                  Remote Monitoring MIB Extensions for
                        Differentiated Services

Status of this Memo

Copyright Notice

Abstract

   This memo defines a portion of the Management Information Base (MIB)
   for use with network management protocols in the Internet community.
   In particular, it describes managed objects used for monitoring
   Differentiated Services (DS) Codepoint usage in packets which contain
   a DS field, utilizing the monitoring framework defined in the RMON-2
   (Remote Network Monitoring Management Version 2) MIB.

Table of Contents

1. The SNMP Network Management Framework

    The SNMP Management Framework presently consists of five major
    components:

    o An overall architecture, described in RFC 2571 [RFC2571].

    o Mechanisms for describing and naming objects and events for the
       purpose of management. The first version of this Structure of
       Management Information (SMI) is called SMIv1 and is described in
       STD 16, RFC 1155 [RFC1155], STD 16, RFC 1212 [RFC1212] and RFC
       1215 [RFC1215]. The second version, called SMIv2, is described in
       STD 58, RFC 2578 [RFC2578], RFC 2579 [RFC2579] and RFC 2580
       [RFC2580].

    o Message protocols for transferring management information. The
       first version of the SNMP message protocol is called SNMPv1 and is
       described in STD 15, RFC 1157 [RFC1157]. 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 [RFC1901]
       and RFC 1906 [RFC1906]. The third version of the message protocol
       is called SNMPv3 and is described in RFC 1906 [RFC1906], RFC 2572
       [RFC2572] and RFC 2574 [RFC2574].

    o Protocol operations for accessing management information. The
       first set of protocol operations and associated PDU formats is
       described in STD 15, RFC 1157 [RFC1157]. A second set of protocol
       operations and associated PDU formats is described in RFC 1905
       [RFC1905].

   o A set of fundamental applications described in RFC 2573 [RFC2573]
      and the view-based access control mechanism described in RFC 2575
      [RFC2575].

   A more detailed introduction to the current SNMP Management Framework
   can be found in RFC 2570 [RFC2570].

   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

   There is a need for a standardized way of monitoring the network
   traffic usage of Differentiated Services (DS) [RFC2474] codepoint
   values. Each DS codepoint (DSCP) value may be given a different
   treatment by a forwarding device, and this affects which packets get
   dropped or delayed during periods of network congestion.

   The IETF DIFFSERV working group has redefined the semantics of the
   Type of Service (TOS) octet in the IP header, which is now called the
   'DS field'. The 6-bit Codepoint (DSCP) portion is contained in the
   DS field, which provides for 64 different packet treatments for the
   implementation of differentiated network services.

   By polling DSCP usage counters, an NMS can determine the network
   throughput for traffic associated with different DSCPs. This data
   can then be analyzed in order to 'tune' DSCP 'allocations' within a
   network, based on the Quality of Service (QoS) policies for that
   network.

   Remote monitoring agents are typically implemented as independent
   software (and sometimes hardware) components, called 'RMON probes'.
   Note that DSMON-capable RMON probes simply collect and aggregate
   statistics, based on criteria (which includes the DSCP value) that
   can be determined by inspecting the contents of monitored packets and
   do not in any way monitor any aspect of a DS forwarding device's
   internal statistics.

2.1. Terms

   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 BCP 14, RFC 2119.
   [RFC2119]

   This document uses some terms that need introduction:

   DataSource
      A source of data for monitoring purposes. This term is used
      exactly as defined in the RMON-2 MIB [RFC2021].

   protocol
      A specific protocol encapsulation, as identified for monitoring
      purposes. This term is used exactly as defined in the RMON
      Protocol Identifiers document [RFC2074].

   Counter Aggregation Group
      A group of statistical counters that are being combined in the
      agent to produce one aggregated counter. Refer to sections 3.1
      and 3.2.1 for details on counter aggregation groups.

   Counter Aggregation Profile
      Also called 'profile'; A complete set of counter aggregation group
      mappings for DSCP values (i.e., 64 mappings, for each DSCP values
      0 to 63), which are applied to all monitored packets on a
      particular data source and/or DSMON collection. Refer to sections
      3.1 and 3.2.1 for details on counter aggregation profiles.

   High Capacity Monitoring
      The generic capability to collect and store statistics with an
      internal range of 64 bits (e.g., Counter64). This term does not
      refer to implementation of the High Capacity RMON MIB [RFC3273].

2.2. Relationship to Differentiated Services

   The DSMON MIB is a product of the RMONMIB WG, not the DIFFSERV WG,
   and it focuses on extending several existing RMON mechanisms to
   support additional packet classification, based on DSCP values
   observed in monitored packets. This document assumes the reader is
   familiar with the DS Architecture [RFC2475].

   It is expected that complex management applications will use the
   counters in this MIB to help analyze DS-related throughput. It is
   expected that other metrics, such as delay and jitter, will also be
   analyzed, but support for other metrics is outside the scope of this
   document.

2.3. Relationship to the Remote Monitoring MIBs

   This MIB is intended to be implemented in Remote Monitoring (RMON)
   probes, which support the RMON-2 MIB [RFC2021]. Such probes may be
   stand-alone devices, or may be co-located with other networking
   devices (e.g., ethernet switches and repeaters).

   The DSMON functions are intended to be implemented in conjunction
   with the associated RMON functions, but the MIB is independent of all
   other RMON data tables.

   Several concepts and even MIB objects from the RMON MIBs are used in
   the DSMON MIB:

   Protocol Directory
      The RMON-2 MIB [RFC2021] defines the protocolDirTable, which is a
      directory of all the protocols that the RMON-2 agent is capable of
      decoding and counting. The DSMON MIB utilizes this directory to
      identify the protocols detected in monitored packets. The
      protocolDirLocalIndex MIB object is used to identify protocol
      encapsulations in all DSMON data tables which classify and
      aggregate by protocol type in some manner. Note that the
      protocolDirTable is used for protocol identification only,
      independent of DSCP classification.

   TimeFilter
      The RMON-2 TimeFilter textual convention provides a mechanism to
      retrieve only rows which have been created or modified since the
      last polling interval (for a particular NMS). The DSMON MIB uses
      this textual convention in the large data tables, in order to
      minimize polling impact.

   Zero-Based Counters
      Since counters are instantiated by management action, as in the
      RMON MIBs, the DSMON MIB uses zero-based counters in all data
      collection tables. Specifically, the ZeroBasedCounter32 textual
      convention from the RMON-2 MIB [RFC2021] and the
      ZeroBasedCounter64 textual convention (defined in the HCNUM-TC MIB
      [RFC2856]) are used to define counter objects in this MIB.

   High Capacity Counters
      The DSMON MIB uses the 'SNMPv1 coexistence' strategy adopted by
      the RMONMIB WG. That is, where a 64-bit counter is provided, a
      32-bit version of the counter, and a 32-bit overflow counter are
      also provided.

TopN Reports
    The DSMON MIB uses the same TopN reporting MIB structure as the
    RMON-2 MIB [RFC2021]. TopN reporting can greatly reduce the
    polling overhead required to analyze DSCP usage patterns.

Some DESCRIPTION clauses for DSMON objects are very similar to those
for existing RMON-2 or HC-RMON objects. This is intentional, since
the semantics of the DSMON features are designed to be as close to
existing RMON feature as possible, to allow developers and users some
level of 'MIB re-use'.

3. MIB Structure

                    Figure 1: DSMON MIB Functional Structure

```
        +--------------+     +---------------+
        |              |     |    Counter    |
        |    DSMON     |     |  Aggregation  |
        | Capabilities |     |    Control    |
        |              |     |               |
        +--------------+     +---------------+
                                     |
                                     |
       +-----------------------------+-----------------------+
       |                             V                       |
       |                                                     |
       | +----------+ +----------+ +----------+ +-----------+ |
       | |          | |          | |          | |           | |
       | | Data Src | | Protocol | | Net. Host| | App Matrix| |
       | |   Stats  | |   Stats  | |   Stats  | |   Stats   | |
       | |          | |          | |          | |           | |
       | +----------+ +----------+ +----------+ +-----------+ |
       |                   |            |            |        |
       |                   V            V            V        |
       |              +----------+ +----------+ +-----------+  |
       |              |          | |          | |           |  |
       |              | Protocol | | Net. Host| | App Matrix|  |
       |              |   TopN   | |   TopN   | |    TopN    |  |
       |              |          | |          | |           |  |
       |              +----------+ +----------+ +-----------+  |
       |                                                      |
       |                  Data Collection                    |
       |                                                      |
       +------------------------------------------------------+
```
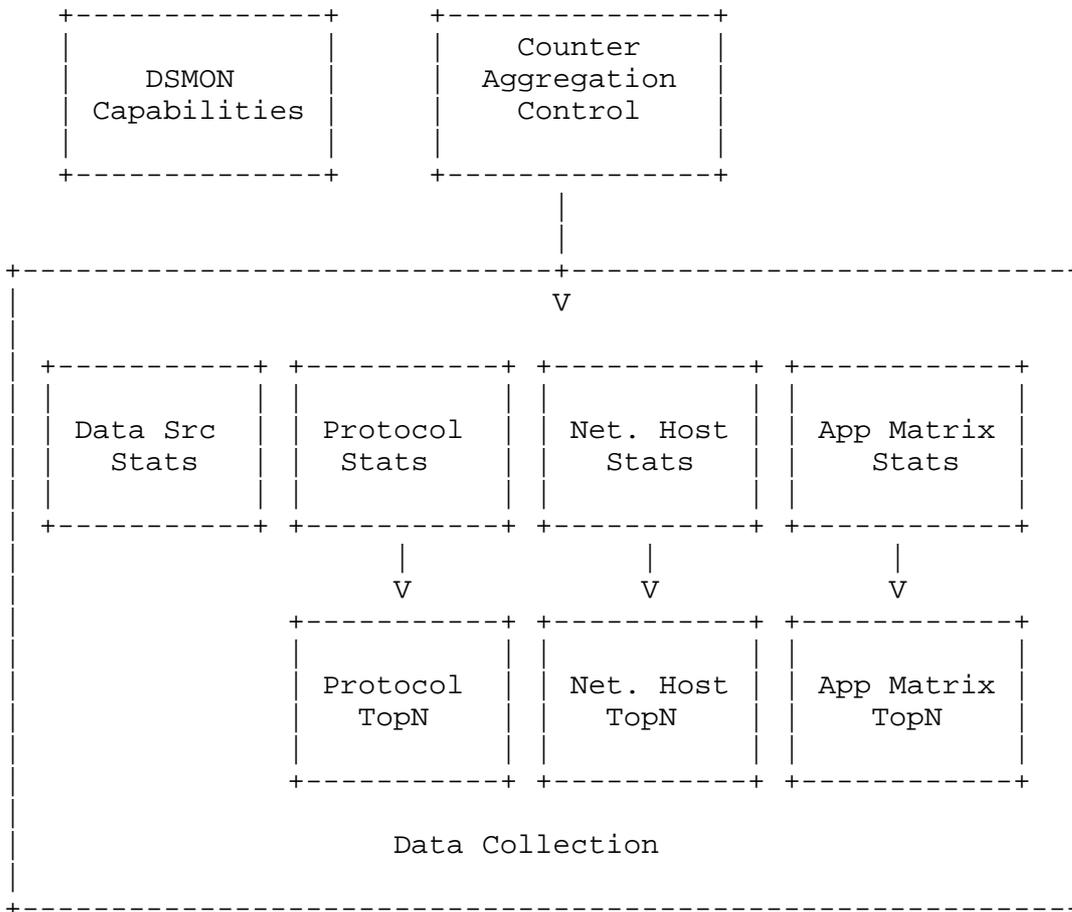
The DSMON MIB can divided into three functional components:

- DSMON Capabilities
  Describes which DSMON object groups are supported by the agent on
  at least one data source.

- Counter Aggregation Control
  Controls how individual DIFFSERV codepoint counters are aggregated
  in DSMON data collections.

- Data Collection
  Controls how individual statistical collections are maintained by
  the agent and reported to management applications. The individual
  boxes within the Data Collection box represent the DSMON data
  collections (described in section 3.2):

    - Data Source Statistics
    - Protocol Statistics
    - Protocol Statistics TopN Reporting
    - Network Protocol Host Statistics
    - Network Protocol Host Statistics TopN Reporting
    - Application Protocol Matrix Statistics
    - Application Protocol Matrix Statistics TopN Reporting

3.1. DSCP Counter Aggregation

A mechanism to configure the agent to internally aggregate counters
is provided, based on DSCP values. This is desirable for several
reasons:

- agent data reduction
  An agent implementation can potentially reduce the number of
  counters maintained for a given DSMON collection.

- agent data collection limitations
  Some implementation strategies might provide for a limited number
  of high-speed (e.g., hardware-based) counters for either single or
  aggregated codepoints.

- application data retrieval reduction
  Applications that would otherwise aggregate counters for
  individual codepoints can move that function to the agent in order
  to reduce the polling overhead on the application, the network,
  and the agent device.

- some unused codepoints at this time
  Various DSCP values may be expected to remain unused on a given
  network, and may be aggregated for counting purposes.

      - some DSCP values are mapped to the same packet treatment
         A network administrator may align the counter aggregation
         configuration of the monitoring device with the DS configuration,
         and aggregate statistics for DSCP values which are expected to
         receive the same treatment by the forwarding devices.

3.1.1. Counter Aggregation Configuration

   The configuration of DSCP counter to counter aggregation group
   mappings is managed in a global manner, so that these settings can be
   shared across several DSMON collections and/or data sources. One
   complete set of DSCP counter mappings is called a counter aggregation
   profile. The DSMON control tables are very similar to existing
   RMON-2 control tables, except they contain an extra parameter to
   identify the counter aggregation profile the agent should use for the
   collection.

   The appropriate granularity for counter aggregation profile
   assignment may be the data source, but in order to reduce MIB
   complexity (by avoiding an extra layer of tables), an instance of the
   counter aggregation profile parameter exists for each collection. An
   agent MAY choose to restrict configurations such that all DSMON data
   collections for the same data source must use the same counter
   aggregation profile.

   The DSMON MIB supports the configuration of an arbitrary number of
   counter aggregation profiles. There is a top-level counter
   aggregation control table, which contains one entry for each counter
   aggregation profile. A subordinate counter aggregation profile table
   provides information about each DSCP counter to counter aggregation
   group mapping in each profile. An auxiliary counter aggregation
   group table also provides descriptive information about each counter
   aggregation group in each profile. Refer to section 3.2.1 for
   details on these MIB objects.

3.2. MIB Group Overview

   The DSMON MIB contains six groups of MIB objects:

   - dsmonAggregateControl group
      Controls the configuration of counter aggregation groups for the
      purpose of reducing the total number of counters maintained by the
      agent.

   - dsmonStatsObjects group
      Report per counter aggregation group distribution statistics for a
      particular RMON dataSource.

- dsmonPdistObjects group
  Report per counter aggregation group distribution statistics for
  each application protocol detected on a particular RMON
  dataSource.

- dsmonHostObjects group
  Report host address distribution statistics for each counter
  aggregation group, detected on a particular RMON dataSource.

- dsmonCapsObjects group
  Report the static DSMON MIB functional capabilities of the agent
  implementation.

- dsmonMatrixObjects group
  Report host address pair distribution statistics for each counter
  aggregation group, detected on a particular RMON dataSource.

3.2.1. DSCP Counter Aggregation Control Group

   This group contains 4 scalar objects and three tables, and is used by
   a management station to configure counter aggregation profiles.

   The dsmonMaxAggGroups scalar is a read-only integer which indicates
   the maximum number of counter aggregation groups that the agent will
   allow to be configured into a single aggregation profile. This value
   SHOULD be equal to 64 (the number of codepoints), but an agent MAY
   limit the number of counter aggregation groups because of resource
   limitations (e.g., small number of hardware-based counters). At
   least one counter aggregation profile containing at least two counter
   aggregation groups SHOULD be supported by the agent. (Note that
   classifying all DSCP counters into the same statistical 'bucket' may
   yield a redundant data collection, which can be achieved more easily
   with an HC-RMON or RMON-2 collection instead.)

   The dsmonAggControlLocked scalar is used as a top level switch,
   controlling most write access to the dsmonAggControlTable,
   dsmonAggProfileTable, and dsmonAggGroupTable. (The
   dsmonAggControlOwner object is the only exception.) All active DSMON
   collection data is deleted, and collection suspended, while this
   object is equal to 'false', since the meaning of one or more counter
   aggregation control tables may change when it is set back to 'true'.

   The dsmonAggControlChanges counter and dsmonAggControlLastChangeTime
   timestamp can be used by a management station to detect that the
   codepoint to counter aggregation group mappings may have changed
   between polls.

The dsmonAggControlTable is a read-create table which contains one
entry for each counter aggregation profile configured on the agent.
Each entry is identified by a dsmonAggControlIndex value, which is
also used as the major index into the dsmonAggProfileTable and
dsmonAggGroupTable. The DSMON control tables with DataSource objects
select a counter aggregation profile by referencing this index value.

The dsmonAggProfileTable is a read-write table which contains 64 rows
for each associated entry in the dsmonAggControlTable, which MUST be
indexed from 0 to 63. The agent creates this set of 64 instances
when the associated dsmonAggControlEntry is activated, and deletes
them when that dsmonAggControlEntry is deactivated. Each of the 64
rows represents a conceptual DSCP counter, identified by the same
dsmonAggProfileDSCP value, and contains the DSCP counter to counter
aggregation group mapping for that DSCP counter, in the indicated
profile. The agent SHOULD use the value zero as the initial counter
aggregation group assignment for each entry in this table.

The dsmonAggGroupTable contains an administratively assigned
descriptive label for each configured counter aggregation group.
This table is not required to be fully configured in order for data
collection to occur, since collections are identified by the agent
with integer indices. It is provided to allow the agent to store a
descriptive string for each configured counter aggregation group.
There is no attempt made to convey any real semantics for each
counter aggregation group. A management station MAY choose not to
configure entries in this table.

3.2.2. DS Statistics Group

This group contains two tables, the dsmonStatsControlTable and the
dsmonStatsTable, and supports counter aggregation group distribution
statistics for half and full-duplex, low and high speed interfaces.
Packet and octets distributions are maintained in the dsmonStatsTable
for each active control row in the dsmonStatsControlTable.

This group provides the lowest statistics granularity in the DSMON
MIB. It is expected that a management application will analyze
certain DS deployment or performance problems by first examining the
counter aggregation group distribution for an entire data source with
this group.

3.2.3. DS Protocol Distribution Group

This group contains two tables for statistics collection,
(dsmonPdistCtlTable and dsmonPdistStatsTable), and two tables for a
'Top N' reporting function for the collected statistics
(dsmonPdistTopNCtlTable and dsmonPdistTopNTable).

The dsmonPdistCtlTable and dsmonPdistStatsTable tables provide
counter aggregation group distribution statistics for each selected
protocol encapsulation in packets monitored on a particular
dataSource. Packet and octets distributions (per counter aggregation
group per protocol) are maintained in the dsmonPdistStatsTable for
each active control row in the dsmonPdistCtlTable.

Due to the potentially large number of entries, the DS Protocol
Distribution is different from the RMON-2 protocol distribution group
in several ways:

-   maximum desired entries parameter added to the control table

-   inserts and deletes counters added to the control table

-   support for LRU garbage collection in the dsmonPdistStatsTable

-   TimeFilter index added to the dsmonPdistStatsTable

-   the selection of protocols is not configurable. Rather than
    select individual protocols to monitor, (e.g., via a
    'supportedOn/Off' extension to the protocolDirTable [RFC 2021]), a
    simplified configuration mechanism is provided. Since DSCP usage
    statistics are most interesting at the application layer, the
    dsmonPdistStatsTable is 'hardwired' to select only application
    layer (i.e., 'terminal') protocols for statistical analysis.

The TopN feature requires two additional tables: the
dsmonPdistTopNCtlTable and the dsmonPdistTopNTable, and supports
periodic usage reporting for the statistics maintained in the
dsmonPdistStatsTable. This feature allows for simple periodic
retrieval of the most used application/counter aggregation group
combinations.

3.2.4. DS Host Distribution Group

   This group contains two tables for statistics collection,
   (dsmonHostCtlTable and dsmonHostTable), and two tables for a 'Top N'
   reporting function for the collected statistics
   (dsmonHostTopNCtlTable and dsmonHostTopNTable).

   The dsmonHostCtlTable and dsmonHostTables provide host distribution
   statistics for each counter aggregation group detected in packets
   monitored on a particular dataSource. The DSMON Host collection is
   similar to the RMON-2 network layer host collection (nlHostTable).
   There is no DSMON application host table defined at this time.

It is expected that a management application will analyze certain DS
deployment or performance problems by first determining the high
priority DSCP values to examine (beyond the scope of this document)
and then examining the dsmonHostTable or dsmonHostTopNTable
statistics to determine which hosts are using the selected counter
aggregation groups.

Packet and octets distributions (in and out, per counter aggregation
group per host) are maintained in the dsmonHostTable for each active
control row in the dsmonHostCtlTable.

The DS Host Distribution is different from the RMON-2 network layer
host group in two ways:

- the protocolDirLocalIndex in the INDEX clause MUST identify a
  network protocol encapsulation which contains a DS field (e.g.,
  IPv4 or IPv6). If a protocol encapsulation with multiple network
  layers is specified, then associated entries in this table refer
  to the innermost network protocol layer.

- the dsmonHostCtlTable supports limited IPv4 and IPv6 prefix
  aggregation by allowing the number of 'monitored address bits' in
  each address to be configured for each collection. The agent will
  zero out the selected number of rightmost address bits for
  counting purposes. This configuration parameter can dramatically
  reduce the number of entries which must be maintained by the
  agent, which should reduce CPU and memory resource requirements on
  the agent, and reduce polling overhead on the network and the
  management station. However, only one mask can be configured for
  each address type, rather than multiple different length masks for
  each address type, based on prefix value.

The TopN feature requires two additional tables: the
dsmonHostTopNCtlTable and the dsmonHostTopNTable, and supports
periodic usage reporting for the statistics maintained in the
dsmonHostTable. This feature allows for simple periodic retrieval of
the most used IP-host/DSCP combinations.

3.2.5. DSMON Capabilities Group

   This group contains a single read-only scalar object,
   dsmonCapabilities, which provides an indication of the MIB groups
   within this MIB that the agent supports.

3.2.6. DS Matrix Distribution Group

   This group contains three tables for statistics collection,
   (dsmonMatrixCtlTable, dsmonMatrixSDTable, and dsmonMatrixDSTable),
   and two tables for a 'Top N' reporting function for the collected
   statistics (dsmonMatrixTopNCtlTable and dsmonMatrixTopNTable).

   The dsmonMatrixCtlTable, dsmonMatrixSDTable, and dsmonMatrixDSTable
   provide host-pair distribution statistics for each counter
   aggregation group detected in packets monitored on a particular
   dataSource. The DSMON Matrix collection is similar to the RMON-2
   application layer matrix collection (alMatrixSDTable and
   alMatrixDSTable). There is no DSMON network layer matrix table
   defined at this time.

   It is expected that a management application will analyze certain DS
   deployment or performance problems by first determining the high
   priority DSCP values to examine (beyond the scope of this document)
   and then examining the dsmonMatrixSDTable, dsmonMatrixDSTable, and/or
   dsmonMatrixTopNTable statistics to determine which host-pairs are
   using the selected counter aggregation groups.

   Packet and octets distributions (source to destination, per counter
   aggregation group per host-pair) are maintained in the
   dsmonMatrixSDTable and dsmonMatrixDSTable for each active control row
   in the dsmonMatrixCtlTable.

   The TopN feature requires two additional tables: the
   dsmonMatrixTopNCtlTable and the dsmonMatrixTopNTable, and supports
   periodic usage reporting for the statistics maintained in the
   dsmonMatrixSDTable. This feature allows for simple periodic
   retrieval of the most used IP-host-pair/DSCP combinations.

3.3. RMON vs. DSMON Indexing Structure

   The DSMON-MIB control and data tables are very similar in structure
   and look-and-feel to existing RMON-2 and HC-RMON control tables for
   the comparable feature, in order to maintain consistent agent
   behavior and functionality across RMON MIBs. The DSMON data tables
   are indexed as closely as possible to the comparable RMON-2 or HC-
   RMON tables, with the addition of an index component for DSCP-based
   classification (i.e. dsmonAggGroup). Refer to Table 1 for a
   comparison of DSMON indexing structure with similar existing RMON
   features.

                    Table 1: DSMON Indexing Comparison

          Existing RMON   DSMON

                        Full Duplex Interface Statistics

    mediaIndependentEntry | dsmonStatsControlEntry
       mediaIndependentIndex | dsmonStatsControlIndex
                                    | dsmonStatsEntry
                                    | dsmonStatsControlIndex,
                                    | dsmonAggGroupIndex
    --------------------------------+-------------------------------
                           Protocol Statistics

    protocolDistControlEntry | dsmonPdistCtlEntry
       protocolDistControlIndex | dsmonPdistCtlIndex
    protocolDistStatsEntry | dsmonPdistStatsEntry
       protocolDistControlIndex, | dsmonPdistCtlIndex,
       protocolDirLocalIndex | dsmonPdistTimeMark,
                                    | dsmonAggGroupIndex,
                                    | protocolDirLocalIndex
    --------------------------------+-------------------------------
                        Protocol TopN Distribution

                                    | dsmonPdistTopNCtlEntry
                                    | dsmonPdistTopNCtlIndex
              none | dsmonPdistTopNEntry
                                    | dsmonPdistTopNCtlIndex,
                                    | dsmonPdistTopNIndex
    --------------------------------+-------------------------------
                         Network Host Statistics

     hlHostControlEntry | dsmonHostCtlEntry
        hlHostControlIndex | dsmonHostCtlIndex
     nlHostEntry | dsmonHostEntry
        hlHostControlIndex, | dsmonHostCtlIndex,
        nlHostTimeMark, | dsmonHostTimeMark,
        protocolDirLocalIndex, | dsmonAggGroupIndex,
        nlHostAddress | protocolDirLocalIndex,
                                    | dsmonHostAddress
    --------------------------------+-------------------------------

Table 1 (Continued): DSMON Indexing Comparison

```
          Existing RMON                    DSMON

     -------------------------------+------------------------------
                     Network Host TopN Distribution

                                    | dsmonHostTopNCtlEntry
                                    |     dsmonHostTopNCtlIndex
              none                  | dsmonHostTopNEntry
                                    |     dsmonHostTopNCtlIndex,
                                    |     dsmonHostTopNIndex
     -------------------------------+------------------------------
                      Application Matrix Statistics

       hlMatrixControlEntry         | dsmonMatrixCtlEntry
          hlMatrixControlIndex      |     dsmonMatrixCtlIndex
       alMatrixSDEntry              | dsmonMatrixSDEntry
          hlMatrixControlIndex,     |     dsmonMatrixCtlIndex,
          alMatrixSDTimeMark,       |     dsmonMatrixTimeMark,
          protocolDirLocalIndex,    |     dsmonAggGroupIndex,
          nlMatrixSDSourceAddress,  |     dsmonMatrixNLIndex,
          nlMatrixSDDestAddress     |     dsmonMatrixSourceAddress
          protocolDirLocalIndex     |     dsmonMatrixDestAddress
                                    |     dsmonMatrixALIndex

       alMatrixDSEntry              | dsmonMatrixDSEntry
          hlMatrixControlIndex,     |     dsmonMatrixCtlIndex,
          alMatrixDSTimeMark,       |     dsmonMatrixTimeMark,
          protocolDirLocalIndex,    |     dsmonAggGroupIndex,
          nlMatrixDSDestAddress,    |     dsmonMatrixNLIndex,
          nlMatrixDSSourceAddress   |     dsmonMatrixDestAddress
          protocolDirLocalIndex     |     dsmonMatrixSourceAddress
                                    |     dsmonMatrixALIndex
     -------------------------------+------------------------------
                    Application Matrix TopN Distribution

                                    | dsmonMatrixTopNCtlEntry
              none                  |     dsmonMatrixTopNCtlIndex
                                    | dsmonMatrixTopNEntry
        (similar to nlMatrixTopN)   |     dsmonMatrixTopNCtlIndex,
                                    |     dsmonMatrixTopNIndex
     -------------------------------+------------------------------
```

4. Definitions

DSMON-MIB DEFINITIONS ::= BEGIN

IMPORTS
        MODULE-IDENTITY, OBJECT-TYPE, Integer32,
        Counter32, Gauge32
                FROM SNMPv2-SMI
        MODULE-COMPLIANCE, OBJECT-GROUP
                FROM SNMPv2-CONF
        RowStatus, TimeStamp, TEXTUAL-CONVENTION, TruthValue
                FROM SNMPv2-TC
        OwnerString, rmon
                FROM RMON-MIB
        protocolDirLocalIndex, LastCreateTime,
        DataSource, ZeroBasedCounter32, TimeFilter
                FROM RMON2-MIB
        CounterBasedGauge64, ZeroBasedCounter64
                FROM HCNUM-TC
        SnmpAdminString
                FROM SNMP-FRAMEWORK-MIB
        Dscp
                FROM DIFFSERV-DSCP-TC;

dsmonMIB MODULE-IDENTITY
    LAST-UPDATED   "200205310000Z"
    ORGANIZATION   "IETF RMONMIB Working Group"
    CONTACT-INFO
            "   Andy Bierman
                     Cisco Systems, Inc.
                     RMONMIB WG Chair and DSMON MIB Editor

             Postal: 170 West Tasman Drive
                     San Jose, CA USA 95134
                Tel: +1 408 527-3711
             E-mail: abierman@cisco.com

             Send comments to <rmonmib@ietf.org>
             Mailing list subscription info:
                 http://www.ietf.org/mailman/listinfo/rmonmib "
    DESCRIPTION
            "This module defines Remote Monitoring MIB extensions for
            Differentiated Services enabled networks.

            RMON DIFFSERV DSCP statistics
             * Per Counter Aggregation Group
             * Per Protocol Per Counter Aggregation Group
             * Per Counter Aggregation Group Per Host

                    * Per Counter Aggregation Group Per Host-Pair

              In order to maintain the RMON 'look-and-feel' and semantic
              consistency, some of the text from the RMON-2 and HC-RMON
              MIBs by Steve Waldbusser has been adapted for use in this
              MIB."
        REVISION   "200205310000Z"
        DESCRIPTION
              "Initial version of the DSMON MIB module. This version
              published as RFC 3287."
        ::= { rmon 26 }

dsmonObjects   OBJECT IDENTIFIER ::= { dsmonMIB 1 }
dsmonNotifications OBJECT IDENTIFIER ::= { dsmonMIB 2 }
dsmonConformance   OBJECT IDENTIFIER ::= { dsmonMIB 3 }

dsmonAggObjects   OBJECT IDENTIFIER ::= { dsmonObjects 1 }
dsmonStatsObjects   OBJECT IDENTIFIER ::= { dsmonObjects 2 }
dsmonPdistObjects   OBJECT IDENTIFIER ::= { dsmonObjects 3 }
dsmonHostObjects   OBJECT IDENTIFIER ::= { dsmonObjects 4 }
dsmonCapsObjects   OBJECT IDENTIFIER ::= { dsmonObjects 5 }
dsmonMatrixObjects OBJECT IDENTIFIER ::= { dsmonObjects 6 }

--
-- Textual Convention to define a
-- DSMON Counter Aggregation Group Index
--

DsmonCounterAggGroupIndex ::= TEXTUAL-CONVENTION
    STATUS current
    DESCRIPTION
            "This TC describes a data type which identifies a DSMON
            counter aggregation group, which is an arbitrary grouping of
            conceptual counters, for monitoring purposes only. The
            range for this data type begins with zero (instead of
            one), to allow for a direct mapping between counter
            indexing schemes that start at zero (e.g. DSCP values in
            packets) and counter aggregation group values."
    SYNTAX Integer32 (0..2147483647)

--
-- Textual Convention to define a
-- DSMON Counter Aggregation Profile Index
--

DsmonCounterAggProfileIndex ::= TEXTUAL-CONVENTION
    STATUS current

```
      DESCRIPTION
              "This TC describes a data type which identifies a DSMON
              counter aggregation profile, which is a set of counter
              aggregation group assignments for each of the 64 DSCP
              values, for a particular statistical collection."
      SYNTAX Integer32 (1..2147483647)


   -- ***********************************************************
   -- *                                                         *
   -- *         D S M O N   C A P A B I L I T I E S       *
   -- *                                                         *
   -- ***********************************************************


   dsmonCapabilities OBJECT-TYPE
       SYNTAX        BITS  {
                         dsmonCounterAggControl(0),
                         dsmonStats(1),
                         dsmonStatsOvfl(2),
                         dsmonStatsHC(3),
                         dsmonPdist(4),
                         dsmonPdistOvfl(5),
                         dsmonPdistHC(6),
                         dsmonHost(7),
                         dsmonHostOvfl(8),
                         dsmonHostHC(9),
                         dsmonCaps(10),
                         dsmonMatrix(11),
                         dsmonMatrixOvfl(12),
                         dsmonMatrixHC(13)
                         }
       MAX-ACCESS  read-only
       STATUS        current
       DESCRIPTION
              "This object provides an indication of the DSMON groups
              supported by the agent.  If a bit is set, then the agent
              implements all of the objects in the DSMON object group,
              where bit 'n' represents the MIB group identified by the
              OBJECT IDENTIFIER value { dsmonGroups n+1 }."
        ::= { dsmonCapsObjects 1 }


   -- ***********************************************************
   -- *                                                             *
   -- *   A G G R E G A T I O N   C O N T R O L   G R O U P S   *
   -- *                                                             *
   -- ***********************************************************
```

dsmonMaxAggGroups OBJECT-TYPE
    SYNTAX   Integer32 (2..64)
    MAX-ACCESS   read-only
    STATUS   current
    DESCRIPTION
            "The maximum number of counter aggregation groups that this
            agent can support. The agent will allow this number of
            distinct groups to be configured in the
            dsmonAggProfileTable, numbered from '0' to
            'dsmonMaxAggGroups - 1', for each counter aggregation
            profile entry supported by the agent.

            The agent MUST NOT lower this value during system operation,
            and SHOULD set this object to an appropriate value during
            system initialization."
    ::= { dsmonAggObjects 1 }

dsmonAggControlLocked OBJECT-TYPE
    SYNTAX   TruthValue
    MAX-ACCESS   read-write
    STATUS   current
    DESCRIPTION
            "Controls the setup of counter aggregation groups for this
            agent.

            If this object contains the value 'true', then write access
            to the objects in the dsmonAggControlTable (except the
            dsmonAggControlOwner object), dsmonAggProfileTable, and
            dsmonAggGroupTable is not permitted, and data collection is
            possible. This object only controls write access to these
            MIB objects. The DSMON data collection control tables
            (e.g., dsmonHostCtlTable) can be configured at any time,
            regardless of the value of this object.

            If this object contains the value 'false', write access to
            the objects in the dsmonAggControlTable,
            dsmonAggProfileTable, and dsmonAggGroupTable is permitted,
            and data collection is not possible. In addition, all
            objects in all DSMON data tables (e.g., dsmonStatsTable)
            shall be deleted.

            An agent is not required to process SNMP Set Requests for
            this object in conjunction with other objects from this MIB.
            This is intended to simplify the processing of Set Requests
            for tables such as the dsmonAggProfileTable, by eliminating
            the possibility that a single Set PDU will contain multiple
            varbinds which are in conflict, such as a PDU which both
            modifies the dsmonAggProfileTable and locks the

dsmonAggProfileTable at the same time.

Note that the agent is not required to validate the entire
counter aggregation configuration when an attempt is made to
transition an instance of this object from 'true' to
'false'. That validation is done if and when a DSMON data
collection is activated.

An agent is required to reactivate any suspended data
collections when this object transitions to 'true', Each
active data control entry (e.g., dsmonStatsControlEntry),
will be validated with respect to the new counter
aggregation configuration. If the counter aggregation
profile referenced in the data collection is valid, then
that collection will be restarted. Otherwise, the RowStatus
object (e.g., dsmonStatsControlStatus) will be set to
'notReady' for that collection control entry."
    ::= { dsmonAggObjects 2 }

dsmonAggControlChanges OBJECT-TYPE
    SYNTAX   Counter32
    MAX-ACCESS   read-only
    STATUS   current
    DESCRIPTION
            "This object counts the number of times the value of the
            dsmonAggControlLocked object has changed. A management
            station can use this object to detect if counters in the
            DSMON data tables (e.g., dsmonStatsEntry) have been deleted
            and recreated between polls.

            This object shall be incremented by one each time the
            dsmonAggControlLocked object changes from 'false' to 'true',
            or from 'true' to 'false'."
    ::= { dsmonAggObjects 3 }

dsmonAggControlLastChangeTime OBJECT-TYPE
    SYNTAX   TimeStamp
    MAX-ACCESS   read-only
    STATUS   current
    DESCRIPTION
            "This object identifies the value of sysUpTime at the moment
            the dsmonAggControlLocked object was last modified. A
            management station can use this object to detect if counters
            in the DSMON data tables (e.g., dsmonStatsEntry) have been
            deleted and recreated between polls.

            This object shall be updated with the current value of
            sysUpTime, if the dsmonAggControlLocked object changes from

                    'false' to 'true', or from 'true' to 'false'.

                    Upon system initialization, this object shall contain the
                    value zero."
            ::= { dsmonAggObjects 4 }

    --
    -- Counter Aggregation Control Table
    --

    dsmonAggControlTable OBJECT-TYPE
        SYNTAX   SEQUENCE OF DsmonAggControlEntry
        MAX-ACCESS   not-accessible
        STATUS   current
        DESCRIPTION
                    "This table provides an overall description and control
                    point for all dsmonAggProfileEntries with the same
                    dsmonAggControlIndex value.

                    A management application SHOULD create a counter aggregation
                    profile by first creating and activating an entry in this
                    table. This will cause the agent to create a set of 64
                    dsmonAggProfileEntries on behalf of this control entry. An
                    application can then set the individual counter aggregation
                    group assignments for each of the 64 DSCP values,

                    This table MUST NOT be modified if the dsmonAggControlLocked
                    object is equal to 'true'.

                    Note that an agent MAY choose to limit the actual number of
                    entries which may be created in this table, and
                    (independently) the number of counter aggregation profiles
                    which may be applied to a particular data source. In this
                    case, the agent SHOULD return an error-status of
                    'resourceUnavailable(13)', as per section 4.2.5 of the
                    'Protocol Operations for SNMPv2' specification [RFC1905].

                    The agent SHOULD support non-volatile configuration of this
                    table, and upon system initialization, the table SHOULD be
                    initialized with the saved values. Otherwise, each
                    potential counter aggregation group description string
                    SHOULD contain the empty string."
            ::= { dsmonAggObjects 5 }

    dsmonAggControlEntry OBJECT-TYPE
        SYNTAX   DsmonAggControlEntry
        MAX-ACCESS   not-accessible

```
     STATUS        current
     DESCRIPTION
            "A conceptual row in the dsmonAggControlTable."
     INDEX { dsmonAggControlIndex }
     ::= { dsmonAggControlTable 1 }

DsmonAggControlEntry ::= SEQUENCE {
     dsmonAggControlIndex          DsmonCounterAggProfileIndex,
     dsmonAggControlDescr          SnmpAdminString,
     dsmonAggControlOwner          OwnerString,
     dsmonAggControlStatus         RowStatus
}

dsmonAggControlIndex OBJECT-TYPE
     SYNTAX        DsmonCounterAggProfileIndex
     MAX-ACCESS    not-accessible
     STATUS        current
     DESCRIPTION
            "An arbitrary integer index value used to identify the
            counter aggregation profile specified by this control
            entry."
     ::= { dsmonAggControlEntry 1 }

dsmonAggControlDescr OBJECT-TYPE
     SYNTAX        SnmpAdminString (SIZE (0..64))
     MAX-ACCESS    read-create
     STATUS        current
     DESCRIPTION
            "An administratively assigned description of the counter
            aggregation profile identified by this entry.

            Upon first creation of an instance of this object, the agent
            SHOULD set this object to the empty string.  If the agent
            supports non-volatile storage, then this object SHOULD be
            re-initialized with its stored value after a system reboot.

            This object MUST NOT be modified if the associated
            dsmonAggControlStatus object is equal to 'active', or the
            dsmonAggControlLocked object is equal to 'true'."
     ::= { dsmonAggControlEntry 2 }

dsmonAggControlOwner 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."
```

```
        ::= { dsmonAggControlEntry 3 }

dsmonAggControlStatus OBJECT-TYPE
     SYNTAX       RowStatus
     MAX-ACCESS   read-create
     STATUS       current
     DESCRIPTION
             "The status of this row.

             An entry MUST NOT exist in the active state unless all
             objects in the entry have an appropriate value.

             Upon setting this object to active(1), the agent will create
             a complete set of 64 associated entries in the
             dsmonAggProfileTable.

             If this object is not equal to active(1), all associated
             entries in the dsmonAggProfileTable shall be deleted.

             This object MUST NOT be modified if the
             dsmonAggControlLocked object is equal to 'true'."
        ::= { dsmonAggControlEntry 4 }

--
-- Counter Aggregation Profile Table
--

dsmonAggProfileTable OBJECT-TYPE
     SYNTAX       SEQUENCE OF DsmonAggProfileEntry
     MAX-ACCESS   not-accessible
     STATUS       current
     DESCRIPTION
             "Controls the setup of counter aggregation profiles for this
             agent.  For each such profile, every DSCP value MUST be
             configured into exactly one counter aggregation group.

             This table MUST NOT be modified if the dsmonAggControlLocked
             object is equal to 'true'.

             The agent will create a set of 64 entries in this table
             (with the same dsmonAggControlIndex value) when the
             associated dsmonAggControlEntry is activated.

             If the agent supports non-volatile configuration of this
             table, then upon system initialization, this table SHOULD be
             initialized with the saved values."
        ::= { dsmonAggObjects 6 }
```

```
dsmonAggProfileEntry OBJECT-TYPE
    SYNTAX      DsmonAggProfileEntry
    MAX-ACCESS  not-accessible
    STATUS      current
    DESCRIPTION
            "A conceptual row in the dsmonAggProfileTable.  The
            dsmonAggControlIndex value in the index identifies the
            dsmonAggControlEntry associated with each entry in this
            table."
    INDEX { dsmonAggControlIndex, dsmonAggProfileDSCP }
    ::= { dsmonAggProfileTable 1 }

DsmonAggProfileEntry ::= SEQUENCE {
    dsmonAggProfileDSCP         Dscp,
    dsmonAggGroupIndex          DsmonCounterAggGroupIndex
}


dsmonAggProfileDSCP OBJECT-TYPE
    SYNTAX      Dscp
    MAX-ACCESS  not-accessible
    STATUS      current
    DESCRIPTION
            "The specific DSCP value for the DSCP counter which is
            configured in a counter aggregation group by this entry."
    ::= { dsmonAggProfileEntry 1 }

dsmonAggGroupIndex OBJECT-TYPE
    SYNTAX      DsmonCounterAggGroupIndex
    MAX-ACCESS  read-write
    STATUS      current
    DESCRIPTION
            "The counter aggregation group which contains this DSCP
            value.  Upon creation of a new sub-tree (set of 64 entries
            with the same dsmonAggControlIndex value) in this table, the
            agent SHOULD initialize all related instances of this object
            to the value zero.

            This object MUST NOT be modified if the
            dsmonAggControlLocked object is equal to 'true'."
    DEFVAL { 0 }
    ::= { dsmonAggProfileEntry 2 }


--
-- Counter Aggregation Group Table
--
```

dsmonAggGroupTable OBJECT-TYPE
     SYNTAX   SEQUENCE OF DsmonAggGroupEntry
     MAX-ACCESS   not-accessible
     STATUS   current
     DESCRIPTION
             "This table provides a description of each counter
             aggregation group configured on this system. Note that the
             semantics of a particular counter aggregation group are only
             relevant within the scope of a particular counter
             aggregation profile.

             This table MUST NOT be modified if the dsmonAggControlLocked
             object is equal to 'true'.

             Note that an agent MAY choose to limit the actual number of
             entries which may be created in this table, and
             (independently) the number of counter aggregation profiles
             which may be applied to a particular data source. In this
             case, the agent SHOULD return an error-status of
             'resourceUnavailable(13)', as per section 4.2.5 of the
             'Protocol Operations for SNMPv2' specification [RFC1905].

             If the agent supports non-volatile configuration of this
             table, then upon system initialization, this table SHOULD be
             initialized with the saved values. Otherwise, each
             potential counter aggregation group description string
             SHOULD contain the empty string.

             An agent SHOULD allow entries to be created or modified in
             this table, even if the specified dsmonAggControlIndex value
             does not identify a valid dsmonAggControlEntry or a complete
             set of valid dsmonAggProfileEntries, to reduce row creation
             order dependencies."
     ::= { dsmonAggObjects 7 }

dsmonAggGroupEntry OBJECT-TYPE
     SYNTAX   DsmonAggGroupEntry
     MAX-ACCESS   not-accessible
     STATUS   current
     DESCRIPTION
             "A conceptual row in the dsmonAggGroupTable. The
             dsmonAggGroupIndex value in the INDEX identifies the counter
             aggregation group associated with each entry.

             The dsmonAggControlIndex in the index identifies the counter
             aggregation profile associated with each entry, identified
             by the dsmonAggControlEntry and dsmonAggProfileEntries with
             the same index value.

           The agent SHOULD support non-volatile configuration of this
           table, and upon system initialization, the table SHOULD be
           initialized with the saved values.

           The dsmonAggGroupIndex in the index identifies the counter
           aggregation group associated with each entry. This object
           SHOULD be indexed from zero to 'N', where 'N' is less than
           the value of the dsmonMaxAggGroups for this agent."

    INDEX { dsmonAggControlIndex, dsmonAggGroupIndex }
    ::= { dsmonAggGroupTable 1 }
DsmonAggGroupEntry ::= SEQUENCE {
    dsmonAggGroupDescr   SnmpAdminString,
    dsmonAggGroupStatus   RowStatus
}

dsmonAggGroupDescr OBJECT-TYPE
    SYNTAX   SnmpAdminString (SIZE (0..64))
    MAX-ACCESS read-create
    STATUS   current
    DESCRIPTION
           "An administratively assigned description of the counter
           aggregation group identified by this entry.

           Upon first creation of an instance of this object, the agent
           SHOULD set this object to the empty string.

           This object MUST NOT be modified if the associated
           dsmonAggGroupStatus object is equal to 'active', or the
           dsmonAggControlLocked object is equal to 'true'."
    ::= { dsmonAggGroupEntry 1 }

dsmonAggGroupStatus OBJECT-TYPE
    SYNTAX   RowStatus
    MAX-ACCESS read-create
    STATUS   current
    DESCRIPTION
           "The status of this row.

           An entry MUST NOT exist in the active state unless all
           objects in the entry have an appropriate value.

           This object MUST NOT be modified if the
           dsmonAggControlLocked object is equal to 'true'."
    ::= { dsmonAggGroupEntry 2 }

```
-- ************************************************************
-- *                                                          *
-- *     P E R - D A T A S O U R C E   C O L L E C T I O N S   *
-- *                                                          *
-- ************************************************************


--
-- Per-DataSource Statistics Control Table
--

dsmonStatsControlTable OBJECT-TYPE
    SYNTAX       SEQUENCE OF DsmonStatsControlEntry
    MAX-ACCESS   not-accessible
    STATUS       current
    DESCRIPTION
            "Controls the setup of per data source per counter
            aggregation group distribution statistics.

            Note that an agent MAY choose to limit the actual number of
            entries which may be created in this table.  In this case,
            the agent SHOULD return an error-status of
            'resourceUnavailable(13)', as per section 4.2.5 of the
            'Protocol Operations for SNMPv2' specification [RFC1905]."
    ::= { dsmonStatsObjects 1 }

dsmonStatsControlEntry OBJECT-TYPE
    SYNTAX       DsmonStatsControlEntry
    MAX-ACCESS   not-accessible
    STATUS       current
    DESCRIPTION
            "A conceptual row in the dsmonStatsControlTable.

            Entries are created and deleted from this table by
            management action only, using the dsmonStatsControlStatus
            RowStatus object.

            The agent SHOULD support non-volatile configuration of this
            table, and upon system initialization, the table SHOULD be
            initialized with the saved values.

            Activation of a control row in this table will cause an
            associated dsmonStatsTable to be created and maintained by
            the agent."
    INDEX { dsmonStatsControlIndex }
    ::= { dsmonStatsControlTable 1 }

DsmonStatsControlEntry ::= SEQUENCE {
    dsmonStatsControlIndex              Integer32,
```

```
    dsmonStatsControlDataSource           DataSource,
    dsmonStatsControlAggProfile           DsmonCounterAggProfileIndex,
    dsmonStatsControlDroppedFrames        Counter32,
    dsmonStatsControlCreateTime           LastCreateTime,
    dsmonStatsControlOwner                OwnerString,
    dsmonStatsControlStatus               RowStatus
}

dsmonStatsControlIndex OBJECT-TYPE
    SYNTAX      Integer32 (1..65535)
    MAX-ACCESS  not-accessible
    STATUS      current
    DESCRIPTION
            "An arbitrary and unique index for this
            dsmonStatsControlEntry."
    ::= { dsmonStatsControlEntry 1 }

dsmonStatsControlDataSource OBJECT-TYPE
    SYNTAX      DataSource
    MAX-ACCESS  read-create
    STATUS      current
    DESCRIPTION
            "The data source of this per protocol per counter
            aggregation group distribution.

            Note that only packets that contain a network protocol
            encapsulation which contains a DS field [RFC2474] will be
            counted in this table.

            This object MUST NOT be modified if the associated
            dsmonStatsControlStatus object is equal to active(1)."
    ::= { dsmonStatsControlEntry 2 }

dsmonStatsControlAggProfile OBJECT-TYPE
    SYNTAX      DsmonCounterAggProfileIndex
    MAX-ACCESS  read-create
    STATUS      current
    DESCRIPTION
            "The dsmonAggControlIndex value identifying the counter
            aggregation profile which should be used on behalf of this
            dsmonStatsControlEntry.

            The associated dsmonAggControlEntry and
            dsmonAggProfileEntries, identified by the same
            dsmonAggControlIndex index value, MUST be active in order
            for this entry to remain active.  It is possible for the
            counter aggregation configuration to change from a valid to
            invalid state for this dsmonStats collection.  In this case,
```

            the associated dsmonStatsControlStatus object will be
            changed to the 'notReady' state, and data collection will
            not occur on behalf of this control entry.

            Note that an agent MAY choose to limit the actual number of
            counter aggregation profiles which may be applied to a
            particular data source.

            This object MUST NOT be modified if the associated
            dsmonStatsControlStatus object is equal to active(1)."
      ::= { dsmonStatsControlEntry 3 }

dsmonStatsControlDroppedFrames OBJECT-TYPE
    SYNTAX   Counter32
    UNITS   "frames"
    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 *StatsDropEvents, 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."
      ::= { dsmonStatsControlEntry 4 }

dsmonStatsControlCreateTime OBJECT-TYPE
    SYNTAX   LastCreateTime
    MAX-ACCESS read-only
    STATUS   current
    DESCRIPTION
            "The value of sysUpTime when this control entry was last
            activated. This can be used by the management station to
            detect if the table has been deleted and recreated between
            polls."
      ::= { dsmonStatsControlEntry 5 }

dsmonStatsControlOwner 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."
            ::= { dsmonStatsControlEntry 6 }

dsmonStatsControlStatus OBJECT-TYPE
        SYNTAX   RowStatus
        MAX-ACCESS   read-create
        STATUS   current
        DESCRIPTION
                    "The status of this row.

                    An entry MUST NOT exist in the active state unless all
                    objects in the entry have an appropriate value.

                    If this object is not equal to active(1), all associated
                    entries in the dsmonStatsTable shall be deleted."
            ::= { dsmonStatsControlEntry 7 }

--
-- Per-DataSource Statistics Table
--

dsmonStatsTable OBJECT-TYPE
        SYNTAX   SEQUENCE OF DsmonStatsEntry
        MAX-ACCESS   not-accessible
        STATUS   current
        DESCRIPTION
                    "A list of information on counter aggregation group usage
                    for each monitored data source.

                    The following table defines per counter aggregation group
                    statistics 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 dsmonStatsIn* objects
                    shall be used and the dsmonStatsOut* objects will not
                    increment.

                    For full-duplex links, the dsmonStatsOut* objects will be
                    present. 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.

                    If the dsmonAggControlLocked object is equal to 'false',
                    then all entries in this table will be deleted and the agent
                    will not process packets on behalf of any

Bierman   Standards Track   [Page 30]

```
                    dsmonStatsControlEntry."
          ::= { dsmonStatsObjects 2 }

  dsmonStatsEntry OBJECT-TYPE
      SYNTAX        DsmonStatsEntry
      MAX-ACCESS    not-accessible
      STATUS        current
      DESCRIPTION
              "A list of information on Differentiated Services DSCP
              usage, containing inbound and outbound packet and octet
              counters for each counter aggregation group configured for
              collection.

              The dsmonStatsControlIndex value in the index identifies the
              dsmonStatsControlEntry on whose behalf this entry was
              created.

              The dsmonAggGroupIndex value in the index is determined by
              examining the DSCP value in each monitored packet, and the
              dsmonAggProfileTable entry for that DSCP value.

              Note that only packets that contain a network protocol
              encapsulation which contains a DS field [RFC2474] will be
              counted in this table.

              An example of the indexing of this entry is
              dsmonStatsOutPkts.1.16"
        INDEX { dsmonStatsControlIndex, dsmonAggGroupIndex }
          ::= { dsmonStatsTable 1 }

  DsmonStatsEntry ::= SEQUENCE {
      dsmonStatsInPkts            ZeroBasedCounter32,
      dsmonStatsInOctets         ZeroBasedCounter32,
      dsmonStatsInOvflPkts       ZeroBasedCounter32,
      dsmonStatsInOvflOctets     ZeroBasedCounter32,
      dsmonStatsInHCPkts         ZeroBasedCounter64,
      dsmonStatsInHCOctets       ZeroBasedCounter64,
      dsmonStatsOutPkts          ZeroBasedCounter32,
      dsmonStatsOutOctets        ZeroBasedCounter32,
      dsmonStatsOutOvflPkts      ZeroBasedCounter32,
      dsmonStatsOutOvflOctets    ZeroBasedCounter32,
      dsmonStatsOutHCPkts        ZeroBasedCounter64,
      dsmonStatsOutHCOctets      ZeroBasedCounter64
  }

  dsmonStatsInPkts OBJECT-TYPE
      SYNTAX        ZeroBasedCounter32
      UNITS         "packets"
```

```
    MAX-ACCESS  read-only
    STATUS      current
    DESCRIPTION
            "The number of packets using one of the DSCP values in the
            indicated counter aggregation group, received on a half-
            duplex link or on the inbound connection of a full-duplex
            link."
    ::= { dsmonStatsEntry 1 }

dsmonStatsInOctets OBJECT-TYPE
    SYNTAX      ZeroBasedCounter32
    UNITS       "octets"
    MAX-ACCESS  read-only
    STATUS      current
    DESCRIPTION
            "The number of octets in packets, using one of the DSCP
            values in the indicated counter aggregation group, received
            on a half-duplex link or on the inbound connection of a
            full-duplex link."
    ::= { dsmonStatsEntry 2 }

dsmonStatsInOvflPkts OBJECT-TYPE
    SYNTAX      ZeroBasedCounter32
    MAX-ACCESS  read-only
    STATUS      deprecated
    DESCRIPTION
            "The number of times the associated dsmonStatsInPkts counter
            has overflowed.  Note that this object will only be
            instantiated if the associated dsmonStatsInHCPkts object is
            also instantiated for a particular dataSource."
    ::= { dsmonStatsEntry 3 }

dsmonStatsInOvflOctets OBJECT-TYPE
    SYNTAX      ZeroBasedCounter32
    MAX-ACCESS  read-only
    STATUS      deprecated
    DESCRIPTION
            "The number of times the associated dsmonStatsInOctets
            counter has overflowed.  Note that this object will only be
            instantiated if the associated dsmonStatsInHCOctets object
            is also instantiated for a particular dataSource."
    ::= { dsmonStatsEntry 4 }

dsmonStatsInHCPkts OBJECT-TYPE
    SYNTAX      ZeroBasedCounter64
    UNITS       "packets"
    MAX-ACCESS  read-only
    STATUS      current
```

```
    DESCRIPTION
            "The 64-bit version of the dsmonStatsInPkts object.

            Note that this object will only be instantiated if the RMON
            agent supports High Capacity monitoring for a particular
            dataSource."
    ::= { dsmonStatsEntry 5 }

dsmonStatsInHCOctets OBJECT-TYPE
    SYNTAX        ZeroBasedCounter64
    UNITS         "octets"
    MAX-ACCESS  read-only
    STATUS        current
    DESCRIPTION
            "The 64-bit version of the dsmonStatsInOctets object.

            Note that this object will only be instantiated if the RMON
            agent supports High Capacity monitoring for a particular
            dataSource."
    ::= { dsmonStatsEntry 6 }

dsmonStatsOutPkts OBJECT-TYPE
    SYNTAX        ZeroBasedCounter32
    UNITS         "packets"
    MAX-ACCESS  read-only
    STATUS        current
    DESCRIPTION
            "The number of packets using one of the DSCP values in the
            indicated counter aggregation group, received on a full-
            duplex link in the direction of the network."
    ::= { dsmonStatsEntry 7 }

dsmonStatsOutOctets OBJECT-TYPE
    SYNTAX        ZeroBasedCounter32
    UNITS         "octets"
    MAX-ACCESS  read-only
    STATUS        current
    DESCRIPTION
            "The number of octets in packets, using one of the DSCP
            values in the indicated counter aggregation group, received
            on a full-duplex link in the direction of the network."
    ::= { dsmonStatsEntry 8 }

dsmonStatsOutOvflPkts OBJECT-TYPE
    SYNTAX        ZeroBasedCounter32
    MAX-ACCESS  read-only
    STATUS        deprecated
    DESCRIPTION
```

```
                  "The number of times the associated dsmonStatsOutPkts
                  counter has overflowed.  Note that this object will only be
                  instantiated if the associated dsmonStatsOutHCPkts object is
                  also instantiated for a particular dataSource."
          ::= { dsmonStatsEntry 9 }


dsmonStatsOutOvflOctets OBJECT-TYPE
     SYNTAX       ZeroBasedCounter32
     MAX-ACCESS   read-only
     STATUS       deprecated
     DESCRIPTION
                  "The number of times the associated dsmonStatsOutOctets
                  counter has overflowed.  Note that this object will only be
                  instantiated if the associated dsmonStatsOutHCOctets object
                  is also instantiated for a particular dataSource."
          ::= { dsmonStatsEntry 10 }


dsmonStatsOutHCPkts OBJECT-TYPE
     SYNTAX       ZeroBasedCounter64
     UNITS        "packets"
     MAX-ACCESS   read-only
     STATUS       current
     DESCRIPTION
                  "The 64-bit version of the dsmonStatsOutPkts object.

                  Note that this object will only be instantiated if the RMON
                  agent supports High Capacity monitoring for a particular
                  dataSource."
          ::= { dsmonStatsEntry 11 }


dsmonStatsOutHCOctets OBJECT-TYPE
     SYNTAX       ZeroBasedCounter64
     UNITS        "octets"
     MAX-ACCESS   read-only
     STATUS       current
     DESCRIPTION
                  "The 64-bit version of the dsmonStatsOutOctets object.
                  Note that this object will only be instantiated if the RMON
                  agent supports High Capacity monitoring for a particular
                  dataSource."
          ::= { dsmonStatsEntry 12 }


-- ***********************************************************
-- *                                                         *
-- *     P E R - P R O T O C O L   C O L L E C T I O N S     *
-- *                                                         *
-- ***********************************************************
```

```
--
-- DSCP Per-Protocol Statistics Control Table
--

dsmonPdistCtlTable OBJECT-TYPE
    SYNTAX        SEQUENCE OF DsmonPdistCtlEntry
    MAX-ACCESS    not-accessible
    STATUS        current
    DESCRIPTION
            "Controls the setup of per application per counter
            aggregation group distribution statistics.

            Note that an agent MAY choose to limit the actual number of
            entries which may be created in this table.  In this case,
            the agent SHOULD return an error-status of
            'resourceUnavailable(13)', as per section 4.2.5 of the
            'Protocol Operations for SNMPv2' specification [RFC1905]."
    ::= { dsmonPdistObjects 1 }

dsmonPdistCtlEntry OBJECT-TYPE
    SYNTAX        DsmonPdistCtlEntry
    MAX-ACCESS    not-accessible
    STATUS        current
    DESCRIPTION
            "A conceptual row in the dsmonPdistCtlTable.

            Entries are created and deleted from this table by
            management action only, using the dsmonPdistCtlStatus
            RowStatus object.

            The agent SHOULD support non-volatile configuration of this
            table, and upon system initialization, the table SHOULD be
            initialized with the saved values.

            Activation of a control row in this table will cause an
            associated dsmonPdistStatsTable to be created and maintained
            by the agent."
    INDEX { dsmonPdistCtlIndex }
    ::= { dsmonPdistCtlTable 1 }

DsmonPdistCtlEntry ::= SEQUENCE {
    dsmonPdistCtlIndex                Integer32,
    dsmonPdistCtlDataSource           DataSource,
    dsmonPdistCtlAggProfile           DsmonCounterAggProfileIndex,
    dsmonPdistCtlMaxDesiredEntries    Integer32,
    dsmonPdistCtlDroppedFrames        Counter32,
    dsmonPdistCtlInserts              Counter32,
    dsmonPdistCtlDeletes              Counter32,
```

        dsmonPdistCtlCreateTime   LastCreateTime,
        dsmonPdistCtlOwner   OwnerString,
        dsmonPdistCtlStatus   RowStatus
    }

    dsmonPdistCtlIndex OBJECT-TYPE
        SYNTAX   Integer32 (1..65535)
        MAX-ACCESS   not-accessible
        STATUS   current
        DESCRIPTION
                "An arbitrary and unique index for this dsmonPdistCtlEntry."
        ::= { dsmonPdistCtlEntry 1 }

    dsmonPdistCtlDataSource OBJECT-TYPE
        SYNTAX   DataSource
        MAX-ACCESS   read-create
        STATUS   current
        DESCRIPTION
                "The source of data for the this per protocol counter
                aggregation group distribution.

                This object MUST NOT be modified if the associated
                dsmonPdistCtlStatus object is equal to active(1)."
        ::= { dsmonPdistCtlEntry 2 }

    dsmonPdistCtlAggProfile OBJECT-TYPE
        SYNTAX   DsmonCounterAggProfileIndex
        MAX-ACCESS   read-create
        STATUS   current
        DESCRIPTION
                "The dsmonAggControlIndex value identifying the counter
                aggregation profile which should be used on behalf of this
                dsmonPdistCtlEntry.

                The associated dsmonAggControlEntry and
                dsmonAggProfileEntries, identified by the same
                dsmonAggControlIndex index value, MUST be active in order
                for this entry to remain active. It is possible for the
                counter aggregation configuration to change from a valid to
                invalid state for this dsmonPdist collection. In this case,
                the associated dsmonPdistCtlStatus object will be changed to
                the 'notReady' state, and data collection will not occur on
                behalf of this control entry.

                Note that an agent MAY choose to limit the actual number of
                counter aggregation profiles which may be applied to a
                particular data source.

```
            This object MUST NOT be modified if the associated
            dsmonPdistCtlStatus object is equal to active(1)."
    ::= { dsmonPdistCtlEntry 3 }

dsmonPdistCtlMaxDesiredEntries OBJECT-TYPE
    SYNTAX        Integer32 (-1 | 1..2147483647)
    MAX-ACCESS  read-create
    STATUS        current
    DESCRIPTION
            "The maximum number of entries that are desired in the
            dsmonPdistStatsTable on behalf of this control entry.  The
            probe will not create more than this number of associated
            entries in the table, but MAY choose to create fewer entries
            in this table for any reason including the lack of
            resources.

            If this value is set to -1, the probe MAY create any number
            of entries in this table.

            This object MUST NOT be modified if the associated
            dsmonPdistCtlStatus object is equal to active(1)."
    ::= { dsmonPdistCtlEntry 4 }

dsmonPdistCtlDroppedFrames OBJECT-TYPE
    SYNTAX      Counter32
    UNITS       "frames"
    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 *StatsDropEvents, 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."
    ::= { dsmonPdistCtlEntry 5 }

dsmonPdistCtlInserts OBJECT-TYPE
    SYNTAX      Counter32
    UNITS       "table entries"
    MAX-ACCESS read-only
    STATUS      current
```

           DESCRIPTION
                   "The number of times a dsmonPdist entry has been inserted
                   into the dsmonPdistTable. If an entry is inserted, then
                   deleted, and then inserted, this counter will be incremented
                   by 2.

                   To allow for efficient implementation strategies, agents MAY
                   delay updating this object for short periods of time. For
                   example, an implementation strategy may allow internal data
                   structures to differ from those visible via SNMP for short
                   periods of time. This counter may reflect the internal data
                   structures for those short periods of time.

                   Note that the table size can be determined by subtracting
                   dsmonPdistCtlDeletes from dsmonPdistCtlInserts."
           ::= { dsmonPdistCtlEntry 6 }

   dsmonPdistCtlDeletes OBJECT-TYPE
       SYNTAX   Counter32
       UNITS   "table entries"
       MAX-ACCESS read-only
       STATUS   current
       DESCRIPTION
                   "The number of times a dsmonPdist entry has been deleted
                   from the dsmonPdist table (for any reason). If an entry is
                   deleted, then inserted, and then deleted, this counter will
                   be incremented by 2.

                   To allow for efficient implementation strategies, agents MAY
                   delay updating this object for short periods of time. For
                   example, an implementation strategy may allow internal data
                   structures to differ from those visible via SNMP for short
                   periods of time. This counter may reflect the internal data
                   structures for those short periods of time.

                   Note that the table size can be determined by subtracting
                   dsmonPdistCtlDeletes from dsmonPdistCtlInserts."
           ::= { dsmonPdistCtlEntry 7 }

   dsmonPdistCtlCreateTime OBJECT-TYPE
       SYNTAX   LastCreateTime
       MAX-ACCESS read-only
       STATUS   current
       DESCRIPTION
                   "The value of sysUpTime when this control entry was last
                   activated. This can be used by the management station to
                   detect if the table has been deleted and recreated between
                   polls."

```
        ::= { dsmonPdistCtlEntry 8 }

dsmonPdistCtlOwner 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."
    ::= { dsmonPdistCtlEntry 9 }

dsmonPdistCtlStatus OBJECT-TYPE
    SYNTAX      RowStatus
    MAX-ACCESS  read-create
    STATUS      current
    DESCRIPTION
            "The status of this row.

            An entry MUST NOT exist in the active state unless all
            objects in the entry have an appropriate value.

            If this object is not equal to active(1), all associated
            entries in the dsmonPdistStatsTable shall be deleted."
    ::= { dsmonPdistCtlEntry 10 }

--
-- Per-Protocol Statistics Table
--

dsmonPdistStatsTable OBJECT-TYPE
    SYNTAX      SEQUENCE OF DsmonPdistStatsEntry
    MAX-ACCESS  not-accessible
    STATUS      current
    DESCRIPTION
            "A list of information on a per protocol per counter
            aggregation group usage.

            If the dsmonAggControlLocked object is equal to 'false',
            then all entries in this table will be deleted and the agent
            will not process packets on behalf of any
            dsmonPdistCtlEntry."
    ::= { dsmonPdistObjects 2 }

dsmonPdistStatsEntry OBJECT-TYPE
    SYNTAX      DsmonPdistStatsEntry
    MAX-ACCESS  not-accessible
    STATUS      current
    DESCRIPTION
```

"A list of information on Differentiated Services DSCP
usage, containing packet and octet counters for each counter
aggregation group configured for collection, and each
protocol (as identified by the protocolDirLocalIndex for the
protocol) identified in each monitored packet.

The dsmonPdistCtlIndex value in the index identifies the
dsmonPdistCtlEntry on whose behalf this entry was created.

Note that only packets that contain a network protocol
encapsulation which contains a DS field [RFC2474] will be
counted in this table.

The dsmonAggGroupIndex value in the index is determined by
examining the DSCP value in each monitored packet, and the
dsmonAggProfileTable entry for that value.

The protocolDirLocalIndex in the index identifies the
protocolDirEntry for the protocol encapsulation of each
monitored packet. The agent will include only application
layer protocols in the associated dsmonPdistStatsTable. Any
'terminal' protocol is considered to be an application
protocol.

An example of the indexing of this entry is
dsmonPdistStatsPkts.9.29943.0.42."
    INDEX { dsmonPdistCtlIndex,
            dsmonPdistTimeMark,
            dsmonAggGroupIndex,
            protocolDirLocalIndex }
    ::= { dsmonPdistStatsTable 1 }

DsmonPdistStatsEntry ::= SEQUENCE {
    dsmonPdistTimeMark   TimeFilter,
    dsmonPdistStatsPkts   ZeroBasedCounter32,
    dsmonPdistStatsOctets   ZeroBasedCounter32,
    dsmonPdistStatsOvflPkts   ZeroBasedCounter32,
    dsmonPdistStatsOvflOctets   ZeroBasedCounter32,
    dsmonPdistStatsHCPkts   ZeroBasedCounter64,
    dsmonPdistStatsHCOctets   ZeroBasedCounter64,
    dsmonPdistStatsCreateTime   LastCreateTime
}

dsmonPdistTimeMark OBJECT-TYPE
    SYNTAX   TimeFilter
    MAX-ACCESS   not-accessible
    STATUS   current
    DESCRIPTION

         "The Time Filter index for this table. This object may be
         used by a management station to retrieve only rows which
         have been created or modified since a particular time. Note
         that the current value for a row are always returned and the
         TimeFilter is not a historical data archiving mechanism.
         Refer to RFC 2021 [RFC2021] for a detailed description of
         TimeFilter operation."
    ::= { dsmonPdistStatsEntry 1 }

dsmonPdistStatsPkts OBJECT-TYPE
    SYNTAX   ZeroBasedCounter32
    UNITS   "packets"
    MAX-ACCESS   read-only
    STATUS   current
    DESCRIPTION
         "The number of packets, using one of the DSCP values in the
         indicated counter aggregation group, for the protocol
         identified by the associated protocolDirLocalIndex value."
    ::= { dsmonPdistStatsEntry 2 }

dsmonPdistStatsOctets OBJECT-TYPE
    SYNTAX   ZeroBasedCounter32
    UNITS   "octets"
    MAX-ACCESS   read-only
    STATUS   current
    DESCRIPTION
         "The number of octets in packets, using one of the DSCP
         values in the indicated counter aggregation group, for the
         protocol identified by the associated protocolDirLocalIndex
         value.

         Note that this object doesn't count just those octets in the
         particular protocol frames, but includes the entire packet
         that contained the protocol."
    ::= { dsmonPdistStatsEntry 3 }

dsmonPdistStatsOvflPkts OBJECT-TYPE
    SYNTAX   ZeroBasedCounter32
    MAX-ACCESS   read-only
    STATUS   deprecated
    DESCRIPTION
         "The number of times the associated dsmonPdistStatsPkts
         counter has overflowed. Note that this object will only be
         instantiated if the associated dsmonPdistStatsHCPkts object
         is also instantiated for a particular dataSource."
    ::= { dsmonPdistStatsEntry 4 }

dsmonPdistStatsOvflOctets OBJECT-TYPE

```
    SYNTAX          ZeroBasedCounter32
    MAX-ACCESS  read-only
    STATUS          deprecated
    DESCRIPTION
            "The number of times the associated dsmonPdistStatsOctets
            counter has overflowed.  Note that this object will only be
            instantiated if the associated dsmonPdistStatsHCOctets
            object is also instantiated for a particular dataSource."
    ::= { dsmonPdistStatsEntry 5 }

dsmonPdistStatsHCPkts OBJECT-TYPE
    SYNTAX          ZeroBasedCounter64
    UNITS       "packets"
    MAX-ACCESS  read-only
    STATUS          current
    DESCRIPTION
            "The 64-bit version of the dsmonPdistStatsPkts object.

            Note that this object will only be instantiated if the RMON
            agent supports High Capacity monitoring for a particular
            dataSource."
    ::= { dsmonPdistStatsEntry 6 }

dsmonPdistStatsHCOctets OBJECT-TYPE
    SYNTAX          ZeroBasedCounter64
    UNITS       "octets"
    MAX-ACCESS  read-only
    STATUS          current
    DESCRIPTION
            "The 64-bit version of the dsmonPdistStatsOctets object.

            Note that this object will only be instantiated if the RMON
            agent supports High Capacity monitoring for a particular
            dataSource."
    ::= { dsmonPdistStatsEntry 7 }

dsmonPdistStatsCreateTime OBJECT-TYPE
    SYNTAX      LastCreateTime
    MAX-ACCESS read-only
    STATUS      current
    DESCRIPTION
            "The value of sysUpTime when this dsmonPdistStats entry was
            last instantiated by the agent.  This can be used by the
            management station to detect if the entry has been deleted
            and recreated between polls."
    ::= { dsmonPdistStatsEntry 8 }
```

```
--
-- Per-Protocol Statistics TopN Control Table
--

dsmonPdistTopNCtlTable OBJECT-TYPE
    SYNTAX        SEQUENCE OF DsmonPdistTopNCtlEntry
    MAX-ACCESS    not-accessible
    STATUS        current
    DESCRIPTION
            "A set of parameters that control the creation of a report
            of the top N dsmonPdist entries according to a particular
            metric.

            Note that an agent MAY choose to limit the actual number of
            entries which may be created in this table.  In this case,
            the agent SHOULD return an error-status of
            'resourceUnavailable(13)', as per section 4.2.5 of the
            'Protocol Operations for SNMPv2' specification [RFC1905]."
    ::= { dsmonPdistObjects 3 }

dsmonPdistTopNCtlEntry OBJECT-TYPE
    SYNTAX        DsmonPdistTopNCtlEntry
    MAX-ACCESS    not-accessible
    STATUS        current
    DESCRIPTION
            "A conceptual row in the dsmonPdistTopNCtlTable.

            Entries are created and deleted from this table by
            management action only, using the dsmonPdistTopNCtlStatus
            RowStatus object.

            The agent SHOULD support non-volatile configuration of this
            table, and upon system initialization, the table SHOULD be
            initialized with the saved values.

            Activation of a control row in this table will cause an
            associated dsmonPdistTopNTable to be created and maintained
            by the agent."
    INDEX { dsmonPdistTopNCtlIndex }
    ::= { dsmonPdistTopNCtlTable 1 }

DsmonPdistTopNCtlEntry ::= SEQUENCE {
    dsmonPdistTopNCtlIndex            Integer32,
    dsmonPdistTopNCtlPdistIndex       Integer32,
    dsmonPdistTopNCtlRateBase         INTEGER,
    dsmonPdistTopNCtlTimeRemaining    Integer32,
    dsmonPdistTopNCtlGeneratedReprts  Counter32,
    dsmonPdistTopNCtlDuration         Integer32,
```

```
    dsmonPdistTopNCtlRequestedSize      Integer32,
    dsmonPdistTopNCtlGrantedSize        Integer32,
    dsmonPdistTopNCtlStartTime          TimeStamp,
    dsmonPdistTopNCtlOwner              OwnerString,
    dsmonPdistTopNCtlStatus             RowStatus
}


dsmonPdistTopNCtlIndex OBJECT-TYPE
    SYNTAX      Integer32 (1..65535)
    MAX-ACCESS not-accessible
    STATUS      current
    DESCRIPTION
            "An index that uniquely identifies an entry in the
            dsmonPdistTopNCtlTable, with the same dsmonPdistTopNCtlIndex
            value as this object.  Each entry in this table defines one
            Top N report prepared on behalf of the dsmonPdistStatsEntry
            collection with the same dsmonPdistCtlIndex as this object."
    ::= { dsmonPdistTopNCtlEntry 1 }


dsmonPdistTopNCtlPdistIndex OBJECT-TYPE
    SYNTAX      Integer32 (1..65535)
    MAX-ACCESS read-create
    STATUS      current
    DESCRIPTION
            "The dsmonPdistTable for which a top N report will be
            prepared on behalf of this entry.  The dsmonPdistTable is
            identified by the value of the dsmonPdistCtlIndex for that
            table - that value is used here to identify the particular
            table.

            This object MUST NOT be modified if the associated
            dsmonPdistTopNCtlStatus object is equal to active(1)."
    ::= { dsmonPdistTopNCtlEntry 2 }


dsmonPdistTopNCtlRateBase OBJECT-TYPE
    SYNTAX       INTEGER {
                    dsmonPdistTopNPkts(1),
                    dsmonPdistTopNOctets(2),
                    dsmonPdistTopNHCPkts(3),
                    dsmonPdistTopNHCOctets(4)
                 }
    MAX-ACCESS read-create
    STATUS      current
    DESCRIPTION
            "The variable for each dsmonPdist that the
            dsmonPdistTopNRate and dsmonPdistTopNHCRate variables are
            based upon.  Each dsmonPdistTopN report generated on behalf
            of this control entry will be ranked in descending order,
```

           based on the associated dsmonPdistStatsTable counter,
           identified by this object.

           The following table identifies the dsmonPdistTable counter
           associated with each enumeration:

           Enumeration   RateBase MIB Object
           -----------   -------------------
           dsmonPdistTopNPkts   dsmonPdistStatsPkts
           dsmonPdistTopNOctets   dsmonPdistStatsOctets
           dsmonPdistTopNHCPkts   dsmonPdistStatsHCPkts
           dsmonPdistTopNHCOctets   dsmonPdistStatsHCOctets

           Note that the dsmonPdistTopNHCPkts and
           dsmonPdistTopNHCOctets enumerations are only available if
           the agent supports High Capacity monitoring.

           This object MUST NOT be modified if the associated
           dsmonPdistTopNCtlStatus object is equal to active(1)."
      ::= { dsmonPdistTopNCtlEntry 3 }

  dsmonPdistTopNCtlTimeRemaining OBJECT-TYPE
      SYNTAX   Integer32 (0..2147483647)
      UNITS   "seconds"
      MAX-ACCESS read-create
      STATUS   current
      DESCRIPTION
           "The number of seconds left in the report currently being
           collected. When this object is modified by the management
           station, a new collection is started, possibly aborting a
           currently running report. The new value is used as the
           requested duration of this report, and is immediately loaded
           into the associated dsmonPdistTopNCtlDuration object.

           When the report finishes, the probe will automatically start
           another collection with the same initial value of
           dsmonPdistTopNCtlTimeRemaining. Thus the management station
           may simply read the resulting reports repeatedly, checking
           the startTime and duration each time to ensure that a report
           was not missed or that the report parameters were not
           changed.

           While the value of this object is non-zero, it decrements by
           one per second until it reaches zero. At the time that this
           object decrements to zero, the report is made accessible in
           the dsmonPdistTopNTable, overwriting any report that may be
           there.

              When this object is modified by the management station, any
              associated entries in the dsmonPdistTopNTable shall be
              deleted."
       DEFVAL { 1800 }
       ::= { dsmonPdistTopNCtlEntry 4 }

   dsmonPdistTopNCtlGeneratedReprts OBJECT-TYPE
       SYNTAX   Counter32
       UNITS   "reports"
       MAX-ACCESS read-only
       STATUS   current
       DESCRIPTION
              "The number of reports that have been generated by this
              entry."
       ::= { dsmonPdistTopNCtlEntry 5 }

   dsmonPdistTopNCtlDuration OBJECT-TYPE
       SYNTAX   Integer32 (0..2147483647)
       UNITS   "seconds"
       MAX-ACCESS read-only
       STATUS   current
       DESCRIPTION
              "The number of seconds that this report has collected during
              the last sampling interval.

              When the associated dsmonPdistTopNCtlTimeRemaining object is
              set, this object shall be set by the probe to the same value
              and shall not be modified until the next time the
              dsmonPdistTopNCtlTimeRemaining is set.

              This value shall be zero if no reports have been requested
              for this dsmonPdistTopNCtlEntry."
       ::= { dsmonPdistTopNCtlEntry 6 }

   dsmonPdistTopNCtlRequestedSize OBJECT-TYPE
       SYNTAX   Integer32 (0..2147483647)
       UNITS   "table entries"
       MAX-ACCESS read-create
       STATUS   current
       DESCRIPTION
              "The maximum number of dsmonPdist entries requested for this
              report.

              When this object is created or modified, the probe SHOULD
              set dsmonPdistTopNCtlGrantedSize as closely to this object
              as is possible for the particular probe implementation and
              available resources."
       DEFVAL { 150 }

        ::= { dsmonPdistTopNCtlEntry 7 }

dsmonPdistTopNCtlGrantedSize OBJECT-TYPE
    SYNTAX   Integer32 (0..2147483647)
    UNITS   "table entries"
    MAX-ACCESS read-only
    STATUS   current
    DESCRIPTION
            "The maximum number of dsmonPdist entries in this report.

            When the associated dsmonPdistTopNCtlRequestedSize object is
            created or modified, the probe SHOULD set this object as
            closely to the requested value as is possible for the
            particular implementation and available resources. The
            probe MUST NOT lower this value except as a result of a
            set to the associated dsmonPdistTopNCtlRequestedSize
            object.

            Protocol entries with the highest value of
            dsmonPdistTopNRate or dsmonPdistTopNHCRate (depending on the
            value of the associated dsmonPdistTopNCtlRateBase object)
            shall be placed in this table in decreasing order of this
            rate until there is no more room or until there are no more
            dsmonPdist entries."
    ::= { dsmonPdistTopNCtlEntry 8 }

dsmonPdistTopNCtlStartTime OBJECT-TYPE
    SYNTAX   TimeStamp
    MAX-ACCESS read-only
    STATUS   current
    DESCRIPTION
            "The value of sysUpTime when this top N report was last
            started. In other words, this is the time that the
            associated dsmonPdistTopNCtlTimeRemaining object was
            modified to start the requested report or the time the
            report was last automatically (re)started.

            This object may be used by the management station to
            determine if a report was missed or not."
    ::= { dsmonPdistTopNCtlEntry 9 }

dsmonPdistTopNCtlOwner 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."

```
      ::= { dsmonPdistTopNCtlEntry 10 }

dsmonPdistTopNCtlStatus OBJECT-TYPE
    SYNTAX      RowStatus
    MAX-ACCESS read-create
    STATUS      current
    DESCRIPTION
            "The status of this dsmonPdistTopNCtlEntry.

            An entry MUST NOT exist in the active state unless all
            objects in the entry have an appropriate value.

            If this object is not equal to active(1), all associated
            entries in the dsmonPdistTopNTable shall be deleted by the
            agent."
      ::= { dsmonPdistTopNCtlEntry 11 }

--
-- dsmonPdist TopN Table
--

dsmonPdistTopNTable OBJECT-TYPE
    SYNTAX      SEQUENCE OF DsmonPdistTopNEntry
    MAX-ACCESS not-accessible
    STATUS      current
    DESCRIPTION
            "A set of statistics for those protocol distribution entries
            that have counted the highest number of octets or packets.

            If the dsmonAggControlLocked object is equal to 'false',
            then all entries in this table SHALL be deleted, and the
            agent will not process TopN reports on behalf of any
            dsmonPdistTopNCtlEntry.

            When the dsmonAggControlLocked object is set to 'true', then
            particular reports SHOULD be restarted from the beginning,
            on behalf of all active rows in the dsmonPdistTopNCtlTable.

            Note that dsmonPdist entries which did not increment at all
            during the report interval SHOULD NOT be included in
            dsmonPdistTopN reports."
      ::= { dsmonPdistObjects 4 }

dsmonPdistTopNEntry OBJECT-TYPE
    SYNTAX      DsmonPdistTopNEntry
    MAX-ACCESS not-accessible
    STATUS      current
    DESCRIPTION
```

                "A conceptual row in the dsmonPdistTopNTable.

                The dsmonPdistTopNCtlIndex value in the index identifies the
                dsmonPdistTopNCtlEntry on whose behalf this entry was
                created. Entries in this table are ordered from 1 to 'N',
                where lower numbers represent higher values of the rate base
                object, over the report interval."
        INDEX { dsmonPdistTopNCtlIndex, dsmonPdistTopNIndex }
        ::= { dsmonPdistTopNTable 1 }

DsmonPdistTopNEntry ::= SEQUENCE {
    dsmonPdistTopNIndex   Integer32,
    dsmonPdistTopNPDLocalIndex   Integer32,
    dsmonPdistTopNAggGroup   DsmonCounterAggGroupIndex,
    dsmonPdistTopNRate   Gauge32,
    dsmonPdistTopNRateOvfl   Gauge32,
    dsmonPdistTopNHCRate   CounterBasedGauge64
}

dsmonPdistTopNIndex OBJECT-TYPE
    SYNTAX   Integer32 (1..2147483647)
    MAX-ACCESS not-accessible
    STATUS   current
    DESCRIPTION
            "An index that uniquely identifies an entry in the
            dsmonPdistTopNTable among those in the same report. This
            index is between 1 and N, where N is the number of entries
            in this report. Note that 'N' may change over time, and may
            also be less than the dsmonPdistTopNCtlGrantedSize value
            associated with this entry."
    ::= { dsmonPdistTopNEntry 1 }

dsmonPdistTopNPDLocalIndex OBJECT-TYPE
    SYNTAX   Integer32 (1..2147483647)
    MAX-ACCESS read-only
    STATUS   current
    DESCRIPTION
            "The protocolDirLocalIndex value which identifies the
            protocol associated with this entry.

            If the protocolDirEntry associated with the
            protocolDirLocalIndex with the same value as this object is
            de-activated or deleted, then the agent MUST delete this
            dsmonPdistTopN entry."
    ::= { dsmonPdistTopNEntry 2 }

dsmonPdistTopNAggGroup OBJECT-TYPE
    SYNTAX   DsmonCounterAggGroupIndex

```
    MAX-ACCESS  read-only
    STATUS      current
    DESCRIPTION
            "The DSCP counter aggregation group index value associated
            with protocol identified in this entry.  This object
            identifies the dsmonAggGroupEntry with the same
            dsmonAggControlIndex value as the associated
            dsmonPdistCtlAggProfile object and the same
            dsmonAggGroupIndex value as this object."
    ::= { dsmonPdistTopNEntry 3 }

dsmonPdistTopNRate OBJECT-TYPE
    SYNTAX      Gauge32
    MAX-ACCESS read-only
    STATUS      current
    DESCRIPTION
            "The amount of change in the selected variable during this
            sampling interval.  The selected variable is this protocol's
            instance of the object selected by
            dsmonPdistTopNCtlRateBase.

            If the associated dsmonPdistTopNCtlRateBase is equal to
            'dsmonPdistTopNHCPkts' or 'dsmonPdistTopNHCOctets', then
            this object will contain the the least significant 32 bits
            of the associated dsmonPdistTopNHCRate object."
    ::= { dsmonPdistTopNEntry 4 }

dsmonPdistTopNRateOvfl OBJECT-TYPE
    SYNTAX      Gauge32
    MAX-ACCESS read-only
    STATUS      deprecated
    DESCRIPTION
            "The most significant 32 bits of the associated
            dsmonPdistTopNHCRate object.

            If the associated dsmonPdistTopNCtlRateBase is equal to
            'dsmonPdistTopNHCPkts' or 'dsmonPdistTopNHCOctets', then
            this object will contain the upper 32 bits of the associated
            dsmonPdistTopNHCRate object.

            If the associated dsmonPdistTopNCtlRateBase is equal to
            'dsmonPdistTopNPkts' or 'dsmonPdistTopNOctets', then this
            object will contain the value zero.

            The agent MAY choose not to instantiate this object if High
            Capacity monitoring is not supported."
    ::= { dsmonPdistTopNEntry 5 }
```

```
dsmonPdistTopNHCRate 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 protocol's
            instance of the object selected by
            dsmonPdistTopNCtlRateBase.

            If the associated dsmonPdistTopNCtlRateBase is equal to
            'dsmonPdistTopNPkts' or 'dsmonPdistTopNOctets', then this
            object will contain the value zero, and the associated
            dsmonPdistTopNRate object will contain the change in the
            selected variable during the sampling interval.

            The agent MAY choose not to instantiate this object if High
            Capacity monitoring is not supported."
    ::= { dsmonPdistTopNEntry 6 }


-- ********************************************************
-- *                                                      *
-- *       P E R  -  H O S T      C O L L E C T I O N S   *
-- *                                                      *
-- ********************************************************


--
-- NL Host Statistics Control Table
--

dsmonHostCtlTable OBJECT-TYPE
    SYNTAX      SEQUENCE OF DsmonHostCtlEntry
    MAX-ACCESS  not-accessible
    STATUS      current
    DESCRIPTION
            "Controls setup of per counter aggregation group, per
            network layer host distribution statistics.

            Note that an agent MAY choose to limit the actual number of
            entries which may be created in this table.  In this case,
            the agent SHOULD return an error-status of
            'resourceUnavailable(13)', as per section 4.2.5 of the
            'Protocol Operations for SNMPv2' specification [RFC1905]."
    ::= { dsmonHostObjects 1 }

dsmonHostCtlEntry OBJECT-TYPE
```

```
     SYNTAX      DsmonHostCtlEntry
     MAX-ACCESS  not-accessible
     STATUS      current
     DESCRIPTION
            "A conceptual row in the dsmonHostCtlTable.

            Entries are created and deleted from this table by
            management action only, using the dsmonHostCtlStatus
            RowStatus object.

            The agent SHOULD support non-volatile configuration of this
            table, and upon system initialization, the table SHOULD be
            initialized with the saved values.

            Activation of a control row in this table will cause an
            associated dsmonHostTable to be created and maintained by
            the agent."
     INDEX { dsmonHostCtlIndex }
     ::= { dsmonHostCtlTable 1 }

DsmonHostCtlEntry ::= SEQUENCE {
     dsmonHostCtlIndex                 Integer32,
     dsmonHostCtlDataSource            DataSource,
     dsmonHostCtlAggProfile            DsmonCounterAggProfileIndex,
     dsmonHostCtlMaxDesiredEntries     Integer32,
     dsmonHostCtlIPv4PrefixLen         Integer32,
     dsmonHostCtlIPv6PrefixLen         Integer32,
     dsmonHostCtlDroppedFrames         Counter32,
     dsmonHostCtlInserts               Counter32,
     dsmonHostCtlDeletes               Counter32,
     dsmonHostCtlCreateTime            LastCreateTime,
     dsmonHostCtlOwner                 OwnerString,
     dsmonHostCtlStatus                RowStatus
}

dsmonHostCtlIndex OBJECT-TYPE
     SYNTAX      Integer32 (1..65535)
     MAX-ACCESS  not-accessible
     STATUS      current
     DESCRIPTION
            "An arbitrary and unique index for this dsmonHostCtlEntry."
     ::= { dsmonHostCtlEntry 1 }

dsmonHostCtlDataSource OBJECT-TYPE
     SYNTAX      DataSource
     MAX-ACCESS  read-create
     STATUS      current
     DESCRIPTION
```

            "The source of data for the associated dsmonHostTable.

            Note that only packets that contain a network protocol
            encapsulation which contains a DS field [RFC2474] will be
            counted in this table.

            This object MUST NOT be modified if the associated
            dsmonHostCtlStatus object is equal to active(1)."
        ::= { dsmonHostCtlEntry 2 }

dsmonHostCtlAggProfile OBJECT-TYPE
    SYNTAX   DsmonCounterAggProfileIndex
    MAX-ACCESS   read-create
    STATUS   current
    DESCRIPTION
            "The dsmonAggControlIndex value identifying the counter
            aggregation profile which should be used on behalf of this
            dsmonHostCtlEntry.

            The associated dsmonAggControlEntry and
            dsmonAggProfileEntries, identified by the same
            dsmonAggControlIndex index value, MUST be active in order
            for this entry to remain active. It is possible for the
            counter aggregation configuration to change from a valid to
            invalid state for this dsmonHost collection. In this case,
            the associated dsmonHostCtlStatus object will be changed to
            the 'notReady' state, and data collection will not occur on
            behalf of this control entry.

            Note that an agent MAY choose to limit the actual number of
            counter aggregation profiles which may be applied to a
            particular data source.

            This object MUST NOT be modified if the associated
            dsmonHostCtlStatus object is equal to active(1)."
        ::= { dsmonHostCtlEntry 3 }

dsmonHostCtlMaxDesiredEntries OBJECT-TYPE
    SYNTAX   Integer32 (-1 | 1..2147483647)
    UNITS   "table entries"
    MAX-ACCESS   read-create
    STATUS   current
    DESCRIPTION
            "The maximum number of entries that are desired in the
            dsmonHostTable on behalf of this control entry. The probe
            will not create more than this number of associated entries
            in the table, but MAY choose to create fewer entries in this
            table for any reason including the lack of resources.

            If this value is set to -1, the probe MAY create any number
            of entries in this table.

            This object MUST NOT be modified if the associated
            dsmonHostCtlStatus object is equal to active(1)."
    ::= { dsmonHostCtlEntry 4 }

dsmonHostCtlIPv4PrefixLen OBJECT-TYPE
    SYNTAX   Integer32 (8..32)
    UNITS   "bits"
    MAX-ACCESS   read-create
    STATUS   current
    DESCRIPTION
            "The number of 'leftmost' contiguous bits in the host
            address field for encapsulations of IPv4, that should be
            maintained in this collection. This object controls how the
            dsmonHostAddress object is derived for packets which contain
            an encapsulation of IPv4.

            If this object has a value less than 32, then 'm' rightmost
            bits, where 'm' is equal to '32 -
            dsmonHostCtlIPv4PrefixLen', will be cleared to zero for
            counting purposes only. The 'leftmost' bit is the most
            significant bit of the first network-byte-order octet of the
            address.

            If this object is equal to 32, then no bits are cleared in
            each dsmonHostAddress field.

            This object MUST NOT be modified if the associated
            dsmonHostCtlStatus object is equal to active(1)."
    DEFVAL { 32 }
    ::= { dsmonHostCtlEntry 5 }

dsmonHostCtlIPv6PrefixLen OBJECT-TYPE
    SYNTAX   Integer32 (8..128)
    UNITS   "bits"
    MAX-ACCESS   read-create
    STATUS   current
    DESCRIPTION
            "The number of 'leftmost' contiguous bits in the host
            address field for encapsulations of IPv6, that should be
            maintained in this collection. This object controls how the
            dsmonHostAddress object is derived for packets which contain
            an encapsulation of IPv6.

            If this object has a value less than 128, then 'm' rightmost
            bits, where 'm' is equal to '128 -

```
            dsmonHostCtlIPv6PrefixLen', will be cleared to zero for
            counting purposes only.  The 'leftmost' bit is the most
            significant bit of the first network-byte-order octet of the
            address.

            If this object is equal to 128, then no bits are cleared in
            each dsmonHostAddress field.

            This object MUST NOT be modified if the associated
            dsmonHostCtlStatus object is equal to active(1)."
    DEFVAL { 128 }
    ::= { dsmonHostCtlEntry 6 }

dsmonHostCtlDroppedFrames OBJECT-TYPE
    SYNTAX      Counter32
    UNITS       "frames"
    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 *StatsDropEvents, but
            for which the probe chose not to count for the associated
            dsmonHost entries 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 if the dsmonHostTable is inactive because no
            appropriate protocols are enabled in the protocol directory,
            this value SHOULD be 0.

            Note that, unlike the dropEvents counter, this number is the
            exact number of frames dropped."
    ::= { dsmonHostCtlEntry 7 }

dsmonHostCtlInserts OBJECT-TYPE
    SYNTAX      Counter32
    UNITS       "table entries"
    MAX-ACCESS read-only
    STATUS      current
    DESCRIPTION
            "The number of times a dsmonHost entry has been inserted
            into the dsmonHost table.  If an entry is inserted, then
            deleted, and then inserted, this counter will be incremented
            by 2.
```

                    To allow for efficient implementation strategies, agents MAY
                    delay updating this object for short periods of time. For
                    example, an implementation strategy may allow internal data
                    structures to differ from those visible via SNMP for short
                    periods of time. This counter may reflect the internal data
                    structures for those short periods of time.

                    Note that the table size can be determined by subtracting
                    dsmonHostCtlDeletes from dsmonHostCtlInserts."
            ::= { dsmonHostCtlEntry 8 }

    dsmonHostCtlDeletes OBJECT-TYPE
        SYNTAX   Counter32
        UNITS   "table entries"
        MAX-ACCESS read-only
        STATUS   current
        DESCRIPTION
                    "The number of times a dsmonHost entry has been deleted from
                    the dsmonHost table (for any reason). If an entry is
                    deleted, then inserted, and then deleted, this counter will
                    be incremented by 2.

                    To allow for efficient implementation strategies, agents MAY
                    delay updating this object for short periods of time. For
                    example, an implementation strategy may allow internal data
                    structures to differ from those visible via SNMP for short
                    periods of time. This counter may reflect the internal data
                    structures for those short periods of time.

                    Note that the table size can be determined by subtracting
                    dsmonHostCtlDeletes from dsmonHostCtlInserts."
            ::= { dsmonHostCtlEntry 9 }

    dsmonHostCtlCreateTime OBJECT-TYPE
        SYNTAX   LastCreateTime
        MAX-ACCESS read-only
        STATUS   current
        DESCRIPTION
                    "The value of sysUpTime when this control entry was last
                    activated. This can be used by the management station to
                    detect if the table has been deleted and recreated between
                    polls."
            ::= { dsmonHostCtlEntry 10 }

    dsmonHostCtlOwner 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."
    ::= { dsmonHostCtlEntry 11 }

dsmonHostCtlStatus OBJECT-TYPE
    SYNTAX      RowStatus
    MAX-ACCESS  read-create
    STATUS      current
    DESCRIPTION
            "The status of this dsmonHostCtlEntry.

            An entry MUST NOT exist in the active state unless all
            objects in the entry have an appropriate value.

            If this object is not equal to active(1), all associated
            entries in the dsmonHostTable shall be deleted."
    ::= { dsmonHostCtlEntry 12 }

--
-- NL Host Statistics Table
--

dsmonHostTable OBJECT-TYPE
    SYNTAX      SEQUENCE OF DsmonHostEntry
    MAX-ACCESS  not-accessible
    STATUS      current
    DESCRIPTION
            "A collection of statistics for particular network protocols
            which contain a DS field, and that has been discovered on a
            particular dataSource.

            The probe will add to this table all appropriate network
            protocols, for each network address seen as the source or
            destination address in all packets with no MAC errors, and
            will increment octet and packet counts in the table for all
            packets with no MAC errors.

            If the dsmonAggControlLocked object is equal to 'false',
            then all entries in this table will be deleted, and the
            agent will not process packets on behalf of any
            dsmonHostCtlEntry."
    ::= { dsmonHostObjects 2 }

dsmonHostEntry OBJECT-TYPE
    SYNTAX      DsmonHostEntry
    MAX-ACCESS  not-accessible
    STATUS      current
```

           DESCRIPTION
                   "A list of information on Differentiated Services DSCP
                   usage, containing packet and octet counters for each counter
                   aggregation group index configured for collection per host
                   address, as identified in the dsmonAggProfileTable.

                   The dsmonHostCtlIndex value in the index identifies the
                   dsmonHostCtlEntry on whose behalf this entry was created.

                   The protocolDirLocalIndex value in the index identifies the
                   specific network layer protocol encapsulation associated
                   with each entry, and the network protocol type of the
                   dsmonHostAddress object. It MUST identify a
                   protocolDirEntry which contains a DS field (e.g., IPv4 or
                   IPv6). Note that if a protocol encapsulation with multiple
                   network layers is specified, then associated entries in this
                   table refer to the innermost network protocol layer host
                   address.

                   The dsmonAggGroupIndex value in the index is determined by
                   examining the DSCP value in each monitored packet, and the
                   dsmonAggProfileTable entry configured for that value.

                   An example of the indexing of this entry is
                   dsmonHostOutPkts.1.27273.3.200.4.171.69.120.0"
           INDEX { dsmonHostCtlIndex,
                   dsmonHostTimeMark,
                   dsmonAggGroupIndex,
                   protocolDirLocalIndex,
                   dsmonHostAddress }
           ::= { dsmonHostTable 1 }

    DsmonHostEntry ::= SEQUENCE {
           dsmonHostTimeMark   TimeFilter,
           dsmonHostAddress   OCTET STRING,
           dsmonHostInPkts   ZeroBasedCounter32,
           dsmonHostInOctets   ZeroBasedCounter32,
           dsmonHostInOvflPkts   ZeroBasedCounter32,
           dsmonHostInOvflOctets   ZeroBasedCounter32,
           dsmonHostInHCPkts   ZeroBasedCounter64,
           dsmonHostInHCOctets   ZeroBasedCounter64,
           dsmonHostOutPkts   ZeroBasedCounter32,
           dsmonHostOutOctets   ZeroBasedCounter32,
           dsmonHostOutOvflPkts   ZeroBasedCounter32,
           dsmonHostOutOvflOctets   ZeroBasedCounter32,
           dsmonHostOutHCPkts   ZeroBasedCounter64,
           dsmonHostOutHCOctets   ZeroBasedCounter64,
           dsmonHostCreateTime   LastCreateTime

```
}

dsmonHostTimeMark OBJECT-TYPE
    SYNTAX       TimeFilter
    MAX-ACCESS   not-accessible
    STATUS       current
    DESCRIPTION
            "The Time Filter index for this table.  This object may be
            used by a management station to retrieve only rows which
            have been created or modified since a particular time.  Note
            that the current value for a row are always returned and the
            TimeFilter is not a historical data archiving mechanism.
            Refer to RFC 2021 [RFC2021] for a detailed description of
            TimeFilter operation."
    ::= { dsmonHostEntry 1 }

dsmonHostAddress OBJECT-TYPE
    SYNTAX       OCTET STRING (SIZE (0..110))
    MAX-ACCESS   not-accessible
    STATUS       current
    DESCRIPTION
            "The network address for this dsmonHostEntry.

            This object is encoded according to the protocol type
            indicated by the protocolDirLocalIndex value in the index.

            In addition, this object may have some 'rightmost' bits
            cleared to zero for counting purposes, as indicated by the
            associated dsmonHostCtlIPv4PrefixLen or
            dsmonHostCtlIPv6PrefixLen objects."
    ::= { dsmonHostEntry 2 }

dsmonHostInPkts OBJECT-TYPE
    SYNTAX       ZeroBasedCounter32
    UNITS        "packets"
    MAX-ACCESS   read-only
    STATUS       current
    DESCRIPTION
            "The number of packets without errors, using one of the DSCP
            values in the indicated counter aggregation group, and
            transmitted to this address, since this entry was added to
            the dsmonHostTable.  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."
    ::= { dsmonHostEntry 3 }

dsmonHostInOctets OBJECT-TYPE
```

```
    SYNTAX        ZeroBasedCounter32
    UNITS         "octets"
    MAX-ACCESS    read-only
    STATUS        current
    DESCRIPTION
            "The number of octets in all packets, transmitted to this
            address and using one of the DSCP values in the indicated
            counter aggregation group, since this entry was added to the
            dsmonHostTable (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."
    ::= { dsmonHostEntry 4 }

dsmonHostInOvflPkts OBJECT-TYPE
    SYNTAX        ZeroBasedCounter32
    MAX-ACCESS    read-only
    STATUS        deprecated
    DESCRIPTION
            "The number of times the associated dsmonHostInPkts counter
            has overflowed.  Note that this object will only be
            instantiated if the associated dsmonHostInHCPkts object is
            also instantiated for a particular dataSource."
    ::= { dsmonHostEntry 5 }

dsmonHostInOvflOctets OBJECT-TYPE
    SYNTAX        ZeroBasedCounter32
    MAX-ACCESS    read-only
    STATUS        deprecated
    DESCRIPTION
            "The number of times the associated dsmonHostInOctets
            counter has overflowed.  Note that this object will only be
            instantiated if the associated dsmonHostInHCOctets object is
            also instantiated for a particular dataSource."
    ::= { dsmonHostEntry 6 }

dsmonHostInHCPkts OBJECT-TYPE
    SYNTAX        ZeroBasedCounter64
    UNITS         "packets"
    MAX-ACCESS    read-only
    STATUS        current
    DESCRIPTION
            "The 64-bit version of the dsmonHostInPkts object.

            Note that this object will only be instantiated if the RMON
```

```
            agent supports High Capacity monitoring for a particular
            dataSource."
    ::= { dsmonHostEntry 7 }


dsmonHostInHCOctets OBJECT-TYPE
    SYNTAX        ZeroBasedCounter64
    UNITS         "octets"
    MAX-ACCESS    read-only
    STATUS        current
    DESCRIPTION
            "The 64-bit version of the dsmonHostInOctets object.

            Note that this object will only be instantiated if the RMON
            agent supports High Capacity monitoring for a particular
            dataSource."
    ::= { dsmonHostEntry 8 }


dsmonHostOutPkts OBJECT-TYPE
    SYNTAX        ZeroBasedCounter32
    UNITS         "packets"
    MAX-ACCESS    read-only
    STATUS        current
    DESCRIPTION
            "The number of packets without errors, using one of the DSCP
            values in the indicated counter aggregation group, and
            transmitted by this address, since this entry was added to
            the dsmonHostTable.  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."
    ::= { dsmonHostEntry 9 }


dsmonHostOutOctets OBJECT-TYPE
    SYNTAX        ZeroBasedCounter32
    UNITS         "octets"
    MAX-ACCESS    read-only
    STATUS        current
    DESCRIPTION
            "The number of octets, transmitted by this address and using
            one of the DSCP values in the identified counter aggregation
            group, since this entry was added to the dsmonHostTable
            (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."
    ::= { dsmonHostEntry 10 }
```

dsmonHostOutOvflPkts OBJECT-TYPE
    SYNTAX   ZeroBasedCounter32
    MAX-ACCESS read-only
    STATUS   deprecated
    DESCRIPTION
            "The number of times the associated dsmonHostOutPkts counter
            has overflowed. Note that this object will only be
            instantiated if the associated dsmonHostOutHCPkts object is
            also instantiated for a particular dataSource."
    ::= { dsmonHostEntry 11 }

dsmonHostOutOvflOctets OBJECT-TYPE
    SYNTAX   ZeroBasedCounter32
    MAX-ACCESS read-only
    STATUS   deprecated
    DESCRIPTION
            "The number of times the associated dsmonHostOutOctets
            counter has overflowed. Note that this object will only be
            instantiated if the associated dsmonHostOutHCOctets object
            is also instantiated for a particular dataSource."
    ::= { dsmonHostEntry 12 }

dsmonHostOutHCPkts OBJECT-TYPE
    SYNTAX   ZeroBasedCounter64
    UNITS   "packets"
    MAX-ACCESS read-only
    STATUS   current
    DESCRIPTION
            "The 64-bit version of the dsmonHostOutPkts object.

            Note that this object will only be instantiated if the RMON
            agent supports High Capacity monitoring for a particular
            dataSource."
    ::= { dsmonHostEntry 13 }

dsmonHostOutHCOctets OBJECT-TYPE
    SYNTAX   ZeroBasedCounter64
    UNITS   "octets"
    MAX-ACCESS read-only
    STATUS   current
    DESCRIPTION
            "The 64-bit version of the dsmonHostOutOctets object.

            Note that this object will only be instantiated if the RMON
            agent supports High Capacity monitoring for a particular
            dataSource."
    ::= { dsmonHostEntry 14 }

```
dsmonHostCreateTime OBJECT-TYPE
    SYNTAX      LastCreateTime
    MAX-ACCESS read-only
    STATUS      current
    DESCRIPTION
            "The value of sysUpTime when this dsmonHost entry was last
            instantiated by the agent.  This can be used by the
            management station to ensure that the entry has not been
            deleted and recreated between polls."
    ::= { dsmonHostEntry 15 }


--
-- Per-Protocol Per-Host NL Statistics TopN Control Table
--

dsmonHostTopNCtlTable OBJECT-TYPE
    SYNTAX      SEQUENCE OF DsmonHostTopNCtlEntry
    MAX-ACCESS  not-accessible
    STATUS      current
    DESCRIPTION
            "A set of parameters that control the creation of a report
            of the top N dsmonHost entries according to a selected
            metric.

            Note that an agent MAY choose to limit the actual number of
            entries which may be created in this table.  In this case,
            the agent SHOULD return an error-status of
            'resourceUnavailable(13)', as per section 4.2.5 of the
            'Protocol Operations for SNMPv2' specification [RFC1905]."
    ::= { dsmonHostObjects 3 }

dsmonHostTopNCtlEntry OBJECT-TYPE
    SYNTAX      DsmonHostTopNCtlEntry
    MAX-ACCESS  not-accessible
    STATUS      current
    DESCRIPTION
            "A conceptual row in the dsmonHostTopNCtlTable.

            Entries are created and deleted from this table by
            management action only, using the dsmonHostTopNCtlStatus
            RowStatus object.

            The agent SHOULD support non-volatile configuration of this
            table, and upon system initialization, the table SHOULD be
            initialized with the saved values.

            Activation of a control row in this table will cause an
```

```
            associated dsmonHostTopNTable to be created and maintained
            by the agent."
    INDEX { dsmonHostTopNCtlIndex }
    ::= { dsmonHostTopNCtlTable 1 }

DsmonHostTopNCtlEntry ::= SEQUENCE {
    dsmonHostTopNCtlIndex          Integer32,
    dsmonHostTopNCtlHostIndex      Integer32,
    dsmonHostTopNCtlRateBase       INTEGER,
    dsmonHostTopNCtlTimeRemaining  Integer32,
    dsmonHostTopNCtlGeneratedReports Counter32,
    dsmonHostTopNCtlDuration       Integer32,
    dsmonHostTopNCtlRequestedSize  Integer32,
    dsmonHostTopNCtlGrantedSize    Integer32,
    dsmonHostTopNCtlStartTime      TimeStamp,
    dsmonHostTopNCtlOwner          OwnerString,
    dsmonHostTopNCtlStatus         RowStatus
}

dsmonHostTopNCtlIndex OBJECT-TYPE
    SYNTAX      Integer32 (1..65535)
    MAX-ACCESS not-accessible
    STATUS      current
    DESCRIPTION
            "An index that uniquely identifies an entry in the
            dsmonHostTopNCtlTable.  Each such entry defines one Top N
            report prepared for one RMON dataSource."
    ::= { dsmonHostTopNCtlEntry 1 }

dsmonHostTopNCtlHostIndex OBJECT-TYPE
    SYNTAX      Integer32 (1..65535)
    MAX-ACCESS read-create
    STATUS      current
    DESCRIPTION
            "The dsmonHostTable for which a top N report will be
            prepared on behalf of this entry.  The dsmonHostTable is
            identified by the value of the dsmonHostCtlIndex for that
            table - that value is used here to identify the particular
            table.

            This object MUST NOT be modified if the associated
            dsmonHostTopNCtlStatus object is equal to active(1)."
    ::= { dsmonHostTopNCtlEntry 2 }

dsmonHostTopNCtlRateBase OBJECT-TYPE
    SYNTAX      INTEGER {
                dsmonHostTopNInPkts(1),
                dsmonHostTopNInOctets(2),
```

```
                 dsmonHostTopNOutPkts(3),
                 dsmonHostTopNOutOctets(4),
                 dsmonHostTopNTotalPkts(5),
                 dsmonHostTopNTotalOctets(6),
                 dsmonHostTopNInHCPkts(7),
                 dsmonHostTopNInHCOctets(8),
                 dsmonHostTopNOutHCPkts(9),
                 dsmonHostTopNOutHCOctets(10),
                 dsmonHostTopNTotalHCPkts(11),
                 dsmonHostTopNTotalHCOctets(12)
             }
    MAX-ACCESS read-create
    STATUS     current
    DESCRIPTION
            "The variable(s) for each dsmonHost that the
            dsmonHostTopNRate and dsmonHostTopNHCRate variables are
            based upon.  Each dsmonHostTopN report generated on behalf
            of this control entry will be ranked in descending order,
            based on the associated dsmonHostTable counter(s),
            identified by this object.

            The following table identifies the dsmonHostTable counters
            associated with each enumeration:

            Enumeration                 RateBase MIB Objects
            -----------                 --------------------
            dsmonHostTopNInPkts         dsmonHostInPkts
            dsmonHostTopNInOctets       dsmonHostInOctets
            dsmonHostTopNOutPkts        dsmonHostOutPkts
            dsmonHostTopNOutOctets      dsmonHostOutOctets
            dsmonHostTopNTotalPkts      dsmonHostInPkts +
                                           dsmonHostOutPkts
            dsmonHostTopNTotalOctets    dsmonHostInOctets +
                                           dsmonHostOutOctets
            dsmonHostTopNInHCPkts       dsmonHostInHCPkts
            dsmonHostTopNInHCOctets     dsmonHostInHCOctets
            dsmonHostTopNOutHCPkts      dsmonHostOutHCPkts
            dsmonHostTopNOutHCOctets    dsmonHostOutHCPkts
            dsmonHostTopNTotalHCPkts    dsmonHostInHCPkts +
                                           dsmonHostOutHCPkts
            dsmonHostTopNTotalHCOctets  dsmonHostInHCOctets +
                                           dsmonHostOutHCOctets

            The following enumerations are only available if the agent
            supports High Capacity monitoring:

            dsmonHostTopNInHCPkts
            dsmonHostTopNInHCOctets
```

```
                    dsmonHostTopNOutHCPkts
                    dsmonHostTopNOutHCOctets
                    dsmonHostTopNTotalHCPkts
                    dsmonHostTopNTotalHCOctets
```

It is an implementation-specific matter whether an agent can
detect an overflow condition resulting from the addition of
two counter delta values for the following enumerations:

```
                    dsmonHostTopNTotalPkts
                    dsmonHostTopNTotalOctets
                    dsmonHostTopNTotalHCPkts
                    dsmonHostTopNTotalHCOctets
```

In the event such an overflow condition can be detected by
the agent, the associated dsmonHostTopNRate,
dsmonHostTopNRateOvfl, and/or dsmonHostTopNHCRate objects
should be set to their maximum value.

This object MUST NOT be modified if the associated
dsmonHostTopNCtlStatus object is equal to active(1)."
```
        ::= { dsmonHostTopNCtlEntry 3 }

dsmonHostTopNCtlTimeRemaining OBJECT-TYPE
    SYNTAX        Integer32 (0..2147483647)
    UNITS         "seconds"
    MAX-ACCESS read-create
    STATUS        current
    DESCRIPTION
```
            "The number of seconds left in the report currently being
            collected. When this object is modified by the management
            station, a new collection is started, possibly aborting a
            currently running report. The new value is used as the
            requested duration of this report, and is immediately loaded
            into the associated dsmonHostTopNCtlDuration object.

            When the report finishes, the probe will automatically start
            another collection with the same initial value of
            dsmonHostTopNCtlTimeRemaining. Thus the management station
            may simply read the resulting reports repeatedly, checking
            the startTime and duration each time to ensure that a report
            was not missed or that the report parameters were not
            changed.

            While the value of this object is non-zero, it decrements by
            one per second until it reaches zero. At the time that this
            object decrements to zero, the report is made accessible in
            the dsmonHostTopNTable, overwriting any report that may be

                    there.

                    When this object is modified by the management station, any
                    associated entries in the dsmonHostTopNTable shall be
                    deleted."
            DEFVAL { 1800 }
            ::= { dsmonHostTopNCtlEntry 4 }

    dsmonHostTopNCtlGeneratedReports OBJECT-TYPE
            SYNTAX   Counter32
            UNITS   "reports"
            MAX-ACCESS read-only
            STATUS   current
            DESCRIPTION
                    "The number of reports that have been generated by this
                    entry."
            ::= { dsmonHostTopNCtlEntry 5 }

    dsmonHostTopNCtlDuration OBJECT-TYPE
            SYNTAX   Integer32 (0..2147483647)
            UNITS   "seconds"
            MAX-ACCESS read-only
            STATUS   current
            DESCRIPTION
                    "The number of seconds that this report has collected during
                    the last sampling interval.

                    When the associated dsmonHostTopNCtlTimeRemaining object is
                    set, this object shall be set by the probe to the same value
                    and shall not be modified until the next time the
                    dsmonHostTopNCtlTimeRemaining is set.

                    This value shall be zero if no reports have been requested
                    for this dsmonHostTopNCtlEntry."
            ::= { dsmonHostTopNCtlEntry 6 }

    dsmonHostTopNCtlRequestedSize OBJECT-TYPE
            SYNTAX   Integer32 (0..2147483647)
            UNITS   "table entries"
            MAX-ACCESS read-create
            STATUS   current
            DESCRIPTION
                    "The maximum number of dsmonHost entries requested for this
                    report.

                    When this object is created or modified, the probe SHOULD
                    set dsmonHostTopNCtlGrantedSize as closely to this object as
                    is possible for the particular probe implementation and

                available resources."
        DEFVAL { 150 }
        ::= { dsmonHostTopNCtlEntry 7 }

dsmonHostTopNCtlGrantedSize OBJECT-TYPE
        SYNTAX   Integer32 (0..2147483647)
        UNITS   "table entries"
        MAX-ACCESS read-only
        STATUS   current
        DESCRIPTION
                "The maximum number of dsmonHost entries in this report.

                When the associated dsmonHostTopNCtlRequestedSize object is
                created or modified, the probe SHOULD set this object as
                closely to the requested value as is possible for the
                particular implementation and available resources. The
                probe MUST NOT lower this value except as a result of a
                set to the associated dsmonHostTopNCtlRequestedSize
                object.

                Protocol entries with the highest value of dsmonHostTopNRate
                or dsmonHostTopNHCRate (depending on the value of the
                associated dsmonHostTopNCtlRateBase object) shall be placed
                in this table in decreasing order of this rate until there
                is no more room or until there are no more dsmonHost
                entries."
        ::= { dsmonHostTopNCtlEntry 8 }

dsmonHostTopNCtlStartTime OBJECT-TYPE
        SYNTAX   TimeStamp
        MAX-ACCESS read-only
        STATUS   current
        DESCRIPTION
                "The value of sysUpTime when this top N report was last
                started. In other words, this is the time that the
                associated dsmonHostTopNCtlTimeRemaining object was modified
                to start the requested report or the time the report was
                last automatically (re)started.

                This object may be used by the management station to
                determine if a report was missed or not."
        ::= { dsmonHostTopNCtlEntry 9 }

dsmonHostTopNCtlOwner 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."
        ::= { dsmonHostTopNCtlEntry 10 }

dsmonHostTopNCtlStatus OBJECT-TYPE
        SYNTAX      RowStatus
        MAX-ACCESS read-create
        STATUS      current
        DESCRIPTION
                "The status of this dsmonHostTopNCtlEntry.

                An entry MUST NOT exist in the active state unless all
                objects in the entry have an appropriate value.

                If this object is not equal to active(1), all associated
                entries in the dsmonHostTopNTable shall be deleted by the
                agent."
        ::= { dsmonHostTopNCtlEntry 11 }

--
-- dsmonHost TopN Table
--

dsmonHostTopNTable OBJECT-TYPE
        SYNTAX      SEQUENCE OF DsmonHostTopNEntry
        MAX-ACCESS not-accessible
        STATUS      current
        DESCRIPTION
                "A set of statistics for those dsmonHost entries that have
                counted the highest number of octets or packets.

                If the dsmonAggControlLocked object is equal to 'false',
                then all entries in this table SHALL be deleted, and the
                agent will not process TopN reports on behalf of any
                dsmonHostTopNCtlEntry.

                When the dsmonAggControlLocked object is set to 'true', then
                particular reports SHOULD be restarted from the beginning,
                on behalf of all active rows in the dsmonHostTopNCtlTable.

                Note that dsmonHost entries which did not increment at all
                during the report interval SHOULD NOT be included in
                dsmonHostTopN reports."
        ::= { dsmonHostObjects 4 }

dsmonHostTopNEntry OBJECT-TYPE
        SYNTAX      DsmonHostTopNEntry
        MAX-ACCESS not-accessible
```

```
        STATUS     current
        DESCRIPTION
                "A conceptual row in the dsmonHostTopNTable.

                The dsmonHostTopNCtlIndex value in the index identifies the
                dsmonHostTopNCtlEntry on whose behalf this entry was
                created.

                Entries in this table are ordered from 1 to 'N', where lower
                numbers represent higher values of the rate base object,
                over the report interval."
        INDEX { dsmonHostTopNCtlIndex, dsmonHostTopNIndex }
        ::= { dsmonHostTopNTable 1 }

DsmonHostTopNEntry ::= SEQUENCE {
    dsmonHostTopNIndex                 Integer32,
    dsmonHostTopNPDLocalIndex          Integer32,
    dsmonHostTopNAddress               OCTET STRING,
    dsmonHostTopNAggGroup              DsmonCounterAggGroupIndex,
    dsmonHostTopNRate                  Gauge32,
    dsmonHostTopNRateOvfl              Gauge32,
    dsmonHostTopNHCRate                CounterBasedGauge64
  }

dsmonHostTopNIndex OBJECT-TYPE
    SYNTAX     Integer32 (1..2147483647)
    MAX-ACCESS not-accessible
    STATUS     current
    DESCRIPTION
            "An index that uniquely identifies an entry in the
            dsmonHostTopNTable among those in the same report.  This
            index is between 1 and N, where N is the number of entries
            in this report."
    ::= { dsmonHostTopNEntry 1 }

dsmonHostTopNPDLocalIndex OBJECT-TYPE
    SYNTAX     Integer32 (1..2147483647)
    MAX-ACCESS read-only
    STATUS     current
    DESCRIPTION
            "The protocolDirLocalIndex value which identifies the
            protocol associated with the dsmonHostTopNAddress object in
            this entry.

            If the protocolDirEntry associated with the
            protocolDirLocalIndex with the same value as this object is
            de-activated or deleted, then the agent MUST delete this
            dsmonHostTopN entry."
```

```
    ::= { dsmonHostTopNEntry 2 }

dsmonHostTopNAddress OBJECT-TYPE
    SYNTAX      OCTET STRING
    MAX-ACCESS read-only
    STATUS      current
    DESCRIPTION
            "The dsmonHostAddress value for the network host identified
            in this entry.  The associated dsmonHostTopNPDLocalIndex
            object identifies the network protocol type and the encoding
            rules for this object."
    ::= { dsmonHostTopNEntry 3 }

dsmonHostTopNAggGroup OBJECT-TYPE
    SYNTAX      DsmonCounterAggGroupIndex
    MAX-ACCESS  read-only
    STATUS      current
    DESCRIPTION
            "The counter aggregation group index value associated with
            host identified in this entry.  This object identifies the
            dsmonAggGroupEntry with the same dsmonAggControlIndex value
            as the associated dsmonHostCtlAggProfile object and the same
            dsmonAggGroupIndex value as this object."
    ::= { dsmonHostTopNEntry 4 }

dsmonHostTopNRate OBJECT-TYPE
    SYNTAX      Gauge32
    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 dsmonHostTopNCtlRateBase.

            If the associated dsmonHostTopNCtlRateBase indicates a High
            Capacity monitoring enumeration, (e.g.
            'dsmonHostTopNInHCPkts'), then this object will contain the
            the least significant 32 bits of the associated
            dsmonHostTopNHCRate object."
    ::= { dsmonHostTopNEntry 5 }

dsmonHostTopNRateOvfl OBJECT-TYPE
    SYNTAX      Gauge32
    MAX-ACCESS read-only
    STATUS      deprecated
    DESCRIPTION
            "The most significant 32 bits of the associated
            dsmonHostTopNHCRate object.
```

                    If the associated dsmonHostTopNCtlRateBase is equal to any
                    of the High Capacity monitoring enumerations (e.g.
                    'dsmonHostTopNInHCPkts'), then this object will contain the
                    upper 32 bits of the associated dsmonHostTopNHCRate object.

                    If the associated dsmonHostTopNCtlRateBase is not equal to
                    any of High Capacity monitoring enumerations, then this
                    object will contain the value zero.

                    The agent MAY choose not to instantiate this object if High
                    Capacity monitoring is not supported."
            ::= { dsmonHostTopNEntry 6 }

dsmonHostTopNHCRate 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 dsmonHostTopNCtlRateBase.

                    If the associated dsmonHostTopNCtlRateBase is not equal to
                    any of the High Capacity monitoring enumerations (e.g.,
                    'dsmonHostTopNInPkts'), then this object will contain the
                    value zero, and the associated dsmonHostTopNRate object will
                    contain the change in the selected variable during the
                    sampling interval.

                    The agent MAY choose not to instantiate this object if High
                    Capacity monitoring is not supported."
         ::= { dsmonHostTopNEntry 7 }

-- **
-- *   *
-- *   P E R - C O N V E R S I O N   C O L L E C T I O N S *
-- *   *
-- **

--
-- AL Matrix Statistics Control Table
--

dsmonMatrixCtlTable OBJECT-TYPE
        SYNTAX   SEQUENCE OF DsmonMatrixCtlEntry
        MAX-ACCESS not-accessible
        STATUS   current

      DESCRIPTION
            "Controls setup of per counter aggregation group, per host-
            pair, application protocol distribution statistics.

            Note that an agent MAY choose to limit the actual number of
            entries which may be created in this table. In this case,
            the agent SHOULD return an error-status of
            'resourceUnavailable(13)', as per section 4.2.5 of the
            'Protocol Operations for SNMPv2' specification [RFC1905]."
      ::= { dsmonMatrixObjects 1 }

dsmonMatrixCtlEntry OBJECT-TYPE
      SYNTAX   DsmonMatrixCtlEntry
      MAX-ACCESS   not-accessible
      STATUS   current
      DESCRIPTION
            "A conceptual row in the dsmonMatrixCtlTable.

            Entries are created and deleted from this table by
            management action only, using the dsmonMatrixCtlStatus
            RowStatus object.

            The agent SHOULD support non-volatile configuration of this
            table, and upon system initialization, the table SHOULD be
            initialized with the saved values.

            Activation of a control row in this table will cause an
            associated dsmonMatrixSDTable and dsmonMatrixDSTable to be
            created and maintained by the agent."
      INDEX { dsmonMatrixCtlIndex }
      ::= { dsmonMatrixCtlTable 1 }

DsmonMatrixCtlEntry ::= SEQUENCE {
      dsmonMatrixCtlIndex   Integer32,
      dsmonMatrixCtlDataSource   DataSource,
      dsmonMatrixCtlAggProfile   DsmonCounterAggProfileIndex,
      dsmonMatrixCtlMaxDesiredEntries   Integer32,
      dsmonMatrixCtlDroppedFrames   Counter32,
      dsmonMatrixCtlInserts   Counter32,
      dsmonMatrixCtlDeletes   Counter32,
      dsmonMatrixCtlCreateTime   LastCreateTime,
      dsmonMatrixCtlOwner   OwnerString,
      dsmonMatrixCtlStatus   RowStatus
}

dsmonMatrixCtlIndex OBJECT-TYPE
      SYNTAX   Integer32 (1..65535)
      MAX-ACCESS   not-accessible

        STATUS   current
        DESCRIPTION
                "An arbitrary and unique index for this
                dsmonMatrixCtlEntry."
        ::= { dsmonMatrixCtlEntry 1 }

dsmonMatrixCtlDataSource OBJECT-TYPE
        SYNTAX   DataSource
        MAX-ACCESS   read-create
        STATUS   current
        DESCRIPTION
                "The source of data for the associated dsmonMatrixSDTable
                and dsmonMatrixDSTable.

                Note that only packets that contain a network protocol
                encapsulation which contains a DS field [RFC2474] will be
                counted in this table.

                This object MUST NOT be modified if the associated
                dsmonMatrixCtlStatus object is equal to active(1)."
        ::= { dsmonMatrixCtlEntry 2 }

dsmonMatrixCtlAggProfile OBJECT-TYPE
        SYNTAX   DsmonCounterAggProfileIndex
        MAX-ACCESS   read-create
        STATUS   current
        DESCRIPTION
                "The dsmonAggControlIndex value identifying the counter
                aggregation profile which should be used on behalf of this
                dsmonMatrixCtlEntry.

                The associated dsmonAggControlEntry and
                dsmonAggProfileEntries, identified by the same
                dsmonAggControlIndex index value, MUST be active in order
                for this entry to remain active. It is possible for the
                counter aggregation configuration to change from a valid to
                invalid state for this dsmonMatrix collection. In this
                case, the associated dsmonMatrixCtlStatus object will be
                changed to the 'notReady' state, and data collection will
                not occur on behalf of this control entry.

                Note that an agent MAY choose to limit the actual number of
                counter aggregation profiles which may be applied to a
                particular data source.

                This object MUST NOT be modified if the associated
                dsmonMatrixCtlStatus object is equal to active(1)."
        ::= { dsmonMatrixCtlEntry 3 }

dsmonMatrixCtlMaxDesiredEntries OBJECT-TYPE
    SYNTAX   Integer32 (-1 | 1..2147483647)
    UNITS   "table entries"
    MAX-ACCESS   read-create
    STATUS   current
    DESCRIPTION
            "The maximum number of entries that are desired in the
            dsmonMatrix tables on behalf of this control entry. The
            probe will not create more than this number of associated
            entries in these tables, but may choose to create fewer
            entries in this table for any reason including the lack of
            resources.

            If this value is set to -1, the probe may create any number
            of entries in this table.

            This object MUST NOT be modified if the associated
            dsmonMatrixCtlStatus object is equal to active(1)."
    ::= { dsmonMatrixCtlEntry 4 }

dsmonMatrixCtlDroppedFrames OBJECT-TYPE
    SYNTAX   Counter32
    UNITS   "frames"
    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 *StatsDropEvents, but
            for which the probe chose not to count for the associated
            dsmonMatrixSD and dsmonMatrixDS entries 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 if the dsmonMatrix tables are inactive because no
            appropriate protocols are enabled in the protocol directory,
            this value SHOULD be 0.

            Note that, unlike the dropEvents counter, this number is the
            exact number of frames dropped."
    ::= { dsmonMatrixCtlEntry 5 }

dsmonMatrixCtlInserts OBJECT-TYPE
    SYNTAX   Counter32
    UNITS   "table entries"
    MAX-ACCESS   read-only

```
     STATUS      current
     DESCRIPTION
            "The number of times a dsmonMatrix entry has been inserted
            into the dsmonMatrix tables.  If an entry is inserted, then
            deleted, and then inserted, this counter will be incremented
            by 2.  The addition of a conversation into both the
            dsmonMatrixSDTable and dsmonMatrixDSTable shall be counted
            as two insertions (even though every addition into one table
            must be accompanied by an insertion into the other).

            To allow for efficient implementation strategies, agents may
            delay updating this object for short periods of time.  For
            example, an implementation strategy may allow internal data
            structures to differ from those visible via SNMP for short
            periods of time.  This counter may reflect the internal data
            structures for those short periods of time.  Note that the
            sum of the dsmonMatrixSDTable and dsmonMatrixDSTable sizes
            can be determined by subtracting dsmonMatrixCtlDeletes from
            dsmonMatrixCtlInserts."
     ::= { dsmonMatrixCtlEntry 6 }

dsmonMatrixCtlDeletes OBJECT-TYPE
     SYNTAX      Counter32
     UNITS       "table entries"
     MAX-ACCESS read-only
     STATUS      current
     DESCRIPTION
            "The number of times a dsmonMatrix entry has been deleted
            from the dsmonMatrix tables (for any reason).  If an entry
            is deleted, then inserted, and then deleted, this counter
            will be incremented by 2.  The deletion of a conversation
            from both the dsmonMatrixSDTable and dsmonMatrixDSTable
            shall be counted as two deletions (even though every
            deletion from one table must be accompanied by a deletion
            from the other).

            To allow for efficient implementation strategies, agents MAY
            delay updating this object for short periods of time.  For
            example, an implementation strategy may allow internal data
            structures to differ from those visible via SNMP for short
            periods of time.  This counter may reflect the internal data
            structures for those short periods of time.

            Note that the sum of the dsmonMatrixSDTable and
            dsmonMatrixDSTable sizes can be determined by subtracting
            dsmonMatrixCtlDeletes from dsmonMatrixCtlInserts."
     ::= { dsmonMatrixCtlEntry 7 }
```

dsmonMatrixCtlCreateTime OBJECT-TYPE
    SYNTAX   LastCreateTime
    MAX-ACCESS read-only
    STATUS   current
    DESCRIPTION
            "The value of sysUpTime when this control entry was last
            activated. This can be used by the management station to
            detect if the table has been deleted and recreated between
            polls."
    ::= { dsmonMatrixCtlEntry 8 }

dsmonMatrixCtlOwner 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."
    ::= { dsmonMatrixCtlEntry 9 }

dsmonMatrixCtlStatus OBJECT-TYPE
    SYNTAX   RowStatus
    MAX-ACCESS read-create
    STATUS   current
    DESCRIPTION
            "The status of this dsmonMatrixCtlEntry.

            An entry MUST NOT exist in the active state unless all
            objects in the entry have an appropriate value.

            If this object is not equal to active(1), all associated
            entries in the dsmonMatrixSDTable and dsmonMatrixDSTable
            shall be deleted."
    ::= { dsmonMatrixCtlEntry 10 }

--
-- AL Matrix SD Statistics Table
--

dsmonMatrixSDTable OBJECT-TYPE
    SYNTAX   SEQUENCE OF DsmonMatrixSDEntry
    MAX-ACCESS not-accessible
    STATUS   current
    DESCRIPTION
            "A list of application traffic matrix entries which collect
            statistics for conversations of a particular application
            protocol between two network-level addresses. This table is
            indexed first by the source address and then by the

           destination address to make it convenient to collect all
           statistics from a particular address.

           The probe will add to this table all pairs of addresses for
           all protocols seen in all packets with no MAC errors, and
           will increment octet and packet counts in the table for all
           packets with no MAC errors."
    ::= { dsmonMatrixObjects 2 }

dsmonMatrixSDEntry OBJECT-TYPE
    SYNTAX   DsmonMatrixSDEntry
    MAX-ACCESS   not-accessible
    STATUS   current
    DESCRIPTION
           "A conceptual row in the dsmonMatrixSDTable.

           The dsmonMatrixCtlIndex value in the index identifies the
           dsmonMatrixCtlEntry on whose behalf this entry was created.

           The dsmonAggGroupIndex value in the index is determined by
           examining the DSCP value in each monitored packet, and the
           dsmonAggProfileTable entry configured for that value."
    INDEX { dsmonMatrixCtlIndex,
            dsmonMatrixTimeMark,
            dsmonAggGroupIndex,
            dsmonMatrixNLIndex,
            dsmonMatrixSourceAddress,
            dsmonMatrixDestAddress,
            dsmonMatrixALIndex
           }
    ::= { dsmonMatrixSDTable 1 }

DsmonMatrixSDEntry ::= SEQUENCE {
    dsmonMatrixTimeMark   TimeFilter,
    dsmonMatrixNLIndex   Integer32,
    dsmonMatrixSourceAddress   OCTET STRING,
    dsmonMatrixDestAddress   OCTET STRING,
    dsmonMatrixALIndex   Integer32,
    dsmonMatrixSDPkts   ZeroBasedCounter32,
    dsmonMatrixSDOvflPkts   ZeroBasedCounter32,
    dsmonMatrixSDHCPkts   ZeroBasedCounter64,
    dsmonMatrixSDOctets   ZeroBasedCounter32,
    dsmonMatrixSDOvflOctets   ZeroBasedCounter32,
    dsmonMatrixSDHCOctets   ZeroBasedCounter64,
    dsmonMatrixSDCreateTime   LastCreateTime
}

dsmonMatrixTimeMark OBJECT-TYPE

```
    SYNTAX        TimeFilter
    MAX-ACCESS    not-accessible
    STATUS        current
    DESCRIPTION
            "The Time Filter index for this table.  This object may be
            used by a management station to retrieve only rows which
            have been created or modified since a particular time.  Note
            that the current value for a row are always returned and the
            TimeFilter is not a historical data archiving mechanism.
            Refer to RFC 2021 [RFC2021] for a detailed description of
            TimeFilter operation."
    ::= { dsmonMatrixSDEntry 1 }


dsmonMatrixNLIndex OBJECT-TYPE
    SYNTAX        Integer32 (1..2147483647)
    MAX-ACCESS    not-accessible
    STATUS        current
    DESCRIPTION
            "The protocolDirLocalIndex value of a protocolDirEntry
            representing the specific network layer protocol
            encapsulation associated with each entry, and the network
            protocol type of the dsmonMatrixSourceAddress and
            dsmonMatrixDestAddress objects."
    ::= { dsmonMatrixSDEntry 2 }


dsmonMatrixSourceAddress OBJECT-TYPE
    SYNTAX        OCTET STRING (SIZE (0..54))
    MAX-ACCESS    not-accessible
    STATUS        current
    DESCRIPTION
            "The network source address for this dsmonMatrix entry.

            This is represented as an octet string with specific
            semantics and length as identified by the dsmonMatrixNLIndex
            component of the index.

            For example, if the dsmonMatrixNLIndex indicates an
            encapsulation of IPv4, this object is encoded as a length
            octet of 4, followed by the 4 octets of the IPv4 address, in
            network byte order."
    ::= { dsmonMatrixSDEntry 3 }


dsmonMatrixDestAddress OBJECT-TYPE
    SYNTAX        OCTET STRING (SIZE (0..54))
    MAX-ACCESS    not-accessible
    STATUS        current
    DESCRIPTION
            "The network destination address for this dsmonMatrix entry.
```

                This is represented as an octet string with specific
                semantics and length as identified by the dsmonMatrixNLIndex
                component of the index.

                For example, if the dsmonMatrixNLIndex indicates an
                encapsulation of IPv4, this object is encoded as a length
                octet of 4, followed by the 4 octets of the IPv4 address, in
                network byte order."
        ::= { dsmonMatrixSDEntry 4 }

dsmonMatrixALIndex OBJECT-TYPE
    SYNTAX   Integer32 (1..2147483647)
    MAX-ACCESS   not-accessible
    STATUS   current
    DESCRIPTION
            "The protocolDirLocalIndex value of the protocolDirEntry
            representing the specific application layer protocol
            associated with each entry.

            It MUST identify an protocolDirEntry which is a direct or
            indirect descendant of the protocolDirEntry identified by
            the associated dsmonMatrixNLIndex object."
    ::= { dsmonMatrixSDEntry 5 }

dsmonMatrixSDPkts OBJECT-TYPE
    SYNTAX   ZeroBasedCounter32
    UNITS   "packets"
    MAX-ACCESS   read-only
    STATUS   current
    DESCRIPTION
            "The number of packets of this protocol type (indicated by
            the associated dsmonMatrixALIndex object) without errors
            transmitted from the source address to the destination
            address since this entry was added to the
            dsmonMatrixSDTable. 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."
    ::= { dsmonMatrixSDEntry 6 }

dsmonMatrixSDOvflPkts OBJECT-TYPE
    SYNTAX   ZeroBasedCounter32
    MAX-ACCESS   read-only
    STATUS   deprecated
    DESCRIPTION
            "The number of times the associated dsmonMatrixSDPkts
            counter has overflowed, since this entry was added to the
            dsmonMatrixSDTable."

```
        ::= { dsmonMatrixSDEntry 7 }

dsmonMatrixSDHCPkts OBJECT-TYPE
    SYNTAX        ZeroBasedCounter64
    UNITS         "packets"
    MAX-ACCESS    read-only
    STATUS        current
    DESCRIPTION
            "The 64-bit version of the dsmonMatrixSDPkts object.

            Note that this object will only be instantiated if the RMON
            agent supports High Capacity monitoring for a particular
            dataSource."
    ::= { dsmonMatrixSDEntry 8 }

dsmonMatrixSDOctets OBJECT-TYPE
    SYNTAX        ZeroBasedCounter32
    UNITS         "octets"
    MAX-ACCESS    read-only
    STATUS        current
    DESCRIPTION
            "The number of octets in packets of this protocol type
            transmitted from the source address to the destination
            address since this entry was added to the dsmonMatrixSDTable
            (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."
    ::= { dsmonMatrixSDEntry 9 }

dsmonMatrixSDOvflOctets OBJECT-TYPE
    SYNTAX        ZeroBasedCounter32
    MAX-ACCESS    read-only
    STATUS        deprecated
    DESCRIPTION
            "The number of times the associated dsmonMatrixSDOctets
            counter has overflowed, since this entry was added to the
            dsmonMatrixSDTable."
    ::= { dsmonMatrixSDEntry 10 }

dsmonMatrixSDHCOctets OBJECT-TYPE
    SYNTAX        ZeroBasedCounter64
    UNITS         "octets"
    MAX-ACCESS    read-only
    STATUS        current
    DESCRIPTION
```

```
             "The 64-bit version of the dsmonMatrixSDPkts object.

             Note that this object will only be instantiated if the RMON
             agent supports High Capacity monitoring for a particular
             dataSource."
    ::= { dsmonMatrixSDEntry 11 }


dsmonMatrixSDCreateTime OBJECT-TYPE
    SYNTAX      LastCreateTime
    MAX-ACCESS read-only
    STATUS      current
    DESCRIPTION
             "The value of sysUpTime when this entry was last activated.
             This can be used by the management station to ensure that
             the entry has not been deleted and recreated between polls."
    ::= { dsmonMatrixSDEntry 12 }



--
-- AL Matrix DS Statistics Table
--

dsmonMatrixDSTable OBJECT-TYPE
    SYNTAX      SEQUENCE OF DsmonMatrixDSEntry
    MAX-ACCESS  not-accessible
    STATUS      current
    DESCRIPTION
             "A list of application traffic matrix entries which collect
             statistics for conversations of a particular application
             protocol between two network-level addresses.  This table is
             indexed first by the destination address and then by the
             source address to make it convenient to collect all
             statistics from a particular address.

             The probe will add to this table all pairs of addresses for
             all protocols seen in all packets with no MAC errors, and
             will increment octet and packet counts in the table for all
             packets with no MAC errors."
    ::= { dsmonMatrixObjects 3 }

dsmonMatrixDSEntry OBJECT-TYPE
    SYNTAX      DsmonMatrixDSEntry
    MAX-ACCESS  not-accessible
    STATUS      current
    DESCRIPTION
             "A conceptual row in the dsmonMatrixDSTable.  Note that this
             table is conceptually a re-ordered version of the
             dsmonMatrixSDTable.  Therefore, all of the index values from
```

```
         that table are used by reference, and their semantics are
         exactly as described in the dsmonMatrixSDTable.

         The dsmonMatrixCtlIndex value in the index identifies the
         dsmonMatrixCtlEntry on whose behalf this entry was created.

         The dsmonMatrixTimeMark value in the index identifies the
         Time Filter index for this table.

         The dsmonAggGroupIndex value in the index is determined by
         examining the DSCP value in each monitored packet, and the
         dsmonAggProfileTable entry configured for that value.

         The dsmonMatrixNLIndex value in the index identifies the
         protocolDirLocalIndex value of a protocolDirEntry
         representing the specific network layer protocol
         encapsulation associated with each entry, and the network
         protocol type of the dsmonMatrixSourceAddress and
         dsmonMatrixDestAddress objects.

         The dsmonMatrixDestAddress value in the index identifies the
         network destination address for this dsmonMatrix entry.

         The dsmonMatrixSourceAddress value in the index identifies
         the network source address for this dsmonMatrix entry.

         The dsmonMatrixALIndex value in the index identifies the
         protocolDirLocalIndex value of the protocolDirEntry
         representing the specific application layer protocol
         associated with each entry."
    INDEX { dsmonMatrixCtlIndex,
            dsmonMatrixTimeMark,
            dsmonAggGroupIndex,
            dsmonMatrixNLIndex,
            dsmonMatrixDestAddress,
            dsmonMatrixSourceAddress,
            dsmonMatrixALIndex
          }
    ::= { dsmonMatrixDSTable 1 }

DsmonMatrixDSEntry ::= SEQUENCE {
    dsmonMatrixDSPkts                   ZeroBasedCounter32,
    dsmonMatrixDSOvflPkts               ZeroBasedCounter32,
    dsmonMatrixDSHCPkts                 ZeroBasedCounter64,
    dsmonMatrixDSOctets                 ZeroBasedCounter32,
    dsmonMatrixDSOvflOctets             ZeroBasedCounter32,
    dsmonMatrixDSHCOctets               ZeroBasedCounter64,
    dsmonMatrixDSCreateTime             LastCreateTime
```

}

dsmonMatrixDSPkts OBJECT-TYPE
    SYNTAX   ZeroBasedCounter32
    UNITS   "packets"
    MAX-ACCESS   read-only
    STATUS   current
    DESCRIPTION
            "The number of packets of this protocol type (indicated by
            the associated dsmonMatrixALIndex object) without errors
            transmitted from the source address to the destination
            address since this entry was added to the
            dsmonMatrixDSTable. 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."
    ::= { dsmonMatrixDSEntry 1 }

dsmonMatrixDSOvflPkts OBJECT-TYPE
    SYNTAX   ZeroBasedCounter32
    MAX-ACCESS   read-only
    STATUS   deprecated
    DESCRIPTION
            "The number of times the associated dsmonMatrixDSPkts
            counter has overflowed, since this entry was added to the
            dsmonMatrixDSTable."
    ::= { dsmonMatrixDSEntry 2 }

dsmonMatrixDSHCPkts OBJECT-TYPE
    SYNTAX   ZeroBasedCounter64
    UNITS   "packets"
    MAX-ACCESS   read-only
    STATUS   current
    DESCRIPTION
            "The 64-bit version of the dsmonMatrixDSPkts object.

            Note that this object will only be instantiated if the RMON
            agent supports High Capacity monitoring for a particular
            dataSource."
    ::= { dsmonMatrixDSEntry 3 }

dsmonMatrixDSOctets OBJECT-TYPE
    SYNTAX   ZeroBasedCounter32
    UNITS   "octets"
    MAX-ACCESS   read-only
    STATUS   current
    DESCRIPTION
            "The number of octets in packets of this protocol type

            transmitted from the source address to the destination
            address since this entry was added to the dsmonMatrixDSTable
            (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."
    ::= { dsmonMatrixDSEntry 4 }

dsmonMatrixDSOvflOctets OBJECT-TYPE
    SYNTAX   ZeroBasedCounter32
    MAX-ACCESS read-only
    STATUS   deprecated
    DESCRIPTION
            "The number of times the associated dsmonMatrixDSOctets
            counter has overflowed, since this entry was added to the
            dsmonMatrixDSTable."
    ::= { dsmonMatrixDSEntry 5 }

dsmonMatrixDSHCOctets OBJECT-TYPE
    SYNTAX   ZeroBasedCounter64
    UNITS   "octets"
    MAX-ACCESS read-only
    STATUS   current
    DESCRIPTION
            "The 64-bit version of the dsmonMatrixDSPkts object.

            Note that this object will only be instantiated if the RMON
            agent supports High Capacity monitoring for a particular
            dataSource."
    ::= { dsmonMatrixDSEntry 6 }

dsmonMatrixDSCreateTime OBJECT-TYPE
    SYNTAX   LastCreateTime
    MAX-ACCESS read-only
    STATUS   current
    DESCRIPTION
            "The value of sysUpTime when this entry was last activated.
            This can be used by the management station to ensure that
            the entry has not been deleted and recreated between polls."
    ::= { dsmonMatrixDSEntry 7 }

--
-- Per-Protocol Per-Matrix Statistics TopN Control Table
--

dsmonMatrixTopNCtlTable OBJECT-TYPE
     SYNTAX   SEQUENCE OF DsmonMatrixTopNCtlEntry
     MAX-ACCESS   not-accessible
     STATUS   current
     DESCRIPTION
             "A set of parameters that control the creation of a report
             of the top N dsmonMatrix entries according to a selected
             metric.

             Note that an agent MAY choose to limit the actual number of
             entries which may be created in this table. In this case,
             the agent SHOULD return an error-status of
             'resourceUnavailable(13)', as per section 4.2.5 of the
             'Protocol Operations for SNMPv2' specification [RFC1905]."
     ::= { dsmonMatrixObjects 4 }

dsmonMatrixTopNCtlEntry OBJECT-TYPE
     SYNTAX   DsmonMatrixTopNCtlEntry
     MAX-ACCESS   not-accessible
     STATUS   current
     DESCRIPTION
             "A conceptual row in the dsmonMatrixTopNCtlTable.

             Entries are created and deleted from this table by
             management action only, using the dsmonMatrixTopNCtlStatus
             RowStatus object.

             The agent SHOULD support non-volatile configuration of this
             table, and upon system initialization, the table SHOULD be
             initialized with the saved values.

             Activation of a control row in this table will cause an
             associated dsmonMatrixTopNTable to be created and maintained
             by the agent."
     INDEX { dsmonMatrixTopNCtlIndex }
     ::= { dsmonMatrixTopNCtlTable 1 }

DsmonMatrixTopNCtlEntry ::= SEQUENCE {
     dsmonMatrixTopNCtlIndex   Integer32,
     dsmonMatrixTopNCtlMatrixIndex   Integer32,
     dsmonMatrixTopNCtlRateBase   INTEGER,
     dsmonMatrixTopNCtlTimeRemaining   Integer32,
     dsmonMatrixTopNCtlGeneratedRpts   Counter32,
     dsmonMatrixTopNCtlDuration   Integer32,
     dsmonMatrixTopNCtlRequestedSize   Integer32,
     dsmonMatrixTopNCtlGrantedSize   Integer32,
     dsmonMatrixTopNCtlStartTime   TimeStamp,
     dsmonMatrixTopNCtlOwner   OwnerString,

```
    dsmonMatrixTopNCtlStatus           RowStatus
}

dsmonMatrixTopNCtlIndex OBJECT-TYPE
    SYNTAX      Integer32 (1..65535)
    MAX-ACCESS not-accessible
    STATUS      current
    DESCRIPTION
            "An index that uniquely identifies an entry in the
            dsmonMatrixTopNCtlTable.  Each such entry defines one Top N
            report prepared for one RMON dataSource."
    ::= { dsmonMatrixTopNCtlEntry 1 }

dsmonMatrixTopNCtlMatrixIndex OBJECT-TYPE
    SYNTAX      Integer32 (1..65535)
    MAX-ACCESS read-create
    STATUS      current
    DESCRIPTION
            "The dsmonMatrixSDTable for which a top N report will be
            prepared on behalf of this entry.  The dsmonMatrixSDTable is
            identified by the same value of the dsmonMatrixCtlIndex
            object.

            This object MUST NOT be modified if the associated
            dsmonMatrixTopNCtlStatus object is equal to active(1)."
    ::= { dsmonMatrixTopNCtlEntry 2 }

dsmonMatrixTopNCtlRateBase OBJECT-TYPE
    SYNTAX      INTEGER {
                dsmonMatrixTopNPkts(1),
                dsmonMatrixTopNOctets(2),
                dsmonMatrixTopNHCPkts(3),
                dsmonMatrixTopNHCOctets(4)
            }
    MAX-ACCESS read-create
    STATUS      current
    DESCRIPTION
            "The variable for each dsmonMatrixSD entry that the
            dsmonMatrixTopNRate and dsmonMatrixTopNHCRate variables are
            based upon.  Each dsmonMatrixTopN report generated on behalf
            of this control entry will be ranked in descending order,
            based on the associated dsmonMatrixSDTable counter,
            identified by this object.

            The following table identifies the dsmonMatrixSDTable
            counters associated with each enumeration:

            Enumeration                    RateBase MIB Objects
```

```
              -----------                   --------------------
              dsmonMatrixTopNPkts          dsmonMatrixSDPkts
              dsmonMatrixTopNOctets        dsmonMatrixSDOctets
              dsmonMatrixTopNHCPkts        dsmonMatrixSDHCPkts
              dsmonMatrixTopNHCOctets      dsmonMatrixSDHCOctets


              The following enumerations are only available if the agent
              supports High Capacity monitoring:

              dsmonMatrixTopNHCPkts
              dsmonMatrixTopNHCOctets

              This object MUST NOT be modified if the associated
              dsmonMatrixTopNCtlStatus object is equal to active(1)."
        ::= { dsmonMatrixTopNCtlEntry 3 }

dsmonMatrixTopNCtlTimeRemaining OBJECT-TYPE
     SYNTAX      Integer32 (0..2147483647)
     UNITS       "seconds"
     MAX-ACCESS read-create
     STATUS      current
     DESCRIPTION
             "The number of seconds left in the report currently being
             collected.  When this object is modified by the management
             station, a new collection is started, possibly aborting a
             currently running report.  The new value is used as the
             requested duration of this report, and is immediately loaded
             into the associated dsmonMatrixTopNCtlDuration object.

             When the report finishes, the probe will automatically start
             another collection with the same initial value of
             dsmonMatrixTopNCtlTimeRemaining.  Thus the management
             station may simply read the resulting reports repeatedly,
             checking the startTime and duration each time to ensure that
             a report was not missed or that the report parameters were
             not changed.

             While the value of this object is non-zero, it decrements by
             one per second until it reaches zero.  At the time that this
             object decrements to zero, the report is made accessible in
             the dsmonMatrixTopNTable, overwriting any report that may be
             there.

             When this object is modified by the management station, any
             associated entries in the dsmonMatrixTopNTable shall be
             deleted."
     DEFVAL { 1800 }
     ::= { dsmonMatrixTopNCtlEntry 4 }
```

dsmonMatrixTopNCtlGeneratedRpts OBJECT-TYPE
    SYNTAX   Counter32
    UNITS   "reports"
    MAX-ACCESS read-only
    STATUS   current
    DESCRIPTION
            "The number of reports that have been generated by this
            entry."
    ::= { dsmonMatrixTopNCtlEntry 5 }

dsmonMatrixTopNCtlDuration OBJECT-TYPE
    SYNTAX   Integer32 (0..2147483647)
    UNITS   "seconds"
    MAX-ACCESS read-only
    STATUS   current
    DESCRIPTION
            "The number of seconds that this report has collected during
            the last sampling interval.

            When the associated dsmonMatrixTopNCtlTimeRemaining object
            is set, this object shall be set by the probe to the same
            value and shall not be modified until the next time the
            dsmonMatrixTopNCtlTimeRemaining is set.

            This value shall be zero if no reports have been requested
            for this dsmonMatrixTopNCtlEntry."
    ::= { dsmonMatrixTopNCtlEntry 6 }

dsmonMatrixTopNCtlRequestedSize OBJECT-TYPE
    SYNTAX   Integer32 (0..2147483647)
    UNITS   "table entries"
    MAX-ACCESS read-create
    STATUS   current
    DESCRIPTION
            "The maximum number of dsmonMatrix entries requested for
            this report.

            When this object is created or modified, the probe SHOULD
            set dsmonMatrixTopNCtlGrantedSize as closely to this object
            as is possible for the particular probe implementation and
            available resources."
    DEFVAL { 150 }
    ::= { dsmonMatrixTopNCtlEntry 7 }

dsmonMatrixTopNCtlGrantedSize OBJECT-TYPE
    SYNTAX   Integer32 (0..2147483647)
    UNITS   "table entries"
    MAX-ACCESS read-only

```
     STATUS      current
     DESCRIPTION
             "The maximum number of dsmonMatrix entries in this report.

             When the associated dsmonMatrixTopNCtlRequestedSize object
             is created or modified, the probe SHOULD set this object as
             closely to the requested value as is possible for the
             particular implementation and available resources.  The
             probe MUST NOT lower this value except as a result of a
             set to the associated dsmonMatrixTopNCtlRequestedSize
             object.

             Protocol entries with the highest value of
             dsmonMatrixTopNRate or dsmonMatrixTopNHCRate (depending on
             the value of the associated dsmonMatrixTopNCtlRateBase
             object) shall be placed in this table in decreasing order of
             this rate until there is no more room or until there are no
             more dsmonMatrix entries."
     ::= { dsmonMatrixTopNCtlEntry 8 }

dsmonMatrixTopNCtlStartTime OBJECT-TYPE
     SYNTAX      TimeStamp
     MAX-ACCESS read-only
     STATUS      current
     DESCRIPTION
             "The value of sysUpTime when this top N report was last
             started.  In other words, this is the time that the
             associated dsmonMatrixTopNCtlTimeRemaining object was
             modified to start the requested report or the time the
             report was last automatically (re)started.

             This object may be used by the management station to
             determine if a report was missed or not."
     ::= { dsmonMatrixTopNCtlEntry 9 }

dsmonMatrixTopNCtlOwner 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."
     ::= { dsmonMatrixTopNCtlEntry 10 }

dsmonMatrixTopNCtlStatus OBJECT-TYPE
     SYNTAX      RowStatus
     MAX-ACCESS read-create
     STATUS      current
```

        DESCRIPTION
                "The status of this dsmonMatrixTopNCtlEntry.

                An entry MUST NOT exist in the active state unless all
                objects in the entry have an appropriate value.

                If this object is not equal to active(1), all associated
                entries in the dsmonMatrixTopNTable shall be deleted by the
                agent."
        ::= { dsmonMatrixTopNCtlEntry 11 }

--
-- dsmonMatrix TopN Table
--

dsmonMatrixTopNTable OBJECT-TYPE
        SYNTAX   SEQUENCE OF DsmonMatrixTopNEntry
        MAX-ACCESS not-accessible
        STATUS   current
        DESCRIPTION
                "A set of statistics for those dsmonMatrix entries that have
                counted the highest number of octets or packets.

                If the dsmonAggControlLocked object is equal to 'false',
                then all entries in this table SHALL be deleted, and the
                agent will not process TopN reports on behalf of any
                dsmonMatrixTopNCtlEntry.

                When the dsmonAggControlLocked object is set to 'true', then
                particular reports SHOULD be restarted from the beginning,
                on behalf of all active rows in the dsmonMatrixTopNCtlTable.

                Note that dsmonMatrix entries which did not increment at all
                during the report interval SHOULD NOT be included in
                dsmonMatrixTopN reports."
        ::= { dsmonMatrixObjects 5 }

dsmonMatrixTopNEntry OBJECT-TYPE
        SYNTAX   DsmonMatrixTopNEntry
        MAX-ACCESS not-accessible
        STATUS   current
        DESCRIPTION
                "A conceptual row in the dsmonMatrixTopNTable.

                The dsmonMatrixTopNCtlIndex value in the index identifies
                the dsmonMatrixTopNCtlEntry on whose behalf this entry was
                created.

                 Entries in this table are ordered from 1 to 'N', where lower
                 numbers represent higher values of the rate base object,
                 over the report interval."
         INDEX { dsmonMatrixTopNCtlIndex, dsmonMatrixTopNIndex }
         ::= { dsmonMatrixTopNTable 1 }

    DsmonMatrixTopNEntry ::= SEQUENCE {
         dsmonMatrixTopNIndex   Integer32,
         dsmonMatrixTopNAggGroup   DsmonCounterAggGroupIndex,
         dsmonMatrixTopNNLIndex   Integer32,
         dsmonMatrixTopNSourceAddress   OCTET STRING,
         dsmonMatrixTopNDestAddress   OCTET STRING,
         dsmonMatrixTopNALIndex   Integer32,
         dsmonMatrixTopNPktRate   Gauge32,
         dsmonMatrixTopNPktRateOvfl   Gauge32,
         dsmonMatrixTopNHCPktRate   CounterBasedGauge64,
         dsmonMatrixTopNRevPktRate   Gauge32,
         dsmonMatrixTopNRevPktRateOvfl   Gauge32,
         dsmonMatrixTopNHCRevPktRate   CounterBasedGauge64,
         dsmonMatrixTopNOctetRate   Gauge32,
         dsmonMatrixTopNOctetRateOvfl   Gauge32,
         dsmonMatrixTopNHCOctetRate   CounterBasedGauge64,
         dsmonMatrixTopNRevOctetRate   Gauge32,
         dsmonMatrixTopNRevOctetRateOvfl   Gauge32,
         dsmonMatrixTopNHCRevOctetRate   CounterBasedGauge64
       }

    dsmonMatrixTopNIndex OBJECT-TYPE
         SYNTAX   Integer32 (1..2147483647)
         MAX-ACCESS not-accessible
         STATUS   current
         DESCRIPTION
                 "An index that uniquely identifies an entry in the
                 dsmonMatrixTopNTable among those in the same report. This
                 index is between 1 and N, where N is the number of entries
                 in this report."
         ::= { dsmonMatrixTopNEntry 1 }

    dsmonMatrixTopNAggGroup OBJECT-TYPE
         SYNTAX   DsmonCounterAggGroupIndex
         MAX-ACCESS read-only
         STATUS   current
         DESCRIPTION
                 "The counter aggregation group index value associated with
                 host identified in this entry. This object identifies the
                 dsmonAggGroupEntry with the same dsmonAggControlIndex value
                 as the associated dsmonMatrixCtlAggProfile object and the
                 same dsmonAggGroupIndex value as this object."

         ::= { dsmonMatrixTopNEntry 2 }

dsmonMatrixTopNNLIndex OBJECT-TYPE
     SYNTAX   Integer32 (1..2147483647)
     MAX-ACCESS read-only
     STATUS   current
     DESCRIPTION
             "The protocolDirLocalIndex value which identifies the
             protocol associated with the dsmonMatrixTopNSourceAddress
             and dsmonMatrixTopNDestAddress objects in this entry.

             If the protocolDirEntry associated with the
             protocolDirLocalIndex with the same value as this object is
             de-activated or deleted, then the agent MUST delete this
             dsmonMatrixTopN entry."
     ::= { dsmonMatrixTopNEntry 3 }

dsmonMatrixTopNSourceAddress OBJECT-TYPE
     SYNTAX   OCTET STRING
     MAX-ACCESS read-only
     STATUS   current
     DESCRIPTION
             "The dsmonMatrixSDSourceAddress value for the source network
             host identified in this entry. The associated
             dsmonMatrixTopNNLIndex object identifies the network
             protocol type and the encoding rules for this object."
     ::= { dsmonMatrixTopNEntry 4 }

dsmonMatrixTopNDestAddress OBJECT-TYPE
     SYNTAX   OCTET STRING
     MAX-ACCESS read-only
     STATUS   current
     DESCRIPTION
             "The dsmonMatrixSDDestAddress value for the destination
             network host identified in this entry. The associated
             dsmonMatrixTopNNLIndex object identifies the network
             protocol type and the encoding rules for this object."
     ::= { dsmonMatrixTopNEntry 5 }

dsmonMatrixTopNALIndex OBJECT-TYPE
     SYNTAX   Integer32 (1..2147483647)
     MAX-ACCESS read-only
     STATUS   current
     DESCRIPTION
             "The protocolDirLocalIndex value which identifies the
             application protocol associated with this entry.

             If the protocolDirEntry associated with the

                    protocolDirLocalIndex with the same value as this object is
                    de-activated or deleted, then the agent MUST delete this
                    dsmonMatrixTopN entry."
            ::= { dsmonMatrixTopNEntry 6 }

dsmonMatrixTopNPktRate OBJECT-TYPE
        SYNTAX   Gauge32
        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 dsmonMatrixSDPkts
                    object.

                    If the value of dsmonMatrixTopNCtlRateBase is
                    dsmonMatrixTopNPkts, this variable will be used to sort this
                    report.

                    If the value of the dsmonMatrixTopNCtlRateBase is
                    dsmonMatrixTopNHCPkts or dsmonMatrixTopNHCOctets, then this
                    object will contain the the least significant 32 bits of the
                    associated dsmonMatrixTopNHCPktRate object."
            ::= { dsmonMatrixTopNEntry 7 }

dsmonMatrixTopNPktRateOvfl OBJECT-TYPE
        SYNTAX   Gauge32
        MAX-ACCESS read-only
        STATUS   deprecated
        DESCRIPTION
                    "The most significant 32 bits of the associated
                    dsmonMatrixTopNHCPktRate object.

                    If the associated dsmonMatrixTopNCtlRateBase is equal to
                    dsmonMatrixTopNHCPkts or dsmonMatrixTopNHCOctets, then this
                    object will contain the most significant 32 bits of the
                    associated dsmonMatrixTopNHCPktRate object, otherwise this
                    object will contain the value zero.

                    The agent MAY choose not to instantiate this object if High
                    Capacity monitoring is not supported."
            ::= { dsmonMatrixTopNEntry 8 }

dsmonMatrixTopNHCPktRate OBJECT-TYPE
        SYNTAX   CounterBasedGauge64
        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 dsmonMatrixSDHCPkts
            object.

            If the value of dsmonMatrixTopNCtlRateBase is
            dsmonMatrixTopNHCPkts, this variable will be used to sort
            this report.

            The agent MAY choose not to instantiate this object if High
            Capacity monitoring is not supported."
     ::= { dsmonMatrixTopNEntry 9 }

dsmonMatrixTopNRevPktRate OBJECT-TYPE
     SYNTAX   Gauge32
     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
            dsmonMatrixDSPkts object (note that the corresponding
            dsmonMatrixSDPkts object selected is the one whose source
            address is equal to dsmonMatrixTopNDestAddress and whose
            destination address is equal to
            dsmonMatrixTopNSourceAddress.)"
     ::= { dsmonMatrixTopNEntry 10 }

dsmonMatrixTopNRevPktRateOvfl OBJECT-TYPE
     SYNTAX   Gauge32
     MAX-ACCESS read-only
     STATUS   deprecated
     DESCRIPTION
            "The most significant 32 bits of the associated
            dsmonMatrixTopNHCRevPktRate object.

            If the associated dsmonMatrixTopNCtlRateBase is equal to
            dsmonMatrixTopNHCPkts or dsmonMatrixTopNHCOCtets, then this
            object will contain the most significant 32 bits of the
            associated dsmonMatrixTopNHCRevPktRate object, otherwise
            this object will contain the value zero.

            The agent MAY choose not to instantiate this object if High
            Capacity monitoring is not supported."
     ::= { dsmonMatrixTopNEntry 11 }

dsmonMatrixTopNHCRevPktRate OBJECT-TYPE
     SYNTAX   CounterBasedGauge64

```
    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
            dsmonMatrixDSHCPkts object  (note that the corresponding
            dsmonMatrixSDHCPkts object selected is the one whose source
            address is equal to dsmonMatrixTopNDestAddress and whose
            destination address is equal to
            dsmonMatrixTopNSourceAddress.)

            The agent MAY choose not to instantiate this object if High
            Capacity monitoring is not supported."
    ::= { dsmonMatrixTopNEntry 12 }

dsmonMatrixTopNOctetRate OBJECT-TYPE
    SYNTAX      Gauge32
    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 dsmonMatrixSDOctets
            object.

            If the value of dsmonMatrixTopNCtlRateBase is
            dsmonMatrixTopNOctets, this variable will be used to sort
            this report.

            If the value of the dsmonMatrixTopNCtlRateBase is
            dsmonMatrixTopNHCPkts or dsmonMatrixTopNHCOctets, then this
            object will contain the the least significant 32 bits of the
            associated dsmonMatrixTopNHCPktRate object."
    ::= { dsmonMatrixTopNEntry 13 }

dsmonMatrixTopNOctetRateOvfl OBJECT-TYPE
    SYNTAX      Gauge32
    MAX-ACCESS read-only
    STATUS      deprecated
    DESCRIPTION
            "The most significant 32 bits of the associated
            dsmonMatrixTopNHCOctetRate object.

            If the associated dsmonMatrixTopNCtlRateBase is equal to
            dsmonMatrixTopNHCPkts or dsmonMatrixTopNHCOctets, then this
            object will contain the most significant 32 bits of the
            associated dsmonMatrixTopNHCOctetRate object, otherwise this
```

             object will contain the value zero.

             The agent MAY choose not to instantiate this object if High
             Capacity monitoring is not supported."
        ::= { dsmonMatrixTopNEntry 14 }

dsmonMatrixTopNHCOctetRate OBJECT-TYPE
     SYNTAX   CounterBasedGauge64
     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
             dsmonMatrixSDHCOctets object.

             If the value of dsmonMatrixTopNCtlRateBase is
             dsmonMatrixTopNHCOctets, this variable will be used to sort
             this report.

             The agent MAY choose not to instantiate this object if High
             Capacity monitoring is not supported."
        ::= { dsmonMatrixTopNEntry 15 }

dsmonMatrixTopNRevOctetRate OBJECT-TYPE
     SYNTAX   Gauge32
     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
             dsmonMatrixDSOctets object (note that the corresponding
             dsmonMatrixSDOctets object selected is the one whose source
             address is equal to dsmonMatrixTopNDestAddress and whose
             destination address is equal to
             dsmonMatrixTopNSourceAddress.)"
        ::= { dsmonMatrixTopNEntry 16 }

dsmonMatrixTopNRevOctetRateOvfl OBJECT-TYPE
     SYNTAX   Gauge32
     MAX-ACCESS read-only
     STATUS   deprecated
     DESCRIPTION
             "The most significant 32 bits of the associated
             dsmonMatrixTopNHCRevOctetRate object.

             If the associated dsmonMatrixTopNCtlRateBase is equal to

                    dsmonMatrixTopNHCPkts or dsmonMatrixTopNHCOCtets, then this
                    object will contain the most significant 32 bits of the
                    associated dsmonMatrixTopNHCRevPktRate object, otherwise
                    this object will contain the value zero.

                    The agent MAY choose not to instantiate this object if High
                    Capacity monitoring is not supported."
            ::= { dsmonMatrixTopNEntry 17 }

    dsmonMatrixTopNHCRevOctetRate OBJECT-TYPE
         SYNTAX   CounterBasedGauge64
         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
                    dsmonMatrixDSHCOctets object (note that the corresponding
                    dsmonMatrixSDHCOctets object selected is the one whose
                    source address is equal to dsmonMatrixTopNDestAddress and
                    whose destination address is equal to
                    dsmonMatrixTopNSourceAddress.)

                    The agent MAY choose not to instantiate this object if High
                    Capacity monitoring is not supported."
             ::= { dsmonMatrixTopNEntry 18 }

    --
    -- Conformance Section
    --

    dsmonCompliances OBJECT IDENTIFIER ::= { dsmonConformance 1 }
    dsmonGroups   OBJECT IDENTIFIER ::= { dsmonConformance 2 }

    --
    -- Compliance for agents that do not support HC or Counter64
    --

    dsmonCompliance MODULE-COMPLIANCE
         STATUS current
         DESCRIPTION
                    "Describes the requirements for conformance to the
                    Differentiated Services Monitoring MIB."
         MODULE -- this module
             MANDATORY-GROUPS {
                                dsmonCounterAggControlGroup,
                                dsmonStatsGroup,
                                dsmonCapsGroup

```
                        }

        GROUP    dsmonStatsHCGroup
        DESCRIPTION
            "The dsmonStatsHCGroup is mandatory for systems which
            implement High Capacity monitoring."

        GROUP    dsmonPdistGroup
        DESCRIPTION
            "The dsmonPdistGroup is mandatory for systems which
            implement RMON-2 protocolDirTable based protocol
            distribution monitoring."

        GROUP   dsmonPdistHCGroup
        DESCRIPTION
            "The dsmonPdistHCGroup is mandatory for systems which
            implement RMON-2 protocolDirTable based protocol
            distribution monitoring on high capacity interfaces."

        GROUP   dsmonHostGroup
        DESCRIPTION
            "The dsmonHostGroup is mandatory for systems which implement
            RMON-2 nlHostTable based network protocol monitoring."

        GROUP   dsmonHostHCGroup
        DESCRIPTION
            "The dsmonHostHCGroup is mandatory for systems which
            implement RMON-2 nlHostTable based network protocol
            monitoring, on high capacity interfaces."

        GROUP   dsmonMatrixGroup
        DESCRIPTION
            "The dsmonMatrixGroup is mandatory for systems which
            implement RMON-2 alMatrix based application protocol
            monitoring."

        GROUP   dsmonMatrixHCGroup
        DESCRIPTION
            "The dsmonMatrixHCGroup is mandatory for systems which
            implement RMON-2 alMatrix based application protocol
            monitoring, on high capacity interfaces."

    ::= { dsmonCompliances 1 }

--
-- Compliance for agents that support HC and Counter64
--
```

```
dsmonHCCompliance MODULE-COMPLIANCE
    STATUS   current
    DESCRIPTION
            "Describes the requirements for conformance to the
            Differentiated Services Monitoring MIB for agents which also
            support High Capacity monitoring and the Counter64 data
            type."
    MODULE   -- this module
        MANDATORY-GROUPS {
                            dsmonCounterAggControlGroup,
                            dsmonStatsGroup,
                            dsmonStatsHCGroup,
                            dsmonCapsGroup
                         }

        GROUP    dsmonPdistGroup
        DESCRIPTION
            "The dsmonPdistGroup is mandatory for systems which
            implement RMON-2 protocolDirTable based protocol
            distribution monitoring."

        GROUP   dsmonPdistHCGroup
        DESCRIPTION
            "The dsmonPdistHCGroup is mandatory for systems which
            implement RMON-2 protocolDirTable based protocol
            distribution monitoring."

        GROUP   dsmonHostGroup
        DESCRIPTION
            "The dsmonHostGroup is mandatory for systems which implement
            RMON-2 nlHostTable based network protocol monitoring."

        GROUP   dsmonHostHCGroup
        DESCRIPTION
            "The dsmonHostHCGroup is mandatory for systems which
            implement RMON-2 nlHostTable based network protocol
            monitoring."

        GROUP   dsmonMatrixGroup
        DESCRIPTION
            "The dsmonMatrixGroup is mandatory for systems which
            implement RMON-2 alMatrix based application protocol
            monitoring."

        GROUP   dsmonMatrixHCGroup
        DESCRIPTION
            "The dsmonMatrixHCGroup is mandatory for systems which
            implement RMON-2 alMatrix based application protocol
```

```
            monitoring."

      ::= { dsmonCompliances 2 }

--
-- Compliance for agents that support HC, but not Counter64
--

dsmonHCNoC64Compliance MODULE-COMPLIANCE
     STATUS   deprecated
     DESCRIPTION
             "Describes the requirements for conformance to the
             Differentiated Services Monitoring MIB for an agent which
             supports high capacity monitoring, but does not support the
             Counter64 data type (e.g., only supports the SNMPv1
             protocol)."
     MODULE   -- this module
         MANDATORY-GROUPS {
                             dsmonCounterAggControlGroup,
                             dsmonStatsGroup,
                             dsmonStatsOvflGroup,
                             dsmonCapsGroup
                          }

         GROUP    dsmonStatsHCGroup
         DESCRIPTION
             "Implementation of the dsmonStatsHCGroup is not required.
             High Capacity monitoring."

         GROUP    dsmonPdistGroup
         DESCRIPTION
             "The dsmonPdistGroup is mandatory for systems which
             implement RMON-2 protocolDirTable based protocol
             distribution monitoring."

         GROUP    dsmonPdistOvflGroup
         DESCRIPTION
             "The dsmonPdistGroup is mandatory for systems which
             implement RMON-2 protocolDirTable based protocol
             distribution monitoring."

         GROUP    dsmonPdistHCGroup
         DESCRIPTION
             "Implementation of the dsmonPdistHCGroup is not required."

         GROUP    dsmonHostGroup
         DESCRIPTION
             "The dsmonHostGroup is mandatory for systems which implement
```

        RMON-2 nlHostTable based network protocol monitoring."

        GROUP   dsmonHostOvflGroup
        DESCRIPTION
            "The dsmonHostGroup is mandatory for systems which implement
            RMON-2 nlHostTable based network protocol monitoring."

        GROUP   dsmonHostHCGroup
        DESCRIPTION
            "Implementation of the dsmonHostHCGroup is not required."

        GROUP   dsmonMatrixGroup
        DESCRIPTION
            "The dsmonMatrixGroup is mandatory for systems which
            implement RMON-2 alMatrix based application protocol
            monitoring."

        GROUP   dsmonMatrixOvflGroup
        DESCRIPTION
            "The dsmonMatrixGroup is mandatory for systems which
            implement RMON-2 alMatrix based application protocol
            monitoring."

        GROUP   dsmonMatrixHCGroup
        DESCRIPTION
            "Implementation of the dsmonMatrixHCGroup is not required."

    ::= { dsmonCompliances 3 }

-- Object Groups

dsmonCounterAggControlGroup OBJECT-GROUP
    OBJECTS {
            dsmonMaxAggGroups,
            dsmonAggControlLocked,
            dsmonAggControlChanges,
            dsmonAggControlLastChangeTime,
            dsmonAggControlDescr,
            dsmonAggControlOwner,
            dsmonAggControlStatus,
            dsmonAggGroupIndex,
            dsmonAggGroupDescr,
            dsmonAggGroupStatus
    }
    STATUS current
    DESCRIPTION

                 "A collection of objects used to configure and manage
                 counter aggregation groups for DSMON collection purposes."
         ::= { dsmonGroups 1 }

    dsmonStatsGroup OBJECT-GROUP
         OBJECTS {
                  dsmonStatsControlDataSource,
                  dsmonStatsControlAggProfile,
                  dsmonStatsControlDroppedFrames,
                  dsmonStatsControlCreateTime,
                  dsmonStatsControlOwner,
                  dsmonStatsControlStatus,
                  dsmonStatsInPkts,
                  dsmonStatsInOctets,
                  dsmonStatsOutPkts,
                  dsmonStatsOutOctets
         }
         STATUS   current
         DESCRIPTION
                 "A collection of objects providing per DSCP statistics."
         ::= { dsmonGroups 2 }

    dsmonStatsOvflGroup OBJECT-GROUP
         OBJECTS {
                  dsmonStatsInOvflPkts,
                  dsmonStatsInOvflOctets,
                  dsmonStatsOutOvflPkts,
                  dsmonStatsOutOvflOctets
         }
         STATUS   deprecated
         DESCRIPTION
                 "A collection of objects providing per-DSCP overflow
                 counters for systems with high capacity data sources, but
                 without support for the Counter64 data type."
         ::= { dsmonGroups 3 }

    dsmonStatsHCGroup OBJECT-GROUP
         OBJECTS {
                  dsmonStatsInHCPkts,
                  dsmonStatsInHCOctets,
                  dsmonStatsOutHCPkts,
                  dsmonStatsOutHCOctets
         }
         STATUS   current
         DESCRIPTION
                 "A collection of objects providing per DSCP statistics for
                 high capacity data sources."
         ::= { dsmonGroups 4 }

dsmonPdistGroup OBJECT-GROUP
    OBJECTS {
            dsmonPdistCtlDataSource,
            dsmonPdistCtlAggProfile,
            dsmonPdistCtlMaxDesiredEntries,
            dsmonPdistCtlDroppedFrames,
            dsmonPdistCtlInserts,
            dsmonPdistCtlDeletes,
            dsmonPdistCtlCreateTime,
            dsmonPdistCtlOwner,
            dsmonPdistCtlStatus,
            dsmonPdistStatsPkts,
            dsmonPdistStatsOctets,
            dsmonPdistStatsCreateTime,
            dsmonPdistTopNCtlPdistIndex,
            dsmonPdistTopNCtlRateBase,
            dsmonPdistTopNCtlTimeRemaining,
            dsmonPdistTopNCtlGeneratedReprts,
            dsmonPdistTopNCtlDuration,
            dsmonPdistTopNCtlRequestedSize,
            dsmonPdistTopNCtlGrantedSize,
            dsmonPdistTopNCtlStartTime,
            dsmonPdistTopNCtlOwner,
            dsmonPdistTopNCtlStatus,
            dsmonPdistTopNPDLocalIndex,
            dsmonPdistTopNAggGroup,
            dsmonPdistTopNRate
    }
    STATUS current
    DESCRIPTION
            "A collection of objects providing per protocol DSCP
            monitoring extensions to the RMON-2 MIB."
    ::= { dsmonGroups 5 }

dsmonPdistOvflGroup OBJECT-GROUP
    OBJECTS {
            dsmonPdistStatsOvflPkts,
            dsmonPdistStatsOvflOctets,
            dsmonPdistTopNRateOvfl
    }
    STATUS deprecated
    DESCRIPTION
            "A collection of objects providing per-protocol DSCP
            overflow counters for systems with high capacity data
            sources, but without support for the Counter64 data type."
    ::= { dsmonGroups 6 }

dsmonPdistHCGroup OBJECT-GROUP

```
     OBJECTS {
             dsmonPdistStatsHCPkts,
             dsmonPdistStatsHCOctets,
             dsmonPdistTopNHCRate
     }
     STATUS  current
     DESCRIPTION
             "A collection of objects providing per protocol DSCP
             monitoring extensions to the RMON-2 MIB for High Capacity
             networks."
     ::= { dsmonGroups 7 }

dsmonHostGroup OBJECT-GROUP
     OBJECTS {
             dsmonHostCtlDataSource,
             dsmonHostCtlAggProfile,
             dsmonHostCtlMaxDesiredEntries,
             dsmonHostCtlIPv4PrefixLen,
             dsmonHostCtlIPv6PrefixLen,
             dsmonHostCtlDroppedFrames,
             dsmonHostCtlInserts,
             dsmonHostCtlDeletes,
             dsmonHostCtlCreateTime,
             dsmonHostCtlOwner,
             dsmonHostCtlStatus,
             dsmonHostInPkts,
             dsmonHostInOctets,
             dsmonHostOutPkts,
             dsmonHostOutOctets,
             dsmonHostCreateTime,
             dsmonHostTopNCtlHostIndex,
             dsmonHostTopNCtlRateBase,
             dsmonHostTopNCtlTimeRemaining,
             dsmonHostTopNCtlGeneratedReports,
             dsmonHostTopNCtlDuration,
             dsmonHostTopNCtlRequestedSize,
             dsmonHostTopNCtlGrantedSize,
             dsmonHostTopNCtlStartTime,
             dsmonHostTopNCtlOwner,
             dsmonHostTopNCtlStatus,
             dsmonHostTopNPDLocalIndex,
             dsmonHostTopNAddress,
             dsmonHostTopNAggGroup,
             dsmonHostTopNRate
     }
     STATUS  current
     DESCRIPTION
             "A collection of objects providing per Host monitoring
```

```
                functions."
        ::= { dsmonGroups 8 }


dsmonHostOvflGroup OBJECT-GROUP
        OBJECTS {
                dsmonHostInOvflPkts,
                dsmonHostInOvflOctets,
                dsmonHostOutOvflPkts,
                dsmonHostOutOvflOctets,
                dsmonHostTopNRateOvfl
        }
        STATUS  deprecated
        DESCRIPTION
                "A collection of objects providing per host DSCP overflow
                counters for systems with high capacity data sources, but
                without support for the Counter64 data type."
        ::= { dsmonGroups 9 }


dsmonHostHCGroup OBJECT-GROUP
        OBJECTS {
                dsmonHostInHCPkts,
                dsmonHostInHCOctets,
                dsmonHostOutHCPkts,
                dsmonHostOutHCOctets,
                dsmonHostTopNHCRate
        }
        STATUS  current
        DESCRIPTION
                "A collection of objects providing per Host monitoring
                functions for High Capacity networks."
        ::= { dsmonGroups 10 }


dsmonCapsGroup OBJECT-GROUP
        OBJECTS {
                dsmonCapabilities
        }
        STATUS  current
        DESCRIPTION
                "A collection of objects providing an indication of the
                DSMON monitoring functions supported by the agent."
        ::= { dsmonGroups 11 }


dsmonMatrixGroup OBJECT-GROUP
        OBJECTS {
                dsmonMatrixCtlDataSource,
                dsmonMatrixCtlAggProfile,
                dsmonMatrixCtlMaxDesiredEntries,
                dsmonMatrixCtlDroppedFrames,
```

```
            dsmonMatrixCtlInserts,
            dsmonMatrixCtlDeletes,
            dsmonMatrixCtlCreateTime,
            dsmonMatrixCtlOwner,
            dsmonMatrixCtlStatus,
            dsmonMatrixSDPkts,
            dsmonMatrixSDOctets,
            dsmonMatrixSDCreateTime,
            dsmonMatrixDSPkts,
            dsmonMatrixDSOctets,
            dsmonMatrixDSCreateTime,
            dsmonMatrixTopNCtlMatrixIndex,
            dsmonMatrixTopNCtlRateBase,
            dsmonMatrixTopNCtlTimeRemaining,
            dsmonMatrixTopNCtlGeneratedRpts,
            dsmonMatrixTopNCtlDuration,
            dsmonMatrixTopNCtlRequestedSize,
            dsmonMatrixTopNCtlGrantedSize,
            dsmonMatrixTopNCtlStartTime,
            dsmonMatrixTopNCtlOwner,
            dsmonMatrixTopNCtlStatus,
            dsmonMatrixTopNAggGroup,
            dsmonMatrixTopNNLIndex,
            dsmonMatrixTopNSourceAddress,
            dsmonMatrixTopNDestAddress,
            dsmonMatrixTopNALIndex,
            dsmonMatrixTopNPktRate,
            dsmonMatrixTopNRevPktRate,
            dsmonMatrixTopNOctetRate,
            dsmonMatrixTopNRevOctetRate
        }
    STATUS   current
    DESCRIPTION
            "A collection of objects providing per conversation
            monitoring functions."
    ::= { dsmonGroups 12 }

dsmonMatrixOvflGroup OBJECT-GROUP
    OBJECTS {
            dsmonMatrixSDOvflPkts,
            dsmonMatrixSDOvflOctets,
            dsmonMatrixDSOvflPkts,
            dsmonMatrixDSOvflOctets,
            dsmonMatrixTopNPktRateOvfl,
            dsmonMatrixTopNRevPktRateOvfl,
            dsmonMatrixTopNOctetRateOvfl,
            dsmonMatrixTopNRevOctetRateOvfl
        }
```

```
     STATUS  deprecated
     DESCRIPTION
             "A collection of objects providing per conversation
             monitoring functions for systems with high capacity data
             sources, but without support for the Counter64 data type."
     ::= { dsmonGroups 13 }

dsmonMatrixHCGroup OBJECT-GROUP
     OBJECTS {
             dsmonMatrixSDHCPkts,
             dsmonMatrixSDHCOctets,
             dsmonMatrixDSHCPkts,
             dsmonMatrixDSHCOctets,
             dsmonMatrixTopNHCPktRate,
             dsmonMatrixTopNHCRevPktRate,
             dsmonMatrixTopNHCOctetRate,
             dsmonMatrixTopNHCRevOctetRate
     }
     STATUS  current
     DESCRIPTION
             "A collection of objects providing per conversation
             monitoring functions for High Capacity networks."
     ::= { dsmonGroups 14 }

END
```

5. Counter Aggregation Configuration Usage Examples

    This section contains an example of the steps that may be followed by
    a management station to configure the objects in the
    dsmonCounterAggControlGroup.

    A note about these examples:

    - they do not define a standard

    - an agent is not obligated to support them

    - a management application is not constrained by them

    - the SET(object = value [, ...]) notation is only conceptual, and
       is not meant to represent an actual SNMP Set PDU.

5.1.   Step 1: Unlock the Counter Aggregation Configuration

   Before any write operations to the tabular objects in this group can
   be made, the counter aggregation configuration must be unlocked by
   setting the dsmonAggControlLocked scalar to false:

       SET(dsmonAggControlLocked.0 = false(2));

5.2.   Step 2: Check the Maximum number of Counter Aggregation Groups

   Make sure the desired counter aggregation groups have a chance of
   being configured on the agent.

       maxGroups = GET(dsmonAggMaxAggGroups.0);

   For this example, maxGroups is greater or equal to 64.

5.3.   Step 3: Check if the counter aggregation profiles already exist

   Make sure the desired counter aggregation profiles have not already
   been configured, or perhaps recreated after an agent restart. The
   following example is oversimplified, in that the entire counter
   aggregation configuration should actually be verified.

       profile1Descr = GET(dsmonAggControlDescr.1);
       profile1Owner = GET(dsmonAggControlOwner.1);
       profile1Status = GET(dsmonAggControlStatus.1);

   For this example, none of the counter aggregation profiles already
   exist.

5.4.   Step 4: Create the Counter Aggregation Control Entries

   The management station should create one entry in the
   dsmonAggControlTable for each counter aggregation profile to be
   configured on the agent.

   Steps 4, 5, and 6 are repeated for each counter aggregation profile
   to be configured on the agent. There are 3 example counter
   aggregation profiles shown in each of these steps.

   Example 1: Each DSCP in its own counter aggregation group.

       SET(dsmonAggControlStatus.1 = createAndGo(4),
           dsmonAggControlOwner.1 = "Example App 1",
           dsmonAggControlDescr.1 = "1 DSCP Per Group");

      Example 2: a collection of DIFFSERV PHBs.

          SET(dsmonAggControlStatus.2 = createAndGo(4),
              dsmonAggControlOwner.2 = "Example App 2",
              dsmonAggControlDescr.2 = "June 2000 DIFFSERV PHBs");

      Example 3: an aggregated collection of DIFFSERV PHBs.

          SET(dsmonAggControlStatus.3 = createAndGo(4),
              dsmonAggControlOwner.3 = "Example App 3",
              dsmonAggControlDescr.3 = "Limited June 2000 PHBs");

5.5. Step 5: Create the Counter Aggregation Group Descriptions

      Example 1: Each DSCP in its own counter aggregation group. One group
      is created for each codepoint, for a total of 64 rows.

          SET(dsmonAggGroupStatus.1.0 = createAndGo(4),
              dsmonAggGroupDescr.1.0 = "DSCP 0");
          SET(dsmonAggGroupStatus.1.1 = createAndGo(4),
              dsmonAggGroupDescr.1.1 = "DSCP 1");
          SET(dsmonAggGroupStatus.1.2 = createAndGo(4),
              dsmonAggGroupDescr.1.2 = "DSCP 2");
          SET(dsmonAggGroupStatus.1.3 = createAndGo(4),
              dsmonAggGroupDescr.1.3 = "DSCP 3");

          ...

          SET(dsmonAggGroupStatus.1.63 = createAndGo(4),
              dsmonAggGroupDescr.1.63 = "DSCP 63");

   Example 2: a collection of current DIFFSERV PHBs. One group is
   created for each PHB to be monitored.

```
    SET(dsmonAggGroupStatus.2.0 = createAndGo(4),
        dsmonAggGroupDescr.2.0 = "CS0");
    SET(dsmonAggGroupStatus.2.1 = createAndGo(4),
        dsmonAggGroupDescr.2.1 = "CS1");
    SET(dsmonAggGroupStatus.2.2 = createAndGo(4),
        dsmonAggGroupDescr.2.2 = "CS2");
    SET(dsmonAggGroupStatus.2.3 = createAndGo(4),
        dsmonAggGroupDescr.2.3 = "CS3");
    SET(dsmonAggGroupStatus.2.4 = createAndGo(4),
        dsmonAggGroupDescr.2.4 = "CS4");
    SET(dsmonAggGroupStatus.2.5 = createAndGo(4),
        dsmonAggGroupDescr.2.5 = "CS5");
    SET(dsmonAggGroupStatus.2.6 = createAndGo(4),
        dsmonAggGroupDescr.2.6 = "CS6");
    SET(dsmonAggGroupStatus.2.7 = createAndGo(4),
        dsmonAggGroupDescr.2.7 = "CS7");
    SET(dsmonAggGroupStatus.2.8 = createAndGo(4),
        dsmonAggGroupDescr.2.8 = "EF");
    SET(dsmonAggGroupStatus.2.9 = createAndGo(4),
        dsmonAggGroupDescr.2.9 = "AF11");
    SET(dsmonAggGroupStatus.2.10 = createAndGo(4),
        dsmonAggGroupDescr.2.10 = "AF12");
    SET(dsmonAggGroupStatus.2.11 = createAndGo(4),
        dsmonAggGroupDescr.2.11 = "AF13");
    SET(dsmonAggGroupStatus.2.12 = createAndGo(4),
        dsmonAggGroupDescr.2.12 = "AF21");
    SET(dsmonAggGroupStatus.2.13 = createAndGo(4),
        dsmonAggGroupDescr.2.13 = "AF22");
    SET(dsmonAggGroupStatus.2.14 = createAndGo(4),
        dsmonAggGroupDescr.2.14 = "AF23");
    SET(dsmonAggGroupStatus.2.15 = createAndGo(4),
        dsmonAggGroupDescr.2.15 = "AF31");
    SET(dsmonAggGroupStatus.2.16 = createAndGo(4),
        dsmonAggGroupDescr.2.16 = "AF32");
    SET(dsmonAggGroupStatus.2.17 = createAndGo(4),
        dsmonAggGroupDescr.2.17 = "AF33");
    SET(dsmonAggGroupStatus.2.18 = createAndGo(4),
        dsmonAggGroupDescr.2.18 = "AF41");
    SET(dsmonAggGroupStatus.2.19 = createAndGo(4),
        dsmonAggGroupDescr.2.19 = "AF42");
    SET(dsmonAggGroupStatus.2.20 = createAndGo(4),
        dsmonAggGroupDescr.2.20 = "AF43");
    SET(dsmonAggGroupStatus.2.21 = createAndGo(4),
        dsmonAggGroupDescr.2.21 = "Nonzero Default");
```

Example 3: an aggregated representation of current DIFFSERV PHBs.
One group is created for each counter aggregation to be monitored (8
rows in this example).

```
    SET(dsmonAggGroupStatus.3.0 = createAndGo(4),
        dsmonAggGroupDescr.3.0 = "Zero CS");
    SET(dsmonAggGroupStatus.3.1 = createAndGo(4),
        dsmonAggGroupDescr.3.1 = "Nonzero CS");
    SET(dsmonAggGroupStatus.3.2 = createAndGo(4),
        dsmonAggGroupDescr.3.2 = "EF");
    SET(dsmonAggGroupStatus.3.3 = createAndGo(4),
        dsmonAggGroupDescr.3.3 = "AF1");
    SET(dsmonAggGroupStatus.3.4 = createAndGo(4),
        dsmonAggGroupDescr.3.4 = "AF2");
    SET(dsmonAggGroupStatus.3.5 = createAndGo(4),
        dsmonAggGroupDescr.3.5 = "AF3");
    SET(dsmonAggGroupStatus.3.6 = createAndGo(4),
        dsmonAggGroupDescr.3.6 = "AF4");
    SET(dsmonAggGroupStatus.3.7 = createAndGo(4),
        dsmonAggGroupDescr.3.7 = "Nonzero Default");
```

5.6. Step 6: Create the Counter Aggregation Profile Mappings

   After the dsmonAggControlEntries are activated, the associated read-
   write dsmonAggProfileEntries will be created. The management station
   must create 64 entries in the dsmonAggProfileTable for each counter
   aggregation profile configured in the dsmonAggControlTable.

   Example 1: Each DSCP in its own counter aggregation group

```
    SET(dsmonAggGroupIndex.1.0 = 0,
        dsmonAggGroupIndex.1.1 = 1,
        dsmonAggGroupIndex.1.2 = 2,
        dsmonAggGroupIndex.1.3 = 3,
        ...
        dsmonAggGroupIndex.1.63 = 63);
```

   Example 2: a collection of current DIFFSERV PHBs.

```
    SET(dsmonAggGroupIndex.2.0 = 0,          -- CS0
        dsmonAggGroupIndex.2.1 = 21,         -- Nonzero Default
        dsmonAggGroupIndex.2.2 = 21,
        dsmonAggGroupIndex.2.3 = 21,
        dsmonAggGroupIndex.2.4 = 21,
        dsmonAggGroupIndex.2.5 = 21,
        dsmonAggGroupIndex.2.6 = 21,
        dsmonAggGroupIndex.2.7 = 21,
        dsmonAggGroupIndex.2.8 = 1,          -- CS1
```

```
dsmonAggGroupIndex.2.9 = 21,
dsmonAggGroupIndex.2.10 = 9,          -- AF11
dsmonAggGroupIndex.2.11 = 21,
dsmonAggGroupIndex.2.12 = 10,         -- AF12
dsmonAggGroupIndex.2.13 = 21,
dsmonAggGroupIndex.2.14 = 11,         -- AF13
dsmonAggGroupIndex.2.15 = 21,
dsmonAggGroupIndex.2.16 = 2,          -- CS2
dsmonAggGroupIndex.2.17 = 21,
dsmonAggGroupIndex.2.18 = 12,         -- AF21
dsmonAggGroupIndex.2.19 = 21,
dsmonAggGroupIndex.2.20 = 13,         -- AF22
dsmonAggGroupIndex.2.21 = 21,
dsmonAggGroupIndex.2.22 = 14,         -- AF23
dsmonAggGroupIndex.2.23 = 21,
dsmonAggGroupIndex.2.24 = 3,          -- CS3
dsmonAggGroupIndex.2.25 = 21,
dsmonAggGroupIndex.2.26 = 15,         -- AF31
dsmonAggGroupIndex.2.27 = 21,
dsmonAggGroupIndex.2.28 = 16,         -- AF32
dsmonAggGroupIndex.2.29 = 8,          -- EF
dsmonAggGroupIndex.2.30 = 17,         -- AF33
dsmonAggGroupIndex.2.31 = 21,
dsmonAggGroupIndex.2.32 = 4,          -- CS4
dsmonAggGroupIndex.2.33 = 21,
dsmonAggGroupIndex.2.34 = 18,         -- AF41
dsmonAggGroupIndex.2.35 = 21,
dsmonAggGroupIndex.2.36 = 19,         -- AF42
dsmonAggGroupIndex.2.37 = 21,
dsmonAggGroupIndex.2.38 = 20,         -- AF43
dsmonAggGroupIndex.2.39 = 21,
dsmonAggGroupIndex.2.40 = 5,          -- CS5
dsmonAggGroupIndex.2.41 = 21,
dsmonAggGroupIndex.2.42 = 21,
dsmonAggGroupIndex.2.43 = 21,
dsmonAggGroupIndex.2.44 = 21,
dsmonAggGroupIndex.2.45 = 21,
dsmonAggGroupIndex.2.46 = 21,
dsmonAggGroupIndex.2.47 = 21,
dsmonAggGroupIndex.2.48 = 6,          -- CS6
dsmonAggGroupIndex.2.49 = 21,
dsmonAggGroupIndex.2.50 = 21,
dsmonAggGroupIndex.2.51 = 21,
dsmonAggGroupIndex.2.52 = 21,
dsmonAggGroupIndex.2.53 = 21,
dsmonAggGroupIndex.2.54 = 21,
dsmonAggGroupIndex.2.55 = 21,
dsmonAggGroupIndex.2.56 = 7,          -- CS7
```

```
        dsmonAggGroupIndex.2.57 = 21,
        dsmonAggGroupIndex.2.58 = 21,
        dsmonAggGroupIndex.2.59 = 21,
        dsmonAggGroupIndex.2.60 = 21,
        dsmonAggGroupIndex.2.61 = 21,
        dsmonAggGroupIndex.2.62 = 21,
        dsmonAggGroupIndex.2.63 = 21);
```

   Example 3: an aggregated collection of current DIFFSERV PHBs.

```
    SET(dsmonAggGroupIndex.3.0 = 0,          -- Zero CS
        dsmonAggGroupIndex.3.1 = 7,          -- Nonzero Default
        dsmonAggGroupIndex.3.2 = 7,
        dsmonAggGroupIndex.3.3 = 7,
        dsmonAggGroupIndex.3.4 = 7,
        dsmonAggGroupIndex.3.5 = 7,
        dsmonAggGroupIndex.3.6 = 7,
        dsmonAggGroupIndex.3.7 = 7,
        dsmonAggGroupIndex.3.8 = 1,          -- Nonzero CS
        dsmonAggGroupIndex.3.9 = 7,
        dsmonAggGroupIndex.3.10 = 3,         -- AF1
        dsmonAggGroupIndex.3.11 = 7,
        dsmonAggGroupIndex.3.12 = 3,
        dsmonAggGroupIndex.3.13 = 7,
        dsmonAggGroupIndex.3.14 = 3,
        dsmonAggGroupIndex.3.15 = 7,
        dsmonAggGroupIndex.3.16 = 1,
        dsmonAggGroupIndex.3.17 = 7,
        dsmonAggGroupIndex.3.18 = 4,         -- AF2
        dsmonAggGroupIndex.3.19 = 7,
        dsmonAggGroupIndex.3.20 = 4,
        dsmonAggGroupIndex.3.21 = 7,
        dsmonAggGroupIndex.3.22 = 4,
        dsmonAggGroupIndex.3.23 = 7,
        dsmonAggGroupIndex.3.24 = 1,
        dsmonAggGroupIndex.3.25 = 7,
        dsmonAggGroupIndex.3.26 = 5,         -- AF3
        dsmonAggGroupIndex.3.27 = 7,
        dsmonAggGroupIndex.3.28 = 5,
        dsmonAggGroupIndex.3.29 = 2,         -- EF
        dsmonAggGroupIndex.3.30 = 5,
        dsmonAggGroupIndex.3.31 = 7,
        dsmonAggGroupIndex.3.32 = 1,
        dsmonAggGroupIndex.3.33 = 7,
        dsmonAggGroupIndex.3.34 = 6,         -- AF4
        dsmonAggGroupIndex.3.35 = 7,
        dsmonAggGroupIndex.3.36 = 6,
        dsmonAggGroupIndex.3.37 = 7,
```

```
     dsmonAggGroupIndex.3.38 = 6,
     dsmonAggGroupIndex.3.39 = 7,
     dsmonAggGroupIndex.3.40 = 1,
     dsmonAggGroupIndex.3.41 = 7,
     dsmonAggGroupIndex.3.42 = 7,
     dsmonAggGroupIndex.3.43 = 7,
     dsmonAggGroupIndex.3.44 = 7,
     dsmonAggGroupIndex.3.45 = 7,
     dsmonAggGroupIndex.3.46 = 7,
     dsmonAggGroupIndex.3.47 = 7,
     dsmonAggGroupIndex.3.48 = 1,
     dsmonAggGroupIndex.3.49 = 7,
     dsmonAggGroupIndex.3.50 = 7,
     dsmonAggGroupIndex.3.51 = 7,
     dsmonAggGroupIndex.3.52 = 7,
     dsmonAggGroupIndex.3.53 = 7,
     dsmonAggGroupIndex.3.54 = 7,
     dsmonAggGroupIndex.3.55 = 7,
     dsmonAggGroupIndex.3.56 = 1,
     dsmonAggGroupIndex.3.57 = 7,
     dsmonAggGroupIndex.3.58 = 7,
     dsmonAggGroupIndex.3.59 = 7,
     dsmonAggGroupIndex.3.60 = 7,
     dsmonAggGroupIndex.3.61 = 7,
     dsmonAggGroupIndex.3.62 = 7,
     dsmonAggGroupIndex.3.63 = 7);
```

5.7. Step 7: Lock the Counter Aggregation Configuration

   Before any existing collections can be activated by the agent, the
   counter aggregation configuration must be locked, by setting the
   dsmonAggControlLocked scalar to 'true'.

```
     SET(dsmonAggControlLocked.0 = true(1));
```

6. Intellectual Property

   The IETF takes no position regarding the validity or scope of any
   intellectual property or other rights that might be claimed to
   pertain to the implementation or use of the technology described in
   this document or the extent to which any license under such rights
   might or might not be available; neither does it represent that it
   has made any effort to identify any such rights. Information on the
   IETF's procedures with respect to rights in standards-track and
   standards-related documentation can be found in BCP 11, RFC 2028.
   Copies of claims of rights made available for publication and any
   assurances of licenses to be made available, or the result of an
   attempt made to obtain a general license or permission for the use of

such proprietary rights by implementors or users of this
specification can be obtained from the IETF Secretariat.

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

7. Acknowledgements

   This memo is a product of the RMONMIB WG. It is based on an Internet
   Draft that was produced with a great deal of assistance from Keith
   McCloghrie and Bijendra Jain.

8. References

   [RFC1155] Rose, M. and K. McCloghrie, "Structure and Identification
             of Management Information for TCP/IP-based Internets", STD
             16, RFC 1155, May 1990.

   [RFC1157] Case, J., Fedor, M., Schoffstall, M. and C. Davin, "Simple
             Network Management Protocol", STD 15, RFC 1157, May 1990.

   [RFC1212] Rose, M. and K. McCloghrie, "Concise MIB Definitions", STD
             16, RFC 1212, March 1991.

   [RFC1215] Rose, M., "A Convention for Defining Traps for use with the
             SNMP", RFC 1215, March 1991.

   [RFC1901] Case, J., McCloghrie, K., Rose, M. and S. Waldbusser,
             "Introduction to Community-based SNMPv2", RFC 1901, January
             1996.

   [RFC1905] 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.

   [RFC1906] 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.

   [RFC2021] Waldbusser, S., "Remote Network Monitoring Management
             Information Base Version 2 using SMIv2", RFC 2021, January
             1997.

   [RFC2026] Bradner, S., "The Internet Standards Process -- Revision
             3", BCP 9, RFC 2026, October 1996.

   [RFC2119] Bradner, S., "Key words for use in RFCs to Indicate
              Requirement Levels", BCP 14, RFC 2119, March 1997.

   [RFC2474] Nichols, K., Blake, S., Baker, F. and D. Black, "Definition
              of the Differentiated Services Field (DS Field) in the IPv4
              and IPv6 Headers", RFC 2474, December 1998.

   [RFC2475] Blake, S., Black, D., Carlson, M., Davies, E., Wang, Z. and
              W. Weiss, "An Architecture for Differentiated Services",
              RFC 2475, December 1998.

   [RFC2570] Case, J., Mundy, R., Partain, D. and B. Stewart,
              "Introduction to Version 3 of the Internet-standard Network
              Management Framework", RFC 2570, April 1999.

   [RFC2571] Wijnen, B., Harrington, D. and R. Presuhn, "An Architecture
              for Describing SNMP Management Frameworks", RFC 2571, April
              1999.

   [RFC2572] Case, J., Harrington D., Presuhn R. and B. Wijnen, "Message
              Processing and Dispatching for the Simple Network
              Management Protocol (SNMP)", RFC 2572, April 1999.

   [RFC2573] Levi, D., Meyer, P. and B. Stewart, "SNMPv3 Applications",
              RFC 2573, April 1999.

   [RFC2574] Blumenthal, U. and B. Wijnen, "User-based Security Model
              (USM) for version 3 of the Simple Network Management
              Protocol (SNMPv3)", RFC 2574, April 1999.

   [RFC2575] Wijnen, B., Presuhn, R. and K. McCloghrie, "View-based
              Access Control Model (VACM) for the Simple Network
              Management Protocol (SNMP)", RFC 2575, April 1999.

   [RFC2578] McCloghrie, K., Perkins, D. and J. Schoenwaelder,
              "Structure of Management Information Version 2 (SMIv2)",
              STD 58, RFC 2578, April 1999.

   [RFC2579] McCloghrie, K., Perkins, D.and J. Schoenwaelder, "Textual
              Conventions for SMIv2", STD 58, RFC 2579, April 1999.

   [RFC2580] McCloghrie, K., Perkins, D. and J. Schoenwaelder,
              "Conformance Statements for SMIv2", STD 58, RFC 2580, April
              1999.

   [RFC2856] Bierman, A., McCloghrie, K., and R. Presuhn, "Textual
              Conventions for Additional High Capacity Data Types", RFC
              2856, June 2000.

   [RFC2895] Bierman, A., Bucci, C. and R. Iddon, "Remote Network
             Monitoring MIB Protocol Identifier Reference", RFC 2895,
             August 2000.

   [RFC3273] Waldbusser, S., "Remote Monitoring Management Information
             Base for High Capacity Networks", RFC 3273, May 2002.

9. 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.

   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 implementors 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.

10. Author's Address

     Andy Bierman
     Cisco Systems, Inc.
     170 West Tasman Drive
     San Jose, CA USA 95134

     Phone: +1 408-527-3711
     EMail: abierman@cisco.com

11. Full Copyright Statement

Acknowledgement