

Serial Interface Commands

This module provides CLI commands for configuring serial interfaces 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.

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clear iphc ipv4

To clear all Real Time Protocol (RTP) and Transport Control Protocol (TCP) statistics for IP header compression (IPHC) packets sent and received on an interface, use the **clear iphc ipv4** command in EXEC mode.

clear iphc ipv4 {**interface** {**serial** | **multilink**} *interface-path-id* | **location** *node-id*}

Syntax Description

interface	Specifies the interface to be configured, by type and the *interface-path-id* argument.
serial	Specifies a serial network interface.
multilink	Specifies a multilink network interface.
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	Specifies the interface to be configured by its *node-id*.
node-id	Fully qualified path of the node 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

Note The **clear counters** command also clears the IPHC statistics for all the interfaces.

Task ID

Task ID	Operations
ip-services	read, write

Examples

The following example shows how to clear RTP and TCP statistics on an interface:

```
RP/0/RSP0/CPU0:router# clear iphc ipv4 interface Serial 0/1/0/1/26:0

Thu Jan  8 20:30:38.155 UTC
```

The following example shows how to clear RTP and TCP statistics on a node:

```
RP/0/RSP0/CPU0:router# clear iphc ipv4 location 0/3/CPU0

Mon Oct 12 22:47:51.430 DST
```

crc (serial)

To set the length of the cyclic redundancy check (CRC) on a serial interface, use the **crc** command in serial configuration mode. To return the CRC setting on a serial interface to the default setting, use the **no** form of this command.

crc {**16** | **32**}

Syntax Description

16	Sets 16-bit CRC mode.
32	Sets 32-bit CRC mode.

Command Default

The default is 16 bits for serial interfaces.

Command Modes

Serial configuration

Command History

Release	Modification
Release 3.9.0	This command was introduced.

Usage Guidelines

CRC is an error-checking technique that uses a calculated numeric value to detect errors in transmitted data. The designators 16 and 32 indicate the length (in bits) of the frame check sequence (FCS). A CRC of 32 bits provides more powerful error detection, but adds overhead. Both the sender and receiver must use the same setting.

CRC-16, the most widely used error checking method throughout the United States and Europe, is used extensively with WANs. CRC-32 is specified by IEEE standard 802 and as an option by some point-to-point transmission standards. It is often used on Switched Multimegabit Data Service (SMDS) networks and LANs.

Task ID

Task ID	Operations
hdlc	read, write

Examples

In the following example, the 32-bit CRC on serial interface 0/3/0/0/0:10 is enabled:

```
RP/0/RSP0/CPU0:router(config)# interface serial 0/3/0/0/0:10
RP/0/RSP0/CPU0:router(config-if)# serial
RP/0/RSP0/CPU0:router(config-if-serial)# crc 32
```

Related Commands

Command	Description
show interfaces	Displays statistics, state and other information such as mac address etc. for all interfaces configured on the router or for a specific node.

description (IPHC profile)

To add a description to an IPHC profile, use the **description** command in IPHC profile configuration mode. To remove a description for an IPHC profile, use the **no** form of this command.

description *description*
no description

Syntax Description

description	Description to be added to the IPHC profile.

Command Default

By default, no description is attached to an IPHC profile.

Command Modes

IPHC profile configuration

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
ip-services	read, write

Examples

In the following example, a description is attached to the IPHC profile test:

```
RP/0/RSP0/CPU0:router(config)# config
RP/0/RSP0/CPU0:router(config)# iphc profile test type iphc
RP/0/RSP0/CPU0:router(config-iphc-profile)# description testprofile
RP/0/RSP0/CPU0:router(config-iphc-profile)# commit
```

encapsulation (serial)

To set the Layer 2 encapsulation of an interface, use the **encapsulation** command in interface configuration mode. To restore the system to the default encapsulation, use the **no** form of this command.

encapsulation {**hdlc** | **ppp** | **frame-relay** | **mfr**}

Syntax Description

hdlc	Enables Cisco High-Level Data Link Control (HDLC) encapsulation on the interface. This is the default encapsulation type.
ppp	Enables PPP encapsulation on the interface.
frame-relay	Enables Frame Relay encapsulation on the interface.
mfr	Enables multilink Frame Relay encapsulation on the interface.

Command Default

For serial interfaces, the default encapsulation is HDLC.

Command Modes

Interface configuration

Command History

Release	Modification
Release 3.9.0	This command was introduced.
Release 4.0.0	Frame Relay and Multilink Frame Relay encapsulation was introduced.

Usage Guidelines

No specific guidelines impact the use of this command.

Task ID

Task ID	Operations
hdlc	read, write
interface	read, write

Examples

The following example shows how to enable PPP encapsulation on serial interface 0/3/0/1:

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

Related Commands

Command	Description
show interfaces	Displays statistics, state and other information such as mac address etc. for all interfaces configured on the router or for a specific node.

feedback disable

To disable the IP header compression (IPHC) context status feedback messages on an interface, use the **feedback disable** command in IPHC profile configuration mode. To re-enable feedback messages after they are disabled, use the **no** form of this command.

feedback disable

Syntax Description

This command has no keywords or arguments.

Command Default

Feedback messages are enabled by default.

Command Modes

IPHC profile configuration

Command History

Release	Modification
Release 4.0.0	This command was introduced.

Usage Guidelines

Note Feedback disable can be configured only within an IPHC profile.

Task ID

Task ID	Operations
ip-services	read, write

Examples

The following example shows how to disable the IP header compression (IPHC) context status feedback messages within an IPHC profile:

```
RP/0/RSP0/CPU0:router(config)# config
RP/0/RSP0/CPU0:router(config)# iphc profile Profile_1 type iphc
RP/0/RSP0/CPU0:router(config-iphc-profile)# feedback disable
```

fragment end-to-end

To enable fragmentation of Frame Relay frames on an interface, use the **fragment end-to-end** command in serial Frame Relay PVC configuration mode. To disable Frame Relay fragmentation, use the **no** form of this command.

fragment end-to-end *fragment-size*

Syntax Description

fragment-size	Number of payload bytes from the original Frame Relay frame that go into each fragment. This number excludes the Frame Relay header of the original frame. All the fragments of a Frame Relay frame, except the last, have a payload size equal to fragment-size; the last fragment has a payload less than or equal to fragment-size. Valid values are from 64 to 512 bytes, depending on your hardware.

Command Default

Fragmentation is disabled by default.

Command Modes

Frame Relay virtual circuit configuration

Command History

Release	Modification
Release 4.0.0	This command was introduced.

Usage Guidelines

The Cisco 8-Port Channelized T1/E1 SPA supports fragment sizes of 128, 256, and 512 bytes.

Task ID

Task ID	Operations
fr	read, write

Examples

The following example shows how to enter serial Frame Relay virtual circuit configuration mode, set the fragmentation size of Frame Relay frames on subinterface 0/6/2/4.1 to 512 bytes:

```
RP/0/RSP0/CPU0:router(config)# interface serial 0/6/2/4.1 point-to-point
RP/0/RSP0/CPU0:router(config-subif)# pvc 100
RP/0/RSP0/CPU0:router(config-fr-vc)# fragment end-to-end 512
```

Related Commands

Command	Description
interface serial, on page 11	Configures a serial interface and enters interface or subinterface configuration mode.

interface serial

To configure a serial interface and enter interface or subinterface configuration mode, use the **interface serial** command in global configuration mode. To delete a serial configuration, use the **no** form of this command.

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

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.
point-to-point	Interface functions as one endpoint of a point-to-point link.
l2transport	Interface functions as one endpoint on an Layer 2 link.

Command Default

No default behavior or values

Command Modes

Global configuration

Command History

Release	Modification
Release 3.9.0	This command was introduced.
Release 4.0.0	The . *subinterface* argument, and the **point-to-point** and **l2transport** keywords were added.

Usage Guidelines

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

Note A slash between values is required as part of the notation.

- The naming notation for T1 interfaces on a channelized SPA is *rack*/*slot*/*module*/*port*/*channel-num*:*channel-group-number*, as shown in the following example:

```
interface serial 0/0/1/2/4:3
```

- If a subinterface is configured under the serial interface, then the router includes the subinterface number at the end of the serial interface address. In this case, the naming notation is *rack*/*slot*/*module*/*port*[/*channel-num*:*channel-group-number*].*subinterface*, as shown in the following example:

```
interface serial 0/0/1/2.1
```

- The naming notation syntax for serial interfaces is as follows:

- *rack*—Chassis number of the rack.
- *slot*—Physical slot number of the modular services card or line card.
- *module*—Module number. Shared port adapters (SPAs) are referenced by their subslot number.
- *port*—Physical port number of the controller.
- *channel-num*:—T1 channel number. T1 channels range from 0 to 23.
- *channel-group-number*:—Time slot number. T1 time slots range from 1 to 24. The *channel-group-number* is preceded by a colon and not a slash.
- *subinterface*—Subinterface number.

- Use the question mark (?) online help function following the **serial** keyword to view a list of all valid interface choices.

Serial interfaces on channelized T3 can be deleted using the **no channel-group** command in T1 configuration mode. If there are nondefault serial parameters defined, you need to use the **no interface serial** command first to revert to the default configuration, and then delete the serial interface using the **no channel-group** command.

Task ID

Task ID	Operations
interface	read, write

Examples

The following example shows how to enter interface configuration mode for a serial interface in slot 6, subslot 2, port 4, T1 channel number 10 and channel group 8:

```
RP/0/RSP0/CPU0:router(config)# interface serial 0/6/2/4/10:8
RP/0/RSP0/CPU0:router(config-if)#
```

The following example shows how to reference the serial interface on channel group 3 of T1 channel group 4 on port 2 of a SPA in subslot 1 and enter subinterface configuration mode:

```
RP/0/RSP0/CPU0:router(config)# interface serial 0/0/1/2/4:3
RP/0/RSP0/CPU0:router(config-if)#
```

Related Commands

Command	Description
channel-group	Configures a DS0 channel group and enters channel group configuration mode.
show interfaces	Displays statistics, state and other information such as mac address etc. for all interfaces configured on the router or for a specific node.

invert

To invert the data stream on a serial interface, use the **invert** command in serial configuration mode. To disable data inversion, use the **no** form of this command.

invert

Syntax Description

This command has no keywords or arguments.

Command Default

Data is not inverted.

Command Modes

Serial configuration

Command History

Release	Modification
Release 3.9.0	This command was introduced.

Usage Guidelines

To verify that data inversion is configured on the interface, use the **show interfaces serial** command.

Task ID

Task ID	Operations
hdlc	read, write

Examples

In the following example, data inversion is enabled on serial interface 0/3/0/0/0:10:

```
RP/0/RSP0/CPU0:router(config)# interface serial 0/3/0/0/0:10
RP/0/RSP0/CPU0:router(config-if)# serial
RP/0/RSP0/CPU0:router(config-if-serial)# invert
```

Related Commands

Command	Description
show interfaces	Displays statistics, state and other information such as mac address etc. for all interfaces configured on the router or for a specific node.

iphc profile

To create an IP header compression (IPHC) profile and enter the IPHC profile configuration mode, use the **iphc profile** command in configuration mode. To remove the profile, use the **no** form of this command.

iphc profile *profile-name* **type** {**ietf** | **iphc**}

Syntax Description

profile-name	Text name for the IPHC profile. The maximum number of characters is 50.
type	Specifies the type of compression format.
ietf	Specifies Internet Engineering Task Force (IETF) standard format. Uses RFC2507 and RFC2508 compression schemes.
iphc	Specifies Internet Protocol Header Compression (IPHC) format.Provides options similar to IETF.

Command Default

No default behavior or values

Command Modes

Configuration

Command History

Release	Modification
Release 4.0.0	This command was introduced.

Usage Guidelines

After you create a profile and enter the IPHC profile configuration mode, you can configure IPHC features in the profile and attach the profile to multiple interfaces. The maximum number of profiles allowed on a router is 250.

A profile cannot be deleted if it is attached to any interfaces. You must remove the profile from all interfaces first. Then, delete the profile using the **no** form of this command.

On-the-fly modifications to IPHC profiles are not supported.

A profile name cannot exceed 50 characters. If you attempt to create a profile name that exceeds 50 characters, you receive the following error message:

```
iphc profile test1test1test1test1test1test1test1test1test1test11 type iphc
!!% 'iphc_profilemgr' detected the 'warning' condition
'Name is longer than allowed character length of 50'
!
```

Examples

The following example shows how to create the IPHC profile Profile_1

```
RP/0/RSP0/CPU0:router(config)# config
RP/0/RSP0/CPU0:router(config)# iphc profile Profile_1 type iphc
RP/0/RSP0/CPU0:router(config-iphc-profile)#
```

ipv4 iphc profile

To attach an IP header compression (IPHC) profile to an interface, use the **ipv4 iphc profile** command in interface configuration mode. To remove the profile from the interface, use the **no** form of this command.

ipv4 iphc profile *profile-name* [**mode service-policy**]

Syntax Description

profile-name	Text name of the configured IPHC profile to attach to this interface.
mode service-policy	(Optional) Specifies that the IPHC profile applies to a QoS service policy.

Command Default

No default behavior or values

Command Modes

Interface configuration

Command History

Release	Modification
Release 4.0.0	This command was introduced.

Usage Guidelines

If the profile name is not recognized the system returns the following error message:

```
!!% 'iphc_ma' detected the 'warning' condition 'Profile doesn't exist'
```

If the encapsulation on the interface is not supported, the system returns the following error message:

```
!!% 'iphc_ma' detected the 'warning' condition 'IPHC capability: Encap type not supported'
```

Task ID

Task ID	Operations
ip-services	read, write
ipv4	read, write

Examples

The following example shows how to attach an IP header compression (IPHC) profile to an interface.

```
RP/0/RSP0/CPU0:router(config)# config
RP/0/RSP0/CPU0:router(config)# interface serial 0/1/0/1
RP/0/RSP0/CPU0:router(config-if)# ipv4 iphc profile Profile_1
```

The following example shows how to attach an IPHC profile that applies to a QoS service policy to an interface:

```
RP/0/RSP0/CPU0:router(config)# config
RP/0/RSP0/CPU0:router(config)# interface serial 0/1/0/1
RP/0/RSP0/CPU0:router(config-if)# ipv4 iphc profile Profile_1 mode service-policy
```

keepalive (serial)

To set the keepalive timer for a specific serial interface, use the **keepalive** command in interface configuration mode. To reset the keepalive timer to the default of 10 seconds, use the **no** form of this command.

keepalive {*interval* [*retry*] | **disable**}
no keepalive

Syntax Description

interval	Number of seconds (from 1 to 30) between keepalive messages. The default is 10.
disable	Turns off the keepalive timer.
retry	(Optional) Number of keepalive messages (from 1 to 255) that can be sent to a peer without a response before transitioning the link to down state. The default is 5.

Command Default

The default interval is 10 seconds between keepalive messages. The default retry is 5 keepalive messages that can be sent without a response. However, when more than 5 keepalive messages are sent to a peer without a response, the link transitions to the down state.

Command Modes

Interface configuration

Command History

Release	Modification
Release 3.9.0	This command was introduced.

Usage Guidelines

HDLC keepalives require that the **keepalive** command is configured the same way on both ends of a single connection. The two connected routers have no way of negotiating the keepalive value because there is no way for one router to tell the other about its configured values. The keepalive value configured on each router (local or partner) sets the rate at which the Cisco IOS XR software sends packets. It also sets the rate at which the local end expects to receive incoming packets.

To set the keepalive value to the default value, use the **keepalive** command without specifying a value for the *interval* argument.

By default, if more than five keepalive messages are sent to a peer and no response is received from the peer, then the link transitions to the down state.

Task ID

Task ID	Operations
hdlc	read, write

Examples

The following example shows how to configure keepalives for 3 seconds on serial interface 0/7/0/1:

```
RP/0/RSP0/CPU0:router(config)# interface serial 0/7/0/1
RP/0/RSP0/CPU0:router(config-if)# keepalive 3
```

Related Commands

Command	Description
show interfaces	Displays statistics, state and other information such as mac address etc. for all interfaces configured on the router or for a specific node.

max-header

To define the maximum size header that can be compressed, use the **max-header** command in IPHC profile configuration mode. To return to the default maximum size, use the **no** form of this command.

max-header *number-of-bytes*
no max-header [*number-of-bytes*]

Syntax Description

number-of-bytes	Maximum size, in bytes, of a header that can be compressed.The range is from 20 to 40. The default is 40.

Command Default

Number-of-bytes; 40.

Command Modes

IPHC profile configuration

Command History

Release	Modification
Release 4.0.0	This command was introduced.

Usage Guidelines

Note The maximum header size can be configured only within an IPHC profile.

Task ID

Task ID	Operations
ip-services	read, write

Examples

The following example shows how to define the maximum size header that can be compressed.

```
RP/0/RSP0/CPU0:router(config)# config
RP/0/RSP0/CPU0:router(config)# iphc profile Profile_1 type iphc
RP/0/RSP0/CPU0:router(config-iphc-profile)# max-header 20
```

non-tcp compression

To enable non-TCP compression in an IP header compression (IPHC) profile, use the **non-tcp compression** command in IPHC profile configuration mode. To disable non-TCP compression in the profile, use the **no** form of this command.

non-tcp compression

Syntax Description

This command has no keywords or arguments.

Command Default

No default behavior or values

Command Modes

IPHC profile configuration

Command History

Release	Modification
Release 4.0.0	This command was introduced.

Usage Guidelines



Note NON-TCP compression can be enabled only within an IPHC profile. Non-TCP compression does not work unless it is enabled under a profile.

Task ID

Task ID	Operations
ip-services	read, write

Examples

The following example shows how to enable NON-TCP compression within an IP header compression (IPHC) profile:

```
RP/0/RSP0/CPU0:router(config)# config
RP/0/RSP0/CPU0:router(config)# iphc profile Profile_1 type iphc
RP/0/RSP0/CPU0:router(config-iphc-profile)# non-tcp compression
```

non-tcp context absolute

To configure the maximum number of non-TCP contexts that are allowed for IPHC under a profile, use the **non-tcp context absolute** command in IPHC profile configuration mode. To remove the non-TCP context from the profile, use the **no** form of this command.

non-tcp context absolute *number-of-contexts*

Syntax Description

number-of-contexts	Numeric value that specifies the maximum number of non-TCP contexts allowed for IPHC under this profile. The range is from 0 to 6000.

Command Default

If the number of contexts is not specified, and only non-TCP compression is enabled, the default number of contexts is 16.

Command Modes

IPHC profile configuration

Command History

Release	Modification
Release 4.0.0	This command was introduced.

Usage Guidelines

The maximum allowed number of non-tcp contexts on a Line Card, across all IPHC profiles and interfaces, is 6000.

Note Non-TCP context can be set only within an IPHC profile.

Task ID

Task ID	Operations
ip-services	read, write

Examples

The following example shows how to enable non-TCP compression within an IP header compression (IPHC) profile:

```
RP/0/RSP0/CPU0:router(config)# config
RP/0/RSP0/CPU0:router(config)# iphc profile Profile_1 type iphc
RP/0/RSP0/CPU0:router(config-iphc-profile)# non-tcp context absolute 255
```

refresh max-period

To configure the maximum number of compressed IP header packets exchanged on a link before IPHC context is refreshed, use the **refresh max-period** command in IPHC profile configuration mode. To return to the default context refresh settings, use the **no** form of this command.

refresh max-period {*max-number* | **infinite**}

Syntax Description

max-number	Maximum number of compressed IP header packets allowed between full headers or before the context is refreshed. Range is from 0 to 65535.
infinite	Allows an unlimited number of packets to be exchanged before context refresh.

Command Default

max-number: 256

Command Modes

IPHC profile configuration

Command History

Release	Modification
Release 4.0.0	This command was introduced.

Usage Guidelines

To enable the configured context refresh settings for RTP packets, the **refresh rtp** command must be used.

Note The maximum period between context refreshes can be set only within an IPHC profile.

Task ID

Task ID	Operations
ip-services	read, write

Examples

The following example shows how to configure the maximum number of compressed IP header packets that are exchanged on a link before the context is refreshed, in an IPHC profile.

```
RP/0/RSP0/CPU0:router(config)# config
RP/0/RSP0/CPU0:router(config)# iphc profile Profile_1 type iphc
RP/0/RSP0/CPU0:router(config-iphc-profile)# refresh max-period 50
```

refresh max-time

To configure the maximum time allowed between context refreshes, use the **refresh max-time** command in IPHC profile configuration mode. To return to the default context refresh settings, use the **no** form of this command.

refresh max-time {*max-time* | **infinite**}

Syntax Description

max-time	Time, in seconds, between context refreshes. Range is from 0 to 255.
infinite	Allows an unlimited time to pass between context refreshes.

Command Default

max-time: 5

Command Modes

IPHC profile configuration

Command History

Release	Modification
Release 4.0.0	This command was introduced.

Usage Guidelines

To enable the configured context refresh settings for RTP packets, the **refresh rtp** command must be used.

Note The maximum time between context refreshes can be set only within an IPHC profile.

Task ID

Task ID	Operations
ip-services	read, write

Examples

The following example shows how to configure the maximum allowed time between context refreshes as 60 seconds, in the IPHC profile ‘Profile 1’:

```
RP/0/RSP0/CPU0:router(config)# config
RP/0/RSP0/CPU0:router(config)# iphc profile Profile_1 type iphc
RP/0/RSP0/CPU0:router(config-iphc-profile)# refresh max-time 60
```

refresh rtp

To enable the configured context refresh settings for RTP packets, use the **refresh rtp** command in IPHC profile configuration mode. To disable context refresh settings for RTP packets, use the **no** form of this command.

refresh rtp

Syntax Description

This command has no keywords or arguments.

Command Default

By default, refresh RTP is disabled and only the first packet in the flow is sent as a ‘full-header’ packet.

Command Modes

IPHC profile configuration

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
ip-services	read, write

Examples

The following example shows how to enable the configured refresh settings for RTP packets:

```
RP/0/RSP0/CPU0:router(config)# config
RP/0/RSP0/CPU0:router(config)# iphc profile Profile_1 type iphc
RP/0/RSP0/CPU0:router(config-iphc-profile)# refresh rtp
```

rtp

To enable Real Time Protocol (RTP) compression and decompression on the interface, use the **rtp** command in IPHC profile configuration mode. To remove RTP from the interface, use the **no** form of this command.

rtp

Syntax Description

This command has no keywords or arguments.

Command Default

No default behavior or values

Command Modes

IPHC profile configuration

Command History

Release	Modification
Release 4.0.0	This command was introduced.

Usage Guidelines



Note RTP can be enabled only within an IPHC profile.

```
You must enable RTP before attaching a profile to an interface. If you do not enable RTP
first, the router will display the following message: '!!% 'iphc_capability' detected the
'warning' condition 'IPHC Capability: RTP Compression NOT enabled in the profile'!
```

Task ID

Task ID	Operations
ip-services	read, write

Examples

The following example shows how to

```
RP/0/RSP0/CPU0:router(config)# config
RP/0/RSP0/CPU0:router(config)# iphc profile Profile_1 type iphc
RP/0/RSP0/CPU0:router(config-iphc-profile)# rtp
```

scramble

To enable payload scrambling (encryption) on a serial interface, use the **scramble** command in interface configuration mode. To disable scrambling, use the **no** form of this command.

scramble

Syntax Description

This command has no keywords or arguments.

Command Default

Scrambling is disabled.

Command Modes

Interface configuration

Command History

Release	Modification
Release 3.9.0	This command was introduced.

Usage Guidelines

Scrambling is used to assist clock recovery on the receiving end. Scrambling is designed to randomize the pattern of 1s and 0s carried in the physical layer frame. Randomizing the digital bits can prevent continuous, nonvariable bit patterns—in other words, long strings of all 1s or all 0s. Several physical layer protocols rely on transitions between 1s and 0s to maintain clocking.

Scrambling can prevent some bit patterns from being mistakenly interpreted as alarms by switches placed between the Data Service Units (DSUs).

The local interface configuration must match the remote interface configuration. For example, if you enable scrambling on the local port, you must also do the same on the remote port.

To verify that scrambling is configured on the interface, use the **show interfaces serial** command.

Task ID

Examples

In the following example, scrambling is enabled on serial interface 0/3/0/0/0:10:

```
RP/0/RSP0/CPU0:router(config)# interface serial 0/3/0/0/0:10
RP/0/RSP0/CPU0:router(config-if)# serial
RP/0/RSP0/CPU0:router(config-if-serial)# scramble
```

Related Commands

Command	Description
show controllers t3	Displays information about the T3 links and hardware and software drivers for the T3 controller.

serial

To configure the serial parameters and enter serial configuration mode, use the **serial** command in interface configuration mode. To return to the default state of the serial interface, use the **no** form of this command.

serial

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 3.9.0	This command was introduced.

Usage Guidelines

Serial interfaces are automatically created for unchannelized ports; for channelized ports, serial interfaces are created when you add T1/E1 channel groups.

Task ID

Task ID	Operations
hdlc	read, write

Examples

The following example shows how to enter serial configuration mode:

```
RP/0/RSP0/CPU0:router(config-if)# serial
RP/0/RSP0/CPU0:router(config-if-serial)#
```

show iphc idb

To display status information for an IP header compression (IPHC) interface description block (IDB), use the **show iphc idb** command in EXEC mode.

show iphc idb {**detail** | **interface** *type interface-path-id* [**detail**] | **location** *node-id* [**detail**]}

Syntax Description

detail	Includes statistics information and internal data.
interface	Specifies the interface for which IPHC information is to be displayed.
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	Specifies the node location for which IPHC information is to be displayed.
node-id	Specifies the fully qualified path of a node. For more information about the syntax for the router, use the question mark (**?**) online help function.

Command Default

The default (no parameters) displays information for all interfaces configured for IPHC.

Command Modes

EXEC

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
ip-services	read

Examples

The following examples show how to display status information for an IP header compression (IPHC) interface description block (IDB).

```
RP/0/RSP0/CPU0:router# show iphc idb interface Serial 0/1/0/1/26:0

Thu Jan  8 20:25:41.079 UTC
```

```
EA Status Codes:                    Neg Status Code:
  CFG_AS: Cfg Apply Succeed          NEG_I: Negotiation Init
  CFG_AF: Cfg Apply Failed           NEG_P: Negotiation Progress
  NEG_AS: Neg Apply Succeed          NEG_D: Negotiation Done
  NEG_AF: Neg Apply Failed           NEG_F: Negotiation Failed

Interface_Name:   Serial0/1/0/1/26:0   Ifhandle  : 0x02008e00
EA Status     : NEG_AS                 Neg Status: NEG_D
MQC Mode      : F                      Prof_Name : iphcfmt


RP/0/RSP0/CPU0:router# show iphc idb interface Serial 0/1/0/1/26:0  detail

Thu Jan  8 20:25:44.731 UTC
EA Status Codes:                    Neg Status Code:
  CFG_AS: Cfg Apply Succeed          NEG_I: Negotiation Init
  CFG_AF: Cfg Apply Failed           NEG_P: Negotiation Progress
  NEG_AS: Neg Apply Succeed          NEG_D: Negotiation Done
  NEG_AF: Neg Apply Failed           NEG_F: Negotiation Failed

Interface_Name: Serial0/1/0/1/26:0   Ifhandle  : 0x02008e00
EA Status     : NEG_AS               Neg Status: NEG_D
MQC Mode      : F                    Prof_Name : iphcfmt

               Tcp    Non-Tcp       Max         Max        Max   RTP
             Space      Space    Header      Period       Time
-------------------------------------------------------------------------
 Cfg_Option      1         60        40         256          5     T
 Neg_Option      1         50        40         256          5     T
```

show iphc ipv4 rtp

To display IPv4 statistics for Real Time Protocol (RTP) and User Datatgram Protocol (UDP) packets sent and received on an interface, use the **show iphc ipv4 rtp** command in EXEC mode.

show iphc ipv4 rtp interface *type interface-path-id* [**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.
location	(Optional) Specifies the location of the interface
node-id	(Optional) Node-id 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

Caution These Cisco support commands are normally reserved for use by Cisco Technical Support personnel only. If used incorrectly. there is some risk that they may cause performance or other issues that impact products, and we highly recommend that you contact Cisco Technical Support before using any of these commands.

Task ID

Task ID	Operations
ip-services	read
cisco-support	read

Examples

The following example shows how to display IPv4, Real Time Protocol (RTP), User Datatgram Protocol (UDP), and Non-Transmission Control Protocol (non-TCP) statistics about IP header compression (IPHC) packets sent and received on an interface:

```
RP/0/RSP0/CPU0:router# show iphc ipv4 rtp interface Serial 0/1/0/1/26:0

Thu Jan  8 20:28:47.569 UTC
RTP/UDP/IP header compression statistics:
  Interface Serial0/1/0/1/26:0
    Rcvd:    100 total, 93 compressed, 7 full header
             0 dropped, 0 status msgs
    Sent:    0 total, 0 compressed, 0 fullheader, 0 status msgs
             0 bytes saved, 0 bytes sent
             1.00 efficiency improvement factor
```

show iphc ipv4 tcp

To display IPv4 Transport Control Protocol (TCP) statistics about IP header compression (IPHC) packets sent and received on an interface, use the **show iphc ipv4 tcp** command in EXEC mode.

show iphc ipv4 tcp interface *type interface-path-id [* **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.
location	(Optional) Specifies the location of the interface
node-id	(Optional) Node-id 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

Caution These Cisco support commands are normally reserved for use by Cisco Technical Support personnel only. If used incorrectly. there is some risk that they may cause performance or other issues that impact products, and we highly recommend that you contact Cisco Technical Support before using any of these commands.

Task ID

Task ID	Operations
ip-services	read
cisco-support	read

Examples

The following example shows how to display IPv4, Transport Control Protocol (TCP) statistics about IP header compression (IPHC) packets sent and received on an interface:

```
RP/0/RSP0/CPU0:router# show iphc ipv4 tcp interface Serial 0/1/0/1/26:0

Thu Jan  8 20:28:54.407 UTC
TCP/IP header compression statistics:
  Interface Serial0/1/0/1/26:0
    Rcvd:    100 total, 93 compressed, 7 full header
             0 dropped, 0 status msgs
    Sent:    0 status msgs
```

show iphc platform trace

To display platform trace information, such as errors or statistics for a file or a node, use the **show iphc platform trace** command in EXEC mode.

show iphc platform trace [**all** | **events** | **errors** [**events**] [**all**] | **internal** [**all** | **errors** [**events**] [**all**] | **events** [**all**]]] [**unique** | **wrapping**] [**hexdump**] [**last** *number-of-entries*] [**reverse**] [**stats**] [**tailf**] [**verbose**] [**file** *file-name* **original location** *node-id* | **location** {*node-id* | **all** | **mgmt-nodes**}]

Syntax Description

all	(Optional) Displays all platform trace information.
events	(Optional) Displays event platform trace information.
unique	(Optional) Displays trace information for unique entries with counts.
wrapping	Optional) Displays wrapping entries.
hexdump	(Optional) Displays trace information in hexadecimal format.
last *number_of_entries*	(Optional) Displays trace information for the last specified number of entries. The range is 1 to 4294967295.
reverse	(Optional) Displays trace information in reverse order (latest traces first).
stats	(Optional) Displays statistics information for the trace.
tailf	(Optional) Displays new traces as they are added.
verbose	(Optional) Displays internal debugging information.
file *file_name*	(Optional) Displays trace information for the specified file.
original	(Optional) Specifies the original location of file.
location *node_id*	(Optional) Displays trace information for the specified card location.
all	(Optional) Displays trace information for all nodes.
mgmt-nodes	(Optional) Displays trace information for all management nodes.

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 keywords **hexdump**, **last**, **reverse**, **stats**, **tailf**, and **verbose** may be entered in any order.

Use of the keywords **file** and **location** allows any number of desired files or locations to be entered. For more information, use the question mark (**?**) online help function.

Caution These Cisco support commands are normally reserved for use by Cisco Technical Support personnel only. If used incorrectly. there is some risk that they may cause performance or other issues that impact products, and we highly recommend that you contact Cisco Technical Support before using any of these commands.

Task ID

Task ID	Operations
ip-services	read
cisco-support	read

Examples

The following example shows how to display platform trace information for a specified location:

```
RP/0/RSP0/CPU0:router# show iphc platform trace all location 0/2/CPU0
Mon Aug 16 06:05:17.906 PDT
6 wrapping entries (24576 possible, 0 filtered, 6 total)
Aug 16 05:53:59.674 iphc_ea/internal 0/2/CPU0 t1  PAL IPHC: LC Platform preinit
Aug 16 05:54:00.255 iphc_ea/internal 0/2/CPU0 t1  PAL IPHC: LC Platform init
Aug 16 05:54:00.255 iphc_ea/internal 0/2/CPU0 t1  PAL IPHC: max iphc interfaces 2048
Aug 16 05:54:00.255 iphc_ea/internal 0/2/CPU0 t1  PAL IPHC: ea respawn count 1
Aug 16 05:54:00.284 iphc_ea/internal 0/2/CPU0 t1  PAL IPHC: LC Platform replay end
Aug 16 05:54:00.284 iphc_ea/internal 0/2/CPU0 t1  PAL IPHC: replay end 0 stale entries
```

show iphc profile

To display the configuration information of an IP header compression (IPHC) profile, use the **show iphc profile** command in EXEC mode.

show iphc profile {*profile-name* | **all**} [**detail**]

Syntax Description

profile-name	Text name of the IPHC profile for which to display information.
all	Displays information for all profiles on the router.
detail	(Optional) Displays the interfaces to which the profile is attached.

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
ip-services	read

Examples

The following examples show how to display information about an IPHC profile:

```
RP/0/RSP0/CPU0:router# show iphc profile ietf-test1
Tue Aug 10 06:53:19.711 PDT
IPHC Profile: ietf-test1
Type: IETF
 Compressing : TCP  NON-TCP (RTP)
 Context     : TCP fixed at 1 NON-TCP fixed at 10
 Refresh     : NON-TCP every 60 seconds or 100 packets
 Feedback    : ON
 Max_Header  : 40
 Refresh RTP : OFF
```

```
RP/0/RSP0/CPU0:router# show iphc profile Profile_1 detail
Thu Jan  8 20:22:24.276 UTC
IPHC Profile: Profile_1
Type: IPHC
 Compressing : TCP  NON-TCP (RTP)
 Context     : TCP fixed at 1 NON-TCP fixed at 60
 Refresh     : NON-TCP every 5 seconds or 256 packets
 Feedback    : ON
```

```
 Max_Header  : 40

*** No of Intf 1 ****
 Serial0_4_3_1_1:0
```

```
RP/0/RSP0/CPU0:router# show iphc profile all
Thu Mar 12 11:05:35.987 UTC
IPHC Profiles : 3
IPHC Profile: p1
Type: IETF
 Compressing : TCP  NON-TCP (RTP)
 Context     : TCP fixed at 1 NON-TCP fixed at 16
 Refresh     : NON-TCP every 5 seconds or 256 packets
 Feedback    : ON
 Max_Header  : 40

IPHC Profile: p2
Type: IETF
 Compressing : TCP  NON-TCP (RTP)
 Context     : TCP fixed at 1 NON-TCP fixed at 16
 Refresh     : NON-TCP every 5 seconds or 256 packets
 Feedback    : ON
 Max_Header  : 40

IPHC Profile: test
Type: IETF
 Compressing : TCP  NON-TCP (RTP)
 Context     : TCP fixed at 1 NON-TCP fixed at 16
 Refresh     : NON-TCP every 5 seconds or 256 packets
 Feedback    : ON
 Max_Header  : 40
```

```
RP/0/RSP0/CPU0:router# show iphc profile all detail
Thu Mar 12 11:06:26.902 UTC
IPHC Profiles : 3
IPHC Profile: p1
Type: IETF
 Compressing : TCP  NON-TCP (RTP)
 Context     : TCP fixed at 1 NON-TCP fixed at 16
 Refresh     : NON-TCP every 5 seconds or 256 packets
 Feedback    : ON
 Max_Header  : 40

 *** No of Intf 1 ****
 Serial0_4_3_1_1:0

IPHC Profile: p2
Type: IETF
 Compressing : TCP  NON-TCP (RTP)
 Context     : TCP fixed at 1 NON-TCP fixed at 16
 Refresh     : NON-TCP every 5 seconds or 256 packets
 Feedback    : ON
 Max_Header  : 40

 *** No of Intf 2 ****
 Serial0_4_3_1_2:0
 Serial0_4_3_1_8:0

IPHC Profile: test
```

```
Type: IETF
 Compressing : TCP  NON-TCP (RTP)
 Context     : TCP fixed at 1 NON-TCP fixed at 16
 Refresh     : NON-TCP every 5 seconds or 256 packets
 Feedback    : ON
 Max_Header  : 40

 *** No of Intf 0 ****
```

show iphc trace all

To display trace results for all IP header compression (IPHC) configurations on the router, use the **show iphc trace all** command in EXEC mode.

show iphc trace all [**unique** | **wrapping**] [**hexdump**] [**last** *number-of-entries*] [**reverse**] [**stats**] [**tailf**] [**verbose**] [**file** *file-name* **original location** *node-id* | **location** {*node-id* | **all** | **mgmt-nodes**}]

Syntax Description

unique	(Optional) Displays trace information for unique entries with counts.
wrapping	Optional) Displays wrapping entries.
hexdump	(Optional) Displays trace information in hexadecimal format.
last *number_of_entries*	(Optional) Displays trace information for the last specified number of entries. The range is from 1 to 4294967295.
reverse	(Optional) Displays trace information in reverse order (latest traces first).
stats	(Optional) Displays statistics information for the trace.
tailf	(Optional) Displays new traces as they are added.
verbose	(Optional) Displays internal debugging information.
file *file_name*	(Optional) Displays trace information for the specified file.
original	(Optional) Specifies the original location of file.
location *node_id*	(Optional) Displays trace information for the specified card location.
all	(Optional) Displays trace information for all nodes.
mgmt-nodes	(Optional) Displays trace information for all management nodes.

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 keywords **hexdump**, **last**, **reverse**, **stats**, **tailf**, and **verbose** may be entered in any order. The keywords **unique** or **wrapping** may only be entered as the first keyword in the command. The keywords **file** or **location** may only be entered as the last keyword in the command.

Use of the keywords **file** and **location** allows any number of desired files or locations to be entered. For more information, use the question mark (**?**) online help function.

Caution These Cisco support commands are normally reserved for use by Cisco Technical Support personnel only. If used incorrectly. there is some risk that they may cause performance or other issues that impact products, and we highly recommend that you contact Cisco Technical Support before using any of these commands.

Task ID

Task ID	Operations
ip-services	read
cisco-support	read

Examples

The following example shows how to display IPHC trace information:

```
RP/0/RSP0/CPU0:router# show iphc trace all

Wed Jul 22 21:48:07.339 DST
20 wrapping entries (3072 possible, 0 filtered, 20 total)
Jul 22 03:31:39.770 iphc/profilemgr/int 0/5/CPU0 t1  : Event Mgr Create Successl
Jul 22 03:31:39.799 iphc/profilemgr/int 0/5/CPU0 t1  : Sysmgr Init Successful
Jul 22 03:31:39.894 iphc/profilemgr/int 0/5/CPU0 t1  : Ens Init Successful
Jul 22 03:31:39.910 iphc/profilemgr/int 0/5/CPU0 t1  : Sysdb Init Successful
Jul 22 03:31:39.911 iphc/profilemgr/int 0/5/CPU0 t1  : Stats thread Init Succesl
Jul 22 03:31:39.942 iphc/profilemgr/int 0/5/CPU0 t1  : Cfg thread Init Successfl
Jul 22 03:31:39.951 iphc/profilemgr/int 0/5/CPU0 t1  : Registered verifier call7
Jul 22 03:31:39.952 iphc/profilemgr/eve 0/5/CPU0 t1  : Scanning Profile: *** Pr*
Jul 22 03:31:39.952 iphc/profilemgr/eve 0/5/CPU0 t1  : Scanning Option (format))
Jul 22 03:31:39.952 iphc/profilemgr/eve 0/5/CPU0 t1  : Scanning Option (tcp_com)
Jul 22 03:31:39.952 iphc/profilemgr/eve 0/5/CPU0 t1  : Scanning Option (tcp_con)
Jul 22 03:31:39.952 iphc/profilemgr/eve 0/5/CPU0 t1  : Scanning Option (non_tcp)
Jul 22 03:31:39.952 iphc/profilemgr/eve 0/5/CPU0 t1  : Scanning Option (rtp) in)
Jul 22 03:31:39.952 iphc/profilemgr/eve 0/5/CPU0 t1  : Scanning Option (max-per)
Jul 22 03:31:39.952 iphc/profilemgr/eve 0/5/CPU0 t1  : Scanning Option (non_tcp)
Jul 22 03:31:39.952 iphc/profilemgr/eve 0/5/CPU0 t1  : +++++ Profile Verificati+
Jul 22 03:31:39.952 iphc/profilemgr/eve 0/5/CPU0 t1  : Verify Profile (Profile_n
Jul 22 03:31:39.959 iphc/profilemgr/eve 0/5/CPU0 t1  : +++++ Profile Verificati+
Jul 22 03:31:39.981 iphc/profilemgr/int 0/5/CPU0 t1  : Registered applier calle7
Jul 22 03:31:39.999 iphc/profilemgr/eve 0/5/CPU0 t1  : Registered Profile (Profy
```

show tech-support iphc

To collect and display IP header compression (IPHC) data for an interface, node, or rack, and store that data in a file, use the **show tech-support iphc** command in EXEC mode.

show tech-support iphc [**file** | **interface** *type interface-path-id* [**location** *node-id* | **rack** *rack_name*] | **location** *node-id* | **rack** *rack_name*] **file location** *file_name* [**background**] [**compressed** | **uncompressed**]

Syntax Description

file	(Optional) Specifies a file name and location for IPHC data to be saved to.
interface	(Optional) Collects IPHC data for the specified 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) Collects IPHC data for the specified card location (*node-id*).
rack *rack_name*	(Optional) Collects IPHC data for the specified rack.
file location *file_name*	Stores the collected data in the specified file (*file_name*) in one of the following valid file locations: • bootflash:—stores the collected data to a bootflash file-system file. • compactflash:—stores the collected data to a compactflash file-system file. • compactflasha:—stores the collected data to a compactflasha file-system file. • disk0:—stores the collected data to a disk0 file-system file. • disk0a:—stores the collected data to a disk0a file-system file. • disk1:—stores the collected data to a disk1 file-system file. • disk1a:—stores the collected data to a disk1a file-system file. • ftp:—stores the collected data to an ftp file-system file. • harddisk:—stores the collected data to a harddisk file-system file. • harddiska:—stores the collected data to a harddiska file-system file. • harddiskb:—stores the collected data to a harddiskb file-system file. • lcdisk0:—stores the collected data to a lcdisk0 file-system file. • lcdisk0a:—stores the collected data to a lcdisk0a file-system file. • nvram:—stores the collected data to an nvram file-system file. • rcp:—stores the collected data to an rcp file-system file. • tftp:—stores the collected data to a tftp file-system file.
background	(Optional) Runs this command in the background.

compressed	(Optional) Compresses the output.
uncompressed	(Optional) Does not compress the output.

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
basic-services	read
cisco-support	read
ipv4	read

Examples

The following example shows how to collect and display IP header compression (IPHC) data:

```
RP/0/RSP0/CPU0:router# show tech-support iphc

Mon Oct 12 20:30:58.660 DST
++ Show tech start time: 2009-Oct-12.203059.DST ++
Mon Oct 12 20:31:05 DST 2009 Waiting for gathering to complete
......
Mon Oct 12 20:31:46 DST 2009 Compressing show tech output
Show tech output available at 0/5/CPU0 : disk0:/showtech/showtech-iphc-2009-Octz
++ Show tech end time: 2009-Oct-12.203148.DST ++
```

tcp compression

To enable TCP compression in an IP header compression (IPHC) profile, use the **tcp compression** command in IPHC profile configuration mode. To disable TCP compression in the profile, use the **no** form of this command.

tcp compression

Syntax Description

This command has no keywords or arguments.

Command Default

No default behavior or values

Command Modes

IPHC profile configuration

Command History

Release	Modification
Release 4.0.0	This command was introduced.

Usage Guidelines

Where the IPHC profile used by a router is configured using this command, the router will negotiate TCP compression with its peer router and decompress any compressed TCP packets sent by its peer. TCP packets transmitted to the peer are transmitted uncompressed.

Note TCP compression can be enabled only within an IPHC profile. TCP compression does not work unless it is enabled under a profile.

Task ID

Task ID	Operations
ip-services	read, write

Examples

The following example shows how to enable TCP compression within an IP header compression (IPHC) profile:

```
RP/0/RSP0/CPU0:router(config)# config
RP/0/RSP0/CPU0:router(config)# iphc profile Profile_1 type iphc
RP/0/RSP0/CPU0:router(config-iphc-profile)# tcp compression
RP/0/RSP0/CPU0:router(config-iphc-profile)#
```

tcp context absolute

To configure the maximum number of TCP contexts that are allowed for IPHC under a profile, use the **tcp context absolute** command in IPHC profile configuration mode. To remove the TCP context from the profile, use the **no** form of this command.

tcp context absolute *number-of-contexts*

Syntax Description

number-of-contexts	Numeric value that specifies the maximum number of TCP contexts allowed for IPHC under this profile. The range is from 0 to 255.

Command Default

If *number-of-contexts* is not specified, and only TCP compression is enabled, the default *number-of-contexts* is 1.

Command Modes

IPHC profile configuration

Command History

Release	Modification
Release 4.0.0	This command was introduced.

Usage Guidelines

The maximum allowed number of tcp contexts on a Line Card, across all IPHC profiles and interfaces, is 255.

Note TCP context can be set only within an IPHC profile.

Task ID

Task ID	Operations
ip-services	read, write

Examples

The following example shows how to enable TCP compression within an IP header compression (IPHC) profile:

```
RP/0/RSP0/CPU0:router(config)# config
RP/0/RSP0/CPU0:router(config)# iphc profile Profile_1 type iphc
RP/0/RSP0/CPU0:router(config-iphc-profile)# tcp context absolute 255
```

transmit-delay (serial)

To specify a number of High-Level Data Link Control (HDLC) flag sequences to be inserted between the packets, use the **transmit-delay** command in serial configuration mode. To restore the default, use the **no** form of this command.

transmit-delay *microseconds*

Syntax Description

microseconds	Number of microseconds of minimum delay after sending a packet. Range is from 0 to 128. The default is 0 (disabled).

Command Default

microseconds: 0 (disabled)

Command Modes

Serial configuration

Command History

Releases	Modifications
Release 3.9.0	This command was introduced.

Usage Guidelines

No specific guidelines impact the use of this command.

Task ID

Task ID	Operations
hdlc	read, write

Examples

In the following example, a delay of 2 microseconds is specified on serial interface 0/3/0/0/0:0:

```
RP/0/RSP0/CPU0:router# configure
RP/0/RSP0/CPU0:router(config)# interface serial 0/3/0/0/0:0
RP/0/RSP0/CPU0:router(config-if)# serial
RP/0/RSP0/CPU0:router(config-if-serial)# transmit-delay 2
```

In the following example, the transmit delay on serial interface 0/3/0/0/0:0 is disabled:

```
RP/0/RSP0/CPU0:router# configure
RP/0/RSP0/CPU0:router(config)# interface serial 0/3/0/0/0:0
RP/0/RSP0/CPU0:router(config-if)# serial
RP/0/RSP0/CPU0:router(config-if-serial)# no transmit-delay
```

Related Commands

Command	Description
show interfaces	Displays statistics, state and other information such as mac address etc. for all interfaces configured on the router or for a specific node.