Network Working Group   D. Thaler
Request for Comments: 3559   Microsoft
Category: Standards Track   June 2003

                   Multicast Address Allocation MIB

Status of this Memo

   This document specifies an Internet standards track protocol for the
   Internet community, and requests discussion and suggestions for
   improvements. Please refer to the current edition of the "Internet
   Official Protocol Standards" (STD 1) for the standardization state
   and status of this protocol. Distribution of this memo is unlimited.

Copyright Notice

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 managed objects used for managing
   multicast address allocation.

Table of Contents

1. Introduction

   This document defines a Management Information Base (MIB) module for
   managing multicast address allocation in a protocol-independent
   manner, as well as for managing specific protocols used in allocating
   multicast addresses. The protocol-independent objects in this MIB
   apply to all multicast address allocation servers (MAASs) and
   clients, as described in [ARCH], including those that allocate
   source-specific multicast addresses for the local machine.

   The protocol-specific objects in this MIB include objects related to
   the Multicast Address Dynamic Client Allocation Protocol (MADCAP)
   [MADCAP]. Interactions with the Multicast-scope Zone Announcement
   Protocol (MZAP) [MZAP] are also noted where appropriate.

2. The Internet-Standard Management Framework

   For a detailed overview of the documents that describe the current
   Internet-Standard Management Framework, please refer to section 7 of
   RFC 3410 [RFC3410].

   Managed objects are accessed via a virtual information store, termed
   the Management Information Base or MIB. MIB objects are generally
   accessed through the Simple Network Management Protocol (SNMP).

   Objects in the MIB are defined using the mechanisms defined in the
   Structure of Management Information (SMI). This memo specifies a MIB
   module that is compliant to the SMIv2, which is described in STD 58,
   RFC 2578 [RFC2578], STD 58, RFC 2579 [RFC2579] and STD 58, RFC 2580
   [RFC2580].

3. Overview

   The purpose of this MIB module is to provide the ability to configure
   and monitor the status of multicast address allocation within the
   local domain.

   Some important monitoring questions which can be answered by this MIB
   module include:

      o How full is scope X?

      o Who's using up the space?

      o Who allocated a given address A?

      o Are requests being met?

This MIB module is divided into two primary sections:

   o Protocol-independent objects relevant to all multicast address
      allocation servers and clients.

   o Protocol-specific objects related to the MADCAP client-server
      protocol.

3.1. Protocol-independent objects

   The protocol-independent objects consist of one "capabilities" scalar
   and five tables. The tables are:

   o The Scope Table contains information on the multicast scopes
      known to a multicast address allocation server. This table
      allows configuring scopes, and viewing what scopes are known to
      the local system after being configured elsewhere.

   o The Scope Name Table contains the names of the multicast
      scopes. This table logically extends the Scope Table with the
      list of scope names in various languages for each scope.

   o The Allocation Range Table contains the address ranges out of
      which the device may allocate addresses. It also allows
      answering the questions "How full is scope X?" and "Are
      requests being met?"

   o The Request Table contains the requests for address
      allocations, and allows answering the question "Who's using up
      the space?"

   o The Address Table contains the blocks of addresses which have
      been allocated, and together with the Request Table, allows
      answering the question "Who allocated a given address A?"

3.2. Protocol-specific objects

   The MADCAP objects consist of a group of (scalar) configuration
   parameters, and a group of (scalar) statistics.

4. Definitions

```
MALLOC-MIB DEFINITIONS ::= BEGIN

IMPORTS
    MODULE-IDENTITY, OBJECT-TYPE, OBJECT-IDENTITY, mib-2,
    Unsigned32, Gauge32, Counter32          FROM SNMPv2-SMI

    RowStatus, TruthValue, StorageType      FROM SNMPv2-TC

    MODULE-COMPLIANCE, OBJECT-GROUP         FROM SNMPv2-CONF

    InetAddress, InetAddressType            FROM INET-ADDRESS-MIB

    LanguageTag                             FROM IPMROUTE-STD-MIB

    SnmpAdminString                         FROM SNMP-FRAMEWORK-MIB

    IANAscopeSource, IANAmallocRangeSource FROM IANA-MALLOC-MIB;

mallocMIB MODULE-IDENTITY
    LAST-UPDATED "200306090000Z" -- June 9, 2003
    ORGANIZATION "IETF MALLOC Working Group"
    CONTACT-INFO
            " WG-EMail:   malloc@catarina.usc.edu
              Subscribe:  malloc-request@catarina.usc.edu
              Archive:    catarina.usc.edu/pub/multicast/malloc/

              Co-chair/editor:
              Dave Thaler
              Microsoft Corporation
              One Microsoft Way
              Redmond, WA 98052
              EMail: dthaler@microsoft.com

              Co-chair:
              Steve Hanna
              Sun Microsystems, Inc.
              One Network Drive
              Burlington, MA 01803
              EMail: steve.hanna@sun.com"
    DESCRIPTION
            "The MIB module for management of multicast address
            allocation.

            Copyright (C) The Internet Society (2003).  This version of
            this MIB module is part of RFC 3559; see the RFC itself for
            full legal notices."
```

```
     -- revision log

     REVISION      "200306090000Z" -- June 9, 2003
     DESCRIPTION
             "Initial version, published as RFC 3559."
     ::= { mib-2 101 }

mallocMIBObjects OBJECT IDENTIFIER ::= { mallocMIB 1 }

malloc      OBJECT IDENTIFIER ::= { mallocMIBObjects 1 }

madcap      OBJECT IDENTIFIER ::= { mallocMIBObjects 2 }

--
-- scalars
--

mallocCapabilities OBJECT-TYPE
     SYNTAX     BITS {
                    startTime(0),
                    serverMobility(1),
                    retryAfter(2)
                }
     MAX-ACCESS read-only
     STATUS     current
     DESCRIPTION
             "This object describes the capabilities which a client or
             server supports.  The startTime bit indicates that
             allocations with a future start time are supported.  The
             serverMobility bit indicates that allocations can be renewed
             or released from a server other than the one granting the
             original allocation.  The retryAfter bit indicates support
             for a waiting state where the client may check back at a
             later time to get the status of its request."
     ::= { malloc 1 }

--
-- the Scope Table
--

mallocScopeTable OBJECT-TYPE
     SYNTAX     SEQUENCE OF MallocScopeEntry
     MAX-ACCESS not-accessible
     STATUS     current
     DESCRIPTION
             "The (conceptual) table containing information on multicast
             scopes from which addresses may be allocated.  Entries in
             this table may be dynamically discovered via some other
```

            protocol, such as MZAP, or may be statically configured,
            such as in an isolated network environment. Each scope is
            associated with a range of multicast addresses, and ranges
            for different rows must be disjoint."
     ::= { malloc 2 }

mallocScopeEntry OBJECT-TYPE
     SYNTAX   MallocScopeEntry
     MAX-ACCESS not-accessible
     STATUS   current
     DESCRIPTION
            "An entry (conceptual row) containing the information on a
            particular multicast scope."
     INDEX   { mallocScopeAddressType, mallocScopeFirstAddress }
     ::= { mallocScopeTable 1 }

MallocScopeEntry ::= SEQUENCE {
     mallocScopeAddressType   InetAddressType,
     mallocScopeFirstAddress   InetAddress,
     mallocScopeLastAddress   InetAddress,
     mallocScopeHopLimit   Unsigned32,
     mallocScopeStatus   RowStatus,
     mallocScopeSource   IANAscopeSource,
     mallocScopeDivisible   TruthValue,
     mallocScopeServerAddressType   InetAddressType,
     mallocScopeServerAddress   InetAddress,
     mallocScopeSSM   TruthValue,
     mallocScopeStorage   StorageType
}

mallocScopeAddressType OBJECT-TYPE
     SYNTAX   InetAddressType
     MAX-ACCESS not-accessible
     STATUS   current
     DESCRIPTION
            "The type of the addresses in the multicast scope range.
            Legal values correspond to the subset of address families
            for which multicast address allocation is supported."
     ::= { mallocScopeEntry 1 }

mallocScopeFirstAddress OBJECT-TYPE
     SYNTAX   InetAddress (SIZE(0..20))
     MAX-ACCESS not-accessible
     STATUS   current
     DESCRIPTION
            "The first address in the multicast scope range. The type
            of this address is determined by the value of the
            mallocScopeAddressType object."

```
     ::= { mallocScopeEntry 2 }

mallocScopeLastAddress OBJECT-TYPE
    SYNTAX      InetAddress (SIZE(0..20))
    MAX-ACCESS  read-create
    STATUS      current
    DESCRIPTION
            "The last address in the multicast scope range.  The type of
            this address is determined by the value of the
            mallocScopeAddressType object."
    ::= { mallocScopeEntry 3 }

mallocScopeHopLimit OBJECT-TYPE
    SYNTAX      Unsigned32 (0..255)
    MAX-ACCESS  read-create
    STATUS      current
    DESCRIPTION
            "The default IPv4 TTL or IPv6 hop limit which applications
            should use for groups within the scope."
    DEFVAL     { 255 }
    ::= { mallocScopeEntry 4 }

mallocScopeStatus OBJECT-TYPE
    SYNTAX      RowStatus
    MAX-ACCESS  read-create
    STATUS      current
    DESCRIPTION
            "The status of this row, by which new entries may be
            created, or old entries deleted from this table.  If write
            access is supported, the other writable objects in this
            table may be modified even while the status is 'active'."
    ::= { mallocScopeEntry 5 }

mallocScopeSource OBJECT-TYPE
    SYNTAX      IANAscopeSource
    MAX-ACCESS  read-only
    STATUS      current
    DESCRIPTION
            "The method by which this entry was learned."
    ::= { mallocScopeEntry 6 }

mallocScopeDivisible OBJECT-TYPE
    SYNTAX      TruthValue
    MAX-ACCESS  read-create
    STATUS      current
    DESCRIPTION
            "If false, the server may allocate addresses out of the
            entire range.  If true, the server must not allocate
```

                addresses out of the entire range, but may only allocate
                addresses out of a subrange learned via another method.
                Creating or deleting a scope which is not divisible has the
                side effect of creating or deleting the corresponding entry
                in the mallocAllocRangeTable. Deleting a scope which is
                divisible has the side effect of deleting any corresponding
                entries in the mallocAllocRangeTable, and the
                mallocRequestTable."
         DEFVAL   { false }
         ::= { mallocScopeEntry 7 }

    mallocScopeServerAddressType OBJECT-TYPE
         SYNTAX   InetAddressType
         MAX-ACCESS read-create
         STATUS   current
         DESCRIPTION
                "The type of the address of a multicast address allocation
                server to which a request may be sent."
         DEFVAL { unknown }
         ::= { mallocScopeEntry 8 }

    mallocScopeServerAddress OBJECT-TYPE
         SYNTAX   InetAddress
         MAX-ACCESS read-create
         STATUS   current
         DESCRIPTION
                "The address of a multicast address allocation server to
                which a request may be sent. The default value is an zero-
                length address, indicating that no server is known. The
                type of this address is determined by the value of the
                mallocScopeServerAddressType object."
         DEFVAL { ''h } -- the empty string
         ::= { mallocScopeEntry 9 }

    mallocScopeSSM OBJECT-TYPE
         SYNTAX   TruthValue
         MAX-ACCESS read-create
         STATUS   current
         DESCRIPTION
                "Indicates whether the scope is a Source-Specific Multicast
                (SSM) range."
         DEFVAL   { false }
         ::= { mallocScopeEntry 10 }

    mallocScopeStorage OBJECT-TYPE
         SYNTAX   StorageType
         MAX-ACCESS read-create
         STATUS   current

```
        DESCRIPTION
                "The storage type for this conceptual row.  Conceptual rows
                having the value 'permanent' need not allow write-access to
                any columnar objects in the row."
        DEFVAL      { nonVolatile }
        ::= { mallocScopeEntry 11 }

--
-- the Scope Name Table
--

mallocScopeNameTable OBJECT-TYPE
        SYNTAX      SEQUENCE OF MallocScopeNameEntry
        MAX-ACCESS not-accessible
        STATUS      current
        DESCRIPTION
                "The (conceptual) table containing information on multicast
                scope names.  Entries in this table may be dynamically
                discovered via some other protocol, such as MZAP, or may be
                statically configured, such as in an isolated network
                environment."
        ::= { malloc 3 }

mallocScopeNameEntry OBJECT-TYPE
        SYNTAX      MallocScopeNameEntry
        MAX-ACCESS not-accessible
        STATUS      current
        DESCRIPTION
                "An entry (conceptual row) containing the information on a
                particular multicast scope name."
        INDEX       { mallocScopeAddressType, mallocScopeFirstAddress,
                        IMPLIED mallocScopeNameLangName }
        ::= { mallocScopeNameTable 1 }

MallocScopeNameEntry ::= SEQUENCE {
        mallocScopeNameLangName          LanguageTag,
        mallocScopeNameScopeName         SnmpAdminString,
        mallocScopeNameDefault           TruthValue,
        mallocScopeNameStatus            RowStatus,
        mallocScopeNameStorage           StorageType
}

mallocScopeNameLangName OBJECT-TYPE
        SYNTAX      LanguageTag (SIZE(1..94))
        MAX-ACCESS not-accessible
        STATUS      current
```

         DESCRIPTION
                 "The RFC 3066 language tag for the language of the scope
                 name."
         ::= { mallocScopeNameEntry 1 }

mallocScopeNameScopeName OBJECT-TYPE
     SYNTAX   SnmpAdminString
     MAX-ACCESS read-create
     STATUS   current
     DESCRIPTION
                 "The textual name associated with the multicast scope. The
                 value of this object should be suitable for displaying to
                 end-users, such as when allocating a multicast address in
                 this scope. If the scope is an IPv4 scope, and no name is
                 specified, the default value of this object should be the
                 string 239.x.x.x/y with x and y replaced appropriately to
                 describe the address and mask length associated with the
                 scope. If the scope is an IPv6 scope, and no name is
                 specified, the default value of this object should
                 generically describe the scope level (e.g., site)."
         ::= { mallocScopeNameEntry 2 }

mallocScopeNameDefault OBJECT-TYPE
     SYNTAX   TruthValue
     MAX-ACCESS read-create
     STATUS   current
     DESCRIPTION
                 "If true, indicates a preference that the name in the
                 associated language should be used by applications if no
                 name is available in a desired language."
     DEFVAL   { false }
         ::= { mallocScopeNameEntry 3 }

mallocScopeNameStatus OBJECT-TYPE
     SYNTAX   RowStatus
     MAX-ACCESS read-create
     STATUS   current
     DESCRIPTION
                 "The status of this row, by which new entries may be
                 created, or old entries deleted from this table. If write
                 access is supported, the other writable objects in this
                 table may be modified even while the status is 'active'."
         ::= { mallocScopeNameEntry 4 }

mallocScopeNameStorage OBJECT-TYPE
     SYNTAX   StorageType
     MAX-ACCESS read-create
     STATUS   current

```
    DESCRIPTION
            "The storage type for this conceptual row.  Conceptual rows
            having the value 'permanent' need not allow write-access to
            any columnar objects in the row."
    DEFVAL      { nonVolatile }
    ::= { mallocScopeNameEntry 5 }

--
-- the Allocation Range Table
--
mallocAllocRangeTable OBJECT-TYPE
    SYNTAX      SEQUENCE OF MallocAllocRangeEntry
    MAX-ACCESS not-accessible
    STATUS      current
    DESCRIPTION
            "The (conceptual) table containing information on subranges
            of addresses from which the device may allocate addresses,
            if it is a MAAS.  If the device is a Prefix Coordinator, any
            ranges which the device is advertising to MAAS's will be in
            this table.  Note that the device may be both a MAAS and a
            Prefix Coordinator.

            Address ranges for different rows must be disjoint, and must
            be contained with the address range of the corresponding row
            of the mallocScopeTable.

            Deleting an allocation range has the side effect of deleting
            any entries within that range from the mallocAddressTable."
    ::= { malloc 4 }

mallocAllocRangeEntry OBJECT-TYPE
    SYNTAX      MallocAllocRangeEntry
    MAX-ACCESS not-accessible
    STATUS      current
    DESCRIPTION
            "An entry (conceptual row) containing the information on a
            particular allocation range."
    INDEX       { mallocScopeAddressType, mallocScopeFirstAddress,
                  mallocAllocRangeFirstAddress }
    ::= { mallocAllocRangeTable 1 }

MallocAllocRangeEntry ::= SEQUENCE {
    mallocAllocRangeFirstAddress        InetAddress,
    mallocAllocRangeLastAddress         InetAddress,
    mallocAllocRangeStatus              RowStatus,
    mallocAllocRangeSource              IANAmallocRangeSource,
    mallocAllocRangeLifetime            Unsigned32,
    mallocAllocRangeMaxLeaseAddrs       Unsigned32,
```

        mallocAllocRangeMaxLeaseTime   Unsigned32,
        mallocAllocRangeNumAllocatedAddrs   Gauge32,
        mallocAllocRangeNumOfferedAddrs   Gauge32,
        mallocAllocRangeNumWaitingAddrs   Gauge32,
        mallocAllocRangeNumTryingAddrs   Gauge32,
        mallocAllocRangeAdvertisable   TruthValue,
        mallocAllocRangeTotalAllocatedAddrs Gauge32,
        mallocAllocRangeTotalRequestedAddrs Gauge32,
        mallocAllocRangeStorage   StorageType
    }

    mallocAllocRangeFirstAddress OBJECT-TYPE
        SYNTAX   InetAddress (SIZE(0..20))
        MAX-ACCESS not-accessible
        STATUS   current
        DESCRIPTION
                "The first address in the allocation range. The type of
                this address is determined by the value of the
                mallocScopeAddressType object."
        ::= { mallocAllocRangeEntry 1 }

    mallocAllocRangeLastAddress OBJECT-TYPE
        SYNTAX   InetAddress (SIZE(0..20))
        MAX-ACCESS read-create
        STATUS   current
        DESCRIPTION
                "The last address in the allocation range. The type of this
                address is determined by the value of the
                mallocScopeAddressType object."
        ::= { mallocAllocRangeEntry 2 }

    mallocAllocRangeStatus OBJECT-TYPE
        SYNTAX   RowStatus
        MAX-ACCESS read-create
        STATUS   current
        DESCRIPTION
                "The status of this row, by which new entries may be
                created, or old entries deleted from this table. If write
                access is supported, the other writable objects in this
                table may be modified even while the status is 'active'."
        ::= { mallocAllocRangeEntry 3 }

    mallocAllocRangeSource OBJECT-TYPE
        SYNTAX   IANAmallocRangeSource
        MAX-ACCESS read-only
        STATUS   current
        DESCRIPTION
                "The means by which this entry was learned."

         ::= { mallocAllocRangeEntry 4 }

mallocAllocRangeLifetime OBJECT-TYPE
    SYNTAX   Unsigned32
    UNITS   "seconds"
    MAX-ACCESS read-create
    STATUS   current
    DESCRIPTION
            "The number of seconds remaining in the lifetime of the
            (sub)range out of which addresses are being allocated. A
            value of 0 indicates that the range is not subject to
            aging."
    DEFVAL   { 0 }
    ::= { mallocAllocRangeEntry 5 }

mallocAllocRangeMaxLeaseAddrs OBJECT-TYPE
    SYNTAX   Unsigned32
    MAX-ACCESS read-create
    STATUS   current
    DESCRIPTION
            "The maximum number of addresses which the server is willing
            to grant for each future request in this range. A value of
            0 means that no specific limit is enforced, as long as the
            server has valid addresses to allocate."
    DEFVAL { 0 }
    ::= { mallocAllocRangeEntry 6 }

mallocAllocRangeMaxLeaseTime OBJECT-TYPE
    SYNTAX   Unsigned32
    UNITS   "seconds"
    MAX-ACCESS read-create
    STATUS   current
    DESCRIPTION
            "The maximum lifetime which the server will grant for future
            requests in this range. A value of 0 means that no
            additional limit is enforced beyond that of
            mallocAllocRangeLifetime."
    DEFVAL { 0 }
    ::= { mallocAllocRangeEntry 7 }

mallocAllocRangeNumAllocatedAddrs OBJECT-TYPE
    SYNTAX   Gauge32
    MAX-ACCESS read-only
    STATUS   current
    DESCRIPTION
            "The number of addresses in the range which have been
            allocated. This value can be used to determine the current
            address space utilization within the scoped range. This

           should match the total number of addresses for this scope
           covered by entries in the mallocAddressTable."
    ::= { mallocAllocRangeEntry 8 }

mallocAllocRangeNumOfferedAddrs OBJECT-TYPE
    SYNTAX   Gauge32
    MAX-ACCESS read-only
    STATUS   current
    DESCRIPTION
           "The number of addresses in the range which have been
           offered. This number should match the sum of
           mallocRequestNumAddrs for all entries in the
           mallocRequestTable in the offered state. Together with
           mallocAllocRangeNumAllocatedAddrs and
           mallocAllocRangeNumTryingAddrs, this can be used to
           determine the address space utilization within the scoped
           range in the immediate future."
    ::= { mallocAllocRangeEntry 9 }

mallocAllocRangeNumWaitingAddrs OBJECT-TYPE
    SYNTAX   Gauge32
    MAX-ACCESS read-only
    STATUS   current
    DESCRIPTION
           "The number of addresses in the range which have been
           requested, but whose state is waiting, while the server
           attempts to acquire more address space."
    ::= { mallocAllocRangeEntry 10 }

mallocAllocRangeNumTryingAddrs OBJECT-TYPE
    SYNTAX   Gauge32
    MAX-ACCESS read-only
    STATUS   current
    DESCRIPTION
           "The number of addresses in the scope covered by entries in
           the mallocRequestTable in the trying state."
    ::= { mallocAllocRangeEntry 11 }

mallocAllocRangeAdvertisable OBJECT-TYPE
    SYNTAX   TruthValue
    MAX-ACCESS read-create
    STATUS   current
    DESCRIPTION
           "The value of this object is true if the range is eligible
           to be advertised to other MAASs. When the row is first
           created, the default value of this object is true if the
           scope is divisible, and is false otherwise."
    ::= { mallocAllocRangeEntry 12 }

mallocAllocRangeTotalAllocatedAddrs OBJECT-TYPE
    SYNTAX   Gauge32
    MAX-ACCESS read-only
    STATUS   current
    DESCRIPTION
            "The approximate number of addresses in the range which have
            been allocated by any MAAS, as determined by a Prefix
            Coordinator. This object need only be present if
            mallocAllocRangeAdvertisable is true. If the number is
            unknown, a value of 0 may be reported."
    ::= { mallocAllocRangeEntry 13 }

mallocAllocRangeTotalRequestedAddrs OBJECT-TYPE
    SYNTAX   Gauge32
    MAX-ACCESS read-only
    STATUS   current
    DESCRIPTION
            "The approximate number of addresses in the range for which
            there is potential demand among MAASs, as determined by a
            Prefix Coordinator. This object need only be present if
            mallocAllocRangeAdvertisable is true. If the number is
            unknown, a value of 0 may be reported."
    ::= { mallocAllocRangeEntry 14 }

mallocAllocRangeStorage OBJECT-TYPE
    SYNTAX   StorageType
    MAX-ACCESS read-create
    STATUS   current
    DESCRIPTION
            "The storage type for this conceptual row. Conceptual rows
            having the value 'permanent' need not allow write-access to
            any columnar objects in the row."
    DEFVAL   { nonVolatile }
    ::= { mallocAllocRangeEntry 15 }

--
-- the Request Table
--

mallocRequestTable OBJECT-TYPE
    SYNTAX   SEQUENCE OF MallocRequestEntry
    MAX-ACCESS not-accessible
    STATUS   current
    DESCRIPTION
            "The (conceptual) table containing information on allocation
            requests, whether allocated or in progress. This table may
            also be used to determine which clients are responsible for
            high address space utilization within a given scope.

            Entries in this table reflect requests dynamically received
            by an address allocation protocol."
     ::= { malloc 5 }

mallocRequestEntry OBJECT-TYPE
     SYNTAX   MallocRequestEntry
     MAX-ACCESS not-accessible
     STATUS   current
     DESCRIPTION
            "An entry (conceptual row) containing the information on a
            particular allocation request."
     INDEX   { mallocRequestId }
     ::= { mallocRequestTable 1 }

MallocRequestEntry ::= SEQUENCE {
     mallocRequestId   Unsigned32,
     mallocRequestScopeAddressType   InetAddressType,
     mallocRequestScopeFirstAddress   InetAddress,
     mallocRequestStartTime   Unsigned32,
     mallocRequestEndTime   Unsigned32,
     mallocRequestNumAddrs   Unsigned32,
     mallocRequestState   INTEGER,
     mallocRequestClientAddressType   InetAddressType,
     mallocRequestClientAddress   InetAddress,
     mallocRequestServerAddressType   InetAddressType,
     mallocRequestServerAddress   InetAddress,
     mallocRequestLeaseIdentifier   OCTET STRING
}

mallocRequestId OBJECT-TYPE
     SYNTAX   Unsigned32 (1..4294967295)
     MAX-ACCESS not-accessible
     STATUS   current
     DESCRIPTION
            "An arbitrary value identifying this row."
     ::= { mallocRequestEntry 1 }

mallocRequestScopeAddressType OBJECT-TYPE
     SYNTAX   InetAddressType
     MAX-ACCESS read-only
     STATUS   current
     DESCRIPTION
            "The type of the first address of the scope to which the
            request applies. Legal values correspond to the subset of
            address families for which multicast address allocation is
            supported."
     ::= { mallocRequestEntry 2 }

mallocRequestScopeFirstAddress OBJECT-TYPE
    SYNTAX   InetAddress
    MAX-ACCESS read-only
    STATUS   current
    DESCRIPTION
            "The first address of the scope to which the request
            applies. This must match mallocScopeFirstAddress for some
            row in the mallocScopeTable. The type of this address is
            determined by the value of the mallocRequestScopeAddressType
            object."
    ::= { mallocRequestEntry 3 }

mallocRequestStartTime OBJECT-TYPE
    SYNTAX   Unsigned32
    UNITS   "seconds"
    MAX-ACCESS read-only
    STATUS   current
    DESCRIPTION
            "The number of seconds remaining before the start time of
            the request. A value of 0 means that the allocation is
            currently in effect."
    ::= { mallocRequestEntry 4 }

mallocRequestEndTime OBJECT-TYPE
    SYNTAX   Unsigned32
    UNITS   "seconds"
    MAX-ACCESS read-only
    STATUS   current
    DESCRIPTION
            "The number of seconds remaining before the end time of the
            request."
    ::= { mallocRequestEntry 5 }

mallocRequestNumAddrs OBJECT-TYPE
    SYNTAX   Unsigned32
    MAX-ACCESS read-only
    STATUS   current
    DESCRIPTION
            "The number of addresses requested. If the addresses have
            been allocated, this number should match the total number of
            addresses for this request covered by entries in the
            mallocAddressTable."
    ::= { mallocRequestEntry 6 }

mallocRequestState OBJECT-TYPE
    SYNTAX   INTEGER {
                    allocated(1),
                    offered(2),   -- tentatively allocated

```
                        waiting(3),   -- waiting for more space
                        trying(4)     -- working on allocating
                   }
    MAX-ACCESS read-only
    STATUS     current
    DESCRIPTION
            "The state of the request.  A value of allocated(1)
            indicates that one or more entries for this request are
            present in the mallocAddressTable.  A value of offered(2)
            indicates that addresses have been offered to the client
            (e.g. via a MADCAP OFFER message), but the allocation has
            not been committed.  A value of waiting(3) indicates that
            the allocation is blocked while the server attempts to
            acquire more space from which it can allocate addresses.  A
            value of trying(4) means that no addresses have been offered
            to the client, but that an attempt to allocate is in
            progress."
    ::= { mallocRequestEntry 7 }

mallocRequestClientAddressType OBJECT-TYPE
    SYNTAX     InetAddressType
    MAX-ACCESS read-only
    STATUS     current
    DESCRIPTION
            "The type of the address of the client that (last) requested
            this allocation."
    ::= { mallocRequestEntry 8 }

mallocRequestClientAddress OBJECT-TYPE
    SYNTAX     InetAddress
    MAX-ACCESS read-only
    STATUS     current
    DESCRIPTION
            "The address of the client that (last) requested this
            allocation.  The type of this address is determined by the
            value of the mallocRequestClientAddressType object."
    ::= { mallocRequestEntry 9 }

mallocRequestServerAddressType OBJECT-TYPE
    SYNTAX     InetAddressType
    MAX-ACCESS read-only
    STATUS     current
    DESCRIPTION
            "The type of the address of the server to which the request
            was (last) sent."
    ::= { mallocRequestEntry 10 }
```

```
mallocRequestServerAddress OBJECT-TYPE
    SYNTAX      InetAddress
    MAX-ACCESS read-only
    STATUS      current
    DESCRIPTION
            "The address of the server to which the request was (last)
            sent.  The type of this address is determined by the value
            of the mallocRequestServerAddressType object."
    ::= { mallocRequestEntry 11 }

mallocRequestLeaseIdentifier OBJECT-TYPE
    SYNTAX      OCTET STRING (SIZE (0..255))
    MAX-ACCESS read-only
    STATUS      current
    DESCRIPTION
            "The Lease Identifier of this request.  If the allocation
            mechanism in use does not use Lease Identifiers, then the
            value is a 0-length string."
    ::= { mallocRequestEntry 12 }

--
-- the Address Table
--

mallocAddressTable OBJECT-TYPE
    SYNTAX      SEQUENCE OF MallocAddressEntry
    MAX-ACCESS not-accessible
    STATUS      current
    DESCRIPTION
            "The (conceptual) table containing information on blocks of
            allocated addresses.  This table may be used to map a given
            multicast group address to the associated request."
    ::= { malloc 6 }

mallocAddressEntry OBJECT-TYPE
    SYNTAX      MallocAddressEntry
    MAX-ACCESS not-accessible
    STATUS      current
    DESCRIPTION
            "An entry (conceptual row) containing the information on a
            particular block of allocated addresses.  The block of
            addresses covered by each entry in this table must fall
            within a range corresponding to an entry in the
            mallocAllocRangeTable."
    INDEX       { mallocAddressAddressType, mallocAddressFirstAddress }
    ::= { mallocAddressTable 1 }
```

```
MallocAddressEntry ::= SEQUENCE {
    mallocAddressAddressType              InetAddressType,
    mallocAddressFirstAddress             InetAddress,
    mallocAddressNumAddrs                 Unsigned32,
    mallocAddressRequestId                Unsigned32
}

mallocAddressAddressType OBJECT-TYPE
    SYNTAX      InetAddressType
    MAX-ACCESS not-accessible
    STATUS      current
    DESCRIPTION
            "The type of the first address in the allocated block.
            Legal values correspond to the subset of address families
            for which multicast address allocation is supported."
    ::= { mallocAddressEntry 1 }

mallocAddressFirstAddress OBJECT-TYPE
    SYNTAX      InetAddress (SIZE(0..20))
    MAX-ACCESS not-accessible
    STATUS      current
    DESCRIPTION
            "The first address in the allocated block.  The type of this
            address is determined by the value of the
            mallocAddressAddressType object."
    ::= { mallocAddressEntry 2 }

mallocAddressNumAddrs OBJECT-TYPE
    SYNTAX      Unsigned32
    MAX-ACCESS read-only
    STATUS      current
    DESCRIPTION
            "The number of addresses in the allocated block."
    ::= { mallocAddressEntry 3 }

mallocAddressRequestId OBJECT-TYPE
    SYNTAX      Unsigned32
    MAX-ACCESS read-only
    STATUS      current
    DESCRIPTION
            "The index of the request which caused this block of
            addresses to be allocated.  This value must match the value
            of mallocRequestId for some entry in the
            mallocRequestTable."
    ::= { mallocAddressEntry 4 }

--
-- MADCAP-specific objects
```

          --

          madcapConfig OBJECT-IDENTITY
              STATUS   current
              DESCRIPTION
                      "Group of objects that count various MADCAP events."
              ::= { madcap 1 }

          madcapConfigExtraAllocationTime OBJECT-TYPE
              SYNTAX   Unsigned32
              UNITS   "seconds"
              MAX-ACCESS read-write
              STATUS   current
              DESCRIPTION
                      "The amount of extra time on either side of a lease which
                      the MADCAP server allocates to allow for clock skew among
                      clients."
              ::= { madcapConfig 1 }

          madcapConfigNoResponseDelay OBJECT-TYPE
              SYNTAX   Unsigned32
              UNITS   "seconds"
              MAX-ACCESS read-write
              STATUS   current
              DESCRIPTION
                      "The amount of time the MADCAP client allows for receiving a
                      response from a MADCAP server."
              ::= { madcapConfig 2 }

          madcapConfigOfferHold OBJECT-TYPE
              SYNTAX   Unsigned32
              UNITS   "seconds"
              MAX-ACCESS read-write
              STATUS   current
              DESCRIPTION
                      "The amount of time the MADCAP server will reserve an
                      address for after sending an OFFER message in anticipation
                      of receiving a REQUEST message."
              ::= { madcapConfig 3 }

          madcapConfigResponseCacheInterval OBJECT-TYPE
              SYNTAX   Unsigned32 (0..300)
              UNITS   "seconds"
              MAX-ACCESS read-write
              STATUS   current
              DESCRIPTION
                      "The amount of time the MADCAP server uses to detect
                      duplicate messages."

```
     ::= { madcapConfig 4 }

madcapConfigClockSkewAllowance OBJECT-TYPE
     SYNTAX     Unsigned32
     UNITS      "seconds"
     MAX-ACCESS read-write
     STATUS     current
     DESCRIPTION
             "The clock skew threshold used by the MADCAP server to
             generate Excessive Clock Skew errors."
     ::= { madcapConfig 5 }

madcapCounters OBJECT-IDENTITY
     STATUS     current
     DESCRIPTION
             "A group of objects that count various MADCAP events."
     ::= { madcap 2 }

madcapTotalErrors OBJECT-TYPE
     SYNTAX     Counter32
     MAX-ACCESS read-only
     STATUS     current
     DESCRIPTION
             "The total number of transactions for which the MADCAP
             server has detected an error of any type, regardless of
             whether the server ignored the request or generated a NAK."
     ::= { madcapCounters 1 }

madcapRequestsDenied OBJECT-TYPE
     SYNTAX     Counter32
     MAX-ACCESS read-only
     STATUS     current
     DESCRIPTION
             "The number of valid requests for which the MADCAP server
             could not complete an allocation, regardless of whether NAKs
             were sent.  This corresponds to the Valid Request Could Not
             Be Completed error code in MADCAP."
     ::= { madcapCounters 2 }

madcapInvalidRequests OBJECT-TYPE
     SYNTAX     Counter32
     MAX-ACCESS read-only
     STATUS     current
     DESCRIPTION
             "The number of invalid requests received by the MADCAP
             server, regardless of whether NAKs were sent.  This
             corresponds to the Invalid Request error code in MADCAP."
     ::= { madcapCounters 3 }
```

madcapExcessiveClockSkews OBJECT-TYPE
    SYNTAX   Counter32
    MAX-ACCESS read-only
    STATUS   current
    DESCRIPTION
            "The number of requests received by the MADCAP server with
            an excessive clock skew, regardless of whether NAKs were
            sent. This corresponds to the Excessive Clock Skew error
            code in MADCAP."
    ::= { madcapCounters 4 }

madcapBadLeaseIds OBJECT-TYPE
    SYNTAX   Counter32
    MAX-ACCESS read-only
    STATUS   current
    DESCRIPTION
            "The number of requests received by the MADCAP server with
            an unrecognized Lease Identifier, regardless of whether NAKs
            were sent. This corresponds to the Lease Identifier Not
            Recognized error code in MADCAP."
    ::= { madcapCounters 5 }

madcapDiscovers OBJECT-TYPE
    SYNTAX   Counter32
    MAX-ACCESS read-only
    STATUS   current
    DESCRIPTION
            "The number of DISCOVER messages received by the MADCAP
            server."
    ::= { madcapCounters 6 }

madcapInforms OBJECT-TYPE
    SYNTAX   Counter32
    MAX-ACCESS read-only
    STATUS   current
    DESCRIPTION
            "The number of INFORM messages received by the MADCAP
            server."
    ::= { madcapCounters 7 }

madcapRequests OBJECT-TYPE
    SYNTAX   Counter32
    MAX-ACCESS read-only
    STATUS   current
    DESCRIPTION
            "The number of REQUEST messages received by the MADCAP
            server."
    ::= { madcapCounters 8 }

madcapRenews OBJECT-TYPE
    SYNTAX   Counter32
    MAX-ACCESS read-only
    STATUS   current
    DESCRIPTION
            "The number of RENEW messages received by the MADCAP
            server."
    ::= { madcapCounters 9 }

madcapReleases OBJECT-TYPE
    SYNTAX   Counter32
    MAX-ACCESS read-only
    STATUS   current
    DESCRIPTION
            "The number of RELEASE messages received by the MADCAP
            server."
    ::= { madcapCounters 10 }

-- conformance information

mallocConformance OBJECT IDENTIFIER ::= { mallocMIB 2 }
mallocCompliances OBJECT IDENTIFIER ::= { mallocConformance 1 }
mallocGroups   OBJECT IDENTIFIER ::= { mallocConformance 2 }

-- compliance statements

mallocServerReadOnlyCompliance MODULE-COMPLIANCE
    STATUS current
    DESCRIPTION
            "The compliance statement for multicast address allocation
            servers implementing the MALLOC MIB without support for
            read-create (i.e., in read-only mode). Such a server can
            then be monitored but can not be configured with this MIB."
    MODULE -- this module
    MANDATORY-GROUPS { mallocBasicGroup,
                       mallocServerGroup }

        OBJECT   mallocScopeLastAddress
        MIN-ACCESS   read-only
        DESCRIPTION
            "Write access is not required."

        OBJECT   mallocScopeHopLimit
        MIN-ACCESS   read-only
        DESCRIPTION
            "Write access is not required."

```
        OBJECT      mallocScopeStatus
        MIN-ACCESS  read-only
        DESCRIPTION
            "Write access is not required."

        OBJECT      mallocScopeDivisible
        MIN-ACCESS  read-only
        DESCRIPTION
            "Write access is not required."

        OBJECT      mallocScopeSSM
        MIN-ACCESS  read-only
        DESCRIPTION
            "Write access is not required."

        OBJECT      mallocScopeStorage
        MIN-ACCESS  read-only
        DESCRIPTION
            "Write access is not required."

        OBJECT      mallocScopeNameScopeName
        MIN-ACCESS  read-only
        DESCRIPTION
            "Write access is not required."

        OBJECT      mallocScopeNameDefault
        MIN-ACCESS  read-only
        DESCRIPTION
            "Write access is not required."

        OBJECT      mallocScopeNameStatus
        MIN-ACCESS  read-only
        DESCRIPTION
            "Write access is not required."

        OBJECT      mallocScopeNameStorage
        MIN-ACCESS  read-only
        DESCRIPTION
            "Write access is not required."

        OBJECT      mallocAllocRangeLastAddress
        MIN-ACCESS  read-only
        DESCRIPTION
            "Write access is not required."
```

```
     OBJECT       mallocAllocRangeStatus
     MIN-ACCESS   read-only
     DESCRIPTION
         "Write access is not required."

     OBJECT       mallocAllocRangeLifetime
     MIN-ACCESS   read-only
     DESCRIPTION
         "Write access is not required."

     OBJECT       mallocAllocRangeMaxLeaseAddrs
     MIN-ACCESS   read-only
     DESCRIPTION
         "Write access is not required."

     OBJECT       mallocAllocRangeMaxLeaseTime
     MIN-ACCESS   read-only
     DESCRIPTION
         "Write access is not required."

     OBJECT       mallocAllocRangeStorage
     MIN-ACCESS   read-only
     DESCRIPTION
         "Write access is not required."

  GROUP  madcapServerGroup
  DESCRIPTION
         "This group is mandatory for servers which implement the
         MADCAP client-server protocol."

     OBJECT       madcapConfigExtraAllocationTime
     MIN-ACCESS   read-only
     DESCRIPTION
         "Write access is not required."

     OBJECT       madcapConfigOfferHold
     MIN-ACCESS   read-only
     DESCRIPTION
         "Write access is not required."

     OBJECT       madcapConfigResponseCacheInterval
     MIN-ACCESS   read-only
     DESCRIPTION
         "Write access is not required."
```

         OBJECT   madcapConfigClockSkewAllowance
         MIN-ACCESS   read-only
         DESCRIPTION
             "Write access is not required."
    ::= { mallocCompliances 1 }

mallocClientReadOnlyCompliance MODULE-COMPLIANCE
     STATUS   current
     DESCRIPTION
             "The compliance statement for clients implementing the
             MALLOC MIB without support for read-create (i.e., in read-
             only mode). Such clients can then be monitored but can not
             be configured with this MIB."
     MODULE   -- this module
     MANDATORY-GROUPS { mallocBasicGroup,
                        mallocClientGroup }

     GROUP   mallocClientScopeGroup
     DESCRIPTION
             "This group is mandatory for clients which maintain a list
             of multicast scopes."

         OBJECT   mallocScopeLastAddress
         MIN-ACCESS   read-only
         DESCRIPTION
             "Write access is not required."

         OBJECT   mallocScopeHopLimit
         MIN-ACCESS   read-only
         DESCRIPTION
             "Write access is not required."

         OBJECT   mallocScopeStatus
         MIN-ACCESS   read-only
         DESCRIPTION
             "Write access is not required."

         OBJECT   mallocScopeServerAddressType
         MIN-ACCESS   read-only
         DESCRIPTION
             "Write access is not required."

         OBJECT   mallocScopeServerAddress
         MIN-ACCESS   read-only
         DESCRIPTION
             "Write access is not required."

          OBJECT   mallocScopeSSM
          MIN-ACCESS   read-only
          DESCRIPTION
              "Write access is not required."

          OBJECT   mallocScopeStorage
          MIN-ACCESS   read-only
          DESCRIPTION
              "Write access is not required."

      GROUP   madcapClientGroup
      DESCRIPTION
              "This group is mandatory for clients which implement the
              MADCAP client-server protocol."

          OBJECT   madcapConfigNoResponseDelay
          MIN-ACCESS   read-only
          DESCRIPTION
              "Write access is not required."
      ::= { mallocCompliances 2 }

   mallocPrefixCoordinatorReadOnlyCompliance MODULE-COMPLIANCE
      STATUS   current
      DESCRIPTION
              "The compliance statement for prefix coordinators
              implementing the MALLOC MIB without support for read-create
              (i.e., in read-only mode). Such devices can then be
              monitored but can not be configured with this MIB."
      MODULE   -- this module
      MANDATORY-GROUPS { mallocBasicGroup,
                         mallocPrefixCoordinatorGroup }

          OBJECT   mallocScopeLastAddress
          MIN-ACCESS   read-only
          DESCRIPTION
              "Write access is not required."

          OBJECT   mallocScopeDivisible
          MIN-ACCESS   read-only
          DESCRIPTION
              "Write access is not required."

          OBJECT   mallocAllocRangeLastAddress
          MIN-ACCESS   read-only
          DESCRIPTION
              "Write access is not required."

          OBJECT   mallocAllocRangeStatus
          MIN-ACCESS read-only
          DESCRIPTION
              "Write access is not required."

          OBJECT   mallocAllocRangeLifetime
          MIN-ACCESS read-only
          DESCRIPTION
              "Write access is not required."

          OBJECT   mallocAllocRangeAdvertisable
          MIN-ACCESS read-only
          DESCRIPTION
              "Write access is not required."

          OBJECT   mallocAllocRangeStorage
          MIN-ACCESS read-only
          DESCRIPTION
              "Write access is not required."
     ::= { mallocCompliances 3 }

 mallocServerFullCompliance MODULE-COMPLIANCE
     STATUS current
     DESCRIPTION
             "The compliance statement for multicast address allocation
             servers implementing the MALLOC MIB with support for read-
             create. Such servers can then be both monitored and
             configured with this MIB."
     MODULE -- this module
     MANDATORY-GROUPS { mallocBasicGroup,
                        mallocServerGroup }

     GROUP madcapServerGroup
     DESCRIPTION
             "This group is mandatory for servers which implement the
             MADCAP client-server protocol."
     ::= { mallocCompliances 4 }

 mallocClientFullCompliance MODULE-COMPLIANCE
     STATUS current
     DESCRIPTION
             "The compliance statement for hosts implementing the MALLOC
             MIB with support for read-create. Such clients can then be
             both monitored and configured with this MIB."
     MODULE -- this module
     MANDATORY-GROUPS { mallocBasicGroup,
                        mallocClientGroup }

        GROUP   mallocClientScopeGroup
        DESCRIPTION
                "This group is mandatory for clients which maintain a list
                of multicast scopes."

        GROUP   madcapClientGroup
        DESCRIPTION
                "This group is mandatory for clients which implement the
                MADCAP client-server protocol."
        ::= { mallocCompliances 5 }

mallocPrefixCoordinatorFullCompliance MODULE-COMPLIANCE
        STATUS   current
        DESCRIPTION
                "The compliance statement for prefix coordinators
                implementing the MALLOC MIB with support for read-create.
                Such devices can then be both monitored and configured with
                this MIB."
        MODULE   -- this module
        MANDATORY-GROUPS { mallocBasicGroup,
                           mallocPrefixCoordinatorGroup }
        ::= { mallocCompliances 6 }

-- units of conformance

mallocBasicGroup OBJECT-GROUP
        OBJECTS { mallocCapabilities, mallocRequestScopeAddressType,
                  mallocRequestScopeFirstAddress,
                  mallocRequestStartTime,
                  mallocRequestEndTime, mallocRequestNumAddrs,
                  mallocRequestState,
                  mallocAddressNumAddrs, mallocAddressRequestId
                }
        STATUS   current
        DESCRIPTION
                "The basic collection of objects providing management of IP
                multicast address allocation."
        ::= { mallocGroups 1 }

mallocServerGroup OBJECT-GROUP
        OBJECTS { mallocScopeLastAddress, mallocScopeHopLimit,
                  mallocScopeSSM, mallocScopeStatus, mallocScopeStorage,
                  mallocAllocRangeLastAddress, mallocAllocRangeLifetime,
                  mallocAllocRangeNumAllocatedAddrs,
                  mallocAllocRangeNumOfferedAddrs,
                  mallocAllocRangeNumWaitingAddrs,
                  mallocAllocRangeNumTryingAddrs,
                  mallocAllocRangeMaxLeaseAddrs,

```
                    mallocAllocRangeMaxLeaseTime, mallocAllocRangeSource,
                    mallocAllocRangeStatus, mallocAllocRangeStorage,
                    mallocScopeDivisible, mallocScopeSource,
                    mallocScopeNameScopeName, mallocScopeNameDefault,
                    mallocScopeNameStatus, mallocScopeNameStorage,
                    mallocRequestClientAddressType,
                    mallocRequestClientAddress
                   }
            STATUS  current
            DESCRIPTION
                "A collection of objects providing management of multicast
                address allocation in servers."
        ::= { mallocGroups 2 }

mallocClientGroup OBJECT-GROUP
            OBJECTS { mallocRequestServerAddressType,
                     mallocRequestServerAddress }
            STATUS  current
            DESCRIPTION
                "A collection of objects providing management of multicast
                address allocation in clients."
        ::= { mallocGroups 3 }

madcapServerGroup OBJECT-GROUP
            OBJECTS { madcapConfigClockSkewAllowance,
               madcapConfigExtraAllocationTime, madcapConfigOfferHold,
               madcapConfigResponseCacheInterval,
               madcapTotalErrors, madcapRequestsDenied,
               madcapInvalidRequests, madcapBadLeaseIds,
               madcapExcessiveClockSkews, madcapDiscovers,
               madcapInforms, madcapRequests,
               madcapRenews, madcapReleases }
            STATUS  current
            DESCRIPTION
                "A collection of objects providing management of MADCAP
                servers."
        ::= { mallocGroups 4 }

madcapClientGroup OBJECT-GROUP
        OBJECTS { mallocRequestLeaseIdentifier,
                  madcapConfigNoResponseDelay }
        STATUS  current
        DESCRIPTION
                "A collection of objects providing management of MADCAP
                clients."
        ::= { mallocGroups 5 }
```

```
mallocClientScopeGroup OBJECT-GROUP
    OBJECTS { mallocScopeLastAddress, mallocScopeHopLimit,
              mallocScopeStatus, mallocScopeStorage, mallocScopeSource,
              mallocScopeServerAddressType, mallocScopeServerAddress,
              mallocScopeSSM, mallocScopeNameScopeName,
              mallocScopeNameDefault, mallocScopeNameStatus,
              mallocScopeNameStorage }
    STATUS  current
    DESCRIPTION
            "A collection of objects providing management of multicast
            scope information in clients."
    ::= { mallocGroups 6 }

mallocPrefixCoordinatorGroup OBJECT-GROUP
    OBJECTS { mallocAllocRangeLastAddress, mallocAllocRangeLifetime,
              mallocAllocRangeStatus, mallocAllocRangeStorage,
              mallocAllocRangeSource,
              mallocAllocRangeTotalAllocatedAddrs,
              mallocAllocRangeTotalRequestedAddrs,
              mallocAllocRangeAdvertisable, mallocScopeLastAddress,
              mallocScopeDivisible, mallocScopeSource }
    STATUS  current
    DESCRIPTION
            "A collection of objects for managing Prefix Coordinators."
    ::= { mallocGroups 7 }
END
```

5. IANA Considerations

    The IANAscopeSource and IANAmallocRangeSource textual conventions are
    imported from the IANA-MALLOC-MIB. The purpose of defining these
    textual conventions in a separate MIB module is to allow additional
    values to be defined without having to issue a new version of this
    document. The Internet Assigned Numbers Authority (IANA) is
    responsible for the assignment of all Internet numbers, including
    various SNMP-related numbers; it will administer the values
    associated with these textual conventions.

    The rules for additions or changes to the IANA-MALLOC-MIB are
    outlined in the DESCRIPTION clause associated with its MODULE-
    IDENTITY statement.

    The current versions of the IANA-MALLOC-MIB can be accessed from the
    IANA home page at: "http://www.iana.org/".

6. Security Considerations

   There are a number of management objects defined in this MIB module
   with a MAX-ACCESS clause of read-write and/or read-create. Such
   objects may be considered sensitive or vulnerable in some network
   environments. The support for SET operations in a non-secure
   environment without proper protection can have a negative effect on
   network operations. These are the tables and objects and their
   sensitivity/vulnerability:

   mallocScopeTable,mallocAllocRangeTable:
      Unauthorized modifications to these tables can result in denial of
      service by not being able to allocate and use multicast addresses,
      allocating too many addresses, allocating addresses that other
      organizations are already using, or causing applications to use a
      hop limit that results in extra bandwidth usage.

   mallocScopeNameTable:
      Unauthorized modifications to this table can result in incorrect
      or misleading scope names being presented to users, resulting in
      potentially using the wrong scope for application data.

   madcapConfigExtraAllocationTime,madcapConfigOfferHold:
      Unauthorized modifications to these objects can result in
      reservations lasting too long, potentially resulting in denial of
      service if allocation ranges are small.

   madcapConfigNoResponseDelay:
      Unauthorized modifications can result in a client not being able
      to allocate multicast addresses.

   Some of the readable objects in this MIB module (i.e., objects with a
   MAX-ACCESS other than not-accessible) may be considered sensitive or
   vulnerable in some network environments. It is thus important to
   control GET and/or NOTIFY access to these objects and possibly to
   encrypt the values of these objects when sending them over the
   network via SNMP. These are the tables and objects and their
   sensitivity/vulnerability:

   mallocRequestLeaseIdentifier:
      If address allocation servers are configured to allow renewal or
      release purely on the basis of knowledge of the Lease Identifier,
      then unauthorized read access to mallocRequestLeaseIdentifier can
      be used in a denial-of-service attack.

   SNMP versions prior to SNMPv3 did not include adequate security.
   Even if the network itself is secure (for example by using IPSec),
   there is no control as to who on the secure network is allowed to

   access and GET/SET (read/change/create/delete) the objects in this
   MIB module.

   It is RECOMMENDED that implementers consider the security features as
   provided by the SNMPv3 framework (see [RFC3410], section 8),
   including full support for the SNMPv3 cryptographic mechanisms (for
   authentication and privacy).

   Further, deployment of SNMP versions prior to SNMPv3 is NOT
   RECOMMENDED. Instead, it is RECOMMENDED to deploy SNMPv3 and to
   enable cryptographic security. It is then a customer/operator
   responsibility to ensure that the SNMP entity giving access to an
   instance of this MIB module is properly configured for only those
   principals (users) with legitimate rights to have access to GET or
   SET (change/create/delete) objects.

7. Acknowledgements

   This MIB module was updated based on feedback from the IETF's
   Multicast Address Allocation (MALLOC) Working Group. Lars Viklund,
   Frank Strauss, and Mike Heard provided helpful feedback on this
   document.

8. Intellectual Property Statement

   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 implementors 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.

9. References

9.1. Normative References

   [ARCH]   Thaler, D., Handley, M. and D. Estrin, "The Internet
              Multicast Address Allocation Architecture", RFC 2908,
              September 2000.

   [MADCAP]   Hanna, S., Patel, B. and M. Shah, "Multicast Address
              Dynamic Client Allocation Protocol (MADCAP)", RFC 2730,
              December 1999.

   [RFC2578] McCloghrie, K., Perkins, D., Schoenwaelder, J., Case, J.,
              Rose, M. and S. Waldbusser, "Structure of Management
              Information Version 2 (SMIv2)", STD 58, RFC 2578, April
              1999.

   [RFC2579] McCloghrie, K., Perkins, D., Schoenwaelder, J., Case, J.,
              Rose, M. and S. Waldbusser, "Textual Conventions for
              SMIv2", STD 58, RFC 2579, April 1999.

   [RFC2580] McCloghrie, K., Perkins, D., Schoenwaelder, J., Case, J.,
              Rose, M. and S. Waldbusser, "Conformance Statements for
              SMIv2", STD 58, RFC 2580, April 1999.

   [RFC2932] McCloghrie, K., Farinacci, D. and D. Thaler, "IPv4
              Multicast Routing MIB", RFC 2932, October 2000.

   [RFC3291] Daniele, M., Haberman, B., Routhier, S. and J.
              Schoenwaelder, "Textual Conventions for Internet Network
              Addresses", RFC 3291, May 2002.

   [RFC3411] Harrington, D., Presuhn, R. and B. Wijnen, "An Architecture
              for Describing Simple Network Management Protocol (SNMP)
              Management Frameworks", STD 62, RFC 3411, December 2002.

9.2. Informative References

   [IPSEC]   Kent, S. and R. Atkinson, "Security Architecture for the
              Internet Protocol", RFC 2401, November 1998.

   [MZAP]   Handley, M., Thaler, D. and R. Kermode, "Multicast-Scope
              Zone Announcement Protocol (MZAP)", RFC 2776, February
              2000.

   [RFC3410] Case, J., Mundy, R., Partain, D. and B. Stewart,
              "Introduction and Applicability Statements for Internet
              Standard Management Framework", RFC 3410, December 2002.

10. Author's Address

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

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

11. Full Copyright Statement

   Copyright (C) The Internet Society (2003). All Rights Reserved.

Acknowledgement