

Network Working Group
Request for Comments: 1450

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Management Information Base
for version 2 of the
Simple Network Management Protocol (SNMPv2)

Status of this Memo

This RFC specifies an IAB standards track protocol for the Internet community, and requests discussion and suggestions for improvements. Please refer to the current edition of the "IAB Official Protocol Standards" for the standardization state and status of this protocol. Distribution of this memo is unlimited.

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1. Introduction

A network management system contains: several (potentially many) nodes, each with a processing entity, termed an agent, which has access to management instrumentation; at least one management station; and, a management protocol, used to convey management information between the agents and management stations. Operations of the protocol are carried out under an administrative framework which defines both authentication and authorization policies.

Network management stations execute management applications which monitor and control network elements. Network elements are devices such as hosts, routers, terminal servers, etc., which are monitored and controlled through access to their management information.

Management information is viewed as a collection of managed objects, residing in a virtual information store, termed the Management Information Base (MIB). Collections of related objects are defined in MIB modules. These modules are written using a subset of OSI's Abstract Syntax Notation One (ASN.1) [1], termed the Structure of Management Information (SMI) [2].

The management protocol, SNMPv2 [3], provides for the exchange of messages which convey management information between the agents and the management stations. It is the purpose of this document to define managed objects which describe the behavior of a SNMPv2 entity.

1.1. A Note on Terminology

For the purpose of exposition, the original Internet-standard Network Management Framework, as described in RFCs 1155, 1157, and 1212, is termed the SNMP version 1 framework (SNMPv1). The current framework is termed the SNMP version 2 framework (SNMPv2).

2. Definitions

SNMPv2-MIB DEFINITIONS ::= BEGIN

IMPORTS

 MODULE-IDENTITY, OBJECT-TYPE, NOTIFICATION-TYPE,
 ObjectName, Integer32, Counter32, snmpModules
 FROM SNMPv2-SMI
 TruthValue, DisplayString, TestAndIncr, TimeStamp
 FROM SNMPv2-TC
 MODULE-COMPLIANCE, OBJECT-GROUP
 FROM SNMPv2-CONF
 system, ifIndex, egpNeighAddr
 FROM RFC1213-MIB
 partyEntry
 FROM SNMPv2-PARTY-MIB;

snmpMIB MODULE-IDENTITY

 LAST-UPDATED "9304010000Z"

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 DESCRIPTION

 "The MIB module for SNMPv2 entities."

 ::= { snmpModules 1 }

snmpMIBObjects OBJECT IDENTIFIER ::= { snmpMIB 1 }

```

-- the SNMPv2 statistics group
--
-- a collection of objects providing basic instrumentation of
-- the SNMPv2 entity.

-- A Case diagram[4] relating these objects is:
--
-- \v/   transport service
--   |
-- ==+==  snmpStatsPackets
--   |
--   +==> snmpStats30Something
--   |
--   +==> snmpStatsEncodingErrors
--   |
--   +==> snmpStatsUnknownDstParties
--   |
--   +==> snmpStatsDstPartyMismatches
--   |
--   +==> snmpStatsUnknownSrcParties
--   |
--   +==> snmpStatsBadAuths
--   |
--   +==> snmpStatsNotInLifetimes
--   |
--   +==> snmpStatsWrongDigestValues
--   |
--   +==> snmpStatsUnknownContexts
--   |
--   +==> snmpStatsBadOperations
--   |
--   +==> snmpStatsSilentDrops
--   |
-- ===== sink

snmpStats            OBJECT IDENTIFIER ::= { snmpMIBObjects 1 }

```

snmpStatsPackets OBJECT-TYPE

SYNTAX Counter32

MAX-ACCESS read-only

STATUS current

DESCRIPTION

"The total number of packets received by the
SNMPv2 entity from the transport service."

REFERENCE

"Derived from RFC1213-MIB.snmpInPkts."

::= { snmpStats 1 }

snmpStats30Something OBJECT-TYPE

SYNTAX Counter32

MAX-ACCESS read-only

STATUS current

DESCRIPTION

"The total number of packets which had an initial
octet with a value of 30 hexadecimal received by a
SNMPv2 entity which does not support SNMPv1.
(Such packets are possibly misdirected SNMPv1
Messages.)"

REFERENCE

"Derived from RFC1213-MIB.snmpInASNParseErrs."

::= { snmpStats 2 }

snmpStatsEncodingErrors OBJECT-TYPE

SYNTAX Counter32

MAX-ACCESS read-only

STATUS current

DESCRIPTION

"The total number of packets received by the
SNMPv2 entity which were improperly encoded or had
invalid syntax."

REFERENCE

"Derived from RFC1213-MIB.snmpInASNParseErrs."

::= { snmpStats 3 }

snmpStatsUnknownDstParties OBJECT-TYPE

SYNTAX Counter32

MAX-ACCESS read-only

STATUS current

DESCRIPTION

"The total number of SnmpPrivMsgs delivered to the
SNMPv2 entity for which the privDst field was not
a known local party."

::= { snmpStats 4 }

snmpStatsDstPartyMismatches OBJECT-TYPE

SYNTAX Counter32

MAX-ACCESS read-only

STATUS current

DESCRIPTION

"The total number of SnmpPrivMsgs delivered to the
SNMPv2 entity which contained a SnmpAuthMsg for
which the authData.dstParty field did not match
the privDst field in the SnmpPrivMsg."

::= { snmpStats 5 }

snmpStatsUnknownSrcParties OBJECT-TYPE

SYNTAX Counter32

MAX-ACCESS read-only

STATUS current

DESCRIPTION

"The total number of SnmpAuthMsgs delivered to the
SNMPv2 entity for which the authData.srcParty
field was not a known remote party."

::= { snmpStats 6 }

snmpStatsBadAuths OBJECT-TYPE

SYNTAX Counter32

MAX-ACCESS read-only

STATUS current

DESCRIPTION

"The total number of SnmpAuthMsgs delivered to the
SNMPv2 entity which contained an authInfo field
which was inconsistent with the authentication
protocol associated with the source party."

::= { snmpStats 7 }

```
snmpStatsNotInLifetimes OBJECT-TYPE
    SYNTAX      Counter32
    MAX-ACCESS  read-only
    STATUS      current
    DESCRIPTION
        "The total number of SnmpAuthMsgs delivered to the
        SNMPv2 entity which were deemed unauthentic due to
        their authInfo.authSrcTimestamp field being less
        than the source party's clock plus lifetime."
    ::= { snmpStats 8 }

snmpStatsWrongDigestValues OBJECT-TYPE
    SYNTAX      Counter32
    MAX-ACCESS  read-only
    STATUS      current
    DESCRIPTION
        "The total number of SnmpAuthMsgs delivered to the
        SNMPv2 entity which were deemed unauthentic due to
        their authInfo.authDigest field being unequal to
        the expected digest value."
    ::= { snmpStats 9 }

snmpStatsUnknownContexts OBJECT-TYPE
    SYNTAX      Counter32
    MAX-ACCESS  read-only
    STATUS      current
    DESCRIPTION
        "The total number of SnmpMgmtComs delivered to the
        SNMPv2 entity for which the context field was not
        a known SNMPv2 context."
    ::= { snmpStats 10 }

snmpStatsBadOperations OBJECT-TYPE
    SYNTAX      Counter32
    MAX-ACCESS  read-only
    STATUS      current
    DESCRIPTION
        "The total number of messages delivered to the
        SNMPv2 entity which were silently dropped because
        the PDU type referred to an operation not allowed
        in the aclTable[5]."
    ::= { snmpStats 11 }
```

snmpStatsSilentDrops OBJECT-TYPE

SYNTAX Counter32

MAX-ACCESS read-only

STATUS current

DESCRIPTION

"The total number of GetRequest-PDUs,
GetNextRequest-PDUs, GetBulkRequest-PDUs,
SetRequest-PDUs, and InformRequest-PDUs delivered
to the SNMPv2 entity which were silently dropped
because the size of an reply containing an
alternate Response-PDU with an empty variable-
bindings field was greater than either a local
constraint or the maximum message size of the
request's source party."

::= { snmpStats 12 }


```

-- the SNMPv1 statistics group
--
-- a collection of objects providing basic instrumentation of
-- a SNMPv2 entity which also implements SNMPv1.

-- A Case diagram[4] relating these objects
-- (and those applicable objects in the snmpStats group)
-- is:
--
-- \v/    transport service
--   |
-- ==+==   snmpStatsPackets
--   |
--   +==> snmpStatsEncodingErrors
--   |
--   +==> snmpV1BadCommunityNames
--   |
--   +==> snmpV1BadCommunityUses
--   |
-- ===== sink

snmpV1                OBJECT IDENTIFIER ::= { snmpMIBObjects 2 }

snmpV1BadCommunityNames OBJECT-TYPE
    SYNTAX           Counter32
    MAX-ACCESS read-only
    STATUS          current
    DESCRIPTION
        "The total number of SNMPv1 Messages delivered to
         the SNMPv2 entity which used a community name not
         known to the SNMPv2 entity."
    REFERENCE
        "Derived from RFC1213-
         MIB.snmpInBadCommunityNames."
    ::= { snmpV1 1 }

```

snmpV1BadCommunityUses OBJECT-TYPE

SYNTAX Counter32

MAX-ACCESS read-only

STATUS current

DESCRIPTION

"The total number of SNMPv1 Messages delivered to
SNMPv2 entity containing an operation which was
not allowed for the community named in the
Message."

REFERENCE

"Derived from RFC1213-MIB.snmpInBadCommunityUses."

::= { snmpV1 2 }

```

-- the object resource group
--
-- a collection of objects allowing a SNMPv2 entity acting in
-- an agent role to describe its dynamically-configurable
-- object resources.

snmpOR                    OBJECT IDENTIFIER ::= { snmpMIBObjects 3 }

snmpORLastChange OBJECT-TYPE
    SYNTAX            TimeStamp
    MAX-ACCESS read-only
    STATUS            current
    DESCRIPTION
        "The value of sysUpTime at the time of the most
         recent change in state or value of any instance of
         snmpORID."
    ::= { snmpOR 1 }

snmpORTable OBJECT-TYPE
    SYNTAX            SEQUENCE OF SnmpOREntry
    MAX-ACCESS not-accessible
    STATUS            current
    DESCRIPTION
        "The (conceptual) table listing the dynamically-
         configurable object resources in a SNMPv2 entity
         acting in an agent role.  SNMPv2 entities which do
         not support dynamically-configurable object
         resources will never have any instances of the
         columnar objects in this table."
    ::= { snmpOR 2 }

snmpOREntry OBJECT-TYPE
    SYNTAX            SnmpOREntry
    MAX-ACCESS not-accessible
    STATUS            current
    DESCRIPTION
        "An entry (conceptual row) in the snmpORTable."
    INDEX            { snmpORIndex }
    ::= { snmpORTable 1 }

```

```
Snmplib ::= SEQUENCE {
    snmpORIndex      Integer32,
    snmpORID         OBJECT IDENTIFIER,
    snmpORDescr      DisplayString
}

snmpORIndex OBJECT-TYPE
    SYNTAX      Integer32
    MAX-ACCESS  not-accessible
    STATUS      current
    DESCRIPTION
        "The auxiliary variable used for identifying
         instances of the columnar objects in the
         snmpORTable."
    ::= { snmplib 1 }

snmpORID OBJECT-TYPE
    SYNTAX      OBJECT IDENTIFIER
    MAX-ACCESS  read-only
    STATUS      current
    DESCRIPTION
        "An authoritative identification of one of the
         dynamically-configurable object resources in a
         SNMPv2 entity acting in an agent role. This is
         analogous to the sysObjectID object in MIB-II."
    ::= { snmplib 2 }

snmpORDescr OBJECT-TYPE
    SYNTAX      DisplayString
    MAX-ACCESS  read-only
    STATUS      current
    DESCRIPTION
        "A textual description of one of the dynamically-
         configurable object resources in a SNMPv2 entity
         acting in an agent role. This is analogous to the
         sysDescr object in MIB-II."
    ::= { snmplib 3 }
```


snmpTrapNumbers OBJECT-TYPE

SYNTAX Counter32

MAX-ACCESS read-only

STATUS current

DESCRIPTION

"The number of traps which have been sent to a particular SNMPv2 party, since the last initialization of the SNMPv2 entity, or the creation of the SNMPv2 party, whichever occurred most recently."

::= { snmpTrapEntry 1 }

snmpTrapEnterprise OBJECT-TYPE

SYNTAX OBJECT IDENTIFIER

MAX-ACCESS not-accessible

STATUS current

DESCRIPTION

"The authoritative identification of the enterprise associated with the trap currently being sent. When a SNMPv2 proxy agent is mapping an RFC1157 Trap-PDU into a SNMPv2-Trap-PDU, this variable occurs as the last varbind."

::= { snmpTrap 3 }

snmpV2EnableAuthenTraps OBJECT-TYPE

SYNTAX TruthValue

MAX-ACCESS read-write

STATUS current

DESCRIPTION

"Indicates whether the SNMPv2 entity, when acting in an agent role, is permitted to generate authenticationFailure traps. The value of this object overrides any configuration information; as such, it provides a means whereby all authenticationFailure traps may be disabled.

Note that it is strongly recommended that this object be stored in non-volatile memory so that it remains constant between re-initializations of the network management system."

REFERENCE

"Derived from RFC1213-MIB.snmpEnableAuthenTraps."
 ::= { snmpTrap 4 }

-- well-known traps

snmpTraps OBJECT IDENTIFIER ::= { snmpMIBObjects 5 }

coldStart NOTIFICATION-TYPE

STATUS current

DESCRIPTION

"A coldStart trap signifies that the SNMPv2 entity, acting in an agent role, is reinitializing itself such that its configuration may be altered."

::= { snmpTraps 1 }

warmStart NOTIFICATION-TYPE

STATUS current

DESCRIPTION

"A warmStart trap signifies that the SNMPv2 entity, acting in an agent role, is reinitializing itself such that its configuration is unaltered."

::= { snmpTraps 2 }

linkDown NOTIFICATION-TYPE

OBJECTS { ifIndex }

STATUS current

DESCRIPTION

"A linkDown trap signifies that the SNMPv2 entity, acting in an agent role, recognizes a failure in one of the communication links represented in its configuration."

::= { snmpTraps 3 }

linkUp NOTIFICATION-TYPE

OBJECTS { ifIndex }

STATUS current

DESCRIPTION

"A linkUp trap signifies that the SNMPv2 entity, acting in an agent role, recognizes that one of the communication links represented in its configuration has come up."

::= { snmpTraps 4 }

authenticationFailure NOTIFICATION-TYPE

STATUS current

DESCRIPTION

"An authenticationFailure trap signifies that the SNMPv2 entity, acting in an agent role, has received a protocol message that is not properly authenticated. While all implementations of the SNMPv2 must be capable of generating this trap, the snmpV2EnableAuthenTraps object indicates whether this trap will be generated."

::= { snmpTraps 5 }

egpNeighborLoss NOTIFICATION-TYPE

OBJECTS { egpNeighAddr }

STATUS current

DESCRIPTION

"An egpNeighborLoss trap signifies that an EGP neighbor has been marked down and the EGP peer relationship no longer obtains."

::= { snmpTraps 6 }

```
-- the set group
--
-- a collection of objects which allow several cooperating
-- SNMPv2 entities, all acting in a manager role, to
-- coordinate their use of the SNMPv2 set operation.

snmpSet            OBJECT IDENTIFIER ::= { snmpMIBObjects 6 }

snmpSetSerialNo OBJECT-TYPE
    SYNTAX        TestAndIncr
    MAX-ACCESS    read-write
    STATUS        current
    DESCRIPTION
        "An advisory lock used to allow several
        cooperating SNMPv2 entities, all acting in a
        manager role, to coordinate their use of the
        SNMPv2 set operation.

        This object is used for coarse-grain coordination.
        To achieve fine-grain coordination, one or more
        similar objects might be defined within each MIB
        group, as appropriate."
    ::= { snmpSet 1 }
```

```
-- conformance information

snmpMIBConformance
    OBJECT IDENTIFIER ::= { snmpMIB 2 }

snmpMIBCompliances
    OBJECT IDENTIFIER ::= { snmpMIBConformance 1 }
snmpMIBGroups    OBJECT IDENTIFIER ::= { snmpMIBConformance 2 }

-- compliance statements

snmpMIBCompliance MODULE-COMPLIANCE
    STATUS    current
    DESCRIPTION
        "The compliance statement for SNMPv2 entities
          which implement the SNMPv2 MIB."
    MODULE    RFC1213-MIB
        MANDATORY-GROUPS { system }

    MODULE    -- this module
        MANDATORY-GROUPS { snmpStatsGroup, snmpORGroup,
                           snmpTrapGroup, snmpSetGroup }

        GROUP    snmpV1Group
        DESCRIPTION
            "The snmpV1 group is mandatory only for those
              SNMPv2 entities which also implement SNMPv1."
        ::= { snmpMIBCompliances 1 }
```

-- units of conformance

```
snmpStatsGroup OBJECT-GROUP
    OBJECTS { snmpStatsPackets, snmpStats30Something,
              snmpStatsEncodingErrors,
              snmpStatsUnknownDstParties,
              snmpStatsDstPartyMismatches,
              snmpStatsUnknownSrcParties, snmpStatsBadAuths,
              snmpStatsNotInLifetimes,
              snmpStatsWrongDigestValues,
              snmpStatsUnknownContexts,
              snmpStatsBadOperations,
              snmpStatsSilentDrops }
    STATUS current
    DESCRIPTION
        "A collection of objects providing basic
        instrumentation of the SNMPv2 entity."
    ::= { snmpMIBGroups 1 }

snmpV1Group OBJECT-GROUP
    OBJECTS { snmpV1BadCommunityNames, snmpV1BadCommunityUses }
    STATUS current
    DESCRIPTION
        "A collection of objects providing basic
        instrumentation of a SNMPv2 entity which also
        implements SNMPv1."
    ::= { snmpMIBGroups 2 }

snmpORGroup OBJECT-GROUP
    OBJECTS { snmpORLastChange, snmpORID, snmpORDescr }
    STATUS current
    DESCRIPTION
        "A collection of objects allowing a SNMPv2 entity
        acting in an agent role to describe its
        dynamically-configurable object resources."
    ::= { snmpMIBGroups 3 }
```

```
snmpTrapGroup OBJECT-GROUP
  OBJECTS { snmpTrapNumbers, snmpV2EnableAuthenTraps }
  STATUS  current
  DESCRIPTION
    "A collection of objects which allow the SNMPv2
     entity, when acting in an agent role, to be
     configured to generate SNMPv2-Trap-PDUs."
 ::= { snmpMIBGroups 4 }

snmpSetGroup OBJECT-GROUP
  OBJECTS { snmpSetSerialNo }
  STATUS  current
  DESCRIPTION
    "A collection of objects which allow several
     cooperating SNMPv2 entities, all acting in a
     manager role, to coordinate their use of the
     SNMPv2 set operation."
 ::= { snmpMIBGroups 5 }

END
```

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The objects in the snmpStats and snmpV1 groups are based, in part, on RFC 1213.

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Randy Worzella, IBM Corporation
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Jeff Yarnell, Protools
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Kiho Yum, 3Com Corporation

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- [1] Information processing systems - Open Systems Interconnection - Specification of Abstract Syntax Notation One (ASN.1), International Organization for Standardization. International Standard 8824, (December, 1987).
- [2] Case, J., McCloghrie, K., Rose, M., and Waldbusser, S., "Structure of Management Information for version 2 of the Simple Network Management Protocol (SNMPv2)", RFC 1442, SNMP Research, Inc., Hughes LAN Systems, Dover Beach Consulting, Inc., Carnegie Mellon University, April 1993.
- [3] Case, J., McCloghrie, K., Rose, M., and Waldbusser, S., "Protocol Operations for version 2 of the Simple Network Management Protocol (SNMPv2)", RFC 1448, SNMP Research, Inc., Hughes LAN Systems, Dover Beach Consulting, Inc., Carnegie Mellon University, April 1993.
- [4] J.D. Case, C. Partridge, Case Diagrams: A First Step to Diagramed Management Information Bases. Computer Communications Review, Volume 19, Number 1, (January, 1989).
- [5] McCloghrie, K., and Galvin, J., "Party MIB for version 2 of the Simple Network Management Protocol (SNMPv2)", RFC 1447, Hughes LAN Systems, Trusted Information Systems, April 1993.

5. Security Considerations

Security issues are not discussed in this memo.

6. Authors' Addresses

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