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Definitions of Managed Objects for RObust Header Compression (ROHC)

Status of this Memo

This document specifies an Internet standards track protocol for the Internet community, and requests discussion and suggestions for improvements. Please refer to the current edition of the "Internet Official Protocol Standards" (STD 1) for the standardization state and status of this protocol. Distribution of this memo is unlimited.

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Abstract

This memo defines a portion of the Management Information Base (MIB) for use with network management protocols in the Internet community. In particular, it describes a set of managed objects that allow monitoring of running instances of RObust Header Compression (ROHC). The managed objects defined in this memo are grouped into three MIB modules. The ROHC-MIB module defines managed objects shared by all ROHC profiles, the ROHC-UNCOMPRESSED-MIB module defines managed objects specific to the ROHC uncompressed profile, the ROHC-RTP-MIB module defines managed objects specific to the ROHC RTP (Real-Time Transport Protocol) profile, the ROHC UDP (User Datagram Protocol) profile, the ROHC ESP (Encapsulating Security Payload) profile, and the ROHC LLA (Link Layer Assisted) profile.

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1. Introduction

This memo defines a portion of the Management Information Base (MIB) for use with network management protocols in the Internet community. In particular, it describes a set of managed objects that allow monitoring of running instances of robust header compression.

The key words "MUST", "MUST NOT", "REQUIRED", "SHALL", "SHALL NOT", "SHOULD", "SHOULD NOT", "RECOMMENDED", "NOT RECOMMENDED", "MAY", and "OPTIONAL" in this document are to be interpreted as described in BCP 14, RFC 2119 [RFC2119].

2. The Internet-Standard Management Framework

For a detailed overview of the documents that describe the current Internet-Standard Management Framework, please refer to section 7 of RFC 3410 [RFC3410].

Managed objects are accessed via a virtual information store, termed the Management Information Base or MIB. MIB objects are generally accessed through the Simple Network Management Protocol (SNMP). Objects in the MIB are defined using the mechanisms defined in the Structure of Management Information (SMI). This memo specifies a MIB

module that is compliant to the SMiv2, which is described in STD 58, RFC 2578 [RFC2578], STD 58, RFC 2579 [RFC2579] and STD 58, RFC 2580 [RFC2580].

3. Overview

This section describes the basic model of RObust Header Compression (ROHC, [RFC3095]) used when developing the MIB modules for ROHC described in the following sections.

ROHC presents a framework for IP header compression that allows flexible adjustment of compression efficiency versus robustness against channel errors depending on the underlying channel characteristics.

ROHC introduces header compressors/decompressors at the end-points (interfaces) of (wireless) channels on which packets with compressed headers are transferred. ROHC exploits the temporal redundancy in successive packet headers of a packet flow by storing non-changing fields of the headers as well as reference values of predictably changing fields as context information. When the context information for a packet flow is also established at the decompressor, only delta-information and unpredictably changing header fields have to be sent over the channel.

This document specifies MIB modules in order to provide a means for managing ROHC implementations via SNMP and within the IETF management framework. The objects defined support configuration management, fault management and performance monitoring.

For configuration management implementation parameters (see Section 6.3 of [RFC3095]) and configuration parameters (including the ones specified in Section 5.1.1 of [RFC3095] and in Section 5.1.1 of [RFC3242]) can be verified by using the MIB modules specified below.

For fault management compressor/decompressor state and mode can be checked.

For performance management a set of statistics is provided including the number of flows that have used ROHC, the current and long term compression ratio, the number of reinitializations and the number of packets sent or received with different header types.

4. Structure of the MIB modules

This section presents the structure of the MIB modules that are specified in Section 5. Basically, the MIB is structured according to the ROHC architecture described in [RFC3759].

ROHC is an evolving technology. [RFC3095] specifies the header compression framework and four profiles: uncompressed, RTP, UDP, and ESP (Real-Time Transport Protocol, User Datagram Protocol, Encapsulating Security Payload). [RFC3242] specifies a profile with additional link layer assistance called LLA (Link Layer Assisted). A profile for compression of TCP (Transmission Control Protocol) flows is under development within the ROHC working group and SCTP (Stream Control Transmission Protocol) compression is being discussed as potential next candidate. Therefore, the managed objects defined below are structured into three MIB modules: the general ROHC-MIB module and the profile-specific ROHC-UNCOMPRESSED-MIB and ROHC-RTP-MIB modules. This flexible approach allows to support future profiles each by its own profile-specific module.

The ROHC-MIB module defines properties of information on ROHC instances, ROHC channels, ROHC profiles, and ROHC compressor and decompressor contexts. All managed objects in this module are assumed to be shared by all profiles.

The ROHC-UNCOMPRESSED-MIB module extends the ROHC-MIB by managed objects that are specific to the ROHC uncompressed profile 0x0000 defined in [RFC3095]. The ROHC-RTP-MIB module extends the ROHC-MIB by managed objects that are specific to the three profiles defined in [RFC3095] (ROHC RTP profile 0x0001, ROHC UDP profile 0x0002, and ROHC ESP profile 0x0003), and to the ROHC LLA profile 0x0005 defined in [RFC3242]. An analysis of these profiles showed that they are tightly related and can share most of the managed objects in the ROHC-UNCOMPRESSED-MIB module. Therefore, a joint module for all of them was preferred to individual modules.

The number of managed objects in the ROHC-UNCOMPRESSED-MIB Module and the ROHC-RTP-MIB Module is rather small. They contain context state and context mode, and profile-specific context statistics. It is assumed that MIB modules for future profiles, such as TCP and SCTP, will be similarly small and easy to design.

4.1. The ROHC-MIB module

The ROHC-MIB module defines managed objects that are expected to be useful for all current and future ROHC profiles. Objects in the ROHC-MIB module are arranged into four tables: the `rohcChannelTable`, the `rohcInstanceTable`, the `rohcProfileTable`, and the `rohcContextTable`. The managed objects in the first three tables are rather static (except for provided statistics), while the objects in the `rohcContextTable` are more dynamic.

All tables are indexed by the IP interface number and by a numeric channel identifier. The channel identifier is used for channels to which compressors and decompressors are attached (called ROHC channels in [RFC3759]), as well as for dedicated feedback channels (called ROHC feedback channels in [RFC3759]). Compressor and decompressor instances are further indexed by their type (either compressor or decompressor). Contexts are indexed by the same index as their corresponding instance and their individual context identifier (CID).

4.1.1. rohcChannelTable

The rohcChannelTable lists all channels used by ROHC instances for transferring compressed packets and/or for giving feedback from the decompressor to the compressor. Listed channels are either ROHC channels or feedback channels as defined in [RFC3759]. The channels are listed per IP interface.

The information per channel in the rohcChannelTable includes

- o the channel ID,
- o the channel type, either 'notInUse', 'rohc', or 'dedicatedFeedback',
- o the channel for which feedback is provided by this channel (if applicable),
- o a string for describing the channel, and
- o the status of the channel being either 'enabled' or 'disabled'.

4.1.2. rohcInstanceTable

The rohcInstanceTable defines properties of ROHC compressor instances and ROHC decompressor instances.

As described in [RFC3759], an instance is associated with exactly one channel and only one instance can be associated with the same channel. Therefore, the same index consisting of ifIndex and rohcChannelID could have been used for both tables. But when accessing the rohcInstanceTable (and the rohcContextTable that shares a part of its index with the rohcInstanceTable) there are many cases where either a compressor contexts or a decompressor contexts are of interest. Therefore, the rohcInstanceType indicating either a compressor or a decompressor was added to the table's index. This allows listing all compressors without accessing any decompressor.

Note that still the combination of `ifIndex` and `rohcChannelID` uniquely identifies an instance. It is always possible to directly identify and access the channel corresponding to a given instance.

The set of instance properties in the `rohcInstanceTable` includes

- o the vendor of the implementation, version number and description,
- o the channels used for compressed packets and for feedback,
- o implementation and configuration properties including clock resolution, maximum context identifier number (`MAX_CID`), the `LARGE_CIDS` flag, and the Maximum Reconstructed Reception Unit (`MRRU`),
- o the storage time for contexts created by this instance,
- o the status of the instance (operational or not).

Optionally, the `rohcInstanceTable` also contains instance statistics including

- o the total number of compressed flows,
- o the current number of compressed flows,
- o the total number of packets passing this instance
- o the total number of static Initialization and Refreshes (`IRs`) passing this instance
- o the total number of dynamic Initialization and Refreshes (`IR-DYNs`) passing this instance, and
- o the total compression ratio achieved on the channel.

Instances are listed per IP interface.

4.1.3. `rohcProfileTable`

The `rohcProfileTable` lists available profiles per instance including information on

- o the profile number,
- o the vendor and version number, and
- o a string describing the profile.

- o a flag indicating whether or not using this profile has been negotiated with the corresponding (de)compressor.

4.1.4. rohcContextTable

The rohcContextTable lists compressor contexts or decompressor contexts per instance and context identifier (CID). Each row of this table represents a context. If a new context is created, also a new row in this table is created. After expiration or termination of a context, the row will continue to exist until the context's storage time expires or until the CID is re-used. Then the row will be deleted.

For each context, the following attributes are listed:

- o the type of context ('compressor' or 'decompressor'), also used as part of the table index,
- o the CID,
- o the state of the CID ('unused', 'active', 'expired', or 'terminated'), also used as part of the table index,
- o the used profile,
- o in case of a decompressor: the decompressor depth, and
- o the storage time.

Optionally, context statistics is provided including

- o activation and deactivation time of the context,
- o the number of packets sent or received, respectively,
- o the numbers of IRs and IR-DYNs sent or received, respectively,
- o the number of feedbacks sent or received, respectively,
- o in case of a decompressor context: the numbers of decompressor failures and repairs,
- o the total compression ratio of all packets passing this context,
- o the total compression ratio of all packet headers compressed in this context,

- o the mean compressed packet size of all packets passing this context,
- o the mean header size of all compressed headers passing this context,
- o the compression ratio of the last 16 packets passing this context,
- o the compression ratio of the last 16 packet headers compressed in this context,
- o the mean compressed packet size of the last 16 packets passing this context,
- o the mean header size of the last 16 compressed headers passing this context.

4.2. The ROHC-UNCOMPRESSED-MIB module

The ROHC-UNCOMPRESSED-MIB module defines managed objects that are specific to ROHC uncompressed profile (0x0000) specified in [RFC3095].

4.2.1. rohcUncmprContextTable

The rohcUncmprContextTable extends the rohcContextTable. It provides information on state and mode of the compressor for profile 0x0000. Optionally, it also provides a counter of ACK feedbacks sent or received by the context, respectively.

4.3. The ROHC-RTP-MIB module

The ROHC-RTP-MIB module defines managed objects that are specific to three profiles specified in [RFC3095] (ROHC RTP profile 0x0001, ROHC UDP profile 0x0002, and ROHC ESP profile 0x0003) and to the ROHC LLA profile 0x0005 specified in [RFC3242]. The ROHC-RTP-MIB contains two tables, the rohcRtpContextTable and the rohcRtpPacketSizeTable.

4.3.1. rohcRtpContextTable

The rohcRtpContextTable extends the rohcContextTable. It provides information on context state and context mode for profiles 0x0001 - 0x0003 and 0x0005. For compressor contexts it optionally contains managed object containing the numbers of allowed and used packet sizes. As further option, counters of the numbers of ACKs, NACKs, and SNACKs in this context are specified.

4.3.2. rohcPacketSizeTable

The optional rohcPacketSizeTable lists per compressor context the allowed packet sizes for profiles ROHC RTP, ROHC UDP, ROHC ESP, or the preferred packet sizes for ROHC LLA, respectively. Allowed packet sizes are marked if they are used. For preferred packet sizes, it is indicated whether the preferred size applies to NHP only, to RHP only or to all packets.

5. Definitions

ROHC-MIB DEFINITIONS ::= BEGIN

IMPORTS

MODULE-IDENTITY, OBJECT-TYPE,
Unsigned32, Counter32, mib-2
FROM SNMPv2-SMI -- [RFC2578]

TEXTUAL-CONVENTION, TruthValue,
TimeInterval, DateAndTime
FROM SNMPv2-TC -- [RFC2579]

MODULE-COMPLIANCE, OBJECT-GROUP
FROM SNMPv2-CONF -- [RFC2580]

SnmpAdminString
FROM SNMP-FRAMEWORK-MIB -- [RFC3411]

ifIndex
FROM IF-MIB; -- [RFC2863]

rohcMIB MODULE-IDENTITY

LAST-UPDATED "200406030000Z" -- June 3, 2004
ORGANIZATION "IETF Robust Header Compression Working Group"
CONTACT-INFO
"WG charter:
<http://www.ietf.org/html.charters/rohc-charter.html>

Mailing Lists:

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DESCRIPTION

"This MIB module defines a set of basic objects for monitoring and configuring robust header compression. The module covers information about running instances of ROHC (compressors or decompressors) at IP interfaces.

Information about compressor contexts and decompressor contexts has different structure for different profiles. Therefore it is not provided by this MIB module, but by individual modules for different profiles.

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<http://www.ietf.org/copyrights/ianamib.html>"

REVISION "200406030000Z" -- June 3, 2004
 DESCRIPTION "Initial version, published as RFC 3816."
 ::= { mib-2 112 }

RohcChannelIdentifier ::= TEXTUAL-CONVENTION

DISPLAY-HINT "d"

STATUS current

DESCRIPTION

"A number identifying a channel.
 The value of 0 must not be used as identifier of an existing channel."

SYNTAX Unsigned32 (1..4294967295)

RohcChannelIdentifierOrZero ::= TEXTUAL-CONVENTION

DISPLAY-HINT "d"

STATUS current

DESCRIPTION

"A number identifying a channel.
 The value of 0 indicates that no channel is identified."

SYNTAX Unsigned32 (0..4294967295)

RohcCompressionRatio ::= TEXTUAL-CONVENTION

DISPLAY-HINT "d"

STATUS current

DESCRIPTION

"A number indicating a compression ratio over

a set of bytes. The value is defined as
 $1000 * \text{bytes}(\text{compressed}) / \text{bytes}(\text{original})$
rounded to the next integer value.

Note that compressed sets of bytes can be larger
than the corresponding uncompressed ones.

Therefore, the number can be greater than 1000."

SYNTAX Unsigned32

--

-- The groups defined within this MIB module:

--

rohObjects OBJECT IDENTIFIER ::= { rohcMIB 1 }
rohConformance OBJECT IDENTIFIER ::= { rohcMIB 2 }

--

-- The ROHC Instance group lists properties of ROHC
-- instances in the rohInstanceTable, about the channels used
-- by the instances in the rohChannelTable and about the profiles
-- available at the instances in the rohProfileTable.

--

rohInstanceObjects OBJECT IDENTIFIER ::= { rohObjects 1 }

--

-- Channel Table

--

-- Listing all channels used for ROHC data channel
-- and/or as feedback channel.

--

rohChannelTable OBJECT-TYPE

SYNTAX SEQUENCE OF RohChannelEntry

MAX-ACCESS not-accessible

STATUS current

DESCRIPTION

"This table lists and describes all ROHC channels
per interface."

::= { rohInstanceObjects 1 }

rohChannelEntry OBJECT-TYPE

SYNTAX RohChannelEntry

MAX-ACCESS not-accessible

STATUS current

DESCRIPTION

"An entry describing a particular script. Every script that
is stored in non-volatile memory is required to appear in

this script table.

Note, that the rohcChannelID identifies the channel uniquely. The ifIndex is part of the index of this table just in order to allow addressing channels per interface."

```
INDEX { ifIndex, rohcChannelID }
::= { rohcChannelTable 1 }
```

```
RohcChannelEntry ::= SEQUENCE {
    rohcChannelID          RohcChannelIdentifier,
    rohcChannelType        INTEGER,
    rohcChannelFeedbackFor RohcChannelIdentifierOrZero,
    rohcChannelDescr       SnmpAdminString,
    rohcChannelStatus      INTEGER
}
```

```
rohcChannelID OBJECT-TYPE
    SYNTAX      RohcChannelIdentifier
    MAX-ACCESS  not-accessible
    STATUS      current
    DESCRIPTION
        "The locally arbitrary, but unique identifier associated
        with this channel. The value is REQUIRED to be unique
        per ROHC MIB implementation independent of the associated
        interface."
```

The value is REQUIRED to remain constant at least from one re-initialization of the entity's network management system to the next re-initialization. It is RECOMMENDED that the value persist across such re-initializations."

```
REFERENCE
    "RFC 3095, Section 5.1.1"
::= { rohcChannelEntry 2 }
```

```
rohcChannelType OBJECT-TYPE
    SYNTAX      INTEGER {
                    notInUse(1),
                    rohc(2),
                    dedicatedFeedback(3)
                }
    MAX-ACCESS  read-only
    STATUS      current
    DESCRIPTION
        "Type of usage of the channel. A channel might be currently
        not in use for ROHC or feedback, it might be in use as
        a ROHC channel carrying packets and optional piggy-backed
        feedback, or it might be used as a dedicated feedback
        channel exclusively carrying feedback."
```

```
::= { rohcChannelEntry 3 }
```

rohcChannelFeedbackFor OBJECT-TYPE

SYNTAX RohcChannelIdentifierOrZero

MAX-ACCESS read-only

STATUS current

DESCRIPTION

"The index of another channel of this interface for which the channel serves as feedback channel.

If no feedback information is transferred on this channel, then the value of this ID is 0. If the channel type is set to notInUse(1), then the value of this object must be 0. If the channel type is rohc(2) and the value of this object is a valid channel ID, then feedback information is piggy-backed on the ROHC channel. If the channel type is dedicatedFeedback(3), then feedback is transferred on this channel and the value of this object MUST be different from 0 and MUST identify an existing ROHC channel."

REFERENCE

"RFC 3095, Section 5.1.1"

```
::= { rohcChannelEntry 4 }
```

rohcChannelDescr OBJECT-TYPE

SYNTAX SnmpAdminString

MAX-ACCESS read-only

STATUS current

DESCRIPTION

"A textual description of the channel."

```
::= { rohcChannelEntry 5 }
```

rohcChannelStatus OBJECT-TYPE

SYNTAX INTEGER {
 enabled(1),
 disabled(2)
 }

MAX-ACCESS read-only

STATUS current

DESCRIPTION

"Status of the channel."

```
::= { rohcChannelEntry 6 }
```

```
--
```

```
-- Instances of ROHC
```

```
--
```

```
-- This table lists properties of running instances of ROHC  
-- compressors and decompressors at the managed node.
```

```
--
```

rohcInstanceTable OBJECT-TYPE

SYNTAX SEQUENCE OF RohcInstanceEntry

MAX-ACCESS not-accessible

STATUS current

DESCRIPTION

"This table lists properties of running instances of robust header compressors and decompressors at IP interfaces. It is indexed by interface number, the type of instance (compressor or decompressor), and the ID of the channel used by the instance as ROHC channel.

Note that the rohcChannelID uniquely identifies an instance. The ifIndex and rohcInstanceType are part of the index, because it simplifies accessing instances per interface and for addressing either compressors or decompressors only."

::= { rohcInstanceObjects 2 }

rohcInstanceEntry OBJECT-TYPE

SYNTAX RohcInstanceEntry

MAX-ACCESS not-accessible

STATUS current

DESCRIPTION

"An entry describing a particular instance of a robust header compressor or decompressor."

INDEX { ifIndex, rohcInstanceType, rohcChannelID }

::= { rohcInstanceTable 1 }

RohcInstanceEntry ::= SEQUENCE {

rohcInstanceType	INTEGER,
rohcInstanceFBChannelID	RohcChannelIdentifierOrZero,
rohcInstanceVendor	OBJECT IDENTIFIER,
rohcInstanceVersion	SnmpAdminString,
rohcInstanceDescr	SnmpAdminString,
rohcInstanceClockRes	Unsigned32,
rohcInstanceMaxCID	Unsigned32,
rohcInstanceLargeCIDs	TruthValue,
rohcInstanceMRRU	Unsigned32,
rohcInstanceContextStorageTime	TimeInterval,
rohcInstanceStatus	INTEGER,
rohcInstanceContextsTotal	Counter32,
rohcInstanceContextsCurrent	Unsigned32,
rohcInstancePackets	Counter32,
rohcInstanceIRs	Counter32,
rohcInstanceIRDYNs	Counter32,
rohcInstanceFeedbacks	Counter32,

```

    rohcInstanceCompressionRatio    RohcCompressionRatio
}

rohcInstanceType OBJECT-TYPE
    SYNTAX      INTEGER {
                    compressor(1),
                    decompressor(2)
                }
    MAX-ACCESS   not-accessible
    STATUS       current
    DESCRIPTION
        "Type of the instance of ROHC. It is either a
         compressor instance or a decompressor instance."
    ::= { rohcInstanceEntry 2 }

rohcInstanceFBChannelID OBJECT-TYPE
    SYNTAX      RohcChannelIdentifierOrZero
    MAX-ACCESS   read-only
    STATUS       current
    DESCRIPTION
        "Identifier of the channel used for feedback.
         If no feedback channel is used, the value of
         this object is 0 ."
    REFERENCE
        "RFC 3095, Section 5.1.1"
    ::= { rohcInstanceEntry 4 }

rohcInstanceVendor OBJECT-TYPE
    SYNTAX      OBJECT IDENTIFIER
    MAX-ACCESS   read-only
    STATUS       current
    DESCRIPTION
        "An object identifier that identifies the vendor who
         provides the implementation of robust header description.
         This object identifier SHALL point to the object identifier
         directly below the enterprise object identifier
         {1 3 6 1 4 1} allocated for the vendor. The value must be
         the object identifier {0 0} if the vendor is not known."
    ::= { rohcInstanceEntry 5 }

rohcInstanceVersion OBJECT-TYPE
    SYNTAX      SnmpAdminString (SIZE (0..32))
    MAX-ACCESS   read-only
    STATUS       current
    DESCRIPTION
        "The version number of the implementation of robust header
         compression. The zero-length string shall be used if the
         implementation does not have a version number."

```

It is suggested that the version number consist of one or more decimal numbers separated by dots, where the first number is called the major version number."

::= { rohcInstanceEntry 6 }

rohcInstanceDescr OBJECT-TYPE

SYNTAX SnmpAdminString

MAX-ACCESS read-only

STATUS current

DESCRIPTION

"A textual description of the implementation."

::= { rohcInstanceEntry 7 }

rohcInstanceClockRes OBJECT-TYPE

SYNTAX Unsigned32

UNITS "milliseconds"

MAX-ACCESS read-only

STATUS current

DESCRIPTION

"This object indicates the system clock resolution in units of milliseconds. A zero (0) value means that there is no clock available."

::= { rohcInstanceEntry 8 }

rohcInstanceMaxCID OBJECT-TYPE

SYNTAX Unsigned32 (1..16383)

MAX-ACCESS read-only

STATUS current

DESCRIPTION

"The highest context ID number to be used by the compressor. Note that this parameter is not coupled to, but in effect further constrained by, rohcChannellLargeCIDs."

REFERENCE

"RFC 3095, Section 5.1.1"

::= { rohcInstanceEntry 9 }

rohcInstanceLargeCIDs OBJECT-TYPE

SYNTAX TruthValue

MAX-ACCESS read-only

STATUS current

DESCRIPTION

"When retrieved, this boolean object returns false if the short CID representation (0 bytes or 1 prefix byte, covering CID 0 to 15) is used; it returns true, if the embedded CID representation (1 or 2 embedded CID bytes covering CID 0 to 16383) is used."

REFERENCE

"RFC 3095, Section 5.1.1"
 ::= { rohcInstanceEntry 10 }

rohcInstanceMRRU OBJECT-TYPE

SYNTAX Unsigned32

MAX-ACCESS read-only

STATUS current

DESCRIPTION

"Maximum reconstructed reception unit. This is the size of the largest reconstructed unit in octets that the decompressor is expected to reassemble from segments (see RFC 3095, Section 5.2.5). Note that this size includes the CRC. If MRRU is negotiated to be 0, no segment headers are allowed on the channel."

REFERENCE

"RFC 3095, Section 5.1.1"
 ::= { rohcInstanceEntry 11 }

rohcInstanceContextStorageTime OBJECT-TYPE

SYNTAX TimeInterval

UNITS "centi-seconds"

MAX-ACCESS read-write

STATUS current

DESCRIPTION

"This object indicates the default maximum amount of time information on a context belonging to this instance is kept as entry in the rohcContextTable after the context is expired or terminated. The value of this object is used to initialize rohcContextStorageTime object when a new context is created.

Changing the value of an rohcInstanceContextStorageTime instance does not affect any entry of the rohcContextTable created previously.

ROHC-MIB implementations SHOULD store the set value of this object persistently."

DEFVAL { 360000 }

::= { rohcInstanceEntry 12 }

rohcInstanceStatus OBJECT-TYPE

SYNTAX INTEGER {
 enabled(1),
 disabled(2)
 }

MAX-ACCESS read-only

STATUS current

DESCRIPTION

"Status of the instance of ROHC."

```
::= { rohcInstanceEntry 13 }
```

```
rohcInstanceContextsTotal OBJECT-TYPE
```

```
SYNTAX Counter32
```

```
MAX-ACCESS read-only
```

```
STATUS current
```

```
DESCRIPTION
```

```
"Counter of all contexts created by this instance.
```

```
Discontinuities in the value of this counter can
occur at re-initialization of the management
system, and at other times as indicated by the
value of ifCounterDiscontinuityTime."
```

```
::= { rohcInstanceEntry 14 }
```

```
rohcInstanceContextsCurrent OBJECT-TYPE
```

```
SYNTAX Unsigned32
```

```
MAX-ACCESS read-only
```

```
STATUS current
```

```
DESCRIPTION
```

```
"Number of currently active contexts created by this
instance."
```

```
::= { rohcInstanceEntry 15 }
```

```
rohcInstancePackets OBJECT-TYPE
```

```
SYNTAX Counter32
```

```
MAX-ACCESS read-only
```

```
STATUS current
```

```
DESCRIPTION
```

```
"Counter of all packets passing this instance.
```

```
Discontinuities in the value of this counter can
occur at re-initialization of the management
system, and at other times as indicated by the
value of ifCounterDiscontinuityTime."
```

```
::= { rohcInstanceEntry 16 }
```

```
rohcInstanceIRs OBJECT-TYPE
```

```
SYNTAX Counter32
```

```
MAX-ACCESS read-only
```

```
STATUS current
```

```
DESCRIPTION
```

```
"The number of all IR packets that are either sent
or received by this instance.
```

```
Discontinuities in the value of this counter can
occur at re-initialization of the management
system, and at other times as indicated by the
```

value of ifCounterDiscontinuityTime."

REFERENCE

"RFC 3095, Section 5.7.7.1"

::= { rohcInstanceEntry 17 }

rohcInstanceIRDYNs OBJECT-TYPE

SYNTAX Counter32

MAX-ACCESS read-only

STATUS current

DESCRIPTION

"The number of all IR-DYN packets that are either sent or received by this instance.

Discontinuities in the value of this counter can occur at re-initialization of the management system, and at other times as indicated by the value of ifCounterDiscontinuityTime."

REFERENCE

"RFC 3095, Section 5.7.7.2"

::= { rohcInstanceEntry 18 }

rohcInstanceFeedbacks OBJECT-TYPE

SYNTAX Counter32

MAX-ACCESS read-only

STATUS current

DESCRIPTION

"The number of all feedbacks that are either sent or received by this instance.

Discontinuities in the value of this counter can occur at re-initialization of the management system, and at other times as indicated by the value of ifCounterDiscontinuityTime."

::= { rohcInstanceEntry 19 }

rohcInstanceCompressionRatio OBJECT-TYPE

SYNTAX RohcCompressionRatio

MAX-ACCESS read-only

STATUS current

DESCRIPTION

"This object indicates the compression ratio so far over all packets on the channel served by this instance. The compression is computed over all bytes of the IP packets including the IP header but excluding all lower layer headers."

::= { rohcInstanceEntry 20 }

--

```
-- Profile Table
--
```

```
rohProfileTable OBJECT-TYPE
```

```
SYNTAX      SEQUENCE OF RohProfileEntry
```

```
MAX-ACCESS  not-accessible
```

```
STATUS      current
```

```
DESCRIPTION
```

```
"This table lists a set of profiles supported by the
instance."
```

```
REFERENCE
```

```
"RFC 3095, Section 5.1.1"
```

```
::= { rohInstanceObjects 3 }
```

```
rohProfileEntry OBJECT-TYPE
```

```
SYNTAX      RohProfileEntry
```

```
MAX-ACCESS  not-accessible
```

```
STATUS      current
```

```
DESCRIPTION
```

```
"An entry describing a particular profile supported by
the instance. It is indexed by the rohChannelID
identifying the instance and by the rohProfile."
```

```
INDEX { rohChannelID, rohProfile }
```

```
::= { rohProfileTable 1 }
```

```
RohProfileEntry ::= SEQUENCE {
```

```
rohProfile      Unsigned32,
```

```
rohProfileVendor OBJECT IDENTIFIER,
```

```
rohProfileVersion SnmpAdminString,
```

```
rohProfileDescr  SnmpAdminString,
```

```
rohProfileNegotiated TruthValue
```

```
}
```

```
rohProfile OBJECT-TYPE
```

```
SYNTAX      Unsigned32 (0..65535)
```

```
MAX-ACCESS  not-accessible
```

```
STATUS      current
```

```
DESCRIPTION
```

```
"Identifier of a profile supported. For a listing of
possible profile values, see the IANA registry for
'RObust Header Compression (ROHC) Profile Identifiers'
at http://www.iana.org/assignments/rohc-pro-ids"
```

```
::= { rohProfileEntry 2 }
```

```
rohProfileVendor OBJECT-TYPE
```

```
SYNTAX      OBJECT IDENTIFIER
```

```
MAX-ACCESS  read-only
```

```
STATUS      current
```

DESCRIPTION

"An object identifier that identifies the vendor who provides the implementation of robust header description. This object identifier SHALL point to the object identifier directly below the enterprise object identifier {1 3 6 1 4 1} allocated for the vendor. The value must be the object identifier {0 0} if the vendor is not known."

::= { rohProfileEntry 3 }

rohProfileVersion OBJECT-TYPE

SYNTAX SnmpAdminString (SIZE (0..32))

MAX-ACCESS read-only

STATUS current

DESCRIPTION

"The version number of the implementation of robust header compression. The zero-length string shall be used if the implementation does not have a version number.

It is suggested that the version number consist of one or more decimal numbers separated by dots, where the first number is called the major version number."

::= { rohProfileEntry 4 }

rohProfileDescr OBJECT-TYPE

SYNTAX SnmpAdminString

MAX-ACCESS read-only

STATUS current

DESCRIPTION

"A textual description of the implementation."

::= { rohProfileEntry 5 }

rohProfileNegotiated OBJECT-TYPE

SYNTAX TruthValue

MAX-ACCESS read-only

STATUS current

DESCRIPTION

"When retrieved, this boolean object returns true if the profile has been negotiated to be used at the instance, i.e., is supported also by the corresponding compressor/decompressor."

::= { rohProfileEntry 6 }

--

-- Context Table

--

rohContextTable OBJECT-TYPE

SYNTAX SEQUENCE OF RohContextEntry

```

MAX-ACCESS    not-accessible
STATUS        current
DESCRIPTION
    "This table lists and describes all compressor contexts
    per instance."
 ::= { rohcObjects 2 }

```

```

rohcContextEntry OBJECT-TYPE
    SYNTAX      RohcContextEntry
    MAX-ACCESS  not-accessible
    STATUS      current
    DESCRIPTION
        "An entry describing a particular compressor context."
    INDEX {
        rohcChannelID,
        rohcContextCID
    }
    ::= { rohcContextTable 1 }

```

```

RohcContextEntry ::= SEQUENCE {
    rohcContextCID                Unsigned32,
    rohcContextCIDState           INTEGER,
    rohcContextProfile            Unsigned32,
    rohcContextDecompressorDepth Unsigned32,
    rohcContextStorageTime        TimeInterval,
    rohcContextActivationTime     DateAndTime,
    rohcContextDeactivationTime   DateAndTime,
    rohcContextPackets            Counter32,
    rohcContextIRs               Counter32,
    rohcContextIRDYNs            Counter32,
    rohcContextFeedbacks         Counter32,
    rohcContextDecompressorFailures Counter32,
    rohcContextDecompressorRepairs Counter32,
    rohcContextAllPacketsRatio    RohcCompressionRatio,
    rohcContextAllHeadersRatio    RohcCompressionRatio,
    rohcContextAllPacketsMeanSize Unsigned32,
    rohcContextAllHeadersMeanSize Unsigned32,
    rohcContextLastPacketsRatio   RohcCompressionRatio,
    rohcContextLastHeadersRatio   RohcCompressionRatio,
    rohcContextLastPacketsMeanSize Unsigned32,
    rohcContextLastHeadersMeanSize Unsigned32
}

```

```

rohcContextCID OBJECT-TYPE
    SYNTAX      Unsigned32 (0..16383)
    MAX-ACCESS  not-accessible
    STATUS      current
    DESCRIPTION

```

"The context identifier (CID) of this context."

REFERENCE

"RFC 3095, Sections 5.1.1 and 5.1.3"

::= { rohContextEntry 2 }

rohContextCIDState OBJECT-TYPE

SYNTAX INTEGER {
 unused(1),
 active(2),
 expired(3),
 terminated(4)
 }

MAX-ACCESS read-only

STATUS current

DESCRIPTION

"State of the CID. When a CID is assigned to a context, its state changes from 'unused' to 'active'. The active context may stop operation due to some explicit signalling or after observing no packet for some specified time. In the first case then the CID state changes to 'terminated', in the latter case it changes to 'expired'. If the CID is re-used again for another context, the state changes back to 'active'."

::= { rohContextEntry 3 }

rohContextProfile OBJECT-TYPE

SYNTAX Unsigned32 (0..65535)

MAX-ACCESS read-only

STATUS current

DESCRIPTION

"Identifier of the profile for this context. The profile is identified by its index in the rohProfileTable for this instance. There MUST exist a corresponding entry in the rohProfileTable using the value of rohContextProfile as second part of the index (and using the same rohChannelID as first part of the index)."

::= { rohContextEntry 4 }

rohContextDecompressorDepth OBJECT-TYPE

SYNTAX Unsigned32

MAX-ACCESS read-only

STATUS current

DESCRIPTION

"This object indicates whether reverse decompression, for example as described in RFC 3095, Section 6.1, is used on this channel or not, and if used, to what extent."

Its value is only valid for decompressor contexts, i.e., if `rohInstanceType` has the value `decompressor(2)`. For compressor contexts where `rohInstanceType` has the value `compressor(1)`, the value of this object is irrelevant and MUST be set to zero (0).

The value of the reverse decompression depth indicates the maximum number of packets that are buffered, and thus possibly be reverse decompressed by the decompressor. A zero (0) value means that reverse decompression is not used."

::= { rohContextEntry 5 }

rohContextStorageTime OBJECT-TYPE

SYNTAX TimeInterval

UNITS "centi-seconds"

MAX-ACCESS read-write

STATUS current

DESCRIPTION

"The value of this object specifies how long this row can exist in the `rohContextTable` after the `rohContextCIDState` switched to `expired(3)` or `terminated(4)`. This object returns the remaining time that the row may exist before it is aged out. The object is initialized with the value of the associated `rohContextStorageTime` object. After expiration or termination of the context, the value of this object ticks backwards. The entry in the `rohContextTable` is destroyed when the value reaches 0.

The value of this object may be set in order to increase or reduce the remaining time that the row may exist. Setting the value to 0 will destroy this entry as soon as the `rohContextCIDState` has the value `expired(3)` or `terminated(4)`.

Note that there is no guarantee that the row is stored as long as this object indicates. In case of limited CID space, the instance may re-use a CID before the storage time of the corresponding row in `rohContextTable` reaches the value of 0. In this case the information stored in this row is not anymore available."

::= { rohContextEntry 6 }

rohContextActivationTime OBJECT-TYPE

SYNTAX DateAndTime

MAX-ACCESS read-only

STATUS current

DESCRIPTION

"The date and time when the context started to be able to compress packets or decompress packets, respectively.

The value '0000000000000000'H is returned if the context has not been activated yet."

DEFVAL { '0000000000000000'H }

::= { rohContextEntry 7 }

rohContextDeactivationTime OBJECT-TYPE

SYNTAX DateAndTime

MAX-ACCESS read-only

STATUS current

DESCRIPTION

"The date and time when the context stopped being able to compress packets or decompress packets, respectively, because it expired or was terminated for other reasons.

The value '0000000000000000'H is returned if the context has not been deactivated yet."

DEFVAL { '0000000000000000'H }

::= { rohContextEntry 8 }

rohContextPackets OBJECT-TYPE

SYNTAX Counter32

MAX-ACCESS read-only

STATUS current

DESCRIPTION

"The number of all packets passing this context.

Discontinuities in the value of this counter can occur at re-initialization of the management system, and at other times as indicated by the value of ifCounterDiscontinuityTime. For checking ifCounterDiscontinuityTime, the interface index is required. It can be determined by reading the rohChannelTable."

::= { rohContextEntry 9 }

rohContextIRs OBJECT-TYPE

SYNTAX Counter32

MAX-ACCESS read-only

STATUS current

DESCRIPTION

"The number of all IR packets sent or received, respectively, by this context.

Discontinuities in the value of this counter can occur at re-initialization of the management system, and at other times as indicated by the

value of ifCounterDiscontinuityTime. For checking ifCounterDiscontinuityTime, the interface index is required. It can be determined by reading the rohChannelTable."

REFERENCE

"RFC 3095, Section 5.7.7.1"

::= { rohContextEntry 10 }

rohContextIRDYNs OBJECT-TYPE

SYNTAX Counter32

MAX-ACCESS read-only

STATUS current

DESCRIPTION

"The number of all IR-DYN packets sent or received, respectively, by this context.

Discontinuities in the value of this counter can occur at re-initialization of the management system, and at other times as indicated by the value of ifCounterDiscontinuityTime. For checking ifCounterDiscontinuityTime, the interface index is required. It can be determined by reading the rohChannelTable."

REFERENCE

"RFC 3095, Section 5.7.7.2"

::= { rohContextEntry 11 }

rohContextFeedbacks OBJECT-TYPE

SYNTAX Counter32

MAX-ACCESS read-only

STATUS current

DESCRIPTION

"The number of all feedbacks sent or received, respectively, by this context.

Discontinuities in the value of this counter can occur at re-initialization of the management system, and at other times as indicated by the value of ifCounterDiscontinuityTime. For checking ifCounterDiscontinuityTime, the interface index is required. It can be determined by reading the rohChannelTable."

::= { rohContextEntry 12 }

rohContextDecompressorFailures OBJECT-TYPE

SYNTAX Counter32

MAX-ACCESS read-only

STATUS current

DESCRIPTION

"The number of all decompressor failures so far in this context. The number is only valid for decompressor contexts, i.e., if rohcInstanceType has the value decompressor(2).

Discontinuities in the value of this counter can occur at re-initialization of the management system, and at other times as indicated by the value of ifCounterDiscontinuityTime. For checking ifCounterDiscontinuityTime, the interface index is required. It can be determined by reading the rohcChannelTable."

::= { rohcContextEntry 13 }

rohcContextDecompressorRepairs OBJECT-TYPE

SYNTAX Counter32

MAX-ACCESS read-only

STATUS current

DESCRIPTION

"The number of all context repairs so far in this context. The number is only valid for decompressor contexts, i.e., if rohcInstanceType has the value decompressor(2).

Discontinuities in the value of this counter can occur at re-initialization of the management system, and at other times as indicated by the value of ifCounterDiscontinuityTime. For checking ifCounterDiscontinuityTime, the interface index is required. It can be determined by reading the rohcChannelTable."

::= { rohcContextEntry 14 }

rohcContextAllPacketsRatio OBJECT-TYPE

SYNTAX RohcCompressionRatio

MAX-ACCESS read-only

STATUS current

DESCRIPTION

"This object indicates the compression ratio so far over all packets passing this context. The compression is computed over all bytes of the IP packets including the IP header but excluding all lower layer headers."

::= { rohcContextEntry 15 }

rohcContextAllHeadersRatio OBJECT-TYPE

SYNTAX RohcCompressionRatio

MAX-ACCESS read-only

STATUS current

DESCRIPTION

"This object indicates the compression ratio so far over all packet headers passing this context. The compression is computed over all bytes of all headers that are subject to compression for the used profile."

::= { rohContextEntry 16 }

rohContextAllPacketsMeanSize OBJECT-TYPE

SYNTAX Unsigned32

MAX-ACCESS read-only

STATUS current

DESCRIPTION

"This object indicates the mean compressed packet size of all packets passing this context. The packet size includes the IP header and payload but excludes all lower layer headers. The mean value is given in byte rounded to the next integer value."

::= { rohContextEntry 17 }

rohContextAllHeadersMeanSize OBJECT-TYPE

SYNTAX Unsigned32

MAX-ACCESS read-only

STATUS current

DESCRIPTION

"This object indicates the mean compressed packet header size of all packets passing this context. The packet header size is the sum of the size of all headers of a packet that are subject to compression for the used profile. The mean value is given in byte rounded to the next integer value."

::= { rohContextEntry 18 }

rohContextLastPacketsRatio OBJECT-TYPE

SYNTAX RohcCompressionRatio

MAX-ACCESS read-only

STATUS current

DESCRIPTION

"This object indicates the compression ratio concerning the last 16 packets passing this context or concerning all packets passing this context if they are less than 16, so far. The compression is computed over all bytes of the IP packets including the IP header but excluding all lower layer headers."

::= { rohContextEntry 19 }

rohContextLastHeadersRatio OBJECT-TYPE

SYNTAX RohcCompressionRatio

MAX-ACCESS read-only

STATUS current

DESCRIPTION

"This object indicates the compression ratio concerning the headers of the last 16 packets passing this context or concerning the headers of all packets passing this context if they are less than 16, so far. The compression is computed over all bytes of all headers that are subject to compression for the used profile."

::= { rohContextEntry 20 }

rohContextLastPacketsMeanSize OBJECT-TYPE

SYNTAX Unsigned32

MAX-ACCESS read-only

STATUS current

DESCRIPTION

"This object indicates the mean compressed packet size concerning the last 16 packets passing this context or concerning all packets passing this context if they are less than 16, so far. The packet size includes the IP header and payload but excludes all lower layer headers. The mean value is given in byte rounded to the next integer value."

::= { rohContextEntry 21 }

rohContextLastHeadersMeanSize OBJECT-TYPE

SYNTAX Unsigned32

MAX-ACCESS read-only

STATUS current

DESCRIPTION

"This object indicates the mean compressed packet header size concerning the last 16 packets passing this context or concerning all packets passing this context if they are less than 16, so far. The packet header size is the sum of the size of all headers of a packet that are subject to compression for the used profile. The mean value is given in byte rounded to the next integer value."

::= { rohContextEntry 22 }

--

-- conformance information

--

rohCompliances OBJECT IDENTIFIER ::= { rohConformance 1 }

rohGroups OBJECT IDENTIFIER ::= { rohConformance 2 }

--

-- compliance statements

--

```
rohCompliance MODULE-COMPLIANCE
    STATUS      current
    DESCRIPTION
        "The compliance statement for SNMP entities that implement
        the ROHC-MIB.

        Note that compliance with this compliance
        statement requires compliance with the
        ifCompliance3 MODULE-COMPLIANCE statement of the
        IF-MIB (RFC2863)."
```

```
MODULE      -- this module
MANDATORY-GROUPS {
    rohInstanceGroup, rohContextGroup
}
GROUP      rohStatisticsGroup
DESCRIPTION
    "A compliant implementation does not have to implement
    the rohStatisticsGroup."
GROUP      rohTimerGroup
DESCRIPTION
    "A compliant implementation does not have to implement
    the rohTimerGroup."
OBJECT     rohInstanceContextStorageTime
MIN-ACCESS read-only
DESCRIPTION
    "A compliant implementation does not have to support changing
    the value of object rohInstanceContextStorageTime."
OBJECT     rohContextStorageTime
MIN-ACCESS read-only
DESCRIPTION
    "A compliant implementation does not have to support changing
    the value of object rohContextStorageTime."
GROUP      rohContextStatisticsGroup
DESCRIPTION
    "A compliant implementation does not have to implement
    the rohContextStatisticsGroup."
 ::= { rohCompliances 1 }
```

```
rohInstanceGroup OBJECT-GROUP
    OBJECTS {
        rohChannelType,
        rohChannelFeedbackFor,
        rohChannelDescr,
        rohChannelStatus,
        rohInstanceFBChannelID,
        rohInstanceVendor,
```

```

        rohcInstanceVersion,
        rohcInstanceDescr,
        rohcInstanceClockRes,
        rohcInstanceMaxCID,
        rohcInstanceLargeCIDs,
        rohcInstanceMRRU,
        rohcInstanceStatus,
        rohcProfileVendor,
        rohcProfileVersion,
        rohcProfileDescr,
        rohcProfileNegotiated
    }
    STATUS          current
    DESCRIPTION
        "A collection of objects providing information about
        ROHC instances, used channels and available profiles."
    ::= { rohcGroups 2 }

rohcStatisticsGroup OBJECT-GROUP
    OBJECTS {
        rohcInstanceContextsTotal,
        rohcInstanceContextsCurrent,
        rohcInstancePackets,
        rohcInstanceIRs,
        rohcInstanceIRDYNs,
        rohcInstanceFeedbacks,
        rohcInstanceCompressionRatio
    }
    STATUS          current
    DESCRIPTION
        "A collection of objects providing ROHC statistics."
    ::= { rohcGroups 4 }

rohcContextGroup OBJECT-GROUP
    OBJECTS {
        rohcContextCIDState,
        rohcContextProfile,
        rohcContextDecompressorDepth
    }
    STATUS          current
    DESCRIPTION
        "A collection of objects providing information about
        ROHC compressor contexts and decompressor contexts."
    ::= { rohcGroups 5 }

rohcTimerGroup OBJECT-GROUP
    OBJECTS {
        rohcInstanceContextStorageTime,

```

```

        rohcContextStorageTime,
        rohcContextActivationTime,
        rohcContextDeactivationTime
    }
    STATUS          current
    DESCRIPTION
        "A collection of objects providing statistical information
         about ROHC compressor contexts and decompressor contexts."
    ::= { rohcGroups 6 }

rohcContextStatisticsGroup OBJECT-GROUP
    OBJECTS {
        rohcContextPackets,
        rohcContextIRs,
        rohcContextIRDYNs,
        rohcContextFeedbacks,
        rohcContextDecompressorFailures,
        rohcContextDecompressorRepairs,
        rohcContextAllPacketsRatio,
        rohcContextAllHeadersRatio,
        rohcContextAllPacketsMeanSize,
        rohcContextAllHeadersMeanSize,
        rohcContextLastPacketsRatio,
        rohcContextLastHeadersRatio,
        rohcContextLastPacketsMeanSize,
        rohcContextLastHeadersMeanSize
    }
    STATUS          current
    DESCRIPTION
        "A collection of objects providing statistical information
         about ROHC compressor contexts and decompressor contexts."
    ::= { rohcGroups 7 }

END

ROHC-UNCOMPRESSED-MIB DEFINITIONS ::= BEGIN

IMPORTS
    MODULE-IDENTITY, OBJECT-TYPE, Counter32, mib-2
        FROM SNMPv2-SMI -- [RFC2578]
    MODULE-COMPLIANCE, OBJECT-GROUP
        FROM SNMPv2-CONF -- [RFC2580]
    rohcChannelID, rohcContextCID
        FROM ROHC-MIB;

```

rohcUncmprMIB MODULE-IDENTITY

LAST-UPDATED "200406030000Z" -- June 3, 2004

ORGANIZATION "IETF Robust Header Compression Working Group"

CONTACT-INFO

"WG charter:

<http://www.ietf.org/html.charters/rohc-charter.html>

Mailing Lists:

General Discussion: rohc@ietf.orgTo Subscribe: rohc-request@ietf.orgIn Body: [subscribe your_email_address](#)

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DESCRIPTION

"This MIB module defines a set of objects for monitoring and configuring ROHC Header Compression (ROHC). The objects are specific to ROHC uncompressed (profile 0x0000).

Copyright (C) The Internet Society (2004). The initial version of this MIB module was published in RFC 3816. For full legal notices see the RFC itself or see:

<http://www.ietf.org/copyrights/ianamib.html>"

REVISION "200406030000Z" -- June 3, 2004

DESCRIPTION "Initial version, published as RFC 3816."

::= { mib-2 113 }

--

-- The groups defined within this MIB module:

--

rohcUncmprObjects OBJECT IDENTIFIER ::= { rohcUncmprMIB 1 }

rohcUncmprConformance OBJECT IDENTIFIER ::= { rohcUncmprMIB 2 }

--

-- Context Table

--

-- The rohcUncmprContextTable lists all contexts per interface

```
-- and instance.  It extends the rohcContextTable.
--
```

```
rohcUncmprContextTable OBJECT-TYPE
```

```
    SYNTAX      SEQUENCE OF RohcUncmprContextEntry
```

```
    MAX-ACCESS  not-accessible
```

```
    STATUS      current
```

```
    DESCRIPTION
```

```
        "This table lists and describes ROHC uncompressed profile
        specific properties of compressor contexts and
        decompressor contexts.  It extends the rohcContextTable
        of the ROHC-MIB module."
```

```
    ::= { rohcUncmprObjects 1 }
```

```
rohcUncmprContextEntry OBJECT-TYPE
```

```
    SYNTAX      RohcUncmprContextEntry
```

```
    MAX-ACCESS  not-accessible
```

```
    STATUS      current
```

```
    DESCRIPTION
```

```
        "An entry describing a particular context."
```

```
    INDEX {
```

```
        rohcChannelID,
```

```
        rohcContextCID
```

```
    }
```

```
    ::= { rohcUncmprContextTable 1 }
```

```
RohcUncmprContextEntry ::= SEQUENCE {
```

```
    rohcUncmprContextState      INTEGER,
```

```
    rohcUncmprContextMode      INTEGER,
```

```
    rohcUncmprContextACKs      Counter32
```

```
}
```

```
rohcUncmprContextState OBJECT-TYPE
```

```
    SYNTAX      INTEGER {
                        initAndRefresh(1),
                        normal(2),
                        noContext(3),
                        fullContext(4)
                    }
```

```
    MAX-ACCESS  read-only
```

```
    STATUS      current
```

```
    DESCRIPTION
```

```
        "State of the context. States initAndRefresh(1) and normal(2)
        are states of compressor contexts, states noContext(3)
        and fullContext(4) are states of decompressor contexts."
```

```
    REFERENCE
```

```
        "RFC 3095, Section 5.10.3"
```

```

        ::= { rohcUncmprContextEntry 3 }

rohcUncmprContextMode OBJECT-TYPE
    SYNTAX      INTEGER {
                        unidirectional(1),
                        bidirectional(2)
                    }
    MAX-ACCESS   read-only
    STATUS       current
    DESCRIPTION
        "Mode of the context."
    REFERENCE
        "RFC 3095, Section 5.10.3"
    ::= { rohcUncmprContextEntry 4 }

rohcUncmprContextACKs OBJECT-TYPE
    SYNTAX      Counter32
    MAX-ACCESS   read-only
    STATUS       current
    DESCRIPTION
        "The number of all positive feedbacks (ACK) sent or
         received in this context, respectively.

         Discontinuities in the value of this counter can
         occur at re-initialization of the management
         system, and at other times as indicated by the
         value of ifCounterDiscontinuityTime. For checking
         ifCounterDiscontinuityTime, the interface index is
         required. It can be determined by reading the
         rohcChannelTable of the ROHC-MIB."
    REFERENCE
        "RFC 3095, Section 5.2.1"
    ::= { rohcUncmprContextEntry 5 }

--
-- conformance information
--

rohcUncmprCompliances OBJECT IDENTIFIER
    ::= { rohcUncmprConformance 1 }
rohcUncmprGroups      OBJECT IDENTIFIER
    ::= { rohcUncmprConformance 2 }

--
-- compliance statements
--

rohcUncmprCompliance MODULE-COMPLIANCE

```

```

STATUS      current
DESCRIPTION
    "The compliance statement for SNMP entities that implement
    the ROHC-UNCOMPRESSED-MIB.

    Note that compliance with this compliance
    statement requires compliance with the
    rohcCompliance MODULE-COMPLIANCE statement of the
    ROHC-MIB and with the ifCompliance3 MODULE-COMPLIANCE
    statement of the IF-MIB (RFC2863)."
```

MODULE -- this module

```

MANDATORY-GROUPS {
    rohcUncmprContextGroup
}
GROUP      rohcUncmprStatisticsGroup
DESCRIPTION
    "A compliant implementation does not have to implement
    the rohcUncmprStatisticsGroup."
::= { rohcUncmprCompliances 1 }
```

rohcUncmprContextGroup OBJECT-GROUP

```

OBJECTS {
    rohcUncmprContextState,
    rohcUncmprContextMode
}
STATUS      current
DESCRIPTION
    "A collection of objects providing information about
    ROHC uncompressed compressors and decompressors."
::= { rohcUncmprGroups 1 }
```

rohcUncmprStatisticsGroup OBJECT-GROUP

```

OBJECTS {
    rohcUncmprContextACKs
}
STATUS      current
DESCRIPTION
    "An object providing context statistics."
::= { rohcUncmprGroups 2 }
```

END

ROHC-RTP-MIB DEFINITIONS ::= BEGIN

IMPORTS

```

    MODULE-IDENTITY, OBJECT-TYPE,
    Unsigned32, Counter32, mib-2
    FROM SNMPv2-SMI
```

-- [RFC2578]

```
TruthValue
    FROM SNMPv2-TC                                -- [RFC2579]

MODULE-COMPLIANCE, OBJECT-GROUP
    FROM SNMPv2-CONF                                -- [RFC2580]

rohcChannelID, rohcContextCID
    FROM ROHC-MIB;                                -- [RFC3816]

rohcRtpMIB MODULE-IDENTITY
    LAST-UPDATED "200406030000Z"  -- June 3, 2004
    ORGANIZATION "IETF Robust Header Compression Working Group"
    CONTACT-INFO
        "WG charter:
         http://www.ietf.org/html.charters/rohc-charter.html

        Mailing Lists:
        General Discussion: rohc@ietf.org
        To Subscribe: rohc-request@ietf.org
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        Germany
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DESCRIPTION
    "This MIB module defines a set of objects for monitoring
    and configuring RObust Header Compression (ROHC).
    The objects are specific to ROHC RTP (profile 0x0001),
    ROHC UDP (profile 0x0002), and ROHC ESP (profile 0x0003)
    defined in RFC 3095 and for the ROHC LLA profile (profile
    0x0005) defined in RFC 3242.

    Copyright (C) The Internet Society (2004). The
    initial version of this MIB module was published
    in RFC 3816. For full legal notices see the RFC
    itself or see:
    http://www.ietf.org/copyrights/ianamib.html"

REVISION      "200406030000Z"  -- June 3, 2004
DESCRIPTION   "Initial version, published as RFC 3816."
 ::= { mib-2 114 }
```

```

--
-- The groups defined within this MIB module:
--

rohcRtpObjects      OBJECT IDENTIFIER ::= { rohcRtpMIB 1 }
rohcRtpConformance  OBJECT IDENTIFIER ::= { rohcRtpMIB 2 }

--
-- Context Table
--
-- The rohcRtpContextTable lists all contexts per interface
-- and instance.  It extends the rohcContextTable.
--

rohcRtpContextTable OBJECT-TYPE
    SYNTAX      SEQUENCE OF RohcRtpContextEntry
    MAX-ACCESS   not-accessible
    STATUS       current
    DESCRIPTION
        "This table lists and describes RTP profile specific
        properties of compressor contexts and decompressor
        contexts.  It extends the rohcContextTable of the
        ROHC-MIB module."
    ::= { rohcRtpObjects 1 }

rohcRtpContextEntry OBJECT-TYPE
    SYNTAX      RohcRtpContextEntry
    MAX-ACCESS   not-accessible
    STATUS       current
    DESCRIPTION
        "An entry describing a particular context."
    INDEX {
        rohcChannelID,
        rohcContextCID
    }
    ::= { rohcRtpContextTable 1 }

RohcRtpContextEntry ::= SEQUENCE {
    rohcRtpContextState      INTEGER,
    rohcRtpContextMode       INTEGER,
    rohcRtpContextAlwaysPad  TruthValue,
    rohcRtpContextLargePktsAllowed TruthValue,
    rohcRtpContextVerifyPeriod Unsigned32,
    rohcRtpContextSizesAllowed Unsigned32,
    rohcRtpContextSizesUsed  Unsigned32,
    rohcRtpContextACKs       Counter32,
    rohcRtpContextNACKs      Counter32,
    rohcRtpContextSNACKs     Counter32,

```

```

    rohcRtpContextNHPS          Counter32,
    rohcRtpContextCSPs          Counter32,
    rohcRtpContextCCPs          Counter32,
    rohcRtpContextPktsLostPhysical Counter32,
    rohcRtpContextPktsLostPreLink Counter32
}

```

rohcRtpContextState OBJECT-TYPE

```

SYNTAX      INTEGER {
                initAndRefresh(1),
                firstOrder(2),
                secondOrder(3),
                noContext(4),
                staticContext(5),
                fullContext(6)
            }

```

MAX-ACCESS read-only

STATUS current

DESCRIPTION

"State of the context as defined in RFC 3095. States initAndRefresh(1), firstOrder(2), and secondOrder(3) are states of compressor contexts, states noContext(4), staticContext(5) and fullContext(6) are states of decompressor contexts."

REFERENCE

"RFC 3095"

::= { rohcRtpContextEntry 3 }

rohcRtpContextMode OBJECT-TYPE

```

SYNTAX      INTEGER {
                unidirectional(1),
                optimistic(2),
                reliable(3)
            }

```

MAX-ACCESS read-only

STATUS current

DESCRIPTION

"Mode of the context."

REFERENCE

"RFC 3095, Section 4.4"

::= { rohcRtpContextEntry 4 }

rohcRtpContextAlwaysPad OBJECT-TYPE

SYNTAX TruthValue

MAX-ACCESS read-only

STATUS current

DESCRIPTION

"Boolean, only applicable to compressor contexts using the

LLA profile. If its value is true, the compressor must pad every RHP packet with a minimum of one octet ROHC padding.

The value of this object is only valid for LLA profiles, i.e., if the corresponding rohcProfile has a value of 0x0005. If the corresponding rohcProfile has a value other than 0x0005, then this object MUST NOT be instantiated."

REFERENCE

"RFC 3242, Section 5.1.1"

DEFVAL { false }

::= { rohcRtpContextEntry 5 }

rohcRtpContextLargePktsAllowed OBJECT-TYPE

SYNTAX TruthValue

MAX-ACCESS read-only

STATUS current

DESCRIPTION

"Boolean, only applicable to compressor contexts using the LLA profile. It specifies how to handle packets that do not fit any of the preferred packet sizes specified. If its value is true, the compressor must deliver the larger packet as-is and must not use segmentation. If it is set to false, the ROHC segmentation scheme must be used to split the packet into two or more segments, and each segment must further be padded to fit one of the preferred packet sizes.

The value of this object is only valid for LLA profiles, i.e., if the corresponding rohcProfile has a value of 0x0005. If the corresponding rohcProfile has a value other than 0x0005, then this object MUST NOT be instantiated."

REFERENCE

"RFC 3242, Section 5.1.1"

DEFVAL { true }

::= { rohcRtpContextEntry 6 }

rohcRtpContextVerifyPeriod OBJECT-TYPE

SYNTAX Unsigned32

MAX-ACCESS read-only

STATUS current

DESCRIPTION

"This object is only applicable to compressor contexts using the LLA profile. It specifies the minimum frequency with which a packet validating the context must be sent. This tells the compressor that a packet containing a CRC

field must be sent at least once every N packets, where N is the value of the object. A value of 0 indicates that periodical verifications are disabled.

The value of this object is only valid for LLA profiles, i.e., if the corresponding rohcProfile has a value of 0x0005. If the corresponding rohcProfile has a value other than 0x0005, then this object MUST NOT be instantiated."

REFERENCE

"RFC 3242, Section 5.1.1"

DEFVAL { 0 }

::= { rohcRtpContextEntry 7 }

rohcRtpContextSizesAllowed OBJECT-TYPE

SYNTAX Unsigned32 (1..4294967295)

MAX-ACCESS read-only

STATUS current

DESCRIPTION

"The value of this object is only valid for decompressor contexts, i.e., if rohcInstanceType of the corresponding rohcContextEntry has the value decompressor(2). For compressor contexts where rohcInstanceType has the value compressor(1), this object MUST NOT be instantiated.

This object contains the number of different packet sizes that may be used in the context."

REFERENCE

"RFC 3095, Section 6.3.1"

::= { rohcRtpContextEntry 8 }

rohcRtpContextSizesUsed OBJECT-TYPE

SYNTAX Unsigned32 (1..4294967295)

MAX-ACCESS read-only

STATUS current

DESCRIPTION

"The value of this object is only valid for decompressor contexts, i.e., if rohcInstanceType of the corresponding rohcContextEntry has the value decompressor(2). For compressor contexts where rohcInstanceType has the value compressor(1), this object MUST NOT be instantiated.

This object contains the number of different packet sizes that are used in the context."

REFERENCE

"RFC 3095, Section 6.3.1"

::= { rohcRtpContextEntry 9 }

rohcRtpContextACKs OBJECT-TYPE

SYNTAX Counter32

MAX-ACCESS read-only

STATUS current

DESCRIPTION

"The number of all positive feedbacks (ACK) sent or received in this context, respectively.

Discontinuities in the value of this counter can occur at re-initialization of the management system, and at other times as indicated by the value of ifCounterDiscontinuityTime. For checking ifCounterDiscontinuityTime, the interface index is required. It can be determined by reading the rohcChannelTable of the ROHC-MIB."

REFERENCE

"RFC 3095, Section 5.2.1."

::= { rohcRtpContextEntry 10 }

rohcRtpContextNACKs OBJECT-TYPE

SYNTAX Counter32

MAX-ACCESS read-only

STATUS current

DESCRIPTION

"The number of all dynamic negative feedbacks (ACK) sent or received in this context, respectively.

Discontinuities in the value of this counter can occur at re-initialization of the management system, and at other times as indicated by the value of ifCounterDiscontinuityTime. For checking ifCounterDiscontinuityTime, the interface index is required. It can be determined by reading the rohcChannelTable of the ROHC-MIB."

REFERENCE

"RFC 3095, Section 5.2.1."

::= { rohcRtpContextEntry 11 }

rohcRtpContextSNACKs OBJECT-TYPE

SYNTAX Counter32

MAX-ACCESS read-only

STATUS current

DESCRIPTION

"The number of all static negative feedbacks (ACK) sent or received in this context, respectively.

Discontinuities in the value of this counter can occur at re-initialization of the management

system, and at other times as indicated by the value of ifCounterDiscontinuityTime. For checking ifCounterDiscontinuityTime, the interface index is required. It can be determined by reading the rohcChannelTable of the ROHC-MIB."

REFERENCE

"RFC 3095, Section 5.2.1."

::= { rohcRtpContextEntry 12 }

rohcRtpContextNHPs OBJECT-TYPE

SYNTAX Counter32

MAX-ACCESS read-only

STATUS current

DESCRIPTION

"This object is only applicable to contexts using the LLA profile. It contains the number of all no-header packets (NHP) sent or received in this context, respectively.

Discontinuities in the value of this counter can occur at re-initialization of the management system, and at other times as indicated by the value of ifCounterDiscontinuityTime. For checking ifCounterDiscontinuityTime, the interface index is required. It can be determined by reading the rohcChannelTable of the ROHC-MIB.

The value of this object is only valid for LLA profiles, i.e., if the corresponding rohcProfile has a value of 0x0005. If the corresponding rohcProfile has a value other than 0x0005, then this object MUST NOT be instantiated."

REFERENCE

"RFC 3242, Section 4.1.1."

::= { rohcRtpContextEntry 13 }

rohcRtpContextCSPs OBJECT-TYPE

SYNTAX Counter32

MAX-ACCESS read-only

STATUS current

DESCRIPTION

"This object is only applicable to contexts using the LLA profile. It contains the number of all context synchronization packets (CSP) sent or received in this context, respectively.

Discontinuities in the value of this counter can occur at re-initialization of the management

system, and at other times as indicated by the value of ifCounterDiscontinuityTime. For checking ifCounterDiscontinuityTime, the interface index is required. It can be determined by reading the rohcChannelTable of the ROHC-MIB.

The value of this object is only valid for LLA profiles, i.e., if the corresponding rohcProfile has a value of 0x0005. If the corresponding rohcProfile has a value other than 0x0005, then this object MUST NOT be instantiated."

REFERENCE

"RFC 3242, Section 4.1.2."

::= { rohcRtpContextEntry 14 }

rohcRtpContextCCPs OBJECT-TYPE

SYNTAX Counter32

MAX-ACCESS read-only

STATUS current

DESCRIPTION

"This object is only applicable to contexts using the LLA profile. It contains the number of all context check packets (CCP) sent or received in this context, respectively.

Discontinuities in the value of this counter can occur at re-initialization of the management system, and at other times as indicated by the value of ifCounterDiscontinuityTime. For checking ifCounterDiscontinuityTime, the interface index is required. It can be determined by reading the rohcChannelTable of the ROHC-MIB.

The value of this object is only valid for LLA profiles, i.e., if the corresponding rohcProfile has a value of 0x0005. If the corresponding rohcProfile has a value other than 0x0005, then this object MUST NOT be instantiated."

REFERENCE

"RFC 3242, Section 4.1.3."

::= { rohcRtpContextEntry 15 }

rohcRtpContextPktsLostPhysical OBJECT-TYPE

SYNTAX Counter32

MAX-ACCESS read-only

STATUS current

DESCRIPTION

"This object is only applicable to decompressor contexts

using the LLA profile. It contains the number of physical packet losses on the link between compressor and decompressor, that have been indicated to the decompressor.

Discontinuities in the value of this counter can occur at re-initialization of the management system, and at other times as indicated by the value of ifCounterDiscontinuityTime. For checking ifCounterDiscontinuityTime, the interface index is required. It can be determined by reading the rohcChannelTable of the ROHC-MIB.

The value of this object is only valid for LLA profiles, i.e., if the corresponding rohcProfile has a value of 0x0005. If the corresponding rohcProfile has a value other than 0x0005, then this object MUST NOT be instantiated."

REFERENCE

"RFC 3242, Section 5.1.2."

::= { rohcRtpContextEntry 16 }

rohcRtpContextPktsLostPreLink OBJECT-TYPE

SYNTAX Counter32

MAX-ACCESS read-only

STATUS current

DESCRIPTION

"This object is only applicable to decompressor contexts using the LLA profile. It contains the number of pre-link packet losses on the link between compressor and decompressor, that have been indicated to the decompressor.

Discontinuities in the value of this counter can occur at re-initialization of the management system, and at other times as indicated by the value of ifCounterDiscontinuityTime. For checking ifCounterDiscontinuityTime, the interface index is required. It can be determined by reading the rohcChannelTable of the ROHC-MIB.

The value of this object is only valid for LLA profiles, i.e., if the corresponding rohcProfile has a value of 0x0005. If the corresponding rohcProfile has a value other than 0x0005, then this object MUST NOT be instantiated."

REFERENCE

"RFC 3242, Section 5.1.2."

::= { rohcRtpContextEntry 17 }

```

--
-- Packet Sizes Table
--
-- The rohcPacketSizeTable lists allowed, preferred, and used
-- packet sizes per compressor context.

rohcRtpPacketSizeTable OBJECT-TYPE
    SYNTAX      SEQUENCE OF RohcRtpPacketSizeEntry
    MAX-ACCESS  not-accessible
    STATUS      current
    DESCRIPTION
        "This table lists all allowed, preferred, and used packet
        sizes per compressor context and channel.

        Note, that the sizes table represents implementation
        parameters that are suggested by RFC 3095 and/or RFC 3242,
        but that are not mandatory."
    ::= { rohcRtpObjects 2 }

rohcRtpPacketSizeEntry OBJECT-TYPE
    SYNTAX      RohcRtpPacketSizeEntry
    MAX-ACCESS  not-accessible
    STATUS      current
    DESCRIPTION
        "An entry of a particular packet size."
    INDEX {
        rohcChannelID,
        rohcContextCID,
        rohcRtpPacketSize
    }
    ::= { rohcRtpPacketSizeTable 1 }

RohcRtpPacketSizeEntry ::= SEQUENCE {
    rohcRtpPacketSize      Unsigned32,
    rohcRtpPacketSizePreferred TruthValue,
    rohcRtpPacketSizeUsed   TruthValue,
    rohcRtpPacketSizeRestrictedType INTEGER
}

rohcRtpPacketSize OBJECT-TYPE
    SYNTAX      Unsigned32 (1..4294967295)
    MAX-ACCESS  not-accessible
    STATUS      current
    DESCRIPTION
        "A packet size used as index."
    ::= { rohcRtpPacketSizeEntry 3 }

rohcRtpPacketSizePreferred OBJECT-TYPE

```

SYNTAX TruthValue
 MAX-ACCESS read-only
 STATUS current
 DESCRIPTION

"This object is only applicable to compressor contexts using the LLA profile. When retrieved, it will have the value true(1) if the packet size is preferred. Otherwise, its value will be false(2).

The value of this object is only valid for LLA profiles, i.e., if the corresponding rohcProfile has a value of 0x0005. If the corresponding rohcProfile has a value other than 0x0005, then this object MUST NOT be instantiated."

REFERENCE

"RFC 3242, Section 5.1.1"

::= { rohcRtpPacketSizeEntry 4 }

rohcRtpPacketSizeUsed OBJECT-TYPE

SYNTAX TruthValue
 MAX-ACCESS read-only
 STATUS current
 DESCRIPTION

"This object is only applicable to compressor contexts using the UDP, RTP, or ESP profile. When retrieved, it will have the value true(1) if the packet size is used. Otherwise, its value will be false(2).

The value of this object is only valid for UDP, RTP, and ESP profiles, i.e., if the corresponding rohcProfile has a value of either 0x0001, 0x0002 or 0x0003. If the corresponding rohcProfile has a value other than 0x0001, 0x0002 or 0x0003, then this object MUST NOT be instantiated."

REFERENCE

"RFC 3095, Section 6.3.1"

::= { rohcRtpPacketSizeEntry 5 }

rohcRtpPacketSizeRestrictedType OBJECT-TYPE

SYNTAX INTEGER {
 nhpOnly(1),
 rhpOnly(2),
 noRestrictions(3)
 }
 MAX-ACCESS read-only
 STATUS current
 DESCRIPTION

"This object is only applicable to preferred packet

sizes of compressor contexts using the LLA profile. When retrieved, it will indicate whether the packet size is preferred for NHP only, for RHP only, or for both of them.

The value of this object is only valid for LLA profiles, i.e., if the corresponding rohcProfile has a value of 0x0005. If the corresponding rohcProfile has a value other than 0x0005, then this object MUST NOT be instantiated."

REFERENCE

"RFC 3242, Section 5.1.1"

::= { rohcRtpPacketSizeEntry 6 }

--

-- conformance information

--

rohcRtpCompliances OBJECT IDENTIFIER ::= { rohcRtpConformance 1 }
rohcRtpGroups OBJECT IDENTIFIER ::= { rohcRtpConformance 2 }

--

-- compliance statements

--

rohcRtpCompliance MODULE-COMPLIANCE

STATUS current

DESCRIPTION

"The compliance statement for SNMP entities that implement the ROHC-RTP-MIB.

Note that compliance with this compliance statement requires compliance with the rohcCompliance MODULE-COMPLIANCE statement of the ROHC-MIB and with the ifCompliance3 MODULE-COMPLIANCE statement of the IF-MIB (RFC2863)."

MODULE -- this module

MANDATORY-GROUPS {
 rohcRtpContextGroup

}

GROUP rohcRtpPacketSizesGroup

DESCRIPTION

"A compliant implementation does not have to implement the rohcRtpPacketSizesGroup."

GROUP rohcRtpStatisticsGroup

DESCRIPTION

"A compliant implementation does not have to implement the rohcRtpStatisticsGroup."

::= { rohcRtpCompliances 1 }

```
rohcRtpContextGroup OBJECT-GROUP
    OBJECTS {
        rohcRtpContextState,
        rohcRtpContextMode,
        rohcRtpContextAlwaysPad,
        rohcRtpContextLargePktsAllowed,
        rohcRtpContextVerifyPeriod
    }
    STATUS      current
    DESCRIPTION
        "A collection of objects providing information about
        ROHC RTP compressors and decompressors."
    ::= { rohcRtpGroups 1 }

rohcRtpPacketSizesGroup OBJECT-GROUP
    OBJECTS {
        rohcRtpContextSizesAllowed,
        rohcRtpContextSizesUsed,
        rohcRtpPacketSizePreferred,
        rohcRtpPacketSizeUsed,
        rohcRtpPacketSizeRestrictedType
    }
    STATUS      current
    DESCRIPTION
        "A collection of objects providing information about
        allowed and used packet sizes at a ROHC RTP compressor."
    ::= { rohcRtpGroups 2 }

rohcRtpStatisticsGroup OBJECT-GROUP
    OBJECTS {
        rohcRtpContextACKs,
        rohcRtpContextNACKs,
        rohcRtpContextSNACKs,
        rohcRtpContextNHPS,
        rohcRtpContextCSPs,
        rohcRtpContextCCPs,
        rohcRtpContextPktsLostPhysical,
        rohcRtpContextPktsLostPreLink
    }
    STATUS      current
    DESCRIPTION
        "A collection of objects providing ROHC compressor and
        decompressor statistics."
    ::= { rohcRtpGroups 3 }

END
```

6. Security Considerations

The managed objects defined by the ROHC-MIB module, the ROHC-UNCOMPRESSED-MIB module and the ROHC-RTP-MIB module do not have a MAX-ACCESS value of read-write and/or read-create except `rohcInstanceContextStorageTime` and `rohcContextStorageTime`, both of which have a MAX-ACCESS value of read-write. These objects determine how long context information is stored after its termination. Unauthorized access to these objects can have one of two negative effects. If they are set to a value lower than required, e.g., to zero, then context information about past contexts might get lost. If they are set to a very high value, then context information will not be deleted and memory consumption of the agent implementation might become very high. However, unauthorized access to these objects cannot cause harm to existing ROHC connections nor can it allow manipulation of running instances of ROHC in a malicious way.

Another security issue is unauthorized access to readable objects in the MIB modules for getting information about existing communication sessions. It is thus important to control even GET and/or NOTIFY access to these objects and possibly to even encrypt the values of these objects when sending them over the network via SNMP. However, the only information that might be disclosed is the use of channels. Users and their addresses are not visible in the MIB. This information can only be mis-used in conjunction with the mis-use of further information.

SNMP versions prior to SNMPv3 did not include adequate security. Even if the network itself is secure (for example by using IPsec), even then, there is no control as to who on the secure network is allowed to access and GET/SET (read/change/create/delete) the objects in this MIB module.

It is RECOMMENDED that implementers consider the security features as provided by the SNMPv3 framework (see [RFC3410], section 8), including full support for the SNMPv3 cryptographic mechanisms (for authentication and privacy).

Further, deployment of SNMP versions prior to SNMPv3 is NOT RECOMMENDED. Instead, it is RECOMMENDED to deploy SNMPv3 and to enable cryptographic security. It is then a customer/operator responsibility to ensure that the SNMP entity giving access to an instance of this MIB module is properly configured to give access to the objects only to those principals (users) that have legitimate rights to indeed GET or SET (change/create/delete) them.

7. Acknowledgements

Many thanks to Lars-Erik Jonsson and Mark West for their guidance through the ROHC world and to Ghyslain Pelletier for explaining how the ROHC LLA profile works. Further thanks to Frank Strauss for his advice on tricky SMI issues. Special thanks to Mike Heard who acted as MIB doctor. He studied every tiny detail, raised a long list of issues and helped to significantly improve this document.

8. References

8.1. Normative References

- [RFC2578] McCloghrie, K., Perkins, D., and J. Schoenwaelder, "Structure of Management Information Version 2 (SMIv2)", STD 58, RFC 2578, April 1999.
- [RFC2579] McCloghrie, K., Perkins, D., and J. Schoenwaelder, "Textual Conventions for SMIv2", STD 58, RFC 2579, April 1999.
- [RFC2580] McCloghrie, K., Perkins, D., and J. Schoenwaelder, "Conformance Statements for SMIv2", STD 58, RFC 2580, April 1999.
- [RFC2863] McCloghrie, K. and F. Kastenholz, "The Interfaces Group MIB", RFC 2863, June 2000.
- [RFC3095] Bormann, C., Burmeister, C., Degermark, M., Fukushima, H., Hannu, H., Jonsson, L., Hakenberg, R., Koren, T., Le, K., Liu, Z., Martensson, A., Miyazaki, A., Svanbro, K., Wiebke, T., Yoshimura, T., and H. Zheng, "RObust Header Compression (ROHC): Framework and four profiles: RTP, UDP, ESP, and uncompressed", RFC 3095, July 2001.
- [RFC3242] Jonsson, L. and G. Pelletier, "RObust Header Compression (ROHC): A Link-Layer Assisted Profile for IP/UDP/RTP", RFC 3242, April 2002.
- [RFC3411] Harrington, D., Presuhn, R., and B. Wijnen, "An Architecture for Describing Simple Network Management Protocol (SNMP) Management Frameworks", STD 62, RFC 3411, December 2002.
- [RFC3759] Jonsson, L., "RObust Header Compression (ROHC): Terminology and Channel Mapping Examples", RFC 3759, April 2004.

8.2. Informative References

[RFC3410] Case, J., Mundy, R., Partain, D., and B. Stewart,
"Introduction and Applicability Statements for Internet-
Standard Management Framework", RFC 3410, December 2002.

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