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Remote Network Monitoring Management Information Base for High Capacity Networks

Status of this Memo

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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.

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1. The SNMP Management Framework

The SNMP Management Framework presently consists of five major components:

- An overall architecture, described in RFC 2571 [1].
- 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].
- 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].
- 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].
- 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),
                 hostTopNHCInPkts(8),
                 hostTopNHCOutPkts(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
        hostTopNHighCapacityTable associated with this object."
    ::= { hostTopNControlEntry 3 }

From the RMON2 MIB:

nlMatrixTopNControlRateBase OBJECT-TYPE
    SYNTAX      INTEGER {
                    nlMatrixTopNPkts(1),
                    nlMatrixTopNOctets(2),
                    nlMatrixTopNHighCapacityPkts(3),
                    nlMatrixTopNHighCapacityOctets(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
        nlMatrixTopNHighCapacityTable 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 HCNUM-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
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        WG Chair
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        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:
```

```
                        Pkts * (.96 + .64) + (Octets * .08)
        Utilization = -------------------------------------
                                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 ethernets. 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)."
    ::= { etherStatsHighCapacityEntry 12 }

etherStatsHighCapacityOverflowPkts512to1023Octets OBJECT-TYPE
    SYNTAX     Counter32
    UNITS      "Packets"
    MAX-ACCESS read-only
    STATUS     current
    DESCRIPTION
        "The number of times the associated
         etherStatsPkts512to1023Octets counter has overflowed."
    ::= { etherStatsHighCapacityEntry 13 }

etherStatsHighCapacityPkts512to1023Octets 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
        512 and 1023 octets in length inclusive
        (excluding framing bits but including FCS octets)."
    ::= { etherStatsHighCapacityEntry 14 }

etherStatsHighCapacityOverflowPkts1024to1518Octets OBJECT-TYPE
    SYNTAX     Counter32
    UNITS      "Packets"
    MAX-ACCESS read-only
```

```
    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 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 2^32, 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 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 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 2^32,
        truncating fractions (i.e., X DIV 2^32), 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 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 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 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 2^32, 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 2^32, truncating fractions (i.e., X DIV
        2^32), 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.)"
    ::= { alMatrixTopNHighCapacityEntry 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

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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

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11. Full Copyright Statement

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