

Remote Network Monitoring Management Information Base for High
Capacity Networks

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.

Copyright Notice

Copyright (C) The Internet Society (2002). All Rights Reserved.

Abstract

This memo defines a portion of the Management Information Base (MIB) for use with network management protocols in TCP/IP-based internets. In particular, it defines objects for managing remote network monitoring (RMON) devices for use on high speed networks. This document contains a MIB Module that defines these new objects and also contains definitions of some updated objects from the RMON-MIB in RFC 2819 and the RMON2-MIB in RFC 2021.

Table of Contents

1	The SNMP Management Framework	2
2	Overview	3
2.1	Structure of MIB	3
3	Updates to RMON MIB and RMON2 MIB objects	4
4	Conventions	6
5	Definitions	7
6	Security Considerations	73
7	Acknowledgments	73
8	References	73
9	Notices	75
10	Author's Address.....	76
11	Full Copyright Statement.....	77

1. The SNMP Management Framework

The SNMP Management Framework presently consists of five major components:

- o An overall architecture, described in RFC 2571 [1].
- o Mechanisms for describing and naming objects and events for the purpose of management. The first version of this Structure of Management Information (SMI) is called SMIV1 and described in STD 16, RFC 1155 [2], STD 16, RFC 1212 [3], and RFC 1215 [4]. The second version, called SMIV2, is described in STD 58, RFC 2578 [5], RFC 2579 [6], and RFC 2580 [7].
- o Message protocols for transferring management information. The first version of the SNMP message protocol is called SNMPv1 and is described in STD 15, RFC 1157 [8]. A second version of the SNMP message protocol, which is not an Internet standards track protocol, is called SNMPv2c and is described in RFC 1901 [9], and RFC 1906 [10]. The third version of the message protocol is called SNMPv3 and is described in RFC 1906 [10], RFC 2572 [11], and RFC 2574 [12].
- o Protocol operations for accessing management information. The first set of protocol operations and associated PDU formats is described in STD 15, RFC 1157 [8]. A second set of protocol operations and associated PDU formats is described in RFC 1905 [13].
- o A set of fundamental applications described in RFC 2573 [14] and the view-based access control mechanism described in RFC 2575 [15].

A more detailed introduction to the current SNMP Management Framework can be found in RFC 2570 [22].

Managed objects are accessed via a virtual information store, termed the Management Information Base or MIB. Objects in the MIB are defined using the mechanisms defined in the SMI.

This memo specifies a MIB module that is compliant to the SMIV2. A MIB conforming to the SMIV1 can be produced through the appropriate translations. The resulting translated MIB must be semantically equivalent, except where objects or events are omitted because no translation is possible (use of Counter64). Some machine readable information in SMIV2 will be converted into textual descriptions in

SMIv1 during the translation process. However, this loss of machine readable information is not considered to change the semantics of the MIB.

2. Overview

This document continues the architecture created in the RMON MIB [RFC 2819] by supporting high speed networks.

Remote network monitoring devices, often called monitors or probes, are instruments that exist for the purpose of managing a network. Often these remote probes are stand-alone devices and devote significant internal resources for the sole purpose of managing a network. An organization may employ many of these devices, one per network segment, to manage its internet. In addition, these devices may be used for a network management service provider to access a client network, often geographically remote.

The objects defined in this document are intended as an interface between an RMON agent and an RMON management application and are not intended for direct manipulation by humans. While some users may tolerate the direct display of some of these objects, few will tolerate the complexity of manually manipulating objects to accomplish row creation. These functions should be handled by the management application.

2.1 Structure of MIB

Except for the mediaIndependentTable, each of the tables in this MIB adds high capacity capability to an associated table in the RMON-1 MIB or RMON-2 MIB.

The objects are arranged into the following groups:

- mediaIndependentGroup
- etherStatsHighCapacityGroup
- etherHistoryHighCapacityGroup
- hostHighCapacityGroup
- hostTopNHighCapacityGroup
- matrixHighCapacityGroup
- captureBufferHighCapacityGroup

- protocolDistributionHighCapacityGroup
- nlHostHighCapacityGroup
- nlMatrixHighCapacityGroup
- nlMatrixTopNHighCapacityGroup
- alHostHighCapacityGroup
- alMatrixHighCapacityGroup
- alMatrixTopNHighCapacityGroup
- usrHistoryHighCapacityGroup

These groups are the basic units of conformance. If a remote monitoring device implements a group, then it must implement all objects in that group. For example, a managed agent that implements the network layer matrix group must implement the nlMatrixSDHighCapacityTable and the nlMatrixDSHighCapacityTable.

Implementations of this MIB must also implement the system and interfaces group of MIB-II [16,17]. MIB-II may also mandate the implementation of additional groups.

These groups are defined to provide a means of assigning object identifiers, and to provide a method for agent implementors to know which objects they must implement.

3. Updates to RMON MIB and RMON2 MIB objects

This document extends the enumerations in the following objects from the RMON MIB [18] and the RMON2 MIB [20].

From the RMON MIB:

hostTopNRateBase OBJECT-TYPE

```
SYNTAX      INTEGER {
    hostTopNInPkts(1),
    hostTopNOutPkts(2),
    hostTopNInOctets(3),
    hostTopNOutOctets(4),
    hostTopNOutErrors(5),
    hostTopNOutBroadcastPkts(6),
    hostTopNOutMulticastPkts(7),
    hostTopNHCIInPkts(8),
    hostTopNHCOOutPkts(9),
```

```

        hostTopNHCInOctets(10),
        hostTopNHCOutOctets(11)
    }
MAX-ACCESS read-create
STATUS current
DESCRIPTION
    "The variable for each host that the hostTopNRate
    variable is based upon, as well as a control
    for the table that the results will be reported in.

    This object may not be modified if the associated
    hostTopNStatus object is equal to valid(1).

    If this value is less than or equal to 7, when the report
    is prepared, entries are created in the hostTopNTable
    associated with this object.
    If this value is greater than or equal to 8, when the report
    is prepared, entries are created in the
    hostTopNHHighCapacityTable associated with this object."
 ::= { hostTopNControlEntry 3 }

```

From the RMON2 MIB:

```

nlMatrixTopNControlRateBase OBJECT-TYPE
    SYNTAX      INTEGER {
        nlMatrixTopNPkts(1),
        nlMatrixTopNOctets(2),
        nlMatrixTopNHHighCapacityPkts(3),
        nlMatrixTopNHHighCapacityOctets(4)
    }
MAX-ACCESS read-create
STATUS current
DESCRIPTION
    "The variable for each nlMatrix[SD/DS] entry that the
    nlMatrixTopNEntries are sorted by, as well as a control
    for the table that the results will be reported in.

    This object may not be modified if the associated
    nlMatrixTopNControlStatus object is equal to active(1).

    If this value is less than or equal to 2, when the report
    is prepared, entries are created in the nlMatrixTopNTable
    associated with this object.
    If this value is greater than or equal to 3, when the report
    is prepared, entries are created in the
    nlMatrixTopNHHighCapacityTable associated with this object."
 ::= { nlMatrixTopNControlEntry 3 }

```

From the RMON2 MIB:

alMatrixTopNControlRateBase OBJECT-TYPE

```
SYNTAX      INTEGER {
                alMatrixTopNTerminalsPkts(1),
                alMatrixTopNTerminalsOctets(2),
                alMatrixTopNAllPkts(3),
                alMatrixTopNAllOctets(4),
                alMatrixTopNTerminalsHighCapacityPkts(5),
                alMatrixTopNTerminalsHighCapacityOctets(6),
                alMatrixTopNAllHighCapacityPkts(7),
                alMatrixTopNAllHighCapacityOctets(8)
            }
```

MAX-ACCESS read-create

STATUS current

DESCRIPTION

"The variable for each alMatrix[SD/DS] entry that the alMatrixTopNEntries are sorted by, as well as the selector of the view of the matrix table that will be used, as well as a control for the table that the results will be reported in.

The values alMatrixTopNTerminalsPkts, alMatrixTopNTerminalsOctets, alMatrixTopNTerminalsHighCapacityPkts, and alMatrixTopNTerminalsHighCapacityOctets cause collection only from protocols that have no child protocols that are counted. The values alMatrixTopNAllPkts, alMatrixTopNAllOctets, alMatrixTopNAllHighCapacityPkts, and alMatrixTopNAllHighCapacityOctets cause collection from all alMatrix entries.

This object may not be modified if the associated alMatrixTopNControlStatus object is equal to active(1)."

```
::= { alMatrixTopNControlEntry 3 }
```

For convenience, updated MIB modules containing these objects may be found at:

```
ftp://ftp.rfc-editor.org/in-notes/mibs/current.mibs/rmon.mib
ftp://ftp.rfc-editor.org/in-notes/mibs/current.mibs/rmon2.mib
```

4. Conventions

The following conventions are used throughout the RMON MIB and its companion documents.

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

Good Packets

Good packets are error-free packets that have a valid frame length. For example, on Ethernet, good packets are error-free packets that are between 64 octets long and 1518 octets long. They follow the form defined in IEEE 802.3 section 3.2.all. Implementors are urged to consult the appropriate media-specific specifications.

Bad Packets

Bad packets are packets that have proper framing and are therefore recognized as packets, but contain errors within the packet or have an invalid length. For example, on Ethernet, bad packets have a valid preamble and SFD (Start of Frame Delimiter), but have a bad FCS (Frame Check Sequence), or are either shorter than 64 octets or longer than 1518 octets. Implementors are urged to consult the appropriate media-specific specifications.

5. Definitions

HC-RMON-MIB DEFINITIONS ::= BEGIN

IMPORTS

MODULE-IDENTITY, OBJECT-TYPE, Counter32, Integer32,

Gauge32, Counter64 FROM SNMPv2-SMI

RowStatus, TimeStamp FROM SNMPv2-TC

MODULE-COMPLIANCE, OBJECT-GROUP FROM SNMPv2-CONF

rmon, OwnerString, statistics, history, hosts, hostTopN, matrix,

etherStatsIndex, etherHistoryIndex, etherHistorySampleIndex,

hostIndex, hostAddress, hostTimeIndex, hostTimeCreationOrder,

hostTopNReport, hostTopNIndex,

matrixSDIndex, matrixSDSourceAddress, matrixSDDestAddress,

matrixDSIndex, matrixDSDestAddress, matrixDSSourceAddress,

capture, captureBufferControlIndex, captureBufferIndex

FROM RMON-MIB

protocolDirLocalIndex, protocolDistControlIndex,

protocolDist, hlHostControlIndex,

nlHost, nlHostTimeMark, nlHostAddress,

hlMatrixControlIndex, nlMatrix,

nlMatrixSDTimeMark, nlMatrixSDSourceAddress, nlMatrixSDDestAddress,

nlMatrixDSTimeMark, nlMatrixDSDestAddress, nlMatrixDSSourceAddress,

nlMatrixTopNControlIndex, nlMatrixTopNIndex,

alHost, alHostTimeMark,

alMatrix, alMatrixSDTimeMark, alMatrixDSTimeMark,

alMatrixTopNControlIndex, alMatrixTopNIndex,

```

usrHistory, usrHistoryControlIndex,
usrHistorySampleIndex, usrHistoryObjectIndex,
rmonConformance, ZeroBasedCounter32, probeConfig
                                FROM RMON2-MIB
ZeroBasedCounter64, CounterBasedGauge64
                                FROM HCNM-TC;

```

-- Remote Network Monitoring MIB

hcrmon MODULE-IDENTITY

LAST-UPDATED "200205080000Z" -- May 08, 2002

ORGANIZATION "IETF RMON MIB Working Group"

CONTACT-INFO

"Steve Waldbusser

Phone: +1-650-948-6500

Fax: +1-650-745-0671

Email: waldbusser@nextbeacon.com

Andy Bierman

WG Chair

abierman@cisco.com

RMONMIB WG Mailing List

rmonmib@ietf.org

<http://www.ietf.org/mailman/listinfo/rmonmib>"

DESCRIPTION

"The MIB module for managing remote monitoring device implementations. This MIB module augments the original RMON MIB as specified in RFC 2819 and RFC 1513 and RMON-2 MIB as specified in RFC 2021."

REVISION "200205080000Z" -- May 08, 2002

DESCRIPTION

"The original version of this MIB, published as RFC3273."

::= { rmonConformance 5 }

-- { rmon 1 } through { rmon 20 } are defined in RMON [RFC 2819] and
-- the Token Ring RMON MIB [RFC 1513] and the RMON-2 MIB [RFC 2021].

mediaIndependentStats OBJECT IDENTIFIER ::= { rmon 21 }

mediaIndependentTable OBJECT-TYPE

SYNTAX SEQUENCE OF MediaIndependentEntry

MAX-ACCESS not-accessible

STATUS current

DESCRIPTION

"Media independent statistics for promiscuous monitoring of any media.

The following table defines media independent statistics that provide information for full and/or half-duplex links as well as high capacity links.

For half-duplex links, or full-duplex-capable links operating in half-duplex mode, the mediaIndependentIn* objects shall be used and the mediaIndependentOut* objects shall not increment.

For full-duplex links, the mediaIndependentOut* objects shall be present and shall increment. Whenever possible, the probe should count packets moving away from the closest terminating equipment as output packets. Failing that, the probe should count packets moving away from the DTE as output packets."

```
::= { mediaIndependentStats 1 }
```

mediaIndependentEntry OBJECT-TYPE

SYNTAX MediaIndependentEntry

MAX-ACCESS not-accessible

STATUS current

DESCRIPTION

"Media independent statistics for promiscuous monitoring of any media."

INDEX { mediaIndependentIndex }

```
::= { mediaIndependentTable 1 }
```

MediaIndependentEntry ::= SEQUENCE {

mediaIndependentIndex	Integer32,
mediaIndependentDataSource	OBJECT IDENTIFIER,
mediaIndependentDropEvents	Counter32,
mediaIndependentDroppedFrames	Counter32,
mediaIndependentInPkts	Counter32,
mediaIndependentInOverflowPkts	Counter32,
mediaIndependentInHighCapacityPkts	Counter64,
mediaIndependentOutPkts	Counter32,
mediaIndependentOutOverflowPkts	Counter32,
mediaIndependentOutHighCapacityPkts	Counter64,
mediaIndependentInOctets	Counter32,
mediaIndependentInOverflowOctets	Counter32,
mediaIndependentInHighCapacityOctets	Counter64,
mediaIndependentOutOctets	Counter32,
mediaIndependentOutOverflowOctets	Counter32,
mediaIndependentOutHighCapacityOctets	Counter64,
mediaIndependentInNUCastPkts	Counter32,
mediaIndependentInNUCastOverflowPkts	Counter32,

```

mediaIndependentInNUCastHighCapacityPkts    Counter64,
mediaIndependentOutNUCastPkts               Counter32,
mediaIndependentOutNUCastOverflowPkts       Counter32,
mediaIndependentOutNUCastHighCapacityPkts   Counter64,
mediaIndependentInErrors                    Counter32,
mediaIndependentOutErrors                   Counter32,
mediaIndependentInputSpeed                  Gauge32,
mediaIndependentOutputSpeed                 Gauge32,
mediaIndependentDuplexMode                  INTEGER,
mediaIndependentDuplexChanges               Counter32,
mediaIndependentDuplexLastChange            TimeStamp,
mediaIndependentOwner                       OwnerString,
mediaIndependentStatus                      RowStatus
}

```

mediaIndependentIndex OBJECT-TYPE

SYNTAX Integer32 (1..65535)

MAX-ACCESS not-accessible

STATUS current

DESCRIPTION

"The value of this object uniquely identifies this mediaIndependent entry."

::= { mediaIndependentEntry 1 }

mediaIndependentDataSource OBJECT-TYPE

SYNTAX OBJECT IDENTIFIER

MAX-ACCESS read-create

STATUS current

DESCRIPTION

"This object identifies the source of the data that this mediaIndependent entry is configured to analyze. This source can be any interface on this device.

In order to identify a particular interface, this object shall identify the instance of the ifIndex object, defined in RFC 1213 and RFC 2233 [16,17], for the desired interface. For example, if an entry were to receive data from interface #1, this object would be set to ifIndex.1.

The statistics in this group reflect all packets on the local network segment attached to the identified interface.

An agent may or may not be able to tell if fundamental changes to the media of the interface have occurred and necessitate a deletion of this entry. For example, a hot-pluggable ethernet card could be pulled out and replaced by a

token-ring card. In such a case, if the agent has such knowledge of the change, it is recommended that it delete this entry.

This object may not be modified if the associated mediaIndependentStatus object is equal to active(1)."
 ::= { mediaIndependentEntry 2 }

mediaIndependentDropEvents OBJECT-TYPE

SYNTAX Counter32

UNITS "Events"

MAX-ACCESS read-only

STATUS current

DESCRIPTION

"The total number of events in which packets were dropped by the probe due to lack of resources. Note that this number is not necessarily the number of packets dropped; it is just the number of times this condition has been detected."

::= { mediaIndependentEntry 3 }

mediaIndependentDroppedFrames OBJECT-TYPE

SYNTAX Counter32

UNITS "Packets"

MAX-ACCESS read-only

STATUS current

DESCRIPTION

"The total number of frames which were received by the probe and therefore not accounted for in the mediaIndependentDropEvents, but for which the probe chose not to count for this entry for whatever reason. Most often, this event occurs when the probe is out of some resources and decides to shed load from this collection.

This count does not include packets that were not counted because they had MAC-layer errors.

Note that, unlike the dropEvents counter, this number is the exact number of frames dropped."

::= { mediaIndependentEntry 4 }

mediaIndependentInPkts OBJECT-TYPE

SYNTAX Counter32

UNITS "Packets"

MAX-ACCESS read-only

STATUS current

DESCRIPTION

"The total number of packets (including bad packets,

broadcast packets, and multicast packets) received on a half-duplex link or on the inbound connection of a full-duplex link."

::= { mediaIndependentEntry 5 }

mediaIndependentInOverflowPkts OBJECT-TYPE

SYNTAX Counter32

UNITS "Packets"

MAX-ACCESS read-only

STATUS current

DESCRIPTION

"The number of times the associated mediaIndependentInPkts counter has overflowed."

::= { mediaIndependentEntry 6 }

mediaIndependentInHighCapacityPkts OBJECT-TYPE

SYNTAX Counter64

UNITS "Packets"

MAX-ACCESS read-only

STATUS current

DESCRIPTION

"The total number of packets (including bad packets, broadcast packets, and multicast packets) received on a half-duplex link or on the inbound connection of a full-duplex link."

::= { mediaIndependentEntry 7 }

mediaIndependentOutPkts OBJECT-TYPE

SYNTAX Counter32

UNITS "Packets"

MAX-ACCESS read-only

STATUS current

DESCRIPTION

"The total number of packets (including bad packets, broadcast packets, and multicast packets) received on a full-duplex link in the direction of the network."

::= { mediaIndependentEntry 8 }

mediaIndependentOutOverflowPkts OBJECT-TYPE

SYNTAX Counter32

UNITS "Packets"

MAX-ACCESS read-only

STATUS current

DESCRIPTION

"The number of times the associated mediaIndependentOutPkts counter has overflowed."

::= { mediaIndependentEntry 9 }

mediaIndependentOutHighCapacityPkts OBJECT-TYPE

SYNTAX Counter64

UNITS "Packets"

MAX-ACCESS read-only

STATUS current

DESCRIPTION

"The total number of packets (including bad packets, broadcast packets, and multicast packets) received on a full-duplex link in the direction of the network."

::= { mediaIndependentEntry 10 }

mediaIndependentInOctets OBJECT-TYPE

SYNTAX Counter32

UNITS "Octets"

MAX-ACCESS read-only

STATUS current

DESCRIPTION

"The total number of octets of data (including those in bad packets) received (excluding framing bits but including FCS octets) on a half-duplex link or on the inbound connection of a full-duplex link."

::= { mediaIndependentEntry 11 }

mediaIndependentInOverflowOctets OBJECT-TYPE

SYNTAX Counter32

UNITS "Octets"

MAX-ACCESS read-only

STATUS current

DESCRIPTION

"The number of times the associated mediaIndependentInOctets counter has overflowed."

::= { mediaIndependentEntry 12 }

mediaIndependentInHighCapacityOctets OBJECT-TYPE

SYNTAX Counter64

UNITS "Octets"

MAX-ACCESS read-only

STATUS current

DESCRIPTION

"The total number of octets of data (including those in bad packets) received (excluding framing bits but including FCS octets) on a half-duplex link or on the inbound connection of a full-duplex link."

::= { mediaIndependentEntry 13 }

mediaIndependentOutOctets OBJECT-TYPE

SYNTAX Counter32

UNITS "Octets"

MAX-ACCESS read-only
STATUS current
DESCRIPTION
"The total number of octets of data (including those in bad packets) received on a full-duplex link in the direction of the network (excluding framing bits but including FCS octets)."
 ::= { mediaIndependentEntry 14 }

mediaIndependentOutOverflowOctets OBJECT-TYPE
SYNTAX Counter32
UNITS "Octets"
MAX-ACCESS read-only
STATUS current
DESCRIPTION
"The number of times the associated mediaIndependentOutOctets counter has overflowed."
 ::= { mediaIndependentEntry 15 }

mediaIndependentOutHighCapacityOctets OBJECT-TYPE
SYNTAX Counter64
UNITS "Octets"
MAX-ACCESS read-only
STATUS current
DESCRIPTION
"The total number of octets of data (including those in bad packets) received on a full-duplex link in the direction of the network (excluding framing bits but including FCS octets)."
 ::= { mediaIndependentEntry 16 }

mediaIndependentInNUCastPkts OBJECT-TYPE
SYNTAX Counter32
UNITS "Packets"
MAX-ACCESS read-only
STATUS current
DESCRIPTION
"The total number of non-unicast packets (including bad packets) received on a half-duplex link or on the inbound connection of a full-duplex link."
 ::= { mediaIndependentEntry 17 }

mediaIndependentInNUCastOverflowPkts OBJECT-TYPE
SYNTAX Counter32
UNITS "Packets"
MAX-ACCESS read-only
STATUS current
DESCRIPTION

"The number of times the associated
mediaIndependentInNUCastPkts counter has overflowed."
::= { mediaIndependentEntry 18 }

mediaIndependentInNUCastHighCapacityPkts OBJECT-TYPE

SYNTAX Counter64

UNITS "Packets"

MAX-ACCESS read-only

STATUS current

DESCRIPTION

"The total number of non-unicast packets (including bad
packets) received on a half-duplex link or on the inbound
connection of a full-duplex link."

::= { mediaIndependentEntry 19 }

mediaIndependentOutNUCastPkts OBJECT-TYPE

SYNTAX Counter32

UNITS "Packets"

MAX-ACCESS read-only

STATUS current

DESCRIPTION

"The total number of non-unicast packets (including bad
packets) received on a full-duplex link in the direction of
the network."

::= { mediaIndependentEntry 20 }

mediaIndependentOutNUCastOverflowPkts OBJECT-TYPE

SYNTAX Counter32

UNITS "Packets"

MAX-ACCESS read-only

STATUS current

DESCRIPTION

"The number of times the associated
mediaIndependentOutNUCastPkts counter has overflowed."

::= { mediaIndependentEntry 21 }

mediaIndependentOutNUCastHighCapacityPkts OBJECT-TYPE

SYNTAX Counter64

UNITS "Packets"

MAX-ACCESS read-only

STATUS current

DESCRIPTION

"The total number of packets (including bad packets)
received on a full-duplex link in the direction of the
network."

::= { mediaIndependentEntry 22 }

mediaIndependentInErrors OBJECT-TYPE

```
SYNTAX      Counter32
UNITS       "Packets"
MAX-ACCESS  read-only
STATUS      current
DESCRIPTION
    "The total number of bad packets received on a
    half-duplex link or on the inbound connection of a
    full-duplex link."
 ::= { mediaIndependentEntry 23 }
```

mediaIndependentOutErrors OBJECT-TYPE

```
SYNTAX      Counter32
UNITS       "Packets"
MAX-ACCESS  read-only
STATUS      current
DESCRIPTION
    "The total number of bad packets received on a full-duplex
    link in the direction of the network."
 ::= { mediaIndependentEntry 24 }
```

mediaIndependentInputSpeed OBJECT-TYPE

```
SYNTAX      Gauge32
UNITS       "Kilobits per Second"
MAX-ACCESS  read-only
STATUS      current
DESCRIPTION
    "The nominal maximum speed in kilobits per second of this
    half-duplex link or on the inbound connection of this
    full-duplex link. If the speed is unknown or there is no fixed
    maximum (e.g. a compressed link), this value shall be zero."
 ::= { mediaIndependentEntry 25 }
```

mediaIndependentOutputSpeed OBJECT-TYPE

```
SYNTAX      Gauge32
UNITS       "Kilobits per Second"
MAX-ACCESS  read-only
STATUS      current
DESCRIPTION
    "The nominal maximum speed in kilobits per second of this
    full-duplex link in the direction of the network. If the speed
    is unknown, the link is half-duplex, or there is no fixed
    maximum (e.g. a compressed link), this value shall be zero."
 ::= { mediaIndependentEntry 26 }
```

mediaIndependentDuplexMode OBJECT-TYPE

```
SYNTAX      INTEGER {
                halfduplex(1),
                fullduplex(2)
            }
```

```
    }
MAX-ACCESS read-only
STATUS current
DESCRIPTION
    "The current mode of this link.
```

Note that if the link has full-duplex capabilities but is operating in half-duplex mode, this value will be halfduplex(1)."

```
::= { mediaIndependentEntry 27 }
```

mediaIndependentDuplexChanges OBJECT-TYPE

```
SYNTAX Counter32
UNITS "Events"
MAX-ACCESS read-only
STATUS current
DESCRIPTION
```

"The number of times this link has changed from full-duplex mode to half-duplex mode or from half-duplex mode to full-duplex mode."

```
::= { mediaIndependentEntry 28 }
```

mediaIndependentDuplexLastChange OBJECT-TYPE

```
SYNTAX TimeStamp
MAX-ACCESS read-only
STATUS current
DESCRIPTION
```

"The value of sysUpTime at the time the duplex status of this link last changed."

```
::= { mediaIndependentEntry 29 }
```

mediaIndependentOwner OBJECT-TYPE

```
SYNTAX OwnerString
MAX-ACCESS read-create
STATUS current
DESCRIPTION
```

"The entity that configured this entry and is therefore using the resources assigned to it."

```
::= { mediaIndependentEntry 30 }
```

mediaIndependentStatus OBJECT-TYPE

```
SYNTAX RowStatus
MAX-ACCESS read-create
STATUS current
DESCRIPTION
```

"The status of this media independent statistics entry."

```
::= { mediaIndependentEntry 31 }
```

-- High Capacity extensions for the etherStatsTable

etherStatsHighCapacityTable OBJECT-TYPE

```

SYNTAX      SEQUENCE OF EtherStatsHighCapacityEntry
MAX-ACCESS  not-accessible
STATUS      current
DESCRIPTION
    "Contains the High Capacity RMON extensions to the RMON-1
    etherStatsTable."
 ::= { statistics 7 }

```

etherStatsHighCapacityEntry OBJECT-TYPE

```

SYNTAX      EtherStatsHighCapacityEntry
MAX-ACCESS  not-accessible
STATUS      current
DESCRIPTION
    "Contains the High Capacity RMON extensions to the RMON-1
    etherStatsEntry. These objects will be created by the agent
    for all etherStatsEntries it deems appropriate."
INDEX { etherStatsIndex }
 ::= { etherStatsHighCapacityTable 1 }

```

```

EtherStatsHighCapacityEntry ::= SEQUENCE {
    etherStatsHighCapacityOverflowPkts          Counter32,
    etherStatsHighCapacityPkts                  Counter64,
    etherStatsHighCapacityOverflowOctets        Counter32,
    etherStatsHighCapacityOctets                Counter64,
    etherStatsHighCapacityOverflowPkts64Octets  Counter32,
    etherStatsHighCapacityPkts64Octets          Counter64,
    etherStatsHighCapacityOverflowPkts65to127Octets Counter32,
    etherStatsHighCapacityPkts65to127Octets     Counter64,
    etherStatsHighCapacityOverflowPkts128to255Octets Counter32,
    etherStatsHighCapacityPkts128to255Octets    Counter64,
    etherStatsHighCapacityOverflowPkts256to511Octets Counter32,
    etherStatsHighCapacityPkts256to511Octets    Counter64,
    etherStatsHighCapacityOverflowPkts512to1023Octets Counter32,
    etherStatsHighCapacityPkts512to1023Octets   Counter64,
    etherStatsHighCapacityOverflowPkts1024to1518Octets Counter32,
    etherStatsHighCapacityPkts1024to1518Octets  Counter64
}

```

etherStatsHighCapacityOverflowPkts OBJECT-TYPE

```

SYNTAX      Counter32
UNITS       "Packets"
MAX-ACCESS  read-only
STATUS      current
DESCRIPTION

```

"The number of times the associated etherStatsPkts counter has overflowed."

```
::= { etherStatsHighCapacityEntry 1 }
```

etherStatsHighCapacityPkts OBJECT-TYPE

SYNTAX Counter64

UNITS "Packets"

MAX-ACCESS read-only

STATUS current

DESCRIPTION

"The total number of packets (including bad packets, broadcast packets, and multicast packets) received."

```
::= { etherStatsHighCapacityEntry 2 }
```

etherStatsHighCapacityOverflowOctets OBJECT-TYPE

SYNTAX Counter32

UNITS "Octets"

MAX-ACCESS read-only

STATUS current

DESCRIPTION

"The number of times the associated etherStatsOctets counter has overflowed."

```
::= { etherStatsHighCapacityEntry 3 }
```

etherStatsHighCapacityOctets OBJECT-TYPE

SYNTAX Counter64

UNITS "Octets"

MAX-ACCESS read-only

STATUS current

DESCRIPTION

"The total number of octets of data (including those in bad packets) received on the network (excluding framing bits but including FCS octets).

If the network is half-duplex Fast Ethernet, this object can be used as a reasonable estimate of utilization. If greater precision is desired, the etherStatsHighCapacityPkts and etherStatsHighCapacityOctets objects should be sampled before and after a common interval. The differences in the sampled values are Pkts and Octets, respectively, and the number of seconds in the interval is Interval. These values are used to calculate the Utilization as follows:

$$\text{Utilization} = \frac{\text{Pkts} * (.96 + .64) + (\text{Octets} * .08)}{\text{Interval} * 10,000}$$

The result of this equation is the value Utilization which is the percent utilization of the ethernet segment on a scale of 0 to 100 percent.

This table is not appropriate for monitoring full-duplex ethernet. If the network is a full-duplex ethernet and the mediaIndependentTable is monitoring that network, the utilization can be calculated as follows:

- 1) Determine the utilization of the inbound path by using the appropriate equation (for ethernet or fast ethernet) to determine the utilization, substituting mediaIndependentInPkts for etherStatsHighCapacityPkts, and mediaIndependentInOctets for etherStatsHighCapacityOctets. Call the resulting utilization inUtilization.
- 2) Determine the utilization of the outbound path by using the same equation to determine the utilization, substituting mediaIndependentOutPkts for etherStatsHighCapacityPkts, and mediaIndependentOutOctets for etherStatsHighCapacityOctets. Call the resulting utilization outUtilization.
- 3) The utilization is the maximum of inUtilization and outUtilization. This metric shows the amount of percentage of bandwidth that is left before congestion will be experienced on the link."

```
::= { etherStatsHighCapacityEntry 4 }
```

```
etherStatsHighCapacityOverflowPkts64Octets OBJECT-TYPE
```

```
SYNTAX Counter32
```

```
UNITS "Packets"
```

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

```
STATUS current
```

```
DESCRIPTION
```

```
"The number of times the associated etherStatsPkts64Octets counter has overflowed."
```

```
::= { etherStatsHighCapacityEntry 5 }
```

```
etherStatsHighCapacityPkts64Octets OBJECT-TYPE
```

```
SYNTAX Counter64
```

```
UNITS "Packets"
```

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

```
STATUS current
```

```
DESCRIPTION
```

"The total number of packets (including bad packets) received that were 64 octets in length (excluding framing bits but including FCS octets)."

::= { etherStatsHighCapacityEntry 6 }

etherStatsHighCapacityOverflowPkts65to127Octets OBJECT-TYPE

SYNTAX Counter32

UNITS "Packets"

MAX-ACCESS read-only

STATUS current

DESCRIPTION

"The number of times the associated etherStatsPkts65to127Octets counter has overflowed."

::= { etherStatsHighCapacityEntry 7 }

etherStatsHighCapacityPkts65to127Octets OBJECT-TYPE

SYNTAX Counter64

UNITS "Packets"

MAX-ACCESS read-only

STATUS current

DESCRIPTION

"The total number of packets (including bad packets) received that were between 65 and 127 octets in length inclusive (excluding framing bits but including FCS octets)."

::= { etherStatsHighCapacityEntry 8 }

etherStatsHighCapacityOverflowPkts128to255Octets OBJECT-TYPE

SYNTAX Counter32

UNITS "Packets"

MAX-ACCESS read-only

STATUS current

DESCRIPTION

"The number of times the associated etherStatsPkts128to255Octets counter has overflowed."

::= { etherStatsHighCapacityEntry 9 }

etherStatsHighCapacityPkts128to255Octets OBJECT-TYPE

SYNTAX Counter64

UNITS "Packets"

MAX-ACCESS read-only

STATUS current

DESCRIPTION

"The total number of packets (including bad packets) received that were between 128 and 255 octets in length inclusive (excluding framing bits but including FCS octets)."

::= { etherStatsHighCapacityEntry 10 }

```
etherStatsHighCapacityOverflowPkts256to511Octets OBJECT-TYPE
    SYNTAX      Counter32
    UNITS       "Packets"
    MAX-ACCESS  read-only
    STATUS      current
    DESCRIPTION
        "The number of times the associated etherStatsPkts256to511Octets
        counter has overflowed."
    ::= { etherStatsHighCapacityEntry 11 }

etherStatsHighCapacityPkts256to511Octets OBJECT-TYPE
    SYNTAX      Counter64
    UNITS       "Packets"
    MAX-ACCESS  read-only
    STATUS      current
    DESCRIPTION
        "The total number of packets (including bad
        packets) received that were between
        256 and 511 octets in length inclusive
        (excluding framing bits but including FCS octets)."
```

```

STATUS      current
DESCRIPTION
    "The number of times the associated
    etherStatsPkts1024to1518Octets counter has overflowed."
 ::= { etherStatsHighCapacityEntry 15 }

```

```

etherStatsHighCapacityPkts1024to1518Octets OBJECT-TYPE
SYNTAX      Counter64
UNITS       "Packets"
MAX-ACCESS  read-only
STATUS      current
DESCRIPTION
    "The total number of packets (including bad
    packets) received that were between
    1024 and 1518 octets in length inclusive
    (excluding framing bits but including FCS octets)."
```

```

 ::= { etherStatsHighCapacityEntry 16 }

```

```
-- High Capacity extensions for the etherHistoryTable
```

```

etherHistoryHighCapacityTable OBJECT-TYPE
SYNTAX      SEQUENCE OF EtherHistoryHighCapacityEntry
MAX-ACCESS  not-accessible
STATUS      current
DESCRIPTION
    "Contains the High Capacity RMON extensions to the RMON-1
    etherHistoryTable."
 ::= { history 6 }

```

```

etherHistoryHighCapacityEntry OBJECT-TYPE
SYNTAX      EtherHistoryHighCapacityEntry
MAX-ACCESS  not-accessible
STATUS      current
DESCRIPTION
    "Contains the High Capacity RMON extensions to the RMON-1
    etherHistoryEntry. These objects will be created by the agent
    for all etherHistoryEntries associated with whichever
    historyControlEntries it deems appropriate. (i.e., either all
    etherHistoryHighCapacityEntries associated with a particular
    historyControlEntry will be created, or none of them will
    be.)"
INDEX { etherHistoryIndex, etherHistorySampleIndex }
 ::= { etherHistoryHighCapacityTable 1 }

```

```

EtherHistoryHighCapacityEntry ::= SEQUENCE {
    etherHistoryHighCapacityOverflowPkts          Gauge32,
    etherHistoryHighCapacityPkts                  CounterBasedGauge64,
    etherHistoryHighCapacityOverflowOctets        Gauge32,

```

```
    etherHistoryHighCapacityOctets          CounterBasedGauge64
}
```

```
etherHistoryHighCapacityOverflowPkts OBJECT-TYPE
```

```
SYNTAX      Gauge32
```

```
UNITS       "Packets"
```

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

```
STATUS      current
```

```
DESCRIPTION
```

```
    "The number of times the associated etherHistoryPkts  
    Gauge overflowed during this sampling interval."
```

```
::= { etherHistoryHighCapacityEntry 1 }
```

```
etherHistoryHighCapacityPkts OBJECT-TYPE
```

```
SYNTAX      CounterBasedGauge64
```

```
UNITS       "Packets"
```

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

```
STATUS      current
```

```
DESCRIPTION
```

```
    "The total number of packets (including bad packets,  
    broadcast packets, and multicast packets) received during  
    this sampling interval."
```

```
::= { etherHistoryHighCapacityEntry 2 }
```

```
etherHistoryHighCapacityOverflowOctets OBJECT-TYPE
```

```
SYNTAX      Gauge32
```

```
UNITS       "Octets"
```

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

```
STATUS      current
```

```
DESCRIPTION
```

```
    "The number of times the associated etherHistoryOctets  
    counter has overflowed during this sampling interval."
```

```
::= { etherHistoryHighCapacityEntry 3 }
```

```
etherHistoryHighCapacityOctets OBJECT-TYPE
```

```
SYNTAX      CounterBasedGauge64
```

```
UNITS       "Octets"
```

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

```
STATUS      current
```

```
DESCRIPTION
```

```
    "The total number of octets of data (including  
    those in bad packets) received on the  
    network (excluding framing bits but including  
    FCS octets) during this sampling interval."
```

```
::= { etherHistoryHighCapacityEntry 4 }
```

```
-- High Capacity Extensions for the hostTable
```

```

hostHighCapacityTable OBJECT-TYPE
    SYNTAX      SEQUENCE OF HostHighCapacityEntry
    MAX-ACCESS  not-accessible
    STATUS      current
    DESCRIPTION
        "Contains the High Capacity RMON extensions to the RMON-1
        hostTable."
    ::= { hosts 5 }

hostHighCapacityEntry OBJECT-TYPE
    SYNTAX      HostHighCapacityEntry
    MAX-ACCESS  not-accessible
    STATUS      current
    DESCRIPTION
        "Contains the High Capacity RMON extensions to the RMON-1
        hostEntry. These objects will be created by the agent
        for all hostEntries associated with whichever
        hostControlEntries it deems appropriate. (i.e., either all
        hostHighCapacityEntries associated with a particular
        hostControlEntry will be created, or none of them will
        be.)"
    INDEX { hostIndex, hostAddress }
    ::= { hostHighCapacityTable 1 }

HostHighCapacityEntry ::= SEQUENCE {
    hostHighCapacityInOverflowPkts Counter32,
    hostHighCapacityInPkts Counter64,
    hostHighCapacityOutOverflowPkts Counter32,
    hostHighCapacityOutPkts Counter64,
    hostHighCapacityInOverflowOctets Counter32,
    hostHighCapacityInOctets Counter64,
    hostHighCapacityOutOverflowOctets Counter32,
    hostHighCapacityOutOctets Counter64
}

hostHighCapacityInOverflowPkts OBJECT-TYPE
    SYNTAX      Counter32
    UNITS       "Packets"
    MAX-ACCESS  read-only
    STATUS      current
    DESCRIPTION
        "The number of times the associated hostInPkts
        counter has overflowed."
    ::= { hostHighCapacityEntry 1 }

hostHighCapacityInPkts OBJECT-TYPE
    SYNTAX      Counter64
    UNITS       "Packets"

```

```
MAX-ACCESS read-only
STATUS      current
DESCRIPTION
    "The number of good packets transmitted to
    this address since it was added to the
    hostHighCapacityTable."
 ::= { hostHighCapacityEntry 2 }
```

```
hostHighCapacityOutOverflowPkts OBJECT-TYPE
SYNTAX      Counter32
UNITS       "Packets"
MAX-ACCESS read-only
STATUS      current
DESCRIPTION
    "The number of times the associated hostOutPkts
    counter has overflowed."
 ::= { hostHighCapacityEntry 3 }
```

```
hostHighCapacityOutPkts OBJECT-TYPE
SYNTAX      Counter64
UNITS       "Packets"
MAX-ACCESS read-only
STATUS      current
DESCRIPTION
    "The number of packets, including bad packets, transmitted
    by this address since it was added to the
    hostHighCapacityTable."
 ::= { hostHighCapacityEntry 4 }
```

```
hostHighCapacityInOverflowOctets OBJECT-TYPE
SYNTAX      Counter32
UNITS       "Octets"
MAX-ACCESS read-only
STATUS      current
DESCRIPTION
    "The number of times the associated hostInOctets
    counter has overflowed."
 ::= { hostHighCapacityEntry 5 }
```

```
hostHighCapacityInOctets OBJECT-TYPE
SYNTAX      Counter64
UNITS       "Octets"
MAX-ACCESS read-only
STATUS      current
DESCRIPTION
    "The number of octets transmitted to this address
    since it was added to the hostHighCapacityTable (excluding
    framing bits but including FCS octets), except for
```

```
those octets in bad packets."  
 ::= { hostHighCapacityEntry 6 }
```

```
hostHighCapacityOutOverflowOctets OBJECT-TYPE  
SYNTAX Counter32  
UNITS "Octets"  
MAX-ACCESS read-only  
STATUS current  
DESCRIPTION  
 "The number of times the associated hostOutOctets  
 counter has overflowed."  
 ::= { hostHighCapacityEntry 7 }
```

```
hostHighCapacityOutOctets OBJECT-TYPE  
SYNTAX Counter64  
UNITS "Octets"  
MAX-ACCESS read-only  
STATUS current  
DESCRIPTION  
 "The number of octets transmitted by this address  
 since it was added to the hostHighCapacityTable (excluding  
 framing bits but including FCS octets), including  
 those octets in bad packets."  
 ::= { hostHighCapacityEntry 8 }
```

-- High Capacity extensions for the hostTimeTable

```
hostTimeHighCapacityTable OBJECT-TYPE  
SYNTAX SEQUENCE OF HostTimeHighCapacityEntry  
MAX-ACCESS not-accessible  
STATUS current  
DESCRIPTION  
 "Contains the High Capacity RMON extensions to the RMON-1  
 hostTimeTable."  
 ::= { hosts 6 }
```

```
hostTimeHighCapacityEntry OBJECT-TYPE  
SYNTAX HostTimeHighCapacityEntry  
MAX-ACCESS not-accessible  
STATUS current  
DESCRIPTION  
 "Contains the High Capacity RMON extensions to the RMON-1  
 hostTimeEntry. These objects will be created by the agent  
 for all hostTimeEntries associated with whichever  
 hostControlEntries it deems appropriate. (i.e., either all  
 hostTimeHighCapacityEntries associated with a particular  
 hostControlEntry will be created, or none of them will  
 be.)"
```

```
INDEX { hostTimeIndex, hostTimeCreationOrder }
 ::= { hostTimeHighCapacityTable 1 }
```

```
HostTimeHighCapacityEntry ::= SEQUENCE {
  hostTimeHighCapacityInOverflowPkts Counter32,
  hostTimeHighCapacityInPkts Counter64,
  hostTimeHighCapacityOutOverflowPkts Counter32,
  hostTimeHighCapacityOutPkts Counter64,
  hostTimeHighCapacityInOverflowOctets Counter32,
  hostTimeHighCapacityInOctets Counter64,
  hostTimeHighCapacityOutOverflowOctets Counter32,
  hostTimeHighCapacityOutOctets Counter64
}
```

```
hostTimeHighCapacityInOverflowPkts OBJECT-TYPE
  SYNTAX Counter32
  UNITS "Packets"
  MAX-ACCESS read-only
  STATUS current
  DESCRIPTION
    "The number of times the associated hostTimeInPkts
    counter has overflowed."
  ::= { hostTimeHighCapacityEntry 1 }
```

```
hostTimeHighCapacityInPkts OBJECT-TYPE
  SYNTAX Counter64
  UNITS "Packets"
  MAX-ACCESS read-only
  STATUS current
  DESCRIPTION
    "The number of good packets transmitted to this address
    since it was added to the hostTimeHighCapacityTable."
  ::= { hostTimeHighCapacityEntry 2 }
```

```
hostTimeHighCapacityOutOverflowPkts OBJECT-TYPE
  SYNTAX Counter32
  UNITS "Packets"
  MAX-ACCESS read-only
  STATUS current
  DESCRIPTION
    "The number of times the associated hostTimeOutPkts
    counter has overflowed."
  ::= { hostTimeHighCapacityEntry 3 }
```

```
hostTimeHighCapacityOutPkts OBJECT-TYPE
  SYNTAX Counter64
  UNITS "Packets"
  MAX-ACCESS read-only
```

STATUS current
DESCRIPTION
"The number of packets, including bad packets, transmitted
by this address since it was added to the
hostTimeHighCapacityTable."
::= { hostTimeHighCapacityEntry 4 }

hostTimeHighCapacityInOverflowOctets OBJECT-TYPE
SYNTAX Counter32
UNITS "Octets"
MAX-ACCESS read-only
STATUS current
DESCRIPTION
"The number of times the associated hostTimeInOctets
counter has overflowed."
::= { hostTimeHighCapacityEntry 5 }

hostTimeHighCapacityInOctets OBJECT-TYPE
SYNTAX Counter64
UNITS "Octets"
MAX-ACCESS read-only
STATUS current
DESCRIPTION
"The number of octets transmitted to this address
since it was added to the hostTimeHighCapacityTable
(excluding framing bits but including FCS octets),
except for those octets in bad packets."
::= { hostTimeHighCapacityEntry 6 }

hostTimeHighCapacityOutOverflowOctets OBJECT-TYPE
SYNTAX Counter32
UNITS "Octets"
MAX-ACCESS read-only
STATUS current
DESCRIPTION
"The number of times the associated hostTimeOutOctets
counter has overflowed."
::= { hostTimeHighCapacityEntry 7 }

hostTimeHighCapacityOutOctets OBJECT-TYPE
SYNTAX Counter64
UNITS "Octets"
MAX-ACCESS read-only
STATUS current
DESCRIPTION
"The number of octets transmitted by this address since
it was added to the hostTimeTable (excluding framing
bits but including FCS octets), including those

```

    octets in bad packets."
 ::= { hostTimeHighCapacityEntry 8 }

-- High Capacity Extensions for the hostTopNTable

hostTopNHighCapacityTable OBJECT-TYPE
    SYNTAX      SEQUENCE OF HostTopNHighCapacityEntry
    MAX-ACCESS  not-accessible
    STATUS      current
    DESCRIPTION
        "Contains the High Capacity RMON extensions to the RMON-1
        hostTopNTable when hostTopNRateBase specifies a High Capacity
        TopN Report."
 ::= { hostTopN 3 }

hostTopNHighCapacityEntry OBJECT-TYPE
    SYNTAX      HostTopNHighCapacityEntry
    MAX-ACCESS  not-accessible
    STATUS      current
    DESCRIPTION
        "Contains the High Capacity RMON extensions to the RMON-1
        hostTopNEntry when hostTopNRateBase specifies a High Capacity
        TopN Report. These objects will be created by the agent
        for all hostTopNEntries associated with whichever
        hostTopNControlEntries have a hostTopNRateBase that specify
        a high capacity report."
    INDEX { hostTopNReport, hostTopNIndex }
 ::= { hostTopNHighCapacityTable 1 }

HostTopNHighCapacityEntry ::= SEQUENCE {
    hostTopNHighCapacityAddress    OCTET STRING,
    hostTopNHighCapacityBaseRate   Gauge32,
    hostTopNHighCapacityOverflowRate Gauge32,
    hostTopNHighCapacityRate       CounterBasedGauge64
}

hostTopNHighCapacityAddress OBJECT-TYPE
    SYNTAX      OCTET STRING
    MAX-ACCESS  read-only
    STATUS      current
    DESCRIPTION
        "The physical address of this host."
 ::= { hostTopNHighCapacityEntry 1 }

hostTopNHighCapacityBaseRate OBJECT-TYPE
    SYNTAX      Gauge32
    MAX-ACCESS  read-only
    STATUS      current

```

DESCRIPTION

"The amount of change in the selected variable during this sampling interval, modulo 2^{32} . The selected variable is this host's instance of the object selected by hostTopNRateBase."

```
::= { hostTopNHighCapacityEntry 2 }
```

```
hostTopNHighCapacityOverflowRate OBJECT-TYPE
```

```
SYNTAX Gauge32
```

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

```
STATUS current
```

DESCRIPTION

"The amount of change in the selected variable during this sampling interval, divided by 2^{32} , truncating fractions (i.e., $X \text{ DIV } 2^{32}$). The selected variable is this host's instance of the object selected by hostTopNRateBase."

```
::= { hostTopNHighCapacityEntry 3 }
```

```
hostTopNHighCapacityRate OBJECT-TYPE
```

```
SYNTAX CounterBasedGauge64
```

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

```
STATUS current
```

DESCRIPTION

"The amount of change in the selected variable during this sampling interval. The selected variable is this host's instance of the object selected by hostTopNRateBase."

```
::= { hostTopNHighCapacityEntry 4 }
```

```
-- High Capacity Extensions for the matrixSDTable
```

```
matrixSDHighCapacityTable OBJECT-TYPE
```

```
SYNTAX SEQUENCE OF MatrixSDHighCapacityEntry
```

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

```
STATUS current
```

DESCRIPTION

"Contains the High Capacity RMON extensions to the RMON-1 matrixSDTable."

```
::= { matrix 5 }
```

```
matrixSDHighCapacityEntry OBJECT-TYPE
```

```
SYNTAX MatrixSDHighCapacityEntry
```

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

```
STATUS current
```

DESCRIPTION

"Contains the High Capacity RMON extensions to the RMON-1 matrixSDEntry. These objects will be created by the agent"

for all matrixSDEntries associated with whichever matrixControlEntries it deems appropriate. (i.e., either all matrixSDHighCapacityEntries associated with a particular matrixControlEntry will be created, or none of them will be.)"

```
INDEX { matrixSDIndex,
        matrixSDSourceAddress, matrixSDDestAddress }
 ::= { matrixSDHighCapacityTable 1 }
```

```
MatrixSDHighCapacityEntry ::= SEQUENCE {
    matrixSDHighCapacityOverflowPkts Counter32,
    matrixSDHighCapacityPkts         Counter64,
    matrixSDHighCapacityOverflowOctets Counter32,
    matrixSDHighCapacityOctets       Counter64
}
```

```
matrixSDHighCapacityOverflowPkts OBJECT-TYPE
    SYNTAX      Counter32
    UNITS       "Packets"
    MAX-ACCESS  read-only
    STATUS      current
    DESCRIPTION
        "The number of times the associated matrixSDPkts
        counter has overflowed."
    ::= { matrixSDHighCapacityEntry 1 }
```

```
matrixSDHighCapacityPkts OBJECT-TYPE
    SYNTAX      Counter64
    UNITS       "Packets"
    MAX-ACCESS  read-only
    STATUS      current
    DESCRIPTION
        "The number of packets transmitted from the source
        address to the destination address (this number
        includes bad packets)."
    ::= { matrixSDHighCapacityEntry 2 }
```

```
matrixSDHighCapacityOverflowOctets OBJECT-TYPE
    SYNTAX      Counter32
    UNITS       "Octets"
    MAX-ACCESS  read-only
    STATUS      current
    DESCRIPTION
        "The number of times the associated matrixSDOctets
        counter has overflowed."
    ::= { matrixSDHighCapacityEntry 3 }
```

```
matrixSDHighCapacityOctets OBJECT-TYPE
```

```

SYNTAX      Counter64
UNITS       "Octets"
MAX-ACCESS  read-only
STATUS      current
DESCRIPTION
    "The number of octets (excluding framing bits but
    including FCS octets) contained in all packets
    transmitted from the source address to the
    destination address."
 ::= { matrixSDHighCapacityEntry 4 }

```

-- High Capacity extensions for the matrixDSTable

```

matrixDSHighCapacityTable OBJECT-TYPE
    SYNTAX      SEQUENCE OF MatrixDSHighCapacityEntry
    MAX-ACCESS  not-accessible
    STATUS      current
    DESCRIPTION
        "Contains the High Capacity RMON extensions to the RMON-1
        matrixDSTable."
    ::= { matrix 6 }

```

```

matrixDSHighCapacityEntry OBJECT-TYPE
    SYNTAX      MatrixDSHighCapacityEntry
    MAX-ACCESS  not-accessible
    STATUS      current
    DESCRIPTION
        "Contains the High Capacity RMON extensions to the RMON-1
        matrixDSEntry. These objects will be created by the agent
        for all matrixDSEntries associated with whichever
        matrixControlEntries it deems appropriate. (i.e., either all
        matrixDSHighCapacityEntries associated with a particular
        matrixControlEntry will be created, or none of them will
        be.)"
    INDEX { matrixDSIndex,
            matrixDSDestAddress, matrixDSSourceAddress }
    ::= { matrixDSHighCapacityTable 1 }

```

```

MatrixDSHighCapacityEntry ::= SEQUENCE {
    matrixDSHighCapacityOverflowPkts Counter32,
    matrixDSHighCapacityPkts         Counter64,
    matrixDSHighCapacityOverflowOctets Counter32,
    matrixDSHighCapacityOctets        Counter64
}

```

```

matrixDSHighCapacityOverflowPkts OBJECT-TYPE
    SYNTAX      Counter32
    UNITS       "Packets"

```

```
MAX-ACCESS read-only
STATUS current
DESCRIPTION
    "The number of times the associated matrixDSPkts
    counter has overflowed."
 ::= { matrixDSHighCapacityEntry 1 }
```

```
matrixDSHighCapacityPkts OBJECT-TYPE
SYNTAX Counter64
UNITS "Packets"
MAX-ACCESS read-only
STATUS current
DESCRIPTION
    "The number of packets transmitted from the source
    address to the destination address (this number
    includes bad packets)."
```

```
 ::= { matrixDSHighCapacityEntry 2 }
```

```
matrixDSHighCapacityOverflowOctets OBJECT-TYPE
SYNTAX Counter32
UNITS "Octets"
MAX-ACCESS read-only
STATUS current
DESCRIPTION
    "The number of times the associated matrixDSOctets
    counter has overflowed."
```

```
 ::= { matrixDSHighCapacityEntry 3 }
```

```
matrixDSHighCapacityOctets OBJECT-TYPE
SYNTAX Counter64
UNITS "Octets"
MAX-ACCESS read-only
STATUS current
DESCRIPTION
    "The number of octets (excluding framing bits
    but including FCS octets) contained in all packets
    transmitted from the source address to the
    destination address."
```

```
 ::= { matrixDSHighCapacityEntry 4 }
```

-- High Capacity extensions for the captureBufferTable

```
captureBufferHighCapacityTable OBJECT-TYPE
SYNTAX SEQUENCE OF CaptureBufferHighCapacityEntry
MAX-ACCESS not-accessible
STATUS current
DESCRIPTION
    "Contains the High Capacity RMON extensions to the RMON-1
```

```

        captureBufferTable."
 ::= { capture 3 }

captureBufferHighCapacityEntry OBJECT-TYPE
SYNTAX      CaptureBufferHighCapacityEntry
MAX-ACCESS  not-accessible
STATUS      current
DESCRIPTION
    "Contains the High Capacity RMON extensions to the RMON-1
    captureBufferEntry. These objects will be created by the agent
    for all captureBufferEntries associated with whichever
    bufferControlEntries it deems appropriate. (i.e., either all
    captureBufferHighCapacityEntries associated with a particular
    bufferControlEntry will be created, or none of them will
    be.)"
INDEX { captureBufferControlIndex, captureBufferIndex }
 ::= { captureBufferHighCapacityTable 1 }

CaptureBufferHighCapacityEntry ::= SEQUENCE {
    captureBufferPacketHighCapacityTime      Integer32
}

captureBufferPacketHighCapacityTime OBJECT-TYPE
SYNTAX      Integer32 (0..999999)
UNITS       "nanoseconds"
MAX-ACCESS  read-only
STATUS      current
DESCRIPTION
    "The number of nanoseconds that had passed since this capture
    buffer was first turned on when this packet was captured,
    modulo 10^6.

    This object is used in conjunction with the
    captureBufferPacketTime object. This object returns the
    number of nano-seconds to be added to to number of
    milli-seconds obtained from the captureBufferPacketTime
    object, to obtain more accurate inter packet arrival time."
 ::= { captureBufferHighCapacityEntry 1 }

-- High Capacity extensions for the protocolDistStatsTable

protocolDistStatsHighCapacityTable OBJECT-TYPE
SYNTAX      SEQUENCE OF ProtocolDistStatsHighCapacityEntry
MAX-ACCESS  not-accessible
STATUS      current
DESCRIPTION
    "Contains the High Capacity RMON extensions to the RMON-2
    protocolDistStatsTable."

```

```
::= { protocolDist 3 }
```

```
protocolDistStatsHighCapacityEntry OBJECT-TYPE
```

```
SYNTAX      ProtocolDistStatsHighCapacityEntry
```

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

```
STATUS      current
```

```
DESCRIPTION
```

"Contains the High Capacity RMON extensions to the RMON-2 protocolDistStatsTable. These objects will be created by the agent for all protocolDistStatsEntries associated with whichever protocolDistControlEntries it deems appropriate. (i.e., either all protocolDistStatsHighCapacityEntries associated with a particular protocolDistControlEntry will be created, or none of them will be.)"

```
INDEX { protocolDistControlIndex, protocolDirLocalIndex }
```

```
::= { protocolDistStatsHighCapacityTable 1 }
```

```
ProtocolDistStatsHighCapacityEntry ::= SEQUENCE {
```

```
  protocolDistStatsHighCapacityOverflowPkts  ZeroBasedCounter32,
```

```
  protocolDistStatsHighCapacityPkts          ZeroBasedCounter64,
```

```
  protocolDistStatsHighCapacityOverflowOctets ZeroBasedCounter32,
```

```
  protocolDistStatsHighCapacityOctets        ZeroBasedCounter64
```

```
}
```

```
protocolDistStatsHighCapacityOverflowPkts OBJECT-TYPE
```

```
SYNTAX      ZeroBasedCounter32
```

```
UNITS       "Packets"
```

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

```
STATUS      current
```

```
DESCRIPTION
```

"The number of times the associated protocolDistStatsPkts counter has overflowed."

```
::= { protocolDistStatsHighCapacityEntry 1 }
```

```
protocolDistStatsHighCapacityPkts OBJECT-TYPE
```

```
SYNTAX      ZeroBasedCounter64
```

```
UNITS       "Packets"
```

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

```
STATUS      current
```

```
DESCRIPTION
```

"The number of packets without errors received of this protocol type. Note that this is the number of link-layer packets, so if a single network-layer packet is fragmented into several link-layer frames, this counter is incremented several times."

```
::= { protocolDistStatsHighCapacityEntry 2 }
```

```
protocolDistStatsHighCapacityOverflowOctets OBJECT-TYPE
```

```

SYNTAX      ZeroBasedCounter32
UNITS       "Octets"
MAX-ACCESS  read-only
STATUS      current
DESCRIPTION
    "The number of times the associated protocolDistStatsOctets
    counter has overflowed."
 ::= { protocolDistStatsHighCapacityEntry 3 }

```

```
protocolDistStatsHighCapacityOctets OBJECT-TYPE
```

```

SYNTAX      ZeroBasedCounter64
UNITS       "Octets"
MAX-ACCESS  read-only
STATUS      current
DESCRIPTION
    "The number of octets in packets received of this protocol
    type since it was added to the protocolDistStatsTable
    (excluding framing bits but including FCS octets), except for
    those octets in packets that contained errors.

    Note this doesn't count just those octets in the particular
    protocol frames, but includes the entire packet that contained
    the protocol."
 ::= { protocolDistStatsHighCapacityEntry 4 }

```

```
-- High Capacity extensions for the nlHostTable.
```

```
nlHostHighCapacityTable OBJECT-TYPE
```

```

SYNTAX      SEQUENCE OF NlHostHighCapacityEntry
MAX-ACCESS  not-accessible
STATUS      current
DESCRIPTION
    "Contains the High Capacity RMON extensions to the RMON-2
    nlHostTable."
 ::= { nlHost 3 }

```

```
nlHostHighCapacityEntry OBJECT-TYPE
```

```

SYNTAX      NlHostHighCapacityEntry
MAX-ACCESS  not-accessible
STATUS      current
DESCRIPTION
    "Contains the High Capacity RMON extensions to the RMON-2
    nlHostEntry. These objects will be created by the agent
    for all nlHostEntries associated with whichever
    hlHostControlEntries it deems appropriate. (i.e., either all
    nlHostHighCapacityEntries associated with a particular
    hlHostControlEntry will be created, or none of them will
    be.)"

```

```

INDEX { hlHostControlIndex, nlHostTimeMark,
        protocolDirLocalIndex, nlHostAddress }
 ::= { nlHostHighCapacityTable 1 }

```

```

NlHostHighCapacityEntry ::= SEQUENCE {
    nlHostHighCapacityInOverflowPkts    ZeroBasedCounter32,
    nlHostHighCapacityInPkts           ZeroBasedCounter64,
    nlHostHighCapacityOutOverflowPkts   ZeroBasedCounter32,
    nlHostHighCapacityOutPkts          ZeroBasedCounter64,
    nlHostHighCapacityInOverflowOctets  ZeroBasedCounter32,
    nlHostHighCapacityInOctets         ZeroBasedCounter64,
    nlHostHighCapacityOutOverflowOctets ZeroBasedCounter32,
    nlHostHighCapacityOutOctets        ZeroBasedCounter64
}

```

```

nlHostHighCapacityInOverflowPkts OBJECT-TYPE
    SYNTAX      ZeroBasedCounter32
    UNITS       "Packets"
    MAX-ACCESS  read-only
    STATUS      current
    DESCRIPTION
        "The number of times the associated nlHostInPkts
        counter has overflowed."
    ::= { nlHostHighCapacityEntry 1 }

```

```

nlHostHighCapacityInPkts OBJECT-TYPE
    SYNTAX      ZeroBasedCounter64
    UNITS       "Packets"
    MAX-ACCESS  read-only
    STATUS      current
    DESCRIPTION
        "The number of packets without errors transmitted to
        this address since it was added to the nlHostHighCapacityTable.
        Note that this is the number of link-layer packets, so if a
        single network-layer packet is fragmented into several
        link-layer frames, this counter is incremented several times."
    ::= { nlHostHighCapacityEntry 2 }

```

```

nlHostHighCapacityOutOverflowPkts OBJECT-TYPE
    SYNTAX      ZeroBasedCounter32
    UNITS       "Packets"
    MAX-ACCESS  read-only
    STATUS      current
    DESCRIPTION
        "The number of times the associated nlHostOutPkts
        counter has overflowed."
    ::= { nlHostHighCapacityEntry 3 }

```

nlHostHighCapacityOutPkts OBJECT-TYPE

SYNTAX ZeroBasedCounter64

UNITS "Packets"

MAX-ACCESS read-only

STATUS current

DESCRIPTION

"The number of packets without errors transmitted by this address since it was added to the nlHostHighCapacityTable. Note that this is the number of link-layer packets, so if a single network-layer packet is fragmented into several link-layer frames, this counter is incremented several times."

::= { nlHostHighCapacityEntry 4 }

nlHostHighCapacityInOverflowOctets OBJECT-TYPE

SYNTAX ZeroBasedCounter32

UNITS "Octets"

MAX-ACCESS read-only

STATUS current

DESCRIPTION

"The number of times the associated nlHostInOctets counter has overflowed."

::= { nlHostHighCapacityEntry 5 }

nlHostHighCapacityInOctets OBJECT-TYPE

SYNTAX ZeroBasedCounter64

UNITS "Octets"

MAX-ACCESS read-only

STATUS current

DESCRIPTION

"The number of octets transmitted to this address since it was added to the nlHostHighCapacityTable (excluding framing bits but including FCS octets), excluding those octets in packets that contained errors.

Note this doesn't count just those octets in the particular protocol frames, but includes the entire packet that contained the protocol."

::= { nlHostHighCapacityEntry 6 }

nlHostHighCapacityOutOverflowOctets OBJECT-TYPE

SYNTAX ZeroBasedCounter32

UNITS "Octets"

MAX-ACCESS read-only

STATUS current

DESCRIPTION

"The number of times the associated nlHostOutOctets counter has overflowed."

```
::= { nlHostHighCapacityEntry 7 }
```

```
nlHostHighCapacityOutOctets OBJECT-TYPE
```

```
SYNTAX      ZeroBasedCounter64
```

```
UNITS       "Octets"
```

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

```
STATUS      current
```

```
DESCRIPTION
```

```
"The number of octets transmitted by this address
since it was added to the nlHostHighCapacityTable
(excluding framing bits but including FCS octets),
excluding those octets in packets that contained
errors.
```

```
Note this doesn't count just those octets in the
particular protocol frames, but includes the entire
packet that contained the protocol."
```

```
::= { nlHostHighCapacityEntry 8 }
```

```
-- High Capacity extensions for the nlMatrixTable
```

```
nlMatrixSDHighCapacityTable OBJECT-TYPE
```

```
SYNTAX      SEQUENCE OF NlMatrixSDHighCapacityEntry
```

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

```
STATUS      current
```

```
DESCRIPTION
```

```
"Contains the High Capacity RMON extensions to the RMON-2
nlMatrixTable."
```

```
::= { nlMatrix 6 }
```

```
nlMatrixSDHighCapacityEntry OBJECT-TYPE
```

```
SYNTAX      NlMatrixSDHighCapacityEntry
```

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

```
STATUS      current
```

```
DESCRIPTION
```

```
"Contains the High Capacity RMON extensions to the RMON-2
nlMatrixEntry. These objects will be created by the agent
for all nlMatrixSDEntries associated with whichever
hlMatrixControlEntries it deems appropriate. (i.e., either all
nlMatrixSDHighCapacityEntries associated with a particular
hlMatrixControlEntry will be created, or none of them will
be.)"
```

```
INDEX { hlMatrixControlIndex, nlMatrixSDTimeMark,
        protocolDirLocalIndex,
        nlMatrixSDSourceAddress, nlMatrixSDDestAddress }
```

```
::= { nlMatrixSDHighCapacityTable 1 }
```

```
NlMatrixSDHighCapacityEntry ::= SEQUENCE {
```

```
nlMatrixSDHighCapacityOverflowPkts ZeroBasedCounter32,
nlMatrixSDHighCapacityPkts         ZeroBasedCounter64,
nlMatrixSDHighCapacityOverflowOctets ZeroBasedCounter32,
nlMatrixSDHighCapacityOctets       ZeroBasedCounter64
}

nlMatrixSDHighCapacityOverflowPkts OBJECT-TYPE
    SYNTAX      ZeroBasedCounter32
    UNITS       "Packets"
    MAX-ACCESS  read-only
    STATUS      current
    DESCRIPTION
        "The number of times the associated nlMatrixSDPkts
        counter has overflowed."
    ::= { nlMatrixSDHighCapacityEntry 1 }

nlMatrixSDHighCapacityPkts OBJECT-TYPE
    SYNTAX      ZeroBasedCounter64
    UNITS       "Packets"
    MAX-ACCESS  read-only
    STATUS      current
    DESCRIPTION
        "The number of packets without errors transmitted from the
        source address to the destination address since this entry was
        added to the nlMatrixSDHighCapacityTable. Note that this is
        the number of link-layer packets, so if a single network-layer
        packet is fragmented into several link-layer frames, this
        counter is incremented several times."
    ::= { nlMatrixSDHighCapacityEntry 2 }

nlMatrixSDHighCapacityOverflowOctets OBJECT-TYPE
    SYNTAX      ZeroBasedCounter32
    UNITS       "Octets"
    MAX-ACCESS  read-only
    STATUS      current
    DESCRIPTION
        "The number of times the associated nlMatrixSDOctets
        counter has overflowed."
    ::= { nlMatrixSDHighCapacityEntry 3 }

nlMatrixSDHighCapacityOctets OBJECT-TYPE
    SYNTAX      ZeroBasedCounter64
    UNITS       "Octets"
    MAX-ACCESS  read-only
    STATUS      current
    DESCRIPTION
        "The number of octets transmitted from the source address to
        the destination address since this entry was added to the
```

nlMatrixSDHighCapacityTable (excluding framing bits but including FCS octets), excluding those octets in packets that contained errors.

Note this doesn't count just those octets in the particular protocol frames, but includes the entire packet that contained the protocol."

```
::= { nlMatrixSDHighCapacityEntry 4 }
```

```
-- High Capacity extensions for the nlMatrixDSTable
```

```
nlMatrixDSHighCapacityTable OBJECT-TYPE
    SYNTAX      SEQUENCE OF NlMatrixDSHighCapacityEntry
    MAX-ACCESS  not-accessible
    STATUS      current
    DESCRIPTION
        "Contains the High Capacity RMON extensions to the RMON-2
         nlMatrixDSTable."
    ::= { nlMatrix 7 }
```

```
nlMatrixDSHighCapacityEntry OBJECT-TYPE
    SYNTAX      NlMatrixDSHighCapacityEntry
    MAX-ACCESS  not-accessible
    STATUS      current
    DESCRIPTION
        "Contains the High Capacity RMON extensions to the RMON-2
         nlMatrixDSEntry. These objects will be created by the agent
         for all nlMatrixDSEntries associated with whichever
         hlmatrixControlEntries it deems appropriate. (i.e., either all
         nlMatrixDSHighCapacityEntries associated with a particular
         hlMatrixControlEntry will be created, or none of them will
         be.)"
    INDEX { hlMatrixControlIndex, nlMatrixDSTimeMark,
            protocolDirLocalIndex,
            nlMatrixDSDestAddress, nlMatrixDSSourceAddress }
    ::= { nlMatrixDSHighCapacityTable 1 }
```

```
NlMatrixDSHighCapacityEntry ::= SEQUENCE {
    nlMatrixDSHighCapacityOverflowPkts  ZeroBasedCounter32,
    nlMatrixDSHighCapacityPkts         ZeroBasedCounter64,
    nlMatrixDSHighCapacityOverflowOctets ZeroBasedCounter32,
    nlMatrixDSHighCapacityOctets       ZeroBasedCounter64
}
```

```
nlMatrixDSHighCapacityOverflowPkts OBJECT-TYPE
    SYNTAX      ZeroBasedCounter32
    UNITS       "Packets"
    MAX-ACCESS  read-only
```

```
STATUS      current
DESCRIPTION
    "The number of times the associated nlMatrixDSPkts
    counter has overflowed."
 ::= { nlMatrixDSHighCapacityEntry 1 }
```

```
nlMatrixDSHighCapacityPkts OBJECT-TYPE
SYNTAX      ZeroBasedCounter64
UNITS       "Packets"
MAX-ACCESS  read-only
STATUS      current
DESCRIPTION
    "The number of packets without errors transmitted from the
    source address to the destination address since this entry was
    added to the nlMatrixDSHighCapacityTable. Note that this is
    the number of link-layer packets, so if a single network-layer
    packet is fragmented into several link-layer frames, this
    counter is incremented several times."
 ::= { nlMatrixDSHighCapacityEntry 2 }
```

```
nlMatrixDSHighCapacityOverflowOctets OBJECT-TYPE
SYNTAX      ZeroBasedCounter32
UNITS       "Octets"
MAX-ACCESS  read-only
STATUS      current
DESCRIPTION
    "The number of times the associated nlMatrixDSOctets
    counter has overflowed."
 ::= { nlMatrixDSHighCapacityEntry 3 }
```

```
nlMatrixDSHighCapacityOctets OBJECT-TYPE
SYNTAX      ZeroBasedCounter64
UNITS       "Octets"
MAX-ACCESS  read-only
STATUS      current
DESCRIPTION
    "The number of octets transmitted from the source address
    to the destination address since this entry was added to the
    nlMatrixDSHighCapacityTable (excluding framing bits but
    including FCS octets), excluding those octets in packets that
    contained errors.

    Note this doesn't count just those octets in the particular
    protocol frames, but includes the entire packet that contained
    the protocol."
 ::= { nlMatrixDSHighCapacityEntry 4 }
```

```
-- High Capacity extensions for the nlMatrixTopNTable
```

```

nlMatrixTopNHighCapacityTable OBJECT-TYPE
    SYNTAX      SEQUENCE OF NlMatrixTopNHighCapacityEntry
    MAX-ACCESS  not-accessible
    STATUS      current
    DESCRIPTION
        "Contains the High Capacity RMON extensions to the RMON-2
        nlMatrixTopNTable when nlMatrixTopNControlRateBase specifies
        a High Capacity TopN Report."
    ::= { nlMatrix 8 }

nlMatrixTopNHighCapacityEntry OBJECT-TYPE
    SYNTAX      NlMatrixTopNHighCapacityEntry
    MAX-ACCESS  not-accessible
    STATUS      current
    DESCRIPTION
        "Contains the High Capacity RMON extensions to the RMON-2
        nlMatrixTopNEntry when nlMatrixTopNControlRateBase specifies
        a High Capacity TopN Report. These objects will be created by
        the agent for all nlMatrixTopNEntries associated with whichever
        nlMatrixTopNControlEntries have a nlMatrixTopNControlRateBase
        that specify a high capacity report."
    INDEX { nlMatrixTopNControlIndex, nlMatrixTopNIndex }
    ::= { nlMatrixTopNHighCapacityTable 1 }

NlMatrixTopNHighCapacityEntry ::= SEQUENCE {
    nlMatrixTopNHighCapacityProtocolDirLocalIndex      Integer32,
    nlMatrixTopNHighCapacitySourceAddress              OCTET STRING,
    nlMatrixTopNHighCapacityDestAddress                OCTET STRING,
    nlMatrixTopNHighCapacityBasePktRate                Gauge32,
    nlMatrixTopNHighCapacityOverflowPktRate            Gauge32,
    nlMatrixTopNHighCapacityPktRate                    CounterBasedGauge64,
    nlMatrixTopNHighCapacityReverseBasePktRate         Gauge32,
    nlMatrixTopNHighCapacityReverseOverflowPktRate     Gauge32,
    nlMatrixTopNHighCapacityReversePktRate             CounterBasedGauge64,
    nlMatrixTopNHighCapacityBaseOctetRate              Gauge32,
    nlMatrixTopNHighCapacityOverflowOctetRate           Gauge32,
    nlMatrixTopNHighCapacityOctetRate                  CounterBasedGauge64,
    nlMatrixTopNHighCapacityReverseBaseOctetRate       Gauge32,
    nlMatrixTopNHighCapacityReverseOverflowOctetRate   Gauge32,
    nlMatrixTopNHighCapacityReverseOctetRate           CounterBasedGauge64
}

nlMatrixTopNHighCapacityProtocolDirLocalIndex OBJECT-TYPE
    SYNTAX      Integer32 (1..2147483647)
    MAX-ACCESS  read-only
    STATUS      current
    DESCRIPTION
        "The protocolDirLocalIndex of the network layer protocol of

```

this entry's network address."
 ::= { nlMatrixTopNHighCapacityEntry 1 }

nlMatrixTopNHighCapacitySourceAddress OBJECT-TYPE

SYNTAX OCTET STRING

MAX-ACCESS read-only

STATUS current

DESCRIPTION

"The network layer address of the source host in this conversation.

This is represented as an octet string with specific semantics and length as identified by the associated nlMatrixTopNProtocolDirLocalIndex.

For example, if the protocolDirLocalIndex indicates an encapsulation of ip, this object is encoded as a length octet of 4, followed by the 4 octets of the ip address, in network byte order."

::= { nlMatrixTopNHighCapacityEntry 2 }

nlMatrixTopNHighCapacityDestAddress OBJECT-TYPE

SYNTAX OCTET STRING

MAX-ACCESS read-only

STATUS current

DESCRIPTION

"The network layer address of the destination host in this conversation.

This is represented as an octet string with specific semantics and length as identified by the associated nlMatrixTopNProtocolDirLocalIndex.

For example, if the nlMatrixTopNProtocolDirLocalIndex indicates an encapsulation of ip, this object is encoded as a length octet of 4, followed by the 4 octets of the ip address, in network byte order."

::= { nlMatrixTopNHighCapacityEntry 3 }

nlMatrixTopNHighCapacityBasePktRate OBJECT-TYPE

SYNTAX Gauge32

UNITS "Packets"

MAX-ACCESS read-only

STATUS current

DESCRIPTION

"The number of packets seen from the source host to the destination host during this sampling interval, modulo 2³², counted using the rules for counting the

```
nlMatrixSDPkts object."
 ::= { nlMatrixTopNHighCapacityEntry 4 }
```

```
nlMatrixTopNHighCapacityOverflowPktRate OBJECT-TYPE
```

```
SYNTAX      Gauge32
```

```
UNITS       "Packets"
```

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

```
STATUS      current
```

```
DESCRIPTION
```

```
"The number of packets seen from the source host
to the destination host during this sampling interval,
divided by 2^32, truncating fractions (i.e., X DIV 2^32),
and counted using the rules for counting the
nlMatrixSDPkts object."
```

```
 ::= { nlMatrixTopNHighCapacityEntry 5 }
```

```
nlMatrixTopNHighCapacityPktRate OBJECT-TYPE
```

```
SYNTAX      CounterBasedGauge64
```

```
UNITS       "Packets"
```

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

```
STATUS      current
```

```
DESCRIPTION
```

```
"The number of packets seen from the source host to the
destination host during this sampling interval, counted
using the rules for counting the nlMatrixSDPkts object.
If the value of nlMatrixTopNControlRateBase is
nlMatrixTopNHighCapacityPkts, this variable will be
used to sort this report."
```

```
 ::= { nlMatrixTopNHighCapacityEntry 6 }
```

```
nlMatrixTopNHighCapacityReverseBasePktRate OBJECT-TYPE
```

```
SYNTAX      Gauge32
```

```
UNITS       "Packets"
```

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

```
STATUS      current
```

```
DESCRIPTION
```

```
"The number of packets seen from the destination host to the
source host during this sampling interval, modulo 2^32, counted
using the rules for counting the nlMatrixSDPkts object (note
that the corresponding nlMatrixSDPkts object selected is the
one whose source address is equal to nlMatrixTopNDestAddress
and whose destination address is equal to
nlMatrixTopNSourceAddress.)"
```

```
Note that if the value of nlMatrixTopNControlRateBase is equal
to nlMatrixTopNHighCapacityPkts, the sort of topN entries is
based entirely on nlMatrixTopNHighCapacityPktRate, and not on
the value of this object."
```

```
::= { nlMatrixTopNHighCapacityEntry 7 }
```

```
nlMatrixTopNHighCapacityReverseOverflowPktRate OBJECT-TYPE
```

```
SYNTAX      Gauge32
UNITS       "Packets"
MAX-ACCESS  read-only
STATUS      current
DESCRIPTION
```

"The number of packets seen from the destination host to the source host during this sampling interval, divided by 2^{32} , truncating fractions (i.e., $X \text{ DIV } 2^{32}$), and counted using the rules for counting the nlMatrixSDPkts object (note that the corresponding nlMatrixSDPkts object selected is the one whose source address is equal to nlMatrixTopNDestAddress and whose destination address is equal to nlMatrixTopNSourceAddress.)

Note that if the value of nlMatrixTopNControlRateBase is equal to nlMatrixTopNHighCapacityPkts, the sort of topN entries is based entirely on nlMatrixTopNHighCapacityPktRate, and not on the value of this object."

```
::= { nlMatrixTopNHighCapacityEntry 8 }
```

```
nlMatrixTopNHighCapacityReversePktRate OBJECT-TYPE
```

```
SYNTAX      CounterBasedGauge64
UNITS       "Packets"
MAX-ACCESS  read-only
STATUS      current
DESCRIPTION
```

"The number of packets seen from the destination host to the source host during this sampling interval, counted using the rules for counting the nlMatrixSDPkts object (note that the corresponding nlMatrixSDPkts object selected is the one whose source address is equal to nlMatrixTopNDestAddress and whose destination address is equal to nlMatrixTopNSourceAddress.)

Note that if the value of nlMatrixTopNControlRateBase is equal to nlMatrixTopNHighCapacityPkts, the sort of topN entries is based entirely on nlMatrixTopNHighCapacityPktRate, and not on the value of this object."

```
::= { nlMatrixTopNHighCapacityEntry 9 }
```

```
nlMatrixTopNHighCapacityBaseOctetRate OBJECT-TYPE
```

```
SYNTAX      Gauge32
UNITS       "Octets"
MAX-ACCESS  read-only
STATUS      current
```

DESCRIPTION

"The number of octets seen from the source host to the destination host during this sampling interval, modulo 2^{32} , counted using the rules for counting the nlMatrixSDOctets object."

::= { nlMatrixTopNHighCapacityEntry 10 }

nlMatrixTopNHighCapacityOverflowOctetRate OBJECT-TYPE

SYNTAX Gauge32

UNITS "Octets"

MAX-ACCESS read-only

STATUS current

DESCRIPTION

"The number of octets seen from the source host to the destination host during this sampling interval, divided by 2^{32} , truncating fractions (i.e., $X \text{ DIV } 2^{32}$), and counted using the rules for counting the nlMatrixSDOctets object."

::= { nlMatrixTopNHighCapacityEntry 11 }

nlMatrixTopNHighCapacityOctetRate OBJECT-TYPE

SYNTAX CounterBasedGauge64

UNITS "Octets"

MAX-ACCESS read-only

STATUS current

DESCRIPTION

"The number of octets seen from the source host to the destination host during this sampling interval, counted using the rules for counting the nlMatrixSDOctets object.
If the value of nlMatrixTopNControlRateBase is nlMatrixTopNHighCapacityOctets, this variable will be used to sort this report."

::= { nlMatrixTopNHighCapacityEntry 12 }

nlMatrixTopNHighCapacityReverseBaseOctetRate OBJECT-TYPE

SYNTAX Gauge32

UNITS "Octets"

MAX-ACCESS read-only

STATUS current

DESCRIPTION

"The number of octets seen from the destination host to the source host during this sampling interval, modulo 2^{32} , counted using the rules for counting the nlMatrixSDOctets object (note that the corresponding nlMatrixSDOctets object selected is the one whose source address is equal to nlMatrixTopNDestAddress and whose destination address is equal to nlMatrixTopNSourceAddress.)"

Note that if the value of nlMatrixTopNControlRateBase is equal to nlMatrixTopNHighCapacityOctets, the sort of topN entries is based entirely on nlMatrixTopNHighCapacityOctetRate, and not on the value of this object."

```
::= { nlMatrixTopNHighCapacityEntry 13 }
```

```
nlMatrixTopNHighCapacityReverseOverflowOctetRate OBJECT-TYPE
```

```
SYNTAX      Gauge32
UNITS       "Octets"
MAX-ACCESS  read-only
STATUS      current
DESCRIPTION
```

"The number of octets seen from the destination host to the source host during this sampling interval, divided by 2³², truncating fractions (i.e., X DIV 2³²), and counted using the rules for counting the nlMatrixSDOctets object (note that the corresponding nlMatrixSDOctets object selected is the one whose source address is equal to nlMatrixTopNDestAddress and whose destination address is equal to nlMatrixTopNSourceAddress.)

Note that if the value of nlMatrixTopNControlRateBase is equal to nlMatrixTopNHighCapacityOctets, the sort of topN entries is based entirely on nlMatrixTopNHighCapacityOctetRate, and not on the value of this object."

```
::= { nlMatrixTopNHighCapacityEntry 14 }
```

```
nlMatrixTopNHighCapacityReverseOctetRate OBJECT-TYPE
```

```
SYNTAX      CounterBasedGauge64
UNITS       "Octets"
MAX-ACCESS  read-only
STATUS      current
DESCRIPTION
```

"The number of octets seen from the destination host to the source host during this sampling interval, counted using the rules for counting the nlMatrixSDOctets object (note that the corresponding nlMatrixSDOctets object selected is the one whose source address is equal to nlMatrixTopNDestAddress and whose destination address is equal to nlMatrixTopNSourceAddress.)

Note that if the value of nlMatrixTopNControlRateBase is equal to nlMatrixTopNHighCapacityOctets, the sort of topN entries is based entirely on nlMatrixTopNHighCapacityOctetRate, and not on the value of this object."

```
::= { nlMatrixTopNHighCapacityEntry 15 }
```

```
-- High Capacity extensions for the alHostTable
```

```

alHostHighCapacityTable OBJECT-TYPE
    SYNTAX      SEQUENCE OF AlHostHighCapacityEntry
    MAX-ACCESS not-accessible
    STATUS      current
    DESCRIPTION
        "Contains the High Capacity RMON extensions to the RMON-2
        alHostTable."
    ::= { alHost 2 }

alHostHighCapacityEntry OBJECT-TYPE
    SYNTAX      AlHostHighCapacityEntry
    MAX-ACCESS not-accessible
    STATUS      current
    DESCRIPTION
        "Contains the High Capacity RMON extensions to the RMON-2
        alHostEntry. These objects will be created by the agent
        for all alHostEntries associated with whichever
        hlHostControlEntries it deems appropriate. (i.e., either all
        alHostHighCapacityEntries associated with a particular
        hlHostControlEntry will be created, or none of them will
        be.)"
    INDEX { hlHostControlIndex, alHostTimeMark,
            protocolDirLocalIndex, nlHostAddress,
            protocolDirLocalIndex }
    ::= { alHostHighCapacityTable 1 }

AlHostHighCapacityEntry ::= SEQUENCE {
    alHostHighCapacityInOverflowPkts    ZeroBasedCounter32,
    alHostHighCapacityInPkts           ZeroBasedCounter64,
    alHostHighCapacityOutOverflowPkts   ZeroBasedCounter32,
    alHostHighCapacityOutPkts          ZeroBasedCounter64,
    alHostHighCapacityInOverflowOctets  ZeroBasedCounter32,
    alHostHighCapacityInOctets         ZeroBasedCounter64,
    alHostHighCapacityOutOverflowOctets ZeroBasedCounter32,
    alHostHighCapacityOutOctets        ZeroBasedCounter64
}

alHostHighCapacityInOverflowPkts OBJECT-TYPE
    SYNTAX      ZeroBasedCounter32
    UNITS       "Packets"
    MAX-ACCESS read-only
    STATUS      current
    DESCRIPTION
        "The number of times the associated alHostInPkts
        counter has overflowed."
    ::= { alHostHighCapacityEntry 1 }

```

alHostHighCapacityInPkts OBJECT-TYPE

SYNTAX ZeroBasedCounter64

UNITS "Packets"

MAX-ACCESS read-only

STATUS current

DESCRIPTION

"The number of packets of this protocol type without errors transmitted to this address since it was added to the alHostHighCapacityTable. Note that this is the number of link-layer packets, so if a single network-layer packet is fragmented into several link-layer frames, this counter is incremented several times."

::= { alHostHighCapacityEntry 2 }

alHostHighCapacityOutOverflowPkts OBJECT-TYPE

SYNTAX ZeroBasedCounter32

UNITS "Packets"

MAX-ACCESS read-only

STATUS current

DESCRIPTION

"The number of times the associated alHostOutPkts counter has overflowed."

::= { alHostHighCapacityEntry 3 }

alHostHighCapacityOutPkts OBJECT-TYPE

SYNTAX ZeroBasedCounter64

UNITS "Packets"

MAX-ACCESS read-only

STATUS current

DESCRIPTION

"The number of packets of this protocol type without errors transmitted by this address since it was added to the alHostHighCapacityTable. Note that this is the number of link-layer packets, so if a single network-layer packet is fragmented into several link-layer frames, this counter is incremented several times."

::= { alHostHighCapacityEntry 4 }

alHostHighCapacityInOverflowOctets OBJECT-TYPE

SYNTAX ZeroBasedCounter32

UNITS "Octets"

MAX-ACCESS read-only

STATUS current

DESCRIPTION

"The number of times the associated alHostInOctets counter has overflowed."

::= { alHostHighCapacityEntry 5 }

`alHostHighCapacityInOctets OBJECT-TYPE``SYNTAX ZeroBasedCounter64``UNITS "Octets"``MAX-ACCESS read-only``STATUS current``DESCRIPTION`

"The number of octets transmitted to this address of this protocol type since it was added to the `alHostHighCapacityTable` (excluding framing bits but including FCS octets), excluding those octets in packets that contained errors.

Note this doesn't count just those octets in the particular protocol frames, but includes the entire packet that contained the protocol."

`::= { alHostHighCapacityEntry 6 }``alHostHighCapacityOutOverflowOctets OBJECT-TYPE``SYNTAX ZeroBasedCounter32``UNITS "Octets"``MAX-ACCESS read-only``STATUS current``DESCRIPTION`

"The number of times the associated `alHostOutOctets` counter has overflowed."

`::= { alHostHighCapacityEntry 7 }``alHostHighCapacityOutOctets OBJECT-TYPE``SYNTAX ZeroBasedCounter64``UNITS "Octets"``MAX-ACCESS read-only``STATUS current``DESCRIPTION`

"The number of octets transmitted by this address of this protocol type since it was added to the `alHostHighCapacityTable` (excluding framing bits but including FCS octets), excluding those octets in packets that contained errors.

Note this doesn't count just those octets in the particular protocol frames, but includes the entire packet that contained the protocol."

`::= { alHostHighCapacityEntry 8 }`

-- High Capacity extensions for the `alMatrixSDTable`

`alMatrixSDHighCapacityTable OBJECT-TYPE``SYNTAX SEQUENCE OF AlMatrixSDHighCapacityEntry`

```

MAX-ACCESS not-accessible
STATUS      current
DESCRIPTION
    "Contains the High Capacity RMON extensions to the RMON-2
    alMatrixSDTable."
 ::= { alMatrix 5 }

```

```

alMatrixSDHighCapacityEntry OBJECT-TYPE
SYNTAX      AlMatrixSDHighCapacityEntry
MAX-ACCESS not-accessible
STATUS      current
DESCRIPTION
    "Contains the High Capacity RMON extensions to the RMON-2
    alMatrixSDEntry. These objects will be created by the agent
    for all alMatrixSDEntries associated with whichever
    hlMatrixControlEntries it deems appropriate. (i.e., either all
    alMatrixSDHighCapacityEntries associated with a particular
    hlMatrixControlEntry will be created, or none of them will
    be.)"
INDEX { hlMatrixControlIndex, alMatrixSDTimeMark,
        protocolDirLocalIndex,
        nlMatrixSDSourceAddress, nlMatrixSDDestAddress,
        protocolDirLocalIndex }
 ::= { alMatrixSDHighCapacityTable 1 }

```

```

AlMatrixSDHighCapacityEntry ::= SEQUENCE {
    alMatrixSDHighCapacityOverflowPkts  ZeroBasedCounter32,
    alMatrixSDHighCapacityPkts         ZeroBasedCounter64,
    alMatrixSDHighCapacityOverflowOctets ZeroBasedCounter32,
    alMatrixSDHighCapacityOctets       ZeroBasedCounter64
}

```

```

alMatrixSDHighCapacityOverflowPkts OBJECT-TYPE
SYNTAX      ZeroBasedCounter32
UNITS       "Packets"
MAX-ACCESS read-only
STATUS      current
DESCRIPTION
    "The number of times the associated alMatrixSDPkts
    counter has overflowed."
 ::= { alMatrixSDHighCapacityEntry 1 }

```

```

alMatrixSDHighCapacityPkts OBJECT-TYPE
SYNTAX      ZeroBasedCounter64
UNITS       "Packets"
MAX-ACCESS read-only
STATUS      current
DESCRIPTION

```

"The number of good packets of this protocol type transmitted from the source address to the destination address since this entry was added to the alMatrixSDHighCapacityTable. Note that this is the number of link-layer packets, so if a single network-layer packet is fragmented into several link-layer frames, this counter is incremented several times."

```
::= { alMatrixSDHighCapacityEntry 2 }
```

```
alMatrixSDHighCapacityOverflowOctets OBJECT-TYPE
```

```
SYNTAX      ZeroBasedCounter32
```

```
UNITS       "Octets"
```

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

```
STATUS      current
```

```
DESCRIPTION
```

"The number of times the associated alMatrixSDOctets counter has overflowed."

```
::= { alMatrixSDHighCapacityEntry 3 }
```

```
alMatrixSDHighCapacityOctets OBJECT-TYPE
```

```
SYNTAX      ZeroBasedCounter64
```

```
UNITS       "Octets"
```

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

```
STATUS      current
```

```
DESCRIPTION
```

"The number of octets in good packets of this protocol type transmitted from the source address to the destination address since this entry was added to the alMatrixSDHighCapacityTable (excluding framing bits but including FCS octets).

Note this doesn't count just those octets in the particular protocol frames, but includes the entire packet that contained the protocol."

```
::= { alMatrixSDHighCapacityEntry 4 }
```

```
-- High Capacity extensions for the alMatrixDSTable
```

```
alMatrixDSHighCapacityTable OBJECT-TYPE
```

```
SYNTAX      SEQUENCE OF AlMatrixDSHighCapacityEntry
```

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

```
STATUS      current
```

```
DESCRIPTION
```

"Contains the High Capacity RMON extensions to the RMON-2 alMatrixDSTable."

```
::= { alMatrix 6 }
```

```
alMatrixDSHighCapacityEntry OBJECT-TYPE
```

```
SYNTAX      AlMatrixDSHighCapacityEntry
```

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

STATUS current

DESCRIPTION

"Contains the High Capacity RMON extensions to the RMON-2 alMatrixSDTable. These objects will be created by the agent for all alMatrixDSEntries associated with whichever hlMatrixControlEntries it deems appropriate. (i.e., either all alMatrixDSHighCapacityEntries associated with a particular hlMatrixControlEntry will be created, or none of them will be.)"

INDEX { hlMatrixControlIndex, alMatrixDSTimeMark,
protocolDirLocalIndex,
nlMatrixDSDestAddress, nlMatrixDSSourceAddress,
protocolDirLocalIndex }
::= { alMatrixDSHighCapacityTable 1 }

alMatrixDSHighCapacityEntry ::= SEQUENCE {
alMatrixDSHighCapacityOverflowPkts ZeroBasedCounter32,
alMatrixDSHighCapacityPkts ZeroBasedCounter64,
alMatrixDSHighCapacityOverflowOctets ZeroBasedCounter32,
alMatrixDSHighCapacityOctets ZeroBasedCounter64
}

alMatrixDSHighCapacityOverflowPkts OBJECT-TYPE

SYNTAX ZeroBasedCounter32

UNITS "Packets"

MAX-ACCESS read-only

STATUS current

DESCRIPTION

"The number of times the associated alMatrixDSPkts counter has overflowed."

::= { alMatrixDSHighCapacityEntry 1 }

alMatrixDSHighCapacityPkts OBJECT-TYPE

SYNTAX ZeroBasedCounter64

UNITS "Packets"

MAX-ACCESS read-only

STATUS current

DESCRIPTION

"The number of good packets of this protocol type transmitted from the source address to the destination address since this entry was added to the alMatrixDSHighCapacityTable. Note that this is the number of link-layer packets, so if a single network-layer packet is fragmented into several link-layer frames, this counter is incremented several times."

::= { alMatrixDSHighCapacityEntry 2 }

alMatrixDSHighCapacityOverflowOctets OBJECT-TYPE

SYNTAX ZeroBasedCounter32

```

UNITS          "Octets"
MAX-ACCESS    read-only
STATUS        current
DESCRIPTION
    "The number of times the associated alMatrixDSOctets
    counter has overflowed."
 ::= { alMatrixDSHighCapacityEntry 3 }

```

```

alMatrixDSHighCapacityOctets OBJECT-TYPE
SYNTAX        ZeroBasedCounter64
UNITS          "Octets"
MAX-ACCESS    read-only
STATUS        current
DESCRIPTION
    "The number of octets in good packets of this protocol type
    transmitted from the source address to the destination address
    since this entry was added to the alMatrixDSHighCapacityTable
    (excluding framing bits but including FCS octets).

    Note this doesn't count just those octets in the particular
    protocol frames, but includes the entire packet that contained
    the protocol."
 ::= { alMatrixDSHighCapacityEntry 4 }

```

```

alMatrixTopNHighCapacityTable OBJECT-TYPE
SYNTAX        SEQUENCE OF AlMatrixTopNHighCapacityEntry
MAX-ACCESS    not-accessible
STATUS        current
DESCRIPTION
    "Contains the High Capacity RMON extensions to the RMON-2
    alMatrixTopNTable when alMatrixTopNControlRateBase specifies
    a High Capacity TopN Report."
 ::= { alMatrix 7 }

```

```

alMatrixTopNHighCapacityEntry OBJECT-TYPE
SYNTAX        AlMatrixTopNHighCapacityEntry
MAX-ACCESS    not-accessible
STATUS        current
DESCRIPTION
    "Contains the High Capacity RMON extensions to the RMON-2
    alMatrixTopNEntry when alMatrixTopNControlRateBase specifies
    a High Capacity TopN Report. These objects will be created by
    the agent for all alMatrixTopNEntries associated with whichever
    alMatrixTopNControlEntries have a alMatrixTopNControlRateBase
    that specify a high capacity report."
INDEX { alMatrixTopNControlIndex, alMatrixTopNIndex }
 ::= { alMatrixTopNHighCapacityTable 1 }

```

```

alMatrixTopNHighCapacityEntry ::= SEQUENCE {
    alMatrixTopNHighCapacityProtocolDirLocalIndex    Integer32,
    alMatrixTopNHighCapacitySourceAddress            OCTET STRING,
    alMatrixTopNHighCapacityDestAddress              OCTET STRING,
    alMatrixTopNHighCapacityAppProtocolDirLocalIndex Integer32,
    alMatrixTopNHighCapacityBasePktRate              Gauge32,
    alMatrixTopNHighCapacityOverflowPktRate          Gauge32,
    alMatrixTopNHighCapacityPktRate                  CounterBasedGauge64,
    alMatrixTopNHighCapacityReverseBasePktRate       Gauge32,
    alMatrixTopNHighCapacityReverseOverflowPktRate   Gauge32,
    alMatrixTopNHighCapacityReversePktRate           CounterBasedGauge64,
    alMatrixTopNHighCapacityBaseOctetRate            Gauge32,
    alMatrixTopNHighCapacityOverflowOctetRate        Gauge32,
    alMatrixTopNHighCapacityOctetRate                 CounterBasedGauge64,
    alMatrixTopNHighCapacityReverseBaseOctetRate     Gauge32,
    alMatrixTopNHighCapacityReverseOverflowOctetRate Gauge32,
    alMatrixTopNHighCapacityReverseOctetRate         CounterBasedGauge64
}

```

```

alMatrixTopNHighCapacityProtocolDirLocalIndex OBJECT-TYPE
    SYNTAX      Integer32 (1..2147483647)
    MAX-ACCESS  read-only
    STATUS      current
    DESCRIPTION
        "The protocolDirLocalIndex of the network layer protocol of
        this entry's network address."
    ::= { alMatrixTopNHighCapacityEntry 1 }

```

```

alMatrixTopNHighCapacitySourceAddress OBJECT-TYPE
    SYNTAX      OCTET STRING
    MAX-ACCESS  read-only
    STATUS      current
    DESCRIPTION
        "The network layer address of the source host in this
        conversation.

        This is represented as an octet string with
        specific semantics and length as identified
        by the associated alMatrixTopNProtocolDirLocalIndex.

        For example, if the alMatrixTopNProtocolDirLocalIndex
        indicates an encapsulation of ip, this object is encoded as a
        length octet of 4, followed by the 4 octets of the ip address,
        in network byte order."
    ::= { alMatrixTopNHighCapacityEntry 2 }

```

```

alMatrixTopNHighCapacityDestAddress OBJECT-TYPE
    SYNTAX      OCTET STRING

```

MAX-ACCESS read-only
 STATUS current
 DESCRIPTION

"The network layer address of the destination host in this conversation.

This is represented as an octet string with specific semantics and length as identified by the associated alMatrixTopNProtocolDirLocalIndex.

For example, if the alMatrixTopNProtocolDirLocalIndex indicates an encapsulation of ip, this object is encoded as a length octet of 4, followed by the 4 octets of the ip address, in network byte order."

::= { alMatrixTopNHighCapacityEntry 3 }

alMatrixTopNHighCapacityAppProtocolDirLocalIndex OBJECT-TYPE

SYNTAX Integer32
 MAX-ACCESS read-only
 STATUS current
 DESCRIPTION

"The type of the protocol counted by this entry."

::= { alMatrixTopNHighCapacityEntry 4 }

alMatrixTopNHighCapacityBasePktRate OBJECT-TYPE

SYNTAX Gauge32
 UNITS "Packets"
 MAX-ACCESS read-only
 STATUS current
 DESCRIPTION

"The number of packets seen of this protocol from the source host to the destination host during this sampling interval, modulo 2^{32} , counted using the rules for counting the alMatrixSDPkts object."

::= { alMatrixTopNHighCapacityEntry 5 }

alMatrixTopNHighCapacityOverflowPktRate OBJECT-TYPE

SYNTAX Gauge32
 UNITS "Packets"
 MAX-ACCESS read-only
 STATUS current
 DESCRIPTION

"The number of packets seen of this protocol from the source host to the destination host during this sampling interval, divided by 2^{32} , truncating fractions (i.e., $X \text{ DIV } 2^{32}$), and counted using the rules for counting the alMatrixSDPkts object."

::= { alMatrixTopNHighCapacityEntry 6 }

`alMatrixTopNHighCapacityPktRate OBJECT-TYPE``SYNTAX CounterBasedGauge64``UNITS "Packets"``MAX-ACCESS read-only``STATUS current``DESCRIPTION`

"The number of packets seen of this protocol from the source host to the destination host during this sampling interval, counted using the rules for counting the `alMatrixSDPkts` object.

If the value of `alMatrixTopNControlRateBase` is `alMatrixTopNTerminalsPkts`, `alMatrixTopNAllPkts`, `alMatrixTopNTerminalsHighCapacityPkts`, or `alMatrixTopNAllHighCapacityPkts`, this variable will be used to sort this report."

`::= { alMatrixTopNHighCapacityEntry 7 }``alMatrixTopNHighCapacityReverseBasePktRate OBJECT-TYPE``SYNTAX Gauge32``UNITS "Packets"``MAX-ACCESS read-only``STATUS current``DESCRIPTION`

"The number of packets seen of this protocol from the destination host to the source host during this sampling interval, modulo 2^{32} , counted using the rules for counting the `alMatrixSDPkts` object (note that the corresponding `alMatrixSDPkts` object selected is the one whose source address is equal to `alMatrixTopNDestAddress` and whose destination address is equal to `alMatrixTopNSourceAddress`.)"

`::= { alMatrixTopNHighCapacityEntry 8 }``alMatrixTopNHighCapacityReverseOverflowPktRate OBJECT-TYPE``SYNTAX Gauge32``UNITS "Packets"``MAX-ACCESS read-only``STATUS current``DESCRIPTION`

"The number of packets seen of this protocol from the destination host to the source host during this sampling interval, divided by 2^{32} , truncating fractions (i.e., $X \text{ DIV } 2^{32}$), and counted using the rules for counting the `alMatrixSDPkts` object (note that the corresponding `alMatrixSDPkts` object selected is the one whose source address is equal to `alMatrixTopNDestAddress` and whose destination address is equal to `alMatrixTopNSourceAddress`.)"

`::= { alMatrixTopNHighCapacityEntry 9 }`

alMatrixTopNHighCapacityReversePktRate OBJECT-TYPE

SYNTAX CounterBasedGauge64

UNITS "Packets"

MAX-ACCESS read-only

STATUS current

DESCRIPTION

"The number of packets seen of this protocol from the destination host to the source host during this sampling interval, counted using the rules for counting the alMatrixSDPkts object (note that the corresponding alMatrixSDPkts object selected is the one whose source address is equal to alMatrixTopNDestAddress and whose destination address is equal to alMatrixTopNSourceAddress.)"

::= { alMatrixTopNHighCapacityEntry 10 }

alMatrixTopNHighCapacityBaseOctetRate OBJECT-TYPE

SYNTAX Gauge32

UNITS "Octets"

MAX-ACCESS read-only

STATUS current

DESCRIPTION

"The number of octets seen of this protocol from the source host to the destination host during this sampling interval, modulo 2^{32} , counted using the rules for counting the alMatrixSDOctets object."

::= { alMatrixTopNHighCapacityEntry 11 }

alMatrixTopNHighCapacityOverflowOctetRate OBJECT-TYPE

SYNTAX Gauge32

UNITS "Octets"

MAX-ACCESS read-only

STATUS current

DESCRIPTION

"The number of octets seen of this protocol from the source host to the destination host during this sampling interval, divided by 2^{32} , truncating fractions (i.e., $X \text{ DIV } 2^{32}$), and counted using the rules for counting the alMatrixSDOctets object."

::= { alMatrixTopNHighCapacityEntry 12 }

alMatrixTopNHighCapacityOctetRate OBJECT-TYPE

SYNTAX CounterBasedGauge64

UNITS "Octets"

MAX-ACCESS read-only

STATUS current

DESCRIPTION

"The number of octets seen of this protocol from the source host to the destination host during this sampling interval,

counted using the rules for counting the
alMatrixSDOctets object.

If the value of alMatrixTopNControlRateBase is
alMatrixTopNTerminalsOctets, alMatrixTopNAllOctets,
alMatrixTopNTerminalsHighCapacityOctets, or
alMatrixTopNAllHighCapacityOctets, this variable will be used
to sort this report."

```
::= { alMatrixTopNHighCapacityEntry 13 }
```

alMatrixTopNHighCapacityReverseBaseOctetRate OBJECT-TYPE

SYNTAX Gauge32

UNITS "Octets"

MAX-ACCESS read-only

STATUS current

DESCRIPTION

"The number of octets seen of this protocol from the
destination host to the source host during this sampling
interval, modulo 2³², counted using the rules for counting
the alMatrixSDOctets object (note that the corresponding
alMatrixSDOctets object selected is the one whose source
address is equal to alMatrixTopNDestAddress and whose
destination address is equal to alMatrixTopNSourceAddress.)"

```
::= { alMatrixTopNHighCapacityEntry 14 }
```

alMatrixTopNHighCapacityReverseOverflowOctetRate OBJECT-TYPE

SYNTAX Gauge32

UNITS "Octets"

MAX-ACCESS read-only

STATUS current

DESCRIPTION

"The number of octets seen of this protocol from the
destination host to the source host during this sampling
interval, divided by 2³², truncating fractions (i.e., X DIV
2³²), and counted using the rules for counting the
alMatrixSDOctets object (note that the corresponding
alMatrixSDOctets object selected is the one whose source
address is equal to alMatrixTopNDestAddress and whose
destination address is equal to alMatrixTopNSourceAddress.)"

```
::= { alMatrixTopNHighCapacityEntry 15 }
```

alMatrixTopNHighCapacityReverseOctetRate OBJECT-TYPE

SYNTAX CounterBasedGauge64

UNITS "Octets"

MAX-ACCESS read-only

STATUS current

DESCRIPTION

"The number of octets seen of this protocol from the
destination host to the source host during this sampling

interval, counted using the rules for counting the alMatrixSDOctets object (note that the corresponding alMatrixSDOctets object selected is the one whose source address is equal to alMatrixTopNDestAddress and whose destination address is equal to alMatrixTopNSourceAddress.)"

```
::= { alMatrixTopNHHighCapacityEntry 16 }
```

```
usrHistoryHighCapacityTable OBJECT-TYPE
  SYNTAX SEQUENCE OF UsrHistoryHighCapacityEntry
  MAX-ACCESS not-accessible
  STATUS current
  DESCRIPTION
    "Contains the High Capacity RMON extensions to the RMON-2
    usrHistoryTable."
    ::= { usrHistory 4 }
```

```
usrHistoryHighCapacityEntry OBJECT-TYPE
  SYNTAX UsrHistoryHighCapacityEntry
  MAX-ACCESS not-accessible
  STATUS current
  DESCRIPTION
    "Contains the High Capacity RMON extensions to the RMON-2
    usrHistoryEntry. These objects will be created by the agent
    for all usrHistoryEntries associated with whichever
    usrHistoryControlEntries it deems appropriate. (i.e., either all
    usrHistoryHighCapacityEntries associated with a particular
    usrHistoryControlEntry will be created, or none of them will
    be.)"
  INDEX { usrHistoryControlIndex, usrHistorySampleIndex,
          usrHistoryObjectIndex }
  ::= { usrHistoryHighCapacityTable 1 }
```

```
UsrHistoryHighCapacityEntry ::= SEQUENCE {
  usrHistoryHighCapacityOverflowAbsValue Gauge32,
  usrHistoryHighCapacityAbsValue CounterBasedGauge64
}
```

```
usrHistoryHighCapacityOverflowAbsValue OBJECT-TYPE
  SYNTAX Gauge32
  MAX-ACCESS read-only
  STATUS current
  DESCRIPTION
    "The absolute value (i.e. unsigned value) of the
    user-specified statistic during the last sampling period,
    divided by 2^32, truncating fractions (i.e., X DIV 2^32).
    The value during the current sampling period is not made
    available until the period is completed."
```

To obtain the true value for this sampling interval, the associated instance of `usrHistoryValStatus` should be checked, and `usrHistoryAbsValue` adjusted as necessary.

If the MIB instance could not be accessed during the sampling interval, then this object will have a value of zero and the associated instance of `usrHistoryValStatus` will be set to `'valueNotAvailable(1)'`.

```
::= { usrHistoryHighCapacityEntry 1 }
```

`usrHistoryHighCapacityAbsValue` OBJECT-TYPE

SYNTAX CounterBasedGauge64

MAX-ACCESS read-only

STATUS current

DESCRIPTION

"The absolute value (i.e. unsigned value) of the user-specified statistic during the last sampling period. The value during the current sampling period is not made available until the period is completed.

To obtain the true value for this sampling interval, the associated instance of `usrHistoryValStatus` should be checked, and `usrHistoryHighCapacityAbsValue` adjusted as necessary.

If the MIB instance could not be accessed during the sampling interval, then this object will have a value of zero and the associated instance of `usrHistoryValStatus` will be set to `'valueNotAvailable(1)'`.

```
::= { usrHistoryHighCapacityEntry 2 }
```

```
--
```

```
-- High Capacity RMON Probe Capabilities
```

```
--
```

`hcRMONCapabilities` OBJECT-TYPE

SYNTAX BITS {

```
mediaIndependentGroup(0),
etherStatsHighCapacityGroup(1),
etherHistoryHighCapacityGroup(2),
hostHighCapacityGroup(3),
hostTopNHighCapacityGroup(4),
matrixHighCapacityGroup(5),
captureBufferHighCapacityGroup(6),
protocolDistributionHighCapacityGroup(7),
nlHostHighCapacityGroup(8),
nlMatrixHighCapacityGroup(9),
nlMatrixTopNHighCapacityGroup(10),
alHostHighCapacityGroup(11),
alMatrixHighCapacityGroup(12),
```

```

        alMatrixTopNHighCapacityGroup(13),
        usrHistoryHighCapacityGroup(14)
    }
MAX-ACCESS read-only
STATUS current
DESCRIPTION
    "An indication of the High Capacity RMON MIB groups supported
    on at least one interface by this probe."
 ::= { probeConfig 16 }

-- Conformance Macros

hcRmonMIBCompliances OBJECT IDENTIFIER ::= { rmonConformance 6 }
hcRmonMIBGroups      OBJECT IDENTIFIER ::= { rmonConformance 7 }

hcMediaIndependentCompliance MODULE-COMPLIANCE
    STATUS current
    DESCRIPTION
        "Describes the requirements for conformance to the
        High Capacity Media Independent Group."
    MODULE -- this module
    MANDATORY-GROUPS { mediaIndependentGroup, hcRMONInformationGroup }
    ::= { hcRmonMIBCompliances 1 }

hcRmon1MIBCompliance MODULE-COMPLIANCE
    STATUS current
    DESCRIPTION
        "Describes the requirements for conformance to the High
        Capacity RMON-1 MIB"
    MODULE -- this module
    GROUP etherStatsHighCapacityGroup
    DESCRIPTION
        "The etherStatsHighCapacityGroup is optional but requires
        implementation of the rmonEtherStatsGroup."

    GROUP etherHistoryHighCapacityGroup
    DESCRIPTION
        "The etherHistoryHighCapacityGroup is optional but
        requires implementation of the rmonHistoryControlGroup and
        rmonEthernetHistoryGroup."

    GROUP hostHighCapacityGroup
    DESCRIPTION
        "The hostHighCapacityGroup is mandatory when the
        hostTopNHighCapacityGroup is implemented. This group also
        requires implementation of the rmonHostGroup."

    GROUP hostTopNHighCapacityGroup

```

DESCRIPTION

"The hostTopNHighCapacityGroup is optional but requires implementation of the rmonHostTopNGroup."

GROUP matrixHighCapacityGroup

DESCRIPTION

"The matrixHighCapacityGroup is optional but requires implementation of the rmonMatrixGroup."

GROUP captureBufferHighCapacityGroup

DESCRIPTION

"The captureBufferHighCapacityGroup is optional but requires implementation of the rmonFilterGroup and rmonPacketCaptureGroup."

MODULE RMON-MIB

GROUP rmonEtherStatsGroup

DESCRIPTION

"The RMON Ethernet Statistics Group is mandatory if the etherStatsHighCapacityGroup is implemented."

GROUP rmonHistoryControlGroup

DESCRIPTION

"The RMON History Control Group is mandatory if the etherHistoryHighCapacityGroup is implemented."

GROUP rmonEthernetHistoryGroup

DESCRIPTION

"The RMON Ethernet History Group is mandatory if the etherHistoryHighCapacityGroup is implemented."

GROUP rmonHostGroup

DESCRIPTION

"The RMON Host Group is mandatory if the hostHighCapacityGroup is implemented."

GROUP rmonHostTopNGroup

DESCRIPTION

"The RMON Host Top N Group is mandatory if the hostTopNHighCapacityGroup is implemented."

GROUP rmonMatrixGroup

DESCRIPTION

"The RMON Matrix Group is mandatory if the matrixHighCapacityGroup is implemented."

GROUP rmonFilterGroup

DESCRIPTION

"The RMON Filter Group is mandatory when the captureBufferHighCapacityGroup is implemented."

GROUP rmonPacketCaptureGroup

DESCRIPTION

"The RMON Packet Capture Group is mandatory when the captureBufferHighCapacityGroup is implemented."

::= { hcRmonMIBCompliances 2 }

hcRmon2MIBCompliance MODULE-COMPLIANCE

STATUS current

DESCRIPTION

"Describes the requirements for conformance to the High Capacity RMON-2 MIB"

MODULE -- this module

MANDATORY-GROUPS { protocolDistributionHighCapacityGroup,
nlHostHighCapacityGroup,
nlMatrixHighCapacityGroup,
nlMatrixTopNHighCapacityGroup,
usrHistoryHighCapacityGroup,
hcRMONInformationGroup }

MODULE RMON2-MIB

MANDATORY-GROUPS { protocolDirectoryGroup,
protocolDistributionGroup,
addressMapGroup,
nlHostGroup,
nlMatrixGroup,
usrHistoryGroup,
probeInformationGroup }

GROUP rmon1EnhancementGroup

DESCRIPTION

"The rmon1EnhancementGroup is mandatory for systems which implement RMON [RFC2819]"

::= { hcRmonMIBCompliances 3 }

hcRmon2MIBApplicationLayerCompliance MODULE-COMPLIANCE

STATUS current

DESCRIPTION

"Describes the requirements for conformance to the High Capacity RMON-2 MIB with Application Layer Enhancements."

MODULE -- this module

MANDATORY-GROUPS { protocolDistributionHighCapacityGroup,

nlHostHighCapacityGroup,
nlMatrixHighCapacityGroup,

```

nlMatrixTopNHighCapacityGroup,
alHostHighCapacityGroup,
alMatrixHighCapacityGroup,
alMatrixTopNHighCapacityGroup,
usrHistoryHighCapacityGroup,
hcrMONInformationGroup }

```

MODULE RMON2-MIB

```

MANDATORY-GROUPS { protocolDirectoryGroup,
                    protocolDistributionGroup,
                    addressMapGroup,
                    nlHostGroup,
                    nlMatrixGroup,
                    alHostGroup,
                    alMatrixGroup,
                    usrHistoryGroup,
                    probeInformationGroup }

```

GROUP rmon1EnhancementGroup

DESCRIPTION

"The rmon1EnhancementGroup is mandatory for systems which
implement RMON [RFC2819]"

```
 ::= { hcrmonMIBCompliances 4 }
```

mediaIndependentGroup OBJECT-GROUP

```

OBJECTS {mediaIndependentDataSource,
         mediaIndependentDropEvents,
         mediaIndependentDroppedFrames,
         mediaIndependentInPkts,
         mediaIndependentInOverflowPkts,
         mediaIndependentInHighCapacityPkts,
         mediaIndependentOutPkts,
         mediaIndependentOutOverflowPkts,
         mediaIndependentOutHighCapacityPkts,
         mediaIndependentInOctets,
         mediaIndependentInOverflowOctets,
         mediaIndependentInHighCapacityOctets,
         mediaIndependentOutOctets,
         mediaIndependentOutOverflowOctets,
         mediaIndependentOutHighCapacityOctets,
         mediaIndependentInNUCastPkts,
         mediaIndependentInNUCastOverflowPkts,
         mediaIndependentInNUCastHighCapacityPkts,
         mediaIndependentOutNUCastPkts,
         mediaIndependentOutNUCastOverflowPkts,
         mediaIndependentOutNUCastHighCapacityPkts,
         mediaIndependentInErrors,
         mediaIndependentOutErrors,
         mediaIndependentInputSpeed,

```

```

mediaIndependentOutputSpeed,
mediaIndependentDuplexMode,
mediaIndependentDuplexChanges,
mediaIndependentDuplexLastChange,
mediaIndependentOwner,
mediaIndependentStatus }

```

STATUS current

DESCRIPTION

"Collects utilization statistics for any type of network."

```
::= { hcRmonMIBGroups 1 }
```

etherStatsHighCapacityGroup OBJECT-GROUP

```

OBJECTS { etherStatsHighCapacityOverflowPkts,
etherStatsHighCapacityPkts,
etherStatsHighCapacityOverflowOctets,
etherStatsHighCapacityOctets,
etherStatsHighCapacityOverflowPkts64Octets,
etherStatsHighCapacityPkts64Octets,
etherStatsHighCapacityOverflowPkts65to127Octets,
etherStatsHighCapacityPkts65to127Octets,
etherStatsHighCapacityOverflowPkts128to255Octets,
etherStatsHighCapacityPkts128to255Octets,
etherStatsHighCapacityOverflowPkts256to511Octets,
etherStatsHighCapacityPkts256to511Octets,
etherStatsHighCapacityOverflowPkts512to1023Octets,
etherStatsHighCapacityPkts512to1023Octets,
etherStatsHighCapacityOverflowPkts1024to1518Octets,
etherStatsHighCapacityPkts1024to1518Octets }

```

STATUS current

DESCRIPTION

"Collects utilization statistics for ethernet networks."

```
::= { hcRmonMIBGroups 2 }
```

etherHistoryHighCapacityGroup OBJECT-GROUP

```

OBJECTS { etherHistoryHighCapacityOverflowPkts,
etherHistoryHighCapacityPkts,
etherHistoryHighCapacityOverflowOctets,
etherHistoryHighCapacityOctets }

```

STATUS current

DESCRIPTION

"Collects utilization statistics for ethernet networks."

```
::= { hcRmonMIBGroups 3 }
```

hostHighCapacityGroup OBJECT-GROUP

```

OBJECTS { hostHighCapacityInOverflowPkts,
hostHighCapacityInPkts,
hostHighCapacityOutOverflowPkts,
hostHighCapacityOutPkts,

```

```

hostHighCapacityInOverflowOctets,
hostHighCapacityInOctets,
hostHighCapacityOutOverflowOctets,
hostHighCapacityOutOctets,
hostTimeHighCapacityInOverflowPkts,
hostTimeHighCapacityInPkts,
hostTimeHighCapacityOutOverflowPkts,
hostTimeHighCapacityOutPkts,
hostTimeHighCapacityInOverflowOctets,
hostTimeHighCapacityInOctets,
hostTimeHighCapacityOutOverflowOctets,
hostTimeHighCapacityOutOctets }

```

STATUS current

DESCRIPTION

"Collects utilization and error statistics per host."

::= { hcRmonMIBGroups 4 }

hostTopNHighCapacityGroup OBJECT-GROUP

```

OBJECTS { hostTopNHighCapacityAddress,
          hostTopNHighCapacityBaseRate,
          hostTopNHighCapacityOverflowRate,
          hostTopNHighCapacityRate }

```

STATUS current

DESCRIPTION

"Prepares sorted reports of utilization and error statistics per host."

::= { hcRmonMIBGroups 5 }

matrixHighCapacityGroup OBJECT-GROUP

```

OBJECTS { matrixSDHighCapacityOverflowPkts,
          matrixSDHighCapacityPkts,
          matrixSDHighCapacityOverflowOctets,
          matrixSDHighCapacityOctets,
          matrixDSHighCapacityOverflowPkts,
          matrixDSHighCapacityPkts,
          matrixDSHighCapacityOverflowOctets,
          matrixDSHighCapacityOctets }

```

STATUS current

DESCRIPTION

"Collects utilization statistics per conversation."

::= { hcRmonMIBGroups 6 }

captureBufferHighCapacityGroup OBJECT-GROUP

```

OBJECTS { captureBufferPacketHighCapacityTime }

```

STATUS current

DESCRIPTION

"Provides finer granularity time stamps."

```
::= { hcRmonMIBGroups 7 }
```

```
protocolDistributionHighCapacityGroup OBJECT-GROUP
```

```
OBJECTS { protocolDistStatsHighCapacityOverflowPkts,  
           protocolDistStatsHighCapacityPkts,  
           protocolDistStatsHighCapacityOverflowOctets,  
           protocolDistStatsHighCapacityOctets }
```

```
STATUS current
```

```
DESCRIPTION
```

```
"Collects the relative amounts of octets and packets for the  
different protocols detected on a network segment."
```

```
::= { hcRmonMIBGroups 8 }
```

```
nlHostHighCapacityGroup OBJECT-GROUP
```

```
OBJECTS { nlHostHighCapacityInOverflowPkts,  
          nlHostHighCapacityInPkts,  
          nlHostHighCapacityOutOverflowPkts,  
          nlHostHighCapacityOutPkts,  
          nlHostHighCapacityInOverflowOctets,  
          nlHostHighCapacityInOctets,  
          nlHostHighCapacityOutOverflowOctets,  
          nlHostHighCapacityOutOctets }
```

```
STATUS current
```

```
DESCRIPTION
```

```
"Counts the amount of traffic sent from and to each network  
address discovered by the probe."
```

```
::= { hcRmonMIBGroups 9 }
```

```
nlMatrixHighCapacityGroup OBJECT-GROUP
```

```
OBJECTS { nlMatrixSDHighCapacityOverflowPkts,  
          nlMatrixSDHighCapacityPkts,  
          nlMatrixSDHighCapacityOverflowOctets,  
          nlMatrixSDHighCapacityOctets,  
          nlMatrixDSHighCapacityOverflowPkts,  
          nlMatrixDSHighCapacityPkts,  
          nlMatrixDSHighCapacityOverflowOctets,  
          nlMatrixDSHighCapacityOctets }
```

```
STATUS current
```

```
DESCRIPTION
```

```
"Counts the amount of traffic sent between each pair of  
network addresses discovered by the probe."
```

```
::= { hcRmonMIBGroups 10 }
```

```
nlMatrixTopNHighCapacityGroup OBJECT-GROUP
```

```
OBJECTS { nlMatrixTopNHighCapacityProtocolDirLocalIndex,  
          nlMatrixTopNHighCapacitySourceAddress,  
          nlMatrixTopNHighCapacityDestAddress,  
          nlMatrixTopNHighCapacityBasePktRate,
```

```

nlMatrixTopNHighCapacityOverflowPktRate,
nlMatrixTopNHighCapacityPktRate,
nlMatrixTopNHighCapacityReverseBasePktRate,
nlMatrixTopNHighCapacityReverseOverflowPktRate,
nlMatrixTopNHighCapacityReversePktRate,
nlMatrixTopNHighCapacityBaseOctetRate,
nlMatrixTopNHighCapacityOverflowOctetRate,
nlMatrixTopNHighCapacityOctetRate,
nlMatrixTopNHighCapacityReverseBaseOctetRate,
nlMatrixTopNHighCapacityReverseOverflowOctetRate,
nlMatrixTopNHighCapacityReverseOctetRate }

```

STATUS current

DESCRIPTION

"Prepares sorted reports of the amount of traffic sent between each pair of network addresses discovered by the probe."

```
::= { hcRmonMIBGroups 11 }
```

alHostHighCapacityGroup OBJECT-GROUP

```

OBJECTS { alHostHighCapacityInOverflowPkts,
          alHostHighCapacityInPkts,
          alHostHighCapacityOutOverflowPkts,
          alHostHighCapacityOutPkts,
          alHostHighCapacityInOverflowOctets,
          alHostHighCapacityInOctets,
          alHostHighCapacityOutOverflowOctets,
          alHostHighCapacityOutOctets }

```

STATUS current

DESCRIPTION

"Counts the amount of traffic, by protocol, sent from and to each network address discovered by the probe."

```
::= { hcRmonMIBGroups 12 }
```

alMatrixHighCapacityGroup OBJECT-GROUP

```

OBJECTS { alMatrixSDHighCapacityOverflowPkts,
          alMatrixSDHighCapacityPkts,
          alMatrixSDHighCapacityOverflowOctets,
          alMatrixSDHighCapacityOctets,
          alMatrixDSHighCapacityOverflowPkts,
          alMatrixDSHighCapacityPkts,
          alMatrixDSHighCapacityOverflowOctets,
          alMatrixDSHighCapacityOctets }

```

STATUS current

DESCRIPTION

"Counts the amount of traffic, by protocol, sent between each pair of network addresses discovered by the probe."

```
::= { hcRmonMIBGroups 13 }
```

```
alMatrixTopNHighCapacityGroup OBJECT-GROUP
  OBJECTS { alMatrixTopNHighCapacityProtocolDirLocalIndex,
            alMatrixTopNHighCapacitySourceAddress,
            alMatrixTopNHighCapacityDestAddress,
            alMatrixTopNHighCapacityAppProtocolDirLocalIndex,
            alMatrixTopNHighCapacityBasePktRate,
            alMatrixTopNHighCapacityOverflowPktRate,
            alMatrixTopNHighCapacityPktRate,
            alMatrixTopNHighCapacityReverseBasePktRate,
            alMatrixTopNHighCapacityReverseOverflowPktRate,
            alMatrixTopNHighCapacityReversePktRate,
            alMatrixTopNHighCapacityBaseOctetRate,
            alMatrixTopNHighCapacityOverflowOctetRate,
            alMatrixTopNHighCapacityOctetRate,
            alMatrixTopNHighCapacityReverseBaseOctetRate,
            alMatrixTopNHighCapacityReverseOverflowOctetRate,
            alMatrixTopNHighCapacityReverseOctetRate }
  STATUS current
  DESCRIPTION
    "Prepares sorted reports of the amount of traffic per protocol
     sent between each pair of network addresses discovered by the
     probe."
  ::= { hcRmonMIBGroups 14 }

usrHistoryHighCapacityGroup OBJECT-GROUP
  OBJECTS { usrHistoryHighCapacityOverflowAbsValue,
            usrHistoryHighCapacityAbsValue }
  STATUS current
  DESCRIPTION
    "Provides user-defined collection of historical information
     from MIB objects on the probe with scalability to statistics
     from high-capacity networks."
  ::= { hcRmonMIBGroups 15 }

hcrMONInformationGroup OBJECT-GROUP
  OBJECTS { hcrMONCapabilities }
  STATUS current
  DESCRIPTION
    "An indication of the high capacity RMON groups supported on
     at least one interface by this probe."
  ::= { hcRmonMIBGroups 16 }

END
```

6. Security Considerations

In order to implement this MIB, a probe must capture all packets on the locally-attached network, including packets between third parties. These packets are analyzed to collect network addresses, protocol usage information, and conversation statistics. Data of this nature may be considered sensitive in some environments. In such environments the administrator may wish to restrict SNMP access to the probe.

A probe implementing this MIB is likely to also implement RMON [RFC 2819], which includes functions for returning the contents of captured packets, potentially including sensitive user data or passwords. It is recommended that SNMP access to these functions be restricted.

There are a number of management objects defined in this MIB that have a MAX-ACCESS clause of read-write and/or read-create. Such objects may be considered sensitive or vulnerable in some network environments. The support for SET operations in a non-secure environment without proper protection can have a negative effect on network operations.

SNMPv1 by itself is not a secure environment. 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.

It is recommended that the implementers consider the security features as provided by the SNMPv3 framework. Specifically, the use of the User-based Security Model RFC 2574 [RFC2574] and the View-based Access Control Model RFC 2575 [RFC2575] is recommended.

It is then a customer/user responsibility to ensure that the SNMP entity giving access to an instance of this MIB, 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. Acknowledgments

This document was produced by the IETF Remote Network Monitoring Working Group.

8. References

- [1] Harrington, D., Presuhn, R. and B. Wijnen, "An Architecture for Describing SNMP Management Frameworks", RFC 2571, April 1999.

- [2] Rose, M. and K. McCloghrie, "Structure and Identification of Management Information for TCP/IP-based Internets", STD 16, RFC 1155, May 1990.
- [3] Rose, M. and K. McCloghrie, "Concise MIB Definitions", STD 16, RFC 1212, March 1991.
- [4] Rose, M., "A Convention for Defining Traps for use with the SNMP", RFC 1215, March 1991.
- [5] McCloghrie, K., Perkins, D., Schoenwaelder, J., Case, J., Rose, M. and S. Waldbusser, "Structure of Management Information Version 2 (SMIv2)", STD 58, RFC 2578, April 1999.
- [6] McCloghrie, K., Perkins, D., Schoenwaelder, J., Case, J., Rose, M. and S. Waldbusser, "Textual Conventions for SMIv2", STD 58, RFC 2579, April 1999.
- [7] McCloghrie, K., Perkins, D., Schoenwaelder, J., Case, J., Rose, M. and S. Waldbusser, "Conformance Statements for SMIv2", STD 58, RFC 2580, April 1999.
- [8] Case, J., Fedor, M., Schoffstall, M. and J. Davin, "Simple Network Management Protocol", STD 15, RFC 1157, May 1990.
- [9] Case, J., McCloghrie, K., Rose, M. and S. Waldbusser, "Introduction to Community-based SNMPv2", RFC 1901, January 1996.
- [10] Case, J., McCloghrie, K., Rose, M. and S. Waldbusser, "Transport Mappings for Version 2 of the Simple Network Management Protocol (SNMPv2)", RFC 1906, January 1996.
- [11] Case, J., Harrington D., Presuhn R. and B. Wijnen, "Message Processing and Dispatching for the Simple Network Management Protocol (SNMP)", RFC 2572, April 1999.
- [12] Blumenthal, U. and B. Wijnen, "User-based Security Model (USM) for version 3 of the Simple Network Management Protocol (SNMPv3)", RFC 2574, April 1999.
- [13] Case, J., McCloghrie, K., Rose, M. and S. Waldbusser, "Protocol Operations for Version 2 of the Simple Network Management Protocol (SNMPv2)", RFC 1905, January 1996.
- [14] Levi, D., Meyer, P. and B. Stewart, "SNMPv3 Applications", RFC 2573, April 1999.

- [15] Wijnen, B., Presuhn, R. and K. McCloghrie, "View-based Access Control Model (VACM) for the Simple Network Management Protocol (SNMP)", RFC 2575, April 1999.
- [16] McCloghrie, K. and M. Rose, Editors, "Management Information Base for Network Management of TCP/IP-based internets: MIB-II", STD 17, RFC 1213, March 1991.
- [17] McCloghrie, K. and F. Kastenholz, "The Interfaces Group MIB", RFC 2863, June 2000.
- [18] Waldbusser, S., "Remote Network Monitoring MIB", STD 59, RFC 2819, May 2000.
- [19] Waldbusser, S., "Token Ring Extensions to the Remote Network Monitoring MIB", RFC 1513, September 1993.
- [20] Waldbusser, S., "Remote Network Monitoring Management Information Base Version 2 using SMIV2", RFC 2021, January 1997.
- [21] Case, J., Mundy, R., Partain, D. and B. Stewart, "Introduction to Version 3 of the Internet-standard Network Management Framework", RFC 2570, April 1999.

9. Notices

The IETF takes no position regarding the validity or scope of any intellectual property or other rights that might be claimed to pertain to the implementation or use of the technology described in this document or the extent to which any license under such rights might or might not be available; neither does it represent that it has made any effort to identify any such rights. Information on the IETF's procedures with respect to rights in standards-track and standards-related documentation can be found in BCP-11. Copies of claims of rights made available for publication and any assurances of licenses to be made available, or the result of an attempt made to obtain a general license or permission for the use of such proprietary rights by implementors or users of this specification can be obtained from the IETF Secretariat.

The IETF invites any interested party to bring to its attention any copyrights, patents or patent applications, or other proprietary rights which may cover technology that may be required to practice this standard. Please address the information to the IETF Executive Director.

10. Author's Address

Steve Waldbusser

Phone: +1-650-948-6500

Fax: +1-650-745-0671

EMail: waldbusser@nextbeacon.com

11. Full Copyright Statement

Copyright (C) The Internet Society (2002). All Rights Reserved.

This document and translations of it may be copied and furnished to others, and derivative works that comment on or otherwise explain it or assist in its implementation may be prepared, copied, published and distributed, in whole or in part, without restriction of any kind, provided that the above copyright notice and this paragraph are included on all such copies and derivative works. However, this document itself may not be modified in any way, such as by removing the copyright notice or references to the Internet Society or other Internet organizations, except as needed for the purpose of developing Internet standards in which case the procedures for copyrights defined in the Internet Standards process must be followed, or as required to translate it into languages other than English.

The limited permissions granted above are perpetual and will not be revoked by the Internet Society or its successors or assigns.

This document and the information contained herein is provided on an "AS IS" basis and THE INTERNET SOCIETY AND THE INTERNET ENGINEERING TASK FORCE DISCLAIMS ALL WARRANTIES, EXPRESS OR IMPLIED, INCLUDING BUT NOT LIMITED TO ANY WARRANTY THAT THE USE OF THE INFORMATION HEREIN WILL NOT INFRINGE ANY RIGHTS OR ANY IMPLIED WARRANTIES OF MERCHANTABILITY OR FITNESS FOR A PARTICULAR PURPOSE.

Acknowledgement

Funding for the RFC Editor function is currently provided by the Internet Society.

