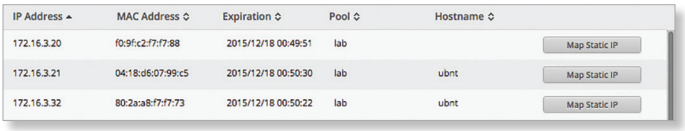
A table displays the following information about each DHCP client. Click a column heading to sort by that heading.

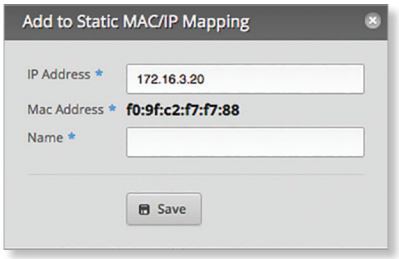


- **IP Address** The IP address assigned to the DHCP client is displayed.
- **MAC Address** The MAC address of the DHCP client is displayed.
- **Lease Expiration** The date and time when the DHCP lease will expire is displayed.
- **Pool** The name of the DHCP server is displayed.
- **Hostname** The name used to identify the DHCP client is displayed.
- **Map Static IP** To convert a dynamic DHCP lease into a static mapping, click **Map Static IP**. Go to the *Add to Static MAC/IP Mapping* section below.

  At the bottom of the screen, you can click *Delete* to delete the DHCP server and its configuration.

Add to Static MAC/IP Mapping

The *Add to Static MAC/IP Mapping* appears.

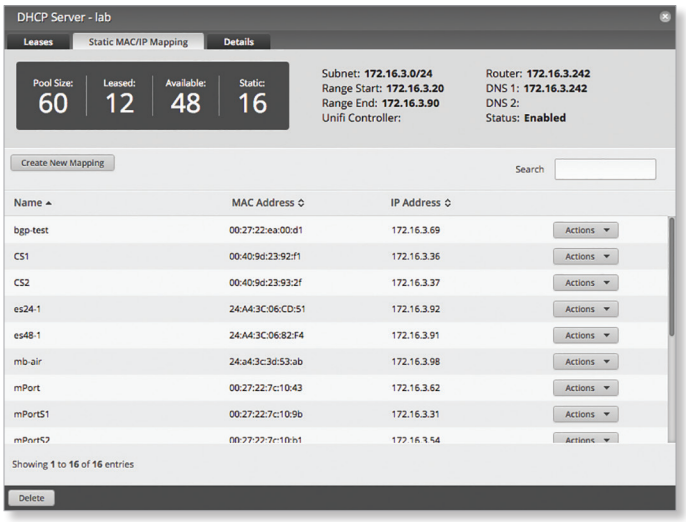


Complete the following:

- **IP Address** The IP address assigned to the DHCP client is displayed. You can change this as needed.
- **MAC Address** The MAC address of the DHCP client is displayed.
- **Name** The name used to identify the DHCP client is displayed. You can change this as needed.

Click **Save** to apply your changes.

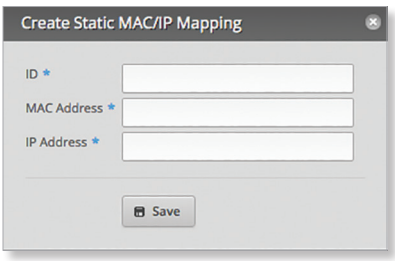
Static MAC/IP Mapping



The top section displays the following status information:

- **Pool Size** The total number of IP addresses is displayed.
- **Leased** The number of used IP addresses is displayed.
- **Available** The number of available IP addresses is displayed.
- **Static** The number of static IP addresses is displayed.
- **Subnet** The IP address and subnet mask of the DHCP server are displayed in slash notation.
- **Range Start** The starting IP address of the range is displayed.
- **Range End** The last IP address of the range is displayed.
- **Router** The default route of the DHCP clients is displayed. The DHCP clients route all packets to this IP address, which is the EdgeRouter's own IP address in most cases.
- **DNS 1/2** The IP address of the DNS server is displayed.
- **Status** The *Enabled*/*Disabled* status of the DHCP server is displayed.
- **Create New Mapping** To map a static IP address to a specific MAC address, click **Create New Mapping**.

  The *Create Static MAC/IP Mapping* appears.



Complete the following:

- **ID** Enter a name for this mapping.
- **MAC Address** Enter the MAC address of the DHCP client.

- **IP Address** Enter the IP address that should be assigned.

Click **Save** to apply your changes.

- **Search** Allows you to search for specific text. Begin typing; there is no need to press *enter*. The results are filtered in real time as soon as you type two or more characters.

A table displays the following information about each static MAC/IP mapping. Click a column heading to sort by that heading.

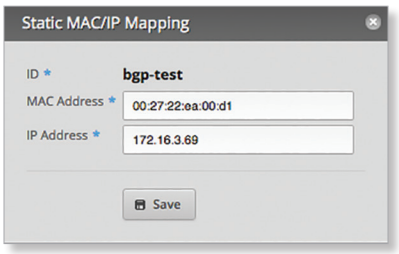


- **Name** The name of the mapping is displayed.
- **MAC Address** The MAC address of the DHCP client is displayed.
- **IP Address** The IP address assigned to the corresponding MAC address is displayed.
- **Actions** Click the **Actions** button to access the following options:
  - **Config** To configure the mapping, click **Config**. Go to the *Configure Static MAC/IP Mapping* section below.
  - **Delete** Remove the selected mapping.

  At the bottom of the screen, you can click *Delete* to delete the DHCP server and its configuration.

Configure Static MAC/IP Mapping

The *Static MAC/IP Mapping* screen appears.

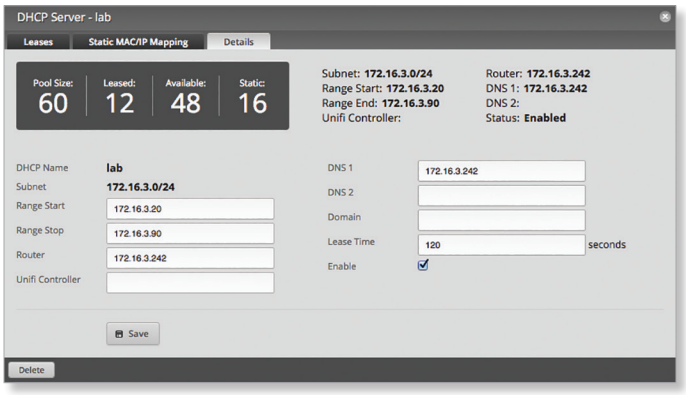


Make changes as needed.

- **ID** The name of this mapping is displayed.
- **MAC Address** Enter the MAC address of the DHCP client.
- **IP Address** Enter the IP address that should be assigned.

Click **Save** to apply your changes.

Details



The top section displays the following status information:

- **Pool Size** The total number of IP addresses is displayed.
- **Leased** The number of used IP addresses is displayed.
- **Available** The number of available IP addresses is displayed.
- **Static** The number of static IP addresses is displayed.
- **Subnet** The IP address and subnet mask of the DHCP server are displayed in slash notation.
- **Range Start** The starting IP address of the range is displayed.
- **Range End** The last IP address of the range is displayed.
- **Router** The default route of the DHCP clients is displayed. The DHCP clients route all packets to this IP address, which is the EdgeRouter's own IP address in most cases.
- **DNS 1/2** The IP address of the DNS server is displayed.
- **Status** The *Enabled*/*Disabled* status of the DHCP server is displayed.

The rest of the *Details* tab displays the following:

- **DHCP Name** The name of the DHCP server is displayed.
- **Subnet** The IP address and subnet mask of the DHCP server are displayed in slash notation.

Make changes as needed to the following options:

- **Range Start** Enter the starting IP address of the range.
- **Range Stop** Enter the last IP address of the range.
- **Router** Enter the default route of the DHCP clients. The DHCP clients route all packets to this IP address, which is the EdgeRouter's own IP address in most cases.
- **UniFi Controller** Enter the IP address of the UniFi Controller. The DHCP server will return the UniFi Controller's IP address to its DHCP clients, so if a client is a UniFi AP, it will know how to contact the UniFi Controller.
- **DNS 1** Enter the IP address of the primary DNS server. Your ISP may provide this information, or you can use Google's DNS server at *8.8.8.8*.
- **DNS 2** Enter the IP address of the secondary DNS server.

- **Domain** Enter the domain name for DHCP clients.
- **Lease Time** Enter the period of time (in seconds) that a DHCP lease should last.
- **Enable** Check the box to enable this DHCP server.

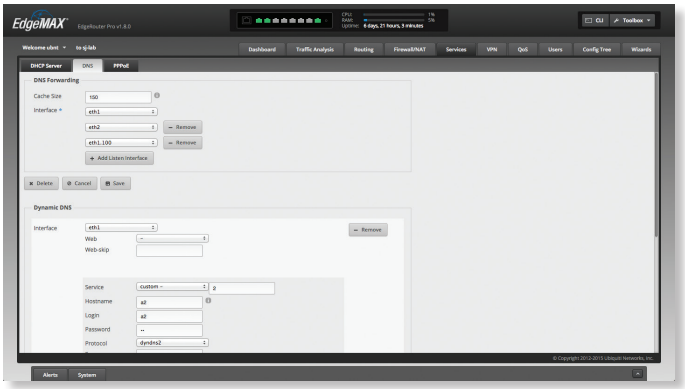
  Click **Save** to apply your changes.

  At the bottom of the screen, you can click *Delete* to delete the DHCP server and its configuration.

DNS

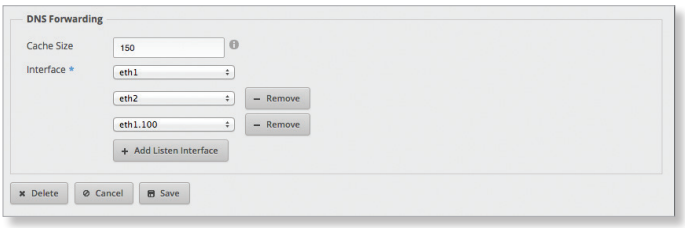
DNS translates domain names to IP addresses; each DNS server on the Internet holds these mappings in its respective DNS database.

On the *DNS* tab, you can configure multiple interfaces for DNS forwarding. You can also configure multiple Dynamic DNS interfaces using multiple Dynamic DNS services.



DNS Forwarding

The EdgeRouter receives all LAN DNS requests and forwards them to the service provider's DNS server. The EdgeRouter receives responses from the DNS server and forwards them to the LAN clients.



Cache Size Completed DNS requests are cached so response time is faster for cached entries, and there is less traffic traveling to the DNS server. Enter the maximum number of DNS queries to cache.

Interface Select the appropriate interface that the EdgeRouter will listen to so it can forward DNS requests.

Add Listen Interface You can select multiple interfaces. To add another interface for DNS forwarding, click **Add Listen Interface**. From the new *Interface* drop-down menu, select the appropriate interface.

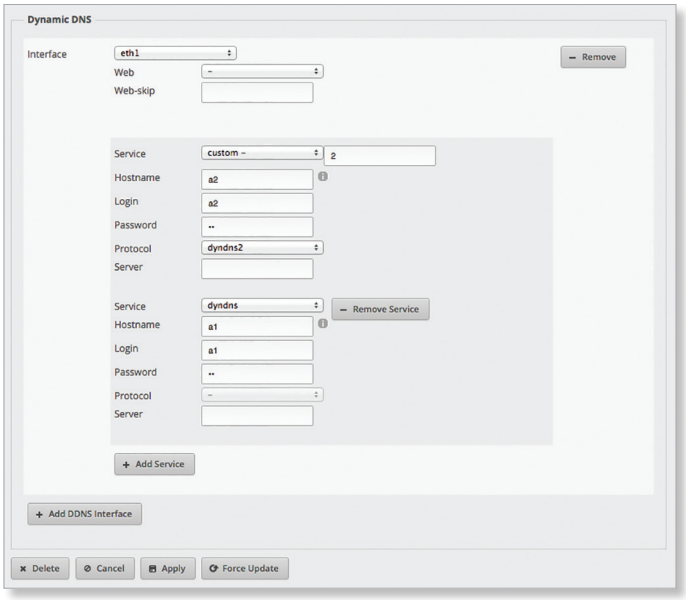
Remove Click **Remove** to delete an interface.

You can click *Delete* to delete the DNS forwarding configuration.

Click **Save** to apply your changes, or click *Cancel*.

Dynamic DNS

Dynamic DNS (DDNS) is a network service that notifies the DNS server in real time of any changes in the device's IP settings. Even if the device's IP address changes, you can still access the device through its domain name.



Add DDNS Interface To add an interface for DDNS service, click **Add DDNS Interface**. Then configure its settings.

- **Interface** Select the appropriate interface of the EdgeRouter.
- **Remove** Click **Remove** to delete an interface.
- **Web** Select the appropriate webpage used to obtain the public IP address, or select **URL** and enter the custom URL. The *Web* and *Web-skip* settings support scenarios in which the router is behind another level of NAT.
- **Web-skip** Enter the text that should be ignored and precedes the public IP address on the selected webpage. This will vary depending on the DDNS service you use. Examples: '*IP Address:* ' and '*Current IP Address:* ' (Ensure you include a space after the colon.)
  - **Service** Select the appropriate DDNS service provider from the drop-down menu, or select **custom** and enter the name of the DDNS service provider.
  - **Hostname** Enter the host name of the device, which has to be updated on the DDNS server. Example: *sample.ddns.com*
  - **Login** Enter the username of the DDNS account.
  - **Password** Enter the password of the DDNS account.
  - **Protocol** Select the appropriate protocol from the drop-down menu.
  - **Server** Enter the IP address or hostname of the DDNS server that should receive DDNS updates.

- **Add Service** You can use multiple services as long as they use the same protocol. To add another DDNS service, click **Add Service**. Then configure a new set of DDNS service settings (except for the *Protocol* setting).

Add DDNS Interface You can use multiple DDNS interfaces. To add another interface for DDNS service, click **Add DDNS Interface**. Then configure a new set of DDNS interface settings.

You can click *Delete* to delete the DDNS configuration.

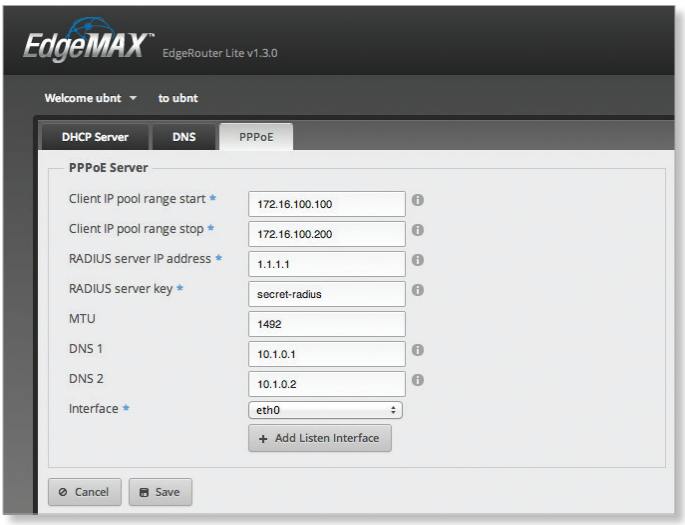
Click **Apply** to save your changes, or click *Cancel*.

You can click *Force Update* to initiate an update of the device's IP address on the DDNS server.

PPPoE

The EdgeRouter can function as a PPPoE (Point-to-Point Protocol over Ethernet) server so a remote PPPoE client can establish a tunnel to the EdgeRouter for network access.

PPPoE Server



Note: If you configured PPPoE using the CLI or the config tree, then you must disable those changes before using the *PPPoE* tab in the web UI.

Client IP pool range start The client IP pool is the pool of IP addresses that remote PPPoE clients will use. Enter the starting IP address of the range (this address must in a /24 subnet).

Client IP pool range stop Enter the last IP address of the range.

RADIUS server IP address The RADIUS (Remote Access Dial-In User Service) server provides authentication to help secure PPPoE connections. Enter the IP address of the RADIUS server.

RADIUS server key Enter the key shared with the RADIUS server.

MTU Enter the MTU (Maximum Transmission Unit) value, which is the maximum packet size (in bytes) that a network interface can transmit. The default is *1492* for the PPPoE connection.

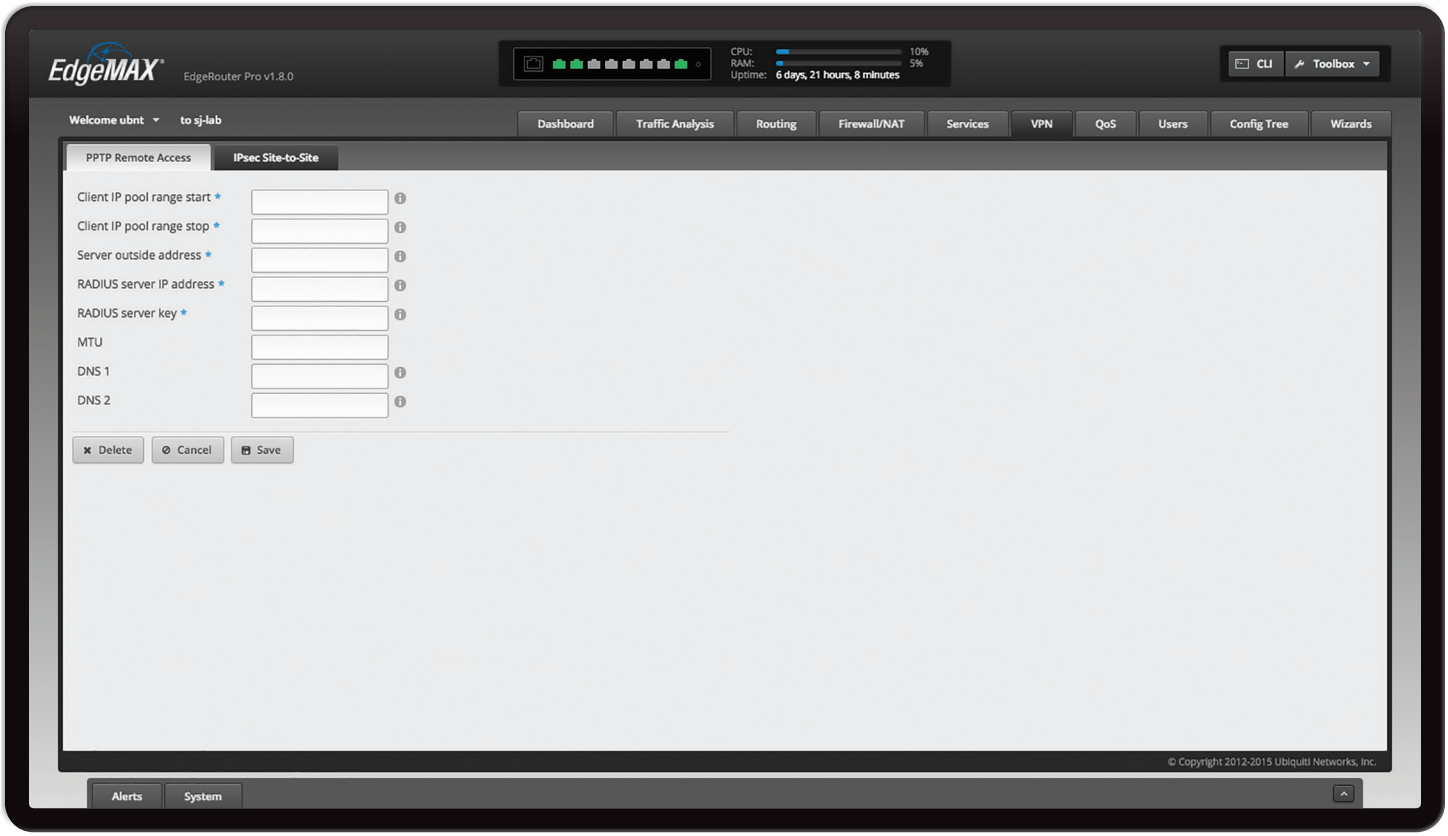
DNS 1 Enter the IP address of the primary remote access DNS server that your PPPoE client will use.

DNS 2 Enter the IP address of the secondary remote access DNS server.

Interface Select the appropriate interface that the EdgeRouter will listen to so it can forward PPPoE requests.

Add Listen Interface You can select multiple interfaces. To add another interface for PPPoE connections, click **Add Listen Interface**. From the new *Interface* drop-down menu, select the appropriate interface.

Click **Save** to apply your changes, or click *Cancel*.



Chapter 8: VPN

The *VPN* tab displays status information about PPTP and IPsec VPN options. You can also configure these options. Any setting marked with a blue asterisk * is required. When the information ⓘ icon is displayed, you can click the icon for more information about an option.

You have two sub-tabs:

PPTP Remote Access Configure the EdgeRouter as a PPTP VPN server.

IPsec Site-to-Site Configure the EdgeRouter as a peer router for a basic IPsec site-to-site VPN tunnel.

PPTP Remote Access

A common type of VPN uses PPTP (Point-to-Point Tunneling Protocol). The EdgeRouter can function as a PPTP VPN server so a remote VPN client can access the LAN using a PPTP VPN tunnel over the Internet.



Client IP pool range start The client IP pool is the pool of IP addresses that remote VPN clients will use. Enter the starting IP address of the range (this address must in a /24 subnet).

Client IP pool range stop Enter the last IP address of the range.

Server outside address Enter the IP address that VPN clients will connect to; this is the outside or external address of the PPTP server.

RADIUS server IP address The RADIUS (Remote Access Dial-In User Service) server provides authentication to help secure VPN tunnels. Enter the IP address of the RADIUS server.

RADIUS server key Enter the key shared with the RADIUS server.

MTU Enter the MTU (Maximum Transmission Unit) value, which is the maximum packet size (in bytes) that a network interface can transmit. The default is *1492* for the PPTP VPN connection.

DNS 1 Enter the IP address of the primary remote access DNS server that your VPN client will use.

DNS 2 Enter the IP address of the secondary remote access DNS server.

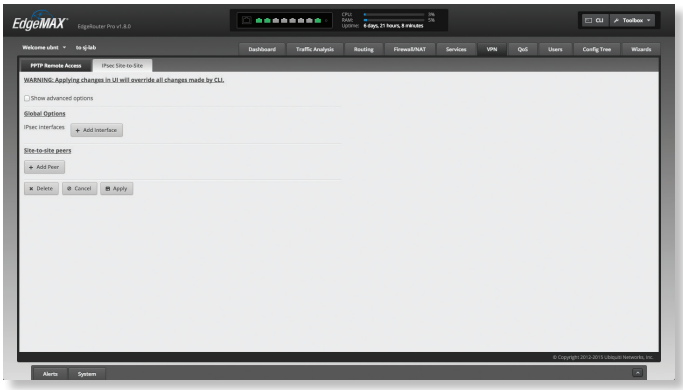
You can click *Delete* to delete the PPTP remote access configuration.

Click **Save** to apply your changes, or click *Cancel*.

IPsec Site-to-Site

A common type of VPN uses IPsec (IP security protocol). The EdgeRouter can function as a peer router so two peer routers can create an IPsec site-to-site VPN tunnel over the Internet. Configuration supports multiple peers, multiple tunnels per peer, and pre-shared secrets.

Note: Any changes you save in the graphical user interface will override any changes you made in the CLI.

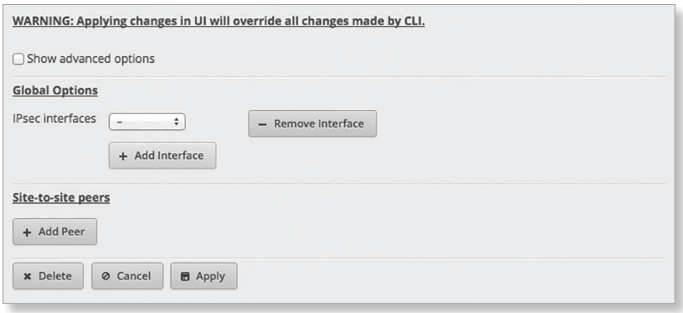


Show advanced options Select this checkbox to display the *Firewall* option.

Global Options

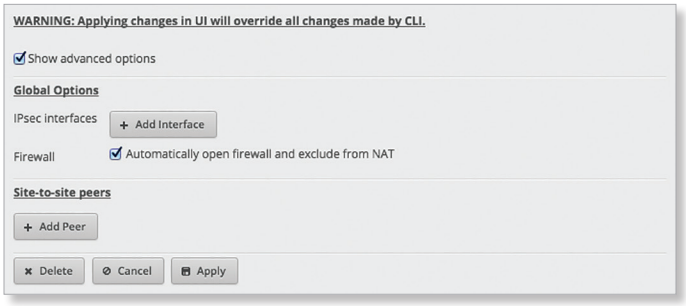
IPsec Interfaces To create a new IPsec interface, click **Add Interface**. Then select the appropriate interface from the drop-down menu.

Remove Interface To delete an IPsec interface, click **Remove Interface**.



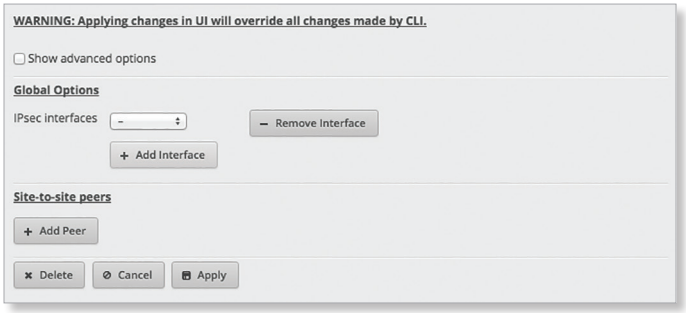
Firewall Enabled by default. Displayed if *Show advanced options* is enabled. If you want the EdgeRouter to automatically open the firewall and exclude it from the NAT, then keep *Firewall* enabled.

If you disable the *Firewall* option, then you will need to manually define firewall rules on the *Firewall/NAT* > *Firewall Policies* tab (refer to **"Firewall Policies" on page 28**).



Site-to-Site Peers

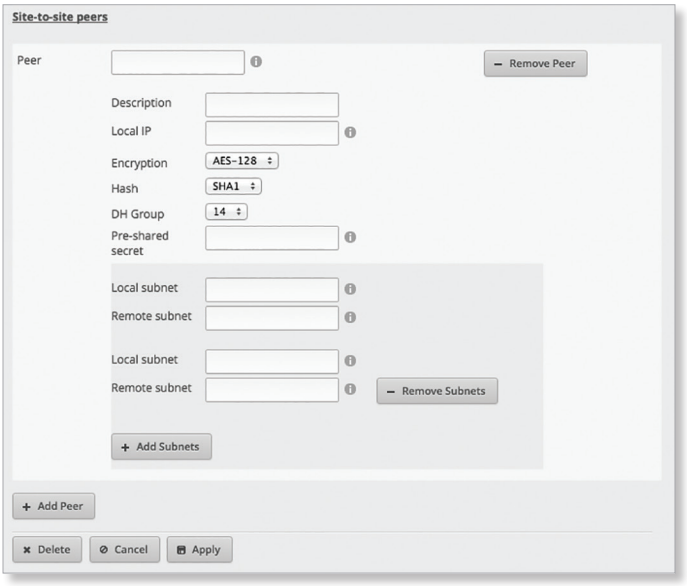
Add Peer To add a site-to-site peer, click **Add Peer**.



Complete the following:

- **Peer** Enter the host name or IPv4/IPv6 address of the peer router.
- **Description** Enter keywords to describe the peer router.
- **Local IP** Enter the IPv4/IPv6 address of the EdgeRouter, or enter **any**.
- **Encryption** Displayed if *Show advanced options* is enabled. Both peer routers must use the same encryption method. Select the appropriate encryption method: **AES-128**, **AES-256**, or **3DES**. The default is *AES-128*.
- **Hash** Displayed if *Show advanced options* is enabled. Both peer routers must use the same hash algorithm. Select the appropriate hash algorithm: **SHA1** or **MD5**. The default is *SHA1*.
- **DH Group** Displayed if *Show advanced options* is enabled. The DH (Diffie-Hellman) group specifies the strength of the DH encryption key for the key exchange. Both peer routers must use the same DH group. Select the appropriate DH group: **2**, **5**, **14**, **15**, **16**, **19**, **20**, **21**, **25**, or **26**. The default is *14*.
- **Pre-shared secret** Enter the pre-shared secret key. Both peer routers must use the same pre-shared secret key for authentication.
- **Local subnet** Enter the local IPv4/IPv6 network address.
- **Remote subnet** Enter the remote IPv4/IPv6 network address.
- **Add Subnets** To create a new set of subnets, click **Add Subnets**. Then complete the new *Local subnet* and *Remote subnet* fields.

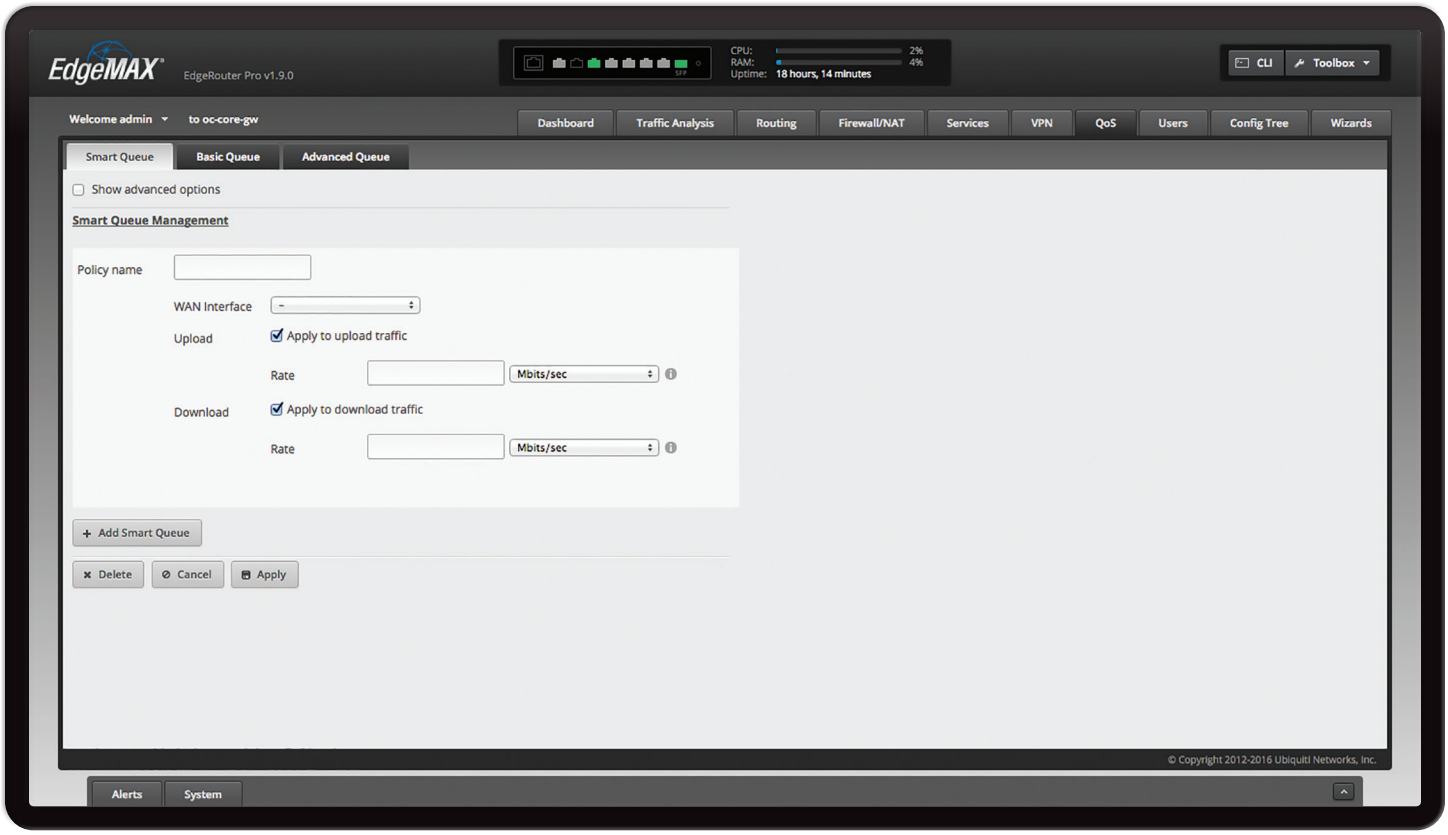
- **Remove Subnets** To delete a set of subnets, click **Remove Subnets**.



Remove Peer To delete a peer, click **Remove Peer**.

You can click *Delete* to delete the IPsec site-to-site configuration.

Click **Apply** to save your changes, or click *Cancel*.



Chapter 9: QoS

The *QoS* tab displays status information about Smart Queue, Basic Queue, and Advanced Queue QoS options. You can also configure these options. Any setting marked with a blue asterisk * is required. When the information ⓘ icon is displayed, you can click the icon for more information about an option.

You have three sub-tabs:

Smart Queue Optimize the usage of overall WAN bandwidth.

Basic Queue Configure simple QoS policies without the complexity of the Advanced Queue feature.

Advanced Queue Configure a hierarchical tree of queues to implement a sophisticated bandwidth-sharing scheme.

Smart Queue

The Smart Queue feature provides FQ-CODEL (Fair Queuing with Controlled Delay) + HTB (Hierarchical Token Bucket) function and supports dynamic interfaces, even if the dynamic interfaces do not exist yet (the policy will be applied later when the interface comes up).

The HTB rate limiting is computation-intensive, so the rate limiting will not work well (cannot achieve the specified rate) above a certain threshold rate. The actual threshold (applied to the sum of the upload and download rates) depends on the specific model and conditions of the actual environment.

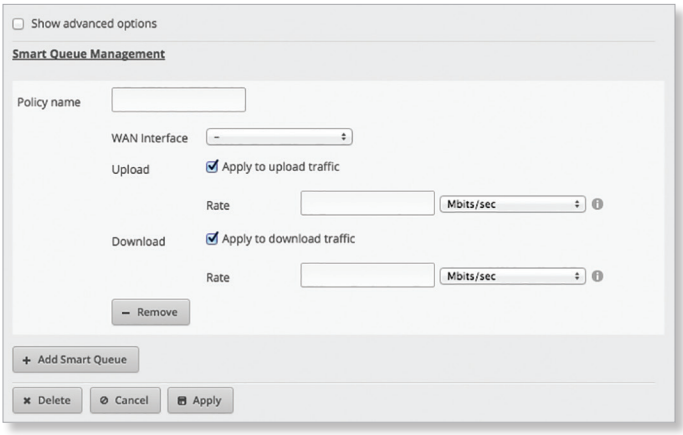
Here are general guidelines on the expected Smart Queue shaping performance:

Model	Expected Maximum Performance
EP-R6	100 - 250 Mbps
EP-R8	120 - 330 Mbps
ER-X	100 - 250 Mbps
ER-X-SFP	100 - 250 Mbps
ERLite-3	60 - 200 Mbps
ERPoe-5	60 - 200 Mbps
ER-8	160 - 450 Mbps
ERPro-8	200 - 550 Mbps

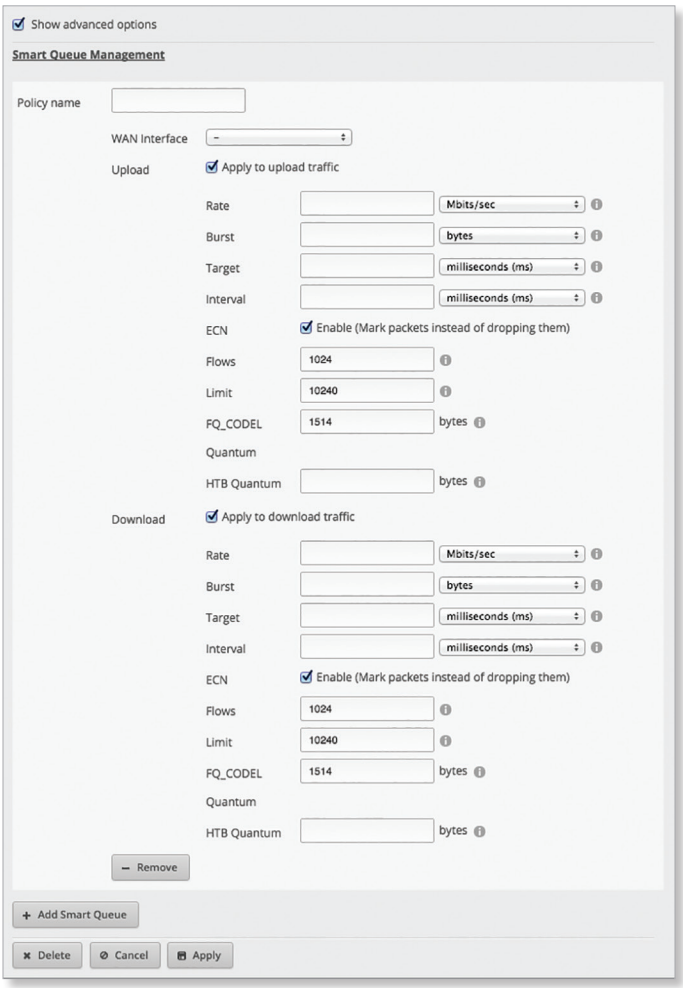
It may require some testing to find the actual threshold in a specific environment, depending on the actual setup, traffic patterns, and other conditions. The actual rate limits will be set to 95% of the specified value, so you can experiment with different values if necessary.

Each smart queue policy applies to one interface. You can configure multiple policies for different interfaces.

Note: The Smart Queue feature conflicts with the existing traffic policy configuration, so the two should not be applied to the same interface at the same time.



Show advanced options Select this checkbox to display the *Burst*, *Target*, *Interval*, *ECN*, *Flows*, *Limit*, *FQ_CODEL*, *Quantum*, and *HTB Quantum* options.



Smart Queue Management To create a new smart queue, click **Add Smart Queue**. Then complete the following options:

- **Policy name** Enter a descriptive name.
- **WAN Interface** Select the appropriate interface.
- **Upload** Select **Apply to upload traffic** to manage QoS for upload traffic.
  - **Rate** Enter the bandwidth limit, and select the unit of measurement: **bits/sec**, **Kbits/sec**, or **Mbits/sec**.
  - **Burst** Displayed if *Show advanced options* is enabled. Enter the amount of data that can burst at best-effort, and select the unit of measurement: **bytes**, **Kbytes**, or **Mbytes**. The valid range is *1500 bytes* to *10 Mbytes*.
  - **Target** Displayed if *Show advanced options* is enabled. Enter the minimum queue delay, and select the unit of measurement: **microseconds (µs)**, **milliseconds (ms)**, or **seconds**. The valid range is *10 µs* to *10 s*.

  Note: The *Target* and *Interval* are automatically calculated for low-bandwidth links if the values are not specified.
  - **Interval** Displayed if *Show advanced options* is enabled. When the minimum queue delay has exceeded the *Target* for longer than the configured *Interval*, the EdgeRouter will enter drop mode. Enter the time interval, and select the unit of measurement: **microseconds (µs)**, **milliseconds (ms)**, or **seconds**. The valid range is *1 ms* to *20 s*.

  Note: The *Target* and *Interval* are automatically calculated for low-bandwidth links if the values are not specified.
  - **ECN** Displayed if *Show advanced options* is enabled. Select the ECN (Explicit Congestion Notification) option if you want to mark packets instead of dropping them. Enabled by default.
  - **Flows** Displayed if *Show advanced options* is enabled. Enter the number of flows into which the incoming packets are classified. The valid range is *1* to *65535*. The default is *1024*.
  - **Limit** Displayed if *Show advanced options* is enabled. Enter the hard limit on the real queue size. The valid range in number of packets is *1* to *1000000*. The default is *10240*.
  - **FQ_CODEL Quantum** Displayed if *Show advanced options* is enabled. Enter the packet scheduling quantum for FQ_CODEL. The valid range in bytes is *256* to *65535*. The default is *1514*.
  - **HTB Quantum** Displayed if *Show advanced options* is enabled. Enter the packet scheduling quantum for HTB. The valid range in bytes is *1* to *65535*.
- **Download** Select **Apply to download traffic** to manage QoS for download traffic.
  - **Rate** Enter the bandwidth limit, and select the unit of measurement: **bits/sec**, **Kbits/sec**, or **Mbits/sec**.
  - **Burst** Displayed if *Show advanced options* is enabled. Enter the amount of data that can burst at best-effort, and select the unit of measurement: **bytes**, **Kbytes**, **Mbytes**, or **Gbytes**. The valid range is *1500 bytes* to *10 Mbytes*.

- **Target** Displayed if *Show advanced options* is enabled. Enter the minimum queue delay, and select the unit of measurement: **microseconds (µs)**, **milliseconds (ms)**, or **seconds**. The valid range is *10 µs* to *10 s*.

Note: The *Target* and *Interval* are automatically calculated for low-bandwidth links if the values are not specified.

- **Interval** Displayed if *Show advanced options* is enabled. When the minimum queue delay has exceeded the *Target* for longer than the configured *Interval*, the EdgeRouter will enter drop mode. Enter the time interval, and select the unit of measurement: **microseconds (µs)**, **milliseconds (ms)**, or **seconds**. The valid range is *1 ms* to *20 s*.

Note: The *Target* and *Interval* are automatically calculated for low-bandwidth links if the values are not specified.

- **ECN** Displayed if *Show advanced options* is enabled. Select this option if you want to mark packets instead of dropping them. Enabled by default.
- **Flows** Displayed if *Show advanced options* is enabled. Enter the number of flows into which the incoming packets are classified. The valid range is *1* to *65535*. The default is *1024*.
- **Limit** Displayed if *Show advanced options* is enabled. Enter the hard limit on the real queue size. The valid range in number of packets is *1* to *1000000*. The default is *10240*.
- **FQ_CODEL Quantum** Displayed if *Show advanced options* is enabled. Enter the packet scheduling quantum for FQ_CODEL. The valid range in bytes is *256* to *65535*. The default is *1514*.
- **HTB Quantum** Displayed if *Show advanced options* is enabled. Enter the packet scheduling quantum for HTB. The valid range in bytes is *1* to *65535*.

Remove To delete a smart queue, click **Remove**.

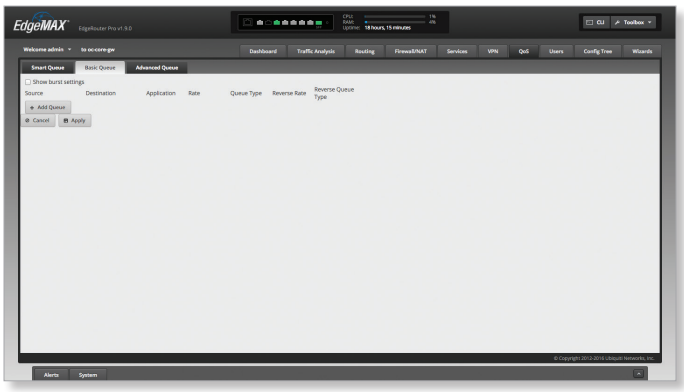
You can click *Delete* to delete the smart queue configuration.

Click **Apply** to save your changes, or click *Cancel*.

Basic Queue

The Basic Queue feature allows you to configure simple QoS policies without the complexity of the Advanced Queue feature.

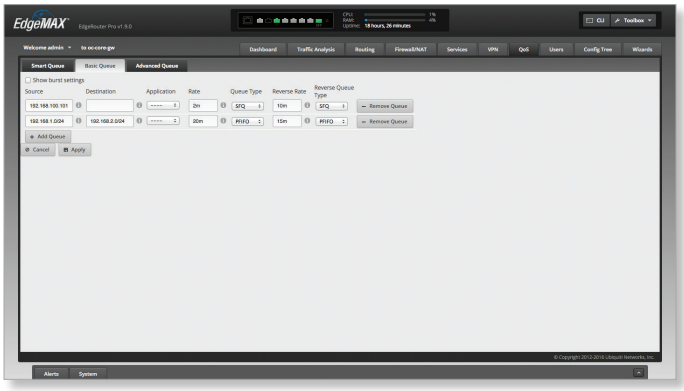
The Basic Queue feature of the EdgeOS Configuration Interface generates Advanced Queue configuration in the background. If you subsequently make changes outside of the *Basic Queue* sub-tab (either through the CLI or *Advanced Queue* sub-tab), then the *Basic Queue* sub-tab will no longer be able to show the configuration. Therefore, if you want to use the *Basic Queue* sub-tab, then you should restrict all QoS configuration changes to the *Basic Queue* sub-tab.



Here is an example of a Basic Queue policy: In the following screen, the first queue specifies that the host, 192.168.100.101, has an upload rate limit of 2 Mbps and a download rate limit of 10 Mbps (using SFQ in both directions).

In this context, “upload” means source (192.168.100.101) to destination (not specified so it is defined as “any”), and “download” means destination to source.

The second queue specifies a rate limit of 20 Mbps for traffic going from 192.168.1.0/24 to 192.168.2.0/24, and 15 Mbps for the reverse direction (192.168.2.0/24 to 192.168.1.0/24), using simple FIFO in both directions.



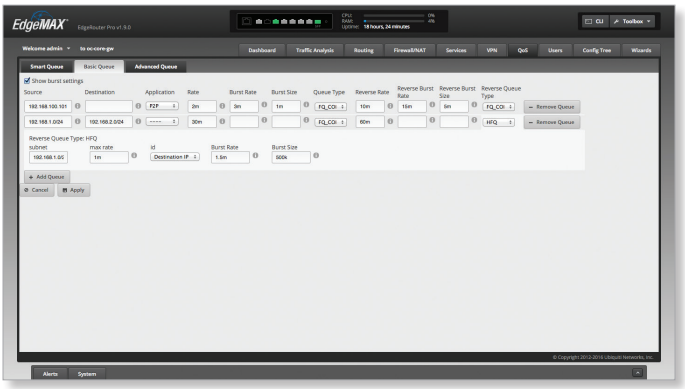
Here is another example.The *Show burst settings* option is enabled, so the *Basic Queue* sub-tab shows the burst rate/size settings for each direction.

The first queue specifies the following:

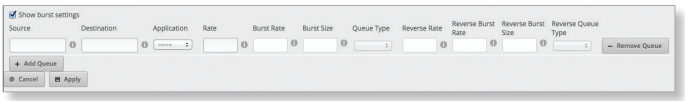
- P2P traffic (as identified by the DPI feature) for the host, 192.168.100.101
- 2 Mbps upload rate limit, allowing bursting up to 3 Mbps for 1 MB of data
- 10 Mbps download rate limit (bursting up to 15 Mbps for 5 MB)
- FQ-CODEL in both directions

The second queue specifies the following:

- upload rate limit of 30 Mbps (with FQ-CODEL) for the 192.168.1.0/24 network
- download (reverse) rate limit of 60 Mbps (with HFQ),
  - each client in the 192.168.1.0/24 subnet has adownload rate limit of 1 Mbps, bursting up to 1.5 Mbps for 500 KB



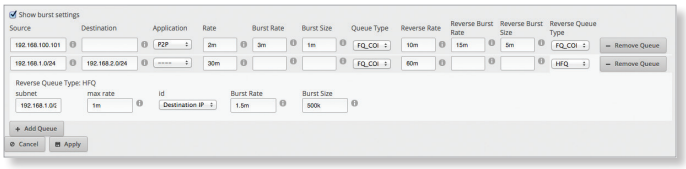
Show burst settings Select this checkbox to display the *Burst Rate*, *Burst Size*, *Reverse Burst Rate*, and *Reverse Burst Size* options.



Add Queue To create a new basic queue, click **Add Queue**. Then complete the following options:

- **Source** Enter the source IP or network address. Examples: *11.1.1.1* or *22.2.2.0/24*.
- **Destination** Enter the destination IP or network address. Examples: *11.1.1.1* or *22.2.2.0/32*.
- **Application** Select the appropriate application.
- **Rate** Enter the bandwidth limit in bits per second, from source to destination. Examples: *1200*, *5k*, or *12m*.
- **Burst Rate** Displayed if *Show burst settings* is enabled. Enter the rate at which data can burst at best-effort in bits per second, from source to destination. Examples: *1200*, *5k*, or *12m*.
- **Burst Size** Displayed if *Show burst settings* is enabled. Enter the amount of data that can burst at best-effort in bytes, from source to destination. Examples: *1200*, *5k*, or *12m*.
- **Queue Type** Select the appropriate queue type:
  - **FQ_CODEL** FQ-CODEL (Fair Queuing with Controlled Delay) is designed to provide equal service for all traffic flows while minimizing delays.
  - **HFQ** Host Fairness Queueing (HFQ) provides simplified policy setup for scenarios in which all hosts of a specific subnet share the same policy. The EdgeRouter automatically applies the specified policy to every host in the specified subnet.

    If you selected HFQ, then you have additional settings to configure:
    - **Subnet** Enter the IP address of the subnet.
    - **Max Rate** Enter the bandwidth limit per host in bits per second, from source to destination. Examples: *1200*, *5k*, or *12m*.
    - **ID** Select **Source IP** or **Destination IP**.
    - **Burst Rate** Enter the rate at which data can burst at best-effort per host in bits per second, from source to destination. Examples: *1200*, *5k*, or *12m*.
    - **Burst Size** Enter the amount of data that can burst at best-effort per host in bytes, from source to destination. Examples: *1200*, *5k*, or *12m*.



  - **SFQ** With SFQ (Stochastic Fairness Queueing), traffic is separated into multiple FIFO (First In, First Out) queues, which are then serviced using a round-robin algorithm.
  - **PFIFO** With PFIFO (Priority First In, First Out) queueing, packets are serviced in order of priority, so highest-priority packets are serviced first. Medium-priority packets are serviced next. Low-priority packets are serviced last.
- **Reverse Rate** Enter the bandwidth limit in bits per second, from destination to source. Examples: *1200*, *5k*, or *12m*.
- **Reverse Burst Size** Displayed if *Show burst settings* is enabled. Enter the rate at which data can burst at best-effort in bits per second, from destination to source. Examples: *1200*, *5k*, or *12m*.

- **Reverse Queue Type** Select the appropriate queue type:
  - **FQ_CODEL** FQ-CODEL (Fair Queuing with Controlled Delay) is designed to provide equal service for all traffic flows while minimizing delays.
  - **HFQ** Host Fairness Queueing (HFQ) provides simplified policy setup for scenarios in which all hosts of a specific subnet share the same policy. The EdgeRouter automatically applies the specified policy to every host in the specified subnet.

    If you selected HFQ, then you have additional settings to configure:

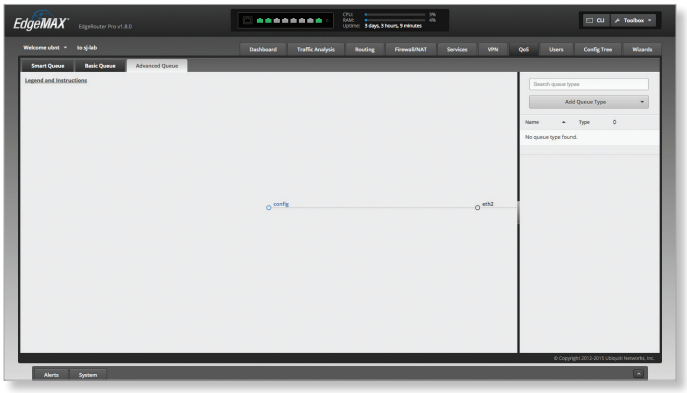
    - **Subnet** Enter the IP address of the subnet.
    - **Max Rate** Enter the bandwidth limit per host in bits per second, from destination to source. Examples: *1200*, *5k*, or *12m*.
    - **ID** Select **Source IP** or **Destination IP**.
    - **Burst Rate** Enter the rate at which data can burst at best-effort per host in bits per second, from destination to source. Examples: *1200*, *5k*, or *12m*.
    - **Burst Size** Enter the amount of data that can burst at best-effort per host in bytes, from destination to source. Examples: *1200*, *5k*, or *12m*.
  - **SFQ** With SFQ (Stochastic Fairness Queueing), traffic is separated into multiple FIFO (First In, First Out) queues, which are then serviced using a round-robin algorithm.
  - **PFIFO** With PFIFO (Priority First In, First Out) queueing, packets are serviced in order of priority, so highest-priority packets are serviced first. Medium-priority packets are serviced next. Low-priority packets are serviced last.

Remove Queue To delete a basic queue, click **Remove Queue**.

Click **Apply** to save your changes, or click *Cancel*.

Advanced Queue

The Advanced Queue feature provides more functionality and flexibility than the existing traffic policy features. With the Advanced Queue feature, you can configure a hierarchical tree of queues to implement a more complex bandwidth-sharing scheme, as opposed to the existing traffic-policy shaper, which only supports flat queues.



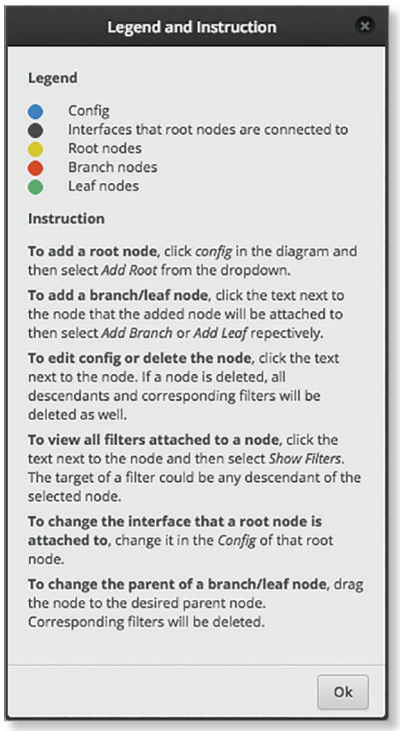
You can attach a QoS policy globally instead of attaching it to only a specific interface. A global attachment designates all traffic – not traffic specific to one interface and direction. A global attachment can make it easier to design the policy and can also provide greater flexibility, as the QoS policy is applied after destination NAT and before source NAT (for example, private IP addresses can be used for QoS policy matching).

A tree of queues consists of root, branch, and leaf nodes. For example, there is a root node R1, which is attached globally. Branch node B11 represents download policies, and leaf node L12 represents upload policies. For download, the traffic is further divided to use different policies according to the subnet.

At each root or branch node, you can attach filters to classify the different traffic that belongs to different child nodes. At each leaf node, a separately defined queue type is attached. For example, the upload direction uses FQ-CODEL. For download, one subnet uses SFQ (Stochastic Fairness Queueing) while the other uses HFQ (Host Fairness Queueing).

Legend and Instructions

Legend and Instructions Click **Legend and Instructions** to display UI (User Interface) information on-screen.



Click **OK** to close the popup.

Icons

The icons indicate the type of node or interface in the diagram depicting the tree of queues:

Icon	Description
	Config
	Interfaces that root nodes are connected to
	Root nodes
	Branch nodes
	Leaf nodes

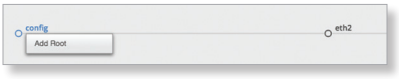
User Interface

The *Advanced Queue* tab allows you to set up the root/branch/leaf nodes, filters, and queue types using an intuitive graphical user interface. The diagram allows for the following interactions:

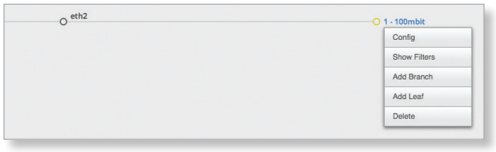
- **Drag and Drop** Drag and drop a node so you can move a branch node from one root node to another.
- **Pan** Pan the tree of queues by dragging it with your mouse.
- **Center** Click a node to center the diagram around that node.
- **Zoom** Use your mouse wheel to zoom in or out.

Configuration Options

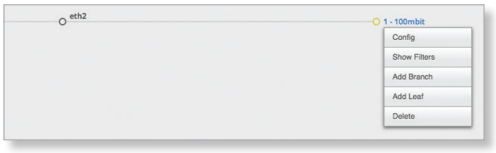
config (to add root node) This option creates a root node. Click **config** in the diagram and then select **Add Root** from the drop-down menu. Proceed to **"Add Root" on page 55**.



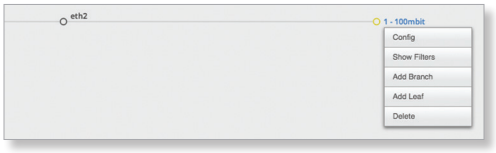
config (to edit a configuration) This option allows you to make changes, including changing the interface that the node is attached to. Click the text next to the node icon. Proceed to **"Config" on page 55**.



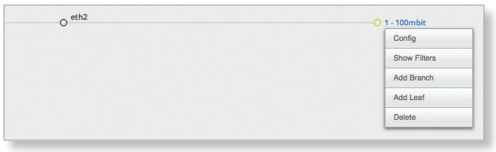
Show Filters (Not available for leaf nodes.) This option displays any filter you have created. The target of a filter can be any descendant of the selected node. Click the text next to the node icon and select **Show Filters**. Proceed to **"Show Filters" on page 55**.



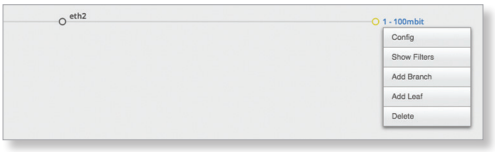
Add Branch This option creates a branch node associated with a root node. Click the text next to the node icon that the added node will be attached to. Then select **Add Branch**. Proceed to the appropriate section: **"Add Branch" on page 57**.



Add Leaf This option creates a leaf node associated with a root node. Click the text next to the node that the added node will be attached to. Then select **Add Leaf**. Proceed to the appropriate section: **"Add Leaf" on page 57**.



Delete This option deletes a node, as well as all of its descendants and corresponding filters. Click the text next to the node icon. Proceed to the appropriate section: **"Delete" on page 58**.



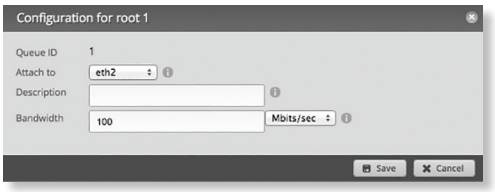
Add Root



- **Queue ID** Enter an identifier. The valid range is *1* to *1023*.
- **Attach to** Select **global** or the appropriate interface that the queue will attach to.
- **Description** Enter keywords to describe the traffic class.
- **Bandwidth** Enter the bandwidth limit, and select the appropriate unit of measurement: **bits/sec**, **Kbits/sec**, or **Mbits/sec**.

  Click **Save** to apply your changes, or click *Cancel*.

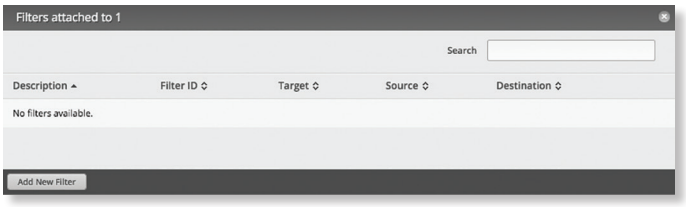
Config



- **Queue ID** The identifier is displayed.
- **Attach to** Select **global** or the appropriate interface that the queue will attach to.
- **Description** Enter keywords to describe the traffic class.
- **Bandwidth** Enter the bandwidth limit, and select the appropriate unit of measurement: **bits/sec**, **Kbits/sec**, or **Mbits/sec**.

  Click **Save** to apply your changes, or click *Cancel*.

Show Filters



Note: The *Show Filters* option does not apply to leaf nodes.

- **Search** Allows you to search for specific text. Begin typing; there is no need to press enter. The results are filtered in real time as soon as you type two or more characters.

  A table displays the following information about each filter. Click a column heading to sort by that heading.
- **Description** The keywords describing the filter are displayed.
- **Filter ID** The identifier is displayed.
- **Target** The target is displayed.
- **Source** The source IP address is displayed.
- **Destination** The destination IP address is displayed.
- **Add New Filter** Click to create a new filter. The *Create Filter* screen appears.



You have two tabs available:

- Basic (below)
- Match (next column)

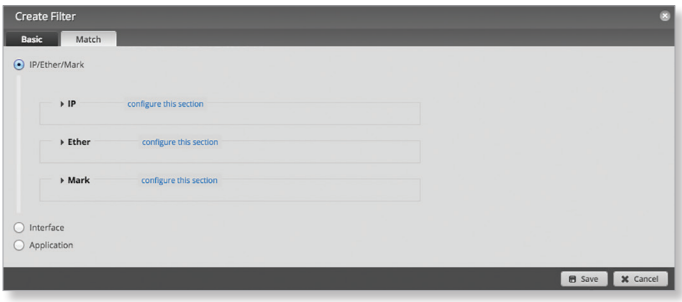
Basic



- **Filter ID** Enter the identifier.
- **Attach to** The queue ID that the filter will attach to is displayed.
- **Target** Select the appropriate target from the drop-down menu.
- **Description** Enter keywords to describe the filter.

Click **Save** to apply your changes, or click *Cancel*.

Match



You have three options available:

- IP/Ether/Mark (below)
- **"Interface" on page 57**
- **"Application" on page 57**

Select the option you want to match and go to the appropriate instructions.

IP/Ether/Mark

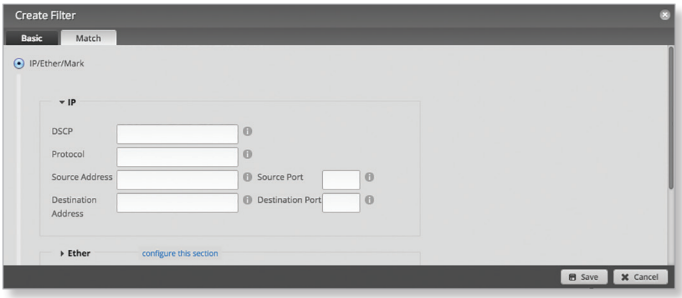
You can configure one or more of the following options:

- IP (below)
- **"Ethernet" on page 56**
- **"Mark" on page 57**

Go to the appropriate instructions.

IP

Click **configure this section** to configure the *IP* settings.



- **DSCP** Enter the IP DSCP (Differentiated Services Code Point) value. The valid range is *0* to *63*.

802.1p Class of Service	TOS Range	DSCP Range	WME Category
0 – Best Effort	0x00-0x1f	0-7	Best Effort
1 – Background	0x20-0x3f	8-15	Background
2 – Spare	0x40-0x5f	16-23	Background
3 – Excellent Effort	0x60-0x7f	24-25, 28-31	Best Effort
4 – Controlled Load	0x80-0x9f	32-39	Video
5 – Video (<100 ms latency)	0xa0-0xbf	40-45	Video
6 – Voice (<10 ms latency)	0x68, 0xb8, 0xc0-0xdf	26-27, 46-47, 48-55	Voice
7 – Network Control	0xe0-0xff	56-63	Voice

- **Protocol** Enter the port number of the protocol. The valid range is *0* to *255*.
- **Source Address** Enter the IP address or network address of the source. You can also enter a range of IP addresses; one of them will be used.

Note: If you enter a network address, enter the IP address and subnet mask using slash notation: *<network_IP_address>/<subnet_mask_number>* (example: *192.0.2.0/24*).

- **Source Port** Enter the port name or number of the source. You can also enter a range of port numbers; one of them will be used.
- **Destination Address** Enter the IP address or network address of the destination. You can also enter a range of IP addresses; one of them will be used.

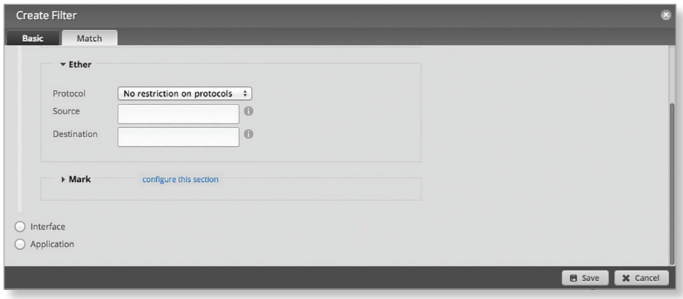
Note: If you enter a network address, enter the IP address and subnet mask using slash notation: *<network_IP_address>/<subnet_mask_number>* (example: *192.0.2.0/24*).

- **Destination Port** Enter the port name or number of the destination. You can also enter a range of port numbers; one of them will be used.

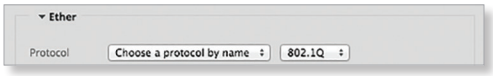
Click **Save** to apply your changes, or click *Cancel*.

Ethernet

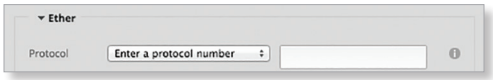
Click **configure this section** to configure the *Ether* settings.



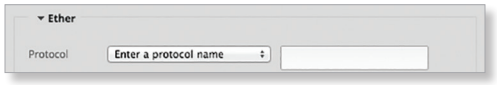
- **Protocol**
  - **No restrictions on protocols** Match packets of all protocols.
  - **Choose a protocol by name** Select the protocol from the drop-down list. Match packets of this protocol.



  - **Enter a protocol number** Enter the port number of the protocol. Match packets of this protocol. The valid range is *0* to *65535*.



- **Enter a protocol name** Enter the name of the protocol. Match packets of this protocol.

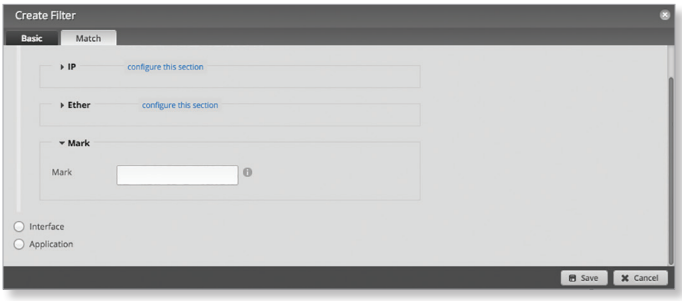


- **Source** Enter the Ethernet source address.
- **Destination** Enter the Ethernet destination address.

Click **Save** to apply your changes, or click *Cancel*.

Mark

Click **configure this section** to configure the *Mark* settings.



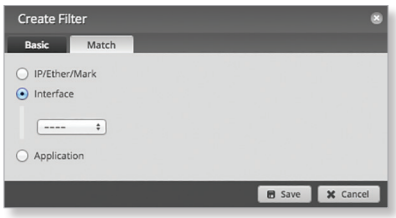
- **Mark** Configure the filter to match packets with the specified marking. For example, you can configure a firewall policy to add different markings to packets according to certain criteria (refer to **"Firewall Policies" on page 28** for more information). These markings can then be matched in the QoS filters.

  Enter the appropriate decimal or hexadecimal value. The valid decimal range is *0* to *255*. The valid hexadecimal range is *0x0* to *0xff*.

Note: Advanced users can use a higher value than 255 or *0xff*; however, proceed with caution.

Click **Save** to apply your changes, or click *Cancel*.

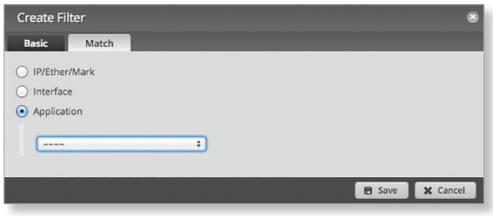
Interface



- **Interface** Select the appropriate interface from the drop-down menu.

Click **Save** to apply your changes, or click *Cancel*.

Application



- **Application** Select the appropriate application category from the drop-down menu. Refer to **"Category" on page 19** for more information.

Click **Save** to apply your changes, or click *Cancel*.

Add Branch

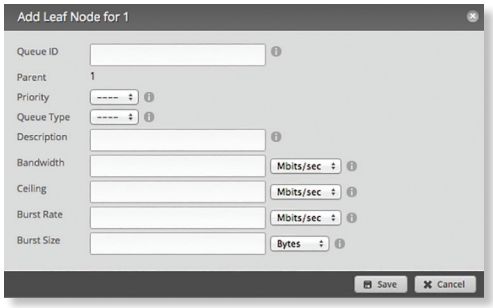


- **Queue ID** Enter an identifier. The valid range is *1* to *1023*.
- **Parent** The queue ID that the branch node will attach to is displayed.
- **Priority** Select the appropriate priority for usage of excess bandwidth.
- **Description** Enter keywords to describe the traffic class.
- **Bandwidth** Enter the bandwidth limit, and select the appropriate unit of measurement: **bits/sec**, **Kbits/sec**, or **Mbits/sec**.

  Click **Save** to apply your changes, or click *Cancel*.

Note: To change the parent of a branch node, drag the branch node to the desired parent node. The corresponding filters will also be deleted.

Add Leaf



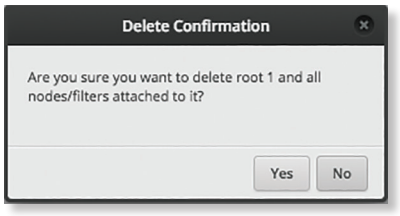
- **Queue ID** Enter an identifier. The valid range is *1* to *1023*.
- **Parent** The queue ID that the leaf node will attach to is displayed.
- **Priority** Select the appropriate priority for usage of excess bandwidth.

- **Queue Type** Select the queue type for this class. Go to **"Queue Types" on page 58** for more information.
- **Description** Enter keywords to describe the traffic class.
- **Bandwidth** Enter the guaranteed bandwidth, and select the appropriate unit of measurement: **bits/sec**, **Kbits/sec**, or **Mbits/sec**.
- **Ceiling** Enter the bandwidth ceiling (maximum allowed bandwidth), and select the appropriate unit of measurement: **bits/sec**, **Kbits/sec**, or **Mbits/sec**.
- **Burst Rate** Enter the maximum data rate that can burst at best-effort, and select the unit of meaurement: **bits/sec**, **Kbits/sec**, or **Mbits/sec**.
- **Burst Size** Enter the maximum amount of data that can burst at best-effort, and select the unit of measurement: **bytes**, **Kbytes**, or **Mbytes**, or **Gbytes**.

  Click **Save** to apply your changes, or click *Cancel*.

Note: To change the parent of a leaf node, drag the leaf node to the desired parent node.

Delete



Click **Yes** to delete the node and all nodes and filters attached to it, or click *No* to cancel.

Queue Types

Queueing determines how the EdgeRouter prioritizes traffic. You can create multiple queue types that use different algorithms to manage traffic.

Note: The *Queue Types* option does not apply to root or branch nodes.

Search Allows you to search for specific text. Begin typing; there is no need to press *enter*. The results are filtered in real time as soon as you type two or more characters.

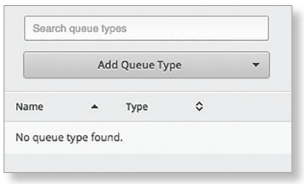
Add Queue Type To add a queue type, click **Add Queue Type** and select one of the following options:

- **"FQ_CODEL" on page 58**
- **"HFQ" on page 59**
- **"SFQ" on page 59**
- **"PFIFO" on page 59**

Proceed to the appropriate instructions for your queue type.

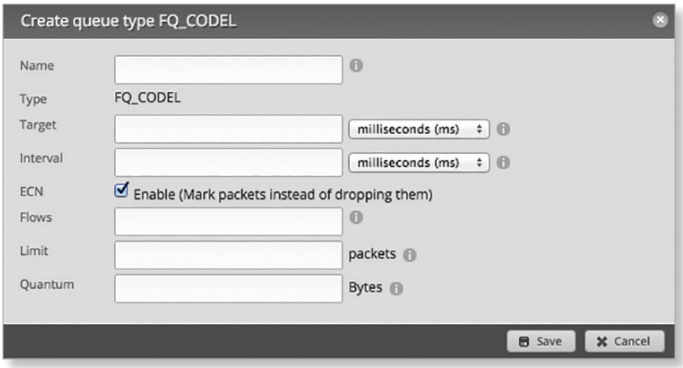
A table displays the following information about each queue type. Click a column heading to sort by that heading.

- **Name** The identifier of the queue type is displayed.
- **Type** The queue type is displayed.



FQ_CODEL

FQ-CODEL (Fair Queuing with Controlled Delay) is designed to provide equal service for all traffic flows while minimizing delays.



- **Name** Enter a unique identifier for this queue type.
- **Type** *FQ_CODEL* is displayed.
- **Target** Enter the minimum queue delay, and select the unit of measurement: **microseconds (µs)**, **milliseconds (ms)**, or **seconds**. The valid range is *10 µs* to *10 s*.
- **Interval** When the minimum queue delay has exceeded the *Target* for longer than the configured *Interval*, the EdgeRouter will enter drop mode. Enter the time interval, and select the unit of measurement: **microseconds (µs)**, **milliseconds (ms)**, or **seconds**. The valid range is *1 ms* to *20 s*.
- **ECN** Select this option if you want to mark packets instead of dropping them. Enabled by default.
- **Flows** Enter the number of flows into which the incoming packets are classified. The valid range is *1* to *65535*.
- **Limit** Enter the hard limit on the real queue size. The valid range in number of packets is *1* to *1000000*.
- **Quantum** Enter the packet scheduling quantum for FQ_CODEL. The valid range in bytes is *256* to *65535*.

  Click **Save** to apply your changes, or click *Cancel*.

HFQ

Host Fairness Queueing (HFQ) provides simplified policy setup for scenarios in which all hosts of a specific subnet share the same policy. The EdgeRouter automatically applies the specified policy to every host in the specified subnet.



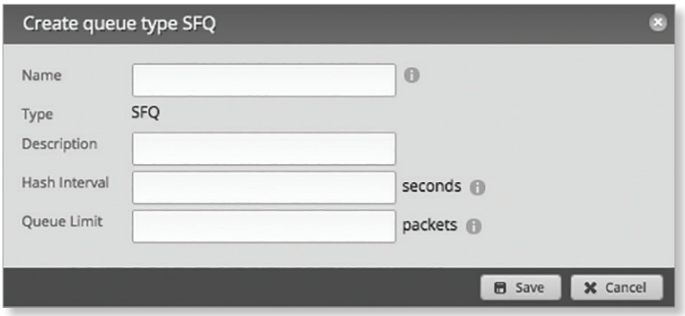
- **Name** Enter a unique identifier for this queue type.
- **Type** *HFQ* is displayed.
- **Description** Enter keywords to describe the queue type.
- **Host Identifier** Select the appropriate host identifier for the host fairness queue, **Source IP** or **Destination IP**. The default is *Source IP*.
- **Max Rate** Enter the maximum bandwidth limit per host, and select the appropriate unit of measurement: **bits/sec**, **Kbits/sec**, or **Mbits/sec**.
- **Subnet** Enter the IPv4 subnet (up to /22 in size) for the host fairness queue.

  Note: If you enter a network address, enter the IP address and subnet mask using slash notation: *<network_IP_address>/<subnet_mask_number>* (example: *192.0.2.0/24*).

Click **Save** to apply your changes, or click *Cancel*.

SFQ

With SFQ (Stochastic Fairness Queueing), traffic is separated into multiple FIFO (First In, First Out) queues, which are then serviced using a round-robin algorithm.



- **Name** Enter a unique identifier for this queue type.
- **Type** *SFQ* is displayed.
- **Description** Enter keywords to describe the queue type.
- **Hash Interval** Enter the hash interval in seconds. The valid range is *0* to *4294967295*.
- **Queue Limit** Enter the maximum queue size in packets. The valid range is *1* to *127*.

Click **Save** to apply your changes, or click *Cancel*.

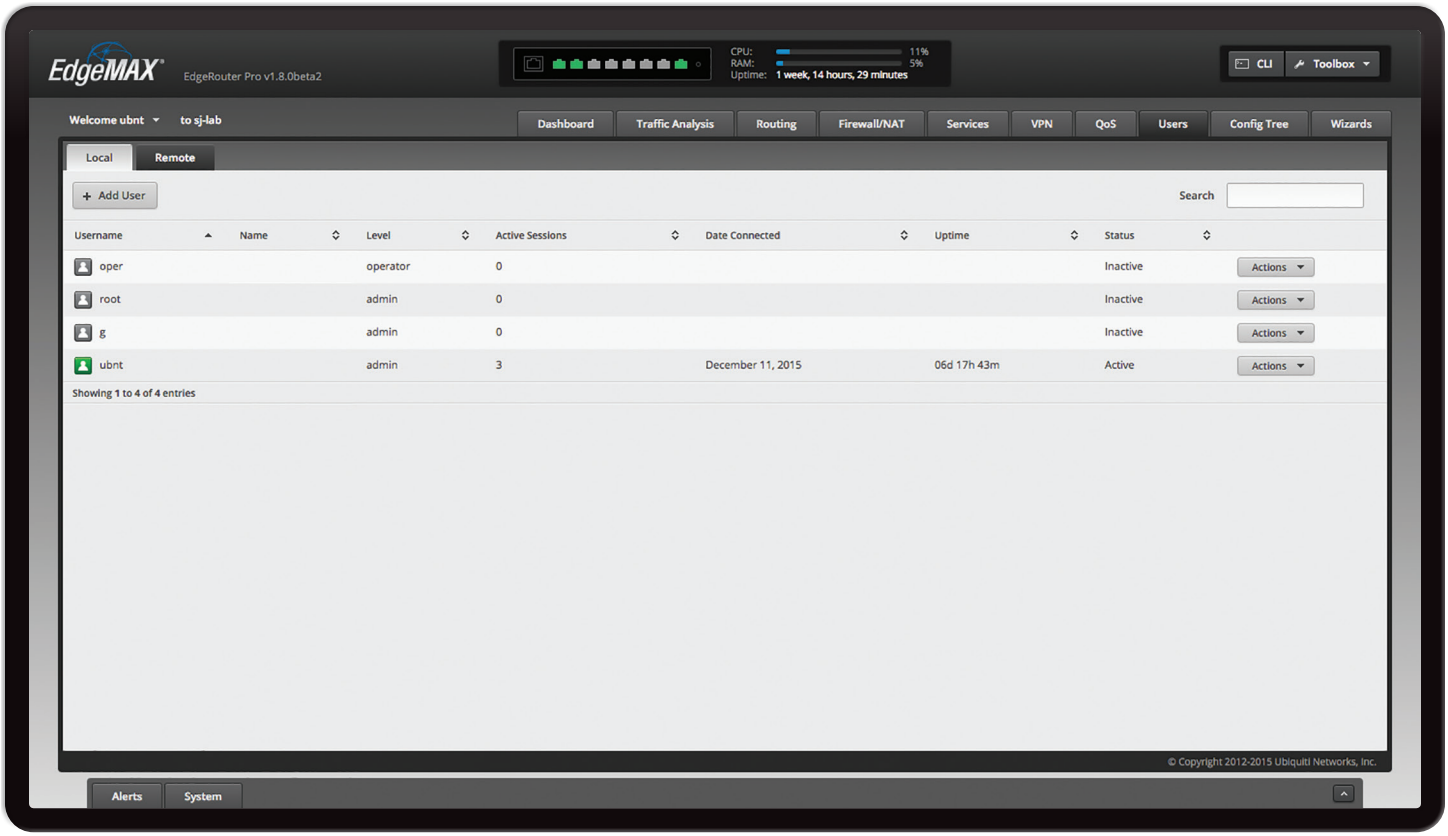
PFIFO

With PFIFO (Priority First In, First Out) queueing, packets are serviced in order of priority, so highest-priority packets are serviced first. Medium-priority packets are serviced next. Low-priority packets are serviced last.



- **Name** Enter a unique identifier for this queue type.
- **Type** *PFIFO* is displayed.
- **Limit** Enter the hard limit on the real queue size. The valid range in number of packets is *1* to *1000000*.

Click **Save** to apply your changes, or click *Cancel*.



Chapter 10: Users

The *Users* tab displays account information about users. You can also configure these user accounts. Any setting marked with a blue asterisk * is required. When the information ⓘ icon is displayed, you can click the icon for more information about an option.

You have two sub-tabs:

Local Displays configurable user accounts.

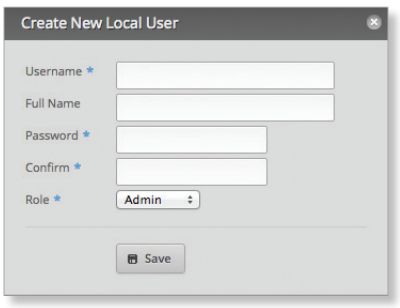
Remote Displays statistics about the users who remotely access the EdgeRouter.

Local

Configure user accounts with unique logins.

Add User To create a new user, click **Add User**.

The *Create New Local User* screen appears.



Complete the following:

- **Username** Enter a unique account name for the user.
- **Full Name** Enter the actual name of the user.
- **Password** Enter the password.
- **Confirm** Enter the password again.
- **Role** Select the appropriate permission level:
  - **Admin** The user can make changes to the EdgeRouter configuration.
  - **Operator** The user can view the EdgeRouter configuration but cannot make changes.

Click **Save** to apply your changes.

Search Allows you to search for specific text. Begin typing; there is no need to press *enter*. The results are filtered in real time as soon as you type two or more characters.

A table displays the following information about each user. Click a column heading to sort by that heading.

Username The account name of the user is displayed.

Name The actual name of the user is displayed.

Level The permission level of the user is displayed.

Active Sessions The number of times the user has accessed the EdgeRouter is displayed.

Date Connected The date of the user's most recent access is displayed.

Uptime The duration of the user's access is displayed.

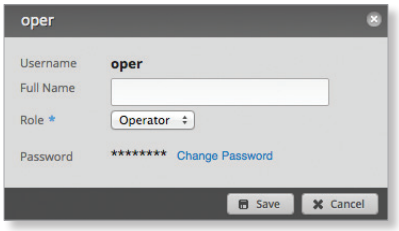
Status The status of the user is displayed.

Actions Click the **Actions** button to access the following options:

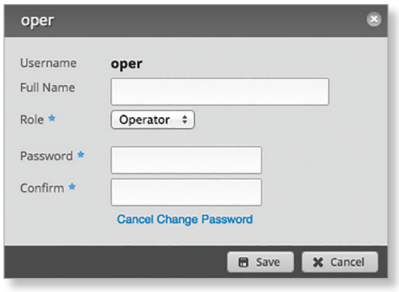
- **Config** To configure the user, click **Config**. Go to the *Configure the User* section below.
- **Delete** Delete the user account; its configuration will be removed.

Configure the User

After you click *Config*, the *Username* screen appears. Make changes as needed.



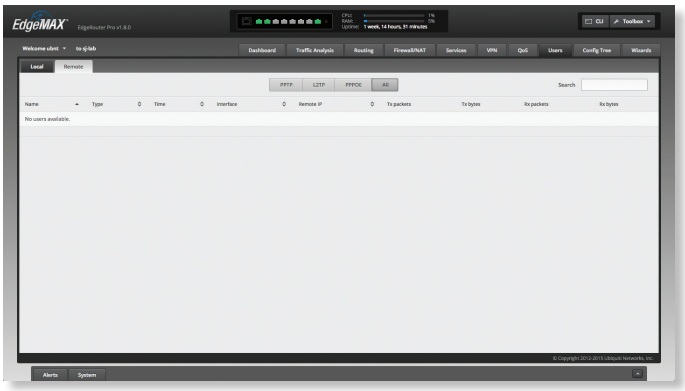
- **Username** The unique account name is displayed.
- **Full Name** Enter the actual name of the user.
- **Role** Select the appropriate permission level:
  - **Admin** The user can make changes to the EdgeRouter configuration.
  - **Operator** The user can view the EdgeRouter configuration but cannot make changes.
- **Password** Click **Change Password** to make a change.
  - **Password** Enter the new password.
  - **Confirm** Enter the new password again.
  - **Cancel Change Password** Click this option to cancel.



Click **Save** to apply your changes, or click *Cancel*.

Remote

Remote access of the EdgeRouter is logged on this tab.



Search Allows you to search for specific text. Begin typing; there is no need to press *enter*. The results are filtered in real time as soon as you type two or more characters.

PPTP/L2TP/PPPOE/All Click the appropriate tab to filter the remote users as needed.

- **PPTP** All users who use PPTP (Point-to-Point Tunneling Protocol) connections are displayed.
- **L2TP** All users who use L2TP (Layer 2 Tunneling Protocol) connections are displayed.
- **PPPOE** All users who use PPPOE (Point-to-Point over Ethernet) connections are displayed.
- **All** All remote users are displayed by default.

A table displays the following information about each remote user. Click a column heading to sort by that heading.

Name The actual name of the user is displayed.

Type The type of connection used by the user is displayed.

Time The duration of the user's access is displayed.

Interface The specific interface used by the user is displayed.

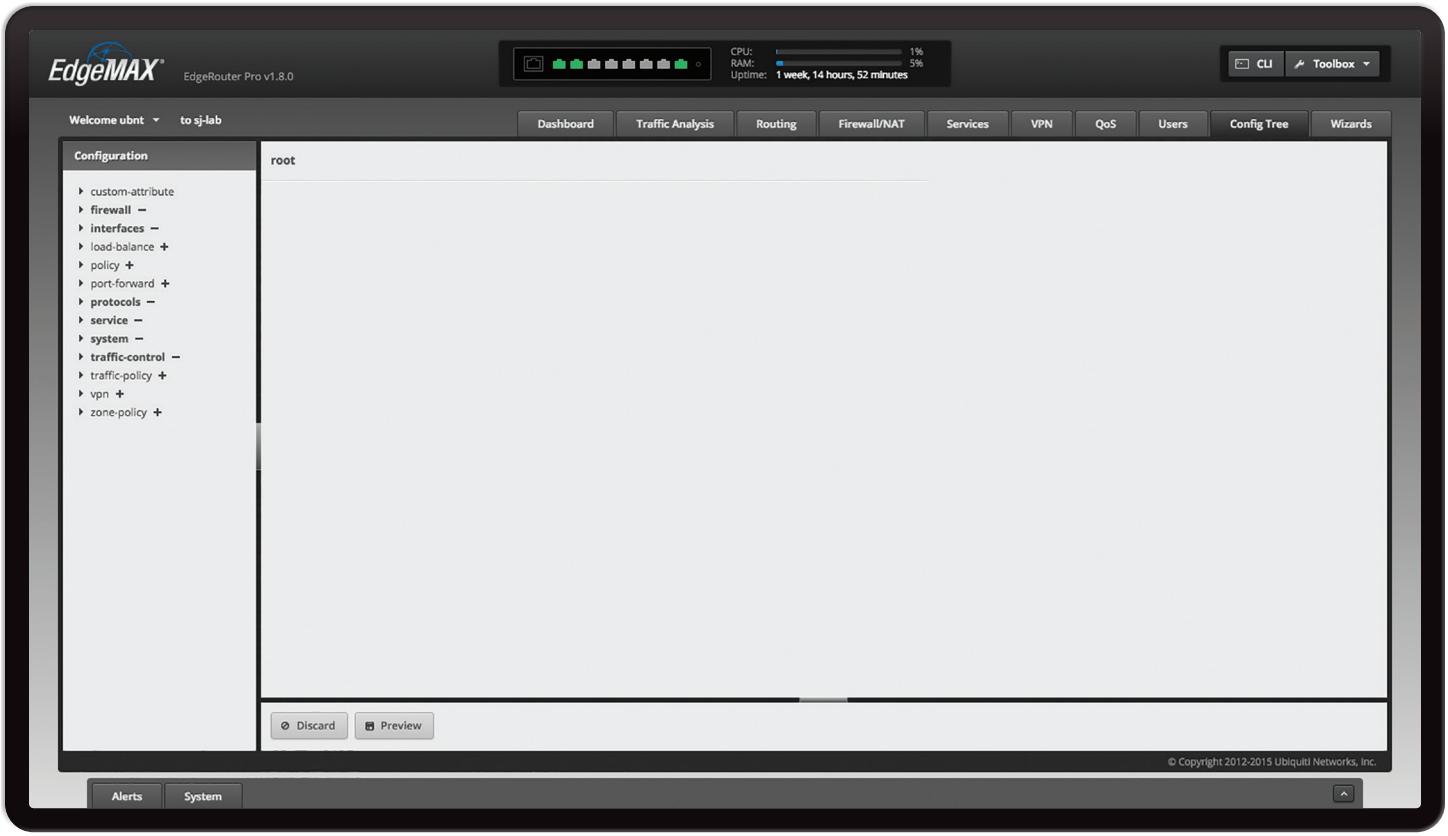
Remote IP The remote IP address of the user is displayed.

TX packets The number of packets transmitted is displayed.

TX bytes The number of bytes transmitted is displayed.

RX packets The number of packets received is displayed.

RX bytes The number of bytes received is displayed.

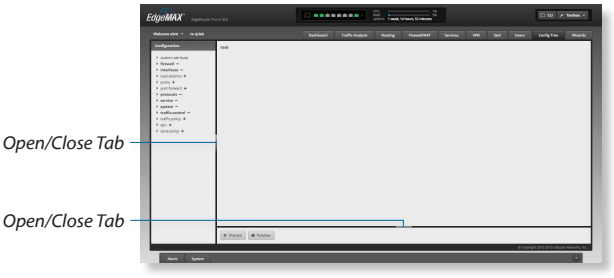


Chapter 11: Config Tree

The *Config Tree* tab allows you to view and modify the configuration using the config tree in the graphical user interface instead of typing commands in the Command Line Interface (CLI). (Refer to **"Command Line Interface" on page 89** for more information about the CLI.)
This chapter describes the basic functionality and user interface of the Config Tree.

When the information ⓘ icon is displayed, you can click the icon for more information about an option.

Click the corresponding **open/close** tab to hide or display the *Configuration* tree section or the *Discard* and *Preview* section.



User Interface

The following are used throughout the config tree:

node The term node describes any feature or field.

+ (plus sign) Equivalent to the *set* command in the CLI. Completing a field also means *set*. Click to add a node to the config. The node is displayed in regular font.

When you click **+** (plus sign), the node + becomes node -.

- (minus sign) Equivalent to the *delete* command in the CLI. Click to remove a node from the config. The node is displayed in boldface.

When you click - (minus sign), the **node -** becomes ~~node +~~.

node (red text) If you click + (plus sign) and the node is new, then the node is displayed in red.

For an existing node, the value of the node or child nodes will be changed after changes are applied. For example, if the value of *host-name* under *system* changes on the user interface, then system and host-name are displayed in red.

For a new node, the color red indicates that the node will be added to the EdgeRouter after changes are applied.

~~node~~ (red text with red strikethrough) If you click - (minus sign) for an existing node, then the node is displayed in red with red strikethrough. It will be removed after changes are applied.

. (period) Enter . (period) as an empty value.

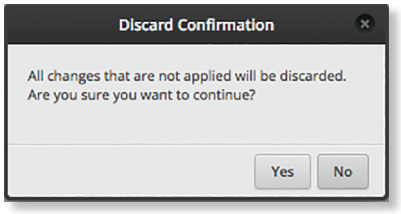
(blank field) A blank field deletes the value.

Update List If displayed, click **Update List** when you have added a node. This adds the node to the *Configuration* section on the left.

Discard and Preview

Discard Click *Discard* to cancel your changes. The *Discard Confirmation* screen appears.

- **Yes** Click **Yes** to remove your changes.
- **No** Click **No** to keep your changes, which are not applied yet.



Preview Click **Preview** to preview your new configuration changes. The *Commands to commit* screen appears and displays a summary of changes. You have two options:

- **Apply** Click **Apply** to save your changes immediately.
- **Not Now** Click **Not Now** to wait.



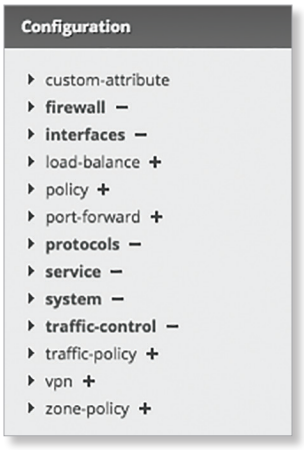
CLI Modes

Operational Mode

The root level of the config tree includes the following:

- custom-attribute
- firewall
- interfaces
- load-balance
- policy
- port-forward
- protocols
- service
- system
- traffic-control
- traffic-policy
- vpn
- zone-policy

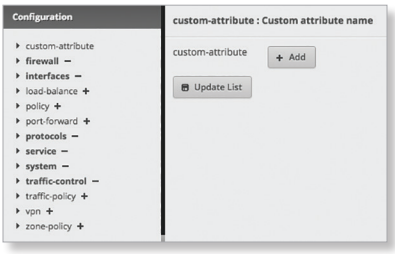
Place your mouse over any node to display a brief description.



Configuration Example

Here is an example:

1. In the *Configuration* section, click **custom-attribute**.
2. Click **Add** to add a custom attribute.

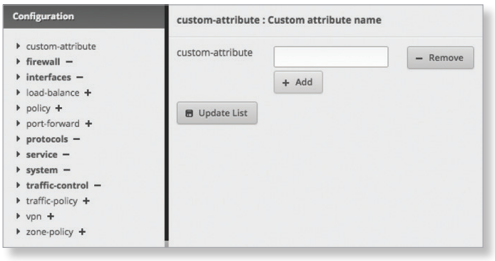


3. In the *custom-attribute* field, enter the name you want to use. You have two options:

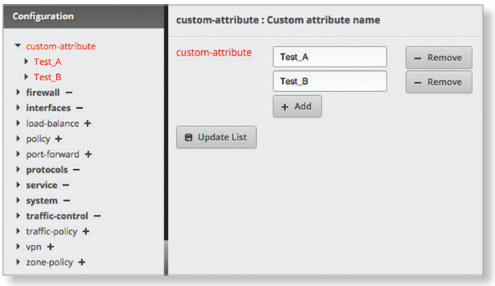
   To add another custom attribute, click **Add**.

   To remove a custom attribute, click **Remove**.

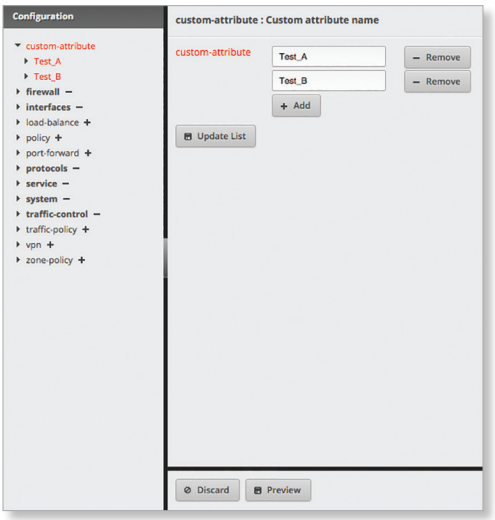
Note: Type validation for generic types (such as text, numbers, and IP addresses) is used for fields.



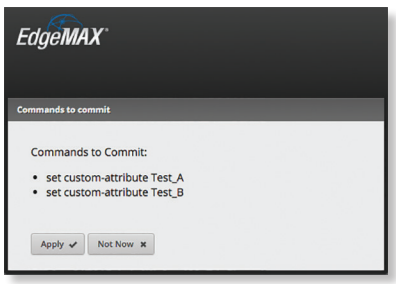
4. Click **Update List** to update your list of custom attributes.



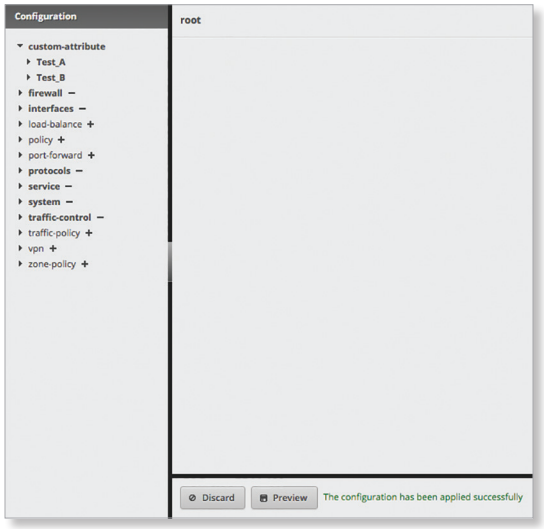
5. Click **Preview**.

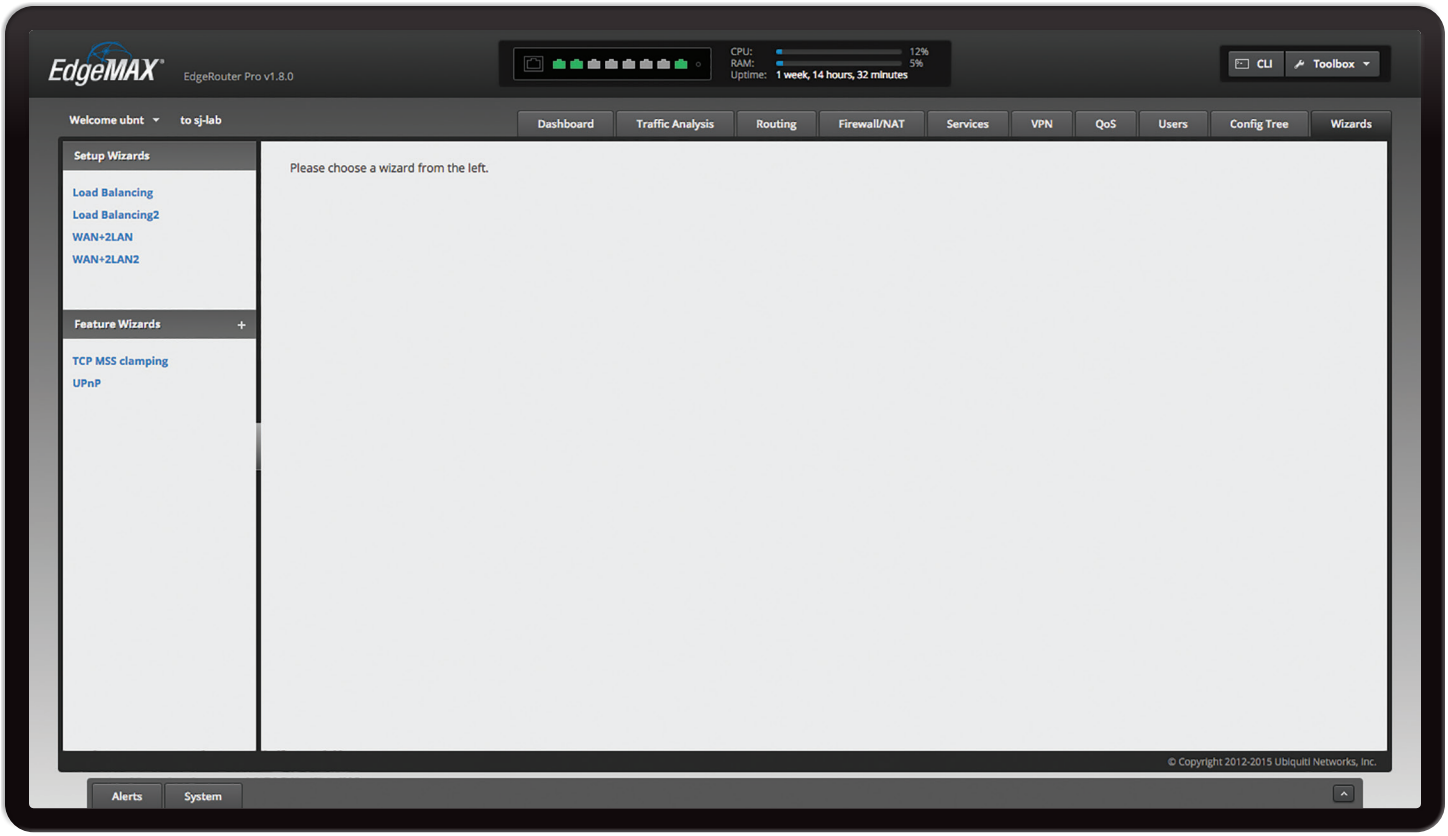


6. Click **Apply** to save your changes.



The configuration has been saved.





Chapter 12: Wizards

The *Wizards* tab allows you to add a new feature wizard and access any available wizards:

- Setup Wizards
  - **"Basic Setup" on page 68**
  - **"Load Balancing Wizard" on page 71**
  - **"Load Balancing2 Wizard" on page 75**
  - **"Switch Wizard (ER-X, ER-X-SFP, or EP-R6)" on page 76**
  - **"WAN+2LAN Wizard" on page 78**
  - **"WAN+2LAN2 Wizard" on page 80**
- Feature Wizards
  - **"DNS Host Names" on page 83**
  - **"TCP MSS Clamping" on page 84**
  - **"UPnP" on page 84**
  - **"VPN Status" on page 84**

Required fields are marked by a blue asterisk *. When the information ⓘ icon is displayed, you can click the icon for more information about an option.

Add a New Feature Wizard

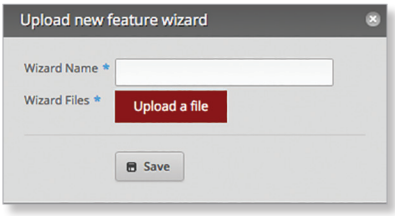
You can add a feature to the EdgeOS Configuration Interface by uploading a wizard as an archive file in the tar.gz format. It should include three files:

- wizard.html
- wizard-run
- validator.json

Creating a wizard requires some knowledge of programming. For more information, go to: **ubnt.link/EdgeOS_Feature_Wizard**

+ To add a new feature wizard, click +.

The *Upload New Feature Wizard* screen appears.



Complete the following:

- **Wizard Name** Enter the name of the new wizard.
- **Wizard File** Click **Upload a file** and select your tar.gz file.

  Click **Save** to apply your changes.

Setup Wizards

There are four types of setup wizards:

- Basic Setup (see below)
- **"Load Balancing Wizards" on page 71**
- **"Switch Wizard (ER-X, ER-X-SFP, or EP-R6)" on page 76**
- **"SOHO Deployment Wizards" on page 77**

Basic Setup

The setup wizard will guide you through a typical Small Office Home Office (SOHO) deployment:

- Configures the Internet connection and NAT masquerade for the Internet port
- Configures eth0 as the WAN port
- Enables default firewall settings for the Internet port
- Enables DHCP server functionality for local networks
- Automatically enables DNS (Domain Name System) forwarding for local networks
- Automatically enables TCP MSS (Maximum Segment Size) clamping for a PPPoE (Point-to-Point over Ethernet) connection
- Bridges the LAN interfaces and/or change the subnets configured on the LAN interfaces
- Configure user accounts during setup

Before You Begin

You can still use the *Basic Setup* wizard even if the EdgeRouter is already configured. The *Basic Setup* setup wizard will replace the entire configuration and require a reboot when the new configuration is applied.

Note: The *Basic Setup* wizard is the same as the *WAN+2LAN2* wizard.

Overview

Click the **Basic Setup** wizard to begin the SOHO configuration.

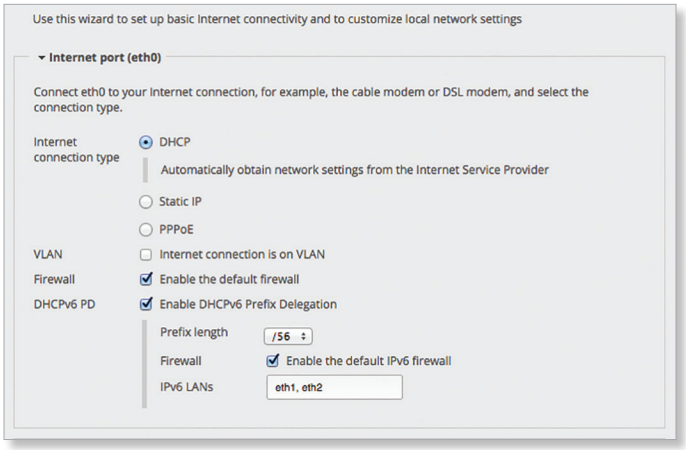
Note: The *Basic Setup* wizard is designed to set up a basic SOHO network. For full configuration functionality, use the other tabs of the EdgeOS Configuration Interface or the Command Line Interface (CLI).

Internet Port (eth0)

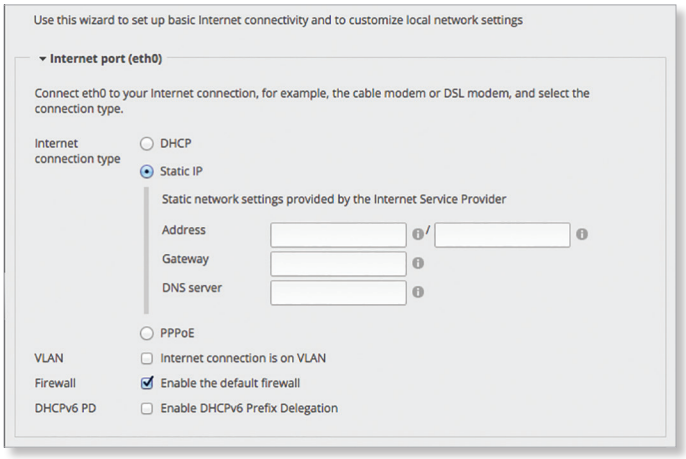
Connect *eth0* to your Internet connection.

Internet connection type Select the Internet connection type your network is using.

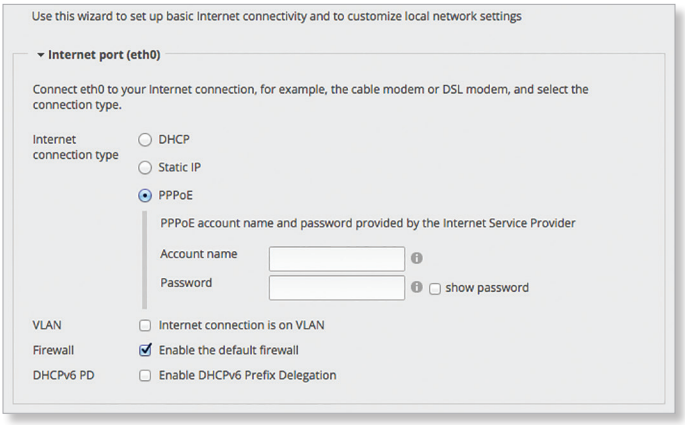
- **DHCP** Select this option if your ISP automatically assigns network settings to your network.



- **Static IP** Select this option if your ISP has assigned static network settings to your network.
  - **Address** Enter the IP address in the first field and the subnet mask or prefix length in the second field.
  - **Gateway** Enter the IP address of the ISP's gateway server, which provides the point of connection to the Internet.
  - **DNS server** Enter the IP address of the ISP's DNS server.

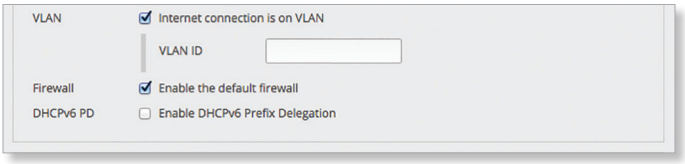


- **PPPoE** Select this option if your ISP uses PPPoE.
  - **Account Name** Enter the name of your PPPoE account.
  - **Password** Enter the password of your PPPoE account.



VLAN Some ISPs requires support for an Internet connection on the VLAN. If your ISP uses a tagged VLAN to provide Internet connectivity, select this option. The configuration generated by the wizard will place the needed settings under the VLAN interface instead.

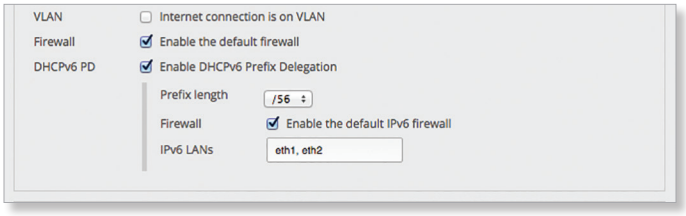
- **VLAN ID** Available if *VLAN* is enabled. Enter the VLAN ID used by the ISP.



Firewall Enabled by default. This option applies the default firewall settings to the EdgeRouter; only established and related traffic types are allowed for local and inbound traffic.

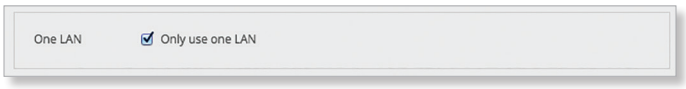
DHCPv6 PD Some ISPs use DHCPv6 PD (Prefix Delegation) to provide IPv6 service. If required, select this option and configure the following:

- **Prefix length** Available if *DHCPv6 PD* is enabled. Select the appropriate prefix length: **/56**, **/60**, or **/64**.
- **Firewall** Available if *DHCPv6 PD* is enabled. This option applies the default IPv6 firewall settings to the EdgeRouter; only established and related traffic types are allowed for local and inbound traffic. Enabled by default.
- **IPv6 LANs** Available if *DHCPv6 PD* is enabled. The IPv6 LAN interfaces are displayed. They are not currently configurable and are the same as the LAN interfaces for the IPv6 part of the wizard (two LANs are used so the corresponding interfaces, eth1 and eth2, or eth1 and switch0, are shown in IPv6 LANs). All LAN interfaces use the service slaac.



One LAN (ER-X, ER-X-SFP, or EP-R6 Only)

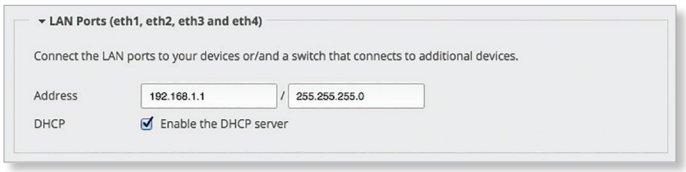
Only use one LAN Select this option to use a single local area network.



LAN Ports (ER-X, ER-X-SFP, or EP-R6 Only)

Address Enter the IP address in the first field, and enter the subnet mask or prefix length in the second field.

DHCP Select this checkbox to have the EdgeRouter assign IP addresses.



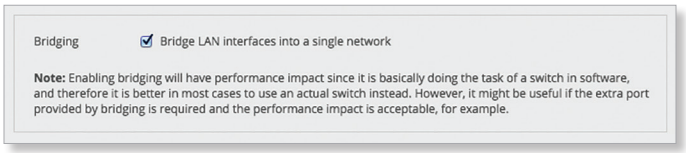
Bridging

If you are using the ERPoe-5, then go to **"Bridging (ERPoe-5)" on page 70**.

Bridging Select this option to bridge the LAN interfaces into a single network.

Bridging will decrease performance because it performs the task of a switch in software; in most cases, it is better to use a hardware switch instead. However, bridging may be useful if the extra port provided by bridging is required and the performance impact is acceptable.

Note: Bridging is not available for the ER-X, ER-X-SFP, or EP-R6.



You have two options:

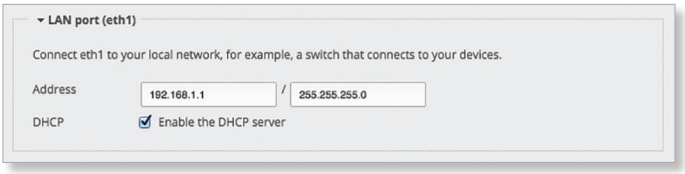
If *Bridging* is disabled, then configure the following:

- **"LAN Port (eth1)" on page 70**
- **"(Optional) Secondary LAN port (eth2)" on page 70**

If *Bridging* is enabled, then go to **"LAN Ports (eth1 and eth2)" on page 70**.

LAN Port (eth1)

If *Bridging* is disabled, connect *eth1* to your local network, such as a switch. Then click **configure this section**.



Address Enter the IP address in the first field, and enter the subnet mask or prefix length in the second field.

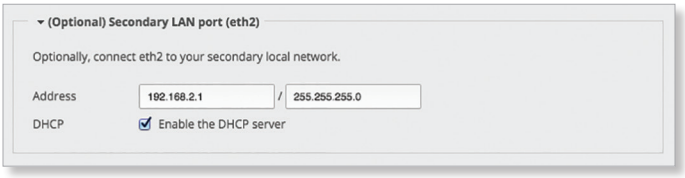
DHCP Select this checkbox to have the EdgeRouter assign IP addresses.

(Optional) Secondary LAN port (eth2)

If *Bridging* is disabled, you can connect *eth2* to your secondary local network. Then click **configure this section**.

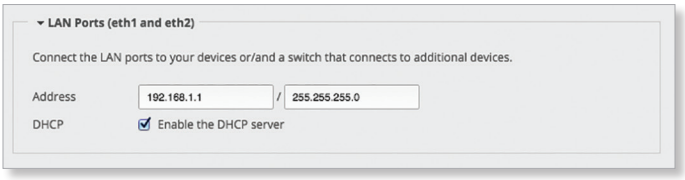
Address Enter the IP address in the first field, and enter the subnet mask or prefix length in the second field.

DHCP Select this checkbox to have the EdgeRouter assign IP addresses.



LAN Ports (eth1 and eth2)

If *Bridging* is enabled, connect the local ports to your devices and/or a switch that connects to additional devices. Then click **configure this section**.



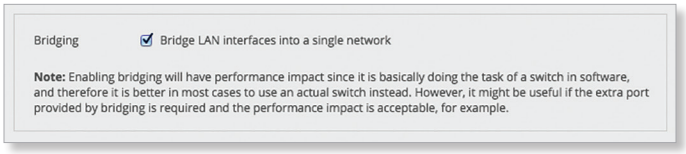
Address Enter the IP address in the first field, and enter the subnet mask or prefix length in the second field.

DHCP Select this checkbox to have the EdgeRouter assign IP addresses.

Bridging (ERPoe-5)

Bridging Select this option to bridge the LAN interfaces into a single network.

Bridging will decrease performance because it performs the task of a switch in software; in most cases, it is better to use a hardware switch instead. However, bridging may be useful if the extra port provided by bridging is required and the performance impact is acceptable.



You have two options:

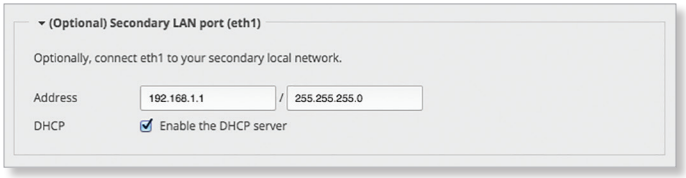
If *Bridging* is disabled, then configure the following:

- *(Optional) Secondary LAN Port (eth1)* section below
- *LAN Ports (eth2, eth3, and eth4)* section below

If *Bridging* is enabled, then go to the *LAN ports (eth1, eth2, eth3, and eth4)* section below.

(Optional) Secondary LAN Port (eth1)

If *Bridging* is disabled, connect *eth1* to your local network, such as a switch. Then click **configure this section**.

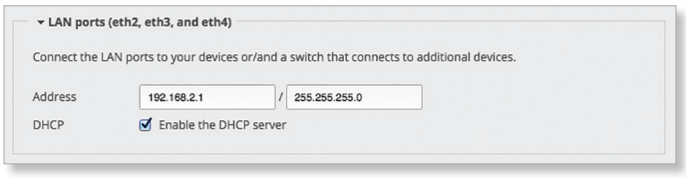


Address Enter the IP address in the first field, and enter the subnet mask or prefix length in the second field.

DHCP Select this checkbox to have the EdgeRouter assign IP addresses.

LAN Ports (eth2, eth3, and eth4)

If *Bridging* is disabled, connect *eth2*, *eth3*, and/or *eth4* to your devices and/or a switch. (The *eth2*, *eth3*, and/or *eth4* become switch ports for a local network.) Then click **configure this section**.



Address Enter the IP address in the first field, and enter the subnet mask or prefix length in the second field.

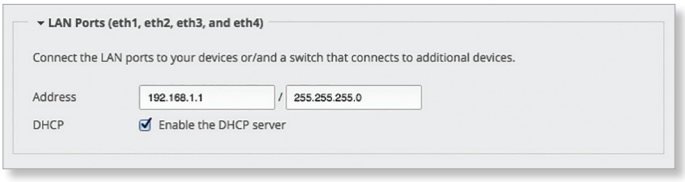
DHCP Select this checkbox to have the EdgeRouter assign IP addresses.

LAN ports (eth1, eth2, eth3, and eth4)

If *Bridging* is enabled, connect *eth1*, *eth2*, *eth3*, and/or *eth4* to your devices and/or a switch. (The *eth1*, *eth2*, *eth3*, and/or *eth4* become switch ports for a local network.) Then click **configure this section**.

Address Enter the IP address in the first field, and enter the subnet mask or prefix length in the second field.

DHCP Select this checkbox to have the EdgeRouter assign IP addresses.

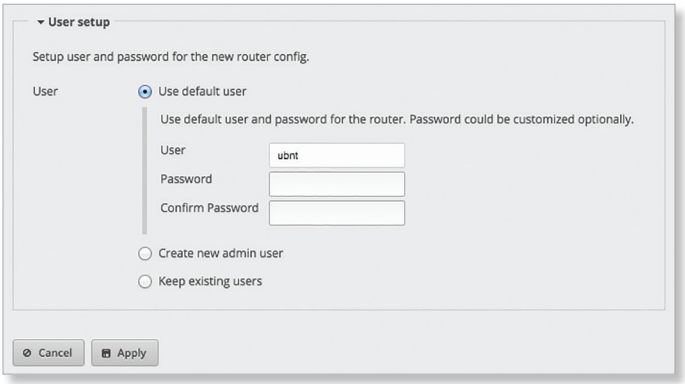


User Setup

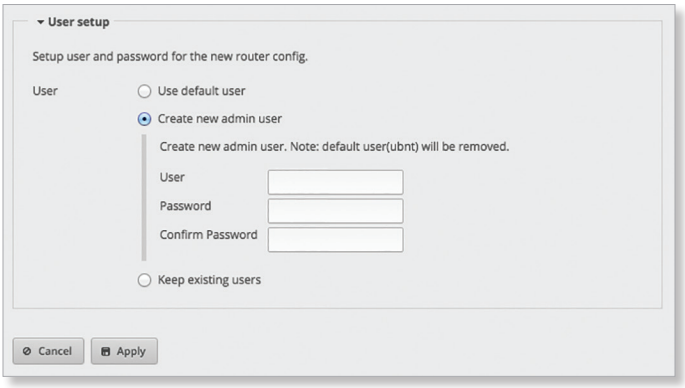
You can set up the username and password for the new EdgeRouter configuration.

User Select one of the following options:

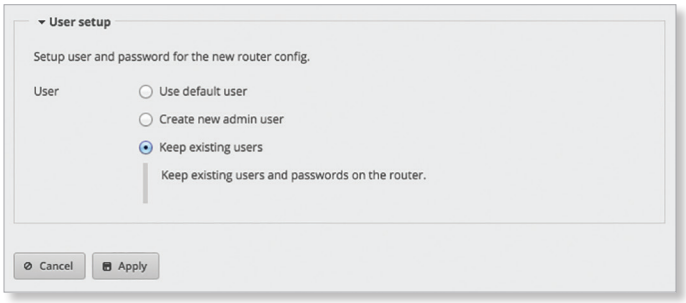
- **Use default user** Replace the default user, *ubnt*.
  - **User** Enter a new admin username.
  - **Password** Enter a new password.
  - **Confirm Password** Enter the new password again.



- **Create new admin user** Create a new admin user and remove the default user, *ubnt*. Complete the following:
  - **User** Enter a new admin username.
  - **Password** Enter a new password.
  - **Confirm Password** Enter the new password again.



- **Keep existing users** Keep the existing usernames and passwords on the EdgeRouter.



Click **Apply** to save your changes, or click *Cancel*.

Load Balancing Wizards

There are two load balancing setup wizards available:

- **Load Balancing** The *Load Balancing* setup wizard sets up basic load balancing and failover using two different Internet connections. You can also configure user accounts during setup. Go to the *Load Balancing Wizard* section below.
- **Load Balancing2** The *Load Balancing2* setup wizard sets up basic load balancing and failover using two different wireless links. You can also configure user accounts during setup. Go to **"Load Balancing2 Wizard" on page 75**.

Load Balancing Wizard

Before You Begin

Use the *Load Balancing* setup wizard to set up basic load balancing with two Internet connections from different Internet Service Providers (ISPs).

The *Load Balancing* setup wizard will replace the entire configuration and require a reboot when the new configuration is applied.

Overview

Click the **Load Balancing** setup wizard to begin.

Go to **"Load Balancing" on page 72** unless you have the ERPoe-5, then go to **"Load Balancing > ERPoe-5" on page 75**.

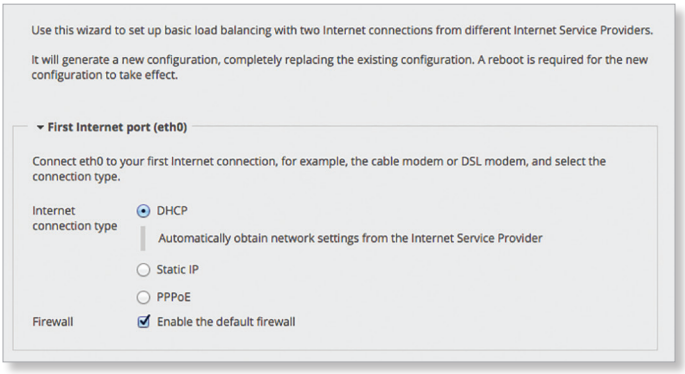
Load Balancing

First Internet Port (eth0)

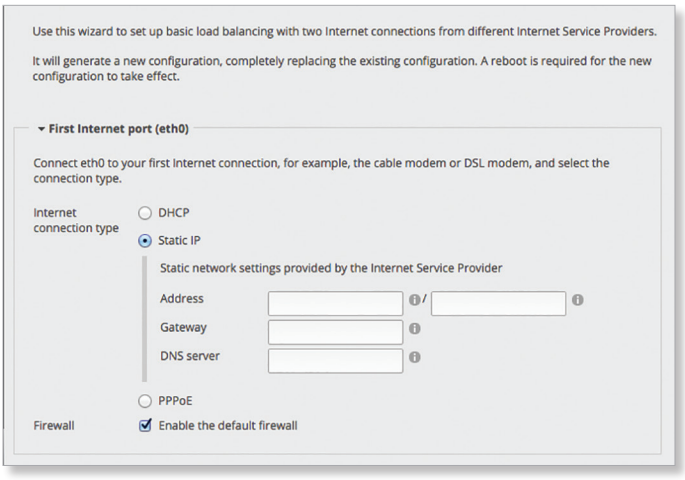
Connect *eth0* to your Internet connection.

Internet connection type Select the first Internet connection type your network is using.

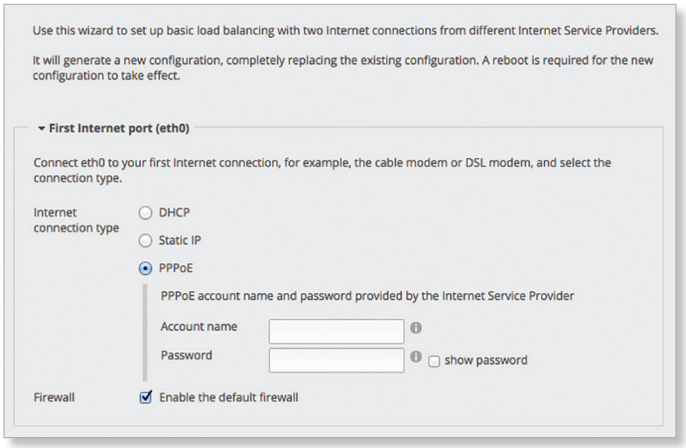
- **DHCP** Select this option if your ISP automatically assigns network settings to your network.



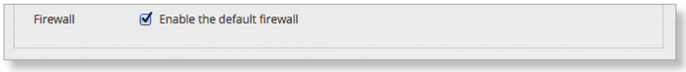
- **Static IP** Select this option if your ISP has assigned static network settings to your network.
  - **Address** Enter the IP address in the first field and the subnet mask or prefix length in the second field.
  - **Gateway** Enter the IP address of the ISP's gateway server, which provides the point of connection to the Internet.
  - **DNS server** Enter the IP address of the ISP's DNS server.



- **PPPoE** Select this option if your ISP uses PPPoE.
  - **Account Name** Enter the name of your PPPoE account.
  - **Password** Enter the password of your PPPoE account.
    - **show password** Select to display the password in plaintext.



Firewall Enabled by default. This option applies the default firewall settings to the EdgeRouter; only established and related traffic types are allowed for local and inbound traffic.

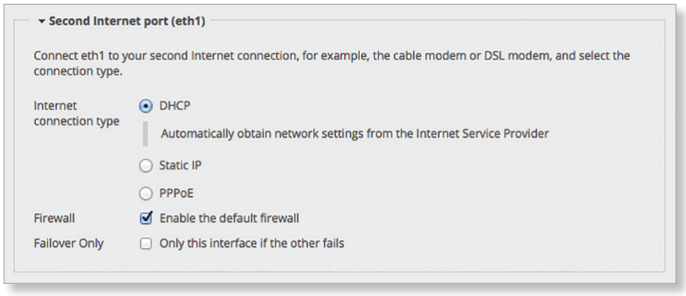


Second Internet Port (eth1)

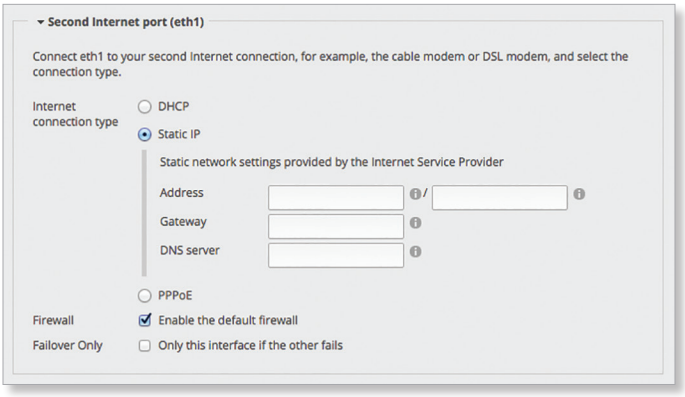
Connect *eth1* to your Internet connection.

Internet connection type Select the second Internet connection type your network is using.

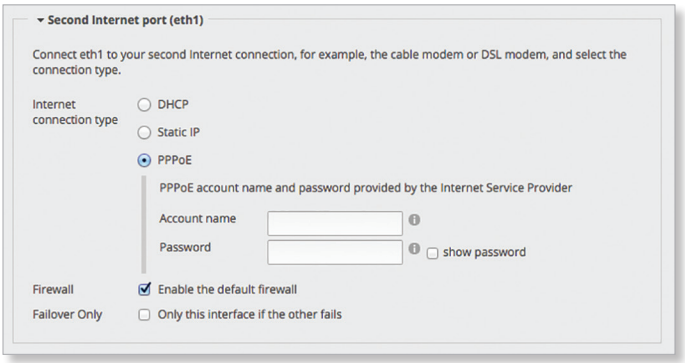
- **DHCP** Select this option if your ISP automatically assigns network settings to your network.



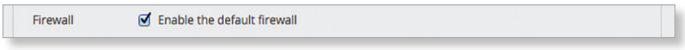
- **Static IP** Select this option if your ISP has assigned static network settings to your network.
  - **Address** Enter the IP address in the first field and the subnet mask or prefix length in the second field.
  - **Gateway** Enter the IP address of the ISP's gateway server, which provides the point of connection to the Internet.
  - **DNS server** Enter the IP address of the ISP's DNS server.



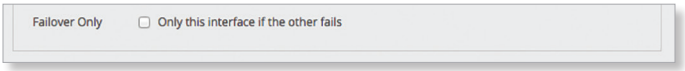
- **PPPoE** Select this option if your ISP uses PPPoE.
  - **Account Name** Enter the name of your PPPoE account.
  - **Password** Enter the password of your PPPoE account.
    - **show password** Select to display the password in plaintext.



Firewall Enabled by default. This option applies the default firewall settings to the EdgeRouter; only established and related traffic types are allowed for local and inbound traffic.

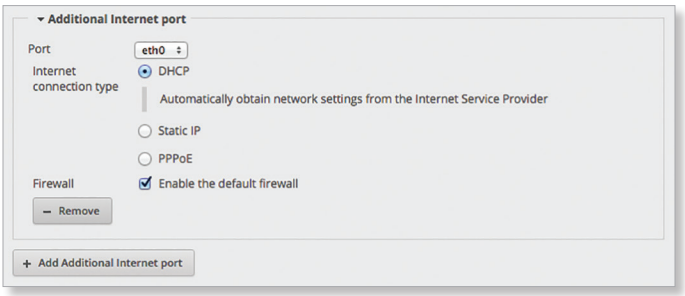


Failover Only Disabled by default. Select this option if you want to use *eth1* only if *eth0* fails.



Add Additional Internet Port

If you need more Internet ports, then click **Add Additional Internet port**.



Port Select the appropriate port for Internet configuration.

Internet connection type Select the second Internet connection type your network is using.

- **DHCP** Select this option if your ISP automatically assigns network settings to your network.
- **Static IP** Select this option if your ISP has assigned static network settings to your network.
  - **Address** Enter the IP address in the first field and the subnet mask or prefix length in the second field.
  - **Gateway** Enter the IP address of the ISP's gateway server, which provides the point of connection to the Internet.
  - **DNS server** Enter the IP address of the ISP's DNS server.
- **PPPoE** Select this option if your ISP uses PPPoE.
  - **Account Name** Enter the name of your PPPoE account.
  - **Password** Enter the password of your PPPoE account.
    - **show password** Select to display the password in plaintext.

Firewall Enabled by default. This option applies the default firewall settings to the EdgeRouter; only established and related traffic types are allowed for local and inbound traffic.

Remove Click **Remove** to delete the Internet port.

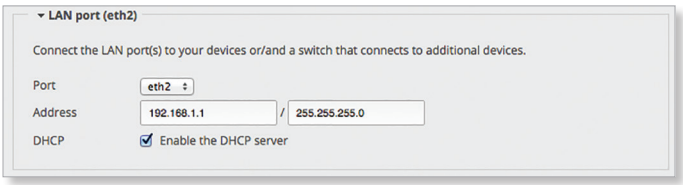
LAN Port (eth2)

Click **configure this section** if you connect *eth2* to your local network, such as a switch. Go to **"LAN Ports (eth2, eth3, and eth4)" on page 74** if you have the ERPoe-5, ER-X, ER-X-SFP, or EP-R6.

Port Select the appropriate port.

Address The IP address is displayed in the first field, and the subnet mask or prefix length is displayed in the second field.

DHCP Select this checkbox to have the EdgeRouter assign IP addresses.



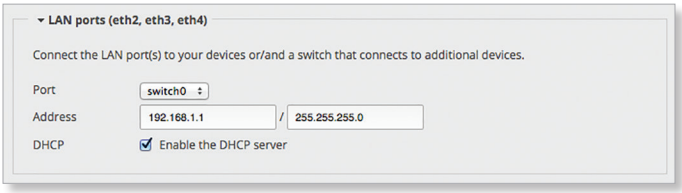
LAN Ports (eth2, eth3, and eth4)

(ERPoe-5, ER-X, ER-X-SFP, or EP-E6) Click **configure this section** if you connect *eth2*, *eth3*, and/or *eth4* to your devices and/or a switch. (The *eth2*, *eth3*, and/or *eth4* become switch ports for a local network.)

Port The switch0 port is automatically selected.

Address The IP address is displayed in the first field, and the subnet mask or prefix length is displayed in the second field.

DHCP Select this checkbox to have the EdgeRouter assign IP addresses.

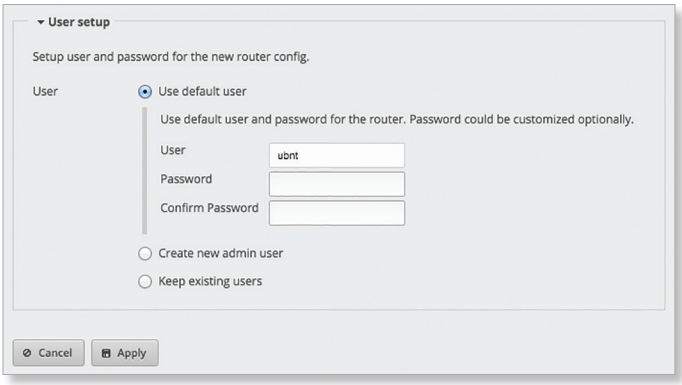


User Setup

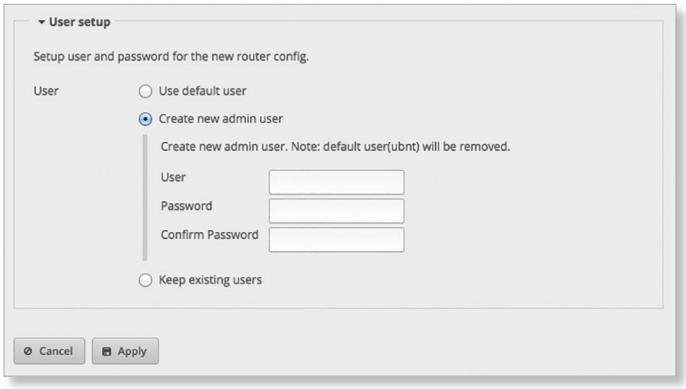
You can set up the username and password for the new EdgeRouter configuration.

User Select one of the following options:

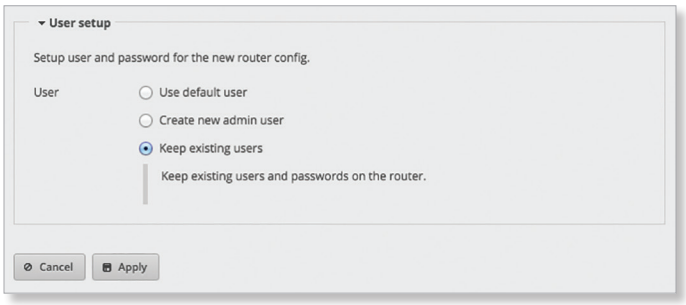
- **Use default user** Replace the default user, *ubnt*.
  - **User** Enter a new admin username.
  - **Password** Enter a new password.
  - **Confirm Password** Enter the new password again.



- **Create new admin user** Create a new admin user and remove the default user, *ubnt*. Complete the following:
  - **User** Enter a new admin username.
  - **Password** Enter a new password.
  - **Confirm Password** Enter the new password again.



- **Keep existing users** Keep the existing usernames and passwords on the EdgeRouter.



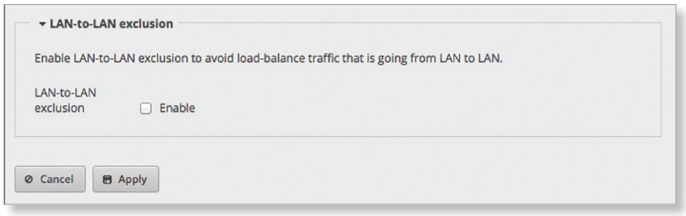
LAN-to-LAN Exclusion

The LAN-to-LAN exclusion feature excludes LAN-to-LAN traffic from load-balancing. Click **configure this section** to manage this feature.

The load balancing feature creates new routing tables for the WAN interfaces to use. This works well for LAN-to-WAN traffic; however, you do not want to load-balance traffic that is going from LAN to LAN. We recommend that you create a firewall/NAT group for the LAN networks and add a rule to the appropriate firewall policy, so this group uses the main routing table for LAN-to-LAN destinations. Refer to **"Firewall/NAT" on page 27** for more information.

Note: The LAN networks rule must precede the load-balance rule.

LAN-to-LAN exclusion This option excludes LAN-to-LAN traffic from load-balancing. Enabled by default.



Click **Apply** to save your changes, or click *Cancel*.

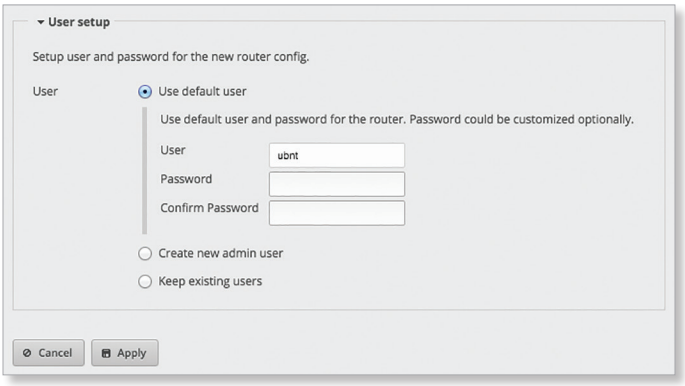
Load Balancing > ERPoe-5

User Setup

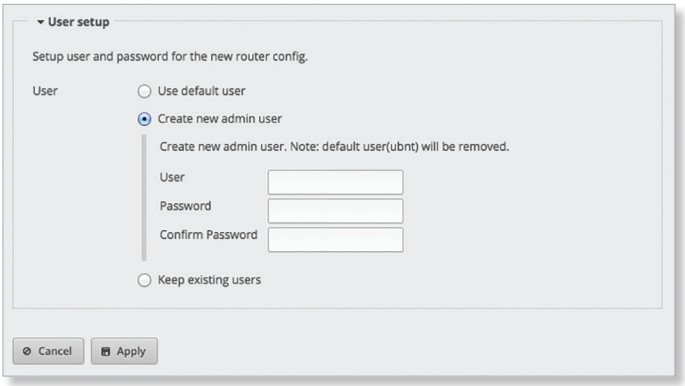
You can set up the username and password for the new EdgeRouter configuration.

User Select one of the following options:

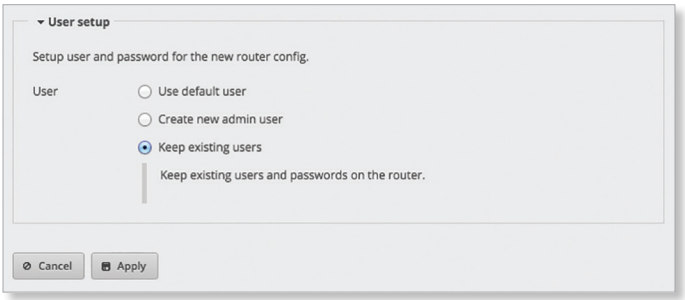
- **Use default user** Replace the default user, *ubnt*.
  - **User** Enter a new admin username.
  - **Password** Enter a new password.
  - **Confirm Password** Enter the new password again.



- **Create new admin user** Create a new admin user and remove the default user, *ubnt*. Complete the following:
  - **User** Enter a new admin username.
  - **Password** Enter a new password.
  - **Confirm Password** Enter the new password again.



- **Keep existing users** Keep the existing usernames and passwords on the EdgeRouter.



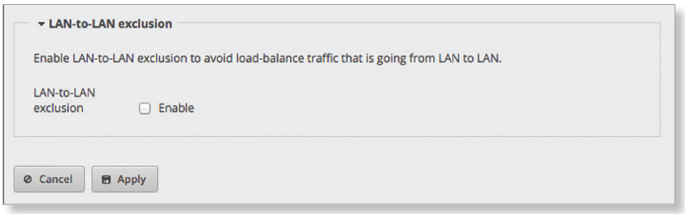
LAN-to-LAN Exclusion

The LAN-to-LAN exclusion feature excludes LAN-to-LAN traffic from load-balancing. Click **configure this section** to manage this feature.

The load balancing feature creates new routing tables for the WAN interfaces to use. This works well for LAN-to-WAN traffic; however, you do not want to load-balance traffic that is going from LAN to LAN. We recommend that you create a firewall/NAT group for the LAN networks and add a rule to the appropriate firewall policy, so this group uses the main routing table for LAN-to-LAN destinations. Refer to **"Firewall/NAT" on page 27** for more information.

Note: The LAN networks rule must precede the load-balance rule.

LAN-to-LAN exclusion This option excludes LAN-to-LAN traffic from load-balancing. Enabled by default.



Click **Apply** to save your changes, or click *Cancel*.

Load Balancing2 Wizard

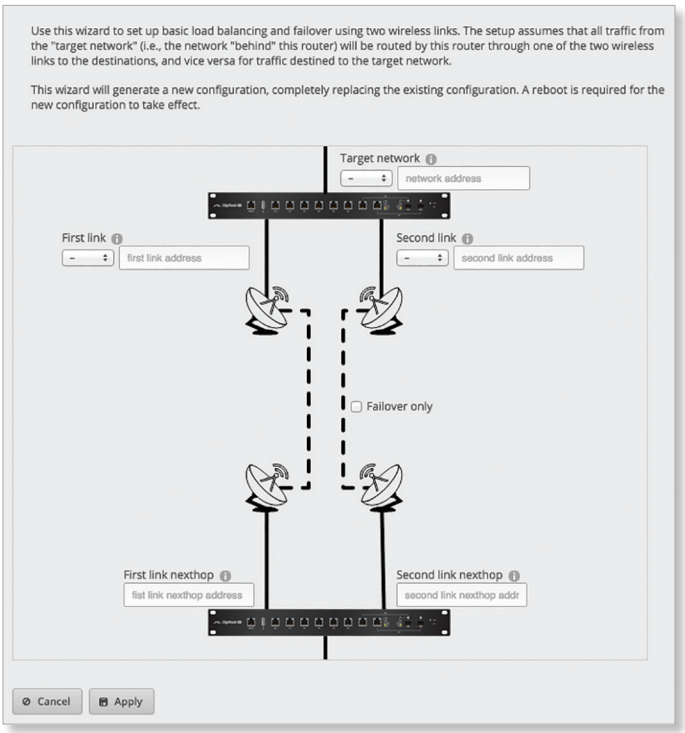
Before You Begin

Use the *Load Balancing2* setup wizard to set up basic load balancing and failover using two wireless links. The setup assumes that all traffic from the target network (the network behind the EdgeRouter) will be routed by the EdgeRouter through one of the two wireless links to the destinations, and vice versa for traffic destined for the target network.

The *Load Balancing2* setup wizard will replace the entire configuration and require a reboot when the new configuration is applied.

Overview

Click the **Load Balancing2** setup wizard to begin.



Target Network

(interface) Select the appropriate interface.

(network address) Enter the IPv4 address with subnet mask or prefix for the target network. Example: *192.0.3.1/24*

First Link

(interface) Select the appropriate interface.

(network address) Enter the IPv4 address with subnet mask or prefix for the first wireless link. Example: *192.0.1.1/24*

Second Link

(interface) Select the appropriate interface.

(network address) Enter the IPv4 address with subnet mask or prefix for the second wireless link. Example: *192.0.2.1/24*

Failover Only

(checkbox) Disabled by default. Select this option if you want to use the second link only if the first link fails.

First Link Nexthop

(next hop address) Enter the next hop IPv4 address for the first wireless link (address on the corresponding interface of the other router). Example: *192.0.1.2*

Second Link Nexthop

(next hop address) Enter the next hop IPv4 address for the second wireless link (address on the corresponding interface of the other router). Example: *192.0.2.2*

Click **Apply** to save your changes, or click *Cancel*.

Switch Wizard (ER-X, ER-X-SFP, or EP-R6)

The setup wizard will set up the EdgeRouter X, EdgeRouter X SFP, or EdgePoint EP-R6 as a layer-2 switch.

Management Access

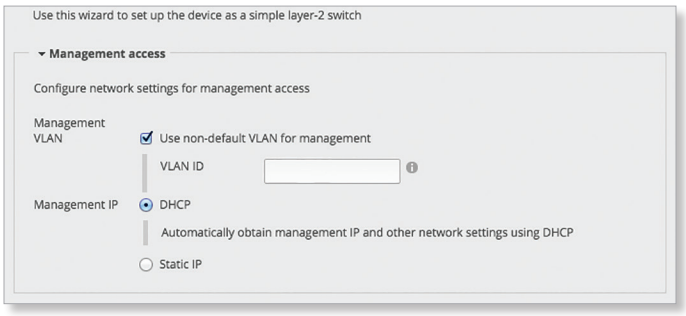
Note: Ensure that the management IP/VLAN settings and port VLAN settings allow management access. For example, if the management VLAN is set but the VLAN is not set on any of the ports, then the EdgeRouter will not be accessible after the reboot and a reset to factory defaults will be needed to re-establish access.

Management VLAN Select this option to use a non-default VLAN for management.

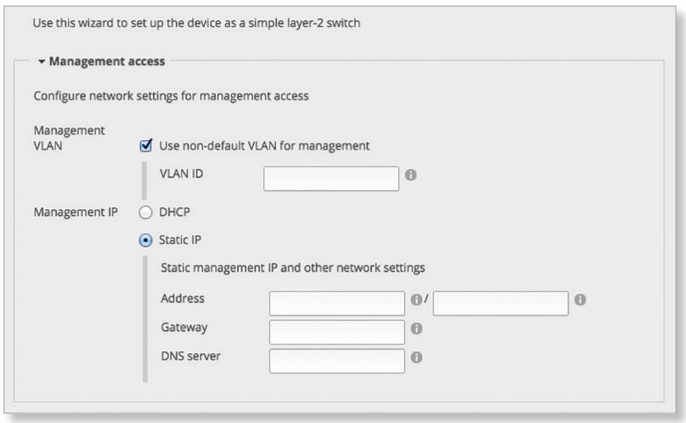
- **VLAN ID** Enter the appropriate VLAN ID for management. The valid range is *1* to *4087*.

Management IP Select the appropriate option:

- **DHCP** Select this option to automatically obtain the management IP address and other network settings using DHCP.



- **Static IP** Select this option to set a static management IP address and other network settings.
  - **Address** Enter the IP address in the first field and the subnet mask or prefix length in the second field.
  - **Gateway** Enter the IP address of the ISP's gateway server, which provides the point of connection to the Internet.
  - **DNS server** Enter the IP address of the ISP's DNS server.



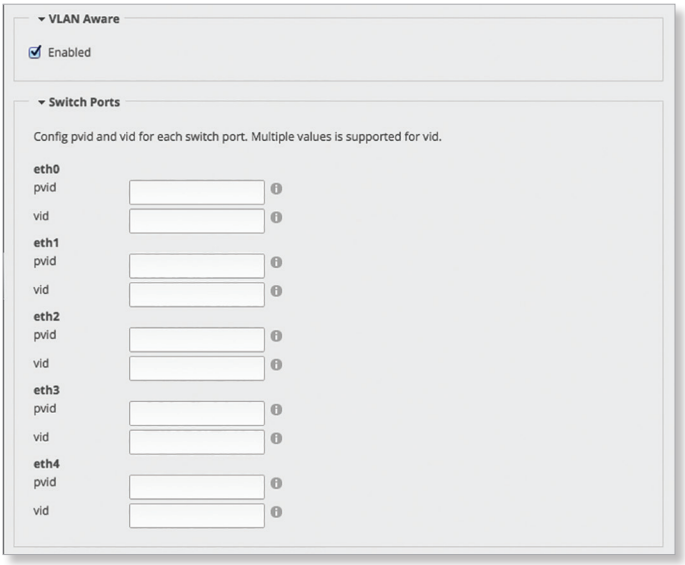
VLAN Aware

Enabled Starting with EdgeOS v1.8.5, the per-port VLAN feature is available. If this option is enabled, then untagged and tagged VLANS can be set for each port in switch mode. If this option is kept disabled (default), then the switch ports will pass all VLANs automatically (simple layer-2 switching with no per-port VLAN).

Switch Ports

If *VLAN Aware* is enabled, then configure the following options for each switch port.

- **pvid** Enter the Port Virtual Local Area Network (VLAN) ID. The valid range is *1* to *4087*.
- **vid** Enter the Virtual Local Area Network (VLAN) ID. Multiple VIDs are allowed; separate the VIDs with a comma. The valid range is *1* to *4087*.

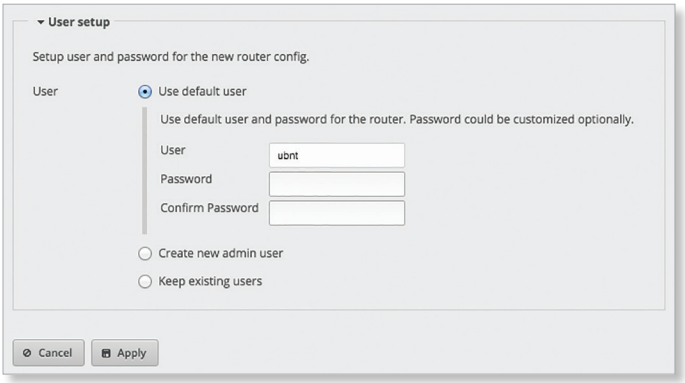


User Setup

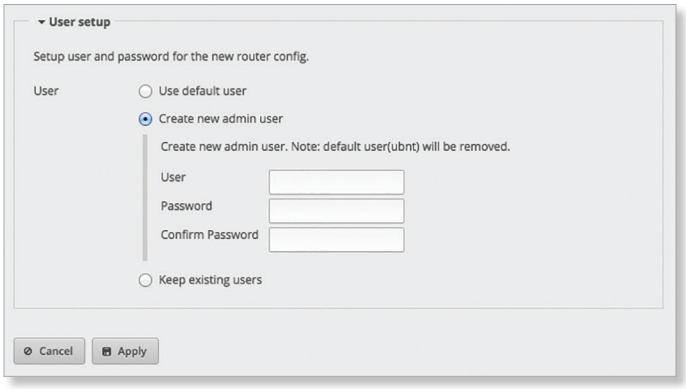
You can set up the username and password for the new EdgeRouter configuration.

User Select one of the following options:

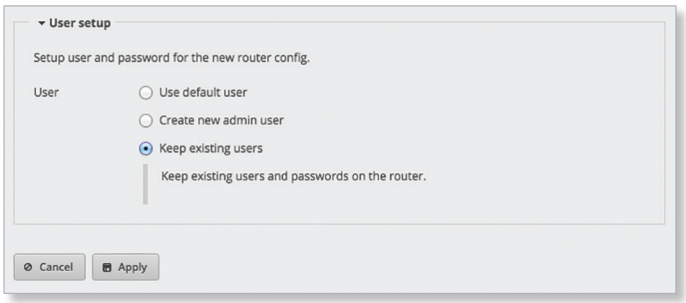
- **Use default user** Replace the default user, *ubnt*.
  - **User** Enter a new admin username.
  - **Password** Enter a new password.
  - **Confirm Password** Enter the new password again.



- **Create new admin user** Create a new admin user and remove the default user, *ubnt*. Complete the following:
  - **User** Enter a new admin username.
  - **Password** Enter a new password.
  - **Confirm Password** Enter the new password again.



- **Keep existing users** Keep the existing usernames and passwords on the EdgeRouter.



Click **Apply** to save your changes, or click *Cancel*.

SOHO Deployment Wizards

The setup wizard will guide you through a typical Small Office Home Office (SOHO) deployment:

- Configures the Internet connection and NAT masquerade for the Internet port
- Enables default firewall settings for the Internet port
- Enables DHCP server functionality for local networks
- Automatically enables DNS (Domain Name System) forwarding for local networks
- Automatically enables TCP MSS (Maximum Segment Size) clamping for a PPPoE (Point-to-Point over Ethernet) connection

There are two SOHO deployment setup wizards available:

- **WAN+2LAN** The *WAN+2LAN* setup wizard is the most basic version available. The WAN port is eth1. Go to the *WAN+2LAN Wizard* section below.
- **WAN+2LAN2** The *WAN+2LAN2* setup wizard allows you to bridge the LAN interfaces and/or change the subnets configured on the LAN interfaces. The WAN port is eth0. You can also configure user accounts during setup. Go to **"WAN+2LAN2 Wizard" on page 80**.

Note: The *WAN+2LAN2* wizard is the same as the *Basic Setup* wizard.

WAN+2LAN Wizard

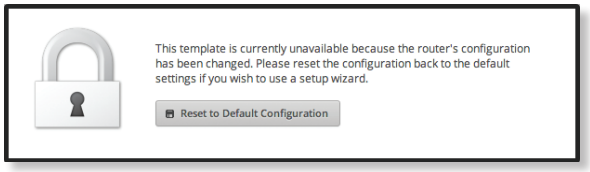
Before You Begin

If the EdgeRouter is already configured, then the *WAN+2LAN* setup wizard is not available. It is available only if the EdgeRouter uses its default configuration.

You can reset the EdgeRouter to its factory defaults using the EdgeOS Configuration Interface:

System Tab Refer to **"Reset Config to Default" on page 7** for instructions.

Wizards Tab Click the **WAN+2LAN** setup wizard in the column on the left. The following window will appear.



Click Reset to Default Configuration and then follow the on-screen instructions.

Overview

Click the **WAN+2LAN** setup wizard to begin the SOHO configuration.

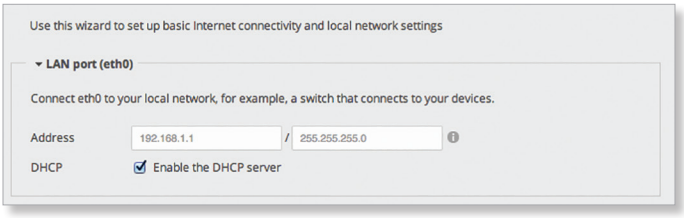
Go to the *WAN+2LAN* section below unless you have the ERPoe-5, then go to **"WAN+2LAN > ERPoe-5" on page 79**.

Note: The *WAN+2LAN* setup wizard is designed to set up a basic SOHO network. For full configuration functionality, use the other tabs of the EdgeOS Configuration Interface or the Command Line Interface (CLI).

WAN+2LAN

LAN Port (eth0)

Connect *eth0* to your local network, such as a switch.



Address The IP address is displayed in the first field, and the subnet mask or prefix length is displayed in the second field.

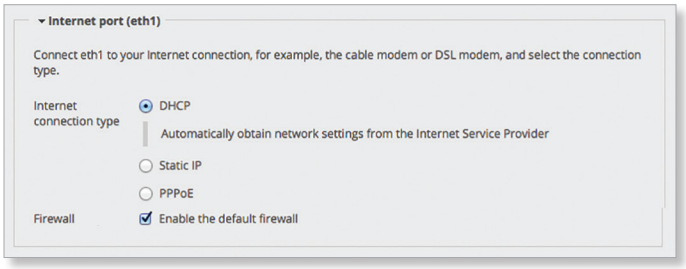
DHCP Select this checkbox to have the EdgeRouter assign IP addresses.

Internet Port (eth1)

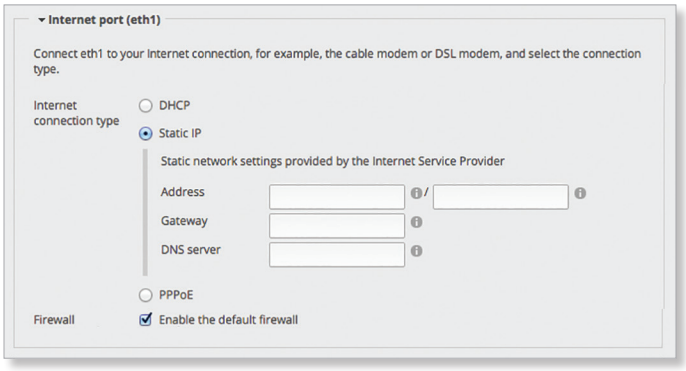
Connect *eth1* to your Internet connection.

Internet connection type Select the Internet connection type your network is using.

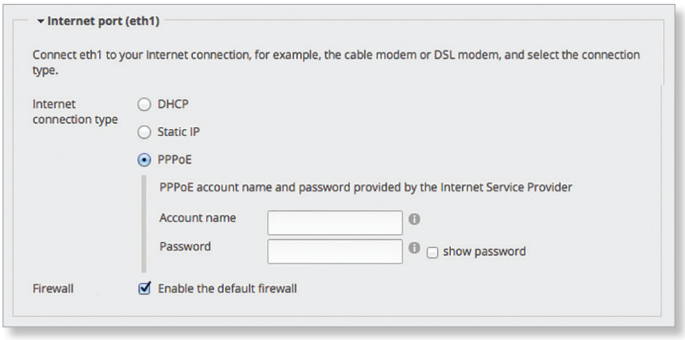
- **DHCP** Select this option if your ISP automatically assigns network settings to your network.



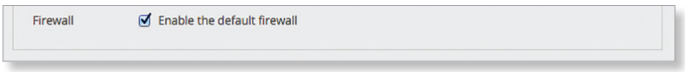
- **Static IP** Select this option if your ISP has assigned static network settings to your network.
  - **Address** Enter the IP address in the first field and the subnet mask or prefix length in the second field.
  - **Gateway** Enter the IP address of the ISP's gateway server, which provides the point of connection to the Internet.
  - **DNS server** Enter the IP address of the ISP's DNS server.



- **PPPoE** Select this option if your ISP uses PPPoE.
  - **Account Name** Enter the name of your PPPoE account.
  - **Password** Enter the password of your PPPoE account.
    - **show password** Select to display the password in plaintext.



Firewall Enabled by default. This option applies the default firewall settings to the EdgeRouter; only established and related traffic types are allowed for local and inbound traffic.

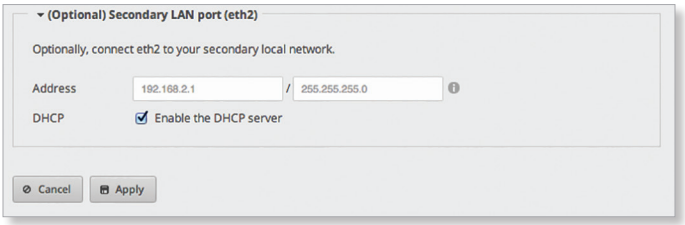


(Optional) Secondary LAN Port (eth2)

Click **configure this section** if you connect *eth2* to your local network, such as a switch.

Address The IP address is displayed in the first field, and the subnet mask or prefix length is displayed in the second field.

DHCP Select this checkbox to have the EdgeRouter assign IP addresses.

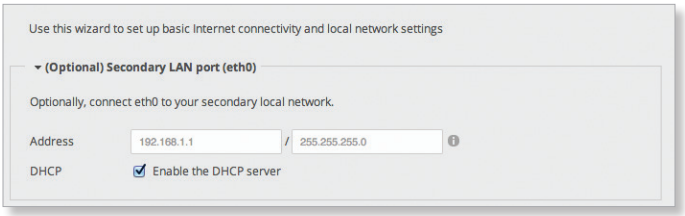


Click **Apply** to save your changes, or click *Cancel*.

WAN+2LAN > ERPoe-5

Optional Secondary LAN Port (eth0)

Click **configure this section** if you connect *eth0* to your secondary local network.



Address The IP address is displayed in the first field, and the subnet mask or prefix length is displayed in the second field.

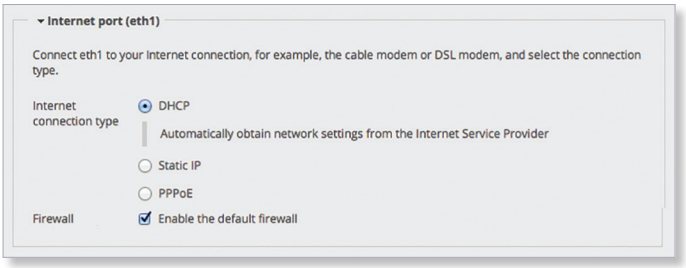
DHCP Select this checkbox to have the EdgeRouter assign IP addresses.

Internet port (eth1)

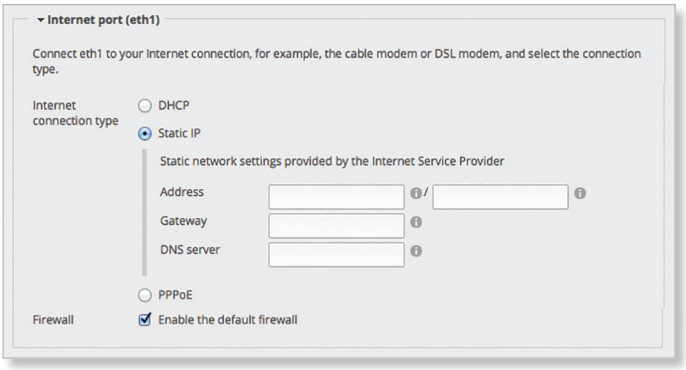
Connect *eth1* to your Internet connection.

Internet connection type Select the Internet connection type your network is using.

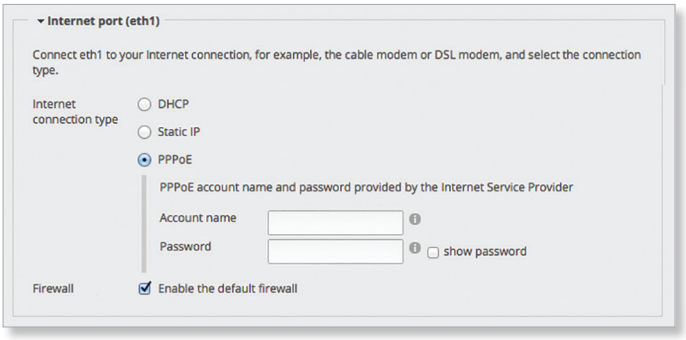
- **DHCP** Select this option if your ISP automatically assigns network settings to your network.



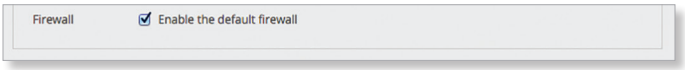
- **Static IP** Select this option if your ISP has assigned static network settings to your network.
  - **Address** Enter the IP address in the first field and the subnet mask or prefix length in the second field.
  - **Gateway** Enter the IP address of the ISP's gateway server, which provides the point of connection to the Internet.
  - **DNS server** Enter the IP address of the ISP's DNS server.



- **PPPoE** Select this option if your ISP uses PPPoE.
  - **Account Name** Enter the name of your PPPoE account.
  - **Password** Enter the password of your PPPoE account.
    - **show password** Select to display the password in plaintext.



Firewall Enabled by default. This option applies the default firewall settings to the EdgeRouter; only established and related traffic types are allowed for local and inbound traffic.

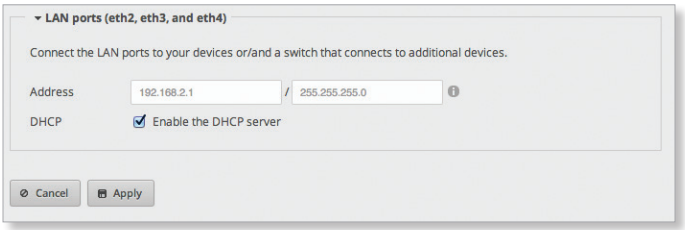


LAN Ports (eth2, eth3, and eth4)

Click **configure this section** if you connect *eth2*, *eth3*, and/or *eth4* to your devices and/or a switch. (The *eth2*, *eth3*, and/or *eth4* become switch ports for a local network.)

Address The IP address is displayed in the first field, and the subnet mask or prefix length is displayed in the second field.

DHCP Select this checkbox to have the EdgeRouter assign IP addresses.



Click **Apply** to save your changes, or click *Cancel*.

WAN+2LAN2 Wizard

Before You Begin

You can still use the *WAN+2LAN* setup wizard even if the EdgeRouter is already configured. The *WAN+2LAN* setup wizard will replace the entire configuration and require a reboot when the new configuration is applied.

Note: The *WAN+2LAN2* wizard is the same as the *Basic Setup* wizard.

Overview

Click the **WAN+2LAN2** setup wizard to begin the SOHO configuration.

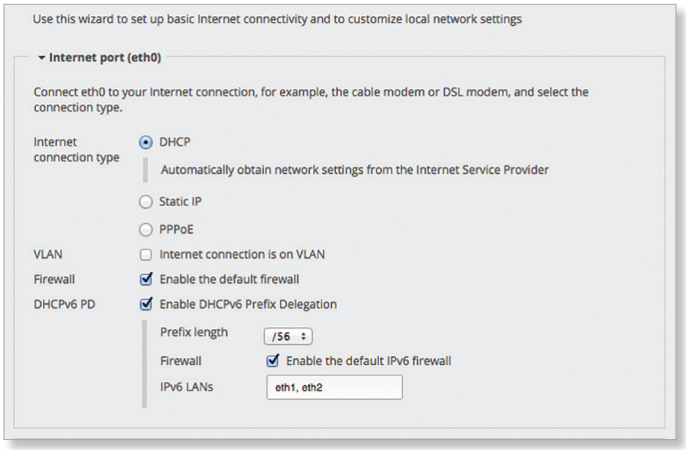
Note: The *WAN+2LAN2* setup wizard is designed to set up a basic SOHO network. For full configuration functionality, use the other tabs of the EdgeOS Configuration Interface or the Command Line Interface (CLI).

Internet Port (eth0)

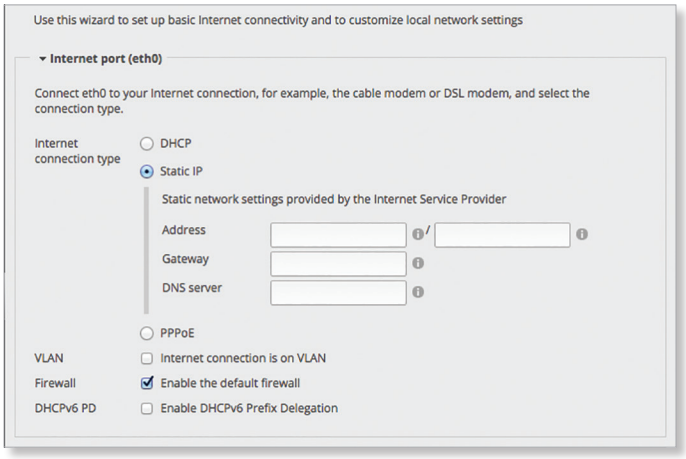
Connect *eth0* to your Internet connection.

Internet connection type Select the Internet connection type your network is using.

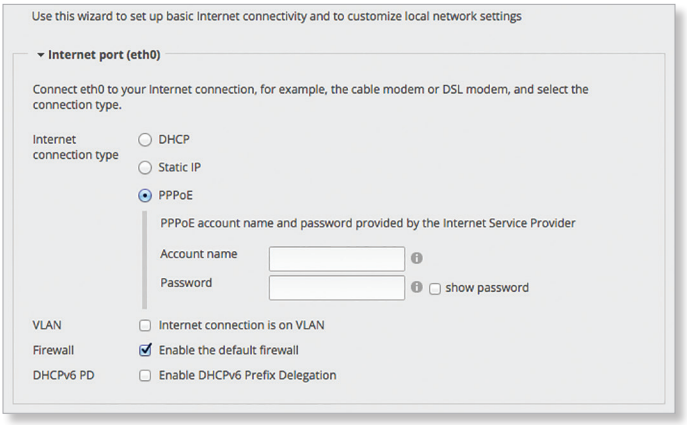
- **DHCP** Select this option if your ISP automatically assigns network settings to your network.



- **Static IP** Select this option if your ISP has assigned static network settings to your network.
  - **Address** Enter the IP address in the first field and the subnet mask or prefix length in the second field.
  - **Gateway** Enter the IP address of the ISP's gateway server, which provides the point of connection to the Internet.
  - **DNS server** Enter the IP address of the ISP's DNS server.

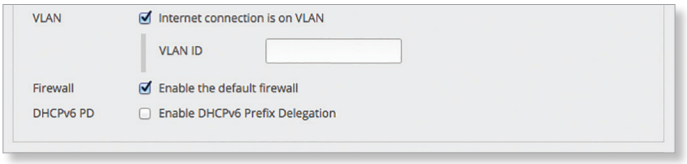


- **PPPoE** Select this option if your ISP uses PPPoE.
  - **Account Name** Enter the name of your PPPoE account.
  - **Password** Enter the password of your PPPoE account.



VLAN Some ISPs requires support for an Internet connection on the VLAN. If your ISP uses a tagged VLAN to provide Internet connectivity, select this option. The configuration generated by the wizard will place the needed settings under the VLAN interface instead.

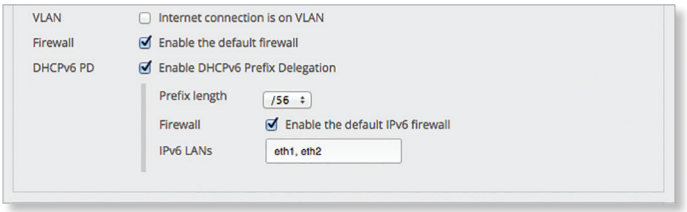
- **VLAN ID** Available if *VLAN* is enabled. Enter the VLAN ID used by the ISP.



Firewall Enabled by default. This option applies the default firewall settings to the EdgeRouter; only established and related traffic types are allowed for local and inbound traffic.

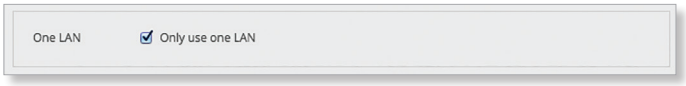
DHCPv6 PD Some ISPs use DHCPv6 PD (Prefix Delegation) to provide IPv6 service. If required, select this option and configure the following:

- **Prefix length** Available if *DHCPv6 PD* is enabled. Select the appropriate prefix length: **/56**, **/60**, or **/64**.
- **Firewall** Available if *DHCPv6 PD* is enabled. This option applies the default IPv6 firewall settings to the EdgeRouter; only established and related traffic types are allowed for local and inbound traffic. Enabled by default.
- **IPv6 LANs** Available if *DHCPv6 PD* is enabled. The IPv6 LAN interfaces are displayed. They are not currently configurable and are the same as the LAN interfaces for the IPv6 part of the wizard (two LANs are used so the corresponding interfaces, eth1 and eth2, or eth1 and switch0, are shown in IPv6 LANs). All LAN interfaces use the service slaac.



One LAN (ER-X, ER-X-SFP, or EP-R6 Only)

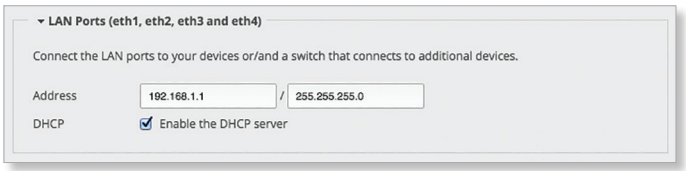
Only use one LAN Select this option to use a single local area network.



LAN Ports (ER-X, ER-X-SFP, or EP-R6 Only)

Address Enter the IP address in the first field, and enter the subnet mask or prefix length in the second field.

DHCP Select this checkbox to have the EdgeRouter assign IP addresses.



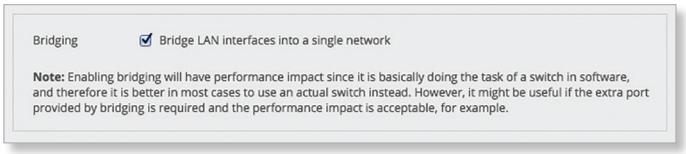
Bridging

If you are using the ERPoe-5, then go to **"Bridging (ERPoe-5)" on page 82**.

Bridging Select this option to bridge the LAN interfaces into a single network.

Bridging will decrease performance because it performs the task of a switch in software; in most cases, it is better to use a hardware switch instead. However, bridging may be useful if the extra port provided by bridging is required and the performance impact is acceptable.

Note: Bridging is not available for the ER-X, ER-X-SFP, or EP-R6.



You have two options:

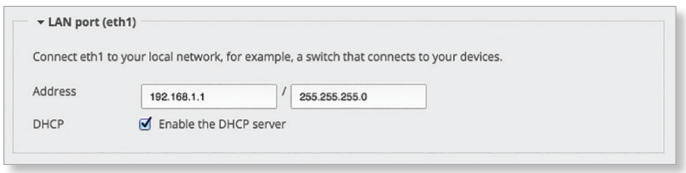
If *Bridging* is disabled, then configure the following:

- *LAN Port (eth1)* section below
- **"(Optional) Secondary LAN port (eth2)" on page 82**

If *Bridging* is enabled, then go to **"LAN Ports (eth1 and eth2)" on page 82**.

LAN Port (eth1)

If *Bridging* is disabled, connect *eth1* to your local network, such as a switch. Then click **configure this section**.



Address Enter the IP address in the first field, and enter the subnet mask or prefix length in the second field.

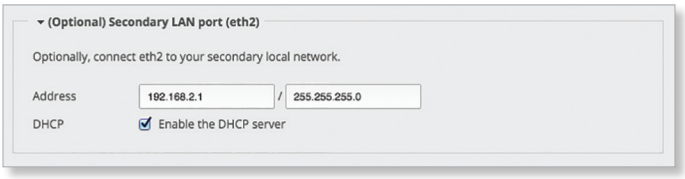
DHCP Select this checkbox to have the EdgeRouter assign IP addresses.

(Optional) Secondary LAN port (eth2)

If *Bridging* is disabled, you can connect *eth2* to your secondary local network. Then click **configure this section**.

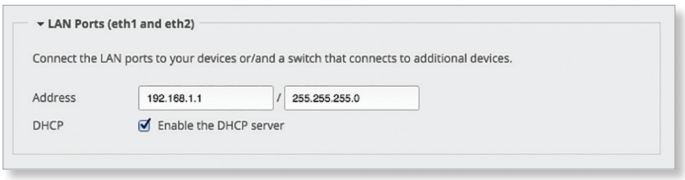
Address Enter the IP address in the first field, and enter the subnet mask or prefix length in the second field.

DHCP Select this checkbox to have the EdgeRouter assign IP addresses.



LAN Ports (eth1 and eth2)

If *Bridging* is enabled, connect the local ports to your devices and/or a switch that connects to additional devices. Then click **configure this section**.



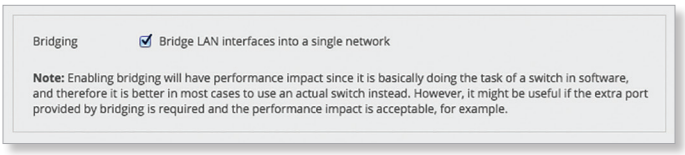
Address Enter the IP address in the first field, and enter the subnet mask or prefix length in the second field.

DHCP Select this checkbox to have the EdgeRouter assign IP addresses.

Bridging (ERPoe-5)

Bridging Select this option to bridge the LAN interfaces into a single network.

Bridging will decrease performance because it performs the task of a switch in software; in most cases, it is better to use a hardware switch instead. However, bridging may be useful if the extra port provided by bridging is required and the performance impact is acceptable.



You have two options:

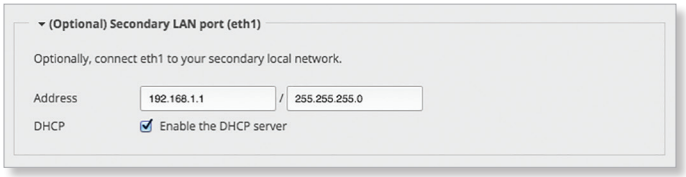
If *Bridging* is disabled, then configure the following

- *(Optional) Secondary LAN Port (eth1)* section in the next column
- *LAN Ports (eth2, eth3, and eth4)* section in the next column

If *Bridging* is enabled, then go to the *LAN ports (eth1, eth2, eth3, and eth4)* section below.

(Optional) Secondary LAN Port (eth1)

If *Bridging* is disabled, connect *eth1* to your local network, such as a switch. Then click **configure this section**.



Address Enter the IP address in the first field, and enter the subnet mask or prefix length in the second field.

DHCP Select this checkbox to have the EdgeRouter assign IP addresses.

LAN Ports (eth2, eth3, and eth4)

If *Bridging* is disabled, connect *eth2*, *eth3*, and/or *eth4* to your devices and/or a switch. (The *eth2*, *eth3*, and/or *eth4* become switch ports for a local network.) Then click **configure this section**.



Address Enter the IP address in the first field, and enter the subnet mask or prefix length in the second field.

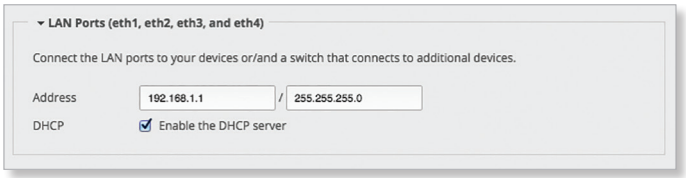
DHCP Select this checkbox to have the EdgeRouter assign IP addresses.

LAN ports (eth1, eth2, eth3, and eth4)

If *Bridging* is enabled, connect *eth1*, *eth2*, *eth3*, and/or *eth4* to your devices and/or a switch. (The *eth1*, *eth2*, *eth3*, and/or *eth4* become switch ports for a local network.) Then click **configure this section**.

Address Enter the IP address in the first field, and enter the subnet mask or prefix length in the second field.

DHCP Select this checkbox to have the EdgeRouter assign IP addresses.

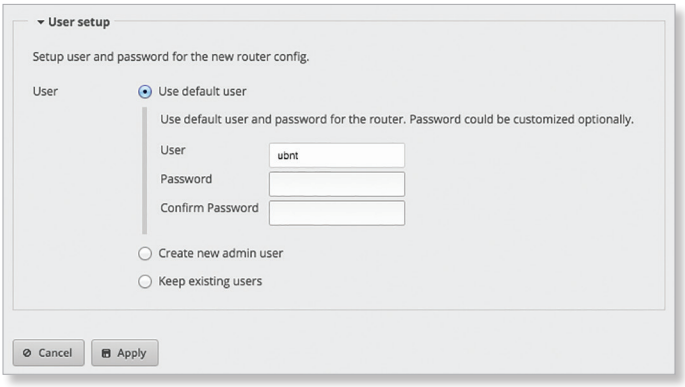


User Setup

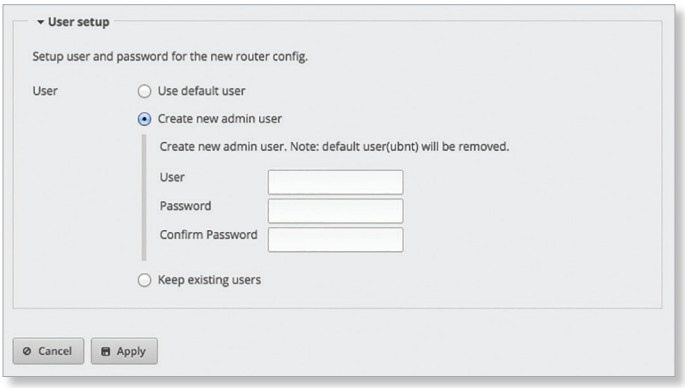
You can set up the username and password for the new EdgeRouter configuration.

User Select one of the following options:

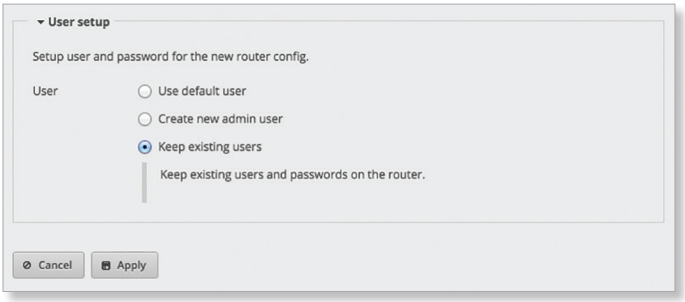
- **Use default user** Replace the default user, *ubnt*.
  - **User** Enter a new admin username.
  - **Password** Enter a new password.
  - **Confirm Password** Enter the new password again.



- **Create new admin user** Create a new admin user and remove the default user, *ubnt*. Complete the following:
  - **User** Enter a new admin username.
  - **Password** Enter a new password.
  - **Confirm Password** Enter the new password again.



- **Keep existing users** Keep the existing usernames and passwords on the EdgeRouter.



Click **Apply** to save your changes, or click *Cancel*.

Feature Wizards

Each wizard will guide you through configuration of the corresponding feature:

- DNS host names (see below)
- **"TCP MSS Clamping" on page 84**
- **"UPnP" on page 84**
- **"VPN Status" on page 84**

DNS Host Names

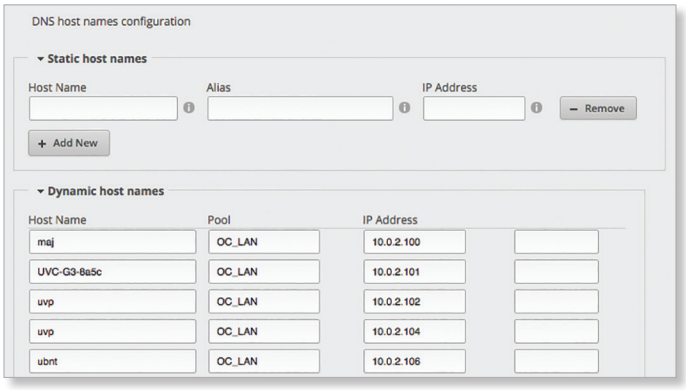
Click the **DNS host names** feature wizard to configure static host names and display a list of dynamic host names for client devices.



Static Host Names

Add New Click **Add New** to create a new static host name.

- **Host Name** Enter the host name of the device.
- **Alias** Enter one or more alias names, separated by commas. Example: *aliasname1, aliasname2*
- **IP Address** Enter the appropriate IP address.
- **Remove** Click **Remove** to delete a static host name.
- **Add New** Click **Add New** to create another new static host name.



Dynamic Host Names

Host Name Displays the host name of the device.

Pool Displays the name of the DHCP server that assigned the IP address.

IP Address Displays the IP address of the device.

(_) If this field is blank, then the entry was created dynamically from a DHCP dynamic lease. If this field displays "static-IP", then the entry stems from a static mapping configured via the DHCP server configuration (see **"Static MAC/IP Mapping" on page 41** for more information).

Click **Apply** to save your changes, or click *Cancel*.

TCP MSS Clamping

TCP MSS (Maximum Segment Size) clamping is typically used when Path MTU Discovery is not working properly.

Using ICMP messages, Path MTU Discovery determines the highest allowable MTU (Maximum Transmission Unit) of traffic traveling between two hosts to avoid fragmentation.

TCP uses MSS, which is the MTU minus the IP and TCP headers. The sender should limit its data so it does not exceed the MSS reported by the receiver.

Sometimes security firewalls or other issues interfere with the Path MTU Discovery process (for example, ICMP messages are blocked), so you can use a workaround, TCP MSS clamping, which sets the MSS value for all TCP connections.

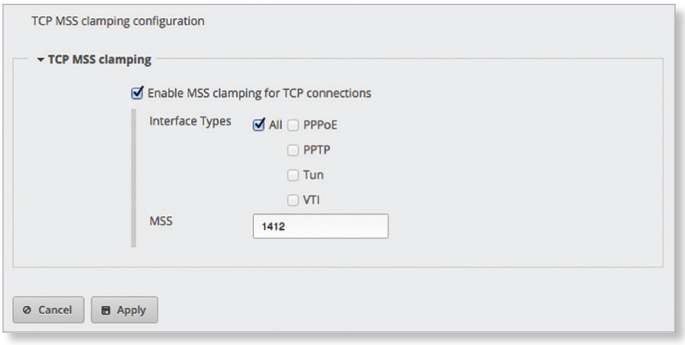
Click the **TCP MSS Clamping** feature wizard to begin configuration.

TCP MSS Clamping

Enable MSS clamping for TCP connections Select this option to specify the MSS value for TCP connections.

Interface Types Select which interface types use MSS clamping: **PPPoE**, **PPTP**, **Tun**, or **VTI**. *All* are enabled by default.

MSS Enter the MSS value to use; *1412* is the default.



Click **Apply** to save your changes, or click *Cancel*.

UPnP

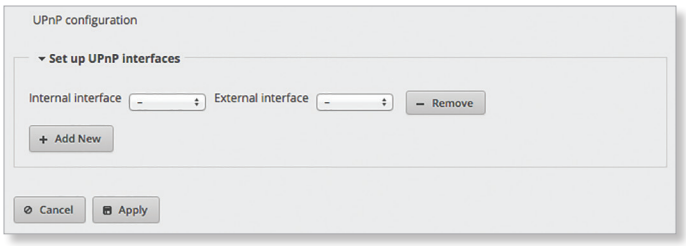
Instead of manually configuring port forwarding rules, you can use UPnP for automatic port forwarding when you have hardware that supports UPnP.

Click the **UPnP** feature wizard to begin configuration.

Set Up UPnP Interfaces

Add New Click **Add New** to create a new UPnP interface.

- **Internal interface** Select the appropriate LAN interface from the drop-down menu. (If you select *Other*, then enter the interface name in the field provided.)
- **External interface** Select the appropriate WAN interface from the drop-down menu. (If you select *Other*, then enter the interface name in the field provided.)
- **Remove** Click **Remove** to delete a UPnP interface.
- **Add New** Click **Add New** to create another new UPnP interface.



Click **Apply** to save your changes, or click *Cancel*.

VPN Status

Click the **VPN status** feature wizard to display the status of your IPsec site-to-site VPN tunnels. For information about configuration, go to **"IPsec Site-to-Site" on page 46**.

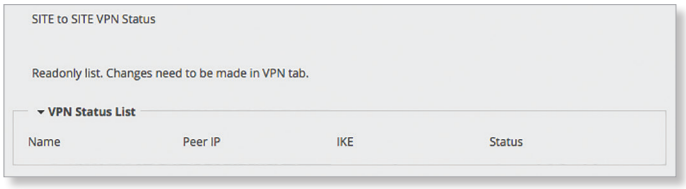
VPN Status List

Name Displays the descriptive name of the VPN tunnel.

Peer IP Displays the IPv4/IPv6 address of the peer router.

IKE Displays the IKE (Internet Key Exchange) encryption method, hash algorithm, DH group, and lifetime in this format:
<encryption>-<hash>-<group>-<lifetime>

Status Displays the status of the VPN tunnel.

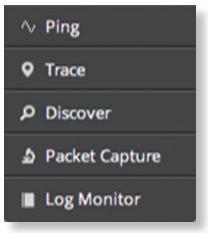


Click **Apply** to save your changes, or click *Cancel*.



Chapter 13: Toolbox

Each tab of the EdgeOS interface contains network administration and monitoring tools. At the top right of the screen, click the **Toolbox** Toolbox button. The *Toolbox* drop-down menu appears.



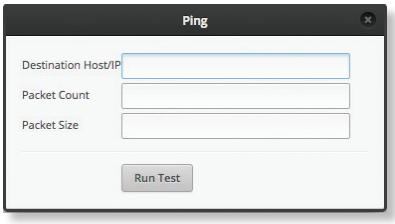
The following tools are available:

- Ping
- Bandwidth
- Trace
- Discover
- Packet Capture
- Log Monitor

Ping

You can ping other devices on the network directly from the EdgeRouter. The *Ping* tool uses ICMP packets to check the preliminary link quality and packet latency estimation between two network devices.

Click **Ping**, and the *Ping* screen appears:



Destination Host/IP Enter the IP address.

Packet Count Enter the number of packets to send for the ping test.

Packet Size Specify the size of the packet.

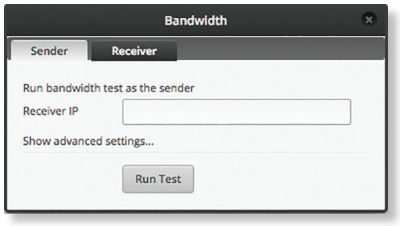
Run Test Click this button to start the test.

Packet loss statistics and latency time evaluation are displayed after the test is completed.

Bandwidth

You can run a speed test as the sender or receiver. To run the test between two routers, run it as a receiver on one end and sender on the other end. On the sender, enter the receiver's IP address and click **Run Test**.

Click **Bandwidth**, and the *Bandwidth* screen appears:

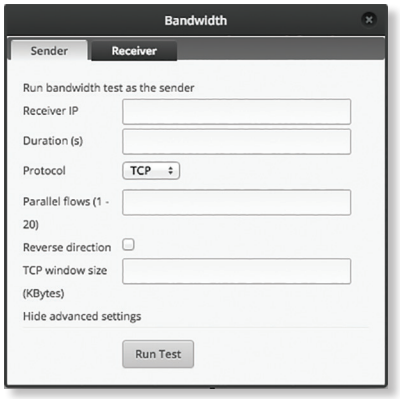


Sender

Receiver IP Enter the IP address.

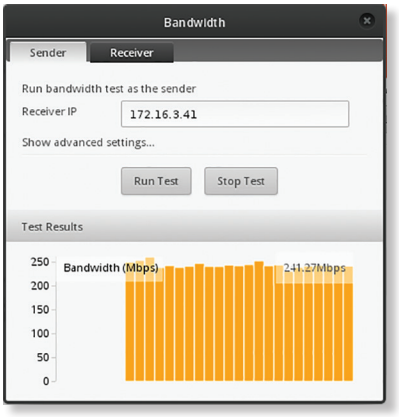
Show advanced settings Click to display settings for advanced users.

- **Duration (s)** Enter the length of time in seconds.
- **Protocol** Select the appropriate protocol, **TCP** or **UDP**.
  - **UDP Bandwidth** If you use UDP, then this option is available. Enter the bandwidth to use.
- **Parallel flows (1-20)** If you want to increase the stress or saturate the link, enter the number of connections or streams that will run simultaneously.
- **Reverse direction** Select this option to reverse the direction of the data flow.
- **TCP window size (KBytes)** Enter the TCP window size, which is the maximum amount of data that can be sent without an acknowledgement.
- **Hide advanced settings** Click to hide settings for advanced users.



Run Test Click this button to start the test as the sender.

Bandwidth statistics are displayed after the test is completed.



Receiver



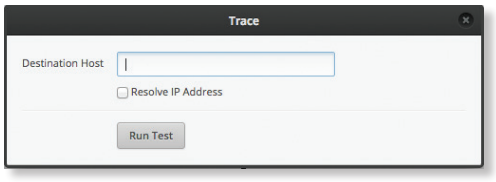
Run Test Click this button to start the test as the receiver.

The bandwidth results are displayed in Mbps after the test is completed.

Trace

The *Trace* tool traces the hops from the EdgeRouter to a specified outgoing IP address. Use this tool to find the route taken by ICMP packets across the network to the destination host.

Click **Trace**, and the *Trace* screen appears:



Destination Host Enter the IP address of the destination host.

Resolve IP Address Select this option to resolve the IP addresses symbolically (as names) instead of numerically.

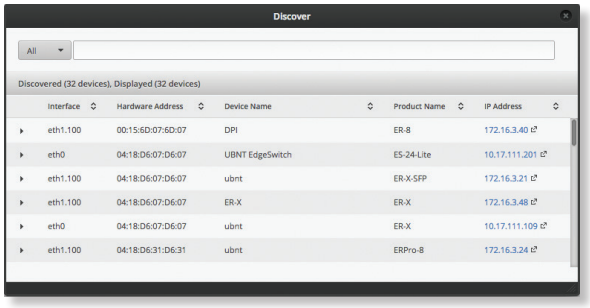
Run Test Click this button to start the test.

Responses are displayed after the test is completed.

Discover

The *Discover* tool searches for all Ubiquiti devices on your network. The *Search* field automatically filters devices containing specified names or numbers as you enter them.

Click **Discover**, and the *Discover* screen appears:



All/eth_ Select which interface to search, or select **All**.

The tool reports the number of *Discovered* and *Displayed* Ubiquiti devices. A table displays the following information about each Ubiquiti device. Click a column heading to sort by that heading.

Interface The EdgeRouter interface used by the device is displayed.

Hardware Address The MAC address of the device is displayed.

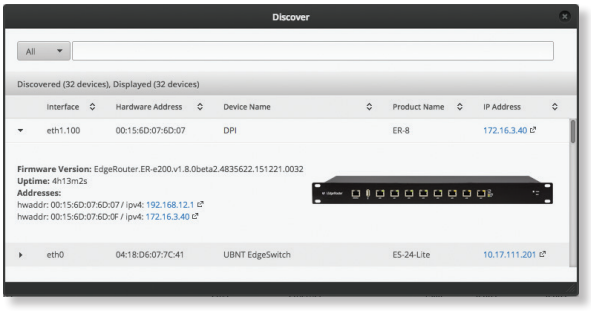
Device Name The name assigned to the device is displayed.

Product Name The Ubiquiti name of the device is displayed.

IP Address The IP address of the device is displayed. You can click it to access the device's configuration through its web management interface.

For more information, click the ▸ arrow to view the following:

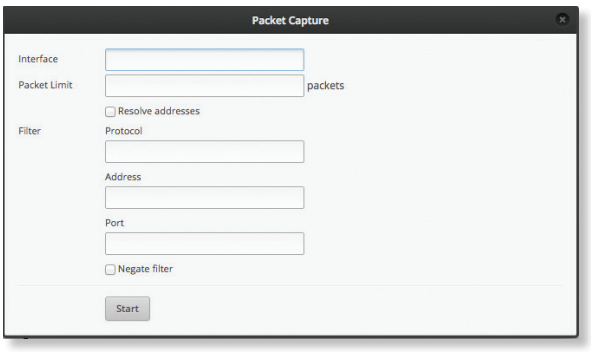
- **Firmware Version** The version number of the device's firmware is displayed.
- **Uptime** The duration of the device's activity is displayed.
- **Addresses** The addresses of the device's interface are displayed. If the device has more than one interface, addresses for each interface are displayed.
  - **hwaddr** The MAC address of the device's interface is displayed.
  - **ipv4** The IP address of the device's interface is displayed.



Packet Capture

Capture packets traveling through the specified interface for analysis. You can set up filters to capture the specific types of packets you are seeking.

Click **Packet Capture**, and the *Packet Capture* screen appears:



Interface Enter the name of the interface.

Packet Limit Enter the number of packets to capture. The maximum number is 150.

Resolve addresses Select this option to resolve the IP addresses symbolically (as names) instead of numerically.

Filter

- **Protocol** Enter the protocol to filter.
- **Address** Enter the address to filter.
- **Port** Enter the port number to filter.
- **Negate filter** Check this box to capture all packets except for the ones matching the selected filter(s).

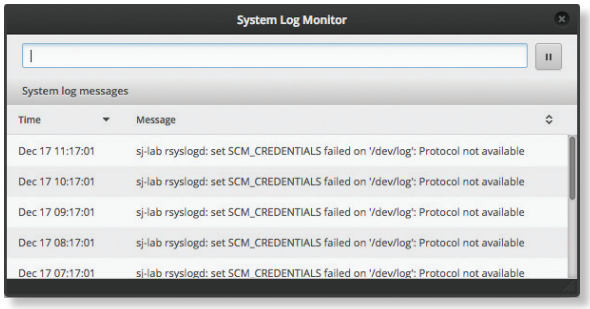
Start Click this button to start the capture. (If a *Packet Limit* is not specified, then this button becomes a *Stop* button during the capture.)

Capture results are displayed with *Time* and *Packet* descriptions.

Log Monitor

The *Log Monitor* is a log displaying live updates.

Click **Log Monitor**, and the *System Log Monitor* screen appears:



Click the *pause* button to stop the live updates. Click the *play* button to resume the live updates.

The *System log messages* table displays the following information about each log. Click a column heading to sort by that heading.

Time The system time is displayed next to every log entry that registers a system event.

Message A description of the system event is displayed.

Appendix A: Command Line Interface

Overview

The Command Line Interface (CLI) is available if you need to configure and monitor advanced features on the EdgeRouter or prefer configuration by command line. The CLI provides direct access to standard Linux tools and shell commands. This chapter explains how to access the CLI and describes a basic set of frequently used commands. Additional information is available on our website at: **community.ubnt.com/edgemax**

New Commands for ER-X Platform

The EdgeRouter X platform, which includes the EdgeRouter X, EdgeRouter X SFP, and EdgePoint EP-R6, now supports the following offload features:

IPsec crypto offload Disabled by default. Starting with EdgeOS v1.9.0, this option provides significant IPsec performance improvement. To enable this option, use the following commands:

```
set system offload ipsec enable
commit
save
```

A router reboot is required for the setting to take effect.

Hardware NAT offload Disabled by default. Starting with EdgeOS v1.8.5, this option can significantly improve packet forwarding performance while reducing CPU utilization. Hardware NAT offload supports IPv4 and IPv6 traffic, such as VLAN, PPPoE, and bridging. To enable this option, use the following command:

```
set system offload hwnat enable
```

Access the CLI

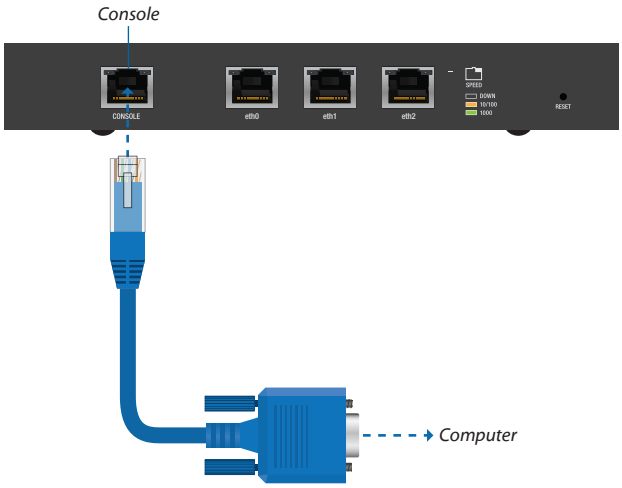
There are four methods you can use to access the CLI:

- **terminal emulator** Go to the following section, *Connect to the Console Port*.
- **SSH** If you are using the console port, go to the following section, *Connect to the Console Port*; otherwise, go to **"Access Using SSH" on page 90**.
- **Telnet** If you are using the console port, go to the following section, *Connect to the Console Port*; otherwise, go to **"Access Using Telnet" on page 90**.
- **EdgeOS Configuration Interface** Go to the *Access Using a Terminal Emulator* section in the next column.

Connect to the Console Port

Instructions may vary slightly, depending on your specific terminal emulator.

1. Use a RJ45-to-DB9, serial console cable, also known as a rollover cable, to connect the *Console* port of the EdgeRouter to your computer. (If your computer does not have a DB9 port, then you will also need a DB9 adapter.)

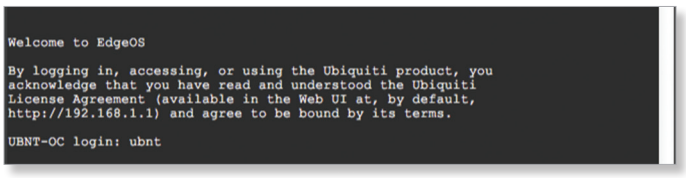


2. Follow the appropriate set of instructions:
   - **terminal emulator** Go to the following section, *Access Using a Terminal Emulator*.
   - **SSH** Go to **"Access Using SSH" on page 90**.
   - **Telnet** Go to **"Access Using Telnet" on page 90**.

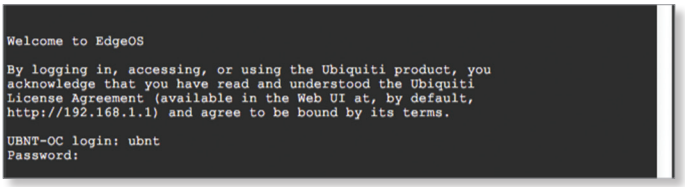
Access Using a Terminal Emulator

Instructions may vary slightly, depending on your specific terminal emulator.

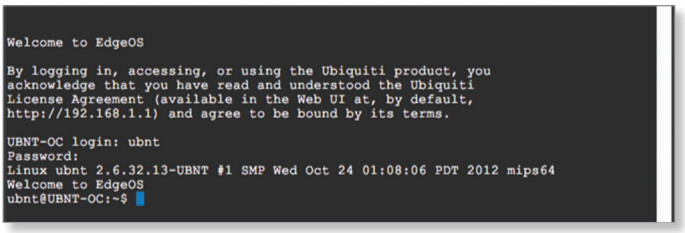
1. Open the terminal emulator on your computer, and configure it with the following serial port settings:
   - **Baud rate** 115200
   - **Data bits** 8
   - **Parity** NONE
   - **Stop bits** 1
   - **Flow control** NONE
2. Select **Serial** as the connection type.
3. Click **Open** to connect to the EdgeRouter.
4. At the *ubnt login* prompt, enter the username (the default is *ubnt*).



5. At the *Password* prompt, enter the password (the default is *ubnt*).



6. For help with commands, you can either press the **?** key or enter **show** and press the **?** key.



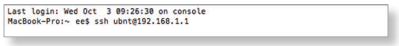
Note: To enhance security, we recommend that you change the default login using one of the following:

- Set up a new user account (preferred option). For details, go to **"Remove the Default User Account" on page 93**.
- Change the default password of the *ubnt* login. Use the *set* command as detailed in **"Remove the Default User Account" on page 93**.

Access Using SSH

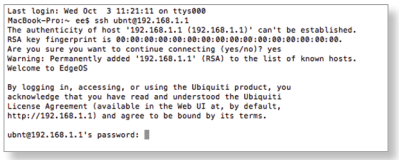
SSH is enabled by default.

1. Open the SSH client on your computer.
2. At the *login* prompt, enter:
   ssh <*username*>**@**<*hostname*>
   The defaults are *ubnt* for the username and *192.168.1.1* for the hostname. You can also enter a domain name instead of an IP address for the hostname.

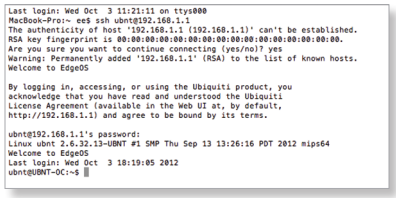


Note: Upon initial login, a host key will be displayed. You will be asked to confirm that you want to save the host key to the local database. Click **Yes** to bypass this message in the future.

At the *Password* prompt, enter the password (the default is *ubnt*).



3. For help with commands, you can either press the **?** key or enter **show** and press the **?** key.



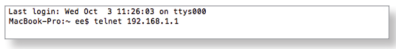
Note: To enhance security, we recommend that you change the default login using at least one of the following options:

- Set up a new user account (preferred option). For details, go to **"Remove the Default User Account" on page 93**.
- Change the default password of the *ubnt* login. Use the *set* command as detailed in **"Remove the Default User Account" on page 93**.

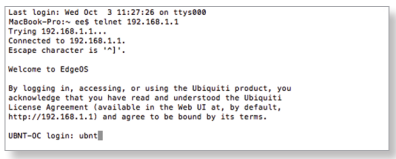
Access Using Telnet

Telnet is disabled by default. To use Telnet, enable it on the *System* tab (see **"Telnet Server" on page 6**).

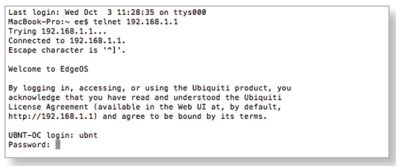
1. Open the telnet client on your computer.
2. At the prompt, enter:
   telnet <*hostname*>
   The default is *192.168.1.1* for the hostname. You can also enter a domain name instead of an IP address for the hostname.



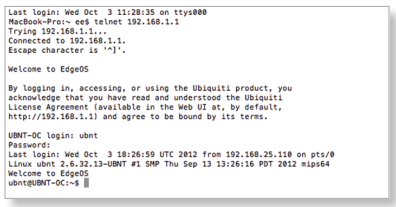
3. At the *login* prompt, enter the username (the default is *ubnt*).



4. At the *Password* prompt, enter the password (the default is *ubnt*).



5. For help with commands, you can either press the **?** key or enter **show** and press the **?** key.



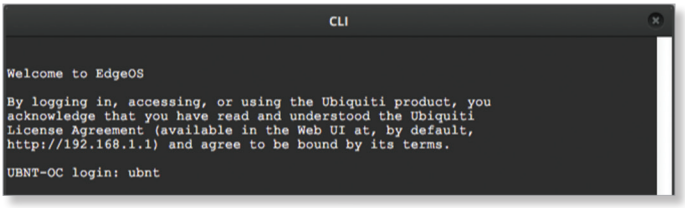
Note: To enhance security, we recommend that you change the default login using at least one of the following options:

- Set up a new user account (preferred option). For details, go to **"Remove the Default User Account" on page 93**.
- Change the default password of the *ubnt* login. Use the *set* command as detailed in **"Remove the Default User Account" on page 93**.

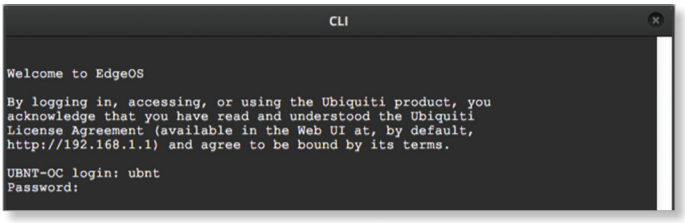
Access Using the EdgeOS Configuration Interface

Each tab of the EdgeOS interface contains CLI access.

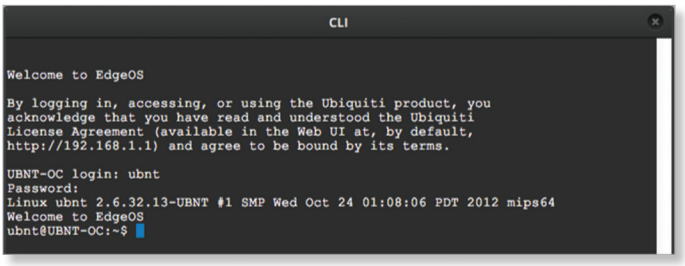
1. At the top right of the screen, click the CLI.
2. The *CLI* window appears. At the *login* prompt, enter the username (the default is *ubnt*).



3. At the *Password* prompt, enter the password (the default is *ubnt*).



4. For help with commands, you can either press the **?** key or enter **show** and press the **?** key.



Note: To enhance security, we recommend that you change the default login using at least one of the following options:

- Set up a new user account (preferred option). For details, go to **"Remove the Default User Account" on page 93**.
- Change the default password of the *ubnt* login. Use the *set* command as detailed in **"Remove the Default User Account" on page 93**.

CLI Modes

Operational Mode

When you first log in, the CLI is in operational mode. Press the **?** key to view the available commands.

```
ubnt@ubnt:~$
```

Note: The question mark does not display on-screen.

```
add          delete          ping6     reset      terminal
clear        disconnect      reboot    restart    traceroute
configure    generate        release   set        traceroute6
connect      initial-setup   remove    show       undebug
copy         no              rename    shutdown
debug        ping            renew     telnet
```

Enter **show** and press the **?** key to view the settings that you have configured.

```
ubnt@ubnt:~$ show
```

```
arp             flow-accounting  nat           tech-support
bridge          hardware         ntp           ubnt
configuration   history          openvpn       users
date            host             pppoe-server  version
debugging       incoming         queueing      vpn
dhcp            interfaces       reboot        vrrp
dhcpv6          ip               route-map     webproxy
disk            ipv6             shutdown      zebra
dns             lldp             snmp
file            log              system
firewall        login            table
```

For example, type **show interfaces** to display the interfaces and their status information.

```
ubnt@ubnt:~$ show interfaces
Codes: S - State, L - Link, u - Up, D - Down,
A - Admin Down
```

```
Interface      IP Address          S/L      Description
---------      ----------          ---      -----------
eth0           -                   u/u
eth1           -                   u/D
eth2           -                   u/D
lo             127.0.0.1/8         u/u
```

To properly shut down the EdgeRouter, use the **shutdown** command.

```
ubnt@ubnt:~$ shutdown
```

WARNING: Use the **shutdown** command to properly shut down the EdgeRouter. An improper shutdown, such as disconnecting the EdgeRouter from its power supply, runs the risk of data corruption!

Configuration Mode

To switch to configuration mode, use the **configure** command.

```
ubnt@ubnt:~$ configure
[edit]
ubnt@ubnt#
```

For the *show*, *set*, and *delete* commands, you can press the **?** key for help.

- **set ?** View the available commands.
- **show ?** View the settings that you have configured. (Because configurations vary, the list you see will differ from the sample list displayed below.)
- **delete ?** View the settings that you can delete.

Enter **show** and press the **?** key.

```
ubnt@ubnt# show

firewall    interfaces    protocol    service    system
[edit]
```

To display the available command completions, press the **tab** key.

Note: The tab does not display on-screen.

```
ubnt@ubnt# show
Possible completions:

firewall                Firewall
interfaces              Network interfaces
protocols               Routing protocol parameters
service                 Services
system                  System parameters
```

The EdgeRouter uses three configurations:

- **Working** When you make changes to the working configuration, they are not applied until you commit the changes to the active configuration.
- **Active** When you commit changes to the active configuration, they are applied; however, the changes do not become part of the boot configuration until you save the changes to the boot configuration.
- **Boot** When the EdgeRouter reboots, it loads the boot configuration for use.

The following scenarios cover some of the most commonly used commands:

- *Configure an Interface* (below)
- *Remove the Default User Account* (in the next column
- **"Create a Firewall Rule" on page 93**
- **"Manage the Configuration File" on page 95**

Configure an Interface

To configure an interface, do the following:

- Assign an IP address and subnet mask
- Enter a description

Use the **set**, **compare**, **commit**, and **save** commands.

To configure an interface, use the **set** command.

```
ubnt@ubnt:~$ configure
[edit]
```

To view the possible completions for the eth0 address, enter **set interfaces ethernet eth0 address** and press the **?** key.

```
ubnt@ubnt# set interfaces ethernet eth0 address
Possible completions:

<x.x.x.x/x>          IP address and prefix length
<h:h:h:h:h:h:h:h/x>  IPv6 address and prefix length
dhcp                 Dynamic Host Configuration Protocol
dhcpv6               Dynamic Host Configuration Protocol
                     for IPv6
[edit]
ubnt@ubnt# set interfaces ethernet eth0 address
10.1.1.80/23
[edit]
ubnt@ubnt# set interfaces ethernet eth0 description
"production LAN"
```

These changes affect the working configuration, not the active configuration. To see what changes have been made to the working configuration, use the **compare** command:

```
ubnt@ubnt# compare
[edit interfaces ethernet eth0]
+address 10.1.1.2/24
+description "production LAN"
[edit]
```

To make the changes active, use the **commit** command:

```
ubnt@ubnt# commit
[edit]
```

If you reboot the EdgeRouter, the changes will be lost. To save these changes, use the **save** command to save the active configuration to the boot configuration.

```
ubnt@ubnt# save
Saving configuration to '/config/config.boot'...
Done
[edit]
ubnt@ubnt# exit
exit
ubnt@ubnt:~$
ubnt@ubnt:~$ show interfaces
Codes: S - State, L - Link, u - Up, D - Down,
A - Admin Down

Interface     IP Address          S/L    Description
---------     ----------          ---    -----------
eth0          10.1.1.80/23        u/u    production LAN
eth1          -                   u/D
eth2          -                   u/D
lo            127.0.0.1/8         u/u
              ::1/128
ubnt@ubnt:$ ping 10.1.0.1
PING 10.1.0.1 (10.1.0.1) 56(84) bytes of data.
64 bytes from 10.1.0.1: icmp_req=1 ttl=64 time=0.460 ms
64 bytes from 10.1.0.1: icmp_req=2 ttl=64 time=0.407 ms
^C
--- 10.1.0.1 ping statistics ---
2 packets transmitted, 2 received, 0% packet loss, time
999 ms
rtt min/avg/max/mdev = 0.407/0.433/0.460/0.033 ms
```

Remove the Default User Account

To remove the default user account, do the following:

- Create a new user
- Log out of the default user account
- Log in with the new user account
- Delete the default user account

Use the **set**, **commit**, **save**, **exit**, and **delete** commands.

```
ubnt@ubnt:~$ configure
[edit]
ubnt@ubnt:# set system login user admin1 authentication
plaintext-password admin1pass
[edit]
ubnt@ubnt:# commit
[edit]
ubnt@ubnt:# save
Saving configuration to '/config/config.boot'...
Done
[edit]
ubnt@ubnt:# exit
exit
ubnt@ubnt:~$ exit
logout

Welcome to Edge OS ubnt ttyS0

ubnt login: admin1
Password:
Linux ubnt 2.6.32.13-UBNT #1 SMP Fri Jun 8 09:48:31 PDT
2012 mips64
Welcome to EdgeOS
admin1@ubnt:~$ configure
[edit]
admin1@ubnt# delete system login user ubnt
[edit]
admin1@ubnt# commit
[edit]
admin1@ubnt# save
Saving configuration to '/config/config.boot'...
Done
[edit]
admin@ubnt# exit
exit
admin1@ubnt:~$
```

The plaintext password that you entered is converted to an encrypted password.

```
admin1@ubnt:~$ configure
[edit]
admin1@ubnt# show system login
user admin1 {
        authentication {
                encrypted-password
                $1$mv8ERQ1T$7xq/eUDwy/5And7nV.9r6.
                plaintext-password
                ""
        }
}
[edit]
admin1@ubnt# exit
exit
admin1@ubnt:~$
```

Create a Firewall Rule

To create a firewall rule, use the **set** or **edit** commands (both methods are described below). In addition, use the **compare**, **discard**, **up**, **top**, **copy**, and **rename** commands.

Create a firewall rule using the full syntax:

```
ubnt@ubnt:~$ configure
[edit]
ubnt@ubnt# set firewall name TEST default-action drop
[edit]
ubnt@ubnt# set firewall name TEST enable-default-log
[edit]
ubnt@ubnt# set firewall name TEST rule 10 description
"allow icmp"
[edit]
ubnt@ubnt# set firewall name TEST rule 10 action accept
[edit]
ubnt@ubnt# set firewall name TEST rule 10 protocol icmp
[edit]
```

To display uncommitted changes, use the **compare** command:

```
ubnt@ubnt# compare
[edit firewall]
+name TEST {
+       default-action drop
+       enable-default-log
+       rule 10 {
+               action accept
+               description "allow icmp"
+               protocol icmp
+       }
+}
[edit]
```

To undo uncommitted changes, use the **discard** command:

```
ubnt@ubnt# discard
Changes have been discarded
[edit]
ubnt@ubnt# compare
No changes between working and active configurations
[edit]
```

To create the same firewall rule while reducing the amount of repetition in the full syntax, use the **edit** command:

```
ubnt@ubnt# edit firewall name TEST
[edit firewall name TEST]
ubnt@ubnt#set default-action drop
[edit firewall name TEST]
ubnt@ubnt# set enable-default-log
[edit firewall name TEST]
ubnt@ubnt#edit rule 10
[edit firewall name TEST rule 10]
```

Press the **?** or **tab** key to display options for the specified edit level.

```
ubnt@ubnt# set
```

```
action        disable    ipsec   p2p        source   time
description   fragment   limit   protocol   state
destination   icmp       log     recent     tcp
[edit firewall name TEST rule 10]
ubnt@ubnt# set description “allow icmp”
[edit firewall name TEST rule 10]
ubnt@ubnt# set action accept
[edit firewall name TEST rule 10]
ubnt@ubnt# set protocol icmp
[edit firewall name TEST rule 10]
```

To show changes within the edit level, use the **compare** command:

```
ubnt@ubnt# compare
[edit firewall name TEST rule 10]
+action accept
+description “allow icmp”
+protocol icmp
[edit firewall name TEST rule 10]
```

To move up an edit level, use the **up** command:

```
ubnt@ubnt#up
[edit firewall name TEST]
ubnt@ubnt# compare
[edit firewall name TEST]
+default-action drop
+enable-default-log
+rule 10 {
+       action accept
+       description “allow icmp”
+       protocol icmp
+}
[edit firewall name TEST]
ubnt@ubnt# up
[edit firewall]
ubnt@ubnt# compare
[edit firewall]
+name TEST {
+       default-action drop
+       enable-default-log
+       rule 10 {
+               action accept
+               description “allow icmp”
+               protocol icmp
+       }
+}
[edit firewall]
```

To return to the top edit level, use the **top** command:

```
ubnt@ubnt# top
[edit]
ubnt@ubnt# compare
[edit firewall]
+name TEST{
+       default-action drop
+       enable-default-log
+       rule 10 {
+               action accept
+               description “allow icmp”
+               protocol icmp
+       }
+}
[edit]
```

To display the existing firewall rule, use the **show firewall** command:

```
ubnt@ubnt# show firewall
name WAN1_LOCAL {
        default-action drop
        rule 10 {
                action accept
                state {
                        established enable
                        related enable
                }
        }
        rule 20 {
                action drop
                state {
                        invalid enable
                }
        }
        rule 30 {
                action accept
                destination {
                        port 22
                }
                protocol tcp
        }
}
[edit]
```

To create a new firewall rule from an existing firewall rule, use the **copy** command.

```
ubnt@ubnt# edit firewall
[edit firewall]
ubnt@ubnt# copy name WAN1_LOCAL to name WAN2_LOCAL
[edit firewall]
ubnt@ubnt# commit
[edit firewall]
ubnt@ubnt#top
[edit]
ubnt@ubnt#show firewall
name WAN1_LOCAL {
        default-action drop
        rule 10 {
                action accept
                state {
                        established enable
                        related enable
                }
        }
```

```
        rule 20 {
                action drop
                state {
                        invalid enable
                }
        }
        rule 30 {
                action accept
                destination {
                        port 22
                }
                protocol tcp
        }
}
name WAN2_LOCAL {
        default-action drop
        rule 10 {
                action accept
                state {
                        established enable
                        related enable
                }
        }
        rule 20 {
                action drop
                state {
                        invalid enable
                }
        }
        rule 30 {
                action accept
                destination {
                        port 22
                }
                protocol tcp
        }
}
[edit]
```

To change the name of the new firewall rule, use the **rename** command.

```
ubnt@ubnt# edit firewall
[edit firewall]
ubnt@ubnt# rename name W[TAB]
WAN1_LOCAL      WAN2_LOCAL
[edit firewall]
ubnt@ubnt# rename name WAN2_LOCAL to name WAN2_IN
[edit firewall]
ubnt@ubnt# commit
[edit firewall]
ubnt@ubnt#top
[edit]
ubnt@ubnt# show firewall name
name WAN1_LOCAL {
        default-action drop
        rule 10 {
                action accept
                state {
                        established enable
                        related enable
                }
        }
        rule 20 {
                action drop
                state {
                        invalid enable
                }
        }
        rule 30 {
                action accept
                destination {
                        port 22
                }
                protocol tcp
        }
}
name WAN2_IN {
        default-action drop
        rule 10 {
                action accept
                state {
                        established enable
                        related enable
                }
        }
        rule 20 {
                action drop
                state {
                        invalid enable
                }
        }
        rule 30 {
                action accept
                destination {
                        port 22
                }
                protocol tcp
        }
}
[edit]
ubnt@ubnt#
```

Manage the Configuration File

Typically, you use the *save* command to save the active configuration to disk (*'config/config.boot'*); however, you can also save the active configuration to a different file or remote server.

Enter **save** and press the **?** key.

```
ubnt@RTR# save
Possible completions:
<Enter>                                 Save to system
                                        config file
<file>                                  Save to file on
                                        local machine
scp://<user>:<passwd>@<host>/<file>     Save to file on
                                        remote machine
ftp://<user>:<passwd>@<host>/<file>     Save to file on
                                        remote machine
tftp://<host>/<file>                    Save to file on
                                        remote machine
[edit]
ubnt@RTR# save tftp://10.1.0.15/rtr-config.boot
Saving configuration to
'tftp://10.1.0.15rtr-config.boot'...
############################################### 100.0%
Done
[edit]
```

Scenario: In the midst of the administrator changing an IPsec tunnel into an OpenVPN tunnel, the administrator had to revert the EdgeRouter to its previous configuration with the IPsec tunnel.

1. Before making changes, the administrator saved a backup configuration file with a working IPsec tunnel configuration:

```
ubnt@RTR# save config.boot-ipsec
Saving configuration to '/config/config.boot-ipsec'...
Done
[edit]
```

Note: This is a backup; if the EdgeRouter were rebooted, it would still boot from the default file: *'/config/config.boot'*

2. After the administrator deleted the IPsec configuration and was configuring of the OpenVPN tunnel, circumstances changed so that the IPsec tunnel was required again. Consequently, the administrator reverted the EdgeRouter to its previous configuration with the IPsec tunnel.

```
ubnt@RTR# load config.boot-ipsec
Loading configuration from
'/config/config.boot-ipsec'...

Load complete. Use 'commit' to make changes active.
[edit]
ubnt@RTR# commit
[edit]
ubnt@RTR# save; exit
Saving configuration to '/config/config.boot'...
Done
exit
ubnt@RTR:~$
```

To automatically make a remote backup after every commit, use the **commit-archive** configuration option, enter **location**, and press the **?** key.

```
ubnt@RTR# set system config-management commit-archive
location
Possible completions:
<url>    Uniform Resource Identifier
Detailed information:
        "scp://<user>:<passwd>@<host>/<dir>"
        "ftp://<user>:<passwd>@<host>/<dir>"
        "tftp://<host>/<dir>"
ubnt@RTR# set system config-management commit-archive
location tftp://10.1.0.15/RTR
[edit]
ubnt@RTR# commit
Archiving config...
        tftp://10.1.0.15/RTR    OK
[edit]
```

On the remote tftp server, a copy with the hostname and date is saved for each commit.

```
admin2@server://tftpboot/RTR$ ls -l
total   8
-rw------- 1 nobody nogroup 908 Aug 17 17:19
        config.boot-RTR.20120817_171932
-rw------- 1 nobody nogroup 874 Aug 17 17:20
        config.boot-RTR.20120818_002046
```

You can also keep a specified number of revisions of the configuration file on the local disk. Use the **commit-revisions** configuration option.

```
ubnt@RTR# set system config-management commit-revisions
50
[edit]
ubnt@RTR# commit
[edit]
```

Here is an example that uses the *commit-revisions* command:

```
ubnt@RTR# set system login user joe authentication
plaintext-password secret
[edit]
ubnt@RTR# commit
[edit]
ubnt@RTR# save; exit
Saving configuration to '/config/config.boot'...
Done
exit

ubnt@RTR:~$ show system commit

0        2012-08-17 18:32:13 by ubnt via cli commit
1        2012-08-17 18:31:52 by ubnt via cli commit
2        2012-08-17 18:31:51 by root via init commit
```

Note: The following commands require that the configuration option, *commit-revisions*, be set first.

```
show system commit diff      commit-confirm
show system commit file      confirm
show system commit           rollback
commit comment
```

For details on the *commit-revisions* option, go to **"Manage the Configuration File" on page 95**.

To display the changes in revision 0, use the **show system commit diff** command.

```
ubnt@RTR:~$ show system commit diff 0
[edit system login]
+user joe       {
+       authentication {
+               encrypted-password
                $1$CWVzYggs$NyJXxC3S572rfm6pY8ZMO.
+               plaintext-password ""
+       }
+       level admin
+}
```

To display the entire configuration file for revision 0, use the **show system commit file** command.

```
ubnt@RTR:~$ show system commit file 0
```

To add a comment to the commit, use the **comment** command.

```
ubnt@RTR# set system login user joe level operator
[edit]
ubnt@RTR# commit comment "change joe from admin to op"
[edit]
ubnt@RTR# save; exit
Saving configuration to '/config/config.boot'...
Done
exit
```

Now you will see the comment when you use the **show system commit** command.

```
ubnt@RTR:~$ show system commit

0        2012-08-17 18:44:41 by ubnt via cli change joe
         from admin to op
1        2012-08-17 18:34:01 by ubnt via cli commit
2        2012-08-17 18:32:13 by ubnt via cli commit
3        2012-08-17 18:31:52 by ubnt via cli commit
4        2012-08-17 18:31:51 by root via init commit
```

When you work on a remote router, certain changes, such as a firewall or NAT rule, can cut off access to the remote router, so you then have to visit the remote router and reboot it. To avoid such issues when you make risky changes, use the **commit-confirm** command first. Then use the **confirm** command to save your changes.

```
ubnt@RTR:~$ configure
[edit]
ubnt@RTR# set firewall name WAN_IN rule 50 action drop
[edit]
ubnt@RTR# set firewall name WAN_IN rule 50 destination
address 172.16.0.0/16
[edit]
ubnt@RTR# commit-confirm
commit confirm will be automatically reboot in
10 minutes unless confirmed
Proceed? [confirm][y]
[edit]
```

After you verify that the changes should be saved, use the **confirm** command.

```
ubnt@RTR# confirm
[edit]
```

You can also specify the number of minutes to wait, but you must remember to also use the **confirm** command. Otherwise, if you forget, then you can be surprised by the EdgeRouter's reboot to its previous configuration.

```
ubnt@RTR# commit-confirm 1
commit confirm will be automatically reboot in 1 minutes
unless confirmed
Proceed? [confirm][y]
[edit]
ubnt@RTR#
Broadcast message from root@RTR (Mon Aug 20 14:00:06
2012):

The system is going down for reboot NOW!
INIT: Switching to runlevel: 6
INIT: Stopping routing services...zebra...done.
Removing all Quagga Routes.
[SNIP]
```

To roll back to an earlier commit, use the **show system commit** and **rollback** commands.

```
ubnt@RTR:~$ show system commit

0        2012-08-21 14:46:41 by admin_5 via cli
         fix bgp policy maps
1        2012-08-21 14:45:59 by admin_5 via cli
         commit
2        2012-08-21 14:45:33 by admin_5 via cli
         fix port forwarding
3        2012-08-21 14:45:15 by admin_5 via cli
         fix firewall
4        2012-08-21 14:44:29 by ubnt via cli
         commit
5        2012-08-21 14:21:15 by ubnt via cli
         add port forward for port 2222 to build-server
6        2012-08-21 14:20:24 by ubnt via cli
         add dmz interface to eth2
7        2012-08-21 14:19:53 by ubnt via cli
         add ipsec tunnel to office_exchange
8        2012-08-21 14:07:18 by ubnt via cli
         add firewall for WAN_IN
9        2012-08-21 14:06:37 by ubnt via cli
         add user first_last
10       2012-08-21 14:04:47 by ubnt via cli
         commit
11       2012-08-21 14:04:46 by root via init
         commit
```

After viewing the history of system commits, you decide to discard the last four commits by *admin_5*. Roll back the system configuration file to commit 4:

```
ubnt@RTR# rollback 4
Proceed with reboot? [confirm] [y]

Broadcast message from root@RTR (ttyS0) (Mon Aug 21
15:09:12 2012):

The system is going down for reboot NOW!
```

Appendix B: Contact Information

Ubiquiti Networks Support

Ubiquiti Support Engineers are located around the world and are dedicated to helping customers resolve software, hardware compatibility, or field issues as quickly as possible. We strive to respond to support inquiries within a 24-hour period.

Ubiquiti Networks, Inc.
2580 Orchard Parkway
San Jose, CA 95131
www.ubnt.com

Online Resources

Support: **ubnt.link/EdgeMAX-Support**

Community: **community.ubnt.com/edgemax**

Downloads: **downloads.ubnt.com/edgemax**

JL081616



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