

Chapter 23

Configuring Frame Relay

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

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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:

E-series Link Layer Configuration Guide, Chapter 2, Configuring Frame Relay

Before Configuring Frame Relay Objects

Before you attempt to configure Frame Relay on your E-series 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 15, Configuring T3/E3 and T1/E1 Modules*, and *Chapter 13, 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 13, Configuring DS0 Bundles*), you are ready to create Frame Relay interfaces.

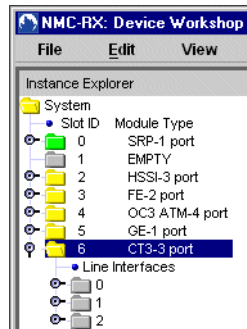


NOTE: Only one Frame Relay interface is allowed per DS0 bundle.

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:

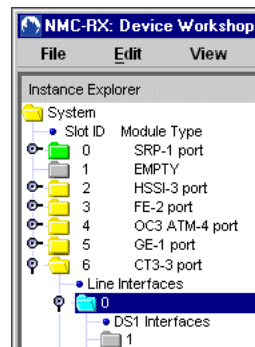


2. Double-click the line interface.

The DS1 interfaces appear.

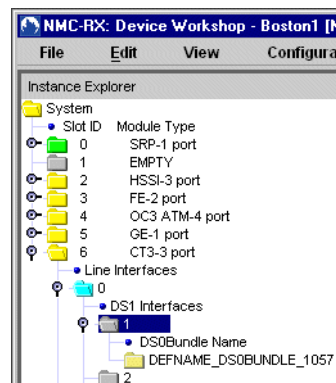


NOTE: If you are configuring a CT3 module, double-click a line interface to display the DS1 interfaces.



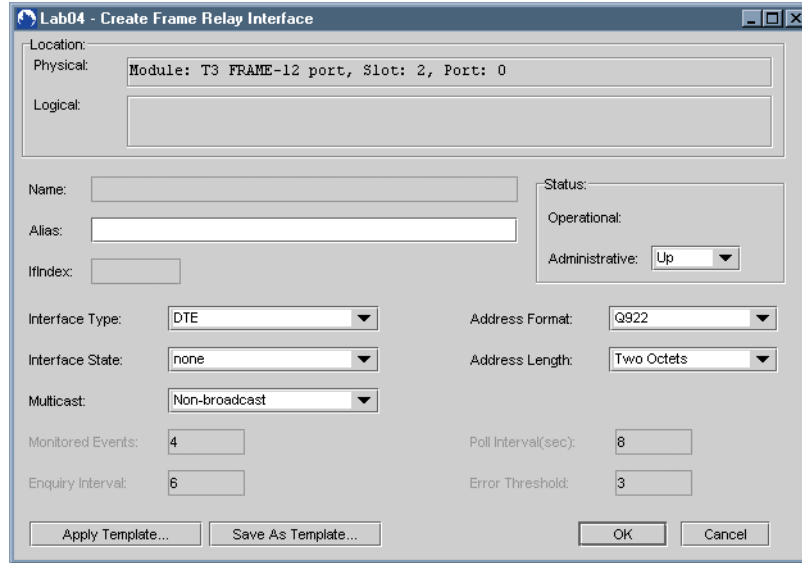
3. Double-click a DS1 interface.

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 54.

Table 54: Frame Relay interface parameters

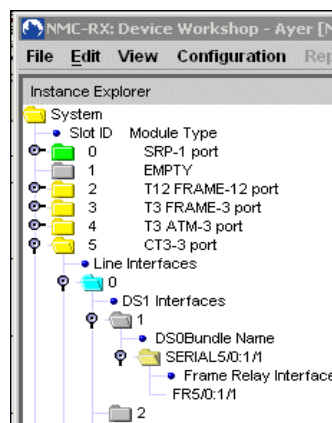
| Parameter | Description |
|------------------|---|
| Name | Identifies the interface; generated automatically |
| Alias | Description of the interface; 0–15 characters; default: blank |
| IfIndex | Identifies the interface on the particular line interface; generated automatically |
| Operational |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

Table 54: Frame Relay interface parameters (continued)

| Parameter | Description |
|---------------------|--|
| 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 |

- 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.

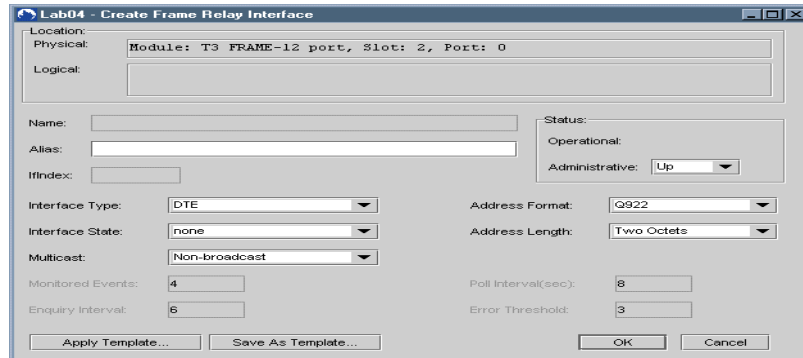
Creating Frame Relay Subinterfaces

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

To create a Frame Relay subinterface:

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

The Create Frame Relay Subinterface dialog box appears.



3. Set the parameters. See Table 55.

Table 55: 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.

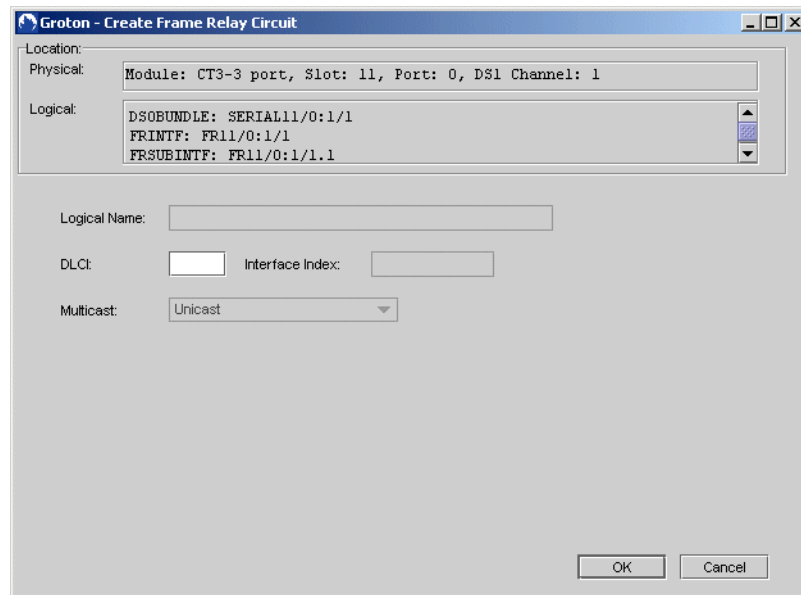
Creating Frame Relay Circuits

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 56.

Table 56: 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 57 describes the attributes.

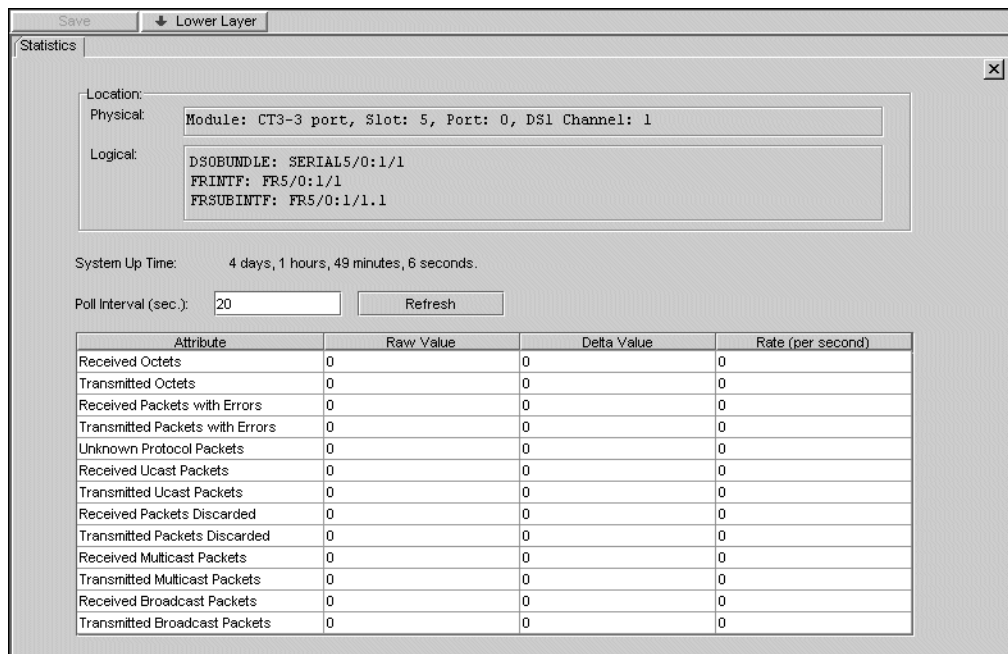


Table 57: Frame Relay interface and subinterface statistics attributes

| 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 |

Table 57: Frame Relay interface and subinterface statistics attributes (continued)

| Attribute | Description |
|---------------------------------|---|
| 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. Table 58 describes the attributes.

| Attribute | Raw Value | Delta Value | Rate (per second) |
|---------------------------|-----------|-------------|-------------------|
| Received FECN Frames | 0 | 0 | 0 |
| Transmitted FECN Frames | 0 | 0 | 0 |
| Received BECN Frames | 0 | 0 | 0 |
| Transmitted BECN Frames | 0 | 0 | 0 |
| Received Frames | 0 | 0 | 0 |
| Transmitted Frames | 0 | 0 | 0 |
| Received Octets | 0 | 0 | 0 |
| Transmitted Octets | 0 | 0 | 0 |
| Received DE Frames | 0 | 0 | 0 |
| Transmitted DE Frames | 0 | 0 | 0 |
| Received Frames Discarded | 0 | 0 | 0 |

Table 58: Frame Relay circuit statistics attributes

| Attribute | Description |
|----------------------|--|
| Received FECN Frames | Number of packets received with the forward explicit congestion notification (FECN) bit set NOTE: 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. |

Table 58: Frame Relay circuit statistics attributes (continued)

| Attribute | Description |
|---------------------------|---|
| Transmitted FECN Frames | Number of packets transmitted with the FECN bit set NOTE: 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. |
| Received BECN Frames | Number of packets received with the backward explicit congestion notification (BECN) bit set NOTE: 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. |
| Transmitted BECN Frames | Number of packets transmitted with the BECN bit set NOTE: 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. |
| 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 NOTE: 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. |
| Transmitted DE Frames | Number of packets transmitted with the DE bit set NOTE: 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. |
| Received Frames Discarded | Number of inbound packets dropped |