



# IP Header Compression Over Frame Relay for Interfaces Support

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**Table 1 Feature History**

<b>Cisco IOS Release</b>	<b>Modification</b>
Cisco IOS Release 12.0(33)S2	This feature was introduced in Release 12.0(33)S2 for SIP-401/501/601 line card on Frame Relay (FR) interfaces having Cisco as the encapsulation type for Cisco 12000 series routers.

IP Header compression is a mechanism that compresses the protocol headers in a packet before the packet is transmitted. Header compression reduces network overhead and speeds up the transmission of both RTP and TCP packets.

The IP Header Compression (IPHC) Over Frame Relay feature enables efficient transmission of real time traffic such as voice and video by compressing and decompressing the packet header. IPHC Over Frame Relay is supported on Cisco 12000 Series Engine 5 based SPA Interface Processor (SIP)-401/501/601 line cards on FR interfaces. For FR, Cisco encapsulation type is the only encapsulation type on which this feature is supported. This feature is already supported on PPP/MLPPP interfaces.

## **Finding Feature Information**

Your software release may not support all the features documented in this module. For the latest feature information and caveats, see the release notes for your platform and software release. To find information about the features documented in this module, and to see a list of the releases in which each feature is supported, see the [“Feature Information for IPHC Over Frame Relay” section on page 29](#).

## **Finding Support Information for Platforms and Cisco IOS and Catalyst OS Software Images**

Use Cisco Feature Navigator to find information about platform support and Cisco IOS, Catalyst OS, and Cisco IOS XE software image support. To access Cisco Feature Navigator, go to <http://www.cisco.com/go/cfn>. An account on Cisco.com is not required.



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# Contents

- [Prerequisites for Configuring IPHC on Frame Relay Interfaces](#)
- [Restrictions for Configuring IPHC on Frame Relay Interfaces](#)
- [Enabling IPHC Support for Frame Relay Interfaces](#)
- [Additional References](#)
- [Command Reference](#)
- [Feature Information for IPHC Over Frame Relay](#)

## Prerequisites for Configuring IPHC on Frame Relay Interfaces

Following are the prerequisites for configuring IPHC on FR interfaces:

- Supported Cisco Series of Routers: Support for this feature is added to Cisco 12000 series routers from this release.
- Supported Cisco IOS Release: This feature is supported only on Cisco IOS Release 12.0(33)S2.
- Supported line card (LC): Line card supporting IPHC over FR feature is SIP-401/501/601.
- Supported SPAs:
  - Channelized SPAs—
    - 8-port Channelized T1/E1 SPA
    - 2-port and 4-port Channelized T3 SPA
    - 1-port Channelized OC-3/STM-1 SPA.
  - Non-channelized SPAs—
    - 2-port and 4-port Clear Channel T3/E3 SPA.
- Supported Interface Type: The interface type on which this feature can be configured is FR interfaces.
- Supported Encapsulation Type: Cisco encapsulation type is the only encapsulation type on which this feature can be configured.

## Restrictions for Configuring IPHC on Frame Relay Interfaces

Following are the restrictions for configuring IPHC on FR interfaces:

- IPHC Over FR feature is supported only on Engine 5 based SIP-401/501/601. It is not supported on SIP-600.
- This feature is not supported on Cisco IOS Releases 12.0(32)SY and 12.0(32)S.
- This feature can be enabled only on point-to-point FR subinterfaces.
- This feature is supported only on SPAs listed in section [“Prerequisites for Configuring IPHC on Frame Relay Interfaces”](#)
- Configuring the CLIs for enabling IPHC on FR interfaces with FR encapsulation format other than Cisco format (like IETF, SNAP) will result in rejection of CLI and displaying of error message.

- If you try to change the encapsulation on FR interface with IPHC configured to encapsulation on which IPHC is not supported, IPHC configurations will be removed from the FR subinterfaces.
- If interface level IPHC configuration is done before enabling IPHC at slot level, IPHC will remain disabled at interface level and will be enabled only after IPHC at slot level configurations are successful.
- CISCO/Original IP Header Compression format does not support negotiation of IPHC parameters (like max-header size/compression-connections/max-period etc.) between peer interfaces (connected back to back). So the user should make sure that IPHC configuration parameters match on both sides for the feature to work correctly.
- FRF.20 is not supported currently on Cisco 12000 Series Router.
- MLFR, IETF FR, and IETF SNAP encapsulation format do not support IPHC Over FR.
- Cisco 12000 Series Routers do not support TCP compression, but supports cTCP packets decompression as the peer devices can send compressed TCP packets.

## Information About IPHC Support for Frame Relay Interfaces

The real-time transport protocol, RTP, as described in RFC 1889, is used to carry real-time data for voice and video applications. For a typical VoIP application, the payload portion of the packet can be much smaller than the headers. For example, using the G.729 Codec, the payload is 20 bytes but the IP/UDP/RTP header is 40 bytes. It is inefficient to send the IP/UDP/RTP header on a slow link without compressing it. The IPHC feature addresses this inefficiency. The basic idea behind IPHC is that although several fields in the IP/UDP/RTP header change from packet to packet, typically, the difference in these fields from packet to packet is constant. The compression scheme capitalizes on this characteristic. RFC 2508 describes the function of IPHC.

Following steps provide details for compressing, decompressing, and reconstructing an original packet:

- When a new flow (like a VoIP phone conversation) is established over a link with IPHC enabled, the device at the transmitting end (compressor) sends a full header (FH) packet followed by compressed packets to the receiving end (decompressor).
- The compressor and the decompressor maintain a copy of the uncompressed header and the difference between the previous packet and the current packet. This data is referred to as the session state and is identified by a session context ID.
- The context ID is added to the packet payload as it is compressed.
- When the decompressor receives the compressed packet, it can completely reconstruct the packet header by adding the saved first-order difference to the saved uncompressed header.
- In a typical case, the IPHC algorithm enables the IP/UDP/RTP header to be compressed to two bytes (four bytes if UDP checksums are being sent).

## Enabling IPHC Support for Frame Relay Interfaces

This section explains the following procedures:

- [Loading Microcode on Line Card](#) (required)
- [Enabling Header Compression at Sub-Interface Level](#) (required)
- [Configuring Compression Connections at Sub-Interface Level](#) (required)
- [Configuring Maximum Packets for Receiving Full-Header](#) (optional)

- [Configuring Maximum Size for Compressing IP Headers](#) (optional)
- [Disabling Context Status Messages](#) (optional)

## Loading Microcode on Line Card

Enabling IPHC on Cisco 12000 Series Routers requires feature bundle microcode to be loaded on SIP-401/501/601 line card.



### Note

Execute the following configuration steps to load the microcode on line card before performing any IPHC configuration on slot or interface level.

To load and bundle microcode on each SIP-401/501/601 line card, perform the following required steps:

### SUMMARY STEPS

1. **enable**
2. **configure terminal**
3. **hw-module slot <x> np mode feature**
4. **show controllers ise np mode**
5. **hw-module slot <slot> ip tcp compression-connections <maximum number of connections>**
6. **hw-module slot <slot> ip rtp compression-connections <maximum number of connections>**

### DETAILED STEPS

	Command or Action	Purpose
Step 1	<b>enable</b>  <b>Example:</b> Router> <b>enable</b>	Enables privileged EXEC mode. If prompted, enter your password.
Step 2	<b>configure terminal</b>  <b>Example:</b> Router# <b>configure terminal</b>	Enters global configuration mode.
Step 3	<b>hw-module slot x np mode feature</b>  <b>Example:</b> Router(config)# <b>hw-module slot 2 np mode feature</b>	Selects feature mode for both ingress and egress data paths on the network processor (NP).
Step 4	<b>show controllers ise np mode</b>  <b>Example:</b> Router# <b>show controllers ise np mode</b>	Verifies the microcode modes on the network processor.

	Command or Action	Purpose
Step 5	<pre>hw-module slot &lt;slot&gt; ip tcp compression-connections &lt;maximum number of connections&gt;</pre> <p><b>Example:</b>  Router# <b>configure terminal</b>  Router(config)# <b>hw-module slot 2 ip tcp</b>  <b>compression-connections 1000</b></p>	Configures the maximum number of TCP contexts per line card. The valid range for maximum number of connections is 1 to 64000. Normal default value is 0 for this parameter.
Step 6	<pre>hw-module slot &lt;slot&gt; ip rtp compression-connections &lt;maximum number of connections&gt;</pre> <p><b>Example:</b>  Router# <b>configure terminal</b>  Router(config)# <b>hw-module slot 2 ip rtp</b>  <b>compression-connections 32760</b></p>	Configures the maximum number of non-TCP (cRTP) contexts per line card. The valid range for maximum number of connections is 1 to 32768. Normal default value is 0 for this parameter. This command requires explicit user configuration for IPHC compression and decompression to work.

## Enabling Header Compression at Sub-Interface Level

To enable the header compression at subinterface level, perform the following required steps:

### SUMMARY STEPS

1. **enable**
2. **configure terminal**
3. **frame-relay ip rtp header-compression**
4. **frame-relay ip tcp header-compression**
5. **show ip rtp header-compression**
6. **show ip tcp header-compression**

### DETAILED STEPS

	Command or Action	Purpose
Step 1	<pre>enable</pre> <p><b>Example:</b>  Router&gt; <b>enable</b></p>	Enables privileged EXEC mode. If prompted, enter your password.
Step 2	<pre>configure terminal</pre> <p><b>Example:</b>  Router# <b>configure terminal</b></p>	Enters global configuration mode.

	Command or Action	Purpose
Step 3	<pre>frame-relay ip rtp header-compression</pre> <p><b>Example:</b>  Router(config)# <b>interface Serial</b>  <b>3/0/0.1/1/1:0.1</b>  Router(config-if)# <b>frame-relay ip rtp</b>  <b>header-compression</b> </p>	<p>Enables RTP header compression for the subinterface.</p> <p><b>Note</b> The parameters passive and periodic-refresh are not supported on Cisco 12000 Series Routers.</p>
Step 4	<pre>frame-relay ip tcp header-compression</pre> <p><b>Example:</b>  Router(config)# <b>interface Serial</b>  <b>3/1/0.1/1/1:0.1</b>  Router(config-if)# <b>frame-relay ip tcp</b>  <b>header-compression</b> </p>	<p>Enables TCP header decompression for all FR maps on a physical subinterface.</p> <p><b>Note</b> If this command is not given, all compressed TCP packets received on the FR sub (interface) will be dropped.</p>
Step 5	<pre>show ip tcp header-compression</pre> <p><b>Example:</b>  Router# <b>show ip tcp header-compression</b> </p>	<p>Displays TCP header compression statistics for FR.</p>
Step 6	<pre>show ip rtp header-compression</pre> <p><b>Example:</b>  Router# <b>show ip rtp header-compression</b> </p>	<p>Displays RTP header compression statistics for FR.</p>

## Configuring Compression Connections at Sub-Interface Level

To configure the header compression connections that can exist at subinterface level, perform the following required steps:

### SUMMARY STEPS

1. **enable**
2. **configure terminal**
3. **frame-relay ip rtp compression-connections** <number>
4. **frame-relay ip tcp compression-connections** <number>

### DETAILED STEPS

	Command or Action	Purpose
Step 1	<pre>enable</pre> <p><b>Example:</b>  Router&gt; <b>enable</b> </p>	<p>Enables privileged EXEC mode. If prompted, enter your password.</p>
Step 2	<pre>configure terminal</pre> <p><b>Example:</b>  Router# <b>configure terminal</b> </p>	<p>Enters global configuration mode.</p>

	Command or Action	Purpose
Step 3	<pre>frame-relay ip rtp compression-connections &lt;number&gt;</pre> <p><b>Example:</b></p> <pre>Router(config)# interface Serial 3/0/0.1/1/1:0.1 Router(config-if)# frame-relay ip rtp compression-connections 50</pre>	Configures the maximum number of RTP header compression connections that can exist on the subinterface. The range for numbers is 1 to 256 on the subinterface and the default value is 32 compression connections.
Step 4	<pre>frame-relay ip tcp compression-connections &lt;number&gt;</pre> <p><b>Example:</b></p> <pre>Router(config)# interface Serial 3/1/0.1/1/1:0.1 Router(config-if)# frame-relay ip tcp compression-connections 50</pre>	Configures the maximum number of TCP header compression connections that can exist on the subinterface. The range for numbers is 1 to 256 on the subinterface and the default value is 1 compression connections.

## Configuring Maximum Packets for Receiving Full-Header

Configure the number of packets after which a full-header (FH) is sent on the Cisco 12000 Series Routers. The full headers are sent based on the specified number of packets configured. A default value of 256 packets is considered, if the number of packets to receive full-header is not configured.

To configure the number of packets after which a full-header needs to be sent at subinterface level, perform the following steps (optional):

### SUMMARY STEPS

1. **enable**
2. **configure terminal**
3. **ip header-compression max-period [period]**

## DETAILED STEPS

	Command or Action	Purpose
Step 1	<code>enable</code>  <b>Example:</b> Router> <code>enable</code>	Enables privileged EXEC mode. If prompted, enter your password.
Step 2	<code>configure terminal</code>  <b>Example:</b> Router# <code>configure terminal</code>	Enters global configuration mode.
Step 3	<code>ip header-compression max-period &lt;period&gt;</code>  <b>Example:</b> Router(config)# <code>interface Serial 2/0/0:1</code> Router(sub-if)# <code>ip header-compression</code> <code>max-period 200</code>	Configures the number of packets after which a full header is sent on an interface. The default value is 256 connections.

## Configuring Maximum Size for Compressing IP Headers

To govern the IP headers of packets that need to be compressed, you can configure the maximum combined size of IP/UDP/RTP headers in the packet which needs to be compressed. The packets with header size more than the configured headers are sent uncompressed. The default size on Cisco 12000 Series Routers SIP-401/501/601 line card is 40 bytes.

**Note**

Compression and decompression for IP Tunnelled packets is not supported on SIP-401/501/601 line card. If Cisco 12000 Series Router is connected to any other Cisco Series of Router, the maximum header size of Cisco 12000 Series of Router should be mapped with the default header size of the other Cisco Series of Router at the remote end.

To configure the maximum size of IP headers that need to be compressed at subinterface level, perform the following steps (optional):

## SUMMARY STEPS

1. `enable`
2. `configure terminal`
3. `ip header-compression max-header [max-header-size]`

## DETAILED STEPS

	Command or Action	Purpose
Step 1	<code>enable</code>  <b>Example:</b> Router> <code>enable</code>	Enables privileged EXEC mode. If prompted, enter your password.
Step 2	<code>configure terminal</code>  <b>Example:</b> Router# <code>configure terminal</code>	Enters global configuration mode.
Step 3	<code>ip header-compression max-header</code> <code>&lt;max-header-size&gt;</code>  <b>Example:</b> Router(config)# <code>interface Serial 3/2/0/18:0</code> Router(sub-if)# <code>ip header-compression</code> <code>max-header 40</code>	Configures the packet's maximum size of IP Header up to which an IP Header needs to be compressed. The default value is 40 on SIP-401/501/601 line card.

## Disabling Context Status Messages

Context status messages are sent by decompressor to compressor to inform about the context status. This context is used by decompressor to decompress received compressed packets correctly. When the path of the upward link is different from the path of the downward link, for example in case of satellite links, CONTEXT\_STATUS messages are not useful. To disable feedback of context\_status messages from subinterface or link this command is used.

To disable context\_status messages at subinterface, perform the following steps (optional):

## SUMMARY STEPS

1. `enable`
2. `configure terminal`
3. `ip header-compression disable-feedback`

## DETAILED STEPS

	Command or Action	Purpose
Step 1	<code>enable</code>  <b>Example:</b> <code>Router&gt; enable</code>	Enables privileged EXEC mode. If prompted, enter your password.
Step 2	<code>configure terminal</code>  <b>Example:</b> <code>Router# configure terminal</code>	Enters global configuration mode.
Step 3	<code>ip header-compression disable-feedback</code>  <b>Example:</b> <code>Router(config)# interface Serial 3/2/0/18:0</code> <code>Router(sub-if)# ip header-compression disable-feedback</code>	Disables the feedback of context_status messages from decompressor.

## Additional References

The following sections provide references related to the IP Header Compressor Support for FR interfaces feature.

## RFCs

RFC	Title
RFC 1144	TCP/IP Header Compression
RFC 2507	IP Header Compression
RFC 2508	Compressed IP/UDP/RTP
RFC 2509	IP Header Compression for PPP
RFC 3544	IP Header Compression over PPP

## Technical Assistance

Description	Link
<p>The Cisco Support website provides extensive online resources, including documentation and tools for troubleshooting and resolving technical issues with Cisco products and technologies.</p> <p>To receive security and technical information about your products, you can subscribe to various services, such as the Product Alert Tool (accessed from Field Notices), the Cisco Technical Services Newsletter, and Really Simple Syndication (RSS) Feeds.</p> <p>Access to most tools on the Cisco Support website requires a Cisco.com user ID and password.</p>	<p><a href="http://www.cisco.com/techsupport">http://www.cisco.com/techsupport</a></p>

# Command Reference

The following commands are introduced or modified in the feature or features documented in this module. For information about all Cisco IOS commands, use the Command Lookup Tool at <http://tools.cisco.com/Support/CLILookup> or the *Cisco IOS Master Command List, All Releases*, at [http://www.cisco.com/en/US/docs/ios/mcl/allreleasemcl/all\\_book.html](http://www.cisco.com/en/US/docs/ios/mcl/allreleasemcl/all_book.html).

- **ip header-compression disable-feedback**
- **Feature Information for IPHC Over Frame Relay**
- **frame-relay ip rtp compression-connections**
- **frame-relay ip tcp header-compression**
- **Feature Information for IPHC Over Frame Relay**
- **ip header-compression max-header**
- **ip header-compression max-period**
- **frame-relay ip rtp header-compression**
- **hw-module slot <slot> ip rtp compression-connections**
- **hw-module slot x np mode feature**
- **ip header-compression disable-feedback**
- **show ip tcp header-compression**

# frame-relay ip rtp header-compression

To enable Real-Time Transport Protocol (RTP) header compression for all FR maps on a physical subinterface, use the **frame-relay ip rtp header-compression** command in subinterface configuration mode. To disable the compression, use the **no** form of this command.



## Note

Compression should be enabled on both the ends of the link. The optional parameters **periodic-refresh** and **passive** are not supported on Cisco 12000 Series Routers.

**frame-relay ip rtp header-compression**

**no frame-relay ip rtp header-compression**

**Syntax Description** Not Applicable

**Defaults** Disabled

**Command Modes** Sub-Interface configuration

Command History	Release	Modification
	11.3	This command was introduced.
	12.3(2)T	This command was modified to include the <b>periodic-refresh</b> keyword.
	12.0(33)S2	The command was retained but the optional parameters <periodic-refresh> and <passive> are not supported on Cisco 12000 Series Routers.

**Usage Guidelines** When the **frame-relay ip rtp header-compression** command is used on the subinterface, it is only applicable on that particular subinterface. Header Compression needs to be configured explicitly on each subinterface for which IP header compression is desired.

**Examples** The following example shows how to enable RTP header compression for all FR maps on a physical interface:

```
Router> enable
Router# configure terminal
Router(config)# interface Serial1/1/1:1.1
Router(config-if)# frame-relay ip rtp header-compression
Router(config-if)# exit
```

---

**Related Commands**

<b>Command</b>	<b>Description</b>
<a href="#">frame-relay ip rtp compression-connections</a>	Enables the TCP header decompression on the specified FR subinterface.
<a href="#">ip header-compression disable-feedback</a>	Displays RTP header compression statistics for FR.

# frame-relay ip rtp compression-connections

To specify the maximum number of Real-Time Transport Protocol (RTP) header compression connections that can exist on a FR subinterface, use the **frame-relay ip rtp compression-connections** interface configuration command. To restore the default, use the **no** form of this command.

**frame-relay ip rtp compression-connections** *number*

**no frame-relay ip rtp compression-connections**

<b>Syntax Description</b>	<i>number</i>	Maximum number of RTP header compression connections. The range is from 1 to 256.
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<b>Defaults</b>	32 Compression Connections
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<b>Command Modes</b>	Interface configuration
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<b>Command History</b>	<b>Release</b>	<b>Modification</b>
	12.1(2)T	This command was introduced.
	12.0(33)S2	This command was first supported on Cisco 12000 Series Routers.

<b>Usage Guidelines</b>	Before you can configure the maximum number of connections, RTP header compression must be configured on the interface using the <b>frame-relay ip rtp header-compression</b> command.
	The number of RTP header compression connections must be set to the same value at each end of the connection.

<b>Examples</b>	The following example shows how to configure a maximum of 150 RTP header compression connections on serial subinterface 3/0/0.1/1/1/0.1:
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```
Router(config)# interface Serial 3/0/0.1/1/1/0.1
Router(config-if)# frame-relay ip rtp compression-connections 150
```

<b>Related Commands</b>	<b>Command</b>	<b>Description</b>
	<a href="#">frame-relay ip tcp header-compression</a>	Configures the maximum number of TCP header compression connections on a FR subinterface.

# frame-relay ip tcp header-compression

To enable Transport Protocol (TCP) header decompression for all FR maps on a physical subinterface, use the **frame-relay ip tcp header-compression** command in subinterface configuration mode. To disable the compression, use the **no** form of this command.



## Note

Compression should be enabled on both the ends of the link. The optional parameters **periodic-refresh** and **passive** are not supported on Cisco 12000 Series Routers. If this command is not given, all compressed TCP packets received on the FR subinterfaces will be dropped.

**frame-relay ip tcp header-compression**

**no frame-relay ip tcp header-compression**

## Syntax Description

Not Applicable

## Defaults

Disabled

## Command Modes

Sub-Interface configuration

## Command History

Release	Modification
11.3	This command was introduced.
12.3(2)T	This command was modified to include the <b>periodic-refresh</b> keyword.
12.0(33)S2	The command was retained but the optional parameters <b>&lt;periodic-refresh&gt;</b> and <b>&lt;passive&gt;</b> are not supported on Cisco 12000 Series Routers.

## Usage Guidelines

When the **frame-relay ip tcp header-compression** command is used on the subinterface, it is only applicable on that particular subinterface. Header decompression needs to be configured explicitly on each subinterface for which TCP header decompression is desired.

## Examples

The following example shows how to enable TCP header decompression for all FR maps on a physical interface:

```
Router> enable
Router# configure terminal
Router(config)# interface Serial1/1/1:1.1
Router(config-if)# frame-relay ip tcp header-compression
Router(config-if)# exit
```

Related Commands	Command	Description
	<a href="#">ip header-compression disable-feedback</a>	Enables RTP header compression on a FR subinterface.
	<a href="#">show ip tcp header-compression</a>	Displays TCP header decompression statistics for FR.

# frame-relay ip tcp compression-connections

To specify the maximum number of TCP header compression connections that can exist on a FR interface, use the **frame-relay ip tcp compression-connections** interface configuration command. To restore the default, use the **no** form of this command.

**frame-relay ip tcp compression-connections** *number*

**no frame-relay ip tcp compression-connections**

<b>Syntax Description</b>	<i>number</i>	Maximum number of TCP header compression connections. The range is from 3 to 256.
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<b>Defaults</b>	One (1) Compression Connection
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<b>Command Modes</b>	Interface configuration
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<b>Command History</b>	<b>Release</b>	<b>Modification</b>
	12.1(2)T	This command was introduced.
	12.0(33)S2	This command was first supported on Cisco 12000 Series Routers.

<b>Usage Guidelines</b>	<p>Before you can configure the maximum number of connections, TCP header compression must be configured on the interface using the <b>frame-relay ip tcp header-compression</b> command.</p> <p>The number of TCP header compression connections must be set to the same value at each end of the connection.</p>
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<b>Examples</b>	<p>The following example shows how to configure a maximum of 150 RTP header compression connections on serial subinterface 3/0/0.1/1/1/0.1:</p>
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```
Router(config)# interface Serial 3/0/0.1/1/1/0.1
Router(config-if)# frame-relay ip rtp compression-connections 150
```

<b>Related Commands</b>	<b>Command</b>	<b>Description</b>
	<a href="#">Feature Information for IPHC Over Frame Relay</a>	Configures the maximum number of RTP header compression connections on a FR subinterface.

# hw-module slot x np mode feature

To work in IPHC load the microcode on SIP-401/501/601 line card, which enables you to work in feature mode from Turbo mode. This is specifically used for working on IPHC.

## hw-module slot x np mode feature

### Syntax Description

<i>x</i>	Slot number in which SIP-401/501/601 line card is installed and on which you want to load the microcode and enable feature mode.
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### Command Modes

Global Configuration mode

### Defaults

Turbo mode

### Command History

Release	Modification
12.0(33)S2	This command was introduced.

### Examples

The following example shows how to configure feature mode on both ingress and egress data paths on the network processor (NP):

```
Router> enable
Router# configure t
Router(config)# hw-module slot 2 np mode feature
```

### Related Commands

Command	Description
<b>no hw-module slot x np mode feature</b>	Selects Turbo mode on the NP.
<b>show controllers ise slot x np mode</b>	Displays the microcode mode on the NP.

## hw-module slot <slot> ip tcp compression-connections

To configure the maximum number of TCP context per line card, use the **hw-module slot <slot> ip tcp compression-connections** command. The default value is 4000 for the maximum number of connections.

**hw-module slot <slot> ip tcp compression-connections** *<maximum number of connections>*

Syntax Description	
<i>&lt;slot&gt;</i>	Slot number of SIP-401/501/601 line card for which you want to configure the maximum number of TCP context.
<i>maximum number of connections</i>	Indicates the maximum number of TCP context per line card. The valid range is 1 to 64000. Normal default value is 0 for this parameter.

**Command Modes** Global Configuration mode

**Defaults** 4000

Command History	Release	Modification
	12.0(33)S2	This command was introduced.

**Examples** The following example shows how to configure the maximum number of TCP context per line card:

```
Router> enable
Router# configure t
Router(config)# hw-module slot 2 ip tcp compression-connections 2000
```

Related Commands	Command	Description
	<a href="#">hw-module slot &lt;slot&gt; ip rtp compression-connections</a>	Configures the maximum number of non-TCP (cRTP) context per line card.

## hw-module slot <slot> ip rtp compression-connections

To configure the maximum number of non-TCP (cRTP) context per line card, use the **hw-module slot <slot> ip rtp compression-connections** command. This command requires explicit user configuration for IPHC compression and decompression to work.

**hw-module slot <slot> ip rtp compression-connections** *<maximum number of connections>*

Syntax Description	
<i>&lt;slot&gt;</i>	Slot number of SIP-401/501/601 line card for which you want to configure the maximum number of non-TCP (cRTP) context.
<i>maximum number of connections</i>	Indicates the maximum number of non-TCP (cRTP) context per line card. The valid range is 1 to 32768. Normal default value is 0 for this parameter.

**Command Modes** Global Configuration mode

**Defaults** 20480

Command History	Release	Modification
	12.0(33)S2	This command was introduced.

**Examples** The following example shows how to configure feature mode on both ingress and egress data paths on the network processor (NP):

```
Router> enable
Router# configure t
Router(config)# hw-module slot 2 ip rtp compression-connections 2000
```

Related Commands	Command	Description
	<a href="#">hw-module slot x np mode feature</a>	Configures the maximum number of non-TCP (cRTP) context per line card.

# ip header-compression disable-feedback

To disable CONTEXT\_STATUS feedback messages from the interface or link, use the **ip header-compression disable-feedback** command in interface configuration mode. To enable CONTEXT\_STATUS feedback messages from the interface or link, use the **no** form of this command.

**ip header-compression disable-feedback**

**no ip header-compression disable-feedback**

## Syntax Description

This command has no arguments or keywords.

## Defaults

CONTEXT\_STATUS feedback messages are enabled by default.

## Command Modes

Interface configuration

## Command History

Release	Modification
12.3(2)T	This command was introduced.
12.0(33)S2	This command was introduced for the first time on Cisco 12000 Series Routers for SIP-401/501/601 line card.

## Usage Guidelines

The **ip header-compression disable-feedback** command is designed for use with satellite links where the path for the upward link is different from the path for the downward link. When the paths are different, CONTEXT\_STATUS messages are not useful.

The **ip header-compression disable-feedback** command can be used with either Real-Time Transport Protocol (RTP) or TCP header compression.

## Examples

The following example shows how to disable the CONTEXT\_STATUS messages on the Serial2/0/0:0.1 subinterface:

```
Router> enable
Router# configure terminal
Router(config)# interface Serial2/0/0:0.1
Router(sub-if)# ip header-compression disable-feedback
Router(sub-if)# exit
```

## Related Commands

Command	Description
<a href="#">ip header-compression max-header</a>	Specifies the maximum size of the compressed IP header.
<a href="#">ip header-compression max-period</a>	Specifies the maximum number of compressed packets between full headers.

# ip header-compression max-header

To specify the maximum size of the compressed IP header, use the **ip header-compression max-header** command in interface configuration mode. To return the size of the compressed IP header to the default value, use the **no** form of this command.

**ip header-compression max-header** *max-header-size*

**no ip header-compression max-header** *max-header-size*

<b>Syntax Description</b>	<i>max-header-size</i> Size of the IP header, in bytes. The size of the IP header can be in the range of 20 to 168 bytes.
---------------------------	---

<b>Defaults</b>	40 bytes for Cisco 12000 Series Routers on a SIP-401/501/601 line card
-----------------	--

<b>Command Modes</b>	Interface configuration
----------------------	-------------------------

<b>Command History</b>	<b>Release</b>	<b>Modification</b>
	12.3(2)T	This command was introduced.
	12.0(33)S2	This command was introduced for the first time on Cisco 12000 Series Routers for SIP-401/501/601 line card.

<b>Usage Guidelines</b>	The <i>max-header-size</i> argument of the <b>ip header-compression max-header</b> command can be used to restrict the size of the header to be compressed.
-------------------------	---

<b>Examples</b>	The following example shows how to configure the maximum IP header size of the packet. In this configuration, the maximum IP header size is 100 bytes.
-----------------	--

```
Router> enable
Router# configure terminal
Router(config)# interface Serial2/0/0:0.1
Router(sub-if)# ip header-compression max-header 100
Router(sub-if)# exit
```

<b>Related Commands</b>	<b>Command</b>	<b>Description</b>
	<a href="#">Feature Information for IPHC Over Frame Relay</a>	Disables CONTEXT_STATUS feedback messages from the interface or link.
	<a href="#">ip header-compression max-period</a>	Specifies the maximum number of compressed packets between full headers.

## ip header-compression max-period

To specify the maximum number of compressed packets between full headers, use the **ip header-compression max-period** command in interface configuration mode. To return the number of compressed packets to the default value, use the **no** form of this command.

**ip header-compression max-period** *number-of-packets*

**no ip header-compression max-period** *number-of-packets*

<b>Syntax Description</b>	<i>number-of-packets</i> Specifies a number of packets between full headers. The number can be in the range of 0 to 65535 packets.
---------------------------	--

<b>Defaults</b>	256 packets
-----------------	-------------

<b>Command Modes</b>	Interface configuration
----------------------	-------------------------

<b>Command History</b>	<b>Release</b>	<b>Modification</b>
	12.3(2)T	This command was introduced.
12.0(33)S2	This command was introduced for the first time on Cisco 12000 Series Routers for SIP-401/501/601 line card.	

<b>Usage Guidelines</b>	With the ip header-compression max-period command, full IP packet headers are sent every 'x' number of compressed packets configured using this command.
-------------------------	--

<b>Examples</b>	The following example shows how to configure the number of packets between full header packets. In this configuration, the packet number specified is 160.
-----------------	--

```
Router> enable
Router# configure terminal
Router(config)# interface Serial12/0/0:0.1
Router(sub-if)# ip header-compression max-period 160
Router(sub-if)# exit
```

Related Commands	Command	Description
	<a href="#">Feature Information for IPHC Over Frame Relay</a>	Disables CONTEXT_STATUS feedback messages from the interface or link.
	<a href="#">ip header-compression max-header</a>	Specifies the maximum size of the compressed IP header.

# show ip rtp header-compression

To display the Real-Time Transport Protocol (RTP) header compression statistics, use the **show ip rtp header-compression** command from EXEC mode.

```
show ip rtp header-compression <interface>
```

## Syntax Description

<i>interface</i>	Indicates the interface on the SIP-401/501/601 line card for which you want to view the RTP header compression statistics.
------------------	--

## Defaults

Not Applicable

## Command Modes

EXEC mode

## Command History

Release	Modification
12.0(33)S2	This command was introduced.

## Usage Guidelines

Use the **show ip rtp header-compression** command is used to view the RTP header compression statistics.

## Examples

The following shows the RTP header compression statistics. The command output in bold indicates the statistics supported on Cisco 12000 Series Routers:

```
Router# show ip rtp header-compression
RTP/UDP/IP header compression statistics:
DLCI 200      Link/Destination info: point-to-point dlci
Interface Serial1/1/1:1.1 DLCI 200 (compression on, Cisco, RTP)
Distributed fast switched:
9 seconds since line card sent last stats update
Rcvd:   0 total, 0 compressed, 0 errors, 0 status msgs
        0 dropped, 0 buffer copies, 0 buffer failures
Sent:   1001 total, 996 compressed, 0 status msgs, 996 not predicted
        34855 bytes saved, 25205 bytes sent
        2.38 efficiency improvement factor
Connect: 16 rx slots, 16 tx slots,
        5 misses, 0 collisions, 0 negative cache hits, 32 free contexts
        99% hit ratio, five minute miss rate 0 misses/sec, 0 ma
```

## Related Commands

Command	Description
<code>ip header-compression disable-feedback</code>	Enables RTP header compression on a FR subinterface.
<code>show ip tcp header-compression</code>	Displays TCP header decompression statistics for FR.

# show ip tcp header-compression

To display the TCP header decompression statistics, use the **show ip tcp header-compression** command from EXEC mode.

```
show ip tcp header-compression <interface>
```

## Syntax Description

<i>interface</i>	Indicates the interface on the SIP-401/501/601 line card for which you want to view the TCP header decompression statistics.
------------------	--

## Command Default

Not Applicable

## Command Modes

EXEC mode

## Command History

Release	Modification
12.0(33)S2	This command was introduced.

## Usage Guidelines

Use the **show ip tcp header-compression** command is used to view the TCP header decompression statistics.

## Examples

The following example shows the TCP header decompression statistics. The command output in bold indicates the statistics supported on Cisco 12000 Series Routers:

```
Router# show ip tcp header-compression
TCP/IP header compression statistics:
DLCI 200      Link/Destination info: point-to-point dlci
Interface Serial1/1/1:1.1 DLCI 200 (compression on, VJ)
Distributed fast switched:
6 seconds since line card sent last stats update
Rcvd:   0 total, 0 compressed, 0 errors, 0 status msgs
        0 dropped, 0 buffer copies, 0 buffer failures
Sent:   0 total, 0 compressed, 0 status msgs, 0 not predicted
        0 bytes saved, 0 bytes sent
Connect: 1 rx slots, 1 tx slots,
        0 misses, 0 collisions, 0 negative cache hits, 1 free contexts
```

## Related Commands

Command	Description
<a href="#">frame-relay ip rtp compression-connections</a>	Enables TCP header decompression on a FR subinterface.
<a href="#">ip header-compression disable-feedback</a>	Displays RTP header compression statistics for FR.

# Feature Information for IPHC Over Frame Relay

IPHC Over FR enables efficient transmission of delay sensitive traffic such as voice and video by compressing and decompressing the IP/UDP/TCP packets. This feature is applicable on Cisco 12000 series routers and only on Engine 5 based SIP-401/501/601 line cards on FR interfaces having Cisco as the encapsulation type.

[Table 2](#) lists the release history for this feature.

Not all commands may be available in your Cisco IOS software release. For release information about a specific command, see the command reference documentation.

Use Cisco Feature Navigator to find information about platform support and software image support. Cisco Feature Navigator enables you to determine which Cisco IOS, Catalyst OS, and Cisco IOS XE software images support a specific software release, feature set, or platform. To access Cisco Feature Navigator, go to <http://www.cisco.com/go/cfn>. An account on Cisco.com is not required.

**Note**

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[Table 2](#) lists only the Cisco IOS software release that introduced support for a given feature in a given Cisco IOS software release train. Unless noted otherwise, subsequent releases of that Cisco IOS software release train also support that feature.

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Table 2 Feature Information for IPHC Over FR

Feature Name	Releases	Feature Information
IPHC Over Frame Relay for Interface Support	12.0(33)S2	<p>This feature was introduced in Cisco IOS Software Release 12.0(33)S2 on Cisco 12000 series routers. This feature is applicable only on Engine 5 based SIP-401/501/601 line cards having FR interfaces with Cisco as the encapsulation type.</p> <p>The following sections provide information about this feature:</p> <ul style="list-style-type: none"> <li>• <a href="#">Prerequisites for Configuring IPHC on Frame Relay Interfaces</a></li> <li>• <a href="#">Restrictions for Configuring IPHC on Frame Relay Interfaces</a></li> <li>• <a href="#">Additional References</a></li> <li>• <a href="#">Command Reference</a></li> </ul> <p>The following commands were introduced or modified:</p> <ul style="list-style-type: none"> <li>• <a href="#">frame-relay ip rtp header-compression</a></li> <li>• <a href="#">hw-module slot x np mode feature</a></li> <li>• <a href="#">hw-module slot &lt;slot&gt; ip rtp compression-connections</a></li> <li>• <a href="#">ip header-compression disable-feedback</a></li> <li>• <a href="#">frame-relay ip rtp compression-connections</a></li> <li>• <a href="#">ip header-compression disable-feedback</a></li> <li>• <a href="#">show ip tcp header-compression</a></li> <li>• <a href="#">Feature Information for IPHC Over Frame Relay</a></li> <li>• <a href="#">frame-relay ip tcp header-compression</a></li> <li>• <a href="#">Feature Information for IPHC Over Frame Relay</a></li> <li>• <a href="#">ip header-compression max-header</a></li> <li>• <a href="#">ip header-compression max-period</a></li> </ul>

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