MBONED Working Group
INTERNET-DRAFT
Expires: April 2006

Bill Fenner
AT&T Research
Dave Thaler
Microsoft
October 2005

Multicast Source Discovery protocol MIB
<draft-ietf-mboned-msdp-mib-01.txt>

Status of this Document

By submitting this Internet-Draft, each author represents that any applicable patent or other IPR claims of which he or she is aware have been or will be disclosed, and any of which he or she becomes aware will be disclosed, in accordance with Section 6 of BCP 79.

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.

This document is a product of the MBONED Working Group. Comments should be addressed to the authors, or the mailing list at mboned@lists.uoregon.edu.

Abstract

This memo defines an experimental 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 Source Discovery Protocol (MSDP) (RFC 3618) speakers.

Table of Contents

1. The Internet-Standard Management Framework. 2
2. Revision History. 2
3. Overview. 6
4. Definitions 6
5. Security Considerations 31
6. IANA Considerations 32
7. Acknowledgements. 32
8. Authors' Addresses. 32
9. Normative References. 33
9.1. Informative References 33
10. Full Copyright Statement 34

1. 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** **[7]**.

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 [4], STD 58, RFC 2579 [5] and STD 58, RFC 2580 [6].

2. Revision History

A record of changes which will be removed before publication.

20 October 2005

Added explicit reasoning for IPv4-only-osity and for the unorganized organization.

Updated Copyright and IPR statements.

Updated Security Considerations, per RFC4181.

Added IANA Considerations, per RFC4181.

Added REVISION and WG mailing list to MODULE-IDENTITY, per RFC4181.

Changed some TimeTicks to TimeStamp, on RFC4181's advice.

Added advice on non-volatile storage, row creation and column modification to tables with RowStatus columns, per RFC4181.

Added msdpReadOnlyCompliance to permit implementations that don't implement writing.

Clarified that msdpSAStatePeriod was an accidental duplication of msdpCacheLifetime.

Described the epochs for TimeTicks objects, per RFC4181. Add a note that msdpCacheLifetime would really be better as a TimeInterval, but is TimeTicks for hysterical raisins.

11 July 2004

Renamed to draft-ietf-mboned-msdp-mib-00.

Fixed spec references and defaults for msdpPeerHoldTimeConfigured, msdpPeerKeepAliveConfigured and msdpPeerConnectRetryInterval, as pointed out by Ketan Talaulikar.

Deprecated all objects related to SA-Requests and notifications, since RFC 3618 doesn't have either one. As pointed out by Ketan Talaulikar.

Clarified that msdpSACachePeerLearnedFrom should be 0.0.0.0 on the originator. From Mike Davison.

Removed msdpSAStatePeriod. I couldn't figure out what it's for; at best it should be SG State Period, but that's already msdpCacheLifetime. From Mike Davison.

17 October 2003

Undid most of the hard work since draft -03, which is the only implementation I was able to find by querying the MSDP mailing list.

29 May 2003

Republished with no changes. How did it get to be almost 2 years?

18 July 2001

Since the INET-ADDRESS-MIB relaxed restrictions on InetAddressType, remove msdpPeerLocalAddressType, rename msdpSACacheGroupAddrType to msdpCacheAddrType, remove msdpCacheSourceAddrType, msdpSACacheOriginRPType, msdpSACachePeerLearnedFromType,

msdpSACacheRPFPeerType.

Updated the DESCRIPTION of msdpRequestsTable to describe exactly how it is used.

Added msdpPeerDiscontinuityTime.

Changed msdpPeerFsmEstablishedTime to a TimeStamp instead of a counting number of seconds.

Changed msdpPeerInMessageElapsedTime to msdpPeerInMessageTime and changed it to a TimeStamp.

Added msdpMeshGroupTable.

Updated conformance information.

1 March 2001

Added msdpPeerIfIndex.

Converted all IpAddress items to InetAddressType/InetAddress pairs. This bigtime violates RFC2578's rules about MIB evolution, so take extra care when implementing this change.

Added msdpRequestsPriority, in order to allow configuration of multiple peers to whom Requests will be sent. Note that this violates RFC2578's rules about MIB evolution, so take extra care when implementing this change.

Removed DEFVAL on scalars, since it should only be needed for table row creation.

Removed msdpPeerSAAdvPeriod, since the spec changed to say its value MUST be 60.

Added none(0) to msdpPeerEncapsulationType enumeration (is this OK? should it be 4?)

Removed msdpPeerEncapsulationState since the encapsulation "negotiation" was removed from the spec.

Added msdpRPAddress to specify the RP address to use when sourcing SA messages.

Added msdpSACacheSourcePrefix to msdpSACacheTable, and added it to the INDEX. Note that this violates RFC2578's rules about MIB evolution, so take extra care when implementing this change.

Completely renumbered the MIB, removing the extra level of msdpMIBobjects and creating an msdpScalars group to contain all scalars. Note that this violates RFC2578's rules about MIB evolution, so take extra care when implementing this change.

16 December 1999

Added msdpSAHoldDownPeriod, msdpPeerEncapsulationState, msdpPeerEncapsulationType, msdpPeerConnectionAttempts, msdpPeerInNotifications, msdpPeerOutNotifications, and msdpLastError

Removed msdpPeerConfigMethod, since this has disappeared from the spec.

Renamed the states in msdpPeerState to go with the state machine in the spec.

Added msdpPeerLocalPort and msdpPeerRemotePort in order to provide full information about the TCP connection in use. I'd like to reorder the Peer Table but that can wait until the MIB gets published as an RFC in order to only change things like that once.

Added msdpSACacheOriginRP as an INDEX to the msdpSACacheTable. Note that this violates RFC2578's rules about MIB evolution, so take extra care when implementing this change.

25 June 1999

Renamed to DRAFT-MSDP-MIB. It will be renamed back to MSDP-MIB when it gets renumbered under mib-2, in order to avoid module naming problems.

Turned msdpSendRequestsTo into a table in order to handle administratively scoped groups with different RP's.

27 May 1999

Added IANA-assigned experimental OID

Added msdpSendRequestsTo and msdpPeerProcessRequestsFrom to configure MSDP SA-Request/Response processing.

Added msdpPeerDataTtl to allow TTL scoping of data packets forwarded across MSDP peerings.

Renumbered msdpSACacheInDataPackets and further items in msdpSACacheTable, to eliminate duplicate OIDs

20 April 1999

initial version.

3. Overview

This MIB module contains four scalars and four tables, one deprecated. The tables are:

- the deprecated Requests Table, containing the longest-match table used to determine the peer to send SA-Requests to for a given group. This table is deprecated because Requests were removed from MSDP before it became an RFC;

- the Peer Table, containing information on the system's peers;

- the Source-Active Cache Table, containing the SA cache entries; and

- the Mesh Group Table, containing the list of MSDP mesh groups to which this system belongs.

This MIB module uses the IpAddress SYNTAX, making it only suitable for IPv4 systems. Although the desired direction for MIBs is to use InetAddressType/InetAddress pairs to allow both IPv4 and IPv6 (and future formats as well), the MSDP protocol itself is IPv4-only, and the MSDP working group made an explicit decision to not create an IPv6 version of the protocol.

This MIB module is somewhat disorganized, with scalars before and after tables, holes in the OID space, tables with the RowStatus in the middle, and so on. This is because objects were added and removed as necessary as the MSDP protocol evolved, and the plan was to renumber the whole MIB when moving to the standard mib-2 tree. The MSDP Working Group then changed direction, publishing the MSDP protcol as Experimental. Since there were existing implementations using the strange object order under the experimental OID, the WG decided not to renumber the MIB and to publish it as experimental, keeping the experimental OID.

4. Definitions

```
--
--
DRAFT-MSDP-MIB DEFINITIONS ::= BEGIN

IMPORTS
    MODULE-IDENTITY, OBJECT-TYPE, NOTIFICATION-TYPE,
    experimental, Counter32, Gauge32, TimeTicks, Integer32,
```

```
    IpAddress
        FROM SNMPv2-SMI
    RowStatus, TruthValue, TimeStamp, DisplayString
        FROM SNMPv2-TC
    MODULE-COMPLIANCE, OBJECT-GROUP, NOTIFICATION-GROUP
        FROM SNMPv2-CONF;

msdpMIB MODULE-IDENTITY
    LAST-UPDATED "200510210000Z"
    ORGANIZATION "IETF MBONED Working Group"
    CONTACT-INFO
           "Bill Fenner
            75 Willow Road
            Menlo Park, CA  94025
            Phone: +1 650 867 6073
            E-mail: fenner@research.att.com

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

            MBONED Working Group: mboned@lists.uoregon.edu"
    DESCRIPTION
           "An experimental MIB module for MSDP Management and
            Monitoring.

            Copyright (C) The Internet Society 2005.  This version of
            this MIB module is part of RFC XXXX; see the RFC itself for
            full legal notices."
    REVISION "200510210000Z"
    DESCRIPTION
           "Initial version, published as RFC XXXX."
    ::= { experimental 92 }
-- RFC Ed.: replace XXXX with actual RFC number & remove this note

msdpMIBobjects OBJECT IDENTIFIER ::= { msdpMIB 1 }

msdp           OBJECT IDENTIFIER ::= { msdpMIBobjects 1 }


msdpEnabled OBJECT-TYPE
    SYNTAX     TruthValue
    MAX-ACCESS read-write
    STATUS     current
    DESCRIPTION
           "The state of MSDP on this MSDP speaker - globally enabled or
```

```
            disabled.

            Changes to this object should be stored to non-volatile
            memory."
    ::= { msdp 1 }

msdpCacheLifetime OBJECT-TYPE
    SYNTAX     TimeTicks
    MAX-ACCESS read-write
    STATUS     current
    DESCRIPTION
           "The lifetime given to SA cache entries when created or
            refreshed.  This is the [SG-State-Period] in the MSDP spec.
            A value of 0 means no SA caching is done by this MSDP
            speaker.

            Changes to this object should be stored to non-volatile
            memory.

            This object does not measure time per se; instead, it is the
            delta from the time at which an SA message is received at
            which it should be expired if not refreshed.  (i.e., it is
            the value of msdpSACacheExpiryTime immediately after
            receiving an SA message applying to that row.)  As such,
            TimeInterval would be a more appropriate SYNTAX; it remains
            TimeTicks for backwards compatability."
    REFERENCE "RFC 3618 section 5.3"
    ::= { msdp 2 }

msdpNumSACacheEntries OBJECT-TYPE
    SYNTAX     Gauge32
    MAX-ACCESS read-only
    STATUS     current
    DESCRIPTION
           "The total number of entries in the SA Cache table."
    ::= { msdp 3 }

--
-- The spec doesn't define SA-Hold-Down-Period any more.
-- msdpSAHoldDownPeriod OBJECT-TYPE
--     ::= { msdp 9 }

-- This object was introduced in error, with a similar definition
-- to msdpCacheLifetime.
-- msdpSAStatePeriod OBJECT-TYPE
--     ::= { msdp 10 }
```

```
msdpRPAddress OBJECT-TYPE
    SYNTAX     IpAddress
    MAX-ACCESS read-write
    STATUS     current
    DESCRIPTION
           "The RP address used when sourcing MSDP SA messages.  May be
            0.0.0.0 on non-RP's.

            Changes to this object should be stored to non-volatile
            memory."
    ::= { msdp 11 }

--
-- The MSDP Requests table
-- SA Requests were removed from the MSDP spec, so this entire table
-- is deprecated.

msdpRequestsTable OBJECT-TYPE
    SYNTAX     SEQUENCE OF MsdpRequestsEntry
    MAX-ACCESS not-accessible
    STATUS     deprecated
    DESCRIPTION
           "The (conceptual) table listing group ranges and MSDP peers
            used when deciding where to send an SA Request message when
            required.  If SA Requests are not enabled, this table may be
            empty.

            In order to choose a peer to whom to send an SA Request for
            a given group G, the subset of entries in this table whose
            (msdpRequestsPeerType, msdpRequestsPeer) tuple represents a
            peer whose msdpPeerState is established are examined.  The
            set is further reduced by examining only those entries for
            which msdpPeerRequestsGroupAddressType equals the address
            type of G, and the entries with the highest value of
            msdpRequestsGroupPrefix are considered, where the group G
            falls within the range described by the combination of
            msdpRequestsGroup and msdpRequestsGroupPrefix.  (This
            sequence is commonly known as a 'longest-match' lookup.)

            Finally, if multiple entries remain, the entry with the
            lowest value of msdpRequestsPriority is chosen.  The SA
            Request message is sent to the peer described by this row."
    ::= { msdp 4 }

msdpRequestsEntry OBJECT-TYPE
    SYNTAX     MsdpRequestsEntry
    MAX-ACCESS not-accessible
    STATUS     deprecated
```

```
    DESCRIPTION
           "An entry (conceptual row) representing a group range used
            when deciding where to send an SA Request message."
    INDEX { msdpRequestsGroupAddress, msdpRequestsGroupMask }
    ::= { msdpRequestsTable 1 }

MsdpRequestsEntry ::= SEQUENCE {
        msdpRequestsGroupAddress  IpAddress,
        msdpRequestsGroupMask     IpAddress,
        msdpRequestsPeer          IpAddress,
        msdpRequestsStatus        RowStatus
    }

msdpRequestsGroupAddress OBJECT-TYPE
    SYNTAX     IpAddress
    MAX-ACCESS not-accessible
    STATUS     deprecated
    DESCRIPTION
           "The group address that, when combined with the mask in this
            entry, represents the group range to which this row
            applies."
    ::= { msdpRequestsEntry 1 }

msdpRequestsGroupMask OBJECT-TYPE
    SYNTAX     IpAddress
    MAX-ACCESS not-accessible
    STATUS     deprecated
    DESCRIPTION
           "The mask that, when combined with the group address in this
            entry, represents the group range to which this row
            applies."
    ::= { msdpRequestsEntry 2 }

msdpRequestsPeer OBJECT-TYPE
    SYNTAX     IpAddress
    MAX-ACCESS read-create
    STATUS     deprecated
    DESCRIPTION
           "The peer to which MSDP SA Requests for groups matching this
            entry's group range will be sent.  This object combined with
            msdpRequestsPeerType must match the INDEX of a row in the
            msdpPeerTable, and to be considered, this peer's
            msdpPeerState must be established."
    ::= { msdpRequestsEntry 3 }

msdpRequestsStatus OBJECT-TYPE
    SYNTAX     RowStatus
    MAX-ACCESS read-create
```

```
    STATUS     deprecated
    DESCRIPTION
           "The status of this row, by which new rows may be added to
            the table or old rows may be deleted."
    ::= { msdpRequestsEntry 4 }


--
-- The MSDP Peer table
--

msdpPeerTable OBJECT-TYPE
    SYNTAX     SEQUENCE OF MsdpPeerEntry
    MAX-ACCESS not-accessible
    STATUS     current
    DESCRIPTION
           "The (conceptual) table listing the MSDP speaker's peers."
    ::= { msdp 5 }

msdpPeerEntry OBJECT-TYPE
    SYNTAX     MsdpPeerEntry
    MAX-ACCESS not-accessible
    STATUS     current
    DESCRIPTION
           "An entry (conceptual row) representing an MSDP peer.

            If row creation is supported, dynamically added rows are
            added to the system's stable configuration (corresponding to
            a StorageType value of nonVolatile).  "
    INDEX      { msdpPeerRemoteAddress }
    ::= { msdpPeerTable 1 }

MsdpPeerEntry ::= SEQUENCE {
        msdpPeerRemoteAddress             IpAddress,
        msdpPeerState                     INTEGER,
        msdpPeerRPFFailures               Counter32,
        msdpPeerInSAs                     Counter32,
        msdpPeerOutSAs                    Counter32,
        msdpPeerInSARequests              Counter32,
        msdpPeerOutSARequests             Counter32,
        msdpPeerInSAResponses             Counter32,
        msdpPeerOutSAResponses            Counter32,
        msdpPeerInControlMessages         Counter32,
        msdpPeerOutControlMessages        Counter32,
        msdpPeerInDataPackets             Counter32,
        msdpPeerOutDataPackets            Counter32,
        msdpPeerFsmEstablishedTransitions  Counter32,
        msdpPeerFsmEstablishedTime        TimeStamp,
```

```
        msdpPeerInMessageTime             TimeStamp,
        msdpPeerLocalAddress              IpAddress,
        msdpPeerConnectRetryInterval      Integer32,
        msdpPeerHoldTimeConfigured        Integer32,
        msdpPeerKeepAliveConfigured       Integer32,
        msdpPeerDataTtl                   Integer32,
        msdpPeerProcessRequestsFrom       TruthValue,
        msdpPeerStatus                    RowStatus,
        msdpPeerRemotePort                Integer32,
        msdpPeerLocalPort                 Integer32,
        msdpPeerEncapsulationType         INTEGER,
        msdpPeerConnectionAttempts        Counter32,
        msdpPeerInNotifications           Counter32,
        msdpPeerOutNotifications          Counter32,
        msdpPeerLastError                 OCTET STRING,
        msdpPeerDiscontinuityTime         TimeStamp
    }

msdpPeerRemoteAddress OBJECT-TYPE
    SYNTAX     IpAddress
    MAX-ACCESS not-accessible
    STATUS     current
    DESCRIPTION
           "The address of the remote MSDP peer."
    ::= { msdpPeerEntry 1 }

-- dunno what happened to 2.

msdpPeerState OBJECT-TYPE
    SYNTAX     INTEGER {
                         inactive(1),
                         listen(2),
                         connecting(3),
                         established(4),
                         disabled(5)
                       }
    MAX-ACCESS read-only
    STATUS     current
    DESCRIPTION
           "The state of the MSDP TCP connection with this peer."
    ::= { msdpPeerEntry 3 }

msdpPeerRPFFailures OBJECT-TYPE
    SYNTAX     Counter32
    MAX-ACCESS read-only
    STATUS     current
    DESCRIPTION
           "The number of SA messages received from this peer which
```

```
            failed the Peer-RPF check.

            Discontinuities in the value of this counter can occur at
            re-initialization of the management system, and at other
            times as indicated by the value of
            msdpPeerDiscontinuityTime."
    ::= { msdpPeerEntry 4 }

msdpPeerInSAs OBJECT-TYPE
    SYNTAX     Counter32
    MAX-ACCESS read-only
    STATUS     current
    DESCRIPTION
           "The number of MSDP SA messages received on this connection.

            Discontinuities in the value of this counter can occur at
            re-initialization of the management system, and at other
            times as indicated by the value of
            msdpPeerDiscontinuityTime."
    ::= { msdpPeerEntry 5 }

msdpPeerOutSAs OBJECT-TYPE
    SYNTAX     Counter32
    MAX-ACCESS read-only
    STATUS     current
    DESCRIPTION
           "The number of MSDP SA messages transmitted on this
            connection.

            Discontinuities in the value of this counter can occur at
            re-initialization of the management system, and at other
            times as indicated by the value of
            msdpPeerDiscontinuityTime."
    ::= { msdpPeerEntry 6 }

msdpPeerInSARequests OBJECT-TYPE
    SYNTAX     Counter32
    MAX-ACCESS read-only
    STATUS     current
    DESCRIPTION
           "The number of MSDP SA-Request messages received on this
            connection.

            Discontinuities in the value of this counter can occur at
            re-initialization of the management system, and at other
            times as indicated by the value of
            msdpPeerDiscontinuityTime."
    ::= { msdpPeerEntry 7 }
```

```
msdpPeerOutSARequests OBJECT-TYPE
    SYNTAX     Counter32
    MAX-ACCESS read-only
    STATUS     current
    DESCRIPTION
           "The number of MSDP SA-Request messages transmitted on this
            connection.

            Discontinuities in the value of this counter can occur at
            re-initialization of the management system, and at other
            times as indicated by the value of
            msdpPeerDiscontinuityTime."
    ::= { msdpPeerEntry 8 }

msdpPeerInSAResponses OBJECT-TYPE
    SYNTAX     Counter32
    MAX-ACCESS read-only
    STATUS     deprecated
    DESCRIPTION
           "The number of MSDP SA-Response messages received on this
            connection.

            Discontinuities in the value of this counter can occur at
            re-initialization of the management system, and at other
            times as indicated by the value of
            msdpPeerDiscontinuityTime."
    ::= { msdpPeerEntry 9 }

msdpPeerOutSAResponses OBJECT-TYPE
    SYNTAX     Counter32
    MAX-ACCESS read-only
    STATUS     deprecated
    DESCRIPTION
           "The number of MSDP SA Response messages transmitted on this
            TCP connection.

            Discontinuities in the value of this counter can occur at
            re-initialization of the management system, and at other
            times as indicated by the value of
            msdpPeerDiscontinuityTime."
    ::= { msdpPeerEntry 10 }

msdpPeerInControlMessages OBJECT-TYPE
    SYNTAX     Counter32
    MAX-ACCESS read-only
    STATUS     current
    DESCRIPTION
           "The total number of MSDP messages, excluding encapsulated
```

```
            data packets, received on this TCP connection.

            Discontinuities in the value of this counter can occur at
            re-initialization of the management system, and at other
            times as indicated by the value of
            msdpPeerDiscontinuityTime."
    ::= { msdpPeerEntry 11 }

msdpPeerOutControlMessages OBJECT-TYPE
    SYNTAX     Counter32
    MAX-ACCESS read-only
    STATUS     current
    DESCRIPTION
           "The total number of MSDP messages, excluding encapsulated
            data packets, transmitted on this TCP connection.

            Discontinuities in the value of this counter can occur at
            re-initialization of the management system, and at other
            times as indicated by the value of
            msdpPeerDiscontinuityTime."
    ::= { msdpPeerEntry 12 }

msdpPeerInDataPackets OBJECT-TYPE
    SYNTAX     Counter32
    MAX-ACCESS read-only
    STATUS     current
    DESCRIPTION
           "The total number of encapsulated data packets received from
            this peer.

            Discontinuities in the value of this counter can occur at
            re-initialization of the management system, and at other
            times as indicated by the value of
            msdpPeerDiscontinuityTime."
    ::= { msdpPeerEntry 13 }

msdpPeerOutDataPackets OBJECT-TYPE
    SYNTAX     Counter32
    MAX-ACCESS read-only
    STATUS     current
    DESCRIPTION
           "The total number of encapsulated data packets sent to this
            peer.

            Discontinuities in the value of this counter can occur at
            re-initialization of the management system, and at other
            times as indicated by the value of
            msdpPeerDiscontinuityTime."
```

```
    ::= { msdpPeerEntry 14 }

msdpPeerFsmEstablishedTransitions OBJECT-TYPE
    SYNTAX     Counter32
    MAX-ACCESS read-only
    STATUS     current
    DESCRIPTION
           "The total number of times the MSDP FSM transitioned into the
            ESTABLISHED state."
    REFERENCE "RFC 3618 section 11"
    ::= { msdpPeerEntry 15 }

msdpPeerFsmEstablishedTime OBJECT-TYPE
    SYNTAX     TimeStamp
    MAX-ACCESS read-only
    STATUS     current
    DESCRIPTION
           "This timestamp is set to the value of sysUpTime when a peer
            transitions into or out of the ESTABLISHED state.  It is set
            to zero when the MSDP speaker is booted."
    REFERENCE "RFC 3618 section 11"
    ::= { msdpPeerEntry 16 }

msdpPeerInMessageTime OBJECT-TYPE
    SYNTAX     TimeStamp
    MAX-ACCESS read-only
    STATUS     current
    DESCRIPTION
           "The sysUpTime value when the last MSDP message was received
            from the peer.  It is set to zero when the MSDP speaker is
            booted."
    ::= { msdpPeerEntry 17 }

msdpPeerLocalAddress OBJECT-TYPE
    SYNTAX     IpAddress
    MAX-ACCESS read-create
    STATUS     current
    DESCRIPTION
           "The local IP address used for this entry's MSDP TCP
            connection."
    ::= { msdpPeerEntry 18 }

-- msdpPeerSAAdvPeriod ([SA-Advertisement-Timer]) has been removed.
--     ::= { msdpPeerEntry 19 }
-- RFC 3618 section 5.1 says it MUST be 60 seconds.


msdpPeerConnectRetryInterval OBJECT-TYPE
```

```
    SYNTAX     Integer32 (1..65535)
    UNITS      "seconds"
    MAX-ACCESS read-create
    STATUS     current
    DESCRIPTION
           "Time interval in seconds for the [ConnectRetry-period] for
            this peer."
    REFERENCE "RFC 3618 section 5.6"
    DEFVAL { 30 }
    ::= { msdpPeerEntry 20 }

msdpPeerHoldTimeConfigured OBJECT-TYPE
    SYNTAX     Integer32 (0|3..65535)
    UNITS      "seconds"
    MAX-ACCESS read-create
    STATUS     current
    DESCRIPTION
           "Time interval in seconds for the [HoldTime-Period]
            configured for this MSDP speaker with this peer.  If the
            value of this object is zero (0), the MSDP connection is
            never torn down due to the absence of messages from the
            peer."
    REFERENCE "RFC 3618 section 5.4"
    DEFVAL { 75 }
    ::= { msdpPeerEntry 21 }

msdpPeerKeepAliveConfigured OBJECT-TYPE
    SYNTAX     Integer32 (0|1..21845)
    UNITS      "seconds"
    MAX-ACCESS read-create
    STATUS     current
    DESCRIPTION
           "Time interval in seconds for the [KeepAlive-Period]
            configured for this MSDP speaker with this peer.  If the
            value of this object is zero (0), no periodic KEEPALIVE
            messages are sent to the peer after the MSDP connection has
            been established."
    REFERENCE "RFC 3618 section 5.5"
    DEFVAL { 60 }
    ::= { msdpPeerEntry 22 }

msdpPeerDataTtl OBJECT-TYPE
    SYNTAX     Integer32 (0..255)
    MAX-ACCESS read-create
    STATUS     current
    DESCRIPTION
           "The minimum TTL a packet is required to have before it may
            be forwarded using SA encapsulation to this peer."
```

```
    DEFVAL { 1 }
    ::= { msdpPeerEntry 23 }

msdpPeerProcessRequestsFrom OBJECT-TYPE
    SYNTAX     TruthValue
    MAX-ACCESS read-create
    STATUS     deprecated
    DESCRIPTION
           "This object indicates whether or not to process MSDP SA
            Request messages from this peer.  If True(1), MSDP SA
            Request messages from this peer are processed and replied to
            (if appropriate) with SA Response messages.  If False(2),
            MSDP SA Request messages from this peer are silently
            ignored.  It defaults to False when msdpCacheLifetime is 0
            and True when msdpCacheLifetime is non-0.

            This object is deprecated because MSDP SA Requests were
            removed from the MSDP specification."
    ::= { msdpPeerEntry 24 }

msdpPeerStatus OBJECT-TYPE
    SYNTAX     RowStatus
    MAX-ACCESS read-create
    STATUS     current
    DESCRIPTION
           "The RowStatus object by which peers can be added and
            deleted.  A transition to 'active' will cause the MSDP
            'Enable MSDP peering with P' Event to be generated.  A
            transition out of the 'active' state will cause the MSDP
            'Disable MSDP peering with P' Event to be generated.  Care
            should be used in providing write access to this object
            without adequate authentication.

            msdpPeerRemoteAddress is the only variable that must be set
            to a valid value before the row can be activated.  Since
            this is the table's INDEX, a row can be activated by simply
            setting the msdpPeerStatus variable.

            It is possible to modify other columns in the same
            conceptual row when the status value is active(1)."
    REFERENCE "RFC 3618 section 11.1"
    ::= { msdpPeerEntry 25 }

msdpPeerRemotePort OBJECT-TYPE
    SYNTAX     Integer32 (0..65535)
    MAX-ACCESS read-only
    STATUS     current
    DESCRIPTION
```

```
            "The remote port for the TCP connection between the MSDP
             peers."
    DEFVAL { 639 }
    ::= { msdpPeerEntry 26 }

msdpPeerLocalPort OBJECT-TYPE
    SYNTAX     Integer32 (0..65535)
    MAX-ACCESS read-only
    STATUS     current
    DESCRIPTION
            "The local port for the TCP connection between the MSDP
             peers."
    DEFVAL { 639 }
    ::= { msdpPeerEntry 27 }

-- msdpPeerEncapsulationState has been removed
-- because there is no longer an encapsulation
-- state machine.
--     ::= { msdpPeerEntry 28 }

msdpPeerEncapsulationType OBJECT-TYPE
    SYNTAX     INTEGER {
                         none(0),
                         tcp(1)
                       }
    MAX-ACCESS read-create
    STATUS     current
    DESCRIPTION
            "The encapsulation in use when encapsulating data in SA
             messages to this peer."
    ::= { msdpPeerEntry 29 }

msdpPeerConnectionAttempts OBJECT-TYPE
    SYNTAX     Counter32
    MAX-ACCESS read-only
    STATUS     current
    DESCRIPTION
            "The number of times the state machine has transitioned from
             INACTIVE to CONNECTING."
    ::= { msdpPeerEntry 30 }

msdpPeerInNotifications OBJECT-TYPE
    SYNTAX     Counter32
    MAX-ACCESS read-only
    STATUS     deprecated
    DESCRIPTION
            "The number of MSDP Notification messages received from this
             peer.
```

```
            This object is deprecated because MSDP Notifications have
            been removed from the spec."
    ::= { msdpPeerEntry 31 }

msdpPeerOutNotifications OBJECT-TYPE
    SYNTAX     Counter32
    MAX-ACCESS read-only
    STATUS     deprecated
    DESCRIPTION
           "The number of MSDP Notification messages transmitted to this
            peer.

            This object is deprecated because MSDP Notifications have
            been removed from the spec."
    ::= { msdpPeerEntry 32 }

msdpPeerLastError OBJECT-TYPE
    SYNTAX     OCTET STRING (SIZE (2))
    MAX-ACCESS read-only
    STATUS     deprecated
    DESCRIPTION
           "The last error code and subcode received via Notification
            from this peer.  If no error has occurred, this field is
            zero.  Otherwise, the first byte of this two byte OCTET
            STRING contains the O-bit and error code, and the second
            byte contains the subcode.

            This object is deprecated because MSDP Notifications have
            been removed from the spec."
    DEFVAL   { '0000'h }
    ::= { msdpPeerEntry 33 }

msdpPeerDiscontinuityTime OBJECT-TYPE
    SYNTAX     TimeStamp
    MAX-ACCESS read-only
    STATUS     current
    DESCRIPTION
           "The value of sysUpTime on the most recent occasion at which
            one or more of this entry's counters suffered a
            discontinuity.  See the DESCRIPTION of each object to see if
            it is expected to have discontinuities.  These
            discontinuities may occur at peer connection establishment.

            If no such discontinuities have occurred since the last
            reinitialization of the local management subsystem, then
            this object contains a zero value."
    ::= { msdpPeerEntry 34 }
```

```
--
-- The MSDP Source-Active Cache table
--

msdpSACacheTable OBJECT-TYPE
    SYNTAX     SEQUENCE OF MsdpSACacheEntry
    MAX-ACCESS not-accessible
    STATUS     current
    DESCRIPTION
           "The (conceptual) table listing the MSDP SA advertisements
            currently in the MSDP speaker's cache."
    ::= { msdp 6 }

msdpSACacheEntry OBJECT-TYPE
    SYNTAX     MsdpSACacheEntry
    MAX-ACCESS not-accessible
    STATUS     current
    DESCRIPTION
           "An entry (conceptual row) representing an MSDP SA
            advertisement.  The INDEX to this table includes
            msdpSACacheOriginRP for diagnosing incorrect MSDP
            advertisements; normally a Group and Source pair would be
            unique.

            Row creation is not permitted; msdpSACacheStatus may only be
            used to delete rows from this table."
    INDEX      { msdpSACacheGroupAddr, msdpSACacheSourceAddr,
                 msdpSACacheOriginRP }
    ::= { msdpSACacheTable 1 }

MsdpSACacheEntry ::= SEQUENCE {
        msdpSACacheGroupAddr        IpAddress,
        msdpSACacheSourceAddr       IpAddress,
        msdpSACacheOriginRP         IpAddress,
        msdpSACachePeerLearnedFrom  IpAddress,
        msdpSACacheRPFPeer          IpAddress,
        msdpSACacheInSAs            Counter32,
        msdpSACacheInDataPackets    Counter32,
        msdpSACacheUpTime           TimeTicks,
        msdpSACacheExpiryTime       TimeTicks,
        msdpSACacheStatus           RowStatus
    }

msdpSACacheGroupAddr OBJECT-TYPE
    SYNTAX     IpAddress
    MAX-ACCESS not-accessible
    STATUS     current
    DESCRIPTION
```

```
            "The group address of the SA Cache entry."
    ::= { msdpSACacheEntry 1 }

msdpSACacheSourceAddr OBJECT-TYPE
    SYNTAX     IpAddress
    MAX-ACCESS not-accessible
    STATUS     current
    DESCRIPTION
            "The source address of the SA Cache entry."
    ::= { msdpSACacheEntry 2 }

msdpSACacheOriginRP OBJECT-TYPE
    SYNTAX     IpAddress
    MAX-ACCESS not-accessible
    STATUS     current
    DESCRIPTION
            "The RP of the SA Cache entry.  This field is in the INDEX in
             order to catch multiple RP's advertising the same source and
             group."
    ::= { msdpSACacheEntry 3 }

msdpSACachePeerLearnedFrom OBJECT-TYPE
    SYNTAX     IpAddress
    MAX-ACCESS read-only
    STATUS     current
    DESCRIPTION
            "The peer from which this SA Cache entry was last accepted.
             This address must correspond to the msdpPeerRemoteAddress
             value for a row in the MSDP Peer Table.  This should be
             0.0.0.0 on the router that originated the entry."
    ::= { msdpSACacheEntry 4 }

msdpSACacheRPFPeer OBJECT-TYPE
    SYNTAX     IpAddress
    MAX-ACCESS read-only
    STATUS     current
    DESCRIPTION
            "The peer from which an SA message corresponding to this
             cache entry would be accepted (i.e. the RPF peer for
             msdpSACacheOriginRP).  This may be different than
             msdpSACachePeerLearnedFrom if this entry was created by an
             MSDP SA-Response.  This address must correspond to the
             msdpPeerRemoteAddress value for a row in the MSDP Peer
             Table, or may be 0.0.0.0 if no RPF peer exists."
    ::= { msdpSACacheEntry 5 }

msdpSACacheInSAs OBJECT-TYPE
    SYNTAX     Counter32
```

```
    MAX-ACCESS read-only
    STATUS     current
    DESCRIPTION
           "The number of MSDP SA messages received relevant to this
            cache entry.  This object must be initialized to zero when
            creating a cache entry."
    ::= { msdpSACacheEntry 6 }

msdpSACacheInDataPackets OBJECT-TYPE
    SYNTAX     Counter32
    MAX-ACCESS read-only
    STATUS     current
    DESCRIPTION
           "The number of MSDP encapsulated data packets received
            relevant to this cache entry.  This object must be
            initialized to zero when creating a cache entry."
    ::= { msdpSACacheEntry 7 }

msdpSACacheUpTime OBJECT-TYPE
    SYNTAX     TimeTicks
    MAX-ACCESS read-only
    STATUS     current
    DESCRIPTION
           "The time since this entry was first placed in the SA cache.

            The first epoch is the time that the entry was first placed
            in the SA cache, and the second epoch is the current time."
    ::= { msdpSACacheEntry 8 }

msdpSACacheExpiryTime OBJECT-TYPE
    SYNTAX     TimeTicks
    MAX-ACCESS read-only
    STATUS     current
    DESCRIPTION
           "The time remaining before this entry will expire from the SA
            cache.

            The first epoch is now, and the second epoch is the time
            that the entry will expire."
    ::= { msdpSACacheEntry 9 }

msdpSACacheStatus OBJECT-TYPE
    SYNTAX     RowStatus
    MAX-ACCESS read-write
    STATUS     current
    DESCRIPTION
           "The status of this row in the table.  The only allowable
            actions are to retrieve the status, which will be `active',
```

```
            or to set the status to `destroy' in order to remove this
            entry from the cache.

            Row creation is not permitted.

            No columnar objects are writable, so there are none that may
            be changed while the status value is active(1).  "
    ::= { msdpSACacheEntry 10 }


--
-- MSDP Mesh Group Membership table
--

msdpMeshGroupTable OBJECT-TYPE
    SYNTAX     SEQUENCE OF MsdpMeshGroupEntry
    MAX-ACCESS not-accessible
    STATUS     current
    DESCRIPTION
           "The (conceptual) table listing MSDP Mesh Group
            configuration."
    ::= { msdp 12 }

msdpMeshGroupEntry OBJECT-TYPE
    SYNTAX     MsdpMeshGroupEntry
    MAX-ACCESS not-accessible
    STATUS     current
    DESCRIPTION
           "An entry (conceptual row) repesenting a peer in an MSDP Mesh
            Group.

            If row creation is supported, dynamically added rows are
            added to the system's stable configuration (corresponding to
            a StorageType value of nonVolatile).  "
    INDEX        { msdpMeshGroupName, msdpMeshGroupPeerAddress }
    ::= { msdpMeshGroupTable 1 }

MsdpMeshGroupEntry ::= SEQUENCE {
        msdpMeshGroupName         DisplayString,
        msdpMeshGroupPeerAddress  IpAddress,
        msdpMeshGroupStatus       RowStatus
    }

msdpMeshGroupName OBJECT-TYPE
    SYNTAX     DisplayString (SIZE(1..64))
    MAX-ACCESS not-accessible
    STATUS     current
    DESCRIPTION
```

```
            "The name of the mesh group."
    ::= { msdpMeshGroupEntry 1 }

msdpMeshGroupPeerAddress OBJECT-TYPE
    SYNTAX     IpAddress
    MAX-ACCESS not-accessible
    STATUS     current
    DESCRIPTION
            "A peer address that is a member of the mesh group with name
             msdpMeshGroupName.  The msdpMeshGroupPeerAddress must match
             a row in the msdpPeerTable."
    ::= { msdpMeshGroupEntry 2 }

msdpMeshGroupStatus OBJECT-TYPE
    SYNTAX     RowStatus
    MAX-ACCESS read-create
    STATUS     current
    DESCRIPTION
            "This entry's status, by which new entries may be added to
             the table and old entries deleted.

             msdpMeshGroupName and msdpMeshGroupPeerAddress must be set
             to valid values before the row can be activated.  Since
             these are the table's INDEX, a row can be activated by
             simply setting the msdpMeshGroupStatus variable.

             It is not possible to modify other columns in the same
             conceptual row when the status value is active(1), because
             there only other objects in the row are part of the INDEX.
             Changing one of these changes the row, so an old row must be
             deleted and a new one created.  "
    ::= { msdpMeshGroupEntry 3 }



-- Traps

msdpTraps   OBJECT IDENTIFIER ::= { msdp 0 }

msdpEstablished NOTIFICATION-TYPE
    OBJECTS { msdpPeerFsmEstablishedTransitions }
    STATUS     current
    DESCRIPTION
            "The MSDP Established event is generated when the MSDP FSM
             enters the ESTABLISHED state."
    ::= { msdpTraps 1 }

msdpBackwardTransition NOTIFICATION-TYPE
```

```
    OBJECTS { msdpPeerState }
    STATUS     current
    DESCRIPTION
           "The MSDPBackwardTransition Event is generated when the MSDP
            FSM moves from a higher numbered state to a lower numbered
            state."
    ::= { msdpTraps 2 }

-- conformance information

msdpMIBConformance OBJECT IDENTIFIER ::= { msdp 8 }
msdpMIBCompliances OBJECT IDENTIFIER ::= { msdpMIBConformance 1 }
msdpMIBGroups      OBJECT IDENTIFIER ::= { msdpMIBConformance 2 }

-- compliance statements

msdpMIBCompliance MODULE-COMPLIANCE
    STATUS     deprecated
    DESCRIPTION
           "The compliance statement for entities which implement a pre-
            RFC version of MSDP.  This statement is deprecated because
            it includes objects used for managing/monitoring aspects of
            MSDP that were removed before it was published as an RFC."
   MODULE  -- this module
   MANDATORY-GROUPS { msdpMIBGlobalsGroup, msdpMIBPeerGroup,
                      msdpMIBNotificationGroup }

       GROUP  msdpMIBEncapsulationGroup
        DESCRIPTION
           "This group is mandatory if MSDP encapsulation interfaces are
                not given their own interface index numbers."
       GROUP  msdpMIBSACacheGroup
        DESCRIPTION
           "This group is mandatory if the MSDP speaker has the ability
                to cache SA messages."
        GROUP  msdpMIBRequestsGroup
        DESCRIPTION
           "This group is mandatory if the MSDP speaker has the ability
                to send SA-Request messages and parse SA-Response
                messages."
        GROUP  msdpMIBRPGroup
        DESCRIPTION
           "This group is mandatory if the MSDP speaker sources (as
                opposed to forwards) MSDP messages."
        GROUP  msdpMIBMeshGroupGroup
        DESCRIPTION
           "This group is mandatory if the MSDP speaker can participate
                in MSDP Mesh Groups."
```

```
   ::= { msdpMIBCompliances 1 }

msdpMIBFullCompliance MODULE-COMPLIANCE
    STATUS     current
    DESCRIPTION
           "The compliance statement for entities which implement MSDP
            (RFC3618)."
   MODULE  -- this module
   MANDATORY-GROUPS { msdpMIBGlobalsGroup, msdpMIBPeerGroup2,
                      msdpMIBSACacheGroup, msdpMIBEncapsulationGroup }
        GROUP  msdpMIBRPGroup
        DESCRIPTION
           "This group is mandatory if the MSDP speaker sources (as
                opposed to forwards) MSDP messages."
        GROUP  msdpMIBMeshGroupGroup
        DESCRIPTION
           "This group is mandatory if the MSDP speaker can participate
                in MSDP Mesh Groups."
   ::= { msdpMIBCompliances 2 }

msdpMIBReadOnlyCompliance MODULE-COMPLIANCE
    STATUS     current
    DESCRIPTION
           "The compliance statement for entities which implement MSDP
            (RFC3618), but do not permit configuration (or only permit
            partial configuration) via SNMP."
   MODULE  -- this module
   MANDATORY-GROUPS { msdpMIBGlobalsGroup, msdpMIBPeerGroup2,
                      msdpMIBSACacheGroup, msdpMIBEncapsulationGroup }
        GROUP  msdpMIBRPGroup
        DESCRIPTION
           "This group is mandatory if the MSDP speaker sources (as
                opposed to forwards) MSDP messages."
        GROUP  msdpMIBMeshGroupGroup
        DESCRIPTION
           "This group is mandatory if the MSDP speaker can participate
                in MSDP Mesh Groups."
        OBJECT     msdpEnabled
        MIN-ACCESS read-only
        DESCRIPTION
           "Write access is not required."
        OBJECT     msdpCacheLifetime
        MIN-ACCESS read-only
        DESCRIPTION
           "Write access is not required."
        OBJECT     msdpPeerLocalAddress
        MIN-ACCESS read-only
        DESCRIPTION
```

```
          "Write access is not required."
        OBJECT     msdpPeerConnectRetryInterval
        MIN-ACCESS read-only
        DESCRIPTION
          "Write access is not required."
        OBJECT     msdpPeerHoldTimeConfigured
        MIN-ACCESS read-only
        DESCRIPTION
          "Write access is not required."
        OBJECT     msdpPeerKeepAliveConfigured
        MIN-ACCESS read-only
        DESCRIPTION
          "Write access is not required."
        OBJECT     msdpPeerDataTtl
        MIN-ACCESS read-only
        DESCRIPTION
          "Write access is not required."
        OBJECT     msdpPeerStatus
        MIN-ACCESS read-only
        DESCRIPTION
          "Write access is not required."
        OBJECT     msdpPeerEncapsulationType
        MIN-ACCESS read-only
        DESCRIPTION
          "Write access is not required."
        OBJECT     msdpSACacheStatus
        MIN-ACCESS read-only
        DESCRIPTION
          "Write access is not required."
        OBJECT     msdpRPAddress
        MIN-ACCESS read-only
        DESCRIPTION
          "Write access is not required."
        OBJECT     msdpMeshGroupStatus
        MIN-ACCESS read-only
        DESCRIPTION
          "Write access is not required."
   ::= { msdpMIBCompliances 3 }

-- units of conformance

msdpMIBGlobalsGroup OBJECT-GROUP
   OBJECTS { msdpEnabled }
    STATUS     current
    DESCRIPTION
           "A collection of objects providing information on global MSDP
            state."
    ::= { msdpMIBGroups 1 }
```

```
msdpMIBPeerGroup OBJECT-GROUP
   OBJECTS { msdpPeerRPFFailures,
             msdpPeerState, msdpPeerInSAs, msdpPeerOutSAs,
             msdpPeerInSARequests, msdpPeerOutSARequests,
             msdpPeerInSAResponses, msdpPeerOutSAResponses,
             msdpPeerInNotifications, msdpPeerOutNotifications,
             msdpPeerInControlMessages, msdpPeerOutControlMessages,
             msdpPeerFsmEstablishedTransitions,
             msdpPeerFsmEstablishedTime,
             msdpPeerLocalAddress,
             msdpPeerRemotePort, msdpPeerLocalPort,
             msdpPeerConnectRetryInterval,
             msdpPeerHoldTimeConfigured,
             msdpPeerKeepAliveConfigured,
             msdpPeerInMessageTime,
             msdpPeerProcessRequestsFrom,
             msdpPeerConnectionAttempts,
             msdpPeerLastError,
             msdpPeerStatus,
             msdpPeerDiscontinuityTime
           }
    STATUS     deprecated
    DESCRIPTION
           "A collection of objects for managing MSDP peers.  This group
            is deprecated in favor of msdpMIBPeerGroup2 because it
            contains objects for managing aspects of MSDP that were
            removed before it was published as an RFC."
    ::= { msdpMIBGroups 2 }

msdpMIBEncapsulationGroup OBJECT-GROUP
   OBJECTS { msdpPeerInDataPackets, msdpPeerOutDataPackets,
             msdpPeerDataTtl,
             msdpPeerEncapsulationType
           }
    STATUS     current
    DESCRIPTION
           "A collection of objects for managing encapsulations if the
            MSDP encapsulation interfaces are not given interface
            indices."
    ::= { msdpMIBGroups 3 }

msdpMIBSACacheGroup OBJECT-GROUP
    OBJECTS { msdpCacheLifetime, msdpNumSACacheEntries,
              msdpSACachePeerLearnedFrom,
              msdpSACacheRPFPeer, msdpSACacheInSAs,
              msdpSACacheInDataPackets,
              msdpSACacheUpTime, msdpSACacheExpiryTime,
              msdpSACacheStatus }
```

```
    STATUS     current
    DESCRIPTION
           "A collection of objects for managing MSDP SA cache entries."
    ::= { msdpMIBGroups 4 }

msdpMIBNotificationGroup NOTIFICATION-GROUP
    NOTIFICATIONS { msdpEstablished,
                    msdpBackwardTransition }
    STATUS     current
    DESCRIPTION
           "A collection of notifications for signaling changes in MSDP
            peer relationships."
    ::= { msdpMIBGroups 5 }

msdpMIBRequestsGroup OBJECT-GROUP
    OBJECTS { msdpRequestsPeer, msdpRequestsStatus }
    STATUS     deprecated
    DESCRIPTION
           "A collection of objects for managing MSDP Request
            transmission.  This group is deprecated because Requests
            were removed from MSDP before its publication as RFC."
    ::= { msdpMIBGroups 6 }

msdpMIBRPGroup OBJECT-GROUP
    OBJECTS { msdpRPAddress }
    STATUS     current
    DESCRIPTION
           "A collection of objects for MSDP speakers that source MSDP
            messages."
    ::= { msdpMIBGroups 7 }

msdpMIBMeshGroupGroup OBJECT-GROUP
    OBJECTS { msdpMeshGroupStatus }
    STATUS     current
    DESCRIPTION
           "A collection of objects for MSDP speakers that can
            participate in MSDP mesh groups."
    ::= { msdpMIBGroups 8 }

msdpMIBPeerGroup2 OBJECT-GROUP
   OBJECTS { msdpPeerRPFFailures,
             msdpPeerState, msdpPeerInSAs, msdpPeerOutSAs,
             msdpPeerInSARequests, msdpPeerOutSARequests,
             msdpPeerInControlMessages, msdpPeerOutControlMessages,
             msdpPeerFsmEstablishedTransitions,
             msdpPeerFsmEstablishedTime,
             msdpPeerLocalAddress,
             msdpPeerRemotePort, msdpPeerLocalPort,
```

```
            msdpPeerConnectRetryInterval,
            msdpPeerHoldTimeConfigured,
            msdpPeerKeepAliveConfigured,
            msdpPeerInMessageTime,
            msdpPeerConnectionAttempts,
            msdpPeerStatus,
            msdpPeerDiscontinuityTime
          }
    STATUS     current
    DESCRIPTION
           "A collection of objects for managing MSDP peers."
    ::= { msdpMIBGroups 9 }

END
```

5. Security Considerations

There are a number of management objects defined in this MIB that have 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.

There are a number of managed objects in this MIB that may contain sensitive information. These are:

- The entire msdpPeerTable. Peer information can result in discovering internal topology, which many want to keep secret.
- msdpNumSACacheEntries. The size of the SA Cache could reveal whether this system has MSDP entries for public and/or private groups.
- The entire msdpSACacheTable. The active sources and groups in a network could be private.
- The entire msdpMeshGroupTable. This information can also lead to internal topology information.

It is thus important to control even GET access to these objects and possibly to even encrypt the values of these object when sending them over the network via SNMP. Not all versions of SNMP provide features for such a secure environment.

SNMPv1 by itself is not a secure 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 GET/SET (read/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 3414 [2] and the View-based Access Control Model RFC 3415 [3] is recommended.

It is then a customer/user responsibility to ensure that the SNMP entity giving access to an instance of this MIB, is properly configured to give access to the objects only to those principals (users) that have legitimate rights to indeed GET or SET (change/create/delete) them.

6. IANA Considerations

Since this MIB is for an experimental protocol, it uses an experimental OID.

Decimal	Name	Description	References
92	MSDP-MIB	Multicast Source Discovery MIB	[Fenner]

The IANA is requested to change the Reference for this entry to point to this document.

7. Acknowledgements

Tom Pusateri and Billy Ng both provided valuable input on early versions of this draft. It was completed based upon feedback from Mike Davison and Ketan Talaulikar. Lucy Lynch provided a desperately-needed reminder to finish this document.

8. Authors' Addresses

Bill Fenner
75 Willow Road
Menlo Park, CA 94025
Phone: +1 650 867 6073
EMail: fenner@research.att.com

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

9. Normative References

[1] Fenner, B. and D. Meyer, editors, "Multicast Source Discovery Protocol (MSDP)", RFC 3618, October 2003.

[2] Blumenthal, U. and B. Wijnen, "User-based Security Model (USM) for version 3 of the Simple Network Management Protocol (SNMPv3)", STD 62, RFC 3414, December 2002.

[3] Wijnen, B., Preshun, R. and K. McCloghrie, "View-based Access Control Model (VACM) for the Simple Network Management Protocol (SNMP)", STD 62, RFC 3415, December 2002.

[4] 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.

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

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

9.1. Informative References

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

10. Full Copyright Statement