

## Chapter 6

# Configuring IP

The NMC-RX application enables you to configure IP interfaces and IP addresses on your E-series device.

Topic	Page
Overview	81
Before Configuring IP Interfaces	81
Creating IP Interfaces	82
Creating IP Addresses	87
Associating a Customer with an IP Interface	88

### Overview

---

TCP/IP is a suite of data communications protocols. Two of the more important protocols in the suite are the Transmission Control Protocol (TCP) and the Internet Protocol (IP).

IP provides the basic packet delivery service for all TCP/IP networks. It is a connectionless protocol, which means that it does not exchange control information to establish an end-to-end connection before transmitting data. A connection-oriented protocol exchanges control information with the remote computer to verify that it is ready to receive data before sending it.

IP relies on protocols in other layers to establish the connection if connection-oriented services are required and to provide error detection and error recovery. IP is sometimes called an unreliable protocol, because it contains no error detection or recovery code.

### Before Configuring IP Interfaces

---

Before you attempt to configure an IP interface, you must configure a module. See the following chapters in the *NMC-RX User Guide, Vol. 1*:

*Chapter 11, Configuring Channelized OC Modules*

*Chapter 12, Configuring Unchannelized OC Modules*

*Chapter 14, Configuring Ethernet Modules*

*Chapter 15, Configuring T3/E3 and T1/E1 Modules*

You must also configure the lower-layer interfaces over which IP traffic flows. See the following chapters in the *NMC-RX User Guide , Vol. 1*:

*Chapter 17, Configuring ATM**Chapter 19, Configuring Bridged IP**Chapter 22, Configuring Cisco HDLC**Chapter 23, Configuring Frame Relay**Chapter 24, Configuring MLPPP Bundles**Chapter 26, Configuring PPP**Chapter 27, Configuring PPP over Ethernet*

## Creating IP Interfaces

---

Using the NMC-RX application, you can create an IP interface and its IP address(es) at the same time. You can create an IP interface with a(n):

Numbered IP address and multiple secondary addresses

Unnumbered IP address

Loopback address

To create a numbered or unnumbered IP address, you need to navigate to the appropriate level (interface, subinterface). There are two ways to navigate to the interface or subinterface level.

If you navigate via the Instance Explorer, you can display interfaces or subinterfaces that belong to a line interface of the module you select.

If you navigate via the Device-wide Explorer, you can display all the interfaces or subinterfaces configured on a device.

Loopback interfaces are created from the system level of the Instance Explorer.

### **Creating an IP Interface with a Numbered or an Unnumbered IP Address**


To create an IP interface with a numbered or an unnumbered IP address:

1. In the Instance Explorer, navigate to the appropriate link layer interface or subinterface level.
2. Click the interface or subinterface.
3. Right-click, select Create, and click IP Address.

The Create IP Address dialog box appears.

4. In the IP Major Interface group box, set parameters. See Table 31.

**Table 31: IP Major Interface group box parameters**

Parameter	Description
Name	Identifies the interface; generated automatically
Alias	Description of the interface; 0–256 characters; default: blank
IfIndex	Identifies the interface on the particular line interface; generated automatically
Operational	Current operational status of the interface
Administrative	Desired status of the interface: Up/Down; default: Up
Category	other broadcast – data is sent to all hosts on a particular physical network pointToPoint – data is sent to directly connected hosts nbma – nonbroadcast multiaccess; data is sent to interconnected hosts but is not broadcast to all hosts on the network
Virtual Router	Virtual router with which you are associating the IP address and IP interface  Displays a list of all the available virtual routers when you click  . You can then select the virtual router with which you want to associate the IP interface you are creating.

**Table 31: IP Major Interface group box parameters (continued)**

Parameter	Description
Interface Number	Number associated with the interface; selectable only when creating a loopback address

5. In the Policy Information group box, select policy names (see Table 32). See *Chapter 2, Configuring Policy Management* for more information.

**Table 32: Policy Information group box parameters**

Parameter	Description
Policy Information	Input - applies policy to data arriving at this interface Output - applies policy to data leaving this interface Local Input - applies policy to local data arriving at this interface Click  and select a policy name from the dialog box. To enable statistics logging, select the Statistics Enabled check box after selecting a policy name.

6. In the Address Information group box, select an address type, and do one of the following:

If you selected Numbered, enter the IP address, net mask, and MTU values (see Table 33).

If you selected UnNumbered, enter an MTU value, click the Select Interface Index button, and make a selection (see Table 33).

**Table 33: Address Information group box parameters**

Parameter	Description
IP Address	32-bit number consisting of a network number and a host number; available only when Numbered address type is selected.
Address Type	Numbered (default): You can create multiple secondary IP addresses for a single IP interface (except on bridged IP). UnNumbered: There can be only one UnNumbered address on an IP interface. If you select UnNumbered, the Select Interface Index button becomes active. Click this button to display the Select IP Interface dialog box, which allows you to select an Interface Index for the UnNumbered IP address. Unnumbered interfaces are often used in point-to-point connections.
Net Mask	You can set a nondefault value only when you create the IP address; default value is 255.255.255.0; you cannot modify this parameter later. For an unnumbered IP address, the value for the mask is 255.255.255.255; you cannot edit this value. Within a virtual router, the subnet part of the IP address must be unique in relation to the other addresses on the router.

**Table 33: Address Information group box parameters (continued)**

Parameter	Description
MTU	Maximum transmission unit; range 0–65535; default is 0, which means that the size is limited by the underlying layer
UnNumbered Loop Interface Index	Takes the ifindex value of another IP loopback interface with Category set as a loopback  Available only when UnNumbered is selected as address type
Secondary Address	Select to make the address the secondary IP address  <b>NOTE:</b> You must create a primary IP address before creating a secondary IP address.

- Complete the status settings in the lower portion of the Create IP Address dialog box by clicking the desired setting's checkbox. See Table 34 for descriptions.

**Table 34: IP status settings**

Status Setting	Meaning
Administrative	IP interface is enabled or disabled by the administrator
ICMP Redirect	Enables the sending of redirect messages if the software is forced to resend a packet through the same interface on which it was received
Direct BCAST	Enables directed broadcast forwarding to physical broadcasts
Proxy ARP	Proxy Address Resolution Protocol; can be enabled only for addresses on top of bridged IP or Ethernet interfaces  Variation of ARP in which an intermediate device (a router, for example) sends an ARP response on behalf of an end node to the requesting host  Can lessen bandwidth use on slow-speed WAN links  ARP is used to map an IP address to a MAC address
IRDP	Enables use of ICMP Router Discover Protocol (IRDP) processing on an interface
Access Route	Enables use of an access route

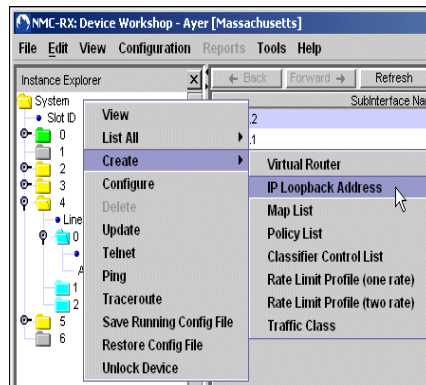
- Click OK to create the IP interface. You have established an IP interface and IP address over the lower-layer interface.

To create additional IP addresses, see page 87.

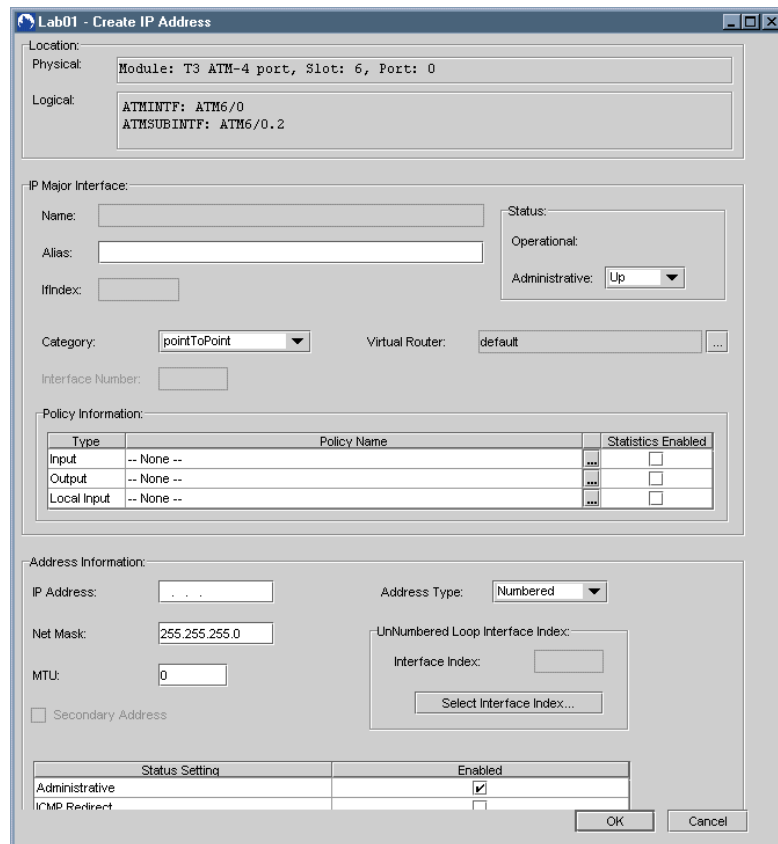
### ***Creating an IP Loopback Address***

To create an IP loopback address:

- In the Instance Explorer, click the System folder.
- Right-click, select Create, and click IP Loopback Address.



The Create IP Address dialog box appears.



3. Perform steps 4–8 in the previous section.

## Creating IP Addresses

You can create numbered and unnumbered IP addresses for IP interfaces. Numbered addresses can be either primary or secondary addresses.



**NOTE:** You must create a primary IP address before creating a secondary IP address.

To create an IP address:

1. In the Device-wide Explorer, select IP Interfaces, right-click, and click List All.

A list of IP interfaces appears in the list area.

2. Select the interface for which you want to create an IP address, right-click, select Create, and click IP Address.

The Create IP Address dialog box appears. Note that previously configured settings in the IP Major Interface group box, such as logical name, are displayed and uneditable.

**Lab01 - Create IP Address**

Location:

Physical: Module: T3 ATM-4 port, Slot: 6, Port: 0

Logical: ATHINTF: ATH6/0  
ATHSUBINTF: ATH6/0.2

IP Major Interface:

Name:

Alias:

Index:

Category: pointToPoint  Virtual Router: default

Interface Number:

Policy Information:

Type	Policy Name	Statistics Enabled
Input	-- None --	<input type="checkbox"/>
Output	-- None --	<input type="checkbox"/>
Local Input	-- None --	<input type="checkbox"/>

Address Information:

IP Address:

Net Mask: 255.255.255.0

MTU: 0

Address Type: Numbered

UnNumbered Loop Interface Index:

Interface Index:

Secondary Address

Status Setting

Status Setting	Enabled
Administrative	<input checked="" type="checkbox"/>
ICMP Redirect	<input type="checkbox"/>

3. Set the Address Information parameters (see steps 5-6, starting on page 84).



**NOTE:** Be sure to click the Secondary Address checkbox.

4. Click OK.

## Associating a Customer with an IP Interface

When you configure an IP interface, you can associate a customer with the interface.

To associate a customer with an IP interface:

1. Select the IP interface that you want to associate with a customer.
2. Right-click, and click Configure.

The IP Intf Configuration tab appears in the work area.

3. Click the Customer Information tab.

4. Click Associate Customer.

The Associate Customer dialog box appears.

5. Select a customer and customer site, and click OK.

The customer is associated with the interface.



**NOTE:** See *NMC-RX User Guide, Vol. 1, Chapter 7, Configuring Customers*, for instructions on configuring customers and customer sites.

To clear a customer's configuration settings, click the Clear Customer button on the Customer Information tab.

## Viewing Policy List Statistics on IP Interfaces

You can display policy statistics on a device for policies associated with IP interfaces. To obtain policy statistics, you must identify a specific policy list rule and one of its associated classifier control list entries (if any).

See *Chapter 2, Configuring Policy Management* for more information on creating policy lists and rules.

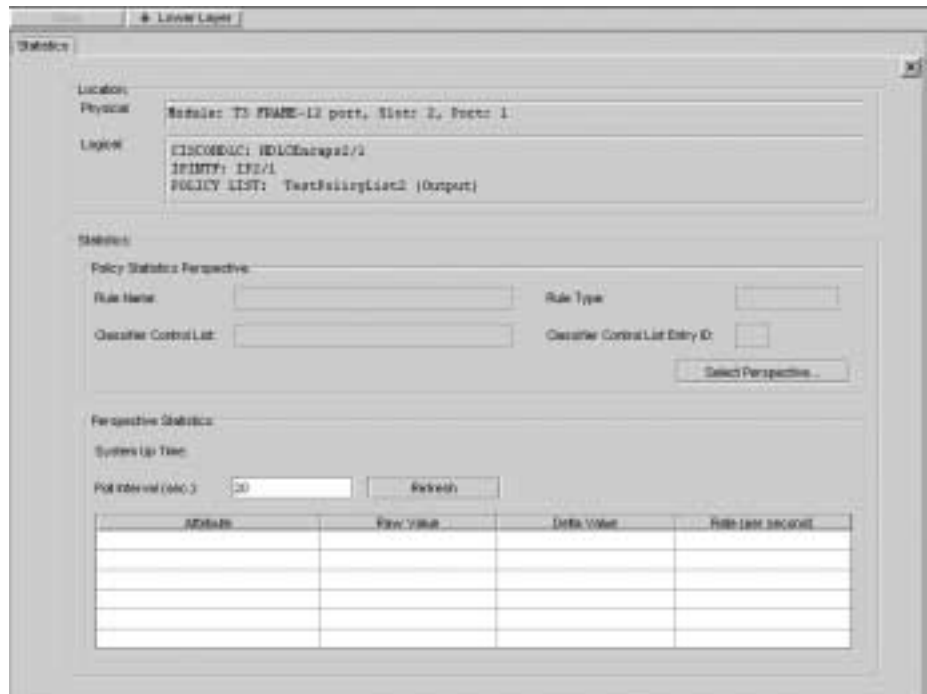
To view policy list statistics on an IP interface:



**NOTE:** These steps assume that you have created a policy list, associated it with an IP interface, and have enabled statistics for the policy type. See *Chapter 2, Associating a Policy List with an IP Interface* for more information.

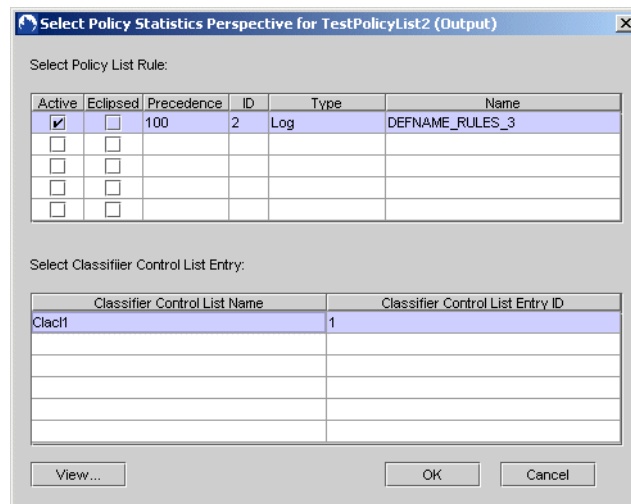
1. In the Device-wide Explorer, select IP Interfaces, right-click, and click List All.  
All IP interfaces on the device are displayed in the list area.
2. Select an IP interface, right-click, and select the statistics you want to display:
  - Policy Statistics (Input)
  - Policy Statistics (Output)
  - Policy Statistics (Local Input)

The Statistics tab appears in the work area.



3. Click the Select Perspective button.

The Select Policy Statistics Perspective for < *policy name* > dialog box appears. The Policy List Rule table lists all rules contained in the policy list.



- Click a policy list rule.

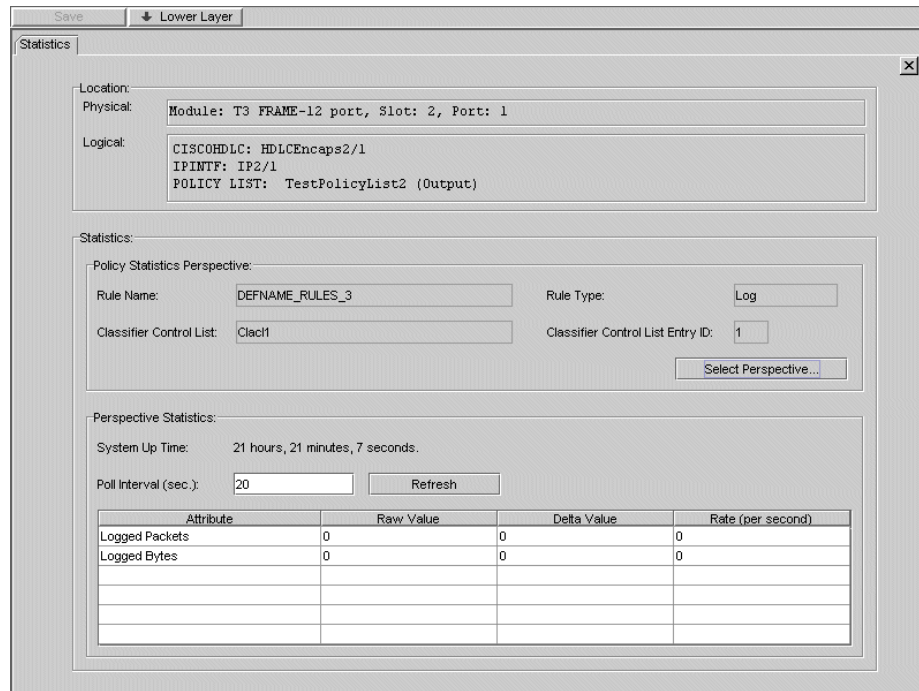
If a policy list rule has classifier control list entries associated with it, you must also select a classifier control list entry.

To view a selected classifier control list entry, click View.

- Click OK.

Information is entered in the Statistics group box, and statistics appear for the perspective you just chose.

Depending on the perspective (rule type/classifier control list entry) selected, different attributes are displayed. See Table 35 for a complete list of attributes.



6. To select a different perspective, repeat steps 3 through 5.

**Table 35: Policy list statistics attributes**

Attribute	Description
Rule Name	Logical identifier of the selected rule from all rules contained by the policy list; uneditable
Classifier Control List	Identifier of the classifier control list associated to the selected rule. If "None" is displayed, then there is no classifier control list associated to the selected rule; uneditable
Rule Type	Rule type for the selected rule; uneditable See below for rule attribute descriptions
Classifier Control List Entry ID	Identifier of the entry associated with the selected classifier control list. This field will be blank when there is no classifier control list associated to the selected rule; uneditable
<b>Color Rule</b>	
Transmitted Packets	Number of packets transmitted by the color rule
Transmitted Bytes	Number of bytes transmitted by the color rule
<b>Filter Rule</b>	
Dropped Packets	Number of packets dropped by the filter rule
Dropped Bytes	Number of bytes dropped by the filter rule
<b>Forward Rule</b>	
Forwarded Packets	Number of packets forwarded by the forward rule
Forwarded Bytes	Number of bytes forwarded by the forward rule

**Table 35: Policy list statistics attributes (continued)**

<b>Attribute</b>	<b>Description</b>
<b>Log Rule</b>	
Logged Packets	Number of packets logged by the log rule
Logged Bytes	Number of bytes logged by the log rule
<b>Mark Rule</b>	
Marked Packets	Number of packets marked by the mark rule
Marked Bytes	Number of bytes marked by the mark rule
<b>Next Hop Rule</b>	
Routed Packets	Number of packets routed to the next-hop IP address
Routed Bytes	Number of bytes routed to the next-hop IP address
<b>Next Interface Rule</b>	
Routed Packets	Number of packets routed to the next-interface interface
Routed Bytes	Number of bytes routed to the next-interface interface
<b>Rate Limit Profile Rule</b>	
Committed Packets	Number of packets policed by the rate limit rule committed action
Committed Bytes	Number of bytes policed by the rate limit rule committed action
Conformed Packets	Number of packets policed by the rate limit rule conformed action
Conformed Bytes	Number of bytes policed by the rate limit rule conformed action
Exceeded Packets	Number of packets policed by the rate limit rule exceeded action
Exceeded Bytes	Number of bytes policed by the rate limit rule exceeded action
<b>Traffic Rule</b>	
Transmitted Packets	Number of packets transmitted by the traffic class rule
Transmitted Bytes	Number of bytes transmitted by the traffic class rule

