Network Working Group
Request for Comments: 3287
Category: Standards Track

A. Bierman
Cisco Systems, Inc.

July 2002

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:

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

- 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].

- 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].

- 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].

- 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.

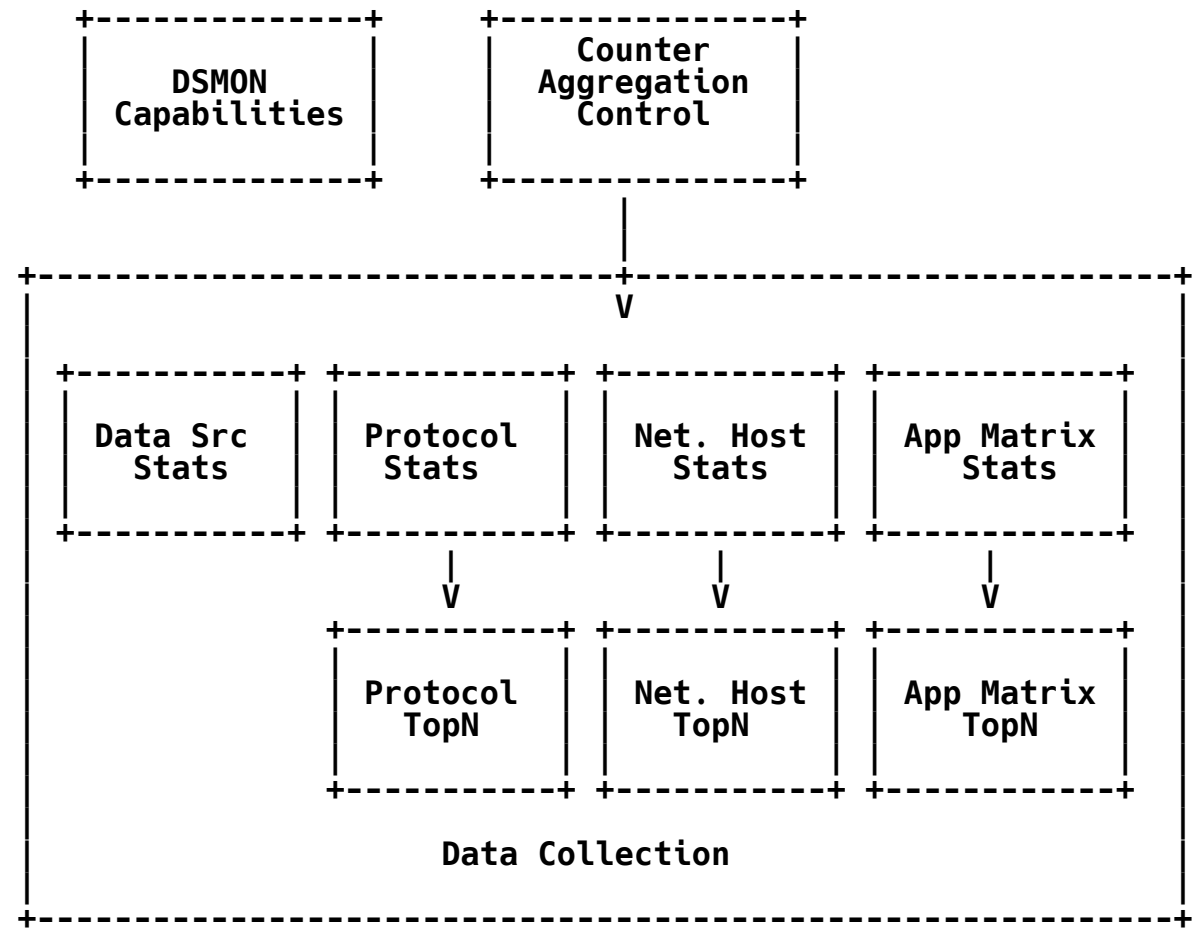
High Capacity Counters
: The DSMON MIB uses the 'SNMPv1 coexistence' strategy adopted by the RMONMIB WG. That is, where a 64-bit counter is provided, a 32-bit version of the counter, and a 32-bit overflow counter are also provided.

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



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 mediaIndependentIndex	dsmonStatsControlEntry dsmonStatsControlIndex dsmonStatsEntry dsmonStatsControlIndex, dsmonAggGroupIndex
Protocol Statistics	
protocolDistControlEntry protocolDistControlIndex protocolDistStatsEntry protocolDistControlIndex, protocolDirLocalIndex	dsmonPdistCtlEntry dsmonPdistCtlIndex dsmonPdistStatsEntry dsmonPdistCtlIndex, dsmonPdistTimeMark, dsmonAggGroupIndex, protocolDirLocalIndex
Protocol TopN Distribution	
none	dsmonPdistTopNCtlEntry dsmonPdistTopNCtlIndex dsmonPdistTopNEntry dsmonPdistTopNCtlIndex, dsmonPdistTopNIndex
Network Host Statistics	
hlHostControlEntry hlHostControlIndex nlHostEntry hlHostControlIndex, nlHostTimeMark, protocolDirLocalIndex, nlHostAddress	dsmonHostCtlEntry dsmonHostCtlIndex dsmonHostEntry dsmonHostCtlIndex, dsmonHostTimeMark, dsmonAggGroupIndex, protocolDirLocalIndex, dsmonHostAddress

Table 1 (Continued): DSMON Indexing Comparison

Existing RMON	DSMON
Network Host TopN Distribution	
none	dsmonHostTopNCtlEntry dsmonHostTopNCtlIndex dsmonHostTopNEntry dsmonHostTopNCtlIndex, dsmonHostTopNIndex
Application Matrix Statistics	
hlMatrixControlEntry hlMatrixControlIndex alMatrixSDEntry hlMatrixControlIndex, alMatrixSDTimeMark, protocolDirLocalIndex, nlMatrixSDSourceAddress, nlMatrixSDDestAddress protocolDirLocalIndex alMatrixDSEntry hlMatrixControlIndex, alMatrixDSTimeMark, protocolDirLocalIndex, nlMatrixDSDestAddress, nlMatrixDSSourceAddress protocolDirLocalIndex	dsmonMatrixCtlEntry dsmonMatrixCtlIndex dsmonMatrixSDEntry dsmonMatrixCtlIndex, dsmonMatrixTimeMark, dsmonAggGroupIndex, dsmonMatrixNLIndex, dsmonMatrixSourceAddress dsmonMatrixDestAddress dsmonMatrixALIndex dsmonMatrixDSEntry dsmonMatrixCtlIndex, dsmonMatrixTimeMark, dsmonAggGroupIndex, dsmonMatrixNLIndex, dsmonMatrixDestAddress dsmonMatrixSourceAddress dsmonMatrixALIndex
Application Matrix TopN Distribution	
none (similar to nlMatrixTopN)	dsmonMatrixTopNCtlEntry dsmonMatrixTopNCtlIndex dsmonMatrixTopNEntry 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
```

```
            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

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