Multilink Commands on the Cisco IOS XR Software

This module provides command line interface (CLI) commands for configuring multilink interfaces on the Cisco XR 12000 Series Router.

bundle

To create a multilink interface bundle, use the **bundle** command in the interface configuration mode. To remove a multilink interface bundle, use the **no** form of this command.

bundle *bundleID*

Syntax Description

bundleID	ID number of the multilink interface bundle. Range is from 1 through 1023.

Command Default No default behavior or values

Command Modes Interface configuration

Command History

Release	Modification
Release 3.4.1	This command was introduced.

Usage Guidelines The **bundle** command is used in mgmtmultilink controller mode to dynamically create a multilink interface. This command is similar to the **channel-group** command on the T1 controller, which dynamically creates a serial interface.

Task ID

Task ID	Operations
sonet-sdh	read, write

Examples The following example shows how to create a multilink interface with a bundle ID of 1:

```
RP/0/0/CPU0:router# configure
RP/0/0/CPU0:router(config)# controller mgmtmultilink 0/1/0/0
RP/0/0/CPU0:router(config-mgmtmultilink)# bundle 1
RP/0/0/CPU0:router(config-mgmtmultilink)# commit
```

Related Commands

Command	Description
	Enters the config-if-multilink submode.

Command	Description
multilink group, on page 11	Attaches a serial interface to a multilink interface bundle.
ppp multilink minimum-active links, on page 15	Sets the minimum number of active links required before the multilink interface line can be brought to the up state.

controller MgmtMultilink

To configure a controller for a generic multilink bundle and enter MgmtMultilink configuration mode, use the **controller MgmtMultilink** command in global configuration mode. To return to the default state, use the **no** form of this command.

controller MgmtMultilink *interface-path-id*

no controller MgmtMultilink *interface-path-id*

Syntax Description

interface-path-id	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.

Command Default

No default behavior or values

Command Modes

Global configuration

Command History

Release	Modification
Release 3.6.0	This command was introduced.

Usage Guidelines

For the *interface-path-id* argument, use the following guidelines:

- If specifying a physical interface, the naming notation is *rack*/*slot*/*module*/*instance*. The slash between values is required as part of the notation. An explanation of each component of the naming notation is as follows:

  - *rack*: Chassis number of the rack.

  - *slot*: Physical slot number of the line card.

  - *module*: Module number.

  - *instance*: Number of the controller instance. The instance is always 0.

- If specifying a virtual interface, the number range varies, depending on interface type.

Task ID

Task ID	Operations
interface	read, write

Examples

The following example shows how to enter the MgmtMultilink configuration mode :

```
RP/0/0/CPU0:router# config
RP/0/0/CPU0:router(config)# controller MgmtMultilink 0/1/0/0
RP/0/0/CPU0:router(config-mgmtmultilink)#
```

Related Commands

Command	Description
show controllers mgmtmultilink, on page 16	Displays information about the state and the number of bundles of a multilink controller.

interface multilink

To configure a multilink interface and enter multilink interface configuration mode, use the **interface multilink** command in global configuration mode. To delete the interface configuration, use the **no** form of this command. To return to the default state, use the **no** form of this command.

interface multilink *interface-path-id*[.*subinterface*{**l2transport**| **point-to-point**}]

no interface multilink *interface-path-id*[.*subinterface*{**l2transport**| **point-to-point**}]

Syntax Description

interface-path-id [.*subinterface*]	Physical interface or virtual interface followed by the optional subinterface path ID. Naming notation is *interface-path-id.subinterface*. The period in front of the subinterface value is required as part of the notation.
	For more information about the syntax for the router, use the question mark (**?**) online help function.
l2transport	Configures interface to function as one endpoint on a Layer 2 link.
point-to-point	Configures interface to function as one endpoint on a point-to-point link.

Command Default   No interfaces are configured.

Command Modes   Global configuration

Command History

Release	Modification
Release 3.6.0	This command was introduced.

Usage Guidelines   The *subinterface* argument and keywords **l2transport** and **po in t-to-point** are only applicable if frame relay encapsulation is enabled using the **encapsulation frame-relay** command.

Task ID

Task ID	Operations
interface	read, write

Cisco IOS XR Interface and Hardware Component Command Reference for the Cisco XR 12000 Series Router,
Release 5.1.x

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Examples   The following example shows how to enable frame relay encapsulation for a multilink bundle, and enter subinterface configuration mode.

```
RP/0/0/CPU0:routerRP/0/0/CPU0:router#
RP/0/0/CPU0:router# configure terminal
RP/0/0/CPU0:router(config)# interface multilink 0/3/0/0/1
RP/0/0/CPU0:router(config-if)# encapsulation frame-relay
RP/0/0/CPU0:router(config-if)# exit
RP/0/0/CPU0:router(config)# interface multilink 0/3/0/0/1.1 point-to-point
RP/0/0/CPU0:router(config-subif)# ipv4 address 10.86.10.48/24
```

The following example shows how to enter interface configuration mode for a multilink bundle with ppp encapsulation. ppp encapsulation is the default encapsulation type:

```
RP/0/0/CPU0:router# configure terminal
RP/0/0/CPU0:router(config)# interface multilink 0/3/0/0/1
RP/0/0/CPU0:router(config-if)#ipv4 address 10.86.10.48/24
```

Related Commands

Command	Description
show interfaces multilink, on page 19	Displays information about a multilink interface.

multilink

To enter the config-if-multilink submode, use the **multilink** command in the interface configuration mode.

multilink

Syntax Description
This command has no keywords or arguments.

Command Default
No default behavior or values

Command Modes
Interface configuration

Command History

Release	Modification
Release 3.4.1	This command was introduced.

Usage Guidelines
For multilink interfaces, the **multilink** command provides access to the config-if-multilink submode to use the **multilink fragment-size** command.

Task ID

Task ID	Operations
hdlc	read, write

Examples
The following example shows how to enter the config-if-multilink submode:

```
RP/0/0/CPU0:router# config
RP/0/0/CPU0:router(config)# interface serial 0/1/0/1/1/1:0
RP/0/0/CPU0:router(config-if)# multilink
RP/0/0/CPU0:router(config-if-multilink)# group 1
RP/0/0/CPU0:router(config-if-multilink)# commit
```

Related Commands

Command	Description
multilink fragment-size, on page 9	
multilink group, on page 11	Attaches a serial interface to a multilink interface bundle.
ppp multilink minimum-active links, on page 15	Sets the minimum number of active links required before the multilink interface line can be brought to the up state.

multilink fragment-size

To set the Layer 2 fragmentation size and enable counting of fragmented packets, for a multilink interface which is controlled by the **mtu** command, use the **multilink fragment-size** command in interface configuration mode. To set the fragment size back to the default, no fragment size, use the **no** form of this command.

multilink fragment-size *size* [**fragment-counter**]

no multilink fragment-size

Syntax Description

size	Fragment size. The allowed values are determined by the hardware. In the current release, the allowed values are 128, 256 and 512. The value 64 also appears in the CLI help for this parameter. However, 64 is not allowed in this release and will cause configuration problems in the system if used.
fragment-counter	Enables counting of the fragmented packets.

Command Default

The default is no multilink fragment-size, which means no fragmentation at Layer 2.

Command Modes

Interface configuration

Command History

Release	Modification
Release 3.4.1	This command was introduced.
Release 4.0.0	The **fragment-counter** keyword was added.

Usage Guidelines

Multilink fragmentation is only supported for ppp encapsulation, not for frame-relay enacapsulation.

Task ID

Task ID	Operations
hdlc	read, write

Examples

The following example shows how to set the fragment size to 128:

```
RP/0/0/CPU0:router# configure
RP/0/0/CPU0:router(config)# interface multilink 0/1/0/0/1
RP/0/0/CPU0:router(config-if)# multilink fragmentation-size 128
RP/0/0/CPU0:router(config-if)# commit
```

The following example shows how to set the fragment size to 128 and enable the fragmentation counters:

```
RP/0/0/CPU0:router# configure
RP/0/0/CPU0:router(config)# interface multilink 0/1/0/0/1
RP/0/0/CPU0:router(config-if)# multilink fragmentation-size 128 fragment-counter
RP/0/0/CPU0:router(config-if)# commit
```

Related Commands	Command	Description
	multilink group, on page 11	Attaches a serial interface to a multilink interface bundle.
	multilink, on page 8	Enters the config-if-multilink submode.
	ppp multilink minimum-active links, on page 15	Sets the minimum number of active links required before the multilink interface line can be brought to the up state.

multilink group

To attach a serial interface to a multilink interface bundle, use the **multilink group** command in interface configuration mode. To remove a serial interface from a multilink interface bundle, use the **no** form of this command.

multilink group *bundleID*

no multilink group *bundleID*

Syntax Description

bundleID	Bundle ID number of the multilink interface, in the format *rack/slot/bay/controllerID/bundleID*)

Command Default   No default behavior or values

Command Modes   Interface configuration

Command History

Release	Modification
Release 3.4.1	This command was introduced.

Usage Guidelines

Task ID

Task ID	Operations
hdlc	read, write

Examples   The following examples show how to attach a serial interface to a multilink interface bundle:

```
RP/0/0/CPU0:router# configure
RP/0/0/CPU0:router(config)# interface serial 0/1/0/1/1/1:0
RP/0/0/CPU0:router(config-if)# multilink group 1
RP/0/0/CPU0:router(config-if)# commit
```

or

```
RP/0/0/CPU0:router# configure
RP/0/0/CPU0:router(config)# interface serial 0/1/0/1/1/1:0
RP/0/0/CPU0:router(config-if)# multilink
RP/0/0/CPU0:router(config-if-multilink)# group 1
(config-if-multilink)# commit
```

Related Commands

Command	Description
multilink fragment-size, on page 9	
multilink, on page 8	Enters the config-if-multilink submode.
ppp multilink minimum-active links, on page 15	Sets the minimum number of active links required before the multilink interface line can be brought to the up state.

multilink interleave

To enable interleave on a multilink interface, use the **multilink interleave** command in interface configuration mode.

multilink interleave

Syntax Description

This command has no keywords or arguments.

Command Default

The default is no interleave.

Command Modes

Interface configuration

Command History

Release	Modification
Release 3.5.0	This command was introduced.

Usage Guidelines

Link Fragmentation and Interleaving (LFI) is designed for MLPPP interfaces and is required when integrating voice and data on low-speed interfaces that run at less than 768 Kbps.

Link Fragmentation and Interleaving (LFI) provides stability for delay-sensitive traffic, such as voice or video, traveling on the same circuit as data. Voice is susceptible to increased latency and jitter when the network processes large packets on low-speed interfaces that run at less than 768 Kbps. LFI reduces delay and jitter by fragmenting large datagrams and interleaving them with low-delay traffic packets.

Task ID

Task ID	Operations
hdlc	read, write

Examples

The following examples show how to enable interleave on a multilink interface.

```
RP/0/0/CPU0:router# configuration
RP/0/0/CPU0:router#(config)# interface multilink 0/1/0/0/1
RP/0/0/CPU0:router#(config-if)# multilink interleave
RP/0/0/CPU0:router#(config-if)# commit
or

RP/0/0/CPU0:router# configuration
RP/0/0/CPU0:router#(config)# interface multilink 0/1/0/0/1
RP/0/0/CPU0:router#(config-if)# multilink
RP/0/0/CPU0:router#(config-if-multilink)# interleave
RP/0/0/CPU0:router#(config-if-multilink)# commit
```

Related Commands

Command	Description
multilink, on page 8	Enters the config-if-multilink submode.
multilink fragment-size, on page 9	

ppp multilink minimum-active links

To set the minimum number of active links required before the multilink interface line can be brought to the up state, use the **ppp multilink minimum-active links** command in global configuration mode.

ppp multilink minimum-active links *value*

Syntax Description

value	Number of active links. The range is 1 through 12.

Command Default

The default value is 1 active link.

Command Modes

Global configuration

Command History

Release	Modification
Release 3.4.1	This command was introduced.

Usage Guidelines

When multiple links are active and one link goes down, the whole bundle goes down.

Task ID

Task ID	Operations
ppp	read, write

Examples

The following example shows how to set the minimum number of active links to 6:

```
RP/0/0/CPU0:router# configure
RP/0/0/CPU0:router(config)# interface Multilink 0/1/0/0/1
RP/0/0/CPU0:router(config-if)# ppp multilink minimum-active links 6
```

Related Commands

Command	Description
multilink fragment-size, on page 9	
multilink group, on page 11	Attaches a serial interface to a multilink interface bundle.
multilink, on page 8	Enters the config-if-multilink submode.

show controllers mgmtmultilink

To display information about the state and the number of bundles of a multilink controller, use the **show controller mgmtmultilink** command in EXEC mode.

show controllers mgmtmultilink *interface-path-id* [**all**| **brief**| **internal-state**| **tabular**]

Syntax Description

interface-path-id	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	Displays all multilink management information.
brief	Displays brief multilink management information.
internal-state	Displays internal multilink management state.
tabular	Displays multilink management information in tabular format.

Command Default

No default behavior or values

Command Modes

EXEC

Command History

Release	Modification
Release 3.4.1	This command was introduced.

Usage Guidelines

For the *interface-path-id* argument, use the following guidelines:

- If specifying a physical interface, the naming notation is *rack*/*slot*/*module*/*instance*. The slash between values is required as part of the notation. An explanation of each component of the naming notation is as follows:

  ◦ *rack*: Chassis number of the rack.

  ◦ *slot*: Physical slot number of the line card.

  ◦ *module*: Module number. A physical layer interface module (PLIM) is always 0.

  ◦ *instance*: Number of the controller instance. The instance is always 0.

• If specifying a virtual interface, the number range varies, depending on interface type.

Task ID

Task ID	Operations
interface	read

Examples

The following example shows how to display information for a management multilink controller:

```
RP/0/0/CPU0:router# show controllers mgmtmultilink 0/3/0/0 all

Controller MgmtMultilink0/3/0/0
  State is up
  Number of bundles: 2
    Bundle 1 - Multilink0/3/0/0/1 (0x06186240)
      Type:  Full Framed T1s
      Bandwidth: 3072 kbps
      Encapsulation: Frame Relay
      Fragment size: 0
      Number of members: 2
      Ancestor name: SONET0/3/0/0
      Member(s):
          Serial0/3/0/0/1/1:0  (0x0619b640)    Active
          Serial0/3/0/0/1/2:0  (0x06176980)    Active

    Bundle 2 - Multilink0/3/0/0/2 (0x06176840)
      Type:  Full Framed T1s
      Bandwidth: 3072 kbps
      Encapsulation: Frame Relay
      Fragment size: 0
      Number of members: 2
      Ancestor name: SONET0/3/0/0
      Member(s):
          Serial0/3/0/0/1/3:0  (0x0619b3c0)    Active
          Serial0/3/0/0/1/4:0  (0x0618b9c0)    Active

RP/0/0/CPU0:router# show controllers mgmtmultilink 0/3/0/0 brief

  MgmtMultilink0/3/0/0 is up

RP/0/0/CPU0:router# show controllers mgmtmultilink 0/3/0/0 tabular

  MgmtMultilink0/3/0/0 is up

RP/0/0/CPU0:router# show controllers mgmtmultilink 0/3/0/0 internal-state

Interface(layer)     admin_up if_state
-------------------- -------- --------
MgmtMultilink0/3/0/0  up       up

RP/0/0/CPU0:router# show controllers mgmtmultilink 0/2/0/0

Controller MgmtMultilink0/2/0/0
   State is up
   Number of bundles: 1
     Bundle 1 - Multilink0/2/0/0/1 (0x0802e400)
       Type:  Full Framed T1s
       Bandwidth: 1536 kbps
       Encapsulation: PPP
       Fragment size: 0
       Number of members: 1
       Ancestor name: SONET0/2/0/0
       Member(s):
           Serial0/2/0/0/1/1:0  (0x08023c00)    Active
```

Related Commands

Command	Description
show interfaces multilink, on page 19	Displays information about a multilink interface.

show interfaces multilink

To display information about a multilink interface, use the **show interfaces multilink** command in EXEC mode.

show interfaces multilink *interface-path-id*

Syntax Description

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.

Command Default   No default behavior or values

Command Modes   EXEC

Command History

Release	Modification
Release 3.6.0	This command was introduced.

Usage Guidelines   For the *interface-path-id* argument, use the following guidelines:

- If specifying a physical interface, the naming notation is *rack/slot/module/port*. The slash between values is required as part of the notation. An explanation of each component of the naming notation is as follows:
    - *rack*: Chassis number of the rack.
    - *slot*: Physical slot number of the line card.
    - *module*: Module number. A physical layer interface module (PLIM) is always 0.
    - *port*: Physical port number of the interface.

- If specifying a virtual interface, the number range varies, depending on interface type.

Task ID

Task ID	Operations
interface	read

Examples   The following example shows how to display information about a multilink interface:

```
RP/0/0/CPU0:router# show interfaces multilink 0/1/0/0/1
 Multilink0/1/0/0/1 is up, line protocol is up
   Interface state transitions: 1
   Hardware is Multilink network interface(s)
   Internet address is 10.1.1.1/24
   MTU 1504 bytes, BW 1536 Kbit
      reliability 255/255, txload 3/255, rxload 3/255
   Encapsulation PPP,  loopback not set, keepalive set (10 sec)
   LCP Open
   Open: IPCP
   Last input 00:00:00, output 00:00:00
   Last clearing of "show interface" counters 02:06:24
   5 minute input rate 19000 bits/sec, 5 packets/sec
   5 minute output rate 19000 bits/sec, 5 packets/sec
      48769 packets input, 12425740 bytes, 0 total input drops
      0 drops for unrecognized upper-level protocol
      Received 0 runts, 0 giants, 0 throttles, 0 parity
      0 input errors, 0 CRC, 0 frame, 0 overrun, 0 ignored, 0 abort
      67905 packets output, 17400050 bytes, 0 total output drops
      0 output errors, 0 underruns, 0 applique, 0 resets
      0 output buffer failures, 0 output buffers swapped out
Fragmentation Statistics
   Input Fragmented packets 0          Input Fragmented bytes 0
   Output Fragmented packets 0         Output Fragmented bytes 0
   Input Unfragmented packets 0        Input Unfragmented bytes 0
   Output Unfragmented packets 0       Output Unfragmented bytes 0
   Input Reassembled packets 0         Input Reassembled bytes 0
```