

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.

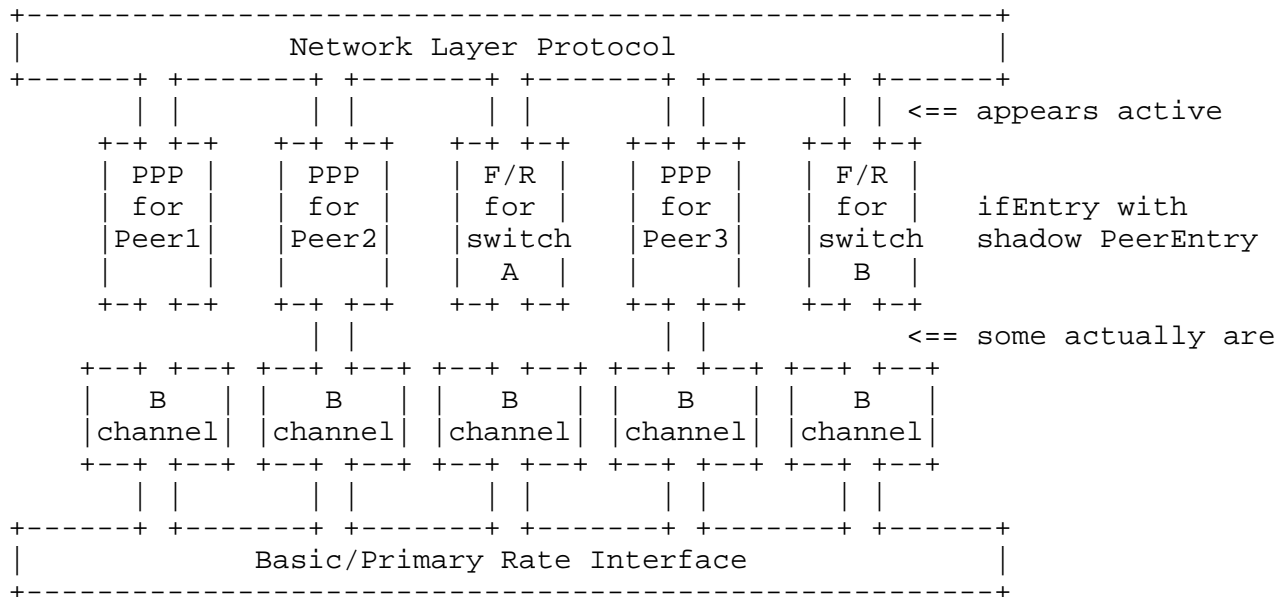
2.2.1. Layering Model and Virtual Circuits

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.

The model, therefore, looks something like this, taking ISDN as an example:



Mapping of IP interfaces to Called Peers to B Channels

IfEntries are maintained for each peer.

In this model, each peer is required to have an associated encapsulation layer interface. This interface can be of any kind, e.g. PPP or LAPB.

In order to specify the network address for a given peer, one would then usually add a routing/forwarding table entry, pointing to the encapsulation layer interface through which this peer can be reached.

2.2.2. ifTestTable

The ifTestTable usage is defined in the MIBs defining the encapsulation below the network layer. For example, if PPP encapsulation is being used, the ifTestTable is defined by PPP.

2.2.3. ifRcvAddressTable

The ifRcvAddressTable usage is defined in the MIBs defining the encapsulation below the network layer. For example, if PPP encapsulation is being used, the ifRcvAddressTable is defined by PPP.

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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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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