

Network Working Group
Request for Comments: 2512
Category: Standards Track

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February 1999

Accounting Information for ATM Networks

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.

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1. Introduction

This memo defines a portion of the Management Information Base (MIB) for use with network management protocols in the Internet community. A separate memo [16] defines managed objects, in a manner independent of the type of network, for controlling the selection, collection and storage of accounting information into files for later retrieval via a file transfer protocol. This memo defines a set of ATM-specific accounting information which can be collected for connections on ATM networks.

2. The SNMP Network Management Framework

The SNMP Management Framework presently consists of five major components:

- o 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 STD 16, RFC 1155 [2], STD 16, 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 STD 15, 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 STD 15, 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 (e.g., 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.

3. Overview

In [16], the items of accounting data to be collected are specified as a set of objects. Which objects are contained in such a set is selectable by an administrator through the specification of one or more (subtree, list) tuples, where the set of objects to be collected is the union of the subsets specified by each tuple:

'subtree' specifies a OBJECT IDENTIFIER value such that every object in the subset is named by the subtree's value appended with a single additional sub-identifier.

'list' specifies an OCTET STRING value, such that if the N-th bit of the string's value is set then the subset contains the object named by appending N as a single additional sub-identifier to the subtree.

This memo specifies such a subtree containing a set of objects defining items of accounting information which are applicable to ATM connections.

Note that all of the objects defined here have a MAX-ACCESS clause of not-accessible, since their purpose is not to be read/written by SNMP, but rather, to be the syntax and semantics of the set of information which can be represented within a single (subtree, list) tuple.

4. Definitions

ATM-ACCOUNTING-INFORMATION-MIB DEFINITIONS ::= BEGIN

IMPORTS

MODULE-IDENTITY, OBJECT-TYPE, OBJECT-IDENTITY,	
mib-2, Integer32, Counter64	FROM SNMPv2-SMI
DisplayString, DateAndTime	FROM SNMPv2-TC
AtmAddr	FROM ATM-TC-MIB;

atmAccountingInformationMIB MODULE-IDENTITY
LAST-UPDATED "9611052000Z"
ORGANIZATION "IETF ATOM MIB Working Group"
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DESCRIPTION

"The MIB module for identifying items of accounting information which are applicable to ATM connections."
::= { mib-2 59 }

atmAcctngMIBObjects OBJECT IDENTIFIER ::= { atmAccountingInformationMIB 1 }

-- Definitions of objects for use in specifying ATM accounting
-- data to be collected

atmAcctngDataObjects OBJECT-IDENTITY

STATUS current

DESCRIPTION

"This identifier defines a subtree under which various objects are defined such that a set of objects to be collected as ATM accounting data can be specified as a (subtree, list) tuple using this identifier as the subtree."
::= { atmAcctngMIBObjects 1 }

-- Objects defined under the atmAcctngDataObjects subtree

--

-- In each case the semantics of the object are interpreted with
-- respect to the creation/storage of an accounting record for a
-- particular connection on a particular interface.

atmAcctngConnectionType OBJECT-TYPE

SYNTAX INTEGER { pvc(1),
pvp(2),
svcIncoming(3),
svcOutgoing(4),
svpIncoming(5),
svpOutgoing(6),
spvcInitiator(7),
spvcTarget(8),
spvpInitiator(9),
spvpTarget(10) }

MAX-ACCESS not-accessible

STATUS current

DESCRIPTION

"The type of connection."
::= { atmAcctngDataObjects 1 }

atmAcctngCastType OBJECT-TYPE

SYNTAX INTEGER { p2p(1), p2mp(2) }

MAX-ACCESS not-accessible

STATUS current
DESCRIPTION
"An indication of whether the connection is point-to-point
or point-to-multipoint."
::= { atmAcctngDataObjects 2 }

atmAcctngIfName OBJECT-TYPE
SYNTAX DisplayString
MAX-ACCESS not-accessible
STATUS current
DESCRIPTION
"A textual name for the interface on which the data for the
connection was collected. If the local SNMP agent supports
the object ifName, the value of this object must be
identical to that of ifName in the conceptual row of the
ifTable corresponding to this interface."
::= { atmAcctngDataObjects 3 }

atmAcctngIfAlias OBJECT-TYPE
SYNTAX DisplayString
MAX-ACCESS not-accessible
STATUS current
DESCRIPTION
"The 'alias' name for the interface as specified by a
network manager, e.g., via a management set operation to
modify the relevant instance of the ifAlias object. Note
that in contrast to ifIndex, ifAlias provides a non-volatile
'handle' for the interface, the value of which is retained
across agent reboots."
::= { atmAcctngDataObjects 4 }

atmAcctngVpi OBJECT-TYPE
SYNTAX INTEGER (0..4095)
MAX-ACCESS not-accessible
STATUS current
DESCRIPTION
"The VPI used for the connection."
::= { atmAcctngDataObjects 5 }

atmAcctngVci OBJECT-TYPE
SYNTAX INTEGER (0..65535)
MAX-ACCESS not-accessible
STATUS current
DESCRIPTION
"The VCI used for the connection."
::= { atmAcctngDataObjects 6 }

atmAcctngCallingParty OBJECT-TYPE

SYNTAX AtmAddr
MAX-ACCESS not-accessible
STATUS current
DESCRIPTION
 "The connection's calling party. If unknown (e.g., for a
 PVC), then the value of this object is the zero-length
 string."
::= { atmAcctngDataObjects 7 }

atmAcctngCalledParty OBJECT-TYPE

SYNTAX AtmAddr
MAX-ACCESS not-accessible
STATUS current
DESCRIPTION
 "The connection's called party. If unknown (e.g., for a
 PVC), then the value of this object is the zero-length
 string."
::= { atmAcctngDataObjects 8 }

atmAcctngCallReference OBJECT-TYPE

SYNTAX OCTET STRING (SIZE(0..3))
MAX-ACCESS not-accessible
STATUS current
DESCRIPTION
 "The connection's call reference value (e.g., from Q.2931).
 If unknown (e.g., for a PVC), then the value of this object
 is the zero-length string."
::= { atmAcctngDataObjects 9 }

atmAcctngStartTime OBJECT-TYPE

SYNTAX DateAndTime
MAX-ACCESS not-accessible
STATUS current
DESCRIPTION
 "The time when the connection was established."
::= { atmAcctngDataObjects 10 }

atmAcctngCollectionTime OBJECT-TYPE

SYNTAX DateAndTime
MAX-ACCESS not-accessible
STATUS current
DESCRIPTION
 "The time at which the data in this record was collected."
::= { atmAcctngDataObjects 11 }

atmAcctngCollectMode OBJECT-TYPE

SYNTAX INTEGER { onRelease(1),
 periodically(2),

```

                                onCommand(3) }
MAX-ACCESS    not-accessible
STATUS        current
DESCRIPTION
    "The reason why this connection data was collected."
 ::= { atmAcctngDataObjects 12 }

atmAcctngReleaseCause OBJECT-TYPE
SYNTAX        Integer32
MAX-ACCESS    not-accessible
STATUS        current
DESCRIPTION
    "If the connection data was collected because of the release
    of an SVC, then this is the cause code in the Release
    message for the connection; otherwise, this object has the
    value zero."
 ::= { atmAcctngDataObjects 13 }

atmAcctngServiceCategory OBJECT-TYPE
SYNTAX        INTEGER { other(1), cbr(2), vbrRt(3), vbrNrt(4),
                        abr(5), ubr(6), unknown(7) }
MAX-ACCESS    not-accessible
STATUS        current
DESCRIPTION
    "The connection's service category."
 ::= { atmAcctngDataObjects 14 }

atmAcctngTransmittedCells OBJECT-TYPE
SYNTAX        Counter64
MAX-ACCESS    not-accessible
STATUS        current
DESCRIPTION
    "The number of cells, including OAM cells, transmitted by
    this switch on this connection."
 ::= { atmAcctngDataObjects 15 }

atmAcctngTransmittedClp0Cells OBJECT-TYPE
SYNTAX        Counter64
MAX-ACCESS    not-accessible
STATUS        current
DESCRIPTION
    "The number of cells with CLP=0, including OAM cells,
    transmitted by this switch on this connection."
 ::= { atmAcctngDataObjects 16 }

atmAcctngReceivedCells OBJECT-TYPE
SYNTAX        Counter64
MAX-ACCESS    not-accessible

```

STATUS current

DESCRIPTION

"The number of cells, including OAM cells, received by this switch on this connection."

::= { atmAcctngDataObjects 17 }

atmAcctngReceivedClp0Cells OBJECT-TYPE

SYNTAX Counter64

MAX-ACCESS not-accessible

STATUS current

DESCRIPTION

"The number of cells with CLP=0, including OAM cells, received by this switch on this connection."

::= { atmAcctngDataObjects 18 }

atmAcctngTransmitTrafficDescriptorType OBJECT-TYPE

SYNTAX OBJECT IDENTIFIER

MAX-ACCESS not-accessible

STATUS current

DESCRIPTION

"The traffic descriptor type (as defined in RFC 1695 and its successors) in the direction in which the switch transmits cells on the connection."

REFERENCE

"See atmTrafficDescriptorTypes in ATM-MIB.my in RFC 1695 and its successors."

::= { atmAcctngDataObjects 19 }

atmAcctngTransmitTrafficDescriptorParam1 OBJECT-TYPE

SYNTAX INTEGER (0..2147483647)

MAX-ACCESS not-accessible

STATUS current

DESCRIPTION

"The first traffic descriptor parameter in the direction in which this switch transmits cells on this connection.

Interpretation of this parameter is dependent on the value of atmAcctngTransmitTrafficDescriptorType."

::= { atmAcctngDataObjects 20 }

atmAcctngTransmitTrafficDescriptorParam2 OBJECT-TYPE

SYNTAX INTEGER (0..2147483647)

MAX-ACCESS not-accessible

STATUS current

DESCRIPTION

"The second traffic descriptor parameter in the direction in which this switch transmits cells on this connection.

Interpretation of this parameter is dependent on the value of atmAcctngTransmitTrafficDescriptorType."


```
::= { atmAcctngDataObjects 21 }
```

atmAcctngTransmitTrafficDescriptorParam3 OBJECT-TYPE

SYNTAX INTEGER (0..2147483647)

MAX-ACCESS not-accessible

STATUS current

DESCRIPTION

"The third traffic descriptor parameter in the direction in which this switch transmits cells on this connection.

Interpretation of this parameter is dependent on the value of atmAcctngTransmitTrafficDescriptorType."

```
::= { atmAcctngDataObjects 22 }
```

atmAcctngTransmitTrafficDescriptorParam4 OBJECT-TYPE

SYNTAX INTEGER (0..2147483647)

MAX-ACCESS not-accessible

STATUS current

DESCRIPTION

"The fourth traffic descriptor parameter in the direction in which this switch transmits cells on this connection.

Interpretation of this parameter is dependent on the value of atmAcctngTransmitTrafficDescriptorType."

```
::= { atmAcctngDataObjects 23 }
```

atmAcctngTransmitTrafficDescriptorParam5 OBJECT-TYPE

SYNTAX INTEGER (0..2147483647)

MAX-ACCESS not-accessible

STATUS current

DESCRIPTION

"The fifth traffic descriptor parameter in the direction in which this switch transmits cells on this connection.

Interpretation of this parameter is dependent on the value of atmAcctngTransmitTrafficDescriptorType."

```
::= { atmAcctngDataObjects 24 }
```

atmAcctngReceiveTrafficDescriptorType OBJECT-TYPE

SYNTAX OBJECT IDENTIFIER

MAX-ACCESS not-accessible

STATUS current

DESCRIPTION

"The traffic descriptor type (as defined in RFC 1695 and its successors) in the direction in which this switch receives cells on this connection."

REFERENCE

"See atmTrafficDescriptorTypes in ATM-MIB.my in RFC 1695 and its successors."

```
::= { atmAcctngDataObjects 25 }
```

atmAcctngReceiveTrafficDescriptorParam1 OBJECT-TYPE

SYNTAX INTEGER (0..2147483647)

MAX-ACCESS not-accessible

STATUS current

DESCRIPTION

"The first traffic descriptor parameter in the direction in which this switch receives cells on this connection.

Interpretation of this parameter is dependent on the value of atmAcctngReceiveTrafficDescriptorType."

::= { atmAcctngDataObjects 26 }

atmAcctngReceiveTrafficDescriptorParam2 OBJECT-TYPE

SYNTAX INTEGER (0..2147483647)

MAX-ACCESS not-accessible

STATUS current

DESCRIPTION

"The second traffic descriptor parameter in the direction in which this switch receives cells on this connection.

Interpretation of this parameter is dependent on the value of atmAcctngReceiveTrafficDescriptorType."

::= { atmAcctngDataObjects 27 }

atmAcctngReceiveTrafficDescriptorParam3 OBJECT-TYPE

SYNTAX INTEGER (0..2147483647)

MAX-ACCESS not-accessible

STATUS current

DESCRIPTION

"The third traffic descriptor parameter in the direction in which this switch receives cells on this connection.

Interpretation of this parameter is dependent on the value of atmAcctngReceiveTrafficDescriptorType."

::= { atmAcctngDataObjects 28 }

atmAcctngReceiveTrafficDescriptorParam4 OBJECT-TYPE

SYNTAX INTEGER (0..2147483647)

MAX-ACCESS not-accessible

STATUS current

DESCRIPTION

"The fourth traffic descriptor parameter in the direction in which this switch receives cells on this connection.

Interpretation of this parameter is dependent on the value of atmAcctngReceiveTrafficDescriptorType."

::= { atmAcctngDataObjects 29 }

atmAcctngReceiveTrafficDescriptorParam5 OBJECT-TYPE

SYNTAX INTEGER (0..2147483647)

MAX-ACCESS not-accessible

STATUS current

DESCRIPTION

"The fifth traffic descriptor parameter in the direction in which this switch receives cells on this connection.

Interpretation of this parameter is dependent on the value of atmAcctngReceiveTrafficDescriptorType."

::= { atmAcctngDataObjects 30 }

atmAcctngCallingPartySubAddress OBJECT-TYPE

SYNTAX AtmAddr

MAX-ACCESS not-accessible

STATUS current

DESCRIPTION

"The connection's calling party sub-address. If the connection has no calling party sub-address, or it's value is unknown, then the value of this object is the zero-length string."

::= { atmAcctngDataObjects 31 }

atmAcctngCalledPartySubAddress OBJECT-TYPE

SYNTAX AtmAddr

MAX-ACCESS not-accessible

STATUS current

DESCRIPTION

"The connection's called party sub-address. If the connection has no called party sub-address, or it's value is unknown, then the value of this object is the zero-length string."

::= { atmAcctngDataObjects 32 }

atmAcctngRecordCrc16 OBJECT-TYPE

SYNTAX OCTET STRING (SIZE(2))

MAX-ACCESS not-accessible

STATUS current

DESCRIPTION

"The value of the CRC-16 checksum (as defined by ISO 3309 (HDLC) and/or ITU X.25) calculated over the accounting record containing this object.

While the mechanism for calculating/encoding the checksum value is specific to the method of encoding the accounting record, an accounting record containing this object is typically generated by initializing the value of this object to the all-zeros string ('0000'H), with the location of these zeros being saved. After generating the record, the checksum is calculated over the whole connection record and then the all-zeros value is overwritten (at the saved location) by the calculated value of the checksum."

::= { atmAcctngDataObjects 33 }

END

5. Acknowledgements

The comments of the IETF's ATOM MIB Working Group are acknowledged.

6. References

- [1] Harrington, D., Presuhn, R. and B. Wijnen, "An Architecture for Describing SNMP Management Frameworks", RFC 2271, January 1998.
- [2] Rose, M. and K. McCloghrie, "Structure and Identification of Management Information for TCP/IP-based Internets", STD 16, RFC 1155, May 1990.
- [3] Rose, M. and K. McCloghrie, "Concise MIB Definitions", STD 16, RFC 1212, March 1991.
- [4] Rose, M., "A Convention for Defining Traps for use with the SNMP", RFC 1215, March 1991.
- [5] 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.
- [6] SNMPv2 Working Group, Case, J., McCloghrie, K., Rose, M. and S. Waldbusser, "Textual Conventions for Version 2 of the Simple Network Management Protocol (SNMPv2)", RFC 1903, January 1996.
- [7] SNMPv2 Working Group, Case, J., McCloghrie, K., Rose, M. and S. Waldbusser, "Conformance Statements for Version 2 of the Simple Network Management Protocol (SNMPv2)", RFC 1904, January 1996.
- [8] Case, J., Fedor, M., Schoffstall, M. and J. Davin, "Simple Network Management Protocol", STD 15, RFC 1157, May 1990.
- [9] SNMPv2 Working Group, Case, J., McCloghrie, K., Rose, M. and S. Waldbusser, "Introduction to Community-based SNMPv2", RFC 1901, January 1996.
- [10] SNMPv2 Working Group, Case, J., McCloghrie, K., Rose, M. and S. Waldbusser, "Transport Mappings for Version 2 of the Simple Network Management Protocol (SNMPv2)", RFC 1906, 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, 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, January 1998.
- [13] 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.
- [14] Levi, D., Meyer, P. and B. Stewart, "SNMPv3 Applications", RFC 2273, 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, January 1998.
- [16] McCloghrie, K., Heinanen, J., Greene, W. and A. Prasad, "Managed Objects for Controlling the Collection and Storage of Accounting Information for Connection-Oriented Networks", RFC 2513, February 1999.
- [17] Noto, M., Spiegel, E. and K. Tesink, "Definitions of Textual Conventions and OBJECT-IDENTITIES for ATM Management", RFC 2514, February 1999.

7. Security Considerations

This MIB module defines data items for potential use as accounting information. Each of these data items is only accessible through a collected accounting file. After being collected, the accounting data should be protected against modification or unauthorized deletion.

8. IANA Considerations

Prior to publication of this memo as an RFC, IANA is requested to make a suitable OBJECT IDENTIFIER assignment.

9. Authors' Addresses

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