

Configuring Frame Relay

22

The NMC-RX application supports IP over Frame Relay permanent virtual circuits (PVCs) on the following modules:

- CT3, CT1, and CE1
- cOCx/STMx
- T3-Frame and E3-Frame
- OCx/STMx POS

Topic	Page
Overview	22-1
References	22-2
Before Configuring Frame Relay Objects	22-2
Creating Frame Relay Objects	22-2
Frame Relay Statistics	22-9

Overview

Frame Relay is a public, connection-oriented packet service based on the core aspects of Integrated Services Digital Network (ISDN). Frame Relay eliminates all processing at the network layer and greatly restricts data-link layer processing.

To create Frame Relay on unchannelized modules, such as a T3-Frame module or E3-Frame module, you must navigate through the following hierarchy:

- The module
- The line interface

For *channelized* modules, such as a CT3, CE1, or CT1 module, you must navigate through the following hierarchy:

- The module
- The line interface
- A DS1 interface
- A DS0 bundle

References

For more information about Frame Relay, see:

- *ERX Link Layer Configuration Guide, Chapter 2, Configuring Frame Relay.*

Before Configuring Frame Relay Objects

Before you attempt to configure Frame Relay on your ERX edge router, you should configure the physical line interface over which the Frame Relay traffic flows, which includes the DS1 interfaces and DS0 bundles. These procedures are described in *Chapter 14, Configuring T3/E3 and T1/E1 Modules*, and *Chapter 12, Configuring DS0 Bundles*.

Creating Frame Relay Objects

This section provides procedures for creating Frame Relay objects. The procedures are presented in the order in which you would typically perform them: create an interface first, a subinterface next, and then a circuit.



Note: *The following procedures apply to configuring Frame Relay on channelized modules. If you are configuring Frame Relay on an unchannelized module, you configure it from the line interface level.*

Creating Frame Relay Interfaces

After you have configured a DS0 bundle (see *Chapter 12, Configuring DS0 Bundles*), you are ready to create Frame Relay interfaces.

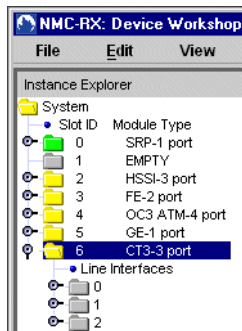


Note: Only one Frame Relay interface is allowed per DS0 bundle.

To create a Frame Relay interface:

- 1 In the Instance Explorer, select the module for which you want to configure a Frame Relay interface.

The line interfaces appear.

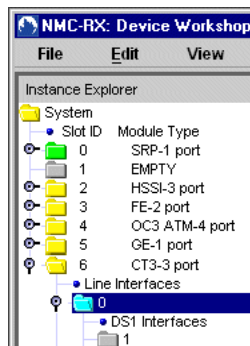


- 2 Double-click the line interface.

The DS1 interfaces appear.

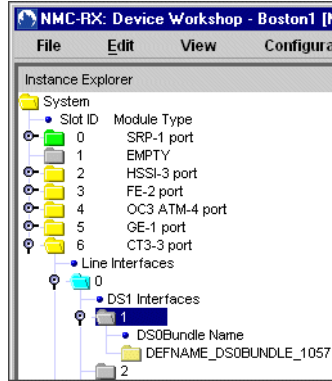


Note: If you are configuring a CT3 module, double-click a line interface to display the DS1 interfaces.



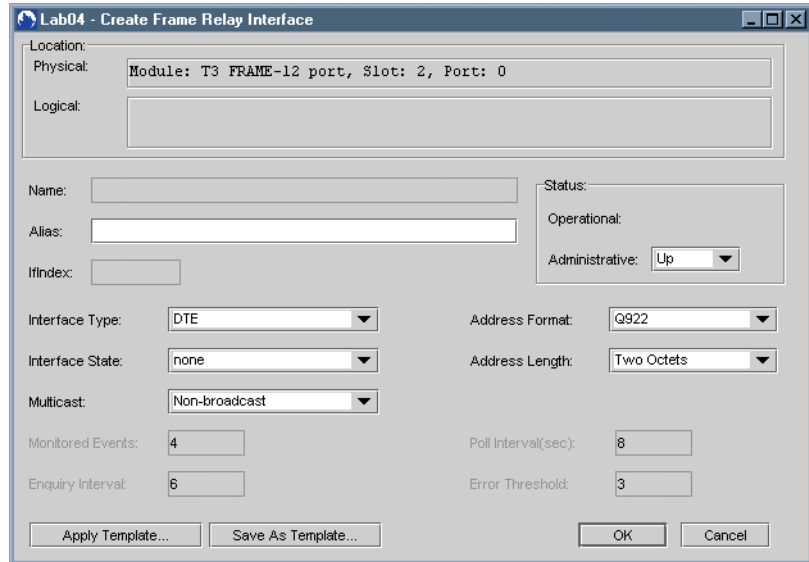
- 3 Double-click a DS1 interface.

The DS0 bundles appear.



- 4 Select a DS0 bundle, right-click, select Create, and click Frame Relay.

The Create Frame Relay Interface dialog box appears.



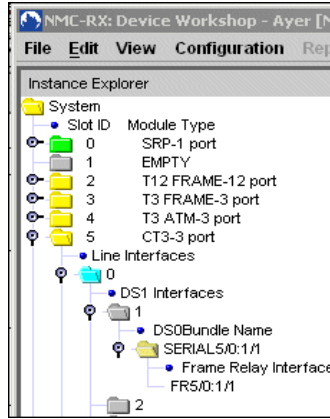
- 5 Set the Frame Relay interface parameters. See Table 22-1.

Table 22-1 Frame Relay interface parameters

Parameter	Description
Name	Identifies the interface; generated automatically
Alias	Description of the interface; 0–15 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
Interface Type	<ul style="list-style-type: none"> • Data communications equipment (DCE) • Data terminal equipment (DTE) • Network-to-Network Interface (NNI)
Interface State	Sets local management information (LMI), which provides configuration and status information relating to the virtual circuit running over Frame Relay; options: None, ANSI, Cisco, Q.933
Multicast	Indicates whether this virtual circuit is used as a unicast virtual circuit or the type of multicast service being used. Currently, nonbroadcast is the only supported option.
Monitored Events	Diagnostic window used to verify link integrity; not available when none is selected from Interface State; range 1–10
Enquiry Interval	Number of status enquiry intervals that pass before issuance of a full-status enquiry message; enquiry Interval is applicable to DTE and NNI only; not available when none is selected from Interface State; range 1–255; default 6
Address Format	Address format that is in use on the Frame Relay interface. Currently, Q922 is the only option.
Address Length	Address length in octets
Poll Interval (sec)	Number of seconds between successive status enquiry messages; not available when none is selected from Interface State; range 5–30 seconds
Error Threshold	Number of errors that will take the interface down; not available when none is selected from Interface State; range 1–10

6 Click OK.

The name of the new Frame Relay interface appears in the Instance Explorer below the DS0 bundle.



Note: If there is an applicable template, you can use that template to configure the non-unique parameters for Frame Relay. The non-unique parameters are displayed in blue in a template. See Chapter 9, *Using Templates*, for more information.

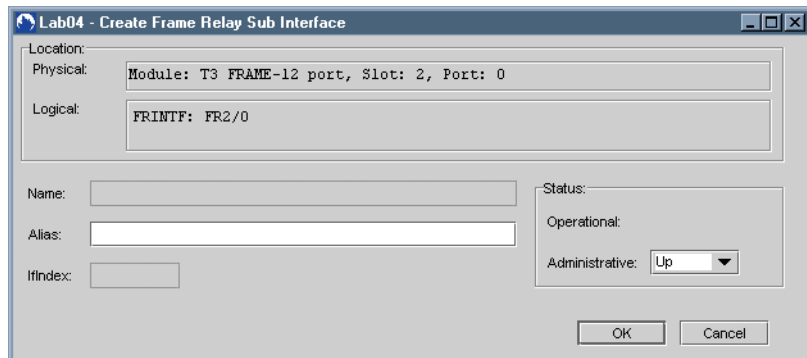
Creating Frame Relay Subinterfaces

After you have created a Frame Relay interface, you can create Frame Relay subinterfaces.

To create a Frame Relay subinterface:

- 1 Click the Frame Relay interface.
- 2 Right-click, select Create, and click Frame Relay Subinterface.

The Create Frame Relay Subinterface dialog box appears.



- 3 Set the parameters. See Table 22-2.

Table 22-2 Frame Relay subinterface parameters

Parameter	Description
Name	Identifies the interface; generated automatically
Alias	Description of the interface; 0–15 characters; default blank
IfIndex	Identifies the interface on the particular line interface; generated automatically
Status	
Operational	Current operational status of the interface
Administrative	Desired status of the interface: Up/Down; default Up

4 Click OK.

The name of the new Frame Relay subinterface appears in the list area.

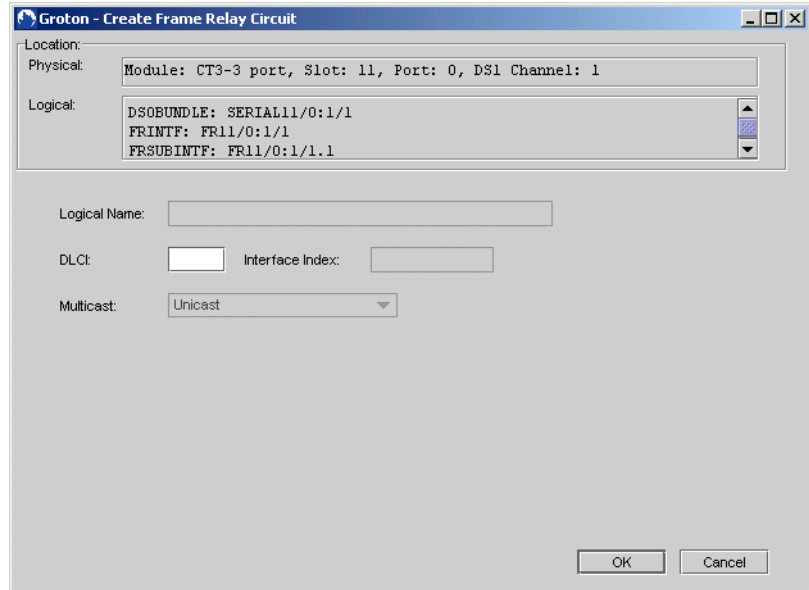
Creating Frame Relay Circuits

The last step in configuring Frame Relay is to create Frame Relay circuits.

To create a Frame Relay circuit:

- 1 From the list of subinterfaces in the list area, select the subinterface for which you want to create a circuit.
- 2 Right-click, select Create, and click Frame Relay Circuit.

The Create Frame Relay Circuit dialog box appears.



- 3 Set the Frame Relay circuit parameters. You must assign a unique DLCI value. See Table 22-3.

Table 22-3 Frame Relay circuit parameters

Parameter	Description
Logical Name	Name that identifies the interface
DLCI	Data-link connection identifier; mandatory parameter that indicates RFC1490 encapsulation; range 16–1007
Interface Index	Interface index number of the Frame Relay subinterface to which the circuit is associated; generated automatically
Multicast	Indicates whether this virtual circuit is used as a unicast virtual circuit or the type of multicast service being used

- 4 Click OK.

The new circuit does not appear in the Instance Explorer, but can be displayed if you select the subinterface it was created from and use the List All command.

Frame Relay Statistics

The NMC-RX application allows you to view and monitor information about Frame Relay interfaces, subinterfaces, and circuits. Once you select a configured device, you can list the objects and request statistics.

To view statistics:

- 1 From the Device-wide Explorer, select Frame Relay, and click either Interfaces, Sub Interfaces, or Circuits.
- 2 Right-click, and click List All.

A list of all objects of the type you selected, which are configured on the device, appears in the list area.

- 3 Select an item in the list area, right-click, and click Statistics.

The appropriate Statistics tab appears. See the following sections for more information.

Interface and Subinterface Statistics

The Statistics tab for Frame Relay interface and subinterface statistics is shown. Table 22-4 describes the attributes.

Save Lower Layer

Statistics

Location:

Physical: Module: CT3-3 port, Slot: 5, Port: 0, DS1 Channel: 1

Logical: DS0BUNDLE: SERIAL5/0:1/1
FRINTF: FR5/0:1/1
FRSUBINTF: FR5/0:1/1.1

System Up Time: 4 days, 1 hours, 49 minutes, 6 seconds.

Poll Interval (sec.): Refresh

Attribute	Raw Value	Delta Value	Rate (per second)
Received Octets	0	0	0
Transmitted Octets	0	0	0
Received Packets with Errors	0	0	0
Transmitted Packets with Errors	0	0	0
Unknown Protocol Packets	0	0	0
Received Ucast Packets	0	0	0
Transmitted Ucast Packets	0	0	0
Received Packets Discarded	0	0	0
Transmitted Packets Discarded	0	0	0
Received Multicast Packets	0	0	0
Transmitted Multicast Packets	0	0	0
Received Broadcast Packets	0	0	0
Transmitted Broadcast Packets	0	0	0

Table 22-4 Frame Relay interface and subinterface statistics attributes

Attribute	Description
System Up Time	Time since last reported change to the operational status
Poll Interval (sec)	Interval in seconds between POLL PDU transmissions
Refresh	When button is clicked, the statistics are refreshed
Received Octets	Number of incoming octets received on this interface or subinterface
Transmitted Octets	Number of outgoing octets transmitted on this interface or subinterface
Received Packets with Errors	Number of incoming errors received on this interface or subinterface
Transmitted Packets with Errors	Number of outgoing packets with errors on this interface or subinterface
Unknown Protocol Packets	Number of packets discarded because of an unknown or unsupported protocol
Received Ucast Packets	Number of received Ucast packets
Transmitted Ucast Packets	Number of transmitted Ucast packets
Received Packets Discarded	Number of received packets without errors discarded
Transmitted Packets Discarded	Number of transmitted packets without errors discarded
Received Multicast Packets	Number of received multicast packets
Transmitted Multicast Packets	Number of transmitted multicast packets
Received Broadcast Packets	Number of received broadcast packets
Transmitted Broadcast Packets	Number of transmitted broadcast packets

Circuit Statistics

The Statistics tab for a Frame Relay circuit is shown below. Table 22-5 describes the attributes.

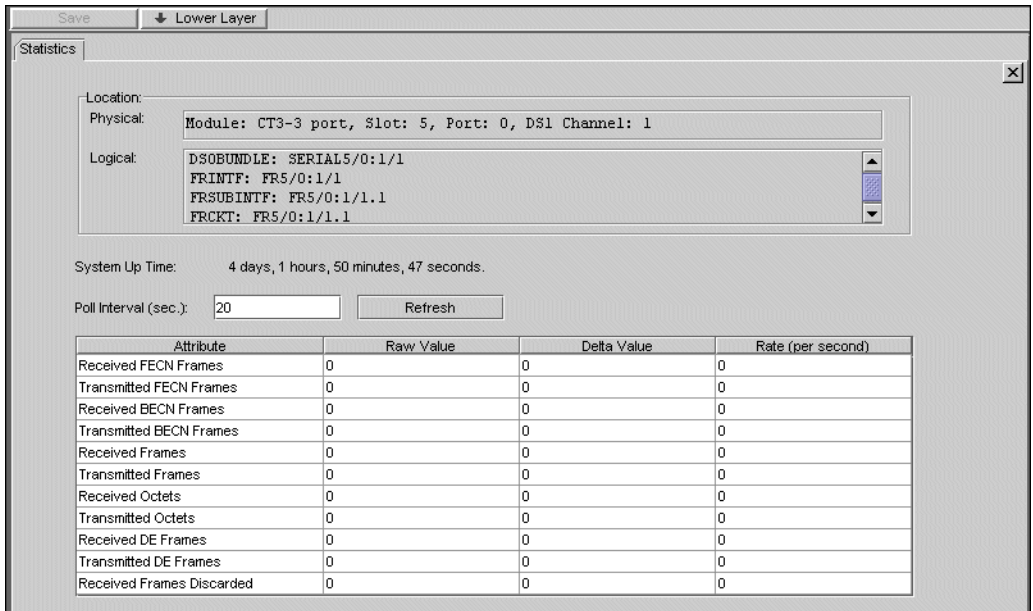


Table 22-5 Frame Relay circuit statistics attributes

Attribute	Description
Received FECN Frames	Number of packets received with the forward explicit congestion notification (FECN) bit set ^a
Transmitted FECN Frames	Number of packets transmitted with the FECN bit set ^a
Received BECN Frames	Number of packets received with the backward explicit congestion notification (BECN) bit set ^b
Transmitted BECN Frames	Number of packets transmitted with the BECN bit set ^b
Received Frames	Number of incoming packets received on the circuit
Transmitted Frames	Number of outgoing packets transmitted on the circuit
Received Octets	Number of octets received on the circuit
Transmitted Octets	Number of octets sent
Received DE Frames	Number of packets received with the discard eligibility (DE) bit set ^c

Table 22-5 Frame Relay circuit statistics attributes (continued)

Attribute	Description
Transmitted DE Frames	Number of packets transmitted with the DE bit set ^c
Received Frames Discarded	Number of inbound packets dropped

- a The FECN bit is set by a network to notify the user that data traffic may experience congestions in the direction of the frame carrying the FECN bit. The FECN bit is set by the network (not by the transmitting user), and there is no obligation for end systems to take any action regarding the FECN bit.
- b The BECN bit is set by a network to notify the user that data traffic may experience congestions in the opposite direction of the frame carrying the BECN bit. The BECN bit is set by the network, and there is no obligation for end systems to take any action regarding the BECN bit.
- c When the DE is set, it indicates that the frame should be discarded in preference to other frames without the DE bit set. DE bit may be set by the network or the user. Once set, it cannot be reset.