

Network Working Group  
Request for Comments: 1450

J. Case  
SNMP Research, Inc.  
K. McCloghrie  
Hughes LAN Systems  
M. Rose  
Dover Beach Consulting, Inc.  
S. Waldbusser  
Carnegie Mellon University  
April 1993

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.

Table of Contents

1 Introduction .....	2
1.1 A Note on Terminology .....	2
2 Definitions .....	3
3.1 The SNMPv2 Statistics Group .....	4
3.2 The SNMPv1 Statistics Group .....	9
3.3 The Object Resource Group .....	11
3.4 The Traps Group .....	13
3.4.1 Well-known Traps .....	16
3.5 The Set Group .....	18
3.6 Conformance Information .....	19
3.6.1 Compliance Statements .....	19
3.6.2 Units of Conformance .....	20
3 Acknowledgements .....	22
4 References .....	26
5 Security Considerations .....	27
6 Authors' Addresses .....	27

## 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

        Postal: Dover Beach Consulting, Inc.  
                420 Whisman Court  
                Mountain View, CA 94043-2186  
                US

        Tel: +1 415 968 1052

        Fax: +1 415 968 2510

        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 }
```

```

SnmpeOREntry ::= 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."
    ::= { snmpeOREntry 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."
    ::= { snmpeOREntry 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."
    ::= { snmpeOREntry 3 }

```

```

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 }

```

```

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 }

```

[Page 13]

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.

Finally, the comments of the SNMP version 2 working group are gratefully acknowledged:

Beth Adams, Network Management Forum  
Steve Alexander, INTERACTIVE Systems Corporation  
David Arneson, Cabletron Systems  
Toshiya Asaba  
Fred Baker, ACC  
Jim Barnes, Xylogics, Inc.  
Brian Bataille  
Andy Bierman, SynOptics Communications, Inc.  
Uri Blumenthal, IBM Corporation  
Fred Bohle, Interlink  
Jack Brown  
Theodore Brunner, Bellcore  
Stephen F. Bush, GE Information Services  
Jeffrey D. Case, University of Tennessee, Knoxville  
John Chang, IBM Corporation  
Szusin Chen, Sun Microsystems  
Robert Ching  
Chris Chiotasso, Ungermann-Bass  
Bobby A. Clay, NASA/Boeing  
John Cooke, Chipcom  
Tracy Cox, Bellcore  
Juan Cruz, Datability, Inc.  
David Cullerot, Cabletron Systems  
Cathy Cunningham, Microcom  
James R. (Chuck) Davin, Bellcore  
Michael Davis, Clearpoint  
Mike Davison, FiberCom  
Cynthia DellaTorre, MITRE  
Taso N. Devetzis, Bellcore  
Manual Diaz, DAVID Systems, Inc.  
Jon Dreyer, Sun Microsystems  
David Engel, Optical Data Systems  
Mike Erlinger, Lexcel  
Roger Fajman, NIH  
Daniel Fauvarque, Sun Microsystems  
Karen Frisa, CMU  
Shari Galitzer, MITRE

Shawn Gallagher, Digital Equipment Corporation  
Richard Graveman, Bellcore  
Maria Greene, Xyplex, Inc.  
Michel Guittet, Apple  
Robert Gutierrez, NASA  
Bill Hagerty, Cabletron Systems  
Gary W. Haney, Martin Marietta Energy Systems  
Patrick Hanil, Nokia Telecommunications  
Matt Hecht, SNMP Research, Inc.  
Edward A. Heiner, Jr., Synernetics Inc.  
Susan E. Hicks, Martin Marietta Energy Systems  
Gerald Holzhauser, Apple  
John Hopprich, DAVID Systems, Inc.  
Jeff Hughes, Hewlett-Packard  
Robin Iddon, Axon Networks, Inc.  
David Itusak  
Kevin M. Jackson, Concord Communications, Inc.  
Ole J. Jacobsen, Interop Company  
Ronald Jacoby, Silicon Graphics, Inc.  
Satish Joshi, SynOptics Communications, Inc.  
Frank Kastenholz, FTP Software  
Mark Kepke, Hewlett-Packard  
Ken Key, SNMP Research, Inc.  
Zbiginew Kielczewski, Eicon  
Jongyeoi Kim  
Andrew Knutsen, The Santa Cruz Operation  
Michael L. Kornegay, VisiSoft  
Deirdre C. Kostik, Bellcore  
Cheryl Krupczak, Georgia Tech  
Mark S. Lewis, Telebit  
David Lin  
David Lindemulder, AT&T/NCR  
Ben Lisowski, Sprint  
David Liu, Bell-Northern Research  
John Lunny, The Wollongong Group  
Robert C. Lushbaugh Martin, Marietta Energy Systems  
Michael Luufer, BBN  
Carl Madison, Star-Tek, Inc.  
Keith McCloghrie, Hughes LAN Systems  
Evan McGinnis, 3Com Corporation  
Bill McKenzie, IBM Corporation  
Donna McMaster, SynOptics Communications, Inc.  
John Medicke, IBM Corporation  
Doug Miller, Telebit  
Dave Minnich, FiberCom

Mohammad Mirhakkak, MITRE  
Rohit Mital, Protools  
George Mouradian, AT&T Bell Labs  
Patrick Mullaney, Cabletron Systems  
Dan Myers, 3Com Corporation  
Rina Nathaniel, Rad Network Devices Ltd.  
Hien V. Nguyen, Sprint  
Mo Nikain  
Tom Nisbet  
William B. Norton, MERIT  
Steve Onishi, Wellfleet Communications, Inc.  
David T. Perkins, SynOptics Communications, Inc.  
Carl Powell, BBN  
Ilan Raab, SynOptics Communications, Inc.  
Richard Ramons, AT&T  
Venkat D. Rangan, Metric Network Systems, Inc.  
Louise Reingold, Sprint  
Sam Roberts, Farallon Computing, Inc.  
Kary Robertson, Concord Communications, Inc.  
Dan Romascanu, Lannet Data Communications Ltd.  
Marshall T. Rose, Dover Beach Consulting, Inc.  
Shawn A. Routhier, Epilogue Technology Corporation  
Chris Rozman  
Asaf Rubissa, Fibronics  
Jon Saperia, Digital Equipment Corporation  
Michael Sapich  
Mike Scanlon, Interlan  
Sam Schaen, MITRE  
John Seligson, Ultra Network Technologies  
Paul A. Serice, Corporation for Open Systems  
Chris Shaw, Banyan Systems  
Timon Sloane  
Robert Snyder, Cisco Systems  
Joo Young Song  
Roy Spitier, Sprint  
Einar Stefferud, Network Management Associates  
John Stephens, Cayman Systems, Inc.  
Robert L. Stewart, Xyplex, Inc. (chair)  
Kaj Tesink, Bellcore  
Dean Throop, Data General  
Ahmet Tuncay, France Telecom-CNET  
Maurice Turcotte, Racal Datacom  
Warren Vik, INTERACTIVE Systems Corporation  
Yannis Viniotis  
Steven L. Waldbusser, Carnegie Mellon University



Timothy M. Walden, ACC  
Alice Wang, Sun Microsystems  
James Watt, Newbridge  
Luanne Waul, Timeplex  
Donald E. Westlake III, Digital Equipment Corporation  
Gerry White  
Bert Wijnen, IBM Corporation  
Peter Wilson, 3Com Corporation  
Steven Wong, Digital Equipment Corporation  
Randy Worzella, IBM Corporation  
Daniel Woycke, MITRE  
Honda Wu  
Jeff Yarnell, Protools  
Chris Young, Cabletron  
Kiho Yum, 3Com Corporation

#### 4. References

- [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

Jeffrey D. Case  
SNMP Research, Inc.  
3001 Kimberlin Heights Rd.  
Knoxville, TN    37920-9716  
US

Phone: +1 615 573 1434  
Email: case@snmp.com

Keith McCloghrie  
Hughes LAN Systems  
1225 Charleston Road  
Mountain View, CA    94043  
US

Phone: +1 415 966 7934  
Email: kzm@hls.com

Marshall T. Rose  
Dover Beach Consulting, Inc.  
420 Whisman Court  
Mountain View, CA    94043-2186  
US

Phone: +1 415 968 1052  
Email: mrose@dbc.mtview.ca.us

Steven Waldbusser  
Carnegie Mellon University  
4910 Forbes Ave  
Pittsburgh, PA    15213  
US

Phone: +1 412 268 6628  
Email: waldbusser@cmu.edu

