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

Status of this Memo

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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.

1. Table of Contents

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:

- 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] 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 xyzTimeElapsed

While 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, _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 xyzValidIntervals

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

6. 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 "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


    END
```

7. Acknowledgments

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

8. References

[1] Case, J., McCloghrie, K., Rose, M., and S. Waldbusser, "Textual Conventions for Version 2 of the Simple Network Management Protocol (SNMPv2)", RFC 1903, January 1996.

[2] Case, J., McCloghrie, K., Rose, M., and S. Waldbusser, "Structure of Management Information for Version 2 of the Simple Network Management Protocol (SNMPv2)", RFC 1902, January 1996.

[3] Fowler, D., "Definitions of Managed Objects for the DS1, E1, DS2 and E2 Interface Types", RFC 2495, January 1999.

[4] Fowler, D., "Definitions of Managed Objects for the DS3/E3 Interface Type", RFC 2496, January 1999.

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

[6] American National Standard for Telecommunications - Digital Hierarchy - Layer 1 In-Service Digital Transmission Performance Monitoring, ANSI T1.231-1997, September 1997.

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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