Textual Conventions for MIB Modules Using Performance History
Based on 15 Minute Intervals

Status of this Memo

This document specifies an Internet standards track protocol for the
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improvements. Please refer to the current edition of the "Internet
Official Protocol Standards" (STD 1) for the standardization state
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Abstract

This document defines a set of Textual Conventions for MIB modules
that make use of performance history data based on 15 minute
intervals.

This memo replaces RFC 2493. Changes relative to RFC 2493 are
summarized in the MIB module’s REVISION clause.

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1. Introduction

In cases where a manager must obtain performance history data about the behavior of equipment it manages, several strategies can be followed in the design of a MIB that represents the managed equipment, including:

0 The agent counts events on a continuous basis and, whenever desired, the manager obtains the value of the event counter and adjusts its understanding of the history of events at the agent.

0 The agent allocates events to ‘buckets’ where each bucket represents an interval of time.

Telecommunications equipment often makes use of the latter strategy. See [3][4][5][7][8] for examples. In particular, for this equipment it is common that history data is maintained by the agent in terms of fifteen minute intervals.

This memo does not attempt to compare the relative merits of different strategies used to obtain history data. Differences may include polling policy, the amount of management traffic between manager and agent, agent simplicity, and ‘data currentness’ of the data obtained by the manager. MIB designers should consider these aspects when choosing a particular strategy in a MIB design. Instead, this memo provides definitions that can be used in MIB modules that require history data based on fifteen minute intervals.

When designing a MIB module, it is often useful to define new types similar to those defined in the SMI [2]. In comparison to a type defined in the SMI, each of these new types has a different name, a similar syntax, but more precise semantics. These newly defined types are termed textual conventions, and are used for the convenience of humans reading the MIB module. This is done through Textual Conventions as defined in RFC 2579 [1]. It is the purpose of this document to define the set of textual conventions to be used when performance history based on 15 minute intervals is kept. The performance history textual conventions defined in this memo are based on 32 bit counts. For high capacity performance history counts see [9].

2. Note on Invalid Data and Proxies

In this document, the word proxy indicates an application which receives SNMP messages and replies to them on behalf of the devices where the actual implementation resides, e.g., DS3/E3 interfaces. The proxy will have already collected the information about the DS3/E3 interfaces into its local database and may not necessarily
forward requests to the actual DS3/E3 interface. It is expected in such an application that there are periods of time where the proxy is not communicating with the DS3/E3 interfaces. In these instances, the proxy will not necessarily have up-to-date configuration information, and will most likely have missed the collection of some data. Missed data collection may result in some intervals in the interval table being unavailable.

3. Note on \texttt{xyzTimeElapsed}

While \texttt{xyzTimeElapsed} is defined as having a maximum, there may be cases (e.g., an adjustment in the system’s time-of-day clock) where the actual value of the current interval would exceed this maximum value.

Suppose that an agent which aligns its 15-minute measurement intervals to 15-minute time-of-day ("wall clock") boundaries has a time-of-day clock that systematically gains time, and that a manager periodically corrects the clock by setting it back.

It is assumed that the agent’s time-of-day clock is reasonably accurate, say within a few seconds per day. Thus, the manager’s periodic clock adjustments will normally be small, and if done frequently enough, need not ever exceed 10 seconds. In this case, all interval durations will be within the allowed tolerance and none need be marked invalid, \textit{if} the ANSI procedure of ending measurement intervals at 15-minute time-of-day boundaries is followed [6].

If the time-of-day clock is systematically adjusted in small increments, then always ending measurement intervals at 15-minute time-of-day boundaries will result, in the long term, in the correct number of intervals with the correct average duration, irrespective of whether the clock is moved ahead or moved back. Thus, if for some reason, such as an adjustment in the system’s time-of-day clock, the current interval exceeds the maximum value, it is considered acceptable that the agent will return the maximum value.

4. Note on \texttt{xyzValidIntervals}

The overall constraint on \texttt{n} is \texttt{1 <= n <= 96}. Any additional constraints on \texttt{n} must be defined in the DESCRIPTION clause (e.g., see [5]).
5. Definitions

PerfHist-TC-MIB DEFINITIONS ::= BEGIN

IMPORTS
   MODULE-IDENTITY,
   Gauge32, mib-2
   FROM SNMPv2-SMI
   TEXTUAL-CONVENTION
   FROM SNMPv2-TC;

perfHistTCMIB MODULE-IDENTITY
   LAST-UPDATED "200308130000Z"
   ORGANIZATION "IETF AToM MIB WG"
   CONTACT-INFO
   "WG charter:
   http://www.ietf.org/html.charters/atommib-charter.html

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DESCRIPTION
   "This MIB Module provides Textual Conventions
to be used by systems supporting 15 minute
based performance history counts.

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RFC 3593; see the RFC itself for full
legal notices."

REVISION   "200308130000Z"
DESCRIPTION
   "Contact information and references updated.
   No technical changes have been applied.
   Published as RFC 3593."

REVISION   "199811071100Z"
DESCRIPTION
   "The RFC 2493 version of this MIB module."
 ::= { mib-2 58 }
-- The Textual Conventions defined below are organized
-- alphabetically

-- Use of these TCs assumes the following:
-- 0 The agent supports 15 minute based history
-- counters.
-- 0 The agent is capable of keeping a history of n
-- intervals of 15 minute performance data. The
-- value of n is defined by the specific MIB
-- module but shall be 0 < n <= 96.
-- 0 The agent may optionally support performance
-- data aggregating the history intervals.
-- 0 The agent will keep separate tables for the
-- current interval, the history intervals, and
-- the total aggregates.
-- 0 The agent will keep the following objects.
-- If performance data is kept for multiple instances
-- of a measured entity, then
-- these objects are applied to each instance of
-- the measured entity (e.g., interfaces).

-- xyzTimeElapsed OBJECT-TYPE
--       SYNTAX  INTEGER (0..899)
--       MAX-ACCESS  read-only
--       STATUS  current
--       DESCRIPTION
--       "The number of seconds that have elapsed since
--       the beginning of the current measurement period.
--       If, for some reason, such as an adjustment in the
--       system's time-of-day clock, the current interval
--       exceeds the maximum value, the agent will return
--       the maximum value."
--       ::= { xxx }

-- xyzValidIntervals OBJECT-TYPE
--       SYNTAX  INTEGER (0..<n>)
--       MAX-ACCESS  read-only
--       STATUS  current
--       DESCRIPTION
--       "The number of previous near end intervals
--       for which data was collected.
--       [ The overall constraint on <n> is 1 <= n <= 96; ]
--       [ Define any additional constraints on <n> here. ]
--       The value will be <n> unless the measurement was
--       (re-)started within the last (<n>*15) minutes, in which
--       case the value will be the number of complete 15
--       minute intervals for which the agent has at least
--       some data. In certain cases (e.g., in the case
-- where the agent is a proxy) it is possible that some
-- intervals are unavailable. In this case, this
-- interval is the maximum interval number for
-- which data is available."
-- ::= { xxx }

-- xyzInvalidIntervals OBJECT-TYPE
-- SYNTAX  INTEGER (0..<n>)
-- MAX-ACCESS read-only
-- STATUS  current
-- DESCRIPTION
-- "The number of intervals in the range from
-- 0 to xyzValidIntervals for which no
-- data is available. This object will typically
-- be zero except in cases where the data for some
-- intervals are not available (e.g., in proxy
-- situations)."
-- ::= { xxx }

PerfCurrentCount ::= TEXTUAL-CONVENTION
STATUS current
DESCRIPTION
"A counter associated with a
performance measurement in a current 15
minute measurement interval. The value
of this counter starts from zero and is
increased when associated events occur,
until the end of the 15 minute interval.
At that time the value of the counter is
stored in the first 15 minute history
interval, and the CurrentCount is
restarted at zero. In the
case where the agent has no valid data
available for the current interval the
corresponding object instance is not
available and upon a retrieval request
a corresponding error message shall be
returned to indicate that this instance
does not exist (for example, a noSuchName
error for SNMPv1 and a noSuchInstance for
SNMPv2 GET operation)."
SYNTAX  Gauge32
PerfIntervalCount ::= TEXTUAL-CONVENTION
STATUS current
DESCRIPTION
"A counter associated with a performance measurement in a previous 15 minute measurement interval. In the case where the agent has no valid data available for a particular interval the corresponding object instance is not available and upon a retrieval request a corresponding error message shall be returned to indicate that this instance does not exist (for example, a noSuchName error for SNMPv1 and a noSuchInstance for SNMPv2 GET operation).
In a system supporting a history of n intervals with IntervalCount(1) and IntervalCount(n) the most and least recent intervals respectively, the following applies at the end of a 15 minute interval:
- discard the value of IntervalCount(n)
- the value of IntervalCount(i) becomes that of IntervalCount(i-1) for n >= i > 1
- the value of IntervalCount(1) becomes that of CurrentCount
- the TotalCount, if supported, is adjusted."
SYNTAX Gauge32

PerfTotalCount ::= TEXTUAL-CONVENTION
STATUS current
DESCRIPTION
"A counter associated with a performance measurements aggregating the previous valid 15 minute measurement intervals. (Intervals for which no valid data was available are not counted)"
SYNTAX Gauge32

END
6. Acknowledgments

This document is a product of the AToM MIB Working Group. The editor would like to acknowledge Mike Heard for his many valuable contributions to this memo.

7. References

7.1. Normative References


7.2. Informative References


8. Security Considerations

This memo defines textual conventions for use in other MIB modules. Security issues for these MIB modules are addressed in the memos defining those modules.

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