

Dial Control Management Information Base using SMIV2

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 and status of this protocol. Distribution of this memo is unlimited.

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 managed objects used for managing demand access circuits, including ISDN.

This document specifies a MIB module in a manner that is compliant to the SNMPv2 SMI. The set of objects is consistent with the SNMP framework and existing SNMP standards.

This document is a product of the ISDN MIB working group within the Internet Engineering Task Force. Comments are solicited and should be addressed to the working group's mailing list at isdn-mib@cisco.com and/or the author.

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1. The SNMPv2 Network Management Framework

The SNMPv2 Network Management Framework presently consists of three major components. They are:

- o the SMI, described in RFC 1902 [1] - the mechanisms used for describing and naming objects for the purpose of management.
- o the MIB-II, STD 17, RFC 1213 [2] - the core set of managed objects for the Internet suite of protocols.
- o the protocol, STD 15, RFC 1157 [3] and/or RFC 1905 [4], - the protocol for accessing managed objects.

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

1.1. Object Definitions

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) defined in the SMI. In particular, each object type is named by an OBJECT IDENTIFIER, an administratively assigned name. 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 descriptor, to refer to the object type.

2. Overview

2.1. Structure of MIB

Managing demand access circuits requires the following groups of information:

- o General configuration information.
- o Information to describe peer configuration and peer statistics. In this respect, peer configuration means information on how to connect to peers on outgoing calls, how to identify peers on incoming calls, and other call related configuration information.
- o Information to store active call information.

- o Information to retain call history.

The MIB, therefore, is structured into four groups.

- o The dialCtlConfiguration group is used to specify general configuration information.
- o The dialCtlPeer group is used to describe peer configuration and peer statistics.
- o The callActive group is used to store active call information.
- o The callHistory group is used to store call history information. These calls could be circuit switched or they could be virtual circuits. History of each and every call is stored, of successful calls as well as unsuccessful and rejected calls. An entry will be created when a call is cleared.

2.2. Relationship to the Interfaces MIB

This section clarifies the relationship of this MIB to the Interfaces MIB [8]. Several areas of correlation are addressed in the following subsections. The implementor is referred to the Interfaces MIB document in order to understand the general intent of these areas.

2.2.1. Layering Model and Virtual Circuits

On an occasional access channel, there are a number of peer systems that are permitted to call or be called, all of which need to be treated as active from a routing viewpoint, but most of which have no call in progress at any given time.

On dialup interfaces, this is further complicated by the fact that calls to a given peer float from channel to channel. One cannot definitively say "I call this peer on that interface." It is necessary, therefore, to provide a mapping algorithm between the low-level interfaces, and the various logical interfaces supporting the peers. This is solved by creating a logical interface (ifEntry) for each peer and a logical interface (ifEntry) for each low-level interface. These are then correlated using the ifStackTable.

The low-level interfaces are either physical interfaces, e.g. modem interfaces, or logical interfaces, e.g. ISDN B channels, which then in turn are layered on top of physical ISDN interfaces.

2.2.3.1. ifEntry for a single peer

IfEntries are defined in the MIBs defining the encapsulation below the network layer. For example, if PPP encapsulation is being used, the ifEntry is defined by PPP.

ifEntries will never be created by the Dial Control MIB. The Dial Control MIB always depends on some other ifIndex of some set of ifTypes. That is, to create an entry in the Dial Control MIB, the base ifEntry must already have been created through some other mechanism.

The Dial Control entry does have its own RowStatus, permitting the Dial Control supplementary information to come and go, but not otherwise disturbing the ifIndex to which it is attached. If in a given implementation the two are tightly bound, deleting the ifEntry may have the side effect of deleting the Dial Control entry.

2.3. Multilink and backup line support

In order to support multilink and backup procedures, there may be several entries for a single peer in the dialCtlPeerCfgTable.

A single peer is identified using the dialCtlPeerCfgId object of the dialCtlPeerCfgTable. There may be several entries in dialCtlPeerCfgTable with the same value of dialCtlPeerCfgId, but different ifIndex values. Each of those entries will then describe a possible connection to the same peer. Such entries can then be used to handle multilink as well as backup procedures, e.g. by bundling the attached ifEntries using PPP multilink.

2.4. Support for generic peers

Generic peers can for example be supported by permitting wild-card characters (e.g., '?' or '*') in dialCtlPeerCfgAnswerAddress. A number to be accepted could then be defined as partly (e.g., '*1234') or entirely generic (e.g., '*').

A detailed specification of such a functionality is outside the scope of this document.

However, the implementor should be aware that supporting generic peers may cause a security hole. The user would not know where a call is from, which could potentially allow unauthorized access.

3. Definitions

3.1. Dial Control MIB

```
DIAL-CONTROL-MIB DEFINITIONS ::= BEGIN
```

```
IMPORTS
```

```

MODULE-IDENTITY,
NOTIFICATION-TYPE,
OBJECT-TYPE,
Unsigned32
    FROM SNMPv2-SMI
TEXTUAL-CONVENTION,
DisplayString,
TimeStamp,
RowStatus
    FROM SNMPv2-TC
MODULE-COMPLIANCE,
OBJECT-GROUP,
NOTIFICATION-GROUP
    FROM SNMPv2-CONF
IANAifType
    FROM IANAifType-MIB
ifOperStatus,
ifIndex,
InterfaceIndex,
InterfaceIndexOrZero
    FROM IF-MIB
transmission
    FROM RFC1213-MIB;
```

```
dialControlMib MODULE-IDENTITY
```

```

LAST-UPDATED      "9609231544Z" -- Sep 23, 1996
ORGANIZATION      "IETF ISDN Working Group"
CONTACT-INFO
    "
        Guenter Roeck
        Postal: cisco Systems
                170 West Tasman Drive
                San Jose, CA 95134
                U.S.A.
        Phone:   +1 408 527 3143
        E-mail:  groeck@cisco.com"
```

```
DESCRIPTION
```

```

"The MIB module to describe peer information for
demand access and possibly other kinds of interfaces."
```

```
::= { transmission 21 }
```

```
AbsoluteCounter32 ::= TEXTUAL-CONVENTION
```

```

STATUS      current
DESCRIPTION
  "Represents a Counter32-like value that starts at zero,
  does not decrease, and does not wrap. This may be used
  only in situations where wrapping is not possible or
  extremely unlikely. Should such a counter overflow,
  it locks at the maximum value of 4,294,967,295.

  The primary use of this type of counter is situations
  where a counter value is to be recorded as history
  and is thus no longer subject to reading for changing
  values."
SYNTAX      Unsigned32

```

```
-- Dial Control Mib objects definitions
```

```
dialControlMibObjects OBJECT IDENTIFIER ::= { dialControlMib 1 }
```

```
-- General configuration group
```

```
dialCtlConfiguration OBJECT IDENTIFIER ::= { dialControlMibObjects 1 }
```

```
-- general configuration data/parameters
```

```

dialCtlAcceptMode OBJECT-TYPE
  SYNTAX INTEGER {
    acceptNone(1),
    acceptAll(2),
    acceptKnown(3)
  }
  MAX-ACCESS read-write
  STATUS      current
  DESCRIPTION
    "The security level for acceptance of incoming calls.
    acceptNone(1) - incoming calls will not be accepted
    acceptAll(2)  - incoming calls will be accepted,
                   even if there is no matching entry
                   in the dialCtlPeerCfgTable
    acceptKnown(3) - incoming calls will be accepted only
                   if there is a matching entry in the
                   dialCtlPeerCfgTable
    "
  ::= { dialCtlConfiguration 1 }

```

```

dialCtlTrapEnable OBJECT-TYPE
  SYNTAX      INTEGER {
    enabled(1),
    disabled(2)
  }

```

```

}
MAX-ACCESS    read-write
STATUS        current
DESCRIPTION
    "This object indicates whether dialCtlPeerCallInformation
    and dialCtlPeerCallSetup traps should be generated for
    all peers. If the value of this object is enabled(1),
    traps will be generated for all peers. If the value
    of this object is disabled(2), traps will be generated
    only for peers having dialCtlPeerCfgTrapEnable set
    to enabled(1)."
```

```

DEFVAL        { disabled }
 ::= { dialCtlConfiguration 2 }
```

```

-- Peer group

dialCtlPeer OBJECT IDENTIFIER ::= { dialControlMibObjects 2 }
```

```

-- peer configuration table

dialCtlPeerCfgTable OBJECT-TYPE
    SYNTAX      SEQUENCE OF DialCtlPeerCfgEntry
    MAX-ACCESS  not-accessible
    STATUS      current
    DESCRIPTION
        "The list of peers from which the managed device
        will accept calls or to which it will place them."
 ::= { dialCtlPeer 1 }
```

```

dialCtlPeerCfgEntry OBJECT-TYPE
    SYNTAX      DialCtlPeerCfgEntry
    MAX-ACCESS  not-accessible
    STATUS      current
    DESCRIPTION
        "Configuration data for a single Peer. This entry is
        effectively permanent, and contains information
        to identify the peer, how to connect to the peer,
        how to identify the peer and its permissions.
        The value of dialCtlPeerCfgOriginateAddress must be
        specified before a new row in this table can become
        active(1). Any writeable parameters in an existing entry
        can be modified while the entry is active. The modification
        will take effect when the peer in question will be
        called the next time.
        An entry in this table can only be created if the
        associated ifEntry already exists."
    INDEX       { dialCtlPeerCfgId, ifIndex }
```

```
::= { dialCtlPeerCfgTable 1 }
```

```
DialCtlPeerCfgEntry ::= SEQUENCE {
    dialCtlPeerCfgId          INTEGER,
    dialCtlPeerCfgIfType     IANAifType,
    dialCtlPeerCfgLowerIf    InterfaceIndexOrZero,
    dialCtlPeerCfgOriginateAddress DisplayString,
    dialCtlPeerCfgAnswerAddress DisplayString,
    dialCtlPeerCfgSubAddress  DisplayString,
    dialCtlPeerCfgClosedUserGroup DisplayString,
    dialCtlPeerCfgSpeed       INTEGER,
    dialCtlPeerCfgInfoType    INTEGER,
    dialCtlPeerCfgPermission  INTEGER,
    dialCtlPeerCfgInactivityTimer INTEGER,
    dialCtlPeerCfgMinDuration INTEGER,
    dialCtlPeerCfgMaxDuration INTEGER,
    dialCtlPeerCfgCarrierDelay INTEGER,
    dialCtlPeerCfgCallRetries INTEGER,
    dialCtlPeerCfgRetryDelay  INTEGER,
    dialCtlPeerCfgFailureDelay INTEGER,
    dialCtlPeerCfgTrapEnable  INTEGER,
    dialCtlPeerCfgStatus      RowStatus
}
```

```
dialCtlPeerCfgId OBJECT-TYPE
```

```
SYNTAX          INTEGER (1..2147483647)
```

```
MAX-ACCESS     not-accessible
```

```
STATUS         current
```

```
DESCRIPTION
```

"This object identifies a single peer. There may be several entries in this table for one peer, defining different ways of reaching this peer. Thus, there may be several entries in this table with the same value of dialCtlPeerCfgId. Multiple entries for one peer may be used to support multilink as well as backup lines. A single peer will be identified by a unique value of this object. Several entries for one peer MUST have the same value of dialCtlPeerCfgId, but different ifEntries and thus different values of ifIndex."

```
::= { dialCtlPeerCfgEntry 1 }
```

```
dialCtlPeerCfgIfType OBJECT-TYPE
```

```
SYNTAX          IANAifType
```

```
MAX-ACCESS     read-create
```

```
STATUS         current
```

```
DESCRIPTION
```

"The interface type to be used for calling this peer."

In case of ISDN, the value of isdn(63) is to be used."
 DEFVAL { other }
 ::= { dialCtlPeerCfgEntry 2 }

dialCtlPeerCfgLowerIf OBJECT-TYPE

SYNTAX InterfaceIndexOrZero
 MAX-ACCESS read-create
 STATUS current
 DESCRIPTION

"ifIndex value of an interface the peer will have to be called on. For example, on an ISDN interface, this can be the ifIndex value of a D channel or the ifIndex value of a B channel, whatever is appropriate for a given peer. As an example, for Basic Rate leased lines it will be necessary to specify a B channel ifIndex, while for semi-permanent connections the D channel ifIndex has to be specified.
 If the interface can be dynamically assigned, this object has a value of zero."

DEFVAL { 0 }
 ::= { dialCtlPeerCfgEntry 3 }

dialCtlPeerCfgOriginateAddress OBJECT-TYPE

SYNTAX DisplayString
 MAX-ACCESS read-create
 STATUS current
 DESCRIPTION

"Call Address at which the peer will be called. Think of this as the set of characters following 'ATDT ' or the 'phone number' included in a D channel call request.

The structure of this information will be switch type specific. If there is no address information required for reaching the peer, i.e., for leased lines, this object will be a zero length string."

::= { dialCtlPeerCfgEntry 4 }

dialCtlPeerCfgAnswerAddress OBJECT-TYPE

SYNTAX DisplayString
 MAX-ACCESS read-create
 STATUS current
 DESCRIPTION

"Calling Party Number information element, as for example passed in an ISDN SETUP message by a PBX or switch, for incoming calls.

This address can be used to identify the peer. If this address is either unknown or identical to dialCtlPeerCfgOriginateAddress, this object will be

```

        a zero length string."
DEFVAL      { "" }
 ::= { dialCtlPeerCfgEntry 5 }

```

dialCtlPeerCfgSubAddress OBJECT-TYPE

```

SYNTAX      DisplayString
MAX-ACCESS  read-create
STATUS      current
DESCRIPTION
    "Subaddress at which the peer will be called.
     If the subaddress is undefined for the given media or
     unused, this is a zero length string."
DEFVAL      { "" }
 ::= { dialCtlPeerCfgEntry 6 }

```

dialCtlPeerCfgClosedUserGroup OBJECT-TYPE

```

SYNTAX      DisplayString
MAX-ACCESS  read-create
STATUS      current
DESCRIPTION
    "Closed User Group at which the peer will be called.
     If the Closed User Group is undefined for the given media
     or unused, this is a zero length string."
REFERENCE
    "Q.931, chapter 4.6.1."
DEFVAL      { "" }
 ::= { dialCtlPeerCfgEntry 7 }

```

dialCtlPeerCfgSpeed OBJECT-TYPE

```

SYNTAX      INTEGER (0..2147483647)
MAX-ACCESS  read-create
STATUS      current
DESCRIPTION
    "The desired information transfer speed in bits/second
     when calling this peer.
     The detailed media specific information, e.g. information
     type and information transfer rate for ISDN circuits,
     has to be extracted from this object.
     If the transfer speed to be used is unknown or the default
     speed for this type of interfaces, the value of this object
     may be zero."
DEFVAL      { 0 }
 ::= { dialCtlPeerCfgEntry 8 }

```

dialCtlPeerCfgInfoType OBJECT-TYPE

```

SYNTAX      INTEGER {
    other(1),
    speech(2),

```

```

    unrestrictedDigital(3),      -- 64k/s data
    unrestrictedDigital56(4),    -- with 56k rate adaption
    restrictedDigital(5),
    audio31(6),                  -- 3.1 kHz audio
    audio7(7),                   -- 7 kHz audio
    video(8),
    packetSwitched(9),
    fax(10)
}
MAX-ACCESS    read-create
STATUS        current
DESCRIPTION
    "The Information Transfer Capability to be used when
    calling this peer.

    speech(2) refers to a non-data connection, whereas
    audio31(6) and audio7(7) refer to data mode
    connections."
DEFVAL        { other }
 ::= { dialCtlPeerCfgEntry 9 }

```

dialCtlPeerCfgPermission OBJECT-TYPE

```

SYNTAX        INTEGER {
    originate(1),
    answer(2),
    both(3),           -- both originate & answer
    callback(4),
    none(5)
}
MAX-ACCESS    read-create
STATUS        current
DESCRIPTION
    "Applicable permissions. callback(4) either rejects the
    call and then calls back, or uses the 'Reverse charging'
    information element if it is available.
    Note that callback(4) is supposed to control charging, not
    security, and applies to callback prior to accepting a
    call. Callback for security reasons can be handled using
    PPP callback."
DEFVAL        { both }
 ::= { dialCtlPeerCfgEntry 10 }

```

dialCtlPeerCfgInactivityTimer OBJECT-TYPE

```

SYNTAX        INTEGER (0..2147483647)
UNITS         "seconds"
MAX-ACCESS    read-create
STATUS        current
DESCRIPTION

```

"The connection will be automatically disconnected if no longer carrying useful data for a time period, in seconds, specified in this object. Useful data in this context refers to forwarding packets, including routing information; it excludes the encapsulator maintenance frames. A value of zero means the connection will not be automatically taken down due to inactivity, which implies that it is a dedicated circuit."

```
DEFVAL      { 0 }
 ::= { dialCtlPeerCfgEntry 11 }
```

dialCtlPeerCfgMinDuration OBJECT-TYPE

```
SYNTAX      INTEGER (0..2147483647)
MAX-ACCESS  read-create
STATUS      current
DESCRIPTION
```

"Minimum duration of a call in seconds, starting from the time the call is connected until the call is disconnected. This is to accomplish the fact that in most countries charging applies to units of time, which should be matched as closely as possible."

```
DEFVAL      { 0 }
 ::= { dialCtlPeerCfgEntry 12 }
```

dialCtlPeerCfgMaxDuration OBJECT-TYPE

```
SYNTAX      INTEGER (0..2147483647)
MAX-ACCESS  read-create
STATUS      current
DESCRIPTION
```

"Maximum call duration in seconds. Zero means 'unlimited'."

```
DEFVAL      { 0 }
 ::= { dialCtlPeerCfgEntry 13 }
```

dialCtlPeerCfgCarrierDelay OBJECT-TYPE

```
SYNTAX      INTEGER (0..2147483647)
UNITS       "seconds"
MAX-ACCESS  read-create
STATUS      current
DESCRIPTION
```

"The call timeout time in seconds. The default value of zero means that the call timeout as specified for the media in question will apply."

```
DEFVAL      { 0 }
 ::= { dialCtlPeerCfgEntry 14 }
```

dialCtlPeerCfgCallRetries OBJECT-TYPE

```
SYNTAX      INTEGER (0..2147483647)
```

```

MAX-ACCESS  read-create
STATUS      current
DESCRIPTION
    "The number of calls to a non-responding address
    that may be made. A retry count of zero means
    there is no bound. The intent is to bound
    the number of successive calls to an address
    which is inaccessible, or which refuses those calls.

    Some countries regulate the number of call retries
    to a given peer that can be made."
DEFVAL      { 0 }
 ::= { dialCtlPeerCfgEntry 15 }

```

```

dialCtlPeerCfgRetryDelay OBJECT-TYPE
SYNTAX      INTEGER (0..2147483647)
UNITS       "seconds"
MAX-ACCESS  read-create
STATUS      current
DESCRIPTION
    "The time in seconds between call retries if a peer
    cannot be reached.
    A value of zero means that call retries may be done
    without any delay."
DEFVAL      { 0 }
 ::= { dialCtlPeerCfgEntry 16 }

```

```

dialCtlPeerCfgFailureDelay OBJECT-TYPE
SYNTAX      INTEGER (0..2147483647)
UNITS       "seconds"
MAX-ACCESS  read-create
STATUS      current
DESCRIPTION
    "The time in seconds after which call attempts are
    to be placed again after a peer has been noticed
    to be unreachable, i.e. after dialCtlPeerCfgCallRetries
    unsuccessful call attempts.
    A value of zero means that a peer will not be called
    again after dialCtlPeerCfgCallRetries unsuccessful call
    attempts."
DEFVAL      { 0 }
 ::= { dialCtlPeerCfgEntry 17 }

```

```

dialCtlPeerCfgTrapEnable OBJECT-TYPE
SYNTAX      INTEGER {
    enabled(1),
    disabled(2)
}

```

```

MAX-ACCESS    read-create
STATUS        current
DESCRIPTION   "This object indicates whether dialCtlPeerCallInformation
              and dialCtlPeerCallSetup traps should be generated for
              this peer."
DEFVAL        { disabled }
 ::= { dialCtlPeerCfgEntry 18 }

```

```

dialCtlPeerCfgStatus OBJECT-TYPE
SYNTAX        RowStatus
MAX-ACCESS    read-create
STATUS        current
DESCRIPTION   "Status of one row in this table."
 ::= { dialCtlPeerCfgEntry 19 }

```

-- Peer statistics table

```

dialCtlPeerStatsTable OBJECT-TYPE
SYNTAX        SEQUENCE OF DialCtlPeerStatsEntry
MAX-ACCESS    not-accessible
STATUS        current
DESCRIPTION   "Statistics information for each peer entry.
              There will be one entry in this table for each entry
              in the dialCtlPeerCfgTable."
 ::= { dialCtlPeer 2 }

```

```

dialCtlPeerStatsEntry OBJECT-TYPE
SYNTAX        DialCtlPeerStatsEntry
MAX-ACCESS    not-accessible
STATUS        current
DESCRIPTION   "Statistics information for a single Peer. This entry
              is effectively permanent, and contains information
              describing the last call attempt as well as supplying
              statistical information."
AUGMENTS      { dialCtlPeerCfgEntry }
 ::= { dialCtlPeerStatsTable 1 }

```

```

DialCtlPeerStatsEntry ::=
SEQUENCE {
    dialCtlPeerStatsConnectTime          AbsoluteCounter32,
    dialCtlPeerStatsChargedUnits        AbsoluteCounter32,
    dialCtlPeerStatsSuccessCalls        AbsoluteCounter32,
    dialCtlPeerStatsFailCalls           AbsoluteCounter32,
    dialCtlPeerStatsAcceptCalls         AbsoluteCounter32,

```

```

        dialCtlPeerStatsRefuseCalls          AbsoluteCounter32,
        dialCtlPeerStatsLastDisconnectCause  OCTET STRING,
        dialCtlPeerStatsLastDisconnectText   DisplayString,
        dialCtlPeerStatsLastSetupTime       TimeStamp
    }

```

dialCtlPeerStatsConnectTime OBJECT-TYPE

```

    SYNTAX      AbsoluteCounter32
    UNITS       "seconds"
    MAX-ACCESS  read-only
    STATUS      current
    DESCRIPTION
        "Accumulated connect time to the peer since system startup.
         This is the total connect time, i.e. the connect time
         for outgoing calls plus the time for incoming calls."
    ::= { dialCtlPeerStatsEntry 1 }

```

dialCtlPeerStatsChargedUnits OBJECT-TYPE

```

    SYNTAX      AbsoluteCounter32
    MAX-ACCESS  read-only
    STATUS      current
    DESCRIPTION
        "The total number of charging units applying to this
         peer since system startup.
         Only the charging units applying to the local interface,
         i.e. for originated calls or for calls with 'Reverse
         charging' being active, will be counted here."
    ::= { dialCtlPeerStatsEntry 2 }

```

dialCtlPeerStatsSuccessCalls OBJECT-TYPE

```

    SYNTAX      AbsoluteCounter32
    MAX-ACCESS  read-only
    STATUS      current
    DESCRIPTION
        "Number of completed calls to this peer."
    ::= { dialCtlPeerStatsEntry 3 }

```

dialCtlPeerStatsFailCalls OBJECT-TYPE

```

    SYNTAX      AbsoluteCounter32
    MAX-ACCESS  read-only
    STATUS      current
    DESCRIPTION
        "Number of failed call attempts to this peer since system
         startup."
    ::= { dialCtlPeerStatsEntry 4 }

```

dialCtlPeerStatsAcceptCalls OBJECT-TYPE

```

    SYNTAX      AbsoluteCounter32

```

MAX-ACCESS read-only
STATUS current
DESCRIPTION
"Number of calls from this peer accepted since system
startup."
 ::= { dialCtlPeerStatsEntry 5 }

dialCtlPeerStatsRefuseCalls OBJECT-TYPE
SYNTAX AbsoluteCounter32
MAX-ACCESS read-only
STATUS current
DESCRIPTION
"Number of calls from this peer refused since system
startup."
 ::= { dialCtlPeerStatsEntry 6 }

dialCtlPeerStatsLastDisconnectCause OBJECT-TYPE
SYNTAX OCTET STRING (SIZE (0..4))
MAX-ACCESS read-only
STATUS current
DESCRIPTION
"The encoded network cause value associated with the last
call.
This object will be updated whenever a call is started
or cleared.
The value of this object will depend on the interface type
as well as on the protocol and protocol version being
used on this interface. Some references for possible cause
values are given below."
REFERENCE
"- Bellcore SR-NWT-001953, Generic Guidelines for
ISDN Terminal Equipment On Basic Access Interfaces,
chapter 5.2.5.8.
- Bellcore SR-NWT-002343, ISDN Primary Rate Interface
Generic Guidelines for Customer Premises Equipment,
chapter 8.2.5.8.
- ITU-T Q.931, Appendix I.
- ITU-T X.25, CAUSE and DIAGNOSTIC field values.
- German Telekom FTZ 1TR6, chapter 3.2.3.4.4.4."
 ::= { dialCtlPeerStatsEntry 7 }

dialCtlPeerStatsLastDisconnectText OBJECT-TYPE
SYNTAX DisplayString
MAX-ACCESS read-only
STATUS current
DESCRIPTION
"ASCII text describing the reason for the last call
termination."

This object exists because it would be impossible for a management station to store all possible cause values for all types of interfaces. It should be used only if a management station is unable to decode the value of dialCtlPeerStatsLastDisconnectCause.

This object will be updated whenever a call is started or cleared."

```
::= { dialCtlPeerStatsEntry 8 }
```

```
dialCtlPeerStatsLastSetupTime OBJECT-TYPE
```

```
SYNTAX      TimeStamp
```

```
MAX-ACCESS  read-only
```

```
STATUS      current
```

```
DESCRIPTION
```

"The value of sysUpTime when the last call to this peer was started.

For ISDN media, this will be the time when the setup message was received from or sent to the network.

This object will be updated whenever a call is started or cleared."

```
::= { dialCtlPeerStatsEntry 9 }
```

```
--
```

```
-- the active call group
```

```
--
```

```
callActive OBJECT IDENTIFIER ::= { dialControlMibObjects 3 }
```

```
-- callActiveTable
```

```
-- Table to store active call information.
```

```
-- These calls could be circuit switched or they could  
-- be virtual circuits.
```

```
-- An entry will be created when a call is started and deleted  
-- when a call is cleared.
```

```
callActiveTable OBJECT-TYPE
```

```
SYNTAX      SEQUENCE OF CallActiveEntry
```

```
MAX-ACCESS  not-accessible
```

```
STATUS      current
```

```
DESCRIPTION
```

"A table containing information about active calls to a specific destination."

```
::= { callActive 1 }
```

```
callActiveEntry OBJECT-TYPE
```

```
SYNTAX      CallActiveEntry
```

```
MAX-ACCESS  not-accessible
```

```

STATUS      current
DESCRIPTION
    "The information regarding a single active Connection.
    An entry in this table will be created when a call is
    started. An entry in this table will be deleted when
    an active call clears."
INDEX       { callActiveSetupTime, callActiveIndex }
 ::= { callActiveTable 1 }

```

```

CallActiveEntry ::=
SEQUENCE {
    callActiveSetupTime      TimeStamp,
    callActiveIndex         INTEGER,
    callActivePeerAddress   DisplayString,
    callActivePeerSubAddress DisplayString,
    callActivePeerId        INTEGER,
    callActivePeerIfIndex   INTEGER,
    callActiveLogicalIfIndex InterfaceIndexOrZero,
    callActiveConnectTime   TimeStamp,
    callActiveCallState     INTEGER,
    callActiveCallOrigin    INTEGER,
    callActiveChargedUnits  AbsoluteCounter32,
    callActiveInfoType      INTEGER,
    callActiveTransmitPackets AbsoluteCounter32,
    callActiveTransmitBytes AbsoluteCounter32,
    callActiveReceivePackets AbsoluteCounter32,
    callActiveReceiveBytes  AbsoluteCounter32
}

```

```

callActiveSetupTime OBJECT-TYPE
SYNTAX      TimeStamp
MAX-ACCESS  not-accessible
STATUS      current
DESCRIPTION
    "The value of sysUpTime when the call associated to this
    entry was started. This will be useful for an NMS to
    retrieve all calls after a specific time. Also, this object
    can be useful in finding large delays between the time the
    call was started and the time the call was connected.
    For ISDN media, this will be the time when the setup
    message was received from or sent to the network."
 ::= { callActiveEntry 1 }

```

```

callActiveIndex OBJECT-TYPE
SYNTAX      INTEGER (1..'7fffffff'h)
MAX-ACCESS  not-accessible
STATUS      current

```

DESCRIPTION

"Small index variable to distinguish calls that start in the same hundredth of a second."

::= { callActiveEntry 2 }

callActivePeerAddress OBJECT-TYPE

SYNTAX DisplayString

MAX-ACCESS read-only

STATUS current

DESCRIPTION

"The number this call is connected to. If the number is not available, then it will have a length of zero."

::= { callActiveEntry 3 }

callActivePeerSubAddress OBJECT-TYPE

SYNTAX DisplayString

MAX-ACCESS read-only

STATUS current

DESCRIPTION

"The subaddress this call is connected to. If the subaddress is undefined or not available, this will be a zero length string."

::= { callActiveEntry 4 }

callActivePeerId OBJECT-TYPE

SYNTAX INTEGER (0..2147483647)

MAX-ACCESS read-only

STATUS current

DESCRIPTION

"This is the Id value of the peer table entry to which this call was made. If a peer table entry for this call does not exist or is unknown, the value of this object will be zero."

::= { callActiveEntry 5 }

callActivePeerIfIndex OBJECT-TYPE

SYNTAX INTEGER (0..2147483647)

MAX-ACCESS read-only

STATUS current

DESCRIPTION

"This is the ifIndex value of the peer table entry to which this call was made. If a peer table entry for this call does not exist or is unknown, the value of this object will be zero."

::= { callActiveEntry 6 }

callActiveLogicalIfIndex OBJECT-TYPE

SYNTAX InterfaceIndexOrZero

```

MAX-ACCESS    read-only
STATUS        current
DESCRIPTION
    "This is the ifIndex value of the logical interface through
    which this call was made. For ISDN media, this would be
    the ifIndex of the B channel which was used for this call.
    If the ifIndex value is unknown, the value of this object
    will be zero."
 ::= { callActiveEntry 7 }

```

```

callActiveConnectTime OBJECT-TYPE
    SYNTAX      TimeStamp
    MAX-ACCESS  read-only
    STATUS      current
    DESCRIPTION
        "The value of sysUpTime when the call was connected.
        If the call is not connected, this object will have a
        value of zero."
    ::= { callActiveEntry 8 }

```

```

callActiveCallState OBJECT-TYPE
    SYNTAX      INTEGER {
        unknown(1),
        connecting(2),
        connected(3),
        active(4)
    }
    MAX-ACCESS  read-only
    STATUS      current
    DESCRIPTION
        "The current call state.
        unknown(1)      - The call state is unknown.
        connecting(2)   - A connection attempt (outgoing call)
                        is being made.
        connected(3)    - An incoming call is in the process
                        of validation.
        active(4)       - The call is active.
        "
    ::= { callActiveEntry 9 }

```

```

callActiveCallOrigin OBJECT-TYPE
    SYNTAX      INTEGER {
        originate(1),
        answer(2),
        callback(3)
    }
    MAX-ACCESS  read-only
    STATUS      current

```

```
DESCRIPTION
    "The call origin."
 ::= { callActiveEntry 10 }
```

```
callActiveChargedUnits OBJECT-TYPE
SYNTAX      AbsoluteCounter32
MAX-ACCESS  read-only
STATUS      current
DESCRIPTION
    "The number of charged units for this connection.
     For incoming calls or if charging information is
     not supplied by the switch, the value of this object
     will be zero."
 ::= { callActiveEntry 11 }
```

```
callActiveInfoType OBJECT-TYPE
SYNTAX      INTEGER {
    other(1),                -- e.g. for non-isdn media
    speech(2),
    unrestrictedDigital(3),  -- 64k/s data
    unrestrictedDigital56(4), -- with 56k rate adaption
    restrictedDigital(5),
    audio31(6),              -- 3.1 kHz audio
    audio7(7),               -- 7 kHz audio
    video(8),
    packetSwitched(9),
    fax(10)
}
MAX-ACCESS  read-only
STATUS      current
DESCRIPTION
    "The information type for this call."
 ::= { callActiveEntry 12 }
```

```
callActiveTransmitPackets OBJECT-TYPE
SYNTAX      AbsoluteCounter32
MAX-ACCESS  read-only
STATUS      current
DESCRIPTION
    "The number of packets which were transmitted for this
     call."
 ::= { callActiveEntry 13 }
```

```
callActiveTransmitBytes OBJECT-TYPE
SYNTAX      AbsoluteCounter32
MAX-ACCESS  read-only
STATUS      current
DESCRIPTION
```

```
        "The number of bytes which were transmitted for this
        call."
 ::= { callActiveEntry 14 }

callActiveReceivePackets OBJECT-TYPE
    SYNTAX      AbsoluteCounter32
    MAX-ACCESS  read-only
    STATUS      current
    DESCRIPTION
        "The number of packets which were received for this
        call."
 ::= { callActiveEntry 15 }

callActiveReceiveBytes OBJECT-TYPE
    SYNTAX      AbsoluteCounter32
    MAX-ACCESS  read-only
    STATUS      current
    DESCRIPTION
        "The number of bytes which were received for this call."
 ::= { callActiveEntry 16 }

--
-- the call history group
--

callHistory OBJECT IDENTIFIER ::= { dialControlMibObjects 4 }

callHistoryTableMaxLength OBJECT-TYPE
    SYNTAX      INTEGER (0..2147483647)
    MAX-ACCESS  read-write
    STATUS      current
    DESCRIPTION
        "The upper limit on the number of entries that the
        callHistoryTable may contain. A value of 0
        will prevent any history from being retained. When
        this table is full, the oldest entry will be deleted
        and the new one will be created."
 ::= { callHistory 1 }

callHistoryRetainTimer OBJECT-TYPE
    SYNTAX      INTEGER (0..2147483647)
    UNITS      "minutes"
    MAX-ACCESS  read-write
    STATUS      current
    DESCRIPTION
        "The minimum amount of time that an callHistoryEntry
        will be maintained before being deleted. A value of
        0 will prevent any history from being retained in the
```

```

        callHistoryTable, but will neither prevent callCompletion
        traps being generated nor affect other tables."
 ::= { callHistory 2 }

```

```

-- callHistoryTable
-- Table to store the past call information. The Destination number
-- and the call connect and disconnect time, the disconnection cause
-- are stored. These calls could be circuit switched or they could
-- be virtual circuits. History of each and every call is stored,
-- of successful calls as well as of unsuccessful and rejected calls.
-- An entry will be created when a call is cleared.

```

```

callHistoryTable OBJECT-TYPE
    SYNTAX          SEQUENCE OF CallHistoryEntry
    MAX-ACCESS      not-accessible
    STATUS          current
    DESCRIPTION
        "A table containing information about specific
        calls to a specific destination."
 ::= { callHistory 3 }

```

```

callHistoryEntry OBJECT-TYPE
    SYNTAX          CallHistoryEntry
    MAX-ACCESS      not-accessible
    STATUS          current
    DESCRIPTION
        "The information regarding a single Connection."
    INDEX           { callActiveSetupTime, callActiveIndex }
 ::= { callHistoryTable 1 }

```

```

CallHistoryEntry ::=
    SEQUENCE {
        callHistoryPeerAddress          DisplayString,
        callHistoryPeerSubAddress       DisplayString,
        callHistoryPeerId               INTEGER,
        callHistoryPeerIfIndex          INTEGER,
        callHistoryLogicalIfIndex       InterfaceIndex,
        callHistoryDisconnectCause      OCTET STRING,
        callHistoryDisconnectText       DisplayString,
        callHistoryConnectTime          TimeStamp,
        callHistoryDisconnectTime       TimeStamp,
        callHistoryCallOrigin           INTEGER,
        callHistoryChargedUnits         AbsoluteCounter32,
        callHistoryInfoType             INTEGER,
        callHistoryTransmitPackets      AbsoluteCounter32,
        callHistoryTransmitBytes        AbsoluteCounter32,
        callHistoryReceivePackets       AbsoluteCounter32,

```

```
        callHistoryReceiveBytes                AbsoluteCounter32
    }

callHistoryPeerAddress OBJECT-TYPE
    SYNTAX      DisplayString
    MAX-ACCESS  read-only
    STATUS      current
    DESCRIPTION
        "The number this call was connected to. If the number is
         not available, then it will have a length of zero."
    ::= { callHistoryEntry 1 }

callHistoryPeerSubAddress OBJECT-TYPE
    SYNTAX      DisplayString
    MAX-ACCESS  read-only
    STATUS      current
    DESCRIPTION
        "The subaddress this call was connected to. If the subaddress
         is undefined or not available, this will be a zero length
         string."
    ::= { callHistoryEntry 2 }

callHistoryPeerId OBJECT-TYPE
    SYNTAX      INTEGER (0..2147483647)
    MAX-ACCESS  read-only
    STATUS      current
    DESCRIPTION
        "This is the Id value of the peer table entry
         to which this call was made. If a peer table entry
         for this call does not exist, the value of this object
         will be zero."
    ::= { callHistoryEntry 3 }

callHistoryPeerIfIndex OBJECT-TYPE
    SYNTAX      INTEGER (0..2147483647)
    MAX-ACCESS  read-only
    STATUS      current
    DESCRIPTION
        "This is the ifIndex value of the peer table entry
         to which this call was made. If a peer table entry
         for this call does not exist, the value of this object
         will be zero."
    ::= { callHistoryEntry 4 }

callHistoryLogicalIfIndex OBJECT-TYPE
    SYNTAX      InterfaceIndex
    MAX-ACCESS  read-only
    STATUS      current
```

DESCRIPTION

"This is the ifIndex value of the logical interface through which this call was made. For ISDN media, this would be the ifIndex of the B channel which was used for this call."
 ::= { callHistoryEntry 5 }

callHistoryDisconnectCause OBJECT-TYPE

SYNTAX OCTET STRING (SIZE (0..4))

MAX-ACCESS read-only

STATUS current

DESCRIPTION

"The encoded network cause value associated with this call.

The value of this object will depend on the interface type as well as on the protocol and protocol version being used on this interface. Some references for possible cause values are given below."

REFERENCE

- "- Bellcore SR-NWT-001953, Generic Guidelines for ISDN Terminal Equipment On Basic Access Interfaces, chapter 5.2.5.8.
- Bellcore SR-NWT-002343, ISDN Primary Rate Interface Generic Guidelines for Customer Premises Equipment, chapter 8.2.5.8.
- ITU-T Q.931, Appendix I.
- ITU-T X.25, CAUSE and DIAGNOSTIC field values.
- German Telekom FTZ 1TR6, chapter 3.2.3.4.4.4."

::= { callHistoryEntry 6 }

callHistoryDisconnectText OBJECT-TYPE

SYNTAX DisplayString

MAX-ACCESS read-only

STATUS current

DESCRIPTION

"ASCII text describing the reason for call termination.

This object exists because it would be impossible for a management station to store all possible cause values for all types of interfaces. It should be used only if a management station is unable to decode the value of dialCtlPeerStatsLastDisconnectCause."

::= { callHistoryEntry 7 }

callHistoryConnectTime OBJECT-TYPE

SYNTAX TimeStamp

MAX-ACCESS read-only

STATUS current

DESCRIPTION

```

    "The value of sysUpTime when the call was connected."
 ::= { callHistoryEntry 8 }

```

```
callHistoryDisconnectTime OBJECT-TYPE
```

```

SYNTAX      TimeStamp
MAX-ACCESS  read-only
STATUS      current
DESCRIPTION
    "The value of sysUpTime when the call was disconnected."
 ::= { callHistoryEntry 9 }

```

```
callHistoryCallOrigin OBJECT-TYPE
```

```

SYNTAX      INTEGER {
    originate(1),
    answer(2),
    callback(3)
}
MAX-ACCESS  read-only
STATUS      current
DESCRIPTION
    "The call origin."
 ::= { callHistoryEntry 10 }

```

```
callHistoryChargedUnits OBJECT-TYPE
```

```

SYNTAX      AbsoluteCounter32
MAX-ACCESS  read-only
STATUS      current
DESCRIPTION
    "The number of charged units for this connection.
    For incoming calls or if charging information is
    not supplied by the switch, the value of this object
    will be zero."
 ::= { callHistoryEntry 11 }

```

```
callHistoryInfoType OBJECT-TYPE
```

```

SYNTAX      INTEGER {
    other(1),                -- e.g. for non-isdn media
    speech(2),
    unrestrictedDigital(3),  -- 64k/s data
    unrestrictedDigital56(4), -- with 56k rate adaption
    restrictedDigital(5),
    audio31(6),              -- 3.1 kHz audio
    audio7(7),               -- 7 kHz audio
    video(8),
    packetSwitched(9),
    fax(10)
}
MAX-ACCESS  read-only

```

```
STATUS      current
DESCRIPTION
    "The information type for this call."
 ::= { callHistoryEntry 12 }
```

```
callHistoryTransmitPackets OBJECT-TYPE
SYNTAX      AbsoluteCounter32
MAX-ACCESS  read-only
STATUS      current
DESCRIPTION
    "The number of packets which were transmitted while this
    call was active."
 ::= { callHistoryEntry 13 }
```

```
callHistoryTransmitBytes OBJECT-TYPE
SYNTAX      AbsoluteCounter32
MAX-ACCESS  read-only
STATUS      current
DESCRIPTION
    "The number of bytes which were transmitted while this
    call was active."
 ::= { callHistoryEntry 14 }
```

```
callHistoryReceivePackets OBJECT-TYPE
SYNTAX      AbsoluteCounter32
MAX-ACCESS  read-only
STATUS      current
DESCRIPTION
    "The number of packets which were received while this
    call was active."
 ::= { callHistoryEntry 15 }
```

```
callHistoryReceiveBytes OBJECT-TYPE
SYNTAX      AbsoluteCounter32
MAX-ACCESS  read-only
STATUS      current
DESCRIPTION
    "The number of bytes which were received while this
    call was active."
 ::= { callHistoryEntry 16 }
```

-- Traps related to Connection management

```
dialControlMibTrapPrefix OBJECT IDENTIFIER ::= { dialControlMib 2 }
dialControlMibTraps OBJECT IDENTIFIER ::= { dialControlMibTrapPrefix 0 }
```

```
dialCtlPeerCallInformation NOTIFICATION-TYPE
OBJECTS {
```

```

    callHistoryPeerId,
    callHistoryPeerIfIndex,
    callHistoryLogicalIfIndex,
    ifOperStatus,
    callHistoryPeerAddress,
    callHistoryPeerSubAddress,
    callHistoryDisconnectCause,
    callHistoryConnectTime,
    callHistoryDisconnectTime,
    callHistoryInfoType,
    callHistoryCallOrigin
}
STATUS          current
DESCRIPTION
    "This trap/inform is sent to the manager whenever
    a successful call clears, or a failed call attempt
    is determined to have ultimately failed. In the
    event that call retry is active, then this is after
    all retry attempts have failed. However, only one such
    trap is sent in between successful call attempts;
    subsequent call attempts result in no trap.
    ifOperStatus will return the operational status of the
    virtual interface associated with the peer to whom
    this call was made to."
 ::= { dialControlMibTraps 1 }

```

```
dialCtlPeerCallSetup NOTIFICATION-TYPE
```

```

    OBJECTS {
        callActivePeerId,
        callActivePeerIfIndex,
        callActiveLogicalIfIndex,
        ifOperStatus,
        callActivePeerAddress,
        callActivePeerSubAddress,
        callActiveInfoType,
        callActiveCallOrigin
    }
STATUS          current
DESCRIPTION
    "This trap/inform is sent to the manager whenever
    a call setup message is received or sent.
    ifOperStatus will return the operational status of the
    virtual interface associated with the peer to whom
    this call was made to."
 ::= { dialControlMibTraps 2 }

```

```
-- conformance information
```

```
dialControlMibConformance OBJECT IDENTIFIER ::=
    { dialControlMib 3 }
dialControlMibCompliances OBJECT IDENTIFIER ::=
    { dialControlMibConformance 1 }
dialControlMibGroups      OBJECT IDENTIFIER ::=
    { dialControlMibConformance 2 }

-- compliance statements

dialControlMibCompliance MODULE-COMPLIANCE
    STATUS          current
    DESCRIPTION
        "The compliance statement for entities which
         implement the DIAL CONTROL MIB"
    MODULE          -- this module
    MANDATORY-GROUPS
        { dialControlGroup, callActiveGroup, callHistoryGroup,
          callNotificationsGroup }
    ::= { dialControlMibCompliances 1 }

-- units of conformance

dialControlGroup OBJECT-GROUP
    OBJECTS {
        dialCtlAcceptMode,
        dialCtlTrapEnable,
        dialCtlPeerCfgIfType,
        dialCtlPeerCfgLowerIf,
        dialCtlPeerCfgOriginateAddress,
        dialCtlPeerCfgAnswerAddress,
        dialCtlPeerCfgSubAddress,
        dialCtlPeerCfgClosedUserGroup,
        dialCtlPeerCfgSpeed,
        dialCtlPeerCfgInfoType,
        dialCtlPeerCfgPermission,
        dialCtlPeerCfgInactivityTimer,
        dialCtlPeerCfgMinDuration,
        dialCtlPeerCfgMaxDuration,
        dialCtlPeerCfgCarrierDelay,
        dialCtlPeerCfgCallRetries,
        dialCtlPeerCfgRetryDelay,
        dialCtlPeerCfgFailureDelay,
        dialCtlPeerCfgTrapEnable,
        dialCtlPeerCfgStatus,
        dialCtlPeerStatsConnectTime,
        dialCtlPeerStatsChargedUnits,
        dialCtlPeerStatsSuccessCalls,
        dialCtlPeerStatsFailCalls,
```

```

    dialCtlPeerStatsAcceptCalls,
    dialCtlPeerStatsRefuseCalls,
    dialCtlPeerStatsLastDisconnectCause,
    dialCtlPeerStatsLastDisconnectText,
    dialCtlPeerStatsLastSetupTime
}
STATUS          current
DESCRIPTION
    "A collection of objects providing the DIAL CONTROL
    capability."
 ::= { dialControlMibGroups 1 }

```

callActiveGroup OBJECT-GROUP

```

OBJECTS {
    callActivePeerAddress,
    callActivePeerSubAddress,
    callActivePeerId,
    callActivePeerIfIndex,
    callActiveLogicalIfIndex,
    callActiveConnectTime,
    callActiveCallState,
    callActiveCallOrigin,
    callActiveChargedUnits,
    callActiveInfoType,
    callActiveTransmitPackets,
    callActiveTransmitBytes,
    callActiveReceivePackets,
    callActiveReceiveBytes
}
STATUS          current
DESCRIPTION
    "A collection of objects providing the active call
    capability."
 ::= { dialControlMibGroups 2 }

```

callHistoryGroup OBJECT-GROUP

```

OBJECTS {
    callHistoryTableMaxLength,
    callHistoryRetainTimer,
    callHistoryPeerAddress,
    callHistoryPeerSubAddress,
    callHistoryPeerId,
    callHistoryPeerIfIndex,
    callHistoryLogicalIfIndex,
    callHistoryDisconnectCause,
    callHistoryDisconnectText,
    callHistoryConnectTime,
    callHistoryDisconnectTime,
}

```

```

    callHistoryCallOrigin,
    callHistoryChargedUnits,
    callHistoryInfoType,
    callHistoryTransmitPackets,
    callHistoryTransmitBytes,
    callHistoryReceivePackets,
    callHistoryReceiveBytes
  }
  STATUS          current
  DESCRIPTION
    "A collection of objects providing the Call History
    capability."
  ::= { dialControlMibGroups 3 }

```

```

callNotificationsGroup NOTIFICATION-GROUP
  NOTIFICATIONS { dialCtlPeerCallInformation, dialCtlPeerCallSetup }
  STATUS          current
  DESCRIPTION
    "The notifications which a Dial Control MIB entity is
    required to implement."
  ::= { dialControlMibGroups 4 }

```

END

4. Acknowledgments

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```

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```

5. References

- [1] SNMPv2 Working Group, 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.
- [2] McCloghrie, K., and M. Rose, Editors, "Management Information Base for Network Management of TCP/IP-based internets: MIB-II", STD 17, RFC 1213, Hughes LAN Systems, Performance Systems International, March 1991.
- [3] Case, J., Fedor, M., Schoffstall, M., and J. Davin, "A Simple Network Management Protocol (SNMP)", STD 15, RFC 1157, SNMP Research, Performance Systems International, MIT Lab for Computer Science, May 1990.
- [4] SNMPv2 Working Group, Case, J., McCloghrie, K., Rose, M. and S. Waldbusser, "Protocol Operations for Version 2 of the Simple Network Management Protocol (SNMPv2)", RFC 1905, January 1996.
- [5] ITU-T Recommendation "Digital subscriber Signalling System No. 1 (DSS 1) - ISDN user-network interface layer 3 specification for basic call control", Rec. Q.931(I.451), March 1993.
- [6] ITU-T Recommendation "Generic procedures for the control of ISDN supplementary services ISDN user-network interface layer 3 specification", Rec. Q.932(I.452).
- [7] ITU-T Recommendation "Digital subscriber Signalling System No. 1 (DSS 1) - Signalling specification for frame-mode basic call control", Rec. Q.933.
- [8] McCloghrie, K. and F. Kastenholz, "Evolution of the Interfaces Group of MIB-II", RFC 1573, Hughes LAN Systems, FTP Software, January 1994.

6. Security Considerations

Information in this MIB may be used by upper protocol layers for security purpose.

The implementor should be aware that supporting generic peers as described in section 3.4 may cause a security hole. The user would not know where a call is from, which could potentially allow unauthorized access if there is no other authentication scheme, e.g. PPP authentication, available.

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