UBIQUITI NETWORKS

EdgeOS™

Operating System for Ubiquiti EdgeRouters

Release Version: 1.4

User Guide

Table of Contents

Chapter 1: Overview

Introduction

EdgeOS™ is a powerful, sophisticated operating system from Ubiquiti Networks™. It allows you to manage your EdgeRouter and networks. This User Guide is designed for use with version 1.3 or above of the EdgeOS Configuration Interface and all of the EdgeRouter models, which this User Guide will collectively refer to as EdgeRouter. Additional information is available on our website at:

http://community.ubnt.com/edgemax

http://documentation.ubnt.com/edgemax

Product Name	Model	Number of Ports	PoE
EdgeRouter Lite	ERLite-3	3	
EdgeRouter PoE	ERPoe-5	5	✓
8-Port EdgeRouter	ER-8	8	
EdgeRouter PRO	ERPro-8	8*	

*Two ports are either RJ45 or SFP.

Configuration

The intuitive EdgeOS Configuration Interface allows you to conveniently manage your EdgeRouter using your web browser. (See **"Using EdgeOS" on page 3** for more information.) If you need to configure advanced features or prefer configuration by command line, you can use the Command Line Interface (CLI). (See **"Command Line Interface" on page 45** for more information.)

Configuration Interface System Requirements

- Microsoft Windows 7, Windows 8, Linux, or Mac OS X
- Web Browser: Google Chrome, Mozilla Firefox, or Microsoft Internet Explorer 8 (or above)

Hardware Overview and Installation

The Quick Start Guide that accompanied your EdgeRouter includes a hardware description and instructions for hardware installation.

Typical Deployment Scenarios

While there are numerous scenarios that are possible, this section highlights three typical deployments:

- Small Office/Home Office (SOHO) Deployment
- Service Provider Deployment
- Corporate Deployment

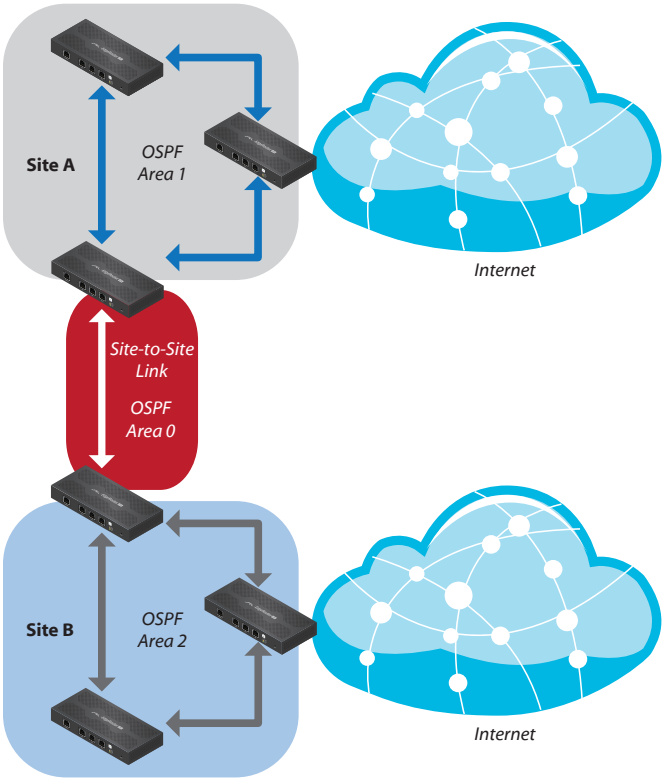
SOHO Deployment

Click the **Wizards** tab and follow the on-screen instructions. See **"Wizards Tab" on page 37** for more information.

Service Provider Deployment

This scenario uses six EdgeRouter devices:

1. OSPF Area 0 to OSPF Area 1
2. OSPF Area 0 to OSPF Area 2
3. OSPF Area 1
4. OSPF Area 1 to Internet
5. OSPF Area 2
6. OSPF Area 2 to Internet



Here are the typical steps to follow:

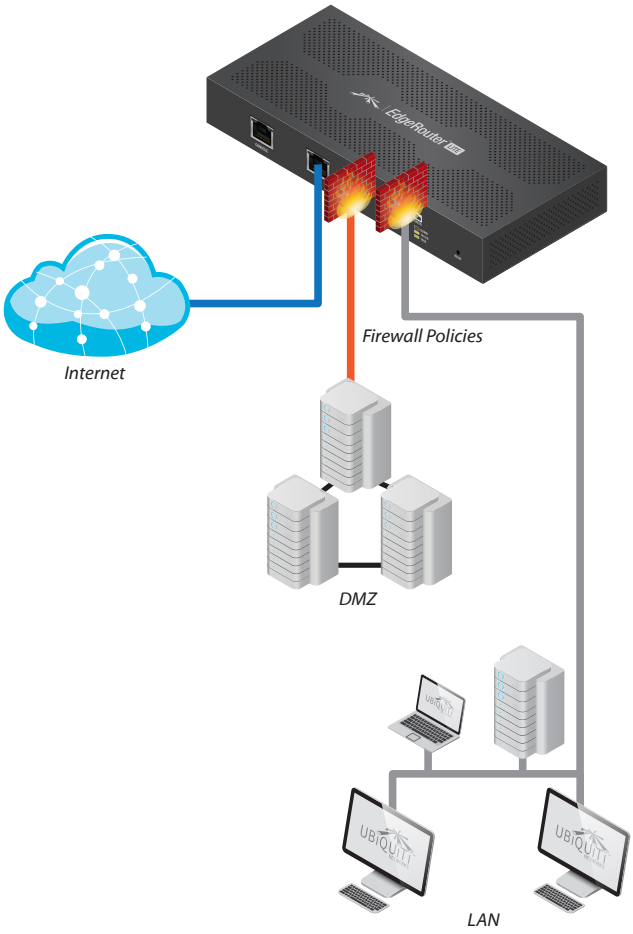
1. Configure the appropriate settings on the *System* tab (see **"System" on page 4** for more information):
   - *Host Name*
   - *Time Zone*
   - *Gateway*
   - *Name Server*
   - *Domain Name*
   - *NTP*
2. Configure the interfaces on the *Dashboard* tab; see **"Interfaces" on page 9** for more information.
3. Configure OSPF settings on the *Routing* > *OSPF* tab; see **"OSPF" on page 17** for more information.
4. Configure DHCP server(s) on the *Services* tab; see **"DHCP Server" on page 30** for more information.
5. Configure NAT rules on the *Security* > *NAT* tab; see **"NAT" on page 24** for more information.

6. Configure firewall rules on the *Security* > *Firewall Policies* tab; see **"Firewall Policies" on page 20** for more information.
7. Configure additional settings as needed for your network.

Corporate Deployment

This scenario uses a single EdgeRouter device. The three independent interfaces connect to the following:

- Internet
- DMZ
- LAN



Here are the typical steps to follow:

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   - *Gateway*
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4. Configure NAT rules on the *Security* > *NAT* tab; see **"NAT" on page 24** for more information.
5. Configure firewall rules on the *Security* > *Firewall Policies* tab; see **"Firewall Policies" on page 20** for more information.
6. Configure additional settings as needed for your network.

Chapter 2: Using EdgeOS

EdgeOS is a powerful, sophisticated operating system that manages your EdgeRouter. It offers both a browser-based interface (EdgeOS Configuration Interface) for easy configuration and a Command Line Interface (CLI) for advanced configuration.

To access the EdgeOS Configuration Interface:

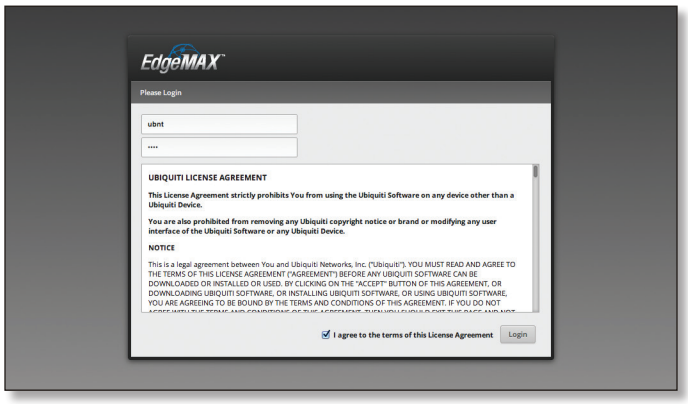
1. Connect an Ethernet cable from the Ethernet port of your computer to the port labeled *eth0* on the EdgeRouter.

2. Configure the Ethernet adapter on your computer with a static IP address on the 192.168.1.x subnet (e.g., 192.168.1.100).

Note: As an alternative, you can connect a serial cable to the *Console* port of the EdgeRouter. See **"Command Line Interface" on page 45** for more information.

3. Launch your web browser. Type **https://192.168.1.1** in the address field. Press **enter** (PC) or **return** (Mac).

4. The login screen will appear. Enter **ubnt** in the *Username* and *Password* fields. Read the Ubiquiti License Agreement, and check the box next to *I agree to the terms of this License Agreement* to accept it. Click **Login**.



The EdgeOS Configuration Interface will appear, allowing you to customize your settings as needed.

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

- Set up a new user account on the *Users* > *Local* tab (preferred option). For details, go to **"Add User" on page 35**.
- Change the default password of the *ubnt* login on the *Users* > *Local* tab. For details, go to **"Configure the User" on page 36**.

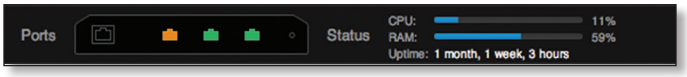
Ports and Status Information

The *Ports* image displays the active connections. An amber port indicates 10/100 Mbps, and a green port indicates 1000 Mbps. The *Status* bar graphs display the following:

CPU The percentage of processing power used by the EdgeRouter.

RAM The percentage of RAM used by the EdgeRouter.

Uptime The duration of the EdgeRouter's activity.



Place your mouse over a port to view the following:

Enabled/Disabled The administrative status is displayed.

Link The connection status is displayed.

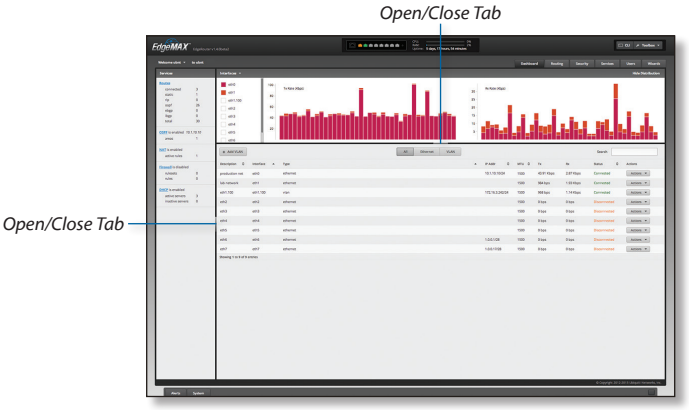
Speed The speed (in Mbps) and duplex mode are displayed.

Navigation

The EdgeOS software consists of five primary tabs, and some of these tabs have sub-tabs. This User Guide covers each tab with a chapter. For details on a specific tab, refer to the appropriate chapter.

- **Dashboard** The **"Dashboard Tab" on page 8** displays status information about services and interfaces. You can also configure interfaces and Virtual Local Area Networks (VLANs).
- **Routing** The **"Routing Tab" on page 14** configures static routes and Open Shortest Path First (OSPF) settings, including metrics, areas, and interfaces.
- **Security** The **"Security Tab" on page 20** configures firewall policies, Network Address Translation (NAT) rules, firewall/NAT groups, and PPTP VPN options.
- **Services** The **"Services Tab" on page 30** configures DHCP servers, DNS forwarding, and the PPPoE server.
- **Users** The **"Users Tab" on page 35** configures user accounts with administrator or operator access.
- **Wizards** The **"Wizards Tab" on page 37** offers a variety of wizards: a setup wizard that configures the EdgeRouter for a typical SOHO deployment and feature wizards that configure port forwarding, TCP MSS clamping, and UPnP.

Depending on the tab you click, some of the screens display information and options in multiple sections. You can click the **open/close** tab to hide or display a section.



Common Interface Options

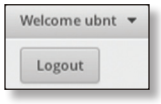
The common interface options are accessible from all tabs on the EdgeOS interface:

- Welcome
- CLI
- Toolbox
- Alerts
- System

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.

Welcome

At the top left of the screen, click **Welcome** to view the *Logout* option:



Logout To manually log out of the EdgeRouter Configuration Interface, click this option.

CLI

Advanced users can make configuration changes using Linux commands. At the top right of the screen, click the **CLI** CLI button. See **"Command Line Interface" on page 45** for more information.

Toolbox

At the top right of the screen, click the **Toolbox** Toolbox button. The following network administration and monitoring tools are available:

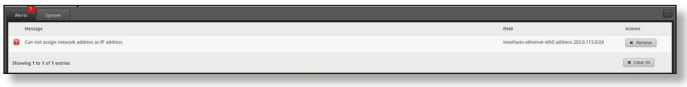
- **"Ping" on page 42**
- **"Trace" on page 43**
- **"Discover" on page 43**
- **"Packet Capture" on page 43**
- **"Log Monitor" on page 44**

Alerts

The number of new alerts is displayed in a red popup.

At the bottom of the screen, click the **Alerts** tab.

A table displays the following information about each important event.



Message A description of the event is displayed.

Field The settings that are affected by the event are displayed.

Actions The following options are available:

- **Remove** Click this button to clear an alert.
- **Clear All** Click this button to clear all alerts.

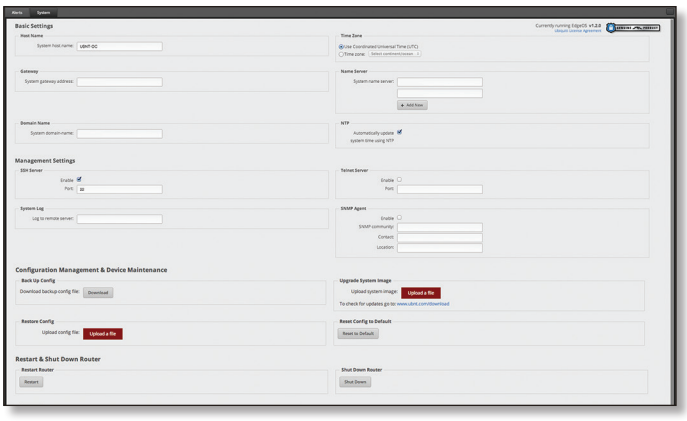
Click the top right corner of the *Alerts* tab to close it.

System

At the bottom of the screen, click the **System** tab to access the device settings.

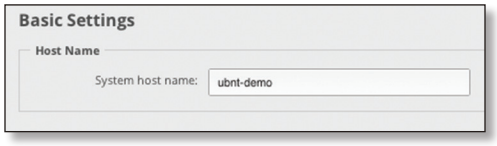
The device settings are organized into these sections:

- **"Basic Settings" on page 5**
- **"Management Settings" on page 5**
- **"Configuration Management & Device Maintenance" on page 6**
- **"Restart & Shut Down Router" on page 7**



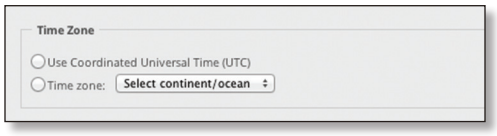
Basic Settings

Host Name



System host name Enter a name for the EdgeRouter. The host name identifies the EdgeRouter as a specific device. For example, a .com URL typically uses this format: <*host_name*>.domain_name.com

Time Zone

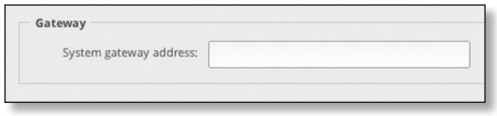


Use Coordinated Universal Time (UTC) UTC is the international time standard used by Network Time Protocol (NTP) servers. If your routers are located in multiple time zones, then you may want to use UTC.

Time zone To set your network to a specific time zone, select **Time zone** and configure the following:

- **Select continent/ocean** Select your location.
- **Select country/region** Select your location.
- **Select time zone** Select your time zone.

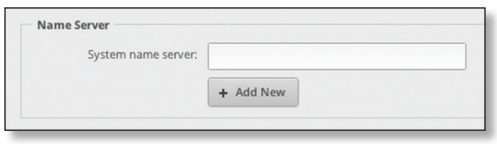
Gateway



System gateway address Enter the IP address of your gateway. This will set up your default route. If you want to set up additional default routes, configure them as static routes on the *Routing* tab. See **"Routing Tab" on page 14** for more information.

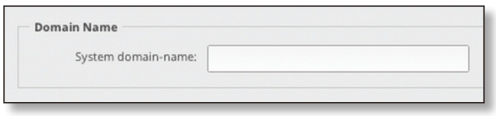
Name Server

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



System name server Enter the IP address of your DNS server (example: *192.0.2.1* for IPv4 or *2001:db8::1* for IPv6). Click **Add New** to add additional servers.

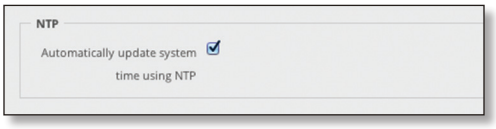
Domain Name



System domain name Enter the domain name of your EdgeRouter. The domain name identifies the EdgeRouter's network on the Internet. For example, a .com URL typically uses this format: host_name.<*domain_name*>.com

NTP

NTP is a protocol for synchronizing the clocks of computer systems over packet-switched, variable-latency data networks. You can use it to set the system time on the EdgeRouter. If the *System Log* option is enabled, then the system time is reported next to every log entry that registers a system event.

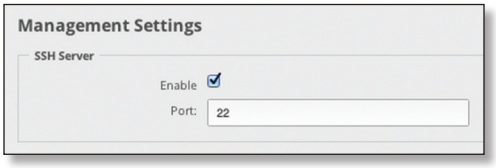


Automatically update system time using NTP By default, the EdgeRouter obtains the system time from a time server on the Internet.

Click **Save** to apply your changes.

Management Settings

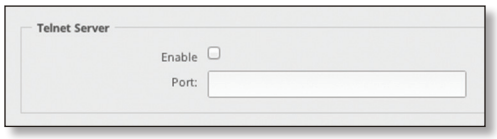
SSH Server



Enable Enabled by default. This option allows SSH (Secure Shell) access to the EdgeRouter for remote configuration by command line. SSH uses encryption and authentication, so it is a secure form of communication. See **"Command Line Interface" on page 45** for more information.

Port Specify the TCP/IP port of the SSH server. The default is *22*.

Telnet Server

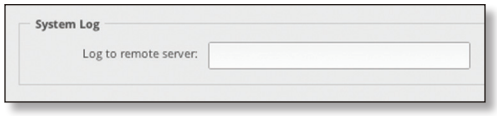


Enable Disabled by default. This option allows Telnet access to the EdgeRouter for remote configuration by command line. Telnet is not a secure form of communication, so we recommend SSH. See **"Command Line Interface" on page 45** for more information.

Port Specify the TCP/IP port of the Telnet server. The default is *23*.

System Log

Every logged message contains at least a system time and host name. Usually a specific service name that generates the system event is also specified within the message. Messages from different services have different contexts and different levels of detail. Usually error, warning, or informational system service messages are reported; however, more detailed debug level messages can also be reported. The more detailed the system messages reported, the greater the volume of log messages generated.



Log to remote server This option allows the EdgeRouter to send system log messages to a remote server. Enter the remote host IP address and TCP/IP port that should receive the system log (syslog) messages. *514* is the default port for the commonly used, system message logging utilities.

Note: Properly configure the remote host to receive syslog protocol messages.

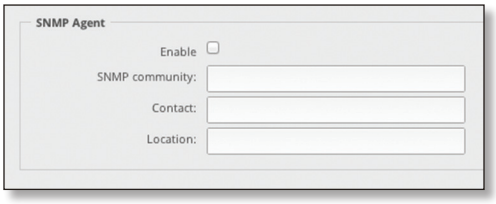
SNMP Agent

Simple Network Monitor Protocol (SNMP) is an application layer protocol that facilitates the exchange of management information between network devices. Network administrators use SNMP to monitor network-attached devices for issues that warrant attention.

The EdgeRouter contains an SNMP agent, which does the following:

- Provides an interface for device monitoring using SNMP
- Communicates with SNMP management applications for network provisioning
- Allows network administrators to monitor network performance and troubleshoot network problems

For the purpose of equipment identification, configure the SNMP agent with contact and location information:



Enable Disabled by default. This option activates the SNMP agent.

SNMP community Specify the SNMP community string. It is required to authenticate access to MIB (Management Information Base) objects and functions as an embedded password. The device supports a read-only community string; authorized management stations have read access to all the objects in the MIB except the community strings, but do not have write access. The device supports SNMP v1. The default is *public*.

Contact Specify the contact who should be notified in case of emergency.

Location Specify the physical location of the EdgeRouter.

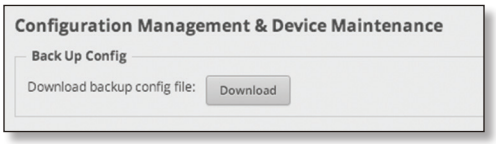
Click **Save** to apply your changes.

Configuration Management & Device Maintenance

The controls in this section manage the device configuration routines, firmware maintenance, and reset to factory default settings.

Back Up Config

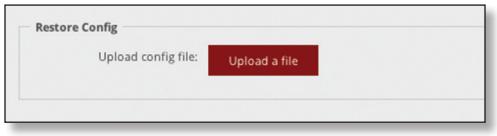
We recommend that you back up your current system configuration before updating the firmware or uploading a new configuration.



Download backup config file Click **Download** to download the current system configuration file.

Note: We strongly recommend that you save the configuration file in a secure location because it includes confidential information. The user login passwords are encrypted; however, other passwords and keys (such as those used for VPN, BGP, authentication, and RADIUS) are stored in plain text.

Restore Config



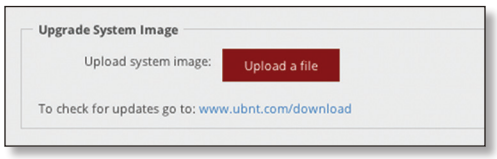
Upload config file Click **Upload a file** to locate the configuration file previously created by the *Back Up Config* option. Select the file and click **Choose**. We recommend that you back up your current system configuration before uploading the new configuration.

Note for advanced users: You can also upload a raw configuration file, */config/config.boot*, using this option.

Upgrade System Image

Download the firmware file from **downloads.ubnt.com** and save it on your computer.

The firmware update is compatible with all configuration settings. The system configuration is preserved while the EdgeRouter is updated with a new firmware version. However, we recommend that you back up your current system configuration before updating the firmware.



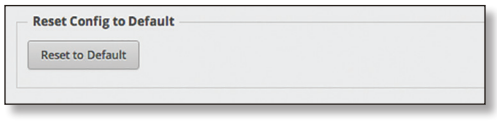
Upload system image To update the EdgeRouter with new firmware, click **Upload a file** and locate the new firmware file. Then click **Choose**.

Please be patient, as the firmware update routine can take three to seven minutes. You cannot access the EdgeRouter until the firmware update routine is completed.

WARNING: Do not power off, do not reboot, and do not disconnect the EdgeRouter from the power supply during the firmware update process as these actions will damage the EdgeRouter!

Reset Config to Default

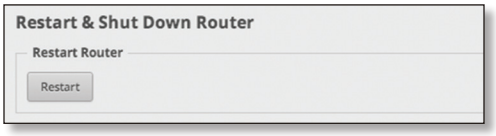
This option resets the EdgeRouter to the default configuration. This option will reboot the EdgeRouter, and the default configuration will be restored. We recommend that you back up your current system configuration before resetting the EdgeRouter to its default configuration.



Reset to Default To reset the EdgeRouter to its default configuration, click this option.

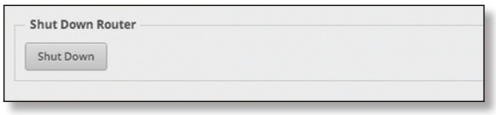
Restart & Shut Down Router

Restart Router



Restart To turn the EdgeRouter off and back on again, click this option.

Shut Down Router



Shut Down To turn off the EdgeRouter, click this option.

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

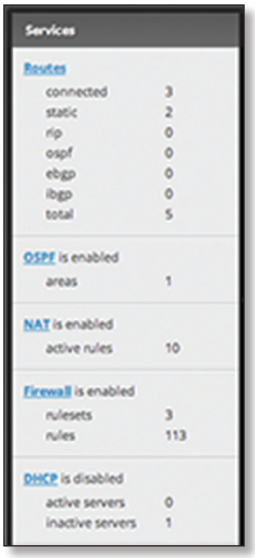
Click the top right corner of the *System* tab to close it.

Chapter 3: Dashboard Tab

The *Dashboard* tab displays status information about services and interfaces. You can also configure interfaces and Virtual Local Area Networks (VLANs). Any setting marked with a blue asterisk * is required.

Services

Status information is displayed. Each heading is a convenient link to the appropriate tab.



Routes

The following route types are listed:

- Connected
- Static
- RIP (Routing Information Protocol)
- OSPF (Open Shortest Path First)
- EBGP (Exterior Border Gateway Protocol)
- IBGP (Interior Border Gateway Protocol)

The number of each route type and the total number of routes are displayed. Click **Routes** to display the *Routing* > *Routes* tab. Go to **"Routes" on page 15** for more information.

OSPF

The OSPF status, settings, and number of areas are displayed. Click **OSPF** to display the *Routing* > *OSPF* tab. Go to **"OSPF" on page 17** for more information.

NAT

The NAT (Network Address Translation) status and number of NAT rules are displayed. Click **NAT** to display the *Security* > *NAT* tab. Go to **"NAT" on page 24** for more information.

Firewall

The firewall status and numbers of sets and rules are displayed. Click **Firewall** to display the *Security* > *Firewall Policies* tab. Go to **"Firewall Policies" on page 20** for more information.

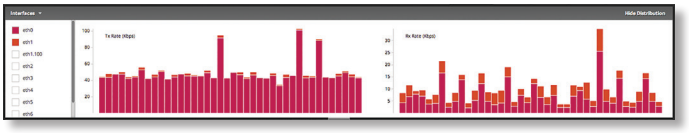
DHCP

The DHCP server status and numbers of active and inactive servers are displayed. Click **DHCP** to display the *Services* tab. Go to **"DHCP Server" on page 30** for more information.

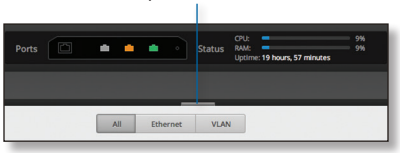
Interfaces

Distribution

Click **Hide Distribution** to hide the *Interfaces* > *Distribution* section. Click the remaining **open/close** tab to display the *Interfaces* > *Distribution* section again.

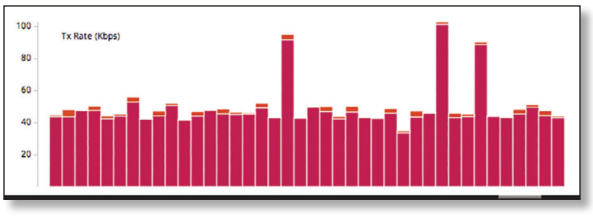


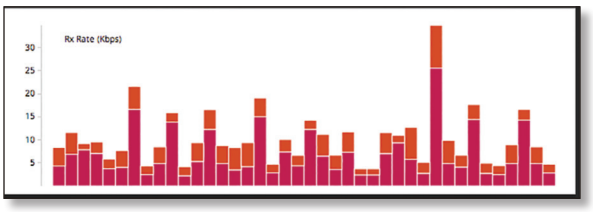
Open/Close Tab



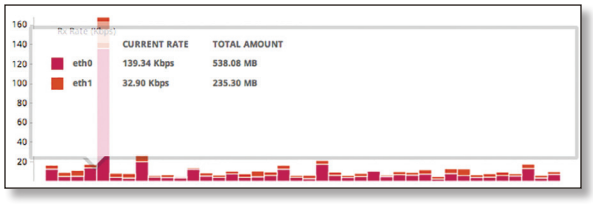
Select the physical or virtual interfaces you want to display from the *Interfaces* column.

The *TX Rate* and *RX Rate* bar graphs display the current data traffic, which is color-coded to match the corresponding interface. The graph scale and throughput dimension (Mbps, for example) change dynamically depending on the mean throughput value. The statistics are updated automatically.





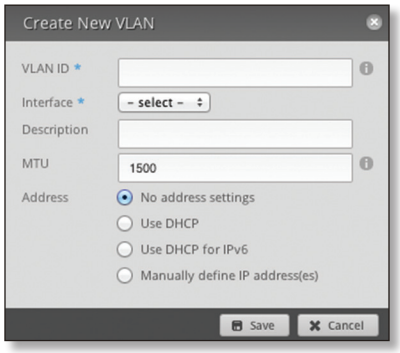
Place your mouse over a bar to view the *Current Rate* and *Total Amount* of traffic for the selected interfaces.



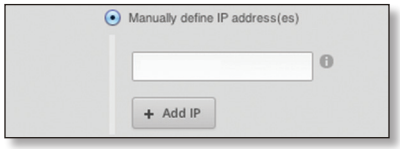
All/Ethernet/VLAN

Add VLAN To create a new VLAN, click **Add VLAN**.

The *Create a New VLAN* screen appears.



- **VLAN ID** The VLAN ID is a unique value assigned to each VLAN at a single device; every VLAN ID represents a different VLAN. The VLAN ID range is 2 to 4094.
- **Interface** Select the appropriate interface.
- **Description** Enter keywords to describe this VLAN.
- **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 *1500*.
- **Address** Select one of the following:
  - **No address settings** The VLAN uses no address settings. (In most cases, an address is needed.)
  - **Use DHCP** The VLAN acquires network settings from a DHCPv4 server.
  - **Use DHCP for IPv6** The VLAN acquires network settings from a DHCPv6 server.
  - **Manually define IP address(es)** Enter the static IP address (example: *192.0.2.1/24* for IPv4 or *2001:db8::1/32* for IPv6). Click **Add IP** to enter additional IP addresses.



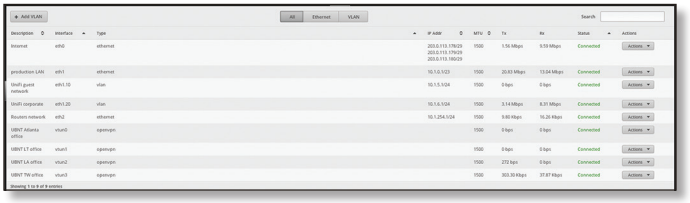
Click **Save** to apply your changes, or click *Cancel*.

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.

All/Ethernet/VLAN Click the appropriate tab to filter the interfaces as needed.

- **All** All interfaces are displayed by default.
- **Ethernet** All of the Ethernet interfaces are displayed.
- **VLAN** All VLANs are displayed.

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



Description The keywords you entered to describe the interface are displayed.

Interface The name of the interface is displayed.

Note: A switch interface is created by default (EdgeRouter PoE only); however, there are no switched ports by default. To configure ports for the switch interface, click **Actions** > **Config** and go to **"Configure the Switch" on page 12**.

Type The type of interface is displayed.

PoE (Available for the EdgeRouter PoE only.) The status (*off*) or voltage (*24v/48v*) of the *PoE* feature is displayed.

IP Addr The IP address of the interface is displayed.

MTU The MTU (Maximum Transmission Unit) value of the interface is displayed. This is the maximum packet size (in bytes) that the interface can transmit.

TX The transmit speed of the interface is displayed.

RX The receive speed of the interface is displayed.

Status The connection status of the interface is displayed.

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

- **Config** To configure the interface, click **Config**.

  If the interface is a physical port, go to the *Configure the Interface* section.

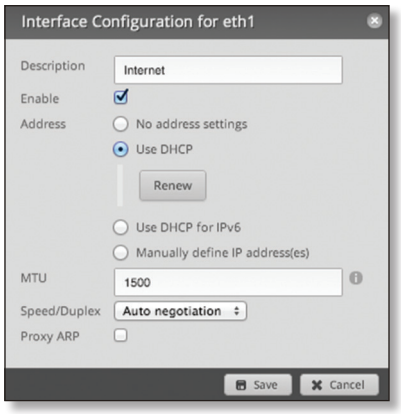
  If the interface is a VLAN, go to **"Configure the VLAN" on page 11**.

  If the interface is a switch (available for the EdgeRouter PoE only), go to **"Configure the Switch" on page 12**.
- **PoE** (Available for the EdgeRouter PoE only.) To configure the PoE settings, click **PoE**. Go to **"Configure the PoE Settings" on page 12**.
- **Disable** Disable the interface while keeping its configuration. (The switch interface cannot be disabled.)

  Note: If you disable a port, its *PoE* functionality remains. (This applies only to the EdgeRouter PoE.)
- **Delete** (Available for VLANs only.) Delete the VLAN from the EdgeRouter configuration.

Configure the Interface

After you click *Config*, the *Interface Configuration* screen appears.

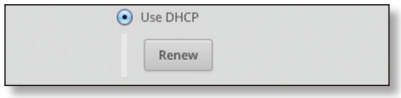


Make changes as needed.

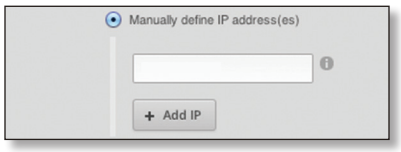
- **Description** Enter keywords to describe this interface.
- **Enable** Check the box to enable the interface. All of the interfaces are saved in the system configuration file; however, only the enabled interfaces are active on the device.

Note: If you disable a port, its *PoE* functionality remains. (This applies only to the EdgeRouter PoE.)

- **Address** Select one of the following:
  - **No address settings** The interface uses no address settings. (In most cases, an address is needed.)
  - **Use DHCP** The interface acquires network settings from a DHCPv4 server. Click the **Renew** button to acquire fresh network settings.



  - **Use DHCP for IPv6** The interface acquires network settings from a DHCPv6 server.
  - **Manually define IP address(es)** Enter the static IP address (example: *192.0.2.1/24* for IPv4 or *2001:db8::1/32* for IPv6). Click **Add IP** to enter additional IP addresses.



- **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 *1500*.

- **Speed/Duplex** The default is *Auto negotiation*. The EdgeRouter automatically negotiates transmission parameters, such as speed and duplex, with its counterpart. In this process, the networked devices first share their capabilities and then choose the fastest transmission mode they both support.

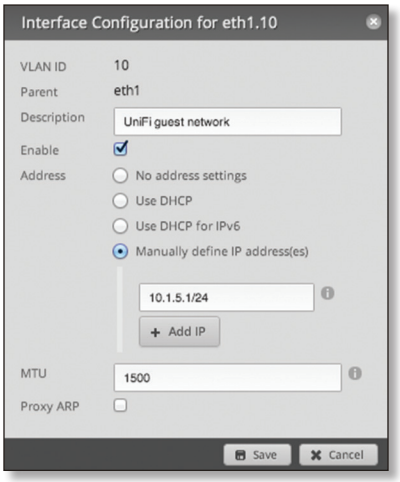
  To manually specify the transmission link speed and duplex mode, select one of the following options: **100/full**, **100/half**, **10/full**, or **10/half**.

  Full-duplex mode allows communication in both directions simultaneously. Half-duplex mode allows communication in both directions, but not simultaneously and only in one direction at a time.
- **Proxy ARP** Enable the EdgeRouter to answer a source host's ARP (Address Resolution Protocol) requests for the IP address of a destination host that is not located on the source host's network. ARP allows hosts on the same network to discover each other's IP address via a layer 2 broadcast to all MAC addresses. If they are not on the same network, the layer 2 broadcast will not reach its destination; however, the EdgeRouter can serve as the go-between if *Proxy ARP* is enabled.

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

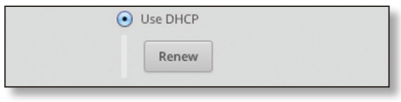
Configure the VLAN

After you click *Config*, the *Interface Configuration* screen appears.

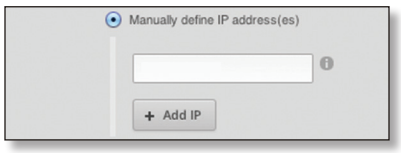


Make changes as needed.

- **VLAN ID** The VLAN ID is displayed.
- **Parent** The interface belonging to this VLAN is displayed.
- **Description** Enter keywords to describe this interface.
- **Enable** Check the box to enable the VLAN. All of the VLANs are saved in the system configuration file; however, only the enabled VLANs are active on the device.
- **Address** Select one of the following:
  - **No address settings** The interface uses no address settings. (In most cases, an address is needed.)
  - **Use DHCP** The interface acquires network settings from a DHCPv4 server. Click the **Renew** button to acquire fresh network settings.



  - **Use DHCP for IPv6** The interface acquires network settings from a DHCPv6 server.
  - **Manually define IP address(es)** Enter the static IP address (example: *192.0.2.1/24* for IPv4 or *2001:db8::1/32* for IPv6). Click **Add IP** to enter additional IP addresses.

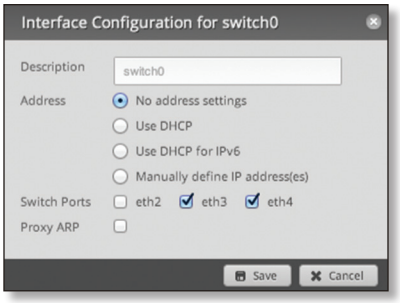


- **MTU** Enter the MTU (Maximum Transmission Unit) value, which is the maximum packet size (in bytes) that a network interface can transmit. The default is *1500*.
- **Proxy ARP** Enable the EdgeRouter to answer a source host's ARP (Address Resolution Protocol) requests for the IP address of a destination host that is not located on the source host's network. ARP allows hosts on the same network to discover each other's IP address via a layer 2 broadcast to all MAC addresses. If they are not on the same network, the layer 2 broadcast will not reach its destination; however, the EdgeRouter can serve as the go-between if *Proxy ARP* is enabled.

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

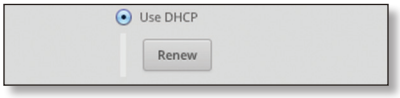
Configure the Switch

(Available for the EdgeRouter PoE only.) After you click *Config*, the *Interface Configuration* screen appears.

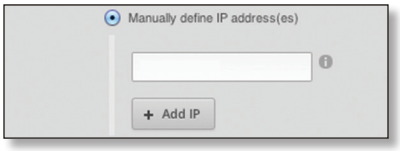


Make changes as needed.

- **Description** Enter keywords to describe this switch.
- **Address** Select one of the following:
  - **No address settings** The switch uses no address settings. (In most cases, an address is needed.)
  - **Use DHCP** The switch acquires network settings from a DHCPv4 server. Click the **Renew** button to acquire fresh network settings.



  - **Use DHCP for IPv6** The switch acquires network settings from a DHCPv6 server.
  - **Manually define IP address(es)** Enter the static IP address (example: *192.0.2.1/24* for IPv4 or *2001:db8::1/32* for IPv6). Click **Add IP** to enter additional IP addresses.



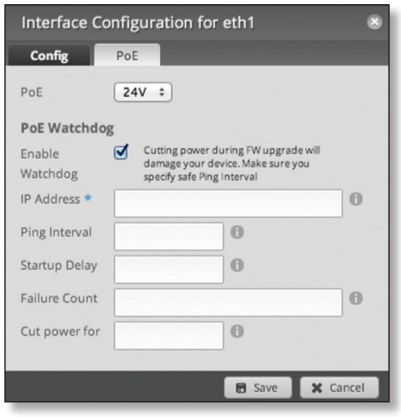
- **Switch Ports** Select the ports for the switch interface.
- **Proxy ARP** Enable the EdgeRouter to answer a source host's ARP (Address Resolution Protocol) requests for the IP address of a destination host that is not located on the source host's network. ARP allows hosts on the same network to discover each other's IP address via a layer 2 broadcast to all MAC addresses. If they are not on the same network, the layer 2 broadcast will not reach its destination; however, the EdgeRouter can serve as the go-between if *Proxy ARP* is enabled.

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

Configure the PoE Settings

Note: Before enabling PoE, check the specifications of your airMAX, airVision, mFi, UniFi, legacy, or third-party devices to ensure they support passive PoE and require the available amount of voltage.

(Available for the EdgeRouter PoE only.) After you click *PoE*, the *PoE* tab of the *Interface Configuration* screen appears.



PoE is disabled by default on all ports. Make changes as needed.

- **PoE** Select one of the following:
  - **Off** To disable *PoE*, select **Off**.

    Note: To disable *PoE*, you must use this setting. If you disable a port, its *PoE* functionality remains.

  - **24V** To output 24V PoE to the connected device, select **24V**.
  - **48V** To output 48V PoE to the connected device, select **48V**.

    Note: You must have a 48V power adapter (not included) powering the EdgeRouter PoE; otherwise, 48V PoE is not allowed.

PoE Watchdog

Ping Watchdog is only for PoE-enabled ports. It configures the device to continuously ping a user-defined IP address (it can be the Internet gateway, for example). If it is unable to ping under the user-defined constraints, then the device will automatically turn off PoE on the port, and then turn it back on. This option creates a kind of "fail-proof" mechanism.

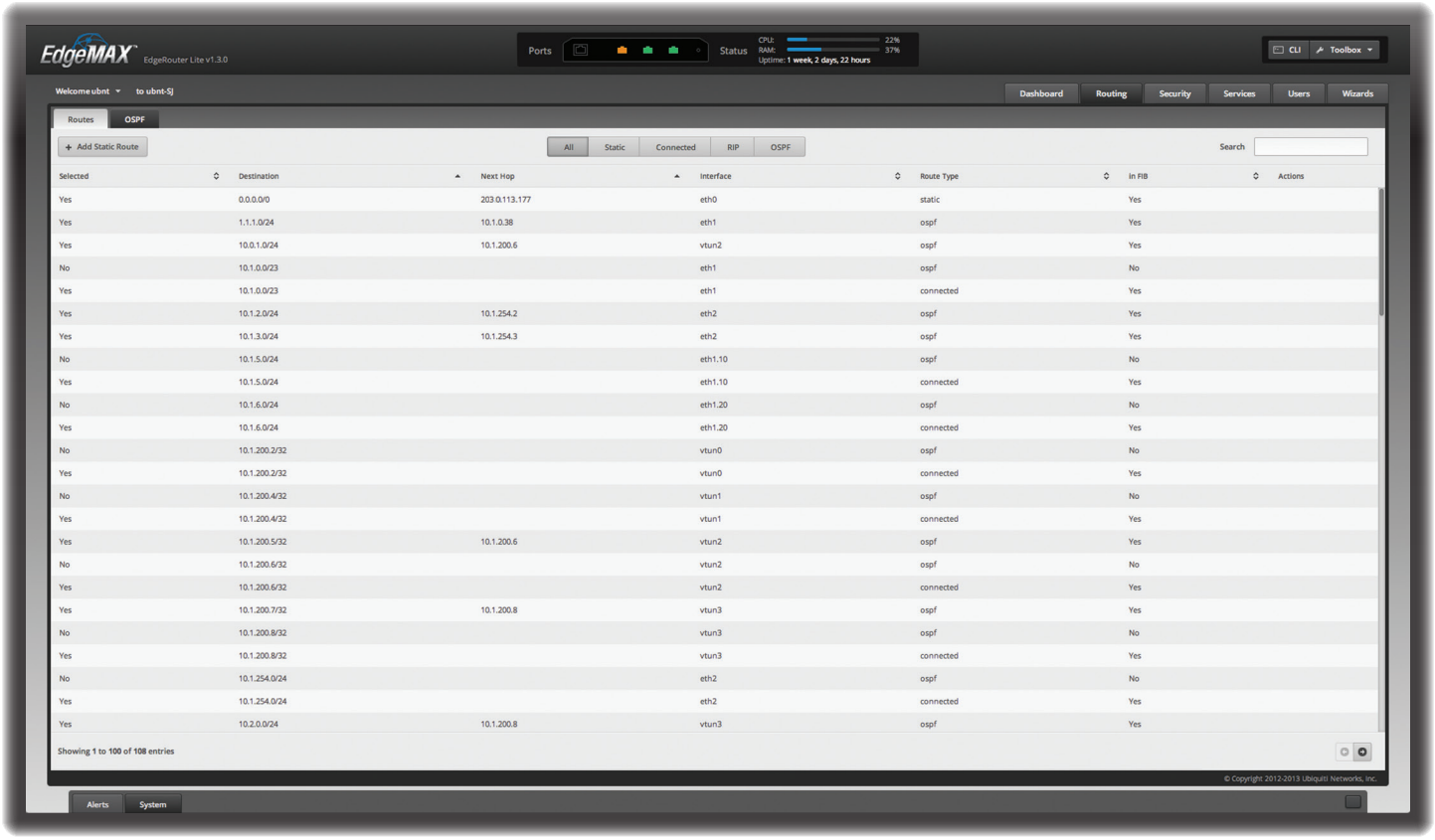
Ping Watchdog is dedicated to continuous monitoring of the specific connection to the remote host using the *Ping* tool. The *Ping* tool works by sending ICMP echo request packets to the target host and listening for ICMP echo response replies. If the specified number of replies is not received, the tool reboots the device.

- **Enable Watchdog** Enable the use of *Ping Watchdog*.
  - **IP Address To Ping** Specify the IP address of the target host to be monitored by *Ping Watchdog*.
  - **Ping Interval** Specify the time interval (in seconds) between the ICMP echo requests that are sent by *Ping Watchdog*. The default value is *300* seconds.
  - **Startup Delay** Specify the initial time delay (in seconds) until the first ICMP echo requests are sent by *Ping Watchdog*. The default value is *300* seconds.

    The *Startup Delay* value should be at least 60 seconds as the network interface and wireless connection initialization takes a considerable amount of time if the device is rebooted.
  - **Failure Count** Specify the number of ICMP echo response replies. If the specified number of ICMP echo response packets is not received continuously, *Ping Watchdog* will reboot the device. The default value is *3*.
  - **Cut power for** Specify the number of seconds this port should pause PoE (if applicable).

    WARNING: Cutting power during a firmware upgrade can damage your device. Ensure that you specify a safe *Ping Interval*.

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



Chapter 4: Routing Tab

The *Routing* tab displays status information about a variety of connected, static, RIP, and OSPF routes. You can also configure static routes and OSPF options. Any setting marked with a blue asterisk * is required.

You have two sub-tabs:

Routes View route information and create static routes.

OSPF Configure OSPF options.

IPv6 Routing

IPv6 (Internet Protocol version 6) is gaining popularity and is bound to grow as IP addressing demands increase. The EdgeOS Configuration Interface supports IPv6 for the following options:

- *System* > *Name Server* configuration (Refer to **"Name Server" on page 5**.)
- *Dashboard* > *VLAN* configuration (Refer to **"Add VLAN" on page 9**.)
- *Dashboard* > *Interface* configuration (Refer to **"Configure the Interface" on page 10**.)

For IPv6 addresses, the EdgeOS Configuration Interface supports "::" (double-colon) notation, which substitutes "::" for a contiguous sequence of 16-bit blocks set to zero. Here is an example: *2001:db8::1*

If written out, the IPv6 address becomes: *2001:db8:0000:0000:0000:0000:0000:0001*

The EdgeOS Configuration Interface displays IPv6 addresses only in two locations:

- *System* > *Name Server* section
- *Dashboard* tab

The EdgeOS Configuration Interface will increase its support of IPv6 in future releases. For other options, you can use the CLI, which has comprehensive IPv6 support.

Note: Use the CLI to view IPv6 options configured in the CLI but not supported by the EdgeOS Configuration Interface.

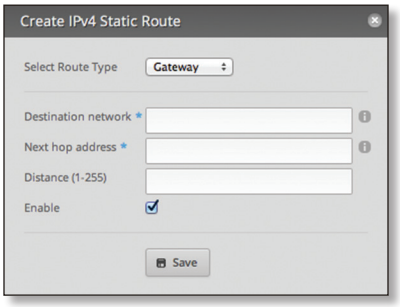
Routes

A route determines how traffic travels to its destination network. If more than one route is suitable, the EdgeRouter uses administrative distance as a metric to compare all available routes, including directly connected routes, manually configured static routes, dynamic routes, and the default route. The EdgeRouter uses the route with the lowest administrative distance.

All/Static/Connected/RIP/OSPF

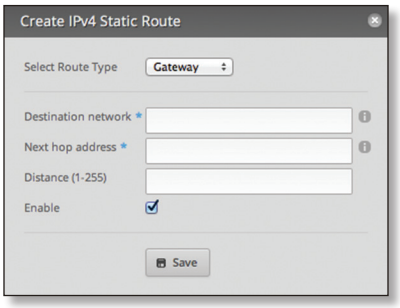
Add Static Route To create a new static route, click **Add Static Route**.

The *Create Static Route* screen appears.



Complete the following:

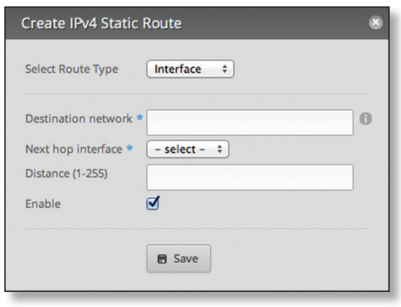
- **Select Route Type** You have three options: *Gateway*, *Interface*, or *Black Hole*.
  - **Gateway** Define a route using the IP address and subnet mask of the next hop gateway.



    - **Destination network** Enter the IP address and subnet mask using slash notation: *<network_IP_address>/<subnet_mask_number>* (example: *192.0.2.0/24*).

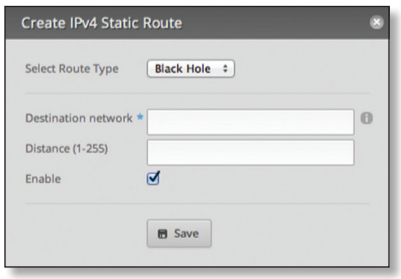
      The first default route is configured on the *System* tab; see **"System gateway address" on page 5** for more information. To create multiple default routes, set up static routes and enter **0.0.0.0/0**.
    - **Next hop address** Enter the IP address.
    - **Distance (1-255)** Enter the administrative distance. If there are identical routes from different sources (such as static, RIP, or OSPF), the EdgeRouter compares the routes and uses the route with the lowest distance.
    - **Enable** Check the box to enable the route.

    Click **Save** to apply your changes.
  - **Interface** Define a route using a next hop interface.



    - **Destination network** Enter the IP address and subnet mask using slash notation: *<network_IP_address>/<subnet_mask_number>* (example: *192.0.2.0/24*).
    - **Next hop interface** Select the appropriate interface from the drop-down list.
    - **Distance (1-255)** Enter the administrative distance. If there are identical routes from different sources (such as static, RIP, and OSPF), the EdgeRouter compares the routes and uses the route with the lowest distance.
    - **Enable** Check the box to enable the route.

    Click **Save** to apply your changes.
  - **Black Hole** Define a route that drops unwanted traffic.



    - **Destination network** Enter the IP address and subnet mask using slash notation: *<network_IP_address>/<subnet_mask_number>* (example: *192.0.2.0/24*).
    - **Distance (1-255)** Enter the administrative distance. If there are identical routes from different sources (such as static, RIP, and OSPF), the EdgeRouter compares the routes and uses the route with the lowest distance.
    - **Enable** Check the box to enable the route.

    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.

All/Static/Connected/RIP/OSPF Click the appropriate tab to filter the routes as needed.

- **All** All routes are displayed by default.
- **Static** All static routes that you have configured are displayed.
- **Connected** All routes that are directly connected to the EdgeRouter are displayed.
- **RIP** All RIP (Routing Information Protocol) routes are displayed. RIP is an interior, distance vector routing protocol that uses hop count as a metric to determine the best route.
- **OSPF** All OSPF (Open Shortest Path First) routes are displayed. OSPF is an interior, link-state routing protocol that uses cost as a metric to determine the best route. The bandwidth of an interface determines the cost – the higher the bandwidth, the lower the cost.

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

Selected The status of the route, whether it has been selected for the routing table, is displayed.

Destination The destination IP address is displayed.

Next Hop The IP address of the next-hop interface is displayed.

Interface The name of the interface is displayed.

Route Type The type of route is displayed.

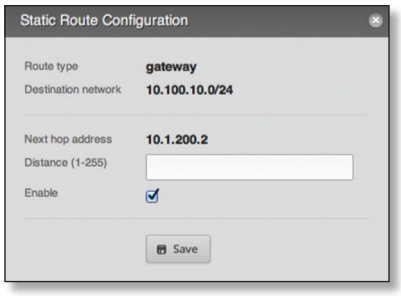
In FIB The forwarding status of the route, whether it is in the FIB (Forwarding Information Base), is displayed.

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

- **Config** To configure the route, click **Config**. Go to the *Configure the Static Route section* below.
- **Delete** Delete the route; its configuration will be removed.
- **Disable** Disable the route while keeping its configuration. (This option is not available for black hole routes.)

Configure the Static Route

After you click *Config*, the *Static Route Configuration* screen appears.



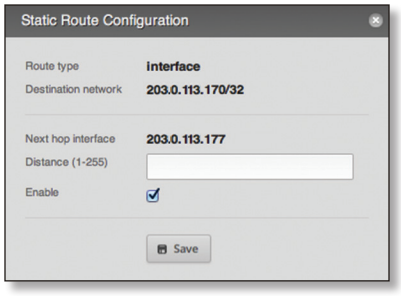
Follow the instructions for your route type:

Gateway

- **Route type** The *gateway* route uses the IP address and subnet mask of the next hop gateway.
- **Destination network** The IP address and subnet mask are displayed in slash notation.
- **Next hop address** The IP address of the next hop gateway is displayed.
- **Distance (1-255)** Enter the administrative distance. If there are identical routes from different sources (such as static, RIP, and OSPF), the EdgeRouter compares the routes and uses the route with the lowest distance.
- **Enable** Check the box to enable the route.

Click **Save** to apply your changes.

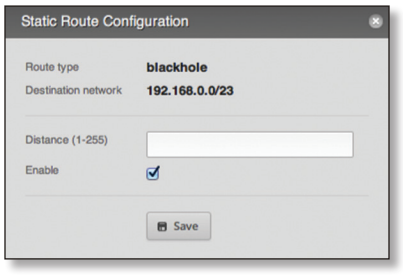
Interface



- **Route type** The *interface* route uses the next hop interface.
- **Destination network** The IP address and subnet mask are displayed in slash notation.
- **Next hop interface** The name of the next hop interface is displayed.
- **Distance (1-255)** Enter the administrative distance. If there are identical routes from different sources (such as static, RIP, and OSPF), the EdgeRouter compares the routes and uses the route with the lowest distance.
- **Enable** Check the box to enable the route.

Click **Save** to apply your changes.

Black Hole

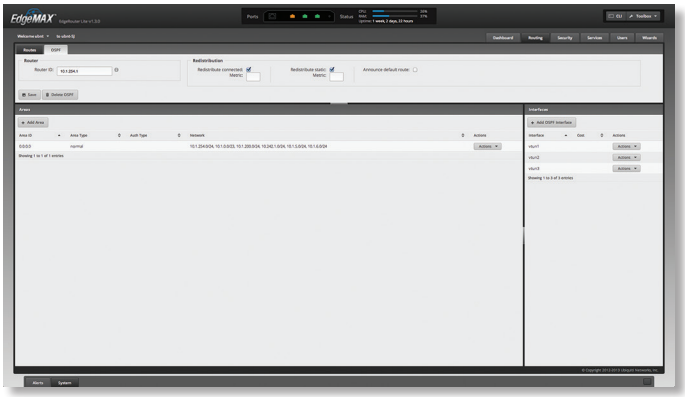


- **Route type** The *black hole* route drops unwanted traffic.
- **Destination network** The IP address and subnet mask are displayed in slash notation.
- **Distance (1-255)** Enter the administrative distance. If there are identical routes from different sources (such as static, RIP, and OSPF), the EdgeRouter compares the routes and uses the route with the lowest distance.
- **Enable** Check the box to enable the route.

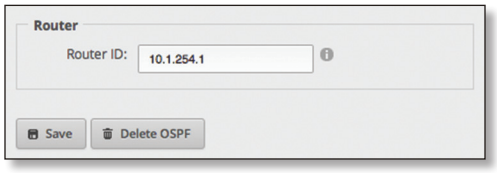
Click **Save** to apply your changes.

OSPF

Using Link State Advertisements, routers communicate with each other when there is a router or link status change. Each router maintains the information in a database, which is used to create and update a network map from the router's point of view. Each router then uses the map to build and update a routing table.



Router

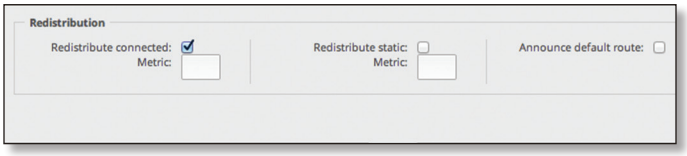


Router ID Enter the IP address that identifies a specific router in an OSPF network. In OSPF, the highest *Router ID* determines which router is the Designated Router (DR), which distributes updates to the other OSPF routers.

Click **Save** to apply your changes, or click *Delete OSPF* to remove the *Router*, *Redistribution*, and *Area* settings (*Interfaces* settings are retained).

Redistribution

A single router can use multiple routing protocols, such as OSPF and RIP, which use incompatible metrics. It must reconcile information from multiple protocols to determine which route to use for a specific destination network. You can change the metrics of the distributed protocol to create protocol compatibility.



Redistribute connected If enabled, the EdgeRouter connects an OSPF area to a network using a different routing protocol and redistributes the other protocol's directly connected routes into the OSPF area. These routes become external OSPF routes.

- **Metric** If there are multiple routes to the same destination, OSPF uses the metric to select a route for the routing table. Assign a cost value to the redistributed connected routes. The EdgeRouter can then use this metric to compare these routes to other OSPF routes.

Redistribute static If enabled, the EdgeRouter connects an OSPF area to a network using a different routing protocol and redistributes the other protocol's static routes into the OSPF area. These routes become external OSPF routes.

- **Metric** If there are multiple routes to the same destination, OSPF uses the metric to select a route for the routing table. Assign a cost value to the redistributed static routes. The EdgeRouter can then use this metric to compare these routes to other OSPF routes.

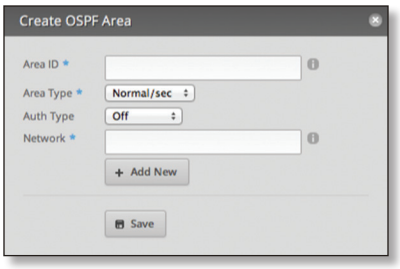
Announce default route If enabled, the EdgeRouter communicates the default route to the other routers of the OSPF network, eliminating the need to configure the default route on the other routers. The default route connects the OSPF network to an outside network.

Areas

To enhance scalability, an OSPF network is comprised of smaller sections called areas. At the minimum, there is the backbone area, called Area 0.

Add Area To create a new area, click **Add Area**.

The *Create OSPF Area* screen appears.



Complete the following:

- **Area ID** This is the number that identifies an area. It can be an integer or use a format similar to an IPv4 address.
- **Area Type** This defines the routes that are acceptable inside the area. Select the appropriate option:
  - **Normal/sec** The default type accepts all routes.
  - **NSSA** A NSSA (Not So Stubby Area) network is a variation of a stub network. It can import external routes from type 7 Link State Advertisements, which are NSSA-specific.
  - **Stub** The network has no external routes. Typically, it has a default route for outbound traffic.
- **Auth Type** Authentication helps secure communication between routers. Select the appropriate option:
  - **Off** No authentication is used.
  - **MD5/sec** Each router uses a key (password) and key ID. This is the most secure option because the key is never transmitted.
  - **Plain text** Each router uses a key. This provides minimal security because the key is transmitted in plain text format.
- **Network** Enter the IP address and subnet mask using slash notation:
  <network_IP_address>/<subnet_mask_number>
  (example: *192.0.2.0/24*).

  Click **Add New** to enter more network addresses.

  Click **Save** to apply your changes.

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

Area ID The identification number of the area is displayed.

Area Type The type of area is displayed.

Auth Type The authentication type of the area is displayed.

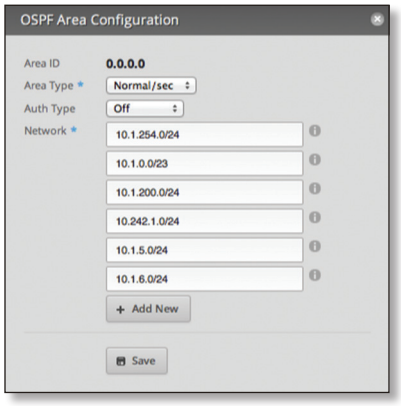
Network The network address of the area is displayed.

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

- **Config** To configure the OSPF Area, click **Config**. Go to the *Configure the OSPF Area* section.
- **Delete** Delete the OSPF Area.

Configure the OSPF Area

After you click *Config*, the *OSPF Area Configuration* screen appears.



Make changes as needed.

- **Area ID** This is the number that identifies an area. It can be an integer or use a format similar to an IPv4 address.
- **Area Type** This defines the routes that are acceptable inside the area. Select the appropriate option:
  - **Normal/sec** The default type accepts all routes.
  - **NSSA** A NSSA (Not So Stubby Area) network is a variation of a stub network. It can import external routes from type 7 Link State Advertisements, which are NSSA-specific.
  - **Stub** The network has no external routes. Typically, it has a default route for outbound traffic.
- **Auth Type** Authentication helps secure communication between routers. Select the appropriate option:
  - **Off** No authentication is used.
  - **MD5/sec** Each router uses a key (password) and key ID. This is the most secure option because the key is never transmitted.
  - **Plain text** Each router uses a key. This provides minimal security because the key is transmitted in plain text format.

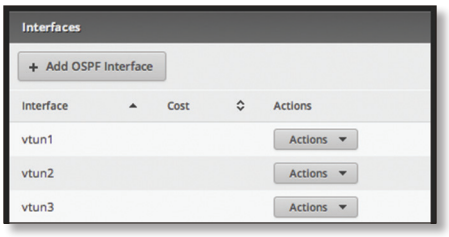
- **Network** Enter the IP address and subnet mask using slash notation: *<network_IP_address>/<subnet_mask_number>* (example: *192.0.2.0/24*).

  Click **Add New** to enter more network addresses.

  Click **Save** to apply your changes.

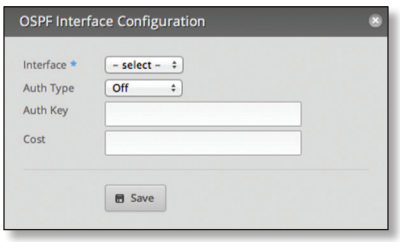
Interfaces

You can configure interfaces with specific OSPF options.



Add OSPF Interface To create a new interface, click **Add OSPF Interface**.

The *OSPF Interface Configuration* screen appears.



Complete the following:

- **Interface** Select the appropriate interface from the drop-down list.
- **Auth Type** OSPF authentication helps secure communication between routers. Select the appropriate option:
  - **Off** No authentication is used.
  - **MD5/sec** Each router uses a key (password) and key ID. This is the most secure option because the key is never transmitted.
  - **Plain text** Each router uses a key. This provides minimal security because the key is transmitted in plain text format.
- **Auth Key** Enter the key used for authentication.
- **Cost** By default, the cost of an interface is based on its bandwidth; however, you can manually assign a cost to the interface.

  Click **Save** to apply your changes.

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

Interface The name of the interface is displayed.

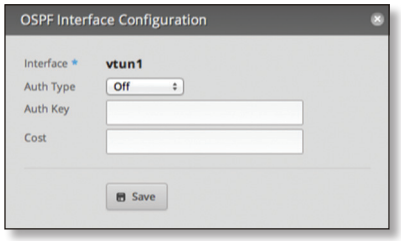
Cost The cost of the interface is displayed. OSPF uses cost as a metric to determine the best route.

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

- **Config** To configure the OSPF Interface, click **Config**. Go to the *Configure the OSPF Interface* section.
- **Delete** Delete the OSPF Interface.

Configure the OSPF Interface

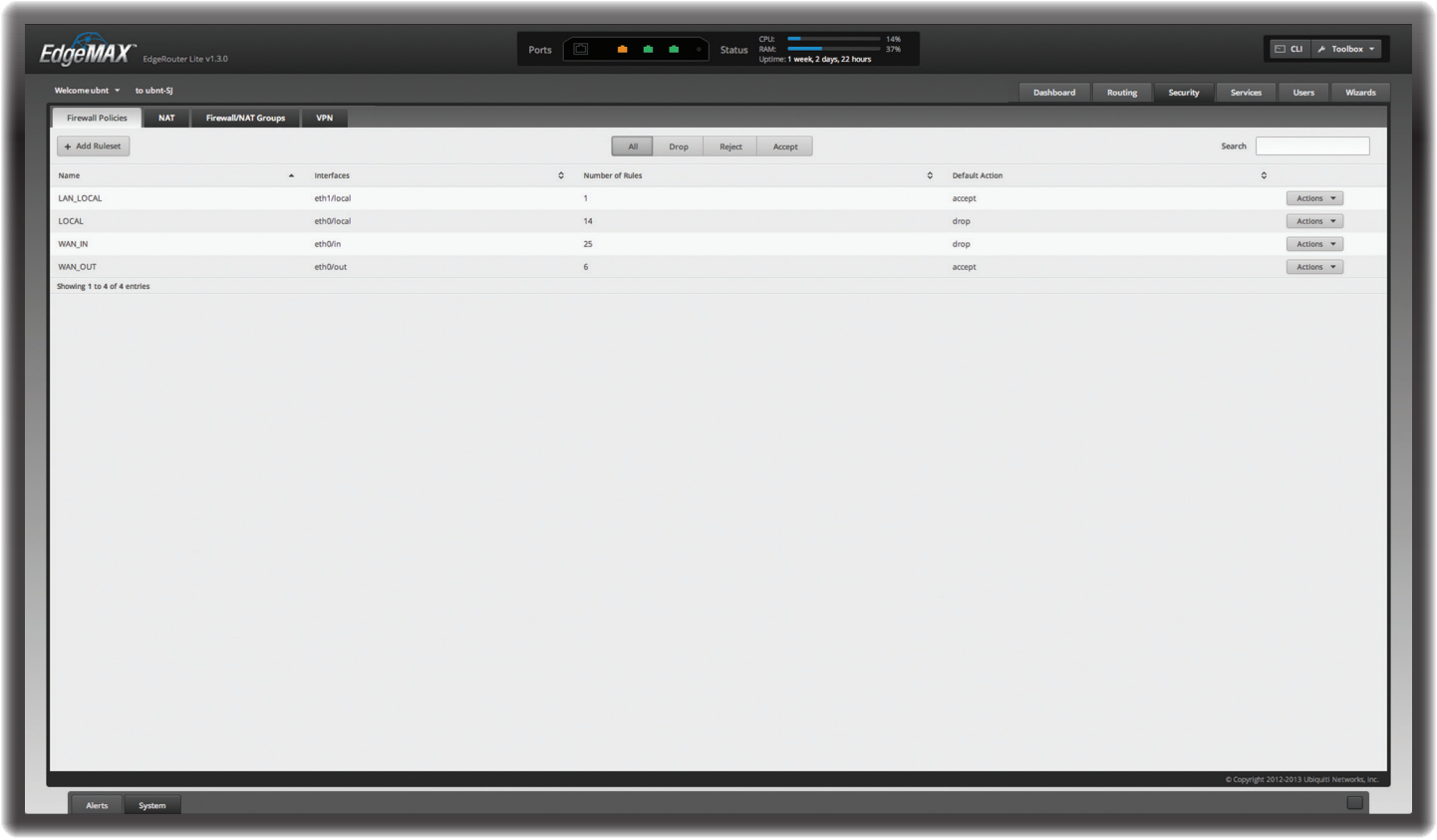
After you click *Config*, the *OSPF Interface Configuration* screen appears.



Make changes as needed.

- **Interface** The name of the interface is displayed.
- **Auth Type** Authentication helps secure communication between routers. Select the appropriate option:
  - **Off** No authentication is used.
  - **MD5/sec** Each router uses a key (password) and key ID. This is the most secure option because the key is never transmitted.
  - **Plain text** Each router uses a key. This provides minimal security because the key is transmitted in plain text format.
- **Auth Key** Enter the key used for authentication.
- **Cost** By default, the cost of an interface is based on its bandwidth; however, you can manually assign a cost to the interface.

  Click **Save** to apply your changes.



Chapter 5: Security Tab

The *Security* tab displays status information about firewall policies, firewall groups, (Network Address Translation) rules, and PPTP VPN options. You can also configure these policies, groups, rules, and options. Any setting marked with a blue asterisk * is required.

You have four sub-tabs:

Firewall Policies Each firewall policy is a set of rules applied in the order you specify.

NAT View and create NAT rules.

Firewall/NAT Groups Create groups defined by IP address, network address, or port number.

VPN Configure the EdgeRouter as a PPTP VPN server.

Firewall Policies

A firewall policy is a set of rules with a default action. Firewall policies are applied before SNAT (Source Network Address Translation) and after DNAT (Destination Network Address Translation).

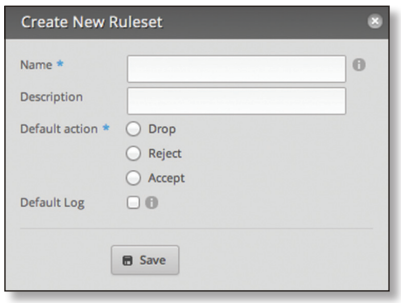
To create a firewall policy:

1. Click the **Firewall/NAT Groups** tab, and create the applicable firewall groups. See **"Firewall/NAT Groups" on page 28** for more information.
2. Click the **Firewall Policies** tab, and then click **Add Policy**. Configure the basic parameters. See the *Add Policy* description in the next column for more information.
3. Configure the details of the firewall policy. See **"Configure the Firewall Policy" on page 21** for more information.

All/Drop/Reject/Accept

Add Policy To create a new policy, click **Add Policy**.

The *Create New Ruleset* screen appears.



Complete the following:

- **Name** Enter a name for this policy.
- **Description** Enter keywords to describe this policy.
- **Default action** All policies have a default action if the packets do not match any rule. Select the appropriate default action:
  - **Drop** Packets are blocked with no message.
  - **Reject** Packets are blocked, and an ICMP (Internet Control Message Protocol) message is sent saying the destination is unreachable.
  - **Accept** Packets are allowed through the firewall.

- **Default Log** Check this box to log packets that trigger the default action.

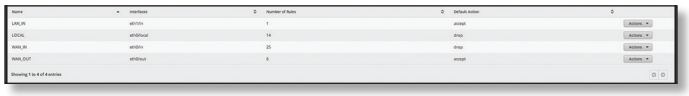
  Click **Save** to apply your changes.

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.

All/Drop/Reject/Accept Click the appropriate tab to filter the policies by default action.

- **All** All policies are displayed by default.
- **Drop** All of the drop policies are displayed.
- **Reject** All of the reject policies are displayed.
- **Accept** All of the accept policies are displayed.

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



Name The name of the policy is displayed.

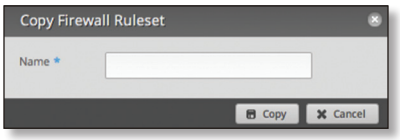
Interfaces The specified interface and direction of traffic flow are displayed.

Number of Rules The number of rules in the policy is displayed.

Default Action The action that the policy will execute if the packets do not match any rule is displayed.

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

- **Edit Rules** To configure the rules, click **Edit Rules**. Go to the *Rules* section in the next column.
- **Configuration** To configure the policy, click **Configuration**. Go to **"Configuration" on page 24**.
- **Interfaces** To select interfaces and direction of traffic flow for your policy, click **Interfaces**. Go to **"Interfaces" on page 24**.
- **Stats** To view statistics on firewall usage, click **Stats**. Go to **"Stats" on page 24**.
- **Copy Policy** To create a duplicate, click **Copy Policy**. The *Copy Firewall Ruleset* screen appears.



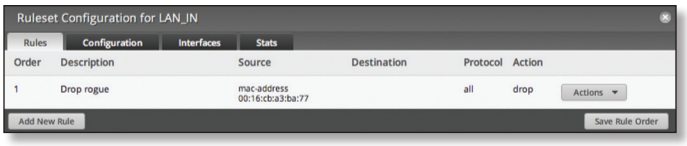
  - **Name** Enter a new name for this policy.

  Click **Copy** to confirm, or click *Cancel*.

- **Delete Policy** Remove the policy.

Configure the Firewall Policy

The *Ruleset Configuration for _* screen appears.



You have four tabs available:

- Rules (see below)
- **"Configuration" on page 24**
- **"Interfaces" on page 24**
- **"Stats" on page 24**

Add New Rule To create a new rule, click **Add New Rule**. Go to **"Add or Configure a Rule" on page 22**.

Save Rule Order To change the rule order, click and drag a rule up or down the sequence, and then release the rule. When you are finished, click **Save Rule Order**.

Rules

A rule tells the EdgeRouter what action to take with a specific packet. Define the following:

- Criteria for matching packets
- Action to take with matching packets

Rules are organized into a set and applied in the specified *Rule Order*. If the packets match a rule's criteria, then its action is triggered. If not, then the next rule is applied.

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

Order The rules are applied in the order specified. The number of the rule in this order is displayed.

Description The keywords you entered to describe this rule are displayed.

Source The source specified by this rule is displayed.

Destination The destination specified by this rule is displayed.

Protocol The protocol that matches the rule is displayed.

Action The action specified by this rule is displayed.

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

- **Basic** To configure the basic options of a rule, click **Basic**. Go to **"Basic" on page 22**.
- **Advanced** To configure the advanced options of a rule, click **Advanced**. Go to **"Advanced" on page 22**.
- **Source** To configure the source options of a rule, click **Source**. Go to **"Source" on page 23**.
- **Destination** To configure the destination options of a rule, click **Destination**. Go to **"Destination" on page 23**.
- **Time** To configure the time options of a rule, click **Time**. Go to **"Time" on page 23**.

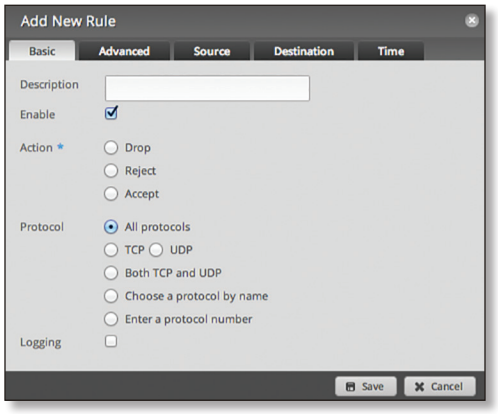
- **Copy Rule** To create a duplicate, click **Copy Rule**. The duplicate rule appears at the bottom of the list.
- **Delete Rule** Remove the rule.

Add or Configure a Rule

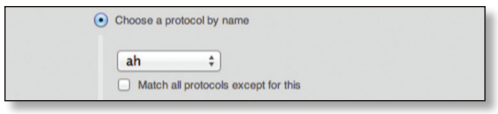
The *Rule Configuration for _* screen appears. You have five tabs available:

- Basic (see below)
- Advanced (see the next column)
- **"Source" on page 23**
- **"Destination" on page 23**
- **"Time" on page 23**

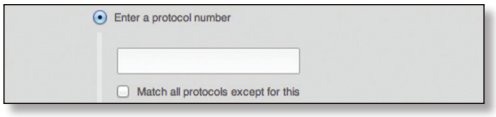
Basic



- **Description** Enter keywords to describe this rule.
- **Enable** Check the box to enable this rule.
- **Action** Select the action for packets that match this rule's criteria.
  - **Drop** Packets are blocked with no message.
  - **Reject** Packets are blocked, and an ICMP (Internet Control Message Protocol) message is sent saying the destination is unreachable.
  - **Accept** Packets are allowed.
- **Protocol**
  - **All protocols** Match packets of all protocols.
  - **TCP** Match TCP packets.
  - **UDP** Match UDP packets.
  - **Both TCP and UDP** Match TCP and UDP packets.
  - **Choose a protocol by name** Select the protocol from the drop-down list. Match packets of this protocol.
    - **Match all protocols except for this** Match packets of all protocols except for the selected protocol.



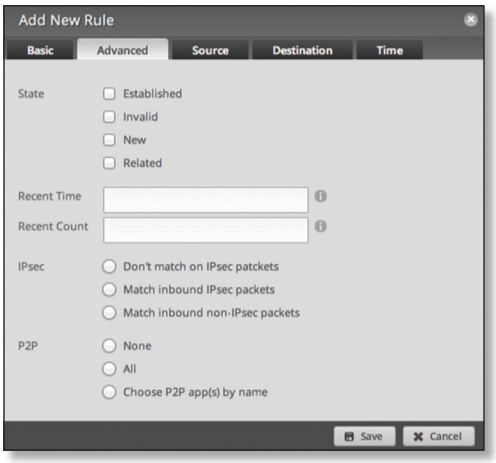
  - **Enter a protocol number** Enter the port number of the protocol. Match packets of this protocol.
    - **Match all protocols except for this** Match packets of all protocols except for the selected protocol.



- **Logging** Check this box to log instances when the rule is matched.

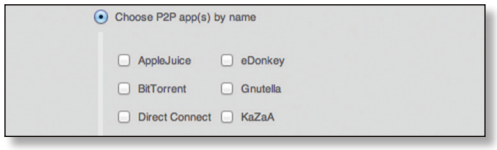
Click **Save** to apply your changes, or click *Cancel*.

Advanced



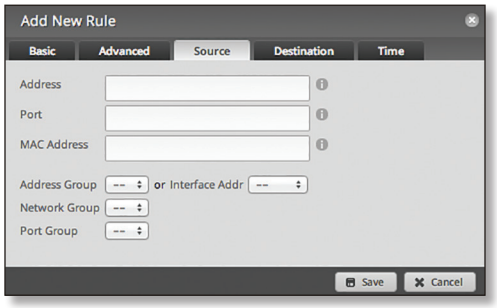
- **State** This describes the connection state of a packet.
  - **Established** Match packets that are part of a two-way connection.
  - **Invalid** Match packets that cannot be identified.
  - **New** Match packets creating a new connection.
  - **Related** Match packets related to established connections.
- **Recent Time** Enter the number of seconds to monitor for attempts to connect from the same source.
- **Recent Count** Enter the number of times the same source is detected within the *Recent Time* duration. This helps thwart attacks using continual attempts to connect.
- **IPsec** IPsec (Internet Protocol security) helps secure packet routing.
  - **Don't match on IPsec packets** Do not match any IPsec packets.
  - **Match inbound IPsec packets** Match IPsec packets that are entering the EdgeRouter.
  - **Match inbound non-IPsec packets** Match non-IPsec packets that are entering the EdgeRouter.

- **P2P** Match P2P (Peer-to-Peer) applications.
  - **None** Do not match P2P connections.
  - **All** Match all P2P connections.
  - **Choose P2P app(s) by name** Match packets of the selected P2P application(s). Check the box of any P2P application on this list to select it.



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

Source



- **Address** Enter the IP address of the source.
- **Port** Enter the port number or range of the source.
- **MAC Address** Enter the MAC address of the source.

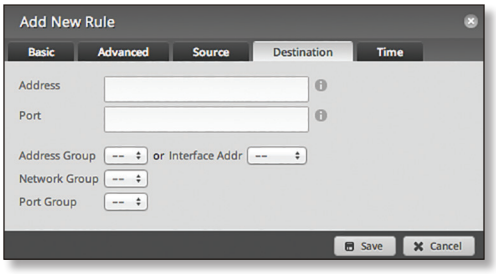
  Firewall groups are created on the *Firewall/NAT Groups* tab; see **"Firewall/NAT Groups" on page 28** for more information. Select the appropriate group(s); you can specify up to two groups maximum in these combinations:

  - An address group and port group
  - A network group and port group

  The packets must match both groups to apply the rule.
- **Address Group or Interface Addr.** Select the appropriate address group or interface address. If you select *Other* as the interface address, then enter the interface name in the field provided. The firewall rule will match the IP address of the selected interface.
- **Network Group** Select the appropriate network group.
- **Port Group** Select the appropriate port group.

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

Destination



- **Address** Enter the IP address of the destination.
- **Port** Enter the port number of the destination.

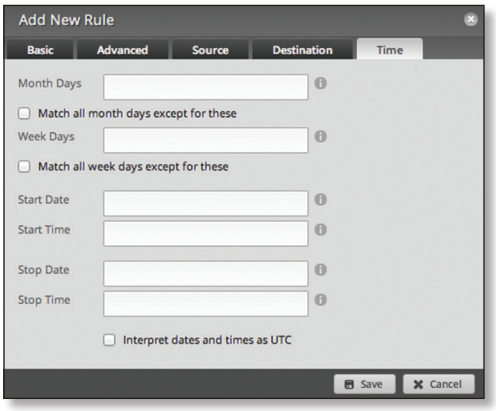
  Firewall groups are created on the *Firewall/NAT Groups* tab; see **"Firewall/NAT Groups" on page 28** for more information. Select the appropriate group(s); you can specify up to two groups maximum in these combinations:

  - An address group and port group
  - A network group and port group

  The packets must match both groups to apply the rule.
- **Address Group or Interface Addr.** Select the appropriate address group or interface address. If you select *Other* as the interface address, then enter the interface name in the field provided. The firewall rule will match the IP address of the selected interface.
- **Network Group** Select the appropriate network group.
- **Port Group** Select the appropriate port group.

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

Time

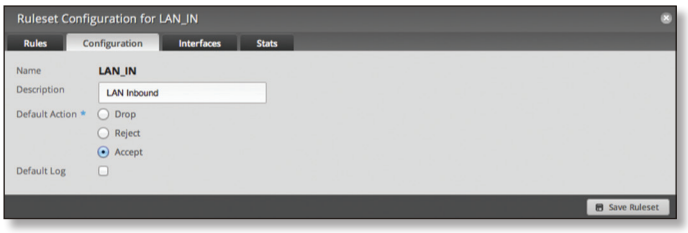


- **Month Days** Enter the days of the month when the rule should be applied. Enter numbers in the range 1 to 31. If you enter more than one day, use commas to separate the numbers (example: *3, 4, 5*).
  - **Match all month days except for these** Match all days of the month except for the selected days.

- **Week Days** Enter the days of the week when the rule should be applied. Enter *Sun*, *Mon*, *Tue*, *Wed*, *Thu*, *Fri*, or *Sat*. If you enter more than one day, use commas to separate the days (example: *Mon, Tue, Wed*).
  - **Match all week days except for these** Match all days of the week except for the selected days.
- **Start Date** Enter the date the rule should start being applied. Use the YYYY-MM-DD (year-month-day) format.
- **Start Time** Enter the time the rule should start being applied. Use the 24-hour format, HH:MM:SS (hours:minutes:seconds).
- **Stop Date** Enter the date the rule should stop being applied. Use the YYYY-MM-DD (year-month-day) format.
- **Stop Time** Enter the time the rule should stop being applied. Use the 24-hour format, HH:MM:SS (hours:minutes:seconds).
- **Interpret dates and times as UTC** Check the box if your network uses UTC.

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

Configuration



Name The name of this policy is displayed.

Description Enter keywords to describe this policy.

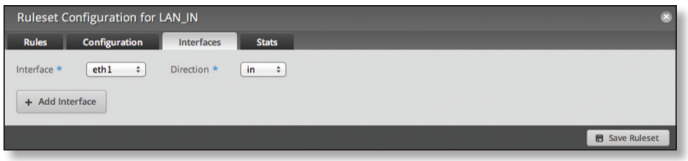
Default action All policies have a default action if the packets do not match any rule. Select the appropriate default action:

- **Drop** Packets are blocked with no message.
- **Reject** Packets are blocked, and an ICMP (Internet Control Message Protocol) message is sent saying the destination is unreachable.
- **Accept** Packets are allowed.

Default Log Check this box to log packets that trigger the default action.

Click **Save Ruleset** to apply your changes.

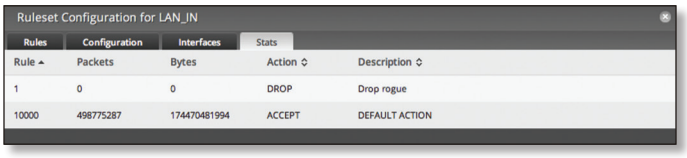
Interfaces



- **Interface** Select the appropriate interface from the drop-down list.
- **Direction** Select the direction of the traffic flow.
  - **in** Match inbound packets.
  - **out** Match outbound packets.
  - **local** Match local packets.
- **Add Interface** Click **Add Interface** to enter more interfaces.

Click **Save Ruleset** to apply your changes.

Stats



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

Rule The rules are applied in the order specified. The number of the rule in this order is displayed.

Packets The number of packets that triggered this rule is displayed.

Bytes The number of bytes that triggered this rule is displayed.

Action The action specified by this rule is displayed.

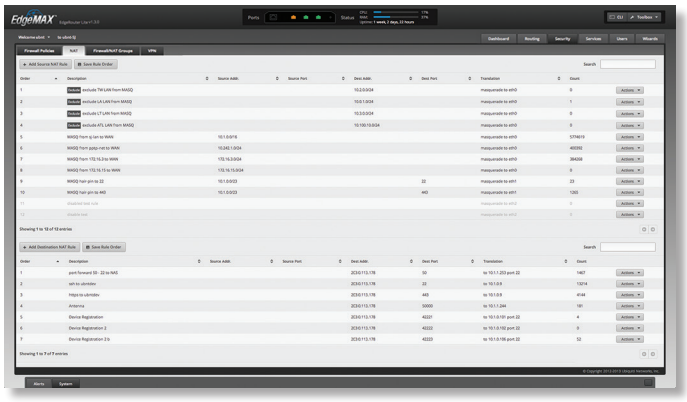
Description The keywords you entered to describe this rule are displayed.

NAT

NAT changes the addressing of packets. A NAT rule tells the EdgeRouter what action to take with a specific packet. Define the following:

- Criteria for matching packets
- Action to take with matching packets

Rules are organized into a set and applied in the specified *Rule Order*. If the packets match a rule's criteria, then its action is performed. If not, then the next rule is applied.



Source NAT Rules

Source NAT Rules change the source address of packets; a typical scenario is that a private source needs to communicate with a public destination. A Source NAT Rule goes from the private network to the public network and is applied after routing, just before packets leave the EdgeRouter.

Add Source NAT Rule To create a new rule, click **Add Source NAT Rule**. Go to **"Add or Configure a Source NAT Rule" on page 25**.

Save Rule Order To change the rule order, click and drag a rule up or down the sequence, and then release the rule. When you are finished, click **Save Rule Order**.

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 rule. Click a column heading to sort by that heading.

Order The rules are applied in the order specified. The number of the rule in this order is displayed.

Description The keywords you entered to describe this rule are displayed.

Source Addr. The source IP address is displayed.

Source Port The source port number is displayed.

Dest. Addr. The destination IP address is displayed.

Dest. Port The destination port number is displayed.

Translation A description of the translation (such as *masquerade to eth_*) is displayed.

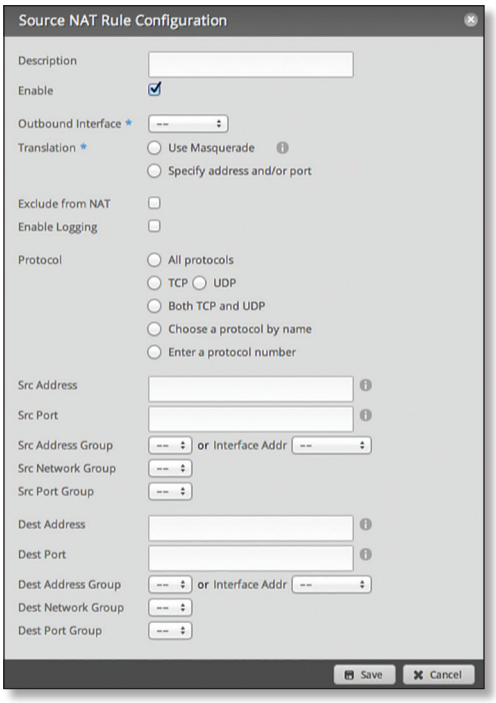
Count The number of translations is displayed.

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

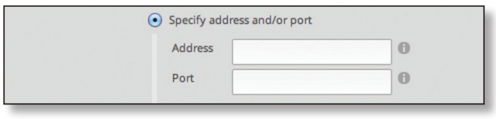
- **Config** To configure the rule, click **Config**. Go to the *Add or Configure a Source NAT Rule* section below.
- **Copy** To create a duplicate, click **Copy**. The duplicate rule appears at the bottom of the list.
- **Delete** Remove the rule.

Add or Configure a Source NAT Rule

After you click *Config*, the *Source NAT Rule Configuration* screen appears.

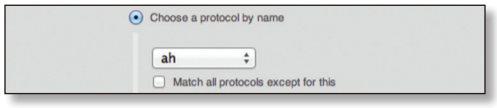


- **Description** Enter keywords to describe this rule.
- **Enable** Check the box to enable this rule.
- **Outbound Interface** Select the interface through which the outgoing packets exit the EdgeRouter. This is required only for Source NAT Rules that use Masquerade.
- **Translation** Select one of the following:
  - **Use Masquerade** Masquerade is a type of Source NAT. If enabled, the source IP address of the packets becomes the public IP address of the outbound interface.
  - **Specify address and/or port** If enabled, the source IP address of the packets becomes the specified IP address and port.
    - **Address** Enter the IP address that will replace the source IP address of the outgoing packet. You can also enter a range of IP addresses; one of them will be used.
    - **Port** Enter the port number that will replace the source port number of the outgoing packet. You can also enter a range of port numbers; one of them will be used.

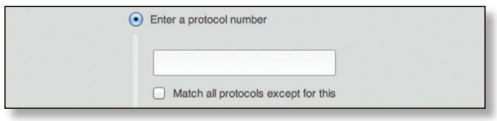


- **Exclude from NAT** Check the box to exclude packets that match this rule from NAT.

- **Enable Logging** Check this box to log instances when the rule is matched.
- **Protocol** Select one of the following:
  - **All protocols** Match packets of all protocols.
  - **TCP** Match TCP packets.
  - **UDP** Match UDP packets.
  - **Both TCP and UDP** Match TCP and UDP packets.
  - **Choose a protocol by name** Select the protocol from the drop-down list. Match packets of this protocol.
    - **Match all protocols except for this** Match packets of all protocols except for the selected protocol.



  - **Enter a protocol number** Enter the port number of the protocol. Match packets of this protocol.
    - **Match all protocols except for this** Match packets of all protocols except for the selected protocol.



- **Src 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*).
- **Src 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.

  NAT groups are created on the *Firewall/NAT Groups* tab; see **"Firewall/NAT Groups" on page 28** for more information. Select the appropriate group(s); you can specify up to two groups maximum in these combinations:
  - An address group and port group
  - A network group and port group

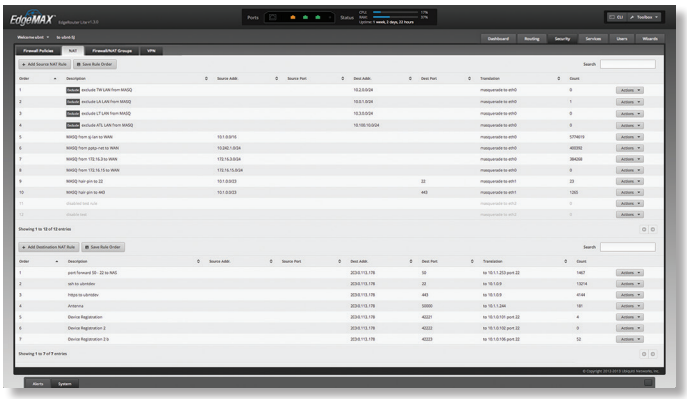
  The packets must match both groups to apply the rule.
- **Src Address Group or Interface Addr.** Select the appropriate address group or interface address. If you select *Other* as the interface address, then enter the interface name in the field provided. The NAT rule will match the IP address of the selected interface.
- **Src Network Group** Select the appropriate network group.
- **Src Port Group** Select the appropriate port group.
- **Dest. 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*).
- **Dest. 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.
- **Dest Address Group or Interface Addr.** Select the appropriate address group or interface address. If you select *Other* as the interface address, then enter the interface name in the field provided. The NAT rule will match the IP address of the selected interface.
- **Dest Network Group** Select the appropriate network group.
- **Dest Port Group** Select the appropriate port group.

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

Destination NAT Rules

Destination NAT Rules change the destination address of packets; a typical scenario is that a public source needs to communicate with a private destination. A Destination NAT Rule goes from the public network to the private network and is applied before routing.

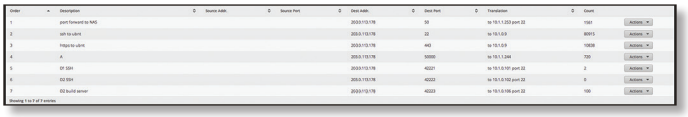


Add Destination NAT Rule To create a new rule, click **Add Destination NAT Rule**. Go to the *Add or Configure a Destination NAT Rule* section.

Save Rule Order To change the rule order, click and drag a rule up or down the sequence, and then release the rule. When you are finished, click **Save Rule Order**.

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 rule. Click a column heading to sort by that heading.



Order The rules are applied in the order specified. The number of the rule in this order is displayed.

Description The keywords you entered to describe this rule are displayed.

Source Addr. The source IP address is displayed.

Source Port The source port number is displayed.

Dest. Addr. The destination IP address is displayed.

Dest. Port The destination port number is displayed.

Translation A description of the translation (such as *to <IP_address>*) is displayed.

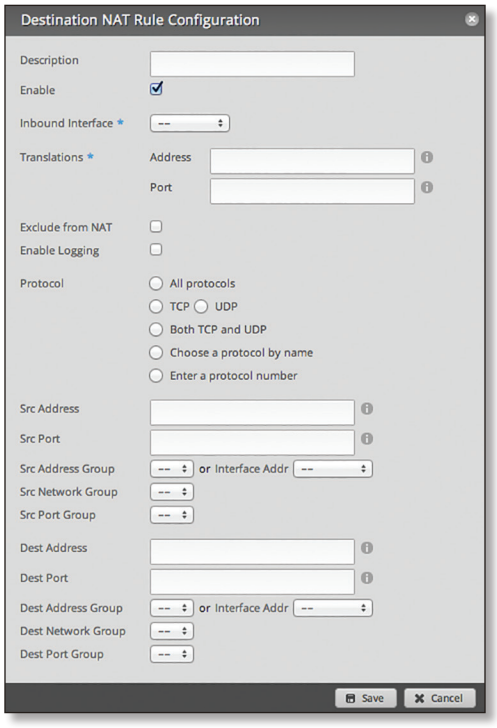
Count The number of translations is displayed.

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

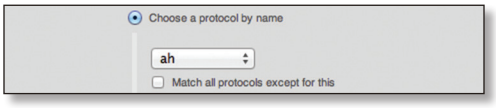
- **Config** To configure the rule, click **Config**. Go to the *Add or Configure a Destination NAT Rule* section below.
- **Copy** To create a duplicate, click **Copy**. The duplicate rule appears at the bottom of the list.
- **Delete** Remove the rule.

Add or Configure a Destination NAT Rule

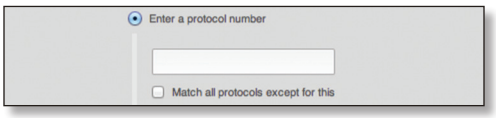
After you click *Config*, the *Destination NAT Rule Configuration* screen appears.



- **Description** Enter keywords to describe this rule.
- **Enable** Check the box to enable this rule.
- **Inbound Interface** Select the interface through which the incoming packets enter the EdgeRouter.
- **Translations** Complete the following:
  - **Address** Enter the IP address that will replace the destination IP address of the incoming packet.
  - **Port** Enter the port number that will replace the destination port number of the incoming packet.
- **Exclude from NAT** Check the box to exclude packets that match this rule from NAT.
- **Enable Logging** Check this box to log instances when the rule is matched.
- **Protocol**
  - **All protocols** Match packets of all protocols.
  - **TCP** Match TCP packets.
  - **UDP** Match UDP packets.
  - **Both TCP and UDP** Match TCP and UDP packets.
  - **Choose a protocol by name** Select the protocol from the drop-down list. Match packets of this protocol.
    - **Match all protocols except for this** Match packets of all protocols except for the selected protocol.



  - **Enter a protocol number** Enter the port number of the protocol. Match packets of this protocol.
    - **Match all protocols except for this** Match packets of all protocols except for the selected protocol.



- **Src 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*).

- **Src 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.

  NAT groups are created on the *Firewall/NAT Groups* tab; see **"Firewall/NAT Groups" on page 28** for more information. Select the appropriate group(s); you can specify up to two groups maximum in these combinations:

  - An address group and port group
  - A network group and port group

  The packets must match both groups to apply the rule.

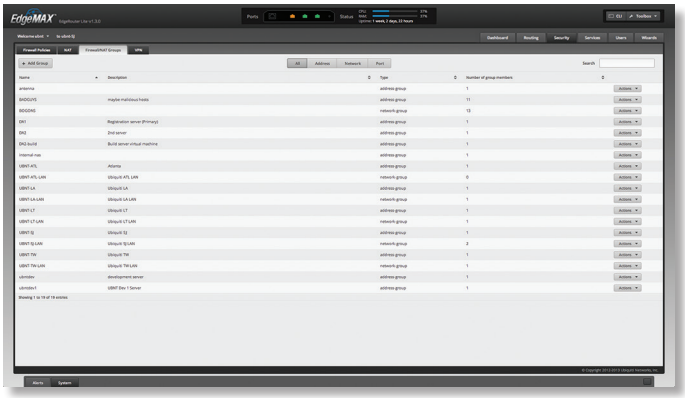
- **Src Address Group or Interface Addr.** Select the appropriate address group or interface address. If you select *Other* as the interface address, then enter the interface name in the field provided. The NAT rule will match the IP address of the selected interface.
- **Src Network Group** Select the appropriate network group.
- **Src Port Group** Select the appropriate port group.
- **Dest. 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*).
- **Dest. 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.
- **Dest Address Group or Interface Addr.** Select the appropriate address group or interface address. If you select *Other* as the interface address, then enter the interface name in the field provided. The NAT rule will match the IP address of the selected interface.
- **Dest Network Group** Select the appropriate network group.
- **Dest Port Group** Select the appropriate port group.

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

Firewall/NAT Groups

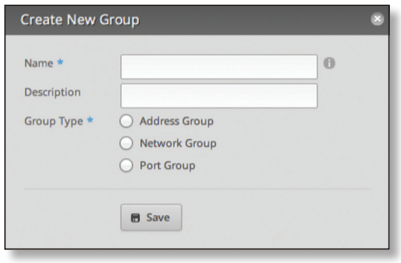
Create groups organized by IP address, network address, or port number.



All/Address/Network/Port

Add Group To create a new group, click **Add Group**.

The *Create New Group* screen appears.



Complete the following:

- **Name** Enter a name for this group.
- **Description** Enter keywords to describe this group.
- **Group Type** Select the appropriate option:
  - **Address Group** Define a group by IP address.
  - **Network Group** Define a group by network address.
  - **Port Group** Define a group by port numbers.

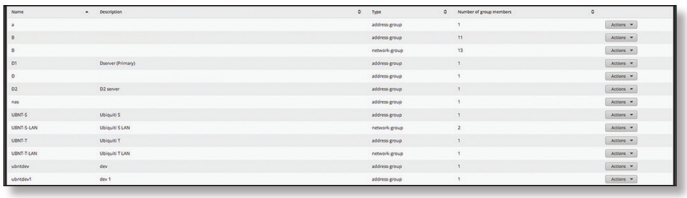
  Click **Save** to apply your changes.

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.

All/Address/Network/Port Click the appropriate tab to filter the groups as needed.

- **All** All groups are displayed by default.
- **Address** All of the address groups are displayed.
- **Network** All of the network groups are displayed.
- **Port** All of the port groups are displayed.

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



Name The name of the group is displayed.

Description The keywords you entered to describe the group are displayed.

Type The type of group is displayed.

Number of group members The number of members is displayed.

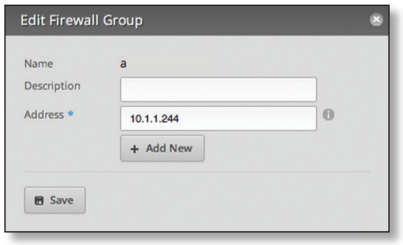
Actions Click the **Actions** button to access the following options:

- **Config** To configure the group, click **Config**. Go to the *Configure the Firewall/NAT Group* section below.
- **Delete** Remove the group.

Configure the Firewall/NAT Group

After you click *Config*, the *Edit Firewall Group* screen appears. Follow the instructions for your group type:

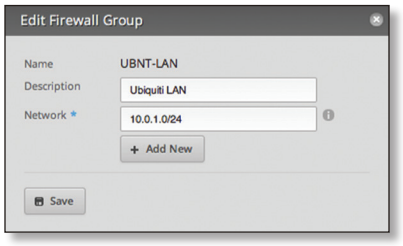
- **Address Group** Make changes as needed.



  - **Name** The name of this group is displayed.
  - **Description** Enter keywords to describe this group.
  - **Address** Enter the IP address or range of addresses (examples: *192.0.2.1* or *192.0.2.1-15*). Click **Add New** to enter more IP addresses.

  Click **Save** to apply your changes.

- **Network Group** Make changes as needed.

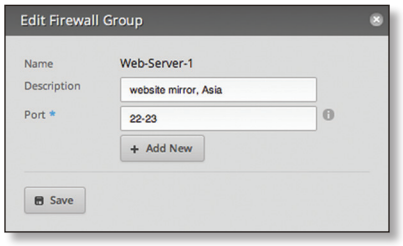


  - **Name** The name of this group is displayed.
  - **Description** Enter keywords to describe this group.
  - **Network** Enter the IP address and subnet mask using slash notation: *<network_IP_address>/<subnet_mask_number>* (example: *192.0.2.0/24*).

    Click **Add New** to enter more network addresses.

  Click **Save** to apply your changes.

- **Port Group** Make changes as needed.



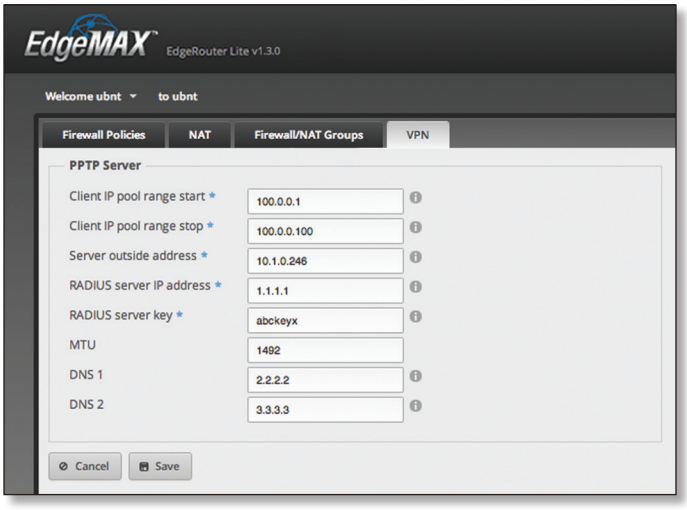
  - **Name** The name of this group is displayed.
  - **Description** Enter keywords to describe this group.
  - **Port** Enter the port name, number, or range. Click **Add New** to enter more ports.

  Click **Save** to apply your changes.

VPN

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.

PPTP Server



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.

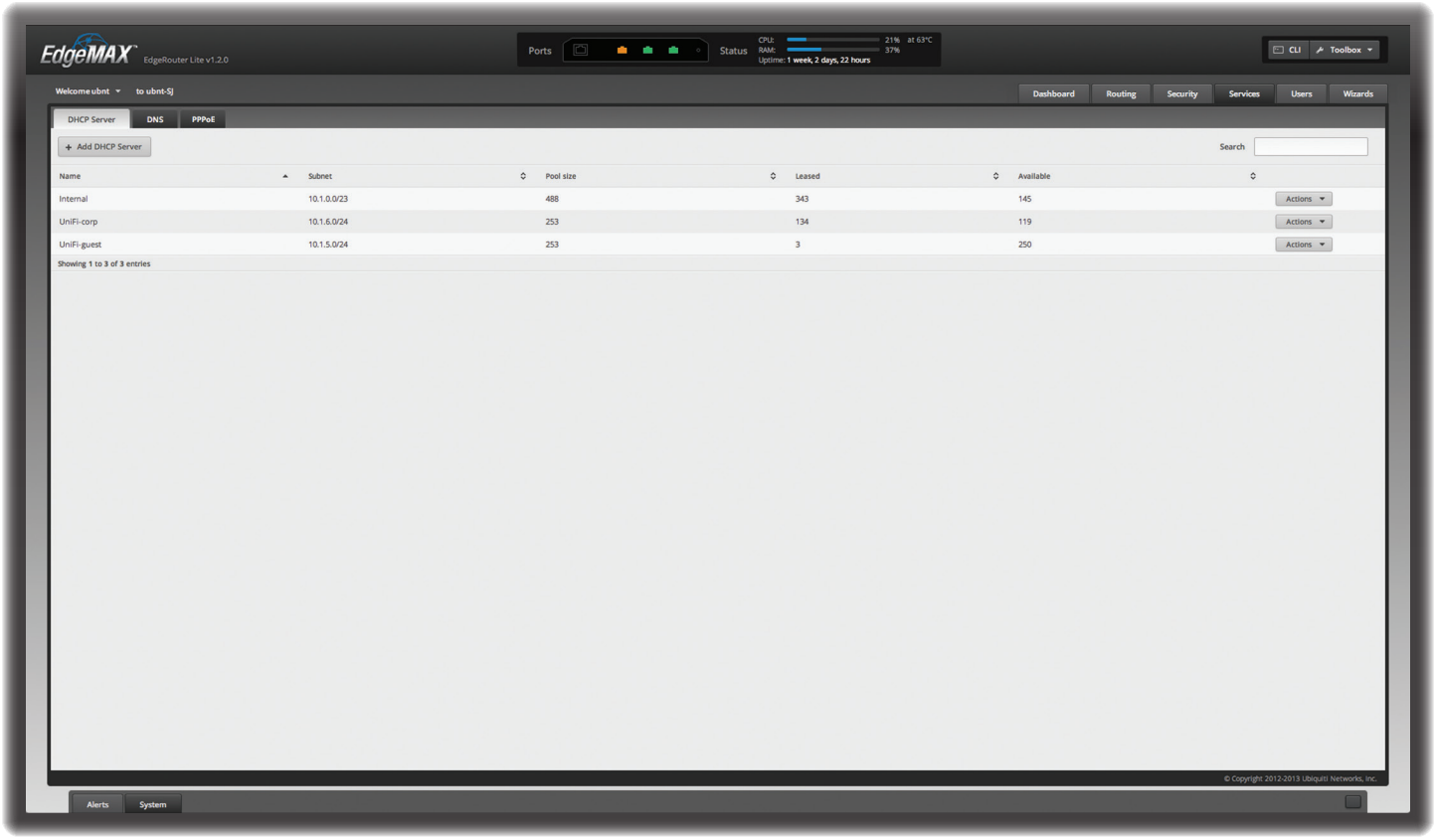
RADIUS server key Enter the key shared with the RADIUS server.

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 PTTP 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.

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



Chapter 6: Services Tab

The *Services* tab displays status information about DHCP servers, DNS forwarding, and the PPPoE server. Any setting marked with a blue asterisk * is required.

You have three sub-tabs:

DHCP Server Configure DHCP servers to implement different subnets on the independent interfaces.

DNS Configure DNS forwarding so the EdgeRouter receives all LAN DNS requests and forwards them to the service provider's DNS server.

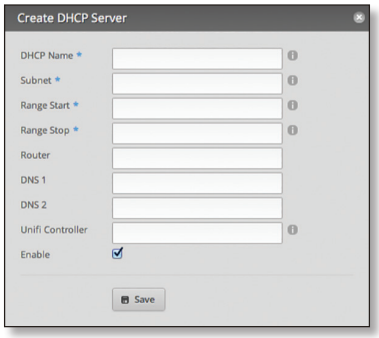
PPPoE Server Configure the PPPoE server so a remote PPPoE client can establish a tunnel to the EdgeRouter for network access.

DHCP Server

A DHCP server assigns IP addresses to DHCP clients. You can configure multiple DHCP servers to assign IP ranges in different subnets on the different interfaces.

Add DHCP Server To create a new DHCP server, click **Add DHCP Server**.

The *Create DHCP Server* screen appears.



Complete the following:

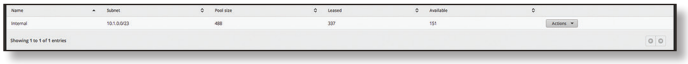
- **DHCP Name** Enter a name for this DHCP server.
- **Subnet** Enter the IP address and subnet mask using slash notation: *<network_IP_address>/<subnet_mask_number>* (example: *192.0.2.0/24*).
- **Range Start** Enter the starting IP address of the range.
- **Range Stop** Enter the last IP address of 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.
- **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.

- **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.
- **Enable** Check the box to enable this DHCP server.

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

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 DHCP server. Click a column heading to sort by that heading.



Name The name of the DHCP server is displayed.

Subnet The IP address and subnet mask of the DHCP server are displayed.

Pool size The total number of IP addresses is displayed.

Leased The number of leased IP addresses is displayed.

Available The number of available IP addresses is displayed.

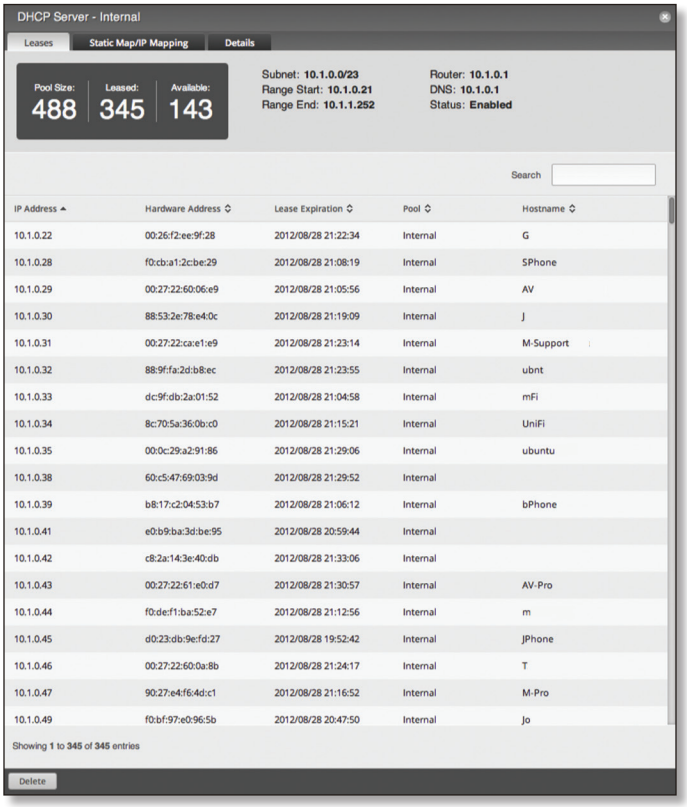
Actions Click the **Actions** button to access the following options:

- **View Leases** To view the current DHCP leases, click **View Leases**. Go to the *Configure the DHCP Server > Leases* section.
- **Configure Static Map** To map static IP addresses to MAC addresses, click **Configure Static Map**. Go to **"Static MAC/IP Mapping" on page 32**.
- **View Details** To configure the DHCP server, click **View Details**. Go to **"Details" on page 33**.
- **Delete** Delete the DHCP server; its configuration will be removed.
- **Disable** Disable the DHCP server while keeping its configuration.

Configure the DHCP Server

The *DHCP Server* - screen appears. You have three tabs available.

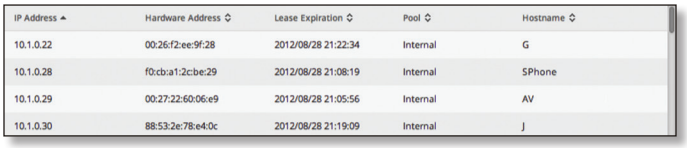
Leases



The top section displays the following status information:

- **Pool Size** The total number of IP addresses is displayed. The DHCP server assigns IP address from the pool (or group) of IP addresses.
- **Leased** The number of used IP addresses is displayed.
- **Available** The number of available 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** The IP address of the DNS server is displayed.
- **Status** The *Enabled*/*Disabled* status of the DHCP server is displayed.
- **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.

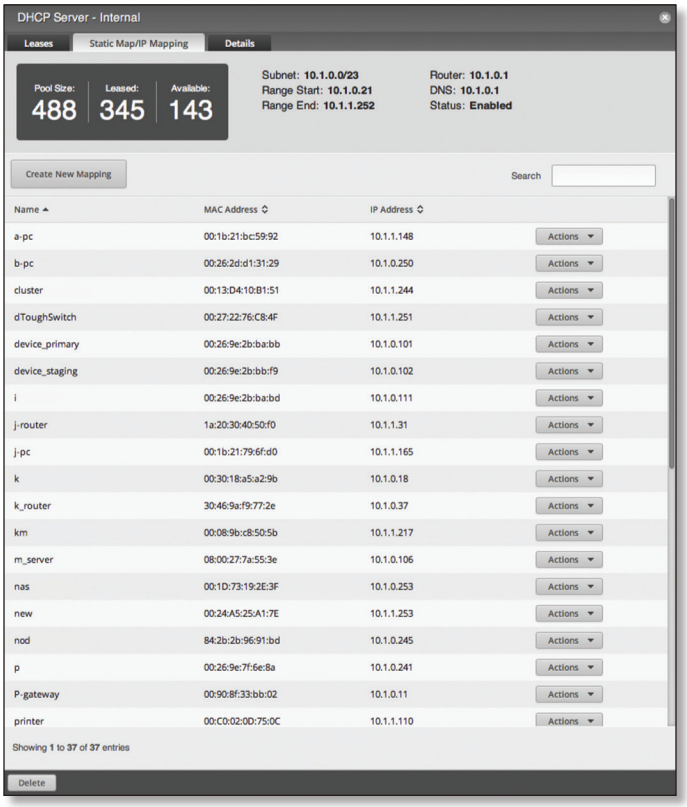
A table displays the following information about each DHCP client. Click a column heading to sort by that heading.



- **IP Address** The IP address assigned to the DHCP client is displayed.
- **Hardware 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.

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

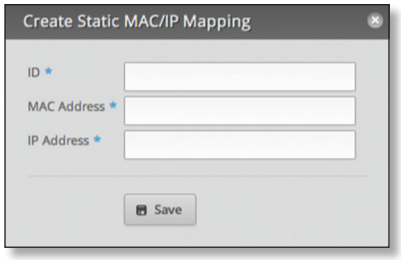
Static MAC/IP Mapping



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.
- **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** 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.

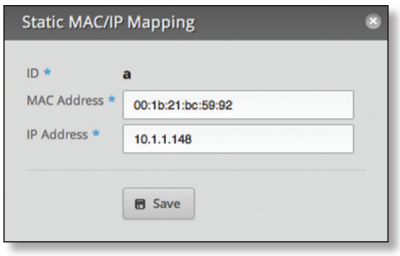
- **Name** The name of the mapping is displayed.
- **MAC Address** The MAC address of the DHCP client is displayed.
- **IP Address** The IP address assigned to the corresponding MAC address is displayed.
- **Actions** Click the **Actions** button to access the following options:

  - **Config** To configure the mapping, click **Config**. Go to **"Configure Static MAC/IP Mapping" on page 33**.
  - **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.

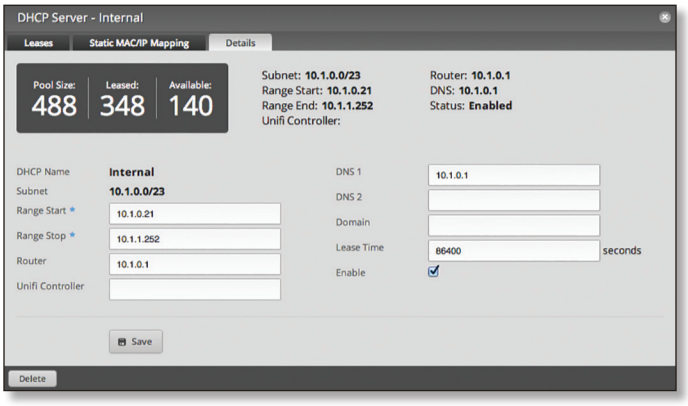


Make changes as needed.

- **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.
- **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** 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.

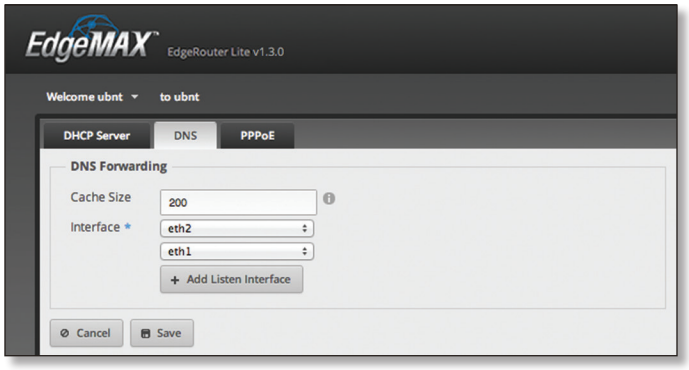
Click **Save** to apply your changes.

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

DNS

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.

DNS Forwarding



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.

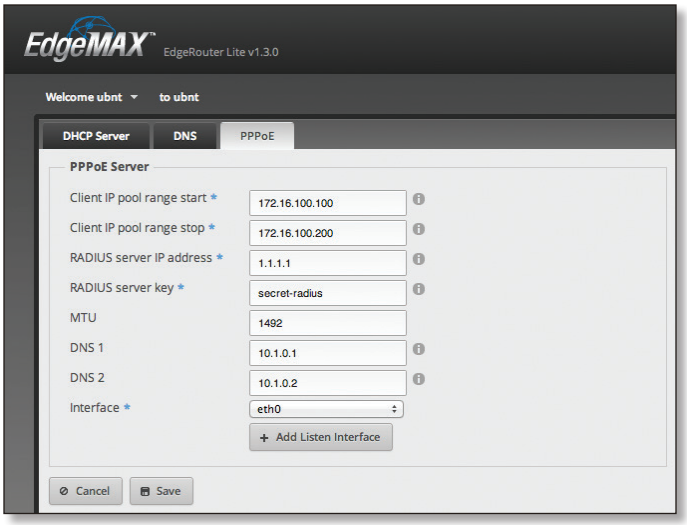
Add Listen Interface You can select multiple interfaces. To add another interface for DNS forwarding, click **Add Listen Interface**. From the new *Interface* drop-down menu, select the appropriate interface.

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

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



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.

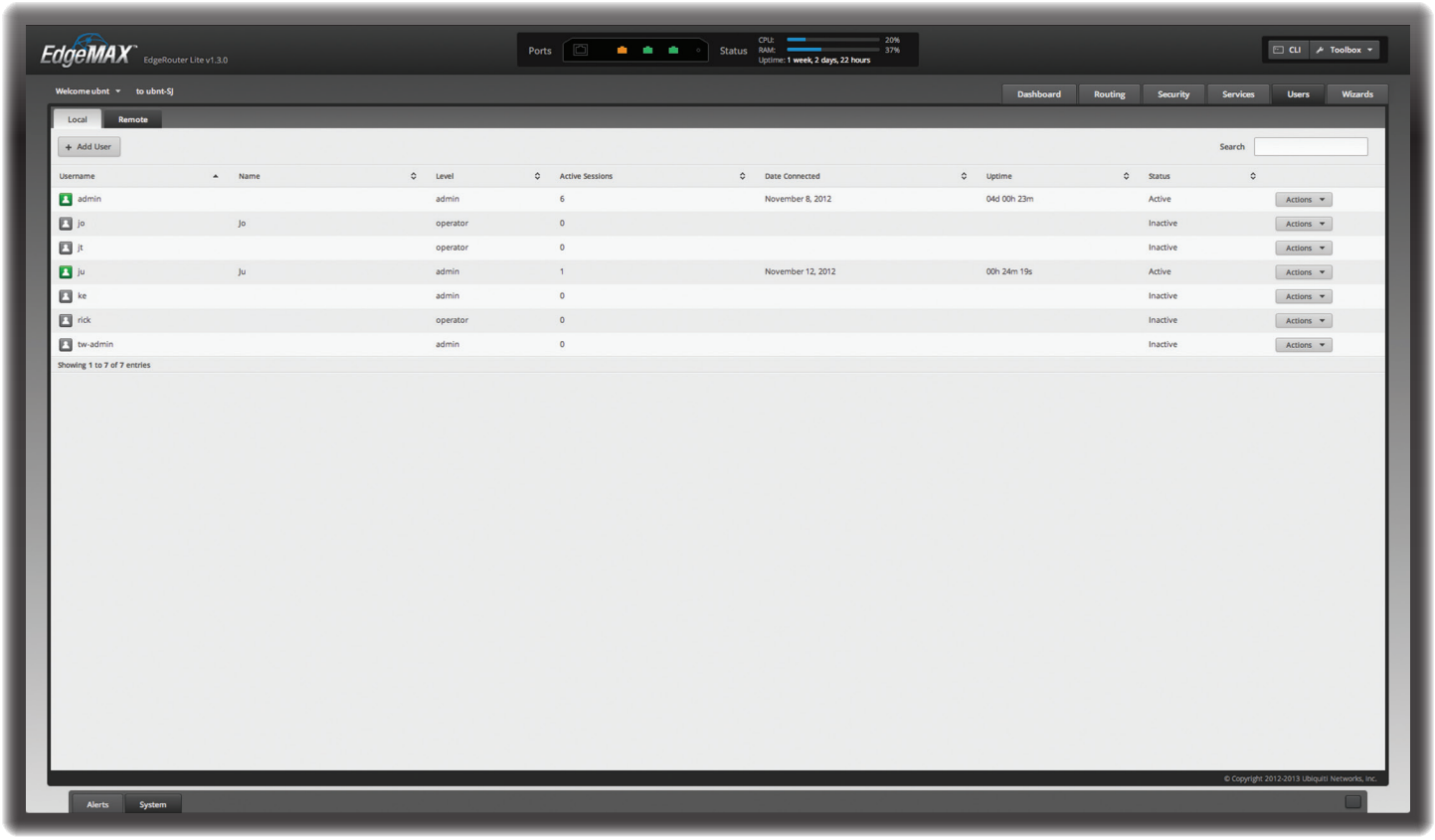
DNS 1 Enter the IP address of the primary remote access DNS server that your PPPoE client will use.

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 7: Users Tab

The *Users* tab displays account information about users. You can also configure these user accounts. Any setting marked with a blue asterisk * is required.

You have two sub-tabs:

Local Displays configurable user accounts.

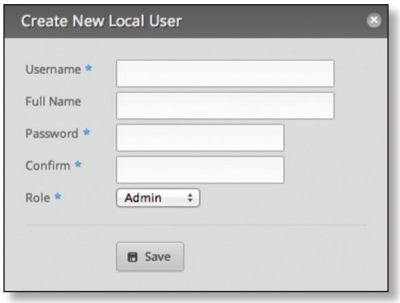
Remote Displays statistics about the users who remotely access the EdgeRouter.

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.

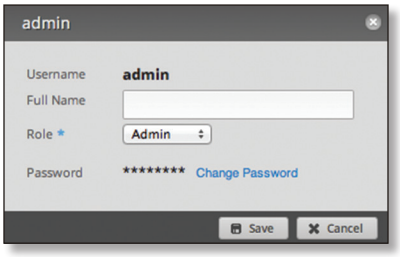
Status The status of the user is displayed.

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

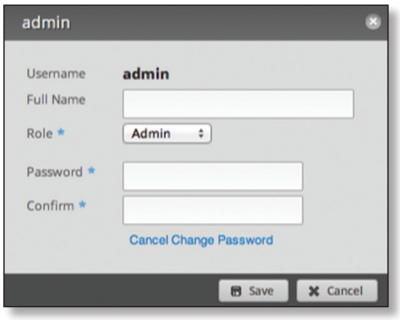
- **Config** To configure the user, click **Config**. Go to the *Configure the User* section below.
- **Delete** Delete the user account; its configuration will be removed.

Configure the User

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



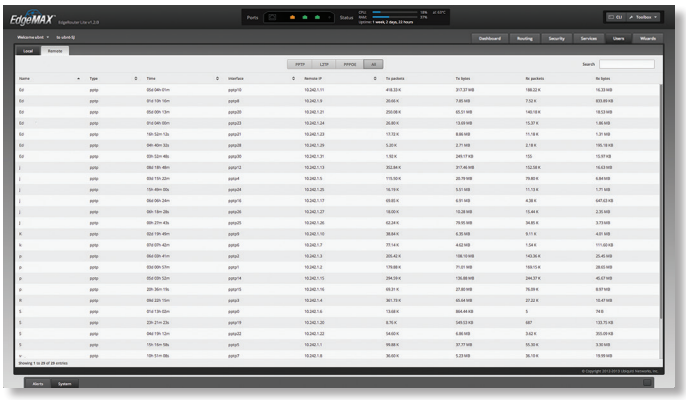
- **Username** The unique account name is displayed.
- **Full Name** Enter the actual name of the user.
- **Role** Select the appropriate permission level:
  - **Admin** The user can make changes to the EdgeRouter configuration.
  - **Operator** The user can view the EdgeRouter configuration but cannot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

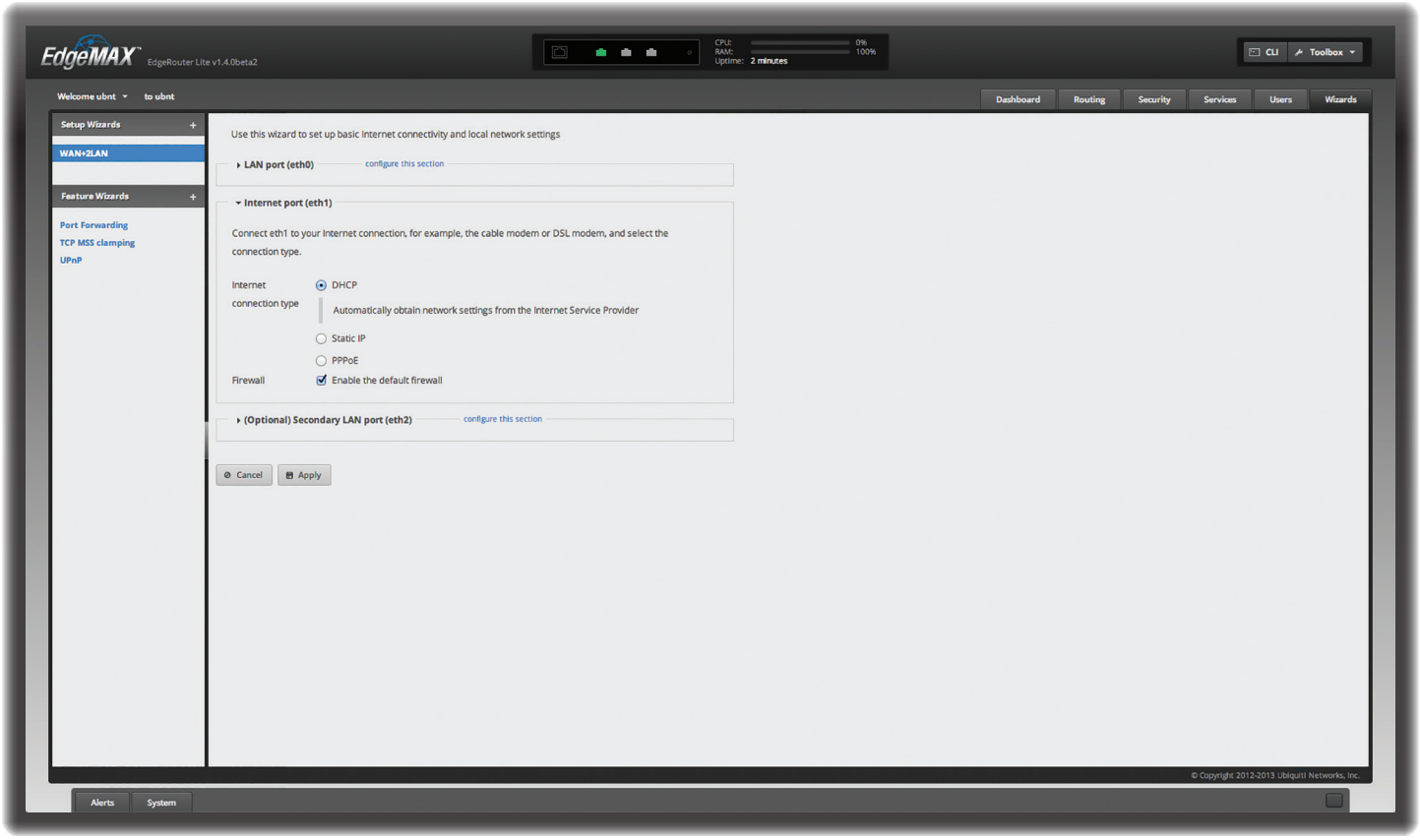
Remote IP The remote IP address of the user is displayed.

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 8: Wizards Tab

The *Wizards* tab allows you to access any available wizards:

- Setup Wizards
  - WAN+2LAN (see the next column)
- Feature Wizards
  - **"Port Forwarding" on page 40**
  - **"TCP MSS Clamping" on page 41**
  - **"UPnP" on page 41**

Setup Wizards

The *WAN+2LAN* setup wizard will guide you through a typical Small Office Home Office (SOHO) deployment:

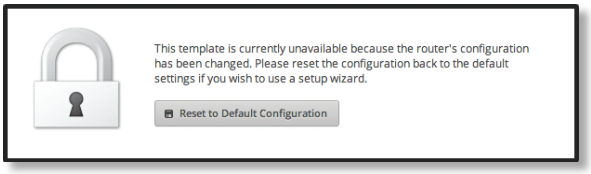
- Configures the Internet connection and NAT masquerade for the Internet port
- Enables default firewall settings for the Internet port
- Enables DHCP server functionality for local networks
- Automatically enables DNS (Domain Name System) forwarding for local networks
- Automatically enables TCP MSS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

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.

WAN+2LAN

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

Go to the section for your EdgeRouter model:

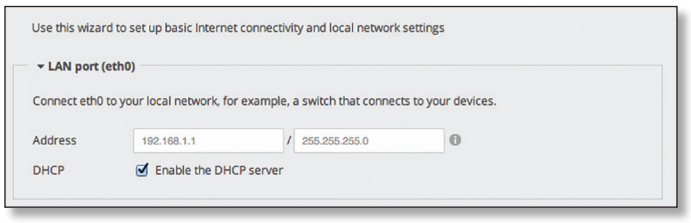
- **ERLite-3, ER-8, and ERPro-8** See **"ERLite-3, ER-8, ERPro-8" on page 38**.
- **ERPoe-5** See **"ERPoe-5" on page 39**.

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).

ERLite-3, ER-8, ERPro-8

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.

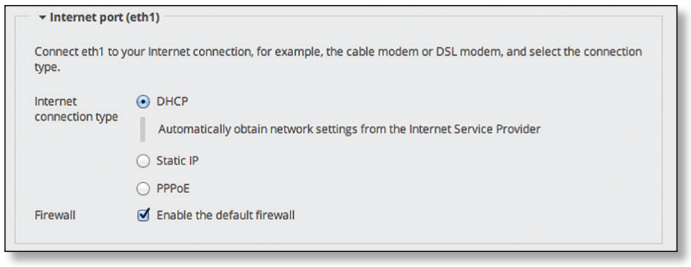
DHCP Select this checkbox to have the EdgeRouter assign IP addresses.

Internet port (eth1)

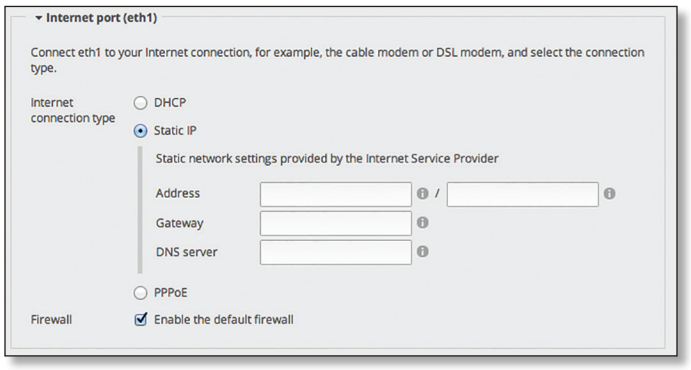
Connect *eth1* to your Internet connection.

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

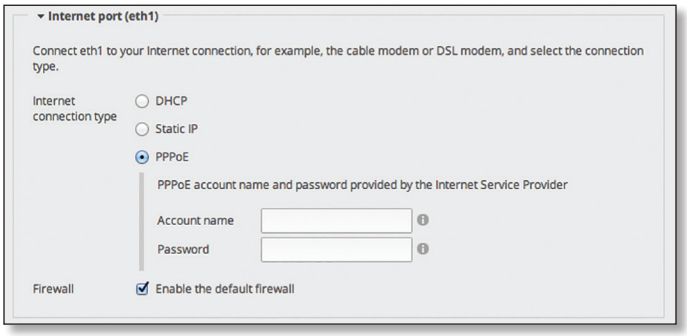
- **DHCP** Select this option if your Internet Service Provider (ISP) automatically assigns network settings to your network.



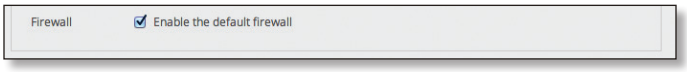
- **Static IP** Select this option if your ISP has assigned static network settings to your network.
  - **Address** Enter the IP address in the first field and the subnet mask or prefix length in the second field.
  - **Gateway** Enter the IP address of the ISP's gateway server, which provides the point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



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.

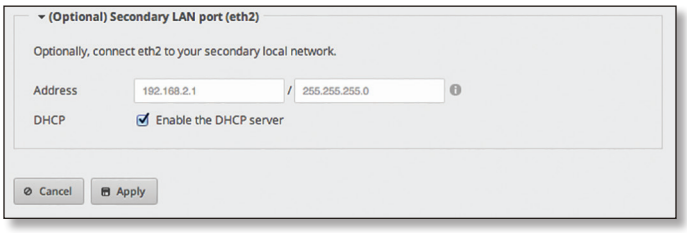


(Optional) Secondary LAN port (eth2)

Click **configure this section** if you connect *eth2* to your devices and/or 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.

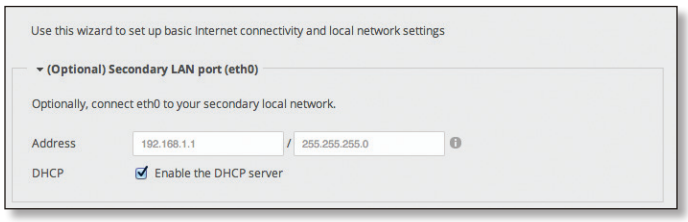


Click **Apply** to apply your changes, or click *Cancel*.

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.

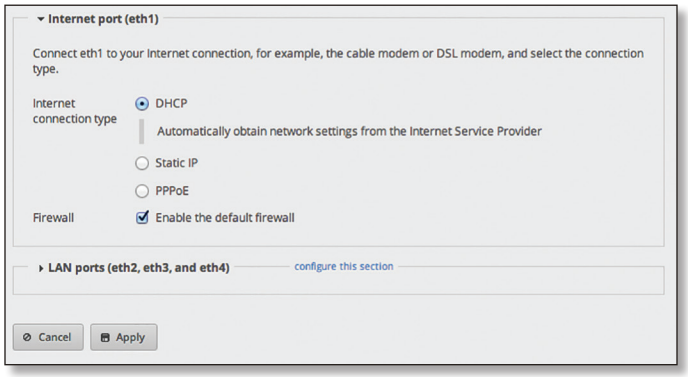
DHCP Select this checkbox to have the EdgeRouter assign IP addresses.

Internet port (eth1)

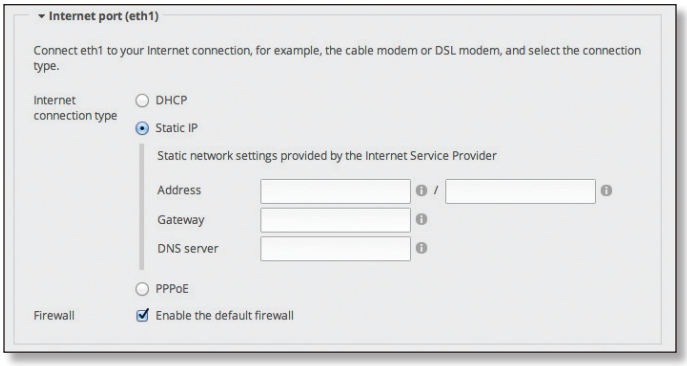
Connect *eth1* to your Internet connection.

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

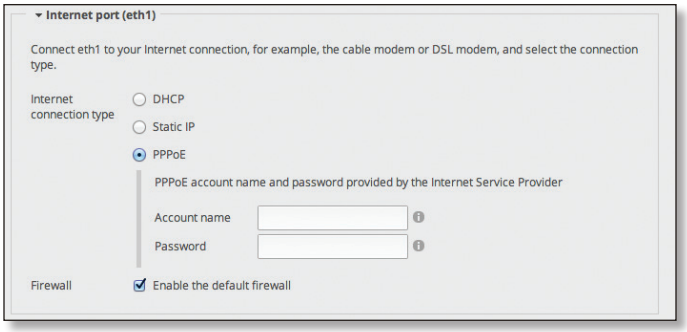
- **DHCP** Select this option if your ISP automatically assigns network settings to your network.



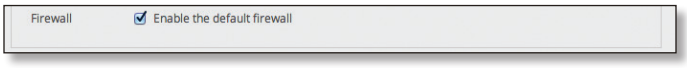
- **Static IP** Select this option if your ISP has assigned static network settings to your network.
  - **Address** Enter the IP address in the first field and the subnet mask or prefix length in the second field.
  - **Gateway** Enter the IP address of the ISP's gateway server, which provides the point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



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.

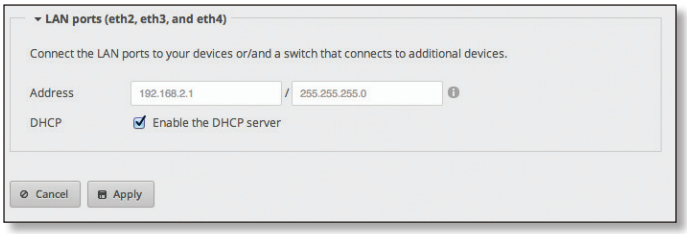


LAN ports (eth2, eth3, and eth4)

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 apply your changes, or click *Cancel*.

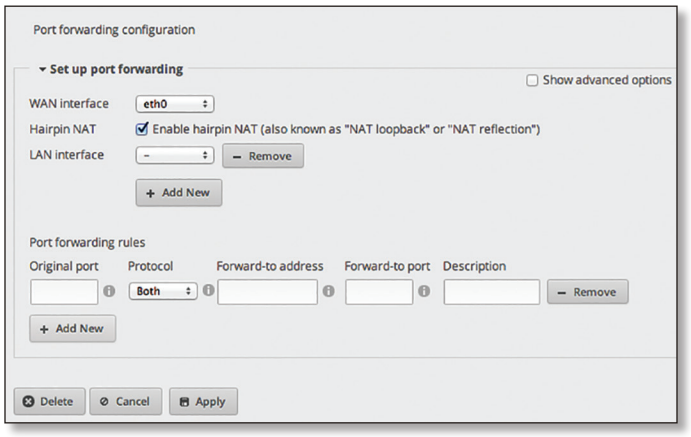
Feature Wizards

Each wizard will guide you through configuration of the corresponding feature: port forwarding, TCP MSS clamping, or UPnP.

Port Forwarding

Typically you configure a port forwarding rule so a host on the external network can access a server on the internal network by using the public IP address (or hostname) of the EdgeRouter.

Click the **Port Forwarding** feature wizard to begin configuration.



Set Up Port Forwarding

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

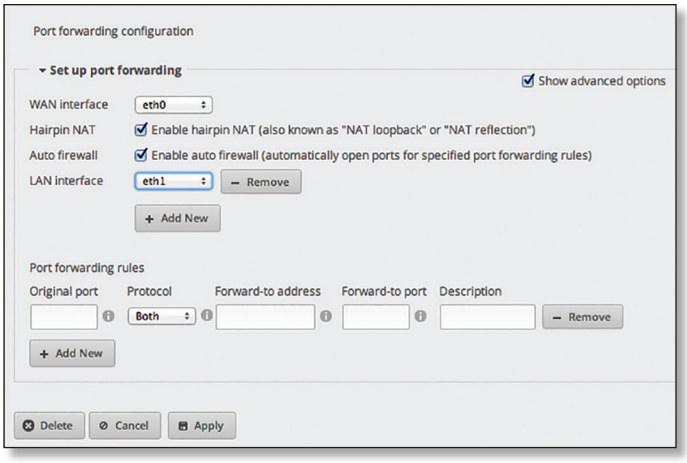
WAN interface Select the appropriate interface from the drop-down menu. (If you select *Other*, then enter the interface name in the field provided.)

Hairpin NAT Enabled by default. If you want to allow a host on the internal network to use the public IP address to access an internal server, then keep *Hairpin NAT* enabled. (Hairpin NAT is also known as NAT loopback or NAT reflection.)

Note: If *Hairpin NAT* is enabled, then it only enables *Hairpin NAT* for the port forwarding rules defined in the wizard; it does not affect the Destination NAT Rules defined on the *Security* > *NAT* tab (refer to **"Destination NAT Rules" on page 26**).

Auto firewall Enabled by default. The *Auto firewall* option is displayed if *Show advanced options* is enabled. If you want the EdgeRouter to automatically open ports for the specified port forwarding rules, then keep *Auto firewall* enabled.

If you disable the *Auto firewall* option, then you will need to manually define firewall rules on the *Security* > *Firewall Policies* tab (refer to **"Firewall Policies" on page 20**).



LAN interface Click **Add New** to display the drop-down menu. Then select the appropriate interface. (If you select *Other*, then enter the interface name in the field provided.)

- **Remove** Click to delete an interface.
- **Add New** Click to add another new interface.

Port Forwarding Rules

Add New Click to create a new rule.

- **Original port** Enter the port or ports that will be forwarded to the LAN. You can identify the port or ports by name, number, and/or range. To specify multiple ports, use a comma-separated list.

  Example: *https,20-23,554*
- **Protocol** Enter the protocol that will be forwarded to the LAN: **Both**, **TCP**, or **UDP**.
- **Forward-to address** Enter the LAN IP address that will receive the forwarded port traffic.
- **Forward-to port** Enter the port or ports that will receive the forwarded port traffic. You can identify the port or ports by name, number, and/or range. If you do not specify the *Forward-to port*, then the original destination port of the traffic will be used.
- **Description** Enter keywords that will identify this rule.
- **Remove** Click to delete a rule.
- **Add New** Click to create a new rule.

Click **Apply** to apply your changes, or click *Cancel*. To remove the entire port forwarding configuration created by the wizard, click **Delete**.

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.

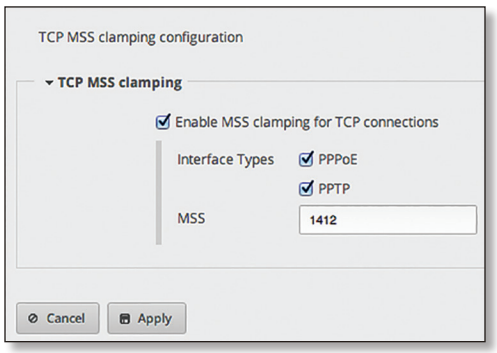
Click the **TCP MSS Clamping** feature wizard to begin configuration.

TCP MSS Clamping

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

Interface Types You can select which interface types use MSS clamping; *PPPoE* and *PPTP* are enabled by default.

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



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

UPnP

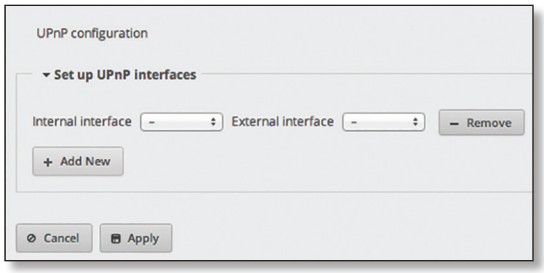
Instead of manually configuring port forwarding rules, you can use UPnP for automatic port forwarding when you have hardware that supports UPnP.

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

Set Up UPnP Interfaces

Add New Click to create a new UPnP interface.

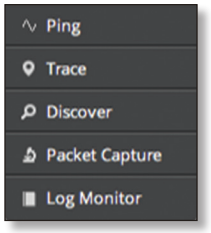
- **Internal interface** Select the appropriate LAN interface from the drop-down menu. (If you select *Other*, then enter the interface name in the field provided.)
- **External interface** Select the appropriate WAN interface from the drop-down menu. (If you select *Other*, then enter the interface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



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

Chapter 9: 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.

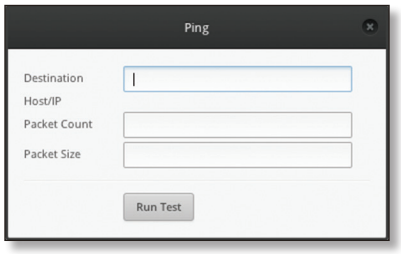


The following tools are available:

- Ping
- 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.



Destination Host/IP Enter the IP address.

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

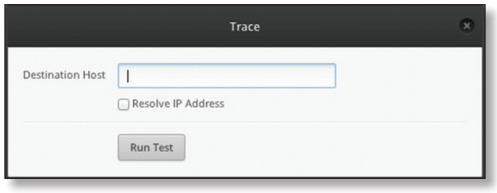
Packet Size Specify the size of the packet.

Run Test Click this button to start the test.

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

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.



Destination Host Enter the IP address of the destination host.

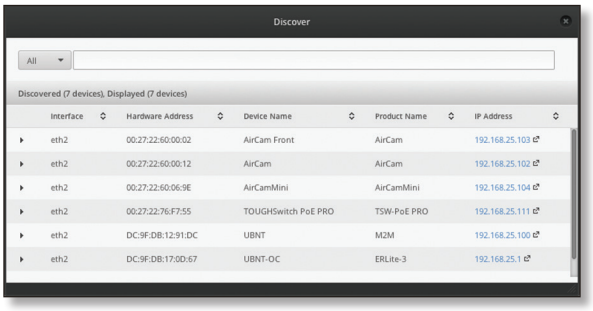
Resolve IP Address Select this option to resolve the IP addresses symbolically (as names) instead of numerically.

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.



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.

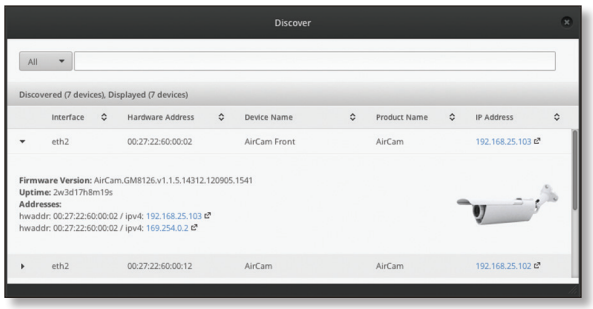
Device Name The name assigned to the device is displayed.

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.

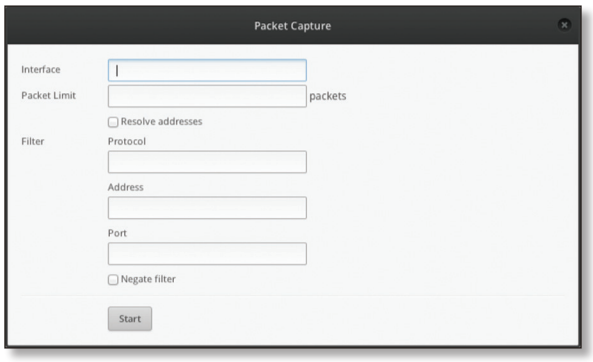
For more information, click the ▸ arrow to view the following:

- **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.



Interface Enter the name of the interface.

Packet Limit Enter the number of packets to capture. The maximum number is 300.

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

Filter

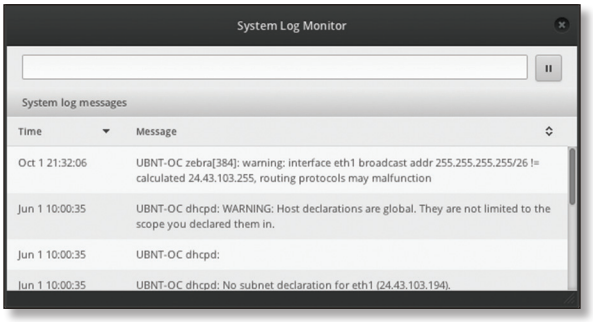
- **Protocol** Enter the protocol to filter.
- **Address** Enter the address to filter.
- **Port** Enter the port number to filter.
- **Negate filter** Check this box to capture all packets except for the ones matching the selected filter(s).

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 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**

Access the CLI

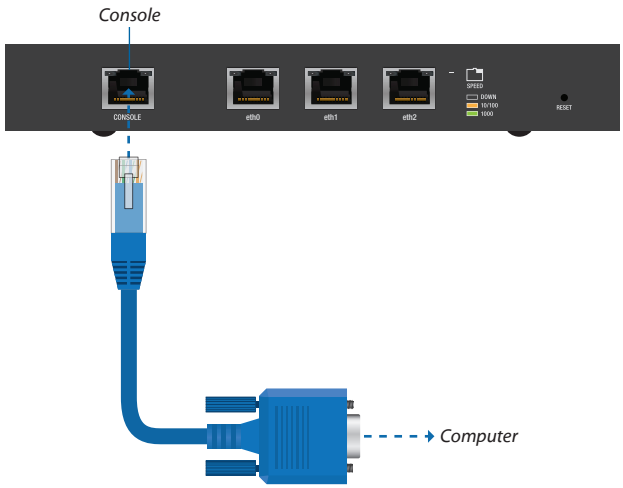
There are four methods you can use to access the CLI:

- **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 46**.
- **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 46**.
- **EdgeOS Configuration Interface** Go to **"Access Using the EdgeOS Configuration Interface" on page 47**.

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 46**.
   - **Telnet** Go to **"Access Using Telnet" on page 46**.

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*).

```
Welcome to EdgeOS

By logging in, accessing, or using the Ubiquiti product, you
acknowledge that you have read and understood the Ubiquiti
License Agreement (available in the Web UI at, by default,
http://192.168.1.1) and agree to be bound by its terms.

UBNT-OC login: ubnt
```

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

```
Welcome to EdgeOS

By logging in, accessing, or using the Ubiquiti product, you
acknowledge that you have read and understood the Ubiquiti
License Agreement (available in the Web UI at, by default,
http://192.168.1.1) and agree to be bound by its terms.

UBNT-OC login: ubnt
Password:
```

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

```
Welcome to EdgeOS

By logging in, accessing, or using the Ubiquiti product, you
acknowledge that you have read and understood the Ubiquiti
License Agreement (available in the Web UI at, by default,
http://192.168.1.1) and agree to be bound by its terms.

UBNT-OC login: ubnt
Password:
Linux ubnt 2.6.32.13-UBNT #1 SMP Wed Oct 24 01:08:06 PDT 2012 mips64
Welcome to EdgeOS
ubnt@UBNT-OC:~$
```

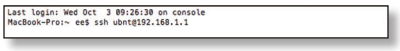
Note: To enhance security, we recommend that you change the default login using one of the following:

- Set up a new user account (preferred option). For details, go to **"Remove the Default User Account" on page 49**.
- Change the default password of the *ubnt* login. Use the *set* command as detailed in **"Remove the Default User Account" on page 49**.

Access Using SSH

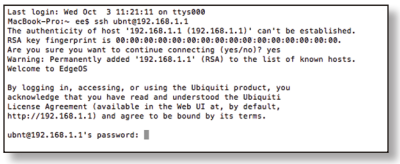
SSH is enabled by default.

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.

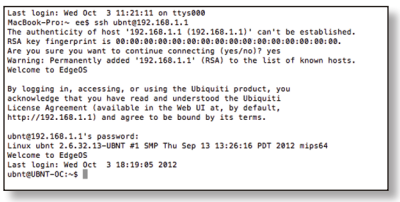


Note: Upon initial login, a host key will be displayed. You will be asked to confirm that you want to save the host key to the local database. Click **Yes** to bypass this message in the future.

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.



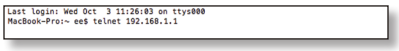
Note: To enhance security, we recommend that you change the default login using at least one of the following options:

- Set up a new user account (preferred option). For details, go to **"Remove the Default User Account" on page 49**.
- Change the default password of the *ubnt* login. Use the *set* command as detailed in **"Remove the Default User Account" on page 49**.

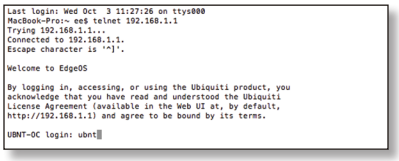
Access Using Telnet

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

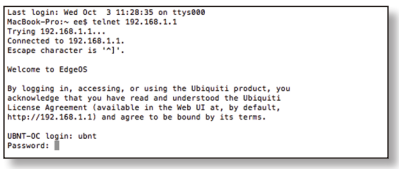
1. Open the telnet client on your computer.
2. At the prompt, enter:
   telnet <*hostname*>
   The default is *192.168.1.1* for the hostname. You can also enter a domain name instead of an IP address for the hostname.



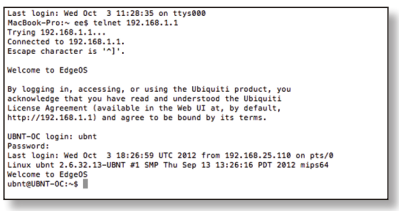
3. At the *login* prompt, enter the username (the default is *ubnt*).



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.



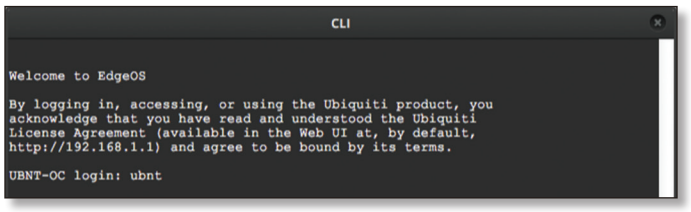
Note: To enhance security, we recommend that you change the default login using at least one of the following options:

- Set up a new user account (preferred option). For details, go to **"Remove the Default User Account" on page 49**.
- Change the default password of the *ubnt* login. Use the *set* command as detailed in **"Remove the Default User Account" on page 49**.

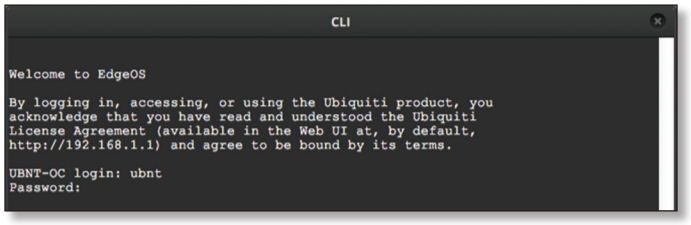
Access Using the EdgeOS Configuration Interface

Each tab of the EdgeOS interface contains CLI access.

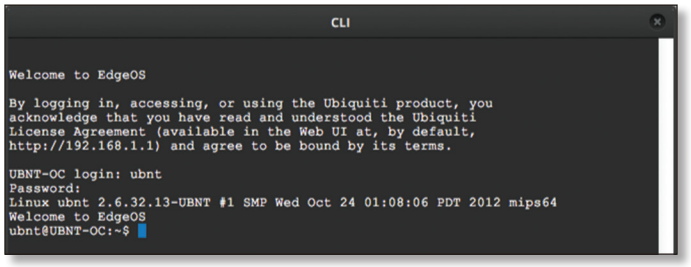
1. At the top right of the screen, click the **CLI** button.
2. The *CLI* window appears. At the *login* prompt, enter the username (the default is *ubnt*).



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 49**.
- Change the default password of the *ubnt* login. Use the *set* command as detailed in **"Remove the Default User Account" on page 49**.

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 onscreen.

```
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 onscreen.

```
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 (see below)
- **"Remove the Default User Account" on page 49**
- **"Create a Firewall Rule" on page 49**
- **"Manage the Configuration File" on page 52**

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 52**.

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.

Online Resources

Support: **support.ubnt.com**

Community: **community.ubnt.com**

Downloads: **downloads.ubnt.com**

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

JL020714