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 specifes 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"
    ORGANIZATION "IETF SNMPv2 Working Group"
    CONTACT-INFO
            "        Marshall T. Rose

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                     US

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             E-mail: mrose@dbc.mtview.ca.us"
    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 }
```

```
SnmpOREntry ::= 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."
    ::= { snmpOREntry 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."
    ::= { snmpOREntry 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."
    ::= { snmpOREntry 3 }
```

```
-- the traps group
--
-- a collection of objects which allow the SNMPv2 entity, when
-- acting in an agent role, to be configured to generate
-- SNMPv2-Trap-PDUs.

snmpTrap       OBJECT IDENTIFIER ::= { snmpMIBObjects 4 }


snmpTrapOID OBJECT-TYPE
    SYNTAX     OBJECT IDENTIFIER
    MAX-ACCESS not-accessible
    STATUS     current
    DESCRIPTION
            "The authoritative identification of the trap
            currently being sent.  This variable occurs as the
            second varbind of a SNMPv2-Trap-PDU."
    ::= { snmpTrap 1 }

snmpTrapTable OBJECT-TYPE
    SYNTAX     SEQUENCE OF SnmpTrapEntry
    MAX-ACCESS not-accessible
    STATUS     current
    DESCRIPTION
            "A table which keeps track of how many traps have
            been sent to each SNMPv2 entity."
    ::= { snmpTrap 2 }

snmpTrapEntry OBJECT-TYPE
    SYNTAX     SnmpTrapEntry
    MAX-ACCESS not-accessible
    STATUS     current
    DESCRIPTION
            "An entry which keeps track of how many traps have
            been sent to a particular SNMPv2 entity."
    AUGMENTS   { partyEntry }
    ::= { snmpTrapTable 1 }

SnmpTrapEntry ::= SEQUENCE {
    snmpTrapNumbers                    Counter32
}
```

```
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
```

3. Acknowledgements

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

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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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