

**Telephony-Return Interface (TRI) Management Information Base
for DOCSIS-compliant Telephony-Return Cable Modems and
Cable Modem Termination Systems**
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Abstract

This memo defines an experimental portion of the Management Information Base (MIB) for use with network management protocols in the Internet community. In particular, it defines a basic set of managed objects for SNMP-based management of DOCSIS compliant Cable Modems and Cable Modem Termination Systems. This memo specifies a MIB module in a manner that is compliant to the SNMP SMIV2[5][6][7]. The set of objects is consistent with the SNMP framework and existing SNMP standards. This memo is a product of the IPCDN working group

within the Internet Engineering Task Force. Comments are solicited and should be addressed to the working group's mailing list at ipcdn@terayon.com and/or the author.

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1. The SNMP Management Framework

The SNMP Management Framework presently consists of five major components:

- An overall architecture, described in [RFC 2271](#) [1].

- o Mechanisms for describing and naming objects and events for the purpose of management. The first version of this Structure of Management Information (SMI) is called SMIV1 and described in [RFC 1155](#) [2], [RFC 1212](#) [3] and [RFC 1215](#) [4]. The second version, called SMIV2, is described in [RFC 1902](#) [5], [RFC 1903](#) [6] and [RFC 1904](#) [7].
- o Message protocols for transferring management information. The first version of the SNMP message protocol is called SNMPv1 and described in [RFC 1157](#) [8]. A second version of the SNMP message protocol, which is not an Internet standards track protocol, is called SNMPv2c and described in [RFC 1901](#) [9] and [RFC 1906](#) [10]. The third version of the message protocol is called SNMPv3 and

described in [RFC 1906](#) [10], [RFC 2272](#) [11] and [RFC 2274](#) [12].

- o Protocol operations for accessing management information. The first set of protocol operations and associated PDU formats is described in [RFC 1157](#) [8]. A second set of protocol operations and associated PDU formats is described in [RFC 1905](#) [13].

- o A set of fundamental applications described in [RFC 2273](#) [14] and the view-based access control mechanism described in [RFC 2275](#) [15].

Managed objects are accessed via a virtual information store, termed the Management Information Base or MIB. Objects in the MIB are defined using the mechanisms defined in the SMI.

This memo specifies a MIB module that is compliant to the SMIV2. A MIB conforming to the SMIV1 can be produced through the appropriate translations. The resulting translated MIB must be semantically equivalent, except where objects or events are omitted because no translation is possible (use of Counter64). Some machine readable information in SMIV2 will be converted into textual descriptions in SMIV1 during the translation process. However, this loss of machine readable information is not considered to change the semantics of the MIB.

2. Glossary

The terms in this document are derived either from normal cable system usage, or from the documents associated with the Data Over Cable Service Interface Specification process.

2.1 CATV

Originally "Community Antenna Television", now used to refer to any cable or hybrid fiber and cable system used to deliver video signals to a community.

2.2 CM

Cable Modem. A CM acts as a "slave" station in a DOCSIS compliant cable data system.

2.3 CMTS

Cable Modem Termination System. A generic term covering a cable bridge or cable router in a head-end. A CMTS acts as the master station in a DOCSIS compliant cable data system. It is the only station that transmits downstream, and it controls the scheduling of upstream transmissions by its associated CMs.

2.4 DOCSIS

Data Over Cable System Interface Specifications

2.5 Downstream

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From the head-end towards the subscriber.

2.6 Head-end

The origination point in most cable systems of the subscriber video signals. Generally also the location of the CMTS equipment.

2.7 RF

Radio Frequency.

2.8 Upstream

From the subscriber towards the headend via PSTN.

3. Overview

This MIB provides a set of objects required for the management of DOCSIS compliant Cable Modems (CM) and Cable Modem Termination Systems (CMTS). The specification is derived from the DOCSIS Radio Frequency Interface specification [16].

The key words "MUST", "MUST NOT", "REQUIRED", "SHALL", "SHALL NOT", "SHOULD", "SHOULD NOT", "RECOMMENDED", "MAY", and "OPTIONAL" in this document are to be interpreted as described in [19]

3.1 Discussion

The data-over-cable-system telephony return interface specification is documented in [20]. The management requirements of this interface are detailed in that specification. Specific inferences to other controls are itemized in the following list: The Telephony Return CM and telephony Return CMTS MUST support the objects in the DOCSIS Cable Device MIB [21] and DOCSIS RFI MIB [22] that are applicable to downstream only. In a Telephony Return CM, the management of the telephony modem MAY use the Modem Management Information Base (MIB) using SMiv2 [23]. These objects generally require proprietary handling to address the telephony modems serial AT command interface. It is not reasonable to require MIB support for all third party dial modems. However, if a dial modem is integrated within a cable modem product, using a subset of the [RFC1696](#) Modem MIB objects to control the dial modem is practical and reasonable. Guidelines for dial modem physical capabilities are provided in [20]. Guidelines for specific applicability of [21], [22], and [23] for telephony return systems are provided in [24].

3.2 Management Requirements

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3.2.1 Handling Of Service Provider Descriptor (SPD) Updates

The Cable Modem service provider option process is documented in [5]. An operator creates service provider descriptors (SPDs) that the CMTS will send to all CMs in its domain. The operator must signify one entry as factory default for initial dial-in service for a subscriber. An external telco-return modem may have objects within the selected SPD modified by changing corresponding scalar objects on a CM using the network management station.

One reason for the SNMP-initiated SPD update is to allow loading of permanent Telephone Numbers, Login Usernames and Login Passwords without requiring individualized configuration files on a per CM basis.

For example the operator MAY:

- o set docsTrTsSPDphoneNum1 to dial a temporary access Telephone Number. A factory default CM user may then be given some limited access by using default values for all other SPD objects.
- o Temporary system access may be upgraded after an undefined operator specified authentication. The operator may then set docsTrTsSPDphoneNum1, docsTrTsSPDuserName, docsTrTsSPDuserPassword (phone/login/password) or any other CM SPD objects to individualized settings.
- o These settings remain in effect unless changed by Telephone Settings Options in the CMs TFTP configuration file.
- o The operator may want to change individual Telephone Settings Options for CMs sharing a global TFTP configuration file. For example, the DHCP Server (ip address) can be changed for all CMs sharing a configuration file without affecting any other active SPD settings by having just DHCP server parameter set in the file. All other MIB modified SPD parameters would remain active (excepting docsTrTsSPDdhcpAddress MIB object) if docsTrCmSPDpersistEnable is TRUE.

4. Definitions

TelcoReturnCABLE-DEVICE-MIB DEFINITIONS ::= BEGIN

```
IMPORTS
MODULE-IDENTITY, OBJECT-TYPE,
Integer32, IPAddress, Unsigned32
FROM SNMPv2-SMI
DisplayString, DateAndTime, TruthValue, RowStatus
```


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```

FROM SNMPv2-TC
OBJECT-GROUP, MODULE-COMPLIANCE
FROM SNMPv2-CONF
InterfaceIndexOrZero
FROM DOCS-IF-MIB
transmission
FROM RFC1213-MIB
;

```

```

docsTrCmMIB MODULE-IDENTITY
    LAST-UPDATED "9904020720Z"
    ORGANIZATION "3Com - Cable Access"
    CONTACT-INFO " Jack Fijolek/Srinivyasa Murthy

```

Adiraju

```

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Fax:      +1 847 2620258
E-mail: Srinivyasa_Adiraju@3Com.com"

```

DESCRIPTION

```

"TELCO Return MIB for Data Over Cable Access
modems and termination systems"
 ::= { transmission 128 }

```

```

docsTrCmMIBObjects OBJECT IDENTIFIER ::=
{docsTrCmMIB 1}
docsTrCmBase OBJECT IDENTIFIER ::= {
docsTrCmMIBObjects 1}

```

docsTrCmCapability OBJECT-TYPE

```

SYNTAX      INTEGER {
                other(1),
                telcoReturn(2),
                twoWay(3),
                threeWay(4)
            }

```

MAX-ACCESS read-only

STATUS current

DESCRIPTION

"This object represents the CM Capability. A CM may be 'TelcoReturn(2)', or 'TwoWay(3)', or Other e.g., undefined"

```

 ::= { docsTrCmBase 1 }

```

docsTrCmMode OBJECT-TYPE

```

SYNTAX      INTEGER {

```

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```

        other(1),
        telcoReturn(2),
        twoWay(3)
    }
    MAX-ACCESS read-write
    STATUS      current
    DESCRIPTION
        "This object represents the CM Operating Mode.  A
CM may be operating as 'TelcoReturn(2)', or 'TwoWay(3)', or
Other e.g, undefined"
    ::= { docsTrCmBase 2 }

```

```

docsTrMsgBase OBJECT IDENTIFIER ::= {
docsTrCmMIBObjects 2}

```

```

docsTrMsgBaseTable OBJECT-TYPE
    SYNTAX SEQUENCE OF DocsTrMsgBaseEntry
    MAX-ACCESS not-accessible
    STATUS      current
    DESCRIPTION
        "Telco Return Message Base Table"
    ::= { docsTrMsgBase 1 }

```

```

docsTrMsgBaseEntry OBJECT-TYPE
    SYNTAX DocsTrMsgBaseEntry
    MAX-ACCESS not-accessible
    STATUS      current
    DESCRIPTION
        "This table contains the information
about TCD/TSI and USRbackOff for each interface"
    INDEX { docsTrMsgIfIndex }
    ::= { docsTrMsgBaseTable 1 }

```

```

DocsTrMsgBaseEntry ::= SEQUENCE {
    docsTrMsgIfIndex InterfaceIndexOrZero,
    docsTrMsgTCDInterval INTEGER,
    docsTrMsgTSIInterval INTEGER,
    docsTrMsgUSRBackOff Unsigned32,
    docsTrMsgRowValue RowStatus
}

```

```

docsTrMsgIfIndex OBJECT-TYPE
    SYNTAX      InterfaceIndexOrZero

```

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MAX-ACCESS not-accessible
STATUS current
DESCRIPTION

"The value corresponds to ifIndex for either a CATV MAC or other network interface. In Cable Modems, the default value is the customer side interface. In Cable Modem Termination Systems, this object has to be specified to create a row in this table."

::= { docsTrMsgBaseEntry 1 }

docsTrMsgTCDInterval OBJECT-TYPE

SYNTAX INTEGER (500..2000)

UNITS "Milliseconds"

MAX-ACCESS read-write

STATUS current

DESCRIPTION

"The interval between CMTS transmission of successive Telephony Channel Descriptor (TCD) messages at this interface."

REFERENCE

"Data Over Cable Telephony Return Interface Specification,[1], TCD Interval."

DEFVAL { 2000 }

::= { docsTrMsgBaseEntry 2 }

docsTrMsgTSIInterval OBJECT-TYPE

SYNTAX INTEGER (1000..4000)

UNITS "Milliseconds"

MAX-ACCESS read-write

STATUS current

DESCRIPTION

"The interval between CMTS transmission of successive Termination System Interface (TSI) messages for a downstream channel at this interface. This is also the time interval a CM should scan on a specific channel for a TSI message and sets the frequency the CM monitors the CMTS epoch counter. "

REFERENCE

"Data Over Cable Telephony Return Interface Specification,[6], TSI Interval."

DEFVAL { 4000 }

::= { docsTrMsgBaseEntry 3 }

docsTrMsgUSRBackOff OBJECT-TYPE

SYNTAX Unsigned32

MAX-ACCESS read-write

STATUS current

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DESCRIPTION

" This object represents the number of times CMTS will resend User Station Reset messages if unacknowledged by CM; Number of duplicate reset requests CM may receive"

DEFVAL{4}

REFERENCE

"Data Over Cable Telephony Return Interface Specification, [6], USR Backoff ."

::= { docsTrMsgBaseEntry 4 }

docsTrMsgRowValue OBJECT-TYPE

SYNTAX RowStatus

MAX-ACCESS read-write

STATUS current

DESCRIPTION

" Controls and reflects the status of rows in this table "

::= { docsTrMsgBaseEntry 5 }

docsTrTsSPD OBJECT IDENTIFIER ::= { docsTrCmMIBObjects 3 }

docsTrTsSPDTable OBJECT-TYPE

SYNTAX SEQUENCE OF DocsTrTsSPDEntry

MAX-ACCESS not-accessible

STATUS current

DESCRIPTION

" A table of all the SPD messages that get sent out"

::= { docsTrTsSPD 1 }

docsTrTsSPDEntry OBJECT-TYPE

SYNTAX DocsTrTsSPDEntry

MAX-ACCESS not-accessible

STATUS current

DESCRIPTION

"This an entry in the SPD table which is one of the SPD that get sent outto the cable modems"

INDEX {docsTrTsSPDindex}

::= {docsTrTsSPDTable 1}

DocsTrTsSPDEntry ::= SEQUENCE {

docsTrTsSPDindex INTEGER,

docsTrTsSPDname DisplayString,

docsTrTsSPDphoneNum1 DisplayString,

docsTrTsSPDphoneNum2 DisplayString,

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```
docsTrTsSPDphoneNum3    DisplayString,
docsTrTsSPDConnThreshold Integer32,
docsTrTsSPDUserName     DisplayString,
docsTrTsSPDUserPassword OCTET STRING,
docsTrTsSPDpppAuth      INTEGER,
docsTrTsSPDdhcpAuth     INTEGER,
docsTrTsSPDradiusRealm  DisplayString,
docsTrTsDemandDialTimer Unsigned32,
docsTrTsSPDdhcpAddress  IPAddress,
docsTrTsSPDfactoryDef   INTEGER,
docsTrTsSPDstatus       INTEGER
```

```
}
```

```
docsTrTsSPDindex    OBJECT-TYPE
SYNTAX  INTEGER(1..16383)
MAX-ACCESS not-accessible
STATUS  current
DESCRIPTION
"The unique number which identifies the Service
Provider Descriptor in the SPDTable"
 ::= { docsTrTsSPDEntry 1 }
```

```
docsTrTsSPDname OBJECT-TYPE
SYNTAX  DisplayString (SIZE(1..128))
MAX-ACCESS read-create
STATUS  current
DESCRIPTION
"The name of the Service Provider. A value of
null string means no name"
DEFVAL { "" }
 ::= { docsTrTsSPDEntry 2 }
```

```
docsTrTsSPDphoneNum1 OBJECT-TYPE
SYNTAX  DisplayString (SIZE (1..128))
MAX-ACCESS read-create
STATUS  current
DESCRIPTION
"The first phone number to try when trying to
reach the service provider. A value of null string means no
phone number"
DEFVAL { "" }
 ::= { docsTrTsSPDEntry 3 }
```

```
docsTrTsSPDphoneNum2 OBJECT-TYPE
SYNTAX  DisplayString (SIZE (1..128))
MAX-ACCESS read-create
```

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STATUS current

DESCRIPTION

"The second phone number to try to reach the service provider when the first number fails. A value of null string means no phone number"

DEFVAL { "" }

::= { docsTrTsSPDEntry 4 }

docsTrTsSPDphoneNum3 OBJECT-TYPE

SYNTAX DisplayString (SIZE (1..128))

MAX-ACCESS read-create

STATUS current

DESCRIPTION

"The third phone number to try in case the 1st and 2nd numbers fail. A value of null string means no phone number"

DEFVAL { "" }

::= { docsTrTsSPDEntry 5 }

docsTrTsSPDConnThreshold OBJECT-TYPE

SYNTAX Integer32 (1..10)

MAX-ACCESS read-create

STATUS current

DESCRIPTION

"The number of sequential connection try failures before indicating connection failure. "

DEFVAL { 1 }

::= { docsTrTsSPDEntry 6 }

docsTrTsSPDuserName OBJECT-TYPE

SYNTAX DisplayString (SIZE (1..32))

MAX-ACCESS read-create

STATUS current

DESCRIPTION

"The username the CM will use during PAP or CHAP authentication over telco link during the initialization procedure."

DEFVAL { "guest" }

::= { docsTrTsSPDEntry 7 }

docsTrTsSPDuserPassword OBJECT-TYPE

SYNTAX OCTET STRING (SIZE (1..15))

MAX-ACCESS read-create

STATUS current

DESCRIPTION

"The password that the CM will use during the PAP or CHAP authentication over the telco link during the initialization procedure."

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```
DEFVAL { "" }
::= { docsTrTsSPDEntry 8 }
```

docsTrTsSPDpppAuth OBJECT-TYPE

```
SYNTAX  INTEGER {
                                other(1),
                                uNegotiate(2),
                                uPAP(3),
                                uCHAP(4)
                                }
MAX-ACCESS  read-create
STATUS      current
DESCRIPTION
    "This instructs the telco return modem of the
authentication procedure to perform over the telco link."
DEFVAL { uNegotiate }
::= { docsTrTsSPDEntry 9 }
```

docsTrTsSPDdhcpAuth OBJECT-TYPE

```
SYNTAX  TruthValue
MAX-ACCESS  read-create
STATUS      current
DESCRIPTION
    "Boolean value reserved to indicate CM MUST
authenticate DHCP messages when enable."
DEFVAL { False }
::= { docsTrTsSPDEntry 10 }
```

docsTrTsSPDradiusRealm OBJECT-TYPE

```
SYNTAX  DisplayString (SIZE(0..128))
MAX-ACCESS  read-create
STATUS      current
DESCRIPTION
    "The realm name contains the ASCII string which
defines a RADIUS server domain. TRAC RADIUS MUST proxy
requests to a server realm. RADIUS syntax is to address
login name as Username- String@Realm-String - RADIUS Realm-
String MUST be correlated by the TRAC RADIUS to the IP
address of a RADIUS server to be proxied to for the
designated RADIUS user profile. If the TRAC RADIUS is the
server for designated user profile,the default value is the
null string."
DEFVAL { "" }
::= { docsTrTsSPDEntry 11 }
```

docsTrTsDemandDialTimer OBJECT-TYPE

```
SYNTAX  Unsigned32
MAX-ACCESS  read-write
```

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STATUS current

DESCRIPTION

" This object represents the number of seconds of networking inactivity allowed before hang-up, the default zero indicates demand dial is not enabled. Demand dial is desirable to allow the traffic engineering of dial-in ports. Networking activity monitoring is a vendor specific implementation"

DEFVAL{ 0 }

::= { docsTrTsSPDentry 12 }

docsTrTsSPDdhcpAddress OBJECT-TYPE

SYNTAX IPAddress

MAX-ACCESS read-create

STATUS current

DESCRIPTION

" The ip address of the DHCP server."

::= { docsTrTsSPDentry 13 }

docsTrTsSPDfactoryDef OBJECT-TYPE

SYNTAX TruthValue

MAX-ACCESS read-create

STATUS current

DESCRIPTION

"boolean value, if true, indicates the SPD which SHOULD be used by the CM during factory default procedure."

::= { docsTrTsSPDentry 14 }

docsTrTsSPDstatus OBJECT-TYPE

SYNTAX INTEGER {

disabled(1),

enabled(2),

deleted(3)

}

MAX-ACCESS read-create

STATUS current

DESCRIPTION

"When the status is set to disabled, that corresponding SPD entry will be disabled from the CMTS. When the status is set to enabled, that corresponding SPD entry will be enabled in the CMTS. When the status is set to deleted, that corresponding SPD entry will be deleted from the CMTS. At least one SPD entry must be present and enabled in a CMTS"

::= { docsTrTsSPDentry 15 }

docsTrCmSPDBase OBJECT IDENTIFIER ::= {

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docsTrCmMIBObjects 4}

docsTrCmSPDpersistEnable OBJECT-TYPE

SYNTAX TruthValue

MAX-ACCESS read-write

STATUS current

DESCRIPTION

"truth value contains interpretation of the SPD MIB objects for the CM local ISP selection method. If docsTrCmSPDpersistEnable is false (2), no SPD MIB objects persist in an active SPD if ANY SPD parameters are set in a TFTP configuration file. In such a case the CM MUST use only configuration file SPD settings and defaults to construct the active SPD. When docsTrCmSPDpersistEnable is true(1), SPD MIB objects persist in an active SPD except where specific SPD parameters in a TFTP configuration file override their corresponding specific SPD MIB objects. In such a case the CM MUST first use the configuration file SPD settings, then use ANY SPD MIB object previously set where TFTP configuration file parameters are not present, lastly, appropriate defaults defined in [18,20] to construct the active SPD. The initial setting is false(2)."

::= { docsTrCmSPDBase 1 }

docsTrCmSPDname OBJECT-TYPE

SYNTAX DisplayString

MAX-ACCESS read-write

STATUS current

DESCRIPTION

" This object contains the service provider Name"

::= { docsTrCmSPDBase 2 }

docsTrCmISPphoneNum1 OBJECT-TYPE

SYNTAX DisplayString

MAX-ACCESS read-write

STATUS current

DESCRIPTION

" This object contains the Primary ISP Phone
number 1"

::= { docsTrCmSPDBase 3 }

docsTrCmISPphoneNum2 OBJECT-TYPE

SYNTAX DisplayString

MAX-ACCESS read-write

STATUS current

DESCRIPTION

" This object contains the Backup Phone number 2
"

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```
 ::= { docsTrCmSPDBase 4 }

docsTrCmISPphoneNum3 OBJECT-TYPE
SYNTAX DisplayString
MAX-ACCESS read-write
STATUS current
DESCRIPTION
" This object contains the Backup Phone number
3"

 ::= { docsTrCmSPDBase 5 }

docsTrCmconnThreshold OBJECT-TYPE
SYNTAX Integer32 (1..10)
MAX-ACCESS read-write
STATUS current
DESCRIPTION
"The number of sequential connection try failures
before indicating connection failure."
 ::= { docsTrCmSPDBase 6 }

docsTrCmPPPloginName OBJECT-TYPE
SYNTAX DisplayString
MAX-ACCESS read-write
STATUS current
DESCRIPTION
" This object contains the PPP Login Name"
 ::= { docsTrCmSPDBase 7 }

docsTrCmPPPpassword OBJECT-TYPE
SYNTAX DisplayString
MAX-ACCESS read-write
STATUS current
DESCRIPTION
" This object contains the PPP Password"
 ::= { docsTrCmSPDBase 8 }

docsTrCmPPPAuth OBJECT-TYPE
SYNTAX INTEGER{
none(1),
pap(2),
chap(3)
}
MAX-ACCESS read-write
STATUS current
DESCRIPTION
" This object contains the secure login
verification method"
```

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```
::= { docsTrCmSPDBase 9 }
```

```
docsTrCmDHCPauth OBJECT-TYPE
```

```
SYNTAX IPAddress
```

```
MAX-ACCESS read-write
```

```
STATUS current
```

```
DESCRIPTION
```

```
"This object contains the DHCP Server IP Address"
```

```
::= { docsTrCmSPDBase 10 }
```

```
docsTrCmradiusRealm OBJECT-TYPE
```

```
SYNTAX DisplayString
```

```
MAX-ACCESS read-write
```

```
STATUS current
```

```
DESCRIPTION
```

```
" This object contains the RADIUS Cable Access  
Realm Name"
```

```
::= { docsTrCmSPDBase 11 }
```

```
docsTrCmDemandDialTimer OBJECT-TYPE
```

```
SYNTAX Unsigned32
```

```
MAX-ACCESS read-write
```

```
STATUS current
```

```
DESCRIPTION
```

```
" This object represents the number of seconds of  
networking inactivity allowed before hang-up, the default  
zero indicates demand dial is not enabled. Demand dial is  
desirable to allow the traffic engineering of dial-in ports.  
Networking activity monitoring is a vendor specific  
implementation"
```

```
::= { docsTrCmSPDBase 12 }
```

```
docsTrCmDHCPserver OBJECT-TYPE
```

```
SYNTAX IPAddress
```

```
MAX-ACCESS read-write
```

```
STATUS current
```

```
DESCRIPTION
```

```
"This object contains the DHCP Server IP Address"
```

```
::= { docsTrCmSPDBase 13 }
```

```
docsTrCmSessionBase OBJECT IDENTIFIER ::= {  
docsTrCmMIBObjects 5}
```

```
docsTrCmPingAuth OBJECT-TYPE
```

```
SYNTAX TruthValue
```

```
MAX-ACCESS read-write
```

```
STATUS current
```

```
DESCRIPTION
```

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"This object has a value of 'true(1)' if CPE is allowed to generate ping (ICMP request) across the network, CPE."

::= { docsTrCmSessionBase 1 }

docsTrCmTerminateOnOffHook OBJECT-TYPE

SYNTAX TruthValue

MAX-ACCESS read-write

STATUS current

DESCRIPTION

"This object has a value of 'true(1)' if CM must terminate data session on off hook/voice call events,

::= { docsTrCmSessionBase 2 }

docsTrCmCMType OBJECT-TYPE

SYNTAX INTEGER {
 extGeneric(1),
 extRouted(2),
 internalOther(3),
 internalISA(4),
 internalPCI(5),
 internalMAC(6),
 internalSBUS(7),
 internalUSB(8)

}

MAX-ACCESS read-only

STATUS current

DESCRIPTION

"This object represents the CM configured type. A CM may be configured as a DOCSIS bridge 'ExtGeneric(1)', as a telephony return IP forwarder 'ExtRouted(2)', or as a single host 'InternalXXX(3-8). "

::= { docsTrCmSessionBase 3 }

docsTrCmRingNoAns OBJECT-TYPE

SYNTAX INTEGER

MAX-ACCESS read-write

STATUS current

DESCRIPTION

"This object defines the number of rings before answer a CM should allow (ring threshold) before failing the connection as NO ANSWER"

::= { docsTrCmSessionBase 4 }

docsTrCmWaitInterval OBJECT-TYPE

SYNTAX Unsigned32

MAX-ACCESS read-only

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STATUS current

DESCRIPTION

"This object defines the number of seconds of
time CM should wait for a call to ring after dialing"

::= { docsTrCmSessionBase 5 }

-- The telephony return modem Command group addresses
-- scripting for dial-modem where a command and result
-- are processed to allow a management station to
-- communicate without apriori mapping of a given AT
-- command set. This process is provided to allow some
-- degree of control over non-integrated dial modems
-- by external telephony return cable modems. Internal
-- (to host) cable modems have OS specific vehicles
-- available to handle dial-up. Integrated telephone
-- and cable solutions should have specific source to
-- deal with dial initialization and modem commands of
-- bundled hardware.

docsTrCmCommand OBJECT IDENTIFIER ::= {
docsTrCmMIBObjects 6 }

docsTrCmCdCode OBJECT-TYPE

SYNTAX INTEGER{

noError(1),
unable(2),
unrecognizedCommand(3),
noResponse(4),
notConnected(5),
connected(6),
onLine(7),
unsupportedCommand(8),
deviceDisabled(9),
deviceInTestMode(10),
testFailed(11),
deviceInSecurityMode(12),
noRTS(13),
noDTR(14),
wrongLoopbackSpeed(15),
noLoopbackInARQ(16),
pendingSoftwareDownload(17),
invalidFrequency(18),
noLoopCurrent(19),
noDialTone(20),
noLineDetected(21)

}

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MAX-ACCESS read-only

STATUS current

DESCRIPTION

"The value of this object indicates a further description of what went wrong when a command fails."

::= { docsTrCmCommand 1 }

docsTrCmCdMgtStationId OBJECT-TYPE

SYNTAX OCTET STRING (SIZE(0..8))

MAX-ACCESS read-write

STATUS current

DESCRIPTION

"This object is a generic read-write variable that a Management Station (MS) can use to guarantee that the results from a given command are the results of a command issued by that specific MS. Each MS must SET a unique value to this object when doing commands and GET the value of this object together with docsTrCmCdResult and docsTrCmCdReqId to detect interference from other MSs."

::= { docsTrCmCommand 2 }

docsTrCmCdReqId OBJECT-TYPE

SYNTAX INTEGER

MAX-ACCESS read-write

STATUS current

DESCRIPTION

"This object contains the request ID field of the SNMP PDU which invoked the most recent command on the telephony return modem, if the request-id is unknown or undefined, the object contains the value zero "

::= { docsTrCmCommand 3 }

docsTrCmCdResult OBJECT-TYPE

SYNTAX OCTET STRING (SIZE(0..64000))

MAX-ACCESS read-write

STATUS current

DESCRIPTION

"This object can contain parameters that are raw results to the particular command being issued. "

::= { docsTrCmCommand 4 }

docsTrCmCdForce OBJECT-TYPE

SYNTAX TruthValue

MAX-ACCESS read-write

STATUS current

DESCRIPTION

"In certain cases the telephony return modem may be in a state where certain commands could adversely affect

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connections. In such cases, a command request with this object not present or set to 'false(2)' will result in a warning. If the operator elects to ignore such warnings, this object can be set to force 'true(1)' in a subsequent request to cause the command to be carried out regardless of the potentially hazardous effect."

```
::= { docsTrCmCommand 5 }
```

```
docsTrCmCdScript OBJECT-TYPE
SYNTAX OCTET STRING (SIZE(0..64000))
MAX-ACCESS read-write
STATUS current
DESCRIPTION
```

"This object can contain parameters that specifically define a particular command or series of commands being issued directly to the dial modem. Script execution depends upon the inclusion in this string of a suitable escape sequence (usually +++) to enter a dial modem into a command mode."

```
::= { docsTrCmCommand 6 }
```

```
docsTrCmCdStatus OBJECT-TYPE
SYNTAX INTEGER{
    none(1),
    success(2),
    inProgress(3),
    notSupported(4),
    unAbleToRun(5),
    aborted(6),
    failed(7)
}
```

```
MAX-ACCESS read-only
STATUS current
DESCRIPTION
```

"This object contains the result of the most recently requested command or test, or the value none(1) if no commands have been requested since last reset."

```
::= { docsTrCmCommand 7 }
```

```
--
```

```
-- Conformance Statements
```

```
--
```

```
docsTrCmConformance OBJECT IDENTIFIER ::= {
docsTrCmMIB 2 }
```

```
docsTrCmGroups OBJECT IDENTIFIER ::= {
docsTrCmConformance 1
}
```

```
docsTrCmCompliances OBJECT IDENTIFIER ::= {
```

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```
docsTrCmConformance
  2 }
```

```
    docsCmBasicCompliance MODULE-COMPLIANCE
      STATUS current
      DESCRIPTION
        "The compliance statement for DOCSIS Telephony
        Return Cable Modems and Cable Modem Termination Systems"
```

```
    MODULE -- This module
    MANDATORY-GROUPS { docsTrCmBaseGroup }
```

```
-- conditionally mandatory groups
```

```
    GROUP docsTrCmBaseGroup
      DESCRIPTION
        "Must be implemented on CMs, not
        implemented on
        CMTSS."
```

```
    GROUP docsTrMsgBaseGroup
      DESCRIPTION
        "Must be implemented on CMTSS and
        Optional on CMs."
```

```
    GROUP docsTrTsSPDBaseGroup
      DESCRIPTION
        "Must be implemented on CMTSS,
        not implemented on Cable Modems."
```

```
    GROUP docsTrCmSessionSPDBaseGroup
      DESCRIPTION
        "Must be implemented on Cable
        Modems, not implemented on CMTSSs."
```

```
    GROUP docsTrCmSessionBaseGroup
      DESCRIPTION
        "Must be implemented on Cable
        Modems, not implemented on CMTSSs."
```

```
    GROUP docsTrCmCommandGroup
      DESCRIPTION
        "Optional on Cable Modems, not
        implemented on CMTSSs."
    ::= { docsTrCmCompliances 1 }
```


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```
docsTrCmBaseGroup  OBJECT-GROUP
  OBJECTS {
    docsTrCmCapability ,
    docsTrCmMode
  }
  STATUS      current
  DESCRIPTION
    "A collection of objects providing CM base
parameters"
  ::= { docsTrCmGroups 1}
```

```
docsTrMsgBaseGroup  OBJECT-GROUP
  OBJECTS {
    docsTrMsgTCDInterval ,
    docsTrMsgTSIInterval ,
    docsTrMsgUSRBackOff ,
    docsTrMsgRowValue
  }
  STATUS      current
  DESCRIPTION
    "A collection of objects providing CM and
CMTS message configured parameters"
  ::= { docsTrCmGroups 2}
```

```
docsTrTsSPDGroup  OBJECT-GROUP
  OBJECTS {
    docsTrTsSPDname ,
    docsTrTsSPDphoneNum1 ,
    docsTrTsSPDphoneNum2 ,
    docsTrTsSPDphoneNum3 ,
    docsTrTsSPDConnThreshold ,
    docsTrTsSPDUserName ,
    docsTrTsSPDUserPassword ,
    docsTrTsSPDpppAuth ,
    docsTrTsSPDdhcpAuth ,
    docsTrTsSPDradiusRealm ,
    docsTrTsDemandDialTimer,
    docsTrTsSPDdhcpAddress ,
    docsTrTsSPDstatus ,
    docsTrTsSPDfactoryDef
  }
  STATUS      current
  DESCRIPTION
    "A collection of objects global SPD
configured parameters for CMTS"
  ::= { docsTrCmGroups 3}
```

```
docsTrCmSPDBaseGroup  OBJECT-GROUP
```

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```
OBJECTS {
docsTrCmSPDname      ,
docsTrCmISPphoneNum1 ,
docsTrCmISPphoneNum2 ,
docsTrCmISPphoneNum3 ,
docsTrCmconnThreshold ,
docsTrCmPPPloginName ,
docsTrCmPPPpassword ,
docsTrCmPPPAuth      ,
docsTrCmDHCPauth      ,
docsTrCmradiusRealm ,
docsTrCmDemandDialTimer,
docsTrCmDHCPserver
}
STATUS      current
DESCRIPTION
    "A collection of objects providing local SPD
parameters for a CM"
 ::= { docsTrCmGroups 4}

docsTrCmSessionBaseGroup OBJECT-GROUP
OBJECTS {
docsTrCmPingAuth ,
docsTrCmTerminateOnOffHook,
docsTrCmCMType,
docsTrCmRingNoAns,
docsTrCmWaitInterval
}
STATUS      current
DESCRIPTION
    "A collection of objects providing session
based parameters for dial modem"
 ::= { docsTrCmGroups 5}

docsTrCmCommandGroup OBJECT-GROUP
OBJECTS {
docsTrCmCdCode,
docsTrCmCdMgtStationId,
docsTrCmCdReqId,
docsTrCmCdForce,
docsTrCmCdResult ,
docsTrCmCdScript,
docsTrCmCdStatus
}
STATUS      current

DESCRIPTION
    "A collection of objects providing a command
```

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```
script interface to the serial dial modem device"  
 ::= { docsTrCmGroups 6 }
```

END

5. Acknowledgments

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6. References

1. Harrington, D., Presuhn, R., and B. Wijnen, "An Architecture for Describing SNMP Management Frameworks", [RFC 2271](#), Cabletron Systems, Inc., BMC Software, Inc., IBM T. J. Watson Research, January 1998
2. Rose, M., and K. McCloghrie, "Structure and Identification of Management Information for TCP/IP-based Internets", [RFC 1155](#), Performance Systems International, Hughes LAN Systems, May 1990
3. Rose, M., and K. McCloghrie, "Concise MIB Definitions", [RFC 1212](#), Performance Systems International, Hughes LAN Systems, March 1991
4. M. Rose, "A Convention for Defining Traps for use with the SNMP", [RFC 1215](#), Performance Systems International, March 1991
5. 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](#), SNMP Research, Inc., Cisco Systems, Inc., Dover Beach Consulting, Inc., International Network Services, January 1996.
6. Case, J., McCloghrie, K., Rose, M., and S. Waldbusser, "Textual Conventions for Version 2 of the Simple Network Management Protocol (SNMPv2)", [RFC 1903](#), SNMP Research, Inc., Cisco Systems, Inc., Dover Beach Consulting, Inc., International Network Services, January 1996.
7. Case, J., McCloghrie, K., Rose, M., and S. Waldbusser, "Conformance Statements for Version 2 of the Simple Network Management Protocol (SNMPv2)", [RFC 1904](#), SNMP Research, Inc., Cisco Systems, Inc., Dover Beach Consulting, Inc., International Network Services, January 1996.

Expires October 1999

[Page 24]

8. Case, J., Fedor, M., Schoffstall, M., and J. Davin, "Simple Network Management Protocol", [RFC 1157](#), SNMP Research, Performance Systems International, Performance Systems International, MIT Laboratory for Computer Science, May 1990.
9. Case, J., McCloghrie, K., Rose, M., and S. Waldbusser, "Introduction to Community-based SNMPv2", [RFC 1901](#), SNMP Research, Inc., Cisco Systems, Inc., Dover Beach Consulting, Inc., International Network Services, January 1996.
10. Case, J., McCloghrie, K., Rose, M., and S. Waldbusser, "Transport Mappings for Version 2 of the Simple Network Management Protocol (SNMPv2)", [RFC 1906](#), SNMP Research, Inc., Cisco Systems, Inc., Dover Beach Consulting, Inc., International Network Services, January 1996.
11. Case, J., Harrington D., Presuhn R., and B. Wijnen, "Message Processing and Dispatching for the Simple Network Management Protocol (SNMP)", [RFC 2272](#), SNMP Research, Inc., Cabletron Systems, Inc., BMC Software, Inc., IBM T. J. Watson Research, January 1998.
12. Blumenthal, U., and B. Wijnen, "User-based Security Model (USM) for version 3 of the Simple Network Management Protocol (SNMPv3)", [RFC 2274](#), IBM T. J. Watson Research, January 1998.
13. Case, J., McCloghrie, K., Rose, M., and S. Waldbusser, "Protocol Operations for Version 2 of the Simple Network Management Protocol (SNMPv2)", [RFC 1905](#), SNMP Research, Inc., Cisco Systems, Inc., Dover Beach Consulting, Inc., International Network Services, January 1996.
14. Levi, D., Meyer, P., and B. Stewart, "SNMPv3 Applications", [RFC 2273](#), SNMP Research, Inc., Secure Computing Corporation, Cisco Systems, January 1998
15. Wijnen, B., Presuhn, R., and K. McCloghrie, "View-based Access Control Model (VACM) for the Simple Network Management Protocol (SNMP)", [RFC 2275](#), IBM T. J. Watson Research, BMC Software, Inc., Cisco Systems, Inc., January 1998
16. "Data-Over-Cable Service Interface Specifications: Cable Modem Radio Frequency Interface Specification SP-RFI-I04-980724", DOCSIS, July 1998,
<http://www.cablemodem.com/public/pubtechspec/SP-RFI-I04-980724.pdf>.
17. L. Steinberg, "Techniques for Managing Asynchronously Generated

Expires October 1999

[Page 25]

Alerts", [RFC 1224](#), May 1991.

18. "Data-Over-Cable Service Interface Specifications: Operations Support System Interface Specification RF Interface SP-OSSI-RF-I02-980410", DOCSIS, April 1998,
<http://www.cablemodem.com/public/pubtechspec/ossi/sp-ossi.PDF>.
19. Bradner, S., "Key words for use in RFCs to Indicate Requirement Levels", [RFC2119](#), Harvard University, March 1997
20. "Data-Over-Cable Service Interface Specifications: Interface Specification SP-BPI-I01-970922", DOCSIS, August 1997,
<http://www.cablemodem.com/public/pubtechspec/ss/SP-CMTRI-I01-970804.pdf>
21. M. St. Johns, [draft-ietf-ipcdn-cable-device-mib-07.txt](#), Cable Device Management Information Base for DOCSIS compliant Cable Modems and Cable Modem Termination Systems", February 1999
22. M. St. Johns, [draft-ietf-ipcdn-rf-interface-mib-07.txt](#), Radio Frequency (RF) Interface Management Information Base for MCNS/DOCSIS compliant RF Interfaces", February 1999
23. J. Barnes et al., Modem Management Information Base (MIB)using SMIV2, IETF [RFC-1696](#), August 1994.
24. J. Fijolek, DOCSIS Data Over Cable Services Interface Specification Operations Support System Interface Specification Telephony Return MIB, SP-OSSI-TRD03-980209, DOCSIS, February 1998

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