

IDMR Working Group
INTERNET-DRAFT
Expires April 2000

Keith McCloghrie
Dino Farinacci
cisco Systems
Dave Thaler
Microsoft
19 October 1999

Internet Group Management Protocol MIB
<[draft-ietf-idmr-igmp-mib-12.txt](#)>

Status of this Memo

This document is an Internet-Draft and is in full conformance with all provisions of [Section 10 of RFC2026](#).

Internet-Drafts are working documents of the Internet Engineering Task Force (IETF), its areas, and its working groups. Note that other groups may also distribute working documents as Internet-Drafts.

Internet-Drafts are draft documents valid for a maximum of six months and may be updated, replaced, or obsoleted by other documents at any time. It is inappropriate to use Internet-Drafts as reference material or to cite them other than as "work in progress."

The list of current Internet-Drafts can be accessed at
<http://www.ietf.org/ietf/1id-abstracts.txt>

The list of Internet-Draft Shadow Directories can be accessed at
<http://www.ietf.org/shadow.html>.

Copyright Notice

Copyright (C) The Internet Society (1999). All Rights Reserved.

Draft

IGMP MIB

October 1999

1. Abstract

This memo defines a portion of the Management Information Base (MIB) for use with network management protocols in the Internet community. In particular, it describes objects used for managing the Internet Group Management Protocol (IGMP).

2. Introduction

This memo defines a portion of the Management Information Base (MIB) for use with network management protocols in the Internet community. In particular, it describes objects used for managing the Internet Group Management Protocol (IGMP), version 1 [[16](#)] or version 2 [[17](#)]. All of this MIB module is applicable to IPv4 multicast routers; a subset is applicable to hosts implementing IGMP. This MIB does not support management of IGMP or equivalent functionality for other address

families, such as IPv6. Such management may be supported by other MIBs.

3. The SNMP Network Management Framework

The SNMP Management Framework presently consists of five major components:

- o An overall architecture, described in [RFC 2571](#) [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 2578](#) [5], [RFC 2579](#) [6] and [RFC 2580](#) [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 2572](#) [11] and [RFC 2574](#) [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 2573](#) [[14](#)] and the view-based access control mechanism described in [RFC 2575](#) [[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.

[4.](#) Overview

This MIB module contains two tables:

- (1) the IGMP Interface Table which contains one row for each interface on which IGMP is enabled, and
- (2) the IGMP Cache Table which contains one row for each IP multicast group for which there are members on a particular interface.

Both tables are intended to be implemented by hosts and routers, but some columnar objects in each table apply only to routers.

5. Definitions

IGMP-STD-MIB DEFINITIONS ::= BEGIN

IMPORTS

```
MODULE-IDENTITY, OBJECT-TYPE, mib-2, Counter32, Gauge32,
Integer32, IPAddress, TimeTicks FROM SNMPv2-SMI
RowStatus, TruthValue          FROM SNMPv2-TC
MODULE-COMPLIANCE, OBJECT-GROUP FROM SNMPv2-CONF
InterfaceIndexOrZero,
InterfaceIndex                  FROM IF-MIB;
```

igmpStdMIB MODULE-IDENTITY

```
LAST-UPDATED "9909171200Z" -- September 17, 1999
ORGANIZATION "IETF IDMR Working Group."
CONTACT-INFO
```

```
    " Dave Thaler
      Microsoft Corporation
      One Microsoft Way
      Redmond, WA 98052-6399
      US
```

```
    Phone: +1 425 703 8835
    EMail: dthaler@dthaler.microsoft.com"
```

DESCRIPTION

```
    "The MIB module for IGMP Management."
```

REVISION "9909171200Z" -- September 17, 1999

DESCRIPTION

```
    "Initial version, published as RFC xxxx (to be filled in by
    RFC-Editor)."
```

```
::= { mib-2 xx }
```

```
-- NOTE TO RFC EDITOR: When this document is published as
-- an RFC, replace XX with IANA-assigned value and delete
-- this comment.
```

igmpMIBObjects OBJECT IDENTIFIER ::= { igmpStdMIB 1 }

igmp OBJECT IDENTIFIER ::= { igmpMIBObjects 1 }

Expires April 2000

[Page 4]

```
--
--
--
```

```
-- The IGMP Interface Table
```

```
igmpInterfaceTable OBJECT-TYPE
```

```
    SYNTAX      SEQUENCE OF IgmpInterfaceEntry
```

```
    MAX-ACCESS  not-accessible
```

```
    STATUS      current
```

```
    DESCRIPTION
```

```
        "The (conceptual) table listing the interfaces on which IGMP
        is enabled."
```

```
    ::= { igmp 1 }
```

```
igmpInterfaceEntry OBJECT-TYPE
```

```
    SYNTAX      IgmpInterfaceEntry
```

```
    MAX-ACCESS  not-accessible
```

```
    STATUS      current
```

```
    DESCRIPTION
```

```
        "An entry (conceptual row) representing an interface on
        which IGMP is enabled."
```

```
    INDEX       { igmpInterfaceIfIndex }
```

```
    ::= { igmpInterfaceTable 1 }
```

```
IgmpInterfaceEntry ::= SEQUENCE {
```

```
    igmpInterfaceIfIndex      InterfaceIndex,
```

```
    igmpInterfaceQueryInterval Integer32,
```

```
    igmpInterfaceStatus      RowStatus,
```

```
    igmpInterfaceVersion      INTEGER,
```

```
    igmpInterfaceQuerier      IpAddress,
```

```
    igmpInterfaceQueryMaxResponseTime Integer32,
```

```
    igmpInterfaceVersion1QuerierTimer TimeTicks,
```

```
    igmpInterfaceWrongVersionQueries Counter32,
```

```
    igmpInterfaceJoins        Counter32,
```

```
    igmpInterfaceGroups       Gauge32,
```

```
    igmpInterfaceRobustness    Integer32,
```

```
    igmpInterfaceLastMembQueryIntvl Integer32,
```

```
    igmpInterfaceProxyIfIndex InterfaceIndexOrZero,
```

```
    igmpInterfaceQuerierUpTime TimeTicks,
```

```
    igmpInterfaceQuerierExpiryTime TimeTicks
```

```
}
```

```
igmpInterfaceIfIndex OBJECT-TYPE
```

```
    SYNTAX      InterfaceIndex
```

```
    MAX-ACCESS  not-accessible
```

```
    STATUS      current
```

DESCRIPTION

"The ifIndex value of the interface for which IGMP is enabled."

::= { igmpInterfaceEntry 1 }

igmpInterfaceQueryInterval OBJECT-TYPE

SYNTAX Integer32

UNITS "seconds"

MAX-ACCESS read-create

STATUS current

DESCRIPTION

"The frequency at which IGMP Host-Query packets are transmitted on this interface."

DEFVAL { 125 }

::= { igmpInterfaceEntry 2 }

igmpInterfaceStatus OBJECT-TYPE

SYNTAX RowStatus

MAX-ACCESS read-create

STATUS current

DESCRIPTION

"The activation of a row enables IGMP on the interface. The destruction of a row disables IGMP on the interface."

::= { igmpInterfaceEntry 3 }

igmpInterfaceVersion OBJECT-TYPE

SYNTAX INTEGER { version1(1), version2(2) }

MAX-ACCESS read-create

STATUS current

DESCRIPTION

"The version of IGMP which is running on this interface. This object can be used to configure a router capable of running either value. For IGMP to function correctly, all routers on a LAN must be configured to run the same version of IGMP on that LAN."

DEFVAL { version2 }

::= { igmpInterfaceEntry 4 }

igmpInterfaceQuerier OBJECT-TYPE

SYNTAX IpAddress

MAX-ACCESS read-only

STATUS current

DESCRIPTION

"The address of the IGMP Querier on the IP subnet to which this interface is attached."

```
::= { igmpInterfaceEntry 5 }
```

igmpInterfaceQueryMaxResponseTime OBJECT-TYPE

SYNTAX Integer32

UNITS "tenths of seconds"

MAX-ACCESS read-create

STATUS current

DESCRIPTION

"The maximum query response time advertised in IGMPv2 queries on this interface."

DEFVAL { 100 }

```
::= { igmpInterfaceEntry 6 }
```

igmpInterfaceVersion1QuerierTimer OBJECT-TYPE

SYNTAX TimeTicks

MAX-ACCESS read-only

STATUS current

DESCRIPTION

"The time remaining until the host assumes that there are no IGMPv1 routers present on the interface. While this is non-zero, the host will reply to all queries with version 1 membership reports."

```
::= { igmpInterfaceEntry 9 }
```

igmpInterfaceWrongVersionQueries OBJECT-TYPE

SYNTAX Counter32

MAX-ACCESS read-only

STATUS current

DESCRIPTION

"The number of queries received whose IGMP version does not match igmpInterfaceVersion. IGMP requires that all routers on a LAN be configured to run the same version of IGMP. Thus, if any queries are received with the wrong version, this indicates a configuration error."

```
::= { igmpInterfaceEntry 10 }
```

igmpInterfaceJoins OBJECT-TYPE

SYNTAX Counter32

MAX-ACCESS read-only

STATUS current

DESCRIPTION

"The number of times a group membership has been added on this interface; that is, the number of times an entry for this interface has been added to the Cache Table. This object gives an indication of the amount of IGMP activity

over time."
 ::= { igmpInterfaceEntry 11 }

igmpInterfaceGroups OBJECT-TYPE

SYNTAX Gauge32
MAX-ACCESS read-only
STATUS current
DESCRIPTION
 "The current number of entries for this interface in the
 Cache Table."
 ::= { igmpInterfaceEntry 13 }

igmpInterfaceRobustness OBJECT-TYPE

SYNTAX Integer32
MAX-ACCESS read-create
STATUS current
DESCRIPTION
 "The Robustness Variable allows tuning for the expected
 packet loss on a subnet. If a subnet is expected to be
 lossy, the Robustness Variable may be increased. IGMP is
 robust to (Robustness Variable-1) packet losses."
 DEFVAL { 2 }
 ::= { igmpInterfaceEntry 14 }

igmpInterfaceLastMembQueryIntvl OBJECT-TYPE

SYNTAX Integer32
UNITS "tenths of seconds"
MAX-ACCESS read-create
STATUS current
DESCRIPTION
 "The Last Member Query Interval is the Max Response Time
 inserted into Group-Specific Queries sent in response to
 Leave Group messages, and is also the amount of time between
 Group-Specific Query messages. This value may be tuned to
 modify the leave latency of the network. A reduced value
 results in reduced time to detect the loss of the last
 member of a group. The value of this object is irrelevant
 if igmpInterfaceVersion is version1."
 DEFVAL { 10 }
 ::= { igmpInterfaceEntry 15 }

igmpInterfaceProxyIfIndex OBJECT-TYPE

SYNTAX InterfaceIndexOrZero
MAX-ACCESS read-create
STATUS current

DESCRIPTION

"Some devices implement a form of IGMP proxying whereby memberships learned on the interface represented by this row, cause IGMP Host Membership Reports to be sent on the interface whose ifIndex value is given by this object. Such a device would implement the igmpV2RouterMIBGroup only on its router interfaces (those interfaces with non-zero igmpInterfaceProxyIfIndex). Typically, the value of this object is 0, indicating that no proxying is being done."

DEFVAL { 0 }

::= { igmpInterfaceEntry 16 }

igmpInterfaceQuerierUpTime OBJECT-TYPE

SYNTAX TimeTicks

MAX-ACCESS read-only

STATUS current

DESCRIPTION

"The time since igmpInterfaceQuerier was last changed."

::= { igmpInterfaceEntry 17 }

igmpInterfaceQuerierExpiryTime OBJECT-TYPE

SYNTAX TimeTicks

MAX-ACCESS read-only

STATUS current

DESCRIPTION

"The amount of time remaining before the Other Querier Present Timer expires. If the local system is the querier, the value of this object is zero."

::= { igmpInterfaceEntry 18 }

```
--
-- The IGMP Cache Table
--

igmpCacheTable OBJECT-TYPE
    SYNTAX      SEQUENCE OF IgmpCacheEntry
    MAX-ACCESS  not-accessible
    STATUS      current
    DESCRIPTION
        "The (conceptual) table listing the IP multicast groups for
        which there are members on a particular interface."
    ::= { igmp 2 }

igmpCacheEntry OBJECT-TYPE
    SYNTAX      IgmpCacheEntry
    MAX-ACCESS  not-accessible
    STATUS      current
    DESCRIPTION
        "An entry (conceptual row) in the igmpCacheTable."
    INDEX       { igmpCacheAddress, igmpCacheIfIndex }
    ::= { igmpCacheTable 1 }

IgmpCacheEntry ::= SEQUENCE {
    igmpCacheAddress      IpAddress,
    igmpCacheIfIndex      InterfaceIndex,
    igmpCacheSelf         TruthValue,
    igmpCacheLastReporter IpAddress,
    igmpCacheUpTime       TimeTicks,
    igmpCacheExpiryTime   TimeTicks,
    igmpCacheStatus       RowStatus,
    igmpCacheVersion1HostTimer TimeTicks
}

igmpCacheAddress OBJECT-TYPE
    SYNTAX      IpAddress
    MAX-ACCESS  not-accessible
    STATUS      current
    DESCRIPTION
        "The IP multicast group address for which this entry
        contains information."
    ::= { igmpCacheEntry 1 }

igmpCacheIfIndex OBJECT-TYPE
    SYNTAX      InterfaceIndex
    MAX-ACCESS  not-accessible
```

STATUS current
DESCRIPTION
 "The interface for which this entry contains information for
 an IP multicast group address."
 ::= { igmpCacheEntry 2 }

igmpCacheSelf OBJECT-TYPE
SYNTAX TruthValue
MAX-ACCESS read-create
STATUS current
DESCRIPTION
 "An indication of whether the local system is a member of
 this group address on this interface."
DEFVAL { true }
 ::= { igmpCacheEntry 3 }

igmpCacheLastReporter OBJECT-TYPE
SYNTAX IPAddress
MAX-ACCESS read-only
STATUS current
DESCRIPTION
 "The IP address of the source of the last membership report
 received for this IP Multicast group address on this
 interface. If no membership report has been received, this
 object has the value 0.0.0.0."
 ::= { igmpCacheEntry 4 }

igmpCacheUpTime OBJECT-TYPE
SYNTAX TimeTicks
MAX-ACCESS read-only
STATUS current
DESCRIPTION
 "The time elapsed since this entry was created."
 ::= { igmpCacheEntry 5 }

igmpCacheExpiryTime OBJECT-TYPE
SYNTAX TimeTicks
MAX-ACCESS read-only
STATUS current
DESCRIPTION
 "The minimum amount of time remaining before this entry will
 be aged out. A value of 0 indicates that the entry is only
 present because igmpCacheSelf is true and that if the router
 left the group, this entry would be aged out immediately.
 Note that some implementations may process membership

reports from the local system in the same way as reports from other hosts, so a value of 0 is not required."
 ::= { igmpCacheEntry 6 }

igmpCacheStatus OBJECT-TYPE

SYNTAX RowStatus

MAX-ACCESS read-create

STATUS current

DESCRIPTION

"The status of this entry."

::= { igmpCacheEntry 7 }

igmpCacheVersion1HostTimer OBJECT-TYPE

SYNTAX TimeTicks

MAX-ACCESS read-only

STATUS current

DESCRIPTION

"The time remaining until the local router will assume that there are no longer any IGMP version 1 members on the IP subnet attached to this interface. Upon hearing any IGMPv1 Membership Report, this value is reset to the group membership timer. While this time remaining is non-zero, the local router ignores any IGMPv2 Leave messages for this group that it receives on this interface."

::= { igmpCacheEntry 8 }

```
-- conformance information
```

```
igmpMIBConformance
```

```
    OBJECT IDENTIFIER ::= { igmpStdMIB 2 }
```

```
igmpMIBCompliances
```

```
    OBJECT IDENTIFIER ::= { igmpMIBConformance 1 }
```

```
igmpMIBGroups OBJECT IDENTIFIER ::= { igmpMIBConformance 2 }
```

```
-- compliance statements
```

```
igmpV1HostMIBCompliance MODULE-COMPLIANCE
```

```
    STATUS current
```

```
    DESCRIPTION
```

```
        "The compliance statement for hosts running IGMPv1 and  
        implementing the IGMP MIB."
```

```
    MODULE -- this module
```

```
    MANDATORY-GROUPS { igmpBaseMIBGroup }
```

```
    OBJECT      igmpInterfaceStatus
```

```
    MIN-ACCESS read-only
```

```
    DESCRIPTION
```

```
        "Write access is not required."
```

```
 ::= { igmpMIBCompliances 1 }
```

```
igmpV1RouterMIBCompliance MODULE-COMPLIANCE
```

```
    STATUS current
```

```
    DESCRIPTION
```

```
        "The compliance statement for routers running IGMPv1 and  
        implementing the IGMP MIB."
```

```
    MODULE -- this module
```

```
    MANDATORY-GROUPS { igmpBaseMIBGroup,  
                        igmpRouterMIBGroup  
                      }
```

```
    OBJECT      igmpInterfaceStatus
```

```
    MIN-ACCESS read-only
```

```
    DESCRIPTION
```

```
        "Write access is not required."
```

```
 ::= { igmpMIBCompliances 2 }
```

```
igmpV2HostMIBCompliance MODULE-COMPLIANCE
```

```
    STATUS current
```

Expires April 2000

[Page 13]

DESCRIPTION

"The compliance statement for hosts running IGMPv2 and implementing the IGMP MIB."

MODULE -- this module

MANDATORY-GROUPS { igmpBaseMIBGroup,
 igmpV2HostMIBGroup
 }

OBJECT igmpInterfaceStatus

MIN-ACCESS read-only

DESCRIPTION

"Write access is not required."

::= { igmpMIBCompliances 3 }

igmpV2RouterMIBCompliance MODULE-COMPLIANCE

STATUS current

DESCRIPTION

"The compliance statement for routers running IGMPv2 and implementing the IGMP MIB."

MODULE -- this module

MANDATORY-GROUPS { igmpBaseMIBGroup,
 igmpRouterMIBGroup,
 igmpV2RouterMIBGroup
 }

OBJECT igmpInterfaceStatus

MIN-ACCESS read-only

DESCRIPTION

"Write access is not required."

::= { igmpMIBCompliances 4 }

-- units of conformance

igmpBaseMIBGroup OBJECT-GROUP

OBJECTS { igmpCacheSelf,
 igmpCacheStatus, igmpInterfaceStatus
 }

STATUS current

DESCRIPTION

"The basic collection of objects providing management of IGMP version 1 or 2."

::= { igmpMIBGroups 1 }

igmpRouterMIBGroup OBJECT-GROUP

```
OBJECTS { igmpCacheUpTime, igmpCacheExpiryTime,
          igmpInterfaceJoins, igmpInterfaceGroups,
          igmpCacheLastReporter, igmpInterfaceQuerierUpTime,
          igmpInterfaceQuerierExpiryTime,
          igmpInterfaceQueryInterval
        }
```

STATUS current

DESCRIPTION

"A collection of additional objects for management of IGMP version 1 or 2 in routers."

::= { igmpMIBGroups 2 }

igmpV2HostMIBGroup OBJECT-GROUP

```
OBJECTS { igmpInterfaceVersion1QuerierTimer }
```

STATUS current

DESCRIPTION

"A collection of additional objects for management of IGMP version 2 in hosts."

::= { igmpMIBGroups 3 }

igmpHostOptMIBGroup OBJECT-GROUP

```
OBJECTS { igmpCacheLastReporter, igmpInterfaceQuerier }
```

STATUS current

DESCRIPTION

"A collection of optional objects for IGMP hosts. Supporting this group can be especially useful in an environment with a router which does not support the IGMP MIB."

::= { igmpMIBGroups 4 }

igmpV2RouterMIBGroup OBJECT-GROUP

```
OBJECTS { igmpInterfaceVersion, igmpInterfaceQuerier,
          igmpInterfaceQueryMaxResponseTime,
          igmpInterfaceRobustness,
          igmpInterfaceWrongVersionQueries,
          igmpInterfaceLastMembQueryIntvl,
          igmpCacheVersion1HostTimer
        }
```

STATUS current

DESCRIPTION

"A collection of additional objects for management of IGMP version 2 in routers."

::= { igmpMIBGroups 5 }

```
igmpV2ProxyMIBGroup OBJECT-GROUP
    OBJECTS { igmpInterfaceProxyIfIndex }
    STATUS   current
    DESCRIPTION
        "A collection of additional objects for management of IGMP
        proxy devices."
    ::= { igmpMIBGroups 6 }

END
```

Expires April 2000

[Page 16]

6. Security Considerations

This MIB contains readable objects whose values provide information related to multicast sessions. Some of these objects could contain sensitive information. In particular, the `igmpCacheSelf` and `igmpCacheLastReporter` can be used to identify machines which are listening to a given group address. There are also a number of objects that have a MAX-ACCESS clause of read-write and/or read-create, which allow an administrator to configure IGMP in the router.

While unauthorized access to the readable objects is relatively innocuous, unauthorized access to the write-able objects could cause a denial of service. Hence, the support for SET operations in a non-secure environment without proper protection can have a negative effect on network operations.

SNMPv1 by itself is such an insecure environment. Even if the network itself is secure (for example by using IPSec), even then, there is no control as to who on the secure network is allowed to access and SET (change/create/delete) the objects in this MIB.

It is recommended that the implementers consider the security features as provided by the SNMPv3 framework. Specifically, the use of the User-based Security Model [RFC 2574](#) [12] and the View-based Access Control Model [RFC 2575](#) [15] is recommended.

It is then a customer/user responsibility to ensure that the SNMP entity giving access to this MIB, is properly configured to give access to those objects only to those principals (users) that have legitimate rights to access them.

7. Intellectual Property Notice

The IETF takes no position regarding the validity or scope of any intellectual property or other rights that might be claimed to pertain to the implementation or use of the technology described in this document or the extent to which any license under such rights might or might not be available; neither does it represent that it has made any effort to identify any such rights. Information on the IETF's procedures with respect to rights in standards-track and standards-related documentation can be found in [BCP-11](#). Copies of claims of rights made available for publication and any assurances of licenses to be made available, or the result of an attempt made to obtain a general license or permission for the use of such proprietary rights by

implementers or users of this specification can be obtained from the IETF Secretariat.

The IETF invites any interested party to bring to its attention any copyrights, patents or patent applications, or other proprietary rights which may cover technology that may be required to practice this standard. Please address the information to the IETF Executive Director.

8. Acknowledgements

This MIB module was updated based on feedback from the IETF's Inter-Domain Multicast Routing (IDMR) Working Group.

9. Authors' Addresses

Keith McCloghrie
cisco Systems, Inc.
170 West Tasman Drive
San Jose, CA 95134-1706
Phone: +1 408 526 5260
EMail: kzm@cisco.com

Dino Farinacci
cisco Systems, Inc.
170 West Tasman Drive
San Jose, CA 95134-1706
Phone: +1 408 526 4696
EMail: dino@cisco.com

Dave Thaler
Microsoft Corporation
One Microsoft Way
Redmond, WA 98052-6399
Phone: +1 425 703 8835
EMail: dthaler@microsoft.com

10. References

- [1] Wijnen, B., Harrington, D., and R. Presuhn, "An Architecture for Describing SNMP Management Frameworks", [RFC 2571](#), Cabletron

Systems, Inc., BMC Software, Inc., IBM T. J. Watson Research, April 1999.

- [2] Rose, M., and K. McCloghrie, "Structure and Identification of Management Information for TCP/IP-based Internets", [RFC 1155](#), STD 16, Performance Systems International, Hughes LAN Systems, May 1990.
- [3] Rose, M., and K. McCloghrie, "Concise MIB Definitions", [RFC 1212](#), STD 16, 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] McCloghrie, K., Perkins, D., Schoenwaelder, J., Case, J., Rose, M., and S. Waldbusser, "Structure of Management Information Version 2 (SMIV2)", [RFC 2578](#), STD 58, Cisco Systems, SNMPinfo, TU Braunschweig, SNMP Research, First Virtual Holdings, International Network Services, April 1999.
- [6] McCloghrie, K., Perkins, D., Schoenwaelder, J., Case, J., Rose, M., and S. Waldbusser, "Textual Conventions for SMIV2", [RFC 2579](#), STD 58, Cisco Systems, SNMPinfo, TU Braunschweig, SNMP Research, First Virtual Holdings, International Network Services, April 1999.
- [7] McCloghrie, K., Perkins, D., Schoenwaelder, J., Case, J., Rose, M., and S. Waldbusser, "Conformance Statements for SMIV2", [RFC 2580](#), STD 58, Cisco Systems, SNMPinfo, TU Braunschweig, SNMP Research, First Virtual Holdings, International Network Services, April 1999.
- [8] Case, J., Fedor, M., Schoffstall, M., and J. Davin, "Simple Network Management Protocol", [RFC 1157](#), STD 15, 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 2572](#), SNMP Research, Inc., Cabletron Systems, Inc., BMC Software, Inc., IBM T. J. Watson Research, April 1999.
- [12] Blumenthal, U., and B. Wijnen, "User-based Security Model (USM) for version 3 of the Simple Network Management Protocol (SNMPv3)", [RFC 2574](#), IBM T. J. Watson Research, April 1999.
- [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 2573](#), SNMP Research, Inc., Secure Computing Corporation, Cisco Systems, April 1999.
- [15] Wijnen, B., Presuhn, R., and K. McCloghrie, "View-based Access Control Model (VACM) for the Simple Network Management Protocol (SNMP)", [RFC 2575](#), IBM T. J. Watson Research, BMC Software, Inc., Cisco Systems, Inc., April 1999.
- [16] Deering, S., "Host Extensions for IP Multicasting", [RFC 1112](#), STD 5, Stanford University, August 1989.
- [17] Fenner, W., "Internet Group Management Protocol, Version 2", [RFC 2236](#), November 1997.

11. Full Copyright Statement

Copyright (C) The Internet Society (1999). All Rights Reserved.

This document and translations of it may be copied and furnished to others, and derivative works that comment on or otherwise explain it or assist in its implementation may be prepared, copied, published and distributed, in whole or in part, without restriction of any kind, provided that the above copyright notice and this paragraph are included on all such copies and derivative works. However, this document itself may not be modified in any way, such as by removing the copyright notice or references to the Internet Society or other Internet organizations,

except as needed for the purpose of developing Internet standards in which case the procedures for copyrights defined in the Internet Standards process must be followed, or as required to translate it into languages other than English.

The limited permissions granted above are perpetual and will not be revoked by the Internet Society or its successors or assigns.

This document and the information contained herein is provided on an "AS IS" basis and THE INTERNET SOCIETY AND THE INTERNET ENGINEERING TASK FORCE DISCLAIMS ALL WARRANTIES, EXPRESS OR IMPLIED, INCLUDING BUT NOT LIMITED TO ANY WARRANTY THAT THE USE OF THE INFORMATION HEREIN WILL NOT INFRINGE ANY RIGHTS OR ANY IMPLIED WARRANTIES OF MERCHANTABILITY OR FITNESS FOR A PARTICULAR PURPOSE.

Table of Contents

1	Abstract	2
2	Introduction	2
3	The SNMP Network Management Framework	2
4	Overview	3
5	Definitions	4
6	Security Considerations	17
7	Intellectual Property Notice	17
8	Acknowledgements	18
9	Authors' Addresses	18
10	References	18
11	Full Copyright Statement	20

Expires April 2000

[Page 21]