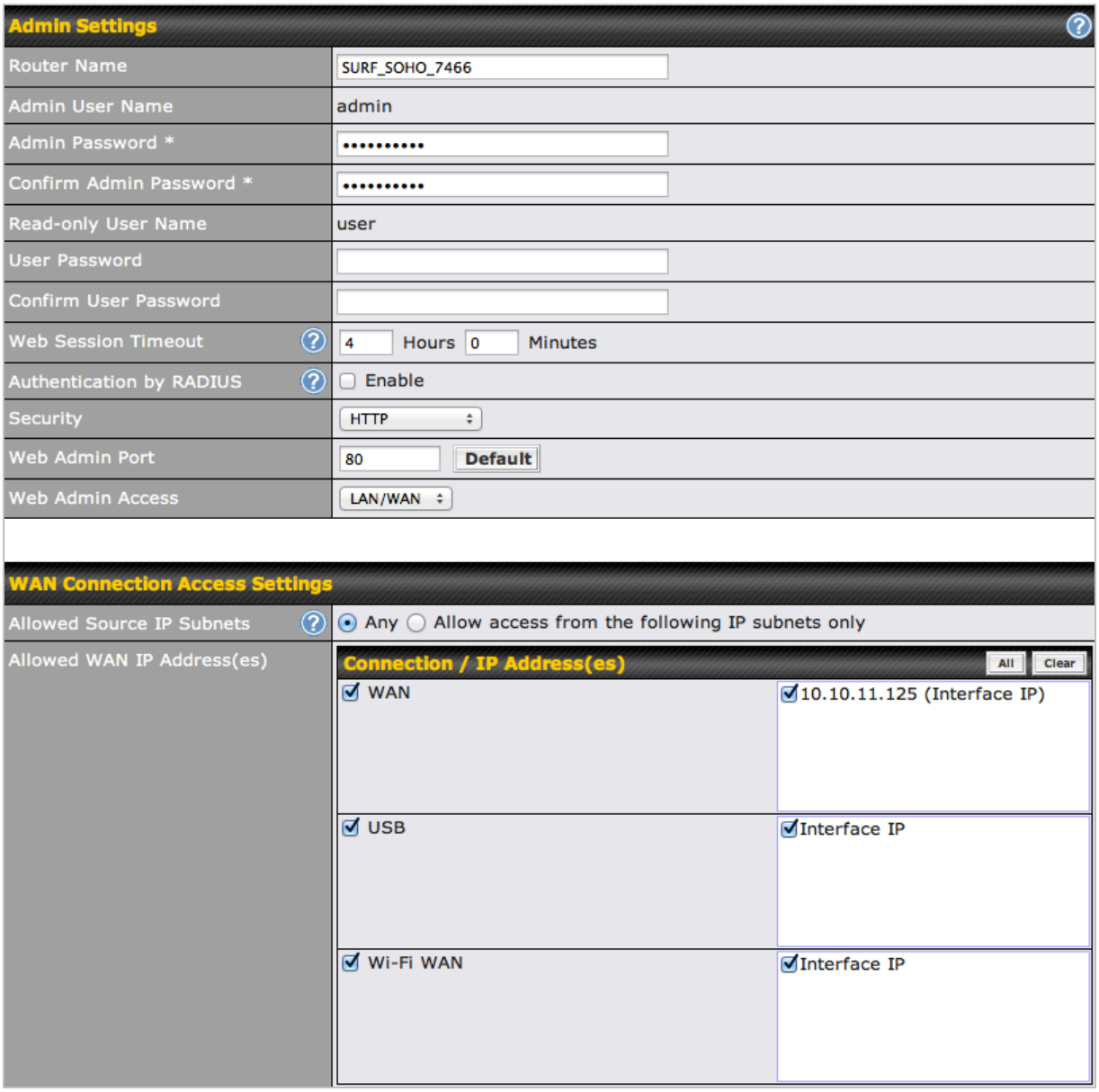

Admin Settings	
Router Name	This field allows you to define a name for the Pepwave Surf SOHO. By default, **Router Name** is set as **SURF-SOHO_XXXX**, where **XXXX** refers to the last 4 digits of the serial number of the device.
Admin User Name	This setting is **admin** by default and is not customizable.
Admin Password	This field allows you to specify a new administrator password.
Confirm Admin Password	This field allows you to verify and confirm the new administrator password.
Read-only User Name	This setting is **user** by default and is not customizable.

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User Password	This field allows you to specify a new user password. Once the user password is set, the read-only user feature will be enabled.
Confirm User Password	This field allows you to verify and confirm the new user password.
Web Session Timeout	This field specifies the number of hours and minutes that a web session can remain idle before the device terminates its access to the Web Admin Interface. By default, this setting is **4 hours**.
Authentication by RADIUS	With this box is checked, the Web Admin will authenticate using an external RADIUS server. Authenticated users are treated as "admin" users with full read-write permission. Local "admin" and "user" accounts will be disabled. When the device is not able to communicate with the external RADIUS server, local accounts will be enabled again for emergency access. Authentication options, detailed below, will be available once this box is checked.
Auth Protocol	This specifies the authentication protocol used. Available options are **MS-CHAP v2** and **PAP**.
Auth Server	This specifies the access address of the external RADIUS server.
Auth Server Secret	This is the secret for accessing the RADIUS server.
Auth Timeout	This option specifies the time value for authentication timeout.
Accounting Server	This specifies the access address of the external accounting server.
Accounting Server Secret	This is the secret for accessing the accounting server.
Network Connection	This option is for specifying the network connection which will be used for authentication. Users can choose from **LAN**, **WAN**, and **USB** connections.
Security	This option is for specifying the protocol(s) through which the Web Admin Interface is accessible: • HTTP • HTTPS • HTTP/HTTPS
Web Admin Port	These fields are for specifying the port number at which the Web Admin Interface is accessible.
Web Admin Access	This option is for specifying the network interfaces through which the Web Admin Interface is accessible: • LAN only • LAN/WAN • If LAN/WAN is chosen, the **WAN Connection Access Settings** form, explained below, will be displayed.

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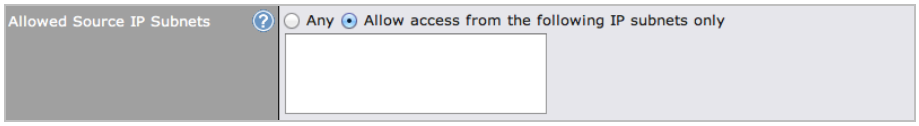
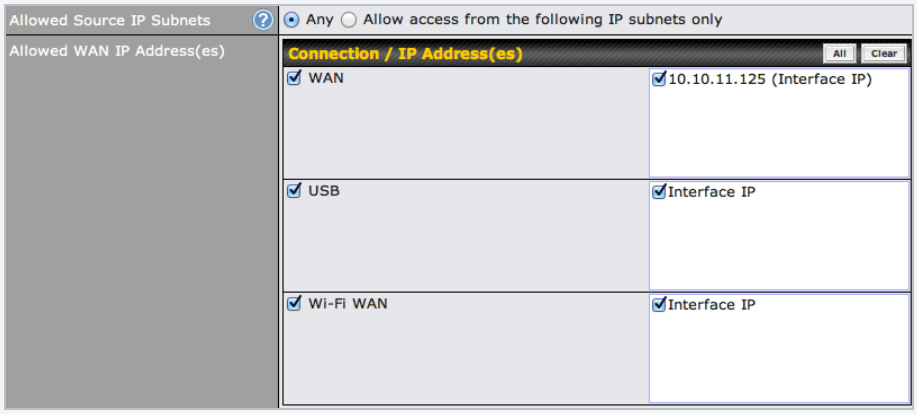
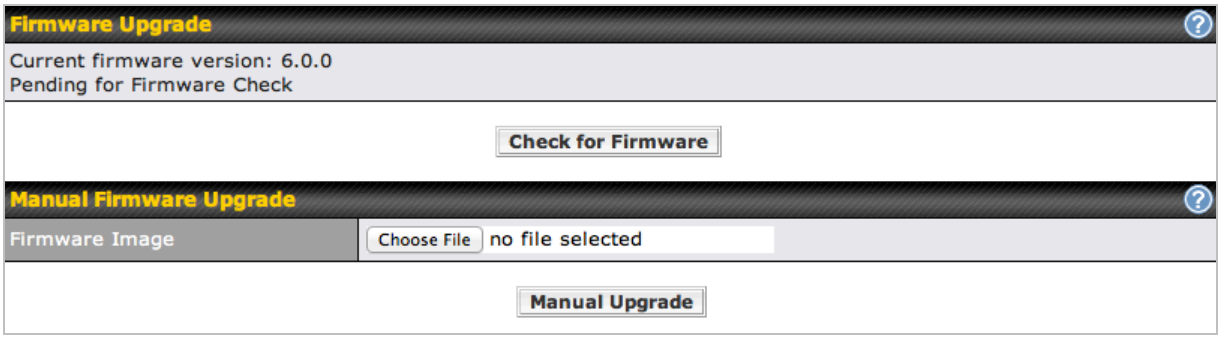
WAN Connection Access Settings	
Allowed Source IP Subnets	This field allows you to restrict web admin access to defined IP subnets. • **Any** - Allow web admin accesses to be from anywhere, without IP address restriction. • **Allow access from the following IP subnets only** - Restrict web admin access to the defined IP subnets. When this option is chosen, a text input area will be displayed beneath:  The allowed IP subnet addresses should be entered into this text area. Each IP subnet must be in form of *w.x.y.z/m*, where *w.x.y.z* is an IP address (e.g., 192.168.0.0), and *m* is the subnet mask in CIDR format, which is between 0 and 32 inclusively. For example: 192.168.0.0/24. To define multiple subnets, separate each IP subnet one in a line. For example: • 192.168.0.0/24 • 10.8.0.0/16
Allowed WAN IP Address(es)	This setting defines which WAN IP address(es) the Web server should listen on. 

16.2 Firmware

The Pepwave Surf SOHO's firmware is upgradeable through the Web Admin Interface. Firmware upgrade functionality is located at ***System > Firmware***.



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There are two ways to upgrade the unit. The first method is an 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 for Firmware** button to upgrade online. The Pepwave Surf SOHO checks online for new firmware, and if new firmware is available, automatically downloads it and updates.

You may also download a firmware image from the Pepwave web site and update the unit manually. Click **Browse** to select the firmware file from the local computer, and then click **Manual Upgrade** to send the firmware to the Pepwave Surf SOHO, which will then automatically initiate the firmware upgrade process.

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

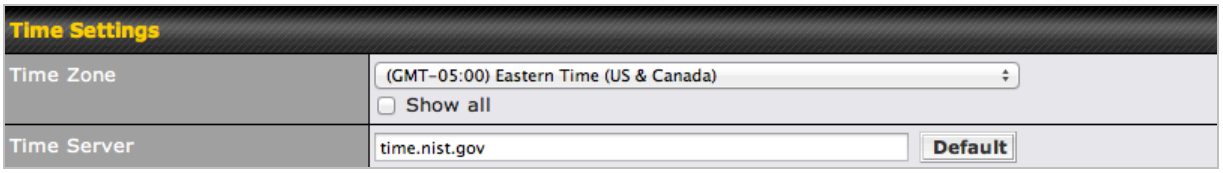
Important Note
The firmware upgrade process may not necessarily preserve the previous configuration, and the behavior varies on a case-by-case basis. Consult the release notes for the particular firmware version. Do not disconnect the power during firmware upgrade process. Do not attempt to upload a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

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

16.3 Time

Time Settings enables the system clock of the Pepwave Surf SOHO to be synchronized with a specified Internet time server.

Time settings are located at ***System > Time***.



Time Server Settings	
Time Zone	This specifies the time zone (along with the corresponding Daylight Savings Time scheme). **Time Zone** affects the time stamps in the Surf SOHO's event log and email notifications. Check **Show all** to show all available time zone options.
Time Server	This setting specifies the NTP network time server used by the Pepwave Surf SOHO.

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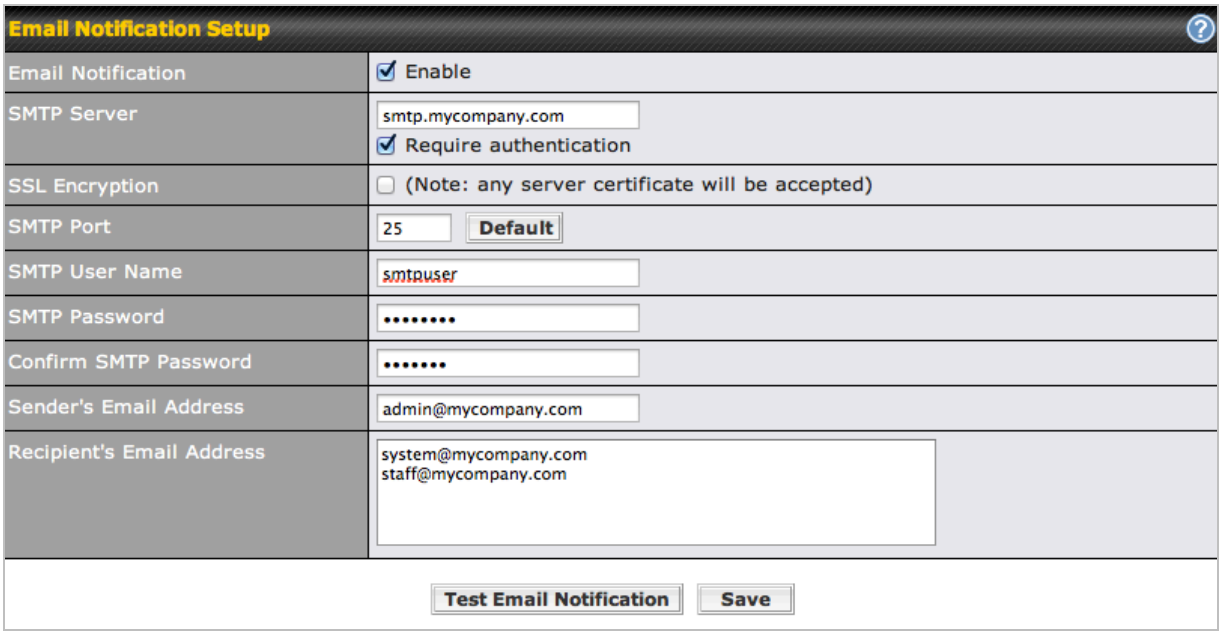
16.4 Email Notification

The email notification functionality of the Pepwave Surf SOHO provides a system administrator with up-to-date information on network status.

The settings for configuring email notifications are found at ***System > Email Notification***.



Email Notification Settings	
Email Notification	If **Enable** is checked, the Pepwave Surf SOHO sends email messages to a system administrator when WAN status changes or when new firmware is available. If **Enable** is not checked, email notification is disabled, and the Pepwave Surf SOHO will not send email messages.
SMTP Server	This field is for specifying the SMTP server to be used for sending email. If the server requires authentication, check **Require authentication**.
SSL Encryption	Check to enable SMTPS. When the box is checked, **SMTP Port** will be changed to **465** automatically.
SMTP Port	This field is for specifying the SMTP port number. By default, this is set to **25**. When **SSL Encryption** is checked, the default port number will be set to **465**. You may customize the port number by editing this field. Click **Default** to restore to the default value.
SMTP User Name / Password	These settings specify the SMTP username and password used when sending email. These options are shown only if **Require authentication** is checked in the **SMTP Server** setting.
Confirm SMTP Password	This field allows you to verify and confirm the new administrator password.

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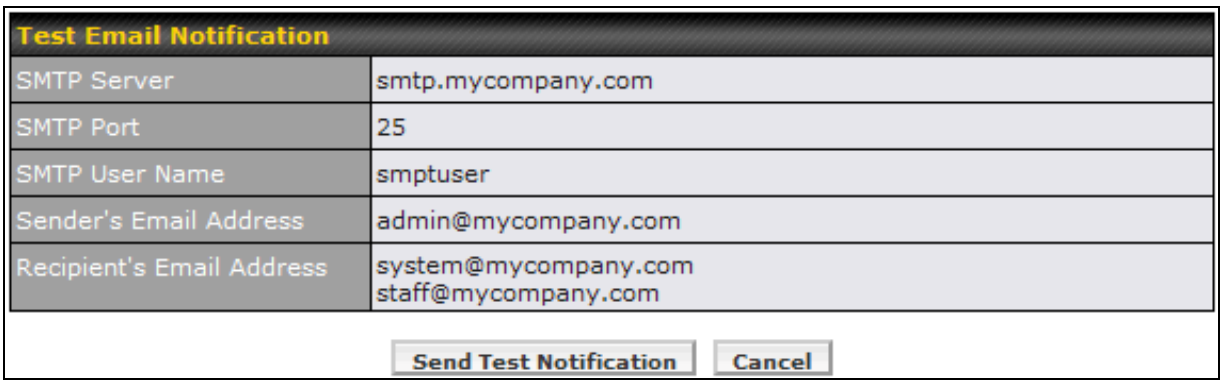
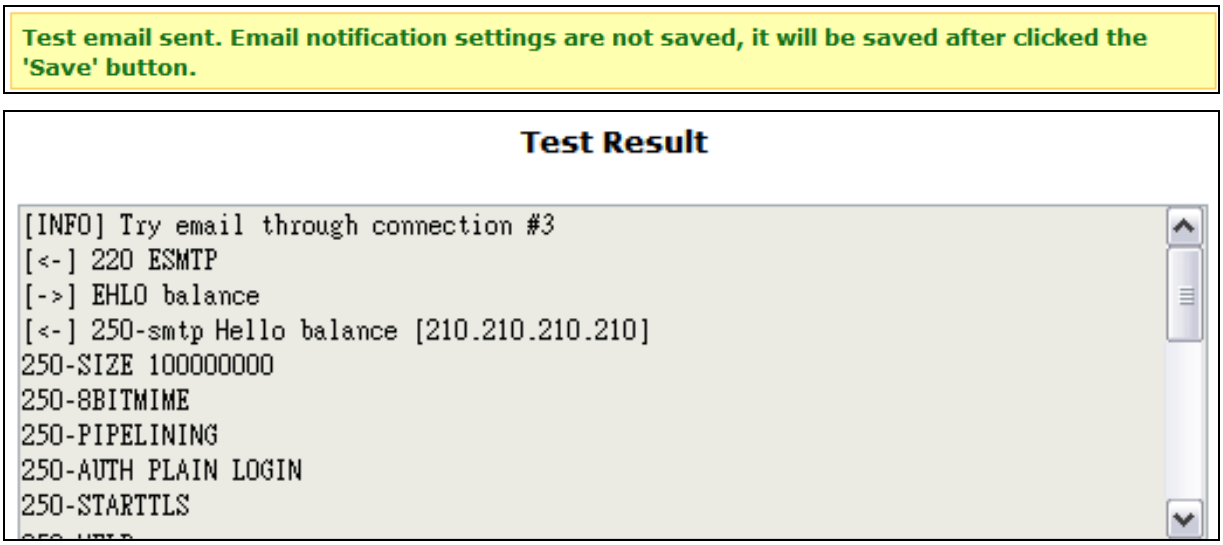
Sender's Email Address	This setting specifies the sender email address reported in the email messages sent by the Pepwave Surf SOHO.
Recipient's Email Address	This setting specifies the email addresses to which the Pepwave Surf SOHO should send email messages. You may enter multiple recipients' email addresses in this field.

After you have completed the settings, you can click the **Test Email Notification** button to test the settings before saving them. After it is clicked, you will see this screen to confirm the settings:



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



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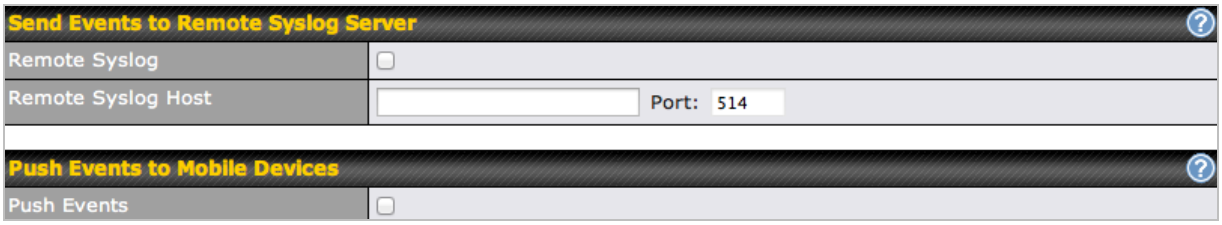
16.5 Event Log

Event Log enables event logging to a specified remote syslog server and mobile devices.

The settings for configuring a remote system log are found at ***System > Event Log***.



Send Events to Remote Syslog Server	
Remote Syslog	This setting specifies whether or not to log events at the specified remote syslog server.
Remote Syslog Host	This setting specifies the IP address or host name of the remote syslog server.
Port	This setting specifies the port number of the remote syslog server. By default, **Port** is **514**.

Push Events to Mobile Devices	
Push Events	When this box is checked, system events will be sent to mobile devices

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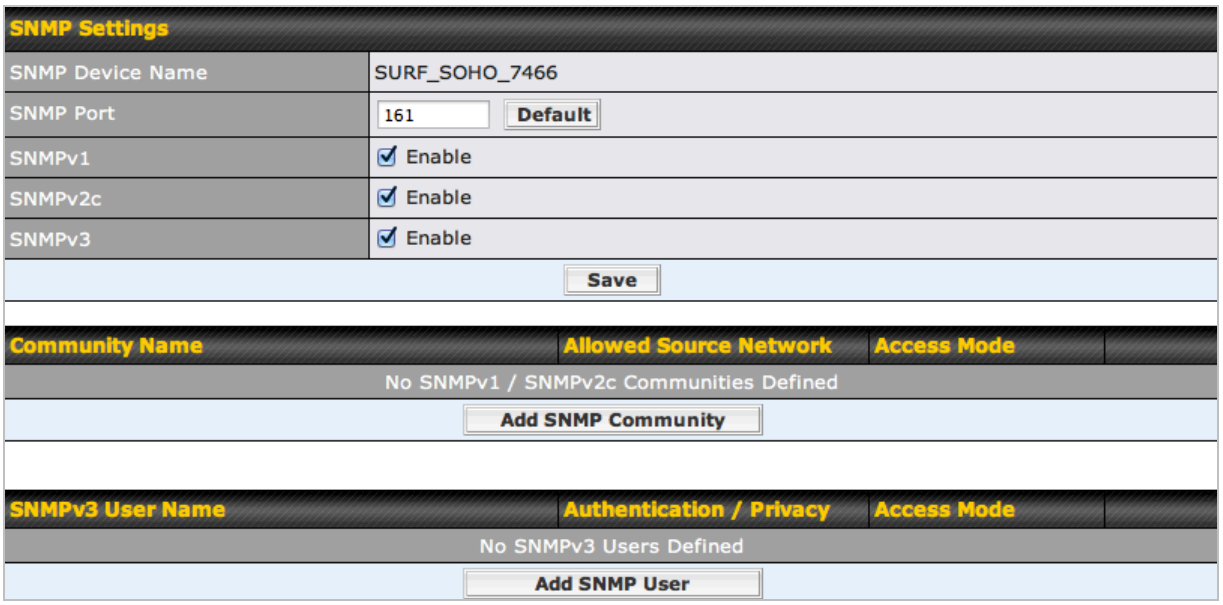
16.6 SNMP

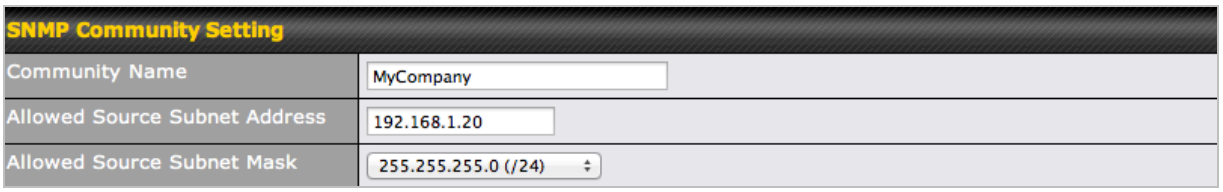
Simple Network Management Protocol (SNMP) is an open standard that can be used to collect information from the Pepwave Surf SOHO.

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



SNMP Settings	
SNMP Device Name	This field shows the router name defined in ***System > Admin Security***.
SNMP Port	This option specifies the port used by SNMP. The default port is **161**.
SNMPv1	This option allows you to enable SNMP version 1.
SNMPv2	This option allows you to enable SNMP version 2.
SNMPv3	This option allows you to enable SNMP version 3.

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



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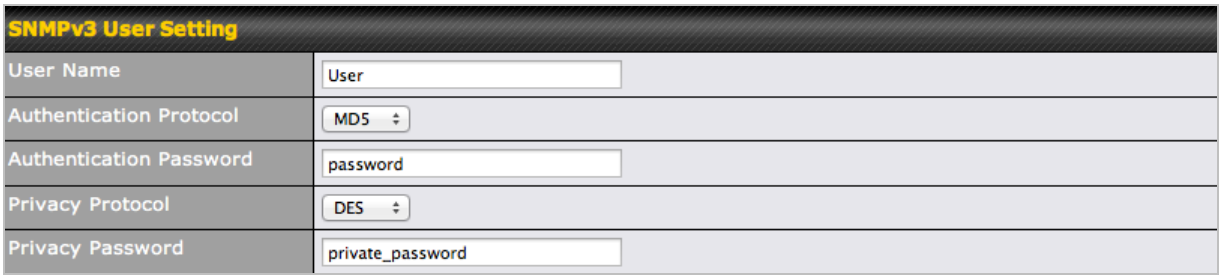
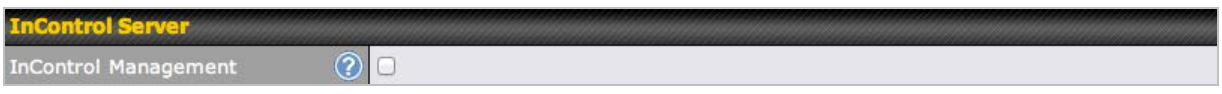
SNMP Community Settings	
Community Name	This setting specifies the SNMP community name.
Allowed Source Subnet Address	This setting specifies a subnet from which access to the SNMP server is allowed (e.g., 192.168.1.0).
Allowed Source Subnet Mask	This setting specifies the subnet mask that corresponds to the subnet specified in **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, which will display the following screen:



SNMPv3 User Settings	
User Name	This setting specifies a user name to be used in SNMPv3.
Authentication Protocol	This setting specifies 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 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.

16.7 InControl



When this check box is checked, the device's status information, usage data, and configuration will be sent to Pepwave's InControl system. Sign up for an InControl account at https://incontrol.pepwave.com/, where you can register devices under the account, monitor device status and usage reports, and download backed up configuration files. By default, this setting is **disabled**.

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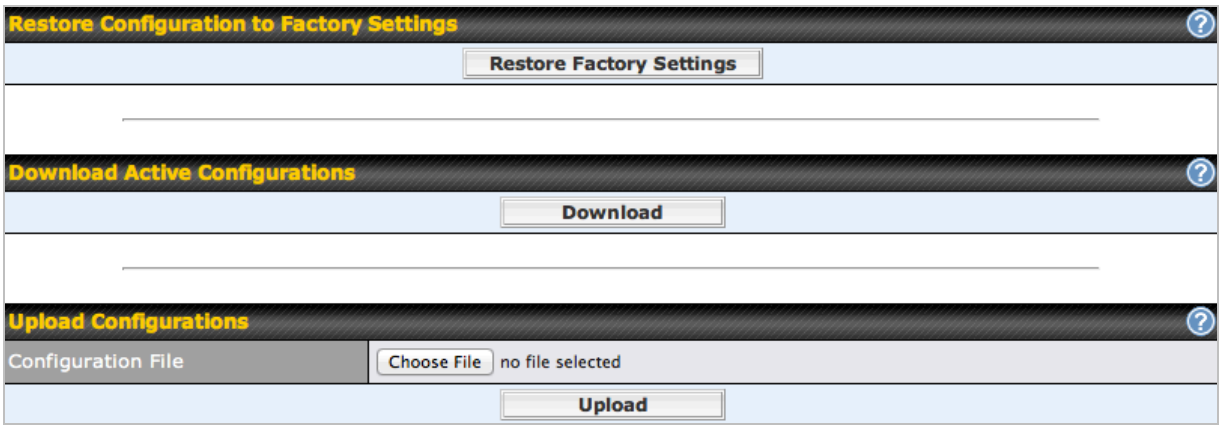
16.8 Configuration

Backing up your Pepwave Surf SOHO's settings immediately after successful completion of the initial setup is strongly recommended.

You can download and upload Pepwave Surf SOHO settings, as well as restore factory settings, at ***System > Configuration***.



16.8.1 Restore Configuration to Factory Settings

The **Restore Factory Settings** button resets the configuration to factory default settings. You must click the **Apply Changes** button to make the settings effective.

16.8.2 Downloading Active Configurations

The **Download** button backs up the current active settings. Click **Download** and save the configuration file.

16.8.3 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. You can also discard changes on the ***Dashboard***.

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16.9 Reboot

This page provides a reboot button for restarting the system.

For highest reliability, the Pepwave Surf SOHO is equipped with two copies of firmware of different versions. You can select the firmware version you would like the device to reboot with.

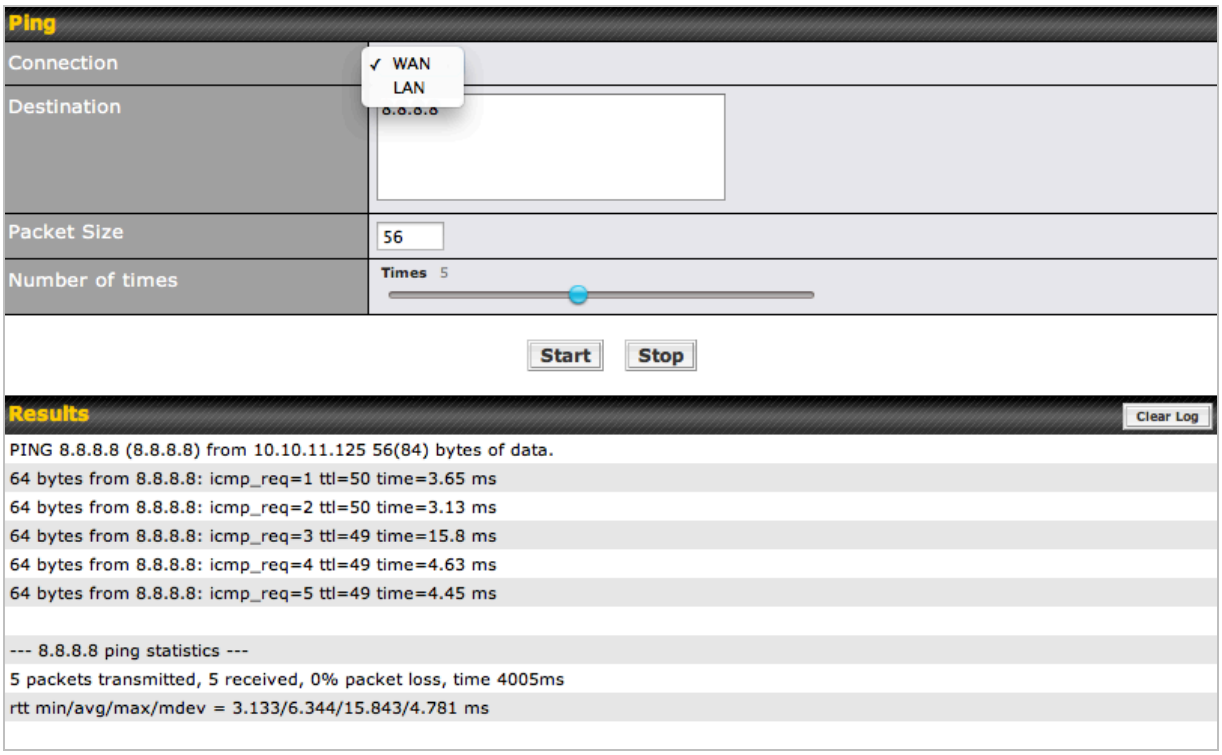
The firmware marked with **(Running)** is the current system bootup firmware.

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

16.10 Ping

The Surf SOHO's built-in ping test sends pings through a specified Ethernet interface or a PepVPN connection. You can specify the number of pings in the field **Number of times** to a maximum of 10 times, and you can specify a **Packet Size** of a maximum of **1472** bytes.

The **Ping** utility is located at ***System > Tools > Ping***.



Tip

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

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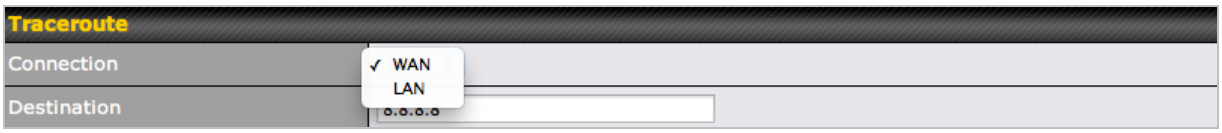
16.11 Traceroute Test

The **Traceroute** test tool in traces the routing path to the destination through a particular Ethernet interface or PepVPN connection.

The Traceroute Test utility is located at ***System > Tools > Traceroute***, illustrated below:



Tip

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

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17 Status

This section displays ***Device*** status, ***Active Sessions,*** the ***Client List***, the ***Event Log***, and ***Bandwidth***.

17.1 Device

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

System Information	
Router Name	SURF_SOHO_7466
Model	Pepwave Surf SOHO
Product Code	SUS-SOHO
Hardware Revision	1
Serial Number	0000-0000-0000
Firmware	6.0.0 build 1128
Modem Support Version	1010 (Modem Support List)
Uptime	18 days 1 hour 44 minutes
System Time	Fri Jul 26 12:57:54 WET 2013
Diagnostic Report	Download

Interface	MAC Address
LAN Port	10:56:CA:00:28:00
WAN	10:56:CA:00:28:01
Wi-Fi WAN	10:56:CA:00:28:06

System Information	
Router Name	This is the name specified in the **Router Name** field located at ***System > Admin Security***.
Model/Product Code	This shows the model name and product code of this device.
Hardware Revision	This shows the hardware version of this device.
Serial Number	This shows the serial number of this device.
Firmware	This shows the firmware version that this device is currently running.
Modem Support Version	This shows the modem support version of this device. A **Modem Support List** link redirects users to a list of cellular modems supported by this device.
Uptime	This shows the length of time since the device has been rebooted.
System Time	This shows the current system time.
Diagnostic Report	A **Download** link is provided for exporting a diagnostic report file.

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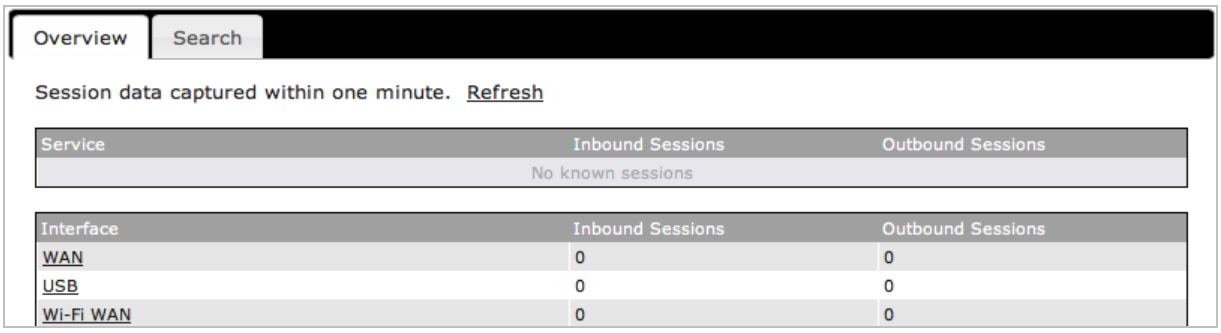
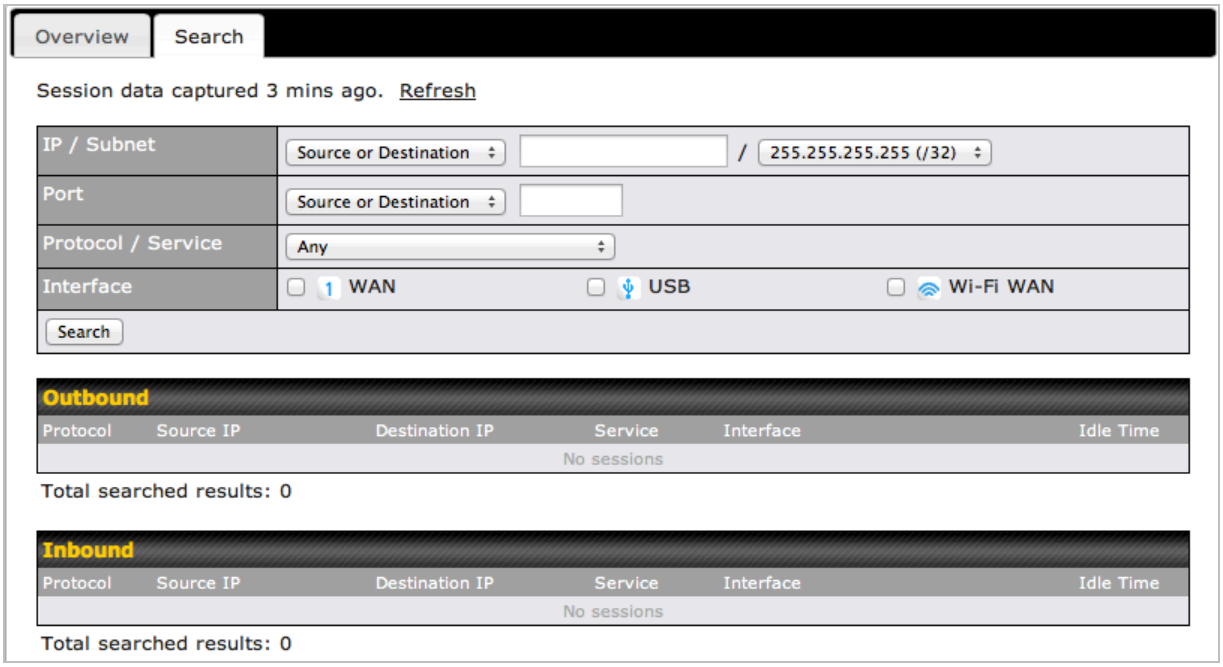
The second table shows the MAC address of each LAN/WAN interface connected.

Important Note
If you encounter issues and would like to contact the Pepwave support team (http://www.pepwave.com/contact/), please download the diagnostic report file and attach it along with a description the problem. In firmware 5.1 or below, a diagnostic report file can be obtained at ***System > Reboot***.

17.2 Active Sessions

Information on active sessions can be found at ***Status > Active Sessions > Overview***. To search active sessions, click the **Search** tab and use the provided fields and menus to filter your results.





Active Sessions displays the active inbound / outbound and UDP / TCP sessions of each WAN connection on the Pepwave Surf SOHO.

A filter is available to help sort out the active session information. Enter a keyword in the field or check one of the WAN connection boxes for filtering.

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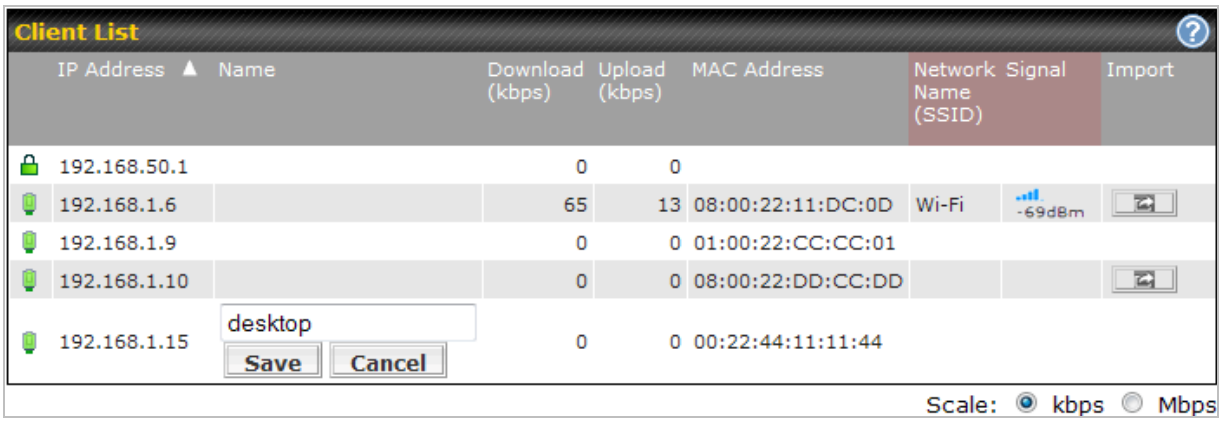
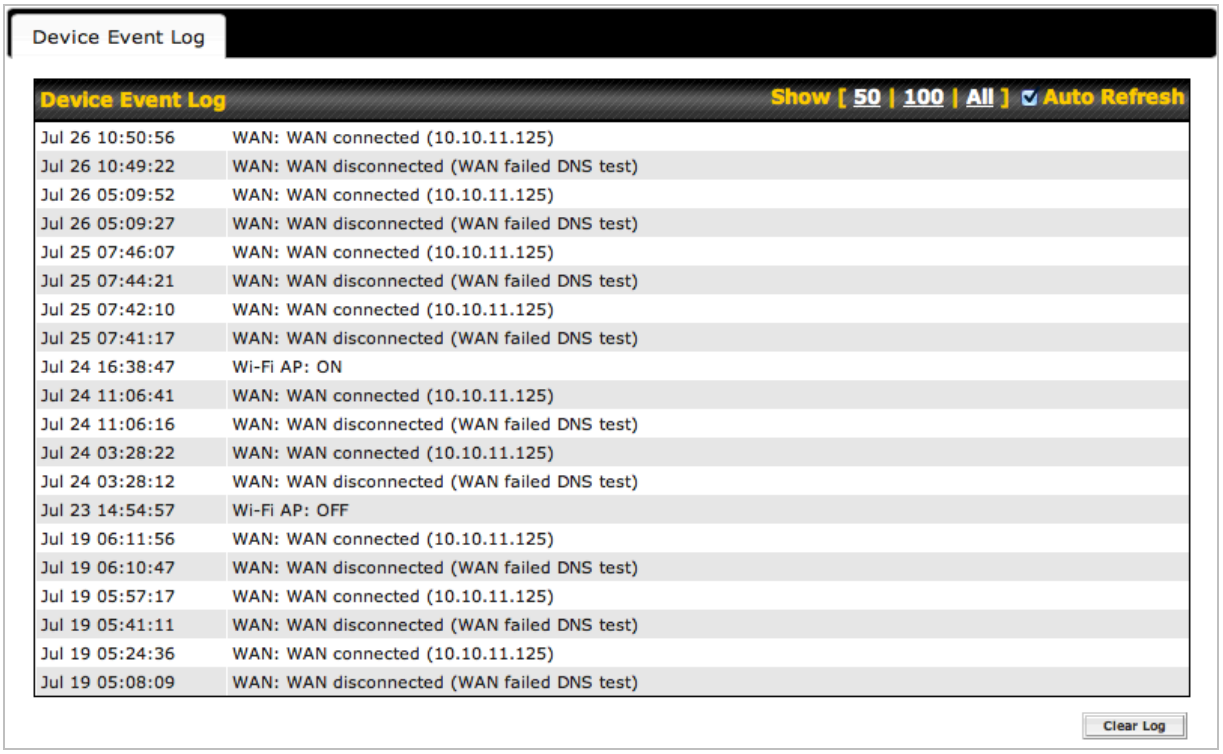
17.3 Client List

The client list table is located at ***Status > Client List***. It lists DHCP client IP addresses, their names (retrieved from the DHCP reservation table or defined by users), current **Download and Upload rate** and MAC addresses that the Pepwave Surf SOHO has offered IP addresses to since it powered up. **Network Name (SSID)** and **Signal** refer to information about the Wi-Fi AP, which is the name of the network and its signal strength. Clients can be imported into the DHCP reservation table by clicking the button in the rightmost column. At ***Network > LAN*** you can further update the record after importing



17.4 Event Log

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



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The log section displays a list of events that have taken place on the Pepwave Surf SOHO. Click **Auto Refresh** 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.

17.5 Bandwidth

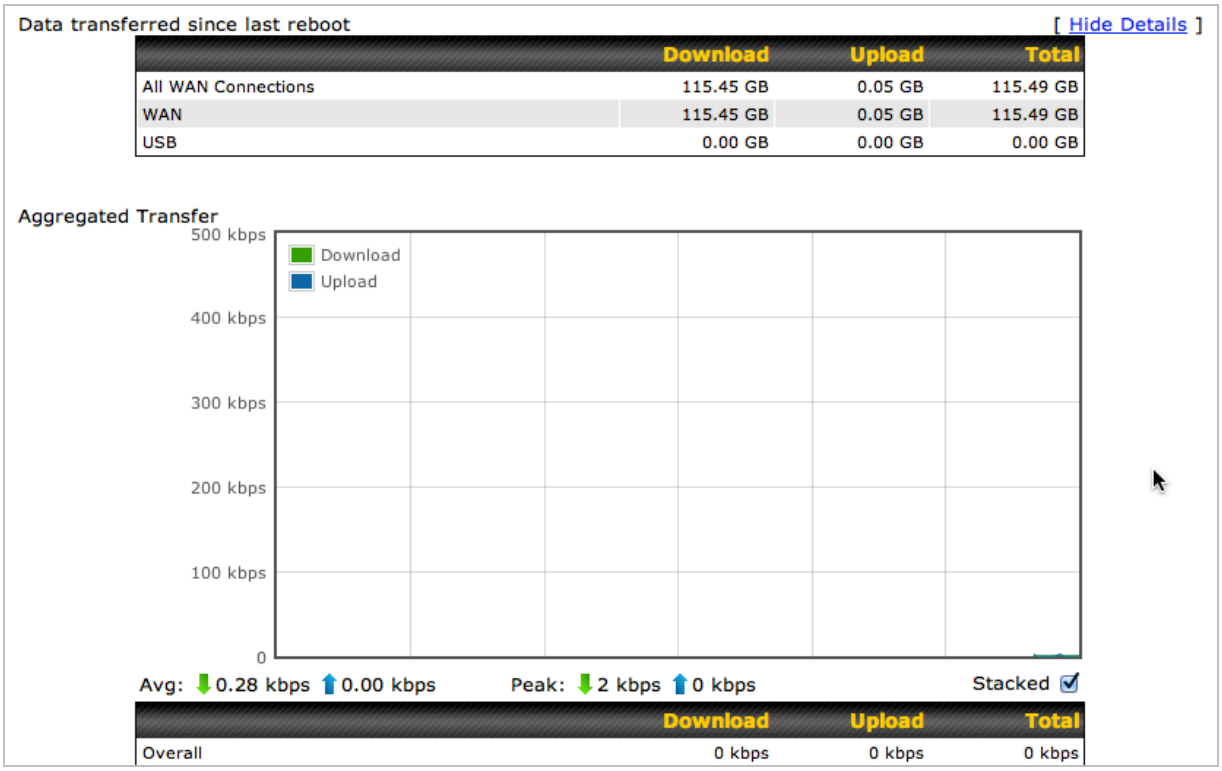
This section shows bandwidth usage statistics and is located at ***Status > Bandwidth***.

17.5.1 Real-Time

The **Data transferred since installation** shows you how much network traffic has been processed by your device since first boot.

Click **Show Details** in the top right corner of each table to display data transfer details.

Check **Stacked**, located below the data transfer graph, to show the aggregated transferred rate in both directions.



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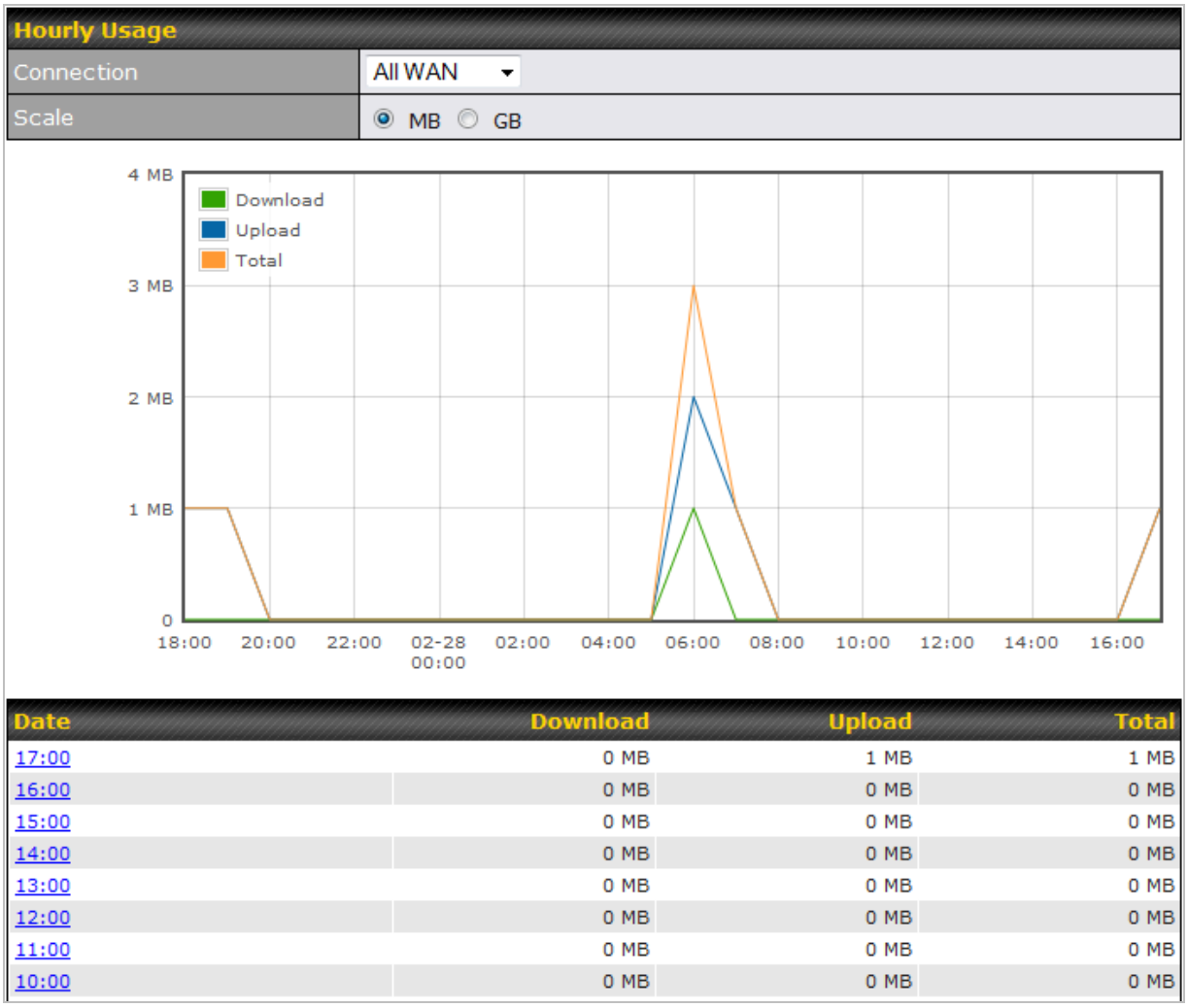
17.5.2 Hourly

This page shows the daily bandwidth usage for all WAN connections.

Select the connection to monitor from the drop-down menu provided.



Date	Download	Upload	Total
17:00	0 MB	1 MB	1 MB
16:00	0 MB	0 MB	0 MB
15:00	0 MB	0 MB	0 MB
14:00	0 MB	0 MB	0 MB
13:00	0 MB	0 MB	0 MB
12:00	0 MB	0 MB	0 MB
11:00	0 MB	0 MB	0 MB
10:00	0 MB	0 MB	0 MB

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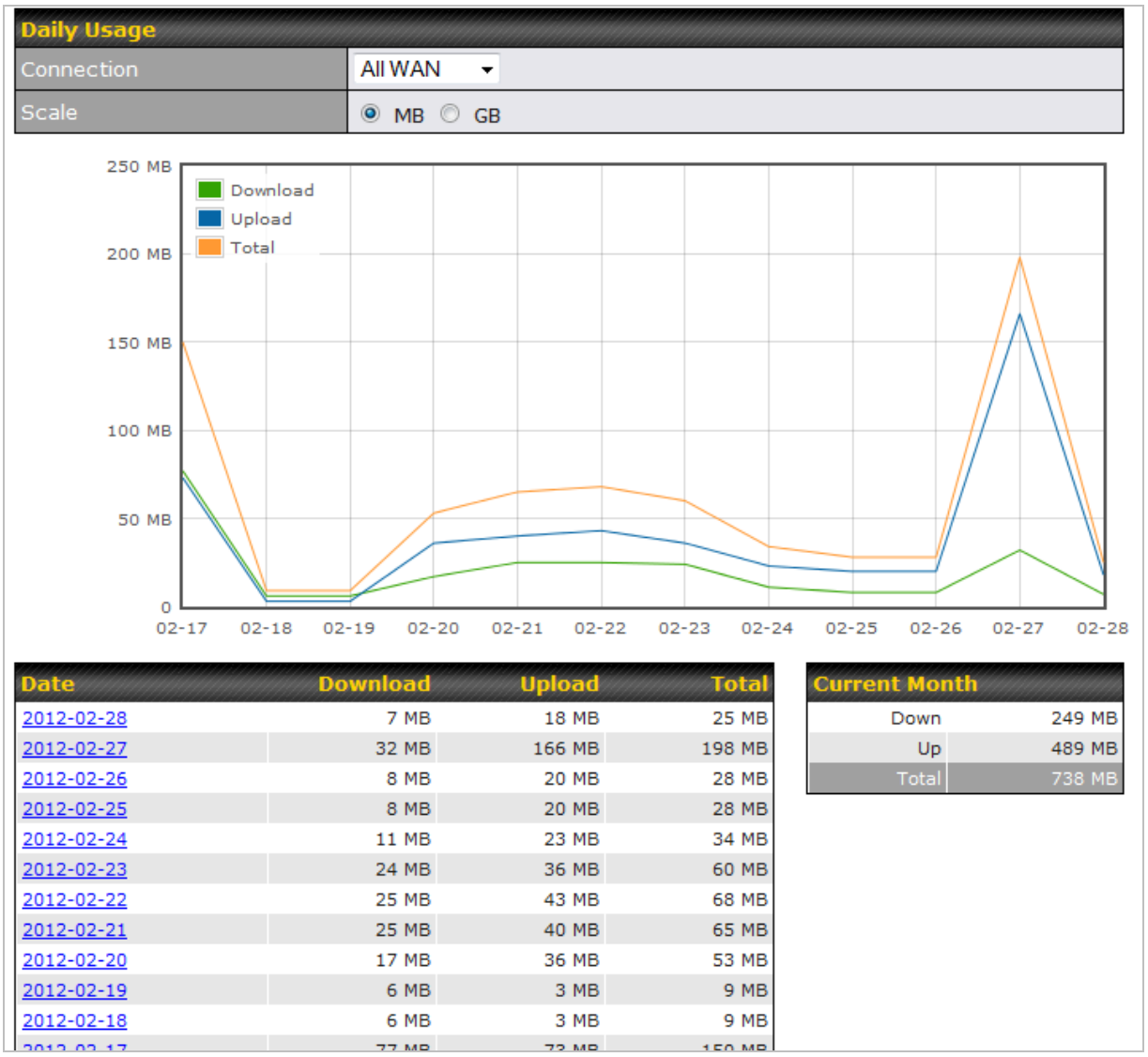
17.5.3 Daily

This page shows the daily bandwidth usage for all WAN connections.

Select the connection to monitor from the drop-down menu provided. If you have enabled the **Bandwidth Monitoring** feature as shown in section 8.4, the **Current Billing Cycle** table for that WAN connection will be displayed.

Click on a date to view the client bandwidth usage on that date. This feature is not available if you have selected to view the bandwidth usage of only a particular WAN connection.

The scale of the graph can be set to display **Megabyte (MB)** or **Gigabyte (GB)**.



Date	Download	Upload	Total
2012-02-28	7 MB	18 MB	25 MB
2012-02-27	32 MB	166 MB	198 MB
2012-02-26	8 MB	20 MB	28 MB
2012-02-25	8 MB	20 MB	28 MB
2012-02-24	11 MB	23 MB	34 MB
2012-02-23	24 MB	36 MB	60 MB
2012-02-22	25 MB	43 MB	68 MB
2012-02-21	25 MB	40 MB	65 MB
2012-02-20	17 MB	36 MB	53 MB
2012-02-19	6 MB	3 MB	9 MB
2012-02-18	6 MB	3 MB	9 MB

Current Month	
Down	249 MB
Up	489 MB
Total	738 MB

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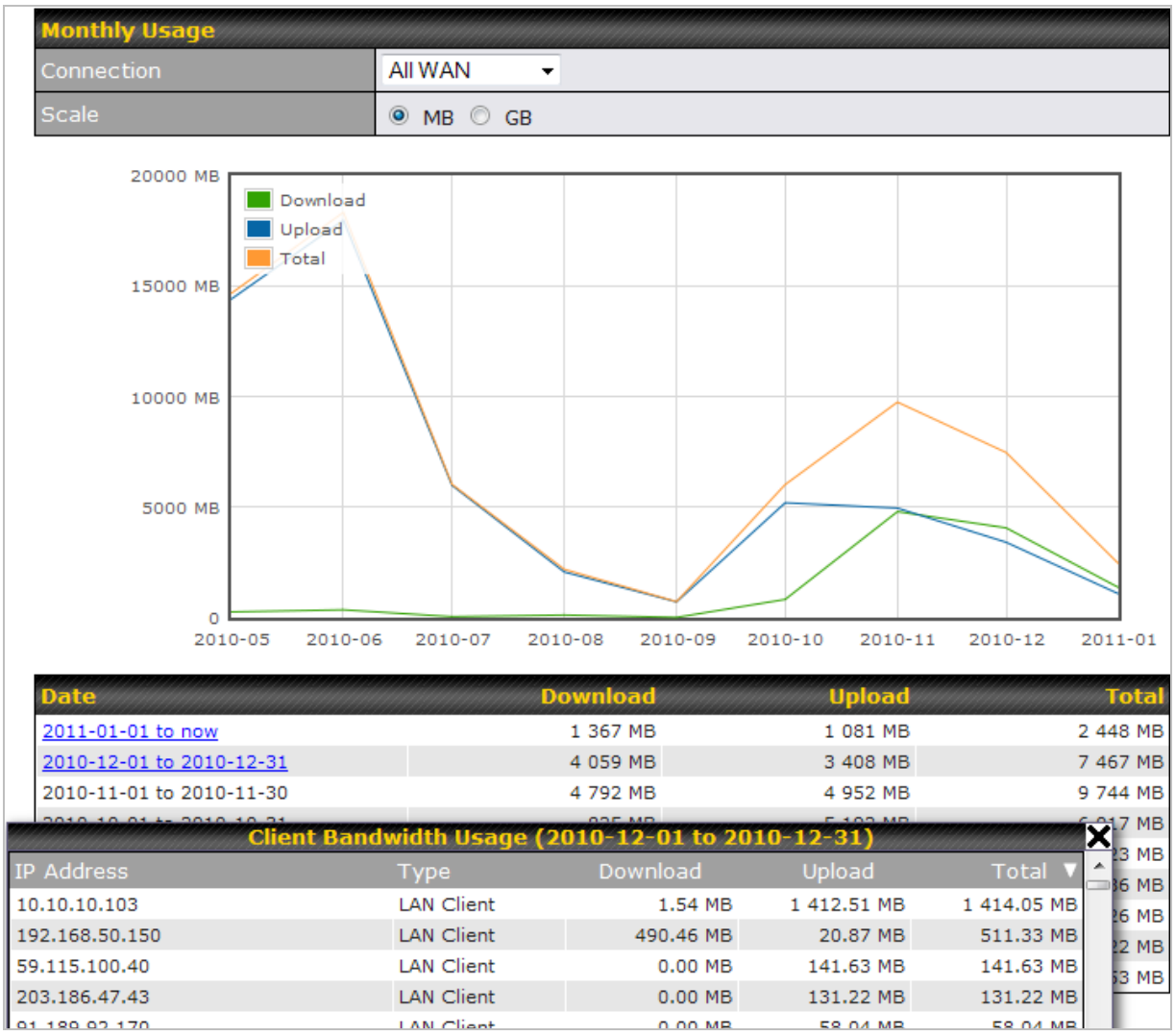
17.5.4 Monthly

This page shows the monthly bandwidth usage for each WAN connection.

If you have enabled the **Bandwidth Monitoring** feature as shown in section 8.4, you can choose a particular connection to check its usage and select to show the monthly usage period in **Billing Cycle** or **Calendar Month**.

Click the first or second row to view the client bandwidth usage of the current month. This feature is not available if you have chosen to view the bandwidth usage of only a particular WAN connection.

The scale of the graph can be set to display **Megabyte (MB)** or **Gigabyte (GB)**.



Tip

By default, the scale is in **MB**. 1GB equals 1024MB.

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Appendix A. Restoration of Factory Defaults

To restore the factory default settings on your Pepwave Surf SOHO unit, follow the steps below:

1. Locate the reset button on the back panel of the Pepwave Surf SOHO.
2. With a paper clip, press the reset button and hold it for at least 10 seconds until the unit reboots itself.

After the Pepwave Surf SOHO finishes rebooting, the factory default settings will be restored.

Important Note
All previous configurations and bandwidth usage data will be lost after restoring the factory default settings. Regular backup of configuration settings is strongly recommended.

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Appendix B. Declaration

1. The device supports time division technology

2. Federal Communication Commission Interference Statement

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 of the following measures:

1) Reorient or relocate the receiving antenna.
2) Increase the separation between the equipment and receiver.
3) Connect the equipment into an outlet on a circuit different from that to which the receiver is connected.
4) Consult the dealer or an experienced radio/TV technician for help.

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.

FCC Caution: Any changes or modifications not expressly approved by the party responsible for compliance could void the user's authority to operate this equipment.

IEEE 802.11b or 802.11g operation of this product in the U.S.A. is firmware-limited to channels 1 through 11.

IMPORTANT NOTE

FCC Radiation Exposure Statement

This equipment complies with FCC radiation exposure limits set forth for an uncontrolled environment.

This equipment should be installed and operated with minimum distance 20cm between the radiator & your body.
This transmitter must not be co-located or operating in conjunction with any other antenna or transmitter.

The availability of specific channels and/or operational frequency bands is country dependent. Firmware is programmed at the factory to match the intended destination.

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3. CE Statement for Surf SOHO

Europe – EU Declaration of Conformity

This device complies with the essential requirements of the R&TTE Directive 1999/5/EC. The following test methods have been applied in order to prove presumption of conformity with the essential requirements of the R&TTE Directive 1999/5/EC:

- EN 60950-1: 2006 + A11 : 2009+A1 : 2010+ A12: 2011
  Safety of Information Technology Equipment

- EN50385 : 2002 / Article 3(1)(a)
  Product standard to demonstrate the compliance of radio base stations and fixed terminal stations for wireless telecommunication systems with the basic restrictions or the reference levels related to human exposure to radio frequency electromagnetic fields (110MHz - 40 GHz) - General public

  EN 300 328 V1.7.1: 2006
  Electromagnetic compatibility and Radio spectrum Matters (ERM); Wideband Transmission systems; Data transmission equipment operating in the 2,4 GHz ISM band and using spread spectrum modulation techniques; Harmonized EN covering essential requirements under article 3.2 of the R&TTE Directive

- EN 301 908-1 V5.2.1: 2011
  Electromagnetic compatibility and Radio spectrum Matters (ERM); Base Stations (BS), Repeaters and User Equipment (UE) for IMT-2000 Third-Generation cellular networks; Part 1: Harmonized EN for IMT-2000, introduction and common requirements, covering essential requirements of article 3.2 of the R&TTE Directive

- EN 301 511 V9.0.2: 2003
  Global System for Mobile communications (GSM); Harmonized standard for mobile stations in the GSM 900 and DCS 1800 bands covering essential requirements under article 3.2 of the R&TTE directive (1999/5/EC)

- EN 301 489-1 V1.9.2: 2008
  Electromagnetic compatibility and Radio Spectrum Matters (ERM); ElectroMagnetic Compatibility (EMC) standard for radio equipment and services; Part 1: Common technical requirements

- EN 301 489-7 V1.3.1: 2005
  ElectroMagnetic compatibility and Radio spectrum Matters (ERM); ElectroMagnetic Compatibility (EMC) standard for radio equipment ad services; Part 7: Specific conditions for mobile and portable radio and ancillary equipment of digital cellular radio telecommunications systems (GSM and DCS)

- EN 301 489-17 V2.2.1: 2012
  Electromagnetic compatibility and Radio spectrum Matters (ERM); ElectroMagnetic Compatibility (EMC) standard for radio equipment and services; Part 17: Specific conditions for 2,4 GHz wideband transmission systems and 5 GHz high performance RLAN equipment

- EN 301 489-24 V1.5.1: 2010
  Electromagnetic compatibility and Radio Spectrum Matters (ERM); ElectroMagnetic Compatibility (EMC) standard for radio equipment and services; Part 24: Specific conditions for IMT-2000 CDMA

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Direct Spread (UTRA) for Mobile and portable (UE) radio and ancillary equipment

Česky [Czech]	*[Jméno výrobce]* tímto prohlašuje, že tento *[typ zařízení]* je ve shodě se základními požadavky a dalšími příslušnými ustanoveními směrnice 1999/5/ES.
Dansk [Danish]	Undertegnede *[fabrikantens navn]* erklærer herved, at følgende udstyr *[udstyrets typebetegnelse]* overholder de væsentlige krav og øvrige relevante krav i direktiv 1999/5/EF.
Deutsch [German]	Hiermit erklärt *[Name des Herstellers]*, dass sich das Gerät *[Gerätetyp]* in Übereinstimmung mit den grundlegenden Anforderungen und den übrigen einschlägigen Bestimmungen der Richtlinie 1999/5/EG befindet.
Eesti [Estonian]	Käesolevaga kinnitab *[tootja nimi = name of manufacturer]* seadme *[seadme tüüp = type of equipment]* vastavust direktiivi 1999/5/EÜ põhinõuetele ja nimetatud direktiivist tulenevatele teistele asjakohastele sätetele.
English	Hereby, *[name of manufacturer]*, declares that this *[type of equipment]* is in compliance with the essential requirements and other relevant provisions of Directive 1999/5/EC.
Español [Spanish]	Por medio de la presente *[nombre del fabricante]* declara que el *[clase de equipo]* cumple con los requisitos esenciales y cualesquiera otras disposiciones aplicables o exigibles de la Directiva 1999/5/CE.
Ελληνική [Greek]	ΜΕ ΤΗΝ ΠΑΡΟΥΣΑ *[name of manufacturer]* ΔΗΛΩΝΕΙ ΟΤΙ *[type of equipment]* ΣΥΜΜΟΡΦΩΝΕΤΑΙ ΠΡΟΣ ΤΙΣ ΟΥΣΙΩΔΕΙΣ ΑΠΑΙΤΗΣΕΙΣ ΚΑΙ ΤΙΣ ΛΟΙΠΕΣ ΣΧΕΤΙΚΕΣ ΔΙΑΤΑΞΕΙΣ ΤΗΣ ΟΔΗΓΙΑΣ 1999/5/ΕΚ.
Français [French]	Par la présente *[nom du fabricant]* déclare que l'appareil *[type d'appareil]* est conforme aux exigences essentielles et aux autres dispositions pertinentes de la directive 1999/5/CE.
Italiano [Italian]	Con la presente *[nome del costruttore]* dichiara che questo *[tipo di apparecchio]* è conforme ai requisiti essenziali ed alle altre disposizioni pertinenti stabilite dalla direttiva 1999/5/CE.
Latviski [Latvian]	Ar šo *[name of manufacturer / izgatavotāja nosaukums]* deklarē, ka *[type of equipment / iekārtas tips]* atbilst Direktīvas 1999/5/EK būtiskajām prasībām un citiem ar to saistītajiem noteikumiem.
Lietuvių [Lithuanian]	Šiuo *[manufacturer name]* deklaruoja, kad šis *[equipment type]* atitinka esminius reikalavimus ir kitas 1999/5/EB Direktyvos nuostatas.
Nederlands [Dutch]	Hierbij verklaart *[naam van de fabrikant]* dat het toestel *[type van toestel]* in overeenstemming is met de essentiële eisen en de andere relevante bepalingen van richtlijn 1999/5/EG.
Malti [Maltese]	Hawnhekk, *[isem tal-manifattur]*, jiddikjara li dan *[il-mudel tal-prodott]* jikkonforma mal-ħtiġijiet essenzjali u ma provvedimenti oħrajn relevanti li hemm fid-Dirrettiva 1999/5/EC.
Magyar [Hungarian]	Alulírott, *[gyártó neve]* nyilatkozom, hogy a *[... típus]* megfelel a vonatkozó alapvetõ követelményeknek és az 1999/5/EC irányelv egyéb elõírásainak.
Polski [Polish]	Niniejszym *[nazwa producenta]* oświadcza, że *[nazwa wyrobu]* jest zgodny z zasadniczymi wymogami oraz pozostałymi stosownymi postanowieniami Dyrektywy 1999/5/EC.
Português [Portuguese]	*[Nome do fabricante]* declara que este *[tipo de equipamento]* está conforme com os requisitos essenciais e outras disposições da Directiva 1999/5/CE.
Slovensko [Slovenian]	*[Ime proizvajalca]* izjavlja, da je ta *[tip opreme]* v skladu z bistvenimi zahtevami in ostalimi relevantnimi določili direktive 1999/5/ES.

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Slovensky [Slovak]	*[Meno výrobcu]* týmto vyhlasuje, že *[typ zariadenia]* spĺňa základné požiadavky a všetky príslušné ustanovenia Smernice 1999/5/ES.
Suomi [Finnish]	*[Valmistaja = manufacturer]* vakuuttaa täten että *[type of equipment = laitteen tyyppimerkintä]* tyyppinen laite on direktiivin 1999/5/EY oleellisten vaatimusten ja sitä koskevien direktiivin muiden ehtojen mukainen.
Svenska [Swedish]	Härmed intygar *[företag]* att denna *[utrustningstyp]* står I överensstämmelse med de väsentliga egenskapskrav och övriga relevanta bestämmelser som framgår av direktiv 1999/5/EG.

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