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R. Cole
US Army CERDEC
J. Macker
Naval Research Laboratory
A. Bierman
YumaWorks, Inc.
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Definition of Managed Objects for Performance Reporting
draft-ietf-manet-report-mib-03

Abstract

This memo defines a portion of the Management Information Base (MIB) for use with network management protocols in the Internet community. In particular, it describes objects for configuring autonomous report generation on any device that supports MIBs containing counter and gauge objects for performance monitoring. This allows a management station to instruct a device to build off-line reports to be collected asynchronously by the management station. Further, this REPORT-SAMPLED-MIB can be configured in a proxy configuration where the report generation is performed on a device in close network proximity to the device containing the referenced counter objects. Hence, this capability allows network operators to reduce the SNMP polling traffic burden on Mobile Ad-Hoc and Disruption Tolerant Networks which is typical of SNMP performance management applications.

Status of This Memo

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Internet-Draft

The REPORT-SAMPLED-MIB

November 2012

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Table of Contents

1.	Introduction	3
2.	The Internet-Standard Management Framework	3
3.	Conventions	4
4.	Overview	4
4.1.	REPORT-SAMPLED-MIB Management Model	4
4.2.	Terms	6
5.	Structure of the MIB Module	6
5.1.	Textual Conventions	6
5.2.	The Sampled Group	7
5.3.	The Notifications Group	7
5.4.	Tables and Indexing	7
6.	Relationship to Other MIB Modules	8
6.1.	Relationship to the SNMPv2-MIB	9
6.2.	Relationship to the RMON2-MIB	9
6.3.	MIB modules required for IMPORTS	9
7.	Definitions	9
8.	Security Considerations	21
9.	Applicability Statement	24
10.	IANA Considerations	25
11.	Contributors	25
12.	Acknowledgements	25
13.	References	25
13.1.	Normative References	25
13.2.	Informative References	26
Appendix A.	Change Log	26
Appendix B.	Open Issues	28
Appendix C.	28

Internet-Draft

The REPORT-SAMPLED-MIB

November 2012

1. Introduction

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

This version of the REPORT-SAMPLED-MIB offers one type of off-line reporting. The MIB offers a means to collect sampled data related to defined MIB objects. This type of reporting is contained in the reportSampledGroup. Other types of report data are possible, including statistical data and historical data. However, it was felt wise to focus on a more limited scope off-line reporting capability and gain experimental use and application prior to expending energy developing a more extensive capability.

For the collection of sampled data, the REPORT-SAMPLED-MIB draws directly from the usrHistoryGroup from RMON 2 [[RFC2021](#)] through application of the 'AUGMENTS' clause. . 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 contain sampled data from a set of identified MIB objects sampled at the same time point. The report consists of the buckets, each containing sets of sampled data from the selected MIB objects but at the specific

sampling times. The reportSampledObjectTable allows the user to identify the multiple MIB objects to be sampled. The reportSampledDataTable contains the storage of the reported sampled data contained within buckets, one bucket for each time sampling instance.

[2.](#) The Internet-Standard Management Framework

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

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

[3.](#) Conventions

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

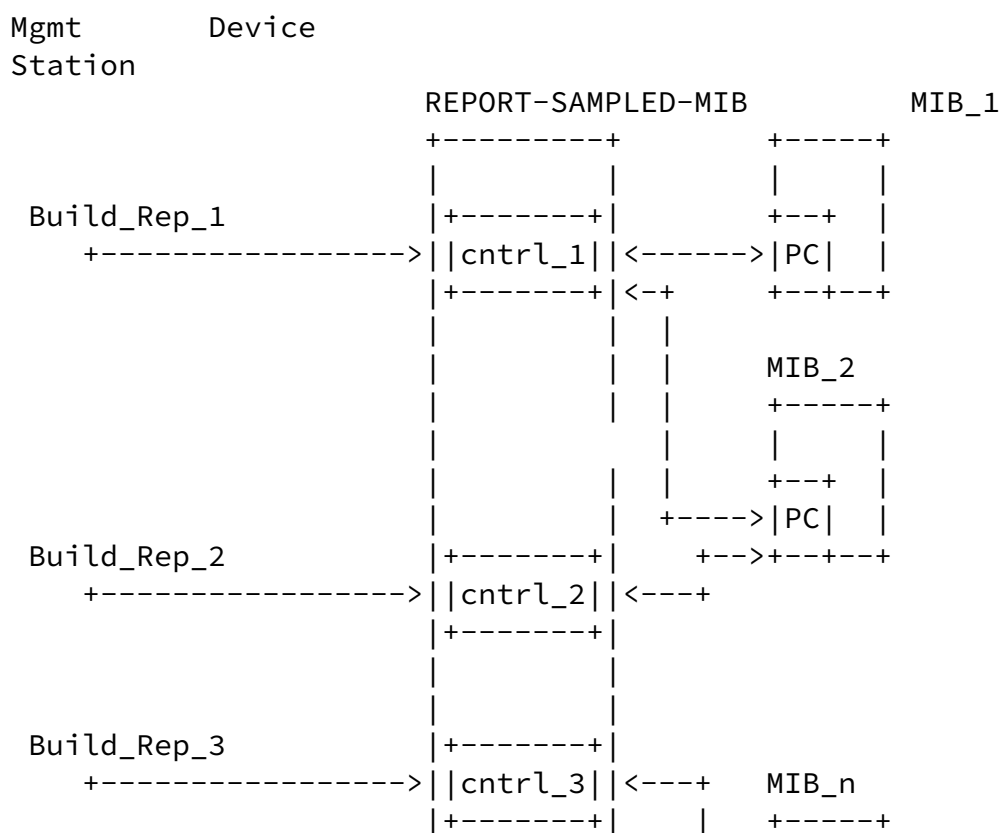
[4.](#) Overview

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

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

This section describes the management model for the REPORT-SAMPLED-MIB process.

Figure 1 illustrates a potential use of the REPORT-SAMPLED-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-SAMPLED-MIB resident on the remote device. The reports instruct the device to monitor the status of specified counters (on other MIBs and potentially on other devices in close network proximity) periodically. The reports are stored locally until the management station decides to pull them off the device. The figure shows a case where the REPORT-SAMPLED-MIB generates a notification that Report_2 has completed, prompting the management station to pull Report_2 from the device.



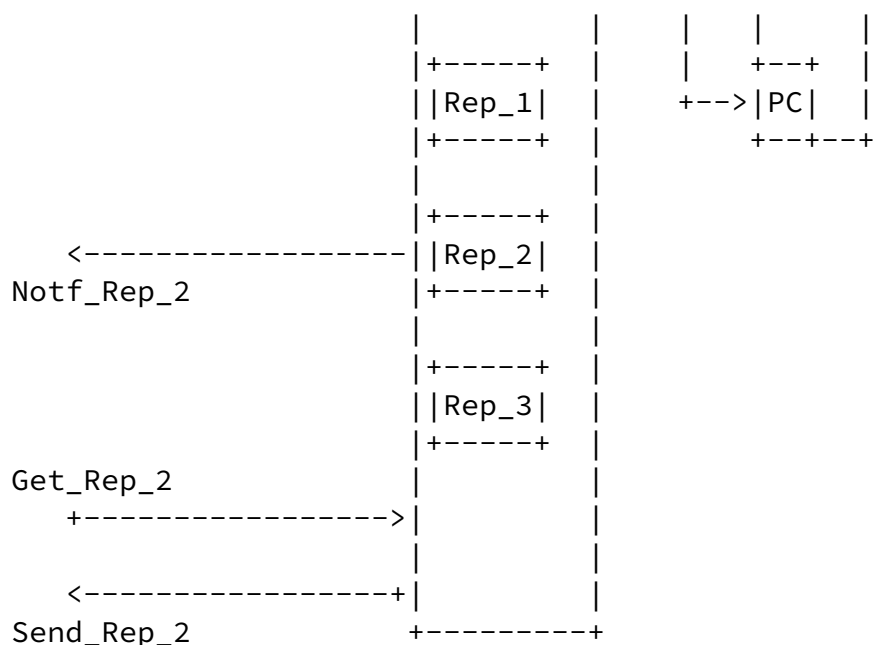


Figure 1: REPORT-SAMPLED-MIB front-end report generation process.

This version of the REPORT-SAMPLED-MIB provides for the collection of sampled data instead of statistical data. It does this by augmenting 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.

4.2. Terms

The following definitions apply throughout this document:

- 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 sampled report data.

5. Structure of the MIB Module

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

- o reportSampledMIBNotifications - defines the notifications associated with the REPORT-SAMPLED-MIB.
- o reportSampledMIBObjects - defines the objects forming the basis for the REPORT-SAMPLED-MIB. These objects are divided up by function into the following groups (currently only one group is defined):
 - o
 - * Sampled Group - This group contains the objects which support the generation (collection) of reports exposing sampled data values.
 - o reportSampledMIBConformance - Defines a variety of conformance of implementations of this REPORT-SAMPLED-MIB.

5.1. Textual Conventions

No textual conventions are used in the REPORT-SAMPLED-MIB.

5.2. The Sampled Group

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

- o reportSampledControlTable - allows for the setting of the parameters of the report.
- o reportSampledObjectTable - sets the referenced objects to be sampled during the test. With this capability, the management application can reference multiple objects, all of which are sampled during the test and reported out through the reportSampledData Table.
- o reportSampledDataTable - contains the reports.

5.3. The Notifications Group

The Notifications Sub-tree contains the list of notifications supported within the REPORT-SAMPLED-MIB and their intended purpose or utility. The single notification defined within this MIB module is the 'reportSampledNewDataReport'. This notification is sent by the agent upon completion of a given report on the device. The notification contains the following objects: 'usrHistoryControlOwner', the entity that configured this report entry, and the 'reportSampledReportIndex', the index of the data table for this report. Collectively, these objects allow the management application to pull the completed report from the agent.

5.4. Tables and Indexing

The REPORT-SAMPLED-MIB module contains a number of tables which record data related to:

- o the control and generation of remote performance reports,
- o the storage of remote performance reports, and
- o the notification of remote report completion.

The REPORT-SAMPLED-MIB module's tables are indexed via the following constructs:

- o usrHistoryControlIndex - from the RMON2-MIB [[RFC2021](#)], an index

that uniquely identifies an entry in the `usrHistoryControlTable`. Each such entry defines a set of samples at a particular interval for a specified set of MIB instances available from the managed system.

- o `usrHistoryObjectIndex` - from the `RMON2-MIB`, an index used to uniquely identify an entry in the `usrHistoryObject` table from the `RMON2-MIB`. Each such entry defines a MIB instance to be collected periodically.
- o `reportSampledReportIndex` - an index that uniquely identifies the particular report an entry is associated with among the set of reports requested through the `reportSampledControlNumber` in the `reportSampledControlEntry`.
- o `reportSampledSampleIndex` - an index that uniquely identifies the particular sample this entry represents among all samples associated with the same `reportSampledControlEntry`.

These tables and their indexing are:

- o `reportSampledControlTable` - this table contains a list of data-collection configuration entries defining aspects of the reports. These include, e.g., number of reports, their start and stop times, etc. This table 'AUGMENTS { `usrHistoryControlEntry` }'.
- o `reportSampledObjectTable` - this table contains a list of data-collection configuration entries which identify specific MIB entries on other devices to monitor. This table 'AUGMENTS { `usrHistoryObjectEntry` }'.
- o `reportSampledTable` - this table contains a list of historical samples collected for the report. This table has 'INDEX { `usrHistoryControlIndex`, `reportSampledReportIndex`, `reportSampledSampleIndex`, `usrHistoryObjectIndex` }'.

6. Relationship to Other MIB Modules

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-SAMPLED-MIB does not duplicate those objects.

[6.2.](#) Relationship to the RMON2-MIB

The REPORT-SAMPLED-MIB is closely related to the RMON2-MIB [[RFC2021](#)] `usrHistoryGroup`. Specifically, the `reportSampledGroup` is a direct copy of the RMON2 User History Group, with the names changed to comply with the naming conventions within the REPORT-SAMPLED-MIB. Further, the design and use of the control tables within the REPORT-SAMPLED-MIB draw exactly from the definition of these table structures in the earlier RMON MIBs through the use of the 'AUGMENTS' clause within the '`reportSampledControlTable`' and the '`reportSampledTable`' in this MIB module.

[6.3.](#) MIB modules required for IMPORTS

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. Therefore, the imported items in this MIB module, such as Textual Conventions, that are not already cited, are cited in this section. Since relationships to other MIB modules should be described in the narrative text, this section will cite modules from which Textual Conventions are imported.

The REPORT-SAMPLED-MIB module IMPORTS objects from SNMPv2-SMI [[RFC2578](#)], SNMPv2-TC [[RFC2579](#)], SNMPv2-CONF [[RFC2580](#)], IF-MIB [[RFC2863](#)], and INET-ADDRESS-MIB [[RFC4001](#)]. Significantly, the REPORT-SAMPLED-MIB module also IMPORTS objects from the RMON2-MIB module [[RFC2021](#)].

[7.](#) Definitions

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

```
IMPORTS
```

```
    MODULE-IDENTITY, OBJECT-TYPE, NOTIFICATION-TYPE,
```

Gauge32, Integer32, experimental
FROM SNMPv2-SMI

-- [[RFC2578](#)]

Cole, et al.

Expires May 4, 2013

[Page 9]

Internet-Draft

The REPORT-SAMPLED-MIB

November 2012

TimeStamp

FROM SNMPv2-TC

-- [[RFC2579](#)]

MODULE-COMPLIANCE, OBJECT-GROUP,
NOTIFICATION-GROUP

FROM SNMPv2-CONF

-- [[RFC2580](#)]

usrHistoryControlEntry, usrHistoryObjectEntry,
usrHistoryControlIndex, usrHistoryControlOwner,
usrHistoryObjectIndex

-- usrHistoryControlObjects, usrHistoryControlBucketsRequested,
-- usrHistoryControlBucketsGranted, usrHistoryControlInterval,
-- usrHistoryControlStatus,
-- usrHistoryObjectVariable, usrHistoryObjectSampleType
FROM RMON2-MIB

-- [[RFC2021](#)]

InetAddress, InetAddressType

FROM INET-ADDRESS-MIB

-- [[RFC4001](#)]

;

reportSampledMIB MODULE-IDENTITY

LAST-UPDATED "201211051300Z" -- November 05, 2012

ORGANIZATION "IETF MANET Working Group"

CONTACT-INFO

"WG E-Mail: manet@ietf.org"

WG Chairs: sratliff@cisco.com

jmacker@nrl.navy.mil

Editors: Robert G. Cole
US Army CERDEC
6010 Frankford Road
Aberdeen Proving Ground, MD 21005
USA
+1 443 395-8744
robert.g.cole@us.army.mil

Joseph Macker

Naval Research Laboratory
Washington, D.C. 20375
USA
macker@itd.nrl.navy.mil

Andy Bierman
YumaWorks, Inc.
andy@yumaworks.com"

DESCRIPTION

Cole, et al.

Expires May 4, 2013

[Page 10]

Internet-Draft

The REPORT-SAMPLED-MIB

November 2012

"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 "201211051300Z" -- November 05, 2012

DESCRIPTION

"The seventh draft of this MIB module published as [draft-ietf-manet-report-mib-03.txt](#).

Revisions to this draft include

- a) Added a 'Tables and Indexing' section to the body of this document.
- b) Added an 'Applicability Statement' section to the body of this document."

REVISION "201201311300Z" -- January 31, 2012

DESCRIPTION

"The sixth draft of this MIB module published as [draft-ietf-manet-report-mib-02.txt](#).

Revisions to this draft include

- a) Pulled the statistical and historical reporting from the MIB module and left only the sampled reporting, in order to greatly simplify the first instance of this reporting MIB module.
- b) Renamed the module, the REPORT-SAMPLED-MIB module.
- c) Leveraged the RMON2-MIB module more effectively through the use of the AUGMENTS clause.
- d) Changed the module to 'experimental'."

REVISION "201102171300Z" -- February 17, 2011

DESCRIPTION

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

Revisions to this draft include

- a) Proposed changes to the statsReport table to simplify communications between device and mgmt application,
- b) Added Notifications,
- c) Changed the reporting structure of the Sampled and the History reporting to align with the structure of the Statistics reports for the purpose of

Cole, et al.

Expires May 4, 2013

[Page 11]

Internet-Draft

The REPORT-SAMPLED-MIB

November 2012

allowing for efficient notification and collection of data reports.

- d) Ran through smilint to clean up all errors and most warning. A few still remain."

REVISION "201007051300Z" -- July 05, 2010

DESCRIPTION

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

Significant revisions to this draft include

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

REVISION "201003021300Z" -- March 02, 2010

DESCRIPTION

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

REVISION "200910251300Z" -- October 25, 2009

DESCRIPTION

"The second draft of this MIB module published as [draft-cole-manet-report-mib-01.txt](#). Significant revisions to this draft include a) the inclusion of raw data collection borrow blatantly from the usrHistory Group within RMON2, b) the deletion of the CurrentHistoryTable from version -00, c) modifications to the overall structure of the MIB, and d) the definition of various Compliance options for implementations related to this MIB."

REVISION "200904281300Z" -- April 28, 2009

DESCRIPTION

"Initial draft of this MIB module published as [draft-cole-manet-report-mib-00.txt](#)."

-- RFC-Editor assigns XXXX

::= { experimental 998 } -- to be assigned by IANA

-- TEXTUAL CONVENTIONS

-- None

--

Cole, et al.

Expires May 4, 2013

[Page 12]

Internet-Draft

The REPORT-SAMPLED-MIB

November 2012

-- Top-Level Object Identifier Assignments

--

```
reportSampledMIBNotifications OBJECT IDENTIFIER
                               ::= { reportSampledMIB 0 }
reportSampledMIBObjects       OBJECT IDENTIFIER
                               ::= { reportSampledMIB 1 }
reportSampledMIBConformance   OBJECT IDENTIFIER
                               ::= { reportSampledMIB 2 }

reportSampledGroup             OBJECT IDENTIFIER
                               ::= { reportSampledMIBObjects 1 }
```

-- Then, the reportSampledGroup assignments are :

-- reportSampledControlTable - 1

-- reportSampledObjectTable - 2

-- reportSampledDataTable - 3

```

reportSampledControlTable OBJECT-TYPE
    SYNTAX SEQUENCE OF SampledControlEntry
    MAX-ACCESS not-accessible
    STATUS current
    DESCRIPTION
        "A list of data-collection configuration entries.
        This table augments the 'usrHistoryControlTable'
        from RMON2-MIB (RFC 2021)."
```

REFERENCE

```

    "RFC 2021 - Remote Network Monitoring Management
    Information Base Version 2 (RMON2-MIB),
    Waldbusser, S., January 1997."
 ::= { 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"
    AUGMENTS { usrHistoryControlEntry }
```

```

 ::= { reportSampledControlTable 1 }

SampledControlEntry ::= SEQUENCE {
    reportSampledControlRequestedNumber    Integer32,
    reportSampledControlReportNumber       Integer32
}

reportSampledControlRequestedNumber OBJECT-TYPE
    SYNTAX Integer32 (1..127)
    MAX-ACCESS read-create
    STATUS current
```

DESCRIPTION

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

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

DEFVAL { 1 }

::= { reportSampledControlEntry 1 }

reportSampledControlReportNumber OBJECT-TYPE

SYNTAX Integer32 (1..127)

MAX-ACCESS read-only

STATUS current

DESCRIPTION

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

::= { reportSampledControlEntry 2 }

-- Object table

reportSampledObjectTable OBJECT-TYPE

SYNTAX SEQUENCE OF SampledObjectEntry

MAX-ACCESS not-accessible

STATUS current

DESCRIPTION

"A list of data-collection configuration entries. This table augments the 'usrHistoryObjectTable' from the RMON2-MIB ([RFC 2021](#))."

REFERENCE

"[RFC 2021](#) - Remote Network Monitoring Management Information Base Version 2 (RMON2-MIB), Waldbusser, S., January 1997."

::= { 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 usrHistoryControlIndex value in the index is that of the associated reportSampledControlEntry.

For example, an instance of reportSampledObjectVariable might be reportSampledObjectVariable.1.3"

AUGMENTS { usrHistoryObjectEntry }
::= { reportSampledObjectTable 1 }

```
SampledObjectEntry ::= SEQUENCE {  
    reportSampledObjectIpAddrType      InetAddressType,  
    reportSampledObjectIPAddress      InetAddress  
}
```

reportSampledObjectIpAddrType OBJECT-TYPE

SYNTAX InetAddressType

MAX-ACCESS read-create

STATUS current

DESCRIPTION

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

Only the values ipv4(1) and ipv6(2) are supported.

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

::= { reportSampledObjectEntry 1 }

reportSampledObjectIPAddress OBJECT-TYPE

SYNTAX InetAddress (SIZE(4|16))

MAX-ACCESS read-create

STATUS current

DESCRIPTION

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

```

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

-- 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 usrHistoryControlIndex value, from the RMON2-MIB
        (RFC 2021), in the index identifies the
        reportSampledControlEntry on whose behalf this entry
        was created.

        The usrHistoryObjectIndex 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"
    REFERENCE
        "RFC 2021 - Remote Network Monitoring Management
        Information Base Version 2 (RMON2-MIB),
        Waldbusser, S., January 1997."
    INDEX { usrHistoryControlIndex, reportSampledReportIndex,
            reportSampledSampleIndex, usrHistoryObjectIndex }
    ::= { reportSampledTable 1 }

SampledEntry ::= SEQUENCE {
    reportSampledReportIndex  Integer32,
```

reportSampledReportID Integer32,

Internet-Draft

The REPORT-SAMPLED-MIB

November 2012

```
    reportSampledSampleIndex   Integer32,  
    reportSampledIntervalStart   TimeStamp,  
    reportSampledIntervalEnd   TimeStamp,  
    reportSampledAbsValue       Gauge32,  
    reportSampledValStatus      INTEGER  
}
```

reportSampledReportIndex OBJECT-TYPE

SYNTAX Integer32 (1..127)

MAX-ACCESS not-accessible

STATUS current

DESCRIPTION

"An index that uniquely identifies the particular report this entry is associated with among the set of reports requested through the reportSampledControlNumber in the reportSampledControlEntry. This index starts at 1 and increases by one as each new report is generated."

::= { reportSampledEntry 1 }

reportSampledReportID OBJECT-TYPE

SYNTAX Integer32 (1..127)

MAX-ACCESS read-only

STATUS current

DESCRIPTION

"An ID that uniquely identifies the particular report this entry is associated with among the set of reports requested through the reportSampledControlNumber in the reportSampledControlEntry. This ID is set to equal the value of the reportSampledReportIndex."

::= { reportSampledEntry 2 }

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 3 }

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 4 }

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 5 }
```

```
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 6 }
```

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 7 }
```

--

-- Notifications

--

reportSampledNotificationObjects OBJECT IDENTIFIER

```

::= {reportSampledMIBNotifications 0}

-- reportSampledNotificationObjects

reportSampledNewDataReport NOTIFICATION-TYPE
    OBJECTS { usrHistoryControlOwner, -- The entity that
        -- configured this entry
        reportSampledReportID -- The ID of the
        -- data table for this report
    }
    STATUS current
    DESCRIPTION
        "reportSampledNewDataReport is a notification sent
        when a new report is completed from the
        reportSampledControlTable. The notification carries
        the index from the control table that established
        this report and the index from the data table that
        holds this report. Indication of the new report
        is when the reportSampledControlReportNumber
        is incremented."
    ::= { reportSampledNotificationObjects 1 }

```

```

--
-- Compliance Statements
--

-- Mandatory for Sampled will include all.

reportSampledCompliances OBJECT IDENTIFIER
    ::= { reportSampledMIBConformance 1 }
reportSampledMIBGroups OBJECT IDENTIFIER
    ::= { reportSampledMIBConformance 2 }

reportSampledCompliance MODULE-COMPLIANCE
    STATUS current
    DESCRIPTION "The Sampled basic implementation requirements for
        managed network entities that implement
        the REPORT Sampled process."
    MODULE -- this module
    MANDATORY-GROUPS { reportSampledLocalGroup }

```

```

::= { reportSampledCompliances 1 }

reportSampledNotificationCompliance  MODULE-COMPLIANCE
    STATUS current
    DESCRIPTION "The Sampled Notification implementation
                 requirements for managed network entities
                 that implement the REPORT process."
    MODULE -- this module
    MANDATORY-GROUPS { reportSampledNotificationObjectGroup }
::= { reportSampledCompliances 2 }

-- Units of Conformance

reportSampledLocalGroup  OBJECT-GROUP
    OBJECTS {
        reportSampledControlRequestedNumber,
        reportSampledControlReportNumber,
        reportSampledObjectIpAddressType,
        reportSampledObjectIPAddress,
        reportSampledReportID,
        reportSampledIntervalStart,
        reportSampledIntervalEnd,
        reportSampledAbsValue,
        reportSampledValStatus
    }
    STATUS current
    DESCRIPTION

```

```

    "Set of REPORT state objects implemented
    in this module."
::= { reportSampledMIBGroups 1 }

--reportSampledImportedGroup  OBJECT-GROUP
--    OBJECTS {
--        usrHistoryControlObjects,
--        usrHistoryControlBucketsRequested,
--        usrHistoryControlBucketsGranted,
--        usrHistoryControlInterval,
--        usrHistoryControlOwner,
--        usrHistoryControlStatus,

```

```

--          usrHistoryObjectVariable,
--          usrHistoryObjectSampleType
--      }
--      STATUS    current
--      DESCRIPTION
--          "Set of REPORT state objects implemented
--          in this module."
-- ::= { reportSampledMIBGroups 2 }

reportSampledNotificationObjectGroup  NOTIFICATION-GROUP
    NOTIFICATIONS {
        reportSampledNewDataReport
    }
    STATUS    current
    DESCRIPTION
        "Set of REPORT notifications implemented
        in this module for the Sampled reports."
    ::= { reportSampledMIBGroups 3 }

END

```

8. Security Considerations

This REPORT-SAMPLED-MIB defines a capability where the local device may poll other remote devices to collect performance data accessible through other MIB modules on the remote devices. These capabilities defined within the REPORT-SAMPLED-MIB are control-able by a network management application through SNMP. As such, a network management application could potentially use the REPORT-SAMPLED-MIB as a mechanism to implement a Distributed Denial-of-Service (DDoS) attack against remote devices. Care should be taken to secure access to the REPORT-SAMPLED-MIB agent. Specifically, access control mechanisms and authentication mechanisms (via SNMPv3) should always be used for SNMP SET operations. Further, some objects may contain data deemed sensitive and authentication and encryption mechanisms (via SNMPv3)

should be used for SNMP GET operations.

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 The reportSampledControlTable is a writable table whose columnar objects are read-create. The following objects with MAX ACCESS of read-create and their security sensitivities are:
 - o
 - * usrHistoryControlBucketRequested - this object identifies the requested number of buckets (or intervals) requested for each identified object for each report instance. As such, this related to the total device memory necessary to hold the collected data for the identified reports. The device must determine whether it has the necessary storage. If not, the device can indicate the available storage through the usrHistoryControlBucketGranted object within this table. The device to protect itself against memory overruns.
 - * usrHistoryControlInterval - this object identifies the time interval being sampling events. If set too low, the device may not be able to sample the object on remote devices fast enough to satisfy the requested interval. Further, setting this value too low could be used to overwhelm the processing capabilities of the remote agent, resulting in a Denial-of-Service (DoS) attack.
 - * reportSampledControlRequestedNumber - this object identifies the requested number of consecutive reports of this type to be generated and stored in this device. When, the value of this object should be considered in the local device's estimates of memory consumption related to this control table row.
 - * usrHistoryControlOwner - this objects provides a name associated with the presumed identity of the application configuring this report. If the local device or management applications attribute any authority to the values contained in this object, then it is critical to secure access to setting or modifying the value of this object.

- * `usrHistoryControlStatus` - this is the `RowStatus` object controlling the configuration of this table row.
- o The `reportSampledObjectTable` is a writable table whose columnar objects are read-create. The following objects with MAX ACCESS of read-create and their security sensitivities are:
 - o
 - * `usrHistoryObjectVariable` - this object identifies the specific OID on a (potentially) remote agent whose counter or gauge values are to be collected for the reports. If, for whatever reason, the values of this OID collected within the report is deemed sensitive, then the SNMP GET operations issued to collect these values should use SNMPv3 authentication and encryption mechanisms to protect.
 - * `reportSampledObjectIpAddressType` - this object identifies the address type associated with the address of the agent whose OID data is being collected for the report.
 - * `reportSampledObjectIpAddress` - this object identifies the address associated with the address of the agent whose OID data is being collected for the report. If the address of the remote devices is deemed sensitive, then the SNMP SETs which write or the SNMP GET which collect this information should be protected using SNMPv3 authentication and encryption mechanisms.
 - * `usrHistoryObjectSampleType` - this object identifies the the way in which data values are to be stored within the reports.

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

Internet-Draft

The REPORT-SAMPLED-MIB

November 2012

the objects only to those principals (users) that have legitimate rights to indeed GET or SET (change/create/delete) them.

[9.](#) Applicability Statement

This document describes objects for configuring parameters of the remote report generation process on a router or close device. This MIB module, denoted REPORT-SAMPLED-MIB, also reports performance information and notifications. The REPORT-SAMPLED-MIB provides for the remote control, collection and notification of performance reports on devices. As such, it eliminates the need for periodic polling for counters from remote management stations as a means for generating performance reports. This is hoped to greatly reduce management overhead on the MANET. This sections provides some examples of how this MIB module can be used in MANET network deployments. A fuller discussion of MANET network management use cases and challenges will be provided elsewhere.

In the following, two scenarios are listed where this MIB module is useful, i.e.,

- o For Mobile vehicles with Low Bandwidth Satellite Link to a Fixed NOC - Here the vehicles carrying the MANET routers carry multiple wireless interfaces, one of which is a relatively low-bandwidth on-the-move satellite connection which interconnects a fix NOC to the nodes of the MANET. Standards-based methods for monitoring and fault management from the fixed NOC are necessary for this deployment option. However, to reduce polling overhead over the low bandwidth communications links, the REPORT-SAMPLED-MIB can be deployed the remote MANET nodes for the remote generation of performance reports.
- o For Fixed NOC and Mobile Local Manager in Larger Vehicles - for larger vehicles, a hierarchical network management arrangement is useful. Centralized network management is performed from a fixed NOC while local management is performed locally from within the vehicles. Standards-based methods for configuration, monitoring, fault and performance management are necessary for this deployment option.

Internet-Draft

The REPORT-SAMPLED-MIB

November 2012

[10.](#) IANA Considerations

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

Descriptor	OBJECT IDENTIFIER value
-----	-----
reportSampledMIB	{ experimental XXX }

[11.](#) 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.

[12.](#) Acknowledgements

We would like to thank Bert Wijnen 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 promoting additions to this MIB through his thoughtful consideration of performance monitoring requirements for other MIBs within the MANET WG, e.g., NHDP and OLSR MIBs.

[13.](#) References

[13.1.](#) Normative References

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

[RFC2863] McCloghrie, K. and F. Kastenholz, "The Interfaces Group

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- [RFC3418] Presuhn, R., "Management Information Base (MIB) for the Simple Network Management Protocol (SNMP)", STD 62, [RFC 3418](#), December 2002.
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- [RFC2578] McCloghrie, K., Ed., Perkins, D., Ed., and J. Schoenwaelder, Ed., "Structure of Management Information Version 2 (SMIv2)", STD 58, [RFC 2578](#), April 1999.

Cole, et al.

Expires May 4, 2013

[Page 25]

Internet-Draft

The REPORT-SAMPLED-MIB

November 2012

- [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.
- [RFC4001] Daniele, M., Haberman, B., Routhier, S., and J. Schoenwaelder, "Textual Conventions for Internet Network Addresses", [RFC 4001](#), February 2005.

[13.2](#). 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.

[Appendix A](#). Change Log

Changes from [draft-ietf-manet-report-mib-01](#) to [draft-ietf-manet-report-mib-02](#) draft.

1. Stripped the Statistical and the Historical Reports from this draft in order to greatly simplify the initial development and experiments of this MIB module.
2. Changed the RFC category to Experimental.

3. Completed the Security section.
4. Relied upon the AUGMENTS statement to simplify further this MIB definition.

Changes from [draft-ietf-manet-report-mib-00](#) to [draft-ietf-manet-report-mib-01](#) draft.

1. Proposed additions to the statsReports in order to potentially simplify data transmission to management applications.
2. Added some Notification definitions and their relationship to the three reports' structure, i.e., statsReports, sampledReports, and historyReports.
3. In the process of adding notifications for the Sampled and the History reports, decided to restructure the reports from their previously rolling storage model to the fixed interval reporting used all along in the Statistics reporting. This allows the

Cole, et al.

Expires May 4, 2013

[Page 26]

Internet-Draft

The REPORT-SAMPLED-MIB

November 2012

agent to notify the management application that a report has completed and that it is ready to be pulled from the agent storage.

4. Ran MIB through smilint checker and cleaned up all errors and most warnings. A few warnings remain to be addressed.
5. Cleaned up textual material.

Changes from [draft-cole-manet-report-mib-02](#) to [draft-ietf-manet-report-mib-00](#) draft.

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

3. Worked on and added sections discussing the relationship to other MIBs.

Changes from [draft-cole-manet-report-mib-01](#) to [draft-cole-manet-report-mib-02](#) draft.

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

Changes from [draft-cole-manet-report-mib-00](#) to [draft-cole-manet-report-mib-01](#) draft.

1. Added (copied) the usrHistory group from RMON2 into the REPORT-SAMPLED-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-SAMPLED-MIB.
4. Added the Compliance and Conformance material. Defined several Compliance Groups to all for base implementations of the REPORT-SAMPLED-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-SAMPLED-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. Identify all objects requiring non-volatile storage in their DESCRIPTION clauses.

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. *
*
*****
```

Authors' Addresses

Robert G. Cole
US Army CERDEC
6010 Frankford Road
Aberdeen Proving Ground, Maryland 21005
USA

Phone: +1 443 395 8744
EMail: robert.g.cole@us.army.mil
URI: <http://www.cs.jhu.edu/~rgcole/>

Joseph Macker
Naval Research Laboratory
Washington, D.C. 20375
USA

EMail: macker@itd.nrl.navy.mil

Andy Bierman
YumaWorks, Inc.
Redwood City, CA 94065

EMail: andy@yumaworks.com