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
Internet community, and requests discussion and suggestions for
improvements. Please refer to the current edition of the "Internet
Official Protocol Standards" (STD 1) for the standardization state
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Abstract

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

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2. 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:
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.

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] 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 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 a 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 RFC1903[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. See for example the Trunk MIB modules [3][4][5].

3. Note on Invalid Data and Proxy

In this document, the word proxy is meant to indicate 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.
4. Note on \textit{xyzTimeElapsed}

While \textit{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.

5. Note on \textit{xyzValidIntervals}

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

6. Definitions

\texttt{PerfHist-TC-MIB DEFINITIONS ::= BEGIN}

\texttt{IMPORTS}

\texttt{MODULE-IDENTITY,}

\texttt{Gauge32, mib-2}

\texttt{FROM SNMPv2-SMI}

\texttt{TEXTUAL-CONVENTION}

\texttt{FROM SNMPv2-TC;}

\texttt{perfHistTCMIB MODULE-IDENTITY}
LAST-UPDATED "9811071100Z"
ORGANIZATION "IETF AToMMIB and TrunkMIB WGs"
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DESCRIPTION
"This MIB Module provides Textual Conventions
to be used by systems supporting 15 minute
based performance history counts."
 ::= { 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

7. Acknowledgments

This document is a product of the AToMMIB and TrunkMIB Working Groups.

8. References

"Textual Conventions for Version 2 of the Simple Network

"Structure of Management Information for Version 2 of the Simple

[3] Fowler, D., "Definitions of Managed Objects for the DS1, E1, DS2

Interface Type", RFC 2496, January 1999.

[5] Tesink, K., "Definitions of Managed Objects for the SONET/SDH
Interface Type", Work in Progress.

Hierarchy - Layer 1 In-Service Digital Transmission Performance
9. 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.

10. IANA Considerations

Prior to publication of this memo as an RFC, IANA is requested to make a suitable OBJECT IDENTIFIER assignment.

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