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Definitions of Managed Objects for Service Level Agreements Performance Monitoring

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Abstract

This memo defines a Management Information Base (MIB) for performing performance monitoring of Service Level Agreements (SLAs) defined via policy definitions. The MIB defined herein focuses on defining a set of objects for monitoring SLAs and not on replication of the content of the policy definitions being monitored.

The MIB defined by this document is based upon the content of "Schema for Service Level Administration of Differential Services and Integrated Services in Networks", refer to [19].

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1.0 Introduction

The key words "MUST", "MUST NOT", "REQUIRED", "SHALL", "SHALL NOT", "SHOULD", "SHOULD NOT", "RECOMMENDED", "MAY", and "OPTIONAL" in this document are to be interpreted as described in RFC 2119, reference [13].

This document is a product of the Internet Engineering Task Force (IETF). Its purpose is to define a MIB module for performance management of Service Level Agreements (SLAs). An SLA is defined via policy. There are a number of methods that exist for how policy is defined and administered. Definition of these methods is considered out side of the scope of this document. For modeling the contents of this MIB a policy definition is considered to consist of a set of traffic profiles that select the conditions for when a policy action should be applied. Refer to "Schema for Service Level Administration of Differential Services and Integrated Services in Networks" [19] for a definition of policy, traffic profile and action.

The SLAPM-MIB is structured primarily to enable monitoring policy traffic profiles at a system. A system can be either an edge device (end-system) or an interior device or node (e.g. router).

2.0 The SNMP Network Management Framework

The SNMP Management Framework presently consists of five major

components:

o An overall architecture, described in RFC 2271 [7].

- Mechanisms for describing and naming objects and events for the purpose of management. The first version of this Structure of Management Information (SMI) is called SMIv1 and described in RFC 1155 [14], RFC 1212 [15] and RFC 1215 [16]. The second version, called SMIv2, is described in RFC 1902 [3], RFC 1903 [4] and RFC 1904 [5].

- Message protocols for transferring management information. The first version of the SNMP message protocol is called SNMPv1 and described in RFC 1157 [1]. A second version of the SNMP message protocol, which is not an Internet standards track protocol, is called SNMPv2c and described in RFC 1901 [17] and RFC 1906 [18]. The third version of the message protocol is called SNMPv3 and described in RFC 1906 [18], RFC 2272 [8] and RFC 2274 [10].

- Protocol operations for accessing management information. The first set of protocol operations and associated PDU formats is described in RFC 1157 [1]. A second set of protocol operations and associated PDU formats is described in RFC 1905 [6].

- A set of fundamental applications described in RFC 2273 [9] and the view-based access control mechanism described in RFC 2275 [11].

Managed objects are accessed via a virtual information store, termed the Management Information Base or MIB. Objects in the MIB are defined ore, using the mechanisms defined in the SMI.

This memo specifies a MIB module that is compliant to the SMIv2. A MIB conforming to the SMIv1 can be produced through the appropriate translations. The resulting translated MIB must be semantically equivalent, except where objects or events are omitted because no translation is possible (use of Counter64). Some machine readable information in SMIv2 will be converted into textual descriptions in SMIv1 during the translation process. However, this loss of machine readable information is not considered to change the semantics of the MIB.

3.0 Structure of the MIB

The SLAPM-MIB consists of the following components:

- Global simple objects

- slapmPolicyStatsTable

- slapmPolicyMonitorTable

- slapmSubcomponentTable

Refer to the compliance statement defined within SLAPM-MIB for a definition of what objects and notifications MUST be implemented by all systems as opposed to those that MUST be implemented by end systems only.

3.1 Global simple objects

Global objects defined within SLAPM-MIB:

o slapmSpinLock

  Enables multiple management application access to SLAPM-MIB. An agent MUST implement the slapmSpinLock object to enable management applications to coordinate their use of the SLAPM-MIB. Management application use of slapmSpinLock is OPTIONAL.

o slapmPolicyCountQueries, slapmPolicyCountAccesses, slapmPolicyCountSuccessAccesses, and slapmPolicyCountNotFounds

  Basic statistics on the amount of policy directory access that has occured at a system.

o slapmPolicyPurgeTime

  Used to prevent the entries in various SLAPM-MIB tables that relate to a policy definition from immediately being deleted when the corresponding policy definition no longer exists. This gives management applications time to discover this condition and close out any polled based interval data that may be being collected. All dependent slapmPolicyMonitorTable entries are also deleted when its parent slapmPolicyStatsEntry is removed. Refer to the OBJECT description for slapmPolicyPurgeTime for a more precise description of this function.

o slapmPolicyTrapEnable

  This object enables or suppresses generation of slapmPolicyMonitorDeleted or slapmPolicyProfileDeleted notifications.

3.2 slapmPolicyStatsTable

The slapmPolicyStatsTable is the main table defined by SLAPM-MIB. The primary index for this table is slapmPolicyStatsSystemAddress that enables support of multiple systems from a single policy agent. The index element, slapmPolicyStatsSystemAddress, value must be either the zero-length octet string when at a policy agent only a single system is being support, 4 octets for a ipv4 address, or 16 octets for a ipv6 address.

It is possible that on a single system multiple policy agent instances exists. The Entity MIB, refer to [20], should be used to handle the resulting MIBs.

With respect to slapmPolicyStatsSystemAddress one slapmPolicyStatsEntry

exists for each SLA traffic profile per policy definition. The structure of indexing for slapmPolicyStatsTable assumes that it is permissible for a policy to consist of a set of traffic profiles. Systems that allow only a single traffic profile to be specified per policy definition MUST still use the name of the traffic profile as the

second index into slapmPolicyStatsTable in order to conform to SLAPM-MIB. Use of a zero-length octet string to indicate this condition is NOT allowed.

SLAPM-MIB also assumes that only a single action can be defined for any single policy definition and hence an action's name doesn't need to be reflected in table indexing.

This table provides basic statistics on the set of policy traffic profiles known at a system. Entries in this table are not administered via SNMP. An agent implementation for this table MUST reflect its current set of policy definitions via table entries. The mechanisms for policy administration are outside of the scope of this memo.

3.3 slapmPolicyMonitorTable

The slapmPolicyMonitorTable provides a method of monitoring the effect of SLA policy being used at a system. A management application creates an slapmPolicyMonitorEntry for each collection that it requires. The value of the BITS slapmPolicyMonitorControl object determines what type of monitoring occurs, at what level to monitor and whether trap support is enabled:

o monitorMinRate(0)

  Use the value of slapmPolicyMonitorInterval as the interval to determine current traffic in and out rates, using slapmPolicyMonitorCurrentInRate and slapmPolicyMonitorCurrentOutRate, that can be compared to slapmPolicyMonitorMinRateLow for determining when to generate a slapmMonitoredEventNotAchieved notification. The notification slapmMonitoredEventOkay is generated when the problem is resolved. This can be determined by comparing the current rates to slapmPolicyMonitorMinRateHigh.

o monitorMaxRate(1)

  Use the value of slapmPolicyMonitorInterval as the interval to determine current traffic in and out rate, using slapmPolicyMonitorCurrentInRate and slapmPolicyMonitorCurrentOutRate, that can be compared to slapmPolicyMonitorMaxRateHigh for determining when to generate a slapmMonitoredEventNotAchieved notification. The notification slapmMonitoredEventOkay is generated when the problem is resolved. This can be determined by comparing the current rates to slapmPolicyMonitorMaxRateLow.

o monitorMaxDelay(2)

Use the value of slapmPolicyMonitorInterval as the interval to determine the current delay. This can be calculated by averaging the round trip times for all TCP connections associated with the policy definition. Compare this value to slapmPolicyMonitorMaxDelayHigh for determining when to generate a

slapmMonitoredEventNotAchieved notification. The notification slapmMonitoredEventOkay is generated when the problem is resolved. This can be determined by comparing the current rates to slapmPolicyMonitorMaxDelayLow.

UDP subcomponents don't support max delay monitoring.

o enableAggregateTraps(3)

The slapmPolicyMonitorControl BITS setting, enableAggregateTraps(3), MUST be set in order for any notifications relating to slapmPolicyStatsTable monitoring to be generated.

o enableSubcomponentTraps(4)

This slapmPolicyMonitorControl BITS setting MUST be set in order for any notifications relating to slapmSubcomponetTable monitoring to be generated. The slapmPolicyMonitorControl BITS setting monitorSubcomponents(5) MUST be selected in order for this setting to be allowed.

o monitorSubcomponents(5)

If selected monitor slapmSubcomponentTable entries individually. Note: aggregate policy traffic profile monitoring is always enabled.

The index element slapmPolicyMonitorOwnerIndex is used as the first index in slapmPolicyMonitorTable in order to enable SNMPv3 VACM security control. The slapmPolicyMonitorTable is the only table that supports SNMP RowStatus operations.

3.4 slapmSubcomponentTable

Entries are made into this table for the protocol entities (policy traffic profile subcomponents) to indicate actual policy traffic profile usage, provide general statistics at either a TCP connection or UDP listener level, and enable subcomponent monitoring.

4.0 Definitions

```
  SLAPM-MIB DEFINITIONS ::= BEGIN

     IMPORTS
        MODULE-IDENTITY, OBJECT-TYPE,
        experimental, Integer32, NOTIFICATION-TYPE,
        Gauge32, Counter32
            FROM SNMPv2-SMI                  -- RFC1902
        TEXTUAL-CONVENTION, RowStatus,
        TestAndIncr, DateAndTime
```

```
        FROM SNMPv2-TC                  -- RFC1903
    MODULE-COMPLIANCE, OBJECT-GROUP,
    NOTIFICATION-GROUP
        FROM SNMPv2-CONF                -- RFC1904
    SnmpAdminString
```

```
            FROM SNMP-FRAMEWORK-MIB;         -- RFC2271

     slapmMIB MODULE-IDENTITY
        LAST-UPDATED "9809300000Z"
        ORGANIZATION "Internet Engineering Task Force (IETF)"
        CONTACT-INFO
            "Kenneth White

            International Business Machines Corporation
            Network Computing Software Division
            Research Triangle Park, NC, USA

            E-mail: kennethw@vnet.ibm.com"
        DESCRIPTION
            "The Service Level Agreement Performance Monitoring MIB
            (SLAPM-MIB) provides data collection and monitoring
            capabilities for the Service Level Agreements (SLAs)
            policy definitions."
        ::= { experimental 88 }

     -- Textual Conventions

     SlapmNameType ::= TEXTUAL-CONVENTION
        STATUS  current
        DESCRIPTION
            "The textual convention for naming entities
            within this MIB.  The actual contents of an object
            defined using this textual convention should consist
            of the distinguished name portion of an name.
            This is usually the right-most
            portion of the name.  This convention is necessary,
            since names within this MIB can be used as index
            items and an instance identifier is limited to 128
            subidentifiers."
        SYNTAX  SnmpAdminString (SIZE(0..32))

     SlapmStatus ::= TEXTUAL-CONVENTION
        STATUS  current
        DESCRIPTION
            "The textual convention for defining the various
            slapmPolicyMonitorTable and the
            slapmSubcomponentTable states for actual policy
            traffic profile monitoring."
        SYNTAX  BITS {
                       slaMinInRateNotAchieved(0),
                       slaMaxInRateExceeded(1),
                       slaMaxInDelayExceeded(2),
                       slaMinOutRateNotAchieved(3),
                       slaMaxOutRateExceeded(4),
```

```
                    slaMaxOutDelayExceeded(5),
                    monitorMinInRateNotAchieved(6),
                    monitorMaxInRateExceeded(7),
                    monitorMaxInDelayExceeded(8),
                    monitorMinOutRateNotAchieved(9),
                    monitorMaxOutRateExceeded(10),
```

```
                    monitorMaxOutDelayExceeded(11)
                  }
    -- Top-level structure of the MIB

    slapmNotifications  OBJECT IDENTIFIER ::= { slapmMIB 0 }
    slapmObjects        OBJECT IDENTIFIER ::= { slapmMIB 1 }
    slapmConformance    OBJECT IDENTIFIER ::= { slapmMIB 2 }

    -- All simple objects

    slapmBaseObjects    OBJECT IDENTIFIER ::= { slapmObjects 1 }

    -- Simple Object Definitions

    slapmSpinLock OBJECT-TYPE
       SYNTAX      TestAndIncr
       MAX-ACCESS  read-write
       STATUS      current
       DESCRIPTION
          "An advisory lock used to allow cooperating applications
          to coordinate their use of the contents of this MIB.  This
          typically occurs when an application seeks to create an
          new entry or alter an existing entry in
          slapmPolicyMonitorTable.  A management implementation
          MAY utilize the slapmSpinLock to serialize its changes
          or additions.  This usage is not required.
          However, slapmSpinLock MUST be supported by agent
          implementations."
       ::= { slapmBaseObjects 1 }

    slapmPolicyCountQueries OBJECT-TYPE
       SYNTAX      Counter32
       MAX-ACCESS  read-only
       STATUS      current
       DESCRIPTION
          "The total number of times that a policy lookup occurred
          with respect to a policy agent.
          This is the number of times that a reference was made to
          a policy definition at a system and includes the number
          of times that a policy repository was accessed,
          slapmPolicyCountAccesses.  The object
          slapmPolicyCountAccesses should be less than
          slapmPolicyCountQueries when policy definitions are
          cached at a system."
       ::= { slapmBaseObjects 2 }

    slapmPolicyCountAccesses OBJECT-TYPE
       SYNTAX      Counter32
       MAX-ACCESS  read-only
```

```
        STATUS      current
        DESCRIPTION
           "Total number of times that a policy repository was
            accessed with respect to a policy agent.
            The value of this object should be less than
            slapmPolicyCountQueries, since typically policy entries
```

```
            are cached to minimize repository accesses."
        ::= { slapmBaseObjects 3 }

    slapmPolicyCountSuccessAccesses OBJECT-TYPE
       SYNTAX      Counter32
       MAX-ACCESS  read-only
       STATUS      current
       DESCRIPTION
          "Total number of successful policy repository accesses
          with respect to a policy agent."
       ::= { slapmBaseObjects 4 }

    slapmPolicyCountNotFounds OBJECT-TYPE
       SYNTAX      Counter32
       MAX-ACCESS  read-only
       STATUS      current
       DESCRIPTION
          "Total number of policy repository accesses,
          with respect to a policy agent, that
          resulted in an entry not being located."
       ::= { slapmBaseObjects 5 }

    slapmPolicyPurgeTime OBJECT-TYPE
       SYNTAX      Integer32 (0..3600)  -- maximum of 1 hour
       UNITS       "seconds"
       MAX-ACCESS  read-write
       STATUS      current
       DESCRIPTION
          "The purpose of this object is to define the amount
          of time (in seconds) to wait before removing an
          slapmPolicyStatsEntry when a system detects that the
          associated policy definition has been deleted.
          This gives any polling management applications
          time to complete their last poll before an entry is
          removed.  An slapmPolicyStatsEntry enters the
          deleteNeeded(3) state via slapmPolicyStatsOperStatus
          when a system first detects that the entry needs
          to be removed.

          Once slapmPolicyPurgeTime has expired for an entry in
          deleteNeeded(3) state it is removed a long with any
          dependent slapmPolicyMonitorTable entries.

          A value of 0 for this option disables this function and
          results in the automatic purging of slapmPolicyTable
          entries upon transition into deleteNeeded(3) state.

          A slapmPolicyProfileDeleted notification is sent when a
          slapmPolicyStatsEntry.  Dependent slapmPolicyMonitorEntry
```

```
            deletion results in a slapmPolicyMonitorDeleted
            notification being sent.  Both notifications are suppressed
            if the value of slapmPolicyTrapEnable is disabled(2)."
         DEFVAL { 900 }  -- 15 minute default purge time
         ::= { slapmBaseObjects 6 }
```

```
     slapmPolicyTrapEnable OBJECT-TYPE
        SYNTAX      INTEGER { enabled(1), disabled(2) }
        MAX-ACCESS  read-write
        STATUS      current
        DESCRIPTION
           "Indicates whether slapmPolicyProfileDeleted and
           slapmPolicyMonitorDeleted notifications should be
           generated by this system."
        DEFVAL { disabled }
        ::= { slapmBaseObjects 7 }

     slapmTableObjects    OBJECT IDENTIFIER ::= { slapmObjects 2 }

     -- Sla Performance Monitoring Policy Statistics Table

     slapmPolicyStatsTable OBJECT-TYPE
        SYNTAX SEQUENCE OF SlapmPolicyStatsEntry
        MAX-ACCESS not-accessible
        STATUS current
        DESCRIPTION
            "Provides statistics on all policies known at a
            system."
       ::= { slapmTableObjects 1 }

     slapmPolicyStatsEntry OBJECT-TYPE
        SYNTAX SlapmPolicyStatsEntry
        MAX-ACCESS not-accessible
        STATUS current
        DESCRIPTION
            "Defines an entry in the slapmPolicyStatsTable.  This table
            defines a set of statistics that is kept on a per system,
            policy and traffic profile basis.  A policy can be
            defined to contain multiple traffic profiles that map to
            a single action.

            Entries in this table are not created or deleted via SNMP
            but reflect the set of policy definitions known at a system."
        INDEX {
               slapmPolicyStatsSystemAddress,
               slapmPolicyStatsPolicyName,
               slapmPolicyStatsTrafficProfileName
              }
        ::= { slapmPolicyStatsTable 1 }

     SlapmPolicyStatsEntry ::=
        SEQUENCE {
            slapmPolicyStatsSystemAddress      OCTET STRING,
            slapmPolicyStatsPolicyName         SlapmNameType,
            slapmPolicyStatsTrafficProfileName SlapmNameType,
```

```
            slapmPolicyStatsOperStatus          INTEGER,
            slapmPolicyStatsActiveConns         Gauge32,
            slapmPolicyStatsTotalConns          Counter32,
            slapmPolicyStatsFirstActivated      DateAndTime,
            slapmPolicyStatsLastMapping         DateAndTime,
            slapmPolicyStatsInOctets            Counter32,
```

```
            slapmPolicyStatsOutOctets          Counter32,
            slapmPolicyStatsConnectionLimit    Integer32,
            slapmPolicyStatsCountAccepts       Counter32,
            slapmPolicyStatsCountDenies        Counter32,
            slapmPolicyStatsInDiscards         Counter32,
            slapmPolicyStatsOutDiscards        Counter32,
            slapmPolicyStatsInPackets          Counter32,
            slapmPolicyStatsOutPackets         Counter32,
            slapmPolicyStatsInProfileOctets    Counter32,
            slapmPolicyStatsOutProfileOctets   Counter32,
            slapmPolicyStatsMinRate            Integer32,
            slapmPolicyStatsMaxRate            Integer32,
            slapmPolicyStatsMaxDelay           Integer32
         }

      slapmPolicyStatsSystemAddress OBJECT-TYPE
         SYNTAX      OCTET STRING (SIZE(0..16))
         MAX-ACCESS  not-accessible
         STATUS      current
         DESCRIPTION
            "Address of a system that an Policy definition relates to.
            A zero length octet string must be used to indicate that
            only a single system is being represented.
            Otherwise, the length of the octet string must be
            4 for an ipv4 address or 16 for an ipv6 address."
         ::= { slapmPolicyStatsEntry 1 }

      slapmPolicyStatsPolicyName OBJECT-TYPE
         SYNTAX      SlapmNameType
         MAX-ACCESS  not-accessible
         STATUS      current
         DESCRIPTION
            "Policy name that this entry relates to."
         ::= { slapmPolicyStatsEntry 2 }

      slapmPolicyStatsTrafficProfileName OBJECT-TYPE
         SYNTAX      SlapmNameType
         MAX-ACCESS  not-accessible
         STATUS      current
         DESCRIPTION
            "The name of a traffic profile that is associated with
            a policy."
         ::= { slapmPolicyStatsEntry 3 }

      slapmPolicyStatsOperStatus OBJECT-TYPE
         SYNTAX      INTEGER {
                                inactive(1),
                                active(2),
                                deleteNeeded(3)
```

```
                        }
        MAX-ACCESS  read-only
        STATUS      current
        DESCRIPTION
           "The state of a policy entry:
```

```
            inactive(1)      - An policy entry was either defined
                               by local SYSDEF or discovered via
                               a directory search but has not been
                               activated (not currently being used).
            active(2)        - Policy entry is being used to affect
                               traffic flows.
            deleteNeeded(3)  - Either though local implementation
                               dependent methods or by discovering
                               that the directory entry corresponding
                               to this table entry no longer
                               exists and slapmPolicyPurgeTime needs
                               to expire before attempting to remove
                               the corresponding slapmPolicyStatsEntry
                               and any dependent slapmPolicyMonitor
                               table entries.
          Note: a policy traffic profile in a state other than
          active(1) is not beening used to affect traffic flows."
       ::= { slapmPolicyStatsEntry 4 }

    slapmPolicyStatsActiveConns OBJECT-TYPE
       SYNTAX      Gauge32
       MAX-ACCESS  read-only
       STATUS      current
       DESCRIPTION
          "The number of active TCP connections that are
          affected by the corresponding policy entry."
       ::= { slapmPolicyStatsEntry 5 }

    slapmPolicyStatsTotalConns OBJECT-TYPE
       SYNTAX      Counter32
       MAX-ACCESS  read-only
       STATUS      current
       DESCRIPTION
          "The number of total TCP connections that are
          affected by the corresponding policy entry."
       ::= { slapmPolicyStatsEntry 6 }

    slapmPolicyStatsFirstActivated OBJECT-TYPE
       SYNTAX      DateAndTime
       MAX-ACCESS  read-only
       STATUS      current
       DESCRIPTION
          "The timestamp for when the corresponding policy entry
          is activated.  The value of this object serves as
          the discontinuity event indicator when polling entries
          in this table.  The value of this object is updated on
          transition of slapmPolicyStatsOperStatus into the active(2)
          state."
       DEFVAL { '0000000000000000'H }
```

```
        ::= { slapmPolicyStatsEntry 7 }

     slapmPolicyStatsLastMapping OBJECT-TYPE
        SYNTAX      DateAndTime
        MAX-ACCESS  read-only
        STATUS      current
```

```
        DESCRIPTION
           "The timestamp for when the last time
           that the associated policy entry was used."
        DEFVAL { '0000000000000000'H }
        ::= { slapmPolicyStatsEntry 8 }

     slapmPolicyStatsInOctets OBJECT-TYPE
        SYNTAX      Counter32
        MAX-ACCESS  read-only
        STATUS      current
        DESCRIPTION
           "The number of octets that was received by IP for an
           entity that map to this entry."
        ::= { slapmPolicyStatsEntry 9 }

     slapmPolicyStatsOutOctets OBJECT-TYPE
        SYNTAX      Counter32
        MAX-ACCESS  read-only
        STATUS      current
        DESCRIPTION
           "The number of octets that was transmitted by IP for an
           entity that map to this entry."
        ::= { slapmPolicyStatsEntry 10 }

     slapmPolicyStatsConnectionLimit OBJECT-TYPE
        SYNTAX      Integer32
        MAX-ACCESS  read-only
        STATUS      current
        DESCRIPTION
           "The limit for the number of active TCP connections that
           are allowed for this policy definition.  A value of zero
           for this object implies that a connection limit has not
           been specified."
        ::= { slapmPolicyStatsEntry 11 }

     slapmPolicyStatsCountAccepts OBJECT-TYPE
        SYNTAX      Counter32
        MAX-ACCESS  read-only
        STATUS      current
        DESCRIPTION
            "This counter is incremented when a policy action's
            Permission value is set to Accept and a session
            (TCP connection) is accepted."
        ::= { slapmPolicyStatsEntry 12 }

     slapmPolicyStatsCountDenies OBJECT-TYPE
        SYNTAX      Counter32
        MAX-ACCESS  read-only
        STATUS      current
```

```
        DESCRIPTION
            "This counter is incremented when a policy action's
            Permission value is set to Deny and a session is denied,
            or when a session (TCP connection) is rejected due to a
            policy's connection limit (slapmPolicyStatsConnectLimit)
            being reached."
```

```
        ::= { slapmPolicyStatsEntry 13 }

     slapmPolicyStatsInDiscards OBJECT-TYPE
        SYNTAX      Counter32
        MAX-ACCESS  read-only
        STATUS      current
        DESCRIPTION
            "This counter counts the number of in octets discarded.
            This occurs when an error is detected.  Examples of this
            are buffer overflow, checksum error, or bad packet
            format."
        ::= { slapmPolicyStatsEntry 14 }

     slapmPolicyStatsOutDiscards OBJECT-TYPE
        SYNTAX      Counter32
        MAX-ACCESS  read-only
        STATUS      current
        DESCRIPTION
            "This counter counts the number of out octets discarded.
            Examples of this are buffer overflow, checksum error, or
            bad packet format."
        ::= { slapmPolicyStatsEntry 15 }

     slapmPolicyStatsInPackets OBJECT-TYPE
        SYNTAX      Counter32
        MAX-ACCESS  read-only
        STATUS      current
        DESCRIPTION
            "This counter counts the number of in packets received
            that relate to this policy entry from IP."
        ::= { slapmPolicyStatsEntry 16 }

     slapmPolicyStatsOutPackets OBJECT-TYPE
        SYNTAX      Counter32
        MAX-ACCESS  read-only
        STATUS      current
        DESCRIPTION
            "This counter counts the number of out packets sent
            by IP that relate to this policy entry."
        ::= { slapmPolicyStatsEntry 17 }

     slapmPolicyStatsInProfileOctets OBJECT-TYPE
        SYNTAX      Counter32
        MAX-ACCESS  read-only
        STATUS      current
        DESCRIPTION
            "This counter counts the number of in octets that are
            determined to be within profile."
        ::= { slapmPolicyStatsEntry 18 }
```

```
     slapmPolicyStatsOutProfileOctets OBJECT-TYPE
        SYNTAX      Counter32
        MAX-ACCESS  read-only
        STATUS      current
        DESCRIPTION
```

```
            "This counter counts the number of out octets that are
            determined to be within profile."
        ::= { slapmPolicyStatsEntry 19 }

    slapmPolicyStatsMinRate OBJECT-TYPE
        SYNTAX      Integer32
        UNITS       "Kilobits per second"
        MAX-ACCESS  read-only
        STATUS      current
        DESCRIPTION
            "The minimum transfer rate defined for this entry."
        ::= { slapmPolicyStatsEntry 20 }

    slapmPolicyStatsMaxRate OBJECT-TYPE
        SYNTAX      Integer32
        UNITS       "Kilobits per second"
        MAX-ACCESS  read-only
        STATUS      current
        DESCRIPTION
            "The maximum transfer rate defined for this entry."
        ::= { slapmPolicyStatsEntry 21 }

    slapmPolicyStatsMaxDelay OBJECT-TYPE
        SYNTAX      Integer32
        UNITS       "milliseconds"
        MAX-ACCESS  read-only
        STATUS      current
        DESCRIPTION
            "The maximum delay defined for this entry."
        ::= { slapmPolicyStatsEntry 22 }

    -- SLA Performance Monitoring Policy Monitor Table

    slapmPolicyMonitorTable OBJECT-TYPE
        SYNTAX SEQUENCE OF SlapmPolicyMonitorEntry
        MAX-ACCESS not-accessible
        STATUS current
        DESCRIPTION
            "Provides a method of monitoring policies and their
            effect at a system."
      ::= { slapmTableObjects 2 }

    slapmPolicyMonitorEntry OBJECT-TYPE
        SYNTAX SlapmPolicyMonitorEntry
        MAX-ACCESS not-accessible
        STATUS current
        DESCRIPTION
            "Defines an entry in the slapmPolicyMonitorTable. This
            table defines which policies should be monitored on a
```

```
            per policy traffic profile basis."
        INDEX {
               slapmPolicyMonitorOwnerIndex,
               slapmPolicyMonitorSystemAddress,
               slapmPolicyMonitorPolicyName,
               slapmPolicyMonitorTrafficProfileName
```

```
            }
        ::= { slapmPolicyMonitorTable 1 }

    SlapmPolicyMonitorEntry ::=
       SEQUENCE {
           slapmPolicyMonitorOwnerIndex             SnmpAdminString,
           slapmPolicyMonitorSystemAddress          OCTET STRING,
           slapmPolicyMonitorPolicyName             SlapmNameType,
           slapmPolicyMonitorTrafficProfileName     SlapmNameType,
           slapmPolicyMonitorControl                BITS,
           slapmPolicyMonitorStatus                 SlapmStatus,
           slapmPolicyMonitorInterval               Integer32,
           slapmPolicyMonitorIntTime                DateAndTime,
           slapmPolicyMonitorCurrentInRate          Gauge32,
           slapmPolicyMonitorCurrentOutRate         Gauge32,
           slapmPolicyMonitorMinRateLow             Integer32,
           slapmPolicyMonitorMinRateHigh            Integer32,
           slapmPolicyMonitorMaxRateHigh            Integer32,
           slapmPolicyMonitorMaxRateLow             Integer32,
           slapmPolicyMonitorMaxDelayHigh           Integer32,
           slapmPolicyMonitorMaxDelayLow            Integer32,
           slapmPolicyMonitorMinInRateNotAchievies  Counter32,
           slapmPolicyMonitorMaxInRateExceeds       Counter32,
           slapmPolicyMonitorMaxInDelayExceeds      Counter32,
           slapmPolicyMonitorMinOutRateNotAchievies Counter32,
           slapmPolicyMonitorMaxOutRateExceeds      Counter32,
           slapmPolicyMonitorMaxOutDelayExceeds     Counter32,
           slapmPolicyMonitorRowStatus              RowStatus
       }

    slapmPolicyMonitorOwnerIndex OBJECT-TYPE
       SYNTAX      SnmpAdminString (SIZE(0..16))
       MAX-ACCESS  not-accessible
       STATUS      current
       DESCRIPTION
          "To facilitate the provisioning of access control by a
          security administrator using the View-Based Access
          Control Model (RFC 2275, VACM) for tables in which
          multiple users may need to independently create or modify
          entries, the initial index is used as an 'owner index'.
          Such an initial index has a syntax of SnmpAdminString,
          and can thus be trivially mapped to a securityName or
          groupName as defined in VACM, in accordance with a
          security policy.

          All entries in that table belonging to a particular user
          will have the same value for this initial index.  For a
          given user's entries in a particular table, the object
          identifiers for the information in these entries will
```

have the same subidentifiers (except for the 'column' subidentifier) up to the end of the encoded owner index. To configure VACM to permit access to this portion of the table, one would create vacmViewTreeFamilyTable entries with the value of vacmViewTreeFamilySubtree including the owner index portion, and vacmViewTreeFamilyMask

```
          'wildcarding' the column subidentifier.  More elaborate
          configurations are possible."
       ::= { slapmPolicyMonitorEntry 1 }

    slapmPolicyMonitorSystemAddress OBJECT-TYPE
       SYNTAX      OCTET STRING (SIZE(0..16))
       MAX-ACCESS  not-accessible
       STATUS      current
       DESCRIPTION
          "Address of a system that an Policy definition relates to.
          A zero length octet string can be used to indicate that
          only a single system is being represented.
          Otherwise, the length of the octet string should be
          4 for an ipv4 address and 16 for an ipv6 address."
       ::= { slapmPolicyMonitorEntry 2 }

    slapmPolicyMonitorPolicyName OBJECT-TYPE
       SYNTAX      SlapmNameType
       MAX-ACCESS  not-accessible
       STATUS      current
       DESCRIPTION
          "Policy name that this entry relates to."
       ::= { slapmPolicyMonitorEntry 3 }

    slapmPolicyMonitorTrafficProfileName OBJECT-TYPE
       SYNTAX      SlapmNameType
       MAX-ACCESS  not-accessible
       STATUS      current
       DESCRIPTION
          "The corresponding Traffic Profile name."
       ::= { slapmPolicyMonitorEntry 4 }

    slapmPolicyMonitorControl OBJECT-TYPE
       SYNTAX      BITS {
                         monitorMinRate(0),
                         monitorMaxRate(1),
                         monitorMaxDelay(2),
                         enableAggregateTraps(3),
                         enableSubcomponentTraps(4),
                         monitorSubcomponents(5)
                        }
       MAX-ACCESS  read-create
       STATUS       current
       DESCRIPTION
          "The value of this object determines the type and level
          of monitoring that is applied to a policy/profile.  The
          value of this object can't be changed once the table
          entry that it is a part of is activated via a
          slapmPolicyMonitorRowStatus transition to active state.
```

monitorMinRate(0) - Monitor minimum transfer rate.
monitorMaxRate(1) - Monitor maximum transfer rate.
monitorMaxDelay(2) - Monitor maximum delay.
enableAggregateTraps(3) - The enableAggregateTraps(3)
BITS setting enables notification generation

```
                    when monitoring a policy traffic profile as an
                    aggregate using the values in the corresponding
                    slapmPolicyStatsEntry.  By default this function
                    is not enabled.
                enableSubcomponentTraps(4) - This BITS setting enables
                    notification generation when monitoring all
                    subcomponents that are mapped to an corresponding
                    slapmPolicyStatsEntry.  By default this
                    function is not enabled.
                monitorSubcomponents(5) - This BITS setting enables
                    monitoring of each subcomponent (typically a
                    TCP connection or UDP listener) individually."
        DEFVAL   { { monitorMinRate, monitorMaxRate,
                    monitorMaxDelay } }
        ::= { slapmPolicyMonitorEntry 5 }

    slapmPolicyMonitorStatus OBJECT-TYPE
        SYNTAX      SlapmStatus
        MAX-ACCESS  read-only
        STATUS      current
        DESCRIPTION
            "The value of this object indicates when a monitored
            value has not meet a threshold or isn't meeting the
            defined service level.  The SalpmStatus TEXTUAL-CONVENTION
            defines two levels of not meeting a threshold.  The first
            set:
                        slaMinInRateNotAchieved(0),
                        slaMaxInRateExceeded(1),
                        slaMaxInDelayExceeded(2),
                        slaMinOutRateNotAchieved(3),
                        slaMaxOutRateExceeded(4),
                        slaMaxOutDelayExceeded(5)

            are used to indicate when the SLA as an aggregate is
            not meeting a threshold while the second set:

                        monitorMinInRateNotAchieved(6),
                        monitorMaxInRateExceeded(7),
                        monitorMaxInDelayExceeded(8),
                        monitorMinOutRateNotAchieved(9),
                        monitorMaxOutRateExceeded(10),
                        monitorMaxOutDelayExceeded(11)

            indicate that at least one subcomponent is not meeting
            a threshold."
        ::= { slapmPolicyMonitorEntry 6 }

    slapmPolicyMonitorInterval OBJECT-TYPE
        SYNTAX      Integer32 (15..86400) -- 15 second min, 24 hour max
```

```
        UNITS       "seconds"
        MAX-ACCESS  read-create
        STATUS      current
        DESCRIPTION
           "The number of seconds that defines the sample period."
        DEFVAL   {20}    -- 20 seconds
```

```
        ::= { slapmPolicyMonitorEntry 7 }

     slapmPolicyMonitorIntTime OBJECT-TYPE
        SYNTAX      DateAndTime
        MAX-ACCESS  read-only
        STATUS      current
        DESCRIPTION
           "The timestamp for when the last interval ended."
        DEFVAL { '0000000000000000'H }
        ::= { slapmPolicyMonitorEntry 8 }

     slapmPolicyMonitorCurrentInRate OBJECT-TYPE
        SYNTAX      Gauge32
        UNITS       "kilobits per second"
        MAX-ACCESS  read-only
        STATUS      current
        DESCRIPTION
           "Using the value of the corresponding
           slapmPolicyMonitorInterval, slapmPolicyStatsInOctets
           is sampled and then divided by slapmPolicyMonitorInterval
           to determine the current in transfer rate."
        ::= { slapmPolicyMonitorEntry 9 }

     slapmPolicyMonitorCurrentOutRate OBJECT-TYPE
        SYNTAX      Gauge32
        UNITS       "kilobits per second"
        MAX-ACCESS  read-only
        STATUS      current
        DESCRIPTION
           "Using the value of the corresponding
           slapmPolicyMonitorInterval, slapmPolicyStatsOutOctets
           is sampled and then divided by slapmPolicyMonitorInterval
           to determine the current out transfer rate."
        ::= { slapmPolicyMonitorEntry 10 }

     slapmPolicyMonitorMinRateLow OBJECT-TYPE
        SYNTAX      Integer32
        UNITS       "kilobits per second"
        MAX-ACCESS  read-create
        STATUS      current
        DESCRIPTION
           "The threshold for generating a
           slapmMonitoredEventNotAchieved notification, signalling
           that a monitored minimum transfer rate has not been meet.

           A slapmMonitoredEventNotAchieved notification is not
           generated again for an slapmPolicyMonitorEntry until
           the minimum transfer rate
           exceeds slapmPolicyMonitorMinRateHigh (a
```

slapmMonitoredEventOkay notification is then transmitted) and then fails below slapmPolicyMonitorMinRateLow. This behavior reduces the slapmMonitoredEventNotAchieved notifications that are transmitted.

A value of zero for this object is returned when the

```
            slapmPolicyMonitorControl monitorMinRate(0) is not
            enabled.  When enabled the default value for this object
            is the min rate value specified in the associated
            action definition minus 10%.  If the action definition
            doesn't have a min rate defined then there is no
            default for this object and a value MUST be specified
            prior to activating this entry when monitorMinRate(0)
            is selected.

            Note: The corresponding slapmPolicyMonitorControl
            BITS setting, enableAggregateTraps(3), MUST be selected in
            order for any notification relating to this entry to
            potentially be generated."
         ::= { slapmPolicyMonitorEntry 11 }

      slapmPolicyMonitorMinRateHigh OBJECT-TYPE
         SYNTAX      Integer32
         UNITS       "kilobits per second"
         MAX-ACCESS  read-create
         STATUS      current
         DESCRIPTION
            "The threshold for generating a slapmMonitoredEventOkay
            notification, signalling that a monitored minimum
            transfer rate has increased to an acceptable level.

            A value of zero for this object is returned when the
            slapmPolicyMonitorControl monitorMinRate(0) is not
            enabled.  When enabled the default value for this object
            is the min rate value specified in the associated
            action definition plus 10%.  If the action definition
            doesn't have a min rate defined then there is no
            default for this object and a value MUST be specified
            prior to activating this entry when monitorMinRate(0)
            is selected.

            Note: The corresponding slapmPolicyMonitorControl
            BITS setting, enableAggregateTraps(3), MUST be selected
            in order for any notification relating to this entry to
            potentially be generated."
         ::= { slapmPolicyMonitorEntry 12 }

      slapmPolicyMonitorMaxRateHigh OBJECT-TYPE
         SYNTAX      Integer32
         UNITS       "kilobits per second"
         MAX-ACCESS  read-create
         STATUS      current
         DESCRIPTION
            "The threshold for generating a
            slapmMonitoredEventNotAchieved notification, signalling
```

that a monitored maximum transfer rate has been exceeded.

A slapmMonitoredEventNotAchieved notification is not generated again for an slapmPolicyMonitorEntry until the maximum transfer rate fails below slapmPolicyMonitorMaxRateLow (a slapmMonitoredEventOkay

```
            notification is then transmitted) and then raises above
            slapmPolicyMonitorMaxRateHigh.  This behavior reduces the
            slapmMonitoredEventNotAchieved notifications that are
            transmitted.

            A value of zero for this object is returned when the
            slapmPolicyMonitorControl monitorMaxRate(1) is not
            enabled.  When enabled the default value for this object
            is the max rate value specified in the associated
            action definition plus 10%.  If the action definition
            doesn't have a max rate defined then there is no
            default for this object and a value MUST be specified
            prior to activating this entry when monitorMaxRate(1)
            is selected.

            Note: The corresponding slapmPolicyMonitorControl
            BITS setting, enableAggregateTraps(3), MUST be selected in
            order for any notification relating to this entry to
            potentially be generated."
         ::= { slapmPolicyMonitorEntry 13 }

      slapmPolicyMonitorMaxRateLow OBJECT-TYPE
         SYNTAX      Integer32
         UNITS       "kilobits per second"
         MAX-ACCESS  read-create
         STATUS      current
         DESCRIPTION
            "The threshold for generating a slapmMonitoredEventOkay
            notification, signalling that a monitored maximum
            transfer rate has fallen to an acceptable level.

            A value of zero for this object is returned when the
            slapmPolicyMonitorControl monitorMaxRate(1) is not
            enabled.  When enabled the default value for this object
            is the max rate value specified in the associated
            action definition minus 10%.  If the action definition
            doesn't have a max rate defined then there is no
            default for this object and a value MUST be specified
            prior to activating this entry when monitorMaxRate(1)
            is selected.

            Note: The corresponding slapmPolicyMonitorControl
            BITS setting, enableAggregateTraps(3), MUST be selected in
            order for any notification relating to this entry to
            potentially be generated."
         ::= { slapmPolicyMonitorEntry 14 }

      slapmPolicyMonitorMaxDelayHigh OBJECT-TYPE
         SYNTAX      Integer32
```

```
        UNITS       "milliseconds"
        MAX-ACCESS  read-create
        STATUS      current
        DESCRIPTION
           "The threshold for generating a
           slapmMonitoredEventNotAchieved notification, signalling
```

```
            that a monitored maximum delay rate has been exceeded.

            A slapmMonitoredEventNotAchieved notification is not
            generated again for an slapmPolicyMonitorEntry until
            the maximum delay rate falls below
            slapmPolicyMonitorMaxDelayLow (a slapmMonitoredEventOkay
            notification is then transmitted) and raises above
            slapmPolicyMonitorMaxDelayHigh.  This behavior reduces
            the slapmMonitoredEventNotAchieved notifications that are
            transmitted.

            A value of zero for this object is returned when the
            slapmPolicyMonitorControl monitorMaxDelay(4) is not
            enabled.  When enabled the default value for this object
            is the max delay value specified in the associated
            action definition plus 10%.  If the action definition
            doesn't have a max delay defined then there is no
            default for this object and a value MUST be specified
            prior to activating this entry when monitorMaxDelay(4)
            is selected.

            Note: The corresponding slapmPolicyMonitorControl
            BITS setting, enableAggregateTraps(3), MUST be selected
            in order for any notification relating to this entry to
            potentially be generated."
         ::= { slapmPolicyMonitorEntry 15 }

      slapmPolicyMonitorMaxDelayLow OBJECT-TYPE
         SYNTAX      Integer32
         UNITS       "milliseconds"
         MAX-ACCESS  read-create
         STATUS      current
         DESCRIPTION
            "The threshold for generating a slapmMonitoredEventOkay
            notification, signalling that a monitored maximum delay
            rate has fallen to an acceptable level.

            A value of zero for this object is returned when the
            slapmPolicyMonitorControl monitorMaxDelay(4) is not
            enabled.  When enabled the default value for this object
            is the max delay value specified in the associated
            action definition minus 10%.  If the action definition
            doesn't have a max delay defined then there is no
            default for this object and a value MUST be specified
            prior to activating this entry when monitorMaxDelay(4)
            is selected.

            Note: The corresponding slapmPolicyMonitorControl
            BITS setting, enableAggregateTraps(3), MUST be selected
```

```
            in order for any notification relating to this entry to
            potentially be generated."
         ::= { slapmPolicyMonitorEntry 16 }

      slapmPolicyMonitorMinInRateNotAchievies OBJECT-TYPE
         SYNTAX      Counter32
```

```
        MAX-ACCESS  read-only
        STATUS      current
        DESCRIPTION
            "The number of times that a minimum transfer in rate
            was not achieved."
        ::= { slapmPolicyMonitorEntry 17 }

     slapmPolicyMonitorMaxInRateExceeds OBJECT-TYPE
        SYNTAX      Counter32
        MAX-ACCESS  read-only
        STATUS      current
        DESCRIPTION
            "The number of times that a maximum transfer in rate
            was exceeded."
        ::= { slapmPolicyMonitorEntry 18 }

     slapmPolicyMonitorMaxInDelayExceeds OBJECT-TYPE
        SYNTAX      Counter32
        MAX-ACCESS  read-only
        STATUS      current
        DESCRIPTION
            "The number of times that a maximum delay in rate
            was exceeded."
        ::= { slapmPolicyMonitorEntry 19 }

     slapmPolicyMonitorMinOutRateNotAchievies OBJECT-TYPE
        SYNTAX      Counter32
        MAX-ACCESS  read-only
        STATUS      current
        DESCRIPTION
            "The number of times that a minimum transfer out rate
            was not achieved."
        ::= { slapmPolicyMonitorEntry 20 }

     slapmPolicyMonitorMaxOutRateExceeds OBJECT-TYPE
        SYNTAX      Counter32
        MAX-ACCESS  read-only
        STATUS      current
        DESCRIPTION
            "The number of times that a maximum transfer out rate
            was exceeded."
        ::= { slapmPolicyMonitorEntry 21 }

     slapmPolicyMonitorMaxOutDelayExceeds OBJECT-TYPE
        SYNTAX      Counter32
        MAX-ACCESS  read-only
        STATUS      current
        DESCRIPTION
            "The number of times that a maximum delay out rate
```

```
            was exceeded."
         ::= { slapmPolicyMonitorEntry 22 }

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

```
        STATUS       current
        DESCRIPTION
          "This object allows entries to be created and deleted
           in the slapmPolicyMonitorTable.  An entry in this table
           is deleted by setting this object to destroy(6).

           Removal of a corresponding (same policy and traffic profile
           names) slapmPolicyStatsEntry has the side effect of the
           automatic deletion an entry in this table."
        ::= { slapmPolicyMonitorEntry 23 }

    -- Subcomponent Table

    slapmSubcomponentTable OBJECT-TYPE
        SYNTAX      SEQUENCE OF SlapmSubcomponentEntry
        MAX-ACCESS  not-accessible
        STATUS      current
        DESCRIPTION
             "Defines a table to provide information on the
             individually components that are mapped to
             a policy traffic profile.

             The indexing for this table is designed to support
             the use of an SNMP GET-NEXT operation using only
             the remote address and remote port as a way for
             a management station to retrieve the table entries
             relating to a particular client."
        ::= { slapmTableObjects 3 }

    slapmSubcomponentEntry OBJECT-TYPE
        SYNTAX      SlapmSubcomponentEntry
        MAX-ACCESS  not-accessible
        STATUS      current
        DESCRIPTION
             "Describes a particular subcomponent entry.  This
             table does not have slapmPolicyStatsOwnerIndex as
             part of its indexing since this table's contents
             is intended to span multiple users."
        INDEX {
                slapmSubcomponentRemAddress,
                slapmSubcomponentRemPort,
                slapmSubcomponentLocalAddress,
                slapmSubcomponentLocalPort
              }
        ::= { slapmSubcomponentTable 1 }

    SlapmSubcomponentEntry ::=
        SEQUENCE {
             slapmSubcomponentRemAddress            OCTET STRING,
```

```
            slapmSubcomponentRemPort            Integer32,
            slapmSubcomponentLocalAddress       OCTET STRING,
            slapmSubcomponentLocalPort          Integer32,
            slapmSubcomponentProtocol           INTEGER,
            slapmSubcomponentSystemAddress      OCTET STRING,
            slapmSubcomponentPolicyName         SlapmNameType,
```

```
            slapmSubcomponentTrafficProfileName    SlapmNameType,
            slapmSubcomponentLastActivity          DateAndTime,
            slapmSubcomponentInOctets              Counter32,
            slapmSubcomponentOutOctets             Counter32,
            slapmSubcomponentTcpOutBufferedOctets  Counter32,
            slapmSubcomponentTcpInBufferedOctets   Counter32,
            slapmSubcomponentTcpReXmts             Counter32,
            slapmSubcomponentTcpRoundTripTime      Integer32,
            slapmSubcomponentTcpRoundTripVariance  Integer32,
            slapmSubcomponentInPdus                Counter32,
            slapmSubcomponentOutPdus               Counter32,
            slapmSubcomponentApplName              SlapmNameType,
            slapmSubcomponentMonitorStatus         SlapmStatus,
            slapmSubcomponentMonitorIntTime        DateAndTime,
            slapmSubcomponentMonitorCurrentOutRate Gauge32,
            slapmSubcomponentMonitorCurrentInRate  Gauge32
         }

   slapmSubcomponentRemAddress OBJECT-TYPE
      SYNTAX      OCTET STRING (SIZE(0..16))
      MAX-ACCESS  not-accessible
      STATUS      current
      DESCRIPTION
         "Indicate the remote address of a subcomponent.
         A remote address can be either an ipv4 address in which
         case 4 octets are required or as an ipv6 address that
         requires 16 octets.  The value of this subidentifier
         is a zero length octet string when this entry relates
         to a UDP listener."
      ::= { slapmSubcomponentEntry 1 }

   slapmSubcomponentRemPort OBJECT-TYPE
      SYNTAX      Integer32(0..65535)
      MAX-ACCESS  not-accessible
      STATUS      current
      DESCRIPTION
         "Indicate the remote port of a subcomponent.
         The value of this subidentifier
         is 0 when this entry relates to a UDP listener."
      ::= { slapmSubcomponentEntry 2 }

   slapmSubcomponentLocalAddress OBJECT-TYPE
      SYNTAX      OCTET STRING (SIZE(4 | 16))
      MAX-ACCESS  not-accessible
      STATUS      current
      DESCRIPTION
         "Indicate the local address of a subcomponent.
         A local address can be either an ipv4 address in which
         case 4 octets are required or as an ipv6 address that
```

```
            requires 16 octets."
         ::= { slapmSubcomponentEntry 3 }

      slapmSubcomponentLocalPort OBJECT-TYPE
         SYNTAX      Integer32(0..65535)
         MAX-ACCESS  not-accessible
```

```
        STATUS      current
        DESCRIPTION
           "Indicate the local port of a subcomponent."
        ::= { slapmSubcomponentEntry 4 }

     slapmSubcomponentProtocol OBJECT-TYPE
        SYNTAX      INTEGER {
                               udpListener(1),
                               tcpConnection(2)
                             }
        MAX-ACCESS  read-only
        STATUS      current
        DESCRIPTION
           "Indicate the protocol in use that identifies the
           type of subcomponent."
        ::= { slapmSubcomponentEntry 5 }

     slapmSubcomponentSystemAddress OBJECT-TYPE
        SYNTAX      OCTET STRING (SIZE(0..16))
        MAX-ACCESS  read-only
        STATUS      current
        DESCRIPTION
           "Address of a system that an Policy definition relates to.
           A zero length octet string can be used to indicate that
           only a single system is being represented.
           Otherwise, the length of the octet string should be
           4 for an ipv4 address and 16 for an ipv6 address."
        ::= { slapmSubcomponentEntry 6 }

     slapmSubcomponentPolicyName OBJECT-TYPE
        SYNTAX      SlapmNameType
        MAX-ACCESS  read-only
        STATUS      current
        DESCRIPTION
           "Policy name that this entry relates to."
        ::= { slapmSubcomponentEntry 7 }

     slapmSubcomponentTrafficProfileName OBJECT-TYPE
        SYNTAX      SlapmNameType
        MAX-ACCESS  read-only
        STATUS      current
        DESCRIPTION
           "The corresponding traffic profile name."
        ::= { slapmSubcomponentEntry 8 }

     slapmSubcomponentLastActivity OBJECT-TYPE
         SYNTAX      DateAndTime
         MAX-ACCESS  read-only
```

```
        STATUS      current
        DESCRIPTION
            "The number of 100ths of seconds  since  this  entry
            was last used."
        DEFVAL { '0000000000000000'H }
        ::= { slapmSubcomponentEntry 9 }
```

```
    slapmSubcomponentInOctets OBJECT-TYPE
        SYNTAX      Counter32
        MAX-ACCESS  read-only
        STATUS      current
        DESCRIPTION
            "The number of octets received from IP for this
            connection."
        ::= { slapmSubcomponentEntry 10 }

    slapmSubcomponentOutOctets OBJECT-TYPE
        SYNTAX      Counter32
        MAX-ACCESS  read-only
        STATUS      current
        DESCRIPTION
            "The number of octets sent to IP for this connection."
        ::= { slapmSubcomponentEntry 11 }

    slapmSubcomponentTcpOutBufferedOctets OBJECT-TYPE
        SYNTAX      Counter32
        MAX-ACCESS  read-only
        STATUS      current
        DESCRIPTION
            "Number of outgoing octets buffered.  The value
            of this object is zero when the entry is not
            for a TCP connection."
        ::= { slapmSubcomponentEntry 12 }

    slapmSubcomponentTcpInBufferedOctets OBJECT-TYPE
        SYNTAX      Counter32
        MAX-ACCESS  read-only
        STATUS      current
        DESCRIPTION
            "Number of incoming octets buffered.  The value
            of this object is zero when the entry is not
            for a TCP connection."
        ::= { slapmSubcomponentEntry 13 }

    slapmSubcomponentTcpReXmts OBJECT-TYPE
        SYNTAX      Counter32
        MAX-ACCESS  read-only
        STATUS      current
        DESCRIPTION
            "Number of retransmissions.  The value
            of this object is zero when the entry is not
            for a TCP connection."
        ::= { slapmSubcomponentEntry 14 }

    slapmSubcomponentTcpRoundTripTime OBJECT-TYPE
```

```
        SYNTAX       Integer32
        UNITS        "milliseconds"
        MAX-ACCESS   read-only
        STATUS       current
        DESCRIPTION
            "The amount of time that has elapsed, measured in
```

```
            milliseconds, from when the last TCP segment was
            transmitted by the TCP Stack until the ACK was
            received.

            The value of this object is zero when the entry is not
            for a TCP connection."
        ::= { slapmSubcomponentEntry 15 }

    slapmSubcomponentTcpRoundTripVariance OBJECT-TYPE
        SYNTAX       Integer32
        MAX-ACCESS   read-only
        STATUS       current
        DESCRIPTION
            "Round trip time variance.

            The value of this object is zero when the entry is not
            for a TCP connection."
        ::= { slapmSubcomponentEntry 16 }

    slapmSubcomponentInPdus OBJECT-TYPE
        SYNTAX       Counter32
        MAX-ACCESS   read-only
        STATUS       current
        DESCRIPTION
            "The number of protocol related data units transferred
            inbound:

              slapmSubcomponentProtocol    PDU Type

                   udpListener(1)          UDP datagrams
                   tcpConnection(2)        TCP segments"
        ::= { slapmSubcomponentEntry 17 }

    slapmSubcomponentOutPdus OBJECT-TYPE
        SYNTAX       Counter32
        MAX-ACCESS   read-only
        STATUS       current
        DESCRIPTION
            "The number of protocol related data units transferred
            outbound:

              slapmSubcomponentProtocol    PDU Type

                   udpListener(1)          UDP datagrams
                   tcpConnection(2)        TCP segments"
        ::= { slapmSubcomponentEntry 18 }

    slapmSubcomponentApplName OBJECT-TYPE
        SYNTAX       SlapmNameType
        MAX-ACCESS   read-only
```

```
        STATUS      current
        DESCRIPTION
            "The application name associated with this entry if known,
            otherwise a zero-length octet string is returned as the value
            of this object."
```

```
         ::= { slapmSubcomponentEntry 19 }

     slapmSubcomponentMonitorStatus OBJECT-TYPE
        SYNTAX      SlapmStatus
        MAX-ACCESS  read-only
        STATUS       current
        DESCRIPTION
           "The value of this object indicates when a monitored
           value has exceeded a threshold or isn't meeting the
           defined service level.  Only the following SlapmStatus
           BITS setting can be reported here:

                       monitorMinInRateNotAchieved(6),
                       monitorMaxInRateExceeded(7),
                       monitorMaxInDelayExceeded(8),
                       monitorMinOutRateNotAchieved(9),
                       monitorMaxOutRateExceeded(10),
                       monitorMaxOutDelayExceeded(11)

           This object only has meaning when an corresponding
           slapmPolicyMonitorEntry exists with the
           slapmPolicyMonitorControl BITS setting
           monitorSubcomponents(5) enabled."
        ::= { slapmSubcomponentEntry 20 }

     slapmSubcomponentMonitorIntTime OBJECT-TYPE
        SYNTAX      DateAndTime
        MAX-ACCESS  read-only
        STATUS      current
        DESCRIPTION
           "The timestamp for when the last interval ended.

           This object only has meaning when an corresponding
           slapmPolicyMonitorEntry exists with the
           slapmPolicyMonitorControl BITS setting
           monitorSubcomponents(5) enabled.  All of the
           octets returned when monitoring is not in effect
           must be zero."
        DEFVAL { '0000000000000000'H }
        ::= { slapmSubcomponentEntry 21 }

     slapmSubcomponentMonitorCurrentInRate OBJECT-TYPE
        SYNTAX      Gauge32
        UNITS       "kilobits per second"
        MAX-ACCESS  read-only
        STATUS      current
        DESCRIPTION
           "Using the value of the corresponding
           slapmPolicyMonitorInterval, slapmSubcomponentStatsInOctets
```

is divided by slapmSubcomponentMonitorInterval to determine the current in transfer rate.

This object only has meaning when an corresponding slapmPolicyMonitorEntry exists with the slapmPolicyMonitorControl BITS setting

```
            monitorSubcomponents(5) enabled.  The value of this
            object is zero when monitoring is not in effect."
         ::= { slapmSubcomponentEntry 22 }

      slapmSubcomponentMonitorCurrentOutRate OBJECT-TYPE
         SYNTAX      Gauge32
         UNITS       "kilobits per second"
         MAX-ACCESS  read-only
         STATUS      current
         DESCRIPTION
            "Using the value of the corresponding
            slapmPolicyMonitorInterval, slapmSubcomponentStatsOutOctets
            is divided by slapmPolicyMonitorInterval to determine the
            current out transfer rate.

            This object only has meaning when an corresponding
            slapmPolicyMonitorEntry exists with the
            slapmPolicyMonitorControl BITS setting
            monitorSubcomponents(5) enabled.  The value of this
            object is zero when monitoring is not in effect."
         ::= { slapmSubcomponentEntry 23 }

      -- Notifications

      slapmMonitoredEventNotAchieved NOTIFICATION-TYPE
         OBJECTS {
             slapmPolicyMonitorIntTime,
             slapmPolicyMonitorControl,
             slapmPolicyMonitorStatus,
             slapmPolicyMonitorStatus,
             slapmPolicyMonitorCurrentInRate,
             slapmPolicyMonitorCurrentOutRate
         }
         STATUS  current
         DESCRIPTION
            "This notification is generated when an monitored event
            is not achieved with respect to threshold.  This
            applies only towards monitoring a policy traffic
            profile as an aggregate via an associating
            slapmPolicyStatsEntry.  The value
            of slapmPolicyMonitorControl can be examined to
            determine what is being monitored.  The first
            slapmPolicyMonitorStatus value supplies the current
            monitor status while the 2nd value supplies the
            previous status.

            Note: The corresponding slapmPolicyMonitorControl
            BITS setting, enableAggregateTraps(3), MUST be
            selected in order for this notification to
```

```
            potentially be generated."
         ::= { slapmNotifications 1 }

      slapmMonitoredEventOkay NOTIFICATION-TYPE
         OBJECTS {
             slapmPolicyMonitorIntTime,
```

```
            slapmPolicyMonitorControl,
            slapmPolicyMonitorStatus,
            slapmPolicyMonitorStatus,
            slapmPolicyMonitorCurrentInRate,
            slapmPolicyMonitorCurrentOutRate
        }
        STATUS  current
        DESCRIPTION
           "This notification is generated when a monitored
           event has improved to an acceptable level.  This
           applies only towards monitoring a policy traffic
           profile as an aggregate via an associating
           slapmPolicyStatsEntry.  The value
           of slapmPolicyMonitorControl can be examined to
           determine what is being monitored.  The first
           slapmPolicyMonitorStatus value supplies the current
           monitor status while the 2nd value supplies the
           previous status.

           Note: The corresponding slapmPolicyMonitorControl
           BITS setting, enableAggregateTraps(3), MUST be
           selected in order for this notification to
           potentially be generated."
        ::= { slapmNotifications 2 }

     slapmPolicyProfileDeleted NOTIFICATION-TYPE
        OBJECTS {
            slapmPolicyStatsActiveConns,
            slapmPolicyStatsTotalConns,
            slapmPolicyStatsFirstActivated,
            slapmPolicyStatsLastMapping,
            slapmPolicyStatsInOctets,
            slapmPolicyStatsOutOctets,
            slapmPolicyStatsConnectionLimit,
            slapmPolicyStatsCountAccepts,
            slapmPolicyStatsCountDenies,
            slapmPolicyStatsInDiscards,
            slapmPolicyStatsOutDiscards,
            slapmPolicyStatsInPackets,
            slapmPolicyStatsOutPackets,
            slapmPolicyStatsInProfileOctets,
            slapmPolicyStatsOutProfileOctets,
            slapmPolicyStatsMinRate,
            slapmPolicyStatsMaxRate,
            slapmPolicyStatsMaxDelay
        }
        STATUS  current
        DESCRIPTION
           "A slapmPolicyDeleted notification is sent when a
```

```
            slapmPolicyStatsEntry is deleted if the value of
            slapmPolicyTrapEnable is enabled(1)."
         ::= { slapmNotifications 3 }

      slapmPolicyMonitorDeleted NOTIFICATION-TYPE
         OBJECTS {
```

```
            slapmPolicyMonitorStatus,
            slapmPolicyMonitorInterval,
            slapmPolicyMonitorIntTime,
            slapmPolicyMonitorCurrentInRate,
            slapmPolicyMonitorCurrentOutRate,
            slapmPolicyMonitorMinRateLow,
            slapmPolicyMonitorMinRateHigh,
            slapmPolicyMonitorMaxRateHigh,
            slapmPolicyMonitorMaxRateLow,
            slapmPolicyMonitorMaxDelayHigh,
            slapmPolicyMonitorMaxDelayLow,
            slapmPolicyMonitorMinInRateNotAchievies,
            slapmPolicyMonitorMaxInRateExceeds,
            slapmPolicyMonitorMaxInDelayExceeds,
            slapmPolicyMonitorMinOutRateNotAchievies,
            slapmPolicyMonitorMaxOutRateExceeds,
            slapmPolicyMonitorMaxOutDelayExceeds
        }
        STATUS  current
        DESCRIPTION
           "A slapmPolicyMonitorDeleted notification is sent when a
           slapmPolicyMonitor is deleted if the value of
           slapmPolicyTrapEnable is enabled(1)."
        ::= { slapmNotifications 4 }

     slapmSubcomponentMonitoredEventNotAchieved NOTIFICATION-TYPE
        OBJECTS {
            slapmSubcomponentSystemAddress,
            slapmSubcomponentPolicyName,
            slapmSubcomponentTrafficProfileName,
            slapmSubcomponentMonitorStatus,
            slapmSubcomponentMonitorStatus,
            slapmSubcomponentMonitorIntTime,
            slapmSubcomponentMonitorCurrentInRate,
            slapmSubcomponentMonitorCurrentOutRate
        }
        STATUS  current
        DESCRIPTION
           "This notification is generated when a monitored value
           does not achieved a threshold specification.  This
           applies only towards monitoring the individual components
           of a policy traffic profile.  The value of the
           corresponding slapmPolicyMonitorControl can be examined
           to determine what is being monitored.  The first
           slapmSubcomponentMonitorStatus value supplies the current
           monitor status while the 2nd value supplies the
           previous status.

           Note: The corresponding slapmPolicyMonitorControl
```

```
            BITS setting, enableSubcomponentTraps(4), MUST be selected
            in order for this notification to potentially be generated."
         ::= { slapmNotifications 5 }

      slapmSubcomponentMonitoredEventOkay NOTIFICATION-TYPE
         OBJECTS {
```

```
            slapmSubcomponentSystemAddress,
            slapmSubcomponentPolicyName,
            slapmSubcomponentTrafficProfileName,
            slapmSubcomponentMonitorStatus,
            slapmSubcomponentMonitorStatus,
            slapmSubcomponentMonitorIntTime,
            slapmSubcomponentMonitorCurrentInRate,
            slapmSubcomponentMonitorCurrentOutRate
        }
        STATUS  current
        DESCRIPTION
           "This notification is generated when a monitored value
           has reached an acceptable level.

           Note: The corresponding slapmPolicyMonitorControl
           BITS setting, enableSubcomponentTraps(3), MUST be
           selected in order for this notification to potentially
           be generated."
        ::= { slapmNotifications 6 }

    ---------------------------------------------------------------------
    -- Conformance information
    -- Compliance statements
    ---------------------------------------------------------------------

    slapmCompliances OBJECT IDENTIFIER ::= { slapmConformance 1 }
    slapmGroups      OBJECT IDENTIFIER ::= { slapmConformance 2 }

    ---------------------------------------------------------------------
    -- Compliance statements
    ---------------------------------------------------------------------

    slapmCompliance MODULE-COMPLIANCE
        STATUS  current
        DESCRIPTION
                "The compliance statement for the SLAPM-MIB."
        MODULE  -- this module
            MANDATORY-GROUPS {
                                slapmBaseGroup,
                                slapmNotGroup
                              }
            GROUP slapmEndSystemGroup
            DESCRIPTION
                "The contents of this group is required by end-system
                implementations."
            GROUP slapmOptionalGroup
            DESCRIPTION
                "The contents of this group is optional, since not all
                systems are capable of generating the values associated
```

```
                with these objects."
            GROUP slapmEndSystemNotGroup
            DESCRIPTION
                "The contents of this group is required by end-system
                implementations."
        ::= { slapmCompliances 1 }
```

```
-- ------------------------------------------------------------------
-- MIB groupings
-- ------------------------------------------------------------------

slapmBaseGroup OBJECT-GROUP
  OBJECTS {
            slapmSpinLock,
            slapmPolicyCountQueries,
            slapmPolicyCountAccesses,
            slapmPolicyCountSuccessAccesses,
            slapmPolicyCountNotFounds,
            slapmPolicyPurgeTime,
            slapmPolicyTrapEnable,
            slapmPolicyStatsOperStatus,
            slapmPolicyStatsActiveConns,
            slapmPolicyStatsFirstActivated,
            slapmPolicyStatsLastMapping,
            slapmPolicyStatsInOctets,
            slapmPolicyStatsOutOctets,
            slapmPolicyStatsConnectionLimit,
            slapmPolicyStatsTotalConns,
            slapmPolicyStatsCountAccepts,
            slapmPolicyStatsCountDenies,
            slapmPolicyStatsInDiscards,
            slapmPolicyStatsOutDiscards,
            slapmPolicyStatsInPackets,
            slapmPolicyStatsOutPackets,
            slapmPolicyStatsMinRate,
            slapmPolicyStatsMaxRate,
            slapmPolicyStatsMaxDelay,
            slapmPolicyMonitorControl,
            slapmPolicyMonitorStatus,
            slapmPolicyMonitorInterval,
            slapmPolicyMonitorIntTime,
            slapmPolicyMonitorCurrentInRate,
            slapmPolicyMonitorCurrentOutRate,
            slapmPolicyMonitorMinRateLow,
            slapmPolicyMonitorMinRateHigh,
            slapmPolicyMonitorMaxRateHigh,
            slapmPolicyMonitorMaxRateLow,
            slapmPolicyMonitorMaxDelayHigh,
            slapmPolicyMonitorMaxDelayLow,
            slapmPolicyMonitorMinInRateNotAchievies,
            slapmPolicyMonitorMaxInRateExceeds,
            slapmPolicyMonitorMaxInDelayExceeds,
            slapmPolicyMonitorMinOutRateNotAchievies,
            slapmPolicyMonitorMaxOutRateExceeds,
            slapmPolicyMonitorMaxOutDelayExceeds,
```

```
                slapmPolicyMonitorRowStatus
              }
    STATUS current
    DESCRIPTION
        "The group of objects defined by this MIB that are
        required for all implementations to be compliant."
```

```
      ::= { slapmGroups 1 }

     slapmOptionalGroup OBJECT-GROUP
       OBJECTS {
                 slapmPolicyStatsInProfileOctets,
                 slapmPolicyStatsOutProfileOctets
               }
      STATUS current
      DESCRIPTION
          "The group of objects defined by this MIB that are
          optional."
      ::= { slapmGroups 2 }

     slapmEndSystemGroup OBJECT-GROUP
       OBJECTS {
                 slapmSubcomponentProtocol,
                 slapmSubcomponentSystemAddress,
                 slapmSubcomponentPolicyName,
                 slapmSubcomponentTrafficProfileName,
                 slapmSubcomponentLastActivity,
                 slapmSubcomponentInOctets,
                 slapmSubcomponentOutOctets,
                 slapmSubcomponentTcpOutBufferedOctets,
                 slapmSubcomponentTcpInBufferedOctets,
                 slapmSubcomponentTcpReXmts,
                 slapmSubcomponentTcpRoundTripTime,
                 slapmSubcomponentTcpRoundTripVariance,
                 slapmSubcomponentInPdus,
                 slapmSubcomponentOutPdus,
                 slapmSubcomponentApplName,
                 slapmSubcomponentMonitorStatus,
                 slapmSubcomponentMonitorIntTime,
                 slapmSubcomponentMonitorCurrentOutRate,
                 slapmSubcomponentMonitorCurrentInRate
               }
       STATUS  current
       DESCRIPTION
           "The group of objects defined by this MIB that are
           required for end system implementations."
       ::= { slapmGroups 3 }

     slapmNotGroup NOTIFICATION-GROUP
       NOTIFICATIONS {
                 slapmMonitoredEventNotAchieved,
                 slapmMonitoredEventOkay,
                 slapmPolicyProfileDeleted,
                 slapmPolicyMonitorDeleted
               }
       STATUS  current
```

```
        DESCRIPTION
            "The group of notifications defined by this MIB that MUST
            be implemented."
        ::= { slapmGroups 4 }

     slapmEndSystemNotGroup NOTIFICATION-GROUP
```

```
       NOTIFICATIONS {
                 slapmSubcomponentMonitoredEventNotAchieved,
                 slapmSubcomponentMonitoredEventOkay
               }
       STATUS  current
       DESCRIPTION
           "The group of objects defined by this MIB that are
           required for end system implementations."
       ::= { slapmGroups 5 }
  END
```

5.0 Security Considerations

Certain management information defined in this MIB may be considered sensitive in some network environments. Therefore, authentication of received SNMP requests and controlled access to management information SHOULD be employed in such environments. The method for this authentication is a function of the SNMP Administrative Framework, and has not been expanded by this MIB.

It is RECOMMENDED that the slapmPolicyMonitorTable and slapmSubcomponentTable not be supported in insecure environments.

6.0 Intellectual Property

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7.0 Acknowledgments

This document is a product of the IETF.

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