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# Configuring a MultiWAN for the EN-4000

The EN-4000 is the newest member of Encore Networks' family of routers. It provides wireless and cabled connections to a local area network (LAN) and to peripheral devices and remote devices.

Follow the procedures in this discussion to configure a multiWAN for the EN-4000.

Also see [Configuring Chassis Ports in the EN-4000](#).

## 6.1 Use of a MultiWAN

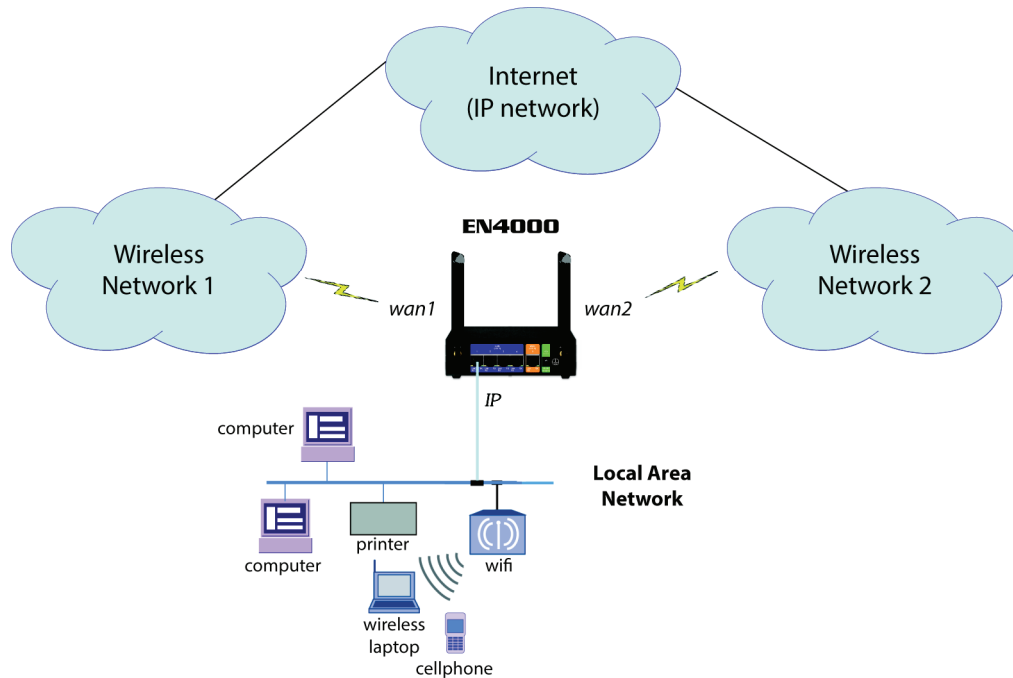
A multiWAN is a group of WAN ports configured to route an IP session over the least busy WAN port in the group, using the same port until the session is finished. (A multiWAN routes the entire session; it does not determine a route by individual packet.) Any WAN port in the EN-4000—including the physical WAN port on the back of the chassis—can be part of a multiWAN.

A multiWAN connects the network to two or more internet service providers (ISPs). In [Figure 6-1](#), a wireless WAN port (*wan1* or *wan2*) in each of the EN-4000's two wireless cards connects to a specified wireless network. These connections provide dual-cell loadsharing/failover. That is, they balance the traffic load when each ISP connection is available, and they allow automatic failover if one ISP connection is dropped.

**Note:** In the example, the wireless WAN ports are named *wan1* and *wan2*. However, your network administrator will choose names that are meaningful in your network.

Wireless WAN ports (*wan1* and *wan2* in [Figure 6-1](#)) assigned to the same multiWAN must be on separate subnets and must use different default gateways.

Figure 6-1. EN-4000 MultiWAN to Two Wireless Carriers



Two wireless cards can be installed in the EN4000 chassis. Each wireless card is specific to its wireless carrier's network. The EN4000 provides two antennas for each wireless card's connection to its wireless network (for a total of four antennas on the EN4000 chassis).

A WAN port on each wireless card allows a device on the local area network (LAN) to connect to the internet through either wireless carrier's network. In this diagram, those wireless WAN ports are named *wan1* and *wan2*.

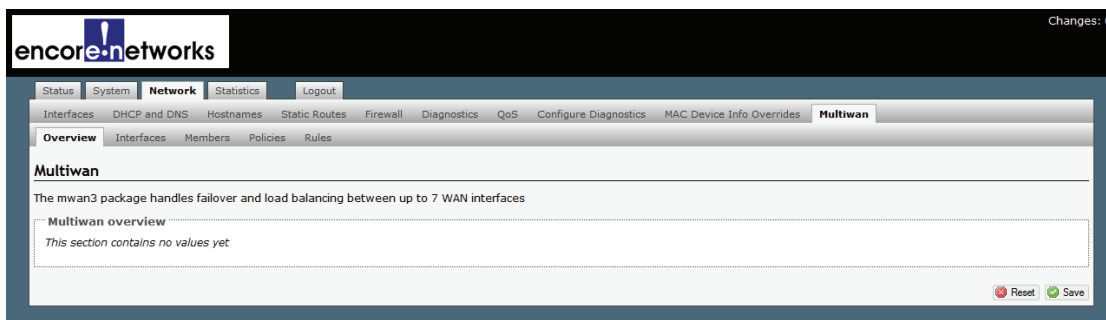
## 6.2 Configuring a MultiWAN

Confer with your network administrator to get values for this configuration.

To configure multiWAN parameters, do the following:

- 1 Select the **Network** management area.
- 2 Then select the **MultiWAN** detail tab.
- 3 If necessary, select the **Overview** detail tab.
  - ❖ The MultiWAN Overview Screen is displayed (Figure 6-2).

Figure 6-2. MultiWAN Overview Screen



**Note:** The multiWAN's rules for loadsharing use the following hierarchy:

- Rule order
- Policies
- Members
- Interfaces

The lowest items of the hierarchy must be configured first. Each level of the hierarchy builds on a lower level, working up to the top of the hierarchy. To develop the rules for the multiWAN, work across the lowest row of tabs, left to right:

- First configure the **Interfaces** (step 4).
- Then organize the interfaces into **Members** (weighted sets, step 5).
- Develop **Policies** for the members (step 6).
- Organize the policies into **Rules** (step 7).

Step 8 and step 9 complete the procedure for building the multiWAN.

#### 4 Select the **Interfaces** tab.

- ❖ The MultiWAN Interface Configuration Summary Screen is displayed (Figure 6-3).

On this screen, you can review the interfaces that constitute the multiWAN. This screen lets you check and track each interface.

In this example, the interfaces are *wan1* and *wan2*. These names correspond to the interfaces *wan1* and *wan2* on the wireless cards in Figure 6-1.

**Note:** A multiWAN may have more than two interfaces.

Figure 6-3. MultiWAN Interface Configuration Summary Screen

The screenshot shows the MultiWAN interface configuration summary screen. The page title is "Multiwan interface configuration" and it states "The mwan3 multiwan package interfaces are configured here". Below this, there is a section for "Multiwan interface aliases" with instructions: "Name must match the interface name found on the Network->Interfaces tab" and "Interfaces may not share the same name as configured members, policies or rules".

	Enabled	Test IP	Test IP reliability	Ping count	Ping timeout	Ping interval	Interface down	Interface up	
wan1	1	8.8.4.4 8.8.8.8 208.67.222.222 208.67.220.220	2	1	2	5	3	8	<a href="#">Edit</a> <a href="#">Delete</a>
wan2	1	8.8.8.8 208.67.220.220	1	1	2	5	3	8	<a href="#">Edit</a> <a href="#">Delete</a>

At the bottom of the table, there is an "Add" button. At the bottom right of the screen, there are buttons for "Reset", "Save", and "Save & Apply".

a Do one of the following on the MultiWAN Interface Configuration Summary Screen:

- i Select the **Edit** button to revise an interface for this multiWAN.

- ii Type a new interface name in the box to the left of the **Add** button, and select that button to add an interface.

**Note:** If you try to add an interface that uses a name already listed, the screen will blank the entry and will wait for a new name. In that case, repeat [substep ii](#).

- ❖ In either case, the MultiWAN Interface Configuration Detail Screen is displayed ([Figure 6-4](#)).

Figure 6-4. MultiWAN Interface Configuration Detail Screen

The screenshot shows the 'Multiwan interface configuration' screen. At the top, there's a navigation bar with 'encore networks' logo and 'Unsaved Changes: 2'. Below that, a menu bar includes 'Status', 'System', 'Network', 'Statistics', and 'Logout'. The main navigation tabs are 'Interfaces', 'DHCP and DNS', 'Hostnames', 'Static Routes', 'Firewall', 'Diagnostics', 'QoS', 'Configure Diagnostics', 'MAC Device Info Overrides', and 'Multiwan'. The current view is 'Multiwan'. Below the navigation, there's a sub-menu with 'Overview', 'Interfaces', 'Members', 'Policies', and 'Rules'. The main content area is titled 'Multiwan interface configuration' and contains a form with the following fields:

Enabled	Yes
Test IP	[Empty field] [Add]
Test IP reliability	1
Ping count	1
Ping timeout	2 seconds
Ping interval	5 seconds
Interface down	3
Interface up	3

At the bottom of the form, there are buttons for 'Back to Overview', 'Reset', 'Save', and 'Save & Apply'.

- b On the MultiWAN Interface Configuration Detail Screen, enter values that will determine whether this interface is active. Enter values for the following fields:

- **Enabled** (required field; allows the multiWAN to use this interface): Select **Yes** to enable the interface or **No** to disable it.
- **Test IP** (host addresses, to determine whether this interface is active): Type the host's IP address. If the interface has more than one host, click the box to the right of the entry field and add another IP address. Continue until you have entered all the host IP addresses to track for this interface.

**Note:** If there is no value in this field, the interface will always be considered active.

- **Test IP Reliability** (number of hosts to test to determine whether the interface is active): Type the number of host IP addresses that must respond to pings. The interface will be considered active when the required number of interfaces respond to pings.

**! Caution:** The number of IP addresses required to respond to pings must be no larger than the number of IP addresses entered in the **Test IP** field. Otherwise, the interface will always be considered inactive.

- **Ping Count** (number of pings for interface test): Enter the number of pings to send to each host IP address listed.

- **Ping Timeout** (number of seconds for successful response): Enter the number of seconds to wait for a response to a ping.  
**Note:** This value should be 2 seconds or longer so that false timeouts are not reported.
  - **Ping Interval** (number of seconds between tests): Enter the number of seconds between pings.
  - **Interface Down** (number of failed tests): Enter the number of failed pings that will make the management system consider the interface inactive.
  - **Interface Up** (number of successful tests): Enter the number of successful pings that will make the management system consider an interface active again.
  - **Reroute** (enabling of failover):
    - ◆ If you set this parameter to **1** (one), this interface will use failover:  
When this interface is inactive, its traffic will be rerouted according to the multiWAN's rules.
    - ◆ If you leave this field empty (blank) or set it to **0** (zero), this interface will not use failover:  
When this interface is inactive, its traffic will not be rerouted according to the multiWAN's rules.
- c When you have finished configuring this interface, select the **Save** button. Then select the **Back to Overview** button to see the MultiWAN Interface Configuration Summary Screen again (Figure 6-5).

Figure 6-5. MultiWAN Interface Configuration Summary Screen

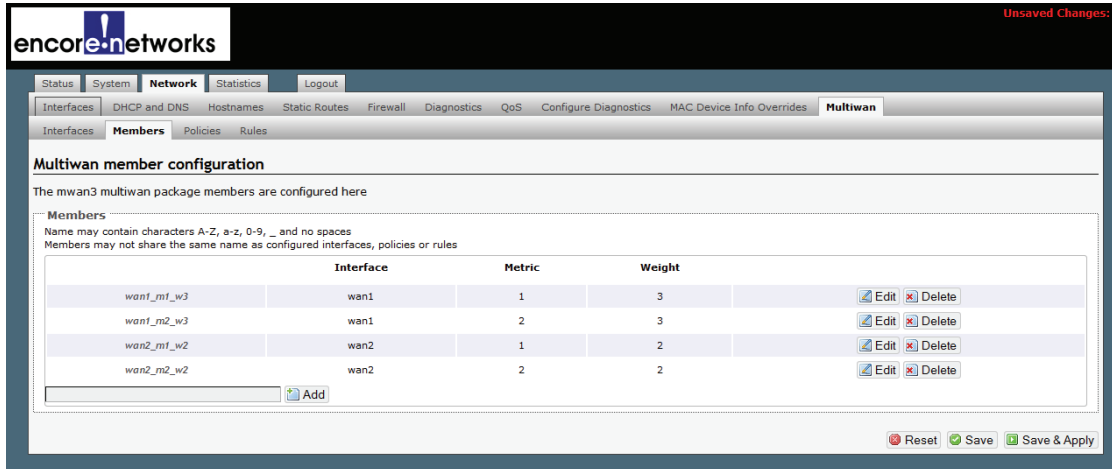
The screenshot shows the MultiWAN interface configuration summary screen. The table below represents the data shown in the interface:

Interface	Enabled	Test IP	Test IP reliability	Ping count	Ping timeout	Ping interval	Interface down	Interface up	Actions
wan1	1	8.8.4.4 8.8.8.8 208.67.222.222 208.67.220.220	2	1	2	5	3	8	Edit Delete
wan2	1	8.8.8.8 208.67.220.220	1	1	2	5	3	8	Edit Delete

- d If you need to configure another interface for the multiWAN, return to step 4a (on page 3).
- e When you have finished configuring all the interfaces for the multiWAN, do one of the following on the MultiWAN Interface Configuration Summary Screen:
- i Select the **Save & Apply** button to save the configuration and use it immediately.

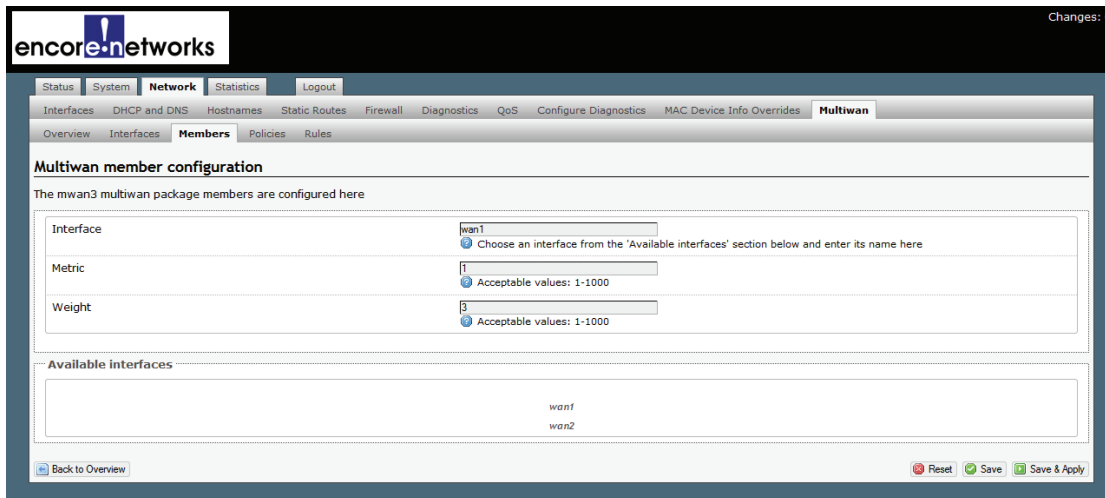
- ii Select the **Save** button to save the multiWAN configuration now and use it after the EN-4000 is restarted.
  - iii Select the **Reset** button to discard the changes and use the previously saved configuration.
- 5 Select the **Members** tab.
- ❖ The MultiWAN Member Configuration Summary Screen is displayed (Figure 6-6). On this screen, you can assign metrics and weights to develop loadsharing within the multiWAN.

Figure 6-6. MultiWAN Member Configuration Summary Screen



- a Do one of the following on the MultiWAN Member Configuration Summary Screen:
- i Select the **Edit** button to revise the loadsharing order and priorities.
  - ii Type a member name in the box to the left of the **Add** button, and select that button to add that member to the multiWAN.
- Note:** If you try to add a member that uses a name already listed, the screen will blank the entry and will wait for a new name. In that case, repeat [substep ii](#).
- ❖ In either case, the MultiWAN Member Configuration Detail Screen is displayed (Figure 6-7).

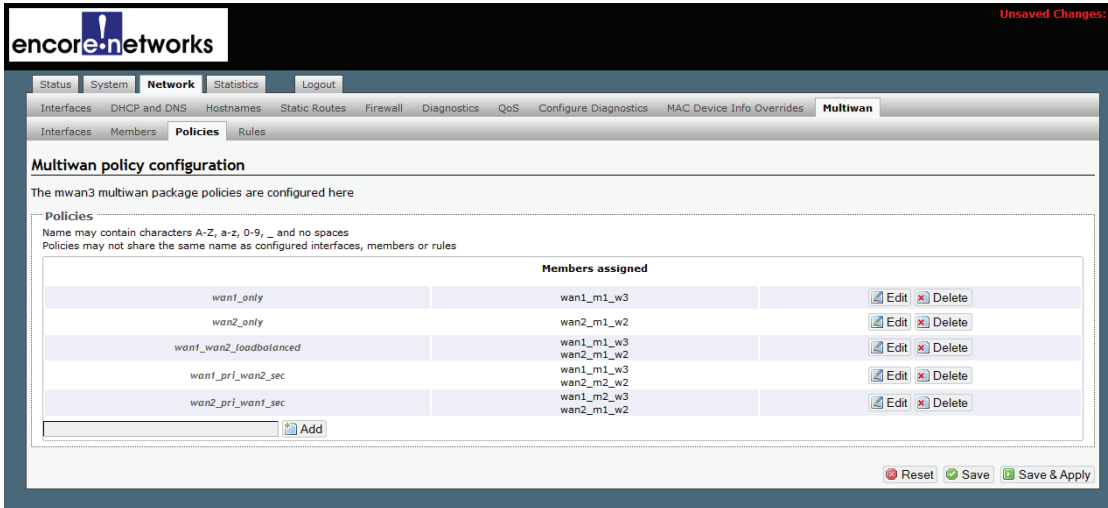
Figure 6-7. MultiWAN Member Configuration Detail Screen



- b** On the MultiWAN Member Configuration Detail Screen, enter values to develop a weighted member set. Enter values for the following fields:
- **Interface** (required field): Type an interface name for this multiWAN member to use. The interface name must be listed under **Available Interfaces** in the lower portion of the screen. (In [Figure 6-7](#), the available interface names are *wan1* and *wan2*.)
  - **Metric** (precedence): Type a value for order of precedence. A low metric has a high priority.
  - **Weight** (load distribution): Type a value to determine loadsharing. A high weight has a high priority.
- Note:** When a packet is tested against the rules, the metric of each active WAN interface is considered.
- ❖ If one WAN has a lower metric than all other WANs in the multiWAN, the traffic will failover to that WAN interface.
  - ❖ If two or more WANs have the same lowest metric, the weights of those WANs are considered. Traffic will pass through those WANs, using load balancing based on the relative weights assigned to those WANs.
- c** When you have finished configuring this multiWAN member, select the **Save** button; then select the **Back to Overview** button to see the MultiWAN Member Configuration Summary Screen.
- d** If you need to configure another member for the multiWAN, return to step [5a](#) (on page 6).
- e** When you have configured metrics and weights for all the members of the multiWAN, do one of the following on the MultiWAN Member Configuration Summary Screen (recall [Figure 6-6](#)):
- Select the **Save & Apply** button to save the configuration and use it immediately.
  - Select the **Save** button to save the multiWAN member configuration now and use it after the EN-4000 is restarted.

- iii Select the **Reset** button to discard the changes and use the previously saved configuration.
- 6 Select the **Policies** tab.
- ❖ The MultiWAN Policy Configuration Summary Screen is displayed (Figure 6-8). On this screen, you can develop policies for the multiWAN.

Figure 6-8. MultiWAN Policy Configuration Summary Screen



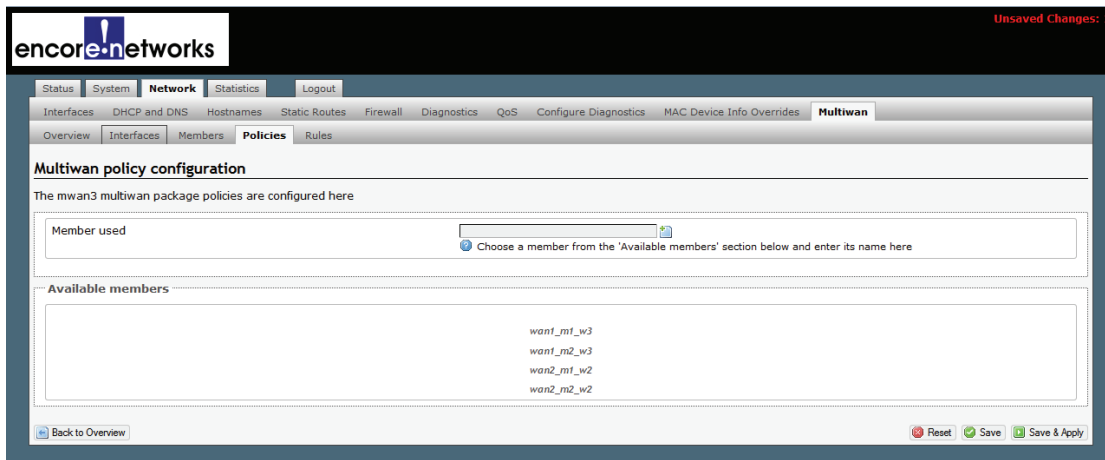
**Note:** You can leave an unused policy in place on this screen, in case it might be used in the future. (To leave a policy unused, do not assign it to a rule in step 7b on page 11.)

- a Do one of the following on the MultiWAN Policy Configuration Summary Screen:
  - i Select an **Edit** button to revise a policy.
  - ii Type a policy name in the box to the left of the **Add** button, and select that button to add a policy.
 

**Note:** If you try to add a policy that uses a name already listed, the screen will blank the entry and will wait for a new name. In that case, repeat [substep ii](#).
- ❖ In either case, the MultiWAN Policy Configuration Detail Screen is displayed (Figure 6-9).



Figure 6-9. MultiWAN Policy Configuration Detail Screen



- b On the MultiWAN Policy Configuration Detail Screen, add members to develop a policy. Do the following:
    - i In the **Member Used** field, type a member name. The name must be listed under **Available Members** in the lower portion of the screen.
    - ii If you want to add another member to the policy, click the button to the right of the field. Another field will be displayed; add another member in that field. Continue until you have included all the members for this policy.
  - c When you have finished configuring the policy, select the **Save** button; then select the **Back to Overview** button to see the MultiWAN Policy Configuration Summary Screen.
  - d If you need to configure another policy for the multiWAN, return to step 6a (on page 8).
  - e When you have finished configuring the policies for multiWAN configuration, do one of the following on the MultiWAN Policy Configuration Summary Screen (recall [Figure 6-8](#)):
    - i Select the **Save & Apply** button to save the configuration and use it immediately.
    - ii Select the **Save** button to save the multiWAN configuration now and use it after the EN-4000 is restarted.
    - iii Select the **Reset** button to discard the changes and use the previously saved configuration.
- 7 Select the **Rules** tab.
- ❖ The MultiWAN Rule Configuration Summary Screen is displayed ([Figure 6-10](#)). On this screen, you can define and organize rules for the multiWAN.

Figure 6-10. MultiWAN Rule Configuration Summary Screen

**Multiwan rule configuration**

The mwan3 multiwan package traffic rules are configured here  
Sorting of rules affects multiwan. Rules are read from top to bottom

**Traffic rules**  
Name may contain characters A-Z, a-z, 0-9, \_ and spaces  
Rules may not share the same name as configured interfaces, members or policies

	Source address	Source port	Destination address	Destination port	Protocol	Policy assigned	Equalize	Sort	
cfs0d92bd	192.168.21.0/24	-	-	563	tcp	wan2_only	-		Edit Delete
cfs0f92bd	192.168.21.0/24	-	-	995	tcp	wan1_only	-		Edit Delete
cfs1192bd	-	-	88.154.0.0/16	1024:65535	tcp	wan1_wan2_loadbalanced	1		Edit Delete
cfs1392bd	-	-	77.11.41.0/24	1024:65535	tcp	wan1_pri_wan2_sec	-		Edit Delete
cfs1592bd	-	-	112.136.0.0/16	5352	udp	wan2_pri_wan1_sec	-		Edit Delete
cfs1792bd	-	-	0.0.0.0/0	-	-	wan1_wan2_loadbalanced	-		Edit Delete

Reset Save Save & Apply

a Do one of the following on the MultiWAN Rule Configuration Summary Screen:

i Select an **Edit** button to revise a rule for the multiWAN.

ii Type a new rule name in the box to the left of the **Add** button, and select that button to add a rule.

**Note:** If you try to add a rule that uses a name already listed, the screen will blank the entry and will wait for a new name. In that case, repeat [substep ii](#).

❖ In either case, the MultiWAN Rule Configuration Detail Screen is displayed ([Figure 6-11](#)).

Figure 6-11. MultiWAN Rule Configuration Detail Screen

The screenshot shows the MultiWAN Rule Configuration Detail Screen. The interface includes a navigation bar with tabs for Status, System, Network, Statistics, and Logout. The main menu includes Interfaces, DHCP and DNS, Hostnames, Static Routes, Firewall, Diagnostics, QoS, Configure Diagnostics, MAC Device Info Overrides, and Multiwan. The current view is the Multiwan rule configuration page, which includes a sub-menu for Overview, Interfaces, Members, Policies, and Rules.

The main configuration area is titled "Multiwan rule configuration" and contains the following fields:

- Source address:** 192.168.21.0/24. A note indicates it supports CIDR notation (eg "192.168.100.0/24") without quotes.
- Source port:** (empty). A note indicates it may be entered as a single port (eg "1024") or as a portrange (eg "1024:2048") without quotes.
- Destination address:** (empty). A note indicates it supports CIDR notation (eg "192.168.100.0/24") without quotes.
- Destination port:** 563. A note indicates it may be entered as a single port (eg "1024") or as a portrange (eg "1024:2048") without quotes.
- Protocol:** tcp.
- Policy assigned:** wan2\_only. A note indicates to choose a policy from the 'Available policies' section below and enter its name here.
- Equalize:** (checked). A note indicates that if checked, mwan3 will load-balance each new session to the same host. If unchecked, mwan3 will load-balance based on destination.

Below the configuration fields is a section titled "Available policies" containing a list of policy names:

- wan1\_only
- wan2\_only
- wan1\_wan2\_loadbalanced
- wan1\_pri\_wan2\_sec
- wan2\_pri\_wan1\_sec
- policy

At the bottom of the screen, there are buttons for "Back to Overview", "Reset", "Save", and "Save & Apply". A red notification in the top right corner indicates "Unsaved Changes: 1".

**b** On the MultiWAN Rule Configuration Detail Screen, enter values for the following parameters:

- **Source Address** (originating IP address, whether local or remote): Type a network range for IP addresses (such as *a.b.c.0/24*, where *a.b.c* represents the local network). You may also type a single IP address, or this field may be left blank.
- **Source Port** (originating port, whether outbound or inbound): Type a port range. You may also type a single port number, or this field may be left blank.
- **Destination Address** (goal IP address, whether local or remote): Type a network range for IP addresses (such as *d.e.f.0/24*, where *d.e.f* represents the remote network). You may also type a single IP address, or this field may be left blank.
- **Destination Port** (goal port, whether outbound or inbound): Type a port range. You may also type a single port number, or this field may be left blank.
- **Protocol** (IP transport protocol): Select a protocol from the list.
- **Policy Assigned** (required): Type a policy name that this rule will use, or set the value to **default**. The policy name must be listed under **Available Policies**. If you select **default**, the rule uses the standard routing table.
- **Equalize** (how to apply loadsharing): If you want load balancing to cycle through the host networks, check the **Equalize** box. If you do not check the box, the rule will use the standard routing table, and load balancing might be based on destinations.

- c When you have finished configuring this rule, select the **Save** button; then select the **Back to Overview** button to see the MultiWAN Rule Configuration Summary Screen again (Figure 6-12).

Figure 6-12. MultiWAN Rule Configuration Summary Screen

The screenshot shows the MultiWAN rule configuration interface. The title is "Multiwan rule configuration". Below the title, there is a note: "The mwan3 multiwan package traffic rules are configured here. Sorting of rules affects multiwan. Rules are read from top to bottom".

The "Traffic rules" section contains a table with the following data:

	Source address	Source port	Destination address	Destination port	Protocol	Policy assigned	Equalize	Sort	
cfg0d92bd	192.168.21.0/24	-	-	563	tcp	wan2_only	-		Edit Delete
cfg0f92bd	192.168.21.0/24	-	-	995	tcp	wan1_only	-		Edit Delete
cfg1192bd	-	-	88.154.0.0/16	1024:65535	tcp	wan1_wan2_loadbalanced	1		Edit Delete
cfg1392bd	-	-	77.11.41.0/24	1024:65535	tcp	wan1_pri_wan2_sec	-		Edit Delete
cfg1592bd	-	-	112.136.0.0/16	5352	udp	wan2_pri_wan1_sec	-		Edit Delete
cfg1792bd	-	-	0.0.0.0/0	-	-	wan1_wan2_loadbalanced	-		Edit Delete

At the bottom of the table, there is an "Add" button. Below the table, there are buttons for "Reset", "Save", and "Save & Apply".

- d If you need to configure another rule for the multiWAN, return to step 7a (on page 10).
- e After you have configured all the rules, confer with your network administrator to determine the order for the rules.
- f Use the arrows in the **Sort** column of the MultiWAN Rule Configuration Summary Screen to move a rule up or down in the list, so that the rules are applied in the determined order.

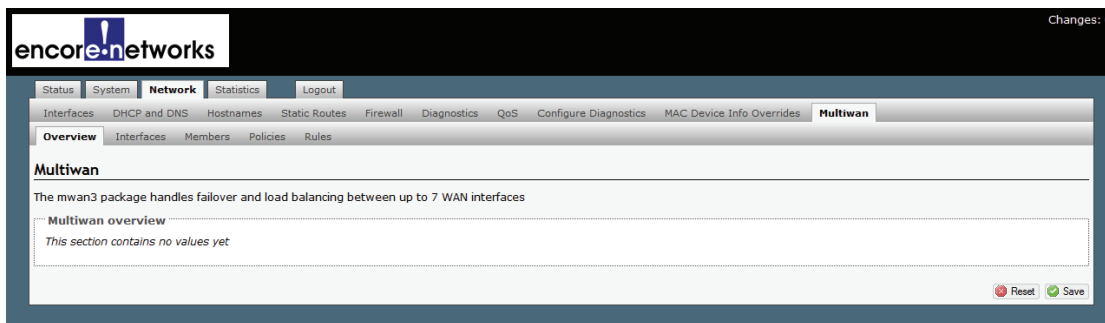
**Note:** The rules test uses a top-down matching routine:

- i When a packet enters the EN-4000, the packet's header information is tested against the first rule in the list.
- ii Within the rule, the packet is tested for a match against each parameter, in the following order (corresponding to headings from left to right in Figure 6-12):
  - ◆ Source Address
  - ◆ Source Port
  - ◆ Destination Address
  - ◆ Destination Port
  - ◆ Protocol

If a parameter is blank (such as **Source Port** for the first rule in Figure 6-12), that parameter is skipped.
- iii If the packet matches all parameters for the rule, the rule's assigned policy is applied to the packet.
- iv If the packet does not match the rule, the packet is tested against the next rule in the list. (Return to [substep ii.](#))

- v If a packet matches no rule, the standard routing table is used to send the packet toward its destination.
- g When you have finished configuring the rules for multiWAN configuration, do one of the following on the MultiWAN Rule Configuration Summary Screen (recall [Figure 6-12](#)):
  - i Select the **Save & Apply** button to save the configuration and use it immediately.
  - ii Select the **Save** button to save the multiWAN configuration now and use it after the EN-4000 is restarted.
  - iii Select the **Reset** button to discard the changes and use the previously saved configuration.
- 8 When you have finished configuring all the multiWAN configuration summary screens ([Figure 6-3](#), [Figure 6-6](#), [Figure 6-8](#), and [Figure 6-10](#)), select the **Overview** tab to navigate to the MultiWAN Overview Screen again ([Figure 6-13](#)).

Figure 6-13. MultiWAN Overview Screen



- 9 Then do one of the following on the MultiWAN Overview Screen:
  - a Select the **Save** button to save the multiWAN configuration now and use it after the EN-4000 has been restarted.
  - b Select the **Reset** button to discard the changes and use the previously saved configuration.
    - ❖ When a packet enters the EN-4000, it will be tested and directed on its path according to the rules.

