          Path Computation Element Communication Protocol (PCEP)
                 Management Information Base (MIB) Module

Abstract

   This memo defines a portion of the Management Information Base (MIB)
   for use with network management protocols in the Internet community.
   In particular, it describes managed objects for modeling of the Path
   Computation Element Communication Protocol (PCEP) for communications
   between a Path Computation Client (PCC) and a Path Computation
   Element (PCE), or between two PCEs.

Status of This Memo

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1. Introduction

The PCE defined in [RFC4655] is an entity that is capable of
computing a network path or route based on a network graph and
applying computational constraints. A PCC may make requests to a PCE
for paths to be computed.

PCEP is the communication protocol between a PCC and PCE and is
defined in [RFC5440]. PCEP interactions include path computation
requests and path computation replies as well as notifications of
specific states related to the use of a PCE in the context of
Multiprotocol Label Switching (MPLS) and Generalized MPLS (GMPLS)
Traffic Engineering (TE).

This memo defines a portion of the MIB for use with network
management protocols in the Internet community. In particular, it
defines a MIB module that can be used to monitor PCEP interactions
between a PCC and a PCE, or between two PCEs.

The scope of this document is to provide a MIB module for the PCEP
base protocol defined in [RFC5440]. Extensions to the PCEP base
protocol are beyond the scope for this document.

1.1. Requirements Language

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 BCP 14 [RFC2119].

1.2. Terminology

This document uses the terminology defined in [RFC4655] and
[RFC5440]. In particular, it uses the following acronyms.

o Path Computation Request (PCReq) message.

o Path Computation Reply (PCRep) message.

o Notification (PCNtf) message.

o Error (PCErr) message.

o Request Parameter (RP) object.

o Synchronization Vector (SVEC) object.

o Explicit Route Object (ERO).

This document uses the term "PCEP entity" to refer to a local PCEP speaker, "peer" to refer to a remote PCEP speaker, and "PCEP speaker" where it is not necessary to distinguish between local and remote.

2. The Internet-Standard Management Framework

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

Managed objects are accessed via a virtual information store, termed the Management Information Base or MIB. MIB objects are generally accessed through the Simple Network Management Protocol (SNMP). Objects in the MIB are defined using the mechanisms defined in the Structure of Management Information (SMI). This memo specifies a MIB module that is compliant to the SMIv2, which is described in STD 58, RFC 2578 [RFC2578], STD 58, RFC 2579 [RFC2579], and STD 58, RFC 2580 [RFC2580].

3. PCEP MIB Module Architecture

The PCEP MIB module contains the following information:

a. PCE and PCC local entity status (see pcePcepEntityTable).

b. PCEP peer information (see pcePcepPeerTable).

c. PCEP session information (see pcePcepSessTable).

d. Notifications to indicate PCEP session changes.

The PCEP MIB module is limited to "read-only" access except for pcePcepNotificationsMaxRate, which is used to throttle the rate at which the implementation generates notifications.

3.1. pcePcepEntityTable

The PCEP MIB module may contain status information for multiple logical local PCEP entities. There are several scenarios in which there may be more than one local PCEP entity, including the following.

o A physical router, which is partitioned into multiple virtual routers, each with its own PCC.

o A PCE device that front ends a cluster of compute resources, each with a different set of capabilities that are accessed via different IP addresses.

The pcePcepEntityTable contains one row for each local PCEP entity. Each row is read-only and contains current status information, plus the PCEP entity's running configuration.

The pcePcepEntityTable is indexed by pcePcepEntityIndex, which also acts as the primary index for the other tables in this MIB module.

3.2. pcePcepPeerTable

The pcePcepPeerTable contains one row for each peer that the local PCEP entity knows about. Each row is read-only and contains information to identify the peer, the running configuration relating to that peer, and statistics that track the messages exchanged with that peer and its response times.

A PCEP speaker is identified by its IP address. If there is a PCEP speaker in the network that uses multiple IP addresses, then it looks like multiple distinct peers to the other PCEP speakers in the network.

The pcePcepPeerTable is indexed first by pcePcepEntityIndex, then by pcePcepPeerAddrType and pcePcepPeerAddr. This indexing structure allows each local PCEP entity to report its own set of peers.

Since PCEP sessions can be ephemeral, pcePcepPeerTable tracks a peer even when no PCEP session currently exists to that peer. The statistics contained in pcePcepPeerTable are an aggregate of the statistics for all successive sessions to that peer.

To limit the quantity of information that is stored, an implementation MAY choose to discard a row from pcePcepPeerTable if and only if no PCEP session exists to the corresponding peer.

3.3. pcePcepSessTable

The pcePcepSessTable contains one row for each PCEP session that the PCEP entity (PCE or PCC) is currently participating in. Each row is read-only and contains the running configuration that is applied to the session, plus identifiers and statistics for the session.

The statistics in pcePcepSessTable are semantically different from those in pcePcepPeerTable since the former applies to the current session only, whereas the latter is the aggregate for all sessions that have existed to that peer.

Although it is forbidden per [RFC5440] to have more than one active PCEP session between a given pair of PCEP entities at any one time, there is a window during session establishment where the

pcePcepSessTable may contain two rows for a given peer, one
representing a session initiated by the local PCEP entity and one
representing a session initiated by the peer. If either of these
sessions reaches an active state, then the other is discarded.

The pcePcepSessTable is indexed first by pcePcepEntityIndex, then by
pcePcepPeerAddrType and pcePcepPeerAddr, and finally by
pcePcepSessInitiator. This indexing structure allows each local PCEP
entity to report its own set of active sessions. The
pcePcepSessInitiator index allows two rows to exist transiently for a
given peer, as discussed above.

3.4. PCEP Notifications

The PCEP MIB module contains notifications for the following
conditions.

a. pcePcepSessUp: PCEP session has gone up.

b. pcePcepSessDown: PCEP session has gone down.

c. pcePcepSessLocalOverload: Local PCEP entity has sent an overload
    PCNtf on this session.

d. pcePcepSessLocalOverloadClear: Local PCEP entity has sent an
    overload-cleared PCNtf on this session.

e. pcePcepSessPeerOverload: Peer has sent an overload PCNtf on this
    session.

f. pcePcepSessPeerOverloadClear: Peer has sent an overload-cleared
    PCNtf on this session.

3.5. Relationship to Other MIB Modules

The PCEP MIB module imports the following textual conventions from
the INET-ADDRESS-MIB defined in RFC 4001 [RFC4001]:

o InetAddressType

o InetAddress

PCEP relies on existing protocols that have specialized MIB objects
to monitor their own activities. Consequently, this document
considers that the monitoring of underlying protocols is out of scope
of the PCEP MIB module.

3.6. Illustrative Example

   The following diagram illustrates the relationships between
   pcePcepEntityTable, pcePcepPeerTable, and pcePcepSessTable.

```
       Index by:
       pcePcepEntityIndex

       +---------------+        Index by:
       |pcePcepEntity  |        pcePcepEntityIndex,
       |Table          |        pcePcepPeerAddrType,
       +---------------+        pcePcepPeerAddr
       |pcePcepEntity  |
       |Entry          |<----*
       +---------------+    |   +------------+        Index by:
       |               |    |   |pcePcepPeer |        pcePcepEntityIndex,
       |               |<-* |   |Table       |        pcePcepPeerAddrType,
       +---------------+  | |   +------------+        pcePcepPeerAddr,
                          | |  *--|PcePcepPeer |        pcePcepSessInitiator
                          | |   |Entry       |<-----*
                          | |   +------------+    |   +------------+
                        *--|   |            |    |   |pcePcepSess |
                          | |   |            |<----*|   |Table       |
                          | |   +------------+    | |  +------------+
                        *-----|   |            |    | |  *-|pcePcepSess |
                          | |   |            |<--*| |   |Entry       |
                          | |   +------------+    | |   +------------+
                        *-----|   |            |    | |  *--|            |
                          +--|   |  [1]       |    | |   |            |
                              +------------+    | |   +------------+
                                              *----|   |            |
                                               |   |   |            |
                                               |   +------------+
                                              *----|  [2]       |
                                               |   |            |
                                               +------------+
```
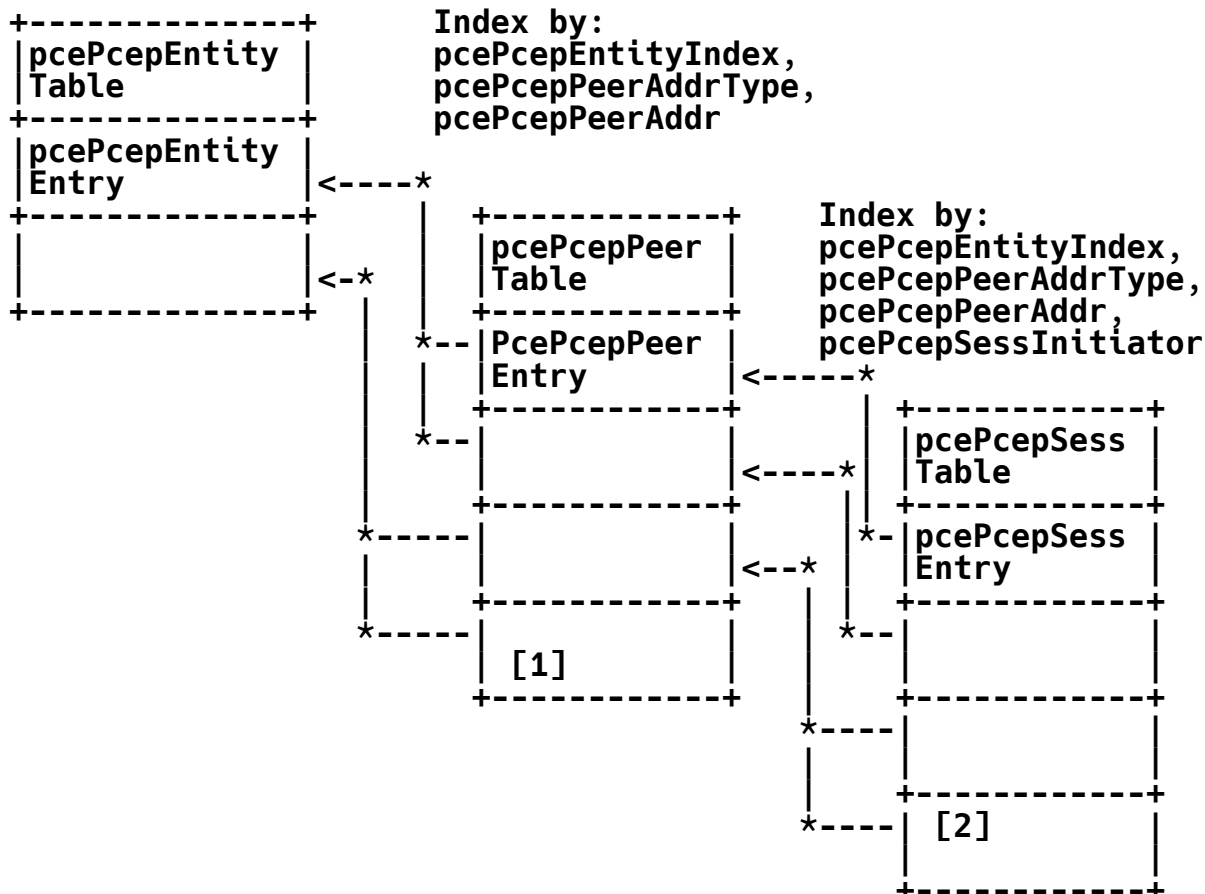
   [1]: A peer entry with no current session.
   [2]: Two sessions exist during a window in session
        initialization.

4. Object Definitions

4.1. PCE-PCEP-MIB

```
PCE-PCEP-MIB DEFINITIONS ::= BEGIN

IMPORTS
    MODULE-IDENTITY,
    OBJECT-TYPE,
    mib-2,
    NOTIFICATION-TYPE,
    Unsigned32,
    Counter32
        FROM SNMPv2-SMI              -- RFC 2578
    TruthValue,
    TimeStamp
        FROM SNMPv2-TC              -- RFC 2579
    MODULE-COMPLIANCE,
    OBJECT-GROUP,
    NOTIFICATION-GROUP
        FROM SNMPv2-CONF            -- RFC 2580
    InetAddressType,
    InetAddress
        FROM INET-ADDRESS-MIB;      -- RFC 4001

pcePcepMIB MODULE-IDENTITY
    LAST-UPDATED
        "201412171200Z" -- 17 December 2014
    ORGANIZATION
        "IETF Path Computation Element (PCE) Working Group"
    CONTACT-INFO
        "Email: pce@ietf.org
         WG charter:
                 http://datatracker.ietf.org/wg/pce/charter/"

    DESCRIPTION
      "This MIB module defines a collection of objects for managing
       the Path Computation Element Communication Protocol (PCEP).

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       set forth in Section 4.c of the IETF Trust's Legal Provisions
       Relating to IETF Documents
       (http://trustee.ietf.org/license-info)."
```

```
        REVISION
            "201412171200Z" -- 17 December 2014
        DESCRIPTION
            "Initial version, published as RFC 7420."
        ::= { mib-2 227 }

    pcePcepNotifications OBJECT IDENTIFIER ::= { pcePcepMIB 0 }
    pcePcepObjects       OBJECT IDENTIFIER ::= { pcePcepMIB 1 }
    pcePcepConformance   OBJECT IDENTIFIER ::= { pcePcepMIB 2 }

    --
    -- PCEP Entity Objects
    --

    pcePcepEntityTable OBJECT-TYPE
        SYNTAX      SEQUENCE OF PcePcepEntityEntry
        MAX-ACCESS  not-accessible
        STATUS      current
        DESCRIPTION
            "This table contains information about local PCEP entities.
             The entries in this table are read-only."
        ::= { pcePcepObjects 1 }

    pcePcepEntityEntry OBJECT-TYPE
        SYNTAX      PcePcepEntityEntry
        MAX-ACCESS  not-accessible
        STATUS      current
        DESCRIPTION
            "This entry represents a local PCEP entity."
        INDEX       {   pcePcepEntityIndex   }
        ::= { pcePcepEntityTable 1 }

    PcePcepEntityEntry ::= SEQUENCE {
        pcePcepEntityIndex                Unsigned32,
        pcePcepEntityAdminStatus          INTEGER,
        pcePcepEntityOperStatus           INTEGER,
        pcePcepEntityAddrType             InetAddressType,
        pcePcepEntityAddr                 InetAddress,
        pcePcepEntityConnectTimer         Unsigned32,
        pcePcepEntityConnectMaxRetry      Unsigned32,
        pcePcepEntityInitBackoffTimer     Unsigned32,
        pcePcepEntityMaxBackoffTimer      Unsigned32,
        pcePcepEntityOpenWaitTimer        Unsigned32,
        pcePcepEntityKeepWaitTimer        Unsigned32,
        pcePcepEntityKeepAliveTimer       Unsigned32,
        pcePcepEntityDeadTimer            Unsigned32,
        pcePcepEntityAllowNegotiation     TruthValue,
        pcePcepEntityMaxKeepAliveTimer    Unsigned32,
```

```
        pcePcepEntityMaxDeadTimer          Unsigned32,
        pcePcepEntityMinKeepAliveTimer     Unsigned32,
        pcePcepEntityMinDeadTimer          Unsigned32,
        pcePcepEntitySyncTimer             Unsigned32,
        pcePcepEntityRequestTimer          Unsigned32,
        pcePcepEntityMaxSessions           Unsigned32,
        pcePcepEntityMaxUnknownReqs        Unsigned32,
        pcePcepEntityMaxUnknownMsgs        Unsigned32
    }

    pcePcepEntityIndex OBJECT-TYPE
        SYNTAX      Unsigned32
        MAX-ACCESS  not-accessible
        STATUS      current
        DESCRIPTION
            "This index is used to uniquely identify the PCEP entity."
        ::= { pcePcepEntityEntry 1 }

    pcePcepEntityAdminStatus OBJECT-TYPE
        SYNTAX       INTEGER {
                        adminStatusUp(1),
                        adminStatusDown(2)
                     }
        MAX-ACCESS  read-only
        STATUS      current
        DESCRIPTION
            "The administrative status of this PCEP entity.

            This is the desired operational status as currently set by
            an operator or by default in the implementation.  The value
            of pcePcepEntityOperStatus represents the current status of
            an attempt to reach this desired status."
        ::= { pcePcepEntityEntry 2 }

    pcePcepEntityOperStatus OBJECT-TYPE
        SYNTAX       INTEGER {
                        operStatusUp(1),
                        operStatusDown(2),
                        operStatusGoingUp(3),
                        operStatusGoingDown(4),
                        operStatusFailed(5),
                        operStatusFailedPerm(6)
                     }
        MAX-ACCESS  read-only
        STATUS      current
        DESCRIPTION
            "The operational status of the PCEP entity.  It takes one of
            the following values.
```

```
                  - operStatusUp(1): the PCEP entity is active.
                  - operStatusDown(2): the PCEP entity is inactive.
                  - operStatusGoingUp(3): the PCEP entity is activating.
                  - operStatusGoingDown(4): the PCEP entity is deactivating.
                  - operStatusFailed(5): the PCEP entity has failed and will
                    recover when possible.
                  - operStatusFailedPerm(6): the PCEP entity has failed and
                    will not recover without operator intervention."
            ::= { pcePcepEntityEntry 3 }

        pcePcepEntityAddrType OBJECT-TYPE
            SYNTAX        InetAddressType
            MAX-ACCESS  read-only
            STATUS        current
            DESCRIPTION
                "The type of the PCEP entity's Internet address.  This object
                 specifies how the value of the pcePcepEntityAddr object
                 should be interpreted.  Only values unknown(0), ipv4(1), or
                 ipv6(2) are supported."
            ::= { pcePcepEntityEntry 4 }

        pcePcepEntityAddr OBJECT-TYPE
            SYNTAX        InetAddress
            MAX-ACCESS  read-only
            STATUS        current
            DESCRIPTION
                "The local Internet address of this PCEP entity.  The type is
                 given by pcePcepEntityAddrType.

                 If operating as a PCE server, the PCEP entity listens on
                 this address.  If operating as a PCC, the PCEP entity binds
                 outgoing TCP connections to this address.

                 It is possible for the PCEP entity to operate both as a PCC
                 and a PCE server, in which case it uses this address both to
                 listen for incoming TCP connections and to bind outgoing
                 TCP connections."
            ::= { pcePcepEntityEntry 5 }

     pcePcepEntityConnectTimer OBJECT-TYPE
            SYNTAX        Unsigned32 (1..65535)
            UNITS         "seconds"
            MAX-ACCESS  read-only
            STATUS        current
```

       DESCRIPTION
            "The time that the PCEP entity will wait to establish a TCP
             connection with a peer. If a TCP connection is not
             established within this time, then PCEP aborts the session
             setup attempt."
        ::= { pcePcepEntityEntry 6 }

    pcePcepEntityConnectMaxRetry OBJECT-TYPE
        SYNTAX   Unsigned32
        MAX-ACCESS   read-only
        STATUS   current
        DESCRIPTION
            "The maximum number of times the system tries to establish
             a TCP connection to a peer before the session with the peer
             transitions to the idle state.

             When the session transitions to the idle state:
             - pcePcepPeerSessionExists transitions to false(2).
             - the associated PcePcepSessEntry is deleted.
             - a backoff timer runs before the session is tried again."
        ::= { pcePcepEntityEntry 7 }

    pcePcepEntityInitBackoffTimer OBJECT-TYPE
        SYNTAX   Unsigned32 (1..65535)
        UNITS   "seconds"
        MAX-ACCESS   read-only
        STATUS   current
        DESCRIPTION
            "The initial backoff time for retrying a failed session
             setup attempt to a peer.

             The backoff time increases for each failed session setup
             attempt, until a maximum backoff time is reached. The
             maximum backoff time is pcePcepEntityMaxBackoffTimer."
        ::= { pcePcepEntityEntry 8 }

    pcePcepEntityMaxBackoffTimer OBJECT-TYPE
        SYNTAX   Unsigned32
        UNITS   "seconds"
        MAX-ACCESS   read-only
        STATUS   current
        DESCRIPTION
            "The maximum backoff time for retrying a failed session
             setup attempt to a peer.

                The backoff time increases for each failed session setup
                attempt, until this maximum value is reached. Session
                setup attempts then repeats periodically without any
                further increase in backoff time."
            ::= { pcePcepEntityEntry 9 }

        pcePcepEntityOpenWaitTimer OBJECT-TYPE
            SYNTAX   Unsigned32 (1..65535)
            UNITS   "seconds"
            MAX-ACCESS read-only
            STATUS   current
            DESCRIPTION
                "The time that the PCEP entity will wait to receive an Open
                message from a peer after the TCP connection has come up.
                If no Open message is received within this time, then PCEP
                terminates the TCP connection and deletes the associated
                PcePcepSessEntry."
            ::= { pcePcepEntityEntry 10 }

        pcePcepEntityKeepWaitTimer OBJECT-TYPE
            SYNTAX   Unsigned32 (1..65535)
            UNITS   "seconds"
            MAX-ACCESS read-only
            STATUS   current
            DESCRIPTION
                "The time that the PCEP entity will wait to receive a
                Keepalive or PCErr message from a peer during session
                initialization after receiving an Open message. If no
                Keepalive or PCErr message is received within this time,
                then PCEP terminates the TCP connection and deletes the
                associated PcePcepSessEntry."
            ::= { pcePcepEntityEntry 11 }

        pcePcepEntityKeepAliveTimer OBJECT-TYPE
            SYNTAX   Unsigned32 (0..255)
            UNITS   "seconds"
            MAX-ACCESS read-only
            STATUS   current
            DESCRIPTION
                "The Keepalive transmission timer that this PCEP entity will
                propose in the initial OPEN message of each session it is
                involved in. This is the maximum time between two
                consecutive messages sent to a peer. Zero means that
                the PCEP entity prefers not to send Keepalives at all.

                Note that the actual Keepalive transmission intervals, in
                either direction of an active PCEP session, are determined
                by negotiation between the peers as specified by RFC

                  5440, and so may differ from this configured value. For
                  the actually negotiated values (per session), see
                  pcePcepSessKeepaliveTimer and
                  pcePcepSessPeerKeepaliveTimer."
              ::= { pcePcepEntityEntry 12 }

      pcePcepEntityDeadTimer OBJECT-TYPE
          SYNTAX   Unsigned32 (0..255)
          UNITS   "seconds"
          MAX-ACCESS read-only
          STATUS   current
          DESCRIPTION
              "The DeadTimer that this PCEP entity will propose in the
               initial OPEN message of each session it is involved in.
               This is the time after which a peer should declare a
               session down if it does not receive any PCEP messages.
               Zero suggests that the peer does not run a DeadTimer at
               all."
          ::= { pcePcepEntityEntry 13 }

      pcePcepEntityAllowNegotiation OBJECT-TYPE
          SYNTAX   TruthValue
          MAX-ACCESS read-only
          STATUS   current
          DESCRIPTION
              "Whether the PCEP entity will permit negotiation of session
               parameters."
          ::= { pcePcepEntityEntry 14 }

      pcePcepEntityMaxKeepAliveTimer OBJECT-TYPE
          SYNTAX   Unsigned32 (0..255)
          UNITS   "seconds"
          MAX-ACCESS read-only
          STATUS   current
          DESCRIPTION
              "In PCEP session parameter negotiation, the maximum value
               that this PCEP entity will accept from a peer for the
               interval between Keepalive transmissions. Zero means that
               the PCEP entity will allow no Keepalive transmission at
               all."
          ::= { pcePcepEntityEntry 15 }

      pcePcepEntityMaxDeadTimer OBJECT-TYPE
          SYNTAX   Unsigned32 (0..255)
          UNITS   "seconds"
          MAX-ACCESS read-only
          STATUS   current

        DESCRIPTION
            "In PCEP session parameter negotiation, the maximum value
             that this PCEP entity will accept from a peer for the
             DeadTimer. Zero means that the PCEP entity will allow not
             running a DeadTimer."
        ::= { pcePcepEntityEntry 16 }

    pcePcepEntityMinKeepAliveTimer OBJECT-TYPE
        SYNTAX   Unsigned32 (0..255)
        UNITS   "seconds"
        MAX-ACCESS read-only
        STATUS   current
        DESCRIPTION
            "In PCEP session parameter negotiation, the minimum value
             that this PCEP entity will accept for the interval between
             Keepalive transmissions. Zero means that the PCEP entity
             insists on no Keepalive transmission at all."
        ::= { pcePcepEntityEntry 17 }

    pcePcepEntityMinDeadTimer OBJECT-TYPE
        SYNTAX   Unsigned32 (0..255)
        UNITS   "seconds"
        MAX-ACCESS read-only
        STATUS   current
        DESCRIPTION
            "In PCEP session parameter negotiation, the minimum value
             that this PCEP entity will accept for the DeadTimer. Zero
             means that the PCEP entity insists on not running a
             DeadTimer."
        ::= { pcePcepEntityEntry 18 }

    pcePcepEntitySyncTimer OBJECT-TYPE
        SYNTAX   Unsigned32 (0..65535)
        UNITS   "seconds"
        MAX-ACCESS read-only
        STATUS   current
        DESCRIPTION
            "The value of SyncTimer is used in the case of a synchronized
             path computation request using the SVEC object.

             Consider the case where a PCReq message is received by a PCE
             that contains the SVEC object referring to M synchronized
             path computation requests. If after the expiration of the
             SyncTimer all the M path computation requests have not been
             received, a protocol error is triggered and the PCE MUST
             cancel the whole set of path computation requests.

         The aim of the SyncTimer is to avoid the storage of unused
         synchronized requests should one of them get lost for some
         reason (for example, a misbehaving PCC).

         A value of zero is returned if and only if the entity does
         not use the SyncTimer."
    ::= { pcePcepEntityEntry 19 }

pcePcepEntityRequestTimer OBJECT-TYPE
    SYNTAX   Unsigned32 (1..65535)
    UNITS   "seconds"
    MAX-ACCESS read-only
    STATUS   current
    DESCRIPTION
        "The maximum time that the PCEP entity will wait for a
         response to a PCReq message."
    ::= { pcePcepEntityEntry 20 }

pcePcepEntityMaxSessions OBJECT-TYPE
    SYNTAX   Unsigned32
    MAX-ACCESS read-only
    STATUS   current
    DESCRIPTION
        "The maximum number of sessions involving this PCEP entity
         that can exist at any time."
    ::= { pcePcepEntityEntry 21 }

pcePcepEntityMaxUnknownReqs OBJECT-TYPE
    SYNTAX   Unsigned32
    MAX-ACCESS read-only
    STATUS   current
    DESCRIPTION
        "The maximum number of unrecognized requests and replies that
         any session on this PCEP entity is willing to accept per
         minute before terminating the session.

         A PCRep message contains an unrecognized reply if it
         contains an RP object whose request ID does not correspond
         to any in-progress request sent by this PCEP entity.

         A PCReq message contains an unrecognized request if it
         contains an RP object whose request ID is zero."
    ::= { pcePcepEntityEntry 22 }

pcePcepEntityMaxUnknownMsgs OBJECT-TYPE
    SYNTAX   Unsigned32
    MAX-ACCESS read-only
    STATUS   current

              DESCRIPTION
                  "The maximum number of unknown messages that any session
                   on this PCEP entity is willing to accept per minute before
                   terminating the session."
              ::= { pcePcepEntityEntry 23 }

       --
       -- The PCEP Peer Table
       --

       pcePcepPeerTable OBJECT-TYPE
           SYNTAX   SEQUENCE OF PcePcepPeerEntry
           MAX-ACCESS   not-accessible
           STATUS   current
           DESCRIPTION
               "This table contains information about peers known by
                the local PCEP entity. The entries in this table are
                read-only.

                This table gives peer information that spans PCEP
                sessions. Information about current PCEP sessions can be
                found in the pcePcepSessTable table."
           ::= { pcePcepObjects 2 }

       pcePcepPeerEntry OBJECT-TYPE
           SYNTAX   PcePcepPeerEntry
           MAX-ACCESS   not-accessible
           STATUS   current
           DESCRIPTION
               "Information about a single peer that spans all PCEP
                sessions to that peer."
           INDEX { pcePcepEntityIndex,
                   pcePcepPeerAddrType,
                   pcePcepPeerAddr }
           ::= { pcePcepPeerTable 1 }

       PcePcepPeerEntry ::= SEQUENCE {
           pcePcepPeerAddrType   InetAddressType,
           pcePcepPeerAddr   InetAddress,
           pcePcepPeerRole   INTEGER,
           pcePcepPeerDiscontinuityTime   TimeStamp,
           pcePcepPeerInitiateSession   TruthValue,
           pcePcepPeerSessionExists   TruthValue,
           pcePcepPeerNumSessSetupOK   Counter32,
           pcePcepPeerNumSessSetupFail   Counter32,
           pcePcepPeerSessionUpTime   TimeStamp,
           pcePcepPeerSessionFailTime   TimeStamp,
           pcePcepPeerSessionFailUpTime   TimeStamp,

```
        pcePcepPeerAvgRspTime                    Unsigned32,
        pcePcepPeerLWMRspTime                    Unsigned32,
        pcePcepPeerHWMRspTime                    Unsigned32,
        pcePcepPeerNumPCReqSent                  Counter32,
        pcePcepPeerNumPCReqRcvd                  Counter32,
        pcePcepPeerNumPCRepSent                  Counter32,
        pcePcepPeerNumPCRepRcvd                  Counter32,
        pcePcepPeerNumPCErrSent                  Counter32,
        pcePcepPeerNumPCErrRcvd                  Counter32,
        pcePcepPeerNumPCNtfSent                  Counter32,
        pcePcepPeerNumPCNtfRcvd                  Counter32,
        pcePcepPeerNumKeepaliveSent              Counter32,
        pcePcepPeerNumKeepaliveRcvd              Counter32,
        pcePcepPeerNumUnknownRcvd                Counter32,
        pcePcepPeerNumCorruptRcvd                Counter32,
        pcePcepPeerNumReqSent                    Counter32,
        pcePcepPeerNumSvecSent                   Counter32,
        pcePcepPeerNumSvecReqSent                Counter32,
        pcePcepPeerNumReqSentPendRep             Counter32,
        pcePcepPeerNumReqSentEroRcvd             Counter32,
        pcePcepPeerNumReqSentNoPathRcvd          Counter32,
        pcePcepPeerNumReqSentCancelRcvd          Counter32,
        pcePcepPeerNumReqSentErrorRcvd           Counter32,
        pcePcepPeerNumReqSentTimeout             Counter32,
        pcePcepPeerNumReqSentCancelSent          Counter32,
        pcePcepPeerNumReqSentClosed              Counter32,
        pcePcepPeerNumReqRcvd                    Counter32,
        pcePcepPeerNumSvecRcvd                   Counter32,
        pcePcepPeerNumSvecReqRcvd                Counter32,
        pcePcepPeerNumReqRcvdPendRep             Counter32,
        pcePcepPeerNumReqRcvdEroSent             Counter32,
        pcePcepPeerNumReqRcvdNoPathSent          Counter32,
        pcePcepPeerNumReqRcvdCancelSent          Counter32,
        pcePcepPeerNumReqRcvdErrorSent           Counter32,
        pcePcepPeerNumReqRcvdCancelRcvd          Counter32,
        pcePcepPeerNumReqRcvdClosed              Counter32,
        pcePcepPeerNumRepRcvdUnknown             Counter32,
        pcePcepPeerNumReqRcvdUnknown             Counter32
    }

    pcePcepPeerAddrType OBJECT-TYPE
        SYNTAX        InetAddressType
        MAX-ACCESS    not-accessible
        STATUS        current
```

DESCRIPTION
    "The type of the peer's Internet address. This object
     specifies how the value of the pcePcepPeerAddr object should
     be interpreted. Only values unknown(0), ipv4(1), or
     ipv6(2) are supported."
::= { pcePcepPeerEntry 1 }

pcePcepPeerAddr OBJECT-TYPE
    SYNTAX   InetAddress
    MAX-ACCESS not-accessible
    STATUS   current
    DESCRIPTION
        "The Internet address of the peer. The type is given by
         pcePcepPeerAddrType."
    ::= { pcePcepPeerEntry 2 }

pcePcepPeerRole OBJECT-TYPE
    SYNTAX   INTEGER {
                   unknown(0),
                   pcc(1),
                   pce(2),
                   pccAndPce(3)
                }
    MAX-ACCESS read-only
    STATUS   current
    DESCRIPTION
        "The role that this peer took the last time a session was
         established. It takes one of the following values.
         - unknown(0): this peer's role is not known.
         - pcc(1): this peer is a Path Computation Client (PCC).
         - pce(2): this peer is a Path Computation Element (PCE).
         - pccAndPce(3): this peer is both a PCC and a PCE."
    ::= { pcePcepPeerEntry 3 }

pcePcepPeerDiscontinuityTime OBJECT-TYPE
    SYNTAX   TimeStamp
    MAX-ACCESS read-only
    STATUS   current
    DESCRIPTION
        "The value of sysUpTime at the time that the information and
         statistics in this row were last reset."
    ::= { pcePcepPeerEntry 4 }

pcePcepPeerInitiateSession OBJECT-TYPE
    SYNTAX   TruthValue
    MAX-ACCESS read-only
    STATUS   current

```
        DESCRIPTION
            "Indicates whether the local PCEP entity initiates sessions
             to this peer or waits for the peer to initiate a session."
        ::= { pcePcepPeerEntry 5 }

    pcePcepPeerSessionExists OBJECT-TYPE
        SYNTAX       TruthValue
        MAX-ACCESS   read-only
        STATUS       current
        DESCRIPTION
            "Indicates whether a session with this peer currently
             exists."
        ::= { pcePcepPeerEntry 6 }

    pcePcepPeerNumSessSetupOK OBJECT-TYPE
        SYNTAX       Counter32
        MAX-ACCESS   read-only
        STATUS       current
        DESCRIPTION
            "The number of PCEP sessions successfully established with
             the peer, including any current session.  This counter is
             incremented each time a session with this peer is
             successfully established."
        ::= { pcePcepPeerEntry 7 }

    pcePcepPeerNumSessSetupFail OBJECT-TYPE
        SYNTAX       Counter32
        MAX-ACCESS   read-only
        STATUS       current
        DESCRIPTION
            "The number of PCEP sessions with the peer that have been
             attempted but failed before being fully established.
             This counter is incremented each time a session retry to
             this peer fails."
        ::= { pcePcepPeerEntry 8 }

    pcePcepPeerSessionUpTime OBJECT-TYPE
        SYNTAX       TimeStamp
        MAX-ACCESS   read-only
        STATUS       current
        DESCRIPTION
            "The value of sysUpTime the last time a session with this
             peer was successfully established.

             If pcePcepPeerNumSessSetupOK is zero, then this object
             contains zero."
        ::= { pcePcepPeerEntry 9 }
```

```
pcePcepPeerSessionFailTime OBJECT-TYPE
    SYNTAX       TimeStamp
    MAX-ACCESS   read-only
    STATUS       current
    DESCRIPTION
        "The value of sysUpTime the last time a session with this
         peer failed to be established.

         If pcePcepPeerNumSessSetupFail is zero, then this object
         contains zero."
    ::= { pcePcepPeerEntry 10 }

pcePcepPeerSessionFailUpTime OBJECT-TYPE
    SYNTAX       TimeStamp
    MAX-ACCESS   read-only
    STATUS       current
    DESCRIPTION
        "The value of sysUpTime the last time a session with this
         peer failed from active.

         If pcePcepPeerNumSessSetupOK is zero, then this object
         contains zero."
    ::= { pcePcepPeerEntry 11 }

pcePcepPeerAvgRspTime OBJECT-TYPE
    SYNTAX       Unsigned32
    UNITS        "milliseconds"
    MAX-ACCESS   read-only
    STATUS       current
    DESCRIPTION
        "The average response time for this peer.

         If an average response time has not been calculated for this
         peer, then this object has the value zero.

         If pcePcepPeerRole is pcc, then this field is meaningless
         and is set to zero."
    ::= { pcePcepPeerEntry 12 }

pcePcepPeerLWMRspTime OBJECT-TYPE
    SYNTAX       Unsigned32
    UNITS        "milliseconds"
    MAX-ACCESS   read-only
    STATUS       current
    DESCRIPTION
        "The smallest (low-water mark) response time seen from this
         peer.
```

          If no responses have been received from this peer, then this
          object has the value zero.

          If pcePcepPeerRole is pcc, then this field is meaningless
          and is set to zero."
       ::= { pcePcepPeerEntry 13 }

   pcePcepPeerHWMRspTime OBJECT-TYPE
       SYNTAX   Unsigned32
       UNITS   "milliseconds"
       MAX-ACCESS   read-only
       STATUS   current
       DESCRIPTION
          "The greatest (high-water mark) response time seen from this
          peer.

          If no responses have been received from this peer, then this
          object has the value zero.

          If pcePcepPeerRole is pcc, then this field is meaningless
          and is set to zero."
       ::= { pcePcepPeerEntry 14 }

   pcePcepPeerNumPCReqSent OBJECT-TYPE
       SYNTAX   Counter32
       MAX-ACCESS   read-only
       STATUS   current
       DESCRIPTION
          "The number of PCReq messages sent to this peer."
       ::= { pcePcepPeerEntry 15 }

   pcePcepPeerNumPCReqRcvd OBJECT-TYPE
       SYNTAX   Counter32
       MAX-ACCESS   read-only
       STATUS   current
       DESCRIPTION
          "The number of PCReq messages received from this peer."
       ::= { pcePcepPeerEntry 16 }

   pcePcepPeerNumPCRepSent OBJECT-TYPE
       SYNTAX   Counter32
       MAX-ACCESS   read-only
       STATUS   current
       DESCRIPTION
          "The number of PCRep messages sent to this peer."
       ::= { pcePcepPeerEntry 17 }

```
pcePcepPeerNumPCRepRcvd OBJECT-TYPE
    SYNTAX        Counter32
    MAX-ACCESS    read-only
    STATUS        current
    DESCRIPTION
        "The number of PCRep messages received from this peer."
    ::= { pcePcepPeerEntry 18 }

pcePcepPeerNumPCErrSent OBJECT-TYPE
    SYNTAX        Counter32
    MAX-ACCESS    read-only
    STATUS        current
    DESCRIPTION
        "The number of PCErr messages sent to this peer."
    ::= { pcePcepPeerEntry 19 }

pcePcepPeerNumPCErrRcvd OBJECT-TYPE
    SYNTAX        Counter32
    MAX-ACCESS    read-only
    STATUS        current
    DESCRIPTION
        "The number of PCErr messages received from this peer."
    ::= { pcePcepPeerEntry 20 }

pcePcepPeerNumPCNtfSent OBJECT-TYPE
    SYNTAX        Counter32
    MAX-ACCESS    read-only
    STATUS        current
    DESCRIPTION
        "The number of PCNtf messages sent to this peer."
    ::= { pcePcepPeerEntry 21 }

pcePcepPeerNumPCNtfRcvd OBJECT-TYPE
    SYNTAX        Counter32
    MAX-ACCESS    read-only
    STATUS        current
    DESCRIPTION
        "The number of PCNtf messages received from this peer."
    ::= { pcePcepPeerEntry 22 }

pcePcepPeerNumKeepaliveSent OBJECT-TYPE
    SYNTAX        Counter32
    MAX-ACCESS    read-only
    STATUS        current
    DESCRIPTION
        "The number of Keepalive messages sent to this peer."
    ::= { pcePcepPeerEntry 23 }
```

```
pcePcepPeerNumKeepaliveRcvd OBJECT-TYPE
    SYNTAX        Counter32
    MAX-ACCESS    read-only
    STATUS        current
    DESCRIPTION
        "The number of Keepalive messages received from this peer."
    ::= { pcePcepPeerEntry 24 }

pcePcepPeerNumUnknownRcvd OBJECT-TYPE
    SYNTAX        Counter32
    MAX-ACCESS    read-only
    STATUS        current
    DESCRIPTION
        "The number of unknown messages received from this peer."
    ::= { pcePcepPeerEntry 25 }

pcePcepPeerNumCorruptRcvd OBJECT-TYPE
    SYNTAX        Counter32
    MAX-ACCESS    read-only
    STATUS        current
    DESCRIPTION
        "The number of corrupted PCEP messages received from this
         peer."
    ::= { pcePcepPeerEntry 26 }

pcePcepPeerNumReqSent OBJECT-TYPE
    SYNTAX        Counter32
    MAX-ACCESS    read-only
    STATUS        current
    DESCRIPTION
        "The number of requests sent to this peer.  A request
         corresponds 1:1 with an RP object in a PCReq message.

         This might be greater than pcePcepPeerNumPCReqSent because
         multiple requests can be batched into a single PCReq
         message."
    ::= { pcePcepPeerEntry 27 }

pcePcepPeerNumSvecSent OBJECT-TYPE
    SYNTAX        Counter32
    MAX-ACCESS    read-only
    STATUS        current
    DESCRIPTION
        "The number of SVEC objects sent to this peer in PCReq
         messages.  An SVEC object represents a set of synchronized
         requests."
    ::= { pcePcepPeerEntry 28 }
```

```
pcePcepPeerNumSvecReqSent OBJECT-TYPE
    SYNTAX         Counter32
    MAX-ACCESS     read-only
    STATUS         current
    DESCRIPTION
        "The number of requests sent to this peer that appeared in
         one or more SVEC objects."
    ::= { pcePcepPeerEntry 29 }

pcePcepPeerNumReqSentPendRep OBJECT-TYPE
    SYNTAX         Counter32
    MAX-ACCESS     read-only
    STATUS         current
    DESCRIPTION
        "The number of requests that have been sent to this peer for
         which a response is still pending."
    ::= { pcePcepPeerEntry 30 }

pcePcepPeerNumReqSentEroRcvd OBJECT-TYPE
    SYNTAX         Counter32
    MAX-ACCESS     read-only
    STATUS         current
    DESCRIPTION
        "The number of requests that have been sent to this peer for
         which a response with an ERO was
         received.  Such responses indicate that a path was
         successfully computed by the peer."
    ::= { pcePcepPeerEntry 31 }

pcePcepPeerNumReqSentNoPathRcvd OBJECT-TYPE
    SYNTAX         Counter32
    MAX-ACCESS     read-only
    STATUS         current
    DESCRIPTION
        "The number of requests that have been sent to this peer for
         which a response with a NO-PATH object was received.  Such
         responses indicate that the peer could not find a path to
         satisfy the request."
    ::= { pcePcepPeerEntry 32 }

pcePcepPeerNumReqSentCancelRcvd OBJECT-TYPE
    SYNTAX         Counter32
    MAX-ACCESS     read-only
    STATUS         current
    DESCRIPTION
        "The number of requests that were canceled by the peer with
         a PCNtf message.
```

```
            This might be different than pcePcepPeerNumPCNtfRcvd because
            not all PCNtf messages are used to cancel requests, and a
            single PCNtf message can cancel multiple requests."
    ::= { pcePcepPeerEntry 33 }

pcePcepPeerNumReqSentErrorRcvd OBJECT-TYPE
    SYNTAX        Counter32
    MAX-ACCESS  read-only
    STATUS        current
    DESCRIPTION
        "The number of requests that were rejected by the peer with a
         PCErr message.

         This might be different than pcePcepPeerNumPCErrRcvd because
         not all PCErr messages are used to reject requests, and a
         single PCErr message can reject multiple requests."
    ::= { pcePcepPeerEntry 34 }

pcePcepPeerNumReqSentTimeout OBJECT-TYPE
    SYNTAX        Counter32
    MAX-ACCESS  read-only
    STATUS        current
    DESCRIPTION
        "The number of requests that have been sent to a peer and
         have been abandoned because the peer has taken too long to
         respond to them."
    ::= { pcePcepPeerEntry 35 }

pcePcepPeerNumReqSentCancelSent OBJECT-TYPE
    SYNTAX        Counter32
    MAX-ACCESS  read-only
    STATUS        current
    DESCRIPTION
        "The number of requests that were sent to the peer and
         explicitly canceled by the local PCEP entity sending a
         PCNtf."
    ::= { pcePcepPeerEntry 36 }

pcePcepPeerNumReqSentClosed OBJECT-TYPE
    SYNTAX        Counter32
    MAX-ACCESS  read-only
    STATUS        current
    DESCRIPTION
        "The number of requests that were sent to the peer and
         implicitly canceled when the session they were sent over was
         closed."
    ::= { pcePcepPeerEntry 37 }
```

```
pcePcepPeerNumReqRcvd OBJECT-TYPE
    SYNTAX        Counter32
    MAX-ACCESS    read-only
    STATUS        current
    DESCRIPTION
        "The number of requests received from this peer.  A request
         corresponds 1:1 with an RP object in a PCReq message.

         This might be greater than pcePcepPeerNumPCReqRcvd because
         multiple requests can be batched into a single PCReq
         message."
    ::= { pcePcepPeerEntry 38 }

pcePcepPeerNumSvecRcvd OBJECT-TYPE
    SYNTAX        Counter32
    MAX-ACCESS    read-only
    STATUS        current
    DESCRIPTION
        "The number of SVEC objects received from this peer in PCReq
         messages.  An SVEC object represents a set of synchronized
         requests."
    ::= { pcePcepPeerEntry 39 }

pcePcepPeerNumSvecReqRcvd OBJECT-TYPE
    SYNTAX        Counter32
    MAX-ACCESS    read-only
    STATUS        current
    DESCRIPTION
        "The number of requests received from this peer that appeared
         in one or more SVEC objects."
    ::= { pcePcepPeerEntry 40 }

pcePcepPeerNumReqRcvdPendRep OBJECT-TYPE
    SYNTAX        Counter32
    MAX-ACCESS    read-only
    STATUS        current
    DESCRIPTION
        "The number of requests that have been received from this
         peer for which a response is still pending."
    ::= { pcePcepPeerEntry 41 }

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

DESCRIPTION
         "The number of requests that have been received from this
          peer for which a response with an ERO was sent. Such
          responses indicate that a path was successfully computed by
          the local PCEP entity."
     ::= { pcePcepPeerEntry 42 }

   pcePcepPeerNumReqRcvdNoPathSent OBJECT-TYPE
       SYNTAX   Counter32
       MAX-ACCESS   read-only
       STATUS   current
       DESCRIPTION
          "The number of requests that have been received from this
           peer for which a response with a NO-PATH object was sent.
           Such responses indicate that the local PCEP entity could
           not find a path to satisfy the request."
       ::= { pcePcepPeerEntry 43 }

   pcePcepPeerNumReqRcvdCancelSent OBJECT-TYPE
       SYNTAX   Counter32
       MAX-ACCESS   read-only
       STATUS   current
       DESCRIPTION
          "The number of requests received from this peer that were
           canceled by the local PCEP entity sending a PCNtf message.

           This might be different than pcePcepPeerNumPCNtfSent because
           not all PCNtf messages are used to cancel requests, and a
           single PCNtf message can cancel multiple requests."
       ::= { pcePcepPeerEntry 44 }

   pcePcepPeerNumReqRcvdErrorSent OBJECT-TYPE
       SYNTAX   Counter32
       MAX-ACCESS   read-only
       STATUS   current
       DESCRIPTION
          "The number of requests received from this peer that were
           rejected by the local PCEP entity sending a PCErr message.

           This might be different than pcePcepPeerNumPCErrSent because
           not all PCErr messages are used to reject requests, and a
           single PCErr message can reject multiple requests."
       ::= { pcePcepPeerEntry 45 }

   pcePcepPeerNumReqRcvdCancelRcvd OBJECT-TYPE
       SYNTAX   Counter32
       MAX-ACCESS   read-only
       STATUS   current

```
        DESCRIPTION
            "The number of requests that were received from the peer and
             explicitly canceled by the peer sending a PCNtf."
        ::= { pcePcepPeerEntry 46 }

    pcePcepPeerNumReqRcvdClosed OBJECT-TYPE
        SYNTAX        Counter32
        MAX-ACCESS    read-only
        STATUS        current
        DESCRIPTION
            "The number of requests that were received from the peer and
             implicitly canceled when the session they were received over
             was closed."
        ::= { pcePcepPeerEntry 47 }

    pcePcepPeerNumRepRcvdUnknown OBJECT-TYPE
        SYNTAX        Counter32
        MAX-ACCESS    read-only
        STATUS        current
        DESCRIPTION
            "The number of responses to unknown requests received from
             this peer.  A response to an unknown request is a response
             whose RP object does not contain the request ID of any
             request that is currently outstanding on the session."
        ::= { pcePcepPeerEntry 48 }

    pcePcepPeerNumReqRcvdUnknown OBJECT-TYPE
        SYNTAX        Counter32
        MAX-ACCESS    read-only
        STATUS        current
        DESCRIPTION
            "The number of unknown requests that have been received from
             a peer.  An unknown request is a request whose RP object
             contains a request ID of zero."
        ::= { pcePcepPeerEntry 49 }

    --
    -- The PCEP Sessions Table
    --

    pcePcepSessTable OBJECT-TYPE
        SYNTAX        SEQUENCE OF PcePcepSessEntry
        MAX-ACCESS    not-accessible
        STATUS        current
        DESCRIPTION
            "A table of PCEP sessions that involve the local PCEP
             entity.  Each entry in this table represents a single
             session.  The entries in this table are read-only.
```

                    An entry appears in this table when the corresponding PCEP
                    session transitions out of idle state. If the PCEP session
                    transitions back into an idle state, then the corresponding
                    entry in this table is removed."
             ::= { pcePcepObjects 3 }

      pcePcepSessEntry OBJECT-TYPE
          SYNTAX   PcePcepSessEntry
          MAX-ACCESS not-accessible
          STATUS   current
          DESCRIPTION
                  "This entry represents a single PCEP session in which the
                  local PCEP entity participates.

                  This entry exists only if the corresponding PCEP session has
                  been initialized by some event, such as manual user
                  configuration, auto-discovery of a peer, or an incoming TCP
                  connection."
          INDEX { pcePcepEntityIndex,
                  pcePcepPeerAddrType,
                  pcePcepPeerAddr,
                  pcePcepSessInitiator }
          ::= { pcePcepSessTable 1 }

      PcePcepSessEntry ::= SEQUENCE {
          pcePcepSessInitiator   INTEGER,
          pcePcepSessStateLastChange   TimeStamp,
          pcePcepSessState   INTEGER,
          pcePcepSessConnectRetry   Counter32,
          pcePcepSessLocalID   Unsigned32,
          pcePcepSessRemoteID   Unsigned32,
          pcePcepSessKeepaliveTimer   Unsigned32,
          pcePcepSessPeerKeepaliveTimer   Unsigned32,
          pcePcepSessDeadTimer   Unsigned32,
          pcePcepSessPeerDeadTimer   Unsigned32,
          pcePcepSessKAHoldTimeRem   Unsigned32,
          pcePcepSessOverloaded   TruthValue,
          pcePcepSessOverloadTime   Unsigned32,
          pcePcepSessPeerOverloaded   TruthValue,
          pcePcepSessPeerOverloadTime   Unsigned32,
          pcePcepSessDiscontinuityTime   TimeStamp,
          pcePcepSessAvgRspTime   Unsigned32,
          pcePcepSessLWMRspTime   Unsigned32,
          pcePcepSessHWMRspTime   Unsigned32,
          pcePcepSessNumPCReqSent   Counter32,
          pcePcepSessNumPCReqRcvd   Counter32,
          pcePcepSessNumPCRepSent   Counter32,
          pcePcepSessNumPCRepRcvd   Counter32,

```
           pcePcepSessNumPCErrSent                  Counter32,
           pcePcepSessNumPCErrRcvd                  Counter32,
           pcePcepSessNumPCNtfSent                  Counter32,
           pcePcepSessNumPCNtfRcvd                  Counter32,
           pcePcepSessNumKeepaliveSent              Counter32,
           pcePcepSessNumKeepaliveRcvd              Counter32,
           pcePcepSessNumUnknownRcvd                Counter32,
           pcePcepSessNumCorruptRcvd                Counter32,
           pcePcepSessNumReqSent                    Counter32,
           pcePcepSessNumSvecSent                   Counter32,
           pcePcepSessNumSvecReqSent                Counter32,
           pcePcepSessNumReqSentPendRep             Counter32,
           pcePcepSessNumReqSentEroRcvd             Counter32,
           pcePcepSessNumReqSentNoPathRcvd          Counter32,
           pcePcepSessNumReqSentCancelRcvd          Counter32,
           pcePcepSessNumReqSentErrorRcvd           Counter32,
           pcePcepSessNumReqSentTimeout             Counter32,
           pcePcepSessNumReqSentCancelSent          Counter32,
           pcePcepSessNumReqRcvd                    Counter32,
           pcePcepSessNumSvecRcvd                   Counter32,
           pcePcepSessNumSvecReqRcvd                Counter32,
           pcePcepSessNumReqRcvdPendRep             Counter32,
           pcePcepSessNumReqRcvdEroSent             Counter32,
           pcePcepSessNumReqRcvdNoPathSent          Counter32,
           pcePcepSessNumReqRcvdCancelSent          Counter32,
           pcePcepSessNumReqRcvdErrorSent           Counter32,
           pcePcepSessNumReqRcvdCancelRcvd          Counter32,
           pcePcepSessNumRepRcvdUnknown             Counter32,
           pcePcepSessNumReqRcvdUnknown             Counter32
     }

   pcePcepSessInitiator OBJECT-TYPE
       SYNTAX         INTEGER {
                        local(1),
                        remote(2)
                      }
       MAX-ACCESS  not-accessible
       STATUS      current
       DESCRIPTION
           "The initiator of the session; that is, whether the TCP
            connection was initiated by the local PCEP entity or the
            peer.

            There is a window during session initialization where two
            sessions can exist between a pair of PCEP speakers, each
            initiated by one of the speakers.  One of these sessions is
            always discarded before it leaves OpenWait state.  However,
            before it is discarded, two sessions to the given peer
```

                 appear transiently in this MIB module. The sessions are
                 distinguished by who initiated them, and so this field is an
                 index for pcePcepSessTable."
          ::= { pcePcepSessEntry 1 }

      pcePcepSessStateLastChange OBJECT-TYPE
          SYNTAX   TimeStamp
          MAX-ACCESS read-only
          STATUS   current
          DESCRIPTION
              "The value of sysUpTime at the time this session entered its
               current state as denoted by the pcePcepSessState object."
          ::= { pcePcepSessEntry 2 }

      pcePcepSessState OBJECT-TYPE
          SYNTAX   INTEGER {
                            tcpPending(1),
                            openWait(2),
                            keepWait(3),
                            sessionUp(4)
                        }
          MAX-ACCESS read-only
          STATUS   current
          DESCRIPTION
              "The current state of the session.

               The set of possible states excludes the idle state since
               entries do not exist in this table in the idle state."
          ::= { pcePcepSessEntry 3 }

      pcePcepSessConnectRetry OBJECT-TYPE
          SYNTAX   Counter32
          MAX-ACCESS read-only
          STATUS   current
          DESCRIPTION
              "The number of times that the local PCEP entity has
               attempted to establish a TCP connection for this session
               without success. The PCEP entity gives up when this
               reaches pcePcepEntityConnectMaxRetry."
          ::= { pcePcepSessEntry 4 }

      pcePcepSessLocalID OBJECT-TYPE
          SYNTAX   Unsigned32 (0..255)
          MAX-ACCESS read-only
          STATUS   current
          DESCRIPTION
              "The value of the PCEP session ID used by the local PCEP
               entity in the Open message for this session.

               If pcePcepSessState is tcpPending, then this is the session
               ID that will be used in the Open message. Otherwise, this
               is the session ID that was sent in the Open message."
        ::= { pcePcepSessEntry 5 }

    pcePcepSessRemoteID OBJECT-TYPE
        SYNTAX   Unsigned32 (0..255)
        MAX-ACCESS read-only
        STATUS   current
        DESCRIPTION
            "The value of the PCEP session ID used by the peer in its
             Open message for this session.

             If pcePcepSessState is tcpPending or openWait, then this
             field is not used and MUST be set to zero."
        ::= { pcePcepSessEntry 6 }

    pcePcepSessKeepaliveTimer OBJECT-TYPE
        SYNTAX   Unsigned32 (0..255)
        UNITS   "seconds"
        MAX-ACCESS read-only
        STATUS   current
        DESCRIPTION
            "The agreed maximum interval at which the local PCEP entity
             transmits PCEP messages on this PCEP session. Zero means
             that the local PCEP entity never sends Keepalives on this
             session.

             This field is used if and only if pcePcepSessState is
             sessionUp. Otherwise, it is not used and MUST be set to
             zero."
        ::= { pcePcepSessEntry 7 }

    pcePcepSessPeerKeepaliveTimer OBJECT-TYPE
        SYNTAX   Unsigned32 (0..255)
        UNITS   "seconds"
        MAX-ACCESS read-only
        STATUS   current
        DESCRIPTION
            "The agreed maximum interval at which the peer transmits PCEP
             messages on this PCEP session. Zero means that the peer
             never sends Keepalives on this session.

             This field is used if and only if pcePcepSessState is
             sessionUp. Otherwise, it is not used and MUST be set to
             zero."
        ::= { pcePcepSessEntry 8 }

    pcePcepSessDeadTimer OBJECT-TYPE
        SYNTAX   Unsigned32 (0..255)
        UNITS   "seconds"
        MAX-ACCESS read-only
        STATUS   current
        DESCRIPTION
            "The DeadTimer interval for this PCEP session."
        ::= { pcePcepSessEntry 9 }

    pcePcepSessPeerDeadTimer OBJECT-TYPE
        SYNTAX   Unsigned32 (0..255)
        UNITS   "seconds"
        MAX-ACCESS read-only
        STATUS   current
        DESCRIPTION
            "The peer's DeadTimer interval for this PCEP session.

             If pcePcepSessState is tcpPending or openWait, then this
             field is not used and MUST be set to zero."
        ::= { pcePcepSessEntry 10 }

    pcePcepSessKAHoldTimeRem OBJECT-TYPE
        SYNTAX   Unsigned32 (0..255)
        UNITS   "seconds"
        MAX-ACCESS read-only
        STATUS   current
        DESCRIPTION
            "The Keepalive hold time remaining for this session.

             If pcePcepSessState is tcpPending or openWait, then this
             field is not used and MUST be set to zero."
        ::= { pcePcepSessEntry 11 }

    pcePcepSessOverloaded OBJECT-TYPE
        SYNTAX   TruthValue
        MAX-ACCESS read-only
        STATUS   current
        DESCRIPTION
            "If the local PCEP entity has informed the peer that it is
             currently overloaded, then this is set to true. Otherwise,
             it is set to false."
        ::= { pcePcepSessEntry 12 }

    pcePcepSessOverloadTime OBJECT-TYPE
        SYNTAX   Unsigned32
        UNITS   "seconds"
        MAX-ACCESS read-only
        STATUS   current

       DESCRIPTION
           "The interval of time that is remaining until the local PCEP
            entity will cease to be overloaded on this session.

            This field is only used if pcePcepSessOverloaded is set to
            true. Otherwise, it is not used and MUST be set to zero."
       ::= { pcePcepSessEntry 13 }

   pcePcepSessPeerOverloaded OBJECT-TYPE
       SYNTAX   TruthValue
       MAX-ACCESS   read-only
       STATUS   current
       DESCRIPTION
           "If the peer has informed the local PCEP entity that it is
            currently overloaded, then this is set to true. Otherwise,
            it is set to false."
       ::= { pcePcepSessEntry 14 }

   pcePcepSessPeerOverloadTime OBJECT-TYPE
       SYNTAX   Unsigned32
       UNITS   "seconds"
       MAX-ACCESS   read-only
       STATUS   current
       DESCRIPTION
           "The interval of time that is remaining until the peer will
            cease to be overloaded. If it is not known how long the
            peer will stay in overloaded state, this field is set to
            zero.

            This field is only used if pcePcepSessPeerOverloaded is set
            to true. Otherwise, it is not used and MUST be set to
            zero."
       ::= { pcePcepSessEntry 15 }

   pcePcepSessDiscontinuityTime OBJECT-TYPE
       SYNTAX   TimeStamp
       MAX-ACCESS   read-only
       STATUS   current
       DESCRIPTION
           "The value of sysUpTime at the time that the statistics in
            this row were last reset."
       ::= { pcePcepSessEntry 16 }

   pcePcepSessAvgRspTime OBJECT-TYPE
       SYNTAX   Unsigned32
       UNITS   "milliseconds"
       MAX-ACCESS   read-only
       STATUS   current

```
    DESCRIPTION
        "The average response time for this peer on this session.

         If an average response time has not been calculated for this
         peer, then this object has the value zero."
    ::= { pcePcepSessEntry 17 }

pcePcepSessLWMRspTime OBJECT-TYPE
    SYNTAX      Unsigned32
    UNITS       "milliseconds"
    MAX-ACCESS  read-only
    STATUS      current
    DESCRIPTION
        "The smallest (low-water mark) response time seen from this
         peer on this session.

         If no responses have been received from this peer, then this
         object has the value zero."
    ::= { pcePcepSessEntry 18 }

pcePcepSessHWMRspTime OBJECT-TYPE
    SYNTAX      Unsigned32
    UNITS       "milliseconds"
    MAX-ACCESS  read-only
    STATUS      current
    DESCRIPTION
        "The greatest (high-water mark) response time seen from this
         peer on this session.

         If no responses have been received from this peer, then this
         object has the value zero."
    ::= { pcePcepSessEntry 19 }

pcePcepSessNumPCReqSent OBJECT-TYPE
    SYNTAX      Counter32
    MAX-ACCESS  read-only
    STATUS      current
    DESCRIPTION
        "The number of PCReq messages sent on this session."
    ::= { pcePcepSessEntry 20 }

pcePcepSessNumPCReqRcvd OBJECT-TYPE
    SYNTAX      Counter32
    MAX-ACCESS  read-only
    STATUS      current
    DESCRIPTION
        "The number of PCReq messages received on this session."
    ::= { pcePcepSessEntry 21 }
```

```
   pcePcepSessNumPCRepSent OBJECT-TYPE
       SYNTAX        Counter32
       MAX-ACCESS    read-only
       STATUS        current
       DESCRIPTION
           "The number of PCRep messages sent on this session."
       ::= { pcePcepSessEntry 22 }

   pcePcepSessNumPCRepRcvd OBJECT-TYPE
       SYNTAX        Counter32
       MAX-ACCESS    read-only
       STATUS        current
       DESCRIPTION
           "The number of PCRep messages received on this session."
       ::= { pcePcepSessEntry 23 }

   pcePcepSessNumPCErrSent OBJECT-TYPE
       SYNTAX        Counter32
       MAX-ACCESS    read-only
       STATUS        current
       DESCRIPTION
           "The number of PCErr messages sent on this session."
       ::= { pcePcepSessEntry 24 }

   pcePcepSessNumPCErrRcvd OBJECT-TYPE
       SYNTAX        Counter32
       MAX-ACCESS    read-only
       STATUS        current
       DESCRIPTION
           "The number of PCErr messages received on this session."
       ::= { pcePcepSessEntry 25 }

   pcePcepSessNumPCNtfSent OBJECT-TYPE
       SYNTAX        Counter32
       MAX-ACCESS    read-only
       STATUS        current
       DESCRIPTION
           "The number of PCNtf messages sent on this session."
       ::= { pcePcepSessEntry 26 }

   pcePcepSessNumPCNtfRcvd OBJECT-TYPE
       SYNTAX        Counter32
       MAX-ACCESS    read-only
       STATUS        current
       DESCRIPTION
           "The number of PCNtf messages received on this session."
       ::= { pcePcepSessEntry 27 }
```

```
pcePcepSessNumKeepaliveSent OBJECT-TYPE
    SYNTAX      Counter32
    MAX-ACCESS  read-only
    STATUS      current
    DESCRIPTION
        "The number of Keepalive messages sent on this session."
    ::= { pcePcepSessEntry 28 }

pcePcepSessNumKeepaliveRcvd OBJECT-TYPE
    SYNTAX      Counter32
    MAX-ACCESS  read-only
    STATUS      current
    DESCRIPTION
        "The number of Keepalive messages received on this session."
    ::= { pcePcepSessEntry 29 }

pcePcepSessNumUnknownRcvd OBJECT-TYPE
    SYNTAX      Counter32
    MAX-ACCESS  read-only
    STATUS      current
    DESCRIPTION
        "The number of unknown messages received on this session."
    ::= { pcePcepSessEntry 30 }

pcePcepSessNumCorruptRcvd OBJECT-TYPE
    SYNTAX      Counter32
    MAX-ACCESS  read-only
    STATUS      current
    DESCRIPTION
        "The number of corrupted PCEP messages received on this
         session."
    ::= { pcePcepSessEntry 31 }

pcePcepSessNumReqSent OBJECT-TYPE
    SYNTAX      Counter32
    MAX-ACCESS  read-only
    STATUS      current
    DESCRIPTION
        "The number of requests sent on this session.  A request
         corresponds 1:1 with an RP object in a PCReq message.

         This might be greater than pcePcepSessNumPCReqSent because
         multiple requests can be batched into a single PCReq
         message."
    ::= { pcePcepSessEntry 32 }
```

```
pcePcepSessNumSvecSent OBJECT-TYPE
    SYNTAX        Counter32
    MAX-ACCESS    read-only
    STATUS        current
    DESCRIPTION
        "The number of SVEC objects sent on this session in PCReq
         messages.  An SVEC object represents a set of synchronized
         requests."
    ::= { pcePcepSessEntry 33 }

pcePcepSessNumSvecReqSent OBJECT-TYPE
    SYNTAX        Counter32
    MAX-ACCESS    read-only
    STATUS        current
    DESCRIPTION
        "The number of requests sent on this session that appeared in
         one or more SVEC objects."
    ::= { pcePcepSessEntry 34 }

pcePcepSessNumReqSentPendRep OBJECT-TYPE
    SYNTAX        Counter32
    MAX-ACCESS    read-only
    STATUS        current
    DESCRIPTION
        "The number of requests that have been sent on this session
         for which a response is still pending."
    ::= { pcePcepSessEntry 35 }

pcePcepSessNumReqSentEroRcvd OBJECT-TYPE
    SYNTAX        Counter32
    MAX-ACCESS    read-only
    STATUS        current
    DESCRIPTION
        "The number of successful responses received on this session.
         A response corresponds 1:1 with an RP object in a PCRep
         message.  A successful response is a response for which an
         ERO was successfully computed."
    ::= { pcePcepSessEntry 36 }

pcePcepSessNumReqSentNoPathRcvd OBJECT-TYPE
    SYNTAX        Counter32
    MAX-ACCESS    read-only
    STATUS        current
    DESCRIPTION
        "The number of unsuccessful responses received on this
         session.  A response corresponds 1:1 with an RP object in a
         PCRep message.  An unsuccessful response is a response with
         a NO-PATH object."
```

```
        ::= { pcePcepSessEntry 37 }

    pcePcepSessNumReqSentCancelRcvd OBJECT-TYPE
        SYNTAX        Counter32
        MAX-ACCESS    read-only
        STATUS        current
        DESCRIPTION
            "The number of requests sent on this session that were
             canceled by the peer with a PCNtf message.

             This might be different than pcePcepSessNumPCNtfRcvd because
             not all PCNtf messages are used to cancel requests, and a
             single PCNtf message can cancel multiple requests."
        ::= { pcePcepSessEntry 38 }

    pcePcepSessNumReqSentErrorRcvd OBJECT-TYPE
        SYNTAX        Counter32
        MAX-ACCESS    read-only
        STATUS        current
        DESCRIPTION
            "The number of requests sent on this session that were
             rejected by the peer with a PCErr message.

             This might be different than pcePcepSessNumPCErrRcvd because
             not all PCErr messages are used to reject requests, and a
             single PCErr message can reject multiple requests."
        ::= { pcePcepSessEntry 39 }

    pcePcepSessNumReqSentTimeout OBJECT-TYPE
        SYNTAX        Counter32
        MAX-ACCESS    read-only
        STATUS        current
        DESCRIPTION
            "The number of requests sent on this session that have been
             sent to a peer and have been abandoned because the peer has
             taken too long to respond to them."
        ::= { pcePcepSessEntry 40 }

    pcePcepSessNumReqSentCancelSent OBJECT-TYPE
        SYNTAX        Counter32
        MAX-ACCESS    read-only
        STATUS        current
        DESCRIPTION
            "The number of requests sent on this session that were sent
             to the peer and explicitly canceled by the local PCEP
             entity sending a PCNtf."
        ::= { pcePcepSessEntry 41 }
```

```
pcePcepSessNumReqRcvd OBJECT-TYPE
    SYNTAX        Counter32
    MAX-ACCESS    read-only
    STATUS        current
    DESCRIPTION
        "The number of requests received on this session.  A request
         corresponds 1:1 with an RP object in a PCReq message.

         This might be greater than pcePcepSessNumPCReqRcvd because
         multiple requests can be batched into a single PCReq
         message."
    ::= { pcePcepSessEntry 42 }

pcePcepSessNumSvecRcvd OBJECT-TYPE
    SYNTAX        Counter32
    MAX-ACCESS    read-only
    STATUS        current
    DESCRIPTION
        "The number of SVEC objects received on this session in PCReq
         messages.  An SVEC object represents a set of synchronized
         requests."
    ::= { pcePcepSessEntry 43 }

pcePcepSessNumSvecReqRcvd OBJECT-TYPE
    SYNTAX        Counter32
    MAX-ACCESS    read-only
    STATUS        current
    DESCRIPTION
        "The number of requests received on this session that
         appeared in one or more SVEC objects."
    ::= { pcePcepSessEntry 44 }

pcePcepSessNumReqRcvdPendRep OBJECT-TYPE
    SYNTAX        Counter32
    MAX-ACCESS    read-only
    STATUS        current
    DESCRIPTION
        "The number of requests that have been received on this
         session for which a response is still pending."
    ::= { pcePcepSessEntry 45 }

pcePcepSessNumReqRcvdEroSent OBJECT-TYPE
    SYNTAX        Counter32
    MAX-ACCESS    read-only
    STATUS        current
    DESCRIPTION
        "The number of successful responses sent on this session.  A
         response corresponds 1:1 with an RP object in a PCRep
```

         message. A successful response is a response for which an
         ERO was successfully computed."
      ::= { pcePcepSessEntry 46 }

   pcePcepSessNumReqRcvdNoPathSent OBJECT-TYPE
      SYNTAX   Counter32
      MAX-ACCESS read-only
      STATUS   current
      DESCRIPTION
         "The number of unsuccessful responses sent on this session.
          A response corresponds 1:1 with an RP object in a PCRep
          message. An unsuccessful response is a response with a
          NO-PATH object."
      ::= { pcePcepSessEntry 47 }

   pcePcepSessNumReqRcvdCancelSent OBJECT-TYPE
      SYNTAX   Counter32
      MAX-ACCESS read-only
      STATUS   current
      DESCRIPTION
         "The number of requests received on this session that were
          canceled by the local PCEP entity sending a PCNtf message.

          This might be different than pcePcepSessNumPCNtfSent because
          not all PCNtf messages are used to cancel requests, and a
          single PCNtf message can cancel multiple requests."
      ::= { pcePcepSessEntry 48 }

   pcePcepSessNumReqRcvdErrorSent OBJECT-TYPE
      SYNTAX   Counter32
      MAX-ACCESS read-only
      STATUS   current
      DESCRIPTION
         "The number of requests received on this session that were
          rejected by the local PCEP entity sending a PCErr message.

          This might be different than pcePcepSessNumPCErrSent because
          not all PCErr messages are used to reject requests, and a
          single PCErr message can reject multiple requests."
      ::= { pcePcepSessEntry 49 }

   pcePcepSessNumReqRcvdCancelRcvd OBJECT-TYPE
      SYNTAX   Counter32
      MAX-ACCESS read-only
      STATUS   current
      DESCRIPTION
         "The number of requests that were received on this session
          and explicitly canceled by the peer sending a PCNtf."

```
          ::= { pcePcepSessEntry 50 }

   pcePcepSessNumRepRcvdUnknown OBJECT-TYPE
       SYNTAX        Counter32
       MAX-ACCESS    read-only
       STATUS        current
       DESCRIPTION
           "The number of responses to unknown requests received on this
            session.  A response to an unknown request is a response
            whose RP object does not contain the request ID of any
            request that is currently outstanding on the session."
       ::= { pcePcepSessEntry 51 }

   pcePcepSessNumReqRcvdUnknown OBJECT-TYPE
       SYNTAX        Counter32
       MAX-ACCESS    read-only
       STATUS        current
       DESCRIPTION
           "The number of unknown requests that have been received on
            this session.  An unknown request is a request whose RP
            object contains a request ID of zero."
       ::= { pcePcepSessEntry 52 }

   ---
   --- Notifications Configuration
   ---

   pcePcepNotificationsMaxRate OBJECT-TYPE
       SYNTAX        Unsigned32
       MAX-ACCESS    read-write
       STATUS        current
       DESCRIPTION
           "This variable indicates the maximum number of
            notifications issued per second.  If events occur
            more rapidly, the implementation may simply fail to
            emit these notifications during that period or may
            queue them until an appropriate time.  A value of zero
            means no notifications are emitted and all should be
            discarded (that is, not queued)."
       ::= { pcePcepObjects 4 }

   ---
   --- Notifications
   ---

   pcePcepSessUp NOTIFICATION-TYPE
       OBJECTS        {
                       pcePcepSessState,
```

```
                    pcePcepSessStateLastChange
                }
    STATUS          current
    DESCRIPTION
        "This notification is sent when the value of
         pcePcepSessState enters the sessionUp state."
    ::= { pcePcepNotifications 1 }

  pcePcepSessDown NOTIFICATION-TYPE
    OBJECTS         {
                    pcePcepSessState,
                    pcePcepSessStateLastChange
                }
    STATUS          current
    DESCRIPTION
        "This notification is sent when the value of
         pcePcepSessState leaves the sessionUp state."
    ::= { pcePcepNotifications 2 }

  pcePcepSessLocalOverload NOTIFICATION-TYPE
    OBJECTS         {
                    pcePcepSessOverloaded,
                    pcePcepSessOverloadTime
                }
    STATUS          current
    DESCRIPTION
        "This notification is sent when the local PCEP entity enters
         overload state for a peer."
    ::= { pcePcepNotifications 3 }

  pcePcepSessLocalOverloadClear NOTIFICATION-TYPE
    OBJECTS         {
                    pcePcepSessOverloaded
                }
    STATUS          current
    DESCRIPTION
        "This notification is sent when the local PCEP entity leaves
         overload state for a peer."
    ::= { pcePcepNotifications 4 }

  pcePcepSessPeerOverload NOTIFICATION-TYPE
    OBJECTS         {
                    pcePcepSessPeerOverloaded,
                    pcePcepSessPeerOverloadTime
                }
    STATUS          current
```

        DESCRIPTION
            "This notification is sent when a peer enters overload
             state."
        ::= { pcePcepNotifications 5 }

    pcePcepSessPeerOverloadClear NOTIFICATION-TYPE
        OBJECTS   {
                        pcePcepSessPeerOverloaded
                      }
        STATUS   current
        DESCRIPTION
            "This notification is sent when a peer leaves overload
             state."
        ::= { pcePcepNotifications 6 }

    --
    -- Module Conformance Statement
    --

    pcePcepCompliances
        OBJECT IDENTIFIER ::= { pcePcepConformance 1 }

    pcePcepGroups
        OBJECT IDENTIFIER ::= { pcePcepConformance 2 }

    --
    -- Read-Only Compliance
    --

    pcePcepModuleReadOnlyCompliance MODULE-COMPLIANCE
        STATUS current
        DESCRIPTION
            "The module is implemented with support for read-only. In
             other words, only monitoring is available by implementing
             this MODULE-COMPLIANCE."

        MODULE -- this module
            MANDATORY-GROUPS   {
                                   pcePcepGeneralGroup,
                                   pcePcepNotificationsGroup
                                 }

        OBJECT   pcePcepEntityAddrType
        SYNTAX   InetAddressType { unknown(0), ipv4(1), ipv6(2) }
        DESCRIPTION   "Only unknown(0), ipv4(1), and ipv6(2) support
                        is required."

```
-- The following restriction is commented out because of a limitation
-- in SMIv2 which does not allow index objects to be restricted in
-- scope.  Nevertheless, this object is intended to be restricted in
-- scope, as follows.
--
--        OBJECT          pcePcepPeerAddrType
--        SYNTAX          InetAddressType { unknown(0), ipv4(1), ipv6(2) }
--        DESCRIPTION     "Only unknown(0), ipv4(1), and ipv6(2) support
--                         is required."

        ::= { pcePcepCompliances 1 }

   -- units of conformance

   pcePcepGeneralGroup OBJECT-GROUP
        OBJECTS { pcePcepEntityAdminStatus,
                  pcePcepEntityOperStatus,
                  pcePcepEntityAddrType,
                  pcePcepEntityAddr,
                  pcePcepEntityConnectTimer,
                  pcePcepEntityConnectMaxRetry,
                  pcePcepEntityInitBackoffTimer,
                  pcePcepEntityMaxBackoffTimer,
                  pcePcepEntityOpenWaitTimer,
                  pcePcepEntityKeepWaitTimer,
                  pcePcepEntityKeepAliveTimer,
                  pcePcepEntityDeadTimer,
                  pcePcepEntityAllowNegotiation,
                  pcePcepEntityMaxKeepAliveTimer,
                  pcePcepEntityMaxDeadTimer,
                  pcePcepEntityMinKeepAliveTimer,
                  pcePcepEntityMinDeadTimer,
                  pcePcepEntitySyncTimer,
                  pcePcepEntityRequestTimer,
                  pcePcepEntityMaxSessions,
                  pcePcepEntityMaxUnknownReqs,
                  pcePcepEntityMaxUnknownMsgs,
                  pcePcepPeerRole,
                  pcePcepPeerDiscontinuityTime,
                  pcePcepPeerInitiateSession,
                  pcePcepPeerSessionExists,
                  pcePcepPeerNumSessSetupOK,
                  pcePcepPeerNumSessSetupFail,
                  pcePcepPeerSessionUpTime,
                  pcePcepPeerSessionFailTime,
                  pcePcepPeerSessionFailUpTime,
                  pcePcepPeerAvgRspTime,
                  pcePcepPeerLWMRspTime,
```

```
                pcePcepPeerHWMRspTime,
                pcePcepPeerNumPCReqSent,
                pcePcepPeerNumPCReqRcvd,
                pcePcepPeerNumPCRepSent,
                pcePcepPeerNumPCRepRcvd,
                pcePcepPeerNumPCErrSent,
                pcePcepPeerNumPCErrRcvd,
                pcePcepPeerNumPCNtfSent,
                pcePcepPeerNumPCNtfRcvd,
                pcePcepPeerNumKeepaliveSent,
                pcePcepPeerNumKeepaliveRcvd,
                pcePcepPeerNumUnknownRcvd,
                pcePcepPeerNumCorruptRcvd,
                pcePcepPeerNumReqSent,
                pcePcepPeerNumSvecSent,
                pcePcepPeerNumSvecReqSent,
                pcePcepPeerNumReqSentPendRep,
                pcePcepPeerNumReqSentEroRcvd,
                pcePcepPeerNumReqSentNoPathRcvd,
                pcePcepPeerNumReqSentCancelRcvd,
                pcePcepPeerNumReqSentErrorRcvd,
                pcePcepPeerNumReqSentTimeout,
                pcePcepPeerNumReqSentCancelSent,
                pcePcepPeerNumReqSentClosed,
                pcePcepPeerNumReqRcvd,
                pcePcepPeerNumSvecRcvd,
                pcePcepPeerNumSvecReqRcvd,
                pcePcepPeerNumReqRcvdPendRep,
                pcePcepPeerNumReqRcvdEroSent,
                pcePcepPeerNumReqRcvdNoPathSent,
                pcePcepPeerNumReqRcvdCancelSent,
                pcePcepPeerNumReqRcvdErrorSent,
                pcePcepPeerNumReqRcvdCancelRcvd,
                pcePcepPeerNumReqRcvdClosed,
                pcePcepPeerNumRepRcvdUnknown,
                pcePcepPeerNumReqRcvdUnknown,
                pcePcepSessStateLastChange,
                pcePcepSessState,
                pcePcepSessConnectRetry,
                pcePcepSessLocalID,
                pcePcepSessRemoteID,
                pcePcepSessKeepaliveTimer,
                pcePcepSessPeerKeepaliveTimer,
                pcePcepSessDeadTimer,
                pcePcepSessPeerDeadTimer,
                pcePcepSessKAHoldTimeRem,
                pcePcepSessOverloaded,
                pcePcepSessOverloadTime,
```

```
                    pcePcepSessPeerOverloaded,
                    pcePcepSessPeerOverloadTime,
                    pcePcepSessDiscontinuityTime,
                    pcePcepSessAvgRspTime,
                    pcePcepSessLWMRspTime,
                    pcePcepSessHWMRspTime,
                    pcePcepSessNumPCReqSent,
                    pcePcepSessNumPCReqRcvd,
                    pcePcepSessNumPCRepSent,
                    pcePcepSessNumPCRepRcvd,
                    pcePcepSessNumPCErrSent,
                    pcePcepSessNumPCErrRcvd,
                    pcePcepSessNumPCNtfSent,
                    pcePcepSessNumPCNtfRcvd,
                    pcePcepSessNumKeepaliveSent,
                    pcePcepSessNumKeepaliveRcvd,
                    pcePcepSessNumUnknownRcvd,
                    pcePcepSessNumCorruptRcvd,
                    pcePcepSessNumReqSent,
                    pcePcepSessNumSvecSent,
                    pcePcepSessNumSvecReqSent,
                    pcePcepSessNumReqSentPendRep,
                    pcePcepSessNumReqSentEroRcvd,
                    pcePcepSessNumReqSentNoPathRcvd,
                    pcePcepSessNumReqSentCancelRcvd,
                    pcePcepSessNumReqSentErrorRcvd,
                    pcePcepSessNumReqSentTimeout,
                    pcePcepSessNumReqSentCancelSent,
                    pcePcepSessNumReqRcvd,
                    pcePcepSessNumSvecRcvd,
                    pcePcepSessNumSvecReqRcvd,
                    pcePcepSessNumReqRcvdPendRep,
                    pcePcepSessNumReqRcvdEroSent,
                    pcePcepSessNumReqRcvdNoPathSent,
                    pcePcepSessNumReqRcvdCancelSent,
                    pcePcepSessNumReqRcvdErrorSent,
                    pcePcepSessNumReqRcvdCancelRcvd,
                    pcePcepSessNumRepRcvdUnknown,
                    pcePcepSessNumReqRcvdUnknown,
                    pcePcepNotificationsMaxRate
                }
        STATUS current
        DESCRIPTION
            "Objects that apply to all PCEP MIB module implementations."
        ::= { pcePcepGroups 1 }
```

```
    pcePcepNotificationsGroup NOTIFICATION-GROUP
        NOTIFICATIONS { pcePcepSessUp,
                        pcePcepSessDown,
                        pcePcepSessLocalOverload,
                        pcePcepSessLocalOverloadClear,
                        pcePcepSessPeerOverload,
                        pcePcepSessPeerOverloadClear
                      }
        STATUS    current
        DESCRIPTION
            "The notifications for a PCEP MIB module implementation."
        ::= { pcePcepGroups 2 }

    END
```

5. Security Considerations

The pcePcepNotificationsMaxRate object defined in this MIB module has
a MAX-ACCESS clause of read-write. 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 opens devices to attack. In particular,
pcePcepNotificationsMaxRate may be used improperly to stop
notifications being issued or to permit a flood of notifications to
be sent to the management agent at a high rate.

All the readable objects in this MIB module (i.e., objects with a
MAX-ACCESS other than not-accessible) may be considered sensitive or
vulnerable in some network environments. It is thus important to
control even GET and/or NOTIFY access to these objects and possibly
to even encrypt the values of these objects when sending them over
the network via SNMP. The sensitivity/vulnerability arises because,
collectively, these objects provide information about the amount and
frequency of path computation requests and responses within the
network and can reveal some aspects of its configuration.

SNMP versions prior to SNMPv3 did not include adequate security.
Even if the network itself is secure (for example by using IPsec),
there is no control as to who on the secure network is allowed to
access and GET/SET (read/change/create/delete) the objects in this
MIB module.

Implementations SHOULD provide the security features described by the
SNMPv3 framework (see [RFC3410]), and implementations claiming
compliance to the SNMPv3 standard MUST include full support for
authentication and privacy via the User-based Security Model (USM)
[RFC3414] with the AES cipher algorithm [RFC3826]. Implementations
MAY also provide support for the Transport Security Model (TSM)

[RFC5591] in combination with a secure transport such as SSH
[RFC5592] or TLS/DTLS [RFC6353].

Further, deployment of SNMP versions prior to SNMPv3 is NOT
RECOMMENDED. Instead, it is RECOMMENDED to deploy SNMPv3 and to
enable cryptographic security. It is then a customer/operator
responsibility to ensure that the SNMP entity giving access to an
instance of this MIB module is properly configured 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

   The MIB module in this document uses the following IANA-assigned
   OBJECT IDENTIFIER values recorded in the SMI Numbers registry:

        Descriptor   OBJECT IDENTIFIER value
        ----------   -----------------------
        pcePcepMIB   { mib-2 227 }

7. References

7.1. Normative References

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7.2. Informative References

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   [RFC4655] Farrel, A., Vasseur, J., and J. Ash, "A Path Computation
              Element (PCE)-Based Architecture", RFC 4655, August 2006,
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Appendix A. PCEP MIB Module Example

   This example considers the set of PCC/PCE relationships shown in the
   following figure. The example shows the contents of the PCEP MIB
   module as read at PCE2 and PCCb.

```
     PCE1---PCE2    PCE3
       |  /   |   /   |
       | /    |  /    |
     PCCa/    PCCb   PCCc
```
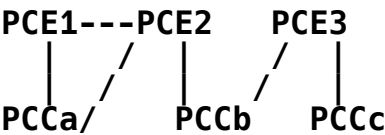
   The IP addresses of the PCE speakers in this diagram are given in the
   following table.

```
     +------+-------------+
     | PCE1 | 1.1.1.1     |
     +------+-------------+
     | PCE2 | 2.2.2.2     |
     +------+-------------+
     | PCE3 | 3.3.3.3     |
     +------+-------------+
     | PCCa | 11.11.11.11 |
     +------+-------------+
     | PCCb | 22.22.22.22 |
     +------+-------------+
     | PCCc | 33.33.33.33 |
     +------+-------------+
```

   In this example, the PCEP session between PCCb and PCE3 is currently
   down.

A.1. Contents of PCEP MIB Module at PCE2

   At PCE2, there is a single local PCEP entity that has three peers
   (PCCa, PCCb, and PCE1). There is a session active to all of these
   peers.

   The contents of the PCEP MIB module as read at PCE2 are as follows.

   In pcePcepEntityTable {
         pcePcepEntityIndex   1,
         pcePcepEntityAdminStatus   adminStatusUp(1),
         pcePcepEntityOperStatus   operStatusUp(1),
         pcePcepEntityAddrType   ipv4(1),
         pcePcepEntityAddr   2.2.2.2, -- PCE2
         pcePcepEntityConnectTimer   60,
         pcePcepEntityConnectMaxRetry   5,
         pcePcepEntityInitBackoffTimer   30,
         pcePcepEntityMaxBackoffTimer   3600,
         pcePcepEntityOpenWaitTimer   60,
         pcePcepEntityKeepWaitTimer   60,
         pcePcepEntityKeepAliveTimer   1,
         pcePcepEntityDeadTimer   4,
         pcePcepEntityAllowNegotiation   true(1),
         pcePcepEntityMaxKeepAliveTimer   60,
         pcePcepEntityMaxDeadTimer   240,
         pcePcepEntityMinKeepAliveTimer   1,
         pcePcepEntityMinDeadTimer   4,
         pcePcepEntitySyncTimer   60,
         pcePcepEntityRequestTimer   120,
         pcePcepEntityMaxSessions   999,
         pcePcepEntityMaxUnknownReqs   5,
         pcePcepEntityMaxUnknownMsgs   5
      }

   In pcePcepPeerTable {
         pcePcepPeerAddrType   ipv4(1), --PCE1
         pcePcepPeerAddr   1.1.1.1,
         pcePcepPeerRole   pccAndPce(3),
         pcePcepPeerDiscontinuityTime   TimeStamp,
         pcePcepPeerInitiateSession   true(1),
         pcePcepPeerSessionExists   true(1),
         pcePcepPeerNumSessSetupOK   1,
         pcePcepPeerNumSessSetupFail   0,
         pcePcepPeerSessionUpTime   TimeStamp,
         pcePcepPeerSessionFailTime   0,
         pcePcepPeerSessionFailUpTime   TimeStamp,
         pcePcepPeerAvgRspTime   0,
         pcePcepPeerLWMRspTime   0,

```
        pcePcepPeerHWMRspTime                     0,
        pcePcepPeerNumPCReqSent                   0,
        pcePcepPeerNumPCReqRcvd                   0,
        pcePcepPeerNumPCRepSent                   0,
        pcePcepPeerNumPCRepRcvd                   0,
        pcePcepPeerNumPCErrSent                   0,
        pcePcepPeerNumPCErrRcvd                   0,
        pcePcepPeerNumPCNtfSent                   0,
        pcePcepPeerNumPCNtfRcvd                   0,
        pcePcepPeerNumKeepaliveSent               123,
        pcePcepPeerNumKeepaliveRcvd               123,
        pcePcepPeerNumUnknownRcvd                 0,
        pcePcepPeerNumCorruptRcvd                 0,
        pcePcepPeerNumReqSent                     0,
        pcePcepPeerNumSvecSent                    0,
        pcePcepPeerNumSvecReqSent                 0,
        pcePcepPeerNumReqSentPendRep              0,
        pcePcepPeerNumReqSentEroRcvd              0,
        pcePcepPeerNumReqSentNoPathRcvd           0,
        pcePcepPeerNumReqSentCancelRcvd           0,
        pcePcepPeerNumReqSentErrorRcvd            0,
        pcePcepPeerNumReqSentTimeout              0,
        pcePcepPeerNumReqSentCancelSent           0,
        pcePcepPeerNumReqSentClosed               0,
        pcePcepPeerNumReqRcvd                     0,
        pcePcepPeerNumSvecRcvd                    0,
        pcePcepPeerNumSvecReqRcvd                 0,
        pcePcepPeerNumReqRcvdPendRep              0,
        pcePcepPeerNumReqRcvdEroSent              0,
        pcePcepPeerNumReqRcvdNoPathSent           0,
        pcePcepPeerNumReqRcvdCancelSent           0,
        pcePcepPeerNumReqRcvdErrorSent            0,
        pcePcepPeerNumReqRcvdCancelRcvd           0,
        pcePcepPeerNumReqRcvdClosed               0,
        pcePcepPeerNumRepRcvdUnknown              0,
        pcePcepPeerNumReqRcvdUnknown              0
    },
    {
        pcePcepPeerAddrType                       ipv4(1),   --PCCa
        pcePcepPeerAddr                           11.11.11.11,
        pcePcepPeerRole                           pcc(1),
        pcePcepPeerDiscontinuityTime              TimeStamp,
        pcePcepPeerInitiateSession                false(0),
        pcePcepPeerSessionExists                  true(1),
        pcePcepPeerNumSessSetupOK                 1,
        pcePcepPeerNumSessSetupFail               0,
        pcePcepPeerSessionUpTime                  TimeStamp,
        pcePcepPeerSessionFailTime                0,
```

```
            pcePcepPeerSessionFailUpTime        TimeStamp,
            pcePcepPeerAvgRspTime               200,
            pcePcepPeerLWMRspTime               100,
            pcePcepPeerHWMRspTime               300,
            pcePcepPeerNumPCReqSent             0,
            pcePcepPeerNumPCReqRcvd             3,
            pcePcepPeerNumPCRepSent             3,
            pcePcepPeerNumPCRepRcvd             0,
            pcePcepPeerNumPCErrSent             0,
            pcePcepPeerNumPCErrRcvd             0,
            pcePcepPeerNumPCNtfSent             0,
            pcePcepPeerNumPCNtfRcvd             0,
            pcePcepPeerNumKeepaliveSent         123,
            pcePcepPeerNumKeepaliveRcvd         123,
            pcePcepPeerNumUnknownRcvd           0,
            pcePcepPeerNumCorruptRcvd           0,
            pcePcepPeerNumReqSent               0,
            pcePcepPeerNumSvecSent              0,
            pcePcepPeerNumSvecReqSent           0,
            pcePcepPeerNumReqSentPendRep        0,
            pcePcepPeerNumReqSentEroRcvd        0,
            pcePcepPeerNumReqSentNoPathRcvd     0,
            pcePcepPeerNumReqSentCancelRcvd     0,
            pcePcepPeerNumReqSentErrorRcvd      0,
            pcePcepPeerNumReqSentTimeout        0,
            pcePcepPeerNumReqSentCancelSent     0,
            pcePcepPeerNumReqSentClosed         0,
            pcePcepPeerNumReqRcvd               3,
            pcePcepPeerNumSvecRcvd              0,
            pcePcepPeerNumSvecReqRcvd           0,
            pcePcepPeerNumReqRcvdPendRep        0,
            pcePcepPeerNumReqRcvdEroSent        3,
            pcePcepPeerNumReqRcvdNoPathSent     0,
            pcePcepPeerNumReqRcvdCancelSent     0,
            pcePcepPeerNumReqRcvdErrorSent      0,
            pcePcepPeerNumReqRcvdCancelRcvd     0,
            pcePcepPeerNumReqRcvdClosed         0,
            pcePcepPeerNumRepRcvdUnknown        0,
            pcePcepPeerNumReqRcvdUnknown        0
        },
        {
            pcePcepPeerAddrType                 ipv4(1), -- PCCb
            pcePcepPeerAddr                     22.22.22.22,
            pcePcepPeerRole                     pcc(1),
            pcePcepPeerDiscontinuityTime        TimeStamp,
            pcePcepPeerInitiateSession          true(1),
            pcePcepPeerSessionExists            true(1),
            pcePcepPeerNumSessSetupOK           1,
```

```
        pcePcepPeerNumSessSetupFail              0,
        pcePcepPeerSessionUpTime                 TimeStamp,
        pcePcepPeerSessionFailTime               0,
        pcePcepPeerSessionFailUpTime             TimeStamp,
        pcePcepPeerAvgRspTime                    200,
        pcePcepPeerLWMRspTime                    100,
        pcePcepPeerHWMRspTime                    300,
        pcePcepPeerNumPCReqSent                  0,
        pcePcepPeerNumPCReqRcvd                  4,
        pcePcepPeerNumPCRepSent                  4,
        pcePcepPeerNumPCRepRcvd                  0,
        pcePcepPeerNumPCErrSent                  0,
        pcePcepPeerNumPCErrRcvd                  0,
        pcePcepPeerNumPCNtfSent                  0,
        pcePcepPeerNumPCNtfRcvd                  0,
        pcePcepPeerNumKeepaliveSent              123,
        pcePcepPeerNumKeepaliveRcvd              123,
        pcePcepPeerNumUnknownRcvd                0,
        pcePcepPeerNumCorruptRcvd                0,
        pcePcepPeerNumReqSent                    0,
        pcePcepPeerNumSvecSent                   0,
        pcePcepPeerNumSvecReqSent                0,
        pcePcepPeerNumReqSentPendRep             0,
        pcePcepPeerNumReqSentEroRcvd             0,
        pcePcepPeerNumReqSentNoPathRcvd          0,
        pcePcepPeerNumReqSentCancelRcvd          0,
        pcePcepPeerNumReqSentErrorRcvd           0,
        pcePcepPeerNumReqSentTimeout             0,
        pcePcepPeerNumReqSentCancelSent          0,
        pcePcepPeerNumReqSentClosed              0,
        pcePcepPeerNumReqRcvd                    4,
        pcePcepPeerNumSvecRcvd                   0,
        pcePcepPeerNumSvecReqRcvd                0,
        pcePcepPeerNumReqRcvdPendRep             0,
        pcePcepPeerNumReqRcvdEroSent             3,
        pcePcepPeerNumReqRcvdNoPathSent          1,
        pcePcepPeerNumReqRcvdCancelSent          0,
        pcePcepPeerNumReqRcvdErrorSent           0,
        pcePcepPeerNumReqRcvdCancelRcvd          0,
        pcePcepPeerNumReqRcvdClosed              0,
        pcePcepPeerNumRepRcvdUnknown             0,
        pcePcepPeerNumReqRcvdUnknown             0
    }

  In pcePcepSessTable {
        pcePcepSessInitiator                     local(1), --PCE1
        pcePcepSessStateLastChange               TimeStamp,
        pcePcepSessState                         sessionUp(4),
```

```
pcePcepSessConnectRetry              0,
pcePcepSessLocalID                   1,
pcePcepSessRemoteID                  2,
pcePcepSessKeepaliveTimer            1,
pcePcepSessPeerKeepaliveTimer        1,
pcePcepSessDeadTimer                 4,
pcePcepSessPeerDeadTimer             4,
pcePcepSessKAHoldTimeRem             1,
pcePcepSessOverloaded                false(0),
pcePcepSessOverloadTime              0,
pcePcepSessPeerOverloaded            false(0),
pcePcepSessPeerOverloadTime          0,
pcePcepSessDiscontinuityTime         TimeStamp,
pcePcepSessAvgRspTime                0,
pcePcepSessLWMRspTime                0,
pcePcepSessHWMRspTime                0,
pcePcepSessNumPCReqSent              0,
pcePcepSessNumPCReqRcvd              0,
pcePcepSessNumPCRepSent              0,
pcePcepSessNumPCRepRcvd              0,
pcePcepSessNumPCErrSent              0,
pcePcepSessNumPCErrRcvd              0,
pcePcepSessNumPCNtfSent              0,
pcePcepSessNumPCNtfRcvd              0,
pcePcepSessNumKeepaliveSent          123,
pcePcepSessNumKeepaliveRcvd          123,
pcePcepSessNumUnknownRcvd            0,
pcePcepSessNumCorruptRcvd            0,
pcePcepSessNumReqSent                0,
pcePcepSessNumSvecSent               0,
pcePcepSessNumSvecReqSent            0,
pcePcepSessNumReqSentPendRep         0,
pcePcepSessNumReqSentEroRcvd         0,
pcePcepSessNumReqSentNoPathRcvd      0,
pcePcepSessNumReqSentCancelRcvd      0,
pcePcepSessNumReqSentErrorRcvd       0,
pcePcepSessNumReqSentTimeout         0,
pcePcepSessNumReqSentCancelSent      0,
pcePcepSessNumReqRcvd                0,
pcePcepSessNumSvecRcvd               0,
pcePcepSessNumSvecReqRcvd            0,
pcePcepSessNumReqRcvdPendRep         0,
pcePcepSessNumReqRcvdEroSent         0,
pcePcepSessNumReqRcvdNoPathSent      0,
pcePcepSessNumReqRcvdCancelSent      0,
pcePcepSessNumReqRcvdErrorSent       0,
pcePcepSessNumReqRcvdCancelRcvd      0,
pcePcepSessNumRepRcvdUnknown         0,
```

```
        pcePcepSessNumReqRcvdUnknown          0
},
{
        pcePcepSessInitiator                  remote(2), --PCCa
        pcePcepSessStateLastChange            TimeStamp,
        pcePcepSessState                      sessionUp(4),
        pcePcepSessConnectRetry               0,
        pcePcepSessLocalID                    2,
        pcePcepSessRemoteID                   1,
        pcePcepSessKeepaliveTimer             1,
        pcePcepSessPeerKeepaliveTimer         1,
        pcePcepSessDeadTimer                  4,
        pcePcepSessPeerDeadTimer              4,
        pcePcepSessKAHoldTimeRem              1,
        pcePcepSessOverloaded                 false(0),
        pcePcepSessOverloadTime               0,
        pcePcepSessPeerOverloaded             false(0),
        pcePcepSessPeerOverloadTime           0,
        pcePcepSessDiscontinuityTime          TimeStamp,
        pcePcepSessAvgRspTime                 200,
        pcePcepSessLWMRspTime                 100,
        pcePcepSessHWMRspTime                 300,
        pcePcepSessNumPCReqSent               0,
        pcePcepSessNumPCReqRcvd               1,
        pcePcepSessNumPCRepSent               1,
        pcePcepSessNumPCRepRcvd               0,
        pcePcepSessNumPCErrSent               0,
        pcePcepSessNumPCErrRcvd               0,
        pcePcepSessNumPCNtfSent               0,
        pcePcepSessNumPCNtfRcvd               0,
        pcePcepSessNumKeepaliveSent           123,
        pcePcepSessNumKeepaliveRcvd           123,
        pcePcepSessNumUnknownRcvd             0,
        pcePcepSessNumCorruptRcvd             0,
        pcePcepSessNumReqSent                 0,
        pcePcepSessNumSvecSent                0,
        pcePcepSessNumSvecReqSent             0,
        pcePcepSessNumReqSentPendRep          0,
        pcePcepSessNumReqSentEroRcvd          0,
        pcePcepSessNumReqSentNoPathRcvd       0,
        pcePcepSessNumReqSentCancelRcvd       0,
        pcePcepSessNumReqSentErrorRcvd        0,
        pcePcepSessNumReqSentTimeout          0,
        pcePcepSessNumReqSentCancelSent       0,
        pcePcepSessNumReqRcvd                 3,
        pcePcepSessNumSvecRcvd                0,
        pcePcepSessNumSvecReqRcvd             0,
        pcePcepSessNumReqRcvdPendRep          0,
```

```
            pcePcepSessNumReqRcvdEroSent          3,
            pcePcepSessNumReqRcvdNoPathSent       0,
            pcePcepSessNumReqRcvdCancelSent       0,
            pcePcepSessNumReqRcvdErrorSent        0,
            pcePcepSessNumReqRcvdCancelRcvd       0,
            pcePcepSessNumRepRcvdUnknown          0,
            pcePcepSessNumReqRcvdUnknown          0
        },
        {
            pcePcepSessInitiator                  remote(2), --PCCb
            pcePcepSessStateLastChange            TimeStamp,
            pcePcepSessState                      sessionUp(4),
            pcePcepSessConnectRetry               0,
            pcePcepSessLocalID                    2,
            pcePcepSessRemoteID                   1,
            pcePcepSessKeepaliveTimer             1,
            pcePcepSessPeerKeepaliveTimer         1,
            pcePcepSessDeadTimer                  4,
            pcePcepSessPeerDeadTimer              4,
            pcePcepSessKAHoldTimeRem              1,
            pcePcepSessOverloaded                 false(0),
            pcePcepSessOverloadTime               0,
            pcePcepSessPeerOverloaded             false(0),
            pcePcepSessPeerOverloadTime           0,
            pcePcepSessDiscontinuityTime          TimeStamp,
            pcePcepSessAvgRspTime                 200,
            pcePcepSessLWMRspTime                 100,
            pcePcepSessHWMRspTime                 300,
            pcePcepSessNumPCReqSent               0,
            pcePcepSessNumPCReqRcvd               4,
            pcePcepSessNumPCRepSent               4,
            pcePcepSessNumPCRepRcvd               0,
            pcePcepSessNumPCErrSent               0,
            pcePcepSessNumPCErrRcvd               0,
            pcePcepSessNumPCNtfSent               0,
            pcePcepSessNumPCNtfRcvd               0,
            pcePcepSessNumKeepaliveSent           123,
            pcePcepSessNumKeepaliveRcvd           123,
            pcePcepSessNumUnknownRcvd             0,
            pcePcepSessNumCorruptRcvd             0,
            pcePcepSessNumReqSent                 0,
            pcePcepSessNumSvecSent                0,
            pcePcepSessNumSvecReqSent             0,
            pcePcepSessNumReqSentPendRep          0,
            pcePcepSessNumReqSentEroRcvd          0,
            pcePcepSessNumReqSentNoPathRcvd       0,
            pcePcepSessNumReqSentCancelRcvd       0,
            pcePcepSessNumReqSentErrorRcvd        0,
```

```
              pcePcepSessNumReqSentTimeout        0,
              pcePcepSessNumReqSentCancelSent     0,
              pcePcepSessNumReqRcvd               4,
              pcePcepSessNumSvecRcvd              0,
              pcePcepSessNumSvecReqRcvd           0,
              pcePcepSessNumReqRcvdPendRep        0,
              pcePcepSessNumReqRcvdEroSent        3,
              pcePcepSessNumReqRcvdNoPathSent     1,
              pcePcepSessNumReqRcvdCancelSent     0,
              pcePcepSessNumReqRcvdErrorSent      0,
              pcePcepSessNumReqRcvdCancelRcvd     0,
              pcePcepSessNumRepRcvdUnknown        0,
              pcePcepSessNumReqRcvdUnknown        0
      }
```

A.2. Contents of PCEP MIB Module at PCCb

At PCCb, there is a single local PCEP entity that has two peers (PCE2 and PCE3). There is a session active to PCE2, but the session to PCE3 is currently down.

The contents of the PCEP MIB module as read at PCCb are as follows.

```
In pcePcepEntityTable  {
      pcePcepEntityIndex                 1,
      pcePcepEntityAdminStatus           adminStatusUp(1),
      pcePcepEntityOperStatus            operStatusUp(1),
      pcePcepEntityAddrType              ipv4(1),
      pcePcepEntityAddr                  22.22.22.22, -- PCCb
      pcePcepEntityConnectTimer          60,
      pcePcepEntityConnectMaxRetry       5,
      pcePcepEntityInitBackoffTimer      30,
      pcePcepEntityMaxBackoffTimer       3600,
      pcePcepEntityOpenWaitTimer         60,
      pcePcepEntityKeepWaitTimer         60,
      pcePcepEntityKeepAliveTimer        1,
      pcePcepEntityDeadTimer             4,
      pcePcepEntityAllowNegotiation      true(1),
      pcePcepEntityMaxKeepAliveTimer     60,
      pcePcepEntityMaxDeadTimer          240,
      pcePcepEntityMinKeepAliveTimer     1,
      pcePcepEntityMinDeadTimer          4,
      pcePcepEntitySyncTimer             60,
      pcePcepEntityRequestTimer          120,
      pcePcepEntityMaxSessions           999,
      pcePcepEntityMaxUnknownReqs        5,
      pcePcepEntityMaxUnknownMsgs        5
      }
```

```
In pcePcepPeerTable {
      pcePcepPeerAddrType                   ipv4(1), --PCE2
      pcePcepPeerAddr                       2.2.2.2,
      pcePcepPeerRole                       pce(2),
      pcePcepPeerDiscontinuityTime          TimeStamp,
      pcePcepPeerInitiateSession            true(1),
      pcePcepPeerSessionExists              true(1)),
      pcePcepPeerNumSessSetupOK             0,
      pcePcepPeerNumSessSetupFail           1,
      pcePcepPeerSessionUpTime              TimeStamp,
      pcePcepPeerSessionFailTime            TimeStamp,
      pcePcepPeerSessionFailUpTime          TimeStamp,
      pcePcepPeerAvgRspTime                 0,
      pcePcepPeerLWMRspTime                 0,
      pcePcepPeerHWMRspTime                 0,
      pcePcepPeerNumPCReqSent               4,
      pcePcepPeerNumPCReqRcvd               0,
      pcePcepPeerNumPCRepSent               0,
      pcePcepPeerNumPCRepRcvd               4,
      pcePcepPeerNumPCErrSent               0,
      pcePcepPeerNumPCErrRcvd               0,
      pcePcepPeerNumPCNtfSent               0,
      pcePcepPeerNumPCNtfRcvd               0,
      pcePcepPeerNumKeepaliveSent           0,
      pcePcepPeerNumKeepaliveRcvd           0,
      pcePcepPeerNumUnknownRcvd             0,
      pcePcepPeerNumCorruptRcvd             0,
      pcePcepPeerNumReqSent                 4,
      pcePcepPeerNumSvecSent                0,
      pcePcepPeerNumSvecReqSent             0,
      pcePcepPeerNumReqSentPendRep          0,
      pcePcepPeerNumReqSentEroRcvd          3,
      pcePcepPeerNumReqSentNoPathRcvd       1,
      pcePcepPeerNumReqSentCancelRcvd       0,
      pcePcepPeerNumReqSentErrorRcvd        0,
      pcePcepPeerNumReqSentTimeout          0,
      pcePcepPeerNumReqSentCancelSent       0,
      pcePcepPeerNumReqSentClosed           0,
      pcePcepPeerNumReqRcvd                 0,
      pcePcepPeerNumSvecRcvd                0,
      pcePcepPeerNumSvecReqRcvd             0,
      pcePcepPeerNumReqRcvdPendRep          0,
      pcePcepPeerNumReqRcvdEroSent          0,
      pcePcepPeerNumReqRcvdNoPathSent       0,
      pcePcepPeerNumReqRcvdCancelSent       0,
      pcePcepPeerNumReqRcvdErrorSent        0,
      pcePcepPeerNumReqRcvdCancelRcvd       0,
      pcePcepPeerNumReqRcvdClosed           0,
```

```
        pcePcepPeerNumRepRcvdUnknown            0,
        pcePcepPeerNumReqRcvdUnknown            0
    },
    {
        pcePcepPeerAddrType                     ipv4(1),   --PCE3
        pcePcepPeerAddr                         3.3.3.3,
        pcePcepPeerRole                         pce(2),
        pcePcepPeerDiscontinuityTime            TimeStamp,
        pcePcepPeerInitiateSession              true(1),
        pcePcepPeerSessionExists                false(0),
        pcePcepPeerNumSessSetupOK               1,
        pcePcepPeerNumSessSetupFail             0,
        pcePcepPeerSessionUpTime                TimeStamp,
        pcePcepPeerSessionFailTime              TimeStamp,
        pcePcepPeerSessionFailUpTime            TimeStamp,
        pcePcepPeerAvgRspTime                   200,
        pcePcepPeerLWMRspTime                   100,
        pcePcepPeerHWMRspTime                   300,
        pcePcepPeerNumPCReqSent                 4,
        pcePcepPeerNumPCReqRcvd                 0,
        pcePcepPeerNumPCRepSent                 0,
        pcePcepPeerNumPCRepRcvd                 3,
        pcePcepPeerNumPCErrSent                 0,
        pcePcepPeerNumPCErrRcvd                 0,
        pcePcepPeerNumPCNtfSent                 0,
        pcePcepPeerNumPCNtfRcvd                 0,
        pcePcepPeerNumKeepaliveSent             123,
        pcePcepPeerNumKeepaliveRcvd             123,
        pcePcepPeerNumUnknownRcvd               0,
        pcePcepPeerNumCorruptRcvd               0,
        pcePcepPeerNumReqSent                   4,
        pcePcepPeerNumSvecSent                  0,
        pcePcepPeerNumSvecReqSent               0,
        pcePcepPeerNumReqSentPendRep            0,
        pcePcepPeerNumReqSentEroRcvd            3,
        pcePcepPeerNumReqSentNoPathRcvd         0,
        pcePcepPeerNumReqSentCancelRcvd         0,
        pcePcepPeerNumReqSentErrorRcvd          0,
        pcePcepPeerNumReqSentTimeout            0,
        pcePcepPeerNumReqSentCancelSent         0,
        pcePcepPeerNumReqSentClosed             1,
        pcePcepPeerNumReqRcvd                   0,
        pcePcepPeerNumSvecRcvd                  0,
        pcePcepPeerNumSvecReqRcvd               0,
        pcePcepPeerNumReqRcvdPendRep            0,
        pcePcepPeerNumReqRcvdEroSent            0,
        pcePcepPeerNumReqRcvdNoPathSent         0,
        pcePcepPeerNumReqRcvdCancelSent         0,
```

```
            pcePcepPeerNumReqRcvdErrorSent        0,
            pcePcepPeerNumReqRcvdCancelRcvd       0,
            pcePcepPeerNumReqRcvdClosed           0,
            pcePcepPeerNumRepRcvdUnknown          0,
            pcePcepPeerNumReqRcvdUnknown          0
        }

    In pcePcepSessTable {
            pcePcepSessInitiator                  local(1), --PCE2
            pcePcepSessStateLastChange            TimeStamp,
            pcePcepSessState                      sessionUp(4),
            pcePcepSessConnectRetry               0,
            pcePcepSessLocalID                    1,
            pcePcepSessRemoteID                   1,
            pcePcepSessKeepaliveTimer             1,
            pcePcepSessPeerKeepaliveTimer         1,
            pcePcepSessDeadTimer                  4,
            pcePcepSessPeerDeadTimer              4,
            pcePcepSessKAHoldTimeRem              1,
            pcePcepSessOverloaded                 false(0),
            pcePcepSessOverloadTime               0,
            pcePcepSessPeerOverloaded             false(0),
            pcePcepSessPeerOverloadTime           0,
            pcePcepSessDiscontinuityTime          TimeStamp,
            pcePcepSessAvgRspTime                 200,
            pcePcepSessLWMRspTime                 100,
            pcePcepSessHWMRspTime                 300,
            pcePcepSessNumPCReqSent               4,
            pcePcepSessNumPCReqRcvd               0,
            pcePcepSessNumPCRepSent               0,
            pcePcepSessNumPCRepRcvd               4,
            pcePcepSessNumPCErrSent               0,
            pcePcepSessNumPCErrRcvd               0,
            pcePcepSessNumPCNtfSent               0,
            pcePcepSessNumPCNtfRcvd               0,
            pcePcepSessNumKeepaliveSent           123,
            pcePcepSessNumKeepaliveRcvd           123,
            pcePcepSessNumUnknownRcvd             0,
            pcePcepSessNumCorruptRcvd             0,
            pcePcepSessNumReqSent                 4,
            pcePcepSessNumSvecSent                0,
            pcePcepSessNumSvecReqSent             0,
            pcePcepSessNumReqSentPendRep          0,
            pcePcepSessNumReqSentEroRcvd          3,
            pcePcepSessNumReqSentNoPathRcvd       1,
            pcePcepSessNumReqSentCancelRcvd       0,
            pcePcepSessNumReqSentErrorRcvd        0,
            pcePcepSessNumReqSentTimeout          0,
```

```
        pcePcepSessNumReqSentCancelSent     0,
        pcePcepSessNumReqRcvd               0,
        pcePcepSessNumSvecRcvd              0,
        pcePcepSessNumSvecReqRcvd           0,
        pcePcepSessNumReqRcvdPendRep        0,
        pcePcepSessNumReqRcvdEroSent        0,
        pcePcepSessNumReqRcvdNoPathSent     0,
        pcePcepSessNumReqRcvdCancelSent     0,
        pcePcepSessNumReqRcvdErrorSent      0,
        pcePcepSessNumReqRcvdCancelRcvd     0,
        pcePcepSessNumRepRcvdUnknown        0,
        pcePcepSessNumReqRcvdUnknown        0
    }

    -- no session to PCE3
```

 Acknowledgements

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