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Definition of Managed Objects for Performance Reporting  
draft-cole-manet-report-mib-02

## 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.

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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 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 same MIB objects but at differing 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 for each 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 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 Reporting MIB ... and notifications.

### [4.1.](#) REPORT-MIB Management Model

This section describes the management model for the Reporting MIB process. First, the model for the reportStatsGroup is presented. Then the model 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 ReportCntl 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) periodically and to generate a set of metrics describing the temporal behavior of those counter values.

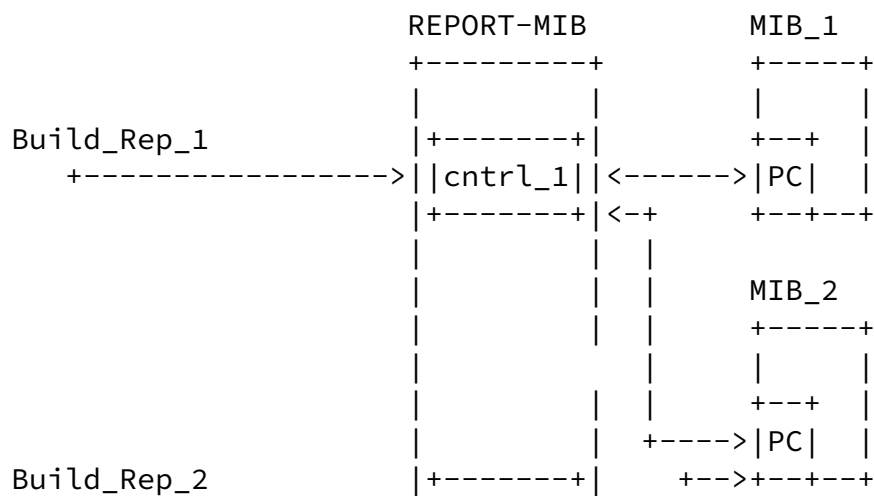
The reports are stored locally until the management station decides to pull them off the device. The figure shows a case where the REPORT-MIB generates a notification that Report\_2 has completed, prompting the management station to pull Report\_2 from the device.

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Mgmt        Device  
Station



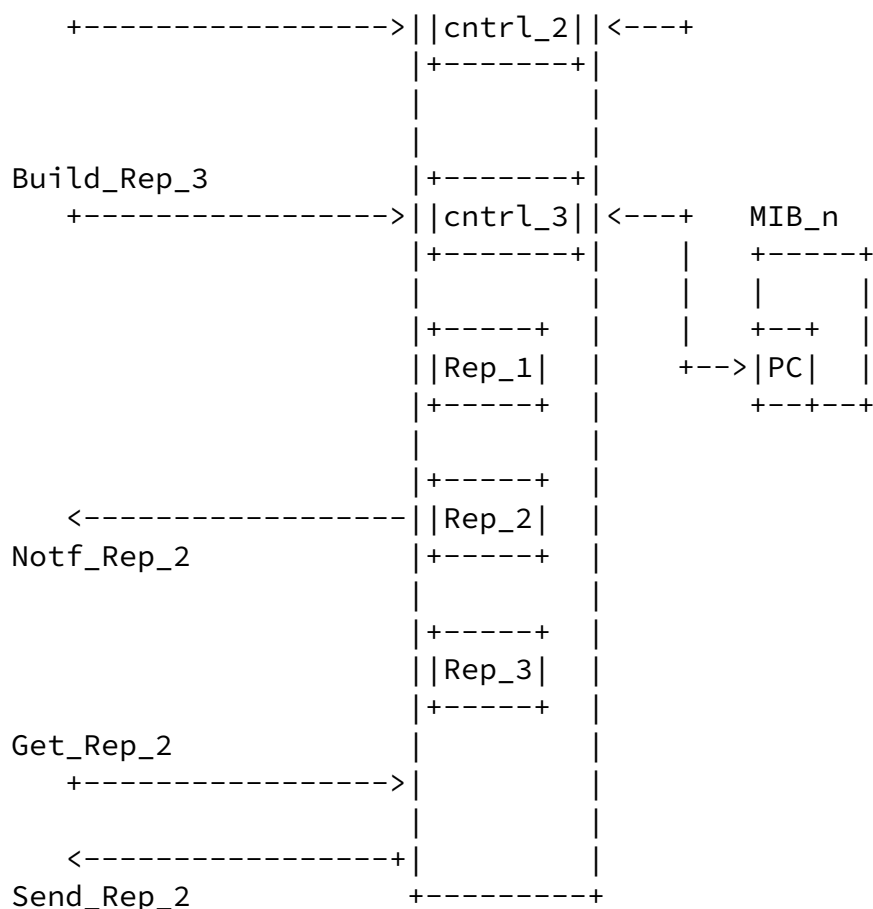


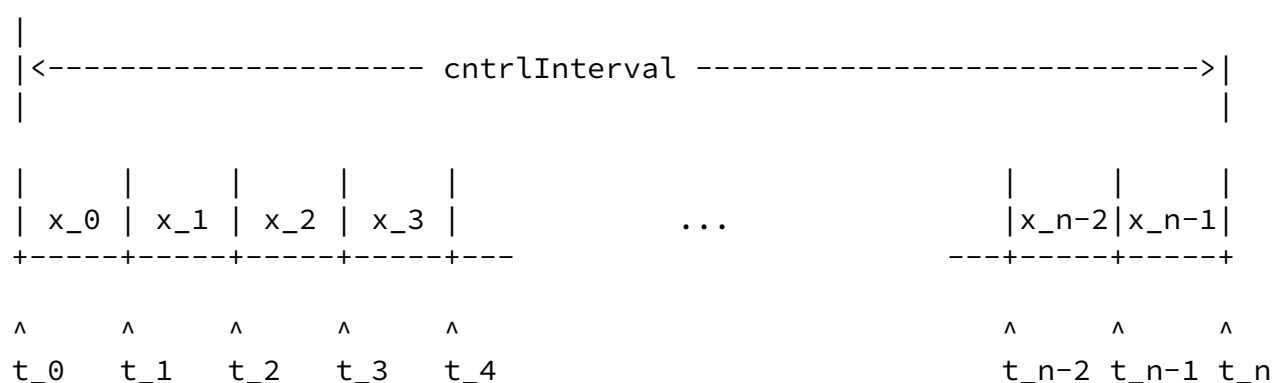
Figure 1: REPORT-MIB front-end report generation process.

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.

The following observations and analysis techniques are not all inclusive. Rather these are the ones we have come up with at the time of writing this document.



- o Frequency -
- o The time interval is that specified in the control table. It is not a metric datum, but it is associated with the metric sample -
- o Maximum -
- o Minimum -
- o Range -
- o Arithmetic Mean -
- o Root Mean Square -
- o Variance -
- o Standard Deviation -
- o Slope of a least-squares line -
- o These are accessible from the statistical datum provided by this MIB module.

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.

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### [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 device has a ....

- o StatsCapabilities - ...
- o StatsControl - ...
- o StatsData - ...

The reportStatsCapabilitiesGroup contains .....

The reportStatsControlGroup contains .....

The reportStatsDataGroup contains ... 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 simply 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 and exist to handle integer overflow situations where, e.g., 'reportStatsDataStatSumX' overruns its maximum many numerous times.

Computations and utility of the other standard metrics are as follows:

- o reportStatsDataStatSumXSq -
- o reportStatsDataStatMaximum -

- o reportStatsDataStatMinimum -
- o reportStatsDataStatSumSq -
- o reportStatsDataStatSumIX -
- o reportStatsDataStatSumIXSq -

### [5.3.](#) The Sampled Group

The Sampled Group contains tables which ....

- o reportSampledControlTable -
- o reportSampledObjectTable -
- o reportSampledDataTable -

The reportSampledControlTable contains .....

The reportSampledObjectsTable contains .....

The reportSampledDataTable contains .....

### [5.4.](#) The History Group

The History Group contains tables which ....

- o reportHistoryControlTable -
- o reportHistoryDataTable -

The reportHistoryControlTable contains .....

The reportHistoryDataTable contains .....

#### [5.5.](#) The Notifications Group

The Notifications Subtree contains the list of notifications supported within the REPORT-MIB and their intended purpose or utility. 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 IF-MIB

[[TODO](#)] This section is included as an example; If the MIB module is not an adjunct of the Interface MIB, then this section should be removed.

#### [6.3.](#) 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 following 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]
```

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

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

```
    OwnerString
        FROM RMON-MIB                                    -- [RFC2819]
```

```
    InterfaceIndexOrZero
        FROM IF-MIB                                      -- [RFC2863]
```

```
    ZeroBasedCounter64
        FROM HCNUM-TC                                    -- [RFC2856]
```

```
    SnmpAdminString
```

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

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

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

reportMIB MODULE-IDENTITY
  LAST-UPDATED "201003021300Z"  -- March 02, 2010
  ORGANIZATION "IETF MANET Working Group"
  CONTACT-INFO
    "WG E-Mail: manet@ietf.org

    WG Chairs: ian.chakeres@gmail.com
               jmacker@nrl.navy.mil

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```

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## DESCRIPTION

"This MIB module contains managed object definitions for the autonomous reporting of performance object counters. Copyright (C) The IETF Trust (2009). This version of this MIB module is part of RFC xxxx; see the RFC itself for full legal notices."

-- Revision History

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

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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.

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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)
    }
```

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```
    }
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

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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 II, RFC XXXX

```
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,
    reportStatsControlSecObj1ID  OBJECT IDENTIFIER,
    reportStatsControlSecObj2ID  OBJECT IDENTIFIER,
    reportStatsControlSecObj3ID  OBJECT IDENTIFIER,
    reportStatsControlSecObj4ID  OBJECT IDENTIFIER,
    reportStatsControlSecObj5ID  OBJECT IDENTIFIER,
    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  not-accessible
    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 }

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 5 }

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 6 }

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 7 }

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 8 }

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 9 }

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 reportCapabilitiesMetwircExtTable above.

This object may not be modified if the associated reportStatsControlStatus object is equal to active(1)."  
::= { reportStatsControlEntry 10 }

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`reportStatsControlMetricExt2 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 reportCapabilitiesMetwircExtTable above.

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

`::= { reportStatsControlEntry 11 }``reportStatsControlMetricExt3 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 reportCapabilitiesMetwircExtTable above.

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

`::= { reportStatsControlEntry 12 }`

reportStatsControlMetricExt4 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 reportCapabilitiesMetwircExtTable above.

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

reportStatsControlMetricExt5 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 reportCapabilitiesMetwircExtTable above.

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

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 15 }

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 16 }

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 17 }

reportStatsControlReportNumber OBJECT-TYPE

SYNTAX Unsigned32

MAX-ACCESS read-only

STATUS current

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DESCRIPTION

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

::= { reportStatsControlEntry 18 }

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 19 }
```

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 20 }
```

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 21 }
```

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 22 }
```

-- 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 }

```
ReportStatsDataEntry ::= SEQUENCE {
    reportStatsDataIndex          Unsigned32,
    reportStatsDataServerAddress  OCTET STRING,
    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  not-accessible
    STATUS      current
    DESCRIPTION
        "The value of reportAggrReportCntrlNumber 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 reportAggrReportCntrlAggrType 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

```

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```
        reportCntrlReportsInterval divided by the value of
        reportCntrlReportsBinInterval, 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

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"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

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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

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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,
    reportSampledControlOwner     OwnerString,
    reportSampledControlStatus    RowStatus
}
```

```
reportSampledControlIndex OBJECT-TYPE
    SYNTAX Integer32 (1..65535)
    MAX-ACCESS not-accessible
    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."

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```
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 and a new bucket is to be added to the reportSampledTable, the oldest bucket associated with this reportSampledControlEntry shall be deleted by the agent so that the new bucket can be added.

When the value of this object changes to a value less than

the current value, entries are deleted from the reportSampledTable associated with this reportSampledControlEntry. Enough of the oldest of these entries shall be deleted by the agent so that their number remains less than or equal to the new value of this object.

When the value of this object changes to a value greater than the current value, the number of associated

reportSampled entries may be allowed to grow."  
 ::= { 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 }

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 6 }

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."

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::= { reportSampledControlEntry 7 }

-- 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,
    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 }

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 3 }



-- data table

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, reportSampledSampleIndex,  
reportSampledObjectIndex }

::= { reportSampledTable 1 }

SampledEntry ::= SEQUENCE {

reportSampledSampleIndex Integer32,  
reportSampledIntervalStart TimeStamp,  
reportSampledIntervalEnd TimeStamp,  
reportSampledAbsValue Gauge32,

```
    reportSampledValStatus      INTEGER
}
```

```
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 1 }
```

```
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 2 }
```

```
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 3 }
```

```
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 4 }

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 5 }

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

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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 ....

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 reportHistoryControlInterval  
might be named reportHistoryControlInterval.1"

INDEX { reportHistoryControlIndex }

::= { reportHistoryControlTable 1 }

HistoryControlEntry ::= SEQUENCE {

reportHistoryControlIndex            Integer32,

reportHistoryControlObject          Integer32,

reportHistoryControlSizeRequested   Integer32,

reportHistoryControlSizeGranted     Integer32,

reportHistoryControlInterval        Integer32,

reportHistoryControlOwner            OwnerString,

reportHistoryControlStatus          RowStatus

}

reportHistoryControlIndex OBJECT-TYPE

SYNTAX Integer32 (1..65535)

MAX-ACCESS not-accessible

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 Integer32 (1..65535)

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 }

reportHistoryControlRequested 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 3 }
```

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

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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 4 }
```

reportHistoryControlInterval OBJECT-TYPE

SYNTAX Integer32 (1..2147483647)

MAX-ACCESS read-create

STATUS current

DESCRIPTION

"The interval in seconds over which the data histories are to be recorded in the part of the reportHistory table associated with this reportHistoryControlEntry.

This object may not be modified if the associated  
reportHistoryControlStatus object is equal to active(1)."  
DEFVAL { 1800 }  
::= { reportHistoryControlEntry 5 }

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 6 }

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 7 }

-- data table

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 string,  
reportHistoryDataValStatus INTEGER  
}

reportHistoryDataIndex 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 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 INTEGER
    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 string,
    MAX-ACCESS read-only
    STATUS current
    DESCRIPTION
        "The absolute value of the
        user-specified MIB object tracked by this
        table entry.

        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 notifications do we want for this MIB?
-- Checkout what is done in the APM-MIB for Notifications?

--
-- 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 }
 ::= { 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,
                      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,
                      reportStatsExtendedMetricsCapabilitiesObjectsGroup,
                      reportStatsExtendedMetricsControlObjectsGroup,
                      reportStatsExtendedMetricsDataObjectsGroup }
 ::= { reportCompliances 3 }

reportSampledBasicCompliance  MODULE-COMPLIANCE

```

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```
STATUS current
DESCRIPTION "The Sampled basic implementation requirements for
             managed network entities that implement
             the REPORT process."
MODULE -- this module
MANDATORY-GROUPS {reportSampledCapabilitiesBaseObjectsGroup,
                  reportSampledControlBaseObjectsGroup,
                  reportSampledObjectIDBaseObjectsGroup,
                  reportSampledDataBaseObjectsGroup }
 ::= { 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 }
 ::= { 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 {
    reportStatsControlInterval,
    reportStatsControlBinInterval,
```

```
reportStatsControlPriObjID,  
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 {  
        reportStatsDataServerAddress,  
        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 }
```

```
reportStatsDataHCObjectsGroup  OBJECT-GROUP  
    OBJECTS {  
        reportStatsDataHCStatSumX,  
        reportStatsDataHCStatSumSq,
```

```

        reportStatsDataHCStatSumIX,
        reportStatsDataHCStatSumIXSq
    }
    STATUS    current
    DESCRIPTION
        "Set of REPORT state objects implemented
        in this module."
    ::= { reportMIBGroups 4 }

reportStatsExtendedMetricsCapabilitiesObjectsGroup OBJECT-GROUP
    OBJECTS {
        reportMetricExtDefType,
        reportMetricExtDefName,

```

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```

        reportMetricExtDefOperation,
        reportMetricExtDefReference,
        reportMetricDirLastChange
    }
    STATUS    current
    DESCRIPTION
        "Set of REPORT state objects implemented
        in this module."
    ::= { reportMIBGroups 5 }

reportStatsExtendedMetricsControlObjectsGroup OBJECT-GROUP
    OBJECTS {
        reportStatsControlSecObj1ID,
        reportStatsControlSecObj2ID,
        reportStatsControlSecObj3ID,
        reportStatsControlSecObj4ID,
        reportStatsControlSecObj5ID,
        reportStatsControlMetricExt1,
        reportStatsControlMetricExt2,
        reportStatsControlMetricExt3,
        reportStatsControlMetricExt4,
        reportStatsControlMetricExt5
    }
    STATUS    current
    DESCRIPTION
        "Set of REPORT state objects implemented
        in this module."
    ::= { reportMIBGroups 6 }

```

```

reportStatsExtendedMetricsDataObjectsGroup  OBJECT-GROUP
  OBJECTS {
    reportStatsDataStatMetricExt1,
    reportStatsDataStatMetricExt2,
    reportStatsDataStatMetricExt3,
    reportStatsDataStatMetricExt4,
    reportStatsDataStatMetricExt5
  }
  STATUS  current
  DESCRIPTION
    "Set of REPORT state objects implemented
    in this module."
::= { reportMIBGroups 7 }

```

```

reportSampledControlBaseObjectsGroup  OBJECT-GROUP
  OBJECTS {
    reportSampledControlObjects,
    reportSampledControlBucketsRequested,
    reportSampledControlBucketsGranted,

```

```

    reportSampledControlInterval,
    reportSampledControlOwner,
    reportSampledControlStatus
  }
  STATUS  current
  DESCRIPTION
    "Set of REPORT state objects implemented
    in this module."
::= { reportMIBGroups 8 }

reportSampledObjectIDBaseObjectsGroup  OBJECT-GROUP
  OBJECTS {
    reportSampledObjectVariable,
    reportSampledObjectSampleType
  }
  STATUS  current
  DESCRIPTION
    "Set of REPORT state objects implemented
    in this module."
::= { reportMIBGroups 9 }

```

```

reportSampledDataBaseObjectsGroup  OBJECT-GROUP
    OBJECTS {
        reportSampledIntervalStart,
        reportSampledIntervalEnd,
        reportSampledAbsValue,
        reportSampledValStatus
    }
    STATUS  current
    DESCRIPTION
        "Set of REPORT state objects implemented
        in this module."
::= { reportMIBGroups 10 }

reportHistoryControlBaseObjectsGroup  OBJECT-GROUP
    OBJECTS {
        reportHistoryControlObjects,
        reportHistoryControlSizeRequested,
        reportHistoryControlSizeGranted,
        reportHistoryControlInterval,
        reportHistoryControlOwner,
        reportHistoryControlStatus
    }
    STATUS  current
    DESCRIPTION
        "Set of REPORT state objects implemented
        in this module."
::= { reportMIBGroups 11 }

```

```

reportHistoryDataBaseObjectsGroup  OBJECT-GROUP
    OBJECTS {
        reportHistoryDataChangeTime,
        reportHistoryDataValueType,
        reportHistoryDataValue,
        reportHistoryDataValStatus
    }
    STATUS  current
    DESCRIPTION
        "Set of REPORT state objects implemented
        in this module."
::= { reportMIBGroups 12 }

```



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' subtree 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.

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## [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

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Information Base", [RFC 1757](#), February 1995.

[RFC2021] Waldbusser, S., "Remote Network Monitoring Management Information Base Version 2 using SMIV2", [RFC 2021](#), January 1997.

## [Appendix A](#). Change Log

Changes from -01 to -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 -00 to -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.
2. Specify the set of metrics for default support. Done.
3. Clean up the Table indexing. Specifically, what uniquely defines a report?
4. Complete notification group.
5. Complete conformance group. Done but not yet checked by smilint.
6. Work on the relationship to other MIBs, IF-MIB, NHDP-MIB.
7. Update the text of the document to reflect the final state of the MIB.
8. Identify all objects requiring non-volatile storage in their DESCRIPTION clauses.

9. Incorporate parameter relationship conditions into their DESCRIPTION clauses.
10. Complete the security analysis and section.
11. Cleanup all the [TODOs] from the MIB template.

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## Appendix C.

```
*****
* Note to the RFC Editor (to be removed prior to publication) *
*
* 1) The reference to RFCXXX 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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