Network Working Group
Request for Comments: 1233

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Editors
May 1991

Definitions of Managed Objects for the DS3 Interface Type

Status of this Memo

This memo defines objects for managing DS3 Interface objects for use with the SNMP protocol. This memo is a product of the SNMP and Transmission MIB Working Group of the Internet Engineering Task Force (IETF). This RFC specifies an IAB standards track protocol for the Internet community, and requests discussion and suggestions for improvements. Please refer to the current edition of the "IAB Official Protocol Standards" for the standardization state and status of this protocol. Distribution of this memo is unlimited.

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1. Abstract

This memo defines an experimental portion of the Management Information Base (MIB) for use with network management protocols in TCP/IP-based internets. In particular, this memo defines MIB objects for representing DS3 physical interfaces. Implementors should consult in addition to this memo the companion document that

describes that DS1 managed objects.

2. The Network Management Framework

The Internet-standard Network Management Framework consists of three components. They are:

RFC 1155 which defines the SMI, the mechanisms used for describing and naming objects for the purpose of management. RFC 1212 defines a more concise description mechanism, which is wholly consistent with the SMI.

RFC 1156 which defines MIB-I, the core set of managed objects for the Internet suite of protocols. RFC 1213, defines MIB-II, an evolution of MIB-I based on implementation experience and new operational requirements.

RFC 1157 which defines the SNMP, the protocol used for network access to managed objects.

The Framework permits new objects to be defined for the purpose of experimentation and evaluation.

3. Objects

Managed objects are accessed via a virtual information store, termed the Management Information Base or MIB. Objects in the MIB are defined using the subset of Abstract Syntax Notation One (ASN.1) [7] defined in the SMI. In particular, each object has a name, a syntax, and an encoding. The name is an object identifier, an administratively assigned name, which specifies an object type. The object type together with an object instance serves to uniquely identify a specific instantiation of the object. For human convenience, we often use a textual string, termed the OBJECT DESCRIPTOR, to also refer to the object type.

The syntax of an object type defines the abstract data structure corresponding to that object type. The ASN.1 language is used for this purpose. However, the SMI [3] purposely restricts the ASN.1 constructs which may be used. These restrictions are explicitly made for simplicity.

The encoding of an object type is simply how that object type is represented using the object type’s syntax. Implicitly tied to the notion of an object type’s syntax and encoding is how the object type is represented when being transmitted on the network. The SMI specifies the use of the basic encoding rules of ASN.1 [8], subject to the additional requirements imposed by the SNMP.

3.1. Format of Definitions

Section 5 contains contains the specification of all object types contained in this MIB module. The object types are defined using the conventions defined in the SMI, as amended by the extensions specified in [13].

4. Overview

These objects are used when the particular media being used to realize an interface is a DS3 interface. At present, this applies to these values of the ifType variable in the Internet-standard MIB:

ds3 (30)

The definitions contained herein are based on the DS3 specifications in ANSI T1.102-1987, ANSI T1.107-1988, and ANSI T1.404-1989 [9,10,11].

4.1. Binding between Interfaces and CSUs

Each agent which resides on a host which uses DS3 interfaces is required to assign a small, positive integer uniquely to each CSU. This is known as the "CSUIndex", and is used to distinguish between different CSUs attached to a node. The CSUIndex is also used as the "key" when accessing tabular information about DS3 interfaces.

The ds3Index column of the DS3 Configuration table relates each CSU to its corresponding interface in the Internet-standard MIB.

4.2. Objectives of this MIB Module

There are numerous things that could be included in a MIB for DS3 signals: the management of multiplexors, CSUs, DSUs, and the like. The intent of this document is to facilitate the common management of CSUs, both in-chassis and external via proxy. As such, a design decision was made up front to very closely align the MIB with the set of objects that can generally be read from CSUs that are currently deployed.

4.3. DS3 Terminology

The terminology used in this document to describe error conditions on a DS3 circuit as monitored by a DS3 CSU are from the ANSI T1M1.3/90 draft standard [12].

Out of Frame (OOF) event
An OOF event is detected when any three or more errors in

sixteen or fewer consecutive F-bits occur within a DS3 M-frame. An OOF event is cleared when reframe occurs.

Loss of Signal (LOS)
This state is declared upon observing 175 +/- 75 contiguous pulse positions with no pulses of either positive or negative polarity.

Coding Violation (CV)
For all DS3 applications, a coding violation is a P-bit Parity Error event. A P-bit Parity Error event is the occurrence of a received P-bit code on the DS3 M-frame that is not identical to the corresponding locally-calculated code. For C-Bit Parity applications, it is also the occurrence of a received CP-Bit parity violation. For SYNTRAN applications, it is also the occurrence of a received CRC-9 code that is not identical to the corresponding locally calculated code.

Bipolar Violation (BPV)
A bipolar violation, for B3ZS-coded signals, is the occurrence of a received bipolar violation that is not part of a zero-substitution code. For B3ZS-coded signals, a bipolar violation may also include other error patterns such as: three or more consecutive zeros and incorrect parity.

Errored Seconds (ES)
An ES is a second with one or more Coding Violation OR one or more Out of Frame events OR an AIS.

Severely Errored Seconds (SES)
A SES is a second with 44 or more Coding Violations OR one or more Out of Frame events OR an AIS.

Severely Errored Framing Seconds (SEFS)
A SEFS is a second with one or more Out of Frame events.

Unavailable Seconds (UAS)
UAS are calculated by counting the number of seconds that the CSU is in the Unavailable signal state (i.e., declared a Red Alarm or a Yellow Alarm), including the initial 10 seconds to enter the state but not including the 10 seconds to exit the state.

Note that any second that may be counted as an UAS may not be counted as an ES or a SES. Since the 10 SESs that comprise the transition from the available to unavailable

signal state may also be counted as ESs and SESs previous to entering the state, these three counters are adjusted so that any second counted during this transition is then subtracted. The 10 seconds in the transition from unavailable to available may be counted as ESs.

A special case exists when the 10 or more second period crosses the 900 second statistics window boundary, as the foregoing description implies that the SES and UAS counters must be adjusted when the Unavailable Signal State is entered. Clearly, successive GETs of the affected ds3IntervalSES and ds3IntervalUAS objects will return differing values if the first GET occurs during the first few seconds of the window. This is viewed as an unavoidable side-effect of selecting the presently defined managed objects as a basis for this memo.

Yellow Alarm
The Yellow Alarm is declared after detecting the Yellow Signal. See ANSI T1.107-1989 [10].

Red Alarm
The Red Alarm is declared after detecting a Loss of Signal, a Loss of Frame (a persistent OOF event), or an Alarm Indication Signal, see [10] for at least 2-10 seconds. The Red Alarm is cleared at the onset of 10 consecutive seconds with no SES.

Circuit Identifier
This is a character string specified by the circuit vendor, and is useful when communicating with the vendor during the troubleshooting process.

5. Object Definitions

```
RFC1233-MIB DEFINITIONS ::= BEGIN

IMPORTS
        experimental, Counter
                FROM RFC1155-SMI
        DisplayString
                FROM RFC1158-MIB
        OBJECT-TYPE
                FROM RFC-1212;

--  This MIB module uses the extended OBJECT-TYPE macro
--  as defined in [13].
```

```
--  this is the MIB module for the DS3 objects

ds3     OBJECT IDENTIFIER ::= { experimental 15 }

-- the DS3 Configuration group

-- Although the objects in this group are read-only, at
-- the agent's discretion they may be made read-write
-- so that the management station, when appropriately
-- authorized, may change the behavior of the CSU,
-- e.g., to place the device into a loopback state.

-- Implementation of this group is mandatory for all
-- systems that attach to a DS3 Interface.

ds3ConfigTable OBJECT-TYPE
    SYNTAX  SEQUENCE OF DS3ConfigEntry
    ACCESS  not-accessible
    STATUS  mandatory
    DESCRIPTION
            "The DS3 Configuration table."
   ::= { ds3 1 }

ds3ConfigEntry OBJECT-TYPE
    SYNTAX  DS3ConfigEntry
    ACCESS  not-accessible
    STATUS  mandatory
    DESCRIPTION
            "An entry in the DS3 Configuration table."
  INDEX   { ds3CSUIndex }
  ::= { ds3ConfigTable 1 }

DS3ConfigEntry ::=
   SEQUENCE {
       ds3CSUIndex
           INTEGER,
       ds3Index
           INTEGER,
       ds3TimeElapsed
           INTEGER (1..900),
       ds3ValidIntervals
           INTEGER (0..96),
       ds3LineType
           INTEGER,
       ds3ZeroCoding
           INTEGER,
       ds3Loopback
           INTEGER,
```

```
                ds3SendCode
                    INTEGER,
                ds3YellowAlarm
                    INTEGER,
                ds3RedAlarm
                    INTEGER,
                ds3CircuitIdentifier
                    DisplayString (SIZE (0..255))
            }

            ds3CSUIndex OBJECT-TYPE
                SYNTAX  INTEGER
                ACCESS  read-only
                STATUS  mandatory
                DESCRIPTION
                        "The index value which uniquely identifies the
                        CSU to which this entry is applicable."
              ::= { ds3ConfigEntry 1 }

           ds3Index OBJECT-TYPE
               SYNTAX  INTEGER
               ACCESS  read-only
               STATUS  mandatory
               DESCRIPTION
                       "An index value that uniquely identifies a DS3
                       Interface.  The interface identified by a
                       particular value of this index is the same
                       interface as identified by the same value an
                       ifIndex object instance."
             ::= { ds3ConfigEntry 2 }

          ds3TimeElapsed OBJECT-TYPE
              SYNTAX  INTEGER (1..900)
              ACCESS  read-only
              STATUS  mandatory
              DESCRIPTION
                      "The number of seconds, including partial
                      seconds, that have elapsed since the beginning of
                      the current error-measurement period."
             ::= { ds3ConfigEntry 3 }

        ds3ValidIntervals OBJECT-TYPE
            SYNTAX  INTEGER (0..96)
            ACCESS  read-only
            STATUS  mandatory
            DESCRIPTION
                    "The number of previous intervals for which valid
                    data was collected.  The value will be 96 unless
```

```
                    the CSU device was brought online within the last
                    24 hours, in which case the value will be the
                    number of complete 15 minute intervals the CSU has
                    been online."
            ::= { ds3ConfigEntry 4 }

        ds3LineType OBJECT-TYPE
            SYNTAX  INTEGER {
                        other(1),
                        ds3M23(2),
                        ds3SYNTRAN(3),
                        ds3CbitParity(4),
                        ds3ClearChannel(5)
                    }
            ACCESS  read-only
            STATUS  mandatory
            DESCRIPTION
                    "This variable indicates the variety of DS3 C-bit
                    application implementing this circuit.  The type
                    of circuit affects the interpretation of the usage
                    and error statistics.  The rate of all of them is
                    44.736 Mbps.

                    The values, in sequence, describe:
                    TITLE:            SPECIFICATION:
                    ds3M23            ANSI T1.107-1988 [10]
                    ds3SYNTRAN        ANSI T1.107-1988 [10]
                    ds3C-bitParity    ANSI T1.107a-1989 [10a]
                    ds3ClearChannel   ANSI T1.102-1987 [9]
                    "
            ::= { ds3ConfigEntry 5 }

        ds3ZeroCoding OBJECT-TYPE
            SYNTAX  INTEGER {
                        ds3other(1),
                        ds3B3ZS(2)
                    }
            ACCESS  read-only
            STATUS  mandatory
            DESCRIPTION
                    "This variable describes the variety of Zero Code
                    Suppression used on the link, which in turn
                    affects a number of its characteristics.
                    ds3B3ZS refers to the use of specified patterns of
                    normal bits and bipolar violations which are used
                    to replace sequences of zero bits of a specified
                    length."
            ::= { ds3ConfigEntry 6 }
```

```
        ds3Loopback OBJECT-TYPE
            SYNTAX  INTEGER {
                        ds3NoLoop(1),
                        ds3LocalLoopbackLocalSide(2),
                        ds3LocalLoopbackRemoteSide(3),
                        ds3RemoteLoopbackLocalSide(4),
                        ds3RemoteLoopbackRemoteSide(5)
                    }
            ACCESS  read-only
            STATUS  mandatory
            DESCRIPTION
                    "This variable represents the loopback state of
                    the CSU.  Devices supporting read/write access
                    should return badValue in response to a requested
                    loopback state that the CSU does not support.  The
                    values mean:

                      ds3NoLoop
                         Not in the loopback state.  A device that is
                         not capable of performing a loopback on
                         either interface shall always return this as
                         it's value.

                      ds3LocalLoopbackLocalSide
                         Signal received from the local side of the
                         device is looped back at the local connector
                         (eg, without involving the CSU).

                      ds3LocalLoopbackRemoteSide
                         Signal received from the local side of the
                         device is looped back at the remote connector
                         (eg, through the CSU).

                      ds3RemoteLoopbackLocalSide
                         Signal received from the remote side of the
                         device is looped back at the local connector
                         (eg, through the CSU).

                      ds3RemoteLoopbackRemoteSide
                         Signal received from the remote side of the
                         device is looped back at the remote connector
                         (eg, without involving the CSU).

                    Note that M23 and ClearChannel interfaces do not
                    support the Loopback managed object."
            ::= { ds3ConfigEntry 7 }
```

```
          ds3SendCode OBJECT-TYPE
              SYNTAX  INTEGER {
                          ds3SendTestMessage(1),
                          ds3SendNoCode(2),
                          ds3SendSetCode(3),
                          ds3SendLoopbackCode(4),
                          ds3SendResetCode(5)
                      }
              ACCESS  read-only
              STATUS  mandatory
              DESCRIPTION
                      "This variable indicates what type of code is
                      being sent across the DS1 circuit by the CSU.  The
                      values mean:

                        ds3SendNoCode
                           sending looped or normal data

                        ds3SendSetCode
                           sending a loopback request

                        ds3SendLoopbackCode
                           sending the code to choose a specific
                           loopback

                        ds3SendResetCode
                           sending a loopback termination request

                        ds3SendTestMessage
                           sending a Test pattern as defined in
                           T1.107a-1989 [10a].
                      "
                       ::= { ds3ConfigEntry 8 }

                   ds3YellowAlarm OBJECT-TYPE
                       SYNTAX  INTEGER {
                                   ds3YellowAlarm(1),
                                   ds3NoYellowAlarm(2)
                                  }
                       ACCESS  read-only
                       STATUS  mandatory
                       DESCRIPTION
                               "This variable indicates if a Yellow
                               Alarm condition exists."
                      ::= { ds3ConfigEntry 9 }

                  ds3RedAlarm OBJECT-TYPE
                      SYNTAX  INTEGER {
```

```
                        ds3RedAlarm(1),
                        ds3NoRedAlarm(2)
                    }
            ACCESS  read-only
            STATUS  mandatory
            DESCRIPTION
                    "This variable indicates if a Red Alarm
                    condition exists."
           ::= { ds3ConfigEntry 10 }

     ds3CircuitIdentifier OBJECT-TYPE
         SYNTAX  DisplayString (SIZE (0..255))
         ACCESS  read-only
         STATUS  mandatory
         DESCRIPTION
                 "This variable contains the transmission
                 vendor's circuit identifier, for the
                 purpose of facilitating troubleshooting."
        ::= { ds3ConfigEntry 11 }


    -- the DS3 Interval group

    -- Implementation of this group is mandatory for all
    -- systems that attach to a DS3 interface.

    -- The DS3 Interval Table contains various statistics
    -- collected by each CSU over the previous 24 hours of
    -- operation.  The past 24 hours are broken into 96
    -- completed 15 minute intervals.

    ds3IntervalTable OBJECT-TYPE
        SYNTAX  SEQUENCE OF DS3IntervalEntry
        ACCESS  not-accessible
        STATUS  mandatory
        DESCRIPTION
                "The DS3 Interval table."
       ::= { ds3 2 }

   ds3IntervalEntry OBJECT-TYPE
       SYNTAX  DS3IntervalEntry
       ACCESS  not-accessible
       STATUS  mandatory
       DESCRIPTION
               "An entry in the DS3 Interval table."
      INDEX   { ds3IntervalIndex, ds3IntervalNumber }
      ::= { ds3IntervalTable 1 }
```

```
DS3IntervalEntry ::=
    SEQUENCE {
        ds3IntervalIndex
            INTEGER,
        ds3IntervalNumber
            INTEGER (1..96),
        ds3IntervalESs
            Counter,
        ds3IntervalSESs
            Counter,
        ds3IntervalSEFSs
            Counter,
        ds3IntervalUASs
            Counter,
        ds3IntervalCSSs
            Counter,
        ds3IntervalBPVs
            Counter,
        ds3IntervalCVs
            Counter
    }

ds3IntervalIndex OBJECT-TYPE
    SYNTAX  INTEGER
    ACCESS  read-only
    STATUS  mandatory
    DESCRIPTION
            "The index value which uniquely identifies the
            CSU to which this entry is applicable.  The
            interface identified by a particular value of
            this index is the same interface as identified
            by the same value an DS3CSUIndex object
            instance."
   ::= { ds3IntervalEntry 1 }

ds3IntervalNumber OBJECT-TYPE
    SYNTAX  INTEGER (1..96)
    ACCESS  read-only
    STATUS  mandatory
    DESCRIPTION
            "A number between 1 and 96, where 1 is the most
            recently completed 15 minute interval and 96 is
            the least recently completed 15 minutes
            interval (assuming that all 96 intervals are
            valid)."
  ::= { ds3IntervalEntry 2 }
```

```
          ds3IntervalESs OBJECT-TYPE
              SYNTAX  Counter
              ACCESS  read-only
              STATUS  mandatory
              DESCRIPTION
                      "The counter associated with the number of
                      Errored Seconds, as defined by [12], encountered
                      by a DS3 CSU in one of the previous 96,
                      individual 15 minute, intervals."
             ::= { ds3IntervalEntry 3 }

         ds3IntervalSESs OBJECT-TYPE
             SYNTAX  Counter
             ACCESS  read-only
             STATUS  mandatory
             DESCRIPTION
                     "The counter associated with the number of
                     Severely Errored Seconds, as defined by [12],
                     encountered by a DS3 CSU in one of the previous
                     96, individual 15 minute, intervals."
            ::= { ds3IntervalEntry 4 }

        ds3IntervalSEFSs OBJECT-TYPE
            SYNTAX  Counter
            ACCESS  read-only
            STATUS  mandatory
            DESCRIPTION
                    "The counter associated with the number of
                    Severely Errored Framing Seconds, as defined by
                    [12], encountered by a DS3 CSU in one of the
                    previous 96, individual 15 minute, intervals."
            ::= { ds3IntervalEntry 5 }

        ds3IntervalUASs OBJECT-TYPE
            SYNTAX  Counter
            ACCESS  read-only
            STATUS  mandatory
            DESCRIPTION
                    "The counter associated with the number of
                    Unavailable Seconds, as defined by [12],
                    encountered by a DS3 CSU in one of the previous
                    96, individual 15 minute, intervals."
            ::= { ds3IntervalEntry 6 }

        ds3IntervalCSSs OBJECT-TYPE
            SYNTAX  Counter
            ACCESS  read-only
            STATUS  mandatory
```

```
            DESCRIPTION
                    "The counter associated with the number of
                    Controlled Slip Seconds, as defined by [12],
                    encountered by a DS3 CSU in one of the previous
                    96, individual 15 minute, intervals.

                    Note that SYNTRAN interfaces are the only
                    interfaces that support the Controlled Slip
                    Seconds managed object.  Accordingly, agents
                    configured with non-SYNTRAN interfaces may treat
                    this object as having an ACCESS clause value of
                    not-accessible."
            ::= { ds3IntervalEntry 7}

        ds3IntervalBPVs OBJECT-TYPE
            SYNTAX  Counter
            ACCESS  read-only
            STATUS  mandatory
            DESCRIPTION
                    "The counter associated with the number of Bipolar
                    Violations, as defined by [12], encountered by a
                    DS3 CSU in one of the previous 96, individual 15
                    minute, intervals."
            ::= { ds3IntervalEntry 8 }

        ds3IntervalCVs OBJECT-TYPE
            SYNTAX  Counter
            ACCESS  read-only
            STATUS  mandatory
            DESCRIPTION
                    "The counter associated with the number of Coding
                    Violations, as defined by [12], encountered by a
                    DS3 CSU in one of the previous 96, individual 15
                    minute, intervals."
            ::= { ds3IntervalEntry 9 }


        -- the DS3 Current group

        -- Implementation of this group is mandatory for all systems
        -- that attach to a DS3 Interface.

        -- The DS3 current table contains various statistics being
        -- collected for the current 15 minute interval.
```

```
        ds3CurrentTable OBJECT-TYPE
            SYNTAX  SEQUENCE OF DS3CurrentEntry
            ACCESS  not-accessible
            STATUS  mandatory
            DESCRIPTION
                    "The DS3 Current table."
            ::= { ds3 3 }

        ds3CurrentEntry OBJECT-TYPE
            SYNTAX  DS3CurrentEntry
            ACCESS  not-accessible
            STATUS  mandatory
            DESCRIPTION
                    "An entry in the DS3 Current table."
            INDEX   { ds3CurrentIndex }
            ::= { ds3CurrentTable 1 }

        DS3CurrentEntry ::=
            SEQUENCE {
                ds3CurrentIndex
                    INTEGER,
                ds3CurrentESs
                    Counter,
                ds3CurrentSESs
                    Counter,
                ds3CurrentSEFSs
                    Counter,
                ds3CurrentUASs
                    Counter,
                ds3CurrentCSSs
                    Counter,
                ds3CurrentBPVs
                    Counter,
                ds3CurrentCVs
                    Counter
            }

        ds3CurrentIndex OBJECT-TYPE
            SYNTAX  INTEGER
            ACCESS  read-only
            STATUS  mandatory
            DESCRIPTION
                    "The index value which uniquely identifies the CSU
                    to which this entry is applicable.  The interface
                    identified by a particular value of this index is
                    the same interface as identified by the same value
                    an DS3CSUIndex object instance."
            ::= { ds3CurrentEntry 1 }
```

```
        ds3CurrentESs OBJECT-TYPE
            SYNTAX  Counter
            ACCESS  read-only
            STATUS  mandatory
            DESCRIPTION
                    "The counter associated with the number of Errored
                    Seconds, as defined by [12], encountered by a DS3
                    CSU in the current 15 minute interval."
            ::= { ds3CurrentEntry 2 }

        ds3CurrentSESs OBJECT-TYPE
            SYNTAX  Counter
            ACCESS  read-only
            STATUS  mandatory
            DESCRIPTION
                    "The counter associated with the number of
                    Severely Errored Seconds, as defined by [12],
                    encountered by a DS3 CSU in the current 15 minute
                    interval."
            ::= { ds3CurrentEntry 3 }

        ds3CurrentSEFSs OBJECT-TYPE
            SYNTAX  Counter
            ACCESS  read-only
            STATUS  mandatory
            DESCRIPTION
                    "The counter associated with the number of
                    Severely Errored Framing Seconds, as defined by
                    [12], encountered by a DS3 CSU in the current 15
                    minute interval."
            ::= { ds3CurrentEntry 4 }

        ds3CurrentUASs OBJECT-TYPE
            SYNTAX  Counter
            ACCESS  read-only
            STATUS  mandatory
            DESCRIPTION
                    "The counter associated with the number of
                    Unavailable Seconds, as defined by [12],
                    encountered by a DS3 CSU in the current 15 minute
                    interval."
            ::= { ds3CurrentEntry 5 }

        ds3CurrentCSSs OBJECT-TYPE
            SYNTAX  Counter
            ACCESS  read-only
            STATUS  mandatory
            DESCRIPTION
```

```
                    "The counter associated with the number of
                    Controlled Slip Seconds, as defined by [12],
                    encountered by a DS3 CSU in the current 15 minute
                    interval.

                    Note that SYNTRAN interfaces are the only
                    interfaces that support the Controlled Slip
                    Seconds managed object.  Accordingly, agents
                    configured with non-SYNTRAN interfaces may treat
                    this object as having an ACCESS clause value of
                    not-accessible."
            ::= { ds3CurrentEntry 6 }

        ds3CurrentBPVs OBJECT-TYPE
            SYNTAX  Counter
            ACCESS  read-only
            STATUS  mandatory
            DESCRIPTION
                    "The counter associated with the number of Bipolar
                    Violations, as defined by [12], encountered by a
                    DS3 CSU in the current 15 minute interval."
            ::= { ds3CurrentEntry 7}

        ds3CurrentCVs OBJECT-TYPE
            SYNTAX  Counter
            ACCESS  read-only
            STATUS  mandatory
            DESCRIPTION
                    "The counter associated with the number of Coding
                    Violations, as defined by [12], encountered by a
                    DS3 CSU in the current 15 minute interval."
            ::= { ds3CurrentEntry 8 }


        -- the DS3 Total group

        -- Implementation of this group is mandatory for all systems
        -- that attach to a DS3.

        -- The DS3 Total Table contains the cumulative sum of the
        -- various statistics for the 24 hour interval preceding the
        -- first valid interval in the DS3CurrentTable.

        ds3TotalTable OBJECT-TYPE
            SYNTAX  SEQUENCE OF DS3TotalEntry
            ACCESS  not-accessible
            STATUS  mandatory
            DESCRIPTION
```

```
                "The DS3 Total table.  24 hour interval."
        ::= { ds3 4 }

    ds3TotalEntry OBJECT-TYPE
        SYNTAX  DS3TotalEntry
        ACCESS  not-accessible
        STATUS  mandatory
        DESCRIPTION
                "An entry in the DS3 Total table."
        INDEX   { ds3TotalIndex }
        ::= { ds3TotalTable 1 }

    DS3TotalEntry ::=
        SEQUENCE {
            ds3TotalIndex
                INTEGER,
            ds3TotalESs
                Counter,
            ds3TotalSESs
                Counter,
            ds3TotalSEFSs
                Counter,
            ds3TotalUASs
                Counter,
            ds3TotalCSSs
                Counter,
            ds3TotalBPVs
                Counter,
            ds3TotalCVs
                Counter
        }

    ds3TotalIndex OBJECT-TYPE
        SYNTAX  INTEGER
        ACCESS  read-only
        STATUS  mandatory
        DESCRIPTION
                "The index value which uniquely identifies the CSU
                to which this entry is applicable.  The interface
                identified by a particular value of this index is
                the same interface as identified by the same value
                an DS3CSUIndex object instance."
        ::= { ds3TotalEntry 1 }

    ds3TotalESs OBJECT-TYPE
        SYNTAX  Counter
        ACCESS  read-only
        STATUS  mandatory
```

```
            DESCRIPTION
                    "The counter associated with the number of Errored
                    Seconds, as defined by [12], encountered by a DS3
                    CSU in the previous 24 hour interval."
            ::= { ds3TotalEntry 2 }

        ds3TotalSESs OBJECT-TYPE
            SYNTAX  Counter
            ACCESS  read-only
            STATUS  mandatory
            DESCRIPTION
                    "The counter associated with the number of
                    Severely Errored Seconds, as defined by [12],
                    encountered by a DS3 CSU in the previous 24 hour
                    interval."
            ::= { ds3TotalEntry 3 }

        ds3TotalSEFSs OBJECT-TYPE
            SYNTAX  Counter
            ACCESS  read-only
            STATUS  mandatory
            DESCRIPTION
                    "The counter associated with the number of
                    Severely Errored Framing Seconds, as defined by
                    [12], encountered by a DS3 CSU in the previous 24
                    hour interval."
            ::= { ds3TotalEntry 4 }

        ds3TotalUASs OBJECT-TYPE
            SYNTAX  Counter
            ACCESS  read-only
            STATUS  mandatory
            DESCRIPTION
                    "The counter associated with the number of
                    Unavailable Seconds, as defined by [12],
                    encountered by a DS3 CSU in the previous 24 hour
                    interval."
            ::= { ds3TotalEntry 5 }

        ds3TotalCSSs OBJECT-TYPE
            SYNTAX  Counter
            ACCESS  read-only
            STATUS  mandatory
            DESCRIPTION
                    "The counter associated with the number of
                    Controlled Slip Seconds, as defined by [12],
                    encountered by a DS3 CSU in the previous 24 hour
                    interval.
```

```
                    Note that SYNTRAN interfaces are the only
                    interfaces that support the Controlled Slip
                    Seconds managed object.  Accordingly, agents
                    configured with non-SYNTRAN interfaces may treat
                    this object as having an ACCESS clause value of
                    not-accessible."
            ::= { ds3TotalEntry 6 }

        ds3TotalBPVs OBJECT-TYPE
            SYNTAX  Counter
            ACCESS  read-only
            STATUS  mandatory
            DESCRIPTION
                    "The counter associated with the number of Bipolar
                    Violations, as defined by [12], encountered by a
                    DS3 CSU in the previous 24 hour interval."
            ::= { ds3TotalEntry 7 }

        ds3TotalCVs OBJECT-TYPE
            SYNTAX  Counter
            ACCESS  read-only
            STATUS  mandatory
            DESCRIPTION
                    "The counter associated with the number of Coding
                    Violations, as defined by [12], encountered by a
                    DS3 CSU in the previous 24 hour interval."
            ::= { ds3TotalEntry 8 }



        END
```

6. Acknowledgments

This document was produced by the SNMP and the Transmission MIB Working Groups:

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Karl Auerbach, Sun
Fred Baker, ACC
Ken Brinkerhoff
Ron Broersma, NOSC
Jack Brown, US Army
Theodore Brunner, Bellcore
Jeffrey Buffum, HP
Jeffrey D. Case, UTK
Chris Chiptasso, Spartacus
Paul Ciarfella, DEC

Bob Collet
Tracy Cox, Bellcore
James R. Davin, MIT-LCS
Kurt Dobbins, Cabletron
Nadya El-Afandi, Network Systems
Gary Ellis, HP
Fred Engle
Mike Erlinger
Richard Fox, Synoptics
Karen Frisa, CMU
Chris Gunner, DEC
Ken Hibbard, Xylogics
Ole Jacobsen, Interop
Ken Jones
Satish Joshi, Synoptics
Frank Kastenholz, Racal-Interlan
Shimshon Kaufman, Spartacus
Jim Kinder, Fibercom
Alex Koifman, BBN
Christopher Kolb, PSI
Cheryl Krupczak, NCR
Peter Lin, Vitalink
John Lunny, TWG
Carl Malamud
Keith McCloghrie, HLS
Donna McMaster, David Systems
Lynn Monsanto, Sun
Dave Perkins, 3COM
Jim Reinstedler, Ungerman Bass
Anil Rijsinghani, DEC
Kary Robertson
Marshall T. Rose, PSI (chair)
L. Michael Sabo, NCSC
Jon Saperia, DEC
John Seligson
Fei Shu, NEC
Sam Sjogren, TGV
Mark Sleeper, Sparta
Lance Sprung
Mike St.Johns
Bob Stewart, Xyplex
Emil Sturniold
Kaj Tesink, Bellcore
Dean Throop, Data General
Bill Townsend, Xylogics
Maurice Turcotte
Kannan Varadhou
Sudhanshu Verma, HP

Warren Vik, Interactive Systems
David Waitzman, BBN
Steve Waldbusser, CMU
Dan Wintringhan
David Wood
Jeff Young, Cray Research

7. References

[1] Cerf, V., "IAB Recommendations for the Development of Internet Network Management Standards", RFC 1052, NRI, April 1988.

[2] Cerf, V., "Report of the Second Ad Hoc Network Management Review Group", RFC 1109, NRI, August 1989.

[3] Rose M., and K. McCloghrie, "Structure and Identification of Management Information for TCP/IP-based internets", RFC 1155, Performance Systems International, Hughes LAN Systems, May 1990.

[4] McCloghrie K., and M. Rose, "Management Information Base for Network Management of TCP/IP-based internets", RFC 1156, Hughes LAN Systems, Performance Systems International, May 1990.

[5] Case, J., Fedor, M., Schoffstall, M., and J. Davin, "Simple Network Management Protocol", RFC 1157, SNMP Research, Performance Systems International, Performance Systems International, MIT Laboratory for Computer Science, May 1990.

[6] McCloghrie K., and M. Rose, Editors, "Management Information Base for Network Management of TCP/IP-based internets", RFC 1213, Performance Systems International, March 1991.

[7] Information processing systems - Open Systems Interconnection - Specification of Abstract Syntax Notation One (ASN.1), International Organization for Standardization, International Standard 8824, December 1987.

[8] Information processing systems - Open Systems Interconnection - Specification of Basic Encoding Rules for Abstract Notation One (ASN.1), International Organization for Standardization, International Standard 8825, December 1987.

[9] American National Standard for telecommunications - digital hierarchy - electrical interfaces, ANSI T1.102- 1987.

[10] American National Standard for telecommunications - digital hierarchy - formats specification, ANSI T1.107- 1988.

[10a] ANSI T1.107a-1989.

[11] American National Standard for telecommunications - Carrier-to-Customer Installation - DS3 Metallic Interface, ANSI T1.404-1989.

[12] In-Service Digital Transmission Performance Monitoring Draft Standard, T1M1.3/90 - 027R2.

[13] Rose, M., and K. McCloghrie, Editors, "Concise MIB Definitions", RFC 1212, Performance Systems International, Hughes LAN Systems, March 1991.

8. Security Considerations

Security issues are not discussed in this memo.

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