Frame Relay Commands

This module provides CLI commands for configuring Frame Relay services on the Cisco ASR 9000 Series Router.

To use commands of this module, you must be in a user group associated with a task group that includes appropriate task IDs. If the user group assignment is preventing you from using any command, contact your AAA administrator for assistance.

clear frame-relay multilink interface

To clear the multilink frame-relay (MFR) statistics for the given interface or location, use the **clear frame-relay multilink interface** command in EXEC mode.

clear frame-relay multilink interface {*type interface-path-id* | **all** [**location** *node id*]}

Syntax Description

type	Interface type. For more information, use the question mark (?) online help function.
interface-path-id	Physical interface or virtual interface. **Note** Use the **show interfaces** command to see a list of all interfaces currently configured on the router. For more information about the syntax for the router, use the question mark (**?**) online help function.
all	Clears MFR statistics for all interfaces
location *node-id*	(Optional) Clears MFR statistics for all interfaces at the location specified by *node-id*. The *node-id* argument is entered in the *rack*/*slot*/*module* notation.

Command Default

No default behavior or values

Command Modes

EXEC mode

Command History

Release	Modification
Release 4.0.0	This command was introduced.

Usage Guidelines

No specific guidelines impact the use of this command.

Task ID

Task ID	Operations
fr	execute

Examples

The following example shows how to use the **clear frame-relay multilink interface** command to clear the multilink frame-relay protocol and internal statistics on an interface:

```
RP/0/RSP0/CPU0:router# clear frame-relay multilink interface serial 0/1/0/0
```

Related Commands

Command	Description
show frame-relay lmi-info, on page 33	Displays Frame Relay information for the LMI.

Command	Description
show interfaces multilink	Displays information about a multilink interface.

clear frame-relay lmi interface

To clear the LMI statistics for the given interface or location, use the **clear frame-relay lmi** command in EXEC mode.

clear frame-relay lmi interface {*type interface-path-id* | **all** [**location** *node id*]}

Syntax Description

type	Interface type. For more information, use the question mark (?) online help function.
interface-path-id	Physical interface or virtual interface. **Note** Use the **show interfaces** command to see a list of all interfaces currently configured on the router. For more information about the syntax for the router, use the question mark (**?**) online help function.
all	Clears LMI statistics for all interfaces
location *node-id*	(Optional) Clears LMI statistics for all interfaces at the location specified by *node-id*. The *node-id* argument is entered in the *rack*/*slot*/*module* notation.

Command Default

No default behavior or values

Command Modes

EXEC mode

Command History

Release	Modification
Release 4.0.0	This command was introduced.

Usage Guidelines

No specific guidelines impact the use of this command.

Task ID

Task ID	Operations
fr	execute

Examples

The following example shows how to use the **clear frame-relay lmi** command to clear the LMI counters on an interface:

```
RP/0/RSP0/CPU0:router# clear frame-relay lmi interface pos 0/1/0/0
```

Related Commands

Command	Description
show frame-relay lmi, on page 31	Displays Frame Relay statistics for the LMI.

encap (PVC)

To change the encapsulation for a Frame Relay permanent virtual circuit (PVC), use the **encap** command in Frame Relay PVC configuration mode. To restore default encapsulation from the Frame Relay main interface, use the **no** form of this command.

encap {**cisco** | **ietf**}

Syntax Description

cisco	(Optional) Uses Cisco encapsulation, which is a 4-byte header, with 2 bytes to identify the data-link connection identifier (DLCI) and 2 bytes to identify the packet type.
ietf	(Optional) Sets the encapsulation method to comply with the Internet Engineering Task Force (IETF) standard (RFC 1490). Use this keyword when connecting to equipment that belongs to a vendor other than Cisco across a Frame Relay network.

Command Default

The default encapsulation keyword is Cisco.

When this command is not configured, encapsulation is inherited from the Frame Relay main interface.

Command Modes

Frame Relay PVC configuration (config-fr-vc)

Command History

Release	Modification
Release 4.0.0	This command was introduced.

Usage Guidelines

This command is available on Packet-over-SONET/SDH (POS), serial, and multilink interfaces.

Task ID

Task ID	Operations
fr	read, write

Examples

The following example shows how to set encapsulation on PVC data-link connection identifier (DLCI) 16 for Packet-over-SONET/SDH (POS) subinterface 0/4/0/1.1:

```
RP/0/RSP0/CPU0:router(config)# interface POS 0/4/0/1.1 l2transport
RP/0/RSP0/CPU0:router(config-subif)# pvc 16
RP/0/RSP0/CPU0:router(config-fr-vc)# encap ietf
```

Related Commands

Command	Description
encapsulation frame-relay, on page 6	Enables Frame Relay encapsulation.

encapsulation frame-relay

To enable Frame Relay encapsulation, use the **encapsulation frame-relay** command in interface configuration mode. To disable Frame Relay encapsulation, use the **no** form of this command.

encapsulation frame-relay [**ietf**]

Syntax Description

ietf	(Optional) Sets the encapsulation method to comply with the Internet Engineering Task Force (IETF) standard (RFC 1490). Use this keyword when connecting to equipment from another vendor across a Frame Relay network.

Command Default

The default encapsulation method is Cisco.

Command Modes

Interface configuration (config-if)

Command History

Release	Modification
Release 4.0.0	This command was introduced.

Usage Guidelines

Use the **encapsulation frame-relay** command to connect an interface to a Frame Relay network. When this command is configured, outgoing packets are encapsulated with a Frame Relay header and Frame Relay headers are removed from incoming packets to the interface.

A Cisco or IETF encapsulation method controls the Network Layer Protocol Identifier (NLPID) that is added to outgoing packets on the interface. The encapsulation method enabled for an outgoing packet can be changed for each data-link connection identifier (DLCI) per subinterface by using the **encap (PVC)** command in Frame Relay PVC configuration mode.

When the **encapsulation frame-relay** command is configured, LMI is enabled by default. To disable LMI use the **frame-relay lmi disable** command.

The following restrictions apply to the **encapsulation frame-relay** command upon configuration or removal of the command on an interface:

- When configuring this command, Layer 3 and Layer 2 configurations are not allowed on the interface.
- Before removing this command, all Frame Relay subinterfaces and LMI configuration should be deleted from the interface.

The **encapsulation frame-relay** command is available on Packet-over-SONET/SDH (POS), serial, and multilink interfaces.

Task ID

Task ID	Operations
interface	read, write
fr	read, write

Examples

The following example shows Frame Relay encapsulation configured on Packet-over-SONET/SDH (POS) 0/3/0/1:

```
RP/0/RSP0/CPU0:router(config)# interface POS 0/3/0/1
RP/0/RSP0/CPU0:router(config-if)# encapsulation frame-relay ietf
```

Related Commands

Command	Description
encap (PVC), on page 5	Changes the encapsulation for a Frame Relay PVC.
frame-relay lmi disable, on page 9	Disables the Frame Relay LMI.

frame-relay intf-type

To configure the interface type of the User-Network Interface (UNI), use the **frame-relay intf-type** command in interface configuration mode. To change the configuration, use the **no** form of this command.

frame-relay intf-type {**dce** | **dte** | **nni**}

Syntax Description

dce	Router functions as a switch connected to a router.
dte	Router is connected to a Frame Relay network.
nni	Router is connected to a NNI signaling interface.

Command Default

DTE

Command Modes

Interface configuration (config-if)

Command History

Release	Modification
Release 4.0.0	This command was introduced.
Release 4.2.1	The **nni** keyword was introduced.

Usage Guidelines

The **frame-relay intf-type** command is available on Packet-over-SONET/SDH (POS), serial, and multilink interfaces.

Task ID

Task ID	Operations
fr	read, write

Examples

The following example shows how to configure a DCE switch type on the interface:

```
RP/0/RSP0/CPU0:router(config)# interface pos 0/4/0/0
RP/0/RSP0/CPU0:router(config-if)# frame-relay intf-type dce
```

frame-relay lmi disable

To disable the Frame Relay Local Management Interface (LMI), use the **frame-relay lmi disable** command in interface configuration mode. To reenable LMI, use the **no** form of this command.

frame-relay lmi disable

Syntax Description

This command has no keywords or arguments.

Command Default

LMI is enabled.

Command Modes

Interface configuration (config-if)

Command History

Release	Modification
Release 4.0.0	This command was introduced.

Usage Guidelines

The **frame-relay lmi disable** command is available on Packet-over-SONET/SDH (POS), serial, and multilink interfaces.

Task ID

Task ID	Operations
fr	read, write

Examples

The following example shows how to configure a DCE switch type on the interface:

```
RP/0/RSP0/CPU0:router(config)# interface pos 0/4/0/0
RP/0/RSP0/CPU0:router(config-if)# frame-relay lmi disable
```

frame-relay lmi-n391dte

To set the full status polling interval, use the **frame-relay lmi-n391dte** command in interface configuration mode. To restore the default interval value, use the **no** form of this command.

frame-relay lmi-n391dte *polling-cycles*

Syntax Description

polling-cycles	Number of Line Integrity Verification (LIV) exchanges performed before requesting a full status message. Range is from 1 to 255. The default is 6.

Command Default

The full status polling interval is 6.

Command Modes

Interface configuration (config-if)

Command History

Release	Modification
Release 4.0.0	This command was introduced.

Usage Guidelines

Use the **frame-relay lmi-n391dte** command to set the full status message polling interval. This command is relevant only when the interface type is data terminal equipment (DTE).

Two message types are supported: status inquiry and status. Status inquiry messages are sent from DTE to DCE. Status messages are sent from DCE to DTE (in response to a status inquiry). The Status (Full) and LIV report types are contained within these messages, and typically there is one status transaction for every five LIV transactions.

This command is available on Packet-over-SONET/SDH (POS), serial, and multilink interfaces.

Task ID

Task ID	Operations
fr	read, write

Examples

The following example shows that one out of every four status inquiries generated requests a full status response from the DCE on the interface:

```
RP/0/RSP0/CPU0:router(config)# interface pos 0/1/0/1
RP/0/RSP0/CPU0:router(config-if)# frame-relay intf-type dte
RP/0/RSP0/CPU0:router(config-if)# frame-relay lmi-n391dte 4
```

frame-relay lmi-n392dce

To set the error threshold on a DCE interface, use the **frame-relay lmi-n392dce** command in interface configuration mode. To restore the default setting, use the **no** form of this command.

frame-relay lmi-n392dce *threshold*

Syntax Description

threshold	Error threshold value. Range is from 1 to 10. Default is 3.

Command Default

The DCE error threshold is 3.

Command Modes

Interface configuration (config-if)

Command History

Release	Modification
Release 4.0.0	This command was introduced.

Usage Guidelines

N392 errors must occur within the number defined by the N393 event count for the link to be declared down. Therefore, the threshold value for this command must be less than the count value defined in the **frame-relay lmi-n393dce** command.

The **frame-relay lmi-n392dce** command is relevant only when the interface type is data communication equipment (DCE).

This command is available on Packet-over-SONET/SDH (POS), serial, and multilink interfaces.

Task ID

Task ID	Operations
fr	read, write

Examples

The following example shows how to set the Local Management Interface (LMI) failure threshold to 4. The router acts as a Frame Relay DCE switch:

```
RP/0/RSP0/CPU0:router(config)# interface pos 0/1/0/1
RP/0/RSP0/CPU0:router(config-if)# frame-relay intf-type dce
RP/0/RSP0/CPU0:router(config-if)# frame-relay lmi-n392dce 4
```

Related Commands

Command	Description
frame-relay lmi-n393dce, on page 13	Sets the DCE monitored events count.

frame-relay lmi-n392dte

To set the error threshold on a DTE interface, use the **frame-relay lmi-n392dte** command in interface configuration mode. To restore the default setting, use the **no** form of this command.

frame-relay lmi-n392dte *threshold*

Syntax Description

threshold	Error threshold value. Range is from 1 to 10. The default is 3.

Command Default

The DTE error threshold is 3.

Command Modes

Interface configuration (config-if)

Command History

Release	Modification
Release 4.0.0	This command was introduced.

Usage Guidelines

The **frame-relay lmi-n392dte** command is relevant only when the interface type is data terminal equipment (DTE).

This command is available on Packet-over-SONET/SDH (POS), serial, and multilink interfaces.

Task ID

Task ID	Operations
fr	read, write

Examples

The following example shows how to set the Local Management Interface (LMI) failure threshold to 4. The router acts as a Frame Relay DTE switch.

```
RP/0/RSP0/CPU0:router(config)# interface pos 0/1/0/1
RP/0/RSP0/CPU0:router(config-if)# frame-relay intf-type dte
RP/0/RSP0/CPU0:router(config-if)# frame-relay lmi-n392dte 4
```

frame-relay lmi-n393dce

To set the DCE monitored events count, use the **frame-relay lmi-n393dce** command in interface configuration mode. To restore the default setting, use the **no** form of this command.

frame-relay lmi-n393dce *events*

Syntax Description

events	Monitored events count. Range is from 1 to 10. The default is 4.

Command Default

The number of DCE monitored events is 4.

Command Modes

Interface configuration (config-if)

Command History

Release	Modification
Release 4.0.0	This command was introduced.

Usage Guidelines

The **frame-relay lmi-n393dce** command is used along with the **frame-relay lmi-n392dce** command to define the condition that causes the link to be declared down.

N392 errors must occur within the *events* argument count in order for the link to be declared down. Therefore, the events value defined in this command must be greater than the threshold value defined in the **frame-relay lmi-n392 dce** command.

The **frame-relay lmi-n393dce** command is relevant only when the interface type is data communication equipment (DCE).

This **frame-relay lmi-n393dce** command is available on Packet-over-SONET/SDH (POS), serial, and multilink interfaces.

Task ID

Task ID	Operations
fr	read, write

Examples

The following example shows how to set the Local Management Interface (LMI) monitored events count to 5.

```
RP/0/RSP0/CPU0:router(config)# interface pos 0/1/0/1
RP/0/RSP0/CPU0:router(config-if)# frame-relay intf-type dce
RP/0/RSP0/CPU0:router(config-if)# frame-relay lmi-n393dce 5
```

Related Commands

Command	Description
frame-relay lmi-n392dce, on page 11	Sets the error threshold on a DCE interface.

frame-relay lmi-n393dte

To set the monitored event count on a DTE interface, use the **frame-relay lmi-n393dte** command in interface configuration mode. To restore the default setting, use the **no** form of this command.

frame-relay lmi-n393dte *events*

Syntax Description

events	Monitored events count. Range is from 1 to 10. The default is 4.

Command Default

The number of DTE monitored events is 4.

Command Modes

Interface configuration

Command History

Release	Modification
Release 4.0.0	This command was introduced.

Usage Guidelines

The **frame-relay lmi-n393dte** command is relevant only when the interface type is data terminal equipment (DTE).

This **frame-relay lmi-n393dte** command is available on Packet-over-SONET/SDH (POS), serial, and multilink interfaces.

Task ID

Task ID	Operations
fr	read, write

Examples

The following example shows how to set the Local Management Interface (LMI) monitored events count to 5.

```
RP/0/RSP0/CPU0:router(config)# interface pos 0/1/0/1
RP/0/RSP0/CPU0:router(config-if)# frame-relay intf-type dte
RP/0/RSP0/CPU0:router(config-if)# frame-relay lmi-n393dte 5
```

frame-relay lmi-t391dte

To set the Local Management Interface (LMI) polling interval, use the **frame-relay lmi-t391dte** command in interface configuration mode. To restore the default interval value, use the **no** form of this command.

frame-relay lmi-t391dte *seconds*

Syntax Description

seconds	Polling interval between each status inquiry from the DTE end, in seconds. Range is from 5 to 30. The default is 10.

Command Default

The LMI polling interval is 10 seconds.

Command Modes

Interface configuration (config-if)

Command History

Release	Modification
Release 4.0.0	This command was introduced.

Usage Guidelines

This **frame-relay lmi-t391dte** command is available on Packet-over-SONET/SDH (POS), serial, and multilink interfaces.

The *seconds* value defined in this command must be less than the polling verification timer defined in the **frame-relay lmi-t392 dce** command.

The **frame-relay lmi-t391dte** command is relevant only when the interface type is data terminal equipment (DCE).

Task ID

Task ID	Operations
fr	read, write

Examples

The following example shows how to set the LMI polling timer interval to 15 seconds:

```
RP/0/RSP0/CPU0:router(config)# interface pos 0/1/0/1
RP/0/RSP0/CPU0:router(config-if)# frame-relay intf-type dte
RP/0/RSP0/CPU0:router(config-if)# frame-relay lmi-t391dte 15
```

frame-relay lmi-t392dce

To set the Local Management Interface (LMI) polling verification timer on the DCE, use the **frame-relay lmi-t392dce** command in interface configuration mode. To restore the default setting, use the **no** form of this command.

frame-relay lmi-t392dce *seconds*

Syntax Description

seconds	Polling verification timer, in seconds. The range is from 5 to 30. The default is 15.

Command Default

The LMI polling verification timer is 15 seconds.

Command Modes

Interface configuration (config-if)

Command History

Release	Modification
Release 4.0.0	This command was introduced.

Usage Guidelines

The **frame-relay lmi-t392dce** command is used along with the **frame-relay lmi-t391dte** command to define the condition that causes the link to be declared down.

The *seconds* value defined in this command must be greater than the polling verification timer defined in the **frame-relay lmi-t391 dte** command.

This **frame-relay lmi-n392dce** command is available on Packet-over-SONET/SDH (POS), serial, and multilink interfaces.

Task ID

Task ID	Operations
fr	read, write

Examples

The following example shows how to set the Local Management Interface (LMI) polling timer interval to 30 seconds:

```
RP/0/RSP0/CPU0:router(config)# interface pos 0/1/0/1
RP/0/RSP0/CPU0:router(config-if)# frame-relay intf-type dce
RP/0/RSP0/CPU0:router(config-if)# frame-relay lmi-t392dce 30
```

frame-relay lmi-type

To select the Local Management Interface (LMI) type, use the **frame-relay lmi-type** command in interface configuration mode. To restore the default setting, use the **no** form of this command.

frame-relay lmi-type [**ansi** | **cisco** | **q933a**]

Syntax Description

ansi	(Optional) Uses LMI as defined by ANSI T1.617a-1994 Annex D.
cisco	(Optional) Uses LMI as defined by Cisco (not standard).
q933a	(Optional) Uses LMI as defined by ITU-T Q.933 (02/2003) Annex A.

Command Default

The default is **cisco**.

Command Modes

Interface configuration (config-if)

Command History

Release	Modification
Release 4.0.0	This command was introduced.

Usage Guidelines

If the DTE is not explicitly configured or the **no** form is not used after explicit configuration, then the DTE automatically senses the LMI type of the DCE and use that type of LMI.

This **frame-relay lmi-type** command is available on Packet-over-SONET/SDH (POS), serial, and multilink interfaces.

Task ID

Task ID	Operations
fr	read, write

Examples

The following example shows how to set the Local Management Interface (LMI) type to Q.933, Annex A:

```
RP/0/RSP0/CPU0:router(config)# interface pos 0/1/0/1
RP/0/RSP0/CPU0:router(config-if)# frame-relay lmi-type q933a
```

frame-relay multilink ack

To configure the MFR acknowledge timeout value for a Frame Relay multilink bundle link, use the **frame-relay multilink ack** command in interface configuration mode. To revert to the default settings, use the **no** form of this command.

frame-relay multilink ack *ack-timeout*

Syntax Description

ack-timeout	Ack timeout value, in seconds. The range is from 1 to 10.

Command Default

The default MFR acknowledge timeout value is 4 seconds.

Command Modes

Interface configuration

Command History

Release	Modification
Release 4.0.0	This command was introduced.

Usage Guidelines

Note The **frame-relay multilink ack** command is supported only on serial interfaces. The **frame-relay multilink ack** command is not supported on Packet-over-SONET/SDH (POS) or multilink frame relay interfaces.

The **frame-relay multilink ack** command can be configured only on bundle link interfaces that have been associated with a bundle using the **encapsulation frame-relay mfr** command.

Note You can enter the **frame-relay multilink ack** command at any time without affecting the current state of the interface; however, the configured timeout value does not go into effect until the interface has gone from the down state to the up state. One way to bring the interface down and back up again is by using the **shutdown** and **no shutdown** commands in interface configuration mode.

Task ID

Task ID	Operations
fr	read, write

Examples

The following example shows how to configure the MFR acknowledge timeout value as 2 seconds. for the serial interface 0/3/1/0:

```
RP/0/RSP0/CPU0:router(config)# interface serial 0/3/1/0
```

```
RP/0/RSP0/CPU0:router(config-if)# frame-relay multilink ack 2
```

Related Commands

Command	Description
encapsulation frame-relay, on page 6	Enables Frame Relay encapsulation.
frame-relay multilink bid, on page 22	Assigns a BID name to a multilink Frame Relay bundle.
show frame-relay lmi-info, on page 33	Displays frame relay information for the LMI.
shutdown (interface)	Disables an interface.

frame-relay multilink bandwidth-class

To configure the bandwidth class for a Frame Relay multilink bundle interface, use the **frame-relay multilink bid bandwidth-class** command in interface configuration mode. To restore the default setting, use the **no** form of this command.

frame-relay multilink bandwidth-class {**a** | **b** | **c** *threshold*}

Syntax Description

a	Configures bandwidth class A. When one or more member links are up, the bundle interface is up. When all the member links are down, the bundle interface is down.
b	Configures bandwidth class B. When all the member links are up, the bundle interface is up. When any member link is down, the bundle interface is down.
c	Configures bandwidth class C. The bundle link *threshold* must be configured.
threshold	Minimum number of links that must be up for the bundle interface to be up. The range is 1 to 255.

Command Default

The default is a (Bandwidth Class A).

Command Modes

Interface configuration

Command History

Release	Modification
Release 4.0.0	This command was introduced.

Usage Guidelines

Bandwidth class is configurable only under Frame Relay Forum 16.1 (FRF 16.1).

Note The **frame-relay multilink bandwidth-class** command is supported only on multilink frame relay interfaces. The **frame-relay multilink bandwidth-class** command is not supported on Packet-over-SONET/SDH (POS) or serial interfaces.

Task ID

Task ID	Operations
fr	read, write

Examples

The following example shows how to set a multilink frame relay interface to bandwidth Class C with a threshold of 3:

```
RP/0/RSP0/CPU0:router(config)# interface Multilink 0/3/1/0/100
RP/0/RSP0/CPU0:router(config-if)# frame-relay multilink bandwidth-class c 3
```

Related Commands

Command	Description
show frame-relay lmi-info, on page 33	Displays Frame Relay information for the LMI.

frame-relay multilink bid

To create a name for a Frame Relay multilink bundle interface, use the **frame-relay multilink bid** command in interface configuration mode. To restore the default setting, use the **no** form of this command.

frame-relay multilink bid bundle-id-name

Syntax Description

bundle-id-name	Name for the Frame Relay multilink bundle. The bundle identifier (**bid**) name identifies the bundle interface at both endpoints. The **bid** name is exchanged in the information elements to ensure consistent link assignments. The **bid** name can be up to 50 characters including the null termination character. The **bid** name is configured at the bundle interface level and is applied to each member link.

Command Default

By default, the interface name, for example, Multilink 0/4/1/0/1, is used as the bundle identifier.

Command Modes

Interface configuration

Command History

Release	Modification
Release 4.0.0	This command was introduced.

Usage Guidelines

Note The **frame-relay multilink bid** command is supported only on multilink frame relay interfaces. The **frame-relay multilink bid** command is not supported on Packet-over-SONET/SDH (POS) or serial interfaces.

Regardless of whether you create a bundle identifier name using the **frame-relay multilink bid** command or whether the system uses the default name for the interface, each bundle should have a unique name.

Task ID

Task ID	Operations
fr	read, write

Examples

The following example shows how to create a Frame Relay multilink interface bundle identifier name:

```
RP/0/RSP0/CPU0:router(config)# interface Multilink 0/3/1/0/100
RP/0/RSP0/CPU0:router(config-if)# frame-relay multilink bid MFRBundle
```

Related Commands

Command	Description
show frame-relay lmi-info, on page 33	Displays Frame Relay information for the LMI.

frame-relay multilink hello

To configure the hello interval used by a Frame Relay multilink bundle link, use the **frame-relay multilink hello** command in interface configuration mode. To reset the name to the default, use the **no** form of this command.

frame-relay multilink hello *hello-interval*

Syntax Description

hello-interval	Hello interval for the Frame Relay multilink bundle link, in seconds. The range is from 1 to 180.

Command Default

The default hello interval is 10 seconds.

Command Modes

Interface configuration

Command History

Release	Modification
Release 4.0.0	This command was introduced.

Usage Guidelines

Note The **frame-relay multilink hello** command is supported only on serial interfaces. The **frame-relay multilink hello** command is not supported on Packet-over-SONET/SDH (POS) or multilink frame relay interfaces.

The **frame-relay multilink hello** command can be configured only on bundle link interfaces that have been associated with a bundle using the **encapsulation frame-relay mfr** command.

Note You can enter the **frame-relay multilink hello** command at any time without affecting the current state of the interface; however, the configured hello interval value does not go into effect until the interface has gone from the down state to the up state. One way to bring the interface down and back up again is by using the **shutdown** and **no shutdown** commands in interface configuration mode.

Task ID

Task ID	Operations
fr	read, write

Examples

The following example shows how to configure the hello interval value as 10 seconds. for the serial interface 0/3/1/0:

```
RP/0/RSP0/CPU0:router(config)# interface serial 0/3/1/0
```

```
RP/0/RSP0/CPU0:router(config-if)# frame-relay multilink hello 10
```

Related Commands

Command	Description
encapsulation frame-relay, on page 6	Enables Frame Relay encapsulation.
frame-relay multilink bid, on page 22	Assigns a BID name to a multilink Frame Relay bundle.
show frame-relay lmi-info, on page 33	Displays frame relay information for the LMI.
shutdown (interface)	Disables an interface.

frame-relay multilink lid

To create a name for a Frame Relay multilink bundle link, use the **frame-relay multilink lid** command in interface configuration mode. To reset the name to the default, use the **no** form of this command.

frame-relay multilink lid *link-id name*

Syntax Description

link-id name	Specifies the name for the Frame Relay multilink bundle link. The link identifier (lid) name can be up to 49 characters long.

Command Default

The name of the physical interface, for example, Serial 0/3/0/0/1/2:0, is used as the lid.

Command Modes

Interface configuration

Command History

Release	Modification
Release 4.0.0	This command was introduced.

Usage Guidelines

Note The **frame-relay multilink lid** command is supported only on serial interfaces. The **frame-relay multilink lid** command is not supported on Packet-over-SONET/SDH (POS) or multilink frame relay interfaces.

The **frame-relay multilink lid** command can be configured only on bundle link interfaces that have been associated with a bundle using the **encapsulation frame-relay mfr** command.

Note You can enter the **frame-relay multilink lid** command at any time without affecting the current state of the interface; however, the link identifier name does not go into effect until the interface has gone from the down state to the up state. One way to bring the interface down and back up again is by using the **shutdown** and **no shutdown** commands in interface configuration mode.

Thelid name is used to identify the bundle link to peer devices and to enable the devices to identify which bundle links are associated with which bundles. The lid name can also be assigned when the bundle link is created using the **encapsulation frame-relay mfr** command with the *name* argument. If a lid name is not assigned, the default lid is the name of the physical interface.

The local and peer lid names do not have to be unique. However, regardless of whether you create a lid name using the **frame-relay multilink lid** command or the systems uses the default name for the bundle link, each link within a bundle must have a unique name. If the same name is used by different links in the same bundle, the bundles will flap indefinitely.

Task ID

Task ID	Operations
fr	read, write

Examples

The following example shows how to configure the lid name as ‘BL1’ for the serial interface 0/3/1/0:

```
RP/0/RSP0/CPU0:router(config)# interface serial 0/3/1/0
RP/0/RSP0/CPU0:router(config-if)# frame-relay multilink lid BL1
```

Related Commands

Command	Description
encapsulation frame-relay, on page 6	Enables Frame Relay encapsulation.
frame-relay multilink bid, on page 22	Assigns a BID name to a multilink Frame Relay bundle.
show frame-relay lmi-info, on page 33	Displays frame relay information for the LMI.
shutdown (interface)	Disables an interface.

frame-relay multilink retry

To configure the retry count for retransmissions for a Frame Relay multilink bundle link, use the **frame-relay multilink retry** command in interface configuration mode. To reset the name to the default, use the **no** form of this command.

frame-relay multilink retry *retry-count*

Syntax Description

retry-count	Retry count for retransmissions. The range is from 1 to 5.

Command Default

The default retry count for retransmissions is 2.

Command Modes

Interface configuration

Command History

Release	Modification
Release 4.0.0	This command was introduced.

Usage Guidelines

Note The **frame-relay multilink retry** command is supported only on serial interfaces. The **frame-relay multilink retry** command is not supported on Packet-over-SONET/SDH (POS) or multilink frame relay interfaces.

The **frame-relay multilink retry** command can be configured only on bundle link interfaces that have been associated with a bundle using the **encapsulation frame-relay mfr** command.

Note You can enter the **frame-relay multilink retry** command at any time without affecting the current state of the interface; however, the configured retry count value does not go into effect until the interface has gone from the down state to the up state. One way to bring the interface down and back up again is by using the **shutdown** and **no shutdown** commands in interface configuration mode.

Task ID

Task ID	Operations
fr	read, write

Examples

The following example shows how to configure the retry count for retransmissions as 2 on the serial interface 0/3/1/0:

```
RP/0/RSP0/CPU0:router(config)# interface serial 0/3/1/0
```

```
RP/0/RSP0/CPU0:router(config-if)# frame-relay multilink retry 2
```

Related Commands

Command	Description
encapsulation frame-relay, on page 6	Enables Frame Relay encapsulation.
frame-relay multilink bid, on page 22	Assigns a BID name to a multilink Frame Relay bundle.
show frame-relay lmi-info, on page 33	Displays frame relay information for the LMI.
shutdown (interface)	Disables an interface.

pvc (frame relay)

To associate a data-link connection identifier (DLCI) number to a permanent virtual circuit (PVC), and to enter Frame Relay PVC configuration mode, use the **pvc** command in subinterface configuration mode. To delete the PVC, use the **no** form of this command.

pvc *dlci-number*

Syntax Description

dlci-number	DLCI number used to identify the PVC. The range is from 16 to 1007.

Command Default

No PVC is defined.

Command Modes

Subinterface configuration (config-subif)

Command History

Release	Modification
Release 4.0.0	This command was introduced.

Usage Guidelines

Commands available in Frame Relay PVC configuration mode are:

```
RP/0/RSP0/CPU0:router(config-fr-vc)# ?

  commit    Commit the configuration changes to running
  describe  Describe a command without taking real actions
  do        Run an exec command
  encap     Set the Encapsulation of this PVC
  exit      Exit from this submode
  no        Negate a command or set its defaults
  show      Show contents of configuration
```

The **pvc** command is available on Packet-over-SONET/SDH (POS), serial, and multilink interfaces.

Task ID

Task ID	Operations
fr	read, write

Examples

The following example shows how to create a PVC with DLCI 16:

```
RP/0/RSP0/CPU0:router(config)# interface pos 0/4/0/0.1 l2transport
RP/0/RSP0/CPU0:router(config-subif)# pvc 16
RP/0/RSP0/CPU0:router(config-fr-vc)#
```

show frame-relay lmi

To display Frame Relay statistics for the Local Management Interface (LMI), use the **show frame-relay lmi** command in EXEC mode.

show frame-relay lmi [**interface** *type interface-path-id* | **location** *node-id*]

Syntax Description

interface	(Optional) Interface for which information is to be displayed.Use the *interface-path-id* argument to specify the interface.
type	(Optional) Interface type. For more information, use the question mark (**?**) online help function.
interface-path-id	(Optional) Physical interface or virtual interface. **Note** Use the **show interfaces** command to see a list of all interfaces currently configured on the router. For more information about the syntax for the router, use the question mark (**?**) online help function.
location *node-id*	(Optional) Displays information about all interfaces on the specified node. The *node-id* argument is entered in the *rack/slot/module* notation.

Command Default

Frame Relay LMI statistics are displayed for all interfaces enabled for LMI.

Command Modes

EXEC mode

Command History

Release	Modification
Release 4.0.0	This command was introduced.

Usage Guidelines

The **show frame-relay lmi** command is available on Packet-over-SONET/SDH (POS), serial, and multilink interfaces.

This command is used to check the status enquiry and status message between DCE and DTE.

Task ID

Task ID	Operations
fr	read

Examples

The following example shows the output from the **show frame-relay lmi** command:

```
RP/0/RSP0/CPU0:router# show frame-relay lmi

LMI Statistics for interface POS0/1/0/0/ (Frame Relay DCE) LMI TYPE = ANSI
```

```
  Invalid Unnumbered Info 0             Invalid Prot Disc 0
  Invalid Dummy Call Ref 0              Invalid Msg Type 0
  Invalid Status Message 0              Invalid Lock Shift 9
  Invalid Information ID 0              Invalid Report IE Len 0
  Invalid Report Request 0              Invalid Keep IE Len 0
  Num Status Enq. Rcvd 9444             Num Status Msgs Sent 9444
  Num Full Status Sent 1578             Num St Enq. Timeouts 41
  Num Link Timeouts 7

LMI Statistics for interface POS0/1/0/1/ (Frame Relay DCE) LMI TYPE = CISCO
  Invalid Unnumbered Info 0             Invalid Prot Disc 0
  Invalid Dummy Call Ref 0              Invalid Msg Type 0
  Invalid Status Message 0              Invalid Lock Shift 0
  Invalid Information ID 0              Invalid Report IE Len 0
  Invalid Report Request 0              Invalid Keep IE Len 0
  Num Status Enq. Rcvd 9481             Num Status Msgs Sent 9481
  Num Full Status Sent 1588             Num St Enq. Timeouts 16
  Num Link Timeouts 4
```

Table 1: show frame-relay lmi Field Descriptions

Field	Description
LMI Statistics	Signaling or LMI specification: CISCO, ANSI, or CCITT. **Note** CCITT is LMI as defined by ITU-T Q.933 (02/2003) Annex A.
Invalid Unnumbered Info	Number of received LMI messages with invalid unnumbered information field.
Invalid Dummy Call	Number of received LMI messages with invalid dummy calls.
Invalid Status Message	Number of received LMI messages with invalid status message.
Invalid Information ID	Number of received LMI messages with invalid information identifier.
Invalid Report Request	Number of received LMI messages with invalid report request.
Num Status Enq. Rcvd	Number of LMI status enquiry messages received.
Num Link Timeouts	Number of link timeouts.
Invalid Prot Disc	Number of received LMI messages with invalid protocol discriminator.
Invalid Msg Type	Number or received LMI messages with invalid message type.
Invalid Lock Shift	Number of received LMI messages with invalid lock shift type.
Invalid Report IE Len	Number of received LMI messages with invalid report IE Length.
Invalid Keep IE Len	Number of received LMI messages with invalid report request.
Num Status Msgs Sent	Number of LMI status enquiry messages sent.
Num St Enq. Timeouts	Number of times the status enquiry message was not received within the T392 DCE timer value.

show frame-relay lmi-info

To display Frame Relay information for the Local Management Interface (LMI), use the **show frame-relay lmi -info** command in EXEC mode.

show frame-relay lmi-info [**interface** *type interface-path-id* | **location** *node-id*] [**detail**]

Syntax Description

interface	(Optional) Displays information on the the interface specified by the *type interface-path-id* argument.
type	Interface type. For more information, use the question mark (**?**) online help function.
interface-path-id	Physical interface or virtual interface. **Note** Use the **show interfaces** command to see a list of all interfaces currently configured on the router. For more information about the syntax for the router, use the question mark (**?**) online help function.
location *node-id*	(Optional) Displays information about all interfaces on the specified node. The *node-id* argument is entered in the *rack/slot/module* notation.
detail	(Optional) Displays managed dcli list.

Command Default

Displays LMI information for all Frame Relay interfaces enabled for LMI.

Command Modes

EXEC mode

Command History

Release	Modification
Release 4.0.0	This command was introduced.

Usage Guidelines

The **show frame-relay lmi-info** command is available on Packet-over-SONET/SDH (POS), serial, and multilink interfaces.

This command is used to check the status enquiry and status message between DCE and DTE.

Task ID

Task ID	Operations
fr	read

Examples

The following example shows sample output for the **show frame-relay lmi-info** command:

```
RP/0/RSP0/CPU0:router# show frame-relay lmi-info
```

```
LMI IDB Info for interface Multilink0/3/0/0/2
  ifhandle:             0x6176840
  Interface type:       DTE
  Interface state:      UP
  Line Protocol:        UP
  LMI type (cnf/oper):  AUTO/CISCO
  LMI type autosense:   OFF
  Interface MTU:        1504
  -------------- DTE -------------
  T391:                 10s
  N391: (cnf/oper):     6/5
  N392: (cnf/oper):     3/0
  N393:                 4
  My seq#:              83
  My seq# seen:         83
  Your seq# seen:       82
  -------------- DCE -------------
  T392:                 15s
  N392: (cnf/oper):     3/0
  N393:                 4
  My seq#:              0
  My seq# seen:         0
  Your seq# seen:       0
LMI IDB Info for interface Multilink0/3/0/0/1
  ifhandle:             0x6186240
  Interface type:       DTE
  Interface state:      UP
  Line Protocol:        UP
  LMI type (cnf/oper):  AUTO/CISCO
  LMI type autosense:   OFF
  Interface MTU:        1504
  -------------- DTE -------------
  T391:                 10s
  N391: (cnf/oper):     6/5
  N392: (cnf/oper):     3/0
  N393:                 4
  My seq#:              83
  My seq# seen:         83
  Your seq# seen:       82
  -------------- DCE -------------
  T392:                 15s
  N392: (cnf/oper):     3/0
  N393:                 4
  My seq#:              0
  My seq# seen:         0
  Your seq# seen:       0
```

Table 2: show frame-relay lmi-info Field Descriptions

Field	Description
DTE	
T391	Local Management Interface polling interval
N391	Full status polling interval
N392	Error threshold value
N393	DTE monitored events count

Field	Description
DCE	
T392	Local Management Interface polling verification timer
N392	Error threshold value
N393	DCE monitored events count

show frame-relay multilink

To display the multilink Frame-Relay (MFR) information about the given interface along with MFR protocol and internal statistics, use the **show frame-relay multilink interface** command in EXEC mode.

show frame-relay multilink [**detail** [**location** *node id*] | **interface** *type interface-path-id* [**detail** | **verbose**] | **location** *node id* | **verbose** [**location** *node id*]]

Syntax Description

detail	(Optional) Displays Interface Descriptor Block (IDB) information and Feasible Successor Metrics (FSM) statistics.
location *node-id*	(Optional) Displays information about all interfaces on the specified node. The *node-id* argument is entered in the *rack*/*slot*/*module* notation.
interface	(Optional) Interface for which you want to display information.
type	Interface type. For more information, use the question mark (?) online help function.
interface-path-id	Physical interface or virtual interface. **Note** Use the **show interfaces** command to see a list of all interfaces currently configured on the router. For more information about the syntax for the router, use the question mark (**?**) online help function.
verbose	(Optional) Displays IDB information, FSM statistics and internal statistics.

Command Default

No default behavior or values

Command Modes

EXEC mode

Command History

Release	Modification
Release 4.0.0	This command was introduced.

Usage Guidelines

No specific guidelines impact the use of this command.

Task ID

Task ID	Operations
fr	read

Examples

The following example shows how to display the multilink Frame-Relay information for all interfaces:

```
RP/0/RSP0/CPU0:router# show frame-relay multilink
```

```
Bundle interface: Multilink0/3/0/0/1, ifhandle 0x060322c0
    Member Links: 2 active, 0 inactive
    State = Up,   BW Class = A

    Member Links:
    Serial0/3/0/0/1/2:0,   HW state = Up, link state = Up
    Serial0/3/0/0/1/1:0,   HW state = Up, link state = Up


Bundle interface: Multilink0/3/0/0/2, ifhandle 0x06032280
    Member Links: 2 active, 0 inactive
    State = Up,   BW Class = A

    Member Links:
    Serial0/3/0/0/1/4:0,   HW state = Up, link state = Up
    Serial0/3/0/0/1/3:0,   HW state = Up, link state = Up


Member interface: Serial0/3/0/0/1/1:0, ifhandle 0x060323c0
  HW state = Up, link state = Up
  Member of bundle interface Multilink0/3/0/0/1 with ifhandle 0x060322c0


Member interface: Serial0/3/0/0/1/2:0, ifhandle 0x06032380
  HW state = Up, link state = Up
  Member of bundle interface Multilink0/3/0/0/1 with ifhandle 0x060322c0


Member interface: Serial0/3/0/0/1/3:0, ifhandle 0x06032340
  HW state = Up, link state = Up
  Member of bundle interface Multilink0/3/0/0/2 with ifhandle 0x06032280


Member interface: Serial0/3/0/0/1/4:0, ifhandle 0x06032300
  HW state = Up, link state = Up
  Member of bundle interface Multilink0/3/0/0/2 with ifhandle 0x06032280
```

The following example shows how to display detailed multilink Frame-Relay information for all interfaces, including IDB information and FSM statistics:

```
RP/0/RSP0/CPU0:router# show frame-relay multilink detail

Bundle interface: Multilink0/3/0/0/1, ifhandle 0x060322c0
    Member Links: 2 active, 0 inactive
    State = Up,   BW Class = A
      nodeid:             0x838
      group:              1
      my_bid:             Multilink0/3/0/0/1
      peer_bid:           Multilink0/6/0/0/1
      magic:              0x696d8a95
      flags:              0x0
      im_state:           3  [Up]
      fsm_req_state:      3  [Up]
      is_owned_resource:  Y
      is_zombie:          N
      active_mbr_count:   2
      cfg_bid:
      bw_class:           1
      bw_class_threshold: 0


    =============== Member Links ===============
```

```
Serial0/3/0/0/1/2:0,   HW state = Up, link state = Up
  my_lid:         Serial0/3/0/0/1/2:0
  peer_lid:       Serial0/6/0/0/1/2:0
  flags:          0x0
  fsm_state:      3  [Up]
  im_state:       3  [Up]
  fsm_req_state:  3  [Up]
  cause:          0  [None]
  retry_count:    0
  in_loopback:    No
  bc_init_rcvd:   Yes
  bc_owned_res:   Yes
  cc_owned_res:   Yes
  is_parent_up:   Yes
  Last Packet Tx: 00:00:09 ago
  Round trip:     00:00.000 (0 secs 999997 nsecs)
  Min Round trip: 00:00.000 (0 secs 999997 nsecs)
  Max Round trip: 00:00.003 (0 secs 3999988 nsecs)
  cfg_lid:
  mfr_t_hello:    10
  mfr_t_ack:      4
  mfr_retry_max:  2
  --------------- Member Link Statistics ---------------
  Add Link Tx:                3     Add Link Rx:                2
  Add Link Ack Tx:            2     Add Link Ack Rx:            1
  Add Link Rej Tx:            0     Add Link Rej Rx:            0
  Remove Link Tx:             0     Remove Link Rx:             0
  Remove Link Ack Tx:         0     Remove Link Ack Rx:         0
  Hello Tx:                6235     Hello Rx:                6236
  Hello Ack Tx:            6236     Hello Ack Rx:            6235
  Loopback Detected:          0     Invalid Pkts Rx:            0
  Bundle Mismatch:            0     Expired Ack Rx:             0
  Hello Timer expiry:      6236     Ack Timer expiry:           1

Serial0/3/0/0/1/1:0,   HW state = Up, link state = Up
  my_lid:         Serial0/3/0/0/1/1:0
  peer_lid:       Serial0/6/0/0/1/1:0
  flags:          0x0
  fsm_state:      3  [Up]
  im_state:       3  [Up]
  fsm_req_state:  3  [Up]
  cause:          0  [None]
  retry_count:    0
  in_loopback:    No
  bc_init_rcvd:   Yes
  bc_owned_res:   Yes
  cc_owned_res:   Yes
  is_parent_up:   Yes
  Last Packet Tx: 00:00:01 ago
  Round trip:     00:00.000 (0 secs 999997 nsecs)
  Min Round trip: 00:00.000 (0 secs 999997 nsecs)
  Max Round trip: 00:00.004 (0 secs 4999985 nsecs)
  cfg_lid:
  mfr_t_hello:    10
  mfr_t_ack:      4
  mfr_retry_max:  2
  --------------- Member Link Statistics ---------------
  Add Link Tx:                3     Add Link Rx:                2
  Add Link Ack Tx:            2     Add Link Ack Rx:            1
  Add Link Rej Tx:            0     Add Link Rej Rx:            0
  Remove Link Tx:             0     Remove Link Rx:             0
  Remove Link Ack Tx:         0     Remove Link Ack Rx:         0
  Hello Tx:                6234     Hello Rx:                6237
```

```
  Hello Ack Tx:             6237     Hello Ack Rx:             6234
  Loopback Detected:           0     Invalid Pkts Rx:             0
  Bundle Mismatch:             0     Expired Ack Rx:              0
  Hello Timer expiry:       6235     Ack Timer expiry:            1


Bundle interface: Multilink0/3/0/0/2, ifhandle 0x06032280
    Member Links: 2 active, 0 inactive
    State = Up,   BW Class = A
      nodeid:             0x838
      group:              2
      my_bid:             Multilink0/3/0/0/2
      peer_bid:           Multilink0/6/0/0/2
      magic:              0x303c008f
      flags:              0x0
      im_state:           3  [Up]
      fsm_req_state:      3  [Up]
      is_owned_resource:  Y
      is_zombie:          N
      active_mbr_count:   2
      cfg_bid:
      bw_class:           1
      bw_class_threshold: 0


    =============== Member Links ===============

    Serial0/3/0/0/1/4:0,   HW state = Up, link state = Up
      my_lid:         Serial0/3/0/0/1/4:0
      peer_lid:       Serial0/6/0/0/1/4:0
      flags:          0x0
      fsm_state:      3  [Up]
      im_state:       3  [Up]
      fsm_req_state:  3  [Up]
      cause:          0  [None]
      retry_count:    0
      in_loopback:    No
      bc_init_rcvd:   Yes
      bc_owned_res:   Yes
      cc_owned_res:   Yes
      is_parent_up:   Yes
      Last Packet Tx: 00:00:00 ago
      Round trip:     00:00.000 (0 secs 999997 nsecs)
      Min Round trip: 00:00.000 (0 secs 999997 nsecs)
      Max Round trip: 00:00.004 (0 secs 4999985 nsecs)
      cfg_lid:
      mfr_t_hello:    10
      mfr_t_ack:      4
      mfr_retry_max:  2
      --------------- Member Link Statistics ---------------
      Add Link Tx:                 3     Add Link Rx:                 2
      Add Link Ack Tx:             2     Add Link Ack Rx:             1
      Add Link Rej Tx:             0     Add Link Rej Rx:             0
      Remove Link Tx:              0     Remove Link Rx:              0
      Remove Link Ack Tx:          0     Remove Link Ack Rx:          0
      Hello Tx:                 6236     Hello Rx:                 6235
      Hello Ack Tx:             6235     Hello Ack Rx:             6236
      Loopback Detected:           0     Invalid Pkts Rx:             0
      Bundle Mismatch:             0     Expired Ack Rx:              0
      Hello Timer expiry:       6237     Ack Timer expiry:            1

    Serial0/3/0/0/1/3:0,   HW state = Up, link state = Up
      my_lid:         Serial0/3/0/0/1/3:0
```

```
      peer_lid:       Serial0/6/0/0/1/3:0
      flags:          0x0
      fsm_state:      3  [Up]
      im_state:       3  [Up]
      fsm_req_state:  3  [Up]
      cause:          0  [None]
      retry_count:    0
      in_loopback:    No
      bc_init_rcvd:   Yes
      bc_owned_res:   Yes
      cc_owned_res:   Yes
      is_parent_up:   Yes
      Last Packet Tx: 00:00:01 ago
      Round trip:     00:00.000 (0 secs 999997 nsecs)
      Min Round trip: 00:00.000 (0 secs 999997 nsecs)
      Max Round trip: 00:00.003 (0 secs 3999988 nsecs)
      cfg_lid:
      mfr_t_hello:    10
      mfr_t_ack:      4
      mfr_retry_max:  2
      --------------- Member Link Statistics ---------------
      Add Link Tx:                3     Add Link Rx:                2
      Add Link Ack Tx:            2     Add Link Ack Rx:            1
      Add Link Rej Tx:            0     Add Link Rej Rx:            0
      Remove Link Tx:             0     Remove Link Rx:             0
      Remove Link Ack Tx:         0     Remove Link Ack Rx:         0
      Hello Tx:                6236     Hello Rx:                6237
      Hello Ack Tx:            6237     Hello Ack Rx:            6236
      Loopback Detected:          0     Invalid Pkts Rx:            0
      Bundle Mismatch:            0     Expired Ack Rx:             0
      Hello Timer expiry:      6237     Ack Timer expiry:           1

  Member interface: Serial0/3/0/0/1/1:0, ifhandle 0x060323c0
    HW state = Up, link state = Up
    Member of bundle interface Multilink0/3/0/0/1 with ifhandle 0x060322c0
    Local bid: Multilink0/3/0/0/1  Peer bid: Multilink0/6/0/0/1
      my_lid:         Serial0/3/0/0/1/1:0
      peer_lid:       Serial0/6/0/0/1/1:0
      flags:          0x0
      fsm_state:      3  [Up]
      im_state:       3  [Up]
      fsm_req_state:  3  [Up]
      cause:          0  [None]
      retry_count:    0
      in_loopback:    No
      bc_init_rcvd:   Yes
      bc_owned_res:   Yes
      cc_owned_res:   Yes
      is_parent_up:   Yes
      Last Packet Tx: 00:00:00 ago
      Round trip:     00:00.000 (0 secs 999997 nsecs)
      Min Round trip: 00:00.000 (0 secs 999997 nsecs)
      Max Round trip: 00:00.004 (0 secs 4999985 nsecs)
      cfg_lid:
      mfr_t_hello:    10
      mfr_t_ack:      4
      mfr_retry_max:  2
      --------------- Member Link Statistics ---------------
      Add Link Tx:                3     Add Link Rx:                2
      Add Link Ack Tx:            2     Add Link Ack Rx:            1
      Add Link Rej Tx:            0     Add Link Rej Rx:            0
      Remove Link Tx:             0     Remove Link Rx:             0
      Remove Link Ack Tx:         0     Remove Link Ack Rx:         0
      Hello Tx:                6235     Hello Rx:                6237
```

```
      Hello Ack Tx:             6237     Hello Ack Rx:             6235
      Loopback Detected:           0     Invalid Pkts Rx:             0
      Bundle Mismatch:             0     Expired Ack Rx:              0
      Hello Timer expiry:       6236     Ack Timer expiry:            1

Member interface: Serial0/3/0/0/1/2:0, ifhandle 0x06032380
  HW state = Up, link state = Up
  Member of bundle interface Multilink0/3/0/0/1 with ifhandle 0x060322c0
  Local bid: Multilink0/3/0/0/1  Peer bid: Multilink0/6/0/0/1
      my_lid:         Serial0/3/0/0/1/2:0
      peer_lid:       Serial0/6/0/0/1/2:0
      flags:          0x0
      fsm_state:      3  [Up]
      im_state:       3  [Up]
      fsm_req_state:  3  [Up]
      cause:          0  [None]
      retry_count:    0
      in_loopback:    No
      bc_init_rcvd:   Yes
      bc_owned_res:   Yes
      cc_owned_res:   Yes
      is_parent_up:   Yes
      Last Packet Tx: 00:00:00 ago
      Round trip:     00:00.000 (0 secs 999997 nsecs)
      Min Round trip: 00:00.000 (0 secs 999997 nsecs)
      Max Round trip: 00:00.003 (0 secs 3999988 nsecs)
      cfg_lid:
      mfr_t_hello:    10
      mfr_t_ack:      4
      mfr_retry_max:  2
      --------------- Member Link Statistics ---------------
      Add Link Tx:                 3     Add Link Rx:                 2
      Add Link Ack Tx:             2     Add Link Ack Rx:             1
      Add Link Rej Tx:             0     Add Link Rej Rx:             0
      Remove Link Tx:              0     Remove Link Rx:              0
      Remove Link Ack Tx:          0     Remove Link Ack Rx:          0
      Hello Tx:                 6236     Hello Rx:                 6237
      Hello Ack Tx:             6237     Hello Ack Rx:             6236
      Loopback Detected:           0     Invalid Pkts Rx:             0
      Bundle Mismatch:             0     Expired Ack Rx:              0
      Hello Timer expiry:       6237     Ack Timer expiry:            1

Member interface: Serial0/3/0/0/1/3:0, ifhandle 0x06032340
  HW state = Up, link state = Up
  Member of bundle interface Multilink0/3/0/0/2 with ifhandle 0x06032280
  Local bid: Multilink0/3/0/0/2  Peer bid: Multilink0/6/0/0/2
      my_lid:         Serial0/3/0/0/1/3:0
      peer_lid:       Serial0/6/0/0/1/3:0
      flags:          0x0
      fsm_state:      3  [Up]
      im_state:       3  [Up]
      fsm_req_state:  3  [Up]
      cause:          0  [None]
      retry_count:    0
      in_loopback:    No
      bc_init_rcvd:   Yes
      bc_owned_res:   Yes
      cc_owned_res:   Yes
      is_parent_up:   Yes
      Last Packet Tx: 00:00:02 ago
      Round trip:     00:00.000 (0 secs 999997 nsecs)
      Min Round trip: 00:00.000 (0 secs 999997 nsecs)
      Max Round trip: 00:00.003 (0 secs 3999988 nsecs)
      cfg_lid:
```

```
      mfr_t_hello:    10
      mfr_t_ack:      4
      mfr_retry_max:  2
      --------------- Member Link Statistics ---------------
      Add Link Tx:                3     Add Link Rx:                2
      Add Link Ack Tx:            2     Add Link Ack Rx:            1
      Add Link Rej Tx:            0     Add Link Rej Rx:            0
      Remove Link Tx:             0     Remove Link Rx:             0
      Remove Link Ack Tx:         0     Remove Link Ack Rx:         0
      Hello Tx:                6236     Hello Rx:                6237
      Hello Ack Tx:            6237     Hello Ack Rx:            6236
      Loopback Detected:          0     Invalid Pkts Rx:            0
      Bundle Mismatch:            0     Expired Ack Rx:             0
      Hello Timer expiry:      6237     Ack Timer expiry:           1

Member interface: Serial0/3/0/0/1/4:0, ifhandle 0x06032300
  HW state = Up, link state = Up
  Member of bundle interface Multilink0/3/0/0/2 with ifhandle 0x06032280
  Local bid: Multilink0/3/0/0/2  Peer bid: Multilink0/6/0/0/2
      my_lid:         Serial0/3/0/0/1/4:0
      peer_lid:       Serial0/6/0/0/1/4:0
      flags:          0x0
      fsm_state:      3  [Up]
      im_state:       3  [Up]
      fsm_req_state:  3  [Up]
      cause:          0  [None]
      retry_count:    0
      in_loopback:    No
      bc_init_rcvd:   Yes
      bc_owned_res:   Yes
      cc_owned_res:   Yes
      is_parent_up:   Yes
      Last Packet Tx: 00:00:01 ago
      Round trip:     00:00.000 (0 secs 999997 nsecs)
      Min Round trip: 00:00.000 (0 secs 999997 nsecs)
      Max Round trip: 00:00.004 (0 secs 4999985 nsecs)
      cfg_lid:
      mfr_t_hello:    10
      mfr_t_ack:      4
      mfr_retry_max:  2
      --------------- Member Link Statistics ---------------
      Add Link Tx:                3     Add Link Rx:                2
      Add Link Ack Tx:            2     Add Link Ack Rx:            1
      Add Link Rej Tx:            0     Add Link Rej Rx:            0
      Remove Link Tx:             0     Remove Link Rx:             0
      Remove Link Ack Tx:         0     Remove Link Ack Rx:         0
      Hello Tx:                6236     Hello Rx:                6235
      Hello Ack Tx:            6235     Hello Ack Rx:            6236
      Loopback Detected:          0     Invalid Pkts Rx:            0
      Bundle Mismatch:            0     Expired Ack Rx:             0
      Hello Timer expiry:      6237     Ack Timer expiry:           1
```

The following example shows how to display detailed multilink Frame Relay information for all interfaces, including IDB information and FSM statistics, on a Cisco 2-Port Channelized OC-12c/DS0 SPA:

```
RP/0/RSP0/CPU0:router# show frame-relay multilink detail
Fri Mar 25 14:04:05.425 UTC
Bundle interface: Multilink0/2/1/0/1, ifhandle 0x04002840
    Member Links: 2 active, 0 inactive
    State = Up,   BW Class = A
      nodeid:             0x829
      group:              1
```

```
  my_bid:             Multilink0/2/1/0/1
  peer_bid:           Multilink0/2/1/0/1
  magic:              0x75b06726
  flags:              0x0
  im_state:           3  [Up]
  fsm_req_state:      3  [Up]
  is_owned_resource:  Y
  is_zombie:          N
  active_mbr_count:   2
  cfg_bid:
  bw_class:           1

  bw_class_threshold: 0


=============== Member Links ===============

Serial0/2/1/0/1/2:0,   HW state = Up, link state = Up
  my_lid:         Serial0/2/1/0/1/2:0
  peer_lid:       Serial0/2/1/0/1/2:0
  flags:          0x0
  fsm_state:      3  [Up]
  im_state:       3  [Up]
  fsm_req_state:  3  [Up]
  cause:          0  [None]
  retry_count:    0
  in_loopback:    No
  bc_init_rcvd:   Yes
  bc_owned_res:   Yes
  cc_owned_res:   Yes
  is_parent_up:   Yes
  Last Packet Tx: 00:00:06 ago
  Round trip:     00:00.000 (0 secs 999997 nsecs)
  Min Round trip: 00:00.000 (0 secs 999997 nsecs)
  Max Round trip: 00:00.002 (0 secs 2999991 nsecs)
  cfg_lid:
  mfr_t_hello:    10
  mfr_t_ack:      4
  mfr_retry_max:  2
  --------------- Member Link Statistics ---------------
  Add Link Tx:                2     Add Link Rx:                1
  Add Link Ack Tx:            1     Add Link Ack Rx:            1
  Add Link Rej Tx:            0     Add Link Rej Rx:            0
  Remove Link Tx:             0     Remove Link Rx:             0
  Remove Link Ack Tx:         0     Remove Link Ack Rx:         0
  Hello Tx:                   2     Hello Rx:                   2
  Hello Ack Tx:               2     Hello Ack Rx:               2
  Loopback Detected:          0     Invalid Pkts Rx:            1
  Bundle Mismatch:            0     Expired Ack Rx:             0
  Hello Timer expiry:         2     Ack Timer expiry:           0

Serial0/2/1/0/1/1:0,   HW state = Up, link state = Up
  my_lid:         Serial0/2/1/0/1/1:0
  peer_lid:       Serial0/2/1/0/1/1:0
  flags:          0x0
  fsm_state:      3  [Up]
  im_state:       3  [Up]
  fsm_req_state:  3  [Up]
  cause:          0  [None]
  retry_count:    0
  in_loopback:    No
  bc_init_rcvd:   Yes
  bc_owned_res:   Yes
  cc_owned_res:   Yes
```

```
    is_parent_up:   Yes
    Last Packet Tx: 00:00:06 ago
    Round trip:     00:00.000 (0 secs 999997 nsecs)
    Min Round trip: 00:00.000 (0 secs 999997 nsecs)
    Max Round trip: 00:00.002 (0 secs 2999991 nsecs)
    cfg_lid:
    mfr_t_hello:    10
    mfr_t_ack:      4
    mfr_retry_max:  2
    --------------- Member Link Statistics ---------------
    Add Link Tx:                2     Add Link Rx:                1
    Add Link Ack Tx:            1     Add Link Ack Rx:            1
    Add Link Rej Tx:            0     Add Link Rej Rx:            0
    Remove Link Tx:             0     Remove Link Rx:             0
    Remove Link Ack Tx:         0     Remove Link Ack Rx:         0
    Hello Tx:                   2     Hello Rx:                   2
    Hello Ack Tx:               2     Hello Ack Rx:               2
    Loopback Detected:          0     Invalid Pkts Rx:            1
    Bundle Mismatch:            0     Expired Ack Rx:             0
    Hello Timer expiry:         2     Ack Timer expiry:           0


Bundle interface: Multilink0/2/1/0/2, ifhandle 0x04002880
    Member Links: 2 active, 0 inactive
    State = Up,   BW Class = A
      nodeid:             0x829
      group:              2
      my_bid:             Multilink0/2/1/0/2
      peer_bid:           Multilink0/2/1/0/2
      magic:              0x41f1f15a
      flags:              0x0
      im_state:           3  [Up]
      fsm_req_state:      3  [Up]
      is_owned_resource:  Y
      is_zombie:          N
      active_mbr_count:   2
      cfg_bid:
      bw_class:           1
      bw_class_threshold: 0


    =============== Member Links ===============

    Serial0/2/1/0/1/4:0,   HW state = Up, link state = Up
      my_lid:         Serial0/2/1/0/1/4:0
      peer_lid:       Serial0/2/1/0/1/4:0
      flags:          0x0
      fsm_state:      3  [Up]
      im_state:       3  [Up]
      fsm_req_state:  3  [Up]
      cause:          0  [None]
      retry_count:    0
      in_loopback:    No
      bc_init_rcvd:   Yes
      bc_owned_res:   Yes
      cc_owned_res:   Yes
      is_parent_up:   Yes
      Last Packet Tx: 00:00:06 ago
      Round trip:     00:00.000 (0 secs 999997 nsecs)
      Min Round trip: 00:00.000 (0 secs 999997 nsecs)
      Max Round trip: 00:00.002 (0 secs 2999991 nsecs)
      cfg_lid:
      mfr_t_hello:    10
```

```
    mfr_t_ack:      4
    mfr_retry_max:  2
    --------------- Member Link Statistics ---------------
    Add Link Tx:                2     Add Link Rx:                1
    Add Link Ack Tx:            1     Add Link Ack Rx:            1
    Add Link Rej Tx:            0     Add Link Rej Rx:            0
    Remove Link Tx:             0     Remove Link Rx:             0
    Remove Link Ack Tx:         0     Remove Link Ack Rx:         0
    Hello Tx:                   2     Hello Rx:                   2
    Hello Ack Tx:               2     Hello Ack Rx:               2
    Loopback Detected:          0     Invalid Pkts Rx:            1
    Bundle Mismatch:            0     Expired Ack Rx:             0
    Hello Timer expiry:         2     Ack Timer expiry:           0

  Serial0/2/1/0/1/3:0,   HW state = Up, link state = Up
    my_lid:         Serial0/2/1/0/1/3:0
    peer_lid:       Serial0/2/1/0/1/3:0
    flags:          0x0
    fsm_state:      3  [Up]
    im_state:       3  [Up]
    fsm_req_state:  3  [Up]
    cause:          0  [None]
    retry_count:    0
    in_loopback:    No
    bc_init_rcvd:   Yes
    bc_owned_res:   Yes
    cc_owned_res:   Yes
    is_parent_up:   Yes
    Last Packet Tx: 00:00:06 ago
    Round trip:     00:00.000 (0 secs 999997 nsecs)
    Min Round trip: 00:00.000 (0 secs 999997 nsecs)
    Max Round trip: 00:00.002 (0 secs 2999991 nsecs)
    cfg_lid:
    mfr_t_hello:    10
    mfr_t_ack:      4
    mfr_retry_max:  2
    --------------- Member Link Statistics ---------------
    Add Link Tx:                2     Add Link Rx:                1
    Add Link Ack Tx:            1     Add Link Ack Rx:            1
    Add Link Rej Tx:            0     Add Link Rej Rx:            0
    Remove Link Tx:             0     Remove Link Rx:             0
    Remove Link Ack Tx:         0     Remove Link Ack Rx:         0
    Hello Tx:                   2     Hello Rx:                   2
    Hello Ack Tx:               2     Hello Ack Rx:               2
    Loopback Detected:          0     Invalid Pkts Rx:            1
    Bundle Mismatch:            0     Expired Ack Rx:             0
    Hello Timer expiry:         2     Ack Timer expiry:           0
```

The following example shows how to display detailed multilink Frame Relay information for all interfaces, including IDB information and FSM statistics, on a Cisco 4-Port Channelized T3 SPA:

```
RP/0/RSP0/CPU0:router# show frame-relay multilink detail
Member interface: Serial0/0/0/0/1:0, ifhandle 0x00005180
  HW state = Up, link state = Up
  Member of bundle interface Multilink0/0/0/0/1 with ifhandle 0x00005280
  Local bid: Multilink0/0/0/0/1  Peer bid: Multilink0/0/0/0/1
      my_lid:         Serial0/0/0/0/1:0
      peer_lid:       Serial0/0/0/0/1:0
      flags:          0x0
      fsm_state:      3  [Up]
      im_state:       3  [Up]
      fsm_req_state:  3  [Up]
      cause:          0  [None]
      retry_count:    0
```

```
      in_loopback:    No
      bc_init_rcvd:   Yes
      bc_owned_res:   Yes
      cc_owned_res:   Yes
      is_parent_up:   Yes
      Last Packet Tx: 00:00:06 ago
      Round trip:     00:00.000 (0 secs 999997 nsecs)
      Min Round trip: 00:00.000 (0 secs 999997 nsecs)
      Max Round trip: 00:00.001 (0 secs 1999994 nsecs)
      cfg_lid:
      mfr_t_hello:    10
      mfr_t_ack:      4
      mfr_retry_max:  2
      --------------- Member Link Statistics ---------------
      Add Link Tx:                3     Add Link Rx:                1
      Add Link Ack Tx:            1     Add Link Ack Rx:            1
      Add Link Rej Tx:            0     Add Link Rej Rx:            0
      Remove Link Tx:             0     Remove Link Rx:             0
      Remove Link Ack Tx:         0     Remove Link Ack Rx:         0
      Hello Tx:               21692     Hello Rx:               21690
      Hello Ack Tx:           21690     Hello Ack Rx:           21692
      Loopback Detected:          0     Invalid Pkts Rx:            0
      Bundle Mismatch:            0     Expired Ack Rx:             0
      Hello Timer expiry:     21693     Ack Timer expiry:           1


Member interface: Serial0/0/0/0/2:0, ifhandle 0x000051c0
  HW state = Up, link state = Up
  Member of bundle interface Multilink0/0/0/0/1 with ifhandle 0x00005280
  Local bid: Multilink0/0/0/0/1  Peer bid: Multilink0/0/0/0/1
      my_lid:         Serial0/0/0/0/2:0
      peer_lid:       Serial0/0/0/0/2:0
      flags:          0x0
      fsm_state:      3  [Up]
      im_state:       3  [Up]
      fsm_req_state:  3  [Up]
      cause:          0  [None]
      retry_count:    0
      in_loopback:    No
      bc_init_rcvd:   Yes
      bc_owned_res:   Yes
      cc_owned_res:   Yes
      is_parent_up:   Yes
      Last Packet Tx: 00:00:03 ago
      Round trip:     00:00.000 (0 secs 999997 nsecs)
      Min Round trip: 00:00.000 (0 secs 999997 nsecs)
      Max Round trip: 00:00.001 (0 secs 1999994 nsecs)
      cfg_lid:
      mfr_t_hello:    10
      mfr_t_ack:      4
      mfr_retry_max:  2
      --------------- Member Link Statistics ---------------
      Add Link Tx:                3     Add Link Rx:                1
      Add Link Ack Tx:            1     Add Link Ack Rx:            1
      Add Link Rej Tx:            0     Add Link Rej Rx:            0
      Remove Link Tx:             0     Remove Link Rx:             0
      Remove Link Ack Tx:         0     Remove Link Ack Rx:         0
      Hello Tx:               21688     Hello Rx:               21694
      Hello Ack Tx:           21694     Hello Ack Rx:           21688
      Loopback Detected:          0     Invalid Pkts Rx:            0
      Bundle Mismatch:            0     Expired Ack Rx:             0
      Hello Timer expiry:     21689     Ack Timer expiry:           1
```

```
Member interface: Serial0/0/0/0/3:0, ifhandle 0x00005200
  HW state = Up, link state = Up
  Member of bundle interface Multilink0/0/0/0/2 with ifhandle 0x000052c0
  Local bid: Multilink0/0/0/0/2  Peer bid: Multilink0/0/0/0/2
      my_lid:         Serial0/0/0/0/3:0
      peer_lid:       Serial0/0/0/0/3:0
      flags:          0x0
      fsm_state:      3  [Up]
      im_state:       3  [Up]
      fsm_req_state:  3  [Up]
      cause:          0  [None]
      retry_count:    0
      in_loopback:    No
      bc_init_rcvd:   Yes
      bc_owned_res:   Yes
      cc_owned_res:   Yes
      is_parent_up:   Yes
      Last Packet Tx: 00:00:03 ago
      Round trip:     00:00.000 (0 secs 999997 nsecs)
      Min Round trip: 00:00.000 (0 secs 999997 nsecs)
      Max Round trip: 00:00.001 (0 secs 1999994 nsecs)
      cfg_lid:
      mfr_t_hello:    10
      mfr_t_ack:      4
      mfr_retry_max:  2
      --------------- Member Link Statistics ---------------
      Add Link Tx:                3     Add Link Rx:                1
      Add Link Ack Tx:            1     Add Link Ack Rx:            1
      Add Link Rej Tx:            0     Add Link Rej Rx:            0
      Remove Link Tx:             0     Remove Link Rx:             0
      Remove Link Ack Tx:         0     Remove Link Ack Rx:         0
      Hello Tx:               21694     Hello Rx:               21689
      Hello Ack Tx:           21689     Hello Ack Rx:           21694
      Loopback Detected:          0     Invalid Pkts Rx:            0
      Bundle Mismatch:            0     Expired Ack Rx:             0
      Hello Timer expiry:     21695     Ack Timer expiry:           1


Member interface: Serial0/0/0/0/4:0, ifhandle 0x00005240
  HW state = Up, link state = Up
  Member of bundle interface Multilink0/0/0/0/2 with ifhandle 0x000052c0
  Local bid: Multilink0/0/0/0/2  Peer bid: Multilink0/0/0/0/2
      my_lid:         Serial0/0/0/0/4:0
      peer_lid:       Serial0/0/0/0/4:0
      flags:          0x0
      fsm_state:      3  [Up]
      im_state:       3  [Up]
      fsm_req_state:  3  [Up]
      cause:          0  [None]
      retry_count:    0
      in_loopback:    No
      bc_init_rcvd:   Yes
      bc_owned_res:   Yes
      cc_owned_res:   Yes
      is_parent_up:   Yes
      Last Packet Tx: 00:00:00 ago
      Round trip:     00:00.000 (0 secs 999997 nsecs)
      Min Round trip: 00:00.000 (0 secs 999997 nsecs)
      Max Round trip: 00:00.001 (0 secs 1999994 nsecs)
      cfg_lid:
      mfr_t_hello:    10
```

```
      mfr_t_ack:      4
      mfr_retry_max:  2
      --------------- Member Link Statistics ---------------
      Add Link Tx:                3     Add Link Rx:                1
      Add Link Ack Tx:            1     Add Link Ack Rx:            1
      Add Link Rej Tx:            0     Add Link Rej Rx:            0
      Remove Link Tx:             0     Remove Link Rx:             0
      Remove Link Ack Tx:         0     Remove Link Ack Rx:         0
      Hello Tx:               21691     Hello Rx:               21689
      Hello Ack Tx:           21689     Hello Ack Rx:           21691
      Loopback Detected:          0     Invalid Pkts Rx:            0
      Bundle Mismatch:            0     Expired Ack Rx:             0
      Hello Timer expiry:     21692     Ack Timer expiry:           1


Bundle interface: Multilink0/0/0/0/1, ifhandle 0x00005280
    Member Links: 2 active, 0 inactive
    State = Up,   BW Class = A
      nodeid:             0x808
      group:              1
      my_bid:             Multilink0/0/0/0/1
      peer_bid:           Multilink0/0/0/0/1
      magic:              0x48bac00c
      flags:              0x0
      im_state:           3  [Up]
      fsm_req_state:      3  [Up]
      is_owned_resource:  Y
      is_zombie:          N
      active_mbr_count:   2
      cfg_bid:
      bw_class:           1
      bw_class_threshold: 0
```

The following example shows how to display the multilink Frame-Relay information for the interface at location 0/3/0/0/1:

```
RP/0/RSP0/CPU0:router# show frame-relay multilink interface multilink 0/3/0/0/1

Bundle interface: Multilink0/3/0/0/1, ifhandle 0x060322c0
    Member Links: 2 active, 0 inactive
    State = Up,   BW Class = A

    Member Links:
    Serial0/3/0/0/1/2:0,   HW state = Up, link state = Up
    Serial0/3/0/0/1/1:0,   HW state = Up, link state = Up
```

Related Commands

Command	Description
interface multilink	Configures a multilink interface and enters multilink interface configuration mode.
frame-relay multilink bid, on page 22	Creates a name for a Frame Relay multilink bundle interface.

show frame-relay pvc

To display statistics about Frame Relay permanent virtual circuits (PVCs), use the **show frame-relay pvc** command in EXEC mode.

show frame-relay pvc [**interface** *type interface-path-id* | **location** *node-id*] [*dlci-number*]

Syntax Description

interface	(Optional) Interface for which information is to be displayed. Use the *type* and *interface-path-id* arguments to specify the interface.
type	(Optional) Interface type. For more information, use the question mark (?) online help function.
interface-path-id	(Optional) Physical interface or virtual interface. **Note** Use the **show interfaces** command to see a list of all interfaces currently configured on the router. For more information about the syntax for the router, use the question mark (**?**) online help function.
location *node-id*	(Optional) Displays information about all interfaces on the specified node. The *node-id* argument is entered in the *rack/slot/module* notation.
dlci-number	(Optional) DLCI number used to identify the PVC. The range is from 16 to 1007.

Command Default

Information for all Frame Relay interfaces and PVCs is displayed.

Command Modes

EXEC mode

Command History

Release	Modification
Release 4.0.0	This command was introduced.

Usage Guidelines

The **show frame-relay pvc** command is available on Packet-over-SONET/SDH (POS), serial, and multilink interfaces.

This command is used to check the status of PVCs on interfaces.

Task ID

Task ID	Operations
fr	read

Examples

The following example shows the output from the **show frame-relay pvc** command:

```
RP/0/RSP0/CPU0:router# show frame-relay pvc
```

```
PVC Statistics for interface POS0/3/2/0 (Frame Relay DCE)

             Active     Inactive      Deleted       Static
  Local          4            0            0            0
  Switched       0            0            0            0
  Dynamic        0            0            0            0

DLCI = 612, DLCI USAGE = LOCAL, ENCAP = CISCO, INHERIT = TRUE, PVC STATUS = ACT
VE, INTERFACE = POS0/3/2/0.1
  input pkts 0          output pkts 0           in bytes 0
  out bytes 0           dropped pkts 0          in FECN packets 0
  in BECN pkts 0        out FECN pkts 0         out BECN pkts 0
  in DE pkts 0          out DE pkts 0
  out bcast pkts 0      out bcast bytes 0
  pvc create time 00:00:00      last time pvc status changed 00:00:00

DLCI = 613, DLCI USAGE = LOCAL, ENCAP = CISCO, INHERIT = TRUE, PVC STATUS = ACT
VE, INTERFACE = POS0/3/2/0.2
  input pkts 0          output pkts 0           in bytes 0
  out bytes 0           dropped pkts 0          in FECN packets 0
  in BECN pkts 0        out FECN pkts 0         out BECN pkts 0
  in DE pkts 0          out DE pkts 0
  out bcast pkts 0      out bcast bytes 0
  pvc create time 00:00:00      last time pvc status changed 00:00:00

DLCI = 614, DLCI USAGE = LOCAL, ENCAP = CISCO, INHERIT = TRUE, PVC STATUS = ACT
VE, INTERFACE = POS0/3/2/0.3
  input pkts 0          output pkts 0           in bytes 0
  out bytes 0           dropped pkts 0          in FECN packets 0
  in BECN pkts 0        out FECN pkts 0         out BECN pkts 0
  in DE pkts 0          out DE pkts 0
  out bcast pkts 0      out bcast bytes 0
  pvc create time 00:00:00      last time pvc status changed 00:00:00

DLCI = 615, DLCI USAGE = LOCAL, ENCAP = CISCO, INHERIT = TRUE, PVC STATUS = ACT
VE, INTERFACE = POS0/3/2/0.4
  input pkts 0          output pkts 0           in bytes 0
  out bytes 0           dropped pkts 0          in FECN packets 0
  in BECN pkts 0        out FECN pkts 0         out BECN pkts 0
  in DE pkts 0          out DE pkts 0
  out bcast pkts 0      out bcast bytes 0
  pvc create time 00:00:00      last time pvc status changed 00:00:00
```

The following example shows the output for a specific frame-relay PVC:

```
RP/0/RSP0/CPU0:router# show frame-relay pvc 613

DLCI = 613, DLCI USAGE = LOCAL, ENCAP = CISCO, INHERIT = TRUE, PVC STATUS = ACTI
VE, INTERFACE = POS0/3/2/0.2
  input pkts 0          output pkts 0           in bytes 0
  out bytes 0           dropped pkts 0          in FECN packets 0
  in BECN pkts 0        out FECN pkts 0         out BECN pkts 0
  in DE pkts 0          out DE pkts 0
  out bcast pkts 0      out bcast bytes 0
  pvc create time 00:00:00      last time pvc status changed 00:00:00
```

Table 3: show frame-relay pvc Field Descriptions

Field	Description
DLCI	One of the DLCI numbers for the PVC.
DLCI USAGE	Lists SWITCHED when the router or access server is used as a switch, or LOCAL when the router or access server is used as a DTE device.
ENCAP	Type of encapsulation.
INHERIT	Encapsulation type for the PVC is inherited from the main interface.
PVC STATUS	Status of the PVC: ACTIVE, INACTIVE, or DELETED.
INTERFACE	Specific subinterface associated with this DLCI.
input pkts	Number of packets received on this PVC.
output pkts	Number of packets sent on this PVC.
in bytes	Number of bytes received on this PVC.
out bytes	Number of bytes sent on this PVC.
dropped pkts	Number of incoming and outgoing packets dropped by the router at the Frame Relay level.
in FECN pkts	Number of packets received with the FECN bit set.
in BECN pkts	Number of packets received with the BECN bit set.
out FECN pkts	Number of packets sent with the FECN bit set.
out BECN pkts	Number of packets sent with the BECN bit set.
in DE pkts	Number of DE packets received.
out DE pkts	Number of DE packets sent.
out bcast pkts	Number of output broadcast packets.
out bcast bytes	Number of output broadcast bytes.
pvc create time	Time at which the PVC was created.
last time pvc status changed	Time at which the PVC changed status.
shaping drops	Number of packets dropped by the traffic-shaping process.
Fragment Counters	Displays whether fragment counters are enabled or disabled on the PVC. Fragment counters are disabled by default. Use the **fragment-counter** command to enable collection of these statistics.

show frame-relay vcm-info interface

To display Virtual Circuit (VC) manager information for a given interface, use the **show frame-relay vcm-info interface** command in EXEC mode.

show frame-relay vcm-info interface *type interface-path-id* [**vc** *dlci*]

Syntax Description

type	Interface type. For more information, use the question mark (**?**) online help function.
interface-path-id	Physical interface or virtual interface. **Note** Use the **show interfaces** command to see a list of all interfaces currently configured on the router. For more information about the syntax for the router, use the question mark (**?**) online help function.
vc	(Optional) Specifies a VC on the interface.
dlci	(Optional) Data-link Connection Identifier number. Range is from 0 to 1023.

Command Default

No default behavior or values

Command Modes

EXEC mode

Command History

Release	Modification
Release 4.0.0	This command was introduced.

Usage Guidelines

No specific guidelines impact the use of this command.

Task ID

Task ID	Operations
fr	read

Examples

The following example shows how to display Virtual Circuit (VC) manager information for the multlink interface 0/1/0/0:

```
RP/0/RSP0/CPU0:router# show frame-relay vcm-info interface multilink 0/3/0/0/1

VCM IDB:Multilink0_3_0_0_1
==================================
IDB type:               IFT_MAIN
<main specific>
  i/f term type:        L3
  i/f handle:           0x06186240
  BW:                   0x00000c00
```

```
  OIR insert:           F
VC chkpt oid:           0x00000000
proto info:             500323c8 [ptr]
proto fn table:         500323d4 [ptr]
i/f type:               0x00000037 [IFT_MULTILINK]
i/f state:              0x00000003 [up]
i/f basecaps num:       0x0000004c [fr]
i/f basecaps state:     0x00000003 [up]
VCM states:             5002c708 [ptr]
in db:                  T
chkpt:                  F
datapath info           0 [0 bytes]
partner info            50016d98 [16 bytes]
  encaps type:          IETF
  intf type:            DTE
non chkptd info         0 [0 bytes]
```

Related Commands

Command	Description
interface multilink	Configures a multilink interface and enters multilink interface configuration mode.
frame-relay multilink bid, on page 22	Creates a name for a Frame Relay multilink bundle interface.

show interfaces (frame relay)

To display statistics about Frame Relay interfaces, use the **show interfaces** command in EXEC mode.

show interfaces [**summary** | [*type interface-path-id*] [**brief** | **description** | **detail** | **accounting** [**rates**]]] [**location** *node-id*]

Syntax Description

summary	(Optional) Displays a summary of interface information by interface type.
type	(Optional) Interface type. For more information, use the question mark (**?**) online help function.
interface-path-id	(Optional) Physical interface or virtual interface. **Note** Use the **show interfaces** command to see a list of all interfaces currently configured on the router. For more information about the syntax for the router, use the question mark (**?**) online help function.
brief	(Optional) Displays brief information about each interface (one line per interface).
description	(Optional) Displays an interface description.
detail	(Optional) Displays detailed information about each interface. This is the default.
accounting	(Optional) Displays the number of packets of each protocol type that have been sent through the interface.
rates	(Optional) Displays interface accounting rates.
location *node-id*	(Optional) Displays information about all interfaces on the specified node. The *node-id* argument is entered in the *rack/slot/module* notation.

Command Default

No default behavior or values

Command Modes

EXEC mode

Command History

Release	Modification
Release 4.0.0	This command was introduced

Usage Guidelines

The **show interfaces** (Frame Relay) command is available on Packet-over-SONET/SDH (POS), serial, and multilink interfaces.

Task ID

Task ID	Operations
fr	read, write

Examples

The following example shows the output from the **show interfaces** command when the interface is configured with Frame Relay encapsulation:

```
RP/0/RSP0/CPU0:router# show interfaces pos 0/1/0/0

POS0/1/0/0 is up, line protocol is up
  Hardware is Packet over SONET/SDH
  Internet address is Unknown
  MTU 4474 bytes, BW 622080 Kbit
     reliability 255/255, txload 1/255, rxload 1/255
  Encapsulation FRAME-RELAY, crc 32, controller loopback not set,
  LMI enq sent  0, LMI stat recvd 0, LMI upd recvd 0
  LMI enq recvd 9463, LMI stat sent  9463, LMI upd sent  0, DCE LMI up
  LMI DLCI 0  LMI type is ANSI Annex D  frame relay DCE
  Last clearing of "show interface" counters never
  5 minute input rate 0 bits/sec, 0 packets/sec
  5 minute output rate 0 bits/sec, 0 packets/sec
     20934 packets input, 1508069 bytes, 1151 total input drops
     0 drops for unrecognized upper-level protocol
     Received 0 broadcast packets, 0 multicast packets
              0 runts, 0 giants, 0 throttles, 0 parity
     1151 input errors, 1058 CRC, 0 frame, 0 overrun, 93 ignored, 0 abort
     19590 packets output, 990924 bytes, 0 total output drops
     Output 0 broadcast packets, 0 multicast packets
     0 output errors, 0 underruns, 0 applique, 0 resets
     0 output buffer failures, 0 output buffers swapped out
```

Table 4: show interfaces Field Descriptions

Field	Description
Interface name	Displays the name of the current interface. In the example, the interface name is POS0/1/0/0.
Interface state	Displays the state of the interface. In the example, the interface is in the administratively up state.
Line protocol state	Displays the state of the Layer 2 line protocol. This field may be different from the interface state if, for example, a keepalive failure has brought down the Layer 2. **Note** The line protocol state is not the same as the protocol state displayed in the **show ip interfaces** command, because it is the state of Layer 2 (media) rather than Layer 3 (IP protocol).
Hardware	Displays the current hardware type.

Field	Description
Internet address is *n.n.n.n/n*	Displays the Layer 2 address (MAC address for Ethernet interfaces). **Note** Enter the **mac-address** command to configure the hardware address.
MTU	Displays the maximum transmission unit (MTU) for the interface. The MTU is the maximum packet size that can be transmitted over the interface. **Note** The MTU field indicates the interface MTU. Enter the **mtu** command to configure a lower MTU value at the layer 3 level.
BW	Displays the bandwidth of the interface in kbps.
reliability	Displays the proportion of packets that are not dropped and do not have errors. **Note** The reliability is shown as a fraction of 255.
txload	Indicates the traffic flowing out of the interface as a proportion of the bandwidth. **Note** The txload is shown as a fraction of 255.
rxload	Indicates the traffic flowing into the interface as a proportion of the bandwidth. **Note** The rxload is shown as a fraction of 255.
Encapsulation	Layer 2 encapsulation installed on the interface.
CRC	Indicates the length of the cyclic redundancy check (CRC), in bytes. **Note** Enter the **pos crc** command to configure the CRC.
controller loopback	Indicates that the hardware was configured as controller loopback.
LMI enq sent	Number of LMI enquiry messages sent.
LMI stat recvd	Number of LMI status messages received.
LMI upd recvd	Number of LMI updated messages received.
LMI enq recvd	Number of LMI enquiry messages received.
LMI stat sent	Number of LMI status messages sent.
LMI upd sent	Number of LMI updated messages sent.
DCE LMI	Displays the state of the DCE LMI.
LMI DLCI	Displays the LMI DLCI identifier.

Field	Description
LMI type	Displays the LMI type.
Last clearing	Time at which the counters that measure cumulative statistics (such as number of bytes transmitted and received) shown in this report were last reset to zero. Note that variables that might affect routing for example, load and reliability) are not cleared when the counters are cleared.
5 minute input rate5 minute output rate	Average number of bits and packets transmitted per second in the last 5 minutes. The 5-minute input and output rates should be used only as an approximation of traffic per second during a given 5-minute period. These rates are exponentially weighted averages with a time constant of 5 minutes. A period of four time constants must pass before the average is within two percent of the instantaneous rate of a uniform stream of traffic over that period.
packets input	Total number of error-free packets received by the system.
bytes	Total number of bytes, including data and MAC encapsulation, in the error-free packets received by the system.
Received...broadcasts	Total number of broadcast or multicast packets received by the interface
runts	Number of packets that are discarded because they are smaller than the minimum packet size of the medium.
giants	Number of packets that are discarded because they exceed the maximum packet size of the medium
input errors	Total number of no buffer, runts, giants, CRCs, frame, overrun, ignored, and terminated counts. Other input-related errors can also increment the count, so that this sum might not balance with the other counts.
CRC	Cyclic redundancy checksum generated by the originating station or far-end device does not match the checksum calculated from the data received. On a serial link, CRCs usually indicate noise, gain hits, or other transmission problems on the data link.
frame	Number of packets received incorrectly having a CRC error and a noninteger number of octets. On a serial line, this is usually the result of noise or other transmission problems.
overrun	Number of times the serial receiver hardware was unable to hand received data to a hardware buffer because the input rate exceeded the receiver's ability to handle the data.
ignored	Number of received packets ignored by the interface because the interface hardware ran low on internal buffers. Broadcast storms and bursts of noise can cause the ignored count to be increased.
abort	Illegal sequence of one bits on a serial interface. This usually indicates a clocking problem between the serial interface and the data link equipment.

Field	Description
carrier transitions	Number of times the carrier detect signal of a serial interface has changed state. For example, if data carrier detect (DCD) goes down and comes up, the carrier transition counter will increment two times. Indicates modem or line problems if the carrier detect line is changing state often.

snmp-server traps frame-relay pvc

To enable Simple Network Management Protocol (SNMP) trap notifications for a Frame Relay permanent virtual circuit (PVC), use the **snmp-server traps frame-relay pvc** command in Global Configuration mode. To disable SNMP notifications for a FR PVC, use the **no** form of this command.

snmp-server traps frame-relay pvc [**interval** *seconds*]

Syntax Description

interval *seconds*	(Optional) Minimum period between successive traps. The range is from 1 to 3600.

Command Default

seconds: 30

Command Modes

Global Configuration mode

Command History

Release	Modification
Release 4.0.0	This command was introduced.

Usage Guidelines

Use the **snmp-server traps frame-relay pvc** command to enable trap requests for a Frame Relay PVC. This command is used with the **snmp-server host** command. Use the **snmp-server host** command to specify which host or hosts receive SNMP notifications.

See *Implementing SNMP on Cisco IOS XR Software* in *System Management Configuration Guide for Cisco ASR 9000 Series Routers* for detailed information about SNMP configuration tasks and commands.

Task ID

Task ID	Operations
snmp	read, write
fr	read, write

Examples

The following example shows how to configure the router to send SNMP trap notifications for a Frame Relay PVC:

```
RP/0/RSP0/CPU0:router(config)# snmp-server host 12.26.25.61 traps public udp-port 5000
RP/0/RSP0/CPU0:router(config)# snmp-server community public RW
RP/0/RSP0/CPU0:router(config)# snmp-server traps frame-relay pvc interval 50
```

Related Commands

Command	Description
snmp-server community	Configures the community access string to permit access to the SNMP.

Command	Description
snmp-server host	Specifies the recipient of an SNMP notification operation.