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Definition of Managed Objects for Performance Reporting  
draft-ietf-manet-report-mib-01

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 objects for configuring autonomous report generation on any device that supports MIBs containing counter and gauge objects for performance monitoring. This allows a management station to instruct a device to build off-line reports to be collected asynchronously by the management station. Further, this REPORT-MIB can be configured in a proxy configuration where the report generation is performed on a device in close network proximity to the device containing the referenced counter objects. Hence, this capability allows network operators to reduce the SNMP polling traffic burden on Mobile Ad-Hoc and Disruption Tolerant Networks which is typical of SNMP performance management applications. This capability also improves the accuracy of the performance reports by minimizing the delay variation between the reporting agent (this MIB) and the data monitor (the MIB containing the monitored counter objects).

Status of This Memo

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## 1. Introduction

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 objects for configuring autonomous, off-line report generation for performance monitoring on any device supporting MIBs containing variables that resolve to type Integer32 (i.e., Integer32, Counter, Gauge, or TimeTicks). This REPORT-MIB allows for the report generation to occur on the same device as containing the referenced counter object or on a device in close network proximity to the device with the referenced counter object. This should be useful to devices or networks where efficient use of bandwidth is of concern or where intermittent connectivity is common. Hence, the REPORT-MIB is useful for devices managed over some Mobile Ad-Hoc Networks (MANETs) or Disruption Tolerant Networks (DTNs).

The REPORT-MIB offers three types of off-line reporting. One type offering reports which present statistical analysis of the objects being tracked; found within the reportStatsGroup. The second type offering a means to collect sampled data related to defined MIB objects. This second type of reporting is contained in the reportSampledGroup. The third offering reports which present (collect) raw data values and their time of change from the objects being tracked; found within the reportHistoryGroup.

For statistical reporting, the REPORT-MIB borrows from the RMON [RFC1757] ReportsControl and Reports Tables. Here the reportStatsCapabilitiesGroup defines the capabilities of the device with respect performance monitoring and statistical analysis. Some analysis is hard-coded into the definition of the reportStatsDataGroup while the device can also advertise extended statistical reporting via the reportMetricExtDefTable. The reportsControlTable specifies the report metrics, the Object ID to monitor and other aspects of the statistical report development and storage.

For the collection of sampled data, the REPORT-MIB draws directly from the usrHistoryGroup from RMON 2 [RFC2021]. Here the reportSampledControlTable allows the user to define aspects of the report for sampled data, including the number of MIB objects to be sampled and the nature of the sampling frequency and overall report duration. This group uses the notion of buckets, which contained sampled data from a set of identified MIB objects sampled at the same time point. The report consists of the buckets, each containing sets of sampled data from the selected MIB objects but at the specific sampling times. The reportSampledObjectTable allows the user to identify the multiple MIB objects to be sampled. The reportSampledDataTable contains the storage of the reported sampled

data contained within buckets, one bucket for each time sampling instance.

For the collection of raw data, the REPORT-MIB contains a reportHistoryGroup comprised of the reportHistoryControlTable for control of historical data reports and the reportHistoryDataTable for the storage of the historical reports.

Various compliance groups are defined which allow for development of raw data collection reports, collection of sampled data reports or only statistical data reports, or all combinations.

## 2. The Internet-Standard Management Framework

For a detailed overview of the documents that describe the current Internet-Standard Management Framework, please refer to section 7 of RFC 3410 [RFC3410].

Managed objects are accessed via a virtual information store, termed the Management Information Base or MIB. MIB objects are generally accessed through the Simple Network Management Protocol (SNMP). Objects in the MIB are defined using the mechanisms defined in the Structure of Management Information (SMI). This memo specifies a MIB module that is compliant to the SMIV2, which is described in STD 58, RFC 2578 [RFC2578], STD 58, RFC 2579 [RFC2579] and STD 58, RFC 2580 [RFC2580].

## 3. Conventions

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

## 4. Overview

The REPORT-MIB references performance objects in other MIBs (and in other devices) and generates offline performance reports on those referenced objects. The REPORT-MIB can be coincident with the other MIB or can reside on another device in close network proximity to the device containing the referenced performance related object.

### 4.1. REPORT-MIB Management Model

This section describes the management model for the REPORT-MIB process. First, the model for the reportStatsGroup is presented. Then the models for the reportSampledGroup and the reportHistoryGroup are presented.

Figure 1 illustrates a potential use of the REPORT-MIB for the generation of off-line, remotely generated reports. The management station on the left hand side of the illustration instructs the remote device to create reports through manipulation of the ReportCntrl Objects in the REPORT-MIB resident on the remote device. The reports instruct the device to monitor the status of specified counters (on other MIBs and potentially on other devices in close network proximity) periodically and to generate a set of metrics describing the temporal behavior of those counter values. The reports are stored locally until the management station decides to pull them off the device. The figure shows a case where the REPORT-MIB generates a notification that Report\_2 has completed, prompting the management station to pull Report\_2 from the device.

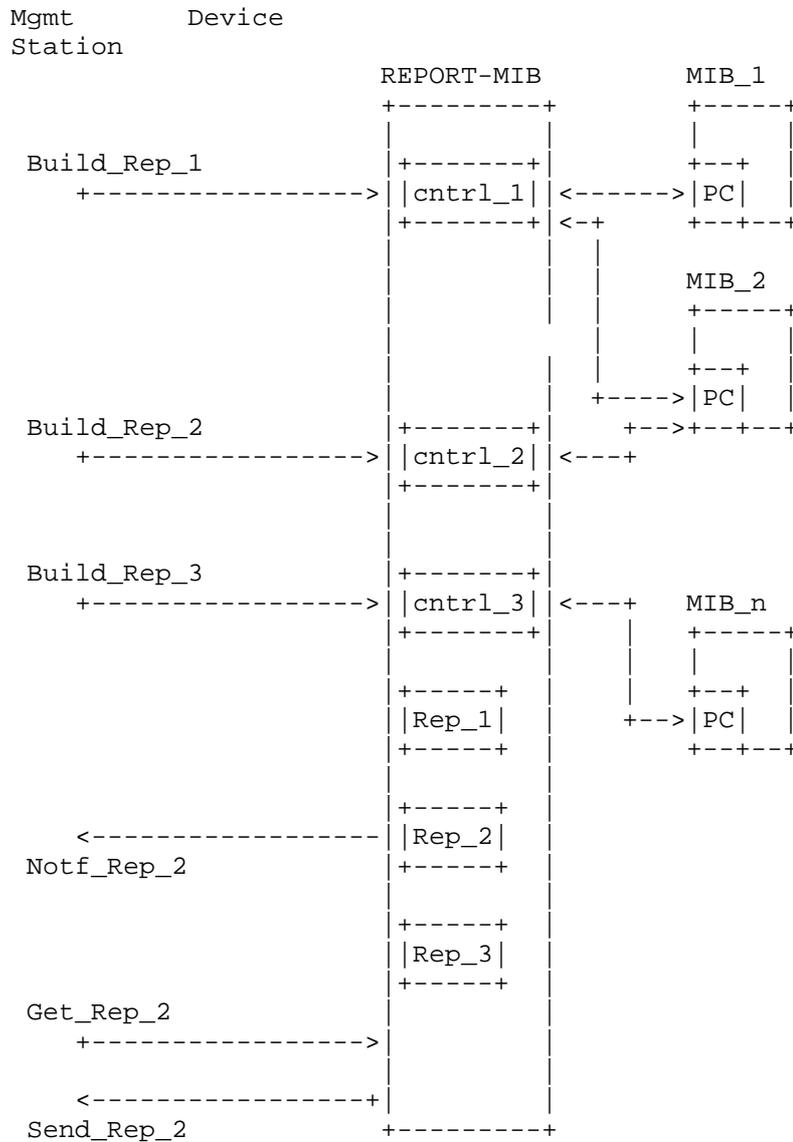
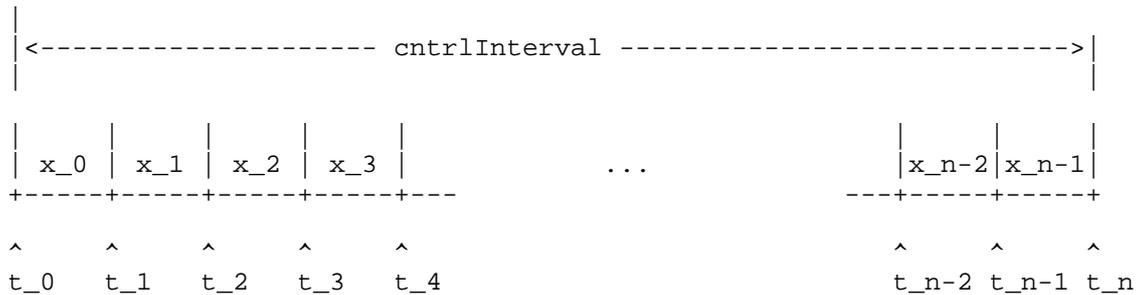


Figure 1: REPORT-MIB front-end report generation process.

The REPORT-MIB's reportStatsGroup defines specifically a set of metrics which are computed within all reports. It also allows for the specification of metric extensions which are local to the specific implementation of the REPORT-MIB. These are identified in the reportStatsCapabilitiesGroup metricExtension Table.

Each metric has an associated Object ID of type counter associated with it. The control table specifies a report interval and a bin interval. The report interval is an integral multiple of the bin interval. For each bin interval, the device identifies the change in the counter value over the bin interval (called  $x_i$ ) and then computes the associated metric, e.g., sum, sum of the square, etc, over the set  $\{x_i\}$ . It maintains the sum of these computations within the metric objects in the 'reportStatsDataTable'. Once the report interval is complete, the management station has enough information to compute a set of interesting and useful statistics.

The computational model of the reportStatsGroup of the REPORT-MIB is illustrated in the figure below. The important controls are a) the `cntrlInterval`, b) the `cntrlBinInterval`, c) the specific `counterObjectId`, and d) the metric. In the figure  $x_i$  represents the  $i$ th value of the counter change, i.e.,  $x_i = \text{counterValue}(t_{i+1}) - \text{counterValue}(t_i)$ . The metrics reported are then computed from the set  $(x_i)$ . Three examples are identified in the figure, e.g., `StatSumX`, `StatSumSq` and `StatMaxX`. Other existing and potential metrics are discussed below.



where  $t_i - t_{i-1} = \text{cntrlBinInterval}$   
 $n = \text{cntrlInterval} / \text{cntrlBinInterval}$

`StatSumX` =  $\text{Sum}(x_i)$  from  $i=0, \dots, n-1$   
`StatSumSq` =  $\text{Sum}(x_i^2)$  from  $i=0, \dots, n-1$   
`StatMaxX` =  $\text{Max}(x_i)$  for  $i=0, \dots, n-1$

Figure 2: REPORT-MIB statistical analysis computation process.

This capability then allows for the computation of various significant statistics related to the behavior of the referenced object.

- o Maximum and Minimum - the maximum and the minimum change in the referenced object during a single cntrlBinInterval during the cntrlInterval.
- o Arithmetic Mean - the mean change in the referenced object over all control bin intervals during the cntrlInterval. This is derived from the StatSumX quantity.
- o Variance - the variance in the change of the referenced object over all control bin intervals within the cntrlInterval. This is derived from the StatSumSq and the StatSumX quantities.

These are accessible from the statistical datum provided by this MIB module. Other statistics are derivable including, e.g., the slope of a least-squares fit to the rate of change of the referenced object. These are described below.

The REPORT-MIB also provides for the collection of sampled data instead of statistical data. It does this by importing (copying) the usrHistory group from RMON2 [RFC2021] which allows for the generation of reports collecting the sampled object values binned for the purpose of aggregation and efficiency of collection. These are defined within the reportSampledGroup. The model used for this type of report generation is based upon three tables. The reportSampledControlTable defines aspects of the report generation related to duration of the reporting interval, the bin (or bucket) sizes for the report, and the number of object values collected for each bucket. The reportUsrHistoryObjectTable identifies the specific MIB objects whose values are binned within the report. And the reportSampledDataTable contains the binned data values collected for the report.

The REPORT-MIB also provides for the collection of historical data instead of statistical or sampled data. It does this by defining the reportHistoryControlTable for the control of the historical reports and the reportHistoryDataTable for the storage of the historical reports.

#### 4.2. Terms

The following definitions apply throughout this document:

- o Capabilities - Objects related to the capabilities of the device and MIB implemented on the device. Some objects are explicitly defined within the REPORT-MIB. Other capabilities can be exposed through the REPORT-MIB, but which are not explicitly defined within this document. These later capabilities include objects, e.g., for new metrics.

- o Control - Objects defined within this document which set the parameters for specific reports to be generated offline on the the remote managed device.
- o Data - Objects which hold the report data, either statistical, sampled or raw history data.

## 5. Structure of the MIB Module

This section presents the structure of the REPORT-MIB module. The objects are arranged into the following groups:

- o reportMIBNotifications - defines the notifications associated with the REPORT-MIB.
- o reportMIBObjects - defines the objects forming the basis for the REPORT MIB. These objects are divided up by function into the following groups:
  - o
    - \* Statistics Group - This group contains the objects which support the generation of reports of a statistical nature.
    - \* Sampled Group - This group contains the objects which support the generation (collection) of reports exposing sampled data values.
    - \* History Group - This group contains the objects which support the generation (collection) of historical reports exposing raw data values.
  - o reportMIBConformance - Defines a variety of conformance of implementations of this REPORT-MIB.

### 5.1. Textual Conventions

The textual conventions used in the REPORT-MIB are as follows. The RowStatus textual convention is imported from RFC 2579 [RFC2579].

### 5.2. The Statistics Group

The REPORT-MIB Statistics Group contains objects which allows for the generation of statistical analysis reports. For example, this group can be exercised to generate the mean and variance of the referenced counter object. The Statistics Group is composed of:

- o reportStatsCapabilitiesGroup - lists the statistics collections capabilities of this device. Certain statistics are mandatory, i.e., hard coded into the MIB definitions. While, the capabilities group allows the developer to add additional statistical analysis capabilities.
- o reportStatsControlGroup - allows the management application to define the parameters of the reports.
- o reportStatsDataGroup - presents the data from the specified reports.

As an example of how the metrics are to be computed within the REPORT-MIB, consider the standard metric object 'reportStatsDataStatSumX'. For each bin interval defined by the object reportCntlReportsBinInterval, the change in the value of the counter pointed to by the Object ID reportCntlReportsPriObjID is calculated. Then this (delta) value is added to the current value of the value contained in the object 'reportStatsDataStatSumX'. Then, if interested in computing the average change in this object (sampled each bin interval) for the duration of the report, the management station simply divides reportStatsDataStatSumX by reportStatsDataStatN. Although this is a trivial example because the value of reportAggrReportStatSumX is simple the difference in the counter reportCntlReportsPriObjID at the start and the end of the total report interval, the other metrics defined are not as trivial.

The objects 'reportStatsDataOverflowStatSumX' and 'reportStatsDataHCSumX' are borrowed from RMON [RFC2021] and exist to handle integer overflow situations where, e.g., 'reportStatsDataStatSumX' overruns its maximum value numerous times.

Computation of the least-square fit of the data collected for a report can be accomplished. (NOTE: describe this capability here.)

### 5.3. The Sampled Group

The Sampled Group contains tables which allows for the development of reports based upon sampling the referenced counter objects at specified intervals. The development of this group within the REPORT-MIB follows exactly the User History group from the RMON 2 MIB [RFC2021]. The Sampled Group is composed of:

- o reportSampledControlTable - allows for the setting of the parameters of the report.
- o reportSampledObjectTable - sets the referenced objects to be sampled during the test. With this capability, the management

application can reference multiple objects, all of which are sampled during the test and reported out through the reportSampledData Table.

- o reportSampledDataTable - contains the reports.

#### 5.4. The History Group

The History Group contains tables which capture information on change events for the referenced objects. Depending upon the referenced objects, this could force the generation of large amounts of data. Care should be exercised when considering the use of this capability.

- o reportHistoryControlTable - defines the parameters for the test.
- o reportHistoryDataTable - presents the reports associated with the constructed tests.

#### 5.5. The Notifications Group

The Notifications Sub-tree contains the list of notifications supported within the REPORT-MIB and their intended purpose or utility. (Note: This group is currently empty.)

### 6. Relationship to Other MIB Modules

[TODO]: The text of this section specifies the relationship of the MIB modules contained in this document to other standards, particularly to standards containing other MIB modules. Definitions imported from other MIB modules and other MIB modules that SHOULD be implemented in conjunction with the MIB module contained within this document are identified in this section.

#### 6.1. Relationship to the SNMPv2-MIB

The 'system' group in the SNMPv2-MIB [RFC3418] is defined as being mandatory for all systems, and the objects apply to the entity as a whole. The 'system' group provides identification of the management entity and certain other system-wide data. The REPORT-MIB does not duplicate those objects.

#### 6.2. Relationship to the RMON2-MIB

The REPORT-MIB is closely related in many aspects to the RMON2-MIB [RFC2021]. Specifically, the reportSampledGroup is a direct copy of the RMON2 User History Group, with the names changed to comply with the naming conventions within the REPORT-MIB. Further, the design and use of the control tables within the REPORT-MIB draw exactly from

the definition of these table structures in the earlier RMON MIBs.

### 6.3. Relationship to the TPM-MIB

The REPORT-MIB pulled the reportStatsGroup directory from the TPM-MIB [RFC4150]. The table structures and the choice of statistics draws directly from the earlier TPM-MIB developed within the RMON Working Group.

### 6.4. MIB modules required for IMPORTS

[TODO]: Citations are not permitted within a MIB module, but any module mentioned in an IMPORTS clause or document mentioned in a REFERENCE clause is a Normative reference, and must be cited someplace within the narrative sections. If there are imported items in the MIB module, such as Textual Conventions, that are not already cited, they can be cited in text here. Since relationships to other MIB modules should be described in the narrative text, this section is typically used to cite modules from which Textual Conventions are imported.

The REPORT-MIB module IMPORTS objects from SNMPv2-SMI [RFC2578], SNMPv2-TC [RFC2579], SNMPv2-CONF [RFC2580], and IF-MIB [RFC2863]

## 7. Definitions

```
REPORT-MIB DEFINITIONS ::= BEGIN
```

```
IMPORTS
```

```
ZeroBasedCounter32
    FROM RMON2-MIB
    -- [RFC2021]
```

```
MODULE-IDENTITY, OBJECT-TYPE, NOTIFICATION-TYPE,
Counter32, Gauge32, Unsigned32, Integer32, mib-2
    FROM SNMPv2-SMI
    -- [RFC2578]
```

```
TEXTUAL-CONVENTION, RowStatus,
TimeStamp, StorageType
    FROM SNMPv2-TC
    -- [RFC2579]
```

```
MODULE-COMPLIANCE, OBJECT-GROUP,
NOTIFICATION-GROUP
    FROM SNMPv2-CONF
    -- [RFC2580]
```

```
OwnerString
```

FROM RMON-MIB -- [RFC2819]

ZeroBasedCounter64  
FROM HCNM-TC -- [RFC2856]

SnmpAdminString  
FROM SNMP-FRAMEWORK-MIB -- [RFC3411]

InetAddress, InetAddressType  
FROM INET-ADDRESS-MIB -- [RFC4001]

SspmClockSource, SspmClockMaxSkew,  
SspmMicroSeconds  
FROM SSPM-MIB -- [RFC4149]

;

## reportMIB MODULE-IDENTITY

LAST-UPDATED "201102171300Z" -- February 17, 2011

ORGANIZATION "IETF MANET Working Group"

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## DESCRIPTION

"This MIB module contains managed object definitions for  
the autonomous reporting of performance object counters.

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-- Revision History

REVISION "201102171300Z" -- February 17, 2011

DESCRIPTION

"The fifth draft of this MIB module published as draft-ietf-manet-report-mib-01.txt. This document has been promoted to a MANET Working Group draft.

Revisions to this draft include

- a) Proposed changes to the statsReport table to simplify communications between device and mgmt application,
- b) Added Notifications,
- c) Changed the reporting structure of the Sampled and the History reporting to align with the structure of the Statistics reports for the purpose of allowing for efficient notification and collection of data reports.
- d) Ran through smilint to clean up all errors and most warning. A few still remain.

"

REVISION "201007051300Z" -- July 05, 2010

DESCRIPTION

"The fourth draft of this MIB module published as draft-ietf-manet-report-mib-00.txt. This document has been promoted to a MANET Working Group draft.

Significant revisions to this draft include

- a) added support for proxy configurations through the addition of address objects associated with the referenced counter objects associated with the performance reports."

REVISION "201003021300Z" -- March 02, 2010

DESCRIPTION

"The third draft of this MIB module published as draft-cole-manet-report-mib-02.txt. Significant revisions to this draft include a) changed naming of usrHistoryGroup to sampledGroup and b) added a historyGroup."

REVISION "200910251300Z" -- October 25, 2009

DESCRIPTION

"The second draft of this MIB module published as

```
draft-cole-manet-report-mib-01.txt. Significant
revisions to this draft include a) the inclusion of
raw data collection borrow blatantly from the
usrHistory Group within RMON2, b) the deletion of
the CurrentHistoryTable from version -00,
c) modifications to the overall structure of the
MIB, and d) the definition of various Compliance
options for implementations related to this MIB."
REVISION      "200904281300Z"    -- April 28, 2009
DESCRIPTION
  "Initial draft of this MIB module published as
  draft-cole-manet-report-mib-00.txt."
-- RFC-Editor assigns XXXX
 ::= { mib-2 998 }    -- to be assigned by IANA
```

```
-- TEXTUAL CONVENTIONS
```

```
ReportMetricDefID ::= TEXTUAL-CONVENTION
  DISPLAY-HINT "d"
  STATUS      current
  DESCRIPTION
    "An index that identifies through reference to a specific
    statistical metrics.
    "
  SYNTAX      Unsigned32 (1..2147483647)
```

```
--
-- Top-Level Object Identifier Assignments
--
```

```
reportMIBNotifications OBJECT IDENTIFIER ::= { reportMIB 0 }
reportMIBObjects        OBJECT IDENTIFIER ::= { reportMIB 1 }
reportMIBConformance   OBJECT IDENTIFIER ::= { reportMIB 2 }
```

```
-- The reportMIBObjects Assignments:
--   reportStatsGroup      - 1
--   reportSampledGroup    - 2
--   reportHistoryGroup    - 3
```

```
reportStatsGroup        OBJECT IDENTIFIER ::= { reportMIBObjects 1 }
```

```
-- Then, the reportStatsGroup assignments are :
--     reportStatsCapabilitiesGroup    - 1
--     reportStatsControlGroup        - 2
--     reportStatsDataGroup           - 3

-- reportStatsCapabilitiesGroup
--     This group contains the REPORT objects that identify specific
--     capabilities within this device related to REPORT functions.

reportCapabilitiesGroup OBJECT IDENTIFIER ::= { reportStatsGroup 1 }

reportClockResolution OBJECT-TYPE
    SYNTAX      SspmMicroSeconds
    MAX-ACCESS  read-only
    STATUS      current
    -- UNITS    Microseconds
    DESCRIPTION
        "A read-only variable indicating the resolution
         of the measurements possible by this device."
    ::= { reportCapabilitiesGroup 1 }

reportClockMaxSkew OBJECT-TYPE
    SYNTAX      SspmClockMaxSkew
    MAX-ACCESS  read-only
    STATUS      current
    -- UNITS    Seconds
    DESCRIPTION
        "A read-only variable indicating the maximum
         offset error due to skew of the local clock
         over the time interval 86400 seconds, in seconds."
    ::= { reportCapabilitiesGroup 2 }

reportClockSource OBJECT-TYPE
    SYNTAX      SspmClockSource
    MAX-ACCESS  read-only
    STATUS      current
    DESCRIPTION
        "A read-only variable indicating the source of the clock.
         This is provided to allow a user to determine how accurate
         the timing mechanism is compared with other devices."
    ::= { reportCapabilitiesGroup 3 }

reportMetricDirLastChange OBJECT-TYPE
    SYNTAX      TimeStamp
    MAX-ACCESS  read-only
    STATUS      current
```

## DESCRIPTION

"The value of sysUpTime at the time the reportTransMetricDirTable was last modified, through modifications of the reportTransMetricDirConfig object."  
 ::= { reportCapabilitiesGroup 4 }

## -- REPORT Metric Extensions Definition Table

reportMetricExtDefTable OBJECT-TYPE

SYNTAX SEQUENCE OF ReportMetricExtDefEntry

MAX-ACCESS not-accessible

STATUS current

## DESCRIPTION

"The reportMetricExtDefTable describes the metrics available to the REPORT-MIB. The reportMetricExtDefTable can define metrics by referencing existing IETF, ITU, and other standards organizations' documents, including enterprise-specific documents. Examples of appropriate references include the ITU-T Recommendation Y.1540 [Y.1540] on IP packet transfer performance metrics and the IETF documents from the IPPM WG; e.g., RFC2681 on the round trip delay metric [RFC2681] or RFC3393 on the delay variation metric [RFC3393]. Other examples include RFC2679 [RFC2679], RFC2680 [RFC2680], and RFC3432 [RFC3432]. Although no specific metric is mandatory, implementations should, at a minimum, support a round-trip delay and a round-trip loss metric.

This table contains one row per metric supported by this agent, and it should be populated during system initialization."

::= { reportCapabilitiesGroup 5 }

reportMetricExtDefEntry OBJECT-TYPE

SYNTAX ReportMetricExtDefEntry

MAX-ACCESS not-accessible

STATUS current

## DESCRIPTION

"Information about a particular metric."

INDEX { reportMetricExtDefID }

::= { reportMetricExtDefTable 1 }

ReportMetricExtDefEntry ::= SEQUENCE {

reportMetricExtDefID ReportMetricDefID,  
 reportMetricExtDefType INTEGER,

```

        reportMetricExtDefName          SnmpAdminString,
        reportMetricExtDefOperation     SnmpAdminString,
        reportMetricExtDefReference     SnmpAdminString
    }

reportMetricExtDefID OBJECT-TYPE
    SYNTAX      ReportMetricDefID
    MAX-ACCESS  not-accessible
    STATUS      current
    DESCRIPTION
        "The index for this entry.  This object identifies
        the particular metric in this MIB module."
    ::= { reportMetricExtDefEntry 1 }

reportMetricExtDefType OBJECT-TYPE
    SYNTAX      INTEGER {
                    other(1),
                    singleObjMetric(2),
                    multipleObjMetric(3)
                }
    MAX-ACCESS  read-only
    STATUS      current
    DESCRIPTION
        "The basic type of metric indicated by this entry.

        The value 'other(1)' indicates that this metric cannot be
        characterized by any of the remaining enumerations specified
        for this object.

        The value 'connectMetric(2)' indicates that this metric
        measures connectivity characteristics.

        The value 'delayMetric(3)' indicates that this metric
        measures delay characteristics.
        "
    ::= { reportMetricExtDefEntry 2 }

reportMetricExtDefName OBJECT-TYPE
    SYNTAX      SnmpAdminString
    MAX-ACCESS  read-only
    STATUS      current
    DESCRIPTION
        "The textual name of this metric.  For example, if
        this reportMetricDefEntry identified the IPPM metric for
        round trip delay, then this object should contain
        the value, e.g., 'Type-P-Round-Trip-Delay'."
    ::= { reportMetricExtDefEntry 3 }

```

```
reportMetricExtDefOperation OBJECT-TYPE
    SYNTAX      SnmpAdminString
    MAX-ACCESS  read-only
    STATUS      current
    DESCRIPTION
        "The textual description of the operations necessary
        to compute this metric.  For example, if
        this reportMetricDefEntry identified the IPPM metric for
        round trip delay, then this object should contain
        the value, e.g., 'Type-P-Round-Trip-Delay'."
    ::= { reportMetricExtDefEntry 4 }

reportMetricExtDefReference OBJECT-TYPE
    SYNTAX      SnmpAdminString
    MAX-ACCESS  read-only
    STATUS      current
    DESCRIPTION
        "This object contains a reference to the document that
        defines this metric.  If this document is available online
        via electronic download, then a de-referencable URL
        should be specified in this object.  The implementation
        must support an HTTP URL type and may support additional
        types of de-referencable URLs such as an FTP type.

        For example, if this reportMetricDefName identified the IPPM
        metric 'Type-P-Round-Trip-Delay', then this object should
        contain the value, e.g.,
        'http://www.ietf.org/rfc/rfc2681.txt'."
    ::= { reportMetricExtDefEntry 5 }

-- Stats Control Group
--   This and the following tables are modeled
--   after the report control and collection
--   capabilities found in RMON 2, RFC 2021

reportStatsControlGroup OBJECT IDENTIFIER ::= {reportStatsGroup 2}

reportStatsControlTable OBJECT-TYPE
    SYNTAX      SEQUENCE OF ReportStatsControlEntry
    MAX-ACCESS  not-accessible
    STATUS      current
    DESCRIPTION
        "The reportStatsControlTable is the controlling entry
        that manages the population of studies in the
        Report for selected time intervals.
```

Note that this is not like the typical RMON controlTable and dataTable in which each entry creates its own data table. Each entry in this table enables the creation of multiple data tables on a study basis. For each interval, the study is updated in place, and the current data content of the table becomes invalid.

The control table entries are persistent across system reboots."

```
::= { reportStatsControlGroup 1 }
```

```
reportStatsControlEntry OBJECT-TYPE
```

```
SYNTAX      ReportStatsControlEntry
```

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

```
STATUS      current
```

```
DESCRIPTION
```

```
"A conceptual row in the reportStatsControlTable.
```

An example of the indexing of this entry is

```
reportGenReportCntrInterval.1"
```

```
INDEX { reportStatsControlIndex }
```

```
::= { reportStatsControlTable 1 }
```

```
ReportStatsControlEntry ::= SEQUENCE {
```

```
  reportStatsControlIndex      Unsigned32,
  reportStatsControlInterval   Unsigned32,
  reportStatsControlBinInterval Unsigned32,
  reportStatsControlPriObjID    OBJECT IDENTIFIER,
  reportStatsControlPriObjIpAddrType InetAddressType,
  reportStatsControlPriObjIPAddr InetAddress,
  reportStatsControlSecObj1ID   OBJECT IDENTIFIER,
  reportStatsControlSecObj1IpAddrType InetAddressType,
  reportStatsControlSecObj1IPAddr InetAddress,
  reportStatsControlSecObj2ID   OBJECT IDENTIFIER,
  reportStatsControlSecObj2IpAddrType InetAddressType,
  reportStatsControlSecObj2IPAddr InetAddress,
  reportStatsControlSecObj3ID   OBJECT IDENTIFIER,
  reportStatsControlSecObj3IpAddrType InetAddressType,
  reportStatsControlSecObj3IPAddr InetAddress,
  reportStatsControlSecObj4ID   OBJECT IDENTIFIER,
  reportStatsControlSecObj4IpAddrType InetAddressType,
  reportStatsControlSecObj4IPAddr InetAddress,
  reportStatsControlSecObj5ID   OBJECT IDENTIFIER,
  reportStatsControlSecObj5IpAddrType InetAddressType,
  reportStatsControlSecObj5IPAddr InetAddress,
  reportStatsControlMetricExt1  ReportMetricDefID,
  reportStatsControlMetricExt2  ReportMetricDefID,
  reportStatsControlMetricExt3  ReportMetricDefID,
```

```

reportStatsControlMetricExt4      ReportMetricDefID,
reportStatsControlMetricExt5      ReportMetricDefID,
reportStatsControlReqReports      Unsigned32,
reportStatsControlGrantedReports  Unsigned32,
reportStatsControlStartTime       TimeStamp,
reportStatsControlReportNumber    Unsigned32,
reportStatsControlInsertsDenied   Counter32,
reportStatsControlOwner           OwnerString,
reportStatsControlStorageType     StorageType,
reportStatsControlStatus          RowStatus
}

reportStatsControlIndex OBJECT-TYPE
    SYNTAX      Unsigned32 (1..65535)
    MAX-ACCESS  read-only
    STATUS      current
    DESCRIPTION
        "An index that uniquely identifies an entry in the
        reportStatsControlTable.  Each such entry defines a unique
        report whose results are placed in the reportGenReportTable
        on behalf of this reportStatsControlEntry."
    ::= { reportStatsControlEntry 1 }

reportStatsControlInterval OBJECT-TYPE
    SYNTAX      Unsigned32
    UNITS       "Seconds"
    MAX-ACCESS  read-create
    STATUS      current
    DESCRIPTION
        "The interval in seconds over which data is accumulated before
        being aggregated into a report in the reportGenReportTable.
        All reports with the same reportStatsControlIndex will be
        based on the same interval.

        The value of the reportStatsControlInterval should be
        an integral multiple of the value of the
        reportStatsControlBinInterval.

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

```

    DEFVAL { 3600 }
    ::= { reportStatsControlEntry 2 }

reportStatsControlBinInterval OBJECT-TYPE
    SYNTAX      Unsigned32
    UNITS       "Seconds"
    MAX-ACCESS  read-create
```

```
STATUS          current
DESCRIPTION
  "The interval in seconds between which the value of the
  reportStatsControlPriObjID and SecObjIDs are polled
  for the purpose of generating the metric values associated
  with this report. All reports with the same
  reportStatsControlIndex will be based on the
  same bin interval.

  This object may not be modified if the associated
  reportStatsControlStatus object is equal to active(1)."
DEFVAL { 3600 }
 ::= { reportStatsControlEntry 3 }

reportStatsControlPriObjID OBJECT-TYPE
SYNTAX          OBJECT IDENTIFIER
MAX-ACCESS      read-create
STATUS          current
DESCRIPTION
  "This identifies the primary counter object to be
  monitored within this report.

  This object may not be modified if the associated
  reportStatsControlStatus object is equal to active(1)."
 ::= { reportStatsControlEntry 4 }

reportStatsControlPriObjIpAddrType OBJECT-TYPE
SYNTAX          InetAddressType
MAX-ACCESS      read-create
STATUS          current
DESCRIPTION
  "This identifies the IP address type
  of the IP address associated with the
  primary counter object to be
  monitored within this report.

  This object may not be modified if the associated
  reportStatsControlStatus object is equal to active(1)."
 ::= { reportStatsControlEntry 5 }

reportStatsControlPriObjIPAddr OBJECT-TYPE
SYNTAX          InetAddress
MAX-ACCESS      read-create
STATUS          current
DESCRIPTION
  "This identifies the IP addree of the
  primary counter object to be
  monitored within this report.
```

This object may not be modified if the associated  
reportStatsControlStatus object is equal to active(1)."  
::= { reportStatsControlEntry 6 }

reportStatsControlSecObj1ID OBJECT-TYPE

SYNTAX OBJECT IDENTIFIER

MAX-ACCESS read-create

STATUS current

DESCRIPTION

"This identifies the secondary counter object to be  
monitored within this report associated with the  
specified reportStatsControlMetricExt1. If the  
reportStatsControlMetricExt1 is a simple metric, then  
the value of this reportStatsControlSecObj1ID is  
set to '0'.

This object may not be modified if the associated  
reportStatsControlStatus object is equal to active(1)."  
::= { reportStatsControlEntry 7 }

reportStatsControlSecObj1IpAddrType OBJECT-TYPE

SYNTAX InetAddressType

MAX-ACCESS read-create

STATUS current

DESCRIPTION

"This identifies the IP address type  
of the IP address associated with the  
secondary counter object to be  
monitored within this report.

This object may not be modified if the associated  
reportStatsControlStatus object is equal to active(1)."  
::= { reportStatsControlEntry 8 }

reportStatsControlSecObj1IPAddr OBJECT-TYPE

SYNTAX InetAddress

MAX-ACCESS read-create

STATUS current

DESCRIPTION

"This identifies the IP addree of the  
secondary counter object to be  
monitored within this report.

This object may not be modified if the associated  
reportStatsControlStatus object is equal to active(1)."  
::= { reportStatsControlEntry 9 }

reportStatsControlSecObj2ID OBJECT-TYPE

SYNTAX           OBJECT IDENTIFIER

MAX-ACCESS   read-create

STATUS        current

DESCRIPTION

"This identifies the secondary counter object to be monitored within this report associated with the specified reportStatsControlMetricExt2. If the reportStatsControlMetricExt2 is a simple metric, then the value of this reportStatsControlSecObj2ID is set to '0'.

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

::= { reportStatsControlEntry 10 }

reportStatsControlSecObj2IpAddrType   OBJECT-TYPE

SYNTAX           InetAddressType

MAX-ACCESS   read-create

STATUS        current

DESCRIPTION

"This identifies the IP address type of the IP address associated with the secondary counter object to be monitored within this report.

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

::= { reportStatsControlEntry 11 }

reportStatsControlSecObj2IPAddr   OBJECT-TYPE

SYNTAX           InetAddress

MAX-ACCESS   read-create

STATUS        current

DESCRIPTION

"This identifies the IP address of the secondary counter object to be monitored within this report.

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

::= { reportStatsControlEntry 12 }

reportStatsControlSecObj3ID   OBJECT-TYPE

SYNTAX           OBJECT IDENTIFIER

MAX-ACCESS   read-create

STATUS        current

DESCRIPTION

"This identifies the secondary counter object to be

monitored within this report associated with the specified reportStatsControlMetricExt3. If the reportStatsControlMetricExt3 is a simple metric, then the value of this reportStatsControlSecObj3ID is set to '0'.

This object may not be modified if the associated reportStatsControlStatus object is equal to active(1)."  
 ::= { reportStatsControlEntry 13 }

reportStatsControlSecObj3IpAddrType OBJECT-TYPE

SYNTAX InetAddressType

MAX-ACCESS read-create

STATUS current

DESCRIPTION

"This identifies the IP address type of the IP address associated with the secondary counter object to be monitored within this report.

This object may not be modified if the associated reportStatsControlStatus object is equal to active(1)."  
 ::= { reportStatsControlEntry 14 }

reportStatsControlSecObj3IPAddr OBJECT-TYPE

SYNTAX InetAddress

MAX-ACCESS read-create

STATUS current

DESCRIPTION

"This identifies the IP address of the secondary counter object to be monitored within this report.

This object may not be modified if the associated reportStatsControlStatus object is equal to active(1)."  
 ::= { reportStatsControlEntry 15 }

reportStatsControlSecObj4ID OBJECT-TYPE

SYNTAX OBJECT IDENTIFIER

MAX-ACCESS read-create

STATUS current

DESCRIPTION

"This identifies the secondary counter object to be monitored within this report associated with the specified reportStatsControlMetricExt4. If the reportStatsControlMetricExt4 is a simple metric, then the value of this reportStatsControlSecObj4ID is set to '0'.

This object may not be modified if the associated  
reportStatsControlStatus object is equal to active(1)."  
::= { reportStatsControlEntry 16 }

reportStatsControlSecObj4IpAddressType OBJECT-TYPE

SYNTAX InetAddressType

MAX-ACCESS read-create

STATUS current

DESCRIPTION

"This identifies the IP address type  
of the IP address associated with the  
secondary counter object to be  
monitored within this report.

This object may not be modified if the associated  
reportStatsControlStatus object is equal to active(1)."  
::= { reportStatsControlEntry 17 }

reportStatsControlSecObj4IPAddr OBJECT-TYPE

SYNTAX InetAddress

MAX-ACCESS read-create

STATUS current

DESCRIPTION

"This identifies the IP address of the  
secondary counter object to be  
monitored within this report.

This object may not be modified if the associated  
reportStatsControlStatus object is equal to active(1)."  
::= { reportStatsControlEntry 18 }

reportStatsControlSecObj5ID OBJECT-TYPE

SYNTAX OBJECT IDENTIFIER

MAX-ACCESS read-create

STATUS current

DESCRIPTION

"This identifies the secondary counter object to be  
monitored within this report associated with the  
specified reportStatsControlMetricExt5. If the  
reportStatsControlMetricExt5 is a simple metric, then  
the value of this reportStatsControlSecObj5ID is  
set to '0'.

This object may not be modified if the associated  
reportStatsControlStatus object is equal to active(1)."  
::= { reportStatsControlEntry 19 }

reportStatsControlSecObj5IpAddressType OBJECT-TYPE

SYNTAX           InetAddressType

MAX-ACCESS      read-create

STATUS           current

DESCRIPTION

"This identifies the IP address type of the IP address associated with the secondary counter object to be monitored within this report.

This object may not be modified if the associated reportStatsControlStatus object is equal to active(1)."  
::= { reportStatsControlEntry 20 }

reportStatsControlSecObj5IPAddr OBJECT-TYPE

SYNTAX           InetAddress

MAX-ACCESS      read-create

STATUS           current

DESCRIPTION

"This identifies the IP address of the secondary counter object to be monitored within this report.

This object may not be modified if the associated reportStatsControlStatus object is equal to active(1)."  
::= { reportStatsControlEntry 21 }

reportStatsControlMetricExt1 OBJECT-TYPE

SYNTAX           ReportMetricDefID

MAX-ACCESS      read-create

STATUS           current

DESCRIPTION

"This identifies the first metric extension placed in the reportGenReportTable. If no metric extension is requested, then this object value is set to '0'.

If this metric is defined on a single counter object, then only the reportStatsControlPriObjID is set, while the value of the reportStatsControlSecObjID is set to '0'. Else, the reportStatsControlSecObjID is set in accordance with the instruction in the definition of the metric extension found in the reportCapabilitiesMetricExtTable above.

This object may not be modified if the associated reportStatsControlStatus object is equal to active(1)."  
::= { reportStatsControlEntry 22 }

reportStatsControlMetricExt2 OBJECT-TYPE

```
SYNTAX      ReportMetricDefID
MAX-ACCESS  read-create
STATUS      current
DESCRIPTION
    "This identifies the second metric extension placed
    in the reportGenReportTable.  If no metric extension
    is requested, then this object value is set to '0'."

    If this metric is defined on a single counter object,
    then only the reportStatsControlPriObjID is set, while
    the value of the reportStatsControlSecObjID is
    set to '0'.  Else, the reportStatsControlSecObjID
    is set in accordance with the instruction in the
    definition of the metric extension found in the
    reportCapabilitiesMetwircExtTable above.

    This object may not be modified if the associated
    reportStatsControlStatus object is equal to active(1)."
 ::= { reportStatsControlEntry 23 }
```

```
reportStatsControlMetricExt3 OBJECT-TYPE
SYNTAX      ReportMetricDefID
MAX-ACCESS  read-create
STATUS      current
DESCRIPTION
    "This identifies the third metric extension placed
    in the reportGenReportTable.  If no metric extension
    is requested, then this object value is set to '0'."

    If this metric is defined on a single counter object,
    then only the reportStatsControlPriObjID is set, while
    the value of the reportStatsControlSecObjID is
    set to '0'.  Else, the reportStatsControlSecObjID
    is set in accordance with the instruction in the
    definition of the metric extension found in the
    reportCapabilitiesMetwircExtTable above.

    This object may not be modified if the associated
    reportStatsControlStatus object is equal to active(1)."
 ::= { reportStatsControlEntry 24 }
```

```
reportStatsControlMetricExt4 OBJECT-TYPE
SYNTAX      ReportMetricDefID
MAX-ACCESS  read-create
STATUS      current
DESCRIPTION
    "This identifies the fourth metric extension placed
    in the reportGenReportTable.  If no metric extension
```

is requested, then this object value is set to '0'.

If this metric is defined on a single counter object, then only the reportStatsControlPriObjID is set, while the value of the reportStatsControlSecObjID is set to '0'. Else, the reportStatsControlSecObjID is set in accordance with the instruction in the definition of the metric extension found in the reportCapabilitiesMetwircExtTable above.

This object may not be modified if the associated reportStatsControlStatus object is equal to active(1)."  
 ::= { reportStatsControlEntry 25 }

reportStatsControlMetricExt5 OBJECT-TYPE

SYNTAX ReportMetricDefID  
MAX-ACCESS read-create  
STATUS current

DESCRIPTION

"This identifies the fifth metric extension placed in the reportGenReportTable. If no metric extension is requested, then this object value is set to '0'.

If this metric is defined on a single counter object, then only the reportStatsControlPriObjID is set, while the value of the reportStatsControlSecObjID is set to '0'. Else, the reportStatsControlSecObjID is set in accordance with the instruction in the definition of the metric extension found in the reportCapabilitiesMetwircExtTable above.

This object may not be modified if the associated reportStatsControlStatus object is equal to active(1)."  
 ::= { reportStatsControlEntry 26 }

reportStatsControlReqReports OBJECT-TYPE

SYNTAX Unsigned32 (1..65535)  
MAX-ACCESS read-create  
STATUS current

DESCRIPTION

"The number of saved reports requested to be allocated on behalf of this entry.

This object may not be modified if the associated reportStatsControlStatus object is equal to active(1)."  
 ::= { reportStatsControlEntry 27 }

```
reportStatsControlGrantedReports OBJECT-TYPE
    SYNTAX      Unsigned32 (0..65535)
    MAX-ACCESS  read-only
    STATUS      current
    DESCRIPTION
        "The number of saved reports the agent has allocated based
        on the requested amount in reportStatsControlReqReports.
        Because each report can have many entries, the total number
        of entries allocated will be this number multiplied by the
        value of reportStatsControlGrantedSize, or by 1 if that
        object doesn't exist.

        When the associated reportStatsControlReqReports object is
        created or modified, the agent should set this object as
        closely to the requested value as is possible for the
        particular implementation and available resources.  When
        considering available resources, the agent must consider its
        ability to allocate this many reports, each with the number
        of entries represented by reportStatsControlGrantedSize, or
        by 1 if that object doesn't exist.

        Note that although the storage required for each report may
        fluctuate due to changing conditions, the agent must continue
        to have storage available to satisfy the full report size for
        all reports, when necessary.  Further, the agent must not
        lower this value except as a result of a set to the
        associated reportStatsControlReqSize object."
 ::= { reportStatsControlEntry 28 }
```

```
reportStatsControlStartTime OBJECT-TYPE
    SYNTAX      TimeStamp
    MAX-ACCESS  read-only
    STATUS      current
    DESCRIPTION
        "The value of sysUpTime when the system began processing the
        report in progress.  Note that the report in progress is not
        available.

        This object may be used by the management station to figure
        out the start time for all previous reports saved for this
        reportStatsControlEntry, as reports are started at fixed
        intervals."
 ::= { reportStatsControlEntry 29 }
```

```
reportStatsControlReportNumber OBJECT-TYPE
    SYNTAX      Unsigned32
    MAX-ACCESS  read-only
    STATUS      current
```

## DESCRIPTION

"The number of the report in progress. When an reportStatsControlEntry is activated, the first report will be numbered zero."

::= { reportStatsControlEntry 30 }

reportStatsControlInsertsDenied OBJECT-TYPE

SYNTAX Counter32

MAX-ACCESS read-only

STATUS current

## DESCRIPTION

"The number of attempts to add an entry to reports for this ReportStatsControlEntry that failed because the number of entries would have exceeded reportStatsControlGrantedSize.

This number is valuable in determining if enough entries have been allocated for reports in light of fluctuating network usage. Note that an entry that is denied will often be attempted again, so this number will not predict the exact number of additional entries needed, but it can be used to understand the relative magnitude of the problem.

Also note that there is no ordering specified for the entries in the report; thus, there are no rules for which entries will be omitted when not enough entries are available. As a consequence, the agent is not required to delete 'least valuable' entries first."

::= { reportStatsControlEntry 31 }

reportStatsControlOwner 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.

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

::= { reportStatsControlEntry 32 }

reportStatsControlStorageType OBJECT-TYPE

SYNTAX StorageType

MAX-ACCESS read-create

```
STATUS          current
DESCRIPTION
    "The storage type of this reportStatsControlEntry.  If the
    value of this object is 'permanent', no objects in this row
    need to be writable."
 ::= { reportStatsControlEntry 33 }

reportStatsControlStatus OBJECT-TYPE
SYNTAX          RowStatus
MAX-ACCESS      read-create
STATUS          current
DESCRIPTION
    "The status of this performance control entry.

    An entry may not exist in the active state unless each
    object in the entry has an appropriate value.

    Once this object is set to active(1), no objects in the
    reportStatsControlTable can be changed.

    If this object is not equal to active(1), all associated
    entries in the reportGenReportTable shall be deleted."
 ::= { reportStatsControlEntry 34 }
```

-- Stats Data Group

```
reportStatsDataGroup OBJECT IDENTIFIER ::= { reportStatsGroup 3 }
```

-- Report Stats Data Table

```
reportStatsDataTable OBJECT-TYPE
SYNTAX          SEQUENCE OF ReportStatsDataEntry
MAX-ACCESS      not-accessible
STATUS          current
DESCRIPTION
    "This table contains completed
    studies for each of the control table entries in
    reportAggrReportCntrlTable.  These studies are
    provided based on the selections and parameters
    found for the entry in the
    reportAggregateReportsCntrlTable.

    The performance statistics are specified in the
    reportTransMetricDirTable associated with the
```

```

    application in question and indexed by
    appLocalIndex and reportTransMetricIndex."
 ::= { reportStatsDataGroup 1 }

```

```
reportStatsDataEntry OBJECT-TYPE
```

```
SYNTAX      ReportStatsDataEntry
```

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

```
STATUS      current
```

```
DESCRIPTION
```

```
    "A conceptual row in the reportStatsDataTable.
```

```

    The reportStatsControlIndex value in the
    index identifies the reportStatsControlEntry
    on whose behalf this entry was created.

```

```

    The reportStatsDataIndex value in the index
    identifies which report
    (in the series of reports) this entry is a part of.

```

```

    The reportStatsDataServerAddress value in the
    index identifies the network layer address of the
    device generating this report.

```

```

    An example of the indexing of this entry is
    reportStatsDataStatN.3.15.34.262.18.4.128.2.6.7.3256521"

```

```
INDEX { reportStatsControlIndex,
        reportStatsDataIndex
      }

```

```
 ::= { reportStatsDataTable 1 }

```

```

-- Note: Thinking about restructuring this
--       table somewhat, in order
--       to allow for a more complete report information to
--       simplify report collection from the remote
--       mgmt application. Indicating below potential
--       additional objects.

```

```
ReportStatsDataEntry ::= SEQUENCE {
    reportStatsDataIndex          Unsigned32,
    -- reportStatsDataServerAddrType  inetAddressType,
    -- reportStatsDataServerAddress    inetAddress,
    reportStatsDataServerAddress  OCTET STRING,
    -- reportStatsDataReportStartTime  TimeStamp,
    -- reportStatsDataReportInterval  Unsigned32,
    reportStatsDataStatN          ZeroBasedCounter32,
    reportStatsDataStatSumX       ZeroBasedCounter32,
    reportStatsDataOverflowStatSumX ZeroBasedCounter32,
    reportStatsDataHCStatSumX     ZeroBasedCounter64,
    reportStatsDataStatMaximum    ZeroBasedCounter32,

```

```

reportStatsDataStatMinimum          ZeroBasedCounter32,
reportStatsDataStatSumSq            ZeroBasedCounter32,
reportStatsDataOverflowStatSumSq    ZeroBasedCounter32,
reportStatsDataHCStatSumSq          ZeroBasedCounter64,
reportStatsDataStatSumIX            ZeroBasedCounter32,
reportStatsDataOverflowStatSumIX    ZeroBasedCounter32,
reportStatsDataHCStatSumIX          ZeroBasedCounter64,
reportStatsDataStatSumIXSq          ZeroBasedCounter32,
reportStatsDataOverflowStatSumIXSq  ZeroBasedCounter32,
reportStatsDataHCStatSumIXSq        ZeroBasedCounter64,
reportStatsDataStatMetricExt1       ZeroBasedCounter32,
reportStatsDataStatMetricExt2       ZeroBasedCounter32,
reportStatsDataStatMetricExt3       ZeroBasedCounter32,
reportStatsDataStatMetricExt4       ZeroBasedCounter32,
reportStatsDataStatMetricExt5       ZeroBasedCounter32
}

reportStatsDataIndex OBJECT-TYPE
    SYNTAX      Unsigned32 (1..2147483647)
    MAX-ACCESS  read-only
    STATUS      current
    DESCRIPTION
        "The value of reportStatsControlReportNumber for the report to
        which this entry belongs."
    ::= { reportStatsDataEntry 1 }

-- [Note: Need to revisit the syntax for this object of type 'address'.]
reportStatsDataServerAddress OBJECT-TYPE
    SYNTAX      OCTET STRING (SIZE (0..108))
    MAX-ACCESS  not-accessible
    STATUS      current
    DESCRIPTION
        "The network layer address of the server host in this
        conversation.

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

        Because this object is an index variable, it is encoded in
        the index according to the index encoding rules.  For
        example, if the protocolDirLocalIndex 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.

        If the associated reportAggrReportCntlAggrType is equal to
        application(4) or client(2), then this object will be a null

```

string and will be encoded simply as a length octet of 0."  
 ::= { reportStatsDataEntry 2 }

reportStatsDataStatN OBJECT-TYPE  
SYNTAX ZeroBasedCounter32  
MAX-ACCESS read-only  
STATUS current  
DESCRIPTION

"The count of the total number of data points for the specified metric. This number is simply the value of reportCntlReportsInterval divided by the value of reportCntlReportsBinInterval, which should be integer valued.  
"

::= { reportStatsDataEntry 3 }

reportStatsDataStatSumX OBJECT-TYPE  
SYNTAX ZeroBasedCounter32  
MAX-ACCESS read-only  
STATUS current  
DESCRIPTION

"The sum of all the data point values for the specified metric. This number always represents the total values of the statistical datum analyzed. Each metric specifies the exact meaning of this object. This value represents the results of one metric and is related directly to the specific parameters of the metric and the Server and Client addresses involved."  
 ::= { reportStatsDataEntry 4 }

reportStatsDataOverflowStatSumX OBJECT-TYPE  
SYNTAX ZeroBasedCounter32  
MAX-ACCESS read-only  
STATUS current  
DESCRIPTION

"The number of times the associated reportAggrReportStatSumX counter has overflowed. Note that this object will only be instantiated if the associated reportAggrReportHCStatSumX object is also instantiated for a particular dataSource."  
 ::= { reportStatsDataEntry 5 }

reportStatsDataHCStatSumX OBJECT-TYPE  
SYNTAX ZeroBasedCounter64  
MAX-ACCESS read-only  
STATUS current  
DESCRIPTION

"The high-capacity version of reportAggrReportStatSumX.

Note that this object will only be instantiated if the agent supports High Capacity monitoring for a particular dataSource."

```
::= { reportStatsDataEntry 6 }
```

reportStatsDataStatMaximum OBJECT-TYPE

SYNTAX ZeroBasedCounter32

MAX-ACCESS read-only

STATUS current

DESCRIPTION

"The single maximum data point value observed during the study period for the specified metric. This number always represents the maximum value of any single statistical datum analyzed. Each metric specifies the exact meaning of this object.

This value represents the results of one metric and is related directly to the specific parameters of the metric and the Server and Client addresses involved."

```
::= { reportStatsDataEntry 7 }
```

reportStatsDataStatMinimum OBJECT-TYPE

SYNTAX ZeroBasedCounter32

MAX-ACCESS read-only

STATUS current

DESCRIPTION

"The single minimum data point value observed during the study period for the specified metric. This number always represents the minimum value of any single statistical datum analyzed. Each metric specifies the exact meaning of this object.

This value represents the results of one metric and is related directly to the specific parameters of the metric and the Server and Client addresses involved."

```
::= { reportStatsDataEntry 8 }
```

reportStatsDataStatSumSq OBJECT-TYPE

SYNTAX ZeroBasedCounter32

MAX-ACCESS read-only

STATUS current

DESCRIPTION

"The sum of all the squared data point values for the specified metric. This number always represents the total of the squared values of the statistical datum analyzed. Each metric specifies the exact meaning of this object.

This value represents the results of one metric and is related directly to the specific parameters of the metric and the Server and Client addresses involved."

```
::= { reportStatsDataEntry 9 }
```

reportStatsDataOverflowStatSumSq OBJECT-TYPE

```
SYNTAX      ZeroBasedCounter32
MAX-ACCESS  read-only
STATUS      current
DESCRIPTION
    "The number of times the associated
    reportAggrReportStatSumSq counter has overflowed.
    Note that this object will only be instantiated if
    the associated reportAggrReportHCStatSumSq object
    is also instantiated for a particular dataSource."
::= { reportStatsDataEntry 10 }
```

reportStatsDataHCStatSumSq OBJECT-TYPE

```
SYNTAX      ZeroBasedCounter64
MAX-ACCESS  read-only
STATUS      current
DESCRIPTION
    "The high-capacity version of reportAggrReportStatSumSq.
    Note that this object will only be instantiated if the
    agent supports High Capacity monitoring for a particular
    dataSource."
::= { reportStatsDataEntry 11 }
```

reportStatsDataStatSumIX OBJECT-TYPE

```
SYNTAX      ZeroBasedCounter32
MAX-ACCESS  read-only
STATUS      current
DESCRIPTION
    "For each interval, each data point is associated with a
    value I, I = 1..N where N is the number of data points;
    reportAggrReportStatSumIX is the multiplication of the
    data point value with the current I. This value
    along with the other statistics values allow the
    calculation of the slope of the least-squares line
    through the data points."
::= { reportStatsDataEntry 12 }
```

reportStatsDataOverflowStatSumIX OBJECT-TYPE

```
SYNTAX      ZeroBasedCounter32
MAX-ACCESS  read-only
STATUS      current
DESCRIPTION
    "The number of times the associated
```

```
    reportAggrReportStatSumIX counter has overflowed.
    Note that this object will only be instantiated if the
    associated reportAggrReportHCStatSumIX object is also
    instantiated for a particular dataSource."
 ::= { reportStatsDataEntry 13 }

reportStatsDataHCStatSumIX OBJECT-TYPE
    SYNTAX      ZeroBasedCounter64
    MAX-ACCESS  read-only
    STATUS      current
    DESCRIPTION
        "The high-capacity version of reportAggrReportStatSumIX.
        Note that this object will only be instantiated if the
        agent supports High Capacity monitoring for a particular
        dataSource."
 ::= { reportStatsDataEntry 14 }

reportStatsDataStatSumIXSq OBJECT-TYPE
    SYNTAX      ZeroBasedCounter32
    MAX-ACCESS  read-only
    STATUS      current
    DESCRIPTION
        "For each interval, each data point is associated with a
        value I, I = 1..N where N is the number of data points;
        reportAggrReportStatSumIXSq is the multiplication
        of the data point value squared with the current I.
        This value along with the other statistics
        values allow the calculation of the slope of
        the least-squares line through the data points."
 ::= { reportStatsDataEntry 15 }

reportStatsDataOverflowStatSumIXSq OBJECT-TYPE
    SYNTAX      ZeroBasedCounter32
    MAX-ACCESS  read-only
    STATUS      current
    DESCRIPTION
        "The number of times the associated
        reportAggrReportStatSumIXSq counter has overflowed.
        Note that this object will only be instantiated if the
        associated reportAggrReportHCStatSumIXSq object is also
        instantiated for a particular dataSource."
 ::= { reportStatsDataEntry 16 }

reportStatsDataHCStatSumIXSq OBJECT-TYPE
    SYNTAX      ZeroBasedCounter64
    MAX-ACCESS  read-only
    STATUS      current
    DESCRIPTION
```

```
    "The high-capacity version of reportAggrReportStatSumIXSq.
    Note that this object will only be instantiated if the
    agent supports High Capacity monitoring for a particular
    dataSource."
 ::= { reportStatsDataEntry 17 }

reportStatsDataStatMetricExt1 OBJECT-TYPE
    SYNTAX      ZeroBasedCounter32
    MAX-ACCESS  read-only
    STATUS      current
    DESCRIPTION
        "The .... for the MetricExt1.
        "
    ::= { reportStatsDataEntry 18 }

reportStatsDataStatMetricExt2 OBJECT-TYPE
    SYNTAX      ZeroBasedCounter32
    MAX-ACCESS  read-only
    STATUS      current
    DESCRIPTION
        "The .... for the MetricExt2.
        "
    ::= { reportStatsDataEntry 19 }

reportStatsDataStatMetricExt3 OBJECT-TYPE
    SYNTAX      ZeroBasedCounter32
    MAX-ACCESS  read-only
    STATUS      current
    DESCRIPTION
        "The .... for the MetricExt3.
        "
    ::= { reportStatsDataEntry 20 }

reportStatsDataStatMetricExt4 OBJECT-TYPE
    SYNTAX      ZeroBasedCounter32
    MAX-ACCESS  read-only
    STATUS      current
    DESCRIPTION
        "The .... for the MetricExt4.
        "
    ::= { reportStatsDataEntry 21 }

reportStatsDataStatMetricExt5 OBJECT-TYPE
    SYNTAX      ZeroBasedCounter32
    MAX-ACCESS  read-only
    STATUS      current
    DESCRIPTION
        "The .... for the MetricExt5.
```

```
"
 ::= { reportStatsDataEntry 22 }

reportSampledGroup          OBJECT IDENTIFIER ::= { reportMIBObjects 2 }

--      Then, the reportSampledGroup assignments are :
--          reportSampledControlTable      - 1
--          reportSampledObjectTable       - 2
--          reportSampledDataTable         - 3

-- REPORT-MIB Editors' Note:
-- The reportSampledGroup is copied from the usrHistory
-- group documented in RMON2 [RFC2021]. We have preserved all of
-- the annotations and object descriptions, as any changes would
-- only diminish the quality of the development. The only changes
-- made were to the naming of the objects themselves. Here we have
-- merely prefixed the original names with 'report' and changed the
-- 'usrHistory' to 'Sampled' as we felt this better reflected the
-- the nature of the capability being offered by this group.
-- The remainder of this group development is essentially
-- copied from [RFC2021]:

--
-- Sampled Collection Group (reportSampledGroup)
--
-- The reportSampled group combines mechanisms seen in the alarm and
-- history groups to provide user-specified sampling collection,
-- utilizing two additional control tables and one additional data
-- table. This function has traditionally been done by NMS
-- applications, via periodic polling. The reportSampled group allows
-- this task to be offloaded to a remote managed device.
--
-- Data (an ASN.1 INTEGER based object) is collected in the same
-- manner as any data table (e.g. etherHistoryTable) except
-- that the user specifies the MIB instances to be collected and their
-- sampling frequency. Objects are collected in
-- bucket-groups, with the intent that all MIB
-- instances in the same bucket-group are collected as atomically as
-- possible by the remote managed device.
--
-- The reportSampledControlTable is a one-dimensional read-create table.
-- Each row configures a collection of sampling buckets; the creation
```

```
-- of a row in this table will cause one or more associated instances in
-- the reportSampledObjectTable to be created. The user specifies the
-- number of bucket elements (rows in the reportSampledObjectTable)
-- requested, as well as the number of buckets requested.
--
-- The reportSampledObjectTable is a 2-d read-write table.
-- Each row configures a single MIB instance to be collected.
-- All rows with the same major index constitute a bucket-group.
--
-- The reportSampledTable is a 3-d read-only table containing
-- the data of associated reportSampledControlEntries. Each
-- entry represents the value of a single MIB instance
-- during a specific sampling interval (or the rate of
-- change during the interval).
--
-- A sample value is stored in two objects - an absolute value and
-- a status object. This allows numbers from -(2G-1) to +4G to be
-- stored. The status object also indicates whether a sample is
-- valid. This allows data collection to continue if periodic
-- retrieval of a particular instance fails for any reason.
--
-- Row Creation Order Relationships
--
-- The static nature of the reportSampledObjectTable creates
-- some row creation/modification issues. The rows in this
-- table need to be set before the associated
-- reportSampledControlEntry can be activated.
--
-- Note that the reportSampledObject entries associated with a
-- particular reportSampledControlEntry are not required to
-- be active before the control entry is activated. However,
-- the reportSampled data entries associated with an inactive
-- reportSampledObject entry will be inactive (i.e.
-- reportSampledValStatus == valueNotAvailable).
--
reportSampledControlTable OBJECT-TYPE
    SYNTAX SEQUENCE OF SampledControlEntry
    MAX-ACCESS not-accessible
    STATUS current
    DESCRIPTION
        "A list of data-collection configuration entries."
        ::= { reportSampledGroup 1 }

reportSampledControlEntry OBJECT-TYPE
    SYNTAX SampledControlEntry
    MAX-ACCESS not-accessible
```

```
STATUS current
DESCRIPTION
    "A list of parameters that set up a group of user-defined
    MIB objects to be sampled periodically (called a
    bucket-group).

    For example, an instance of reportSampledControlInterval
    might be named reportSampledControlInterval.1"
INDEX { reportSampledControlIndex }
 ::= { reportSampledControlTable 1 }

SampledControlEntry ::= SEQUENCE {
    reportSampledControlIndex          Integer32,
    reportSampledControlObjects        Integer32,
    reportSampledControlBucketsRequested Integer32,
    reportSampledControlBucketsGranted Integer32,
    reportSampledControlInterval       Integer32,
    reportSampledControlRequestedNumber Integer32,
    reportSampledControlReportNumber   Integer32,
    reportSampledControlOwner           OwnerString,
    reportSampledControlStatus         RowStatus
}

reportSampledControlIndex OBJECT-TYPE
    SYNTAX Integer32 (1..65535)
    MAX-ACCESS read-only
    STATUS current
    DESCRIPTION
        "An index that uniquely identifies an entry in the
        reportSampledControlTable.  Each such entry defines a
        set of samples at a particular interval for a specified
        set of MIB instances available from the managed system."
    ::= { reportSampledControlEntry 1 }

reportSampledControlObjects OBJECT-TYPE
    SYNTAX Integer32 (1..65535)
    MAX-ACCESS read-create
    STATUS current
    DESCRIPTION
        "The number of MIB objects to be collected
        in the portion of reportSampledTable associated with this
        reportSampledControlEntry.

        This object may not be modified if the associated instance
        of reportSampledControlStatus is equal to active(1)."
    ::= { reportSampledControlEntry 2 }

reportSampledControlBucketsRequested OBJECT-TYPE
```

SYNTAX Integer32 (1..65535)

MAX-ACCESS read-create

STATUS current

DESCRIPTION

"The requested number of discrete time intervals over which data is to be saved in the part of the reportSampledTable associated with this reportSampledControlEntry.

When this object is created or modified, the probe should set reportSampledControlBucketsGranted as closely to this object as is possible for the particular probe implementation and available resources."

DEFVAL { 50 }

::= { reportSampledControlEntry 3 }

reportSampledControlBucketsGranted OBJECT-TYPE

SYNTAX Integer32 (1..65535)

MAX-ACCESS read-only

STATUS current

DESCRIPTION

"The number of discrete sampling intervals over which data shall be saved in the part of the reportSampledTable associated with this reportSampledControlEntry.

When the associated reportSampledControlBucketsRequested object is created or modified, the probe should set this object as closely to the requested value as is possible for the particular probe implementation and available resources. The probe must not lower this value except as a result of a modification to the associated reportSampledControlBucketsRequested object.

The associated reportSampledControlBucketsRequested object should be set before or at the same time as this object to allow the probe to accurately estimate the resources required for this reportSampledControlEntry.

There will be times when the actual number of buckets associated with this entry is less than the value of this object. In this case, at the end of each sampling interval, a new bucket will be added to the reportSampledTable.

When the number of buckets reaches the value of this object, this report is complete and a new report is begun."

::= { reportSampledControlEntry 4 }

```
reportSampledControlInterval OBJECT-TYPE
    SYNTAX Integer32 (1..2147483647)
    MAX-ACCESS read-create
    STATUS current
    DESCRIPTION
        "The interval in seconds over which the data is
        sampled for each bucket in the part of the reportSampled
        table associated with this reportSampledControlEntry.

        Because the counters in a bucket may overflow at their
        maximum value with no indication, a prudent manager will
        take into account the possibility of overflow in any of
        the associated counters. It is important to consider the
        minimum time in which any counter could overflow on a
        particular media type and set the
        reportSampledControlInterval object to a value less
        than this interval.

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

```
    DEFVAL { 1800 }
    ::= { reportSampledControlEntry 5 }
```

```
reportSampledControlRequestedNumber OBJECT-TYPE
    SYNTAX Integer32 (1..127)
    MAX-ACCESS read-create
    STATUS current
    DESCRIPTION
        "The number of reports to be generated and stored by this
        agent for this report request.

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

```
    DEFVAL { 1 }
    ::= { reportSampledControlEntry 6 }
```

```
reportSampledControlReportNumber OBJECT-TYPE
    SYNTAX Integer32 (1..127)
    MAX-ACCESS read-create
    STATUS current
    DESCRIPTION
        "The number of the current report in progress. The first
        report is assigned a number equal to '1'. Each successive
        report number is incremented by unity. When the last report
        is completed, this value is set to
        reportSampledControlRequestedNumber + 1."
```

```
    ::= { reportSampledControlEntry 7 }
```

```
reportSampledControlOwner 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."
    ::= { reportSampledControlEntry 8 }

reportSampledControlStatus OBJECT-TYPE
    SYNTAX RowStatus
    MAX-ACCESS read-create
    STATUS current
    DESCRIPTION
        "The status of this variable history control entry.

        An entry may 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 reportSampledTable shall be deleted."
    ::= { reportSampledControlEntry 9 }

-- Object table

reportSampledObjectTable OBJECT-TYPE
    SYNTAX SEQUENCE OF SampledObjectEntry
    MAX-ACCESS not-accessible
    STATUS current
    DESCRIPTION
        "A list of data-collection configuration entries."
    ::= { reportSampledGroup 2 }

reportSampledObjectEntry OBJECT-TYPE
    SYNTAX SampledObjectEntry
    MAX-ACCESS not-accessible
    STATUS current
    DESCRIPTION
        "A list of MIB instances to be sampled periodically.

        Entries in this table are created when an associated
        reportSampledControlObjects object is created.

        The reportSampledControlIndex value in the index is
        that of the associated reportSampledControlEntry.

        For example, an instance of reportSampledObjectVariable
```

```
    might be reportSampledObjectVariable.1.3"
INDEX { reportSampledControlIndex, reportSampledObjectIndex }
 ::= { reportSampledObjectTable 1 }
```

```
SampledObjectEntry ::= SEQUENCE {
    reportSampledObjectIndex          Integer32,
    reportSampledObjectVariable      OBJECT IDENTIFIER,
    reportSampledObjectIpAddrType   InetAddressType,
    reportSampledObjectIPAddress     InetAddress,
    reportSampledObjectSampleType    INTEGER
}
```

```
reportSampledObjectIndex OBJECT-TYPE
    SYNTAX Integer32 (1..65535)
    MAX-ACCESS not-accessible
    STATUS current
    DESCRIPTION
        "An index used to uniquely identify an entry in the
        reportSampledObject table.  Each such entry defines a
        MIB instance to be collected periodically."
    ::= { reportSampledObjectEntry 1 }
```

```
reportSampledObjectVariable OBJECT-TYPE
    SYNTAX OBJECT IDENTIFIER
    MAX-ACCESS read-create
    STATUS current
    DESCRIPTION
        "The object identifier of the particular variable to be
        sampled.
```

Only variables that resolve to an ASN.1 primitive type of Integer32 (Integer32, Counter, Gauge, or TimeTicks) may be sampled.

Because SNMP access control is articulated entirely in terms of the contents of MIB views, no access control mechanism exists that can restrict the value of this object to identify only those objects that exist in a particular MIB view. Because there is thus no acceptable means of restricting the read access that could be obtained through the user history mechanism, the probe must only grant write access to this object in those views that have read access to all objects on the probe.

During a set operation, if the supplied variable name is not available in the selected MIB view, a badValue error must be returned.

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

reportSampledObjectIpAddressType OBJECT-TYPE

SYNTAX InetAddressType

MAX-ACCESS read-create

STATUS current

DESCRIPTION

"This identifies the IP address type  
of the IP address associated with the  
secondary counter object to be  
monitored within this report.

This object may not be modified if the associated  
reportStatsControlStatus object is equal to active(1)."  
 ::= { reportSampledObjectEntry 3 }

reportSampledObjectIPAddress OBJECT-TYPE

SYNTAX InetAddress

MAX-ACCESS read-create

STATUS current

DESCRIPTION

"This identifies the IP address of the  
secondary counter object to be  
monitored within this report.

This object may not be modified if the associated  
reportStatsControlStatus object is equal to active(1)."  
 ::= { reportSampledObjectEntry 4 }

reportSampledObjectSampleType OBJECT-TYPE

SYNTAX INTEGER {  
    absoluteValue(1),  
    deltaValue(2)  
}

MAX-ACCESS read-create

STATUS current

DESCRIPTION

"The method of sampling the selected variable for storage in  
the reportSampledTable.

If the value of this object is absoluteValue(1), the value of  
the selected variable will be copied directly into the history  
bucket.

If the value of this object is deltaValue(2), the value of the  
selected variable at the last sample will be subtracted from

the current value, and the difference will be stored in the history bucket. If the associated reportSampledObjectVariable instance could not be obtained at the previous sample interval, then a delta sample is not possible, and the value of the associated reportSampledValStatus object for this interval will be valueNotAvailable(1).

This object may not be modified if the associated reportSampledControlStatus object is equal to active(1)."  
::= { reportSampledObjectEntry 5 }

-- data table

-- Note: Need to think about how to collect this report data. It  
-- is stored in individual buckets containing individual object  
-- samples. Want to avoid having to table walk to collect this  
-- information.

reportSampledTable OBJECT-TYPE  
SYNTAX SEQUENCE OF SampledEntry  
MAX-ACCESS not-accessible  
STATUS current  
DESCRIPTION  
"A list of user defined history entries."  
::= { reportSampledGroup 3 }

reportSampledEntry OBJECT-TYPE  
SYNTAX SampledEntry  
MAX-ACCESS not-accessible  
STATUS current  
DESCRIPTION  
"A historical sample of user-defined variables. This sample  
is associated with the reportSampledControlEntry which set  
up the parameters for a regular collection of these samples.

The reportSampledControlIndex value in the index identifies  
the reportSampledControlEntry on whose behalf this entry  
was created.

The reportSampledObjectIndex value in the index identifies  
the reportSampledObjectEntry on whose behalf this entry  
was created.

For example, an instance of reportSampledAbsValue, which  
represents the 14th sample of a variable collected as  
specified by reportSampledControlEntry.1 and  
reportSampledObjectEntry.1.5, would be named  
reportSampledAbsValue.1.14.5"

```
INDEX { reportSampledControlIndex, reportSampledReportIndex,
        reportSampledSampleIndex, reportSampledObjectIndex }
 ::= { reportSampledTable 1 }

SampledEntry ::= SEQUENCE {
    reportSampledReportIndex  Integer32,
    reportSampledSampleIndex  Integer32,
    reportSampledIntervalStart TimeStamp,
    reportSampledIntervalEnd  TimeStamp,
    reportSampledAbsValue     Gauge32,
    reportSampledValStatus    INTEGER
}

reportSampledReportIndex OBJECT-TYPE
    SYNTAX      Integer32 (1..127)
    MAX-ACCESS  read-only
    STATUS      current
    DESCRIPTION
        "An index that uniquely identifies the particular report
        this entry is associated with among the set of reports
        requested through the reportSampledControlNumber in the
        reportSampledControlEntry. This index starts at 1 and
        increases by one as each new report is generated."
    ::= { reportSampledEntry 1 }

reportSampledSampleIndex OBJECT-TYPE
    SYNTAX      Integer32 (1..2147483647)
    MAX-ACCESS  not-accessible
    STATUS      current
    DESCRIPTION
        "An index that uniquely identifies the particular sample this
        entry represents among all samples associated with the same
        reportSampledControlEntry. This index starts at 1 and
        increases by one as each new sample is taken."
    ::= { reportSampledEntry 2 }

reportSampledIntervalStart OBJECT-TYPE
    SYNTAX      TimeStamp
    MAX-ACCESS  read-only
    STATUS      current
    DESCRIPTION
        "The value of sysUpTime at the start of the interval over
        which this sample was measured. If the probe keeps track of
        the time of day, it should start the first sample of the
        history at a time such that when the next hour of the day
        begins, a sample is started at that instant.
```

Note that following this rule may require the probe to delay

collecting the first sample of the history, as each sample must be of the same interval. Also note that the sample which is currently being collected is not accessible in this table until the end of its interval."  
 ::= { reportSampledEntry 3 }

reportSampledIntervalEnd OBJECT-TYPE  
SYNTAX TimeStamp  
MAX-ACCESS read-only  
STATUS current  
DESCRIPTION  
 "The value of sysUpTime at the end of the interval over which this sample was measured."  
 ::= { reportSampledEntry 4 }

reportSampledAbsValue OBJECT-TYPE  
SYNTAX Gauge32  
MAX-ACCESS read-only  
STATUS current  
DESCRIPTION  
 "The absolute value (i.e. unsigned value) of the user-specified statistic during the last sampling period. The value during the current sampling period is not made available until the period is completed."  
  
To obtain the true value for this sampling interval, the associated instance of reportSampledValStatus must be checked, and reportSampledAbsValue adjusted as necessary.  
  
If the MIB instance could not be accessed during the sampling interval, then this object will have a value of zero and the associated instance of reportSampledValStatus will be set to 'valueNotAvailable(1)'.  
 ::= { reportSampledEntry 5 }

reportSampledValStatus OBJECT-TYPE  
SYNTAX INTEGER {  
 valueNotAvailable(1),  
 valuePositive(2),  
 valueNegative(3)  
}  
MAX-ACCESS read-only  
STATUS current  
DESCRIPTION  
 "This object indicates the validity and sign of the data in the associated instance of reportSampledAbsValue."

If the MIB instance could not be accessed during the sampling interval, then 'valueNotAvailable(1)' will be returned.

If the sample is valid and actual value of the sample is greater than or equal to zero then 'valuePositive(2)' is returned.

If the sample is valid and the actual value of the sample is less than zero, 'valueNegative(3)' will be returned. The associated instance of reportSampledAbsValue should be multiplied by -1 to obtain the true sample value."

```
::= { reportSampledEntry 6 }
```

```
-- REPORT-MIB Editors' Note: This ends the copy of definitions from  
-- the usrHistory group from RMON2 [RFC 2021].
```

```
reportHistoryGroup          OBJECT IDENTIFIER ::= { reportMIBObjects 3 }
```

```
--      Then, the reportHistoryGroup assignments are :  
--          reportHistoryControlTable      - 1  
--          reportHistoryDataTable         - 2
```

```
-- Notes: The history group is intended to track changes in  
-- identified objects of type counter, gauge, other. Each,  
-- time the object is updated in the associated MIB, the  
-- history group stores a table entry in the associated  
-- historyDataTable capturing the time the change was  
-- made to the identified object.
```

```
-- The historyControl Table ...
```

```
--
```

```
-- The historyData Table ....
```

```
reportHistoryControlTable OBJECT-TYPE  
    SYNTAX SEQUENCE OF HistoryControlEntry  
    MAX-ACCESS not-accessible  
    STATUS current  
    DESCRIPTION  
        "A list of data-collection configuration entries."  
    ::= { reportHistoryGroup 1 }
```

```
reportHistoryControlEntry OBJECT-TYPE  
    SYNTAX HistoryControlEntry  
    MAX-ACCESS not-accessible
```

```

STATUS current
DESCRIPTION
    "A list of parameters that set up the collection
    of a history of changes
    in the user-defined MIB objects.

    For example, an instance of reportHistoryControlObject
    might be named reportHistoryControlObject.1"
INDEX { reportHistoryControlIndex }
 ::= { reportHistoryControlTable 1 }

HistoryControlEntry ::= SEQUENCE {
    reportHistoryControlIndex          Integer32,
    reportHistoryControlObject        OBJECT IDENTIFIER,
    reportHistoryControlObjectIpAddrType  InetAddressType,
    reportHistoryControlObjectIPAddress  InetAddress,
    reportHistoryControlSizeRequested    Integer32,
    reportHistoryControlSizeGranted      Integer32,
    reportHistoryControlRequestedNumber  Integer32,
    reportHistoryControlReportNumber     Integer32,
    reportHistoryControlOwner           OwnerString,
    reportHistoryControlStatus          RowStatus
}

reportHistoryControlIndex OBJECT-TYPE
    SYNTAX Integer32 (1..65535)
    MAX-ACCESS read-only
    STATUS current
    DESCRIPTION
        "An index that uniquely identifies an entry in the
        reportHistoryControlTable.  Each such entry defines a
        set of histories at a particular interval for a specified
        MIB object instance available from the managed system."
    ::= { reportHistoryControlEntry 1 }

reportHistoryControlObject OBJECT-TYPE
    SYNTAX OBJECT IDENTIFIER
    MAX-ACCESS read-create
    STATUS current
    DESCRIPTION
        "The MIB object to be monitored for the collection
        histories in the reportHistoryDataTable associated with this
        reportHistoryControlEntry.

        This object may not be modified if the associated instance
        of reportHistoryControlStatus is equal to active(1)."
    ::= { reportHistoryControlEntry 2 }

```

reportHistoryControlObjectIpAddrType OBJECT-TYPE

SYNTAX InetAddressType

MAX-ACCESS read-create

STATUS current

DESCRIPTION

"This identifies the IP address type of the IP address associated with the secondary counter object to be monitored within this report.

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

::= { reportHistoryControlEntry 3 }

reportHistoryControlObjectIPAddress OBJECT-TYPE

SYNTAX InetAddress

MAX-ACCESS read-create

STATUS current

DESCRIPTION

"This identifies the IP address of the secondary counter object to be monitored within this report.

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

::= { reportHistoryControlEntry 4 }

reportHistoryControlSizeRequested OBJECT-TYPE

SYNTAX Integer32 (1..65535)

MAX-ACCESS read-create

STATUS current

DESCRIPTION

"The requested maximum number of history entries to be saved in the reportHistoryDataTable associated with this reportHistoryControlEntry.

When this object is created or modified, the device should set reportHistoryControlSizeGranted as closely to this object as is possible for the particular device implementation and available resources."

DEFVAL { 50 }

::= { reportHistoryControlEntry 5 }

reportHistoryControlSizeGranted OBJECT-TYPE

SYNTAX Integer32 (1..65535)

MAX-ACCESS read-only

STATUS current

## DESCRIPTION

"The maximum allowed number of discrete history entries in the reportHistoryTable associated with this reportHistoryControlEntry.

When the associated reportHistoryControlSizeRequested object is created or modified, the device should set this object as closely to the requested value as is possible for the particular device implementation and available resources. The device must not lower this value except as a result of a modification to the associated reportHistoryControlSizeRequested object.

The associated reportHistoryControlSizeRequested object should be set before or at the same time as this object to allow the device to accurately estimate the resources required for this reportHistoryControlEntry.

When the number of histories reaches the value of this object and a new history is to be added to the reportHistoryTable, the oldest history associated with this reportHistoryControlEntry shall be deleted by the agent so that the new history can be added."

::= { reportHistoryControlEntry 6 }

reportHistoryControlRequestedNumber OBJECT-TYPE

SYNTAX Integer32 (1..127)

MAX-ACCESS read-create

STATUS current

DESCRIPTION

"The number of reports to be generated and stored by this agent for this report request.

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

DEFVAL { 1 }

::= { reportHistoryControlEntry 7 }

reportHistoryControlReportNumber OBJECT-TYPE

SYNTAX Integer32 (1..127)

MAX-ACCESS read-create

STATUS current

DESCRIPTION

"The number of the current report in progress. The first report is assigned a number equal to '1'. Each successive report number is incremented by unity. When the last report is completed, this value is set to reportSampledControlRequestedNumber + 1."

```
 ::= { reportHistoryControlEntry 8 }

reportHistoryControlOwner 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."
    ::= { reportHistoryControlEntry 9 }

reportHistoryControlStatus OBJECT-TYPE
    SYNTAX RowStatus
    MAX-ACCESS read-create
    STATUS current
    DESCRIPTION
        "The status of this variable history control entry.

        An entry may 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 reportHistoryTable shall be deleted."
    ::= { reportHistoryControlEntry 10 }

-- data table

-- Note: Similar to the note on the sampled report
-- collection above. We need to consider what
-- model to use to transmit the report data to
-- the remote management application. Currently
-- the data is stored in individuals events per
-- table row. This will impact the design of the
-- table as well as the design of the
-- Notifications.
reportHistoryTable OBJECT-TYPE
    SYNTAX SEQUENCE OF HistoryEntry
    MAX-ACCESS not-accessible
    STATUS current
    DESCRIPTION
        "A list of user defined history entries."
    ::= { reportHistoryGroup 3 }

reportHistoryEntry OBJECT-TYPE
    SYNTAX HistoryEntry
    MAX-ACCESS not-accessible
```

```

STATUS current
DESCRIPTION
    "A historical trail of user-defined variables.  This list
    is associated with the reportHistoryControlEntry which set
    up the parameters for a regular collection of these samples.

```

```

    The reportHistoryControlIndex value in the index identifies
    the reportHistoryControlEntry on whose behalf this entry
    was created.  This also identifies the MIB object
    being tracked by this reportHistoryEntry.

```

```

    For example, an instance of reportHistory...

```

```

INDEX { reportHistoryControlIndex,
        reportHistoryDataIndex }
 ::= { reportHistoryTable 1 }

```

```

HistoryEntry ::= SEQUENCE {
    reportHistoryDataIndex      Integer32,
    reportHistoryDataChangeTime TimeStamp,
    reportHistoryDataValueType INTEGER,
    reportHistoryDataValue     OCTET STRING,
    reportHistoryDataValStatus INTEGER
}

```

```

reportHistoryDataIndex OBJECT-TYPE
    SYNTAX      Integer32 (1..2147483647)
    MAX-ACCESS  read-only
    STATUS      current
    DESCRIPTION
        "An index that uniquely identifies the particular sample this
        entry represents among all historical entries
        associated with the same
        reportHistoryControlEntry.  This index starts at 1 and
        increases by one as each new sample is taken."
    ::= { reportHistoryEntry 1 }

```

```

reportHistoryDataChangeTime OBJECT-TYPE
    SYNTAX TimeStamp
    MAX-ACCESS read-only
    STATUS current
    DESCRIPTION
        "The value of sysUpTime at the time that the MIB object was
        updated."
    ::= { reportHistoryEntry 2 }

```

```

-- Note: May want to move this to the reportHistoryControlTable,
--      as it is too redundant in this table.  Also, need to reconsider

```

```
-- the best way to indicate type and to represent values.
reportHistoryDataValueType OBJECT-TYPE
    SYNTAX Integer32
    MAX-ACCESS read-only
    STATUS current
    DESCRIPTION
        "The type of the data value stored in the
        reportHistoryDataValue string.  The user identifies
        the MIB object to be tracked by this table.
        Various types of objects can be track, so the
        application needs to know the data type being
        stored.  Types supported include counter, gauge,
        integer, float.
        "
    ::= { reportHistoryEntry 3 }

reportHistoryDataValue OBJECT-TYPE
    SYNTAX OCTET STRING
    MAX-ACCESS read-only
    STATUS current
    DESCRIPTION
        "The absolute value of the
        user-specified MIB object tracked by this
        table entry.  This holds the new object
        value following this change in value.

        If the MIB instance could not be accessed ....
        "
    ::= { reportHistoryEntry 4 }

-- Note: Need to consider in detail the ability of the
-- device to track the times of object change in
-- enough detail to be useful.  What happens if the
-- device gets too busy and delays updating MIB object
-- values tracked by this table entry.  Needs more work.
reportHistoryDataValStatus OBJECT-TYPE
    SYNTAX INTEGER {
        valueAvailable(1),
        valueDelayed(2)
    }
    MAX-ACCESS read-only
    STATUS current
    DESCRIPTION
        "This object indicates the validity of the data in
        the associated instance of reportHistoryAbsValue.

        If the MIB instance could not be accessed promptly,
        then 'valueDelayed(2)' will be returned.
```

```

    If the sample is valid and actual value of the sample
    was promptly recorded, then 'valueAvailable(1)' is
    returned.
    "
 ::= { reportHistoryEntry 5 }

--
-- Notifications
--

-- NOTE: What is the report transmission model we want to
-- support for this MIB? Want to minimize chatter
-- on the network. Potentially want to see if
-- can pack reports into Notifications(?).
-- The statsReports are formatted in a way to
-- support bulk transmissions. However, as noted
-- above, the sampledReports and the historyReports
-- are stored as individual measurements per row and
-- storage is continually rotated as more measurements
-- are made in these two report types. This
-- may complicate report transmission and
-- Notifications definitions.

-- NOTE: What notifications do we want for this MIB?
-- Checkout what is done in the APM-MIB for Notifications?
-- Examples may include a) report completion
-- b) overflow counters exceeded

reportNotificationControl OBJECT IDENTIFIER
 ::= {reportMIBNotifications 1}
reportNotificationObjects OBJECT IDENTIFIER
 ::= {reportMIBNotifications 2}
reportNotificationStates OBJECT IDENTIFIER
 ::= {reportMIBNotifications 3}

-- reportNotificationControl

reportSetNotification OBJECT-TYPE
    SYNTAX      OCTET STRING (SIZE(4))
    MAX-ACCESS  read-write
    STATUS      current
    DESCRIPTION
        "A 4-octet string serving as a bit map for
        the notification events defined by the REPORT
        notifications. This object is used to enable
```

and disable specific REPORT notifications where a 1 in the bit field represents enabled. The right-most bit (least significant) represents notification 0.

This object is persistent and when written the entity SHOULD save the change to non-volatile storage.

```
"  
 ::= { reportNotificationControl 1 }
```

```
-- reportNotificationObjects
```

```
reportNewStatsDataReport NOTIFICATION-TYPE  
  OBJECTS { reportStatsControlIndex, -- The index of the  
            -- control table for this report  
            reportStatsDataIndex    -- The index of the  
            -- data table for this report  
          }  
  STATUS      current  
  DESCRIPTION  
    "reportNewStatsDataReport is a notification sent  
    when a new report is completed from the  
    reportStatsControlTable. The notification carries  
    the index from the control table that established  
    this report and the index from the data table that  
    holds this report."  
  ::= { reportNotificationObjects 1 }
```

```
reportNewSampledDataReport NOTIFICATION-TYPE  
  OBJECTS { reportSampledControlIndex, -- The index of the  
            -- control table for this report  
            reportSampledReportIndex  -- The index of the  
            -- data table for this report  
          }  
  STATUS      current  
  DESCRIPTION  
    "reportNewSampledDataReport is a notification sent  
    when a new report is completed from the  
    reportSampledControlTable. The notification carries  
    the index from the control table that established  
    this report and the index from the data table that  
    holds this report. Indication of the new report  
    is when the reportSampledControlReportNumber  
    is incremented."  
  ::= { reportNotificationObjects 2 }
```

```
reportNewHistoryDataReport NOTIFICATION-TYPE
    OBJECTS { reportHistoryControlIndex, -- The index of the
              -- control table for this report
              reportHistoryDataIndex -- The index of the
              -- data table for this report
            }
    STATUS current
    DESCRIPTION
        "reportNewHistoryDataReport is a notification sent
        when a new report is completed from the
        reportHistoryControlTable. The notification carries
        the index from the control table that established
        this report and the index from the data table that
        holds this report. Indication of the new report
        is when the reportHistoryControlReportNumber
        is incremented."
    ::= { reportNotificationObjects 3 }

-- reportNotificationStates
-- none to define

--
-- Compliance Statements
--

-- [NOTE: Current thoughts on Conformance follow:
-- Mandatory for Stats will include no extensions,
-- or high capacity objects.
-- Hence, the reports will have only the hard-coded statistics.
-- Optional for Stats will be extensions definition table and high
-- capacity objects.
--
-- Mandatory for Sampled will include all.
--
-- Mandatory for History will include all.]

reportCompliances OBJECT IDENTIFIER ::= { reportMIBConformance 1 }
reportMIBGroups OBJECT IDENTIFIER ::= { reportMIBConformance 2 }

reportStatsBasicCompliance MODULE-COMPLIANCE
    STATUS current
    DESCRIPTION "The Stats basic implementation requirements for
                managed network entities that implement
                the REPORT process."
```

```
MODULE -- this module
MANDATORY-GROUPS {reportStatsCapabilitiesBaseObjectsGroup,
                  reportStatsControlBaseObjectsGroup,
                  reportStatsDataBaseObjectsGroup,
                  reportNotificationGroup,
                  reportStatsNotificationGroup }
 ::= { reportCompliances 1 }

reportStatsHCCompliance MODULE-COMPLIANCE
STATUS current
DESCRIPTION "The HC implementation requirements for
            managed network entities that implement
            the REPORT process."
MODULE -- this module
MANDATORY-GROUPS {reportStatsCapabilitiesBaseObjectsGroup,
                  reportStatsControlBaseObjectsGroup,
                  reportStatsDataBaseObjectsGroup,
                  reportNotificationGroup,
                  reportStatsNotificationGroup,
                  reportStatsDataHCObjectsGroup }
 ::= { reportCompliances 2 }

reportStatsExtendedMetricsCompliance MODULE-COMPLIANCE
STATUS current
DESCRIPTION "The extended metrics implementation requirements for
            managed network entities that implement
            the REPORT process."
MODULE -- this module
MANDATORY-GROUPS {reportStatsCapabilitiesBaseObjectsGroup,
                  reportStatsControlBaseObjectsGroup,
                  reportStatsDataBaseObjectsGroup,
                  reportNotificationGroup,
                  reportStatsNotificationGroup,
                  reportStatsExtendedMetricsCapabilitiesObjectsGroup,
                  reportStatsExtendedMetricsControlObjectsGroup,
                  reportStatsExtendedMetricsDataObjectsGroup }
 ::= { reportCompliances 3 }

reportSampledBasicCompliance MODULE-COMPLIANCE
STATUS current
DESCRIPTION "The Sampled basic implementation requirements for
            managed network entities that implement
            the REPORT process."
MODULE -- this module
MANDATORY-GROUPS {reportSampledControlBaseObjectsGroup,
                  reportSampledObjectIDBaseObjectsGroup,
                  reportSampledDataBaseObjectsGroup,
                  reportNotificationGroup,
```

```

        reportSampledNotificationGroup }
 ::= { reportCompliances 4 }

reportHistoryBasicCompliance MODULE-COMPLIANCE
  STATUS current
  DESCRIPTION "The History basic implementation requirements for
              managed network entities that implement
              the REPORT process."
  MODULE -- this module
  MANDATORY-GROUPS {reportHistoryControlBaseObjectsGroup,
                    reportHistoryDataBaseObjectsGroup,
                    reportNotificationGroup,
                    reportHistoryNotificationGroup }
 ::= { reportCompliances 5 }

-- Units of Conformance

reportStatsCapabilitiesBaseObjectsGroup OBJECT-GROUP
  OBJECTS {
    reportClockResolution,
    reportClockMaxSkew,
    reportClockSource
  }
  STATUS current
  DESCRIPTION
    "Set of REPORT configuration objects implemented
    in this module."
 ::= { reportMIBGroups 1 }

reportStatsControlBaseObjectsGroup OBJECT-GROUP
  OBJECTS {
    reportStatsControlIndex,
    reportStatsControlInterval,
    reportStatsControlBinInterval,
    reportStatsControlPriObjID,
    reportStatsControlPriObjIpAddrType,
    reportStatsControlPriObjIPAddr,
    reportStatsControlReqReports,
    reportStatsControlGrantedReports,
    reportStatsControlStartTime,
    reportStatsControlReportNumber,
    reportStatsControlInsertsDenied,
    reportStatsControlOwner,
    reportStatsControlStorageType,
    reportStatsControlStatus
  }

```

```
    }
    STATUS current
    DESCRIPTION
        "Set of REPORT Stats Control base objects implemented
        in this module."
 ::= { reportMIBGroups 2 }
```

```
reportStatsDataBaseObjectsGroup OBJECT-GROUP
    OBJECTS {
        reportStatsDataIndex,
        reportStatsDataStatN,
        reportStatsDataStatSumX,
        reportStatsDataOverflowStatSumX,
        reportStatsDataStatMaximum,
        reportStatsDataStatMinimum,
        reportStatsDataStatSumSq,
        reportStatsDataOverflowStatSumSq,
        reportStatsDataStatSumIX,
        reportStatsDataOverflowStatSumIX,
        reportStatsDataStatSumIXSq,
        reportStatsDataOverflowStatSumIXSq
    }
    STATUS current
    DESCRIPTION
        "Set of REPORT state objects implemented
        in this module."
 ::= { reportMIBGroups 3 }
```

```
reportNotificationGroup OBJECT-GROUP
    OBJECTS {
        reportSetNotification
    }
    STATUS current
    DESCRIPTION
        "Set of REPORT notifications implemented
        in this module for the Statistics reports."
 ::= { reportMIBGroups 4 }
```

```
reportStatsNotificationGroup NOTIFICATION-GROUP
    NOTIFICATIONS {
        reportNewStatsDataReport
    }
    STATUS current
    DESCRIPTION
        "Set of REPORT notifications implemented
        in this module for the Statistics reports."
 ::= { reportMIBGroups 5 }
```

```
reportStatsDataHCObjectsGroup OBJECT-GROUP
  OBJECTS {
    reportStatsDataHCStatSumX,
    reportStatsDataHCStatSumSq,
    reportStatsDataHCStatSumIX,
    reportStatsDataHCStatSumIXSq
  }
  STATUS current
  DESCRIPTION
    "Set of REPORT state objects implemented
    in this module."
  ::= { reportMIBGroups 6 }

reportStatsExtendedMetricsCapabilitiesObjectsGroup OBJECT-GROUP
  OBJECTS {
    reportMetricExtDefType,
    reportMetricExtDefName,
    reportMetricExtDefOperation,
    reportMetricExtDefReference,
    reportMetricDirLastChange
  }
  STATUS current
  DESCRIPTION
    "Set of REPORT state objects implemented
    in this module."
  ::= { reportMIBGroups 7 }

reportStatsExtendedMetricsControlObjectsGroup OBJECT-GROUP
  OBJECTS {
    reportStatsControlSecObj1ID,
    reportStatsControlSecObj1IpAddrType,
    reportStatsControlSecObj1IPAddr,
    reportStatsControlSecObj2ID,
    reportStatsControlSecObj2IpAddrType,
    reportStatsControlSecObj2IPAddr,
    reportStatsControlSecObj3ID,
    reportStatsControlSecObj3IpAddrType,
    reportStatsControlSecObj3IPAddr,
    reportStatsControlSecObj4ID,
    reportStatsControlSecObj4IpAddrType,
    reportStatsControlSecObj4IPAddr,
    reportStatsControlSecObj5ID,
    reportStatsControlSecObj5IpAddrType,
    reportStatsControlSecObj5IPAddr,
    reportStatsControlMetricExt1,
    reportStatsControlMetricExt2,
    reportStatsControlMetricExt3,
    reportStatsControlMetricExt4,
```

```
        reportStatsControlMetricExt5
    }
    STATUS current
    DESCRIPTION
        "Set of REPORT state objects implemented
        in this module."
 ::= { reportMIBGroups 8 }

reportStatsExtendedMetricsDataObjectsGroup OBJECT-GROUP
    OBJECTS {
        reportStatsDataStatMetricExt1,
        reportStatsDataStatMetricExt2,
        reportStatsDataStatMetricExt3,
        reportStatsDataStatMetricExt4,
        reportStatsDataStatMetricExt5
    }
    STATUS current
    DESCRIPTION
        "Set of REPORT state objects implemented
        in this module."
 ::= { reportMIBGroups 9 }

reportSampledControlBaseObjectsGroup OBJECT-GROUP
    OBJECTS {
        reportSampledControlIndex,
        reportSampledControlObjects,
        reportSampledControlBucketsRequested,
        reportSampledControlBucketsGranted,
        reportSampledControlInterval,
        reportSampledControlRequestedNumber,
        reportSampledControlReportNumber,
        reportSampledControlOwner,
        reportSampledControlStatus
    }
    STATUS current
    DESCRIPTION
        "Set of REPORT state objects implemented
        in this module."
 ::= { reportMIBGroups 10 }

reportSampledObjectIDBaseObjectsGroup OBJECT-GROUP
    OBJECTS {
        reportSampledObjectVariable,
        reportSampledObjectIpAddrType,
        reportSampledObjectIPAddress,
        reportSampledObjectSampleType
    }
    STATUS current
```

```
DESCRIPTION
    "Set of REPORT state objects implemented
    in this module."
 ::= { reportMIBGroups 11 }

reportSampledDataBaseObjectsGroup OBJECT-GROUP
    OBJECTS {
        reportSampledReportIndex,
        reportSampledIntervalStart,
        reportSampledIntervalEnd,
        reportSampledAbsValue,
        reportSampledValStatus
    }
    STATUS current
    DESCRIPTION
        "Set of REPORT state objects implemented
        in this module."
 ::= { reportMIBGroups 12 }

reportSampledNotificationGroup NOTIFICATION-GROUP
    NOTIFICATIONS {
        reportNewSampledDataReport
    }
    STATUS current
    DESCRIPTION
        "Set of REPORT notifications implemented
        in this module for the Sampled reports."
 ::= { reportMIBGroups 13 }

reportHistoryControlBaseObjectsGroup OBJECT-GROUP
    OBJECTS {
        reportHistoryControlIndex,
        reportHistoryControlObject,
        reportHistoryControlObjectIpAddrType,
        reportHistoryControlObjectIPAddress,
        reportHistoryControlSizeRequested,
        reportHistoryControlSizeGranted,
        reportHistoryControlRequestedNumber,
        reportHistoryControlReportNumber,
        reportHistoryControlOwner,
        reportHistoryControlStatus
    }
    STATUS current
    DESCRIPTION
        "Set of REPORT state objects implemented
        in this module."
 ::= { reportMIBGroups 14 }
```

```
reportHistoryDataBaseObjectsGroup OBJECT-GROUP
  OBJECTS {
    reportHistoryDataIndex,
    reportHistoryDataChangeTime,
    reportHistoryDataValueType,
    reportHistoryDataValue,
    reportHistoryDataValStatus
  }
  STATUS current
  DESCRIPTION
    "Set of REPORT state objects implemented
    in this module."
 ::= { reportMIBGroups 15 }

reportHistoryNotificationGroup NOTIFICATION-GROUP
  NOTIFICATIONS {
    reportNewHistoryDataReport
  }
  STATUS current
  DESCRIPTION
    "Set of REPORT notifications implemented
    in this module for the History reports."
 ::= { reportMIBGroups 16 }
```

END

## 8. Security Considerations

[TODO] Each specification that defines one or more MIB modules MUST contain a section that discusses security considerations relevant to those modules. This section MUST be patterned after the latest approved template (available at <http://www.ops.ietf.org/mib-security.html>). Remember that the objective is not to blindly copy text from the template, but rather to think and evaluate the risks/vulnerabilities and then state/document the result of this evaluation.

[TODO] if you have any read-write and/or read-create objects, please include the following boilerplate paragraph.

There are a number of management objects defined in this MIB module with 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. These are the tables and objects and their sensitivity/vulnerability:

- o [TODO] writable MIB objects that could be especially disruptive if abused MUST be explicitly listed by name and the associated security risks MUST be spelled out; RFC 2669 has a very good example.
- o [TODO] list the writable tables and objects and state why they are sensitive.

[TODO] else if there are no read-write objects in your MIB module, use the following boilerplate paragraph.

There are no management objects defined in this MIB module that have a MAX-ACCESS clause of read-write and/or read-create. So, if this MIB module is implemented correctly, then there is no risk that an intruder can alter or create any management objects of this MIB module via direct SNMP SET operations.

[TODO] if you have any sensitive readable objects, please include the following boilerplate paragraph.

Some of the readable objects in this MIB module (i.e., objects with a MAX-ACCESS other than not-accessible) may be considered sensitive or vulnerable in some network environments. It is thus important to control even GET and/or NOTIFY access to these objects and possibly to even encrypt the values of these objects when sending them over the network via SNMP. These are the tables and objects and their sensitivity/vulnerability:

- o [TODO] you must explicitly list by name any readable objects that are sensitive or vulnerable and the associated security risks MUST be spelled out (for instance, if they might reveal customer information or violate personal privacy laws such as those of the European Union if exposed to unauthorized parties)
- o [TODO] list the tables and objects and state why they are sensitive.

[TODO] discuss what security the protocol used to carry the information should have. The following three boilerplate paragraphs should not be changed without very good reason. Changes will almost certainly require justification during IESG review.

SNMP versions prior to SNMPv3 did not include adequate security. 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 module.

It is RECOMMENDED that implementers consider the security features as provided by the SNMPv3 framework (see [RFC3410], section 8), including full support for the SNMPv3 cryptographic mechanisms (for authentication and privacy).

Further, deployment of SNMP versions prior to SNMPv3 is NOT RECOMMENDED. Instead, it is RECOMMENDED to deploy SNMPv3 and to enable cryptographic security. It is then a customer/operator responsibility to ensure that the SNMP entity giving access to an instance of this MIB module 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.

## 9. IANA Considerations

[TODO] In order to comply with IESG policy as set forth in <http://www.ietf.org/ID-Checklist.html>, every Internet-Draft that is submitted to the IESG for publication MUST contain an IANA Considerations section. The requirements for this section vary depending what actions are required of the IANA. see RFC4181 section 3.5 for more information on writing an IANA clause for a MIB module document.

[TODO] select an option and provide the necessary details.

Option #1:

The MIB module in this document uses the following IANA-assigned OBJECT IDENTIFIER values recorded in the SMI Numbers registry:

Descriptor	OBJECT IDENTIFIER value
-----	-----
sampleMIB	{ mib-2 XXX }

Option #2:

Editor's Note (to be removed prior to publication): the IANA is requested to assign a value for "XXX" under the 'mib-2' sub-tree and to record the assignment in the SMI Numbers registry. When the assignment has been made, the RFC Editor is asked to replace "XXX" (here and in the MIB module) with the assigned value and to remove this note.

Note well: prior to official assignment by the IANA, a draft document MUST use placeholders (such as "XXX" above) rather than actual numbers. See RFC4181 Section 4.5 for an example of how this is done in a draft MIB module.

Option #3:

This memo includes no request to IANA.

## 10. Contributors

This MIB document uses the template authored by D. Harrington which is based on contributions from the MIB Doctors, especially Juergen Schoenwaelder, Dave Perkins, C.M.Heard and Randy Presuhn.

## 11. Acknowledgements

We would like to thank Bert Wijnen and Andy Bierman for pointing out the existence of the usrHistory group within RMON2 and in answering our numerous questions on the usrHistory group. Further, we wish to thank U. Herberg for his forcing additions to this MIB through his thoughtful consideration of performance monitoring requirements for other MIBs, e.g., NHDP and OLSR MIBs.

## 12. References

### 12.1. Normative References

- [RFC2863] McCloghrie, K. and F. Kastenholz, "The Interfaces Group MIB", RFC 2863, June 2000.
- [RFC3418] Presuhn, R., "Management Information Base (MIB) for the Simple Network Management Protocol (SNMP)", STD 62, RFC 3418, December 2002.
- [RFC2119] Bradner, S., "Key words for use in RFCs to Indicate Requirement Levels", BCP 14, RFC 2119, March 1997.
- [RFC2578] McCloghrie, K., Ed., Perkins, D., Ed., and J. Schoenwaelder, Ed., "Structure of Management Information Version 2 (SMIV2)", STD 58, RFC 2578, April 1999.
- [RFC2579] McCloghrie, K., Ed., Perkins, D., Ed., and J. Schoenwaelder, Ed., "Textual Conventions for SMIV2", STD 58, RFC 2579, April 1999.
- [RFC2580] McCloghrie, K., Perkins, D., and J. Schoenwaelder, "Conformance Statements for SMIV2", STD 58, RFC 2580,

April 1999.

## 12.2. Informative References

- [RFC3410] Case, J., Mundy, R., Partain, D., and B. Stewart, "Introduction and Applicability Statements for Internet-Standard Management Framework", RFC 3410, December 2002.
- [RFC1757] Waldbusser, S., "Remote Network Monitoring Management Information Base", RFC 1757, February 1995.
- [RFC2021] Waldbusser, S., "Remote Network Monitoring Management Information Base Version 2 using SMIV2", RFC 2021, January 1997.
- [RFC4150] Dietz, R. and R. Cole, "Transport Performance Metrics MIB", RFC 4150, August 2005.

## Appendix A. Change Log

Changes from draft-ietf-manet-report-mib-00 to draft-ietf-manet-report-mib-01 draft.

1. Proposed additions to the statsReports in order to potentially simplify data transmission to management applications.
2. Added some Notification definitions and their relationship to the three reports' structure, i.e., statsReports, sampledReports, and historyReports.
3. In the process of adding notifications for the Sampled and the History reports, decided to restructure the reports from their previously rolling storage model to the fixed interval reporting used all along in the Statistics reporting. This allows the agent to notify the management application that a report has completed and that it is ready to be pulled from the agent storage.
4. Ran MIB through smilint checker and cleaned up all errors and most warnings. A few warnings remain to be addressed.
5. Cleaned up textual material.

Changes from draft-cole-manet-report-mib-02 to draft-ietf-manet-report-mib-00 draft.

1. Major change was the incorporation of the IP address objects associated with all objects of type 'OBJECT IDENTIFIER'. This allows the REPORT-MIB to exist as a proxy report generation capability on a device separate but in close proximity to the device monitoring the referenced object.
2. Cleaned up the up front text, reducing the repetition with the object descriptions in the MIB.
3. Worked on and added sections discussing the relationship to other MIBs.

Changes from draft-cole-manet-report-mib-01 to draft-cole-manet-report-mib-02 draft.

1. Restructured the MIB somewhat to now offer the three reporting capabilities in increasing order of detail: a) statistical reports, b) sampled reports, and c) historical reports.
2. Renamed the usrHistoryGroup and elements to samplingGroup. This is in line with its actual capabilities.
3. Added a new historyGroup which provides a history of change events.
4. Updated the4 Conformance section to reflect the above changes and additions. But did not yet run smilint to check MIB syntax.

Changes from draft-cole-manet-report-mib-00 to draft-cole-manet-report-mib-01 draft.

1. Added (copied) the usrHistory group from RMON2 into the REPORT-MIB.
2. Restructured the MIB to account for the inclusion of the reportSampledGroup.
3. Dropped the reportCurReportsTable as this did not make sense within the context of the REPORT-MIB.
4. Added the Compliance and Conformance material. Defined several Compliance Groups to all for base implementations of the REPORT-MIB for only statistical reports, for only historical reports or for both. Allow for enhanced implementations to address higher capacity issues and extension to metric reporting for statistical reporting.

5. Ran the MIB through the smilint checker and in the process corrected numerous typos, omissions, TEXTUAL CONVENTIONS, IMPORTS, etc.
6. Updated main text to reflect changes.

#### Appendix B. Open Issues

This section contains the set of open issues related to the development and design of the REPORT-MIB. This section will not be present in the final version of the MIB and will be removed once all the open issues have been resolved.

1. Need to add an index associated with object IDs of interest which are contained within a table, e.g., IfPacketsIn in an InterfaceTable which is indexed by IfIndex. (Note: (RGC)I think adding the IP address associated with the referenced object addresses this issue.)
2. Complete notification group. Need to develop the preferred data report transmission model. This will influence the design of the Notifications. The initial form for the notifications has been laid out in draft-ietf-manet-report-mib-02.
3. Update the text of the document to reflect the final state of the MIB.
4. Identify all objects requiring non-volatile storage in their DESCRIPTION clauses.
5. Complete the security analysis and section.
6. Cleanup all the [TODOs] from the MIB template.

Appendix C.

```

*****
* Note to the RFC Editor (to be removed prior to publication) *
*
* 1) The reference to RFCXXXX within the DESCRIPTION clauses *
* of the MIB module point to this draft and are to be *
* assigned by the RFC Editor. *
*
* 2) The reference to RFCXXX2 throughout this document point *
* to the current draft-ietf-manet-report-xx.txt. This *
* need to be replaced with the XXX RFC number. *
*
*****

```

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