

## Chapter 24

# Configuring Frame Relay

This chapter describes how to configure 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

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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 an 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

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For more information about Frame Relay, see:

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

## Before Configuring Frame Relay Objects

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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 16, Configuring T3/E3 and T1/E1 Modules*, and *Chapter 14, Configuring DS0 Bundles*.

## Creating Frame Relay Objects

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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.

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## Creating Frame Relay Interfaces

After you have configured a DS0 bundle (see *Chapter 14, Configuring DS0 Bundles*), you are ready to create Frame Relay interfaces.



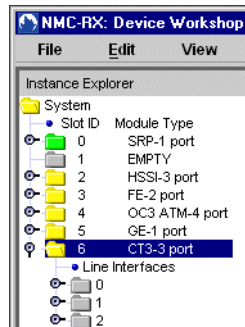
**NOTE:** Only one Frame Relay interface is allowed per DS0 bundle.

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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.

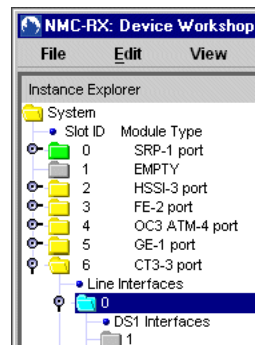


2. Double-click the line interface.

The DS1 interfaces appear.

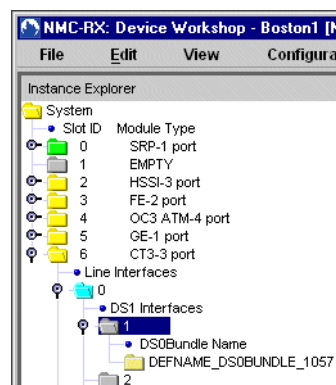


**NOTE:** If you are configuring a CT3 module, double-click a line interface to display the DS1 interfaces.



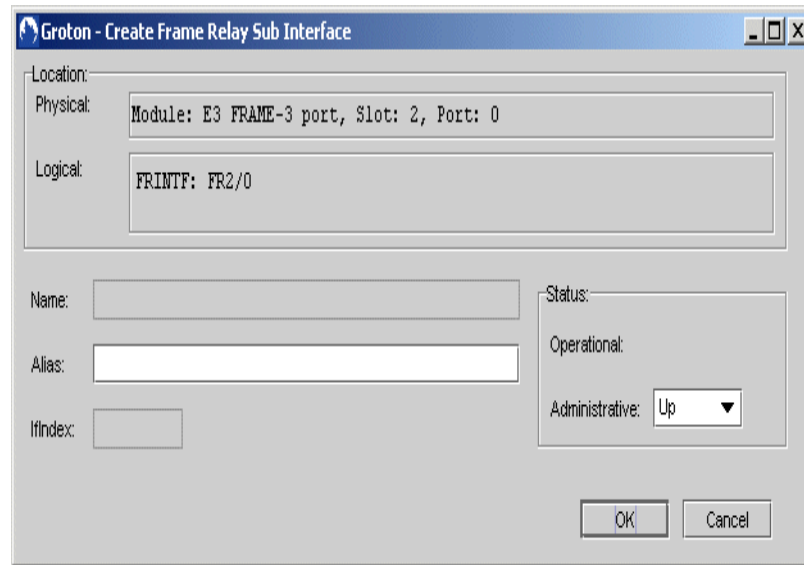
3. Double-click a DS1 interface.

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 (Table 76).

**Table 76: Frame Relay Interface Parameters**

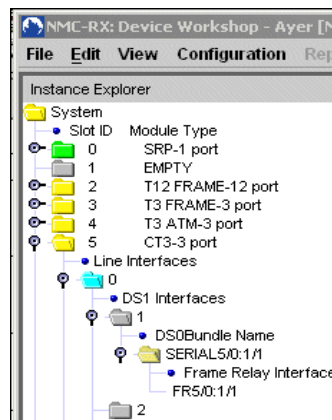
Parameter	Description
Name	Identifies the interface; generated automatically
Alias	Description of the interface; 0–15 characters; default: blank
IfIndex	Identifies the interface on the particular line interface; generated automatically
Operational	Current operational status of the interface
Administrative	Desired status of the interface: Up/Down; default: Up
Interface Type	<ul style="list-style-type: none"> <li>■ Data communication equipment (DCE)</li> <li>■ Data terminal equipment (DTE)</li> <li>■ Network-to-Network Interface (NNI)</li> </ul>
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

**Table 76: Frame Relay Interface Parameters (continued)**

Parameter	Description
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

- 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. For more information, see *Chapter 10, Using Templates*.

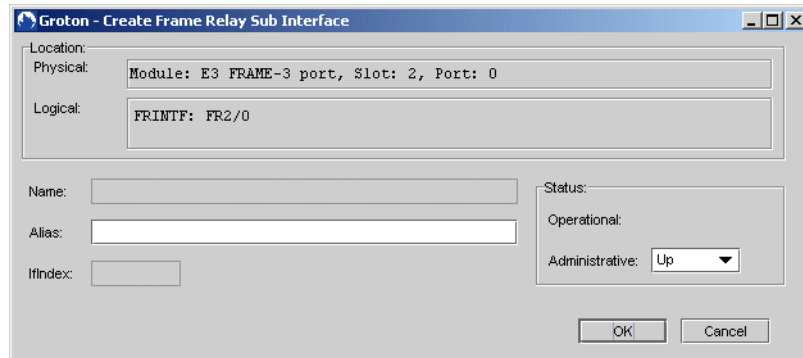
### Creating Frame Relay Subinterfaces

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 (Table 77).

**Table 77: 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
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.

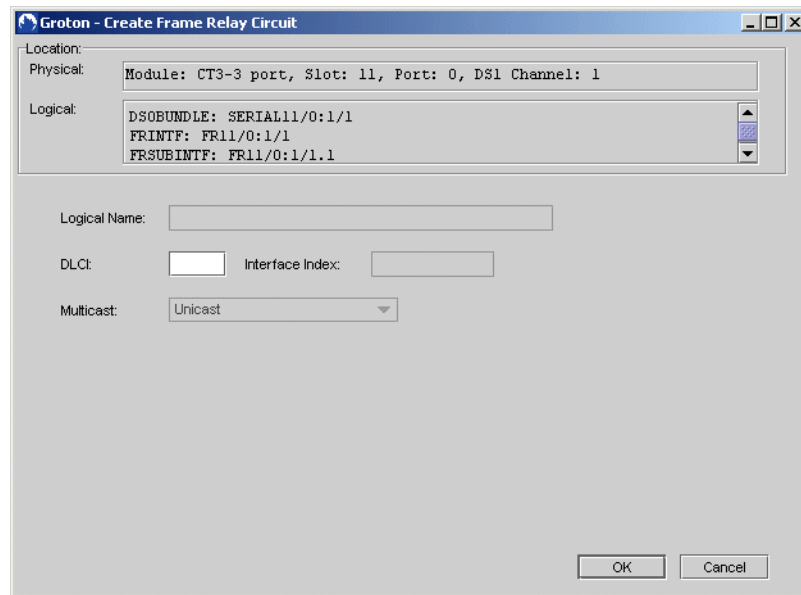
### Creating Frame Relay Circuits

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 (Table 78). You must assign a unique data-link connection identifier (DLCI) value.

**Table 78: 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.

## Viewing 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 select 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 select 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 79 describes the attributes.

The screenshot shows a window titled 'Statistics' with a 'Save' button and a 'Lower Layer' dropdown. The window is divided into several sections:

- Location:**
  - Physical:** Module: CT3-3 port, Slot: 5, Port: 0, DSL Channel: 1
  - Logical:**
    - DSOBUNDLE: 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.):** 20 (with a 'Refresh' button)
- Table 79: Statistics**

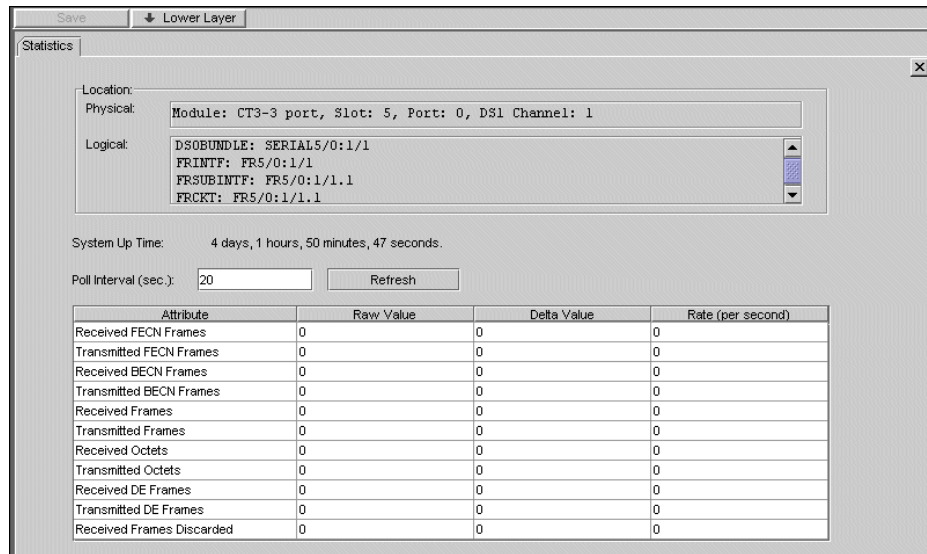
Attribute	Raw Value	Delta Value	Rate (per second)
Received Octets	0	0	0
Transmitted Octets	0	0	0
Received Packets with Errors	0	0	0
Transmitted Packets with Errors	0	0	0
Unknown Protocol Packets	0	0	0
Received Ucast Packets	0	0	0
Transmitted Ucast Packets	0	0	0
Received Packets Discarded	0	0	0
Transmitted 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 79: Frame Relay Interface and Subinterface Statistics Attributes**

<b>Attribute</b>	<b>Description</b>
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. Table 80 describes the attributes.



**Table 80: Frame Relay Circuit Statistics Attributes**

Attribute	Description
Received FECN Frames	Number of packets received with the forward explicit congestion notification (FECN) bit set  <b>NOTE:</b> 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.
Transmitted FECN Frames	Number of packets transmitted with the FECN bit set  <b>NOTE:</b> 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  <b>NOTE:</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.

**Table 80: Frame Relay Circuit Statistics Attributes (continued)**

Attribute	Description
Transmitted BECN Frames	Number of packets transmitted with the BECN bit set  <b>NOTE:</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.
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  <b>NOTE:</b> When the DE value 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  <b>NOTE:</b> When the DE value 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

