

Remote Monitoring MIB Extensions for Differentiated Services

Status of this Memo

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

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Abstract

This memo defines a portion of the Management Information Base (MIB) for use with network management protocols in the Internet community. In particular, it describes 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.

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1. The SNMP Network Management Framework

The SNMP Management Framework presently consists of five major components:

- o An overall architecture, described in RFC 2571 [RFC2571].
- o Mechanisms for describing and naming objects and events for the purpose of management. The first version of this Structure of Management Information (SMI) is called SMIV1 and is described in STD 16, RFC 1155 [RFC1155], STD 16, RFC 1212 [RFC1212] and RFC 1215 [RFC1215]. The second version, called SMIV2, is described in STD 58, RFC 2578 [RFC2578], RFC 2579 [RFC2579] and RFC 2580 [RFC2580].
- o Message protocols for transferring management information. The first version of the SNMP message protocol is called SNMPv1 and is described in STD 15, RFC 1157 [RFC1157]. A second version of the SNMP message protocol, which is not an Internet standards track protocol, is called SNMPv2c and is described in RFC 1901 [RFC1901] and RFC 1906 [RFC1906]. The third version of the message protocol is called SNMPv3 and is described in RFC 1906 [RFC1906], RFC 2572 [RFC2572] and RFC 2574 [RFC2574].
- o Protocol operations for accessing management information. The first set of protocol operations and associated PDU formats is described in STD 15, RFC 1157 [RFC1157]. A second set of protocol operations and associated PDU formats is described in RFC 1905 [RFC1905].

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

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

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

This memo specifies a MIB module that is compliant to the SMIV2. A MIB conforming to the SMIV1 can be produced through the appropriate translations. The resulting translated MIB must be semantically equivalent, except where objects or events are omitted because no translation is possible (use of Counter64). Some machine readable information in SMIV2 will be converted into textual descriptions in SMIV1 during the translation process. However, this loss of machine readable information is not considered to change the semantics of the MIB.

2. Overview

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

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

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

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

2.1. Terms

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

This document uses some terms that need introduction:

DataSource

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

protocol

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

Counter Aggregation Group

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

Counter Aggregation Profile

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

High Capacity Monitoring

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

2.2. Relationship to Differentiated Services

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

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

2.3. Relationship to the Remote Monitoring MIBs

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

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

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

Protocol Directory

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

TimeFilter

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

Zero-Based Counters

Since counters are instantiated by management action, as in the RMON MIBs, the DSMON MIB uses zero-based counters in all data collection tables. Specifically, the ZeroBasedCounter32 textual convention from the RMON-2 MIB [RFC2021] and the ZeroBasedCounter64 textual convention (defined in the HCNM-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.

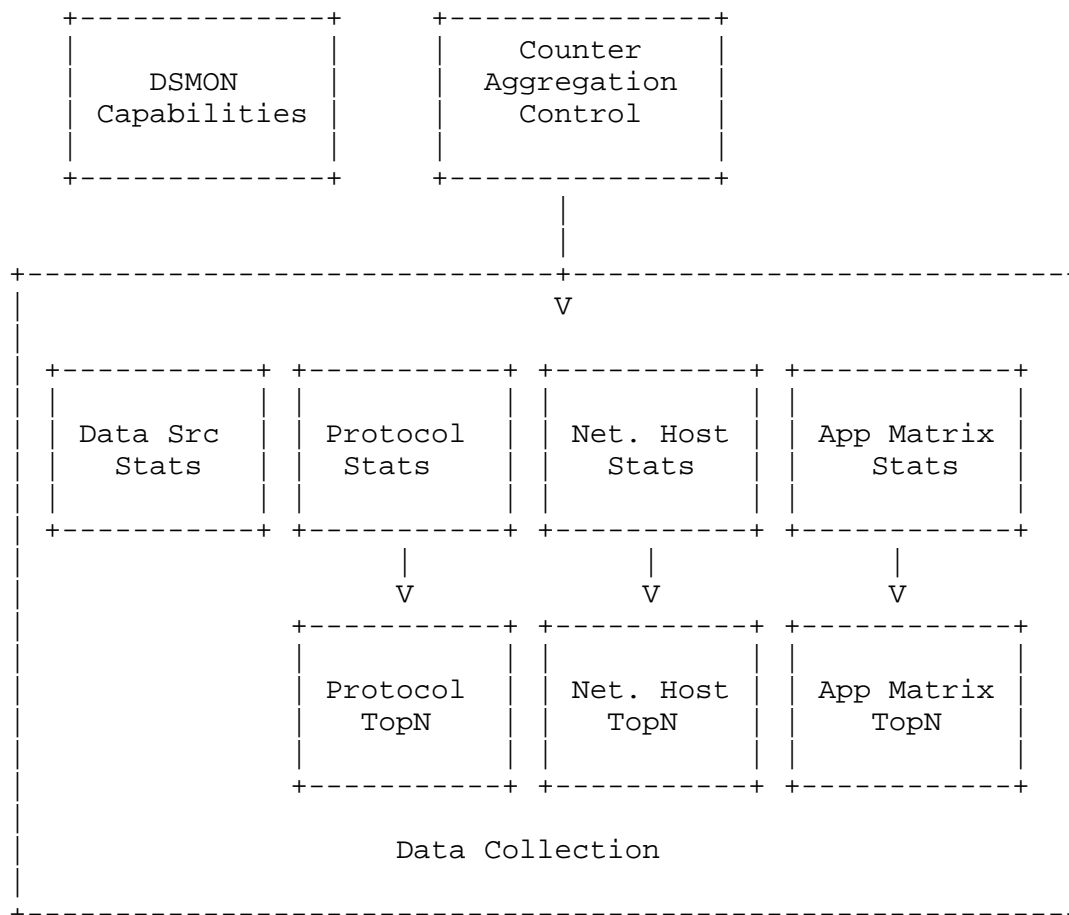
TopN Reports

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 be 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 }
```

dsmonStatsOutOvfOctets 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 dsmonPdistTopNCtrlRateBase.

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

If the associated dsmonPdistTopNCtrlRateBase 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 dsmonPdistTopNCtrlRateBase.

If the associated dsmonPdistTopNCtrlRateBase 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 dsmonHostTopNPDLIndex 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 dsmonHostTopNCtrlRateBase.

If the associated dsmonHostTopNCtrlRateBase 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 dsmonMatrixTopNCtrlRateBase is dsmonMatrixTopNPkts, this variable will be used to sort this report.

If the value of the dsmonMatrixTopNCtrlRateBase is dsmonMatrixTopNHCPkts or dsmonMatrixTopNHCOctets, then this object will contain 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 dsmonMatrixTopNCtrlRateBase 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 dsmonMatrixTopNCtrlRateBase 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 dsmonMatrixTopNHCPkts object.

If the associated dsmonMatrixTopNCtrlRateBase is equal to dsmonMatrixTopNHCPkts or dsmonMatrixTopNHCOctets, then this object will contain the most significant 32 bits of the associated dsmonMatrixTopNHCPkts 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 }

dsmonMatrixTopNHCPkts 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 dsmonMatrixTopNCtrlRateBase is dsmonMatrixTopNOctets, this variable will be used to sort this report.

If the value of the dsmonMatrixTopNCtrlRateBase 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 dsmonMatrixTopNCtrlRateBase 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 dsmonMatrixTopNCtrlRateBase 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 dsmonMatrixTopNHCRRevOctetRate object.

If the associated dsmonMatrixTopNCtrlRateBase is equal to

dsmonMatrixTopNHCPkts or dsmonMatrixTopNHCOctets, then this object will contain the most significant 32 bits of the associated dsmonMatrixTopNHCRcvPktRate 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 }

dsmonMatrixTopNHCRcvOctetRate 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."

```
        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 }

dsmonPdistHCGGroup 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,
    dsmonHostTopNPDLIndex,
    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,
    dsmonMatrixDSPPkts,
    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));
```

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7. Acknowledgements

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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.

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